I/O-System – 750 and 753 Series – One System for Every Application

General Product Information

One System for Every Application

The WAGO-I/O-SYSTEM 750/753 is characterized by its universal application scope and extensive product portfolio. With more than 500 different modules, the versatility and flexibility is so great that virtually every requirement in a wide range of industries is covered.

Industrial Automation

The wide selection of I/O modules for various potential and signal forms, as well as specialty functions, makes it possible to economically wire sensors/actuators – even in safety-related applications.

Building Automation

The broad portfolio allows for flexible, cellar-to-ceiling solutions with conventional I/O modules, standardized industry-specific fieldbus protocols and subsystems for typical applications in lighting, shading, heating, ventilating and air conditioning (HVAC) and more.

Marine and Onshore/Offshore Automation

International approvals coupled with industry-specific features permit use in shipbuilding and other harsh sectors. Addressing industry- and operating environment-specific requirements has enabled use on marine diesels and in the EMC-sensitive area of a vessel's bridge. Because WAGO meets the marine industry's significantly greater requirements for immunity to interference or emission of interference and mechanical performance, WAGO I/O is well-suited to other industries.

Process Automation

Use even under the harshest environmental conditions is possible with special approvals. Potential hazardous location applications include oil and gas production, the chemical industry and power generation. The WAGO-I/O-SYSTEM can be installed in Zone 2/22 with its intrinsically safe I/O modules making it possible to connect sensors/actuators in Zones 1/21 and 0/20.

Maximum Fieldbus Independence

The system's modularity is also reflected in its support for numerous fieldbus systems and ETHERNET standards. Depending on the application, it is possible to choose between fieldbus couplers and communication modules for different protocols.

Easy to Use

The modular, rail-mounted module design permits easy, tool-free installation and straightforward modifications, such as system expansions. The straightforward design prevents installation errors. In addition, proven CAGE CLAMP® technology offers fast, vibration-proof and maintenance-free connections that are independent of operator skill. Depending on the I/O module's granularity, the field peripherals can be wired directly using 1-, 2-, 3- or 4-wire technology.

Worldwide Approvals

International approvals for building and industrial automation, as well as the process and shipbuilding industries guarantee worldwide use even under harsh operating conditions, e.g., ATEX, BR-Ex, IECEx, UL 508 and UL ANSI/ISA.

Extremely Compact

Our patented mechanical design leads to extremely compact I/O nodes. In fact, select I/O modules can accommodate up to 16 channels in a 12 mm (1/2") wide housing.

- Finely granular I/O modules enable customization of nodes
- Space-saving design allows high integration density and direct connection

Maximum Reliability and Ruggedness

The WAGO-I/O-SYSTEM is also designed for applications operating under the most demanding environmental conditions in accordance with the highest standards, e.g., those required in shipbuilding. The system is distinguished from other products that are solely intended for industrial use because of:

- Greatly increased vibration rating
- Significantly greater immunity to interference (ESD)
- Lower emission of interference
- Larger voltage fluctuation range
- Improved ruggedness for continuous operation in a temperature range near the limit

In addition, CAGE CLAMP® spring pressure connections ensure superior reliability. Integrated QA measures in the production process and 100 % function testing ensure consistent quality.

Clear Identification

Pullout group markers identify module functionality (integrated or as an option). Connector assignment and technical data are located on the side of the module. The WAGO WSB marker system also allows for module- and channel-related identification.

- Fieldbus-independent – compatible with all standard fieldbus protocols & ETHERNET standards
- Flexible platform adapts to diverse applications and environments
- Tested and approved worldwide
- Wide range of accessories for marking and connection technology
- CAGE CLAMP® connection technology for vibration-proof, fast and maintenance-free connection

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I/O-System – 750 and 753 Series
Versions

Pluggable connector

The pluggable connections of the WAGO-I/O-SYSTEM 753 allow quick and safe replacement. Optional coding pins prevent inserting the pluggable connector in the wrong I/O module. Replacing and connecting the I/O module requires no further action and eliminates possible errors – permanent wiring.
Alternatively, field wiring is possible via interface modules that can be connected to the I/O-System using a ribbon cable (see Configurations).

Extended temperature range

Industrial automation technology is typically operated in temperatures ranging from 0 °C to 55 °C. However, there are also applications that require an extended temperature range. For these applications, WAGO offers a line of WAGO-I/O-SYSTEM 750 products for temperatures ranging from -20 °C to +60 °C.
For extreme applications, where even this extended temperature range is not sufficient, the WAGO-I/O-SYSTEM 750 XTR is available.

Functional safety

In the European Union, the machinery directive defines the requirements for machine and system safety. This ensures a uniform standard for the protection of "life and limb" for people within a machine's operating area.

The required risk assessment is based on harmonized standards (e.g., EN 13849) that identifies existing risks and required risk reduction (SIL or PL quality). Based on the risk assessment, safety functionality can be implemented, e.g., by presence detection or protection zone violations using secure switches or light arrays to immediately shutdown the "risk". For this purpose, the safety signals are detected by the "yellow" safety modules and transmitted via "PROFIsafe" to the F-SPS for further processing. The result is then executed via a safe actuator (output module, controller, etc.).

The unique safety characteristic values of the WAGO modules facilitate calculation of the final safety function up to Cat. 4/PLe according to EN 13849, or SIL3 according to EN 62061 or IEC 61511.

The mixed operation of safe and conventional modules streamlines system configuration. For increased EMC immunity required according to the standard, WAGO offers compact filter modules for the power supply. Specific features of the power supply must be considered, which are described in detail in the corresponding manuals.

Use in hazardous locations

In many plants within the chemical or petrochemical industries, as well as production and process automation, machinery is operated that processes explosive materials including gas and combustible dust. This is why electrical equipment must be explosion-proof in order to avoid injuries to personnel and equipment damage.
The modules within the WAGO-I/O-SYSTEM 750 are designed for use in both non-potentially explosive and potentially explosive areas.
The direct application of fieldbus technology in potentially explosive areas is typically resource-intensive. When used in hazardous areas of Zone 2/22, the WAGO-I/O-SYSTEM 750 offers a safe, easy and economical connection to the sensors and actuators of Zones 0/20 and 1/21. Then WAGO has also developed "blue" Ex-i I/O modules for these intrinsically safe applications, providing users with all the benefits of modern fieldbus technology integrated into a standard node. The WAGO-I/O-SYSTEM 750 is also approved for mining applications.

I/O-System – 750 and 753 Series
Interfaces and Configurations

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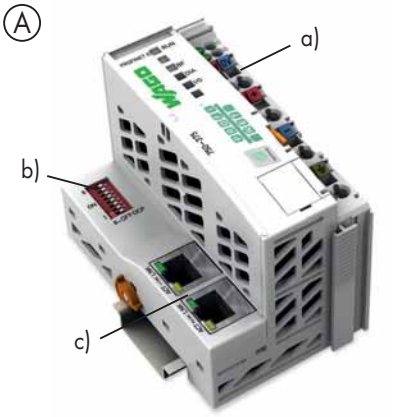

Housing design fieldbus coupler (A)
- Including supply module (a) to power downstream I/O modules
- Technical differences on the connection level. Optional address switch (b) and fieldbus interface (c)
- W x H* x L (mm) 51 x 65 x 100 or
- W x H* x L (mm) 62 x 65 x 100

Housing design fieldbus coupler ECO (B)
- Restriction on power supply and data width
- W x H* x L (mm) 50 x 65 x 97

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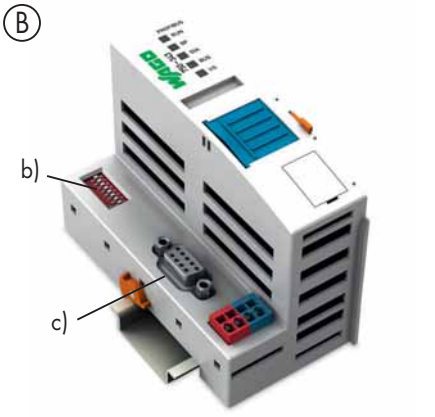

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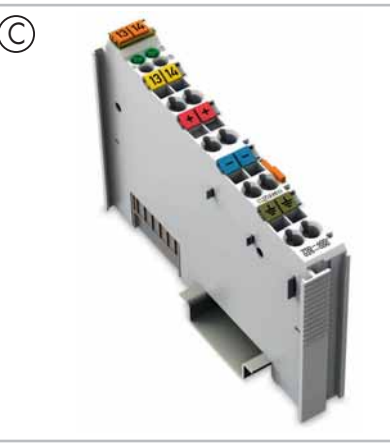

Housing design 750 (C)
- 8 connection terminals (CAGE CLAMP®)
- W x H* x L (mm) 12 x 65 x 100

Housing design 753 (D)
- Pluggable connector
- 8 connection terminals (CAGE CLAMP®)
- W x H* x L (mm) 12 x 65 x 100

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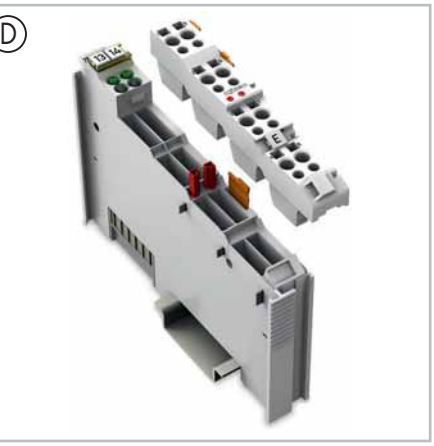

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Housing design 750 (E)
- 16 connection terminals (CAGE CLAMP® S)
- W x H* x L (mm) 12 x 65 x 100

Housing design 750 (F)
- For time-saving wiring between I/O-System and interface modules
- Ribbon cable connector for connection to 289 Series Interface Modules and *JUMPFLEX*® Interface Adapter
- W x H* x L (mm) 12 x 73 x 100

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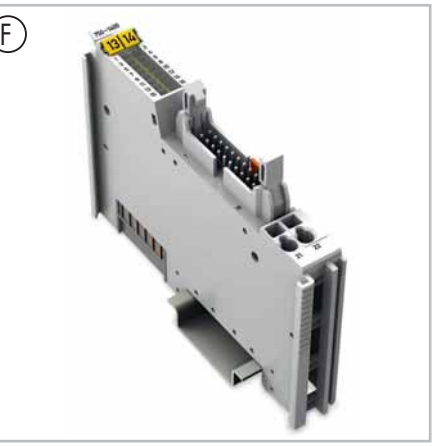

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Housing design double width (G)
Some modules are integrated into a double housing to address specific technological needs. Despite utilizing the same standardized housing, these modules are twice as wide.
- W x H* x L (mm) 24 x 65 x 100

Special housing design (H)
Some modules are integrated into a specialized housing with a specific width and pluggable connectors. The dimensions are specified on the respective catalog page.

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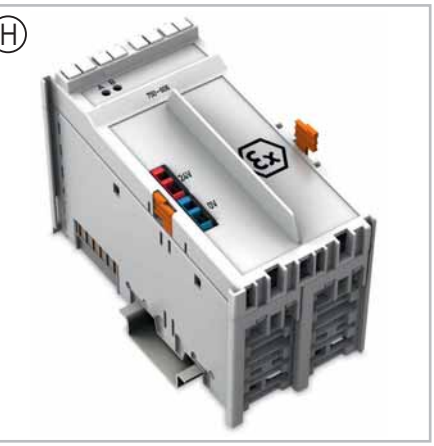
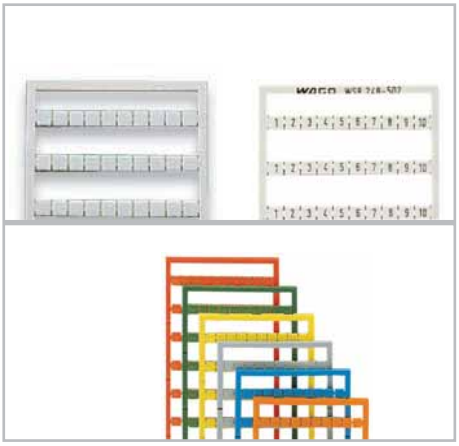


*Height from upper edge of the DIN-rail

I/O-System – 750 and 753 Series
Markings and Mounting Accessories

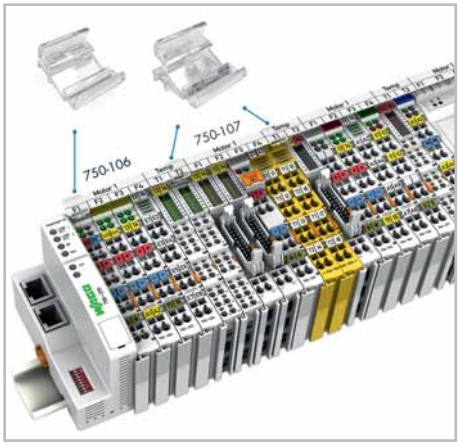
Transparent group marker carriers to indicate module type by color.

Removable group marker carriers are available for all 750 and 753 Series I/O modules with a maximum of four LEDs, as well as all fieldbus couplers with a supply module.

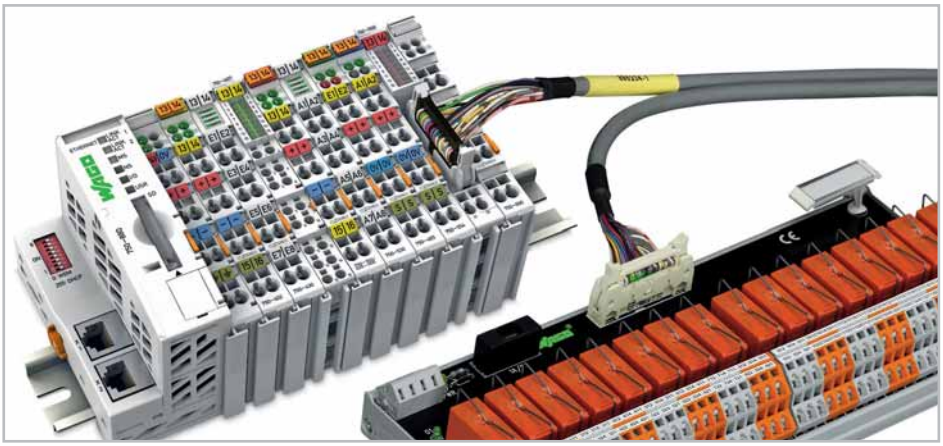


Miniature WSB quick marking system, blank, pre-marked and colored. Suitable for all 750 and 753 Series I/O modules.

Marker carrier for an individual I/O module. Suitable for all 750 and 753 Series I/O modules. The marker carrier can be placed in the upper, miniature WSB carrier plate.



Marker carriers for an I/O node. Both carrier models (750-106 and 750-107) permit continuous marking regardless of the I/O module housing used.



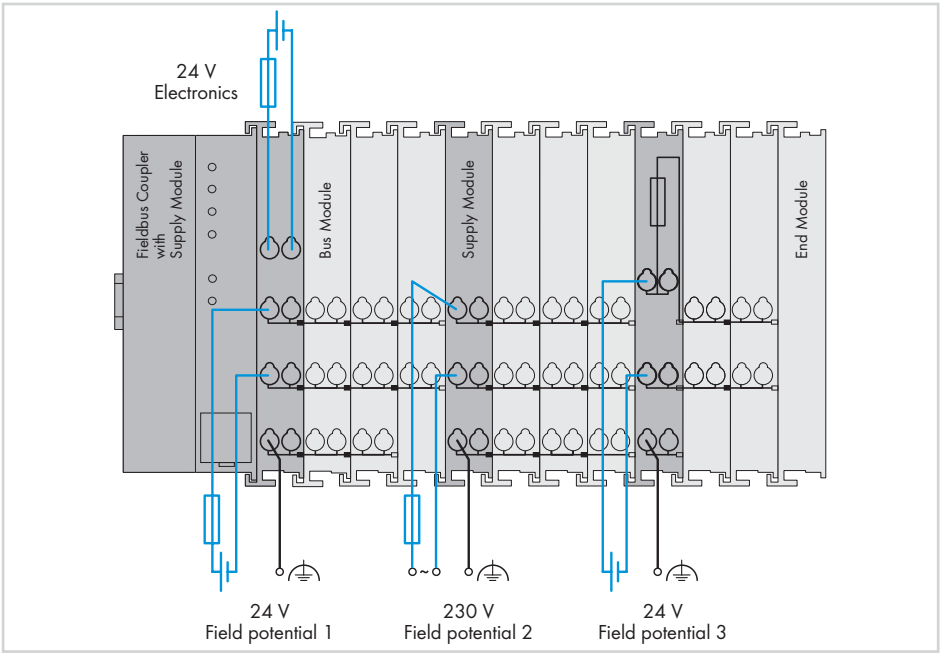
Interface modules for system wiring

Interface cables

Power supply

The fieldbus coupler always powers the internal electronics' power supply. The field-side power supply is electrically isolated via the supply module on the fieldbus coupler or a separate potential supply module. The division enables a separate supply for sensors and actuators. Snapping I/O modules together automatically routes the supply voltages (system power supply 5 VDC via the data contacts and field supply via the optional power jumper contacts). Supply modules with diagnostics enable additional power supply monitoring. This ensures a flexible, user-specific supply design for a station.

The current 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 exceeds this value, an additional bus supply module is necessary. Even in this case, the 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.



Notes

Additional steps must be must be implemented based on where the I/O-System is installed:

- As part of **shipbuilding** or in the onshore/offshore sector, specific power and field-side power supply filters must be provided (750-624/626).
- As part of operating **intrinsically safe Ex i modules,** use of a specific supply module is required (750-625). In addition, specific power and field-side power supply filters must be provided (750-624/626).
- For the 24 VDC power supply of electronics and field, PELV/SELV power supply units are recommended. As part of a safety-related application, they are mandatory.
- The mixed operation of safe and conventional modules streamlines system configuration. For increased EMC immunity required according to the standard, WAGO offers compact filter modules for the power supply.

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

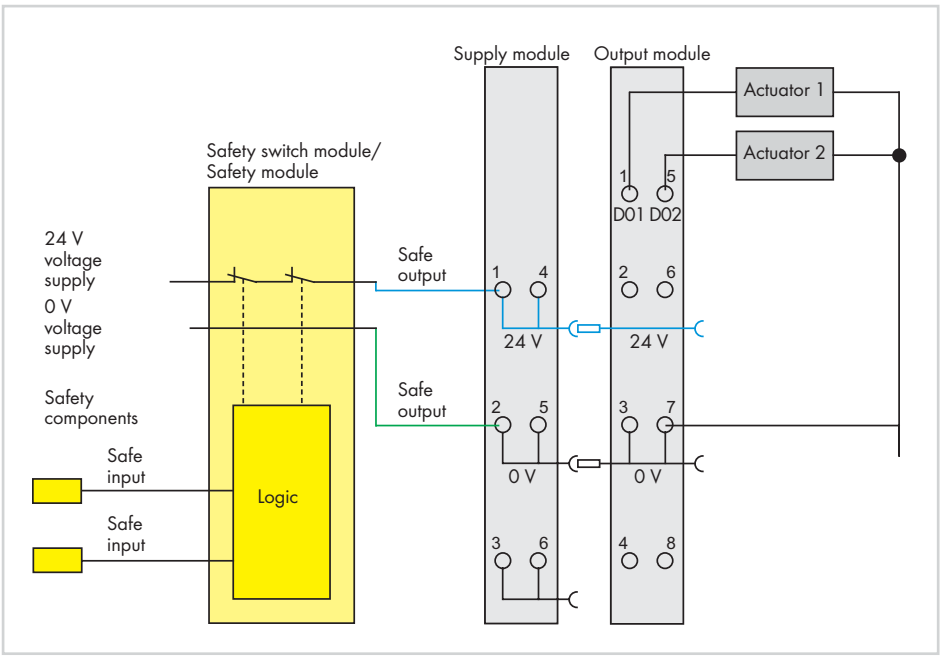
Interference-free in safety-related applications

To safely and easily 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 time response) remain unchanged.

Some modules are designed to provide interference-free safety functionality. These modules comply with safety requirements up to Category 4 of DIN EN ISO 13849-1:2007. The safety category and performance level depend solely on the safety components and their wiring.

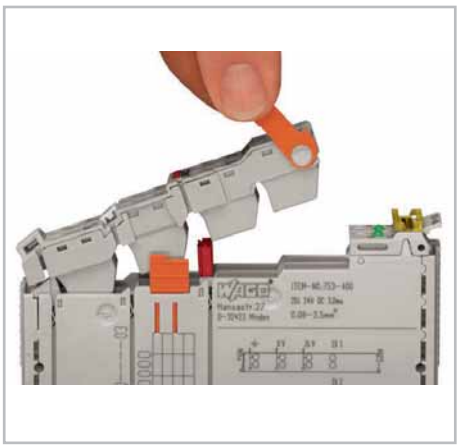
Attention!
Interference-free WAGO I/O modules have no active impact on the safety function – they are not an active part of the safety application and are not a substitute for the safety switching device! When using the components in safety functions, the corresponding notes must be observed in the relevant manual.



Example: Two-channel, double-pole power supply disconnection

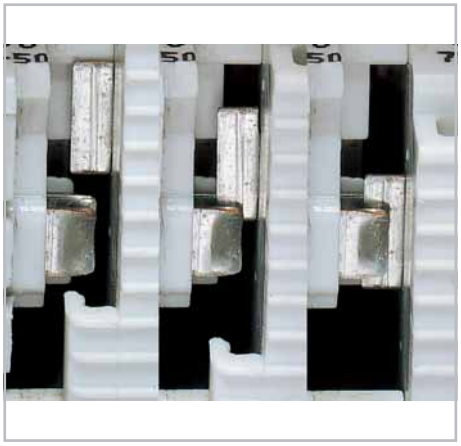
I/O-System – 750 and 753 Series
Application and Installation Instructions

Attachment/release on the mounting rail



Releasing the pluggable connector

Optional protection against mismating of pluggable connectors via coding elements



Secure, automatic connection of the power supply by self-cleaning blade contacts

Notice:
Within select 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 an I/O 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.

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

Secure, automatic connection of the data and electronics power supply by gold-plated pressure contacts

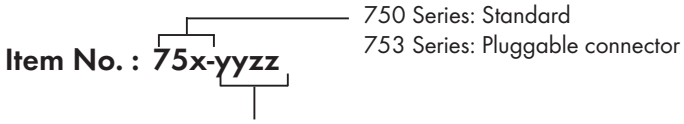
Securing the cable to the connector

Service interface for configuring the fieldbus coupler. Connectivity via configuration cable or radio adapter

I/O-System – 750 and 753 Series

Item Number Keys

Explanation of the components for the item number key



01zz: Marker
03zz: Fieldbus coupler
zz: Consecutive number

1yzz: 16 connection points or ribbon cables
y4zz: Input
00 ... 49 = Digital input
50 ... 99 = Analog input
04: Counter
y5zz: Output
00 ... 49 = Digital output
50 ... 99 = Analog input
11: PWM
y6zz: Function / technology / communication / system module
0z: Power supply, potential duplication, end module
1z: Power supply, potential duplication, separation modules
2z: Power supply, bus extension, filter, separation modules
3z: Distance and angle measurement, DC drive controller, counter
4z: Communication (building), radio, RTC, vibration monitoring
5z: Serial interfaces, communication
6z: Functional safety
.../000-001: PROFIsafe V1.3
.../000-002: PROFIsafe V2
.../000-003: PROFIsafe V2 iPar
7z: Stepper

09zz: Accessories

.../025-000: Extended temperature range -20 °C ... +60 °C
.../000-800: Interference-free
.../040-000: 750 XTR Series, see Section 5

I/O-System – 750 and 753 Series
Standards and Rated Conditions

General Specifications	
Operating voltage	24 VDC (-25 % ... +30 %)*; *for all shipbuilding-certified fieldbus couplers and I/O modules
Operating temperature	0 °C ... +55 °C
Operating temperature for versions with an extended temperature range	-20 °C ... +60 °C
Storage temperature	-25 °C ... +85 °C
Storage temperature for versions with an extended temperature range	-40 °C ... +85 °C
Relative humidity (without condensation)	95 %
Operating altitude	without temperature derating: 0 m ... 2000 m; with temperature derating: 2000 m ... 5000 m (0.5 K/100 m); max.: 5000 m
Degree of contamination	II acc. to IEC 61131-2
Vibration resistance	0.5g (4g for all shipbuilding-certified fieldbus couplers and I/O modules) acc. to IEC 60068-2-6
Shock resistance	15g acc. to IEC 60068-2-27
EMC immunity to interference	acc. to EN 61000-6-2 / marine applications
EMC emission of interference	acc. to EN 61000-6-3 / EN 61000-6-4 / marine applications
Protection type	IP20
Mounting position	any
Type of mounting	on DIN 35 rail
Housing material	Polycarbonate, polyamide 6.6
Stress due to contaminants	acc. to IEC 60068-2-42 and IEC 60068-2-43
Maximum contaminant concentration with a relative humidity < 75 %	SO2 ≤ 25 ppm; H2S ≤ 10 ppm
Connection technology	CAGE CLAMP®
Conductor cross-section; stripped lengths for standard I/O modules and fieldbus couplers: 753 Series I/O Modules: ECO Fieldbus Couplers:	 0.08 mm² ... 2.5 mm²/28 ... 14 AWG; 8 ... 9 mm/0.33 in. 0.08 mm² ... 2.5 mm²/28 ... 14 AWG; 9 ... 10 mm/0.37 in. 0.08 mm² ... 1.5 mm²/28 ... 16 AWG; 5 ... 6 mm/0.22 in.
Connection technology	CAGE CLAMP® S
Conductor cross-section; stripped lengths for I/O modules with 16 connecting terminals:	solid: 0.08 mm² ... 1.5 mm²/28 ... 16 AWG, fine-stranded: 0.25 mm² ... 1.5 mm²/22 ... 16 AWG; 8 ... 9 mm/0.33 in.
Current via power jumper contacts	max. 10 A