

# WAGO-I/O-SYSTEM 750

## Manual

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## 750-460(/xxx-xxx)

### 4AI Pt 100/RTD

### 4-Channel Analog Input Module for RTDs

Version 1.1.0

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Every conceivable measure has been taken to ensure the accuracy and completeness of this documentation. However, as errors can never be fully excluded, we always appreciate any information or suggestions for improving the documentation.

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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 protected by trademark or patent.

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# 1 Notes about this Documentation

## Note



### Always retain this documentation!

This documentation is part of the product. Therefore, retain the documentation during the entire service life of the product. Pass on the documentation to any subsequent user. In addition, ensure that any supplement to this documentation is included, if necessary.

## 1.1 Validity of this Documentation

This documentation is only applicable to the I/O module 750-460 (4AI Pt 100/RTD) and the variants listed in the table below.

Table 1: Variants

Item number/Variant	Designation
<b>Pt-resistance sensors</b>	
750-460	4AI Pt 100/RTD
750-460/000-003	4AI Pt 1000/RTD
<b>Ni-resistance sensors</b>	
750-460/000-005	4AI Ni 1000 TK6180/RTD

## Note



### Documentation Validity for Variants

Unless otherwise indicated, the information given in this documentation applies to listed variants.

The I/O module 750-460 shall only be installed and operated according to the instructions in this manual and in the manual for the used fieldbus coupler/controller.

## NOTICE

### Consider power layout of the WAGO-I/O-SYSTEM 750!

In addition to these operating instructions, you will also need the manual for the used fieldbus coupler/controller, which can be downloaded at [www.wago.com](http://www.wago.com). There, you can obtain important information including information on electrical isolation, system power and supply specifications.

## 1.2 Copyright

This Manual, including all figures and illustrations, is copyright-protected. Any further use of this Manual by third parties that violate pertinent copyright provisions is prohibited. Reproduction, translation, electronic and phototechnical filing/archiving (e.g., photocopying) as well as any amendments require the written consent of WAGO Kontakttechnik GmbH & Co. KG, Minden, Germany. Non-observance will involve the right to assert damage claims.

## 1.3 Symbols

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 **DANGER**

**Personal Injury!**

Indicates a high-risk, imminently hazardous situation which, if not avoided, will result in death or serious injury.

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---

 **DANGER**

**Personal Injury Caused by Electric Current!**

Indicates a high-risk, imminently hazardous situation which, if not avoided, will result in death or serious injury.

---

---

 **WARNING**

**Personal Injury!**

Indicates a moderate-risk, potentially hazardous situation which, if not avoided, could result in death or serious injury.

---

---

 **CAUTION**

**Personal Injury!**

Indicates a low-risk, potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

---

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**NOTICE**

**Damage to Property!**

Indicates a potentially hazardous situation which, if not avoided, may result in damage to property.

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**NOTICE**

**Damage to Property Caused by Electrostatic Discharge (ESD)!**

Indicates a potentially hazardous situation which, if not avoided, may result in damage to property.

---

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**Note**

**Important Note!**

Indicates a potential malfunction which, if not avoided, however, will not result in damage to property.

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## *Information*

**Additional Information:**

Refers to additional information which is not an integral part of this documentation (e.g., the Internet).

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## 1.4 Number Notation

Table 2: Number Notation

Number Code	Example	Note
Decimal	100	Normal notation
Hexadecimal	0x64	C notation
Binary	'100' '0110.0100'	In quotation marks, nibble separated with dots (.)

## 1.5 Font Conventions

Table 3: Font Conventions

Font Type	Indicates
<i>italic</i>	Names of paths and data files are marked in italic-type. e.g.: <i>C:\Program Files\WAGO Software</i>
<b>Menu</b>	Menu items are marked in bold letters. e.g.: <b>Save</b>
>	A greater-than sign between two names means the selection of a menu item from a menu. e.g.: <b>File &gt; New</b>
<b>Input</b>	Designation of input or optional fields are marked in bold letters, e.g.: <b>Start of measurement range</b>
“Value”	Input or selective values are marked in inverted commas. e.g.: Enter the value “4 mA” under <b>Start of measurement range</b> .
<b>[Button]</b>	Pushbuttons in dialog boxes are marked with bold letters in square brackets. e.g.: <b>[Input]</b>
<b>[Key]</b>	Keys are marked with bold letters in square brackets. e.g.: <b>[F5]</b>

## 2 Important Notes

This section includes an overall summary of the most important safety requirements and notes that are mentioned in each individual section. To protect your health and prevent damage to devices as well, it is imperative to read and carefully follow the safety guidelines.

### 2.1 Legal Bases

#### 2.1.1 Subject to Changes

WAGO Kontakttechnik GmbH & Co. KG reserves the right to provide for any alterations or modifications that serve to increase the efficiency of technical progress. WAGO Kontakttechnik GmbH & Co. KG owns all rights arising from the granting of patents or from the legal protection of utility patents. Third-party products are always mentioned without any reference to patent rights. Thus, the existence of such rights cannot be excluded.

#### 2.1.2 Personnel Qualifications

All sequences implemented on WAGO-I/O-SYSTEM 750 devices may only be carried out by electrical specialists with sufficient knowledge in automation. The specialists must be familiar with the current norms and guidelines for the devices and automated environments.

All changes to the coupler or controller should always be carried out by qualified personnel with sufficient skills in PLC programming.

#### 2.1.3 Use of the WAGO-I/O-SYSTEM 750 in Compliance with Underlying Provisions

Fieldbus couplers, fieldbus controllers and I/O modules found in the modular WAGO-I/O-SYSTEM 750 receive digital and analog signals from sensors and transmit them to actuators or higher-level control systems. Using programmable controllers, the signals can also be (pre-) processed.

The devices have been developed for use in an environment that meets the IP20 protection class criteria. Protection against finger injury and solid impurities up to 12.5 mm diameter is assured; protection against water damage is not ensured. Unless otherwise specified, operation of the devices in wet and dusty environments is prohibited.

Operating the WAGO-I/O-SYSTEM 750 devices in home applications without further measures is only permitted if they meet the emission limits (emissions of interference) according to EN 61000-6-3. You will find the relevant information in the section “Device Description” > “Standards and Guidelines” in the manual for the used fieldbus coupler/controller.

Appropriate housing (per 94/9/EG) is required when operating the WAGO-I/O-SYSTEM 750 in hazardous environments. Please note that a prototype test certificate must be obtained that confirms the correct installation of the system in a housing or switch cabinet.

#### **2.1.4 Technical Condition of Specified Devices**

The devices to be supplied ex works are equipped with hardware and software configurations, which meet the individual application requirements. WAGO Kontakttechnik GmbH & Co. KG will be exempted from any liability in case of changes in hardware or software as well as to non-compliant usage of devices.

Please send your request for modified and new hardware or software configurations directly to WAGO Kontakttechnik GmbH & Co. KG.

## 2.2 Safety Advice (Precautions)

For installing and operating purposes of the relevant device to your system the following safety precautions shall be observed:



### **DANGER**

#### **Do not work on devices while energized!**

All power sources to the device shall be switched off prior to performing any installation, repair or maintenance work.

### **DANGER**

#### **Install the device only in appropriate housings, cabinets or in electrical operation rooms!**

The WAGO-I/O-SYSTEM 750 and its components are an open system. As such, install the system and its components exclusively in appropriate housings, cabinets or in electrical operation rooms. Allow access to such equipment and fixtures to authorized, qualified staff only by means of specific keys or tools.

### **NOTICE**

#### **Replace defective or damaged devices!**

Replace defective or damaged device/module (e.g., in the event of deformed contacts), since the long-term functionality of device/module involved can no longer be ensured.

### **NOTICE**

#### **Protect the components against materials having seeping and insulating properties!**

The components are not resistant to materials having seeping and insulating properties such as: aerosols, silicones and triglycerides (found in some hand creams). If you cannot exclude that such materials will appear in the component environment, then install the components in an enclosure being resistant to the above-mentioned materials. Clean tools and materials are imperative for handling devices/modules.

### **NOTICE**

#### **Clean only with permitted materials!**

Clean soiled contacts using oil-free compressed air or with ethyl alcohol and leather cloths.

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## NOTICE

**Do not use any contact spray!**

Do not use any contact spray. The spray may impair contact area functionality in connection with contamination.

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## NOTICE

**Do not reverse the polarity of connection lines!**

Avoid reverse polarity of data and power supply lines, as this may damage the devices involved.

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## NOTICE



**Avoid electrostatic discharge!**

The devices are equipped with electronic components that may be destroyed by electrostatic discharge when touched. Please observe the safety precautions against electrostatic discharge per DIN EN 61340-5-1/-3. When handling the devices, please ensure that environmental factors (personnel, work space and packaging) are properly grounded.

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### 3 Device Description

The 750-460 I/O module measures resistance at field level or evaluates platinum or nickel resistance sensors.

The resistance values are converted into temperature values. A microprocessor in the I/O module linearizes the measured resistance values and converts them into a numeric value proportional to the temperature of the selected resistance sensor.

The I/O module provides four input channels for directly connecting 2-wire temperature sensors to the CAGE CLAMP® connectors +R1, -R1 ... +R4, -R4.

The assignment of the connections is described in the “Connectors” section.

Connection examples are shown in section “Connecting Devices” > ... > “Connection Example(s)”.

A red error LED per channel indicates a wire break, a short circuit or that the signal is outside the measuring range.

The meaning of the LEDs is described in the “Display Elements” section.

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#### Note



##### **Use a supply module!**

Use a supply module for field-side power supply of downstream I/O modules.

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The field voltage and the system voltage are electrically isolated from each other.

With consideration of the power jumper contacts, the individual modules can be arranged in any combination when configuring the fieldbus node. An arrangement in groups within the group of potentials is not necessary.

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

### 3.1 View

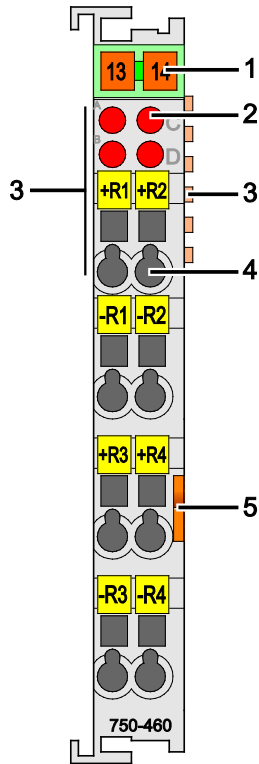


Figure 1: View

Table 4: Legend for Figure “View”

Pos.	Description	Details See Section
1	Marking possibility with Mini-WSB	---
2	Status LEDs	“Device Description” > “Display Elements”
3	Data contacts	“Device Description” > “Connectors”
4	CAGE CLAMP® connectors	“Device Description” > “Connectors”
5	Release tab	“Mounting” > ”Inserting and Removing Devices”

## 3.2 Connectors

### 3.2.1 Data Contacts/Internal Bus

Communication between the fieldbus coupler/controller and the I/O modules as well as the system supply of the I/O modules is carried out via the internal bus. It is comprised of 6 data contacts, which are available as self-cleaning gold spring contacts.

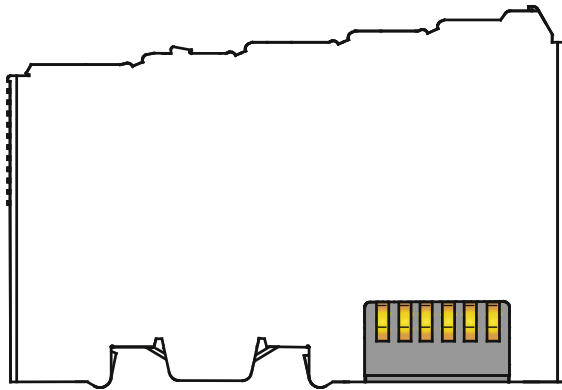


Figure 2: Data Contacts

### NOTICE

**Do not place the I/O modules on the gold spring contacts!**

Do not place the I/O modules on the gold spring contacts in order to avoid soiling or scratching!

### NOTICE



**Ensure that the environment is well grounded!**

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



### 3.2.2 Power Jumper Contacts/Field Supply

The I/O module 750-460 has no power jumper contacts.

### 3.2.3 CAGE CLAMP® Connectors

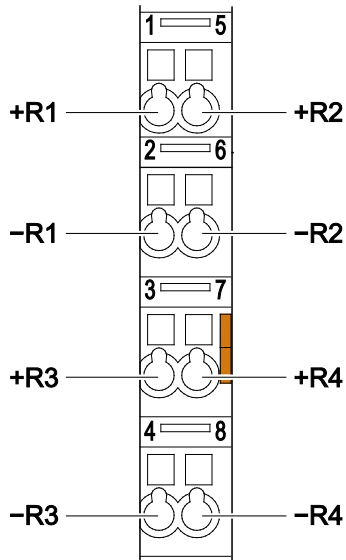


Figure 3: 750-460 Connections, 4-channel, 2-wire

Table 5: Legend for the “750-461 Connections, 4-channel, 2-wire” Figure

Channel	Designation	Connection	Function
1	+R1	1	Sensor 1: +R
	-R1	2	Sensor 1: -R
2	+R2	5	Sensor 2: +R
	-R2	6	Sensor 2: -R
3	+R3	3	Sensor 3: +R
	-R3	4	Sensor 3: -R
4	+R4	7	Sensor 4: +R
	-R4	8	Sensor 4: -R



### Note

#### Use shielded signal lines!

Only use shielded signal lines for analog signals and I/O modules which are equipped with shield clamps. Only then can you ensure that the accuracy and interference immunity specified for the respective I/O module can be achieved even in the presence of interference acting on the signal cable.

### 3.3 Display Elements

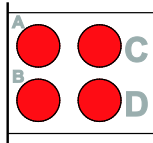


Figure 4: Display Elements

Table :6 Legend for the “Display Elements” Figure

Channel	LED	State	Function
1	A	OFF	Normal operation
		Red	Permissible measurement range overrange and underrange, short circuit, wire break
2	W	OFF	Normal operation
		Red	Permissible measurement range overrange and underrange, short circuit, wire break
3	C	OFF	Normal operation
		Red	Permissible measurement range overrange and underrange, short circuit, wire break
4	D	OFF	Normal operation
		Red	Permissible measurement range overrange and underrange, short circuit, wire break

### 3.4 Operating Elements

The I/O module 750-460 has no operating elements.

### 3.5 Schematic Diagram

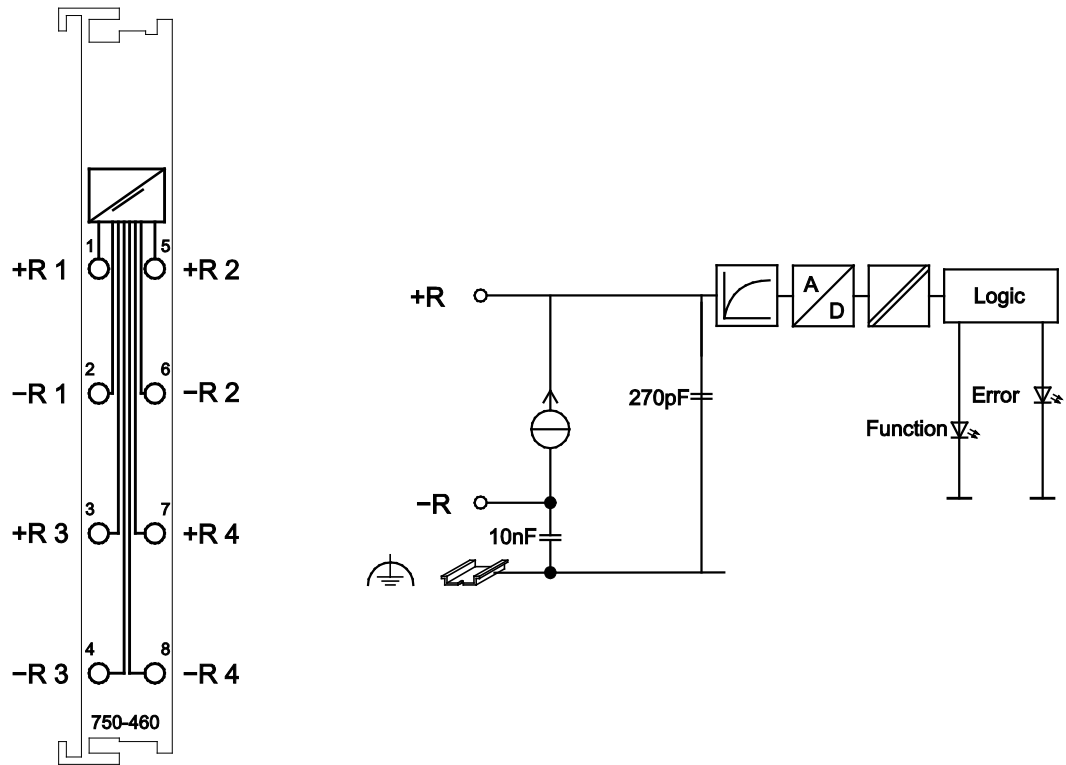


Figure 5: Schematic Diagram

## 3.6 Technical Data

### 3.6.1 Device Data

Table 7: Technical Data — Device

Width	12 mm
Height (from top edge of DIN rail)	64 mm
Depth	100 mm
Weight	approx. 43 g

### 3.6.2 Power Supply

Table 8: Technical Data – Power Supply

Power supply	via system voltage (DC/DC)
Current consumption, system voltage <sub>typ.</sub> (5 VDC)	65 mA
Current consumption, power jumper contact <sub>max.</sub> (24 VDC)	---
Voltage via power jumper contacts	---
Current via power jumper contacts <sub>max.</sub>	---
Isolation (peak value)	400 V system/field side

### 3.6.3 Communication

Table 9: Technical Data – Communication

Data width, internal (internal data bus) 2-channel operation	4 × 16 bit data 4 × 8 bit control/status (optional)
---	--

### 3.6.4 Inputs

Table 10: Technical Data – Inputs

Number of inputs	4
Sensor types	
Basic version	Pt100
Optional version for	Pt1000, Ni1000 TK6180
Sensor connection	2-wire
Temperature range	
Pt	–200–+850 °C
Ni	–60–+250 °C
Measuring current <sub>typ.</sub>	0.5 mA
Conversion time	250 ms
Resolution <sup>1)</sup>	0.1 °C
<sup>1)</sup> Over entire range	
Measuring error at 25 °C	< ±0.2 % of full scale value
Temperature coefficient	< ±0.01 %/K of full scale value

### 3.6.5 Climatic Environmental Conditions

Table 11: Technical Data – Climatic Environmental Conditions

Operating temperature range	0 °C ... 55 °C
Storage temperature range	–25 °C ... +85 °C
Relative humidity without condensation	Max. 95 %
Resistance to harmful substances	Acc. to IEC 60068-2-42 and IEC 60068-2-43
Maximum pollutant concentration at relative humidity < 75 %	SO <sub>2</sub> ≤ 25 ppm H <sub>2</sub> S ≤ 10 ppm
Special conditions	Ensure that additional measures for components are taken, which are used in an environment involving: – dust, caustic vapors or gases – ionizing radiation

### 3.6.6 Connection Type

Table 12: Technical Data – Field Wiring

Wire connection	CAGE CLAMP®
Cross section	0.08 mm <sup>2</sup> ... 2.5 mm <sup>2</sup> , AWG 28 ... 14
Stripped lengths	8 mm ... 9 mm / 0.33 in

Table 13: Technical Data – Data Contacts

Data contacts	Slide contact, hard gold plated, self-cleaning
---------------	--

## 3.7 Approvals

### Information



#### More information about approvals.

Detailed references to the approvals are listed in the document “Overview Approvals **WAGO-I/O-SYSTEM 750**”, which you can find via the internet under: [www.wago.com](http://www.wago.com) > SERVICES > DOWNLOADS > Additional documentation and information on automation products > WAGO-I/O-SYSTEM 750 > System Description.

The following approvals have been granted to the basic version and all variants of 750-460 I/O modules:

 Conformity Marking

 cUL<sub>US</sub> UL508



Korea Certification

MSIP-REM-W43-AIM750

The following ship approvals have been granted to the basic version of 750-460 I/O modules:



Federal Maritime and Hydrographic Agency

### 3.8 Standards and Guidelines

All variations of 750-460 I/O modules meet the following requirements on emission and immunity of interference:

EMC CE-Immunity to interference      acc. to EN 61000-6-2

EMC CE-Emission of interference      acc. to EN 61000-6-4



## 4 Process Image

### Note



#### Evaluation of Status Byte

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

This status byte can be displayed via the commissioning tool **WAGO-I/O-CHECK**.

However, processing via the fieldbus coupler/controller is optional, which means that accessing or parsing the status information depends on the fieldbus system.

### 4.1 I/O Modules for Pt Resistance Sensors

For evaluating platinum resistance sensors, the resistance measurement values are converted and output as temperature values. All temperature values are represented in a standard numerical format. The possible numeric range corresponds to the defined temperature range of Pt sensors of  $-200\text{ °C}$  ...  $+850\text{ °C}$ . When set as Pt100 or Pt1000, the sensor temperature values are displayed at a resolution of 1 digit per  $0.1\text{ °C}$  in one word (16-bit). As a result,  $0\text{ °C}$  corresponds to the numeric value  $0x0000$  and  $100\text{ °C}$  to the numeric value  $0x03E8$  (dec. 1000). Temperature values below  $0\text{ °C}$  are represented in two's complement binary.

The 750-460 analog input module transfers 16-bit measured values and 8 status bits (optional) per channel to the coupler/controller.

Table 14: Process Image, Pt100/Pt1000, with Wire Break Diagnostics

Temperature °C	Numeric value <sup>1)</sup>			Status Byte Hex.	LED Error R1 ... R4
	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
Wire break at RL	'0010.0001.0011.0100'	0x2134	8500	0x42	ON

1) Temperature values below  $0\text{ °C}$  are represented in two's complement binary.

The measured value can exceed the range of  $-2000$  to  $8500$  before limitation takes effect.

## 4.2 I/O Modules for Ni Resistance Sensors

For evaluating nickel resistance sensors, the resistance measurement values are converted and output as temperature values. All temperature values are represented in a standard numerical format. The possible numeric range corresponds to the defined temperature range of Ni sensors of  $-60\text{ °C} \dots +250\text{ °C}$ .

When set as Ni1000, the sensor temperature values are displayed at a resolution of 1 digit per  $0.1\text{ °C}$  in one word (16-bit). As a result,  $0\text{ °C}$  corresponds to the numeric value 0x0000 and  $100\text{ °C}$  to the numeric value 0x03E8 (dec. 1000). Temperature values below  $0\text{ °C}$  are represented in two's complement binary.

The I/O modules transfer 16-bit measured values and 8 status bits (optional) per channel to the coupler/controller.

Table 15: Process Image, Ni1000, with Wire Break Diagnostics

Temperature °C	Numeric value <sup>1)</sup>			Status Byte Hex.	LED Error R1 ... R4
	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
Wire break at RL	'0010.0001.0011.0100'	0x2134	8500	0x42	ON

1) Temperature values below  $0\text{ °C}$  are represented in two's complement binary.

The measured value can exceed the range of  $-600 \dots 2500$  before limitation takes effect.

## 5 Mounting

### 5.1 Mounting Sequence

Fieldbus couplers/controllers and I/O modules of the WAGO-I/O-SYSTEM 750/753 are snapped directly on a carrier rail in accordance with the European standard EN 50022 (DIN 35).

The reliable positioning and connection is made using a tongue and groove system. Due to the automatic locking, the individual devices are securely seated on the rail after installation.

Starting with the fieldbus coupler/controller, the I/O modules are mounted adjacent to each other according to the project design. Errors in the design of the node in terms of the potential groups (connection via the power contacts) are recognized, as the I/O modules with power contacts (blade contacts) cannot be linked to I/O modules with fewer power contacts.

---

#### CAUTION

##### **Risk of injury due to sharp-edged blade contacts!**

The blade contacts are sharp-edged. Handle the I/O module carefully to prevent injury.

---

#### NOTICE

##### **Insert I/O modules only from the proper direction!**

All I/O modules feature grooves for power jumper contacts on the right side. For some I/O modules, the grooves are closed on the top. Therefore, I/O modules featuring a power jumper contact on the left side cannot be snapped from the top. This mechanical coding helps to avoid configuration errors, which may destroy the I/O modules. Therefore, insert I/O modules only from the right and from the top.

---

#### Note



##### **Don't forget the bus end module!**

Always plug a bus end module 750-600 onto the end of the fieldbus node! You must always use a bus end module at all fieldbus nodes with WAGO-I/O-SYSTEM 750 fieldbus couplers/controllers to guarantee proper data transfer.

---

## 5.2 Inserting and Removing Devices

### NOTICE

**Perform work on devices only if they are de-energized!**

Working on energized devices can damage them. Therefore, turn off the power supply before working on the devices.

### 5.2.1 Inserting the I/O Module

1. Position the I/O module so that the tongue and groove joints to the fieldbus coupler/controller or to the previous or possibly subsequent I/O module are engaged.

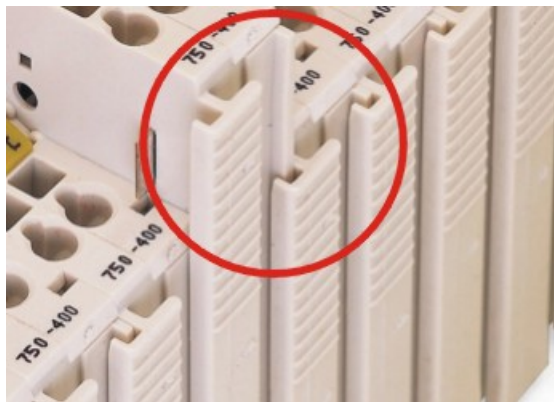


Figure 6: Insert I/O Module (Example)

2. Press the I/O module into the assembly until the I/O module snaps into the carrier rail.

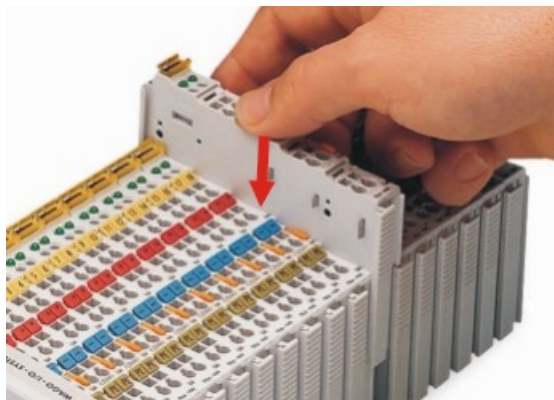


Figure 7: Snap the I/O Module into Place (Example)

With the I/O module snapped in place, the electrical connections for the data contacts and power jumper contacts (if any) to the fieldbus coupler/controller or to the previous or possibly subsequent I/O module are established.

## 5.2.2 Removing the I/O Module

1. Remove the I/O module from the assembly by pulling the release tab.

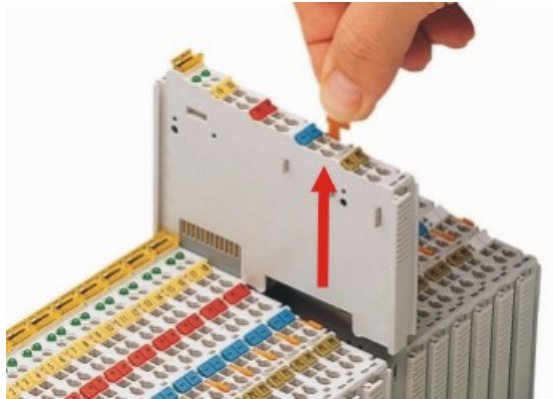


Figure 8: Removing the I/O Module (Example)

Electrical connections for data or power jumper contacts are disconnected when removing the I/O module.

## 6 Connect Devices

### 6.1 Connecting a Conductor to the CAGE CLAMP®

The WAGO CAGE CLAMP® connection is appropriate for solid, stranded and finely stranded conductors.

#### Note



**Only connect one conductor to each CAGE CLAMP®!**

Only one conductor may be connected to each CAGE CLAMP®.

Do not connect more than one conductor at one single connection!

If more than one conductor must be routed to one connection, these must be connected in an up-circuit wiring assembly, for example using WAGO feed-through terminals.

#### Exception:

If it is unavoidable to jointly connect 2 conductors, then you must use a ferrule to join the wires together. The following ferrules can be used:

Length:	8 mm
Nominal cross section <sub>max.</sub> :	1 mm <sup>2</sup> for 2 conductors with 0.5 mm <sup>2</sup> each
WAGO product:	216-103 or products with comparable properties

1. For opening the CAGE CLAMP® insert the actuating tool into the opening above the connection.
2. Insert the conductor into the corresponding connection opening.
3. For closing the CAGE CLAMP® simply remove the tool. The conductor is now clamped firmly in place.

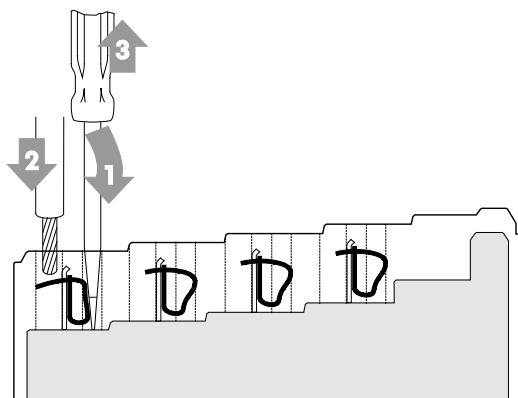


Figure 9: Connecting a Conductor to a CAGE CLAMP®

## 6.2 Connection Examples

### Note



#### Use shielded signal lines!

Only use shielded signal lines for analog signals and I/O modules which are equipped with shield clamps. Only then can you ensure that the accuracy and interference immunity specified for the respective I/O module can be achieved even in the presence of interference acting on the signal cable.

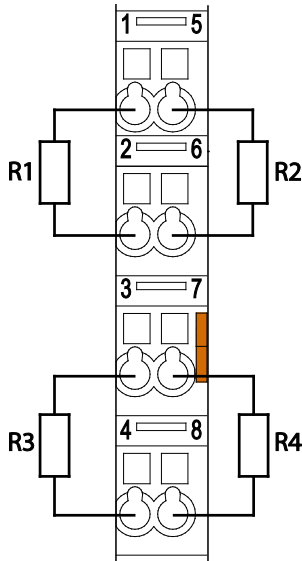


Figure 10: Connection Example

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