

WAGO SYSTEM 750

Fieldbus Independent I/O Modules

**4 AI Pt100/ RTD
750-460, (/xxx-xxx)**



Manual

Version 1.0.2

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Every conceivable measure has been taken to ensure the correctness and completeness of this documentation. However, as errors can never be fully excluded, we would appreciate any information or ideas at any time.

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We wish to point out that the software and hardware terms as well as the trademarks of companies used and/or mentioned in the present manual are generally trademark or patent protected.

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1 Important Comments

To ensure fast installation and start-up of the units described in this manual, we strongly recommend that the following information and explanations are carefully read and abided by.

1.1 Legal Principles

1.1.1 Copyright

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1.1.2 Personnel Qualification

The use of the product detailed in this manual is exclusively geared to specialists having qualifications in PLC programming, electrical specialists or persons instructed by electrical specialists who are also familiar with the valid standards. WAGO Kontakttechnik GmbH & Co. KG declines all liability resulting from improper action and damage to WAGO products and third party products due to non-observance of the information contained in this manual.

1.1.3 Intended Use

For each individual application, the components supplied are to work with a dedicated hardware and software configuration. Modifications are only permitted within the framework of the possibilities documented in the manuals. All other changes to the hardware and/or software and the non-conforming use of the components entail the exclusion of liability on part of WAGO Kontakttechnik GmbH & Co. KG.

Please direct any requirements pertaining to a modified and/or new hardware or software configuration directly to WAGO Kontakttechnik GmbH & Co. KG.

1.2 Symbols



Danger

Always abide by this information to protect persons from injury.



Warning

Always abide by this information to prevent damage to the device.



Attention

Marginal conditions must always be observed to ensure smooth operation.



ESD (Electrostatic Discharge)

Warning of damage to the components by electrostatic discharge. Observe the precautionary measure for handling components at risk.



Note

Routines or advice for efficient use of the device and software optimization.



More information

References on additional literature, manuals, data sheets and INTERNET pages

1.3 Number Notation

Number Code	Example	Note
Decimal	100	normal notation
Hexadecimal	0x64	C notation
Binary	'100' '0110.0100'	Within ' Nibble separated with dots

1.4 Safety Notes



Warning

Switch off the system prior to working on bus modules!

In the event of deformed contacts, the module in question is to be replaced, as its functionality can no longer be ensured on a long-term basis.

The components are not resistant against materials having seeping and insulating properties. Belonging to this group of materials is: e.g. aerosols, silicones, triglycerides (found in some hand creams).

If it cannot be ruled out that these materials appear in the component environment, then additional measures are to be taken:

- installation of the components into an appropriate enclosure
 - handling of the components only with clean tools and materials.
-



Attention

Cleaning of soiled contacts may only be done with ethyl alcohol and leather cloths. Thereby, the ESD information is to be regarded.

Do not use any contact spray. The spray may impair the functioning of the contact area.

The WAGO-I/O-SYSTEM 750 and its components are an open system. It must only be assembled in housings, cabinets or in electrical operation rooms. Access must only be given via a key or tool to authorized qualified personnel.

The relevant valid and applicable standards and guidelines concerning the installation of switch boxes are to be observed.



ESD (Electrostatic Discharge)

The modules are equipped with electronic components that may be destroyed by electrostatic discharge. When handling the modules, ensure that the environment (persons, workplace and packing) is well grounded. Avoid touching conductive components, e.g. gold contacts.

1.5 Scope

This manual describes the Analog Input Module 750-460, (/xxx-xxx)
4 AI Pt100/ RTD of the modular WAGO-I/O-SYSTEM 750.

Handling, assembly and start-up are described in the manual of the Fieldbus Coupler. Therefore this documentation is valid only in the connection with the appropriate manual.

2 I/O Modules

2.1 Analog Input Modules

2.1.1 750-460, (/xxx-xxx) [4 AI Pt100/ RTD]

4-Channel Analog Input Module for RTDs
2- conductor connection

2.1.1.1 View

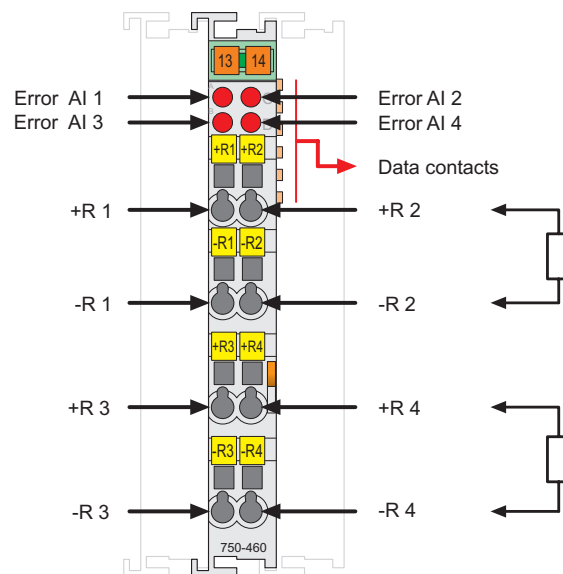


Fig. 2.1.1-1: 4-Channel Analog Input Module 750-460

g046000e

2.1.1.2 Variations

Item-No.	Designation	Description
Pt resistance sensors		
750-460	4 AI PT100/RTD	4- Channel Analog Input Module, Pt 100 Measuring range: -200 °C ... +850 °C
750-460/000-003	4 AI PT1000/RTD	4- Channel Analog Input Module, Pt 1000 Measuring range: -200 °C ... +850 °C
Ni resistance sensors		
750-460/000-005	4 AI Ni 1000/RTD	4- Channel Analog Input Module, Ni 1000 Measuring range: -60 °C ... +250 °C

2.1.1.3 Description

The 750-460 analog input module allows Pt or Ni Resistive Temperature Devices, RTDs, to be measured in the field. It can also be used to measure resistances in the field. Depending on the operating mode, the resistance value is converted to a temperature or directly sent out by the module. A microprocessor within the module is used for converting and linearizing the measured resistance value into a numeric value proportional to the temperature of the selected resistance sensor.

The analog input module is a 2-conductor device and has 4 input channels. Four devices may be directly connected to the module.

The shield (screen) is directly connected to the DIN rail. A capacitive connection is made automatically when snapped onto the DIN rail.

A broken wire, short-circuit or overrange are indicated by a red error LED per channel.

An optocoupler is used for electrical isolation between the bus and the field side.

Any configuration of the input modules is possible when designing the fieldbus node. Grouping of module types is not necessary.



Attention

This module has no power contacts. For field supply to downstream I/O modules, a supply module will be needed.

The analog input module 750-460 and its variations can be used with all couplers/controllers of the WAGO-I/O-SYSTEM 750 (except for the economy types 750-320, -323, -324 and -327).

2.1.1.4 Display Elements

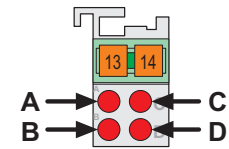


Fig. 2.1.1-2: Display Elements g045302x

LED	Channel	State	Function
A red	1	off	Normal operation
		on	Overrange/underflow of the admissible measuring range, broken wire
B red	2	off	Normal operation
		on	Overrange/underflow of the admissible measuring range, broken wire
C red	3	off	Normal operation
		on	Overrange/underflow of the admissible measuring range, broken wire
D red	4	off	Normal operation
		on	Overrange/underflow of the admissible measuring range, broken wire

2.1.1.5 Schematic Diagram

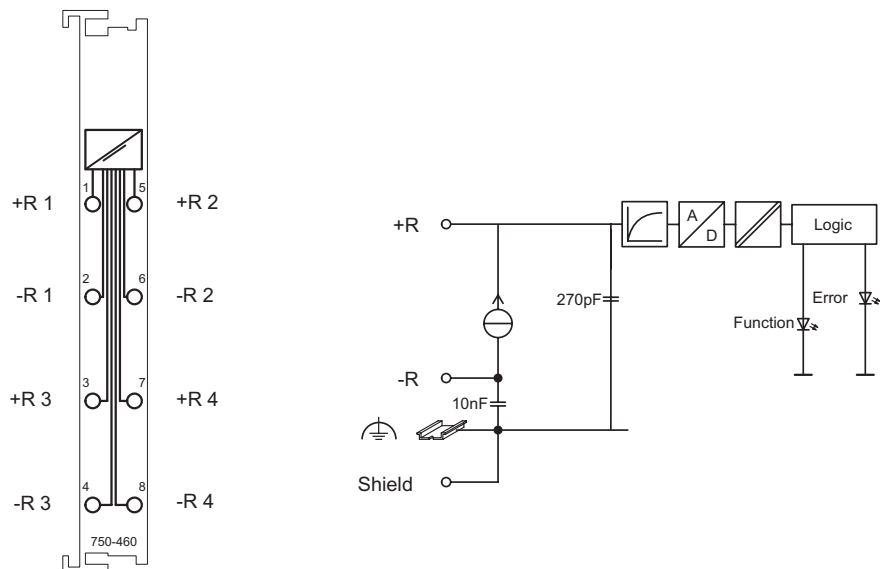


Fig. 2.1.1-3: 4-Channel Analog Input Module 750-460

g046001e

2.1.1.6 Technical Data

Module Specific Data	
Number of inputs	4
Voltage supply	via system voltage DC /DC
Current consumption _{max.} (internal)	65 mA
Sensor types	Pt 100 (factory preset), optionally orderable variants for Pt 1000, Ni 1000
Sensor connection	2-wire
Temperature range	-200 °C ... +850 °C (Pt) -60 °C ... +250 °C (Ni)
Resolution	0,1 °C
Conversion time	250 ms
Measuring error _{25°C}	<± 0.2 % of full scale value
Temperature coefficient	<± 0.01 % /K of full scale value
Isolation	400 V (System/Supply)
Measured current _{typ.}	0.5 mA
Bit width	4 x 16 bits data 4 x 8 bits control/status (option)
Dimensions (mm) W x H x L	12 x 64* x 100 * from upper edge of 35 DIN rail
Weight	ca. 55 g
Standards and Regulations (cf. Chapter 2.2 of the Coupler/Controller Manual)	
EMC-Immunity to interference (CE)	acc. to EN 50082-2 (96)
EMC-Emission of interference (CE)	acc. to EN 50081-1 (93)
Approvals (cf. Chapter 2.2 of the Coupler/Controller Manual)	
	cUL _{US} (UL508)
	Conformity Marking



More Information

Detailed references to the approvals are listed in the document "Overview Approvals WAGO-I/O-SYSTEM 750", which you can find on the CD ROM ELECTRONICC Tools and Docs (Item-No.: 0888-0412) or in the internet under:

www.wago.com → Documentation → WAGO-I/O-SYSTEM 750 → System Description

2.1.1.7 Process Image

Some fieldbus systems can process input channel status information by means of a status byte.

This status byte can be displayed via the starting tool WAGO-I/O-CHECK 2. However, processing via the coupler / controller is optional, which means that accessing or parsing the status information depends on the fieldbus system.



Attention

The representation of the process data of some I/O modules or their variations in the process image depends on the fieldbus coupler/-controller used. Please take this information as well as the particular design of the respective control/status bytes from the section "Fieldbus Specific Design of the Process Data" included in the description concerning the process image of the corresponding coupler/controller.

2.1.1.7.1 I/O Modules for Pt Resistance Sensors

Pt resistance sensors (Measuring range: -200 °C ... +850 °C)	
750-460	Evaluation of Pt 100
750-460/000-003	Evaluation of Pt 1000

To evaluate the platinum resistance sensors, the measured values of the resistance are converted and sent as temperature values.

All temperature values are represented in a standard numeric format. The possible numerical range matches the defined temperature range of the Pt sensors from -200 °C to +850 °C.

In the Pt 100 or Pt 1000 setting, the temperature values of the sensors are represented with a resolution of 1 digit per 0.1 °C within a word (16 bits). Thus, 0 °C corresponds to the numeric value 0x0000 and 100 °C to 0x03E8 (dec. 1000).

Temperature values below 0 °C are represented in two's complement binary form.

The analog input module 750-460 transmits 16-bit measured values per channel as well as 8 optional status bits to the coupler/controller.

However, accessing the status byte depends on the fieldbus system being used.

750-460 (Pt 100) and 750-460/000-003 (Pt 1000)					
Temperature °C	Numerical value ¹⁾			Status- byte hex.	LED Error AI 1, 2
	binary	hex.	dec.		
<-200.00	'1000.0000.0000.0001'	0x8001	-32767	0x41	on
-200.00	'1111.1000.0011.0000'	0xF830	-2000	0x00	off
-100.00	'1111.1100.0001.1000'	0xFC18	-1000	0x00	off
0.00	'0000.0000.0000.0000'	0x0000	0	0x00	off
100.00	'0000.0011.1110.1000'	0x03E8	1000	0x00	off
200.00	'0000.0111.1101.0000'	0x07D0	2000	0x00	off
500.00	'0001.0011.1000.1000'	0x1388	5000	0x00	off
750.00	'0001.1101.0100.1100'	0x1D4C	7500	0x00	off
800.00	'0001.1111.0100.0000'	0x1F40	8000	0x00	off
850.00	'0010.0001.0011.0100'	0x2134	8500	0x00	off
>850.00	'0010.0001.0011.0100'	0x2134	8500	0x42	on
Broken wire against R _L	'0010.0001.0011.0100'	0x2134	8500	0x42	on

¹⁾ Temperature values below 0 °C are represented in two's complement binary form.

The measured value can exceed the range from -2000 to 8500 until the limitation applies.

2.1.1.7.2 I/O Modules for Ni Resistance Sensors

Ni resistance sensors (Measuring range: -60 °C ... +250 °C)	
750-460/000-005	Evaluation of Ni 1000

To evaluate the nickel resistance sensors, the measured values of the resistance are converted and sent as temperature values.

All temperature values are represented in a standard numeric format. The possible numerical range matches the defined temperature range of the Ni sensors from -60 °C to +250 °C.

In the Ni 1000 setting, the temperature values of the sensors are represented with a resolution of 1 digit per 0.1 °C within a word (16 bits). Thus, 0 °C corresponds to the numeric value 0x0000 and 100 °C to 0x03E8 (dec. 1000). Temperature values below 0 °C are represented in two's complement binary form.

The analog input module transmits 16-bit measured values per channel as well as 8 optional status bits to the coupler/controller.

750-460/000-005 (Ni 1000)					
Temperature °C	Numerical value ¹⁾			Status- byte hex.	LED Error AI 1, 2
	binary	hex.	dec.		
<-60.0	'1000.0000.0000.0001'	0x8001	-32767	0x41	on
-60.0	'1111.1101.1010.1000'	0xFDA8	-600	0x00	off
-50.0	'1111.1110.0000.1100'	0xFE0C	-500	0x00	off
0.0	'0000.0000.0000.0000'	0x0000	0	0x00	off
50.0	'0000.0001.1111.0100'	0x01F4	500	0x00	off
100.0	'0000.0011.1110.1000'	0x03E8	1000	0x00	off
150.0	'0000.0101.1101.1100'	0x05DC	1500	0x00	off
200.0	'0000.0111.1101.0000'	0x07D0	2000	0x00	off
250.0	'0000.1001.1100.0100'	0x09C4	2500	0x00	off
>250.0	'0010.0001.0011.0100'	0x2134	8500	0x42	on
Broken wire against R _L	'0010.0001.0011.0100'	0x2134	8500	0x42	on

¹⁾ Temperature values below 0 °C are represented in two's complement binary form.

The measured value can exceed the range from -600 to 2500 until the limitation applies.



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