

Table 15: Technical Data – Data Contacts

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

### 3.6.6 Climatic Environmental Conditions

Table 16: Technical Data – Climatic Environmental Conditions

|                                                                |                                                                                                                                                                        |
|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Surrounding air temperature, operation                         | 0°C...55°C                                                                                                                                                             |
| Surrounding air temperature, storage                           | –25 °C ... +85 °C                                                                                                                                                      |
| Operating altitude                                             | without temperature derating:<br>0 ... 2000 m;<br>with temperature derating:<br>2000 ... 5000 m (0.5 K/100 m);<br>max.: 5000 m                                         |
| Relative humidity                                              | Max. 5 % ... 95 % without condensation                                                                                                                                 |
| Pollution degree                                               | 2                                                                                                                                                                      |
| Protection type                                                | IP20                                                                                                                                                                   |
| Resistance to harmful substances                               | Acc. to IEC 60068-2-42 and<br>IEC 60068-2-43                                                                                                                           |
| Maximum pollutant concentration at<br>relative humidity < 75 % | SO <sub>2</sub> ≤ 25 ppm<br>H <sub>2</sub> S ≤ 10 ppm                                                                                                                  |
| Special conditions                                             | Ensure that additional measures for<br>components are taken, which are used<br>in an environment involving:<br>– dust, caustic vapors or gases<br>– ionizing radiation |

### 3.7 Approvals

The following approvals have been granted to 750-496 I/O modules:

 Conformity Marking

 UL508

The following approvals are pending for 750-496 I/O modules:

 Korea Certification MSIP-REM-W43-AIM750

The following Ex approvals have been granted to the basic version of 750-496 I/O modules:

 cULus ANSI/ISA 12.12.01  
Class I, Div2 ABCD T4

The following Ex approvals are pending for 750-496 I/O modules:

 TÜV 07 ATEX 554086 X  
I M2 Ex d I Mb  
II 3 G Ex nA IIC T4 Gc  
II 3 D Ex tc IIIC T135°C Dc  
IECEx TUN 09.0001 X  
Ex d I Mb  
Ex nA IIC T4 Gc  
Ex tc IIIC T135°C Dc

The following ship approvals are pending for 750-496 I/O modules:



ABS (American Bureau of Shipping)



Federal Maritime and Hydrographic Agency



BV (Bureau Veritas)



KR (Korean Register of Shipping)



LR (Lloyd's Register)

Env. 1, 2, 3, 4



NKK (Nippon Kaiji Kyokai)



PRS (Polski Rejestr Statków)



RINA (Registro Italiano Navale)

The following ship approvals have been granted to the basic version of 750-496 I/O modules:



DNV GL

[Temperature: B, Humidity: A, Vibration: B, EMC: B,  
Enclosure: A]



## Note

**Applicable from HW 01 / SW 01!**

This ship approval is only applicable from HW 01 / SW 01!

## 3.8 Standards and Guidelines

750-496 I/O modules meet the following standards and guidelines:

750-496 I/O modules meet the following requirements on emission and immunity of interference:

|                                 |                                        |
|---------------------------------|----------------------------------------|
| EMC CE-Immunity to interference | EN 61000-6-2<br>and to EN 61131-2      |
| EMC CE-Emission of interference | EN 61000-6-3 + A1<br>and to EN 61131-2 |



## 4 Process Image

The 750-496 I/O module provides 1 status byte (8 bits) and 1 data word (16 bits) per channel.

The I/O module supplies the input current range 0 ... 20 mA or 4 ... 20 mA or 3.6 ... 21 mA (sensor type NAMUR NE43) at a resolution of 13 bits.

The digitalized measured value is transmitted to the process image of the coupler/controller in a data word (16 bits) as input byte "0" (low) and input byte "1" (high). This value is mapped with a resolution of 12 bits on bit B3 ... B14. Status information, which can be evaluated for fault detection, is contained in the two least significant bits (B0 ... B1).

In the case of a measurement underrange or overrange, bits B0 and B1 are set = 1.

Bit 2 is not defined and is not evaluated.

## 4.1 Overview



### Note

#### Presentation of control/status bytes a function of fieldbus coupler/controller!

The I/O module always makes its complete process image incl. control/status bytes available to the fieldbus coupler/controller. The **WAGO-I/O-CHECK** commissioning tool accesses the complete commissioning process image. The fieldbus coupler/controller uses a different process image to stage cyclic process data via the fieldbus. In the other process image, depending on the fieldbus coupler/controller, the representation of control/status bytes can be suppressed.

Table 17: Process Image – I/O Module 750-496

| Process Image       |                                               |                      |                                    |
|---------------------|-----------------------------------------------|----------------------|------------------------------------|
| Input <sup>1)</sup> |                                               | Output <sup>2)</sup> |                                    |
| Byte 0              | Status byte CH1_S0                            | Byte 0               | Control byte CH1_C0                |
| Byte 1              | Function of status byte: Process value CH1_D0 | Byte 1               | Function of control byte: Reserved |
| Byte 2              | Function of status byte: Process value CH1_D1 | Byte 2               | Function of control byte: Reserved |
| Byte 3              | Control byte CH2_S1                           | Byte 3               | Control byte CH2_C1                |
| Byte 4              | Function of status byte: Process value CH2_D0 | Byte 4               | Function of control byte: Reserved |
| Byte 5              | Function of status byte: Process value CH2_D1 | Byte 5               | Function of control byte: Reserved |
| ...                 | ...                                           | ...                  | ...                                |
| Byte 21             | Status byte CH8_S7                            | Byte 21              | Control byte CH8_C7                |
| Byte 22             | Function of status byte: Process value CH8_D0 | Byte 22              | Function of control byte: Reserved |
| Byte 23             | Function of status byte: Process value CH8_D1 | Byte 23              | Function of control byte: Reserved |

<sup>1)</sup> CHx\_Sx = Status byte x from channel x  
 CHx\_D0 = Low byte for process value for channel x  
 CHx\_D1 = High byte for process value for channel x

<sup>2)</sup> CHx\_Cx = Control byte x from channel x

## 4.2 Status Bytes

Status bytes are identically implemented for all channels. Therefore, the following description in this section applies to all status bytes of the I/O module.

Table 18: Status Byte CH1\_S0

| Status byte CH1_S0, Byte 1 |                                |                                                                                                                |               |                 |                 |            |            |
|----------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------|---------------|-----------------|-----------------|------------|------------|
| Bit 7                      | Bit 6                          | Bit 5                                                                                                          | Bit 4         | Bit 3           | Bit 2           | Bit 1      | Bit 0      |
| RegCom                     | General Error                  | Wire Break                                                                                                     | Short Circuit | User Over-range | User Underrange | Over-range | Underrange |
| Underrange                 | Underrange                     |                                                                                                                |               |                 |                 |            |            |
|                            | 0:                             | The field-side input current is above the current lower limit.                                                 |               |                 |                 |            |            |
|                            | 1:                             | The field-side input current is below the current lower limit.                                                 |               |                 |                 |            |            |
| Overrange                  | Range exceeded                 |                                                                                                                |               |                 |                 |            |            |
|                            | 0:                             | The field-side input current is below the current upper limit.                                                 |               |                 |                 |            |            |
|                            | 1:                             | The field-side input current is above the current upper limit.                                                 |               |                 |                 |            |            |
| User Underrange            | User limiting value underrange |                                                                                                                |               |                 |                 |            |            |
|                            | 0:                             | The field-side input current is above the current lower limit configured by the user.                          |               |                 |                 |            |            |
|                            | 1:                             | The field-side input current is below the current lower limit configured by the user.                          |               |                 |                 |            |            |
| User Overrange             | User limiting value overrange  |                                                                                                                |               |                 |                 |            |            |
|                            | 0:                             | The field-side input current is below the current upper limit configured by the user.                          |               |                 |                 |            |            |
|                            | 1:                             | The field-side input current is above the current upper limit configured by the user.                          |               |                 |                 |            |            |
| Short Circuit              | Short circuit                  |                                                                                                                |               |                 |                 |            |            |
|                            | 0:                             | The field-side input current is within the maximum permissible input current range.                            |               |                 |                 |            |            |
|                            | 1:                             | The field-side input current is above the maximum permissible input current range.                             |               |                 |                 |            |            |
| Wire Break                 | Wire break <sup>1)</sup>       |                                                                                                                |               |                 |                 |            |            |
|                            | 0:                             | The field-side input current is above 1 mA.                                                                    |               |                 |                 |            |            |
|                            | 1:                             | The field-side input current is below 1 mA.                                                                    |               |                 |                 |            |            |
| General Error              | General error                  |                                                                                                                |               |                 |                 |            |            |
|                            | 0:                             | No error or bit 0 (underrange), bit 1 (overrange), bit 4 (short circuit) or bit 5 (wire break) is/are not set. |               |                 |                 |            |            |
|                            | 1:                             | General error; bit 0 (underrange) or bit 1 (overrange) is/are set.                                             |               |                 |                 |            |            |
| RegCom                     | Register communication         |                                                                                                                |               |                 |                 |            |            |
|                            | 0:                             | Register communication is disabled (normal mode).                                                              |               |                 |                 |            |            |
|                            | 1:                             | Register communication is enabled.                                                                             |               |                 |                 |            |            |

<sup>1)</sup>Does not apply to 0 ... 20 mA (ID0)

## 4.3 Process Data

### 4.3.1 Overview of Sensor Types

The following table serves as an overview of all supported sensor types. The following sections contain detailed information about the individual sensor types. The information provided in the respective tables on the resolution of the measured values and the raw value ranges yielded from this are based on manufacturing scaling.

| ID | Sensor type   | Measurement range |
|----|---------------|-------------------|
| 0  | 0 ... 20 mA   | 0 ... +20 mA      |
| 1  | 4 ... 20 mA   | +4 ... +20 mA     |
| 2  | 3.6 ... 21 mA | +3.8 ... +20.5 mA |

### 4.3.2 Standard Format

#### 4.3.2.1 Sensor Type 0 ... 20 mA

For the current measurement with sensor type 0 ... 20 mA, the input range of 0 ... +20 mA is mapped to a process value range of 0 ... +32767. The current underranges and overranges refer to manufacturer range violations.

Table 19: Process Image, Sensor Type 0-20 mA, Two's Complement Representation

| Input current<br>mA         | Numeric value     |                   |        |       | Status       | Error LED |
|-----------------------------|-------------------|-------------------|--------|-------|--------------|-----------|
|                             |                   |                   |        |       | Byte<br>Hex. |           |
|                             | Binary            | XFÜ <sup>1)</sup> | Hex.   | Dec.  |              |           |
| < 0                         | '0000.0000.0000.0 | '011'             | 0x0003 | 3     | 0x41         | ON        |
| Underrange <sup>2)</sup>    |                   |                   |        |       |              |           |
| 0.0                         | '0000.0000.0000.0 | '000'             | 0x0000 | 0     | 0x00         | OFF       |
| 2.5                         | '0000.1111.1111.1 | '000'             | 0x0FF8 | 4088  | 0x00         | OFF       |
| 5.0                         | '0001.1111.1111.1 | '000'             | 0x1FF8 | 8184  | 0x00         | OFF       |
| 7.5                         | '0010.1111.1111.1 | '000'             | 0x2FF8 | 12280 | 0x00         | OFF       |
| 10.0                        | '0011.1111.1111.1 | '000'             | 0x3FF8 | 16376 | 0x00         | OFF       |
| 12.5                        | '0100.1111.1111.1 | '000'             | 0x4FF8 | 20472 | 0x00         | OFF       |
| 15.0                        | '0101.1111.1111.1 | '000'             | 0x5FF8 | 24568 | 0x00         | OFF       |
| 17.5                        | '0110.1111.1111.1 | '000'             | 0x6FF8 | 28664 | 0x00         | OFF       |
| 20.0                        | '0111.1111.1111.1 | '000'             | 0x7FF8 | 32760 | 0x00         | OFF       |
| Overrange <sup>2)</sup>     | '0111.1111.1111.1 | '011'             | 0x7FFB | 32763 | 0x42         | ON        |
| > 20.0                      |                   |                   |        |       |              |           |
| Short circuit <sup>3)</sup> | '0111.1111.1111.1 | '011'             | 0x7FFB | 32763 | 0x50         | ON        |
| > 21.0                      |                   |                   |        |       |              |           |

<sup>1)</sup>Status bits: X: not used, F= error, Ü= overflow

<sup>2)</sup>When underrange / overrange limit is ON

<sup>3)</sup>When short circuit diagnostics is ON

**4.3.2.2 Sensor Type 4 ... 20 mA**

For the current measurement with sensor type 4 ... 20 mA, the input range of +4 ... +20 mA is mapped to a value range of 0 ... +32767. The current underranges and overranges refer to manufacturer range violations.

Table 20: Process Image, Sensor Type 4 ... 20 mA, Two's Complement Representation

| Input current<br>mA                   | Numeric value     |                   |        |       | Status<br>Byte<br>Hex. | Error LED |
|---------------------------------------|-------------------|-------------------|--------|-------|------------------------|-----------|
|                                       | Binary            | XFÜ <sup>1)</sup> | Hex.   | Dec.  |                        |           |
| < 1.0<br>Wire break <sup>3)</sup>     | '0000.0000.0000.0 | 011'              | 0x0003 | 3     | 0x60                   | ON        |
| < 4.0<br>Underrange <sup>2)</sup>     | '0000.0000.0000.0 | 011'              | 0x0003 | 3     | 0x41                   | ON        |
| 4.0                                   | '0000.0000.0000.0 | 000'              | 0x0000 | 0     | 0x00                   | OFF       |
| 5.6                                   | '0000.1100.1100.0 | 000'              | 0x0CC8 | 3272  | 0x00                   | OFF       |
| 7.2                                   | '0001.1001.1001.1 | 000'              | 0x1998 | 6552  | 0x00                   | OFF       |
| 8.8                                   | '0010.0110.0110.0 | 000'              | 0x2660 | 9824  | 0x00                   | OFF       |
| 10.4                                  | '0011.0011.0011.0 | 000'              | 0x3330 | 13104 | 0x00                   | OFF       |
| 12.0                                  | '0011.1111.1111.1 | 000'              | 0x3FF8 | 16376 | 0x00                   | OFF       |
| 13.6                                  | '0100.1100.1100.1 | 000'              | 0x4CC8 | 19656 | 0x00                   | OFF       |
| 15.2                                  | '0101.1001.1001.1 | 000'              | 0x5998 | 22936 | 0x00                   | OFF       |
| 16.8                                  | '0110.0110.0110.0 | 000'              | 0x6660 | 26208 | 0x00                   | OFF       |
| 18.4                                  | '0111.0011.0011.0 | 000'              | 0x7330 | 29488 | 0x00                   | OFF       |
| 20.0                                  | '0111.1111.1111.1 | 000'              | 0x7FF8 | 32760 | 0x00                   | OFF       |
| Overrange <sup>2)</sup><br>> 20.0     | '0111.1111.1111.1 | 011'              | 0x7FFB | 32763 | 0x42                   | ON        |
| Short circuit <sup>3)</sup><br>> 21.0 | '0111.1111.1111.1 | 011'              | 0x7FFB | 32763 | 0x50                   | ON        |

<sup>1)</sup>Status bits: X: not used, F= error, Ü= overflow

<sup>2)</sup>When underrange / overrange limit is ON

<sup>3)</sup>When wire break / short circuit diagnostics is ON

#### 4.3.2.3 Sensor Type 3.6 ... 21 mA (NAMUR NE43)

For the current measurement with sensor type 3.6 ... 21 mA, the input range of +3.6 ... +21 mA is mapped to a value range of -768 ... +32767. The current underranges and overranges refer to manufacturer range violations.

Table 21: Process Image, Sensor Type 3.6 ... 21 mA (NAMUR NE43), Two's Complement Representation

| Input current<br>mA         | Numeric value     |                   |        |       | Status<br>Byte<br>Hex. | Error LED |
|-----------------------------|-------------------|-------------------|--------|-------|------------------------|-----------|
|                             | Binary            | XFÜ <sup>1)</sup> | Hex.   | Dec.  |                        |           |
| < 1.0                       |                   |                   |        |       |                        |           |
| Wire break <sup>3)</sup>    | '1111.1101.0000.0 | 011'              | 0xFD03 | -765  | 0x60                   | ON        |
| < 3.6                       |                   |                   |        |       |                        |           |
| Underrange <sup>2)</sup>    | '1111.1101.0000.0 | 011'              | 0xFD03 | -765  | 0x41                   | ON        |
| 3.6                         | '1111.1101.0000.0 | 011'              | 0xFD03 | -765  | 0x41                   | ON        |
| 3.8                         | '1111.1110.0111.1 | 000'              | 0xFE78 | -392  | 0x00                   | OFF       |
| 4.0                         | '0000.0000.0000.0 | 000'              | 0x0000 | 0     | 0x00                   | OFF       |
| 5.6                         | '0000.1100.0000.1 | 000'              | 0x0C08 | 3080  | 0x00                   | OFF       |
| 7.2                         | '0001.1000.0001.0 | 000'              | 0x1810 | 6160  | 0x00                   | OFF       |
| 8.8                         | '0010.0100.0010.0 | 000'              | 0x2420 | 9248  | 0x00                   | OFF       |
| 10.4                        | '0011.0000.0010.1 | 000'              | 0x3028 | 12328 | 0x00                   | OFF       |
| 12.0                        | '0011.1100.0011.1 | 000'              | 0x3C38 | 15416 | 0x00                   | OFF       |
| 13.6                        | '0100.1000.0100.0 | 000'              | 0x4840 | 18496 | 0x00                   | OFF       |
| 15.2                        | '0101.0100.0101.0 | 000'              | 0x5450 | 21584 | 0x00                   | OFF       |
| 16.8                        | '0110.0000.0101.1 | 000'              | 0x6058 | 24664 | 0x00                   | OFF       |
| 18.4                        | '0111.0000.0110.1 | 000'              | 0x6C68 | 27752 | 0x00                   | OFF       |
| 20.0                        | '0111.1000.1110.0 | 000'              | 0x7870 | 30832 | 0x00                   | OFF       |
| 20.5                        | '0111.1100.0011.1 | 000'              | 0x7C38 | 31800 | 0x00                   | OFF       |
| 21.0                        | '0111.1111.1111.1 | 011'              | 0x7FFB | 32763 | 0x42                   | ON        |
| Overrange <sup>2)</sup>     |                   |                   |        |       |                        |           |
| > 21.0                      | '0111.1111.1111.1 | 011'              | 0x7FFB | 32763 | 0x42                   | ON        |
| Short circuit <sup>3)</sup> |                   |                   |        |       |                        |           |
| > 21.0                      | '0111.1111.1111.1 | 011'              | 0x7FFB | 32763 | 0x50                   | ON        |

<sup>1)</sup>Status bits: X: not used, F= error, Ü= overflow

<sup>2)</sup>When underrange / overrange limit is ON

<sup>3)</sup>When wire break / short circuit diagnostics is ON

### 4.3.3 Special Format

#### 4.3.3.1 Sensor Type 0 ... 20 mA

For the current measurement with sensor type 0 ... 20 mA, the input range of 0 ... +20 mA is mapped to a process value range of 0 ... +32767. The current underranges and overranges refer to manufacturer range violations.

Table 22: Process Image, Sensor Type 0 ... 20 mA, Amount/Sign Format

| Input current<br>mA         | Numeric value     |                   |        |       | Status<br>Byte<br>Hex. | Error LED |
|-----------------------------|-------------------|-------------------|--------|-------|------------------------|-----------|
|                             | Binary            | XFÜ <sup>1)</sup> | Hex.   | Dec.  |                        |           |
| < 0                         | '0000.0000.0000.0 | 011'              | 0x0003 | 3     | 0x41                   | ON        |
| Underrange <sup>2)</sup>    |                   |                   |        |       |                        |           |
| 0.0                         | '0000.0000.0000.0 | 000'              | 0x0000 | 0     | 0x00                   | OFF       |
| 2.5                         | '0000.1111.1111.1 | 000'              | 0x0FF8 | 4088  | 0x00                   | OFF       |
| 5.0                         | '0001.1111.1111.1 | 000'              | 0x1FF8 | 8184  | 0x00                   | OFF       |
| 7.5                         | '0010.1111.1111.1 | 000'              | 0x2FF8 | 12280 | 0x00                   | OFF       |
| 10.0                        | '0011.1111.1111.1 | 000'              | 0x3FF8 | 16376 | 0x00                   | OFF       |
| 12.5                        | '0100.1111.1111.1 | 000'              | 0x4FF8 | 20472 | 0x00                   | OFF       |
| 15.0                        | '0101.1111.1111.1 | 000'              | 0x5FF8 | 24568 | 0x00                   | OFF       |
| 17.5                        | '0110.1111.1111.1 | 000'              | 0x6FF8 | 28664 | 0x00                   | OFF       |
| 20.0                        | '0111.1111.1111.1 | 000'              | 0x7FF8 | 32760 | 0x00                   | OFF       |
| Overrange <sup>2)</sup>     | '0111.1111.1111.1 | 011'              | 0x7FFB | 32763 | 0x42                   | ON        |
| > 20.0                      |                   |                   |        |       |                        |           |
| Short circuit <sup>3)</sup> | '0111.1111.1111.1 | 011'              | 0x7FFB | 32763 | 0x50                   | ON        |
| > 21.0                      |                   |                   |        |       |                        |           |

<sup>1)</sup>Status bits: X: not used, F= error, Ü= overflow

<sup>2)</sup>When underrange / overrange limit is ON

<sup>3)</sup>When short circuit diagnostics is ON

### 4.3.3.2 Sensor Type 4 ... 20 mA

For the current measurement with sensor type 4 ... 20 mA, the input range of +4 ... +20 mA is mapped to a value range of 0 ... +32767. The current underranges and overranges refer to manufacturer range violations.

Table 23: Process Image, Sensor Type 4 ... 20 mA, Amount/Sign Format

| Input current<br>mA         | Numeric value     |                   |        |       | Status<br>Byte<br>Hex. | Error LED |
|-----------------------------|-------------------|-------------------|--------|-------|------------------------|-----------|
|                             | Binary            | XFÜ <sup>1)</sup> | Hex.   | Dec.  |                        |           |
| < 1.0                       | '0000.0000.0000.0 | 011'              | 0x0003 | 3     | 0x60                   | ON        |
| Wire break <sup>3)</sup>    |                   |                   |        |       |                        |           |
| < 4.0                       | '0000.0000.0000.0 | 011'              | 0x0003 | 3     | 0x41                   | ON        |
| Underrange <sup>2)</sup>    |                   |                   |        |       |                        |           |
| 4.0                         | '0000.0000.0000.0 | 000'              | 0x0000 | 0     | 0x00                   | OFF       |
| 5.6                         | '0000.1100.1100.0 | 000'              | 0x0CC8 | 3272  | 0x00                   | OFF       |
| 7.2                         | '0001.1001.1001.1 | 000'              | 0x1998 | 6552  | 0x00                   | OFF       |
| 8.8                         | '0010.0110.0110.0 | 000'              | 0x2660 | 9824  | 0x00                   | OFF       |
| 10.4                        | '0011.0011.0011.0 | 000'              | 0x3330 | 13104 | 0x00                   | OFF       |
| 12.0                        | '0011.1111.1111.1 | 000'              | 0x3FF8 | 16376 | 0x00                   | OFF       |
| 13.6                        | '0100.1100.1100.1 | 000'              | 0x4CC8 | 19656 | 0x00                   | OFF       |
| 15.2                        | '0101.1001.1001.1 | 000'              | 0x5998 | 22936 | 0x00                   | OFF       |
| 16.8                        | '0110.0110.0110.0 | 000'              | 0x6660 | 26208 | 0x00                   | OFF       |
| 18.4                        | '0111.0011.0011.0 | 000'              | 0x7330 | 29488 | 0x00                   | OFF       |
| 20.0                        | '0111.1111.1111.1 | 000'              | 0x7FF8 | 32760 | 0x00                   | OFF       |
| Overrange <sup>2)</sup>     | '0111.1111.1111.1 | 011'              | 0x7FFB | 32763 | 0x42                   | ON        |
| > 20.0                      |                   |                   |        |       |                        |           |
| Short circuit <sup>3)</sup> | '0111.1111.1111.1 | 011'              | 0x7FFB | 32763 | 0x50                   | ON        |
| > 21.0                      |                   |                   |        |       |                        |           |

<sup>1)</sup>Status bits: X: not used, F= error, Ü= overflow

<sup>2)</sup>When underrange / overrange limit is ON

<sup>3)</sup>When wire break / short circuit diagnostics is ON



**4.3.3.3 Sensor Type 3.6 ... 21 mA (NAMUR NE43)**

For the current measurement with sensor type 3.6 ... 21 mA, the input range of +3.6 ... +21 mA is mapped to a value range of **-771 ... +32767**. The current underranges and overranges refer to manufacturer range violations.

Table 24: Process Image, Sensor Type 3.6 ... 21 mA (NAMUR NE43), Amount/Sign Format

| Input current<br>mA         | Numeric value     |                   |        |             | Status       | Error LED |
|-----------------------------|-------------------|-------------------|--------|-------------|--------------|-----------|
|                             | Binary            | XFÜ <sup>1)</sup> | Hex.   | Dec.        | Byte<br>Hex. |           |
| < 1.0                       | '1000.0011.0000.0 | 011'              | 0x8303 | <b>-771</b> | 0x60         | ON        |
| Wire break <sup>3)</sup>    |                   |                   |        |             |              |           |
| < 3.6                       | '1000.0011.0000.0 | 011'              | 0x8303 | <b>-771</b> | 0x41         | ON        |
| Underrange <sup>2)</sup>    |                   |                   |        |             |              |           |
| 3.6                         | '1000.0011.0000.0 | 011'              | 0x8303 | <b>-771</b> | 0x41         | ON        |
| 3.8                         | '1000.0001.1000.1 | 000'              | 0x8188 | <b>-392</b> | 0x00         | OFF       |
| 4.0                         | '0000.0000.0000.0 | 000'              | 0x0000 | 0           | 0x00         | OFF       |
| 5.6                         | '0000.1100.0000.1 | 000'              | 0x0C08 | 3080        | 0x00         | OFF       |
| 7.2                         | '0001.1000.0001.0 | 000'              | 0x1810 | 6160        | 0x00         | OFF       |
| 8.8                         | '0010.0100.0010.0 | 000'              | 0x2420 | 9248        | 0x00         | OFF       |
| 10.4                        | '0011.0000.0010.1 | 000'              | 0x3028 | 12328       | 0x00         | OFF       |
| 12.0                        | '0011.1100.0011.1 | 000'              | 0x3C38 | 15416       | 0x00         | OFF       |
| 13.6                        | '0100.1000.0100.0 | 000'              | 0x4840 | 18496       | 0x00         | OFF       |
| 15.2                        | '0101.0100.0101.0 | 000'              | 0x5450 | 21584       | 0x00         | OFF       |
| 16.8                        | '0110.0000.0101.1 | 000'              | 0x6058 | 24664       | 0x00         | OFF       |
| 18.4                        | '0111.0000.0110.1 | 000'              | 0x6C68 | 27752       | 0x00         | OFF       |
| 20.0                        | '0111.1000.1110.0 | 000'              | 0x7870 | 30832       | 0x00         | OFF       |
| 20.5                        | '0111.1100.0011.1 | 000'              | 0x7C38 | 31800       | 0x00         | OFF       |
| 21.0                        | '0111.1111.1111.1 | 011'              | 0x7FFB | 32763       | 0x42         | ON        |
| Overrange <sup>2)</sup>     | '0111.1111.1111.1 | 011'              | 0x7FFB | 32763       | 0x42         | ON        |
| > 21.0                      |                   |                   |        |             |              |           |
| Short circuit <sup>3)</sup> | '0111.1111.1111.1 | 011'              | 0x7FFB | 32763       | 0x50         | ON        |
| > 21.0                      |                   |                   |        |             |              |           |

<sup>1)</sup>Status bits: X: not used, F= error, Ü= overflow

<sup>2)</sup>When underrange / overrange limit is ON

<sup>3)</sup>When wire break / short circuit diagnostics is ON

## 5 Mounting

### 5.1 Mounting Sequence

Fieldbus couplers, controllers and I/O modules of the WAGO-I/O-SYSTEM 750 are snapped directly on a carrier rail in accordance with the European standard EN 60175 (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 or 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. Do not touch the blade contacts.

---

---

#### **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 or controllers to guarantee proper data transfer.

---

## 5.2 Inserting and Removing Devices



### DANGER

**Do not work when devices are energized!**

High voltage can cause electric shock or burns.

Switch off all power to the device prior to performing any installation, repair or maintenance work.

### 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 or controller or to the previous or possibly subsequent I/O module are engaged.

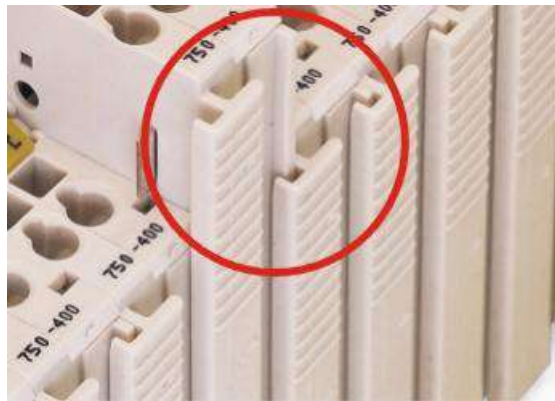


Figure 7: Insert I/O Module (Example)

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

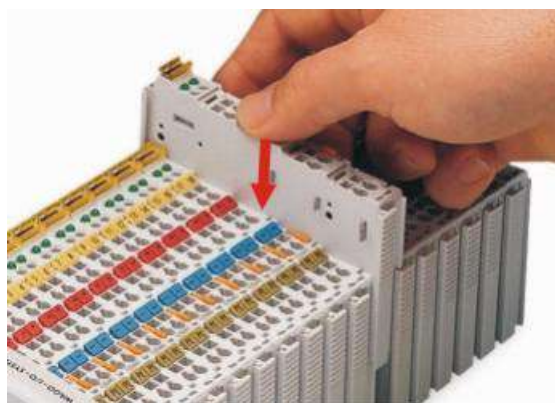


Figure 8: Snap the I/O Module into Place (Example)

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 or 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.

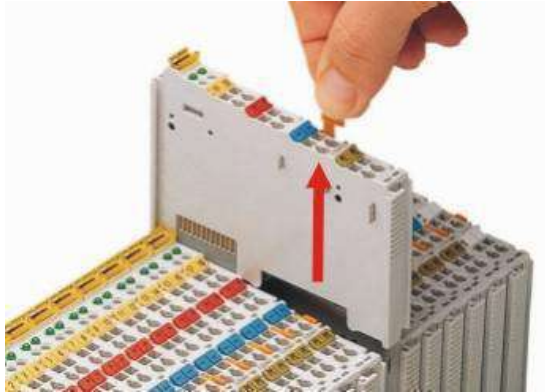


Figure 9: Removing the I/O Module (Example)

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 Push-in CAGE CLAMP®

The Push-in CAGE CLAMP® connection is appropriate for solid, stranded and finely stranded conductors.



#### Note

**Only connect one conductor to each Push-in CAGE CLAMP® connection!**  
Only one conductor may be connected to each Push-in CAGE CLAMP® connection.  
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.

Terminate both solid and stranded or ferruled conductors by simply pushing them in - no tool required. For all other types of conductors, Push-in CAGE CLAMP® must be opened for connection with an operating tool with a 2.5 mm blade (order no. 210-719).

1. To open the Push-in CAGE CLAMP® insert the actuating tool into the opening above the connection.
2. Insert the conductor into the corresponding connection opening.
3. To close the Push-in CAGE CLAMP® simply remove the tool - the conductor is then clamped firmly in place.

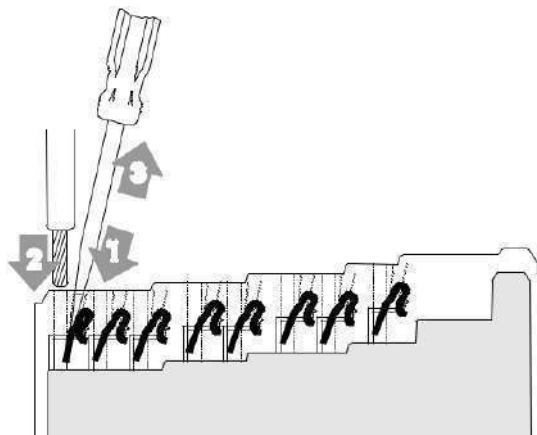


Figure 10: Connecting a Conductor to a Push-in CAGE CLAMP®

## 6.2 Connection Example

### 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.

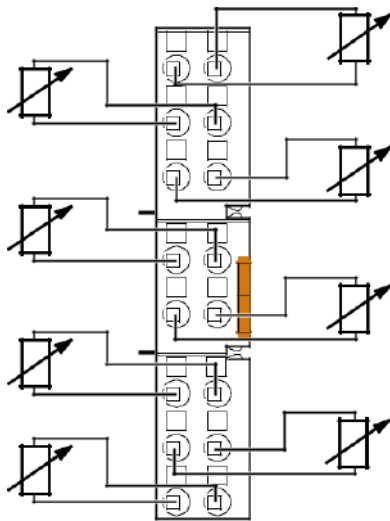


Figure 11: Connection example – 2-Wire

## 7 Commissioning

### 7.1 Parameterization with WAGO-I/O-CHECK

The WAGO-I/O-CHECK software from WAGO Kontakttechnik GmbH & Co. KG can be used to conveniently and completely configure and parameterize the I/O module. You have the following options.

- Graphical display of bus nodes
- Display of the measured values
- Settings for the application
- Configuration of the I/O module operating modes
- Parameterization of module, channel and scaling settings
- Calibration of channels and adjustment of analog inputs
- Monitoring

#### Information



##### **WAGO-I/O-CHECK**

You can obtain the WAGO-I/O-CHECK software on a CD under Item No. 759-302. This CD contains all the application program files and an explanation. You can find a description at the internet page at <http://www.wago.com>

#### Note



##### **Save all your settings before you begin parameterization!**

To be on the safe side you should always save all of your current settings in a parameter file before you begin parameterization. This enables you to always use the original values, should any parameters you are defining not be correct.

To open specific parameterization dialogs for the I/O module 750-496, proceed as follows:

1. Right click on the I/O module.
2. Click the **Settings** menu item (see following figure).

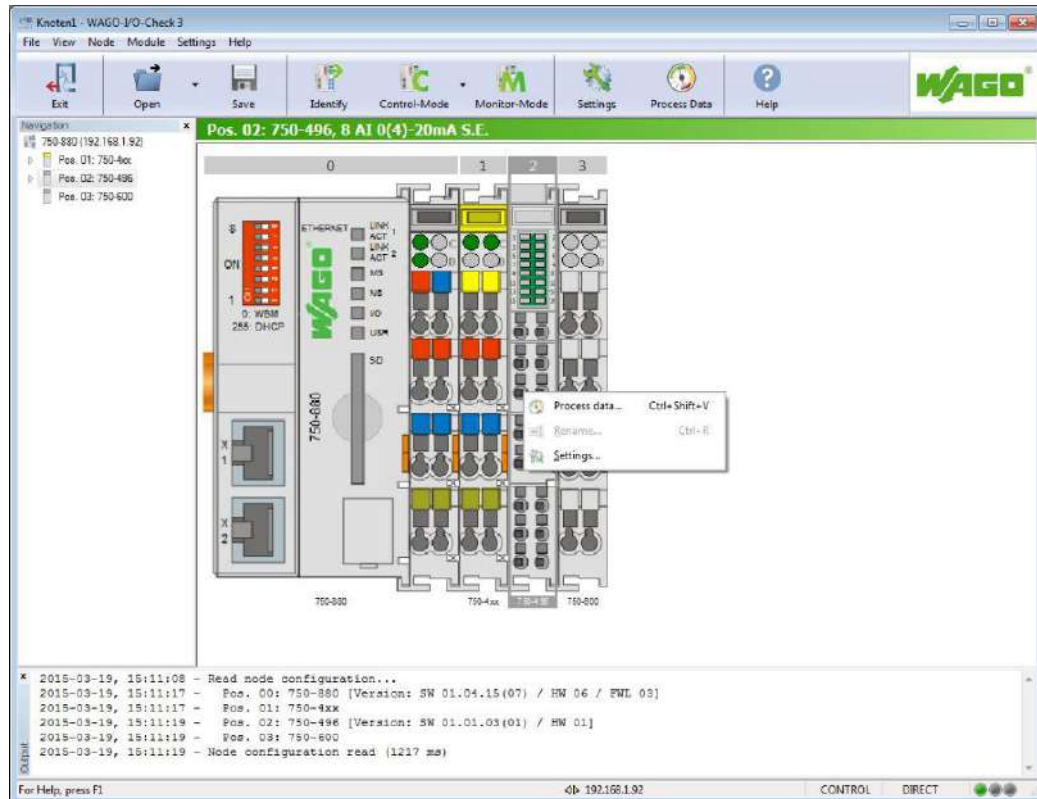


Figure 12: WAGO-I/O-CHECK user interface

The configuration dialog appears, which forms the basis for the following description. This forms the basis for the subsequent explanation.



### 7.1.1 Parameterization Dialog

The parameterization dialog is divided into the following areas:

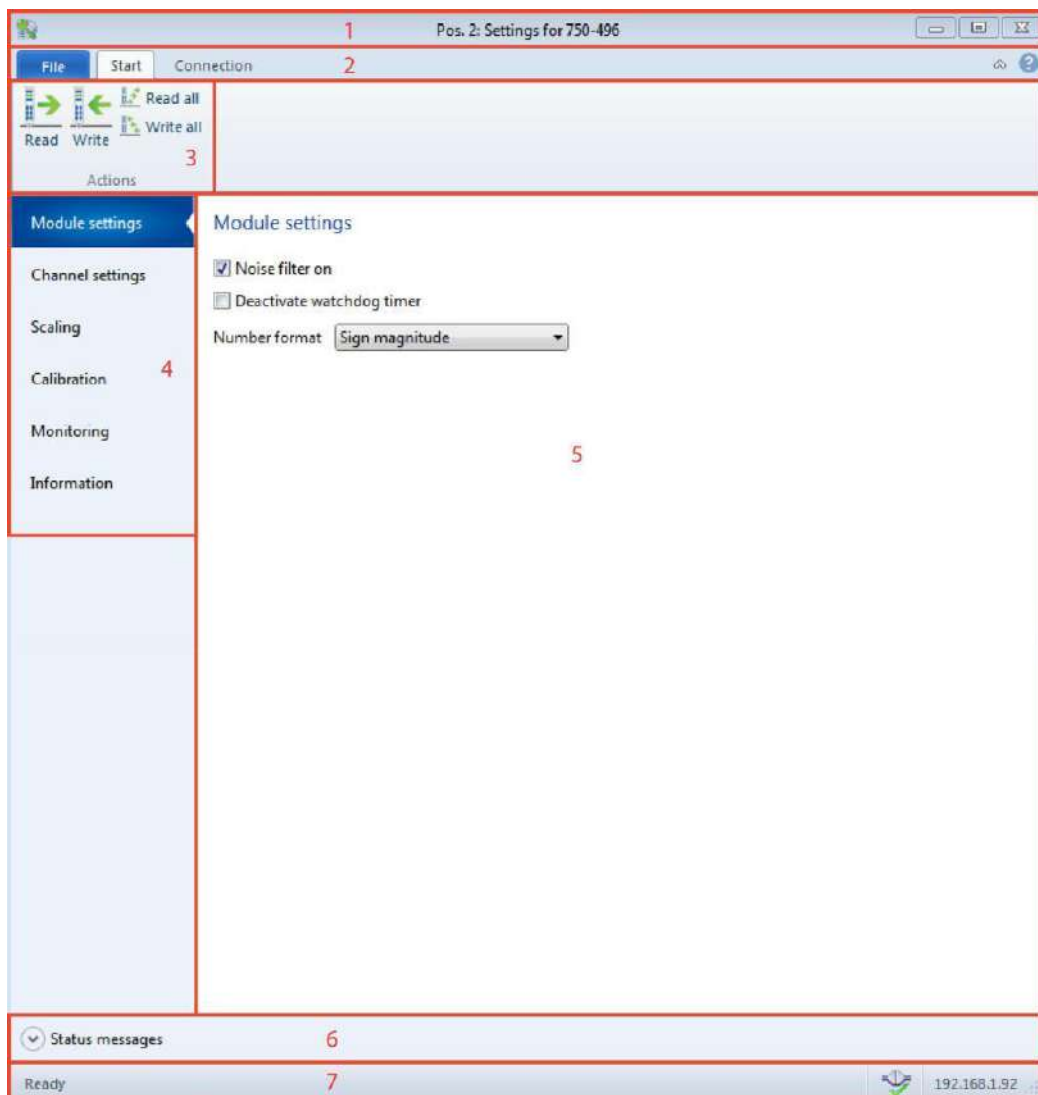


Figure 13: Parameterization Dialog for the I/O Module 750-496

- 1 Title bar
- 2 Horizontal tab menu
- 3 Main menu
- 4 Vertical tab menu
- 5 Area of application
- 6 Status messages
- 7 Status bar

The individual areas are explained in more detail in the following sections.

### 7.1.1.1 Title Bar

The title bar in the parameterization dialog contains the program icon, a window title and buttons for exiting, minimizing and maximizing the application window.

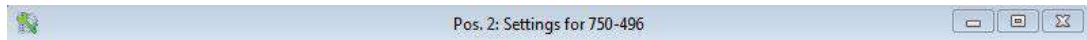
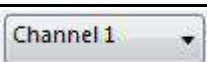


Figure 14: Title Bar in the Parameterization Dialog

The window title provides information about the position of the selected I/O module within the fieldbus node used and the item number of the selected I/O module.

### 7.1.1.2 Main Menu

Table 25: buttons on the main menu

| Button                                                                                            | Function     | Description                                                                                           |
|---------------------------------------------------------------------------------------------------|--------------|-------------------------------------------------------------------------------------------------------|
| <br>Connect      | [Connect]    | Creates a connection to the I/O module                                                                |
| <br>Disconnect | [Disconnect] | Interrupts an existing connection to the I/O module                                                   |
| <br>Read       | [Read]       | Reads all parameters of the currently displayed view in the application area of the I/O module.       |
| <br>Read all   | [Read all]   | Reads all parameters from the I/O module including module, channel, scaling and calibration settings. |
| <br>Write      | [Write]      | Writes all parameters of the currently displayed view in the application area to the I/O module.      |
| <br>Write all  | [Write all]  | Writes all parameters to the I/O module including module, channel, scaling and calibration settings.  |
| <br>Channel 1  | [Channel x]  | Opens the channel selection list.                                                                     |

### 7.1.1.3 Horizontal Tab Menu

The horizontal tab menu contains the following tabs:

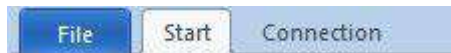


Figure 15: Horizontal Tab Menu

Click one of the tabs to display the respective selection options in the main menu.

The individual tabs are explained in more detail in the following sections.

#### 7.1.1.3.1 “File” Tab

The **File** tab opens the application menu. It contains the following buttons.

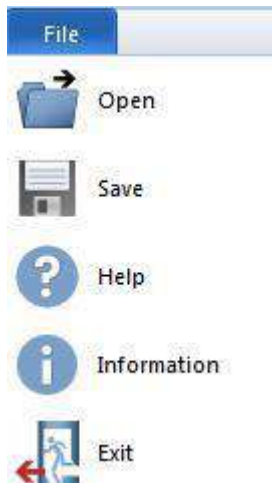


Figure 16: Buttons in the Application Menu

Table 26: Buttons in the application menu

| Button                                                                                          | Function      | Description                                                                                                                             |
|-------------------------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------|
|  Open        | [Open]        | Opens the dialog for loading a parameter file.                                                                                          |
|  Save        | [Save]        | Opens the dialog for saving a parameter file.                                                                                           |
|  Help        | [Help]        | Opens the manual for the I/O module 750-496 in PDF format                                                                               |
|  Information | [Information] | Opens the information dialog, which contains details about the version of the software used and the manufacturer's contact information. |
|  Exit        | [Exit]        | Closes the parameterization dialog and the connection to the I/O module is interrupted.                                                 |
| Recent parameter files                                                                          |               | Lists recent parameter files (max. 15); you can open the files from this area directly.                                                 |

Select one of the menu items to execute the respective action.

#### 7.1.1.3.1.1 “Open” Menu Item



### Note

#### Only open parameter files created with WAGO-I/O-CHECK!

Please note that only parameter files created with WAGO-I/O-CHECK can be opened. The parameter files have the extension \*.ai.

In this menu item you can open and load an existing parameter file. Proceed as follows:

1. Click the **[File]** button in the horizontal tab menu.
2. The application menu opens.
3. Click the **[Open]** button in the application menu.
4. A standard Windows dialog for selecting the source directory opens.
5. Select the parameter file that you want to open.
6. Click **[Open]** in the standard Windows dialog.
7. The parameter file opens.

#### 7.1.1.3.1.2 “Save” Menu Item



### Note

#### Calibration settings are not saved!

Please note that the calibration settings cannot be saved in the parameter file.



### Note

#### Note the memory range!

Please note that only the settings are saved in the parameter file that you have already transferred to the I/O module by clicking the **[Write]** or **[Write all]** buttons in the main menu.

In this menu item you can save the changes you have made in a parameter file. Proceed as follows:

1. Click the **[File]** button in the horizontal tab menu.
2. The application menu opens.
3. Click the **[Save]** button in the application menu.
4. A standard Windows dialog appears to select the target directory.

5. Select the target directory in which you want to save the new parameter file.
6. Click **[Save]** in the standard Windows dialog.
7. The parameter file is saved to the target directory that you selected.

#### 7.1.1.3.2 “Start” Tab

Click the **Start** tab in the horizontal tab menu to display the following selection options in the main menu.



Figure 17: Contents of the Horizontal Tab **Start**

If you select the **Channel settings** menu item in the vertical tab menu, you can also choose the required I/O module channel in the main menu.

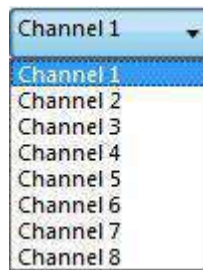


Figure 18: Start > Main Menu > Channel Selection List

The exact meaning of the individual selection options is described in the “Main Menu” section.

#### 7.1.1.3.3 “Connection” Tab

Click the **Connection** tab in the horizontal tab menu to display the following selection options in the main menu.

If there is no connection to the I/O module, the following button appears:



Figure 19: **Connection** Tab for Disconnected I/O Module

Click the **[Connect]** button to establish a connection to the I/O module.

If there is a connection to the I/O module, the following button appears:



Figure 20: **Connection** Tab for Connected I/O Module

Click the **[Disconnect]** button to interrupt the connection to the I/O module.

The exact meaning of the individual selection options is described in the “Main Menu” section.

#### 7.1.1.4 Vertical Tab Menu

In the vertical tab menu, you can select the individual module- and channel-specific menu items.



Figure 21: Overview of the Vertical Tab Menu

Click one of the menu items to call up the related parameterization options in the application area.

The exact meaning of the individual selection options is described in the following sections.

#### 7.1.1.4.1 “Module settings” Menu Item



### Note

#### Save settings!

Click the **[Write]** or **[Write all]** button to write any settings you have made to the I/O module.

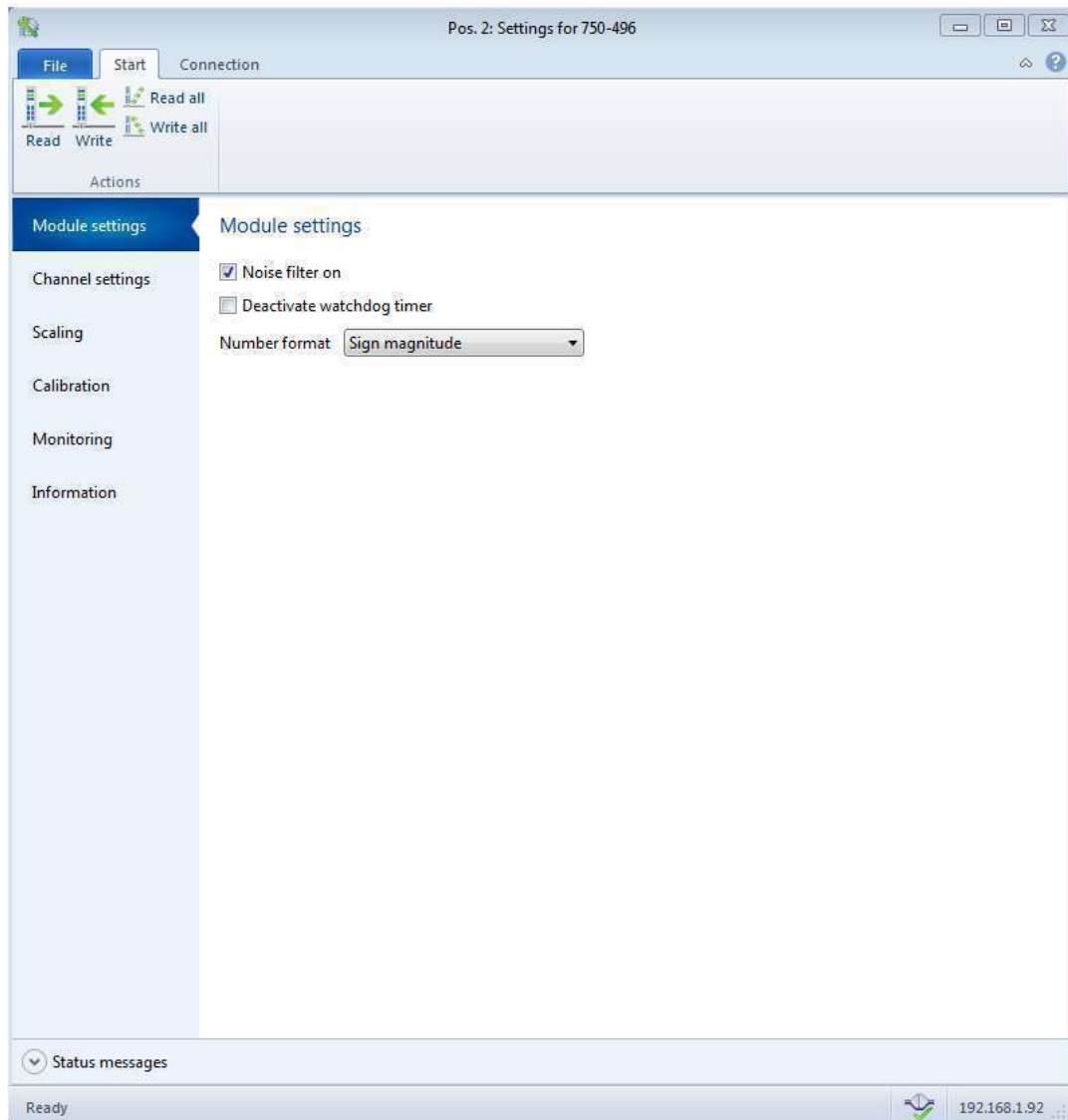


Figure 22: **Module settings** Menu Item View

Table 27: **Module settings** Menu Item

| Option                      | Description                                                                                                       |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>Noise Filter</b>         |                                                                                                                   |
| Noise filter on             | <input type="checkbox"/> *) The noise filter is deactivated.                                                      |
|                             | <input checked="" type="checkbox"/> The noise filter is activated.                                                |
| <b>Watchdog Timer</b>       |                                                                                                                   |
| Deactivate watchdog timer   | <input type="checkbox"/> *) The watchdog timer is activated.                                                      |
|                             | <input checked="" type="checkbox"/> The watchdog timer is deactivated.<br>The green LEDs illuminate continuously. |
| <b>Process value format</b> |                                                                                                                   |
| Number format               | Two's complement representation*)                                                                                 |
|                             | Amount/sign format                                                                                                |

\*) Factory setting

#### 7.1.1.4.2 “Channel settings” Menu Item



### Note

#### Save settings!

Click the **[Write]** or **[Write all]** button to write any settings you have made to the I/O module.



### Note

#### Offset input for sensor type NAMUR NE43 not possible!

When selecting the sensor type 3.6 ... 21 mA (NAMUR NE 43), it is not possible to enter an offset value for the range violation diagnostics.



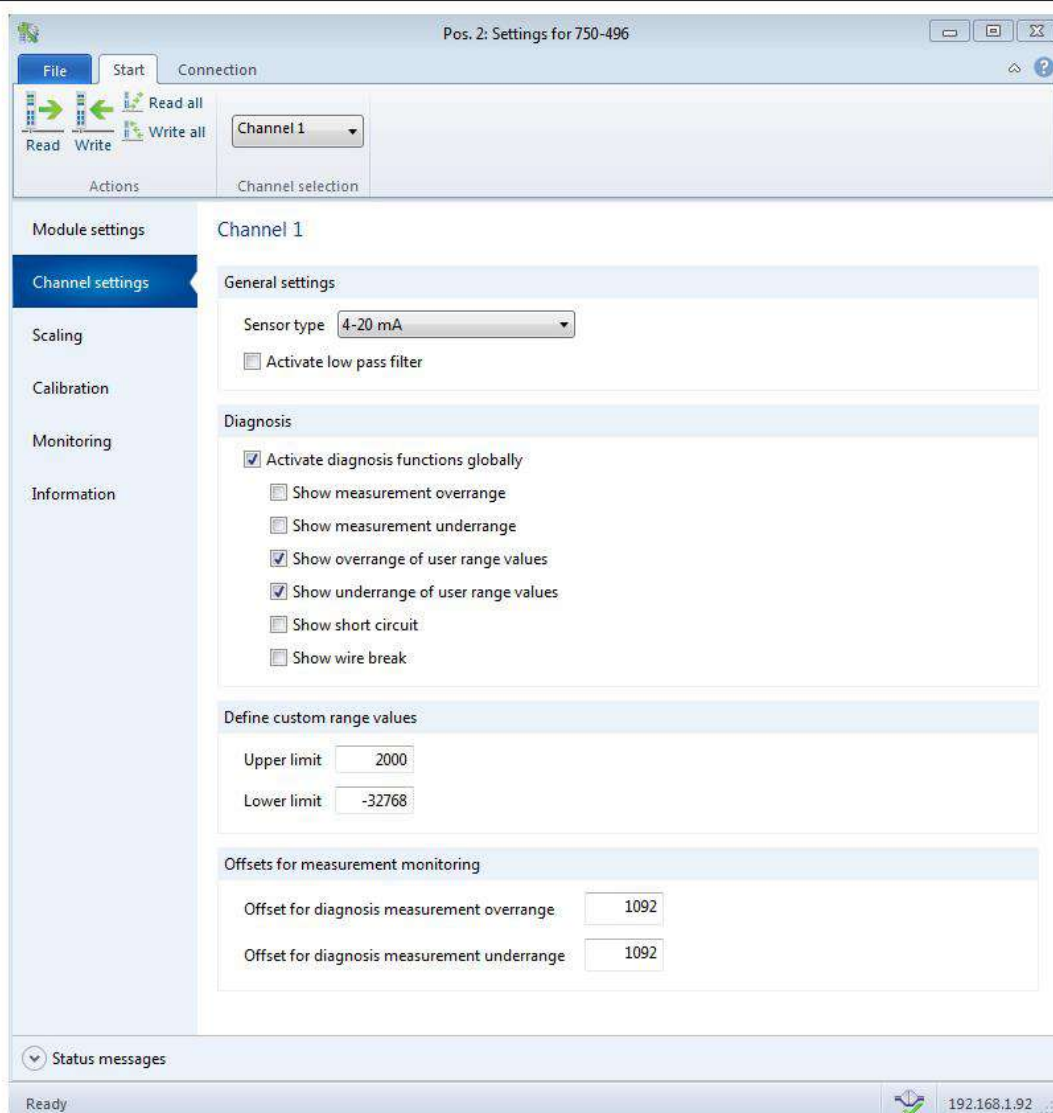


Figure 23: Channel settings Menu Item View

Table 28: Channel settings Menu Item

| Option                     | Description                                                                                                                     |                                                                                                                                                                                                                                |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>General Settings</b>    |                                                                                                                                 |                                                                                                                                                                                                                                |
| Sensor type                | Channel deactivated                                                                                                             | The channel selected in the main menu is deactivated.<br><br>If the channel is deactivated, "0x7FFF" appears in the <b>Monitoring</b> menu item under process value "N/A" (not available) and under hexadecimal process value. |
|                            | 0 ... 20 mA                                                                                                                     | Measurement range 0 ... +20 mA                                                                                                                                                                                                 |
|                            | 4 ... 20 mA <sup>*)</sup>                                                                                                       | Measurement range +4 ... +20 mA                                                                                                                                                                                                |
|                            | 3.6 ... 21 mA (NAMURNE43)                                                                                                       | Measurement range +3.8 ... +20.5 mA                                                                                                                                                                                            |
| Software low pass filter   | <input checked="" type="checkbox"/> The software low pass filter is activated.                                                  |                                                                                                                                                                                                                                |
| ON                         | <input type="checkbox"/> The software low pass filter is deactivated.                                                           |                                                                                                                                                                                                                                |
| <b>Diagnostics</b>         |                                                                                                                                 |                                                                                                                                                                                                                                |
| Show measurement overrange | <input checked="" type="checkbox"/> <sup>*)</sup> The "Measurement Overrange" is activated and is displayed in the status byte. |                                                                                                                                                                                                                                |
|                            | <input type="checkbox"/> The "Measurement Overrange" diagnosis function is deactivated and not displayed in the status byte.    |                                                                                                                                                                                                                                |

Table 28: **Channel settings** Menu Item

| Option                                         | Description                                                                                                                                                                                                                      |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Show measurement underrange                    | <input checked="" type="checkbox"/> *) The "Measurement Underrange" diagnosis function is activated and is displayed in the status byte.                                                                                         |
|                                                | <input type="checkbox"/> The "Measurement Underrange" diagnostics function is deactivated and is not displayed in the status byte.                                                                                               |
| Show overrange of user range values            | <input checked="" type="checkbox"/> *) The "User limiting value overrange" diagnosis function is activated and is displayed in the status byte.                                                                                  |
|                                                | <input type="checkbox"/> The "User limiting value overrange" diagnosis function is deactivated and is not displayed in the status byte.                                                                                          |
| Show underrange of user range values           | <input checked="" type="checkbox"/> *) The "User limiting value underrange" diagnosis function is activated and is displayed in the status byte.                                                                                 |
|                                                | <input type="checkbox"/> The "User limiting value underrange" diagnosis function is deactivated and is not displayed in the status byte.                                                                                         |
| Show short circuit                             | <input checked="" type="checkbox"/> *) The "Display short circuit" diagnosis function is activated and is displayed in the status byte.                                                                                          |
|                                                | <input type="checkbox"/> The "Display short circuit" diagnosis function is deactivated and is not displayed in the status byte.                                                                                                  |
| Show wire break                                | <input checked="" type="checkbox"/> *) The "Show wire break" is activated and is displayed in the status byte.                                                                                                                   |
|                                                | <input type="checkbox"/> The "Show wire break" diagnosis function is deactivated and is not display status byte.                                                                                                                 |
| <b>Specifying Limiting Values</b>              |                                                                                                                                                                                                                                  |
| Upper limit                                    | Enter the upper limiting value of your required value range.<br><b>The value entered must fall within the value range -32768 ... +32767.</b>                                                                                     |
| Lower limit                                    | Enter the lower limiting value of your required value range.<br><b>The value entered must fall within the value range -32768 ... +32767.</b>                                                                                     |
| <b>Offset for Measurement Range Monitoring</b> |                                                                                                                                                                                                                                  |
| Offset for diagnosis measurement overrange     | Enter the offset value at which the "Measurement Range Overrange" diagnostic message should be triggered.<br><br>Note: When selecting the sensor type 3.6 ... 21mA (NAMUR NE43), you are not permitted to determine this value.  |
| Offset for diagnosis measurement underrange    | Enter the offset value at which the "Measurement Range Underrange" diagnostic message should be triggered.<br><br>Note: When selecting the sensor type 3.6 ... 21mA (NAMUR NE43), you are not permitted to determine this value. |

\*) Factory setting

## 7.1.1.4.3 "Scaling" Menu Item

**Note****Save settings!**

Click the **[Write]** or **[Write all]** button to write any settings you have made to the I/O module.

## Note



### Selecting the scaling method!

Factory scaling is always active according to the measurement range selected.  
Gain/Offset values can be adjusted by activating the user scaling.  
Activating/deactivating factory scaling has no effect here.

## Note



### Scaling method is carried out by channel!

Before writing the settings to the I/O module, make sure to select the respective channel.

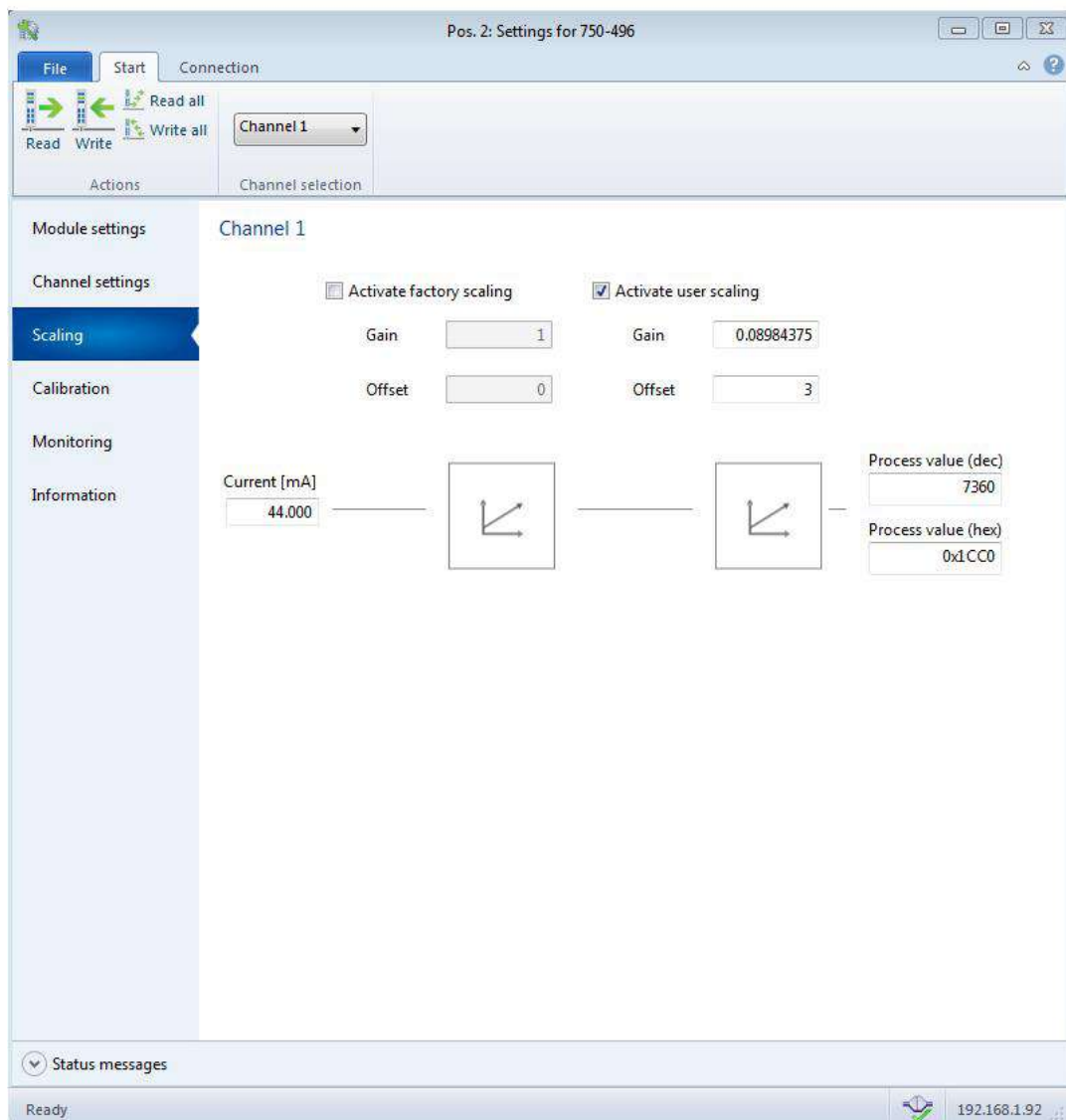


Figure 24: **Scaling** Menu Item View

Table 29: **Scaling** Menu Item

| Option                   | Description                                                                                                                                                                                                                        |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Channel x</b>         |                                                                                                                                                                                                                                    |
| Activate factory scaling | <input checked="" type="checkbox"/> Factory scaling is activated (no effect).                                                                                                                                                      |
|                          | <input type="checkbox"/> Factory scaling is deactivated (no effect).                                                                                                                                                               |
|                          | Gain The Gain value is specified by the manufacturer.                                                                                                                                                                              |
|                          | Offset The Offset value is specified by the manufacturer.                                                                                                                                                                          |
| Activate user scaling    | <input checked="" type="checkbox"/> User-defined scaling is active. By activating this setting you can also specify the individual gain and offset values.                                                                         |
|                          | <input type="checkbox"/> User scaling is deactivated. Individually specified gain and offset values cannot be entered.                                                                                                             |
|                          | Gain Enter the Gain value for the user scaling.<br>The Gain value is used as a gain factor on the process value.<br>The value entered must fall within the value range 0 ... 65535.<br>The resolution is 1/1024.                   |
|                          | Offset Enter the Offset value for the user scaling.<br>The Offset value causes a zero offset of the process value (shift along the Y axis).<br>The value entered must fall within the value range <b>-32768 ... 32767</b> .        |
| Current [mA]             | Display of the calibrated input current in milliamps (mA).<br>This is a 32-bit value.<br>If the channel is deactivated, "N/A" (not available) is displayed.<br><br>The input current value is read cyclically from the I/O module. |
| Process value (dec)      | Display of the process value for the channel selected in decimal notation.<br>If the channel is deactivated, "N/A" (not available) is displayed.<br><br>The process value is read cyclically from the I/O module.                  |
| Process value (hex)      | Display of the process value for the channel selected in hexadecimal notation.<br>If the channel is deactivated, "0x7FFF" (not available) is displayed.<br><br>The process value is read cyclically from the I/O module.           |

<sup>\*)</sup> Factory setting

## 7.1.1.4.4 “Calibration” Menu Item



## Note

### Save settings!

Click the **[Write]** or **[Write all]** button to write any settings you have made to the I/O module.

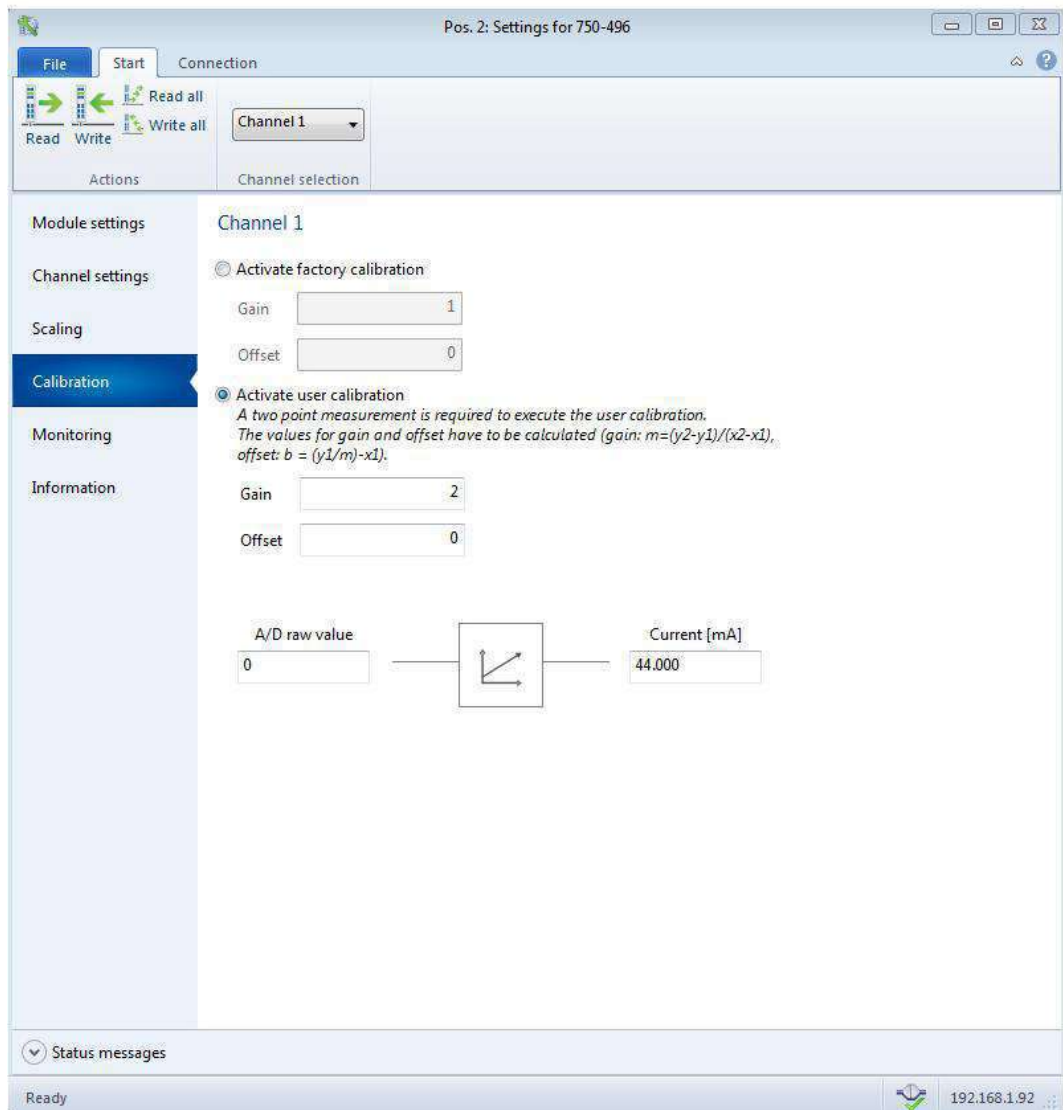


Figure 25: Calibration Menu Item View

Table 30: Calibration Menu Item

| Option                              |                                                                                                                                                                 | Description                                                                                                                                                                                                                  |                                                                                                                                                        |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Selection of the calibration method | Activate factory configuration                                                                                                                                  |                                                                                                                                                                                                                              |                                                                                                                                                        |
|                                     | Activate factory configuration                                                                                                                                  | <input checked="" type="radio"/> *)                                                                                                                                                                                          | Factory calibration is activated and user calibration is deactivated.                                                                                  |
|                                     |                                                                                                                                                                 | <input type="radio"/>                                                                                                                                                                                                        | Factory calibration is deactivated and user calibration is activated.                                                                                  |
|                                     |                                                                                                                                                                 | Gain                                                                                                                                                                                                                         | The Gain value is specified by the manufacturer.                                                                                                       |
|                                     |                                                                                                                                                                 | Offset                                                                                                                                                                                                                       | The Offset value is specified by the manufacturer.                                                                                                     |
|                                     | Activate user calibration                                                                                                                                       |                                                                                                                                                                                                                              |                                                                                                                                                        |
|                                     | Activate user calibration                                                                                                                                       | <input checked="" type="radio"/>                                                                                                                                                                                             | User calibration is activated and factory calibration is deactivated. You determine the gain and offset value yourself.                                |
|                                     |                                                                                                                                                                 | <input type="radio"/> *)                                                                                                                                                                                                     | User calibration is deactivated and factory calibration is activated.                                                                                  |
|                                     |                                                                                                                                                                 | Gain                                                                                                                                                                                                                         | Enter the Gain value for the user calibration.                                                                                                         |
|                                     |                                                                                                                                                                 |                                                                                                                                                                                                                              | The Gain value changes the gain factor of the A/D raw value. The value entered must fall within the value range 0 ... 65535. The resolution is 1/8192. |
| Offset                              | Enter the Offset value for the user calibration.                                                                                                                |                                                                                                                                                                                                                              |                                                                                                                                                        |
|                                     | The Offset value moves the zero point of the A/D raw value (offset on the y axis). The value entered must fall within the value range <b>-32768 ... 32767</b> . |                                                                                                                                                                                                                              |                                                                                                                                                        |
| A/D raw value                       |                                                                                                                                                                 | Raw value of the analog/digital converter. This is a 14-bit value. If the channel is deactivated, "N/A" (not available) is displayed.<br><br>The A/D raw value is read cyclically from the I/O module.                       |                                                                                                                                                        |
| Current [mA]                        |                                                                                                                                                                 | Display of the calibrated input current in milliamps (mA). This is a 32-bit value. If the channel is deactivated, "N/A" (not available) is displayed.<br><br>The input current value is read cyclically from the I/O module. |                                                                                                                                                        |

<sup>\*)</sup> Factory setting

### 7.1.1.4.5 “Monitoring” Menu Item

In this area, an overview of all of the I/O module channels are displayed individually. This overview provides information about the process value of each individual I/O module channel.

## Note



### Save settings!

Click the **[Write]** or **[Write all]** button to write any settings you have made to the I/O module.

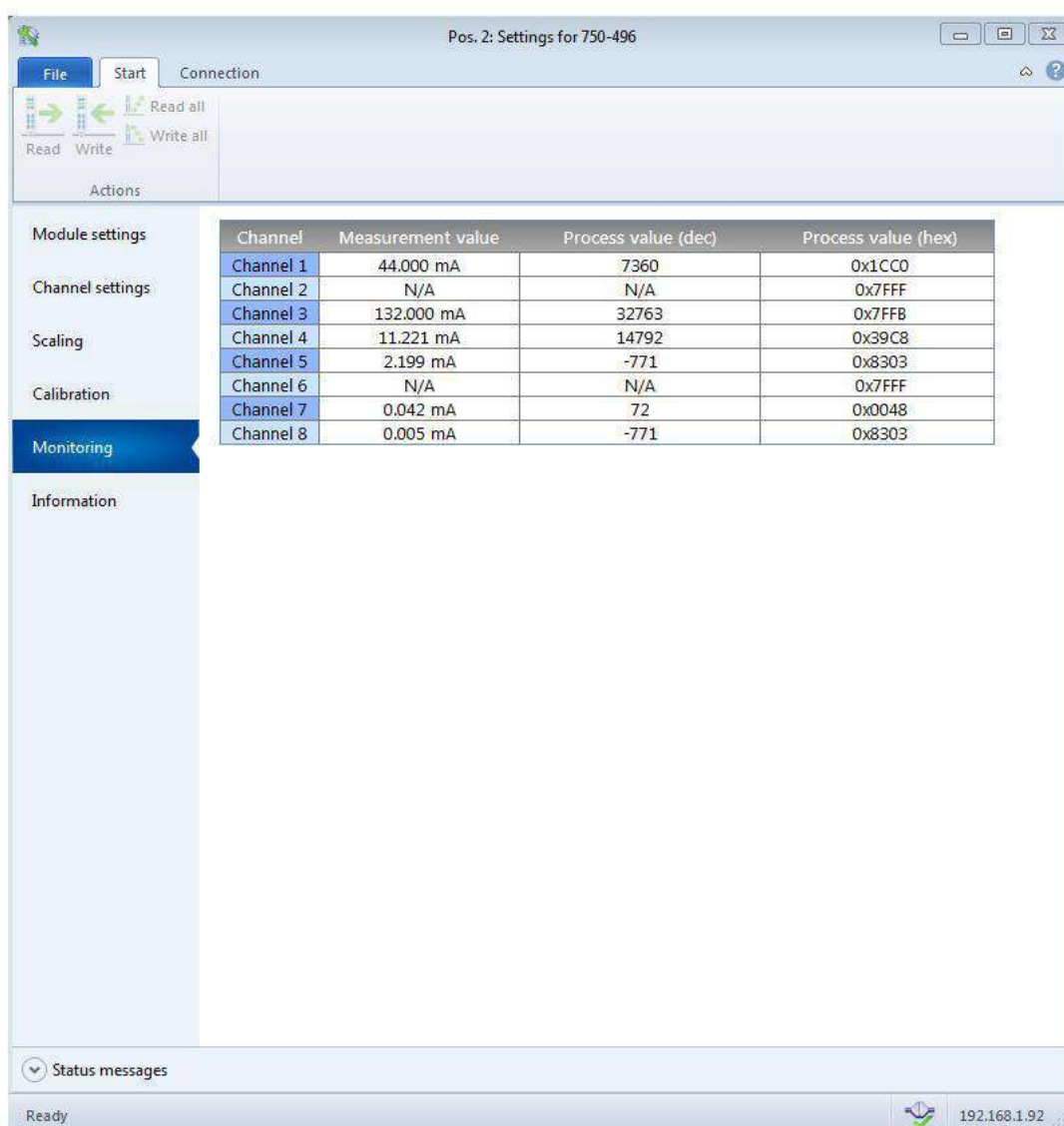


Figure 26: **Monitoring** Menu Item View

Table 31: **Monitoring** Menu Item

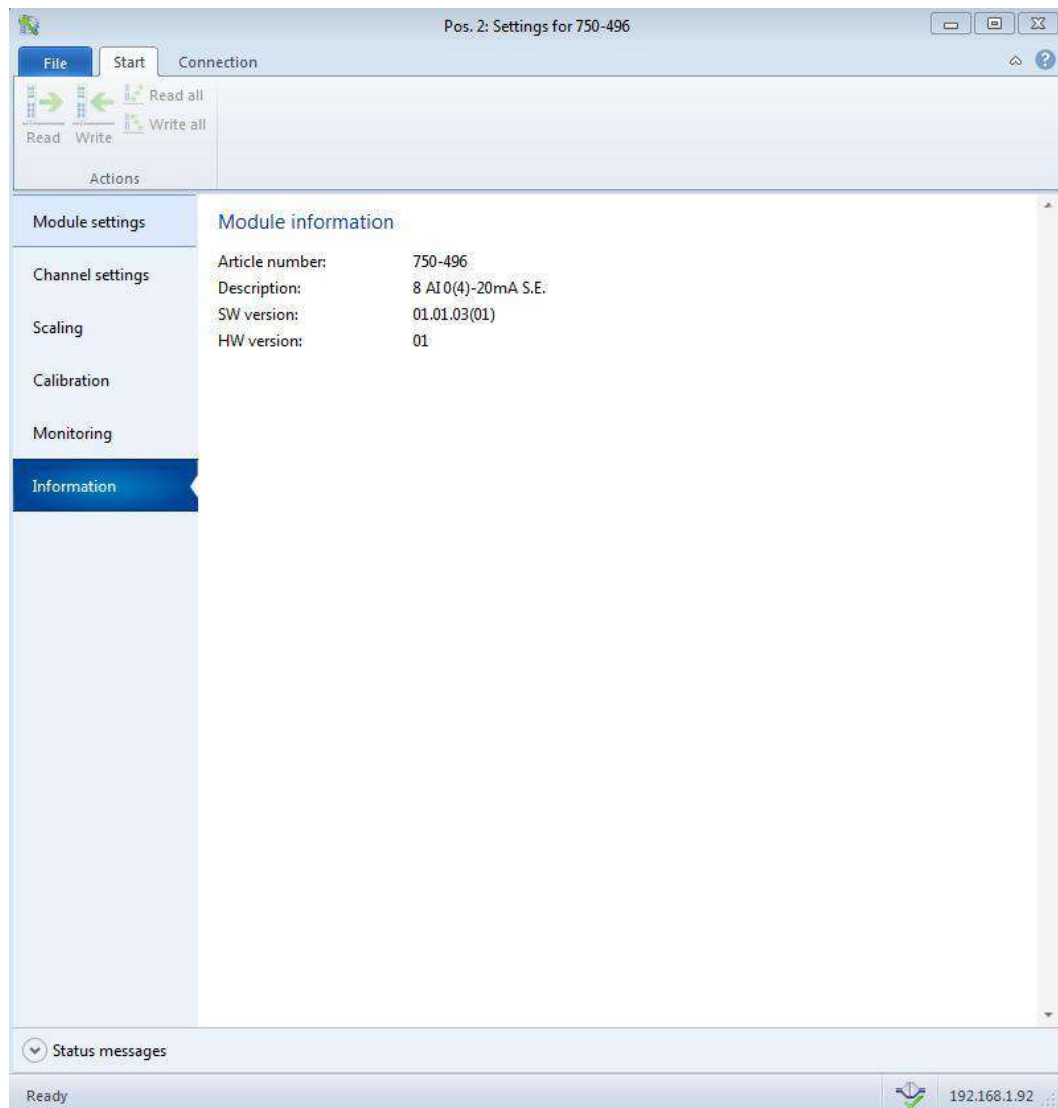
| Option                        | Description                                                                                                                                                                                                                            |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Process value overview</b> |                                                                                                                                                                                                                                        |
| Channel                       | Display of the bus channel                                                                                                                                                                                                             |
| Measured value                | <p>Display of the calibrated input current in milliamps (mA).<br/>This is a 32-bit value.<br/>If the channel is deactivated, "N/A" (not available) is displayed.</p> <p>The measured value is read cyclically from the I/O module.</p> |
| Process value (dec)           | <p>Display of the process value in decimal notation.<br/>If the channel is deactivated, "N/A" (not available) is displayed.</p> <p>The process value is read cyclically from the I/O module.</p>                                       |
| Process value (hex)           | <p>Display of the process value in hexadecimal notation.<br/>If the channel is deactivated, the process value (hex) "0x7FFF" is displayed.</p> <p>The process value is read cyclically from the I/O module.</p>                        |

#### 7.1.1.4.6 "Information" Menu Item

This area provides an overview of the specifications for the I/O module used.  
You obtain information about the following points:

- Article number
- Description
- Software version
- Hardware version



Figure 27: **Information** Menu Item View

### 7.1.1.5 Application Area

Click one of the menu items in the vertical tab menu to call up the related parameterization options in the application area.

### 7.1.1.6 Status Messages



## Note

### Activate diagnostics!

Activate the diagnostics in the **Channel settings** menu item to receive status messages!

This area provides information about occurring diagnostics. If you have activated diagnostics in the **Channel settings** menu item and a diagnostic occurs, the diagnostic is displayed in the status messages window. These status messages are determined from the status bytes of the individual channels.

Click the button to expand the **Status Messages** window at the bottom of the parameterization dialog to display the status messages.

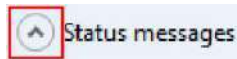


Figure 28: Expanding the Status Messages Window

The following status messages with corresponding additional information are displayed:

Table 32: Status Messages – Possible Status Messages with Additional Information

| Status message                         | Error type  | Channel | Status byte |
|----------------------------------------|-------------|---------|-------------|
| Measurement range overflow             | Warning     | x       | 0x42        |
| Measurement range underflow            | Warning     | x       | 0x41        |
| User-defined limiting value overrange  | Warning     | x       | 0x04        |
| User-defined limiting value underrange | Warning     | x       | 0x08        |
| Short circuit                          | Error       | x       | 0x50        |
|                                        | Information | x       | 0x00        |
| Wire break                             | Error       | x       | 0x60        |
|                                        | Information | x       | 0x00        |
| Channel deactivated                    | Information | x       | 0x00        |
| Measured values in permissible range   | Information | x       | 0x00        |

The status messages are displayed with assignment of the relevant I/O module channels.

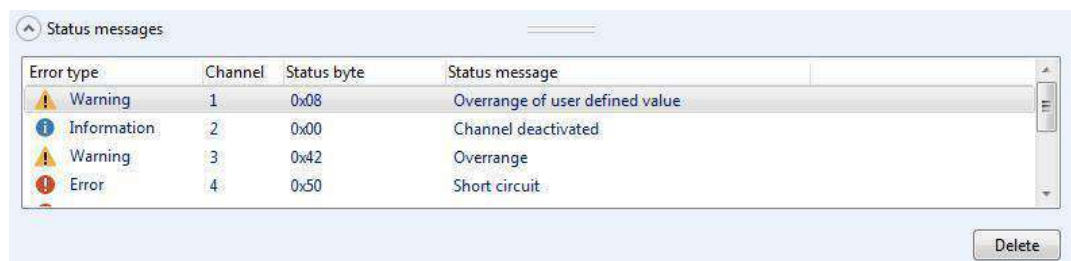


Figure 29: Status Messages in the Application Window of the Parameterization Dialog

Click the **[Delete]** button to clear the status message history. The history is automatically cleared if you interrupt the connection to the I/O module or close the parameterization dialog.

### 7.1.1.7 Status Bar

The following information is displayed in the status bar:

- Status indication with display of the currently executed action as text or the respective error message if an error occurs
- A progress bar is displayed as the actions are executed
- Online status
- IP address or COM interface



Figure 30: Status Bar in the Parameterization Dialog

## 7.2 Calibrating Measured Values

User calibration serves to compensate for tolerances in electrical components. Calibrate the I/O module by channel to achieve maximum measurement accuracy for each channel.



### Note

**User calibration by channel required!**

Calibrate separately for each channel.

The following sensor types are specified:

Table 33: Sensor Types

| ID | Sensor type                |
|----|----------------------------|
| 1  | 0 ... 20 mA                |
| 2  | 4 ... 20 mA                |
| 3  | 3.6 ... 21 mA (NAMUR NE43) |

The variables in the following equations have the following meaning:

Table 34: Variable Legend – Calibrating Measured Values

| Variable | Meaning/function                      |
|----------|---------------------------------------|
| m        | Calibration gain (gain factor)        |
| b        | Calibration offset (offset)           |
| x1       | Actual value 1 (analog input current) |
| x2       | Actual value 2 (analog input current) |
| y1       | Setpoint 1                            |
| y2       | Setpoint 2                            |

The “Gain” and “Offset” values are required to perform user-defined calibration. The calibration gain is the gain factor. The calibration offset is the offset on the y axis. The following general calibration equation applies:

$$y = (x + b) \times m$$

The general calibration equation yields the following two equations for calculating the two values sought:

$$\text{Calibration gain: } m = (y2 - y1) / (x2 - x1)$$

$$\text{Calibration offset: } b = (y1 / m) - x1$$

### 7.2.1 Example of Determining Gain and Offset

A two-point calibration method is used. Perform the following steps in WAGO-I/O-CHECK:

1. Select a sensor type.  
In this example, sensor type 0 ... 20 mA (ID1) was selected.
2. Activate user calibration.
3. Set the value for the calibration offset to "0".
4. Set the value for the calibration gain to "1".
5. Apply a 24 kOhm resistor in series with a ammeter to an I/O module channel. Read the current of the measurement device and I/O module.

Example:

Reference current 1 (y1)= 0.9 mA  
At 1 V is x1 = 0.915 mA

6. Apply a second 1.1 kOhm resistor in series to the same I/O module channel. Read the current of the measurement device and I/O module.

Example:

Reference current 2 (y2)= 13.7 mA  
At 9 V is x2 = 13.8 mA

7. Insert all read values into the respective equations to obtain the values for the calibration gain and offset sought.

Example:

Calibration gain:

$$m = (y_2 - y_1) / (x_2 - x_1)$$

$$\rightarrow m = (13.7 \text{ mA} - 0.9 \text{ mA}) / (13.8 \text{ mA} - 0.915 \text{ mA}) = \underline{0.993}$$

Calibration offset:

$$b = (y_1 / m) - x_1$$

$$\rightarrow b = (0.9 \text{ mA} / 0.993) - 0.915 \text{ mA} = \underline{-0.008 \text{ mA}}$$

8. Enter the value calculated for calibration gain (0.993) in WAGO-I/O-CHECK.
9. Convert the result for the calibration offset from milliamps to microamps.
10. Enter the value calculated for calibration **offset in microamps (-8 µA)** in WAGO-I/O-CHECK.

## 7.3 Scaling Measured Values

User scaling serves to adjust the process values. When user scaling is used, the required accuracy of the process value resolution is changed, but not fundamentally limited. User scaling is optional.

The values for “Gain” and “Offset” are required to perform user-defined scaling. The scaling gain is the gain factor. The scaling offset is the offset on the y axis. When these two values are input, a scaled process value is yielded as the result. The following general scaling equation applies:

- $y_2 = y_1 \times (\text{Gain} / 1024) + \text{Offset}$

The variables have the following meaning:

Table 35: Variable Legend – Scaling Measured Values

| Variable | Meaning/function           |
|----------|----------------------------|
| y2       | Scaled process value       |
| y1       | Unscaled process value     |
| Gain     | Scaling gain (gain factor) |
| Offset   | Scaling offset (offset)    |
| 1024     | Resolution 1/1024          |

The y1 value (unscaled process value) serves as the input value for the user scaling. With user scaling switched off, the y1 value is transferred unchanged to y2.

## 8 Diagnostics

### 8.1 I/O Module Behavior in the Event of an Error

The response of the I/O module if a diagnostic is present depends on the configuration for wire break monitoring, short circuit monitoring, underrange/overrange monitoring and upper/lower limiting value monitoring. You can activate or deactivate these diagnostics separately in *WAGO-I/O-CHECK* (see section “Startup” > ... > “Parameterization with *WAGO-I/O-CHECK*”).

The I/O module only allows one error to be indicated. A dedicated bit in the status byte is assigned to each error. The associated status bit is set if an error status is detected. Certain errors cause multiple error statuses to occur. This is why error statuses are given priority levels. In the event of several errors being present, the error with the highest priority will always be displayed.

The following priority levels apply:

Table 36: Priority levels of diagnostic functions

| Priority level | diagnosis function                                       |
|----------------|----------------------------------------------------------|
| High           | Short circuit                                            |
| High           | Wire break                                               |
| Medium         | Under-range                                              |
| Medium         | Over-range                                               |
| Low            | Violation of user-defined lower limit (user under-range) |
| Low            | Violation of user-defined upper limit (user over-range)  |

Table 37: Behavior in the Event of an I/O Module Error Dependent on the Configuration

| Configuration                       |                                 | I/O module behavior for wire break/short circuit                                                                                                    | I/O module behavior for range violation                                                                                                         |
|-------------------------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Wire break/short circuit monitoring | Underrange/overrange monitoring |                                                                                                                                                     |                                                                                                                                                 |
| OFF                                 | OFF                             | Process value is saturated, no change in status byte, error LED off                                                                                 | Process value is saturated, no change in status byte, error LED off                                                                             |
| OFF                                 | ON                              | Process value is saturated, no change in status byte, error LED on                                                                                  | Process value is saturated, error bit (bit 0: Underrange or bit 1: Overrange) is set, general error (bit 6: General Error) is set, error LED ON |
| ON                                  | OFF                             | Process value is saturated, error bit (bit 5: Wire Break or bit 6: Short Circuit) is set, general error (bit 6: General Error) is set, error LED ON | Process value is saturated, no change in status byte, error LED off                                                                             |
| ON                                  | ON                              | Process value is saturated, error bit (bit 5: Wire Break or bit 6: Short Circuit) is set, general error (bit 6: General Error) is set, error LED ON | Process value is saturated, error bit (bit 0: Underrange or bit 1: Overrange) is set, general error (bit 6: General Error) is set, error LED ON |

The limiting values for detecting an underrange / overrange, a wire break, short circuit or a limiting value underrange / overrange and the output process values are specified in the process image tables (see section "Process Image").

A general error signals a diagnosed error status. A general error is displayed if one or more of the error statuses named in this section occur or other internal error statuses for the I/O module are present. If there are any of the diagnostics for range violation, short circuit or wire break, the bit for general error is always set.

## Note



### Note how long diagnostics are displayed!

A diagnosed error status is displayed at least 100 ms even if the detected error status is no longer present in this period. If a higher-priority error status occurs in this period, the higher-priority error status is displayed for 100 ms and the lower-priority error status is lost.



## 9 Use in Hazardous Environments

The **WAGO-I/O-SYSTEM 750** (electrical equipment) is designed for use in Zone 2 hazardous areas and shall be used in accordance with the marking and installation regulations.

The following sections include both the general identification of components (devices) and the installation regulations to be observed. The individual subsections of the “Installation Regulations” section must be taken into account if the I/O module has the required approval or is subject to the range of application of the ATEX directive.

## 9.1 Marking Configuration Examples

### 9.1.1 Marking for Europe According to ATEX and IECEx

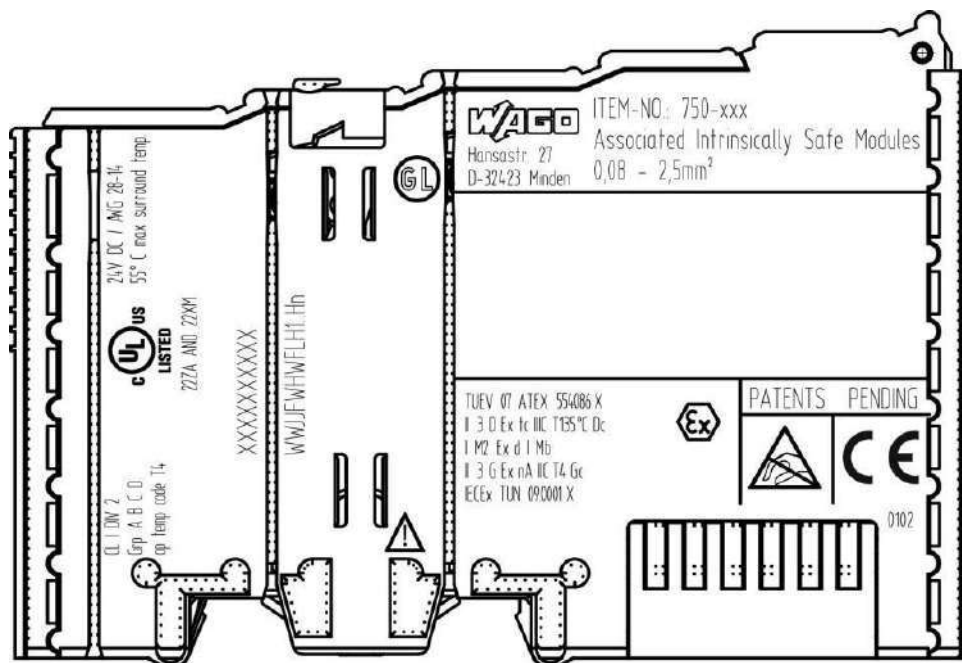


Figure 31: Marking Example According to ATEX and IECEx

TUEV 07 ATEX 554086 X  
 II 3 D Ex tc IIC T135°C Dc  
 I M2 Ex d I Mb  
 II 3 G Ex nA IIC T4 Gc  
 IECEx TUN 090001 X



Figure 32: Text Detail – Marking Example According to ATEX and IECEx

Table 38: Description of Marking Example According to ATEX and IECEx

| Marking                                      | Description                                                                |
|----------------------------------------------|----------------------------------------------------------------------------|
| TUEV 07 ATEX 554086 X<br>IECEx TUN 09.0001 X | Approving authority resp. certificate numbers                              |
| <b>Dust</b>                                  |                                                                            |
| II                                           | Equipment group: All except mining                                         |
| 3 D                                          | Category 3 (Zone 22)                                                       |
| Ex                                           | Explosion protection mark                                                  |
| tc                                           | Type of protection: Protection by enclosure                                |
| IIIC                                         | Explosion group of dust                                                    |
| T135°C                                       | Max. surface temperature of the enclosure (without a dust layer)           |
| Dc                                           | Equipment protection level (EPL)                                           |
| <b>Mining</b>                                |                                                                            |
| I                                            | Equipment group: Mining                                                    |
| M2                                           | Category: High level of protection                                         |
| Ex                                           | Explosion protection mark                                                  |
| d                                            | Type of protection: Flameproof enclosure                                   |
| I                                            | Explosion group for electrical equipment for mines susceptible to firedamp |
| Mb                                           | Equipment protection level (EPL)                                           |
| <b>Gases</b>                                 |                                                                            |
| II                                           | Equipment group: All except mining                                         |
| 3 G                                          | Category 3 (Zone 2)                                                        |
| Ex                                           | Explosion protection mark                                                  |
| nA                                           | Type of protection: Non-sparking equipment                                 |
| IIC                                          | Explosion group of gas and vapours                                         |
| T4                                           | Temperature class: Max. surface temperature 135 °C                         |
| Gc                                           | Equipment protection level (EPL)                                           |

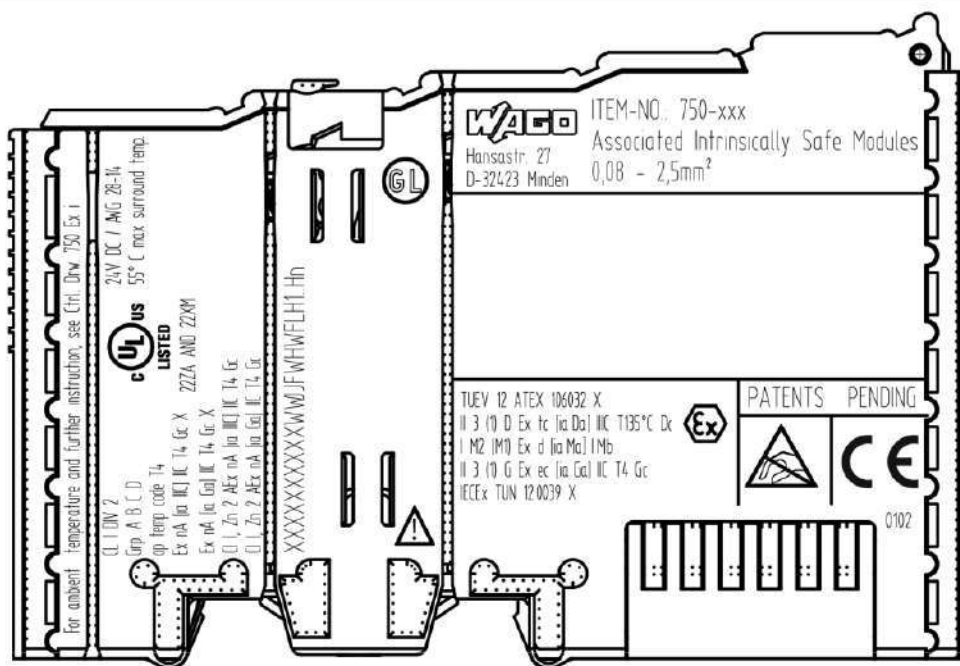


Figure 33: Marking Example for Approved Ex i I/O Module According to ATEX and IECEx

TUEV 12 ATEX 106032 X  
 II 3 (I) D Ex tc [ia Da] IIC T135°C Dc  
 I M2 (M1) Ex d [ia Ma] IMb  
 II 3 (I) G Ex ec [ia Ga] IIC T4 Gc  
 IECEx TUN 120039 X



Figure 34: Text Detail – Marking Example for Approved Ex i I/O Module According to ATEX and IECEx

Table 39: Description of Marking Example for Approved Ex i I/O Module According to ATEX and IECEx

| Marking                                      | Description                                                                                                                     |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| TUEV 12 ATEX 106032 X<br>IECEx TUN 12 0039 X | Approving authority resp. certificate numbers                                                                                   |
| <b>Dust</b>                                  |                                                                                                                                 |
| II                                           | Equipment group: All except mining                                                                                              |
| 3(1)D                                        | Category 3 (Zone 22) equipment containing a safety device for a category 1 (Zone 20) equipment                                  |
| Ex                                           | Explosion protection mark                                                                                                       |
| tc                                           | Type of protection: Protection by enclosure                                                                                     |
| [ia Da]                                      | Type of protection and equipment protection level (EPL): Associated apparatus with intrinsic safety circuits for use in Zone 20 |
| IIIC                                         | Explosion group of dust                                                                                                         |
| T135°C                                       | Max. surface temperature of the enclosure (without a dust layer)                                                                |
| Dc                                           | Equipment protection level (EPL)                                                                                                |
| <b>Mining</b>                                |                                                                                                                                 |
| I                                            | Equipment Group: Mining                                                                                                         |
| M2 (M1)                                      | Category: High level of protection with electrical circuits which present a very high level of protection                       |
| Ex                                           | Explosion protection mark                                                                                                       |
| d                                            | Type of protection: Flameproof enclosure                                                                                        |
| [ia Ma]                                      | Type of protection and equipment protection level (EPL): Associated apparatus with intrinsic safety electrical circuits         |
| I                                            | Explosion group for electrical equipment for mines susceptible to firedamp                                                      |
| Mb                                           | Equipment protection level (EPL)                                                                                                |
| <b>Gases</b>                                 |                                                                                                                                 |
| II                                           | Equipment group: All except mining                                                                                              |
| 3(1)G                                        | Category 3 (Zone 2) equipment containing a safety device for a category 1 (Zone 0) equipment                                    |
| Ex                                           | Explosion protection mark                                                                                                       |
| ec                                           | Equipment protection by increased safety "e"                                                                                    |
| [ia Ga]                                      | Type of protection and equipment protection level (EPL): Associated apparatus with intrinsic safety circuits for use in Zone 0  |
| IIC                                          | Explosion group of gas and vapours                                                                                              |
| T4                                           | Temperature class: Max. surface temperature 135 °C                                                                              |
| Gc                                           | Equipment protection level (EPL)                                                                                                |

9.1.2 Marking for the United States of America (NEC) and Canada (CEC)

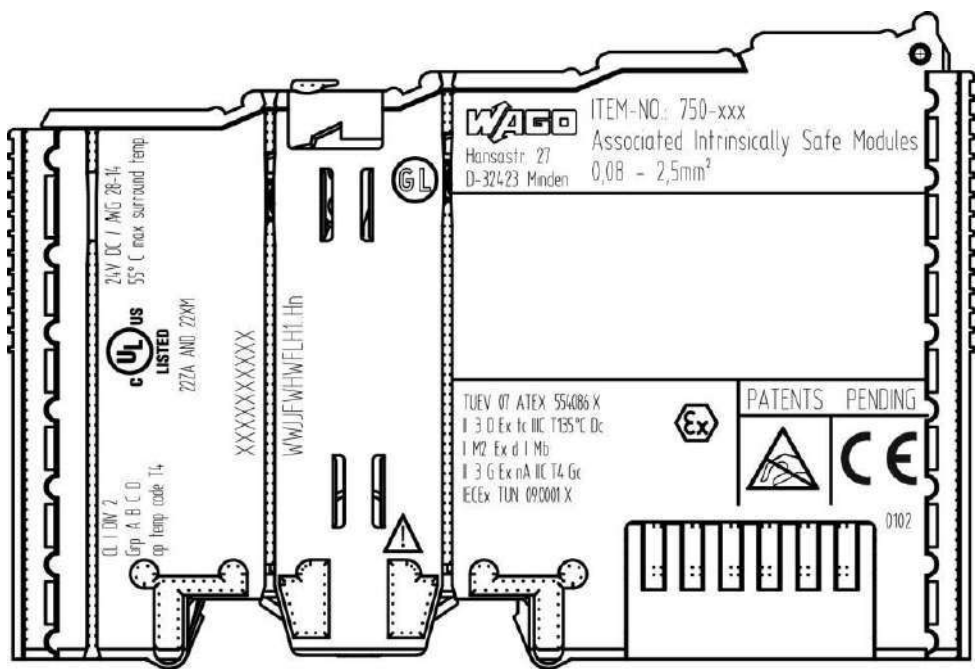


Figure 35: Marking Example According to NEC

CL I DIV 2  
Grp. A B C D  
op temp code T4

Figure 36: Text Detail – Marking Example According to NEC 500

Table 40: Description of Marking Example According to NEC 500

| Marking         | Description                      |
|-----------------|----------------------------------|
| CL I            | Explosion protection (gas group) |
| DIV 2           | Area of application              |
| Grp. A B C D    | Explosion group (gas group)      |
| op temp code T4 | Temperature class                |

CI I, Zn 2 AEx nA [ia Ga] IIC T4 Gc

Figure 37: Text Detail – Marking Example for Approved Ex i I/O Module According to NEC 505

Table 41: Description of Marking Example for Approved Ex i I/O Module According to NEC 505

| Marking | Description                                                                                                                     |
|---------|---------------------------------------------------------------------------------------------------------------------------------|
| CI I,   | Explosion protection group                                                                                                      |
| Zn 2    | Area of application                                                                                                             |
| AEx     | Explosion protection mark                                                                                                       |
| nA      | Type of protection                                                                                                              |
| [ia Ga] | Type of protection and equipment protection level (EPL): Associated apparatus with intrinsic safety circuits for use in Zone 20 |
| IIC     | Group                                                                                                                           |
| T4      | Temperature class                                                                                                               |
| Gc      | Equipment protection level (EPL)                                                                                                |

CI I, Zn 2 AEx nA [ia IIIC] IIC T4 Gc

Figure 38: Text Detail – Marking Example for Approved Ex i I/O Module According to NEC 506

Table 42: Description of Marking Example for Approved Ex i I/O Modules According to NEC 506

| Marking   | Description                                                                                                                     |
|-----------|---------------------------------------------------------------------------------------------------------------------------------|
| CI I,     | Explosion protection group                                                                                                      |
| Zn 2      | Area of application                                                                                                             |
| AEx       | Explosion protection mark                                                                                                       |
| nA        | Type of protection                                                                                                              |
| [ia IIIC] | Type of protection and equipment protection level (EPL): Associated apparatus with intrinsic safety circuits for use in Zone 20 |
| IIC       | Group                                                                                                                           |
| T4        | Temperature class                                                                                                               |
| Gc        | Equipment protection level (EPL)                                                                                                |

Ex nA [ia IIIC] IIC T4 Gc X  
 Ex nA [ia Ga] IIC T4 Gc X

Figure 39: Text Detail – Marking Example for Approved Ex i I/O Modules According to CEC  
 18 attachment J

Table 43: Description of Marking Example for Approved Ex i I/O Modules According to CEC  
 18 attachment J

| Marking      | Description                                                                                                                     |
|--------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>Dust</b>  |                                                                                                                                 |
| Ex           | Explosion protection mark                                                                                                       |
| nA           | Type of protection                                                                                                              |
| [ia IIIC]    | Type of protection and equipment protection level (EPL): Associated apparatus with intrinsic safety circuits for use in Zone 20 |
| IIC          | Group                                                                                                                           |
| T4           | Temperature class                                                                                                               |
| Gc           | Equipment protection level (EPL)                                                                                                |
| X            | Symbol used to denote specific conditions of use                                                                                |
| <b>Gases</b> |                                                                                                                                 |
| Ex           | Explosion protection mark                                                                                                       |
| nA           | Type of protection                                                                                                              |
| [ia Ga]      | Type of protection and equipment protection level (EPL): Associated apparatus with intrinsic safety circuits for use in Zone 0  |
| IIC          | Group                                                                                                                           |
| T4           | Temperature class                                                                                                               |
| Gc           | Equipment protection level (EPL)                                                                                                |
| X            | Symbol used to denote specific conditions of use                                                                                |



## 9.2 Installation Regulations

For the installation and operation of electrical equipment in hazardous areas, the valid national and international rules and regulations which are applicable at the installation location must be carefully followed.

### 9.2.1 Special Notes Regarding Explosion Protection

The following warning notices are to be posted in the immediately proximity of the WAGO-I/O-SYSTEM 750 (hereinafter “product”):

**WARNING – DO NOT REMOVE OR REPLACE FUSED WHILE ENERGIZED!**

**WARNING – DO NOT DISCONNECT WHILE ENERGIZED!**

**WARNING – ONLY DISCONNECT IN A NON-HAZARDOUS AREA!**

Before using the components, check whether the intended application is permitted in accordance with the respective printing. Pay attention to any changes to the printing when replacing components.

The product is an open system. As such, the product must only be installed in appropriate enclosures or electrical operation rooms to which the following applies:

- Can only be opened using a tool or key
- Inside pollution degree 1 or 2
- In operation, internal air temperature within the range of  $0\text{ °C} \leq T_a \leq +55\text{ °C}$   
**or**  $-20\text{ °C} \leq T_a \leq +60\text{ °C}$  for components with extension number .../025-xxx  
**or**  $-40\text{ °C} \leq T_a \leq +70\text{ °C}$  for components with extension number .../040-xxx
- Minimum degree of protection: min. IP54 (acc. to EN/IEC 60529)
- For use in Zone 2 (Gc), compliance with the applicable requirements of the standards EN/IEC/ABNT NBR IEC 60079-0, -7, -11, -15
- For use in Zone 22 (Dc), compliance with the applicable requirements of the standards EN/IEC/ABNT NBR IEC 60079-0, -7, -11, -15 and -31
- For use in mining (Mb), minimum degree of protection IP64 (acc. EN/IEC 60529) and adequate protection acc. EN/IEC/ABNT NBR IEC 60079-0 and -1
- Depending on zoning and device category, correct installation and compliance with requirements must be assessed and certified by a “Notified Body” (ExNB) if necessary!

---

Explosive atmosphere occurring simultaneously with assembly, installation or repair work must be ruled out. Among other things, these include the following activities

- Insertion and removal of components
- Connecting or disconnecting from fieldbus, antenna, D-Sub, ETHERNET or USB connections, DVI ports, memory cards, configuration and programming interfaces in general and service interface in particular:
  - Operating DIP switches, coding switches or potentiometers
  - Replacing fuses

Wiring (connecting or disconnecting) of non-intrinsically safe circuits is only permitted in the following cases

- The circuit is disconnected from the power supply.
- The area is known to be non-hazardous.

Outside the device, suitable measures must be taken so that the rated voltage is not exceeded by more than 40 % due to transient faults (e.g., when powering the field supply).

Product components intended for intrinsically safe applications may only be powered by 750-606 or 750-625/000-001 bus supply modules.

Only field devices whose power supply corresponds to overvoltage category I or II may be connected to these components.

### 9.2.2 Special Notes Regarding ANSI/ISA Ex

For ANSI/ISA Ex acc. to UL File E198726, the following additional requirements apply:

- Use in Class I, Division 2, Group A, B, C, D or non-hazardous areas only
- ETHERNET connections are used exclusively for connecting to computer networks (LANs) and may not be connected to telephone networks or telecommunication cables
- **WARNING** – The radio receiver module 750-642 may only be used to connect to external antenna 758-910!
- **WARNING** – Product components with fuses must not be fitted into circuits subject to overloads!  
These include, e.g., motor circuits.
- **WARNING** – When installing I/O module 750-538, “Control Drawing No. 750538” in the manual must be strictly observed!



## Information

### Additional Information

Proof of certification is available on request.

Also take note of the information given on the operating and assembly instructions.

The manual, containing these special conditions for safe use, must be readily available to the user.

## 10 Appendix

### 10.1 Configuration and Parameterization using a GSD File with PROFIBUS DP and PROFINET IO

#### 10.1.1 Configuration 8 AI 0(4)-20 mA, S.E.

##### 10.1.1.1 PROFIBUS DP Fieldbus Coupler/Controller 750-333(/0xx-000), 750-833(/0xx-000)

When using the aforementioned PROFIBUS DP fieldbus devices, the process image size is configured by selecting the corresponding GSD entry.

Table 44: Configuration PROFIBUS DP

| GSD Entry                       |           | PI-Length/[byte] |     | Data Type      | Inst. |
|---------------------------------|-----------|------------------|-----|----------------|-------|
| Module                          | Submodule | I                | O   |                |       |
| 750-496 8AI/0/4-20mA/SE         | n/a       | 16               | n/a | INT16          | 8     |
| 750-496 8AI/0/4-20mA/SE<br>RA   |           | 24               | 24  | {UINT8, INT16} |       |
| PFC 750-496 8AI/0/4-20mA/<br>SE |           | n/a              | n/a | n/a            | n/a   |

##### 10.1.1.2 PROFINET IO Fieldbus Coupler 750-370, 750-375(/025-000), 750-377(/025-000)

When using the aforementioned PROFINET IO fieldbus couplers, the process image size is configured by selecting the corresponding GSD entry.

Table 45: Configuration 750-370

| GSD Entry                   |           | PI-Length/[byte] |     | Data Type      | Inst. |
|-----------------------------|-----------|------------------|-----|----------------|-------|
| Module                      | Submodule | I                | O   |                |       |
| 750-496 8AI, 0(4)-20 mA     | n/a       | 16               | n/a | INT16          | 8     |
| 750-496 8AI, 0(4)-20 mA, EM |           | 24               | 24  | {UINT8, INT16} |       |

Table 46: Configuration 750-375(/025-000), 750-377(/025-000)

| GSD Entry                  |                       | PI-Length/[byte] |     | Data Type      | Inst. |
|----------------------------|-----------------------|------------------|-----|----------------|-------|
| Module                     | Submodule             | I                | O   |                |       |
| 750-496 8AI,<br>0(4)-20 mA | INT16[8] I            | 16               | n/a | INT16          | 8     |
|                            | {UINT8, INT16}[8] I/O | 24               | 24  | {UINT8, INT16} |       |

### 10.1.2 Parameterization 8 AI 0(4)-20 mA, S.E.

Apart from the user limits, the GSD file can be used to provide the I/O module on the PROFIBUS DP and PROFINET IO fieldbus coupler with all operating parameters.

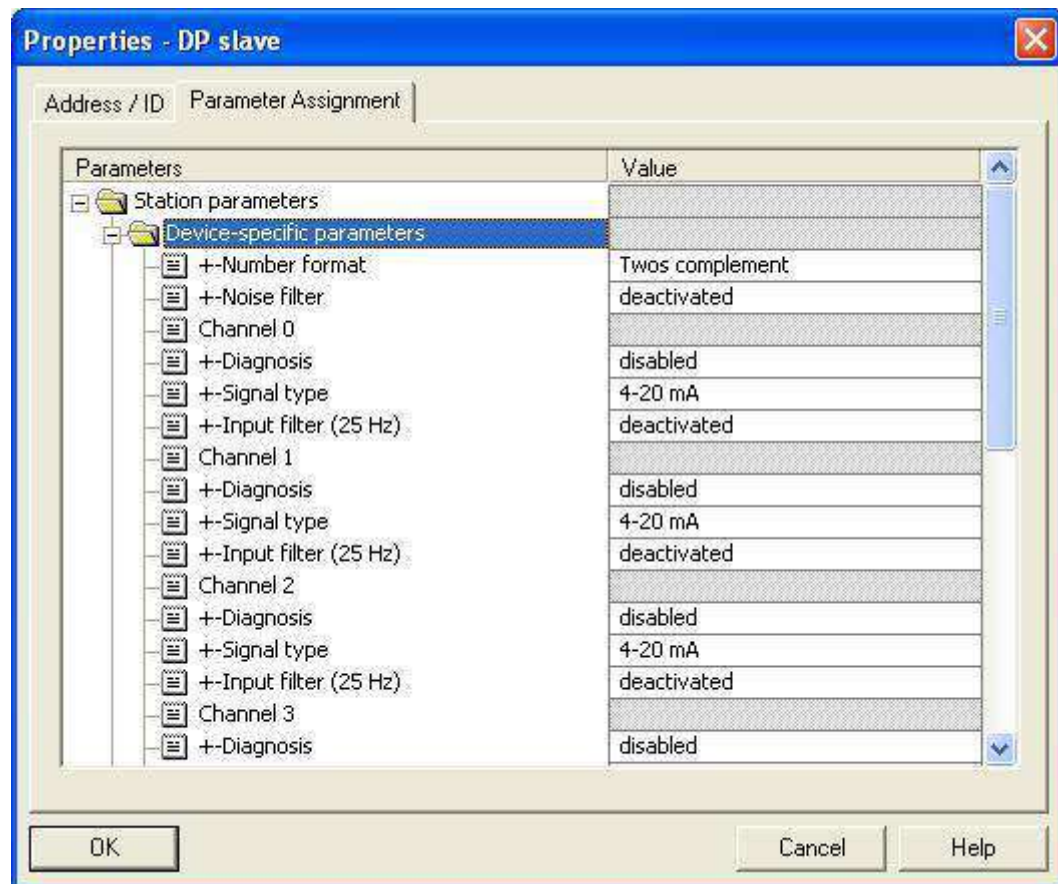


Figure 40: Example of the PROFIBUS DP fieldbus coupler parameterization dialog

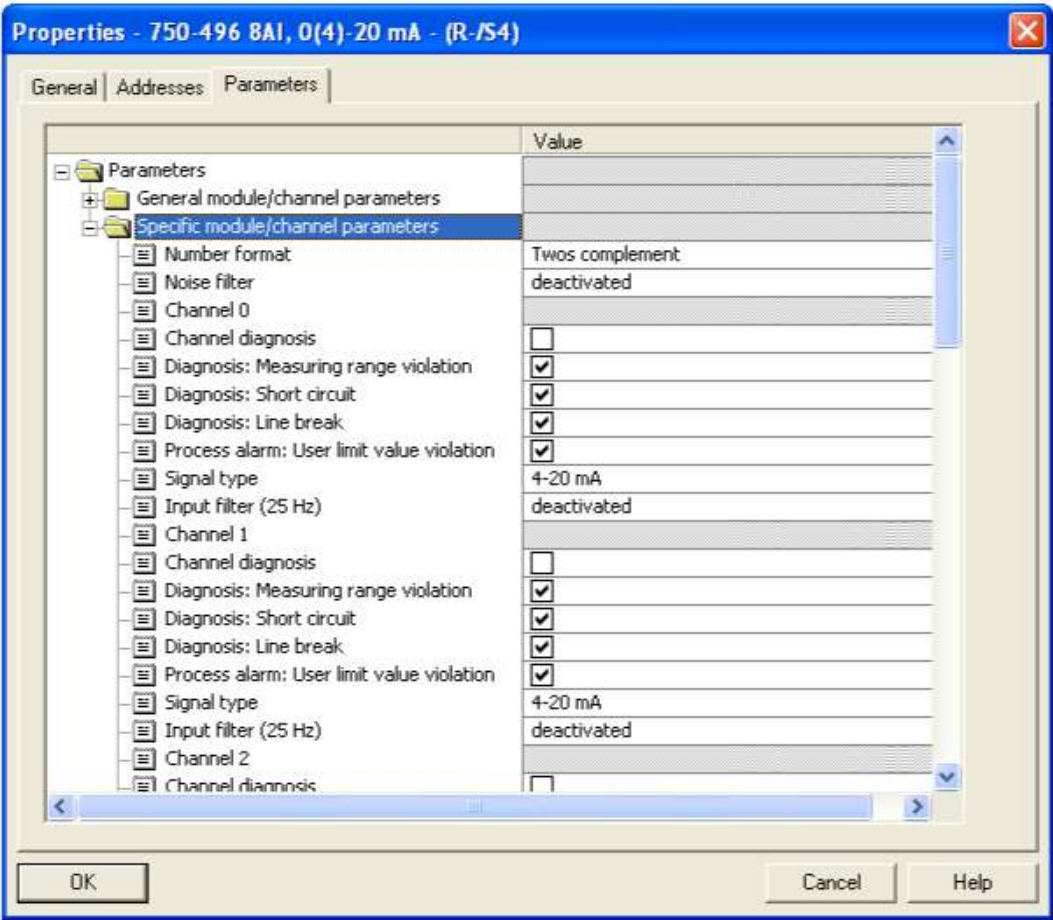


Figure 41: Example of the 750-370 fieldbus coupler parameterization dialog

For the PROFINET IO fieldbus couplers 750-375(/025-000) and 750-377(/025-000) the channel's user limits can be adjusted via GSD, too. On input values falling below or exceeding those limits, a respective process alarm will be issued.

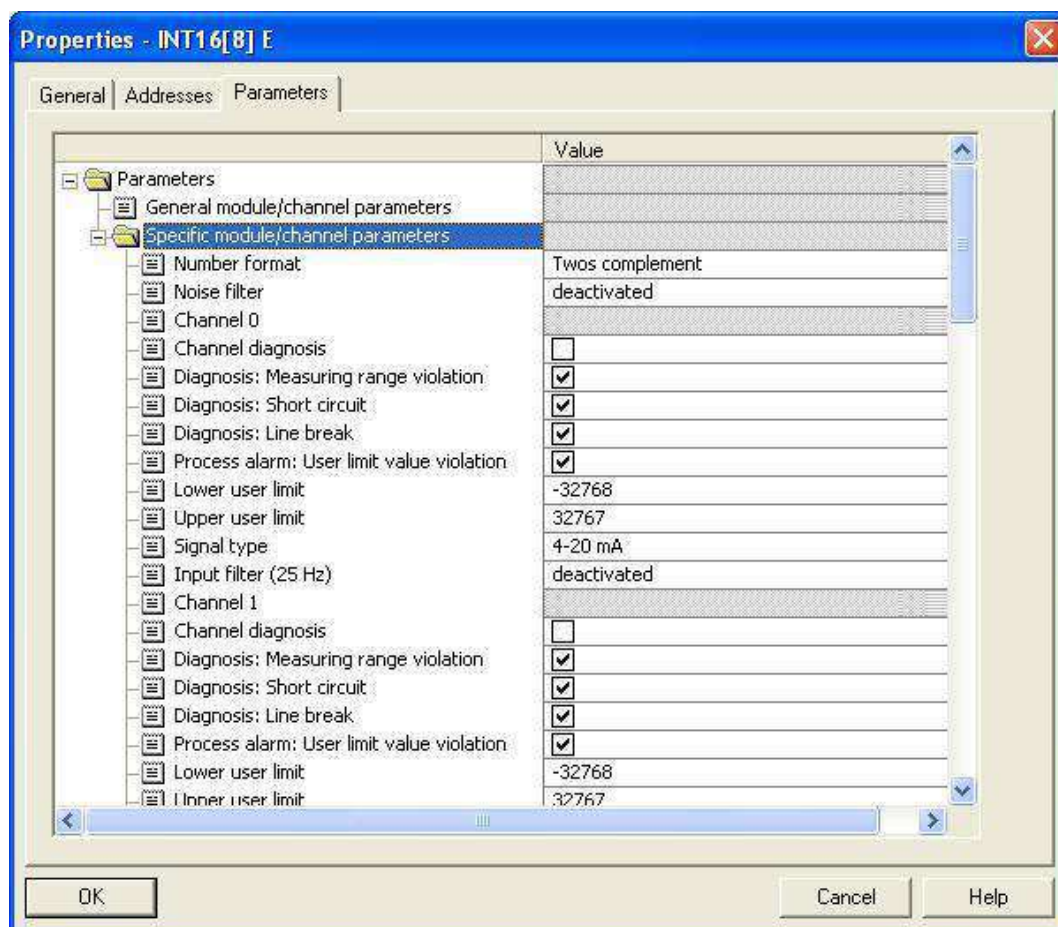


Figure 42: Example of the 750-375(/025-000) and 750-377(/025-000) fieldbus coupler parameterization dialog

### 10.1.2.1 All PROFIBUS DP and PROFINET IO Fieldbus Couplers

The following assignment applies to the parameters of the I/O module when using PROFIBUS DP and PROFINET IO fieldbus devices.

Table 47: Specific module / channel parameters for 750-496

| GSD File                                            |                        | WAGO-I/O-CHECK          |                        |
|-----------------------------------------------------|------------------------|-------------------------|------------------------|
| Description                                         | Value                  | Selection box           | Value                  |
| Number format                                       | Twos complement*)      | Number format           | Twos complement*)      |
|                                                     | Sign magnitude         |                         | Sign magnitude         |
| Noise filter                                        | deactivated*)          | Noise-Filter            | Checkbox deactivated*) |
|                                                     | activated              |                         | activated              |
| Signal type<br>Channel x<br>(x = 0...7)             | deactivated            | Signal type             | deactivated            |
|                                                     | 0-20 mA                |                         | 0-20 mA                |
|                                                     | 4-20 mA*)              |                         | 4-20 mA*)              |
|                                                     | 3.6-21 mA (Namur NE43) |                         | 3.6-21 mA (Namur NE43) |
| Input filter<br>(25 Hz)<br>Kanal x<br>(x = 0 ... 7) | deactivated*)          | Input filter<br>(25 Hz) | Checkbox deactivated*) |
|                                                     | activated              |                         | activated              |

\*) Factory setting

### 10.1.2.2 PROFIBUS DP Fieldbus Coupler 750-333(/0xx-000), 750-833(/0xx-000)

The aforementioned fieldbus couplers allow module-specific parameterization of behavior at diagnosis.

Table 48: General module / channel parameters

| Parameter                          | Value          | Explanation                                                                                                                                                                                                                                                                                              |
|------------------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Diagnosis<br>Channel x (x = 0...7) | 0 (disabled)*) | The fieldbus coupler signals a diagnosis if the I/O module reports the events: <ul style="list-style-type: none"> <li>Measuring range overflow</li> <li>Measuring range underflow</li> </ul> Diagnostics reported by the I/O module do not lead to the signaling of a diagnosis by the fieldbus coupler. |
|                                    | 1 (enabled)    | Diagnostics reported by the I/O module lead to the signaling of a diagnosis by the fieldbus coupler.                                                                                                                                                                                                     |

\*) Factory setting



### 10.1.2.3 PROFINET IO Fieldbus Coupler 750-370, 750-375(/025-000), 750-377(/025-000)

The aforementioned fieldbus couplers allow module-specific parameterization of behavior at diagnosis.

Table 49: General module / channel parameters

| Parameter                                                       | Value                   | Explanation                                                                                                                                                                                                                           |
|-----------------------------------------------------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Channel diagnosis<br>Channel x (x = 0...7)                      | 0 (false) <sup>*)</sup> | Any errors that may occur on the respective signal channel do not cause transmission of a diagnostic alarm nor entry in the diagnostics database of the station proxy.                                                                |
|                                                                 | 1 (true)                | Any errors that may occur on the respective signal channel and the error type explicitly released entail transmission of a diagnostic alarm. The respective error leads to an entry in the diagnostics database of the station proxy. |
| Diagnosis: Measuring range underflow<br>Channel x (x = 0 ... 7) | 0 (false)               | An undershoot on the respective signal channel does not lead to transmission of a diagnostic alarm nor entry in the diagnostics database of the station proxy.                                                                        |
|                                                                 | 1 (true) <sup>*)</sup>  | Provided that the channel diagnostics of the respective signal channel has been activated, an undershoot leads to transmission of a diagnostic alarm and entry in the diagnostics database of the station proxy.                      |
| Diagnosis: Measuring range violation<br>Channel x (x = 0 ... 7) | 0 (false)               | An violation on the respective signal channel does not lead to transmission of a diagnostic alarm nor entry in the diagnostics database of the station proxy.                                                                         |
|                                                                 | 1 (true) <sup>*)</sup>  | Provided that the channel diagnostics of the respective signal channel has been activated, an violation leads to transmission of a diagnostic alarm and entry in the diagnostics database of the station proxy.                       |
| Diagnosis: Short circuit<br>Channel x (x = 0 ... 7)             | 0 (false)               | A short circuit on the respective signal channel does not lead to transmission of a diagnostic alarm nor to entry in the diagnostics database of the station proxy.                                                                   |
|                                                                 | 1 (true) <sup>*)</sup>  | Provided that the channel diagnostics of the respective signal channel has been activated, a short circuit leads to transmission of a diagnostic alarm and entry in the diagnostics database of the station proxy.                    |
| Diagnosis: Wire break<br>Channel x (x = 0 ... 7)                | 0 (false)               | A wire break on the respective signal channel does not lead to transmission of a diagnostic alarm nor to entry in the diagnostics database of the station proxy.                                                                      |
|                                                                 | 1 (true) <sup>*)</sup>  | Provided that the channel diagnostics of the respective signal channel has been activated, a wire break leads to transmission of a diagnostic alarm and entry in the diagnostics database of the station proxy.                       |

Table 49: General module / channel parameters

| Parameter                                                                  | Value                          | Explanation                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Process alarm:<br>User limit value<br>violation<br>Channel x (x = 0 ... 7) | 0 (false)                      | Falling below the lower or above the upper user limit on the respective signal channel does not lead to transmission of a process alarm. The lower and upper user limits are set in another attribute.                                                                                                                      |
|                                                                            | 1 (true) <sup>*)</sup>         | Provided that the channel diagnostics of the respective signal channel has been activated, falling below the lower or above the upper user limit leads to transmission of a process alarm. No entry in the diagnostics database of the station proxy is made. The lower and upper user limits are set in another attribute. |
| Lower user limit                                                           | -32768 <sup>*)</sup> ... 32767 | Based on the value range of the input signal, a lower limit value of the input signal can be specified that can lead to the abovementioned event of a process alarm.                                                                                                                                                        |
| Upper user limit                                                           | -32768 ... 32767 <sup>*)</sup> | Based on the value range of the input signal, an upper limit value of the input signal can be specified that can lead to the abovementioned event of a process alarm.                                                                                                                                                       |

<sup>\*)</sup> Factory setting

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WAGO Kontakttechnik GmbH & Co. KG  
Postfach 2880 • D - 32385 Minden  
Hansastraße 27 • D - 32423 Minden  
Phone: +49 571 887 – 0  
Fax: +49 571 887 – 844169  
E-Mail: [info@wago.com](mailto:info@wago.com)  
Internet: [www.wago.com](http://www.wago.com)

# WAGO-I/O-SYSTEM 750

## Manual



### 750-600(/xxx-xxx)

End Module  
Internal Bus Termination

Version 1.3.0



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### **WAGO Kontakttechnik GmbH & Co. KG**

Hansastraße 27  
D-32423 Minden

Phone: +49 (0) 571/8 87 – 0  
Fax: +49 (0) 571/8 87 – 169

E-Mail: [info@wago.com](mailto:info@wago.com)

Web: <http://www.wago.com>

### **Technical Support**

Phone: +49 (0) 571/8 87 – 555  
Fax: +49 (0) 571/8 87 – 8555

E-Mail: [support@wago.com](mailto:support@wago.com)

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.

E-Mail: [documentation@wago.com](mailto:documentation@wago.com)

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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 750-600 (End Module) and the variants listed in the table below.

Table 1: Variants

| Item Number/Variant | Designation  |
|---------------------|--------------|
| 750-600             | End Module   |
| 750-600/025-000     | End Module/T |



## Note

### Documentation Validity for Variants

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

The I/O module 750-600 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

 **DANGER****Personal Injury!**

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

 **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.

**NOTICE****Damage to Property!**

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

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

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

**Note****Important Note!**

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



## *Information*

### **Additional Information:**

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

## 1.4 Number Notation

Table 2: Number Notation

| Number Code | Example              | Note                                               |
|-------------|----------------------|----------------------------------------------------|
| Decimal     | 100                  | Normal notation                                    |
| Hexadecimal | 0x64                 | C notation                                         |
| Binary      | '100'<br>'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.<br>e.g.: <i>C:\Program Files\WAGO Software</i>                            |
| <b>Menu</b>     | Menu items are marked in bold letters.<br>e.g.: <b>Save</b>                                                                        |
| >               | A greater-than sign between two names means the selection of a menu item from a menu.<br>e.g.: <b>File &gt; New</b>                |
| <b>Input</b>    | Designation of input or optional fields are marked in bold letters,<br>e.g.: <b>Start of measurement range</b>                     |
| “Value”         | Input or selective values are marked in inverted commas.<br>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.<br>e.g.: <b>[Input]</b>                               |
| <b>[Key]</b>    | Keys are marked with bold letters in square brackets.<br>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.

**NOTICE****Do not use any contact spray!**

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

**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.

**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.

## 3 Device Description

The module 750-600 (End Module) is used to terminate the internal bus of a fieldbus node. This module completes the internal data circuit and ensures correct data flow.



### 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.

### 3.1 View

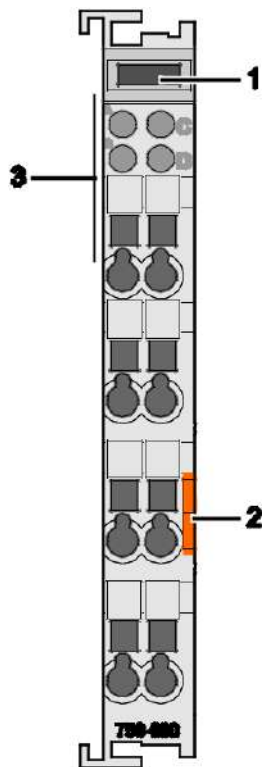


Figure 1: View

Table 4: Legend for Figure "View"

| Pos. | Description                       | Details see section                           |
|------|-----------------------------------|-----------------------------------------------|
| 1    | Marking possibility with Mini-WSB | ---                                           |
| 2    | Release tab                       | "Mounting" > "Inserting and Removing Devices" |
| 3    | Data contacts                     | "Device Description" > "Connectors"           |

## 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.

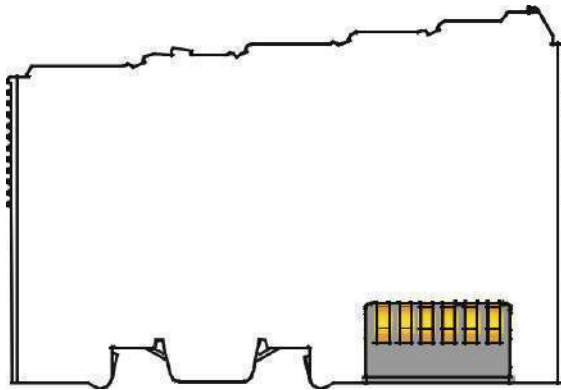


Figure 2: Data Contacts

#### 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 750-600 has no power jumper contacts.

### 3.2.3 CAGE CLAMP<sup>®</sup> Connectors

The I/O module 750-600 has no CAGE CLAMP<sup>®</sup> connectors.

### **3.3 Display Elements**

The I/O module 750-600 has no display elements.

### **3.4 Operating Elements**

The I/O module 750-600 has no operating elements.

## 3.5 Technical Data

### 3.5.1 Device

Table 5: Technical Data – Device

|                                         |              |
|-----------------------------------------|--------------|
| Width                                   | 12 mm        |
| Height (from upper edge of 35 DIN rail) | 64 mm        |
| Depth                                   | 100 mm       |
| Weight                                  | Approx. 35 g |

### 3.5.2 Connection Type

Table 6: Technical Data – Data Contacts

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

### 3.5.3 Climatic Environmental Conditions

Table 7: Technical Data – Climatic Environmental Conditions

|                                                                                              |                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating temperature range                                                                  | 0°C...55°C                                                                                                                                                                                                            |
| Operating temperature range for components with extended temperature range (750-xxx/025-xxx) | –20 °C ... +60 °C                                                                                                                                                                                                     |
| Storage temperature range                                                                    | –25 °C ... +85 °C                                                                                                                                                                                                     |
| Storage temperature range for components with extended temperature range (750-xxx/025-xxx)   | –40 °C ... +85 °C                                                                                                                                                                                                     |
| Relative humidity                                                                            | Max. 5 % ... 95 % without condensation                                                                                                                                                                                |
| 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<br>H <sub>2</sub> S ≤ 10 ppm                                                                                                                                                                 |
| Special conditions                                                                           | Ensure that additional measures for components are taken, which are used in an environment involving: <ul style="list-style-type: none"> <li>– dust, caustic vapors or gases</li> <li>– ionizing radiation</li> </ul> |

## 3.6 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 750-600 I/O modules:



Conformity Marking



cULUS

UL508



Korea Certification

MSIP-REM-W43-END750

The following Ex approvals have been granted to the basic version and all variants of 750-600 I/O modules:



TÜV 07 ATEX 554086 X

I M2 Ex d I Mb

II 3 G Ex nA IIC T4 Gc

II 3 D Ex tc IIIC T135°C Dc

IECEX TUN 09.0001 X

Ex d I Mb

Ex nA IIC T4 Gc

Ex tc IIIC T135°C Dc



cULUS

ANSI/ISA 12.12.01

Class I, Div2 ABCD T4



The following ship approvals have been granted to the basic version and all variants of 750-600 I/O modules listed in the table:

Table 8: Ship Approvals

|                     |  |  |  |  |  |  |  |  |  |  |
|---------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 750-600             | X                                                                                 | X                                                                                 | X                                                                                 | X                                                                                 | X                                                                                  | X                                                                                   | X                                                                                   | X                                                                                   | X                                                                                   | X                                                                                   |
| 750-600<br>/025-000 |                                                                                   | X                                                                                 |                                                                                   |                                                                                   | X                                                                                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |



ABS (American Bureau of Shipping)



BV (Bureau Veritas)



DNV (Det Norske Veritas)

Class B



GL (Germanischer Lloyd)

Cat. A, B, C, D (EMC 1)



KR (Korean Register of Shipping)



LR (Lloyd's Register)

Env. 1, 2, 3, 4



NKK (Nippon Kaiji Kyokai)



PRS (Polski Rejestr Statków)



RINA (Registro Italiano Navale)

## 3.7 Standards and Guidelines

All variations of 750-600 I/O modules meet the following requirements on emission and immunity of interference:

|                                 |                      |
|---------------------------------|----------------------|
| EMC CE-Emission of interference | acc. to EN 61000-6-3 |
|---------------------------------|----------------------|

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

|                                                  |                            |
|--------------------------------------------------|----------------------------|
| EMC marine applications-Emission of interference | acc. to Germanischer Lloyd |
|--------------------------------------------------|----------------------------|

|                                                  |                            |
|--------------------------------------------------|----------------------------|
| EMC marine applications-Immunity to interference | acc. to Germanischer Lloyd |
|--------------------------------------------------|----------------------------|

## 4 Mounting

### 4.1 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.

## 4.2 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.

### 4.2.1 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.

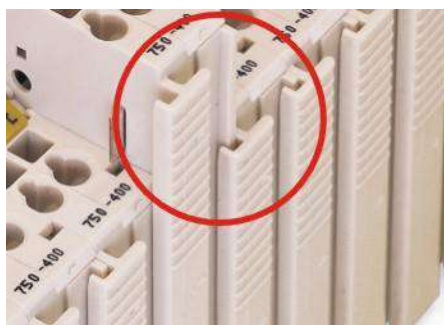


Figure 3: Insert I/O Module (Example)

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

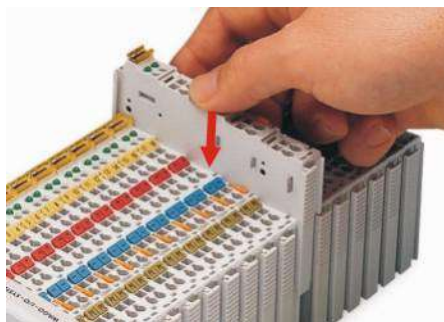


Figure 4: Snap the I/O Module into Place (Example)

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.

### 4.2.2 Removing the I/O Module

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

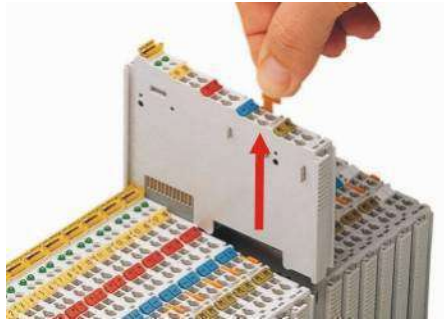


Figure 5: Removing the I/O Module (Example)

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

## 5 Use in Hazardous Environments

The **WAGO-I/O-SYSTEM 750** (electrical equipment) is designed for use in Zone 2 hazardous areas.

The following sections include both the general identification of components (devices) and the installation regulations to be observed. The individual subsections of the “Installation Regulations” section must be taken into account if the I/O module has the required approval or is subject to the range of application of the ATEX directive.

## 5.1 Marking Configuration Examples

### 5.1.1 Marking for Europe According to ATEX and IEC-Ex

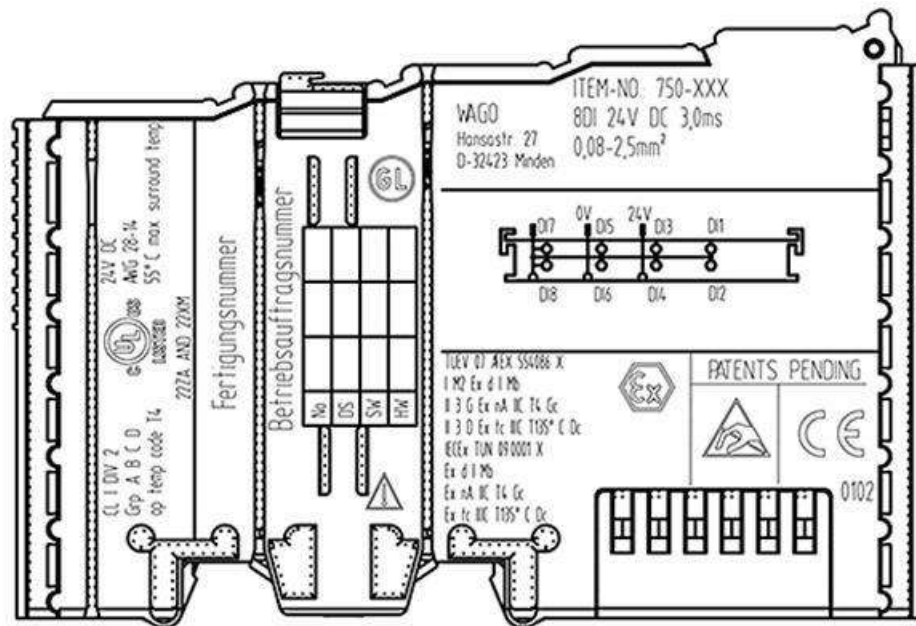


Figure 6: Side Marking Example for Approved I/O Modules According to ATEX and IECEx

TUEV 07 AEX 554086 X  
I M2 Ex d I Mb  
II 3 G Ex nA IIC T4 Gc  
II 3 D Ex tc IIC T135° C Dc  
IECEx TUN 09.0001 X  
Ex d I Mb  
Ex nA IIC T4 Gc  
Ex tc IIC T135° C Dc



Figure 7: Text Detail – Marking Example for Approved I/O Modules According to ATEX and IECEx.

Table 9: Description of Marking Example for Approved I/O Modules According to ATEX and IECEx

| Printing on Text                            | Description                                                                                                                                                                                           |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TÜV 07 ATEX 554086 X<br>IECEx TUN 09.0001 X | Approving authority and certificate numbers                                                                                                                                                           |
| <b>Dust</b>                                 |                                                                                                                                                                                                       |
| II                                          | Equipment group: All except mining                                                                                                                                                                    |
| 3D                                          | Category 3 (Zone 22)                                                                                                                                                                                  |
| Ex                                          | Explosion protection mark                                                                                                                                                                             |
| tc Dc                                       | Type of protection and equipment protection level (EPL): protection by enclosure                                                                                                                      |
| IIC                                         | Explosion group of dust                                                                                                                                                                               |
| T 135°C                                     | Max. surface temperature of the enclosure (without a dust layer)                                                                                                                                      |
| <b>Mining</b>                               |                                                                                                                                                                                                       |
| I                                           | Equipment group: Mining                                                                                                                                                                               |
| M2                                          | Category: High level of protection                                                                                                                                                                    |
| Ex                                          | Explosion protection mark                                                                                                                                                                             |
| d Mb                                        | Type of protection and equipment protection level (EPL): Flameproof enclosure                                                                                                                         |
| I                                           | Explosion group for electrical equipment for mines susceptible to firedamp                                                                                                                            |
| <b>Gases</b>                                |                                                                                                                                                                                                       |
| II                                          | Equipment group: All except mining                                                                                                                                                                    |
| 3G                                          | Category 3 (Zone 2)                                                                                                                                                                                   |
| Ex                                          | Explosion protection mark                                                                                                                                                                             |
| nA Gc                                       | Type of protection and equipment protection level (EPL): Non-sparking equipment                                                                                                                       |
| nC Gc                                       | Type of protection and equipment protection level (EPL): Sparking apparatus with protected contacts. A device which is so constructed that the external atmosphere cannot gain access to the interior |
| IIC                                         | Explosion group of gas and vapours                                                                                                                                                                    |
| T4                                          | Temperature class: Max. surface temperature 135°C                                                                                                                                                     |



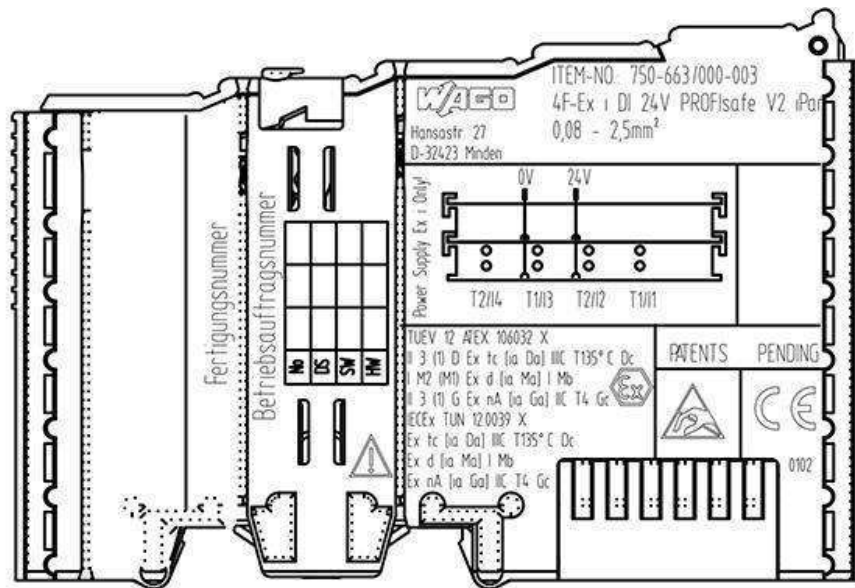


Figure 8: Side Marking Example for Approved Ex i I/O Modules According to ATEX and IECEx.

TUEV 12 ATEX 106032 X  
 II 3 (1) D Ex tc [ia Da] IIC T135° C Dc  
 I M2 (M1) Ex d [ia Ma] I Mb  
 II 3 (1) G Ex nA [ia Ga] IIC T4 Gc  
 IECEx TUN 12.0039 X  
 Ex tc [ia Da] IIC T135° C Dc  
 Ex d [ia Ma] I Mb  
 Ex nA [ia Ga] IIC T4 Gc

Figure 9: Text Detail – Marking Example for Approved Ex i I/O Modules According to ATEX and IECEx.

Table 10: Description of Marking Example for Approved Ex i I/O Modules According to ATEX and IECEx

| Inscription Text                                        | Description                                                                                                                     |
|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| TÜV 07 ATEX 554086 X<br>IECE <sub>x</sub> TUN 09.0001X  | Approving authority and certificate numbers                                                                                     |
| TÜV 12 ATEX 106032 X<br>IECE <sub>x</sub> TUN 12.0039 X |                                                                                                                                 |
| Dust                                                    |                                                                                                                                 |
| II                                                      | Equipment group: All except mining                                                                                              |
| 3(1)D                                                   | Category 3 (Zone 22) equipment containing a safety device for a category 1 (Zone 20) equipment                                  |
| 3(2)D                                                   | Category 3 (Zone 22) equipment containing a safety device for a category 2 (Zone 21) equipment                                  |
| Ex                                                      | Explosion protection mark                                                                                                       |
| tc Dc                                                   | Type of protection and equipment protection level (EPL): protection by enclosure                                                |
| [ia Da]                                                 | Type of protection and equipment protection level (EPL): associated apparatus with intrinsic safety circuits for use in Zone 20 |
| [ib Db]                                                 | Type of protection and equipment protection level (EPL): associated apparatus with intrinsic safety circuits for use in Zone 21 |
| IIIC                                                    | Explosion group of dust                                                                                                         |
| T 135°C                                                 | Max. surface temperature of the enclosure (without a dust layer)                                                                |
| Mining                                                  |                                                                                                                                 |
| I                                                       | Equipment Group: Mining                                                                                                         |
| M2 (M1)                                                 | Category: High level of protection with electrical circuits which present a very high level of protection                       |
| Ex d Mb                                                 | Explosion protection mark with Type of protection and equipment protection level (EPL): Flameproof enclosure                    |
| [ia Ma]                                                 | Type of protection and equipment protection level (EPL): associated apparatus with intrinsic safety electrical circuits         |
| I                                                       | Explosion group for electrical equipment for mines susceptible to firedamp                                                      |

Table 10: Description of Marking Example for Approved Ex i I/O Modules According to ATEX and IECEx

| <b>Gases</b> |                                                                                                                                |
|--------------|--------------------------------------------------------------------------------------------------------------------------------|
| II           | Equipment group: All except mining                                                                                             |
| 3(1)G        | Category 3 (Zone 2) equipment containing a safety device for a category 1 (Zone 0) equipment                                   |
| 3(2)G        | Category 3 (Zone 2) equipment containing a safety device for a category 2 (Zone 1) equipment                                   |
| Ex           | Explosion protection mark                                                                                                      |
| nA Gc        | Type of protection and equipment protection level (EPL): Non-sparking equipment                                                |
| [ia Ga]      | Type of protection and equipment protection level (EPL): associated apparatus with intrinsic safety circuits for use in Zone 0 |
| [ia Gb]      | Type of protection and equipment protection level (EPL): associated apparatus with intrinsic safety circuits for use in Zone 1 |
| IIC          | Explosion group of gas and vapours                                                                                             |
| T4           | Temperature class: Max. surface temperature 135°C                                                                              |

## 5.1.2 Marking for America According to NEC 500

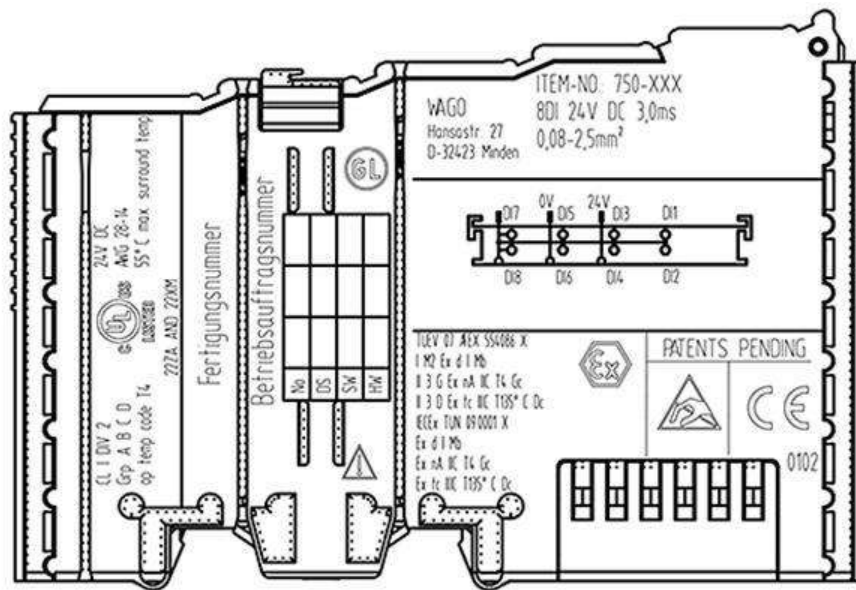


Figure 10: Side Marking Example for I/O Modules According to NEC 500



Figure 11: Text Detail – Marking Example for Approved I/O Modules According to NEC 500

Table 11: Description of Marking Example for Approved I/O Modules According to NEC 500

| Printing on Text | Description                                            |
|------------------|--------------------------------------------------------|
| CL I             | Explosion protection group (condition of use category) |
| DIV 2            | Area of application                                    |
| Grp. ABCD        | Explosion group (gas group)                            |
| Op temp code T4  | Temperature class                                      |

## 5.2 Installation Regulations

For the installation and operation of electrical equipment in hazardous areas, the valid national and international rules and regulations which are applicable at the installation location must be carefully followed.

### 5.2.1 Special Conditions for Safe Use (ATEX Certificate TÜV 07 ATEX 554086 X)

1. For use as Gc- or Dc-apparatus (in zone 2 or 22) the Field bus Independent I/O Modules WAGO-I/O-SYSTEM 750-\*\*\* shall be erected in an enclosure that fulfils the requirements of the applicable standards (see the marking) EN 60079-0, EN 60079-11, EN 60079-15 and EN 60079-31. For use as group I electrical apparatus M2 the apparatus shall be erected in an enclosure that ensures a sufficient protection according to EN 60079-0 and EN 60079-1 and the degree of protection IP64.  
The compliance of these requirements and the correct installation into an enclosure or a control cabinet of the devices shall be certified by an ExNB.
2. Measures have to be taken outside of the device that the rating voltage is not being exceeded of more than 40 % because of transient disturbances.
3. Dip-switches, binary-switches and potentiometers, connected to the module may only be actuated when explosive atmosphere can be excluded.
4. The connecting and disconnecting of the non-intrinsically safe circuits is only permitted during installation, for maintenance or for repair purposes. The temporal coincidence of explosion hazardous atmosphere and installation, maintenance resp. repair purposes shall be excluded.  
This is although and in particular valid for the interfaces “Memory-Card”, “USB”, “Fieldbus connection”, “Configuration and programming interface”, “antenna socket”, “D-Sub”, “DVI-port” and the “Ethernet interface”. These interfaces are not energy limited or intrinsically safe circuits. An operating of those circuits is in the behalf of the operator.
5. For the types 750-606, 750-625/000-001, 750-487/003-000, 750-484 and 750-633 the following shall be considered: The Interface circuits shall be limited to overvoltage category I/II/III (non mains/mains circuits) as defined in EN 60664-1.
6. For replaceable fuses the following shall be considered: Do not remove or replace the fuse when the apparatus is energized.
7. The following warnings shall be placed nearby the unit:  
WARNING – DO NOT REMOVE OR REPLACE FUSE WHEN ENERGIZED  
WARNING – DO NOT SEPARATE WHEN ENERGIZED  
WARNING – SEPARATE ONLY IN A NON-HAZARDOUS AREA

### 5.2.2 Special Conditions for Safe Use (ATEX Certificate TÜV 12 ATEX 106032 X)

1. For use as Gc- or Dc-apparatus (in zone 2 or 22) the Field bus Independent I/O Modules WAGO-I/O-SYSTEM 750-\*\*\* Ex i shall be erected in an enclosure that fulfils the requirements of the applicable standards (see the marking) EN 60079-0, EN 60079-11, EN 60079-15 and EN 60079-31. For use as group I electrical apparatus M2 the apparatus shall be erected in an enclosure that ensures a sufficient protection according to EN 60079-0 and EN 60079-1 and the degree of protection IP64.  
The compliance of these requirements and the correct installation into an enclosure or a control cabinet of the devices shall be certified by an ExNB.
2. Measures have to be taken outside of the device that the rating voltage is not being exceeded of more than 40 % because of transient disturbances.
3. The connecting and disconnecting of the non-intrinsically safe circuits is only permitted during installation, for maintenance or for repair purposes. The temporal coincidence of explosion hazardous atmosphere and installation, maintenance resp. repair purposes shall be excluded.
4. For the type the following shall be considered: The Interface circuits shall be limited to overvoltage category I/II/III (non mains/mains circuits) as defined in EN 60664-1.

### 5.2.3 Special Conditions for Safe Use (IEC-Ex Certificate TUN 09.0001 X)

1. For use as Gc- or Dc-apparatus (in zone 2 or 22) the Field bus Independent I/O Modules WAGO-I/O-SYSTEM 750-\*\*\* shall be erected in an enclosure that fulfils the requirements of the applicable standards (see the marking) IEC 60079-0, IEC 60079-11, IEC 60079-15 and IEC 60079-31. For use as group I electrical apparatus M2 the apparatus shall be erected in an enclosure that ensures a sufficient protection according to IEC 60079-0 and IEC 60079-1 and the degree of protection IP64.  
The compliance of these requirements and the correct installation into an enclosure or a control cabinet of the devices shall be certified by an ExCB.
2. Measures have to be taken outside of the device that the rating voltage is not being exceeded of more than 40 % because of transient disturbances.
3. DIP-switches, binary-switches and potentiometers, connected to the module may only be actuated when explosive atmosphere can be excluded.
4. The connecting and disconnecting of the non-intrinsically safe circuits is only permitted during installation, for maintenance or for repair purposes. The temporal coincidence of explosion hazardous atmosphere and installation, maintenance resp. repair purposes shall be excluded. This is although and in particular valid for the interfaces “Memory-Card”, “USB”, “Fieldbus connection”, “Configuration and programming interface”, “antenna socket”, “D-Sub”, “DVI-port” and the “Ethernet interface”. These interfaces are not energy limited or intrinsically safe circuits. An operating of those circuits is in the behalf of the operator.
5. For the types 750-606, 750-625/000-001, 750-487/003-000, 750-484 and 750-633 the following shall be considered: The Interface circuits shall be limited to overvoltage category I/II/III (non mains/mains circuits) as defined in IEC 60664-1.
6. For replaceable fuses the following shall be considered: Do not remove or replace the fuse when the apparatus is energized.
7. The following warnings shall be placed nearby the unit:  
WARNING – DO NOT REMOVE OR REPLACE FUSE WHEN ENERGIZED  
WARNING – DO NOT SEPARATE WHEN ENERGIZED  
WARNING – SEPARATE ONLY IN A NON-HAZARDOUS AREA



### 5.2.4 Special Conditions for Safe Use (IEC-Ex Certificate IECEx TUN 12.0039 X)

1. For use as Gc- or Dc-apparatus (in zone 2 or 22) the Field bus independent I/O Modules WAGO-I/O-SYSTEM 750-\*\*\* Ex i shall be erected in an enclosure that fulfils the requirements of the applicable standards (see the marking) IEC 60079-0, IEC 60079-11, IEC 60079-15, IEC 60079-31.  
For use as group I electrical apparatus M2 the apparatus shall be erected in an enclosure that ensures a sufficient protection according to IEC 60079-0 and IEC 60079-1 and the degree of protection IP64.  
The compliance of these requirements and the correct installation into an enclosure or a control cabinet of the devices shall be certified by an ExCB.
2. Measures have to be taken outside of the device that the rating voltage is not being exceeded of more than 40 % because of transient disturbances.
3. The connecting and disconnecting of the non-intrinsically safe circuits is only permitted during installation, for maintenance or for repair purposes. The temporal coincidence of explosion hazardous atmosphere and installation, maintenance resp. repair purposes shall be excluded.
4. For the type the following shall be considered: The Interface circuits shall be limited to overvoltage category I/II/III (non mains/mains circuits) as defined in IEC 60664-1.

## 5.2.5 Special Conditions for Safe Use According to ANSI/ISA 12.12.01

- A. “This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D or non-hazardous locations only.”
- B. “This equipment is to be fitted within tool-secured enclosures only.”
- C. “WARNING Explosion hazard - substitution of components may impair suitability for Class I, Div. 2.”
- D. “WARNING – Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous” has to be placed near each operator accessible connector and fuse holder.
- E. When a fuse is provided, the following information shall be provided: “A switch suitable for the location where the equipment is installed shall be provided to remove the power from the fuse.”
- F. For devices with EtherCAT/Ethernet connectors “Only for use in LAN, not for connection to telecommunication circuits.”
- G. “WARNING - Use Module 750-642 only with antenna module 758-910.”
- H. For Couplers/Controllers and Economy bus modules only: The instructions shall contain the following: “The configuration interface Service connector is for temporary connection only. Do not connect or disconnect unless the area is known to be non-hazardous. Connection or disconnection in an explosive atmosphere could result in an explosion.”
- I. Modules containing fuses only: “WARNING - Devices containing fuses must not be fitted into circuits subject to over loads, e.g. motor circuits.”
- J. Modules containing SD card reader sockets only: “WARNING - Do not connect or disconnect SD-Card while circuit is live unless the area is known to be free of ignitable concentrations of flammable gases or vapors.”



### Information

#### Additional Information

Proof of certification is available on request.

Also take note of the information given on the operating and assembly instructions.

The manual, containing these special conditions for safe use, must be readily available to the user.

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# WE INNOVATE!

WAGO Kontakttechnik GmbH & Co. KG  
Postfach 2880 • D-32385 Minden  
Hansastraße 27 • D-32423 Minden  
Phone: 05 71/8 87 – 0  
Fax: 05 71/8 87 –169  
E-Mail: [info@wago.com](mailto:info@wago.com)  
Internet: <http://www.wago.com>

# WAGO-I/O-SYSTEM 750

## Manual



### 750-652

#### Serial Interface RS-232 / RS-485

#### Configurable

Version 2.0.0

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### **WAGO Kontakttechnik GmbH & Co. KG**

Hansastraße 27  
D-32423 Minden

Phone: +49 (0) 571/8 87 – 0  
Fax: +49 (0) 571/8 87 – 169

E-Mail: [info@wago.com](mailto:info@wago.com)

Web: <http://www.wago.com>

### **Technical Support**

Phone: +49 (0) 571/8 87 – 555  
Fax: +49 (0) 571/8 87 – 8555

E-Mail: [support@wago.com](mailto:support@wago.com)

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.

E-Mail: [documentation@wago.com](mailto:documentation@wago.com)

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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 750-652 (Serial Interface RS-232 / RS-485) and the variants listed in the table below.

Table 1: Variants

| Item Number/Variant | Designation                        |
|---------------------|------------------------------------|
| 750-652             | Serial Interface RS-232 / RS-485   |
| 750-652/025-000     | Serial Interface RS-232 / RS-485/T |



## Note

### Documentation Validity for Variants

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

The I/O module 750-652 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



### DANGER

#### Personal Injury!

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



### 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.

### NOTICE

#### Damage to Property!

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



### NOTICE

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

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



### Note

#### Important Note!

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



## *Information*

**Additional Information:**

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

## 1.4 Number Notation

Table 2: Number Notation

| Number Code | Example              | Note                                               |
|-------------|----------------------|----------------------------------------------------|
| Decimal     | 100                  | Normal notation                                    |
| Hexadecimal | 0x64                 | C notation                                         |
| Binary      | '100'<br>'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.<br>e.g.: <i>C:\Program Files\WAGO Software</i>                            |
| <b>Menu</b>     | Menu items are marked in bold letters.<br>e.g.: <b>Save</b>                                                                        |
| >               | A greater-than sign between two names means the selection of a menu item from a menu.<br>e.g.: <b>File &gt; New</b>                |
| <b>Input</b>    | Designation of input or optional fields are marked in bold letters,<br>e.g.: <b>Start of measurement range</b>                     |
| “Value”         | Input or selective values are marked in inverted commas.<br>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.<br>e.g.: <b>[Input]</b>                               |
| <b>[Key]</b>    | Keys are marked with bold letters in square brackets.<br>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 2014/34/EU) 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.

## NOTICE

### **Do not use any contact spray!**

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

## 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.



## 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.

### 3 Device Description

The I/O module 750-652 (Serial Interface RS-232 / RS-485) allows the optional connection of devices with a RS-485, RS-422 or RS-232 interface.

It also provides gateways between the serial interface and the fieldbus systems supported by the WAGO-I/O-SYSTEM 750.

No higher protocol level is required by the module. Communication to the associated fieldbus master is completely transparent. This provides for a broader application scope for the serial interface module. If required, communication protocols can be configured via fieldbus master.

The 2560 byte input buffer provides for high data baud rates. At lower baud rates, the data received in lower priority tasks is evaluated without data loss.

The 512-byte output buffer provides fast transmission of larger data strings.

The operating mode of the I/O module can be configured using the WAGO-I/O-CHECK startup tool. Learn what version on WAGO-I/O-CHECK you need in the table “WAGO-I/O-CHECK Minimum Requirements” in the “Commissioning” section.



#### Note

##### NOTE

The default operating mode is RS-485 half-duplex. The default data transmission rate is 9600 baud. 1 start bit, 8 data bits and 1 stop bit are sent. There is no parity generation and dataflow control.

Before starting operation, the connections of the I/O module 750-652 must be cabled appropriately (see section “Connect Devices” > ... > “Connection Examples”).

In RS-232 mode, the interface works in accordance with the TIA/EIA-232-F and CCITT V.28/DIN 66259-1 standards.

In RS-485/RS-422 mode, the interface works in accordance with the TIA/EIA-485-A, DIN 66259 standards.

The connected device can communicate directly with the control unit via the fieldbus coupler/controller used.

The active communication channel works independent of the fieldbus system used in full or half-duplex operation at up to 115200 baud.

In the data flow control through RTS/CTS in RS-232 mode, a lead time or follow-on time can be configured for the I/O module for the RTS signal. This function is available with firmware version 03 or higher.

Direct data exchange between different fieldbus nodes of the 750 series is possible in conjunction with a second I/O module 750-652. This function is available with firmware version 03 or higher.

The I/O module 750-652 can be configured as a DMX device with a baud rate of 250 kBits/s. This function is available with firmware version 03 or higher.

The I/O module 750-652 can be configured as a DMX device at a baud rate of 250 kBits/s. This function is available with firmware version 03 or higher. The I/O module can be operated as a DMX sender with firmware version 03 or higher and as a DMX receiver with firmware version 06 or higher.

The wiring to the communication partner takes place in RS-232 mode via the TxD, RxD connections, if necessary RTS/CTS and ground and in the RS-485/RS-422 mode via the connections A, B, X, Y, and ground.

The shield connection is fed directly to the carrier rail and contact is made automatically by snapping the module onto the rail.

The assignment of the connections is described in the “Connectors” section. Connection examples are shown in section “Connect Devices” > ... > “Connection Example(s)”.

Multi-color LEDs indicate the operating status and the trouble-free internal bus communication as well as the status of the signal transmission. The meaning of the LEDs is described in the “Display Elements” section.

The I/O module 750-652 (Serial Interface RS-232 / RS-485) receives the 24 V voltage supply for the field level from an upstream I/O module or from the fieldbus coupler/controller via blade-formed power jumper contacts. It then provides these potentials to subsequent I/O modules via spring-formed power jumper contacts.

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 750-652 module can be used with the fieldbus couplers and controllers of the WAGO-I/O-SYSTEM 750 of the specified version or higher listed in the “Compatibility list” table.

Table 4: Compatibility List 750-652

| Bus System | Fieldbus Couplers/Controllers | Item No.        | Firmware Revision Status |
|------------|-------------------------------|-----------------|--------------------------|
| PROFINET   | Fieldbus coupler              | 750-370         | 02                       |
|            |                               | 750-375         | 01                       |
|            |                               | 750-377         | 01                       |
| PROFIBUS   | Fieldbus coupler              | 750-333         | 14                       |
|            | Controller                    | 750-833         | 14                       |
| ETHERNET   | Fieldbus coupler              | 750-341         | 07                       |
|            |                               | 750-342         | 17                       |
|            |                               | 750-352         | 02                       |
|            | Controller                    | 750-841         | 18                       |
|            |                               | 750-842         | 18                       |
|            |                               | 750-843         | 02                       |
|            |                               | 750-852         | 09                       |
|            |                               | 750-871         | 07                       |
|            |                               | 750-872         | 03                       |
|            |                               | 750-873         | 03                       |
|            |                               | 750-880         | 02                       |
|            |                               | 750-881         | 02                       |
|            |                               | 750-882         | 01                       |
|            |                               | 750-885         | 09                       |
|            | PFC100 controller             | 750-810x        | 05                       |
|            | PFC200 controller             | 750-820x        | 01                       |
|            | BA application controller     | 750-884         | 09                       |
|            | I/O-IPC                       | 758-870/000-xxx | 05                       |
|            |                               | 758-874/000-xxx | 05                       |
|            |                               | 758-875/000-xxx | 05                       |
|            |                               | 758-876/000-xxx | 05                       |
| DeviceNet  | Fieldbus coupler              | 750-306         | 4K                       |
|            | ECO fieldbus coupler          | 750-346         | 10                       |
|            | Controller                    | 750-806         | 10                       |
| CANopen    | Fieldbus coupler              | 750-337         | 19                       |
|            |                               | 750-338         | 19                       |
|            | ECO fieldbus coupler          | 750-347         | 08                       |
|            |                               | 750-348         | 08                       |
|            | Controller                    | 750-837         | 14                       |
|            |                               | 750-838         | 14                       |

Table 4: Compatibility List 750-652

| Bus System | Fieldbus Couplers/Controllers | Item No.        | Firmware Revision Status |
|------------|-------------------------------|-----------------|--------------------------|
| MODBUS     | Fieldbus coupler              | 750-315/300-000 | 01                       |
|            |                               | 750-316/300-000 | 01                       |
|            | Controller                    | 750-815/300-000 | 01                       |
|            |                               | 750-816/300-000 | 01                       |
| EtherCat   | Fieldbus coupler              | 750-354         | 03                       |
| sercos III | Fieldbus coupler              | 750-351         | 04                       |
| BACnet     | Controller                    | 750-829         | 07                       |
|            |                               | 750-830         | 03                       |
|            |                               | 750-831         | 07                       |
| KNX        | Controller                    | 750-849         | 04                       |
|            |                               | 750-889         | 07                       |

Other fieldbus couplers/controllers on request.

## 3.1 View

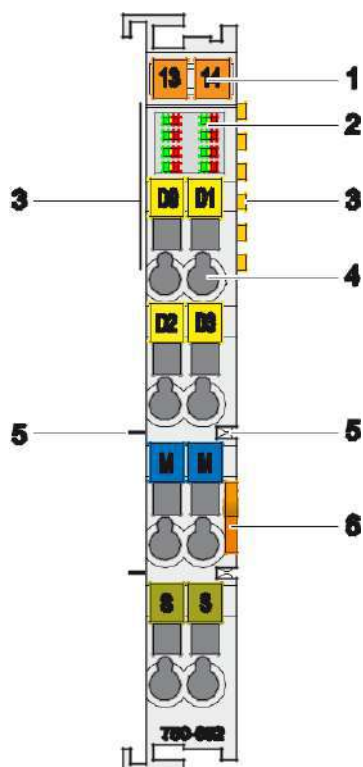


Figure 1: View

Table 5: 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 <sup>®</sup> connectors | “Device Description” > “Connectors”           |
| 5    | Power jumper contacts              | “Device Description” > “Connectors”           |
| 6    | 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.

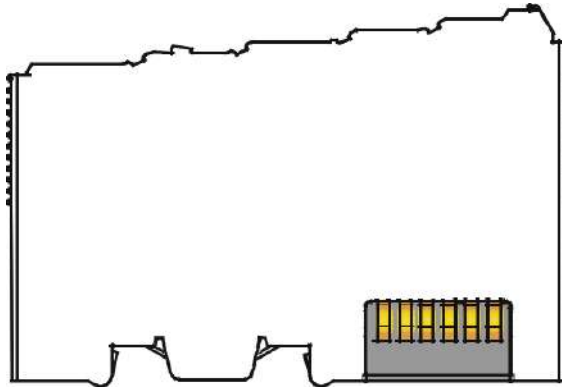


Figure 2: Data Contacts

#### 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

#### **⚠ 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.

The I/O module 750-652 has 2 self-cleaning power jumper contacts that supply and transmit power for the field side. The contacts on the left side of the I/O module are designed as blade contacts and those on the right side as spring contacts.

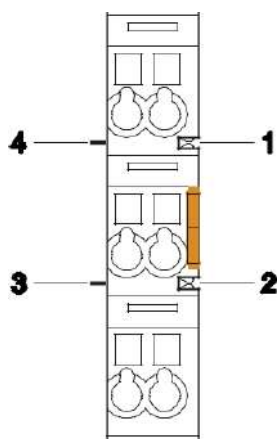


Figure 3: Power Jumper Contacts

Table 6: Legend for Figure “Power Jumper Contacts”

| Contact | Type           | Function                                          |
|---------|----------------|---------------------------------------------------|
| 1       | Spring contact | Potential transmission ( $U_V$ ) for field supply |
| 2       | Spring contact | Potential transmission (0 V) for field supply     |
| 3       | Blade contact  | Potential feed-in (0 V) for field supply          |
| 4       | Blade contact  | Potential feed-in ( $U_V$ ) for field supply      |

#### **NOTICE**

##### **Do not exceed maximum current via power jumper contacts!**

The maximum current to flow through the power jumper contacts is 10 A. Greater currents can damage the contacts.

When configuring your system, ensure that this current is not exceeded. If exceeded, insert an additional supply module.



## Note

### **Use supply modules for ground (earth)!**

The I/O module has no power jumper contacts for receiving and transmitting the earth potential. Use a supply module when an earth potential is needed for the subsequent I/O modules.

### 3.2.3 CAGE CLAMP® Connectors



#### 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.

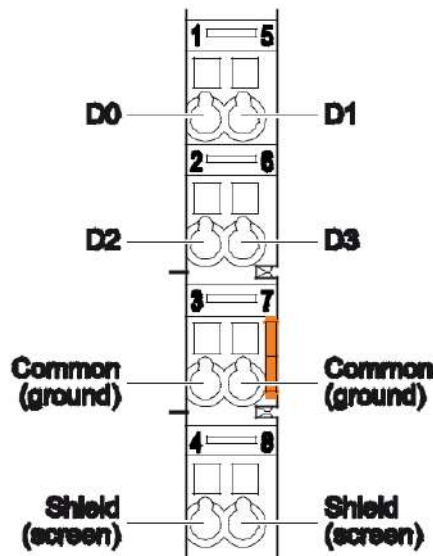


Figure 4: CAGE CLAMP® Connectors

Table 7: Legend for Figure “CAGE CLAMP® Connectors”

| Designation        | Connector | Function                                 |
|--------------------|-----------|------------------------------------------|
| D0                 | 1         | RTS (RS-232)<br>Z / TxD+ (RS-485/RS-422) |
| D1                 | 5         | TxD (RS-232)<br>Y / TxD– (RS-485/RS-422) |
| D2                 | 2         | CTS (RS-232)<br>B / RxD+ (RS-485/RS-422) |
| D3                 | 6         | RxD (RS-232)<br>A / RxD– (RS-485/RS-422) |
| Common<br>(ground) | 3         | Common (ground)                          |
|                    | 7         | Common (ground)                          |
| Shield<br>(screen) | 4         | Shield (screen)                          |
|                    | 8         | Shield (screen)                          |

### 3.3 Display Elements



Figure 5: Display Elements

Table 8: Legend for Figure “Display Elements”

| Designation         | LED | Status | Function                                                                                                                                                                           |
|---------------------|-----|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Function            | A   | Green  | Ready for operation and undisturbed internal bus communication                                                                                                                     |
|                     |     | Red    | Not ready for operation or no or disturbed internal bus communication                                                                                                              |
| TxD (transmit)      | B   | OFF    | No signal transmission TxD                                                                                                                                                         |
|                     |     | Green  | Signal transmission TxD present <sup>1)</sup>                                                                                                                                      |
|                     |     | Yellow | I/O module has received XOFF character, the transmission is inactive <sup>2)</sup><br>CTS line has fallen, the transmission is inactive <sup>3)</sup>                              |
| RxD (receive)       | C   | OFF    | No signal transmission RxD or input open                                                                                                                                           |
|                     |     | Green  | Signal transmission RxD present <sup>1)</sup>                                                                                                                                      |
|                     |     | Red    | Signal transmission RxD present <sup>1)</sup> , but some characters received are defective (parity, data frame or overrun error has occurred) <sup>4)</sup>                        |
| Transmission status | D   | OFF    | No transmission error                                                                                                                                                              |
|                     |     | Green  | Output buffer is full                                                                                                                                                              |
|                     |     | Yellow | Input buffer is full (LED lights up if there are more than 2304 characters in the input buffer. LED does not light up if there are fewer than 2176 characters in the input buffer) |
| Mode                | E   | Green  | RS-485 half-duplex, DMX                                                                                                                                                            |
|                     |     | Yellow | RS-422 full-duplex, data exchange                                                                                                                                                  |
|                     |     | Red    | RS-232                                                                                                                                                                             |
| Data flow control   | F   | OFF    | No data flow control                                                                                                                                                               |
|                     |     | Green  | RTS/CTS data flow control active <sup>3)</sup>                                                                                                                                     |
|                     |     | Yellow | XON/XOFF data flow control active <sup>2)</sup>                                                                                                                                    |
|                     |     | Red    | RTS with lead time and follow-on time is active <sup>5)</sup>                                                                                                                      |

Table 8: Legend for Figure “Display Elements”

| Designation                      | LED | Status          | Function                                                          |
|----------------------------------|-----|-----------------|-------------------------------------------------------------------|
| Data exchange mode <sup>5)</sup> | G   | OFF             | Data exchange mode is OFF <sup>5)</sup>                           |
|                                  |     | Yellow          | Data exchange mode is initialized                                 |
|                                  |     | Green           | Data exchange mode is ON                                          |
|                                  |     | Yellow flashing | Data exchange mode is ON, but there is no communication (timeout) |
| DMX <sup>5)</sup>                | H   | OFF             | DMX is OFF                                                        |
|                                  |     | Green           | DMX is ON                                                         |

1) With high baud rates, the pulses are so short that the on state cannot or can hardly be detected with the naked eye.

2) XON/XOFF data flow control active

3) RTS/CTS data flow control active

4) Defective characters are not transmitted by the I/O module to the fieldbus coupler/controller.

5) Firmware version 03 or higher

## 3.4 Operating Elements

The I/O module 750-652 has no operating elements.

### 3.5 Schematic Diagram

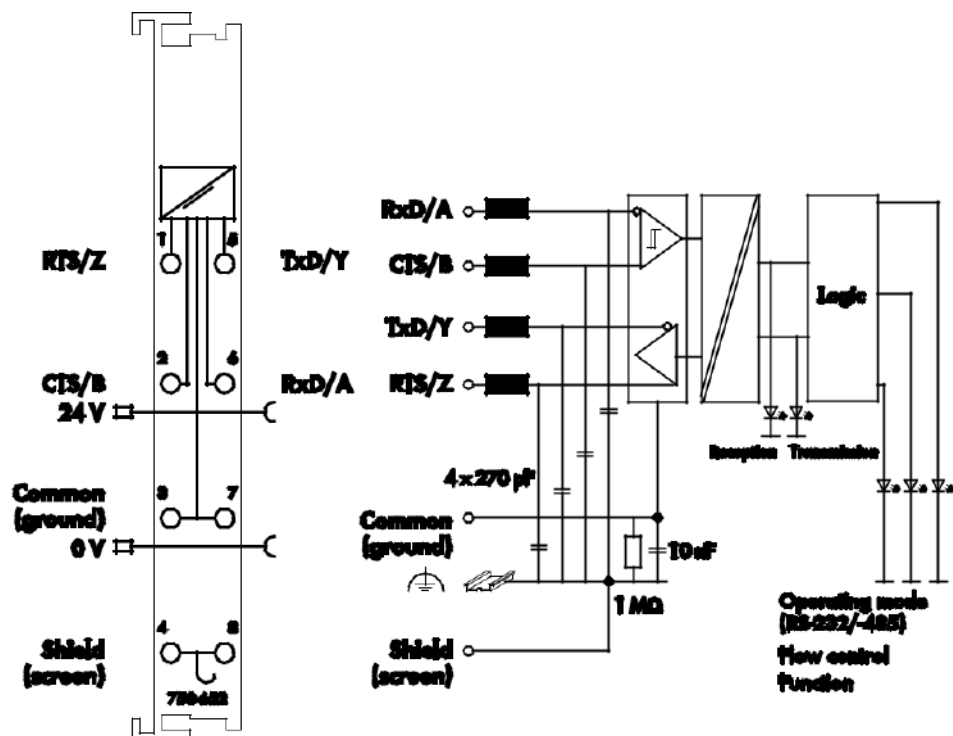


Figure 6: Schematic Diagram

## 3.6 Technical Data

### 3.6.1 Device Data

Table 9: Technical Data – Device Data

|                                         |              |
|-----------------------------------------|--------------|
| Width                                   | 12 mm        |
| Height (from upper edge of DIN 35 rail) | 64 mm        |
| Length                                  | 100 mm       |
| Weight                                  | Approx. 51 g |
| Degree of protection                    | IP20         |

### 3.6.2 Supply

Table 10: Technical Data – Supply

|                                                   |                                            |
|---------------------------------------------------|--------------------------------------------|
| Power supply                                      | Via system voltage internal bus<br>(5 VDC) |
| Current consumption (internal)                    | Max. 85 mA                                 |
| Current via power jumper contacts <sub>max.</sub> | 10 A                                       |
| Isolation (peak value)                            | 500 V system/supply                        |

### 3.6.3 Communication

Table 11: Technical Data – Communication

|                       |                                                                                                                                                                                                                               |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Transmission channels | 1 TxD/1 RxD, full-duplex, half-duplex, 7 or 8 bit data, 1 or 2 stop bits                                                                                                                                                      |
| Mode (configurable)   | <ul style="list-style-type: none"> <li>• RS-232</li> <li>• RS-485 half-duplex<sup>*)</sup></li> <li>• RS-422 full-duplex</li> <li>• Data exchange RS-422<sup>1)</sup></li> <li>• DMX half-duplex/250k<sup>2)</sup></li> </ul> |
| Data flow control     | RTS/CTS <sup>3)</sup> depending on mode, XON/XOFF <sup>4)</sup>                                                                                                                                                               |
| Baud rate             | 300 ... 115200 baud                                                                                                                                                                                                           |
| Data width, internal  | 8, 24 <sup>*)</sup> or 48 bytes (configurable)                                                                                                                                                                                |
| Line length           | RS-485/RS-422: max. approx. 1000 m <sup>5)</sup><br>RS-232: max. 40 m<br>Data exchange mode/<br>DMX: max. 100 m <sup>6)</sup>                                                                                                 |
| Buffer                | 2560 bytes for receive / 512 bytes for send <sup>7)</sup>                                                                                                                                                                     |

\*) Factory default setting

1) Firmware version 03 or higher

2) Firmware version 03 or higher: Sending DMX packets possible  
Firmware version 06 or higher: Receiving DMX packets possible

3) Activation of flow control RTS/CTS is only possible for “RS-232” mode;  
Flow control RTS/CTS with lead/follow-on time possible with firmware version 03 or higher.

4) Activation of flow control XON/XOFF is only possible for “RS-232” and “RS-422 full-duplex” modes.

5) Depending on baud rate, bus system and cable type (use of a twisted-pair cable is recommended)

6) A twisted-pair cable must be used in “DMX” mode.

7) “RS-232”, “RS-485 half-duplex”, “RS-422 full-duplex” modes

### 3.6.4 Interface

Table 12: Technical Data – Interface

|                                                          |                                                                                                                    |
|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Number of interfaces                                     | 1                                                                                                                  |
| Input resistance of the receiver<br>RS-485/RS-422 or DMX | <b>24 kΩ (1/2 Unit Load)</b><br>Defined receiver state with short-circuited or isolated inputs<br>(true fail-safe) |
| Isolation                                                | 500 V system/supply                                                                                                |

### 3.6.5 Connection Type

Table 13: Technical Data – Field Wiring

|                  |                                     |
|------------------|-------------------------------------|
| Wire connection  | CAGE CLAMP <sup>®</sup>             |
| Cross section    | 0.08 mm² ... 2.5 mm², AWG 28 ... 14 |
| Stripped lengths | 8 mm ... 9 mm / 0.33 in             |



Table 14: Technical Data – Power Jumper Contacts

|                       |                                     |
|-----------------------|-------------------------------------|
| Power jumper contacts | Blade/spring contact, self-cleaning |
|-----------------------|-------------------------------------|

Table 15: Technical Data – Data Contacts

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

### 3.6.6 Climatic Environmental Conditions

Table 16: Technical Data – Climatic Environmental Conditions

|                                                                                              |                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating temperature range                                                                  | 0°C...55°C                                                                                                                                                       |
| Operating temperature range for components with extended temperature range (750-xxx/025-xxx) | –20 °C ... +60 °C                                                                                                                                                |
| Storage temperature range                                                                    | –25 °C ... +85 °C                                                                                                                                                |
| Storage temperature range for components with extended temperature range (750-xxx/025-xxx)   | –40 °C ... +85 °C                                                                                                                                                |
| Relative humidity                                                                            | Max. 5 % ... 95 % without condensation                                                                                                                           |
| 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<br>H <sub>2</sub> S ≤ 10 ppm                                                                                                            |
| Special conditions                                                                           | Ensure that additional measures for components are taken, which are used in an environment involving:<br>– dust, caustic vapors or gases<br>– ionizing radiation |

## 3.7 Approvals

The following approvals have been granted to the basic version and all variants of 750-652 I/O modules:



Conformity Marking



cULUS

UL508



Korea Certification

MSIP-REM-W43-SIM750

The following Ex approvals have been granted to the basic version and all variants of 750-652 I/O modules:

TÜV 07 ATEX 554086 X



I M2 Ex d I Mb

II 3 G Ex nA IIC T4 Gc

II 3 D Ex tc IIIC T135°C Dc

IECEX TUN 09.0001 X

Ex d I Mb

Ex nA IIC T4 Gc

Ex tc IIIC T135°C Dc



cULUS

ANSI/ISA 12.12.01

Class I, Div2 ABCD T4

The following ship approvals have been granted to the basic version and all variants of 750-652 I/O modules listed in the table:

Table 17: Ship Approvals

|                 |  |  |  |  |  |  |  |  |  |  |
|-----------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>750-652</b>  | X                                                                                 | X                                                                                 | X                                                                                 | X                                                                                 | X                                                                                  | X                                                                                   | X                                                                                   | X                                                                                   | X                                                                                   | X                                                                                   |
| <b>/025-000</b> |                                                                                   | X                                                                                 |                                                                                   |                                                                                   | X                                                                                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |



ABS (American Bureau of Shipping)



Federal Maritime and Hydrographic Agency



BV (Bureau Veritas)



DNV (Det Norske Veritas)

Class B



GL (Germanischer Lloyd)

Cat. A, B, C, D (EMC 1)



KR (Korean Register of Shipping)



LR (Lloyd's Register)

Env. 1, 2, 3, 4



NKK (Nippon Kaiji Kyokai)



PRS (Polski Rejestr Statków)



RINA (Registro Italiano Navale)

## 3.8 Standards and Guidelines

All variations of 750-652 I/O modules meet the following requirements on emission and immunity of interference:

|                                                  |                |
|--------------------------------------------------|----------------|
| EMC CE-Immunity to interference                  | EN 61131-2     |
| EMC CE-Immunity to interference                  | EN 61000-6-2   |
| EMC CE-Emission of interference                  | EN 61000-6-3   |
| EMC marine applications-Emission of interference | acc. to DNV GL |
| EMC marine applications-Immunity to interference | acc. to DNV GL |

## 4 Process Image



### Note

#### Mapping of process data in the process image of fieldbus systems

The representation of the I/O modules' process data 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 fieldbus coupler/controller used.

### 4.1 Operating Modes for Serial Transmission

The data to be sent and received will be stored in up to 46 input and output bytes (D0 ... D45). Data flow is controlled with control and status bytes C0 and S0 or C1 and S1. The input bytes form the memory area for up to 46 characters, which were received by the interface. The characters to be transmitted are sent via the output bytes.

Table 18: Process Data for Serial Transmission

| Process Image Length | Input Data |               | Output Data |                |
|----------------------|------------|---------------|-------------|----------------|
| 8 bytes              | S0         | Status byte 0 | C0          | Control byte 0 |
|                      | S1         | Status byte 1 | C1          | Control byte 1 |
|                      | D0         | Data byte 0   | D0          | Data byte 0    |
|                      | D1         | Data byte 1   | D1          | Data byte 1    |
|                      | D2         | Data byte 2   | D2          | Data byte 2    |
|                      | ...        |               | ...         |                |
|                      | D5         | Data byte 5   | D5          | Data byte 5    |
| 24 bytes             | D6         | Data byte 6   | D6          | Data byte 6    |
|                      | ...        |               | ...         |                |
|                      | D21        | Data byte 21  | D21         | Data byte 21   |
| 48 bytes             | D22        | Data byte 22  | D22         | Data byte 22   |
|                      | ...        |               | ...         |                |
|                      | D45        | Data byte 45  | D45         | Data byte 45   |

The structure of the control and status bytes is described in the tables below.

Table 19: Control Byte C0

| Bit 7 | Bit 6                                                                                      | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|-------|--------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------|
| RC    | OL2                                                                                        | OL1   | OL0   | SC    | IR    | RA    | TR    |
| TR    | Transmit request                                                                           |       |       |       |       |       |       |
| RA    | Receive acknowledge                                                                        |       |       |       |       |       |       |
| IR    | Initialization request                                                                     |       |       |       |       |       |       |
| SC    | Send continuous (of data from the FIFO)                                                    |       |       |       |       |       |       |
| OL 0  | Output length (number of characters to be sent that were stored in the output data, bit 0) |       |       |       |       |       |       |
| OL1   | Output length (number of characters to be sent that were stored in the output data, bit 1) |       |       |       |       |       |       |
| OL2   | Output length (number of characters to be sent that were stored in the output data, bit 2) |       |       |       |       |       |       |
| RC    | Reserved for internal communication                                                        |       |       |       |       |       |       |

Table 20: Status Byte S0

| Bit 7 | Bit 6                                                                                    | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|-------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------|
| RC    | BUF F                                                                                    | IL2   | IL1   | IL0   | IA    | RR    | TA    |
| TA    | Transmit acknowledge                                                                     |       |       |       |       |       |       |
| RR    | Receive request                                                                          |       |       |       |       |       |       |
| IA    | Initialization acknowledge                                                               |       |       |       |       |       |       |
| IL0   | Input length (number of characters received that are available in the input data, bit 0) |       |       |       |       |       |       |
| IL1   | Input length (number of characters received that are available in the input data, bit 1) |       |       |       |       |       |       |
| IL2   | Input length (number of characters received that are available in the input data, bit 2) |       |       |       |       |       |       |
| BUF F | Buffer full (message: input buffer is full)                                              |       |       |       |       |       |       |
| RC    | Reserved for internal communication                                                      |       |       |       |       |       |       |

Table 21: Control Byte C1

| Bit 7 | Bit 6                                                                                      | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|-------|--------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------|
| 0     | 0                                                                                          | 0     | 0     | OL5   | OL4   | OL3   |       |
| OL3   | Output length (number of characters to be sent that were stored in the output data, bit 3) |       |       |       |       |       |       |
| OL4   | Output length (number of characters to be sent that were stored in the output data, bit 4) |       |       |       |       |       |       |
| OL5   | Output length (number of characters to be sent that were stored in the output data, bit 5) |       |       |       |       |       |       |
| 0     | This constant must be set to 0.                                                            |       |       |       |       |       |       |