

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

S7-400

6ES7431-0HH00-0AB0

SM 431 16-CHANNEL ANALOG INPUT MODULE

Used with the applicable SIMATIC S7-400 configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Siemens official manufacturer documentation

5.22 Analog input module SM 431; AI 16 x 13 Bit (6ES7431-0HH00-0AB0)

5.22.1 Features

Overview

The analog input module SM 431; AI 16 x 13 Bit has the following features:

- 16 inputs for voltage/current measurement
- Various measuring ranges, adjustable in parallel
- Resolution 13 bits
- Non-isolated between the analog section and bus
- The maximum permissible common mode voltage between the channels and the reference potentials of the connected sensors and central ground point is 2 VDC/VAC

Wiring diagram SM 431; AI 16 x 13 Bit

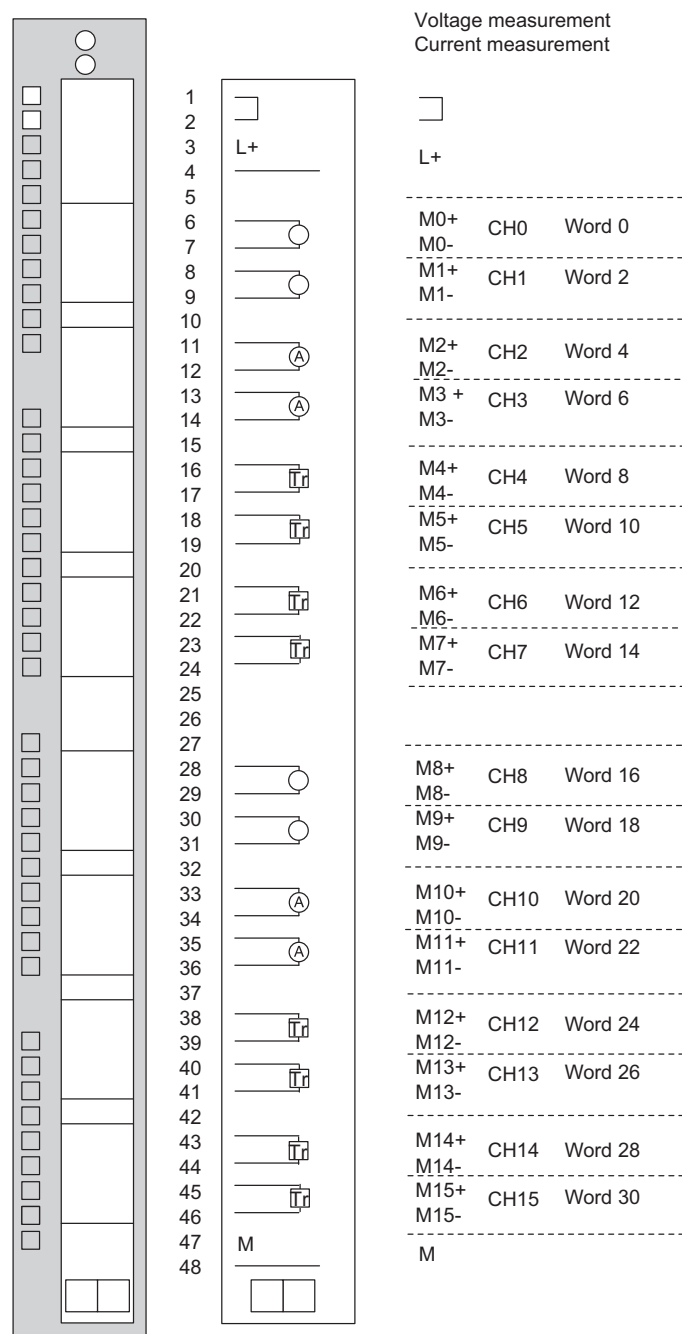


Figure 5-32 Wiring diagram SM 431; AI 16 x 13 Bit

Specifications of the SM 431; AI 16 x 13 Bit

Dimensions and weight	
Dimensions W x H x D (mm)	25 x 290 x 210
Weight	Approx. 500 g
Module-specific data	
Number of inputs	16
Shielded	Max. 200 m
Voltages, currents, electrical potentials	
Nominal load voltage L+	24 VDC (only required for the supply of 2-wire transducers)
• Reverse polarity protection	Yes
• Transducer power supply	
• Supply current	Max. 50 mA
• Short-circuit-proof	Yes
• Constant measured current for resistance-type sensor	Typ. 1.67 mA
Electrical isolation	
• Between channels and the backplane bus	No
• Between channels	No
• Between channels and load voltage L+	No
Permissible potential difference	
• Between inputs and MANA (UCM)	2 VDC/2 VAC _{pp}
• Between input (UCM)	2 VDC/2 VAC _{pp}
Insulation tested	
• Between bus and chassis ground	500 VDC
• Current consumption	
• From the backplane bus (5 V)	Max. 100 mA
• From load voltage L+ (with 16 connected, fully controlled 2-wire transducers)	Max. 400 mA
Power loss of the module	Typ. 2 W

Formation of analog values	
Measuring principle	Integrating
Integration/conversion time/resolution (per channel)	(Does not go into the response time)
• Programmable	Yes
• Noise suppression f1 in Hz	60 / 50
• Integration time in ms	50 / 60
• Basic conversion time in ms	55 / 65
• Resolution (including overshoot range)	13 bits
Measured value smoothing	Not supported
Basic execution time of the module, in ms (all channels enabled)	880 / 1040
Noise suppression, error limits	
Noise suppression for $f = nx$ ($f1 \pm 1\%$), ($f1$ = interference frequency) $n = 1, 2, \dots$	
• Common-mode interference (UCM <2 V)	> 86 dB
• Series-mode interference (peak value of disturbance < nominal input range)	> 60 dB
Crosstalk between inputs	> 50 dB
Operational limit (across temperature range, relative to input range)	
• Voltage input	
– ± 1 V	$\pm 0,65 \%$
– ± 10 V	$\pm 0,65 \%$
– 1 to 5 V	$\pm 1 \%$
• Current input	
– ± 20 mA	$\pm 0,65 \%$
– 4 to 20 mA	$\pm 0,65 \%$
Basic error limit (operational error limit at 25° C, relative to input range)	
• Voltage input	
– ± 1 V	$\pm 0,25 \%$
– ± 10 V	$\pm 0,25 \%$
– 1 to 5 V	$\pm 0,5 \%$
• Current input	
– ± 20 mA	$\pm 0,25 \%$
– 4 to 20 mA	$\pm 0,25 \%$
Temperature error (relative to input range)	$\pm 0,01 \%$
Linearity error (relative to input range)	$\pm 0,05 \%$
Repetition accuracy (in transient state at 25° C, relative to input range)	$\pm 0,01 \%$
Status, interrupts, diagnostics	
Interrupts	None
Diagnostic functions	None
Injection of substitution values	No

Sensor selection data	
Input range (nominal values) / input impedance	
• Voltage	$\pm 1 \text{ V} / 10 \text{ M}\Omega$ $\pm 10 \text{ V} / 100 \text{ M}\Omega$ $1 \text{ to } 5 \text{ V} / 100 \text{ M}\Omega$
• Current	$\pm 20 \text{ mA} / 50 \Omega$ $4 \text{ to } 20 \text{ mA} / 50 \Omega$
Permissible voltage at voltage input (destruction limit)	20 V continuous; 75 V for 1 ms (cycle factor 1 : 20)
Permissible current at current input (destruction limit)	40 mA
Connection for signal sensors	
• For voltage measurement	Supported
• For current measurement	
– As 2-wire transducer	Supported
– As 4-wire transducer	Supported
• Load of the 2-wire transducer	Max. 750Ω