



# WAGO-I/O-SYSTEM 750

## One System for Every Application







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# WAGO AUTOMATION

## Engineering Software

*e!COCKPIT* is an integrated development environment that supports every automation task from hardware configuration, programming, simulation and visualization including commissioning – in just one software package. This development environment enables users to easily master complex automation networks, saving both time and money.



## Operation and Monitoring

Operate, observe, visualize, diagnose: WAGO's web and control panels for small to medium-sized control and visualization tasks feature user-friendly tools and quick graphic development, reducing engineering costs.



Our commitment to innovation has led to many industry-changing milestones. In 1995, WAGO developed the first modular, fieldbus independent I/O system, known as the WAGO-I/O-SYSTEM. We continue our dedication to innovation and versatility enabling us to set new standards in usability, performance and reliability.



### Controllers

WAGO offers programmable controllers in a wide variety of performance classes for any stand-alone or distributed automation application. Being fieldbus independent, our PLCs provide the

flexibility to integrate with your plant's industrial networks. Furthermore, utilizing the IEC 61131-3 programming standard, these controllers are able to execute a variety of automation tasks.

### Bus Couplers and I/O Modules

Supporting popular fieldbus networks, the WAGO-I/O-SYSTEM bus couplers reliably collect and transfer all signals to your higher level control system. A growing portfolio of more than 500 digital, analog and special function I/O modules means you have access to the right module for your application. An added benefit is their compatibility with both our bus couplers, as well as our controllers, increasing versatility and reducing inventory.



### Networking Components

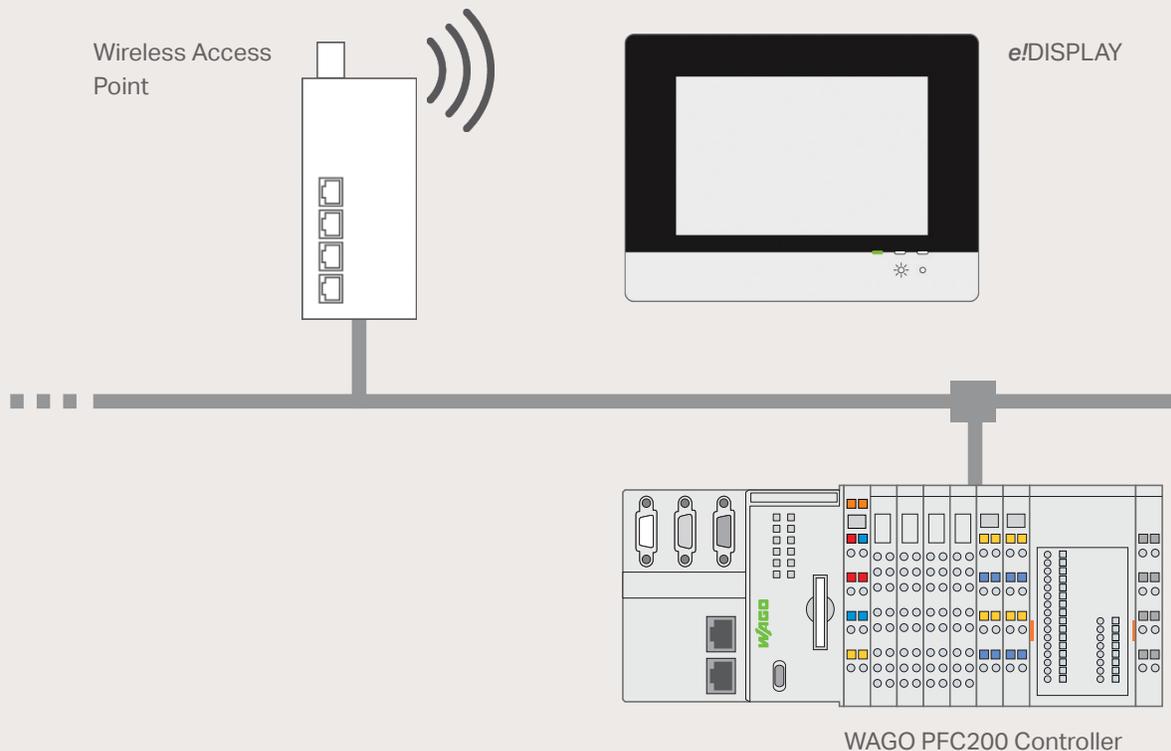
In the field of industrial automation, more and more wireless technologies, such as mobile radio, Bluetooth and WLAN, supplement data transmission via fieldbus or industrial ETHERNET systems. Rounding out your automation application are our industrial switches and wireless technologies. A complete line of managed and un-managed industrial ETHERNET switches reliably transmit data traffic and protect against network failures. In addition, our wireless Bluetooth and WLAN replace traditional copper connections to reduce costs and installation time.

# BUILT-IN WEB-SERVER

## Remote Visualization and Control

While plant supervisors, maintenance staff and machine operators benefit from having system information readily at hand, control engineers seek innovative tools to enhance machine operation and shorten development time. WAGO's Ethernet controllers with built-in web servers help both users and developers increase productivity by providing critical data in graphical formats on web browsers and mobile devices.

The graphical visualizations and logic are developed in a single software tool - WAGO-I/O-PRO or e!COCKPIT. As a result, visualization objects can directly access the variables in the controller's code, accelerating development time by not having to use a separate HMI development package and exporting and importing tags. The graphic screens can be securely monitored using your favorite web browser, our web based e!DISPLAYS and tablets or smart phones using the WAGO Web Visu app.



# VISUALIZATION

## WebVisu

The WAGO WebVisu APP is a convenient mobile application that enables quick and easy access to equipment status, process data and product levels at the swipe of a finger.

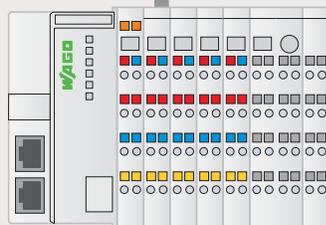
- Access up to 100 controllers on a single mobile device
- No additional hardware required – just a WAGO Ethernet Controller
- Easy implementation 1) enter controller name, 2) enter controller URL, and 3) click accept
- Supports 750 Series Ethernet controllers with web-based visualization
- Display visualization screens developed in WAGO-I/O-PRO or e!COCKPIT



View WebVisu screens on your mobile device using the WAGO WebVisu App



Use your web browser to view WebVisu screens on your PC



WAGO ETHERNET 2.0 Controller

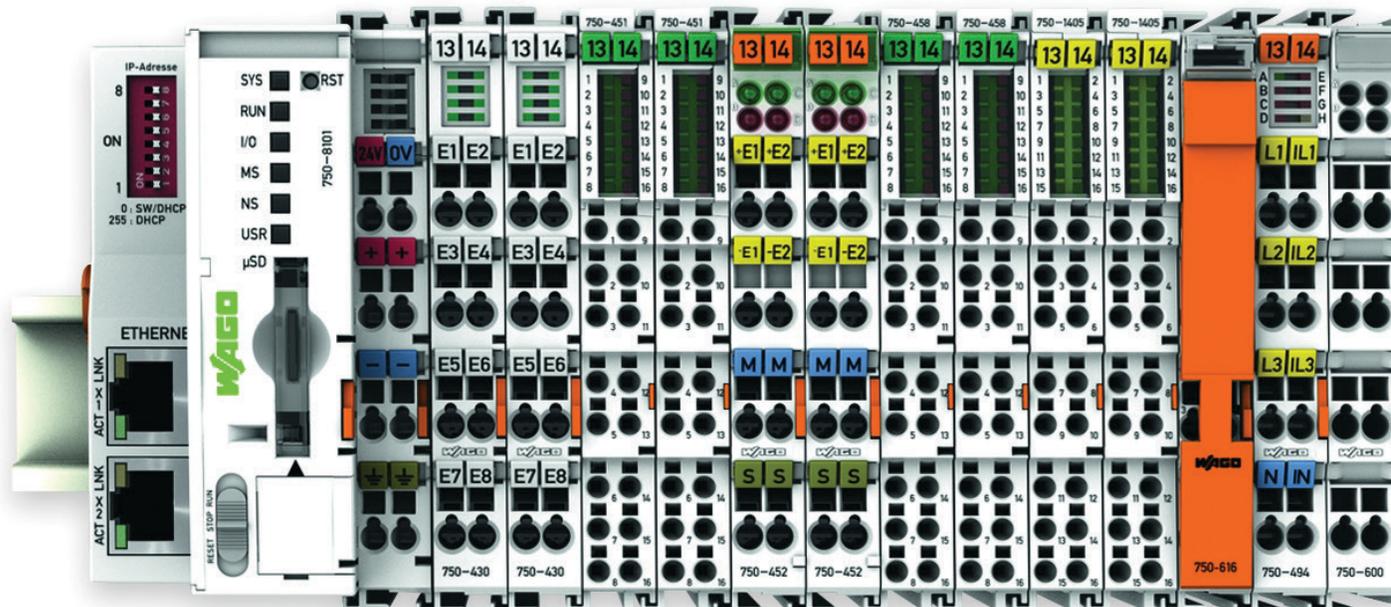
ETHERNET

# WAGO-I/O-SYSTEM 750

## One System for Every Application

The universal WAGO-I/O-SYSTEM 750/753 is defined by its broad application range and extensive product portfolio. With more than 500 different digital, analog and special function I/O modules, virtually every signal type in a wide range of industries is covered.

Proven in industrial, process and building automation, as well as SmartGrid and hazardous locations: The WAGO-I/O-SYSTEM offers the most flexible, modular and compact platform for stand alone or distributed automation. Worldwide approvals such as UL, ABS, and IECEx are examples of the system's versatility and robust design.



### ADVANTAGES:

- Fieldbus independent – Supports all standard fieldbus protocols and Ethernet standards
- More than 500 digital, analog and special function I/O modules
- Flexible platform adapts to diverse applications and environments
- Worldwide approvals – UL, ABS, IECEx and more
- 753 Series for pluggable wiring
- CAGE CLAMP connection technology for vibration-proof, fast and maintenance-free wiring.

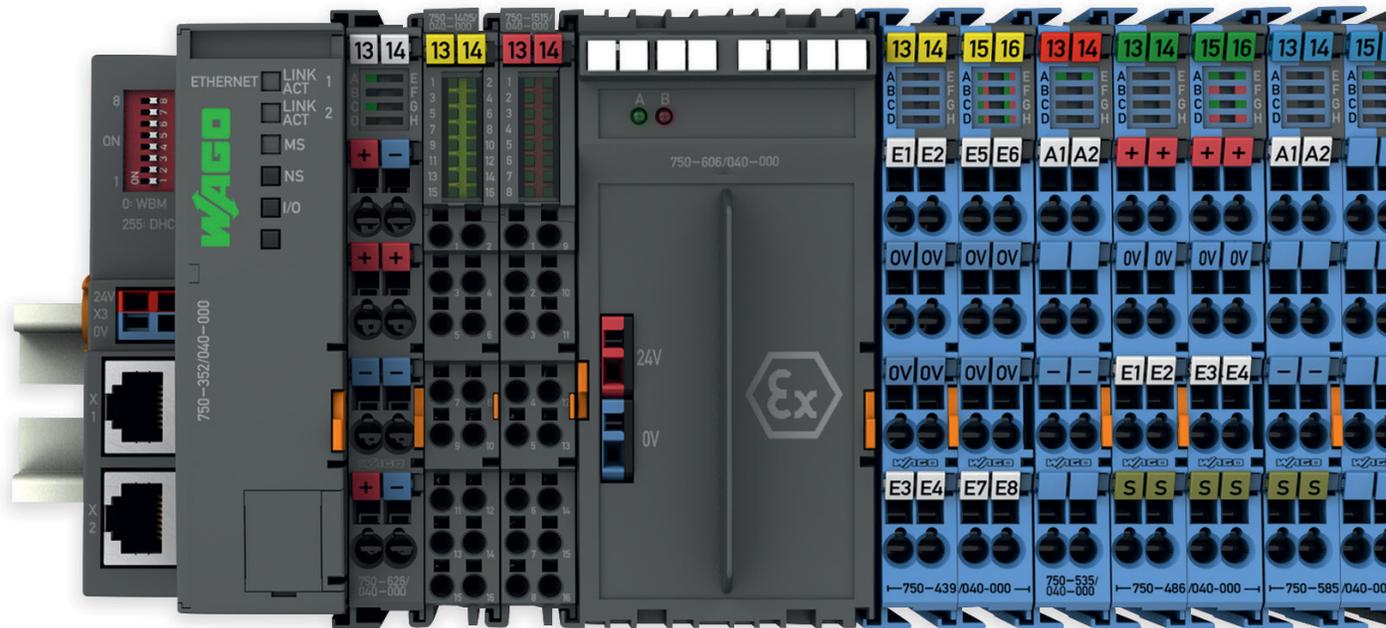
# WAGO-I/O-SYSTEM 750 XTR

## Taking It to the eXTReMe – The Standard for 750 XTR

The WAGO-I/O-SYSTEM 750 XTR is instantly recognizable by its dark gray housings. With an extreme temperature range, immunity to interference, resistance to vibration as well as impulse voltages – the WAGO-I/O-SYSTEM 750 XTR unique construction makes it ideal for extreme environments.

The XTR Series is the first choice for demanding applications including:

- Onshore/offshore
- Marine/Shipboard
- Renewable energy
- Substation and power distribution
- Petrochemical
- Water and wastewater treatment
- Mining
- Railway and mobile vehicle

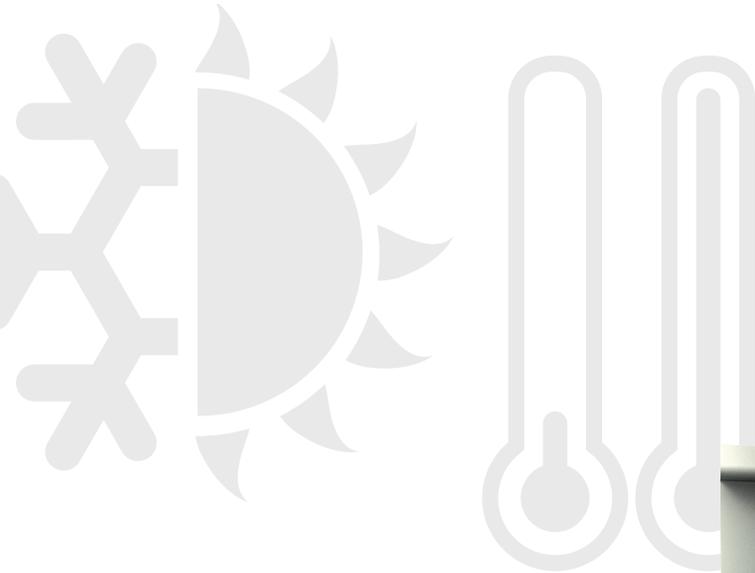


### ADVANTAGES:

- Based on the universal WAGO-I/O-SYSTEM 750 Series
- Approved for hazardous locations – including intrinsic safety
- Lower energy and maintenance costs – no air conditioning required
- Compact foot print – reduce enclosure size
- Ideal for high altitudes up to 16,000 ft

# eXTReMe TEMPERATURES

from -40 °C to +70 °C



## ADVANTAGES:

- No air conditioning required
- Compact footprint
- Lower energy and maintenance costs

## Superior Reliability in Extreme Climates

Automation systems are increasingly being located in outdoor and remote locations where components are directly affected by fluctuating temperatures and weather conditions. Application examples include: drilling rigs, railway and substations. Regardless of freezing cold (-40 °C/-40 °F), extreme heat (+70 °C/+158 °F) or high humidity, the WAGO-I/O- SYSTEM 750 XTR is engineered for dependability in virtually any environmental condition. This applies to both start-up and continuous operation.

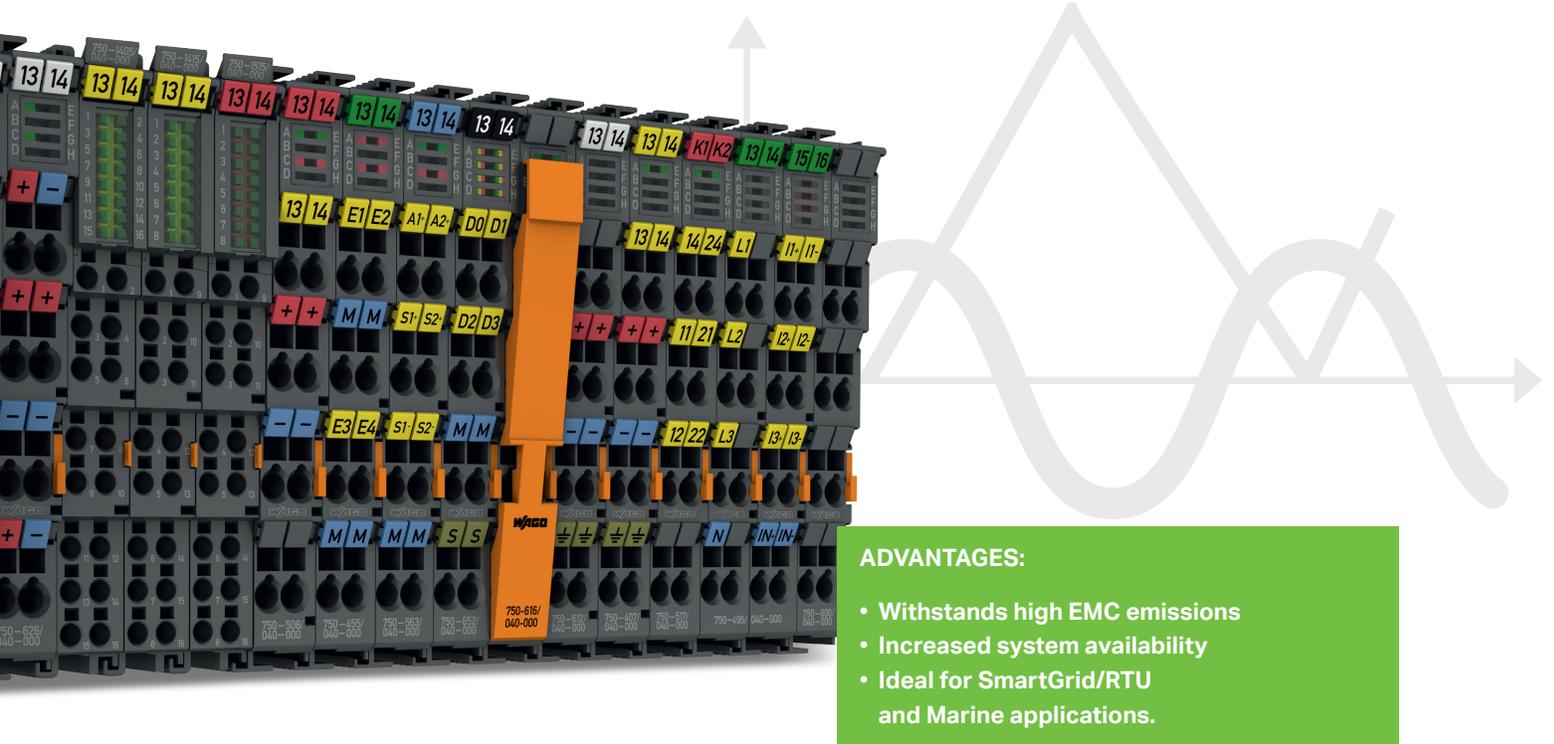
The maximum approved operating altitude of 16,000 ft is another highlight. Even in the thin air of a mountain-top application, the system demonstrates its high performance and availability.

WAGO's 750 XTR minimizes space requirements with a compact footprint, but the savings go well beyond cabinet dimensions. XTR does not require additional heating/cooling equipment, which significantly reduces both energy consumption and maintenance costs.



# eXTreme ISOLATION AND IMMUNITY TO INTERFERENCE

## Up to 5 kV of Impulse Voltage



### ADVANTAGES:

- Withstands high EMC emissions
- Increased system availability
- Ideal for SmartGrid/RTU and Marine applications.

### Additional Protection against Interference Pulses

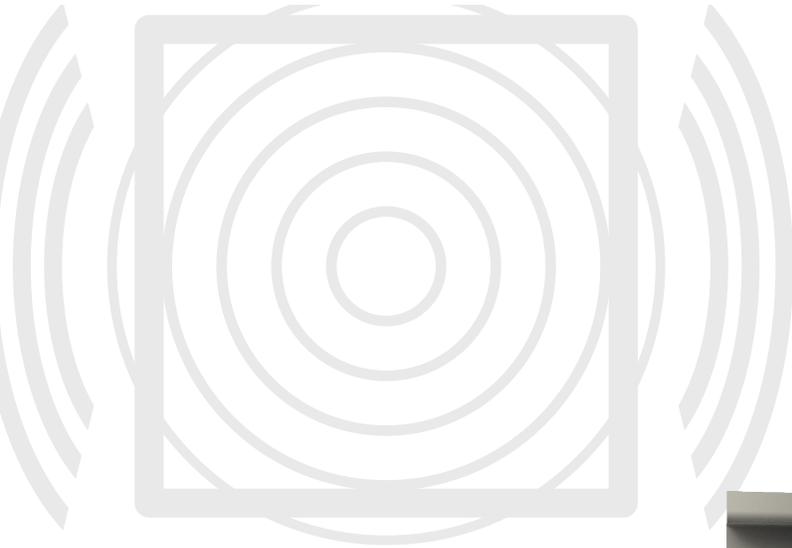
Increasing demands for high productivity are shaping manufacturing processes, and placing high demands on automation systems.

The WAGO I/O-SYSTEM 750 XTR provides greater isolation up to 5 kV impulse voltage and higher resistance to EMC interference. These strengths result in trouble-free operation.

These features make the system ideal for use in SmartGRID applications by supporting the right protocols (DNP3, MODBUS, IEC 60870, IEC 61850 and IEC 61400) as well as the EMC standard EN 60870-2-1.

# eXTReMe VIBRATION RESISTANCE

## Up to 5 g of Acceleration



### ADVANTAGES:

- Install close to vibration and shock generating equipment
- Increased system uptime
- Maximize return on investment

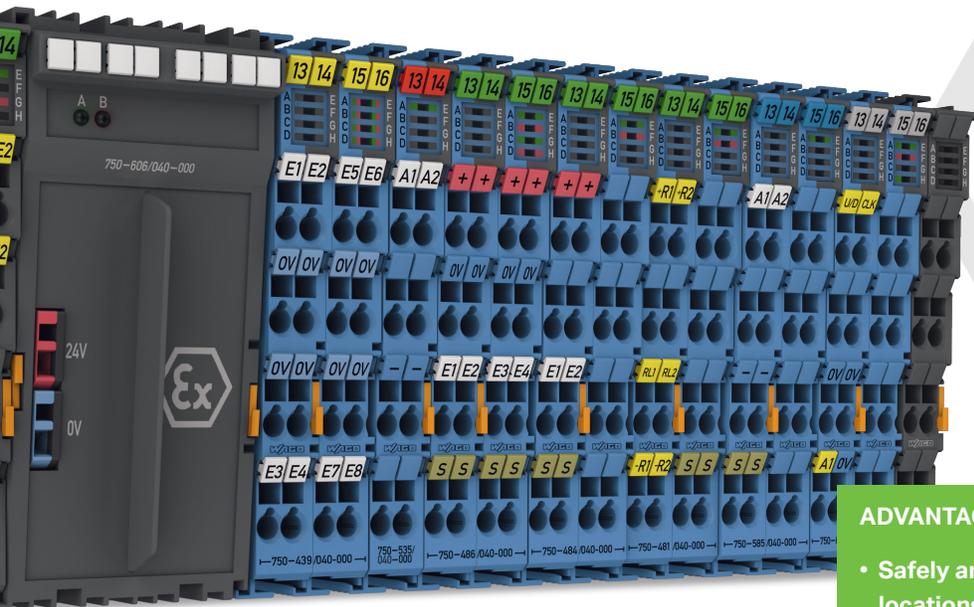
### High Mechanical Performance

The WAGO I/O-SYSTEM 750 XTR is also setting new standards with 5 g of vibration resistance, 15 g of shock resistance, as well as 25 g of continuous shock resistance – proving the system’s dependability in extreme environments. Count on long-lasting, reliable and trouble-free operation.

The extreme ruggedness of the 750 XTR Series pays off by maximizing both uptime and investment security – increasing productivity.

# eXTreme INTRINSIC SAFETY

## Signal Acquisition and Transmission in Zones 0 and 1



- ADVANTAGES:**
- Safely and easily connect field devices in hazardous locations and extreme conditions
  - Wide variety of Ex i Digital, Analog and system modules
  - UL, cUL, ATEX and IECEx approvals for use worldwide

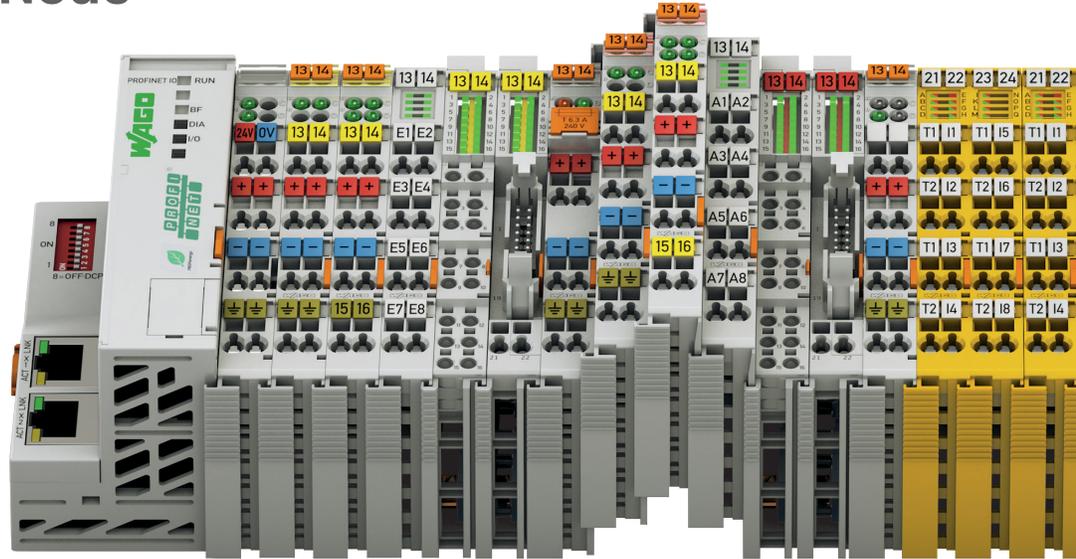
### Intrinsically Safe Signal Acquisition

The intrinsic safety of a device or system is a technical property which ensures that even in the event of an error, an unsafe condition does not occur. This property is of particular importance for equipment used in hazardous areas, such as the oil and gas industry.

The WAGO-I/O-SYSTEM 750 XTR can be mounted outside of hazardous areas or within zone 2/22 and Class 1 Div. 2 hazardous locations. With a broad offering of Ex i modules and an extensive list of certifications (ATEX, IECEx, AEx, etc.) – the 750 XTR Series is the right solution for your intrinsically safe requirements.

# UNIVERSAL, COMPACT, ECONOMICAL

## The Ideal Fieldbus Node



### Maximum Fieldbus Independence

One of the founding principles behind the WAGO I/O-SYSTEM is fieldbus independence. As one of the first to bring this concept to industry, we now support 16+ networks.

### Worldwide Approvals

International approvals for building and industrial automation, as well as the process and marine industries, guarantee worldwide use – even under harsh operating conditions. These certifications include: ATEX, BR-Ex, IECEx, UL, UL ANSI/ISA and numerous marine certifications.

### Clear Identification

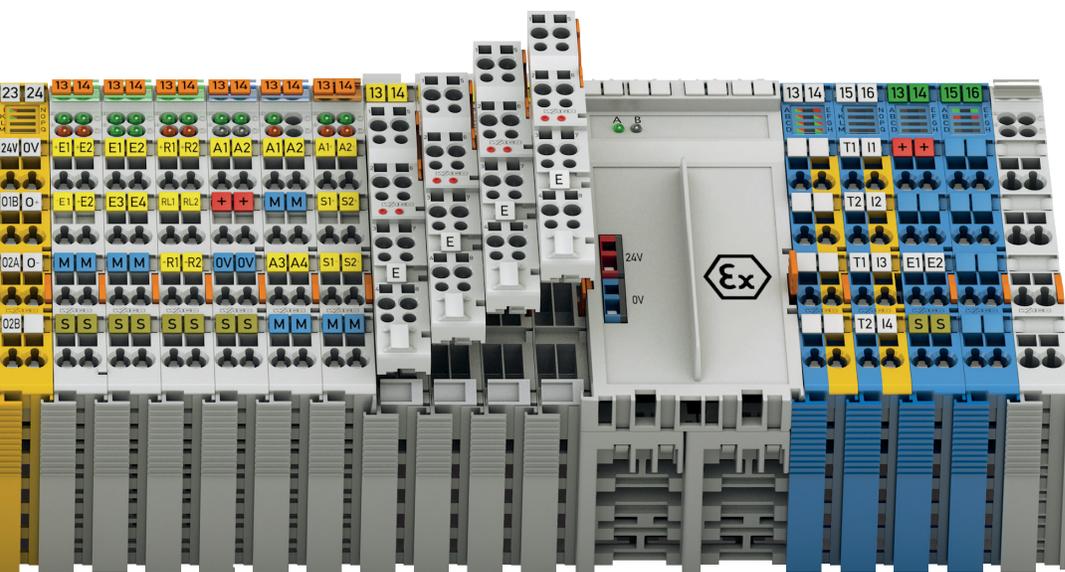
Module functionality is identified via integrated or pluggable marker carriers. Terminal assignment and technical data are printed on the side of the I/O module.

The WAGO WSB marker system also allows for module- and channel-related identification.

### Extremely Compact

Our patented mechanical design allows for extremely compact I/O nodes. I/O modules can accommodate up to 16 channels in a 1/2" wide housing, while most bus couplers are only 2" wide by 4" deep.





### Pluggable Connections

753 Series modules feature pluggable connectors and can be used in conjunction with 750 Series modules, bus-couplers and controllers. The removable connector allows an operator to easily replace the module without rewiring. This convenience eliminates installation errors and saves time.

### Maximum Reliability and Ruggedness

The WAGO I/O-SYSTEM is engineered and tested for use in the most demanding environments in accordance with the highest standards. In addition, integrated QA measures in the production process and 100% function testing ensure consistent quality.

### Secure and Reliable Connections

CAGE CLAMP® spring pressure connection technology offers fast, vibration-proof and corrosion/thermal cycling resistant wiring that is maintenance-free. No torque specs required!

### Maximum Flexibility

With so many options, a WAGO I/O-SYSTEM node can be configured to meet the most difficult application requirements.

- Freely mix analog, digital and special function modules in the same node
- Supply modules allow different voltages (e.g., 24 V, 120 V, 230 V) in the same I/O node
- Modules available in 1 to 16 channels – buy only the I/O you need.
- Gateway to other networks – Serial, CANopen, I/O link, etc.

### Easy to Use

A modular, DIN-rail mount design permits easy installation, expansion and modification of the I/O node without tools. Furthermore, the I/O modules employ built-in contacts for efficient field power distribution – no jumpers required. This straight forward design prevents installation errors.

# More than 500 I/O Modules Available

## 1-, 2-, 4-, 8- and 16-Channel



### Digital Input Modules

#### 2-Channel Digital Input Modules

24, 48, 60, 110, 220 VDC  
120, 230 VAC  
NPN/PNP, 0.2 ms/3.0 ms filter,  
diagnostics

#### 2-Channel Digital Specialty Modules

NAMUR  
Pulse extension  
Intruder detection  
Up/down counter, 500 Hz, 100 kHz

#### 4-Channel Digital Input Modules

5, 24, 42 VDC  
24 VAC, 42 VAC, 110-230 VAC

#### 8-Channel Digital Input Modules

24 VDC, 5–14 VDC  
NPN/PNP, 0.2/3.0 ms filter  
PTC

#### 16-Channel Digital Input Modules

Push-in CAGE CLAMP®,  
24 VDC, NPN/PNP  
Ribbon cable, 24 VDC, NPN/PNP



### Digital Output Modules

#### 1-Channel Digital Output Module

440 VAC, 16 A  
Manual operation, bistable, isolated  
output

#### 2-Channel Digital Output Modules

24 VDC, 0.5 A/2 A, diagnostics  
(broken wire/short circuit)  
230 VAC, SSR, 3.0 A, diagnostics

#### 4-Channel Digital Output Modules

5 VDC, 24 VAC, 0.5 A  
120–230 VAC, 0.25 A  
NPN/PNP, diagnostics

#### 8-Channel Digital Output Modules

5–14 VDC, 1 A  
24 VDC, 0.5 A  
NPN/PNP, diagnostics

#### 16-Channel Digital Output Modules

Push-in CAGE CLAMP®,  
24 VDC, 0.5 A, NPN/PNP  
Ribbon cable, 24 VDC, 0.5 A,  
NPN/PNP

#### 2-Channel Relay Output Modules

0–230 V AC/DC  
2 make contacts/2 changeover  
contacts, isolated outputs/non-floating

#### 4-Channel Relay Output Modules

4 make contacts



### Analog Input Modules

#### 1-Channel Analog Input Modules

Resistor bridge (strain gauge)

#### 2-Channel Analog Input Modules

0(4)–20 mA, 0–1(5) A AC/DC  
0–10 V, ±10 V, 0–30 VDC  
Thermocouple measurement module  
RTD measurement module (adjustable)  
Differential/single-ended input  
Measurement input (electrical isolation)  
HART modules

#### 4-Channel Analog Input Modules

0(4)–20 mA  
0–10 V, ±10 V  
RTD measurement module (adjustable)  
Single-ended input

#### 8-Channel Analog Input Modules

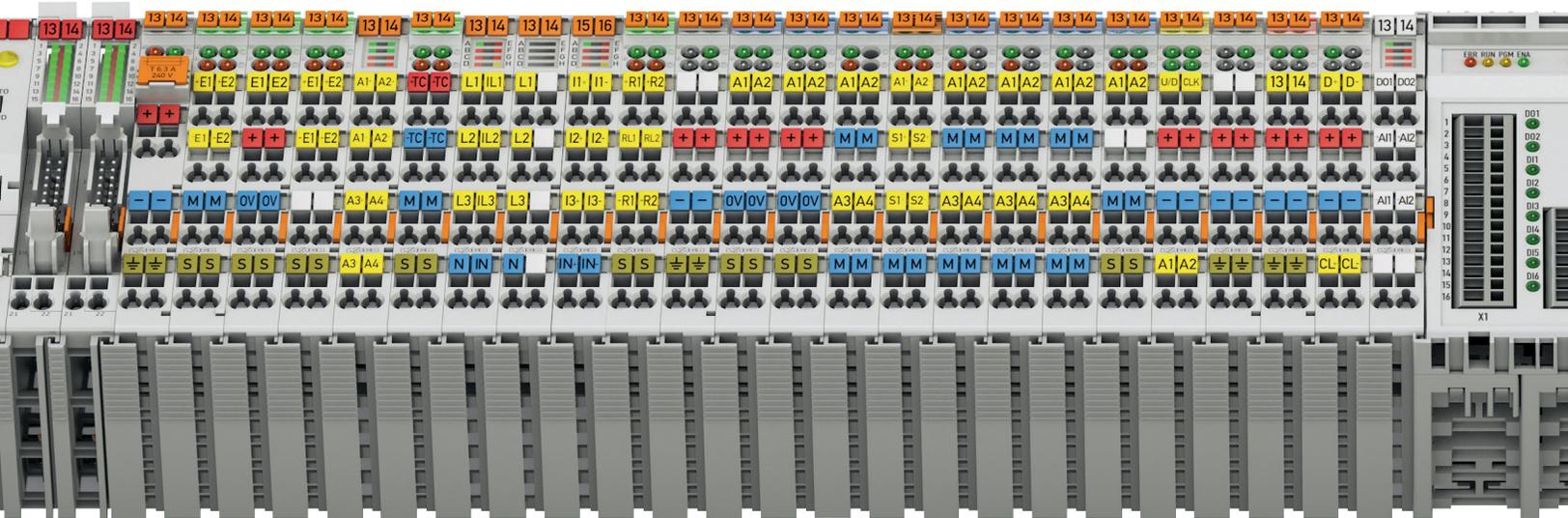
0–10 V / ±10 V  
0(4)–20 mA  
Thermocouple measurement module  
RTD measurement module  
Single-ended input  
Push-in CAGE CLAMP®  
connection technology

#### 3-Phase Power Measurement Modules

480/690 V, 1 A/5 A/Rogowski coil/Shunt



IEC 60870-5-101/-103/-104  
IEC 61850  
IEC 61400-25  
DNP3



## Analog Output Modules

### 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

### 8-Channel Analog Output Modules

- 0–10 V, ±10 V

### Analog Specialty Functions

- 6–18 V
- 0–10 V, 10 mA, diagnostics



## Function and Technology Modules

### Counters

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

### Distance and Angle Measurement

- 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/2OUT
- Servo stepper controller, 70 V/7.5 A, 6IN/2OUT
- DC drive controller, 24 V/5 A

### Pulse Width

### Output Module

### Proportional Valve Module

- Control of hydraulic or pneumatic valves

### Vibration Monitoring

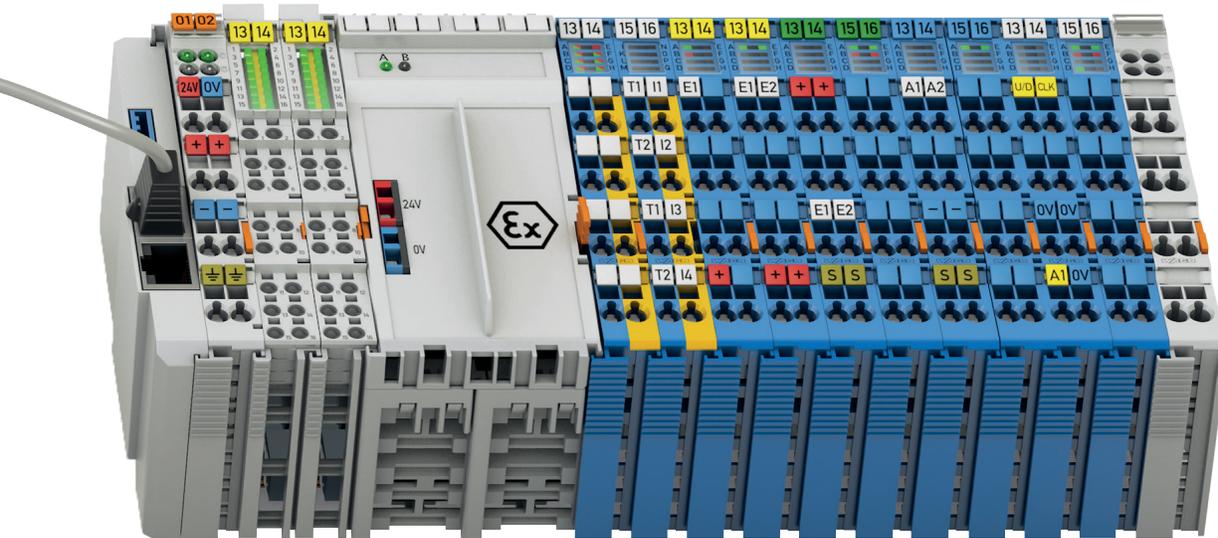
- Vibration velocity/bearing condition monitoring

### RTC Module

- DCF77 radio receiver



<p>■</p> <p><b>Communication Modules</b></p> <p><b>Building Automation</b></p> <ul style="list-style-type: none"> <li>DALI Multi-Master</li> <li>EnOcean radio receiver</li> <li>MP-Bus</li> <li>KNX/EIB/TP1 module</li> <li>LON®</li> <li>SMI</li> <li>M-Bus</li> <li>DMX</li> </ul> <p><b>Serial Interfaces</b></p> <ul style="list-style-type: none"> <li>RS-232/RS-485 interfaces (configurable)</li> <li>TTY interface, 20 mA, current loop</li> <li>Data exchange module</li> </ul> <p><b>4-Channel I/O-Link Master</b></p> <p><b>AS Interface Master</b></p> <ul style="list-style-type: none"> <li>Per (M4) V 3.0 specification</li> <li>Up to 62 slaves</li> </ul> <p><b>CAN Gateway</b></p> <p><b>Radio Interface</b></p> <ul style="list-style-type: none"> <li>Bluetooth®/RF transceiver</li> </ul>	<p>■</p> <p><b>Functional Safety</b></p> <p><b>Fail-Safe Digital Input PROFIsafe</b></p> <ul style="list-style-type: none"> <li>4FDI, 24 VDC</li> <li>8FDI, 24 VDC</li> <li>PLe/Cat. 4 to EN ISO 13849 or SIL 3 EN IEC 62061</li> </ul> <p><b>Fail-Safe Digital Input/Output PROFIsafe</b></p> <ul style="list-style-type: none"> <li>4FDI/2FDO, 24 VDC, 10 A</li> <li>4FDI/4FDO, 24 VDC, 0.5 A</li> <li>4FDI/4FDO, 24 VDC, 2 A</li> <li>4FDI/4FRO, 48 VAC, 60 VDC, 6 A</li> </ul> <p><b>Intrinsically Safe Digital Input</b></p> <ul style="list-style-type: none"> <li>4 F Ex i DI, 24 VDC, Zones 0+1</li> </ul>	<p>■</p> <p><b>Supply and Segment Modules</b></p> <p><b>Internal Data Bus Extension</b></p> <ul style="list-style-type: none"> <li>End module</li> <li>Coupler module</li> </ul> <p><b>Supply Module</b></p> <ul style="list-style-type: none"> <li>0–230 V AC/DC</li> <li>Fuse/diagnostics (optional)</li> <li>24 VDC / 5–15 VDC (adjustable)</li> </ul> <p><b>Filter Modules</b></p> <ul style="list-style-type: none"> <li>System and field supply</li> <li>24 VDC power supply filter with overvoltage (surge) protection</li> </ul> <p><b>Field-Side Connection Modules</b></p> <ul style="list-style-type: none"> <li>24 VDC</li> <li>0 VDC</li> </ul> <p><b>Separation Modules</b></p> <ul style="list-style-type: none"> <li>24 VDC / 230 VAC</li> </ul> <p><b>End module</b></p>
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## Ex i Intrinsically Safe Modules

### 1-Channel Digital Input

NAMUR

### 2-Channel Digital Input

NAMUR

### 4-Channel Digital Input

PROFIsafe

### 8-Channel Digital Input

NAMUR

### 2-Channel Digital Output

Max. 40 mA

### 4-Channel Digital Output

Valves

### 2-Channel Relay Output

2 changeover contacts

### 2-Channel Analog Input

4 ... 20 mA

4 ... 20 mA, HART

Resistance measurement (RTD)

Thermocouples

### 4-Channel Analog Input

0/4 ... 20 mA, 3.6 ... 21 mA (NE43)

### 2-Channel Analog Output

0 ... 20 mA

4 ... 20 mA

### Up/down counters

20 Hz ... 50 kHz

### Supply Module

24 VDC, 1 A

# WAGO-I/O-SYSTEM 750 XTR

## For eXTReme Environments

### Digital Input Modules

#### 2-Channel Digital Input

- 220 VDC, 3.0 ms
- 110 VDC, 3.0 ms
- 60 VDC, 3.0 ms

#### 8-Channel Digital Input

- 24 VDC, 3.0 ms
- 24 VDC, 0.2 ms

#### 16-Channel Digital Input

- 24 VDC, 3.0 ms

### Digital Output Modules

#### 2-Channel Digital Output

- 24 VDC, 2 A, diagnostics
- 230 VAC, 1 A, relay with 2 make contacts

#### 8-Channel Digital Output

- 24 VDC, 0.5 A

### Analog Input Modules

#### 2-Channel Analog Input

- 4 ... 20 mA, differential input, NE43
- Resistance measurement (RTD)
- Thermocouples

#### 4-Channel Analog Input

- 0 ... 20 mA / 4 ... 20 mA
- 0 ... 10 V /  $\pm 10$  V
- Single-ended input
- Resistance measurement (RTD)

#### 3-Phase Power Measurement

- 690 V, 1 A/5 A/Rogowski coil

### Analog Output Modules

#### 2-Channel Analog Output

- 0/4 ... 20 mA

#### 4-Channel Analog Output

- 0 ... 10 V /  $\pm 10$  V

### Communication, Supply and Segment Modules

#### Supply Module

- 24 VDC / 0 ... 230 VAC/DC

#### Filter Module

- 24 VDC power supply filter/  
field-side power supply filter
- System and field supply

#### Field Side Connection Module

- 24 VDC, 0 VDC

#### Serial Interface

- RS-232/RS-485

#### Spacer Module

#### End Module

### Intrinsic Safety

#### 8-Channel Digital Input

- NAMUR

#### 2-Channel Digital Output

- Max. 40 mA

#### 2-Channel Analog Input

- Resistance measurement (RTD)
- 4 ... 20 mA, HART

#### 4-Channel Analog Input

- 0/4 ... 20 mA, 3.6 ... 21 mA (NE43)

#### 2-Channel Analog Output

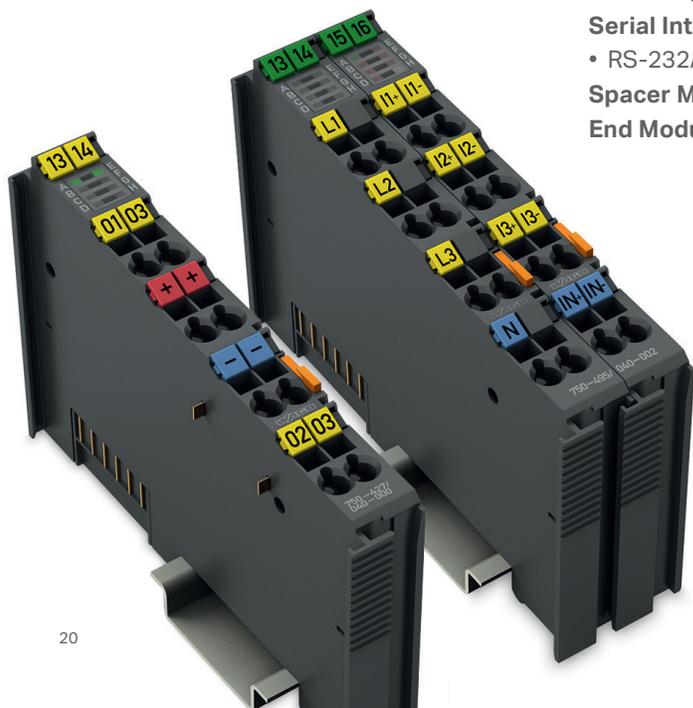
- 0 ... 20 mA

#### Up/Down Counter

- 20 ... 50 kHz

#### Supply Module

- 24 VDC, 1 A





# XTR TECHNICAL DATA

## Approvals and Standards

CE  
 UL/cUL  
 ANSI 12.12.1 Class 1, Division 2  
 Hazardous location  
 GL Marine approval  
 ABS, DNV, KR marine approvals  
 (pending)

## Temperature

-40 °C to +70 °C operating temperature  
 -40 °C to +85 °C storage temperature

## Condensation

Withstands short term condensation  
 per Class 3K7/IEC EN 60721-3-3  
 (Except wind-driven precipitation  
 and ice formation)

## Shock

15 g, 11 ms, 1000 shocks per axis,  
 half sine  
 25 g, 6 ms, 1000 shocks per axis,  
 half sine

## Isolation

24 V modules: 500 VAC/775 VDC,  
 1.0 kV impulse voltage  
 230 V modules: 2,500 VAC/3,500 VDC,  
 5,000 V impulse voltage

## Surge Voltage

1 kV (conductor/conductor)  
 2 kV (conductor/ground)

## Vibration

Acceleration 5 g

## Altitude

< 6,500 ft without derating, over-  
 voltage category III  
 6,500 ft to 9,800 ft max operating temp.  
 65 °C, over-voltage category III  
 13,000 ft to 16,000 ft max operating  
 temp. 55 °C, over-voltage category III

- eXTReme environment I/O System
- No air conditioning required
- For use in high vibration applications

# FIELDBUS-INDEPENDENT

## The Right Fieldbus Coupler and Controller for Every Application



### Bus Couplers

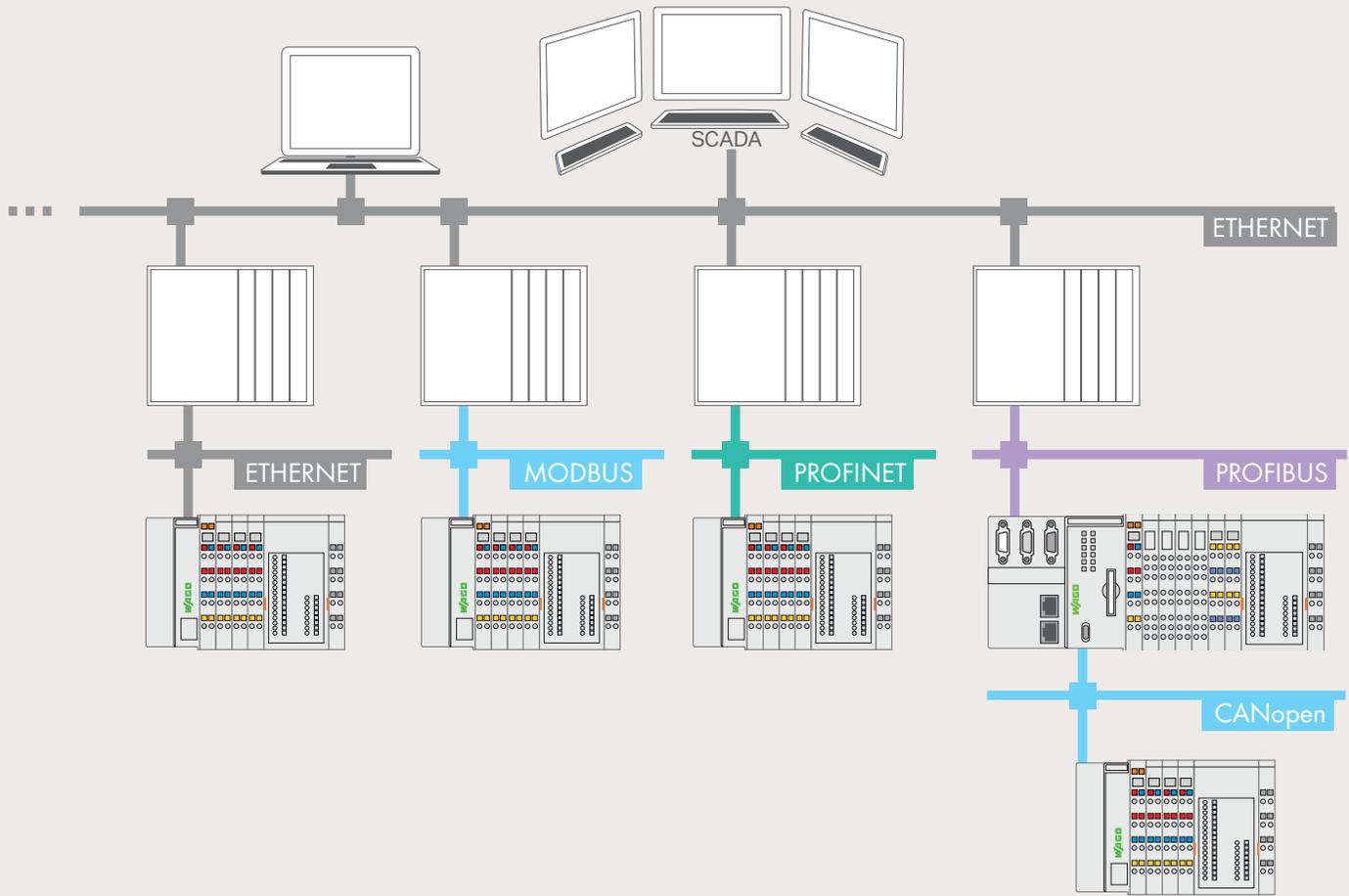
- Fieldbus couplers connect the WAGO-I/O-SYSTEM to a higher-level control system
- Fieldbus-independent – Support all standard fieldbus protocols and ETHERNET standards
- Space-saving design
- XTR for eXTREme environments



### 750 Series PLCs

- Controllers for most popular fieldbus systems and Ethernet standards
- IEC 61131-3 programming standard with WAGO-I/O-PRO software
- Compact platform adapts to diverse applications and environments
- XTR for eXTREme environments





### PFC Series PLCs

- High processing speed and large memory
- Multiple Fieldbus protocols for gateway functionality
- Programmable via modern engineering software – e!COCKPIT
- Linux real-time operating system
- High level security with TLS, SSH, VPN and built-in firewall
- XTR for eXTReMe environments

Directly connect 500+ digital, analog and special function WAGO-I/O-SYSTEM modules to any Bus coupler or controller.

# APPLICATIONS

## Factory Automation



The comprehensive selection of I/O modules for different potentials and signal types saves time and money as the sensors/actuators can be wired directly – even in safety-related applications.

### Technical Highlights:

- Fieldbus-independent PLCs and bus couplers with scalable performance for major fieldbus systems and industrial Ethernet standards
- Cost- and space-saving design with 1-, 2-, 4-, 8- and 16-channels per I/O module
- Functional safety according to PLe/Cat. 4 per EN ISO 13849 or SIL3 EN IEC 62061
- Special function modules, such as positioning, condition monitoring and much more
- Wide range of gateways (e.g., CAN, IO-Link, AS-Interface and much more)
- Current and energy measurement technology for energy consumption calculation

### IIoT Ready PLC Controllers

The digital transformation of manufacturing and process systems enables managers, operators, engineers, and maintenance staff to view real-time and historical data from their plant floor machines. Companies are implementing Cloud and Fog computing systems for orchestrating, distributing and managing their information across their enterprise. But first, these advanced systems need to securely collect the data from their plant floor and remote field equipment. WAGO's PFC controllers offer advanced features to facilitate fast and secure data harvesting.

### Onboard VPN

The PFC family of controller offers users two different technologies for communicating via Virtual Private Networks (VPN). Users can select either IPSEC or open VPN standards for encryption and authentication to help secure their data.

### Secure Protocols

PFC100s and PFC200s support many secure networking protocols for added security. The onboard web server leverages secure HTTPS. Use FTPs for secure file transfer and SSH for secure communications.

### Built-in Firewall

WAGO PFC100 and PFC200 Controllers are IIoT ready. These advanced devices have an onboard firewall to help protect your systems from unauthorized access. The controllers Web Based Management (WMB) tools make it simple to setup and manage network traffic through the trust chain.

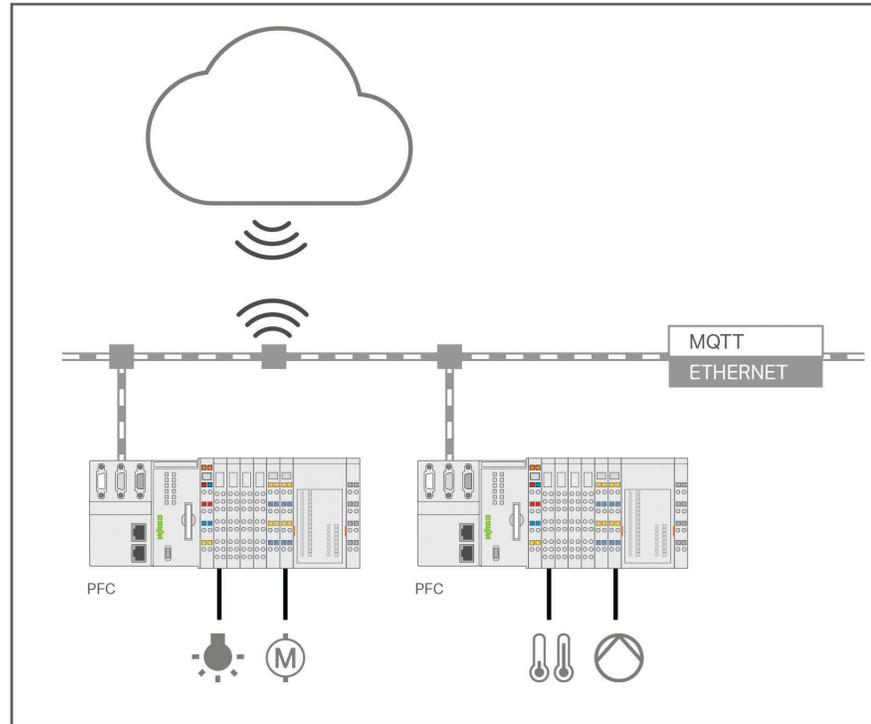


## IloT Controllers

WAGO PFC100 controllers enabled with MQTT operate as Edge Devices, transmitting data from the field level to the cloud, where it can be aggregated and used for analyses. This creates true added value for your company - be it for enhancing efficiency for plant floor production, for energy management, or for product tracking. Leverage WAGO's performance class controllers for your new system designs or integrate them with existing systems to make your digital transformation straight forward and cost effective.

### Technical Highlights:

- Distributed data acquisition and visualization independent of location
- Linking to Microsoft Azure, Amazon Web Services or IBM Bluemix using a standardized MQTT protocol
- High-level of security, thanks to TLS encryption
- Direct linking of the field level to a cloud
- Expansion of existing systems with the PFC as an IloT gateway



## The WAGO digitalTAP™

WAGO has embedded the MTConnect adapter and agent into our industrial I/O system. This enables users to wire the sensors, stack lights, and operator buttons from their legacy machines to our I/O system that transforms the data into a standardized digital format per the MTConnect Standard.

WAGO's digitalTAP™ leverages our economical PFC100 controller that provides a wide variety of features and benefits to your digital transformation project.



# APPLICATIONS

## Energy Management & SmartGrid

The main objective of the power generation and distribution industry is to ensure the reliable and safe supply of power. With an extensive product portfolio, WAGO offers a broad spectrum of application possibilities: substation automation, renewable energy sources, as well as energy monitoring and control.

### Technical Highlights:

- Scalable controllers and RTUs
- SmartGrid communication per IEC 60870, 61850, 61400-25, and DNP3
- Current and energy measurement technology for extensive network analysis
- Gateway functionality with interfaces to all common fieldbus systems
- 750 XTR for extreme environments



### SmartGrid Communications

With increasing energy demands and an expanding renewable energy source, it is more important than ever for utilities to monitor the grid. To support these applications, WAGO offers programmable controllers and I/O modules for data collection and communication with higher level control systems via SmartGrid protocols such as IEC 60870, 61850, 61400 and DNP3. Protocol integration is fast and easy with pre-built software to configure the communication between devices.





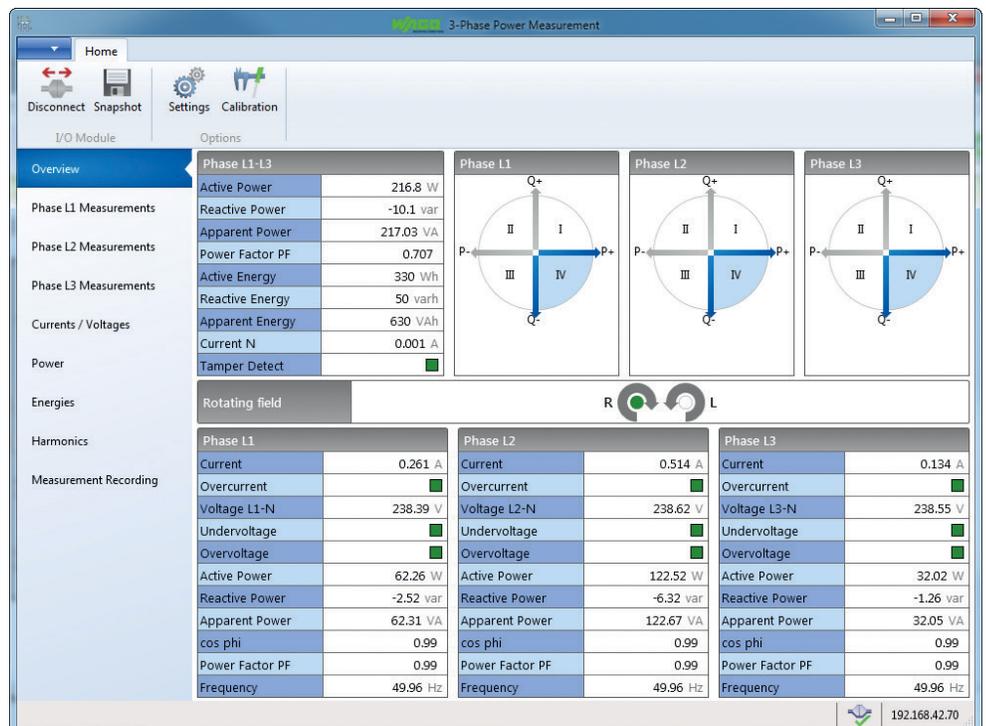
## Power and Energy Management

The WAGO-I/O-SYSTEM offers flexible and economical solutions for your energy management applications. Simply place a 3-Phase power measurement module in the WAGO I/O node to detect and process all relevant variables in a 3-phase supply network. This family of modules provides operators with increased insight into energy consumption by a specific machine or an entire system, as well as the ability to perform comprehensive network analysis.

- Measure machine and system energy consumption values
- Detect and process relevant 3-phase variables
- Comprehensive network analysis
- Connection to the WAGO-I/O-SYSTEM: fieldbus independent, compact and flexible

### Technical Highlights:

- Graphical display of bus nodes
- Clear display of all measured values
- Extensive power measurement module settings
- Integrated diagnostic indication
- Graphical 4-square representation
- Configure and visualize with WAGO-I/O-CHECK or via controller and function blocks



Configuration and Visualization of Measured Values:



# APPLICATIONS

## Process Automation & Hazardous Locations

Whether in food, beverage, chemical, water or oil & gas; process applications face demanding challenges. The compact size, flexibility and reliability of the WAGO-I/O-SYSTEM is uniquely qualified to meet those challenges.

Technical Highlights:

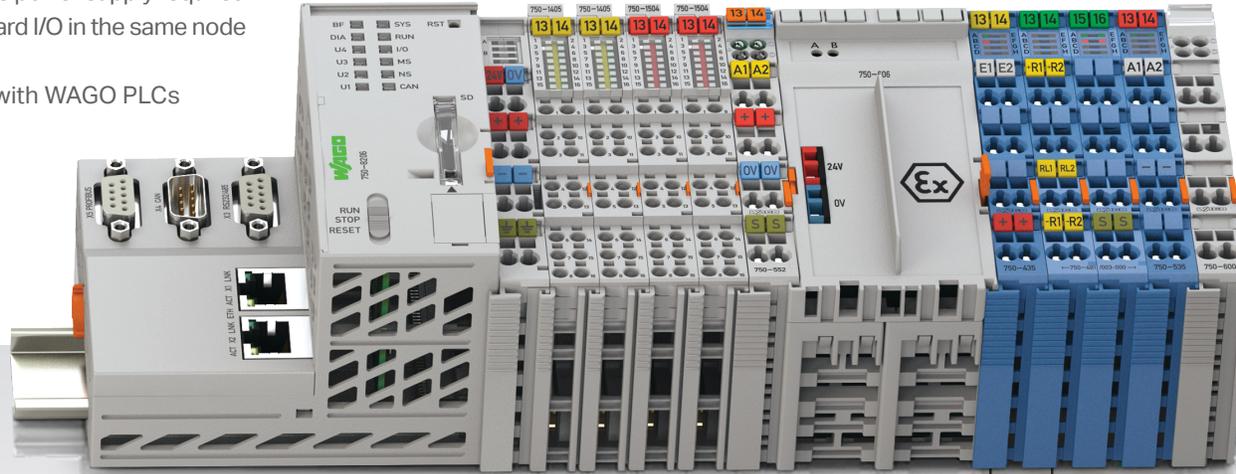
- Fieldbus independent
- High density analog I/O
  - 8 Channels in just 12 mm wide
- Hart protocol support
- XTR for eXTReme environments
  - Temperature & humidity -40 °C to +70 °C
- Class I Div. 2 approvals
- Intrinsically safe I/O
- Temperature (configurable RTD and Thermocouple)
- Module diagnostics – short circuit, wire break, and out of range indication
- Certified to ATEX, IECEx, CSA and UL

## Hazardous Locations Intrinsic Safety Built-in

Intrinsically safe digital, analog and specialty I/O modules reduce costs, control system footprint, and wiring time by eliminating the need for separate DIN rail mount IS barriers.

- Digital, Analog and Specialty I/O
- Wire directly to Ex i devices in Zone 0 or Zone 1 locations
- Locate the I/O in Zone 2/Class 1, Division 2 locations
- No external intrinsically safe power supply required
- Intrinsically safe and standard I/O in the same node
- Fieldbus independent
- Use as distributed I/O or with WAGO PLCs

With the ability to combine standard I/O and intrinsically safe I/O in the same node, the WAGO-I/O-SYSTEM is ideal for use in hazardous locations.

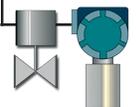


WAGO-I/O-SYSTEM is ideal for hazardous location applications. WAGO's programmable controllers, bus couplers and I/O are rated for use in UL Class 1 Division 2 and IEC Zone 2 locations

ZONE 2

ZONE 1

ZONE 0





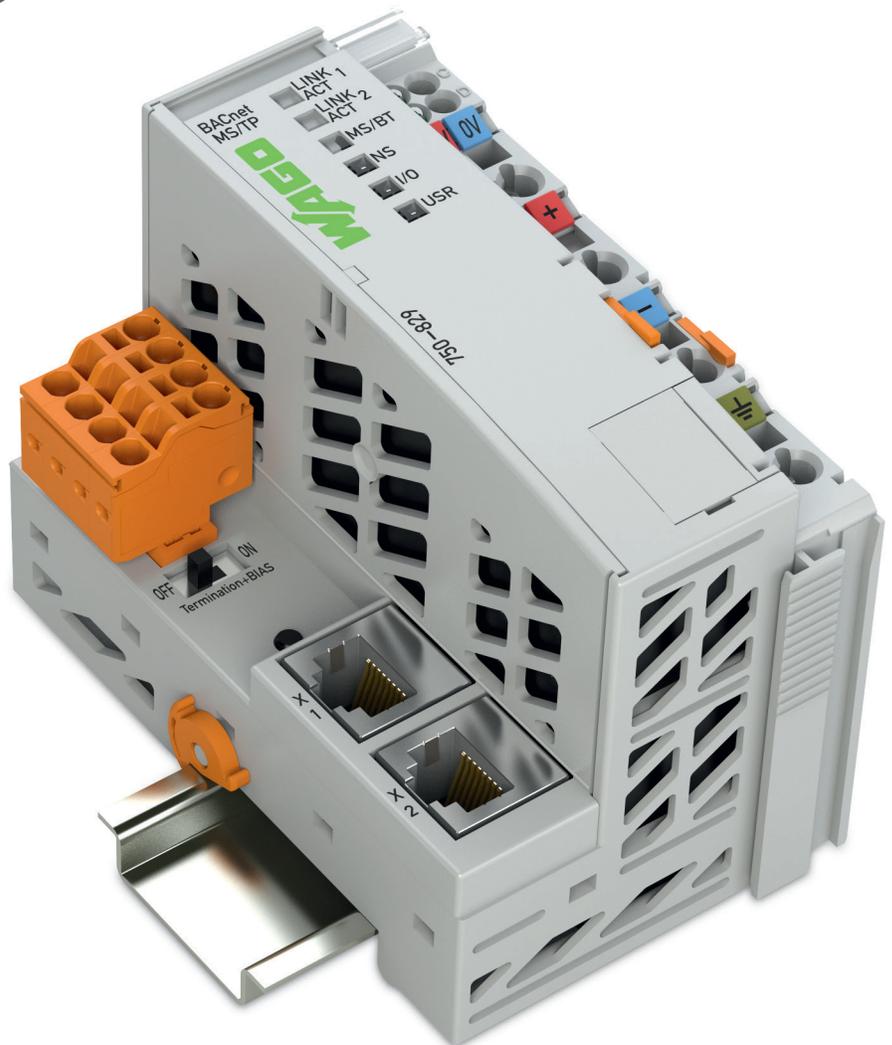
# APPLICATIONS

## Building Automation

Our broad portfolio enables flexible, cellar-to-ceiling solutions with standardized industry specific fieldbus protocols and device protocols for applications in lighting, blind control, HVAC and more.

Technical Highlights:

- Fully integrated building automation with BACnet/IP, BACnet MS/TP, KNX IP and Modbus TCP
- Fast and efficient solutions for all building systems due to freely programmable controllers and application-specific function blocks
- Continuous networking and remote access, e.g., using Web-based technologies
- Wide range of building automation interfaces (e.g., KNX, LON®, DALI, EnOcean, SMI, MP-Bus and much more)



## Building Automation

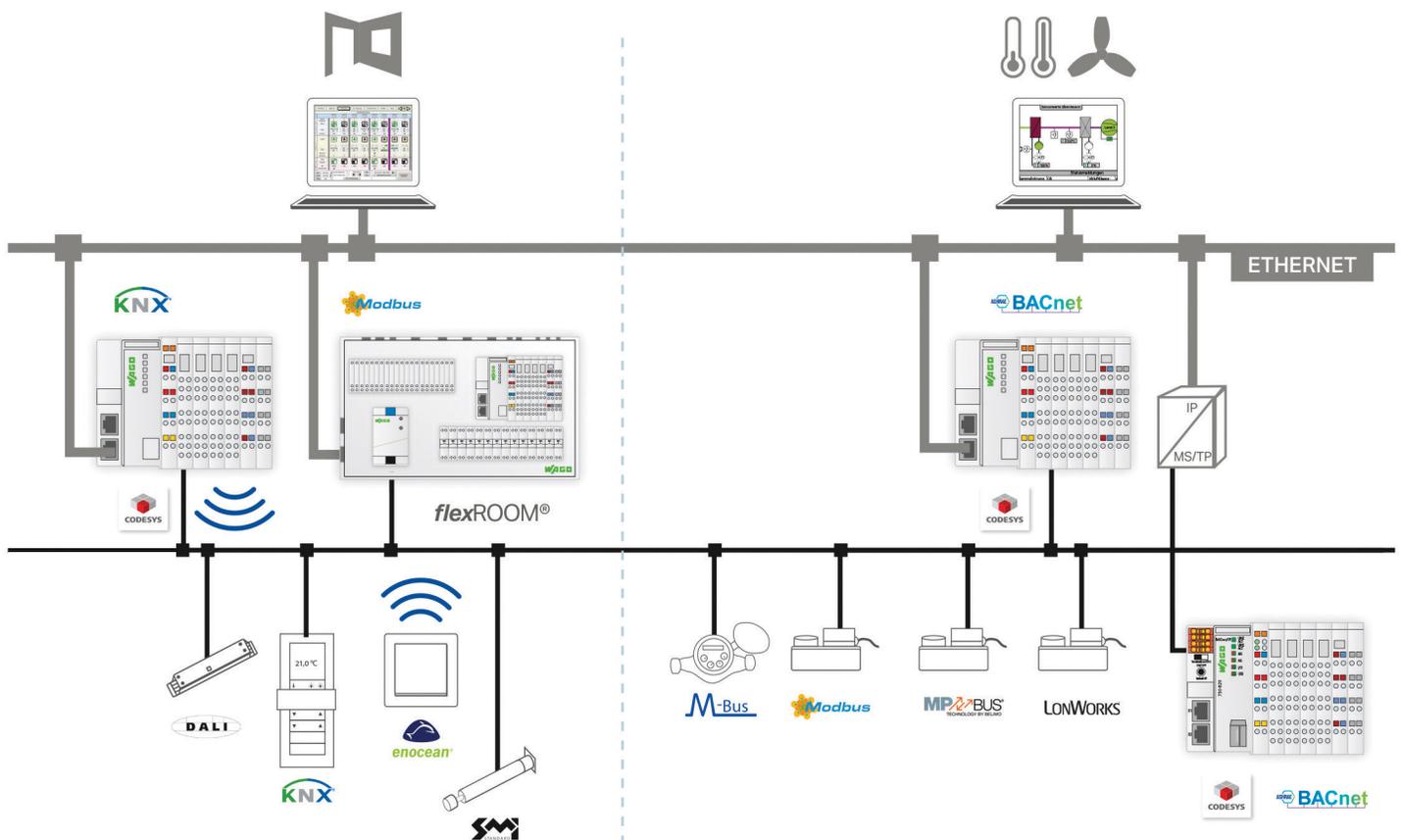
WAGO's comprehensive range of fieldbus controllers support established protocol standards. Configuration, programming and visualization are easily performed using the IEC 61131-3-compliant WAGO-I/O-PRO Software package.

## BACnet Controllers

For BACnet communication, WAGO offers two different controllers equipped with BACnet/IP (ETHERNET) or BACnet MS/TP (RS-485) interfaces. Both high-performance controllers support the BACnet Building Controller (B-BC) profile and are freely programmable. The controllers can be easily commissioned with WAGO's user-friendly BACnet Configurator.

## ETHERNET Controllers

WAGO provides a wide range of ETHERNET controllers in different performance classes and with various interface combinations. The ETHERNET fieldbus controllers support Modbus TCP. A wide variety of standard ETHERNET protocols is also supported for easy integration into IT environments (e.g., HTTP, BootP, DHCP, DNS, SNTP, SNMP, FTP).



# APPLICATIONS

## Heavy Industry

Dust, shock, and vibration are all challenges for automation systems in heavy equipment applications. Engine monitoring and complex hydraulics are becoming increasingly important in maximizing efficiency and reducing emissions. The WAGO-I/O-SYSTEM offers standard and specialty modules that meet the requirements of this demanding industry. These unique modules reduce time to market due to easy-to-use configuration tools while their compact size reduces the footprint of the control system.

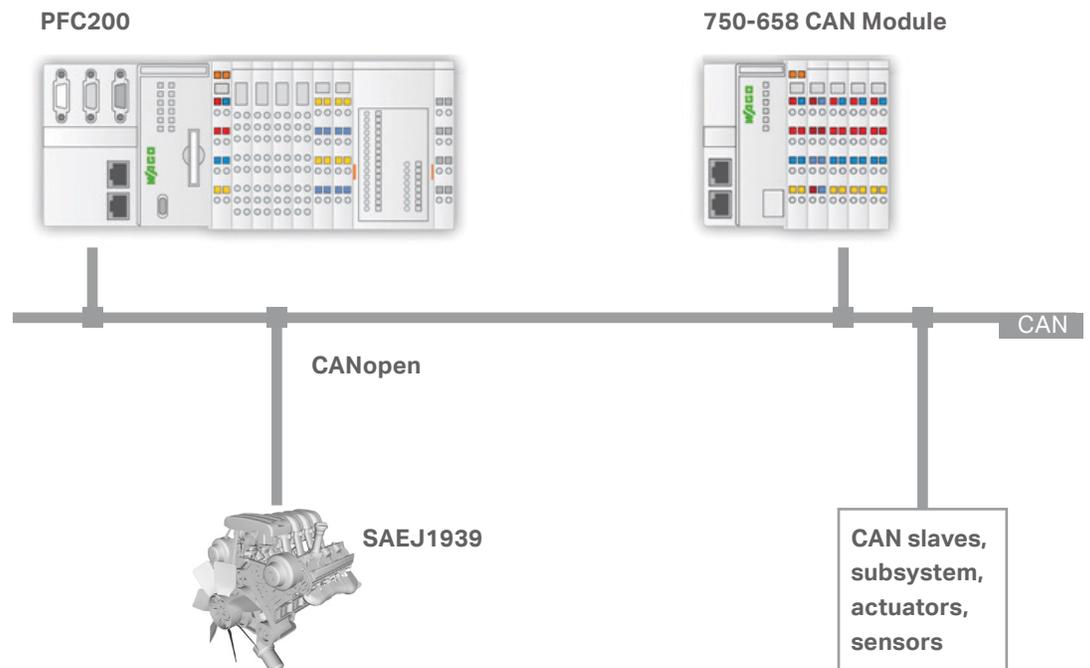
### Technical Highlights:

- Fieldbus independent
- CAN ports on PLCs and specialty modules for J1939 communications
- Proportional valve module
- XTR for eXTReMe environments
  - Temperature and humidity -40 °C to +70 °C
  - Shock and vibration resistant
- Hazardous location approvals
- Intrinsically safe I/O
- Temperature (configurable RTD and Thermocouple)
- Module diagnostics – short circuit, wire break, and out of range indication



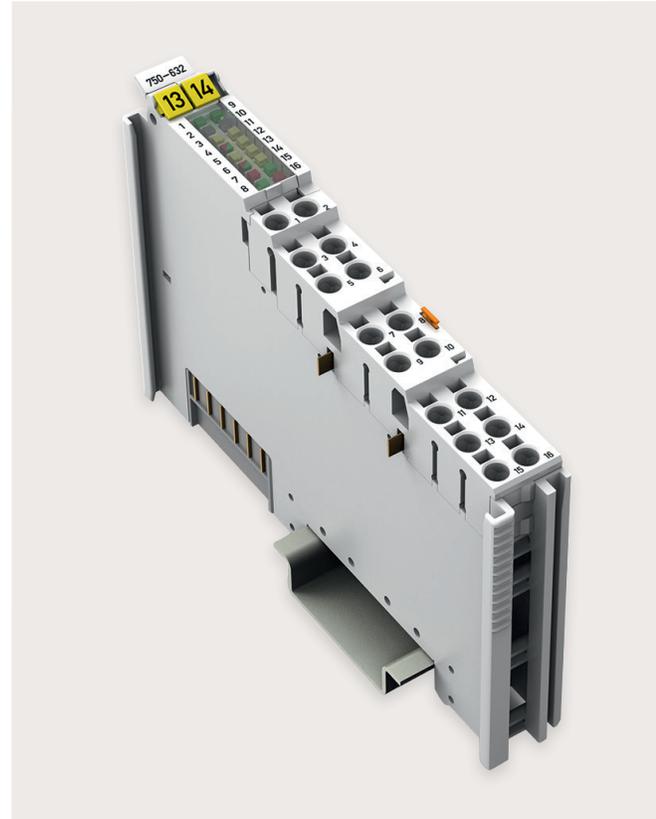
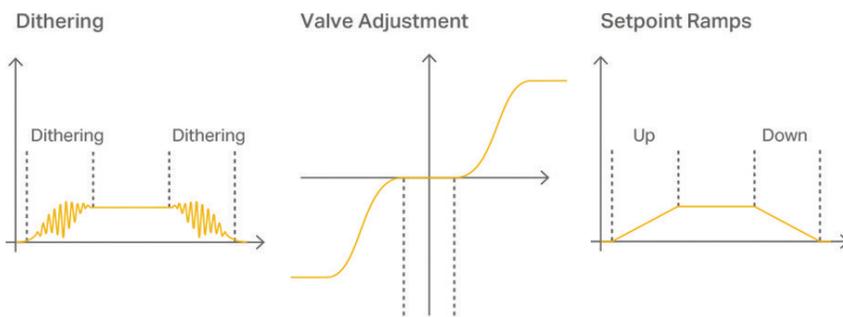
### SAE J1939 Communications

Engine monitoring via SAE J1939 is easier than ever using the WAGO-I/O-SYSTEM. There are two configuration options: 1) I/O module in the node – the 750-685 CAN gateway module provides a link between CAN based J1939 and other fieldbuses, such as MODBUS EtherNet/IP, and PROFINET, or 2) communication port on the PLC – our PFC family of performance class controllers are available with CAN ports for SAE J1939.



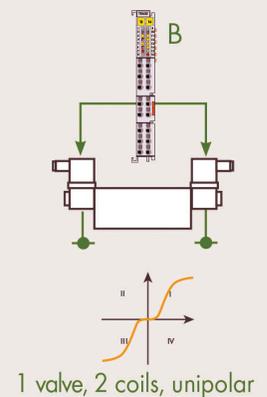
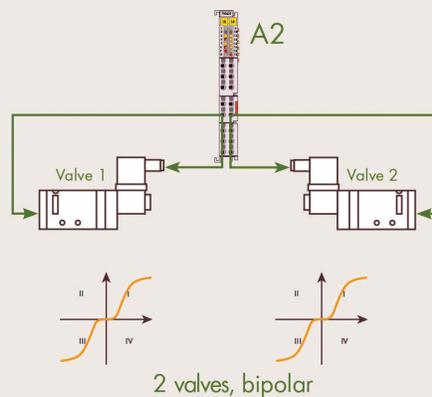
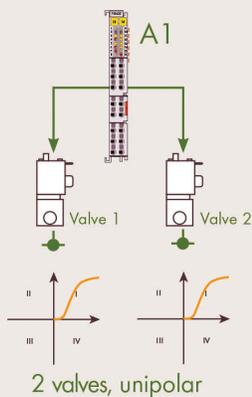
## Proportional Valve Module

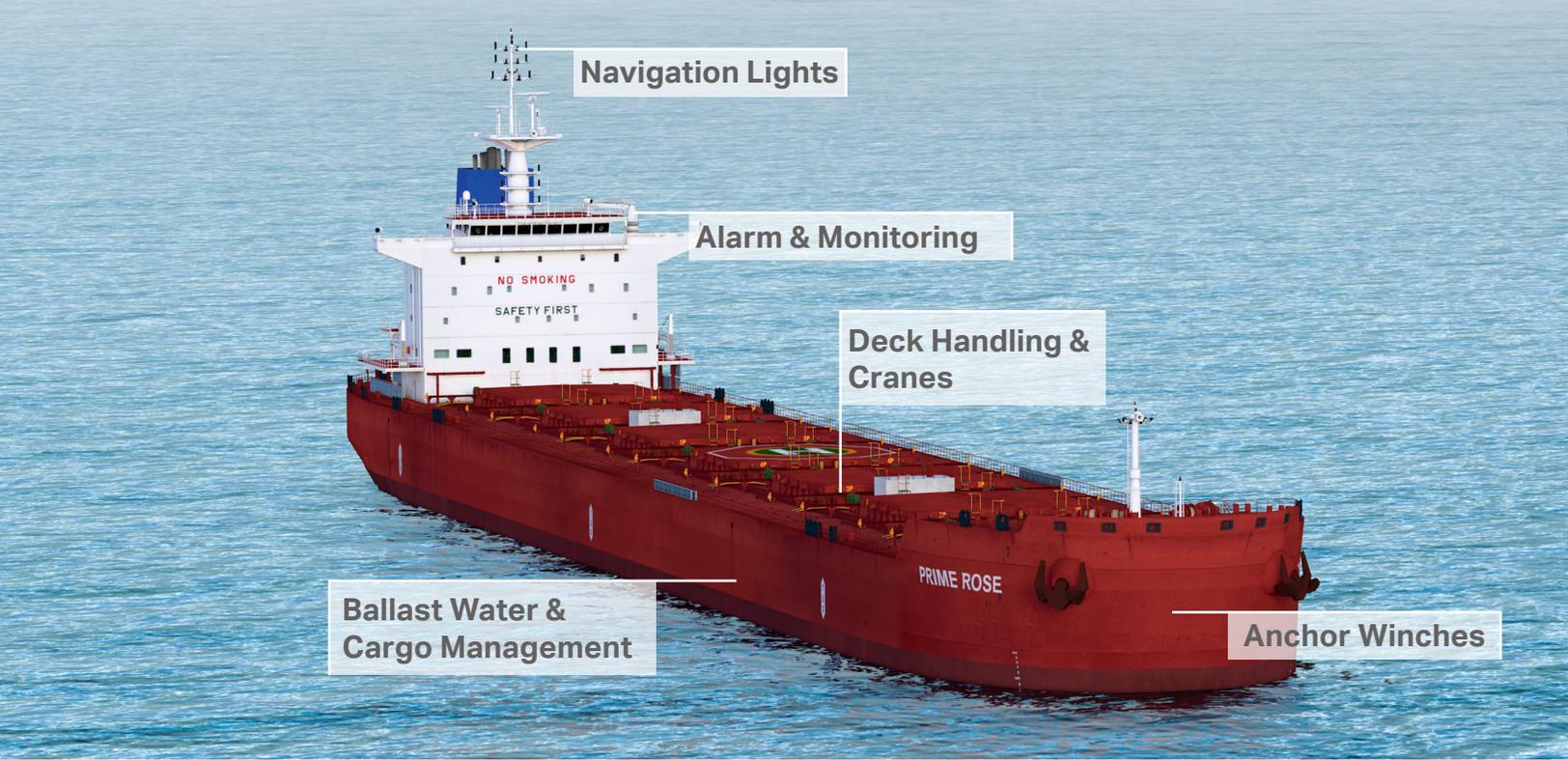
The 750-632 Proportional Valve Module controls up to two valves. The module features two current-controlled PWM outputs with configurable dithering and can operate two single-coil valves up to 24 V/1.6 A, or one valve up to 24 V/2.0 A. The single channel operating mode allows the use of dual coil valves. In addition, both unipolar and bipolar valve control are possible.



### Technical Highlights:

- Proportional control of hydraulic or pneumatic valves
- Two current-controlled PWM outputs
- Two operating modes
  - 2 channels with 1.6 A
  - 1 channel with 2.0 A
- Two additional digital function inputs
- Switchable dithering
- Adjustable setpoint ramps
- Valve adjustment:
  - Dual gain compensation
  - Scaling
  - Linearization
- Approvals:
  - Conformity marking 1
  - UL 508
  - ANSI/ISA 12.12.1





Navigation Lights

Alarm & Monitoring

Deck Handling & Cranes

Ballast Water & Cargo Management

Anchor Winches

# APPLICATIONS

## Transportation

### Marine & Offshore

Affecting the modern day marine and offshore industry are new regulations, an increasing competitive environment and the call for more efficient processes. As a result, collecting more data and the need to analyze data in real-time is becoming more important. Answering this call is the WAGO-I/O-SYSTEM with product and features such as XTR 750 for eXTReMe environments, worldwide marine certifications, SAE J1939 communication, redundant system capabilities and intrinsically safe modules - all in a compact and modular design.

### Technical Highlights:

- International approvals – ABS, DNV-GL, Lloyds Register, BV, RINA, KR, NK, PRS
- Network redundancy PLC
- XTR for eXTReMe environments
  - Temperature -40 °C to +70 °C
  - Vibration & shock
  - Isolation up to 5 kV
- Certified operation on the bridge "compass" certificate (BSH)
- Gateway functions: RS-232/485, NMEA2000, SAE J1939, ModbusRTU and more

### From the Bridge to the Engine Room

- Redundancy for high availability
- Worldwide marine certifications
- XTR for eXTReMe environments



## Railway

Safety and reliability are the cornerstones of both the rail industry and the WAGO-I/O-SYSTEM. Whether its railway vehicles, signaling technology, hump yards or train stations our products, tested to standards like EN 50121 and 50155, help fulfill the industry's stringent requirements.

### Technical Highlights:

- XTR for eXTReme environments
  - EMC resistance per EN 50121-3-2
  - Temperature class: TX (-40 °C to 70 °C)
  - Shock and vibration per EN 61373
  - Isolation up to 5kV per EN 60870-2-1
  - System tested to EN 51055
- IRIS (international railway industry standard) certification
- Fieldbus independence
- Compact footprint



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