TECHDOCS

# WAGO I/O System 750/753

16-channel digital output; 24 VDC; 0.5 A; low-side switching

750-1505



Product manual
Valid as of HW version 04 | FW version --
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Every conceivable measure has been taken to ensure the accuracy and completeness of this documentation. However, as errors can never be fully excluded, we always appreciate any information or suggestions for improving the documentation.

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# Table of Contents

**1 Provisions ... 4**
1.1 Scope of Applicability ... 4
**2 Overview ... 5**
**3 Properties ... 6**
3.1 View ... 6
3.2 Indicators ... 7
3.3 Wiring Interface ... 8
3.4 Power Jumper Contacts ... 9
3.5 Circuit Diagram ... 10
**4 Functions ... 11**
4.1 Signal Processing ... 11
4.2 Process Image ... 11
**5 Planning ... 12**
5.1 Compatibility ... 12
5.2 Requirements for Wiring and Accessories ... 12
5.3 Connection Example ... 12
5.4 Use in Safety Applications ... 13
5.4.1 Connection to Safety Switching Devices or F I/O Modules ... 14
5.4.2 Connection Examples for Use in Safety Applications ... 15
**6 Appendix ... 16**
6.1 Technical Data, Approvals, Guidelines and Standards ... 16
6.1.1 Data sheet 750-1505 ... 17

# 1 Provisions

## 1.1 Scope of Applicability

This document applies to the following product:

**750-1505** (16DO 24V DC 0.5A/ LSS) 16-channel digital output; 24 VDC; 0.5 A; low-side switching.

| | |
|---|---|
| From hardware version | 04 |
| From firmware version | -- |
| Product detail page | **www.wago.com/750-1505** |

### Note

**Note applicable documents!**

The complete operating instructions for the product consists of several, applicable documents. The product must only be installed and operated in accordance with the complete operating instructions. Knowledge of all applicable documents is required for proper use. You can find all documents and information on the product detail page.

**Applicable document**

**System Manual I/O System 750/753**

- Provisions
- Safety
- Planning
- Transport and Storage
- Assembly and Disassembly
- Conductor Termination
- Decommissioning

# 2 Overview

The I/O module transmits binary control signals to connected actuators (e.g., magnetic valves, contactors, transmitters, relays or other electrical loads).

The I/O module is suitable for interference-free use in safety circuits.

The I/O module has 16 output channels, allowing direct connection of single-wire actuators.

The I/O module's outputs provide low-side switching. If the signal status of an output channel is "high," the 0 V potential of the field power supply is switched to the corresponding output connection.

For each channel, a green status LED indicates the signal status.

The field level and the system level are electrically isolated from one another.

The I/O module can be operated on all head stations of the WAGO I/O System 750/753.

# 3 Properties

## 3.1 View

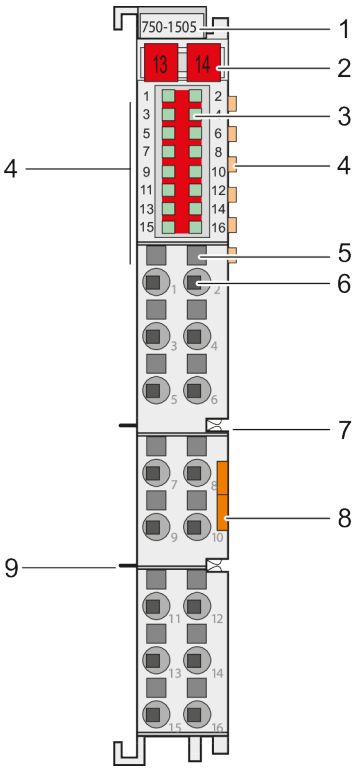



Figure 1: View

| | | |
|---|---|---|
| 1 | Item number | Scope of Applicability [▸ 4] |
| 2 | Slot for Mini-WSB (optional) | System Manual I/O System 750/753 |
| 3 | Status LEDs | Indicators [▸ 7] |
| 4 | Data contacts | System Manual I/O System 750/753 |
| 5 | Access to open the associated Push-in CAGE CLAMP® connection | System Manual I/O System 750/753 |
| 6 | CAGE CLAMP® connection | Wiring Interface [▸ 8] and<br>System Manual I/O System 750/753 |
| 7 | Power jumper contacts (spring) | Power Jumper Contacts [▸ 9] and<br>System Manual I/O System 750/753 |
| 8 | Release tab | System Manual I/O System 750/753 |
| 9 | Power jumper contacts (blade) | Power Jumper Contacts [▸ 9] and<br>System Manual I/O System 750/753 |

## 3.2 Indicators

For each channel, a green status LED indicates the signal status.

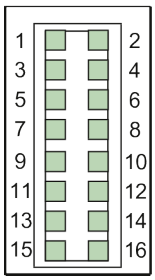



Figure 2: Indicators

| Channel | Designation | LED | State | Function |
|---|---|---|---|---|
| 1 | DO 1 status | 1 | Off | DO 1 output: signal voltage (0) |
| | | | Green | DO 1 output: signal voltage (1) |
| 2 | DO 2 status | 2 | Off | DO 2 output: signal voltage (0) |
| | | | Green | DO 2 output: signal voltage (1) |
| 3 | DO 3 status | 3 | Off | DO 3 output: signal voltage (0) |
| | | | Green | DO 3 output: signal voltage (1) |
| 4 | DO 4 status | 4 | Off | DO 4 output: signal voltage (0) |
| | | | Green | DO 4 output: signal voltage (1) |
| 5 | DO 5 status | 5 | Off | DO 5 output: signal voltage (0) |
| | | | Green | DO 5 output: signal voltage (1) |
| 6 | DO 6 status | 6 | Off | DO 6 output: signal voltage (0) |
| | | | Green | DO 6 output: signal voltage (1) |
| 7 | DO 7 status | 7 | Off | DO 7 output: signal voltage (0) |
| | | | Green | DO 7 output: signal voltage (1) |
| 8 | DO 8 status | 8 | Off | DO 8 output: signal voltage (0) |
| | | | Green | DO 8 output: signal voltage (1) |
| 9 | DO 9 status | 9 | Off | DO 9 output: signal voltage (0) |
| | | | Green | DO 9 output: signal voltage (1) |
| 10 | DO 10 status | 10 | Off | DO 10 output: signal voltage (0) |
| | | | Green | DO 10 output: signal voltage (1) |
| 11 | DO 11 status | 11 | Off | DO 11 output: signal voltage (0) |
| | | | Green | DO 11 output: signal voltage (1) |
| 12 | DO 12 status | 12 | Off | DO 12 output: signal voltage (0) |
| | | | Green | DO 12 output: signal voltage (1) |
| 13 | DO 13 status | 13 | Off | DO 13 output: signal voltage (0) |
| | | | Green | DO 13 output: signal voltage (1) |
| 14 | DO 14 status | 14 | Off | DO 14 output: signal voltage (0) |
| | | | Green | DO 14 output: signal voltage (1) |
| 15 | DO 15 status | 15 | Off | DO 15 output: signal voltage (0) |
| | | | Green | DO 15 output: signal voltage (1) |
| 16 | DO 16 status | 16 | Off | DO 16 output: signal voltage (0) |
| | | | Green | DO 16 output: signal voltage (1) |

## 3.3 Wiring Interface

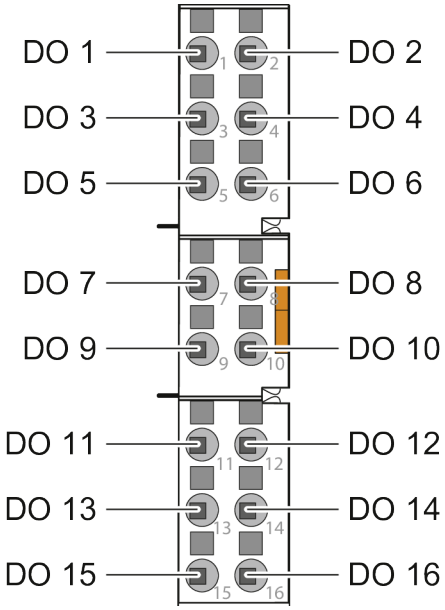



Figure 3: Push-in CAGE CLAMP® Connections

| Channel | Designation | Connection | Function |
|---|---|---|---|
| 1 | DO 1 | 1 | Output DO 1: signal voltage |
| 2 | DO 2 | 2 | Output DO 2: signal voltage |
| 3 | DO 3 | 3 | Output DO 3: signal voltage |
| 4 | DO 4 | 4 | Output DO 4: signal voltage |
| 5 | DO 5 | 5 | Output DO 5: signal voltage |
| 6 | DO 6 | 6 | Output DO 6: signal voltage |
| 7 | DO 7 | 7 | Output DO 7: signal voltage |
| 8 | DO 8 | 8 | Output DO 8: signal voltage |
| 9 | DO 9 | 9 | Output DO 9: signal voltage |
| 10 | DO 10 | 10 | Output DO 10: signal voltage |
| 11 | DO 11 | 11 | Output DO 11: signal voltage |
| 12 | DO 12 | 12 | Output DO 12: signal voltage |
| 13 | DO 13 | 13 | Output DO 13: signal voltage |
| 14 | DO 14 | 14 | Output DO 14: signal voltage |
| 15 | DO 15 | 15 | Output DO 15: signal voltage |
| 16 | DO 16 | 16 | Output DO 16: signal voltage |

## 3.4 Power Jumper Contacts

The potential for the field supply is fed in via the blade contacts and passed on via the spring contacts.

For additional information on the Power Jumper Contacts, please see
System Manual I/O System 750/753.

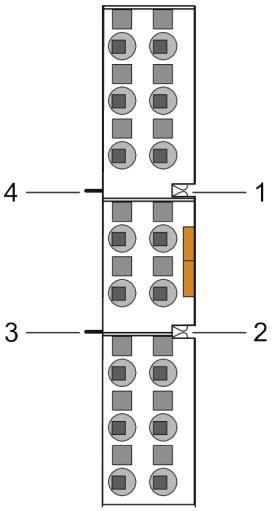



Figure 4: Power Jumper Contacts

| No. | Type |
|---|---|
| 1 | Groove with spring contact |
| 2 | |
| 3 | Blade contact |
| 4 | |

### Arrangement in the Bus Node

For mechanical arrangement of the I/O module, the previous component must have at least 2 open grooves for accommodating the blade contacts.

For electrical compatibility requirements see Section Circuit Diagram [▸ 10].

## 3.5 Circuit Diagram

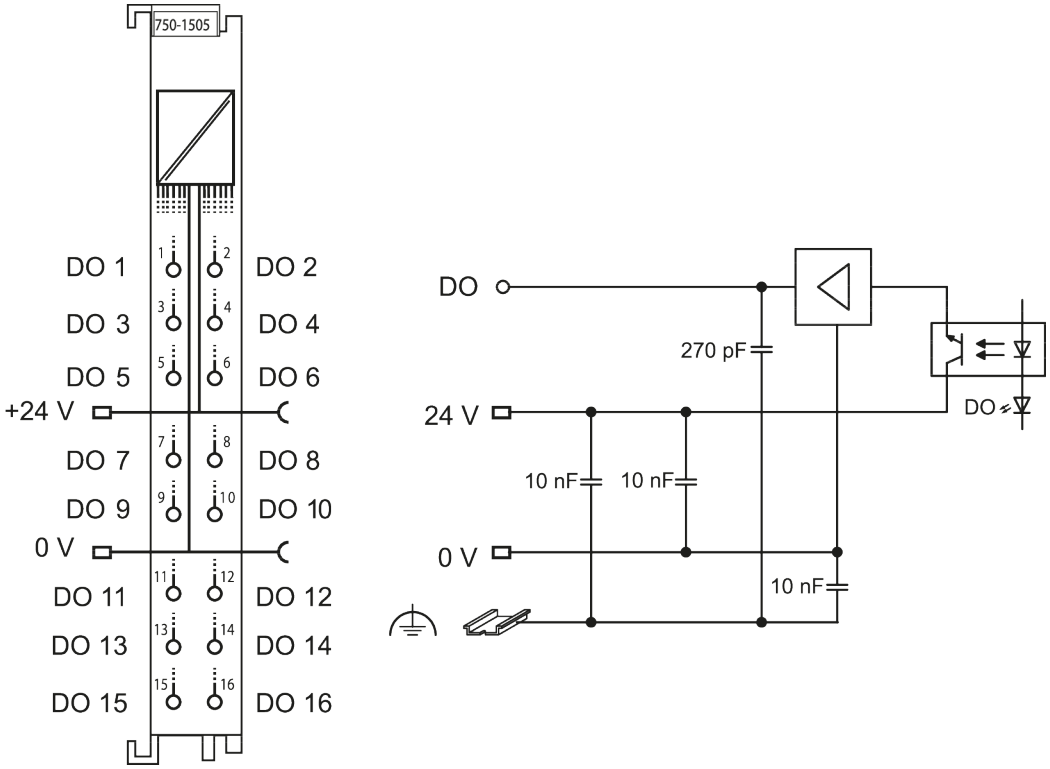



Figure 5: Circuit Diagram

For information on the system power supply, please see 🕮 **System Manual I/O System 750/753**.

# 4 Functions

## 4.1 Signal Processing

The I/O module's outputs provide low-side switching. If the signal status of an output channel is "high," the 0 V potential of the field power supply is switched to the corresponding output connection.

## 4.2 Process Image

Table 1: Output bits 0 .. 7

| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|
| DO 8 | DO 7 | DO 6 | DO 5 | DO 4 | DO 3 | DO 2 | DO 1 |

| | |
|---|---|
| DO 1 | DO 1 signal state – digital output channel 1 |
| DO 2 | DO 2 signal state – digital output channel 2 |
| DO 3 | DO 3 signal state – digital output channel 3 |
| DO 4 | DO 4 signal state – digital output channel 4 |
| DO 5 | DO 5 signal state – digital output channel 5 |
| DO 6 | DO 6 signal state – digital output channel 6 |
| DO 7 | DO 7 signal state – digital output channel 7 |
| DO 8 | DO 8 signal state – digital output channel 8 |

Table 2: Output bits 8 .. 16

| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|
| DO 16 | DO 15 | DO 14 | DO 13 | DO 12 | DO 11 | DO 10 | DO 9 |

| | |
|---|---|
| DO 9 | DO 9 signal state – digital output channel 9 |
| DO 10 | DO 10 signal state – digital output channel 10 |
| DO 11 | DO 11 signal state – digital output channel 11 |
| DO 12 | DO 12 signal state – digital output channel 12 |
| DO 13 | DO 13 signal state – digital output channel 13 |
| DO 14 | DO 14 signal state – digital output channel 14 |
| DO 15 | DO 15 signal state – digital output channel 15 |
| DO 16 | DO 16 signal state – digital output channel 16 |

# 5 Planning

This section provides helpful information for planing the use of the product in a node.

## 5.1 Compatibility

The I/O module can be operated on all head stations of the WAGO I/O System 750/753.

## 5.2 Requirements for Wiring and Accessories

To protect the I/O module against overload, use a supply module with a fuse (e.g., Item No.: 750-601 or 750-610).

If applicable, use appropriate potential multiplication modules (e.g., item no. 750-1605, 750-1606 or 750-1607) for the power supply to the actuators.

Use a suitable protective circuit to limit the induction voltage, such a recovery diode, parallel to the load. Inductive voltage limitation prevents damage to the I/O module's electronics when inductive loads are switched off.

An operating tool with a 2.5 mm blade (e.g., Item No.: 210-719) is required for opening the Push-in CAGE CLAMP® connections.

## 5.3 Connection Example

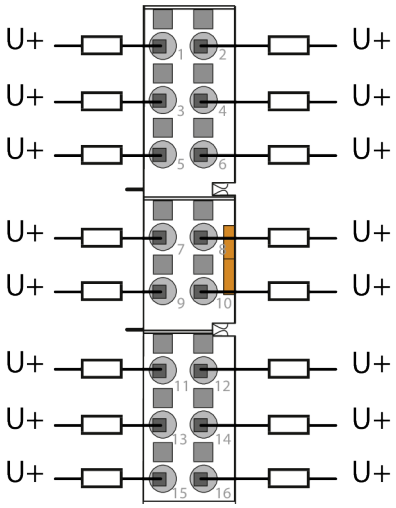



Figure 6: Example

## 5.4 Use in Safety Applications

The I/O module is suitable for interference-free use in safety circuits.

If the field-side supply is shut down via a safety switching device, the safety function of the I/O module is not active. If the interference-free I/O module is used correctly in a safety-related application, this does not affect either the SIL (or the Performance Level and category) achieved by the circuit. Note the following information.

- **Only operate with functional extra-low voltage**
  When using interference-free I/O modules, only use SELV/PELV-capable power supplies for the 24 VDC power supply.
- **Observe maximum voltage**
  Even in the event of failure, only a maximum voltage of $U_{max.}$ must be allowed to act on the interference-free I/O module; otherwise irreparable damage to the I/O module could occur. Use a power supply with active voltage limitation (overvoltage protection) or an alternate component. For the interference-free I/O module, the field supply voltage is: $U_{max.} < 32$ V
- **Ensure protection type IP54**
  Protection type IP54 is mandatory. Therefore, integration and operation of the interference-free I/O module is only allowed in switch boxes or control cabinets with protection type IP54 or higher.
- **Protect the outputs against feedback**
  The 24 V power supply must never be applied to the output of an interference-free I/O module. The system would not detect such a wiring error.
- **Avoid reverse power supply of the I/O module**
  A group of interference-free I/O modules must only be powered by a safety switching device. It is absolutely essential to avoid reverse power supply.
- **Prevent short circuits between outputs**
  It is absolutely essential to prevent short circuits between the outputs of different interference-free I/O modules. The system would not detect such short circuits.

According to EN ISO 13849-2, the following measures are required for an “external voltage” fault exclusion:

- Use of cables routed separately and
- Protection from external damage (e.g., with cable duct).

### 5.4.1 Connection to Safety Switching Devices or F I/O Modules

When the interference-free I/O module is used in safety-related applications, the I/O modules belonging to a safety switching device must be combined to form a potential group. The power supply of the potential group must only be provided via the following supply/filter modules:

Table 3: Supply/Filter Modules for Setting up a Potential Group

| | |
|---|---|
| Supply module | Item no.: 750-601 |
| | Item no.: 750-602 |
| Filter module | Item no.: 750-626 |

Either a supply module or a distance module without power jumper contacts (item no.: 750-616) must be connected at the end of the potential group.

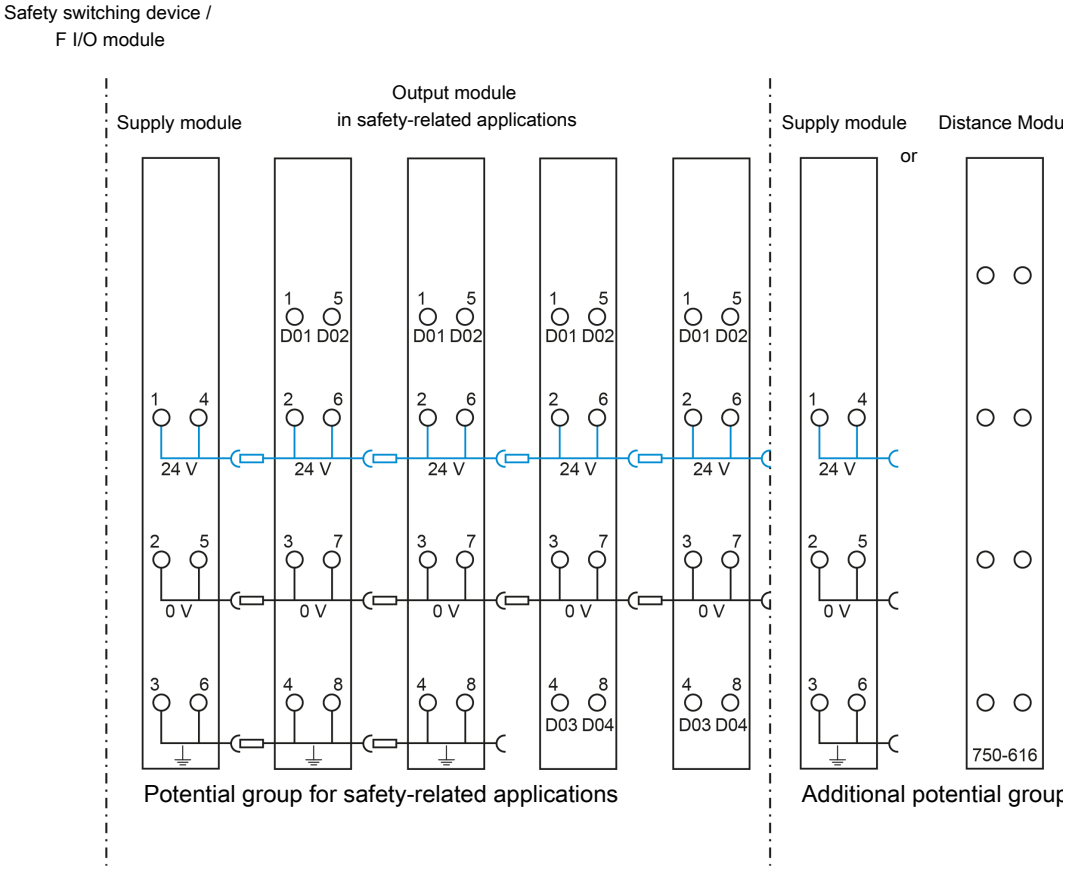



Figure 7: Setting Up a Potential Group (Example)

### 5.4.2 Connection Examples for Use in Safety Applications

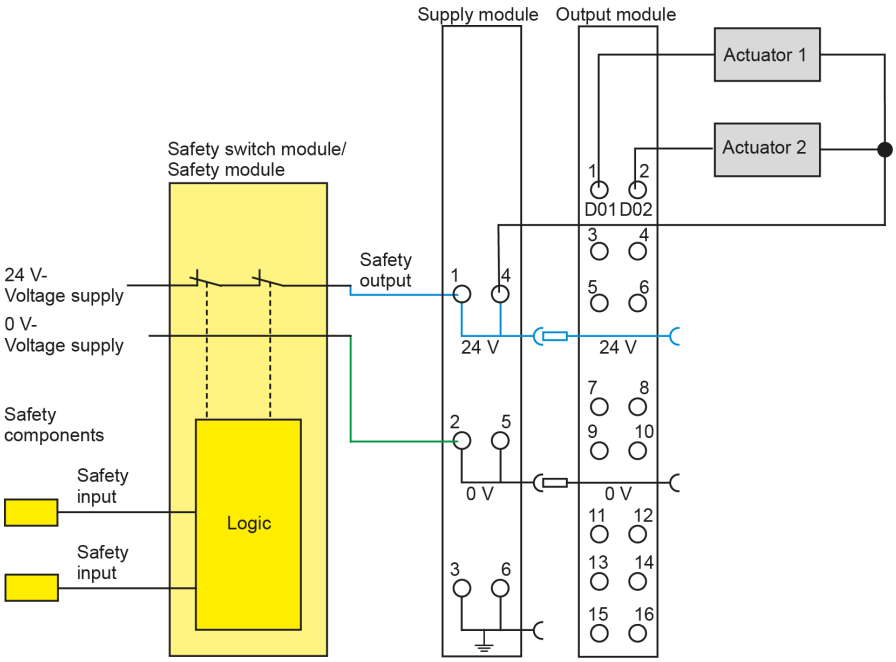



Figure 8: Two-Channel, **Single-Pole** Power Supply Shutdown

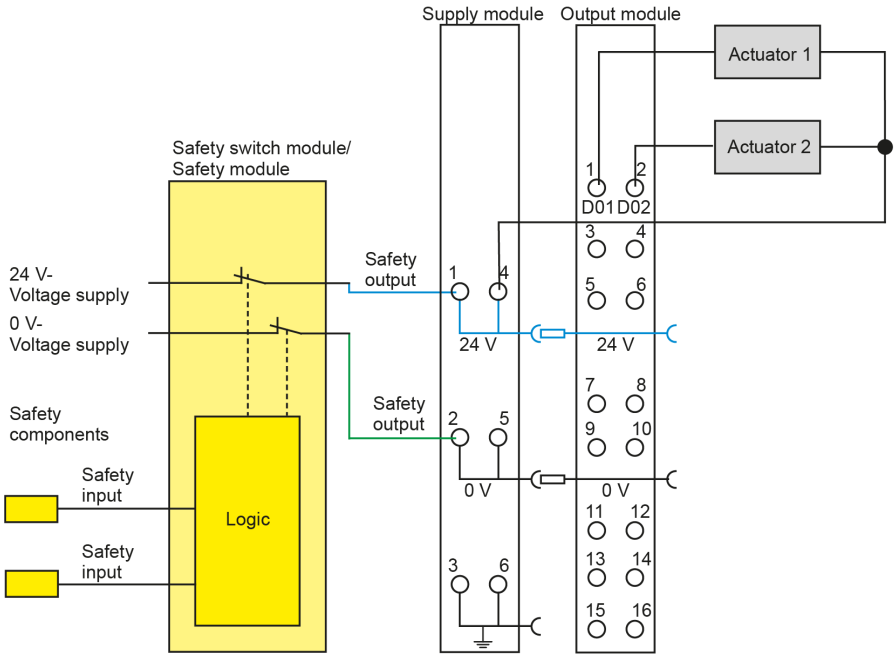



Figure 9: Two-Channel, **Two-Pole** Power Supply Shutdown

# 6 Appendix

## 6.1 Technical Data, Approvals, Guidelines and Standards

**Note**

**Subject to changes!**

Please also observe the further product documentation! You can generate the current datasheet at any time at: www.wago.com /<item number>.

**See also**

Data sheet 750-1505 [▶ 17]

# Data Sheet | Item Number: 750-1505

16-channel digital output; 24 VDC; 0.5 A; Low-side switching

https://www.wago.com/750-1505

## Technical data

| | |
|---|---|
| Number of digital outputs | 16 |
| Total number of channels (module) | 16 |
| Signal type | Digital |
| Signal type (voltage) | 24 VDC |
| Actuator connection | 16 x (1-wire) |
| Output characteristic | low-side switching |
| Output current per channel | 0.5 A |
| Output current | short-circuit-protected |
| Load type | Resistive, inductive, lamp load |
| Switching frequency (max.) | 1 kHz |
| Output data width (internal) max. | 16 bits |
| Supply voltage (system) | 5 VDC; via data contacts |
| Current consumption (5 V system supply) | 40 mA |
| Supply voltage (field) | 24 VDC (-25 … +30 %); via power jumper contacts (power supply via blade contact; transmission (field side supply voltage only) via spring contact) |
| Current consumption, field supply (module with no external load) | 11 mA |
| Isolation | 500 V system/field |
| Indicators | LED (1-16) green: Status DO 1 … DO 16 |
| Number of incoming power jumper contacts | 2 |
| Number of outgoing power jumper contacts | 2 |
| Current carrying capacity (power jumper contacts) | 10 A |

## Connection Data

| | |
|---|---|
| Connection technology: I/O | 16 x Push-in CAGE CLAMP® (outputs) |
| Connectable conductor materials | Copper |
| Connection type | Output |
| Solid conductor | 0.08 … 1.5 mm² / 28 … 16 AWG |
| Fine-stranded conductor | 0.25 … 1.5 mm² / 22 … 16 AWG |
| Strip length | 8 … 9 mm / 0.31 … 0.35 inches |

## Physical data

| | |
|---|---|
| Width | 12 mm / 0.472 inches |
| Height | 100 mm / 3.937 inches |
| Depth | 69 mm / 2.717 inches |
| Depth from upper-edge of DIN-rail | 61.8 mm / 2.433 inches |


Continued on next page

## Mechanical data

| | |
|---|---|
| Mounting type | DIN-35 rail |
| Pluggable connector | fixed |

## Material data

| | |
|---|---|
| Color | light gray |
| Housing material | Polycarbonate; polyamide 6.6 |
| Fire load | 0.623 MJ |
| Weight | 47.5 g |
| Conformity marking | CE |

## Environmental requirements

| | |
|---|---|
| Ambient temperature (operation) | 0 … +55 °C |
| Ambient temperature (storage) | -40 … +85 °C |
| Protection type | IP20 |
| Pollution degree | 2 per IEC 61131-2 |
| Operating altitude | 0 … 2000 m / 0 … 6562 ft |
| Mounting position | Horizontal left, horizontal right, horizontal top, horizontal bottom, vertical top and vertical bottom |
| Relative humidity (without condensation) | 95 % |
| Vibration resistance | 4g per IEC 60068-2-6 |
| Shock resistance | 15g per IEC 60068-2-27 |
| EMC immunity to interference | per EN 61000-6-2, marine applications |
| EMC emission of interference | per EN 61000-6-3, marine applications |
| Exposure to pollutants | per IEC 60068-2-42 and IEC 60068-2-43 |
| Permissible $H_2S$ contaminant concentration at a relative humidity 75 % | 10 ppm |
| Permissible $SO_2$ contaminant concentration at a relative humidity 75 % | 25 ppm |

## Product Classification

| | |
|---|---|
| UNSPSC | 32151705 |
| eCl@ss 10.0 | 27-24-26-04 |
| eCl@ss 9.0 | 27-24-26-04 |
| ETIM 9.0 | EC001599 |
| ETIM 10.0 | EC001599 |
| ECCN | NO US CLASSIFICATION |

## Environmental Product Compliance

| | |
|---|---|
| CAS-No. | 1303-86-2<br>1317-36-8<br>7439-92-1<br>75980-60-8 |
| REACH Candidate List Substance | Diboron trioxide<br>Lead<br>Lead monoxide<br>Phosphine oxide, diphenyl(2,4,6-trimethylbenzoyl)- |
| RoHS Compliance Status | Compliant,With Exemption |
| RoHS Exemption | 6(c)<br>7(a)<br>7(c)-I<br>7(c)-II |
| SCIP notification number (Austria) | 3226b730-4074-45fa-b8ec-61a974f3842e |
| SCIP notification number (Belgium) | a8e77bc5-8b31-4ad3-9ff7-1017ca955595 |
| SCIP notification number (Bulgaria) | 74f060e6-30b3-48d9-bde8-1e6d7e89e94d |
| SCIP notification number (Czech Republic) | 2d97089b-42d1-4ed2-b0bb-35a5d75f8dd0 |
| SCIP notification number (Denmark) | f275f896-16e2-499c-8539-fc7399c726f3 |
| SCIP notification number (Finland) | eed91a68-6f14-4f17-863b-ed6fb9383281 |
| SCIP notification number (France) | f05291df-d1a6-40b1-99f7-a5c08e3c7484 |


Continued on next page

## Environmental Product Compliance

| | |
|---|---|
| SCIP notification number (Germany) | 6fb986c0-7c8d-4ec6-85f3-40590c3ffef0 |
| SCIP notification number (Hungary) | d9f7c1f5-635c-4261-8dfa-bf49a0d09af9 |
| SCIP notification number (Italy) | 9c880323-c1d3-4850-8e04-98b3ad2a90c0 |
| SCIP notification number (Netherlands) | 37720692-749e-4a75-9095-b12fe5be45f7 |
| SCIP notification number (Poland) | f60a531e-4e13-41b2-ba63-77784525f561 |
| SCIP notification number (Romania) | c515dece-86d7-427c-9eb6-ef75888cf312 |
| SCIP notification number (Sweden) | ba7f4e40-3696-478b-b6e5-5f2daf582b74 |

## Approvals / Certificates

### General approvals

| Approval | Standard | Certificate Name |
|---|---|---|
| EAC<br>GZO Almaty Standart | TP TC 020/2011 | EAC CoC 03083 |
| KC<br>National Radio Research Agency | Article 58-2, Clause 3 | MSIP-REM-W43-DOM750 |
| UL<br>Underwriters Laboratories Inc. (ORDINARY LOCATIONS) | UL 508 | E175199 |

### Declarations of conformity and manufacturer's declarations

| Approval | Standard | Certificate Name |
|---|---|---|
| EU-Declaration of Conformity<br>WAGO GmbH & Co. KG | - | - |
| UK-Declaration of Conformity<br>WAGO GmbH & Co. KG | - | - |

### Approvals for marine applications

| Approval | Standard | Certificate Name |
|---|---|---|
| ABS<br>American Bureau of Shipping | - | 22-2219060 |
| BSH<br>Bundesamt fuer Seeschifffahrt und Hydrographie | - | 1104 |
| BV<br>Bureau Veritas S.A. | - | 30389/C0 BV |
| DNV<br>DNV GL SE | DNV-CG-0339,Aug.2021 | TAA0000194 |
| KR<br>Korean Register of Shipping | - | KR HMB05880-AC001 |
| LR<br>Lloyds Register EMEA | - | LR22180952TA |
| PRS<br>Polski Rejestr Statków | - | TE/1101/880590/23 |
| RINA<br>RINA Germany GmbH | - | ELE343521XG001 |

### Approvals for hazardous areas

| Approval | Standard | Certificate Name |
|---|---|---|
| ATEX<br>TUEV Nord Cert GmbH | EN 60079-0 | TUEV14ATEX148929X (II 3 G Ex ec IIC T4 Gc) |
| CCCEx<br>CQST/CNEx | CNCA-C23-01 | 2020312310000213 (Ex ec IIC T4 Gc) |
| IECEx<br>TUEV Nord Cert GmbH | IEC 60079-0 | IECEx TUN 14.0035 X (Ex ec IIC T4 Gc) |
| INMETRO<br>TÜV Rheinland do Brasil Ltda. | IEC 60079-0 | TÜV 12.1297 X |
| KTL<br>Korea Testing Laboratory | KOSHA Article 34, IEC60079-0 | 20-KA4BO-0099X |
| UKEx<br>WAGO GmbH & Co. KG | EN 60079-0 | UKCA_WA GO22UKEX003X_ec |
| UL<br>Underwriters Laboratories Inc. (HAZARDOUS LOCATIONS) | UL 121201 | E198726 |

# List of Tables

Table 1 Output bits 0 .. 7 ..... 11
Table 2 Output bits 8 .. 16 ..... 11
Table 3 Supply/Filter Modules for Setting up a Potential Group ..... 14

# List of Figures


Figure 1 View ..... 6
Figure 2 Indicators ..... 7
Figure 3 Push-in CAGE CLAMP® Connections ..... 8
Figure 4 Power Jumper Contacts ..... 9
Figure 5 Circuit Diagram ..... 10
Figure 6 Example ..... 12
Figure 7 Setting Up a Potential Group (Example) ..... 14
Figure 8 Two-Channel, **Single-Pole** Power Supply Shutdown ..... 15
Figure 9 Two-Channel, **Two-Pole** Power Supply Shutdown ..... 15

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