

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

6ES7134-4MB02-0AB0

2AI I High Feature Module

SIEMENS

Selected Official Content

ET 200S 2 AI I 2/4WIRE HF Analog Electronic Module Manual
Document: A5E01076111-01
Included Siemens source pages: 3, 7, 8, 9, 10, 11, 13, 21, 25

REFERENCE SCOPE

This Amikon reference package adds a branded cover to selected official Siemens pages.
The appended manufacturer pages retain their original layout, colors, diagrams and pagination.
Use the current controlled Siemens documentation and site procedure for installation work.

Official product record

<https://sieportal.siemens.com/en-ww/products-services/detail/6ES7134-4MB02-0AB0>

Official Siemens manual

https://cache.industry.siemens.com/dl/files/998/25545998/att_111879/v1/et200s_2ai_i_2_4wire_hf_manual_en-US.

Preface

Purpose of the manual

This manual supplements the *ET 200S Distributed I/O System* Operating Instructions. General functions for the ET 200S are described in the *ET 200S Distributed I/O System* Operating Instructions.

The information in this document along with the operating instructions enables you to commission the ET 200S.

Basic knowledge requirements

To understand these operating instructions you should have general knowledge of automation engineering.

Scope of the manual

This manual applies to this ET 200S module. It describes the components that are valid at the time of publication.

Recycling and disposal

Thanks to the fact that it is low in contaminants, this ET 200S module is recyclable. For environmentally compliant recycling and disposal of your electronic waste, please contact a company certified for the disposal of electronic waste.

Additional support

If you have any questions relating to the products described in these operating instructions, and do not find the answers in this document, please contact your local Siemens representative.

<http://www.siemens.com/automation/partner>

The portal to our technical documentation for the various SIMATIC products and systems is available at:

<http://www.siemens.com/automation/simatic/portal>

The online catalog and ordering system are available at:

<http://www.siemens.com/automation/mall>

Properties

1.1 2AI 2/4WIRE HF analog electronic module (6ES7134-4MB02-0AB0)

Properties

- 2 inputs for measuring current
- Input ranges:
 - ± 20 mA, resolution 15 bits + sign
 - 4 mA to 20 mA, resolution 15 bits
- Isolated from the load voltage L+
- Permitted common-mode voltage between the channels 100 VAC
- Supports two-wire or four-wire measuring transducers
- Supports isochronous operation
 - Minimum time for the isochronous DP cycle (T_{DPmin}): 0.7 ms
 - Minimum conversion time of the input modules: (T_{WEmin}): 0.5 ms
- Supports I&M functions
- Extended temperature range from 0 to 50°C with vertical installation

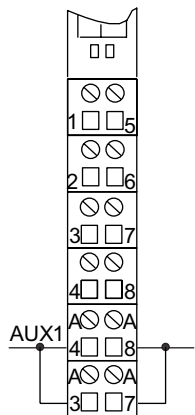
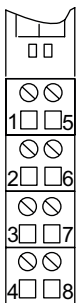
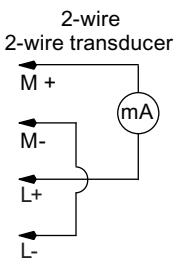
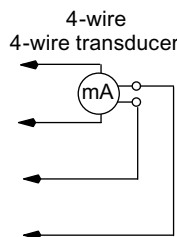
General terminal assignment

Note

Terminals 4, 8, A4, A8, A3 and A7 are only available at specified terminal modules.

Terminal assignment for the 2 AI 2/4WIRE HF (6ES7134-4MB02-0AB0)				
Terminal	Assignment	Terminal	Assignment	Notes
1	M ₀₊	5	M ₁₊	for 2-wire transducer: - M_{n+}: Input signal "-", Channel n - M_{n-}: Connect to L- - L+: Input signal "+", Channel n - AUX1: Protective-conductor terminal or potential bus (freely usable up to 230 VAC) For 4-wire transducer: - M_{n+}: Input signal "+", Channel n - M_{n-}: Input signal "-", Channel n - L+: Power supply for four-wire measuring transducer - L-: Return circuit for measuring transducer supply - AUX1: Protective-conductor terminal or potential bus (freely usable up to 230 VAC)
2	M ₀₋	6	M ₁₋	
3	L+	7	L+	
4	L-	8	L-	
A4	AUX1	A8	AUX1	
A3	AUX1	A7	AUX1	

Usable terminal modules

Usable terminal modules for the 2 AI 2/4WIRE HF (6ES7134-4MB02-0AB0)		
TM-E15C26-A1 (6ES7193-4CA50-0AA0)	TM-E15C24-01 (6ES7193-4CB30-0AA0)	← Spring terminal
TM-E15S26-A1 (6ES7193-4CA40-0AA0)	TM-E15S24-01 (6ES7193-4CB20-0AA0)	← Screw-type terminal
TM-E15N26-A1 (6ES7193-4CA80-0AA0)	TM-E15N24-01 (6ES7193-4CB70-0AA0)	← Fast Connect
  Wiring examples 2-wire 2-wire transducer  4-wire 4-wire transducer 		

The diagram illustrates the ET 200S backplane bus connection. It shows a 'Backplane bus' block connected to an 'ET 200S backplane bus connection' block. This block is connected to a 24V power source through a 1M resistor. The 24V source is also connected to a 'Current limitation' block. The 'Current limitation' block is connected to terminals 3, 7, 4, and 8. The 'ET 200S backplane bus connection' block is connected to two 'ADU' blocks. The top 'ADU' block is connected to terminals 1 and 2. The bottom 'ADU' block is connected to terminals 5 and 6. The 'ADU' blocks are connected to a common ground line labeled M_{ANA} .

Figure 1-1 Block diagram of the 2AI I 2/4WIRE HF

Dimensions and weight	
Width (mm)	15
Weight	Approx. 45 g
Module-specific data	
Supports isochronous operation ¹	Yes
Supports I&M functions	Yes
Number of inputs	2
Cable length	
• Shielded	Max. 200 m
Parameter length	12 bytes
Address space	4 bytes
Analog value representation	S5 and S7 format
¹ Supported if no interference frequency suppression or smoothing is configured.	
Voltages, currents, potentials	
Rated load voltage L+ (from the power module)	24 VDC
• Reverse polarity protection	Yes
Power supply of the transducers	Yes
• Short-circuit protection	Yes, 60 mA (for both channels)
Electrical isolation	
• Between the channels and backplane bus	Yes
• Between the modules and load voltage L+	No, with 2WIRE Yes, with 4WIRE
• Between the channels	No

Properties

1.1 2AI 2/4WIRE HF analog electronic module (6ES7134-4MB02-0AB0)

Permissible potential difference			
• Between channels (U_{CM})	140 VDC/100 VAC (with isolated power supply for the measuring transducer)		
• Between M_{ANA} and the central grounding point (U_{ISO})	75 V DC/60 V AC		
• Insulation tested	500 VDC		
Current consumption			
• From the load voltage L+ (no encoder supply)	Max. 48 mA		
Power dissipation of the module	Typically 1.2 W		
Status, interrupts, diagnostics			
Diagnostics function			
• Group error	Red "SF" LED		
• Diagnostic functions readable	Yes		
• Process interrupts ²	Configurable, violation of upper and lower limits		
² Process interrupts are only sent if the process interrupt mechanism is not overloaded.			
Analog value generation			
Measuring principle	Sigma-Delta		
Conversion and cycle time:			
Integration time can be assigned parameters	Yes		
• Interference frequency suppression in Hz	60	50	No
• Conversion time in ms (per channel)	17	20	0,04
• Cycle time of the module in ms (per module)	18	21	0,5
• Resolution	±20 mA/15 bits + sign 4 to 20 mA/15 bits		
Suppression of interference, limits of error			
Noise suppression for $f = n \times (f_1 \pm 0.5\%)$, (f_1 = interference frequency)			
• Common-mode interference (U_{SS})	Min. 100 dB		
• Series-mode interference (peak interference value < rated value of input range)	Min. 90 dB		
Crosstalk between the inputs	Min. -100 dB		
Operational limit (in the entire temperature range, with reference to the input range)	±0.1% with interference frequency suppression ±0.2% without interference frequency suppression		
Intrinsic error limit (operational limit at 25°C)	±0.05% with interference frequency suppression ±0.1% with interference frequency suppression		
Temperature error (with reference to the input range)	± 0.003 %/K		
Linearity error (with reference to the input range)	± 0,01 %		
Repeatability (in steady state at 25°C with reference to input range)	± 0,01 %		

Data for selecting a sensor		
Input range (rated value)/input resistance		
• Current	Approx. 44 Ω	
Permitted input current (destruction limit)	Approx. 50 mA (can be limited electronically)	
Load of the two-wire transmitter:	Max. 750 Ω	
Smoothing of the measured values	Yes, can be assigned parameters in 4 steps by means of digital filtering	
	Step	Time constant
	None	1 x cycle time
	Weak	4 x cycle time
	Medium	16 x cycle time
	Strong	32 x cycle time

I&M functions

The I&M data can be read from the module using interface modules with the following order numbers or firmware/product versions (or higher):

Interface module	Order number	Firmware version	Product version
IM151-1 HIGH FEATURE	6ES7151-1BA01-0AB0	V2.0	02
IM151-3 PN	6ES7151-3AA20-0AB0	V4.0	01
IM151-3 PN HIGH FEATURE	6ES7151-3AA20-0AB0	V4.0	01
IM151-3 PN FO	6ES7151-3BB21-0AB0	V4.0	01

Parameters

2.1 Parameters

Table 2-1 Parameters for analog input module

2AI I 2/4WIRE HF	Range of values	Default setting	Applicability
Group diagnostics (parameter assignment error, internal error)	• Disable • Enable	Disable	Module
Diagnostics: Overflow/underflow	• Disable • Enable	Disable	Module
Diagnostics: Wire break ¹	• Disable • Enable	Disable	Channel
Smoothing ²	• None • Weak • Medium • Strong	None	Channel
Type/range of measurement	• Deactivated • 4 to 20 mA, 2-wire transmitter • 4 to 20 mA, 4-wire transmitter • $\pm$ 20 mA	4 to 20 mA, 4-wire transmitter	Channel
Interference frequency suppression ²	• Disable • Enable	Disable	Module
¹ Only in the measuring range 4 to 20 mA			
² Not with isochronous mode			

Connecting

5.1 Connecting measuring sensors

Introduction

You can connect different measuring encoders to the analog input module:

- Current transmitters as:
 - 2-wire transmitters
 - 4-wire transmitters

In this chapter you will find out how to connect the measuring encoders and what to watch out for when doing so.

Cables for analog signals

You should use shielded and twisted-pair cables for the analog signals. This reduces the effect of interference. You should ground the shield of the analog cables at both ends. If there are differences in potential between the cable ends, an equipotential bonding current that may interfere with the analog signals will flow across the shield. If this is the case, you should only ground the shield at one end of the cable.

Analog input modules

The analog input modules are electrically isolated:

- Between the logic and backplane bus
- Between the load voltage and the channels.
 - Electrical isolation: No link between M_{ANA} and the central grounding point (U_{ISO})

Note

Ensure that this difference in potential U_{ISO} does not exceed the permitted value. If there is a possibility of exceeding the permitted value, establish a connection between terminal M_{ANA} and the central grounding point.

5.2 Wiring unused channels of the analog input modules

Rules

Pay attention to the following instructions when wiring unused channels:

- "Deactivate" unused input channels when assigning parameters.
- A deactivated channel always returns the value 7FFF_H.

5.3 Using the shield connection

Rules

To prevent interference we recommend the following for analog electronic modules:

- Use shielded wires to the sensors and actuators.
- Lay out the wire shields on the shield connection.
- Connect the shield connection to the ground bus with low impedance.