

Programmable Fieldbus Controller XTR

◀◀◀ Section 2

PERSPECTO® Control Panels

- Merging control and visualization
- 8.9 cm ... 38.1 cm (3.5" ... 15")

◀◀ Section 3.1

PFC200

- Maximum performance in a minimum space
- High processing speed
- Additional operating controls (e.g., start/stop switch)
- Based on Linux® also in high-level language

◀ Section 3.2

Programmable Fieldbus Controllers

- Decentralized intelligence based on fieldbus couplers
- Programmable to IEC 61131-3
- WAGO-I/O-SYSTEM 750, modular

Programmable Fieldbus Controller XTR

For demanding applications where the following are critical:

- Extreme temperature stability
- Immunity to interference and impulse-voltage withstand
- Vibration and shock resistance

Programmable Fieldbus Controller XTR:

Taking it to the eXTReme – The standard for 750 XTR

Programmable XTR fieldbus controllers are easily recognized by their dark gray housings. The WAGO-I/O-SYSTEM 750 XTR's unique features make it ideal for extreme environment applications.

The WAGO-I/O-SYSTEM 750 XTR is extremely weather-resistant, immune to electromagnetic interference, as well as insensitive to vibrations and impulse voltages. This is what makes 750 XTR the first choice for demanding applications including:

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

Marine Systems and Onshore/Offshore Industry

International approvals coupled with industry-specific features permit use in shipbuilding and other harsh sectors. Meeting stringent criteria permits operation 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.

Telecontrol technology

Standardized telecontrol protocols according to IEC 60870-5, IEC 61850 and IEC 61400-25 permit the use of programmable fieldbus controllers in telecontrol technology. In addition, increased requirements for dielectric strength according to EN 60870-2-1 are met. The result is a tailor-made solution for demanding telecontrol applications that exceeds all requirements.

Link between Process Data and IT Application – Even under eXTReme Conditions

The controllers ideally combine real-time requirements with IT functionality. They support both MODBUS/TCP and ETHERNET/IP for use in industrial environments. HTTP, SNMP, FTP, BootP, DHCP, DNS and other protocols simplify integration into IT environments. Integrated Web pages and Web-based visualization provide IT applications with real-time process data. Furthermore, the PLC incorporates library functions for email, SOAP, ASP, IP configuration, ETHERNET sockets and file system.

Modular Expandability

With the WAGO-I/O-SYSTEM 750 XTR, the programmable fieldbus controllers can be expanded to almost any input/output interface. Using the same standard platform has given the XTR the same proven advantages.

Worldwide Approvals

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

Superior reliability in extreme climates

Regardless of freezing cold, extreme heat and high humidity, the WAGO-I/O-SYSTEM 750 XTR is engineered for absolute dependability in all climatic conditions. The XTR version of the programmable fieldbus coupler is unfazed by both freezing cold down to -40 °C and scorching heat up to +70 °C. And this applies to both initial start-up and daily operation. Another highlight is that the XTR functions at elevations up to 5,000 m, opening up these applications to new highs for safety, reliability and performance – even in the thin air of a mountain top station.

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 against EMC interference. These strengths add up to trouble-free operation.

High Mechanical Performance

Automation systems must be particularly vibration-resistant, especially when installed close to vibration-prone and shock-generating system components. Powerful motors and power circuit breakers are just two examples of common disturbance-creating components. The WAGO-I/O-SYSTEM 750 XTR continues to set new standards here. Count on long-lasting, trouble-free operation and industry-topping levels of safety – even in the most torturous applications, such as tunnel boring machines.

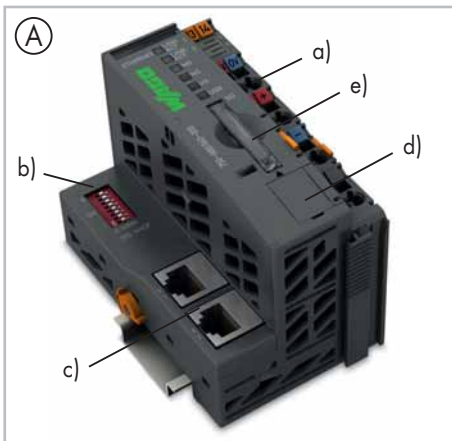


- Controllers for eXTReme conditions
 - No air conditioning required
 - Can be used in unshielded areas
 - Install close to vibrating and shock-generating system components
- Extensive IT integration opportunities
- Expandable with the WAGO-I/O-SYSTEM 750 XTR's extensive portfolio
- Maintenance-free
- CAGE CLAMP® spring connection technology for vibration-proof, fast and maintenance-free connections



Programmable Fieldbus Controller XTR

Interfaces and Configurations



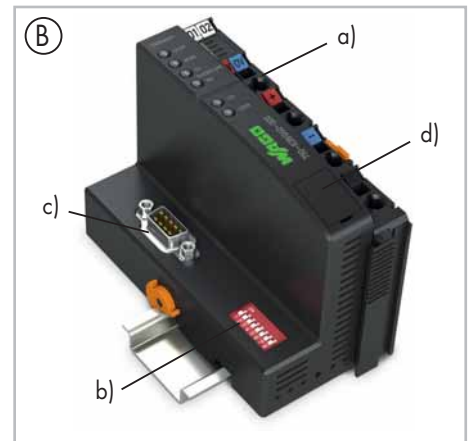
- Includes supply module (a)
- Technical differences on the connection level. Address switch (b) and fieldbus interface (c)
- Service port (d)

Housing design (A)

- SD card slot for external storage media (e)
- W x H* x L (mm) 62 x 65 x 100

Housing design (B)

- W x H* x L (mm) 51 x 65 x 100



*Height from upper edge of the DIN-rail

Item Number Keys

Explanation of the components for the item number key

Item No. : 750-8xx/040-00y

3x: 16-bit

CANopen

8x: 32-bit multitasking
001:

ETHERNET
Telecontrol

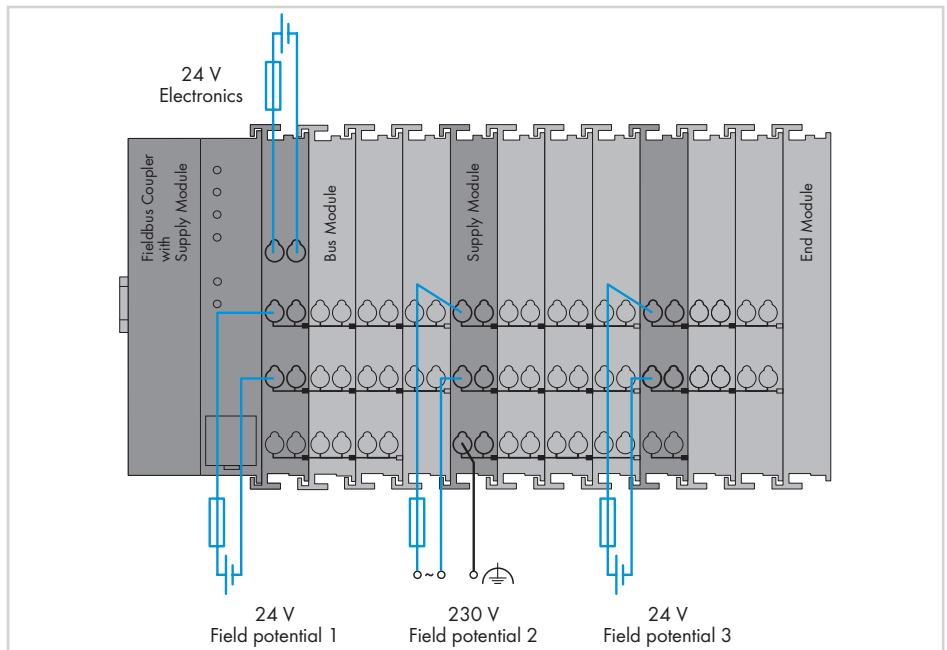
3 Programmable Fieldbus Controller XTR

Installation Instructions

Power Supply

Power is always channeled to the internal electronics power supply by the fieldbus coupler. The power supply to the field-side supply is electrically isolated. The division enables a separate supply for sensors and actuators. The I/O modules' connections automatically lead to transferring the supply voltages. 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 is dependent on the coupler used. If the sum of the internal current demand of all the I/O modules should exceed this value, an additional bus 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.



Notes

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

- As part of **shipbuilding** or in the onshore/off-shore sector, as well as in telecontrol applications, specific power and field-side power supply filters must be provided (750-624/040-001 or 750-626/040-000).

Mixed Operation

Mixed operation (standard/XTR modules) within a node is possible when groups of 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 ambient temperature is not critical.

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

Interference-Free in Safety-Related Applications

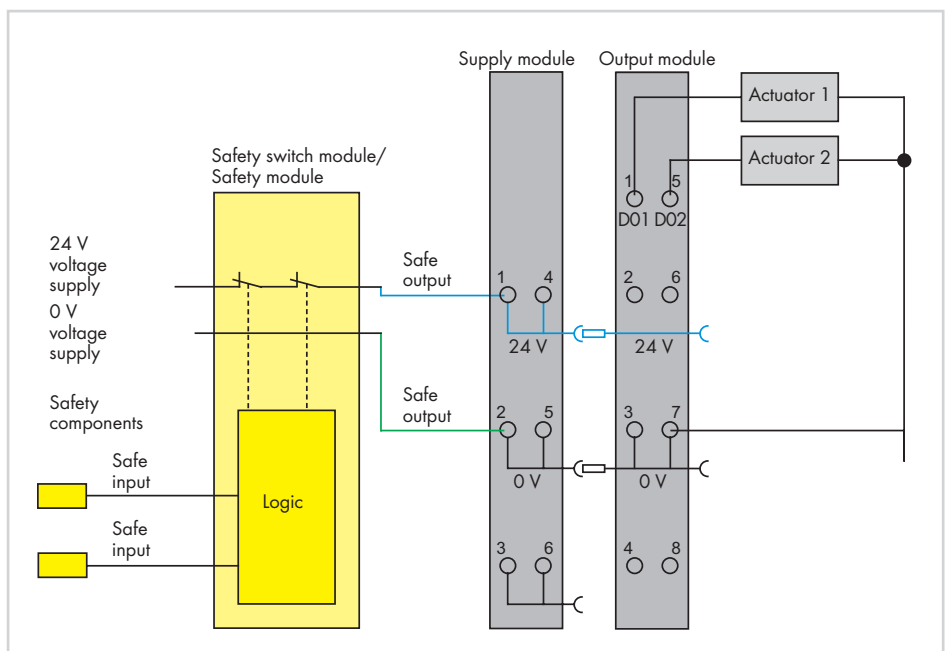
To safely and easily perform cost-effective, centralized deactivation of complete actuator groups, the actuator's power supply can be switched off using a safety switching device. This can either be performed for each individual actuator or by turning off the power supply to a group of control outputs.

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.

All 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. Safety category and performance level depend solely on the safety components and their wiring.

Notice:

Interference-free WAGO I/O modules have no active influence 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.



General Specifications

Operating voltage	24 VDC under laboratory conditions +15 °C ... +35 °C: 18 V ... 31.2 V (17.4 V ... 31.2 V) ¹⁾ for -40 °C ... +55 °C: 18 V ... 28.8 V (17.4 V ... 28.8 V) ¹⁾ for +55 °C ... +70 °C: 18 V ... 26.4 V (17.4 V ... 26.4 V) ¹⁾ ¹⁾ Including residual ripple of 15 %
Operating temperature	-40 °C ... +70 °C
Storage temperature	-40 °C ... +85 °C
Relative humidity	Max. 95 % short-term condensation acc. to class 3K7 / IEC EN 60721-3-3 (excluding wind-driven precipitation, water and ice formation)
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
Dielectric strength	acc. (EN 60870-2-1) Modules ≤ 50 V: 510 VAC/775 VDC; Modules > 50 V: 2.5 kVAC/3.5 VDC Isolation: Rated surge voltage Modules ≤ 50 V: 1 kV (class VW1 acc. to EN 60870-2-1) Modules > 50 V: 5 kV (class VW3 acc. to EN 60870-2-1) Surge: Modules ≤ 50 V: 1 kV (L - I) / 2 kV (L - E) Modules > 50 V: 2 kV (L - I) / 4 kV (L - E) Overvoltage category: III
Vibration resistance	5g acc. to IEC 60068-2-6, EN 60870-2-2, IEC 60721-3-1, IEC 60721-3-3, EN 61131-2
Shock resistance	15g/11 ms/half-sine/1000 shocks acc. to IEC 60068-2-27 25g/6 ms/1000 shocks acc. to IEC 60068-2-27
EMC immunity to interference	EN 61000-6-1, EN 61000-6-2, EN 61131-2 Marine applications, EN 50121-3-2, EN 50121-4 EN 50121-5, EN 60255-26, EN 60870-2-1 EN 61850-3, IEC 61000-6-5, IEEE 1613, VDEW: 1994
EMC emission of interference	EN 61000-6-3 and EN 61000-6-4, 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, EN 50121-5
Protection type	IP20
Mounting position	standing horizontal/lying, vertical
Type of mounting	DIN-rail
Housing material	Polycarbonate, polyamide 6.6
Stress due to contaminants	acc. to IEC 60068-2-42 and IEC 60068-2-43
Maximum pollutant concentration with a relative humidity < 75 %	SO ₂ ≤ 25 ppm; H ₂ S ≤ 10 ppm
Connection technology	CAGE CLAMP®
Conductor cross-section; stripped lengths	0.25 mm ² ... 2.5 mm ² /24 ... 14 AWG; 8 ... 9 mm/0.33 in.
Current via power jumper contacts	max. 10 A

PLC - ETHERNET Programmable Fieldbus Controller

for eXTReme environmental conditions; 32-bit CPU, multitasking

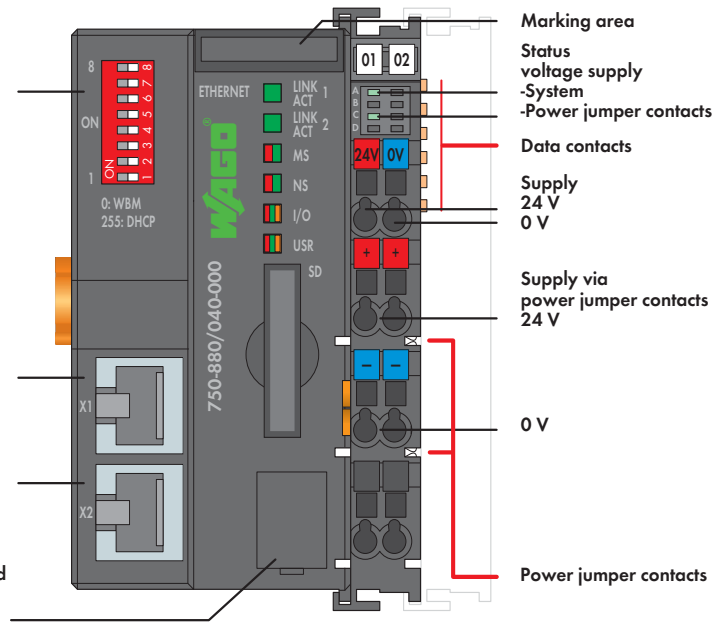


Address

Fieldbus connection RJ-45

Fieldbus connection RJ-45

Configuration and programming interface




In conjunction with the WAGO-I/O-SYSTEM, the ETHERNET PLC is used as a programmable controller within ETHERNET networks. The PLC supports all digital, analog, and specialty modules found within the 750/753 Series, and is suitable for data rates of 10/100 Mbit/s. Two ETHERNET interfaces and an integrated switch enable fieldbus wiring in a line topology. This eliminates additional network devices, such as switches or hubs. Both interfaces support Auto-Negotiation and Auto-MDI(X). The DIP switch configures the last byte of the IP address and may be used for IP address assignment. The PLC supports both MODBUS/TCP and ETHERNET/IP for use in industrial environments. It also supports a wide variety of standard ETHERNET protocols for easy integration into IT environments (e.g., HTTP, BootP, DHCP, DNS, SNMP, FTP). For telecontrol applications, the 750-880/040-001 Controller supports the IEC 60870-5-101/-103-104, IEC 61850-7 and IEC 61400-25 communication protocols.

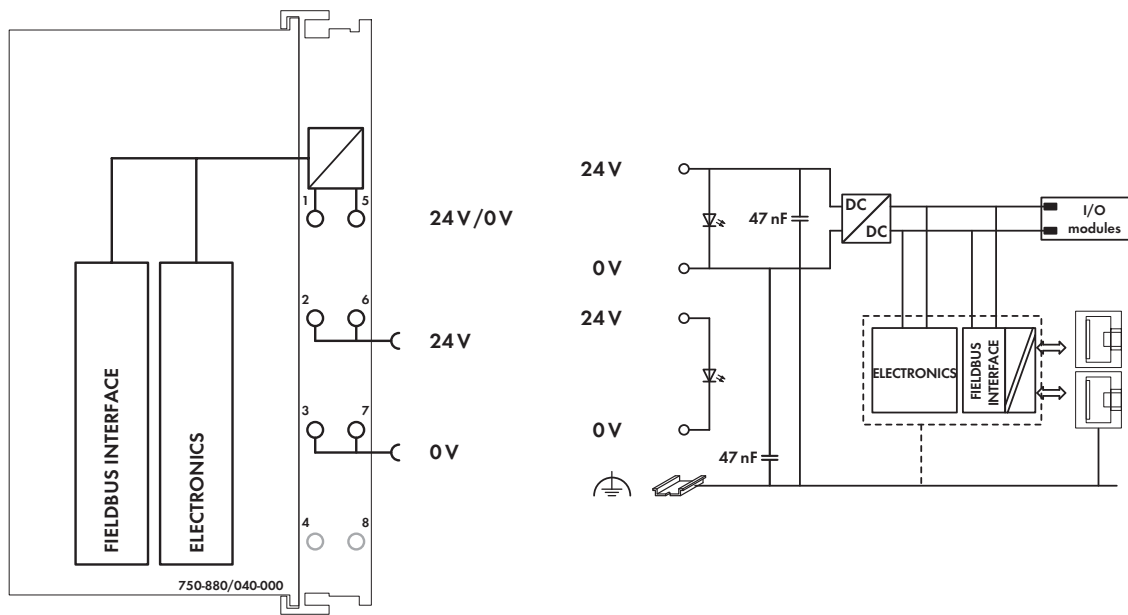
An integrated Web server provides the user with configuration options and status information from the controller. The IEC 61131-3 programmable controller is multitasking-capable and features a battery-backed RTC. A data memory of 1 MB is available. The 750-880 PLC has a slot for a removable memory card, allowing device parameters or files (e.g., boot files) to be transferred from one controller to another. The memory card can be accessed via FTP and be used as an additional drive.

The module is ideally suited for operation in harsh environmental conditions:

- strongly extended temperature range
- higher dielectric strength and EMC resistance
- higher vibration and shock resistance

Description	Item No.	Pack. Unit
ETHERNET Controller /XTR	750-880/040-000	1
ETHERNET Telecontroller /XTR	750-880/040-001	1
Accessories		
SD memory card, 2 GB	758-879/000-001	1
WAGO-I/O-PRO V2.3, RS-232 kit	759-333	1
WAGO-I/O-PRO V2.3, USB kit	759-333/000-923	1
Miniature WSB Quick marking system		
 plain	248-501	5
with marking	see Section 11	
Approvals		
Conformity marking	CE	
Korea Certification	KC	
Marine applications	GL	
UL 508		
ANSI/ISA 12.12.01	Class I, Div. 2, Grp. ABCD, T4	

System Data	
No. of controllers connected to Master	limited by ETHERNET specification
Transmission medium	Twisted Pair S-UTP 100 Ω, Cat 5; Max. line length: 100 m
Baud rate	10/100 Mbit/s
Transmission performance	Class D acc. to EN 50173
Buscoupler connection	2 x RJ-45
Protocols	EtherNet/IP, MODBUS/TCP (UDP), HTTP, BootP, DHCP, DNS, SNMP, FTP, SNMP
750-880/040-001	IEC 60870-5-101/-103/-104, IEC 61850, IEC 61400-25
Programming	WAGO-I/O-PRO
IEC 61131-3	IL, LD, FBD (CFC), ST, FC
SD card slot	Push-push mechanism, sealable cover lid
Type of memory card	SD and SDHC up to 32 GB (All guaranteed properties are only valid in connection with the WAGO 758-879/000-001 memory card.)



Technical Data	
Number of I/O modules	64
Fieldbus	
Max. input process image	1020 words
Max. output process image	1020 words
Configuration	via PC
Program memory	1024 Kbytes
Data memory	1024 Kbytes
Non-volatile memory (retain)	32 Kbytes
Power supply	via CAGE CLAMP® connections, 24 VDC
Input current typ. at rated load (24 V)	500 mA
Efficiency of the power supply (typ.) at nominal load (24 V)	90 %
Internal current consumption (5 V)	450 mA
Total current for I/O modules (5 V)	1700 mA
	up to 60°C operating temperature;
	1500 mA > 60°C operating temperature
Voltage via power jumper contacts	24 V DC
under laboratory conditions +15 °C ... +35 °C	18 V ... 31.2 V (17.4 V ... 31.2 V) ¹⁾
for -40 °C ... +55 °C	18 V ... 28.8 V (17.4 V ... 28.8 V) ¹⁾
for +55 °C ... +70 °C	18 V ... 26.4 V (17.4 V ... 26.4 V) ¹⁾
	¹⁾ including residual ripple of 15 %
Isolation (peak value)	510 VAC or 775 VDC
	power supply/DIN rail
Rated surge voltage	1 kV
Overtoltage category	III

General Specifications	
Operating temperature	-40 °C ... +70 °C
Wire connection	CAGE CLAMP®
Cross sections	0.25 mm ² ... 2.5 mm ² / AWG 24 ... 14
Strip lengths	8 ... 9 mm / 0.33 in
Dimensions (mm) W x H x L	62 x 65 x 100
	Height from upper-edge of DIN 35 rail
Weight	164 g
Storage temperature	-40 °C ... +85 °C
Relative humidity	95 %, short-term condensation acc. to class 3K7 / IEC EN 60721-3-3 (except wind-driven precipitation, water and ice formation)
Vibration resistance	acc. to IEC 60068-2-6 (acceleration: 5g), EN 60870-2-2, IEC 60721-3-1, -3, EN 61131-2
Shock resistance	acc. to IEC 60068-2-27
Degree of protection	IP20
EMC immunity of interference	acc. to EN 61000-6-1, -2, EN 61131-2, marine applications, EN 50121-3-2, -4, -5, EN 60255-26, EN 60870-2-1, EN 61850-3, IEC 61000-6-5, IEEE 1613, VDEW: 1994
EMC emission of interference	acc. to EN 61000-6-3, -4, EN 61131-2, EN 60255-26, marine applications, EN 60870-2-1, EN 61850-3, EN 50121-3-2, -4, -5
Operating altitude	without temperature derating: 0 m ... 2000 m; with temperature derating: 2000 m ... 5000 m (0.5 K/100 m); max.: 5000 m

PLC - CANopen Programmable Fieldbus Controller, D-Sub

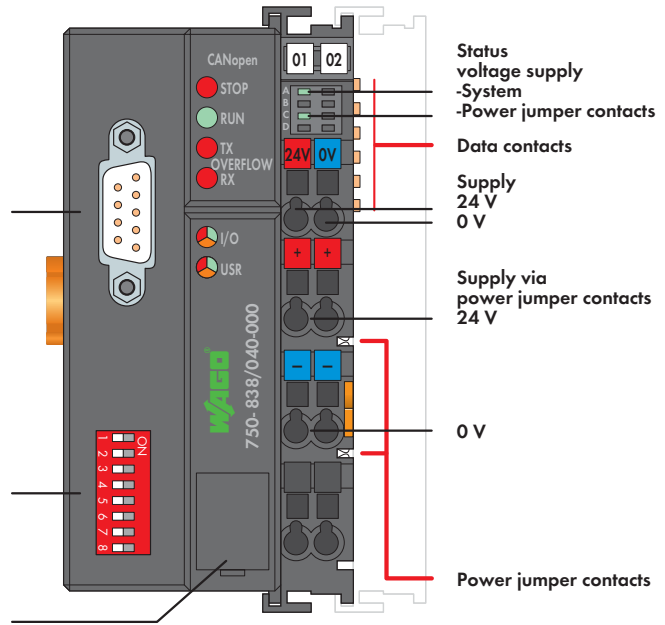
for eXTReme environmental conditions; 16-bit CPU



Fieldbus connection D-Sub

DIP switch for node ID and baud rate

Configuration and programming interface



The CANopen PLC combines control functionality, I/O interface and fieldbus in one device.

Programming PLC applications is performed in compliance with IEC 61131-3. The programmer can access all fieldbus and I/O data.



Features and applications:

- Central control system is assisted by decentralized processing units
- Complex applications are divided into independent, testable units
- Programmable fault response in the event of a fieldbus failure
- Signal pre-processing reduces fieldbus transmissions
- Peripheral equipment can be controlled directly, resulting in faster system response times
- Compact, self-sufficient controller

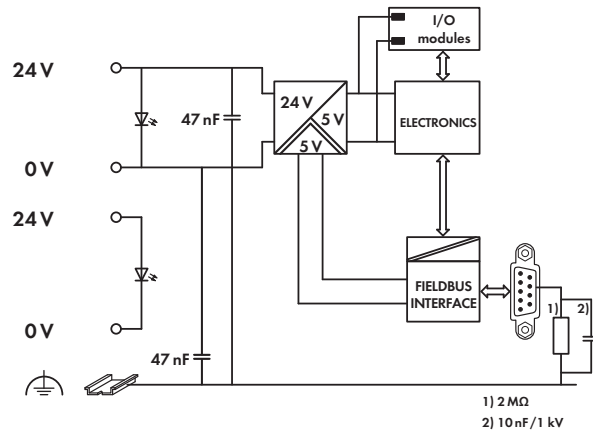
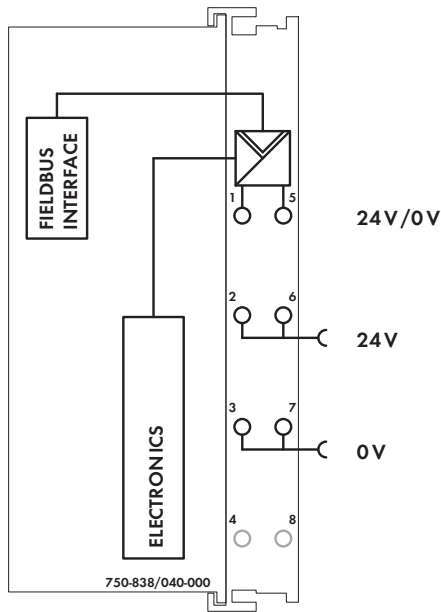
The module is ideally suited for operation in harsh environmental conditions:

- strongly extended temperature range
- higher dielectric strength and EMC resistance
- higher vibration and shock resistance

Notice: EDS files required

Description	Item No.	Pack. Unit
CANopen Controller /XTR	750-838/040-000	1
Accessories		
EDS files	Download: www.wago.com	
WAGO-I/O-PRO V2.3, RS-232 kit	759-333	1
WAGO-I/O-PRO V2.3, USB kit	759-333/000-923	1
Miniature WSB Quick marking system		
 plain	248-501	5
with marking	see Section 11	
Approvals		
Conformity marking	CE	
Korea Certification		
Marine applications	GL	
UL 508		
ANSI/ISA 12.12.01	Class I, Div. 2, Grp. ABCD, T4	

System Data	
No. of controllers connected to Master	110
Transmission medium	Shielded Cu cable 3 x 0.25 mm ²
Max. length of bus line	30 m ... 1000 m (depends on baud rate/cable)
Baud rate	10 Kbaud ... 1 Mbaud
Buscoupler connection	1 x D-Sub 9; plug
Programming	WAGO-I/O-PRO V2.3
IEC 61131-3	IL, LD, FBD (CFC), ST, FC



Technical Data	
Number of I/O modules	64
Fieldbus	
Max. input process image	512 bytes
Max. output process image	512 bytes
Max. input variables	512 bytes
Max. output variables	512 bytes
Configuration	via PC or PLC
Program memory	640 Kbytes
Data memory	832 Kbytes
Non-volatile memory (retain)	8 Kbytes
Cycle time	< 3 ms for 1,000 statements / 256 dig. I/Os
No. of PDOs	32 Tx / 32 Rx
No. of SDOs	2 server SDOs / 16 client SDOs
Communication profile	DS-301 V4.01
Device profile	DS-401 V 2.0
	Marginal check
	Edge-triggered PDOs
	Programmable error response
	DSP 405
	using function blocks NMT master can be programmed
COB ID distribution	SDO, standard
Node ID distribution	DIP switches
Other CANopen features	NMT slave
	Minimum boot-up
	Variable PDO mapping
	Emergency message
	Life guarding / heartbeat
	Configuration of virtual modules
Power supply	via CAGE CLAMP® connections, 24 VDC
Max. input current (24 V)	500 mA
Power supply efficiency	90 %
Internal current consumption (5 V)	350 mA
Total current for I/O modules (5 V)	1650 mA
	up to 60°C operating temperature;
	1250 mA > 60°C operating temperature
Voltage via power jumper contacts	24 V DC
under laboratory conditions +15 °C ... +35 °C	18 V ... 31.2 V (17.4 V ... 31.2 V) ¹⁾
for -40 °C ... +55 °C	18 V ... 28.8 V (17.4 V ... 28.8 V) ¹⁾
for +55 °C ... +70 °C	18 V ... 26.4 V (17.4 V ... 26.4 V) ¹⁾
	¹⁾ including residual ripple of 15 %

General Specifications	
Current via power jumper contacts (max.)	10 A DC
Isolation (peak value)	510 VAC or 775 VDC power supply/DIN rail
Rated surge voltage	1 kV
Overvoltage category	III
Operating temperature	-40 °C ... +70 °C
Wire connection	CAGE CLAMP®
Cross sections	0.25 mm ² ... 2.5 mm ² / AWG 24 ... 14
Strip lengths	8 ... 9 mm / 0.33 in
Dimensions (mm) W x H x L	51 x 65 x 100
	Height from upper-edge of DIN 35 rail
Weight	200 g
Storage temperature	-40 °C ... +85 °C
Relative humidity	95 %, short-term condensation acc. to class 3K7 / IEC EN 60721-3-3 (except wind-driven precipitation, water and ice formation)
Vibration resistance	acc. to IEC 60068-2-6 (acceleration: 5g), EN 60870-2-2, IEC 60721-3-1, -3, EN 61131-2
Shock resistance	acc. to IEC 60068-2-27
Degree of protection	IP20
EMC immunity of interference	acc. to EN 61000-6-1, -2, EN 61131-2, marine applications, EN 50121-3-2, -4, -5, EN 60255-26
EMC emission of interference	acc. to EN 61000-6-3, -4, EN 61131-2, EN 60255-26, marine applications, EN 60870-2-1, EN 61850-3, EN 50121-3-2, -4, -5
Operating altitude	without temperature derating: 0 m ... 2000 m; with temperature derating: 2000 m ... 5000 m (0.5 K/100 m); max.: 5000 m