WAGO I/O SYSTEM 750

# Fieldbus Independent I/O Modules

## 2 AO DC 0-10 V 750-550

# Manual

Version 1.0.2

WAGO®
INNOVATIVE CONNECTIONS

**WAGO Kontakttechnik GmbH & Co. KG**
Hansastraße 27
D-32423 Minden

Phone: +49 (0) 571/8 87 – 0
Fax: +49 (0) 571/8 87 – 1 69

E-Mail: info@wago.com

Web: http://www.wago.com

**Technical Support**
Phone: +49 (0) 571/8 87 – 5 55
Fax: +49 (0) 571/8 87 – 85 55

E-Mail: support@wago.com

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

E-Mail: documentation@wago.com

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

# Content

# 1 Important Comments

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

## 1.1 Legal Principles

### 1.1.1 Copyright

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### 1.1.2 Personnel Qualification

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

### 1.1.3 Intended Use

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

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

## 1.2 Symbols

**Danger**
Always abide by this information to protect persons from injury.

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

**Attention**
Marginal conditions must always be observed to ensure smooth operation.

**ESD** (Electrostatic Discharge)
Warning of damage to the components by electrostatic discharge. Observe the precautionary measure for handling components at risk.

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

**More information**
References on additional literature, manuals, data sheets and INTERNET pages

## 1.3 Number Notation

| Number Code | Example | Note |
|---|---|---|
| Decimal | 100 | normal notation |
| Hexadecimal | 0x64 | C notation |
| Binary | '100'<br>'0110.0100' | Within ',<br>Nibble separated with dots |

## 1.4 Safety Notes

**Warning**
Switch off the system prior to working on bus modules!

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

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

If it cannot be ruled out that these materials appear in the component environment, then additional measures are to be taken:
- installation of the components into an appropriate enclosure
- handling of the components only with clean tools and materials.

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

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

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

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

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

## 1.5 Scope

This manual describes the Analog Output Module 750-550
2 AO DC 0-10 V of the modular WAGO-I/O-SYSTEM 750.

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

# 2 I/O Modules

## 2.1 Analog Output Modules

### 2.1.1 750-550 [2 AO DC 0-10 V]

2-Channel Analog Output Module 0-10 V

#### 2.1.1.1 View

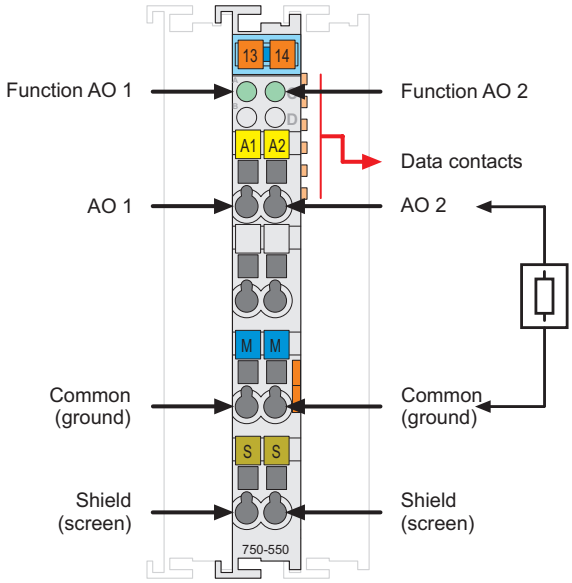


Fig. 2.1.1-1: 2-Channel Analog Output Module 750-550 g055000e

#### 2.1.1.2 Variations

| Item-No.: | Designation | Description |
|---|---|---|
| 750-550 | 2 AO (0-10V) | 2-Channel Analog Output Module , 0-10V |
| 750-550/000-200 | 2 AO (0-10V) with Siemens (S5-FB 251) | 2-Channel Analog Output Module , 0-10V, adapted data format for S5-control systems with the use of function block FB 251 |

### 2.1.1.3 Description

The analog output module 750-550 and its variation create a standardized signal of 0-10 V.

The module has two short circuit protected output channels and enables the direct wiring of two 2-conductor actuators to AO 1 and ground or AO 2 and ground. The signals are transmitted via AO 1 or AO 2.
The channels have a common ground and a shield (screen) (S). The shield (screen) is directly connected to the DIN rail. A capacitive connection is made automatically when snapped onto the DIN rail.

The input signal is electrically isolated and will be transmitted with a resolution of 12 bits.

The operational readiness and the trouble-free internal data bus communication of the channels are indicated via a function LED.

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

The voltage supply is done via the internal system voltage.

**Attention**
This module is not provided with integrated power jumper contacts. For field supply to downstream I/O modules, a supply module will be needed.

The analog output 750-550 and its variations module can be used with all couplers/controllers of the WAGO-I/O-SYSTEM 750 (except for the economy types 750-320, -323, -324 and -327).

### 2.1.1.4 Display Elements

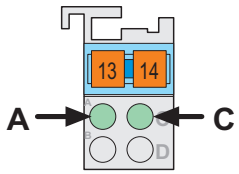


Fig. 2.1.1-2: Display Elements g041402x

| LED | Channel | Designation | State | Function |
|---|---|---|---|---|
| A green | 1 | Function AO 1 | off | No operational readiness or the internal data bus communication is interrupted |
| | | | on | Operational readiness and trouble-free operational readiness |
| C green | 2 | Function AO 2 | off | No operational readiness or the internal data bus communication is interrupted |
| | | | on | Operational readiness and trouble-free operational readiness |

### 2.1.1.5 Schematic Diagram

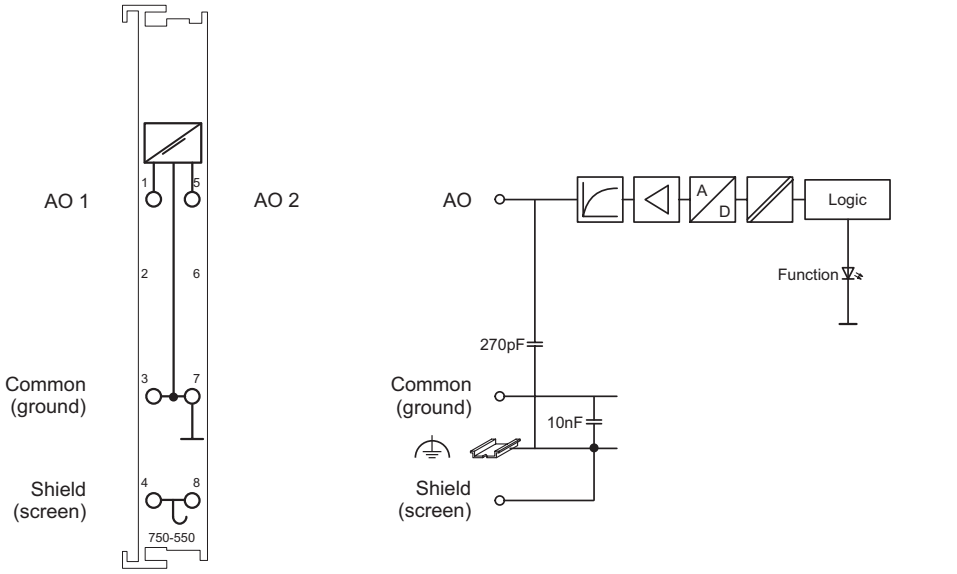


Fig. 2.1.1-3: 2-Channel Analog Output Module 750-550 g055001e

### 2.1.1.6 Technical Data

| Module Specific Data | |
|---|---|
| Number of outputs | 2 |
| Voltage supply | via system voltage DC/DC |
| Current consumption $_{typ.}$ (internal) | 65 mA |
| Signal voltage | 0 ... 10 V |
| Load impedance | > 5 kΩ |
| Resolution | 12 Bit |
| Conversion time | approx. 2 ms |
| Output filter settle time $_{typ.}$ | 300 µs |
| Temperature coefficient | <± 0.01 %/°K of the full scale value |
| Isolation | 500 V (Field/System) |
| Bit width | 2 x 16 bits data<br>2 x 8 bits control/status (option) |
| Dimensions (mm) W x H x L | 12 x 64* x 100<br>* from upper edge of 35 DIN rail |
| Weight | ca. 55 g |
| **Standards and Regulations (cf. Chapter 2.2 of the Coupler/Controller Manual)** | |
| EMC-Immunity to interference (CE) | acc. to EN 50082-2 (96) |
| EMC-Emission of interference (CE) | acc. to EN 50081-1 (93) |
| EMC-Immunity to interference (Ship building) | acc. to Germanischer Lloyd (97) |
| EMC-Emission of interference (Ship building) | acc. to Germanischer Lloyd (97) |

| Approvals (cf. Chapter 2.2 of the Coupler/Controller Manual) | | |
|---|---|---|
| | cULus (UL508) | |
| | ABS (American Bureau of Shipping) | |
| | BV (Bureau Veritas) | |
| | DNV (Det Norske Veritas) | Cl. B |
| | GL (Germanischer Lloyd) | Cat. A, B, C, D |
| | KR (Korean Register of Shipping) | |
| | LR (Lloyd's Register) | Env. 1, 2, 3, 4 |
| | NKK (Nippon Kaiji Kyokai) | |
| | RINA (Registro Italiano Navale) | (only for 750-550) |
| | cULus (UL1604) | Class I Div2 ABCD T4A |
| | KEMA | II 3 G EEx nA II T4 |
| CE | Conformity Marking | |

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

### 2.1.1.7 Process Image

The analog output module 750-550 and its variations transmit 16-bit data and 8 status bits per channel.

The digitalized output value is transmitted in a data word (16 bits) as output byte 0 (low) and output byte 1 (high) into the process image of the coupler / controller.
This value is represented with a 12 bit resolution on bit B3 ... B14.
The three least significant bits (B0 ... B2) are not parsed.

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

As the returned status byte of this output module is always zero, it will not be parsed.

#### 2.1.1.7.1 Standard Format

For the standard module 750-550, the numerical values ranging from 0x0000 to 0x7FFF are scaled on the output voltage ranging from 0 V to 10 V.

| Process values of module 750-550 | | | | |
|---|---|---|---|---|
| Output voltage | numerical value | | | status-byte |
| 0 - 10 V | binary output value | hex. | dec. | hex. |
| 0 | 0000 0000 0000 0000 | 00 00 | 0 | 00 |
| 1,25 | 0001 0000 0000 0000 | 10 00 | 4096 | 00 |
| 2,5 | 0010 0000 0000 0000 | 20 00 | 8192 | 00 |
| 3,75 | 0011 0000 0000 0000 | 30 00 | 12288 | 00 |
| 5 | 0100 0000 0000 0000 | 40 00 | 16384 | 00 |
| 6,25 | 0101 0000 0000 0000 | 50 00 | 20480 | 00 |
| 7,5 | 0110 0000 0000 0000 | 60 00 | 24576 | 00 |
| 8,75 | 0111 0000 0000 0000 | 70 00 | 28672 | 00 |
| 10 | 0111 1111 1111 1111 | 7F FF | 32764 | 00 |

#### 2.1.1.7.2 Special Formats

To digitalize the output value, the variation 750-550/000-200 uses a data format adapted for the S5 control systems using FB 251.

For this variation, the numerical values ranging from 0x0000 to 0x4000 are scaled on the output voltage ranging from 0 V to 10 V.

| Process values of module 750-550/000-200 | | | | |
|---|---|---|---|---|
| Output voltage | numerical value | | | status-byte |
| | binary | hex. | dec. | hex. |
| 0 - 10 V | output value | | | |
| 0 | 0000 0000 0000 0000 | 0000 | 0 | 00 |
| 1,25 | 0000 1000 0000 0000 | 0800 | 2048 | 00 |
| 2,5 | 0001 0000 0000 0000 | 1000 | 4096 | 00 |
| 3,75 | 0001 1000 0000 0000 | 1800 | 6144 | 00 |
| 5 | 0010 0000 0000 0000 | 2000 | 8192 | 00 |
| 6,25 | 0010 1000 0000 0000 | 2800 | 10240 | 00 |
| 7,5 | 0011 0000 0000 0000 | 3000 | 12288 | 00 |
| 8,75 | 0011 1000 0000 0000 | 3800 | 14336 | 00 |
| 10 | 0100 0000 0000 0000 | 4000 | 16384 | 00 |

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 – 1 69
E-Mail: info@wago.com

Internet: http://www.wago.com