I/O System – 750 XTR Series
General Product Information

Taking It to the eXTReme — The Standard for 750 XTR

Instantly recognizable by its dark gray modules, the WAGO-I/O-SYSTEM 750 XTR’s unique features make it ideal for extreme environments.

Extremely temperature-resistant, immune to interference, as well as unfazed by vibrations and impulse voltages – WAGO’s 750 XTR is the first choice for demanding applications including:

- Marine systems and onshore/offshore industry
- Renewable energy systems (wind turbines, solar systems and biogas plants)
- Transformer stations and power distribution systems
- Petrochemical processing
- Water and wastewater treatment systems
- Custom machines
- Railway applications

Superior Reliability in Extreme Climates

Automation systems are increasingly being located in outdoor and remote locations where components are directly affected by widely fluctuating temperature conditions such as wind turbines or transformer stations.

Engineered for freezing cold, extreme heat and high humidity, the WAGO-I/O-SYSTEM 750 XTR provides absolute dependability in virtually any weather. The XTR version of the WAGO-I/O-SYSTEM 750 is unfazed by both freezing cold down to −40°C and scorching heat up to +70°C. And this applies equally for both start-up and ongoing operation. The maximum approved operating altitude of 5,000 m is another highlight. Even in the thin air of a mountain-top station, the system impressively demonstrates its high performance and availability.

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eXTReme Evolution of the Tried and Tested

Using an industry-leading platform, the WAGO-I/O-SYSTEM 750 XTR boasts the same proven benefits:

- Compact design: up to 16 channels in a module width of 12 mm (1/2")
- Easy to Use
- Vibration-proof, fast and maintenance-free CAGE CLAMP® spring connections
- Fieldbus independence due to its modular design
- Clear identification with the WAGO WSB Marking System

Additional Protection Against Interference Pulses

The WAGO-I/O-SYSTEM 750 XTR provides greater isolation up to 5 kV of impulse voltage, lower EMC emission of interference and higher insensitivity to EMC interference. These strengths add up to trouble-free operation.

High Mechanical Performance

Automation systems must be incredibly vibration-resistant, especially when installed close to vibration-prone and shock-generating system components. Powerful motors and power circuit breakers are just two examples from a wide range of applications that can stress automation systems. In order to perform in these demanding environments, the WAGO-I/O-SYSTEM 750 XTR was developed to set new standards. With 5g of vibration resistance up to an acceleration of 50 m/s² per DIN EN 60068-2-6 and shock resistance of 15g (150 m/s²) as well as 25g (250 m/s²) of shock resistance per IEC 60068-2-27, the system is engineered for dependability – no matter what. Count on long-lasting, trouble-free operation and industry-topping levels of safety – even in the most severe applications, such as tunnel boring machines.

Worldwide Approvals

International approvals for industrial automation, shipbuilding and onshore/offshore applications guarantee worldwide use even under the harshest operating conditions, e.g., Germanischer Lloyd, Det Norske Veritas, American Bureau of Shipping, Korean Register of Shipping, Nippon Kaiji Kyokai, Registro Italiano Navale, Polski Rejestr Statkow.

Advantages:

- No need for air conditioning
- Takes less space
- Lower energy and maintenance costs
- Can be used in unshielded areas
- Maximum system uptime
- Install close to vibrating and shock-generating system components
- Vibration-proof, fast and maintenance-free CAGE CLAMP® connections
I/O System – 750 XTR Series
Interfaces and Types

Housing design: fieldbus coupler (A)
- Including supply module (a) to power downstream I/O modules
- Technical differences on the connection level: fieldbus interface (b) and optional addressing switch (c)
- W x H x D (mm) 50.5 x 71.1 x 100

Housing design: fieldbus coupler Eco (B)
- Restriction on power supply and data width
- W x H x D (mm) 49.5 x 71.9 x 96.8

Housing design: 750 (C)
- 8 connection points (CAGE CLAMP®)
- W x H x D (mm) 12 x 67.8 x 100

Housing design: 750 (D)
- 16 connection points (Push-in CAGE CLAMP®)
- W x H x D (mm) 12 x 69 x 100

Housing design: double width (G)
- Some modules are integrated into a double housing to address specific technological needs. Despite utilizing the same standardized housing, these modules are twice as wide.
- W x H x D (mm) 24 x 67.8 x 100

Specialty housing design (H)
- Some modules are integrated into a specialty housing with a specific width and pluggable connectors. The dimensions are specified on the respective catalog pages.

Housing design: intrinsically safe XTR modules (G)
- 8 connection points (CAGE CLAMP®)
- W x H x D (mm) 12 x 67.8 x 100

Housing design (intrinsically safe XTR modules): double width (H)
- 16 connection points (CAGE CLAMP®)
- W x H x D (mm) 24 x 67.8 x 100
I/O System – 750 XTR Series
Application and Installation Instructions

Securing/removing a module from the mounting rail

Secure, automatic data and electronics power supply connection via gold-plated pressure contacts

Service interface for configuring the fieldbus coupler; connectivity via configuration cable or radio adapter

Notice:
For some I/O modules, not all power jumper contacts are made! An I/O module with three power jumper contacts (e.g., 2-channel digital input) cannot be snapped into place behind a module in which not every contact is made.

To increase electromagnetic compatibility (EMC), some components are connected to the DIN-rail by a discharge contact. The DIN-rail must always have a low-resistance connection to the ground potential.

Secure, automatic power supply connection via self-cleaning blade contacts

Wide range of accessories available for EMC-compliant installation, including shield connection

Marking Accessories

Mini-WSB Quick Marking System, blank, pre-marked and colored; suitable for all 750 Series I/O Modules.

Marker carrier for one single I/O module (suitable for all 750 and 753 Series I/O Modules); the marker carrier can be accommodated in the upper Mini-WSB marker slot.

Marker carrier for one I/O node; both carrier models (750-106 and 750-107) permit continuous marking regardless of the I/O module housing used.
I/O System – 750 XTR Series
Application and Installation Instructions

Power Supply
The internal electronics are powered by the fieldbus coupler. The power supply to the field-side supply is electrically isolated. This division enables a separate supply for sensors and actuators. Snapping the I/O modules together automatically routes the supply voltages. Supply modules with diagnostics also enable power supply monitoring. This ensures a flexible, user-specific supply design for a station. Power supply to the electronics is limited by a maximum value. This value depends on the fieldbus coupler used. If the sum of the internal current demand of all the I/O modules should exceed this value, an additional system supply module is necessary. Even in this case, power supply to the field-side supply of 10 A may not be exceeded. However, different power supply modules allow a new power supply, formation of potential groups and the implementation of emergency stops.

Interference-Free in Safety-Related Applications
To easily and safely perform cost-effective, centralized deactivation of complete actuator groups, the actuator’s power supply can be switched off using a safety switching device. This can either be performed for each individual actuator or by turning off the power supply to a group of control outputs. In the event of failure, ensure that no interference from other current or power circuits occurs – even when the control voltage is switched off – so the defined safety function properties (logic and response time) remain unchanged.

All 750 XTR Series Digital Output Modules are designed to provide interference-free safety functionality. The modules can be used in safety applications up to category 4 per DIN EN 13849-1:2007. Safety category and performance level depend solely on the safety components and their wiring.

Notice:
WAGO’s interference-free I/O modules are not a component of the safety function and do not replace the safety switching device! When using the components in safety functions, the corresponding notes must be observed in the relevant manual.

Notes
Additional steps must be implemented based on where the I/O system is installed:
- Specific power and field-side power supply filters (750-624/040-001 or 750-626/040-000) are required for marine and onshore/offshore applications, as well as in telecontrol and rail technology.

A specific supply module (750-606/040-000) is required to operate intrinsically safe Ex i modules.

Additionally, both supply modules and a field-side power supply filters are recommended when operating intrinsically safe Ex i modules for marine and onshore/offshore applications.

Please refer to the manual for details about the power supply’s design.

Mixed Operation
Mixed operation (standard/XTR modules) within a node is possible when groups of I/O modules are electrically isolated on the field side, i.e., electrically isolated power supply. The combination may be useful, for example, when there are only increased requirements for dielectric strength and immunity to interference, but the surrounding air temperature is not critical.

Example: 2-channel, double-pole power supply disconnection
I/O System – 750 XTR Series

Item Number Key

Explanation of item number key’s components

<table>
<thead>
<tr>
<th>Item No.</th>
<th>750-yyzz/040-00x</th>
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<tbody>
<tr>
<td>01zz</td>
<td>Marker</td>
</tr>
<tr>
<td>03zz</td>
<td>Fieldbus Coupler</td>
</tr>
<tr>
<td>zz</td>
<td>Consecutive number</td>
</tr>
<tr>
<td>1yzz</td>
<td>16 connection points or ribbon cable</td>
</tr>
<tr>
<td>y4zz</td>
<td>Input</td>
</tr>
<tr>
<td>00 ... 49</td>
<td>Digital input</td>
</tr>
<tr>
<td>50 ... 99</td>
<td>Analog input</td>
</tr>
<tr>
<td>y5zz</td>
<td>Output</td>
</tr>
<tr>
<td>00 ... 49</td>
<td>Digital output</td>
</tr>
<tr>
<td>50 ... 99</td>
<td>Analog input</td>
</tr>
<tr>
<td>y6zz</td>
<td>Communication/system modules</td>
</tr>
<tr>
<td>0z</td>
<td>Power supply, field-side connection, end module</td>
</tr>
<tr>
<td>1z</td>
<td>Power supply, spacer module</td>
</tr>
<tr>
<td>2z</td>
<td>Filter</td>
</tr>
<tr>
<td>5z</td>
<td>Serial interface</td>
</tr>
<tr>
<td>09zz</td>
<td>Accessories</td>
</tr>
</tbody>
</table>

Approvals

Overview of the approvals in the item comparison in Section 11, Technical Section, or online under www.wago.com

Standards and Rated Conditions for Rail Applications (EN 50155), not for Intrinsically Safe XTR Modules

<table>
<thead>
<tr>
<th>Railway Applications (EN 50155)</th>
<th>Class/Standard Compliance</th>
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<tbody>
<tr>
<td>4.1 Rated operating conditions</td>
<td></td>
</tr>
<tr>
<td>4.1.1 Altitude above sea level</td>
<td>AX (EN 50125-1)</td>
</tr>
<tr>
<td>4.1.2 Surrounding air temperature</td>
<td>TX</td>
</tr>
<tr>
<td>4.1.3 Shock and vibration</td>
<td>1A and 1B (EN 61373)</td>
</tr>
<tr>
<td>4.1.4 Relative humidity</td>
<td>95 % (coated PCBs)</td>
</tr>
<tr>
<td>5.1 Power supply</td>
<td></td>
</tr>
<tr>
<td>5.1.1.1 Master voltage fluctuations</td>
<td>Minimum voltage 0.725 x Un</td>
</tr>
<tr>
<td>5.1.1.2 Power interruptions</td>
<td>Maximum voltage 1.3 x Un</td>
</tr>
<tr>
<td>5.4 Surge, ESD, burst tests</td>
<td>S1</td>
</tr>
<tr>
<td>5.5.1.1.2 Power interruptions</td>
<td>50121-3-2</td>
</tr>
<tr>
<td>5.5 EMC (emission of interference, immunity to interference)</td>
<td>EN 50121-3-2, EN 50121-4, -5</td>
</tr>
</tbody>
</table>

Fire behavior: per EN 45545-2 hazard level HL3

WAGO is certified in accordance with the IRIS quality standard.
## General Specifications

**Supply voltage (system)**

- 24 VDC (~25% to +30%); via power jumper contacts; specified values for surrounding air temperature:
  - +15°C to +35°C
  - For -40°C to +55°C: 24 V (~25% to +20%)
  - For +55°C to +70°C: 24 V (~25% to +10%)
- Lower limit in all temperature ranges: ~27.5% (including 15% residual ripple)

**Supply voltage (system) for intrinsically safe XTR modules**

- 24 VDC via power jumper contacts (Ex i power supply: \(U_{\text{op}} = \max. 26.8\) V)

**Surrounding air temperature (operation)**

- -40°C to +70°C

**Surrounding air temperature (storage)**

- -40°C to +85°C

**Relative humidity**

- Max. 95%; short-term condensation per Class 3K7 / IEC EN 60721-3-3 and E DIN 40046-721-3 (except wind-driven precipitation, water and ice formation)

**Operating altitude**

- Without temperature derating: 0…2000 m; with temperature derating: 2000…5000 m (0.5 K/100 m); max.: 5000 m

**Pollution degree**

- 2 per IEC 61131-2

**Immunity to impulse voltages**

- Per EN 60870-2-1
  - Module ≤ 50 V: 510 VAC/775 VDC
  - Module > 50 V: 2.5 kVAC/3.5 kVDC
- Isolation: rated surge voltage (EN 60079-11)
  - Module ≤ 50 V: 1 kV (Class VW1 per EN 60870-2-1)
  - Module > 50 V: 5 kV (Class VW3 per EN 60870-2-1)
- Intrinsically safe module:
  - 1 kV; 1.5 kV between intrinsically safe and non-intrinsically safe circuits
  - Surge: Module ≤ 50 V: 1 kV (L - L) / 2 kV (L - E)
  - Module > 50 V: 2 kV (L - L) / 4 kV (L - E)

**Vibration resistance**

- Per IEC 60068-2-6 (acceleration: 5g), EN 60870-2-2, IEC 60721-3-1, -3 (not for intrinsically safe modules)

**Shock resistance**

- Per IEC 60068-2-27 (15g/11 ms/half-sine/1,000 shocks; 25g/6 ms/1,000 shocks); EN 61373 (not for intrinsically safe modules)

**EMC immunity to interference**

- Per EN 61000-6-1, -2; EN 61131-2; Marine applications; EN 60255-26; EN 60870-2-1; EN 61850-3; IEC 61000-6-5; IEEE 1613; VDEW; 1994
  - EN 50121-3-2; EN 50121-4, -5 (not for intrinsically safe modules)

**EMC emission of interference**

- Per EN 61000-6-3, -4; EN 61131-2; EN 60255-26; Marine applications; EN 60870-2-1 (industrial and residential areas); EN 61850-3 (industrial and residential areas)
  - EN 50121-3-2; EN 50121-4, -5 (not for intrinsically safe modules)

**Protection type**

- IP20

**Mounting position**

- Horizontal (standing/lying) or vertical

**Mounting type**

- DIN-35 rail mounting

**Housing material**

- Polycarbonate; polyamide 6.6

**Exposure to pollutants**

- Per IEC 60668-2-42 and IEC 60668-2-43

**Permissible SO2 contaminant concentration at a relative humidity < 75%**

- 25 ppm

**Permissible H2S contaminant concentration at a relative humidity < 75%**

- 10 ppm

**Connection technology**

**Conductor cross section; strip length for standard modules and fieldbus couplers:**

- Eco fieldbus couplers and power supply module:
  - 0.25…2.5 mm²/24…14 AWG; 8…9 mm/0.31…0.35 inch
  - 0.25…1.5 mm²/24…14 AWG; 5…6 mm/0.2…0.24 inch

**Connection technology**

**Conductor cross section; strip length for I/O modules with 16 connection points:**

- 0.25…1.5 mm²/24…16 AWG; 8…9 mm/0.31…0.35 inch

**Current carrying capacity (power jumper contacts)**

- 10 A; 1 A for all intrinsically safe modules