The WAGO-I/O-SYSTEM

A System for All Applications

WAGO®
INNOVATIVE CONNECTIONS

Decentralized Automation

The introduction of industrial fieldbus systems has significantly impacted automation. Modern, decentralized topologies with distributed "intelligence" have replaced traditional, centralized automation structures, allowing users to maximize profits and optimize system processes.

The introduction of Industrial Ethernet has satisfied industry demands for both increased performance and the availability of open-system architectures, while the worldwide establishment of fieldbus standards ensures compatibility.

The interoperability of these open systems epitomizes the capability of modern automation systems.

WAGO Kontakttechnik

As the leader in screwless connection technology and interface electronics, WAGO developed the first finely modular, fieldbus-independent system in 1995 and has continued to lead the industry in quality and innovation. A compact design combined with the highest quality standards has made the WAGO-I/O-SYSTEM one of the world's most successful fieldbus systems.

Product innovation and manufacturing occur at WAGO's worldwide headquarters in Minden, Germany. With more than 4,800 employees at 32 locations worldwide, WAGO can provide superior product availability and support.

Benefits of Decentralized Fieldbus Systems

Quality and reliability

- Integral quality assurance measures play a vital role in the manufacturing process
- 100% functional test
- Worldwide approvals

The optimum fieldbus system

With a fieldbus-independent design that features finely modular components, the WAGO-I/O-SYSTEM is approved for extremely diverse applications.

The system is optimized for process-oriented communication and is a scalable-performance solution for high integration density with an unbeatable price/performance ratio.

- The application possibilities are virtually infinite.
- Although the application possibilities are virtually infinite, hardware and system costs have been reduced to a minimum.

When selecting a fieldbus system, consider the following four factors that separate the WAGO-I/O-SYSTEM from lesser systems:

Maximum return on investment

- "Open," fieldbus-independent design optimizes investments

Best price/performance ratio

- Finely modular I/O modules enable customized node configurations
- The space-saving design enables high packing density and the convenience of direct connection

Optimization of life cycle costs

- Ease of use reduces project engineering, commissioning and service costs
- Streamlined design significantly reduces handling errors
- Easy-to-install components eliminate unnecessary (and often costly) accessories and manufacturer-specific configuration tools

Maximum operational reliability

- Industry-leading quality and reliability for a wide variety of applications – all WAGO components adhere to the highest standards for environmental exposure (e.g., climate, vibration and shock loading, EMC and emitted interference).

Universal, Compact and Economical – The Ideal

Fieldbus-independent
The basic premise of the modular system is reflected in the support of numerous fieldbus systems. Depending on the application, it is possible to choose between fieldbus couplers and controllers for different protocols.

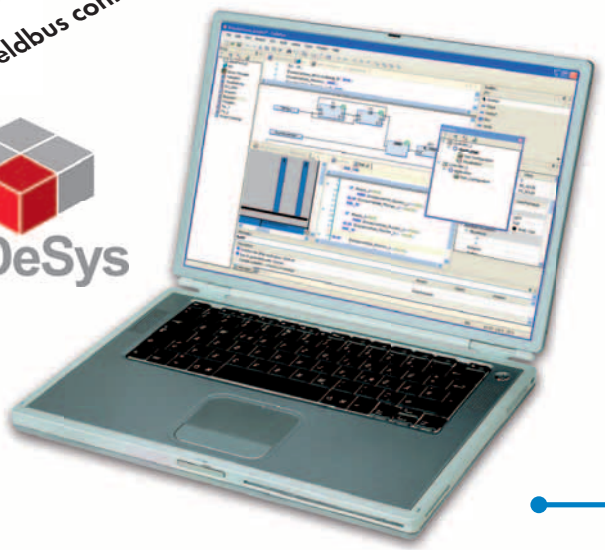
Automatic connection
Power jumper contacts automatically provide both internal data transmission and electronics supply in addition to potential distribution.

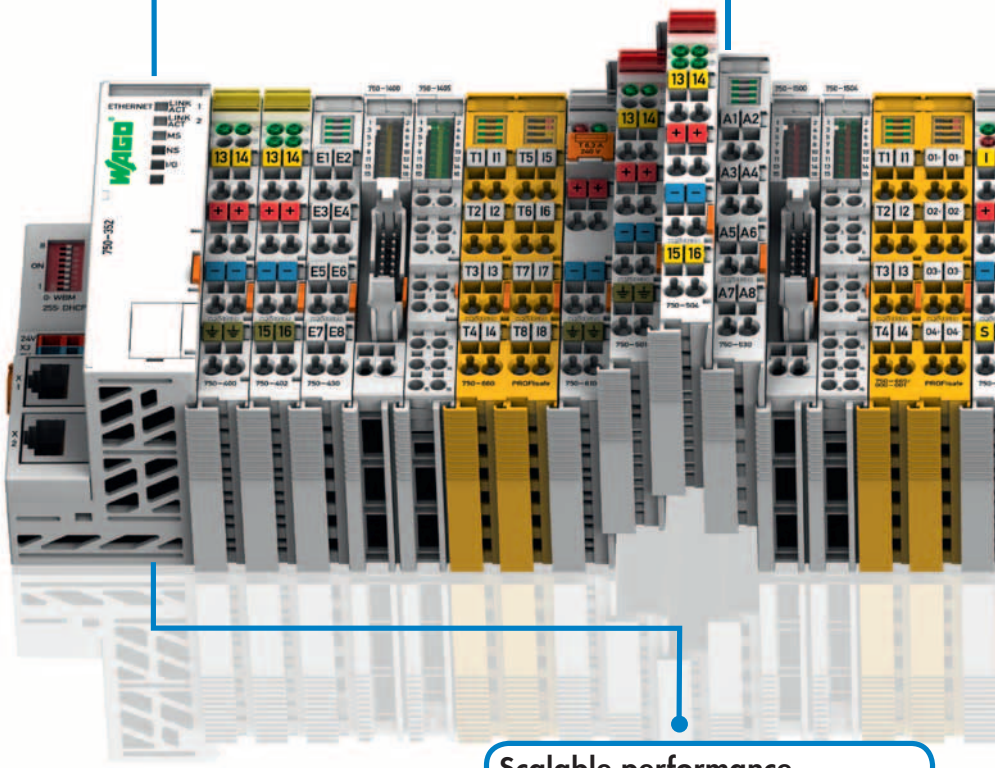
Compact IPC

Fieldbus coupler

Programmable fieldbus controller

CoDeSys





Scalable performance
With economy and standard fieldbus couplers, 16-bit controllers, 32-bit controllers and IPCs, interfaces are available for any size and type of automation task – from autonomous small controllers to global networks. Additionally, both the programmable fieldbus controllers and IPCs extend the functionality of the fieldbus coupler with a programmable logic controller (PLC). Configuration, programming and visualization are performed via WAGO-I/O-PRO CAA software package, which complies with IEC 61131-3.

Fieldbus Node

Clear identification

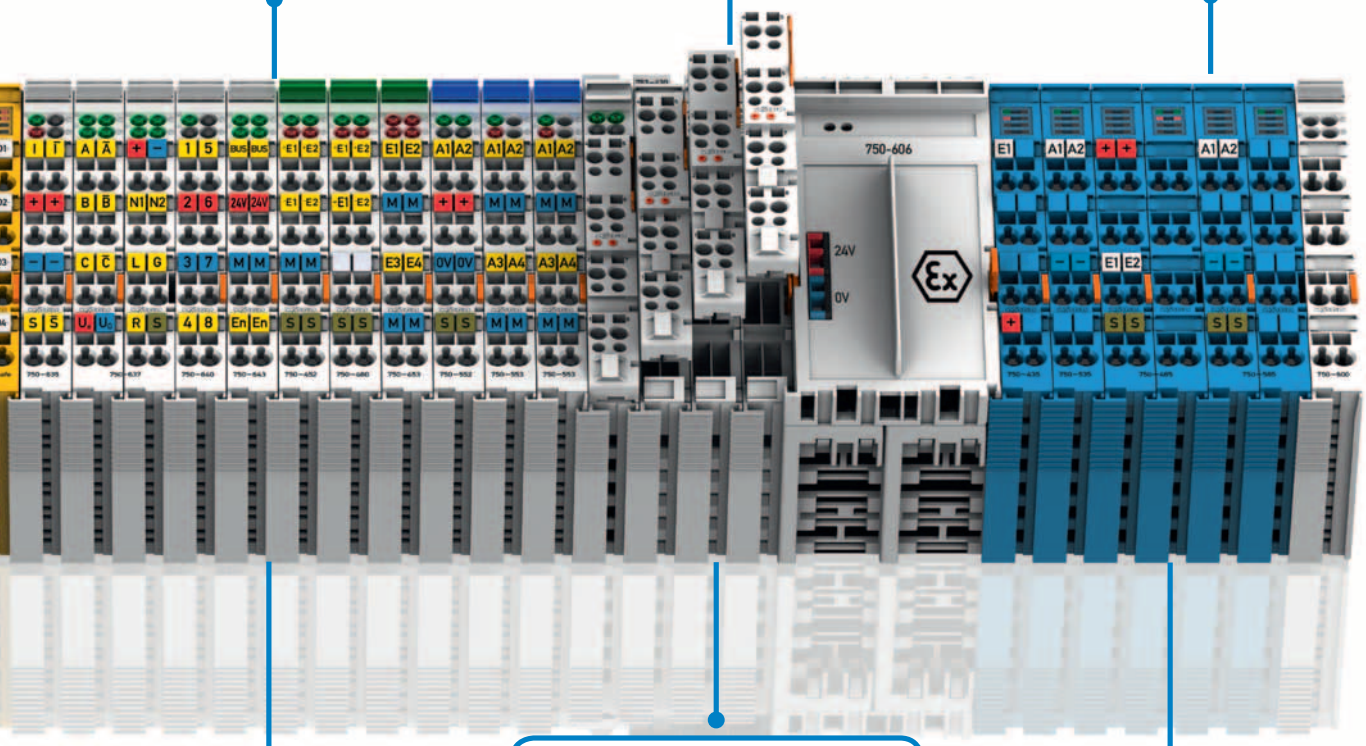
Colored markers identify the functionality of individual I/O modules; the terminal assignment and technical data are conveniently printed onto the side of the module.
The WAGO WSB marker system also allows for module-related and channel-related identification.

Pluggable connection

For the ultimate in convenience, the 753 Series I/O modules are compatible with the 750 Series I/O modules, which enables the use of 753 Series pluggable connectors. An integrated swing arm acts as a separate wiring plan, which allows an operator to easily replace a module without removing and then rewiring all pre-existing wiring. This virtually eliminates handling errors and saves time – if needed, this can be executed via place holder modules.

Strong and secure connections

Spring pressure technology guarantees continuous operation, even under the most demanding environmental conditions; e.g., climate cycling, shock/vibration loading and ESD.



Compact size

The extremely small size makes this system easy to use in the most confined spaces. Up to 16 channels can be accommodated in a 12mm-wide module.

Simple handling

The modular, rail-mounted module design allows for easy, tool-free handling and straightforward modifications, such as additions. Additionally, proven CAGE CLAMP® technology ensures that all connections made in the field are quick, vibration-proof and maintenance-free. Depending on the I/O module's granularity, the field peripherals can be wired directly using 1-, 2-, 3- or 4-wire technology.

Highly flexible

Each node in the WAGO-I/O-SYSTEM can be configured to meet each channel's requirements, and various potentials and signal forms are available (granularity of 1 to 8 channels). Digital and analog I/Os, as well as specialty modules, can be easily combined. Supply modules allow any potential groups to be handled within a node.

PROFINET

PROFIBUS

EtherNet/IP

EtherCAT

MODBUS/TCP

DeviceNet

CANopen

SERCOS interface

MODBUS

INTERBUS

CC-Link

II/O-LIGHTBUS

CAL

IEC 60870-5

KNX

BACnet

LONWORKS

Digital Input Modules

2-Channel Digital Input Modules
- DC 5 V, 24 V, 42 V, 48 V, 110 V
- AC 24 V, 42 V, 120 V, 230 V
- NPN/PNP, 0.2 ms/3.0 ms filter, diagnostics

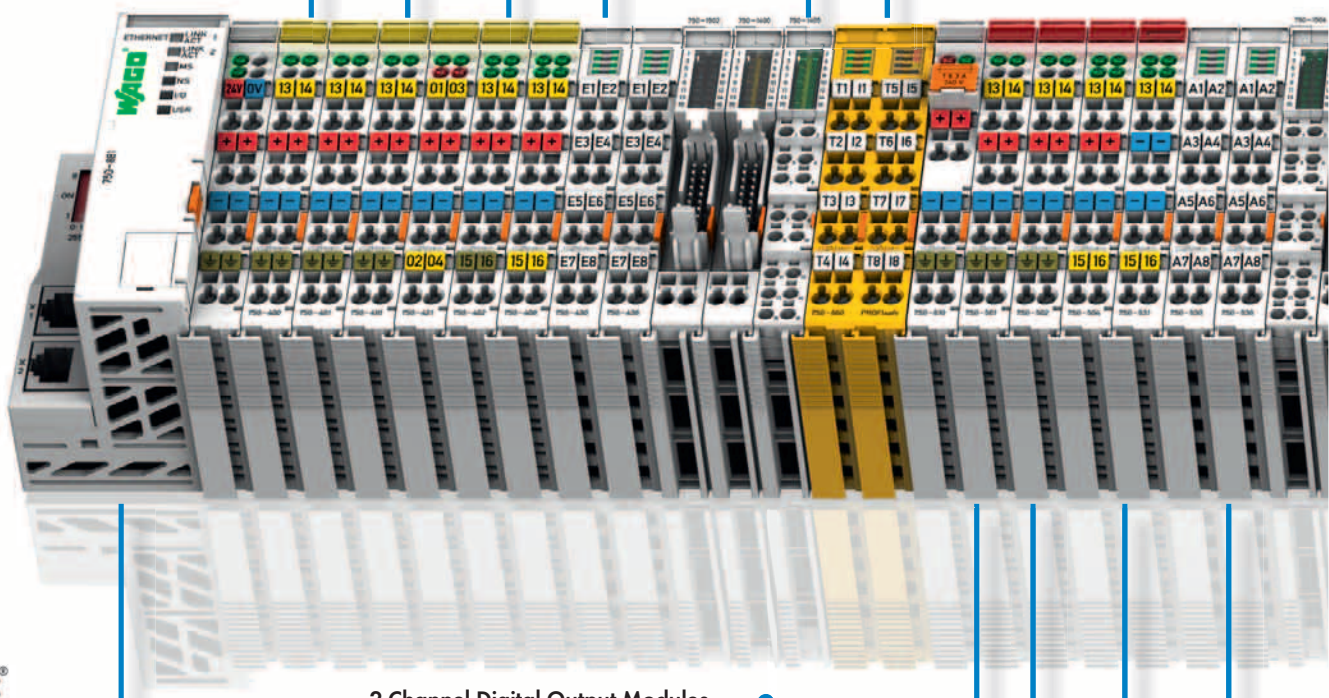
2-Channel Digital Specialty Modules
- NAMUR
- Pulse extension
- Intruder detection
- Up/down counter, 100 kHz

4-Channel Digital Input Modules
- DC 24 V
- AC 110 V ... 230 V

8-Channel Digital Input Modules
- DC 24 V, DC 5 V ... 14 V
- NPN/PNP

16-Channel Digital Input Modules
- CAGE CLAMP®S, DC 24 V, NPN/PNP
- Ribbon cable, DC 24 V, NPN/PNP

Safety Modules (PROFIsafe)
- 4F-DI, 8F-DI
- CAT. 4 to EN 954-1 and SIL 3 IEC 61508



2-Channel Digital Output Modules
- DC 24 V
- 0.5 A/2 A, diagnostics (broken wire/short circuit)
- AC 230 V, SSR, 3.0 A, diagnostics

2-Channel Digital Specialty Modules
- Pulse width (PWM) output module

4-Channel Digital Output Modules
- DC 24 V, 0.5 A, AC 0 ... 230 V, 0.25 A
- NPN/PNP, diagnostics

8-Channel Digital Output Modules
- DC 5 V ... 14 V, 1 A, DC 24 V, 0.5 A
- NPN/PNP, diagnostics

16-Channel Digital Output Modules
- CAGE CLAMP®S, DC 24 V, 0,5 A
- Ribbon cable, DC 24 V, 0.5 A

Safety Modules (PROFIsafe)
- 4/4F-DIO, 8F-DO
- CAT. 4 according to EN 954-1 and SIL 3 IEC 61508

2-Channel Relay Output Modules
- AC/DC 0 ... 230 V
- 2 make contacts/2 changeover contacts, isolated outputs/non-floating

Digital Output Modules

Compact IPCs

Programmable Fieldbus Controllers

Fieldbus Couplers

Versatile and Flexible – More than 400 Different 1-, 2-, 4-,

Analog Input Modules

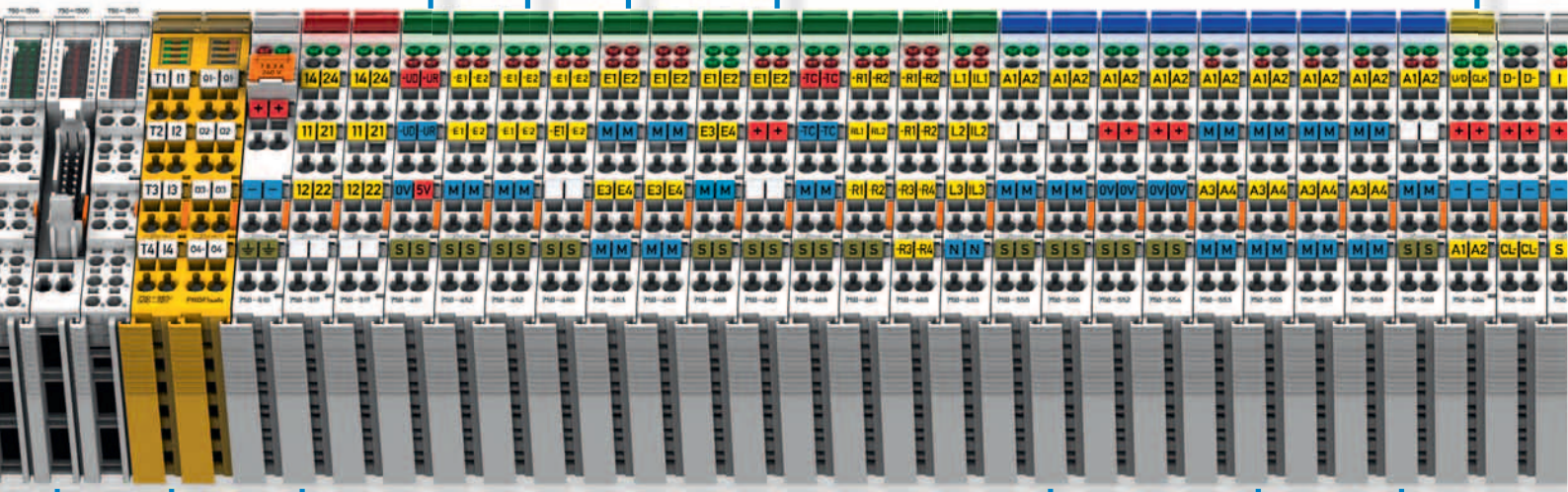
1-Channel Analog Input Modules
- Resistor bridges (strain gauge)

2-Channel Analog Input Modules
- Differential/single-ended input
- Measurement input (electrical isolation)
- 12-/14-/16-bit resolution
- AC/DC 0(4) ... 20 mA, 0 ... 1(5) A
- DC 0 ... 10 V, ±10 V, 0 ... 30 V,
- Diagnostics

4-Channel Analog Input Modules
- Single-ended input
- 0(4) ... 20 mA,
- 0 ... 10 V, ±10 V

Analog Specialty Modules
- HART protocol support
- RTD measurement module (adjustable)
- Thermocouple measurement module, diagnostics

Drive



2-Channel Analog Output Modules
- 0 ... 10 V/±10 V
- 0(4) ... 20 mA

4-Channel Analog Output Modules
- 0 ... 10 V/±10 V
- 0(4) ... 20 mA

Analog Specialty Modules
- 6 V ... 18 V
- 0 ... 10 V, 10 mA, diagnostics

Analog Output Modules

, 8- and 16-Channel Function Modules are Available.

ive Technology

Building Automation

Counters
- Up/down counter
- Frequency counter
- Peak-time counter

Distance and Angle Measurement Modules
- SSI transmitter interface
- Incremental encoder interface
- Digital impulse interface

Positioning
- Stepper controller RS-422
- Stepper controller 24 V/1.5 A
- Stepper controller 70 V/7.5 A 6IN/6OUT
- Servo stepper controller 70 V/7.5 A 6IN/6OUT
- DC drive controller 24 V/5 A

Vibration Monitoring
- Vibration velocity/bearing condition monitoring

1-Channel Digital Outp
- AC 440 V, 16 A
- Manual operation, bistable

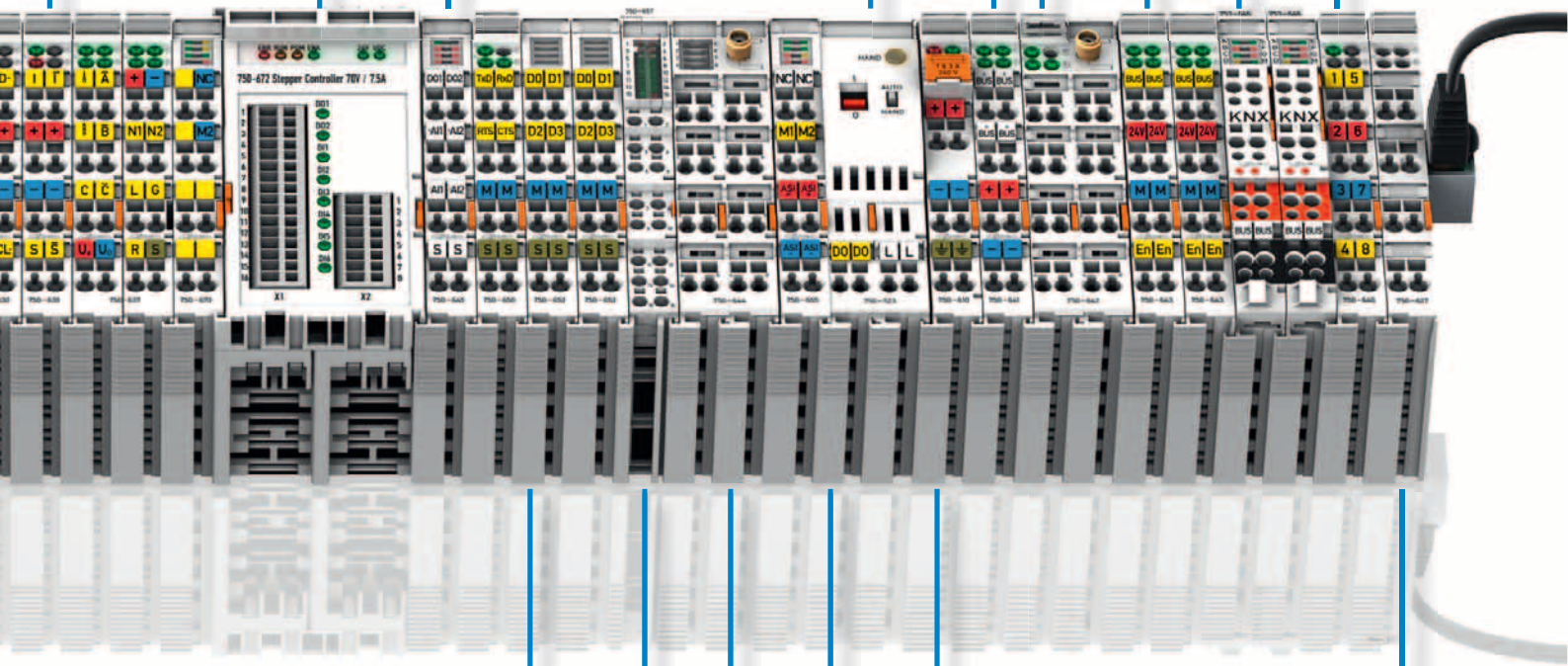
DALI/DSI Master

EnOcean Radio Receiv

MP-Bus

KNX/EIB/TP1 Module

RTC Module
- DCF-77 radio receiver



Supply Modules
- AC/DC 0 ... 230 V
- Fuse/diagnostics (optional)
- DC 24 V / DC 5 V ... 15 V (adjustable)

AS-Interface Master
- Acc. to (M4) V 3.0 standard
- Up to 62 slaves

Radio Interface
- Bluetooth®/RF transceiver

4-Channel IO-Link Master

Serial Interface
- RS-232/RS-485/RS-485 interface (configurable)
- TTY interface 20 mA Current loop
- Data exchange module

Internal Data B
- End module
- Coupler module

Communication and Gateway

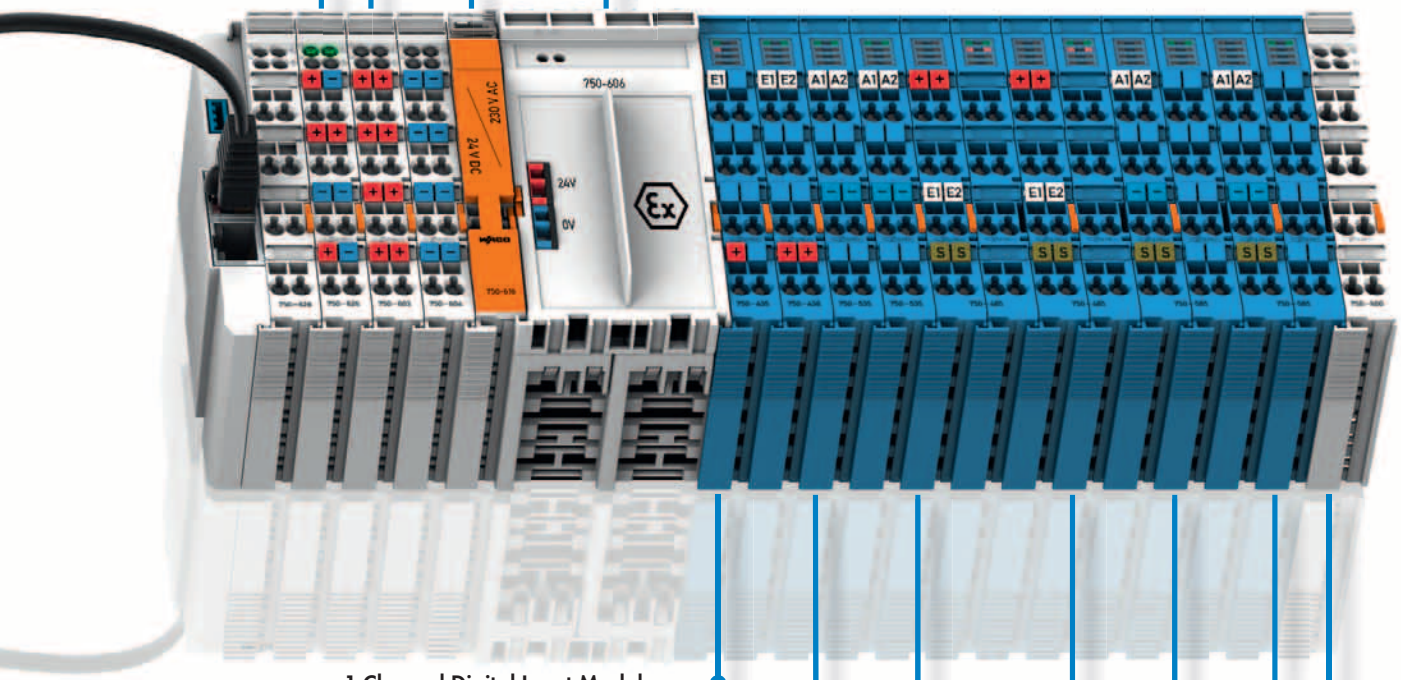
System Modules AC/DC 230 V DC 24 V AC 120 V

Filter Modules
- System and field-side power supply
- 24 VDC power supply filter (surge)

Field-Side Connection Modules
- DC 24 V
- DC 0 V

Separation Modules
- DC 24 V / AC 230 V

Supply Modules
- DC 24 V, Ex i



1-Channel Digital Input Modules
- Proximity switch to DIN EN 50227
- Diagnostics
- Zones 0+1

2-Channel Digital Input Modules
- Proximity switch to DIN EN 50227
- Zones 0+1

2-Channel Digital Output Modules
- 2-channel, DC 24 V, short-circuit protected
- Zone 1

2-Channel Analog Input Module
- 4 ... 20 mA (Zone 1)
- Resistance sensors (Pt100/RTD) (Zones 0+1)
- Thermocouples and voltage sensors (Zones 0+1)

2-Channel Analog Output Modules
- 0 ... 20 mA
- Zone 1

2-Channel Analog Input Module
- 4 ... 20 mA, HART

End Module

Ex i Intrinsically Safe Modules

A System for All Applications

For building and facility management

Modern and intelligent building automation systems used for energy management, HVAC, lighting control and building access help save resources, while enhancing occupant comfort and safety.

However, not every sensor and actuator in an intelligent network must be completely autonomous.

The WAGO-I/O-SYSTEM provides an optimized solution for semi-decentralized automation concepts where the control logic is relocated to the autonomous application controller (room or floor controller).

These controllers have direct communication with one another, negating the need for central control levels.

Continuous access and networking are guaranteed by complying with open standards.

This modular approach to project engineering and commissioning greatly accelerates and considerably simplifies automation tasks.

- Cross-discipline building automation with ETHERNET (MODBUS/TCP, BACnet/IP, KNX-IP), LonWorks and KNX-TP
- Fast and efficient solutions for all industries due to programmable controllers and application-specific function modules (independent of bus protocol)

- Continuous networking and remote access; e.g., using Web-based technologies
- Comprehensive range of interfaces (MODBUS RTU, M-Bus, etc), lighting control (DALI), sun protection (SMI), radio technology (EnOcean), MP-Bus, RTC

For shipbuilding and the onshore/offshore industry

Applications in shipbuilding, onshore and offshore industries are particularly demanding of the performance capability and availability of components.

WAGO components used in shipbuilding are put to the test in the most punishing operating environments.

For example, continuous vibrations, shock loads, extreme temperature cycling and severe humidity assault the components placed in a ship's engine room. However, these components reliably meet ever-increasing demands for electromagnetic compatibility day in and day out, year after year.

From stem to stern, the WAGO-I/O-SYSTEM's reputation for reliability and superior performance have garnered it several international certifications, proving its suitability for shipbuilding and other applications where extreme conditions call for high-performance components.
Along with classic fieldbus protocols, "distributed" Ethernet-based concepts are also an advantage in many projects due to flexible and open communication. Multi-client and multi-server architectures increase availability, and allow redundancy mechanisms using a standard ETHERNET infrastructure.

- International approvals: GL, LR, DNV, BV, RINA, KR, NK, BSH, ABS, PRS
- IEC-60945 conformity
- Environmental category D (GL), EMC1 (direct operation on combustion engines and compressors)
- Unrestricted operation on the bridge, "compass" certificate (BSH)
- Gateway functions: NMEA, J1939, MODBUS RTU, RK512 ...

For industrial automation

Industrial applications place inordinately harsh demands on the fieldbus peripherals, making overall life cycle costs crucial. Convenient project engineering, fast assembly/commissioning, straightforward expansion and reliable diagnostics of the WAGO-I/O-SYSTEM reduce these costs and increase productivity.

The fieldbus-independent I/O modules can combine with many fieldbus couplers/controllers to create main fieldbus systems and industrial Ethernet standards. This enables the system to easily accommodate individual customer requirements without major modifications. These factors minimize handling errors and ensure the long-term protection of system investments.

The comprehensive selection of I/O modules for different potential and signal forms saves time and money because the sensors/actuators can be directly wired. High integration density is provided by the ability to integrate up to 16 channels in a 12mm-wide module and up to 64/255 I/O modules per fieldbus coupler or controller.

Specialty modules for industrial drive technology (stepper controllers, encoders, etc.), gateway functionalities (AS-Interface, MODBUS) and functional safety (PROFIsafe) complete the range.

Finely modular fieldbus nodes (1, 2, 4, 8 and 16 channels/module) enable the production of customized configurations without expensive overcapacity.

The coupler's special software features support project engineers in handling of hardware expansion (e.g., "virtual I/O modules on PROFIBUS").

The WAGO-I/O-CHECK commissioning software lowers engineering and installation costs by allowing users to "build" nodes virtually and verify the correct operation of connected peripherals early in the process.

PLC functionality is guaranteed with the programmable IEC61131-3-compatible fieldbus controllers. Relocating time-intensive and complex applications, such as commissioning, to the fieldbus nodes relieves the bus and controller of these tasks and modularizes the process.

- Fieldbus-independent solutions with scalable performance for the main fieldbus systems and industrial ETHERNET standards
- Cost- and space-optimized configurations with 1, 2, 4, 8 and 16 channels per I/O module
- Specialty functions are available depending on applications
- Easy handling - no need for expensive accessories and software
- Compact design
- Superior quality and innovation ensure a high return on investment

For process engineering

The exceptional reliability and quality of WAGO's components provide process and engineering devices with the highest levels of technical accuracy and safety.
The WAGO-I/O-SYSTEM has been awarded with several international certifications, making it the best choice for a myriad of applications – even those with the most demanding environmental conditions.

Extensive engineering and quality have given the WAGO-I/O-SYSTEM a wide operating range. It can operate as a direct connection for an intrinsically safe peripheral in both Zones 0 and 1 (where highly explosive compounds are prevalent) just as easily as it operates in Zone 2 (where explosive compounds are relatively rare). The accurate and comprehensive diagnostic functions may eliminate potential downtime by detecting faults – right down to the cable level.

Programmable fieldbus controllers increase system availability, and both the specific and local responses to events are provided by decentralized control logic. I/O modules for condition monitoring (preventative maintenance) are included in the range, as are analog measuring modules (AC/DC TRMS) and serial interface modules, which provide protocol gateways to serial field devices.

- Application according to standards within Zone 2 hazardous areas
- Intrinsically safe digital and analog I/O modules for connection to peripherals in Zones 1 and 2
- Numerous specialty functions, analog functions (RTD, TC, AC/DC), NAMUR and extensive diagnostics (e.g., short circuits, wire breakage and out-of-measurement range)
- HART protocol support
- Telecontrol protocol in accordance with IEC 60870-5
- Select modules have an extended temperature range of -20 °C to +60 °C

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