ABB Service Manual

07AI91

1. Description

ABB Analog Input Module 07 AI 91

2. Specifications

Specification	Value
Permissible	temperature range during operation 0...55 °C
Rated	supply voltage 24 V DC
Max.	current consumption max. 0.15 A
Max.	power dissipation max. 3 W
Protection	against reversed polarity of power connection yes
Conductor	cross section for
the	removable connectors max. 2.5 mm2
Number	of analog input channels 8
Electrical	isolation CS31 system bus interface
from	the rest of the unit
Addressing	and configuration Coding switch under right housing cover
Diagnosis	see chapter "Diagnosis and displays"
Operation	and error displays total of 17 LEDs,
see	chapter "Diagnosis and displays"
Number	of channels per module 8 (each configurable in pairs)
Electrical	isolation from CS31 system bus
Line	frequency suppression can be configured for 50 Hz, 60 Hz, or none
Input	delay 0 (no RC combination)
Line	frequency hum suppression (software filter) 20.0 ms at 50-Hz suppression
16.7	ms at 60-Hz suppression
Permissible	input overvoltage max. +/- 30 V
Updating	period per channel
incl.	input delay and co

3. Product Information

ABB Analog Input Module 07 AI 91

8 inputs, configurable for temperature sensors or as voltage inputs,

24 V DC, CS31 system bus

The analog input module 07 AI 91 is used as a remote

module at the CS31 system bus. It has 8 analog input

channels with the following features:

• The channels can be configured in pairs for the

connection of the following temperature or voltage

sensors:

• ± 10 V / ± 5 V / ± 500 mV / ± 50 mV

• 4...20 mA (with external 250 Ω resistor)

• Pt100 / Pt1000 with linearization

• Thermocouples types J, K and S with

linearization

• Only electrically isolated sensors may be used.

• The range of ± 5 V can also be used for measuring

0..20 mA with an additional external 250 Ω resistor.

• The configuration of the input channels as well as

the setting of the module address are performed

with the DIL switches.

The 07 AI 91 uses one module address (group number) in

the word input range. Each of the 8 channels use 16 bits.

The unit is powered with 24 V DC. The CS31 system bus

connection is electrically isolated from the rest of the unit.

The module offers a number of diagnosis functions (see

chapter "Diagnosis and displays"). The diagnosis functions perform a self-calibration for all channels.

Displays and operating elements on the

front panel

1 8 green LEDs for channel selection and diagnosis,

8 green LEDs for analog value display of one

channel

2 List of diagnosis information relating to the LEDs,

when used for diagnosis display

3 Red LED for error messages

4 Test button

Electrical connection

The module is mounted on a DIN rail (15 mm high) or with

4 screws. The following figure shows the electrical connection of the input module.

Specifications for the platinum temperature sensors are:

Pt100 = platinum 100 Ω at 0 °C measuring range -50...400 °C constant current 2 mA

Pt1000 = platinum 1000 Ω at 0 °C measuring range -50...400 °C constant current 0.2 mA

Specifications for the thermocouples are:

Type J = Fe-CuNi 0...1200 °C iron / copper-nickel + = Fe - = CuNi

Type K = NiCr-NiAl 0...1372 °C nickel-chromium / nickel-aluminium + = NiCr - = NiAl

Type S = Pt10Rh-Pt 0...1600 °C platinum-10% rhodium / platinum + = Pt10Rh - = Pt

Technical data for the complete module

Permissible temperature range during operation 0...55 °C

Rated supply voltage 24 V DC

Max. current consumption max. 0.15 A

Max. power dissipation max. 3 W

Protection against reversed polarity of power connection yes

Conductor cross section for

the removable connectors max. 2.5 mm2

Number of analog input channels 8

Electrical isolation CS31 system bus interface

from the rest of the unit

Addressing and configuration Coding switch under right housing cover

Diagnosis see chapter "Diagnosis and displays"

Operation and error displays total of 17 LEDs,

see chapter "Diagnosis and displays"

Technical data for analog inputs (applies to all settings)

Number of channels per module 8 (each configurable in pairs)

Electrical isolation from CS31 system bus

Line frequency suppression can be configured for 50 Hz, 60 Hz, or none

Input delay 0 (no RC combination)

Line frequency hum suppression (software filter) 20.0 ms at 50-Hz suppression

16.7 ms at 60-Hz suppression

Permissible input overvoltage max. +/- 30 V

Updating period per channel

incl. input delay and conversion time

- suppression 50/60 Hz typ. 100 ms

- no suppression typ. 30 ms

- when using thermocouples

and suppression 50/60 Hz typ. 150 ms

The total updating time is reduced

when not all channels are used (configuration see Fig. 5.2-3).

Voltage inputs

Input resistance > 1 MΩ

Measuring ranges (nominal values) +/- 10 V, +/- 5 V, +/- 500 mV, +/- 50 mV

Resolution 12 bit + sign

Total error < ±0.5 % of full scale

Channels not used must be bridged

Current inputs 0...20 mA / 4...20 mA

By bridging the input terminals with a shunt, the voltage input can also be used for input currents. The following

specifications are valid:

Current range 0...20 mA 4...20 mA

Selected measuring range +/- 5 V 4...20 mA

Required external shunt 250 Ω 250 Ω

Destruction limits of the shunt depends on its load capabilities

Total error < ±0.5 % of full scale ± tolerance of the shunt

Channels not used must be bridged

Pt100/Pt1000 input

Evaluation range with linearization -50°C...+400°C

Resistance of the sensors within the evaluation range

Pt100 80.31 Ω...247.04 Ω

Pt1000 803.1 Ω...2470.4 Ω

Resolution 12 bit + sign (1 LSB = 0.1°C)

Permissible total line resistance of

both current-carrying lines max. 50 Ω per sensor (in 4-wire configuration)

Evaluation error within the range of -50...+400°C Pt100: +/- 0.5 % of full scale

(linearity, linearization, temperature range, Pt1000: +/- 1.0 % of full scale

resolution, adjustment)

Constant current sinks for the sensors

Pt100 2 mA

Pt1000 0.2 mA

Power dissipation in the sensor

Pt100 meas. value = 0°C 0.4 mW

meas. value = 400°C 1.0 mW

Pt1000 meas. value = 0°C 0.04 mW

meas. value = 400°C 0.1 mW

No-load voltage of the current output < +15 V

Permissible total voltage drop at the sensors and

lines circuited in series max. 7.0 V (current sink 0.2 mA is used)

max. 2.5 V (current sink 2.0 mA is used)

Cable length, if cables have been laid in parallel

shielded max. 50 m

two-core shielded and cross section > 0.5 mm2 max. 200 m

Mechanical data

Mounting on DIN rail according to DIN EN 50022-35, 15 mm deep.

The DIN rail is positioned centrally between the upper

and the lower edges of the module.

Mounting with screws by 4 screws M4

Width x height x depth 120 x 140 x 85 mm

Wiring method removable terminal blocks with screw-type terminals

conductor cross section max. 2.5 mm2

Weight 450 g