EN

wenglor
the innovative family

ZAC50CN0x

Ethernet Junctions



EtherCAT

Operating instructions

Available as PDF only
Status: 2015-03-11

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1. Proper Use

This wenglor product must be used in accordance with the following functional principle:
Junction
A Junction is an active network component which distributes data to the corresponding addresses within a network in a targeted fashion. wenglor junctions are fitted optionally with additional Power over Ethernet technology. The power supply is integrated into existing network connection by means of Power over Ethernet. As an addition to Industrial Ethernet, there are several digital inputs and outputs directly on the junction that can be activated or evaluated via the network.

2. Safety Precautions

- This operating instruction is part of the product and must be kept during its entire service life.
- Read this operating instruction carefully before using the product.
- Installation, start-up and maintenance of this product has only to be carried out by trained personnel.
- Tampering with or modifying the product is not permissible.
- Protect the product against contamination during start-up.
- Not a safety component in accordance with the EU Machinery Directive.

3. EC Declaration of Conformity

The products are developed, constructed and manufactured according to the directive 2004/108/EC. The following international standards and specifications apply:

- **EN 55022:2006+A1:2007** Information technology equipment. Radio disturbance characteristics. Limits and methods of measurement
- **EN 61000-6-2:2005** Electromagnetic compatibility (EMC), Part 6-2: Generic standards. Immunity for industrial environments

Any additional standards which are applicable for the given application must be observed.

RoHS

4. Technical Data

Order number	ZAC50CN01	ZAC50CN02
Supply voltage	18...32 V DC	18...32 V DC
Max. Current Consumption Device *	0.3 A	0.25 A
Max. Current Consumption System **	2.2 A	2 A
max. PoE Capacity	30 W	25 W
Temperature range	–25...60 °C	–25...60 °C
Voltage drop junctioning outputs	< 2.5 V	< 2.5 V
Max. junctioning current junctioning outputs	0.6 A	0.6 A
Max. total current of the digital I/O ports	1A	1A
Digital I/O ports short-circuit protected	Yes	Yes
Digital I/O ports overload protected	Yes	Yes
Digital I/O ports reverse polarity protected	Yes	Yes
Number of digital I/O ports	2	2
Housing material	Aluminum	Aluminum
Protection class	IP67	IP67
Type of connection power	7/8", 5-pin	7/8", 5-pin
Type of Connection Industrial Ethernet Ports	M12×1, 4-pin, D-coding	M12×1, 4-pin, D-coding
Type of Connection PoE Ports	M12×1, 8-pin, type x	M12×1, 8-pin, type x
Type of Connection Digital I/O ports	M12×1, 4-pin, A-coding	M12×1, 4-pin, A-coding
Number of PoE ports	5	2
Number of Industrial Ethernet Ports	2	2
Number of Digital I/O ports	2	2
PoE Standard	IEEE802.3af	IEEE802.3af
PoE Classes	Class 0, 1, 2, 3	Class 0, 1, 2, 3
Baud Rate	100 Mbit/s	100 Mbit/s
Transmission Mode	Full Duplex	Full Duplex
EoE Ethernet over EtherCAT	Yes	Yes
Website	Yes	Yes
Junction Mode	Store & Forward	Store & Forward
VLAN Prioritization	Yes	Yes
Auto-Crossover	Yes	Yes
Auto-Negotiating	Yes	Yes
Auto-Polarity	Yes	Yes

* Maximum own power consumption of the product without additional loads
** Maximum own power consumption of the product with additional loads
Full assignment of all PoE ports (if available) without digital I/O ports

4.1. Connection table ZAC50CN0x

52

Socket 1 Suitable Plug: 50

Pin	Function	In/ Out
1	TxD (+)	Out
2	TxD (–)	Out
3	RxD (+)	In
4	RxD (–)	In
5	PoE (+)	Out
6	PoE (+)	Out
7	PoE (–)	Out
8	PoE (–)	Out

Socket 2 Suitable Plug: 51

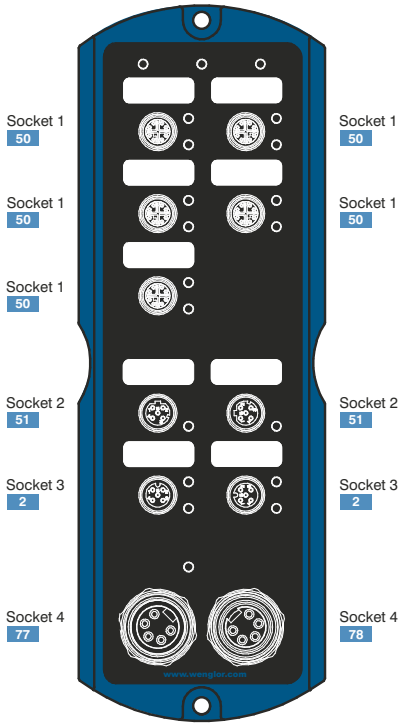
Pin	Function	In/ Out
1	TxD (+)	Out
2	RxD (+)	In
3	TxD (–)	Out
4	RxD (–)	In

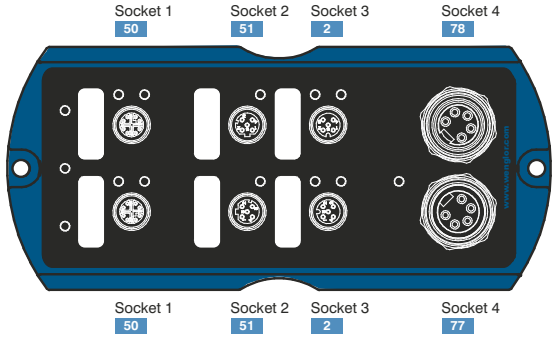
Socket 3 Suitable Plug: 2

Pin	Function	In/ Out
1	+24 V DC	Out
2	I/O	
3	GND	Out
4	I/O	
5		

Socket 4 Suitable Plug: 77 78

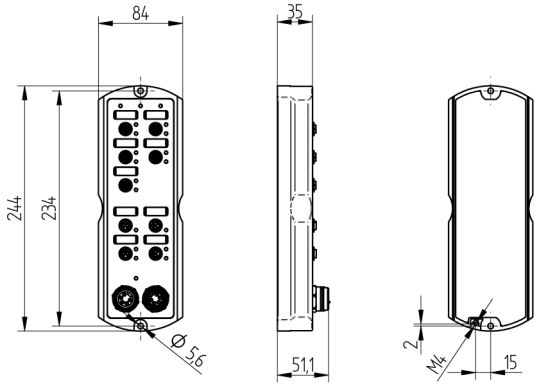
Pin	Function
1	0 V DC
2	0 V DC
3	⏚
4	+24 V DC U_{System}
5	+24 V DC $U_{Digital\ I/O\ /\ Sensor}$



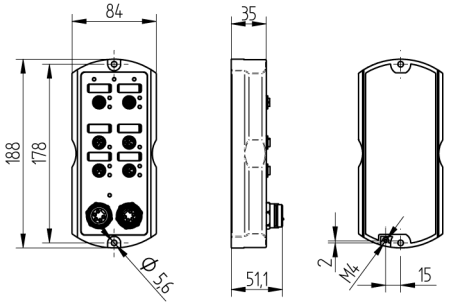


4.2. Housing Dimensions

4.2.1 ZAC5xxN01



4.2.2 ZAC50xN02



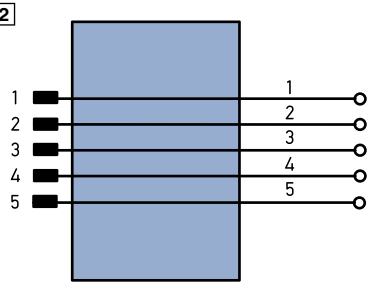
4.3. Complementary Products

Connection plug, 7/8", 5-pin

Order number: ZAT77NN01

Suitable Plug: 77

S82

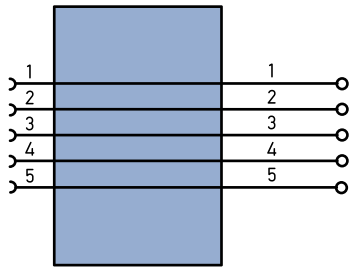


Connection socket, 7/8", 5-pin

Order number: ZAB78NN01

Suitable Plug: 78

S87

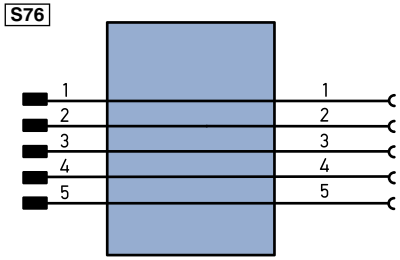


Connecting cable, 7/8", 5-pin

Order number: ZAV78R201,

Suitable Plug: 78
Cable length: 2 m

S76

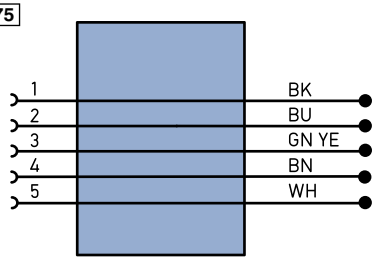


Connecting line, 7/8", 5-pin

Order number: ZAS78R601,

Suitable Plug: 78
Cable length: 10 m

S75

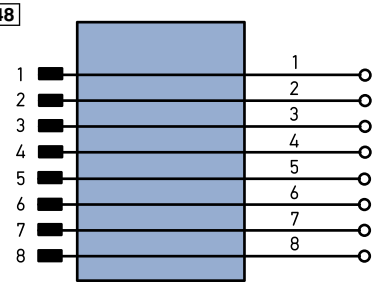


Connector Plug RJ45; 8-pin

Order number: ZAT45NN01

Suitable Plug: 45

S48

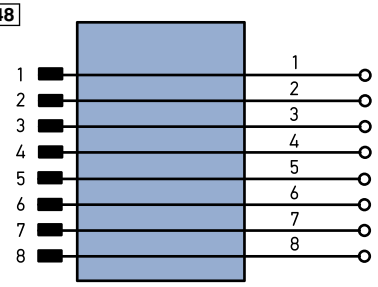


Connection plug, M12×1; 8-pin

Order number: ZAT50NN01

Suitable Plug: 50

S48

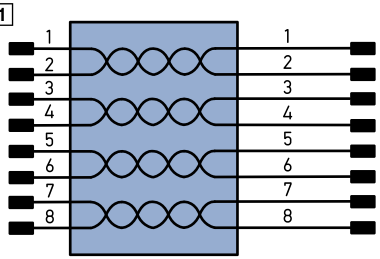


Connecting cable M12×1; 8-pin

Order number: ZAV50R201,
Order number: ZAV50R501,

Suitable Plug: 50
Cable length: 2 m (ZAV50R201)
Cable length: 5 m (ZAV50R501)

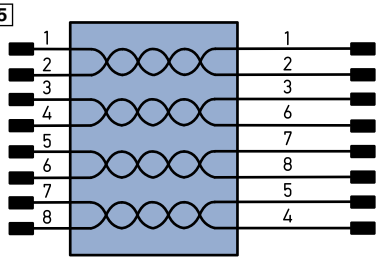
S81



S85

Order number: ZAV50R502,

Suitable Plug: 50
Cable length: 5 m

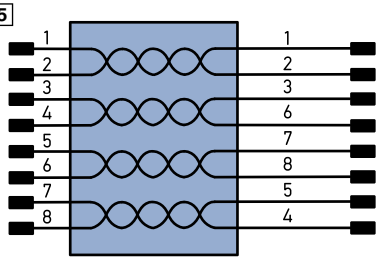


Connecting line M12×1, 8-pin

Order number: ZAS50R601

Suitable Plug: 50
Cable length: 10 m

S85

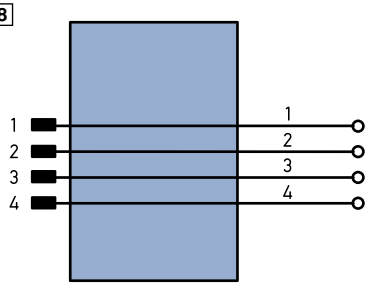


Connection plug, M12×1, 4-pin

Order number: ZAT51NN01

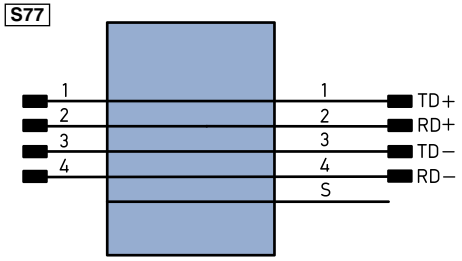
Suitable Plug: 51

S08



Connecting cable M12×1; 4-pin; D-coding

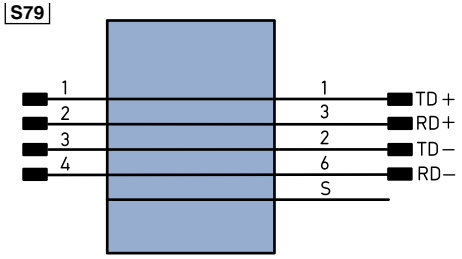
S77



Order number: ZAV51R201,
Order number: ZAV51R601,

Suitable Plug: 51
Cable length: 2 m (ZAV51R201)
Cable length: 10 m (ZAV51R601)

S79



Order number: ZAV51R202,
Order number. ZAV51R602,

Suitable Plug: 51
Cable length: 2 m (ZAV51R202)
Cable length: 10 m (ZAV51R602)

2 Connection and power supply cables
M12×1; 4-pin, different lengths are available for connecting the sensor/actuator.

Legend

+	Supply Voltage +
–	Supply Voltage 0 V
~	Supply Voltage (AC Voltage)
A	Switching Output (NO)
Ā	Switching Output (NC)
V	Contamination/Error Output (NO)
V̄	Contamination/Error Output (NC)
E	Input (analog or digital)
T	Teach Input
Z	Time Delay (activation)
S	Shielding
RxD	Interface Receive Path
TxD	Interface Send Path
RDY	Ready
GND	Ground
CL	Clock
E/A	Output/Input programmable
	IO-Link
PoE	Power over Ethernet
IN	Safety Input
OSSD	Safety Output
Signal	Signal Output

nc	not connected
U	Test Input
Ū	Test Input inverted
W	Trigger Input
O	Analog Output
O–	Ground for the Analog Output
BZ	Block Discharge
AMV	Valve Output
a	Valve Control Output +
b	Valve Control Output 0 V
SY	Synchronization
E+	Receiver-Line
S+	Emitter-Line
⏚	Grounding
SnR	Switching Distance Reduction
Rx+/–	Ethernet Receive Path
Tx+/–	Ethernet Send Path
Bus	Interfaces-Bus A(+)/B(–)
La	Emitted Light disengageable
Mag	Magnet activation
RES	Input confirmation
EDM	Contactor Monitoring

ENA	Encoder A
ENB	Encoder B
AMIN	Digital output MIN
AMAX	Digital output MAX
AOK	Digital output OK
SY In	Synchronization In
SY OUT	Synchronization OUT
OLT	Brightness output
M	Maintenance

Wire Colors according to DIN IEC 757

BK	Black
BN	Brown
RD	Red
OG	Orange
YE	Yellow
GN	Green
BU	Blue
VT	Violet
GY	Grey
WH	White
PK	Pink
GNYE	Green Yellow

5. Application Notes

The Ethernet ports are fitted with overvoltage discharge protection. Internal varistors limit voltage surges to approx 70 V. The connecting cables of the digital I/O ports must not be longer than 30 m.

6. Mounting Instructions

When mounting and operating the junctions, the corresponding electrical and mechanical regulations, standards and safety rules must be observed. The junction must be protected against mechanical influences. The product must be fastened in such a way that the mounting position cannot change. The junction is designed for use in the industrial sector. The industrial environment is characterized in that consumers are not connected directly to the public low-voltage mains network. Additional measures must be taken for use in the residential sector, business and commercial sectors.
The table below defines the tightening torques of the plugs and fastening options for ensuring compliant and faultless operation.

Connection type	Tightening torque in (Nm)
M12	0.4
7/8" plug	1.5
FE ground strap	2.2±0.2
Junction Mounting	4.0±0.2

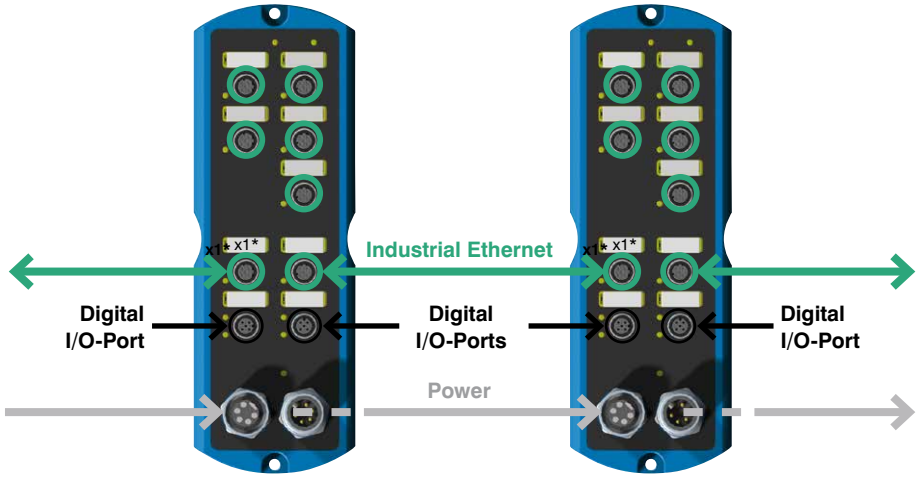
7. Initial Operation

Project planning, installation, start-up, maintenance and testing of the devices may only be carried out by qualified electrical technicians familiar with the safety standards of automation technology.

Only cables and accessories that meet the standards and requirements for safety, electromagnetic compatibility and, if necessary, telecommunications terminal equipment and the specifications. In case of damage, the product must not be used further on. In the event of improper use, the guarantee and liability claim against the manufacturer shall lapse.

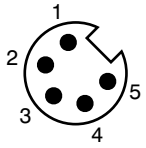
Information concerning which cables and accessories are approved for installation can be found at **www.wenglor.com** or are described in this manual.

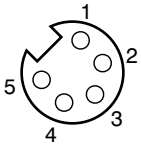
7.1. System Structure



* x1 designated the EtherCAT IN Port

7.2. Power Cable





Power In		
0 V	Pin 1	
0 V	Pin 2	
⏚	Pin 3	
24 V max. 9 A	Pin 4	System
24 V max. 9 A	Pin 5	Digital I/O / Sensor

Power Out	
0 V	Pin 1
0 V	Pin 2
⏚	Pin 3
24 V max. 9 A	Pin 4
24 V max. 9 A	Pin 5

The 7/8" plug is designed for a maximum current of 9 A per pin. This must be taken into account when looping the supply voltage.

The junction must be connected to a power supply of 18 to 32 V DC. The System/sensor supplies the connection with voltage and the Digital I/O provides the power supply of the digital I/O ports.

The voltage of the System must not be junctioned off during ongoing operation and hence must not be conducted via emergency stop circuits, since otherwise the junction and all connected Ethernet products will not be able to participate in the communication.

Measures must be taken in all cases to ensure that the supply voltage, measured at the remotest participant, does not fall short of the system supply voltage of 18 V DC.

To be complied with in reactive operation:
If the power supply of the digital I/O ports is merged with the voltage supply of the junction, there will then be the risk of a communication disruption in the event of a short-circuit on the I/O devices.

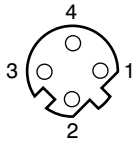
7.3. Functional Earth

The FE connection is on the lower front edge of the junction. To ensure proper functioning in accordance with the EMC regulations specified in the data sheet, we recommend using our ground strap, which is included in the scope of delivery (for tightening torque see “Housing Dimensions” on page 13).

7.4. Industrial Ethernet Cable

wenglor provides a variety of preassembled industrial Ethernet cables.
To ensure cabling as simple and reliable as possible, we recommend using our preassembled industrial Ethernet cables.

Assignment of the Industrial Ethernet connection:

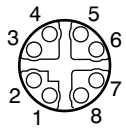


Pin	Function
1	TxD (+)
2	RxD (+)
3	TxD (–)
4	RxD (–)

7.5. Industrial Ethernet Cable with Power over Ethernet

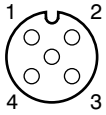
To ensure cabling as simple and reliable as possible, we recommend using our preassembled industrial Ethernet cables. In addition, several branches can be connected. The PoE ports (x2 – x6) can also be used for this purpose. Please note that the next branch must always be operated via the EtherCAT in port (x1). ZAT50NN01 field-assembly connectors see chapter “4.3. Supplementary products” on page 7) must be used for these connections.

Assignment of the Industrial Ethernet connection with PoE:



Pin	Function
1	TxD (+)
2	TxD (–)
3	RxD (+)
4	RxD(–)
5	PoE (+)
6	PoE (+)
7	PoE (–)
8	PoE (–)

7.6. Connecting Digital Sensors and Actuators

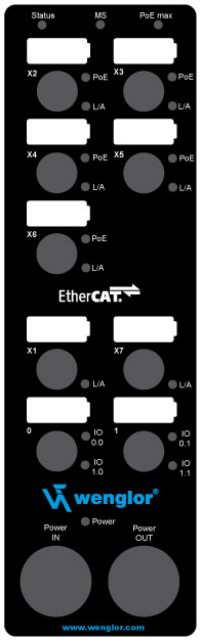


Pin	Function
1	24 V
2	Freely programmable input/output
3	0 V
4	Freely programmable input/output

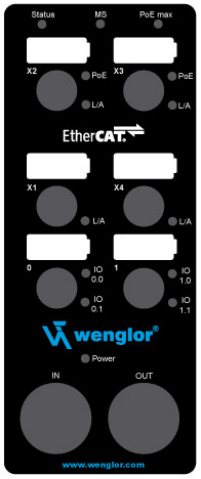
Sockets that are not used must be provided with caps, which are included in the scope of supply. Otherwise, the protection class IP67 cannot be guaranteed.

7.7. Diagnosis

Assignment example:



ZAC50CN01



ZAC50CN02

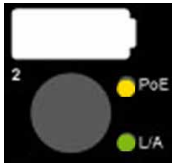
7.7.1 LED Display EtherCAT Device (ZAC50CN0x)



The status displays for the communication are marked on the junction with status and MS.

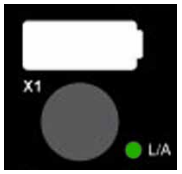
Designation	Condition	Function
Status	**Green off**	ESM state: Initialisation
	Green flashing	ESM state: PRE - Operational
	Flashing green once	ESM state: SAFE - Operational
	Green on	ESM state: Operational
	Red off	No Error
	Red on	Application controller failure
	Flashing red once	Local Error
	Flashing red twice	Process Data Watchdog Timeout/ EtherCAT Watchdog Timeout
	Red flashing	Red blinking Invalid Configuration
MS (Module Status)	Off	—
	Green	Operate Status
	Red	Device Error
	Red flashing	—
PoE max	Red	Maximum PoE performance reached
	Red flashing	PoE performance monitoring was junctioned off

The LED display on the M12 sockets displays the diagnosis for the corresponding socket.

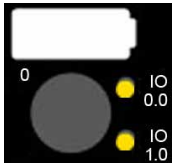


Designation	Condition	Function
PoE	Yellow	PoE in operation
	Yellow flashing	PoE function junctioned off
L/A	Off	No Ethernet device is connected to the port
	Green	An Ethernet device is connected to the port
	Green flashing	An Ethernet device which is currently communicating is connected to the port

The LED display on the M12 sockets displays the diagnosis for the corresponding socket.



Designation	Condition	Function
L/A	Off	No Ethernet device is connected to the port
	Green	An Ethernet device is connected to the port
	Green flashing	An Ethernet device which is currently communicating is connected to the port



Designation	Condition	Function	
IO 0.0/IO 1.0	Yellow	Input	UB at Pin 2/4
		Output	Junctioning output at UB Pin 2/4
	Red	Output	Short circuit at Pin 2/4

7.8. Operation on a Controller

If you want to commission the device when connected to a control system, please perform the following steps:

- Connect the branch to the supply voltage and to the control system via the EtherCAT in port (x1). You will find the matching connection equipment on the wenglor homepage.
- You will need the EtherCAT XML Device Description File (ESI-File EtherCAT Slave Information) which is available at **www.wenglor.com › Product World › Product search** (Order number) **› Download › Product Description Files.**
- The files should always be stored in the ESI directory of the respective master. If the Twin-CAT software is used, it should be stored in the folder "...\IO\EtherCAT\" in the installation folder.
- The following example shows the steps that have to be carried out (example based on the TwinCat System Manager by Beckhoff):
- First, the list "Echtzeit Ethernet kompatible Geräte" (list of all real-time Ethernet-compatible devices) must be requested.
- Once the correct network card has been installed, new slave devices can be searched for in "E/A Geräte" (I/O devices). If all configurations are correct, the slave devices are now listed in the TwinCAT tree.
- The assemblies can now be switched into "Free Run" mode so that the local cycle runs independently of the pre-set master cycle.
- In the next step, the process data of the individual devices can be configured.

For a more detailed description of the different control systems and the installation of files or the network design, please refer to the help files of the corresponding control system.

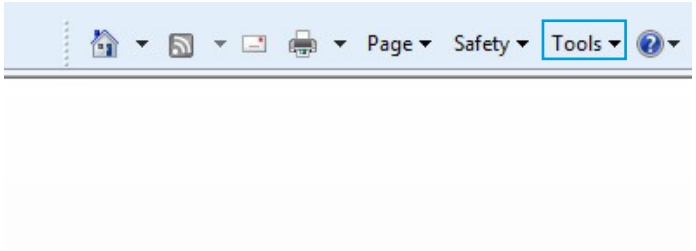
8. Web-based Configuration

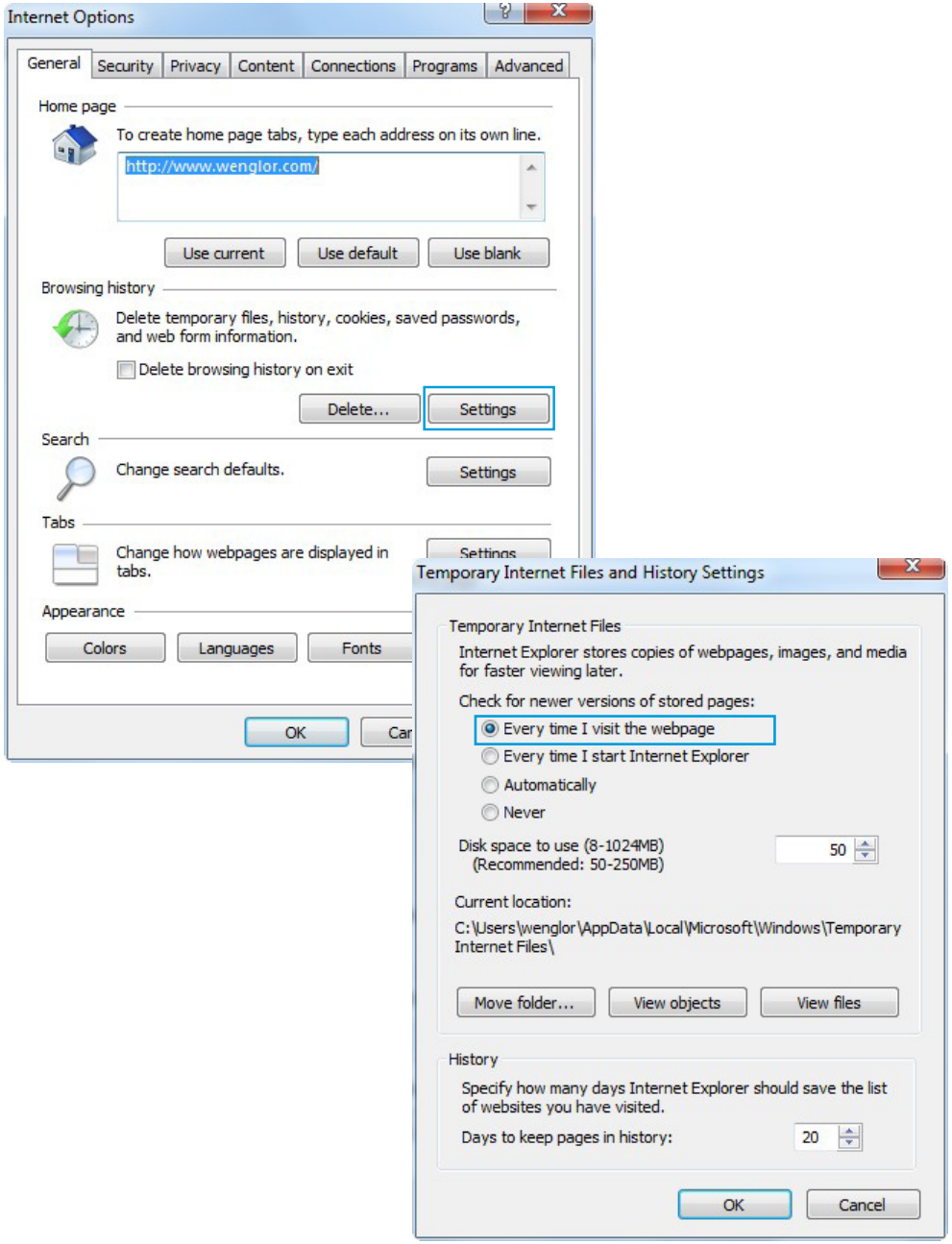
The Junction is equipped with a web-based set-up interface which operates independent of the operating system. Parameterizing of the Junction can conveniently be done using a standard web browser. The web server allows control-independent monitoring or creation of a test environment. The web server allows control-independent monitoring or a test environment to be set up. It is not needed for normal operation on the controller.

Attention:
To be able to open the web server of the EtherCAT product communication via EoE (Ethernet over EtherCAT) is required. This is only possible via the mailbox communication of a PLC or a PC-based controller software such as TwinCAT®. All web server settings can be made, if the product is in Pre-OP mode. For information on how to configure the network parameters please refer to the instructions “Start-Up-EtherCAT-Device” **(www.wenglor.com › Product World › Product search** (Order number) **› Download › General instructions)** in the chapter “Displaying and working with the integrated web server”. All further steps require an active mailbox and network communication.
When using on a controller, settings changed through the website are overwritten by the controller.

8.1. Call up the Administration Interface

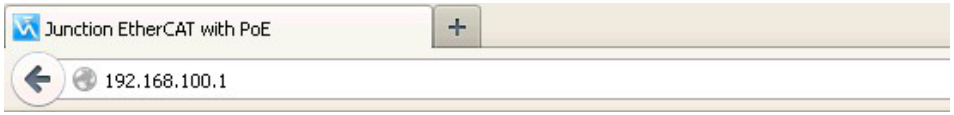
Launch a web browser. Enter the preset IP address of the Junction in the address bar of your browser and press enter To ensure that the browser displays the current website settings, the website in question must always be refreshed automatically in case of change. This setting must be changed browser-specific and is demonstrated here by means of Internet Explorer as an example. Under **Extras → Internet Options → Browsing history → Settings** the selection should be set to **Every time I visit the webpage.** Otherwise, any changes to the homepage might be displayed incorrectly.





In order to now be able to open the website of the Junction (in the example ZAC50CN01), the IP address must be entered in the address bar of the browser as described

Example: 192.168.100.1 (IP address set, for example, via TwinCAT® in the area EoE of the Junction)

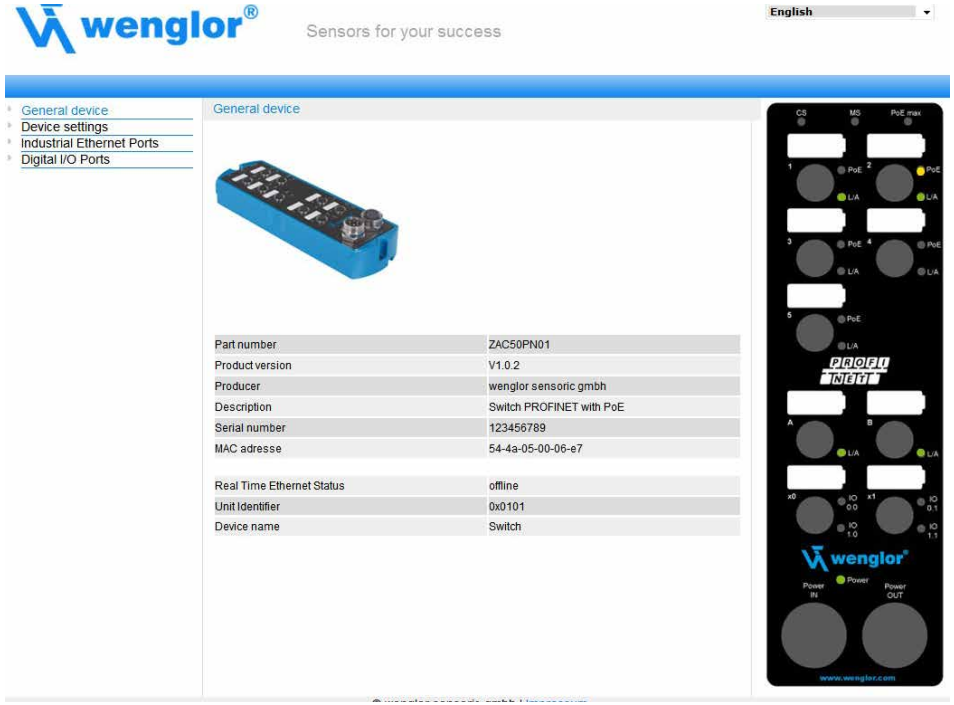


The overview page **Device General** is not password-protected. If the pages of the device or port settings are accessed, a password prompt appears.
The following user data are preset in the delivery state:

User name: admin
Password: admin

The password can be changed on the page **Device Settings.**

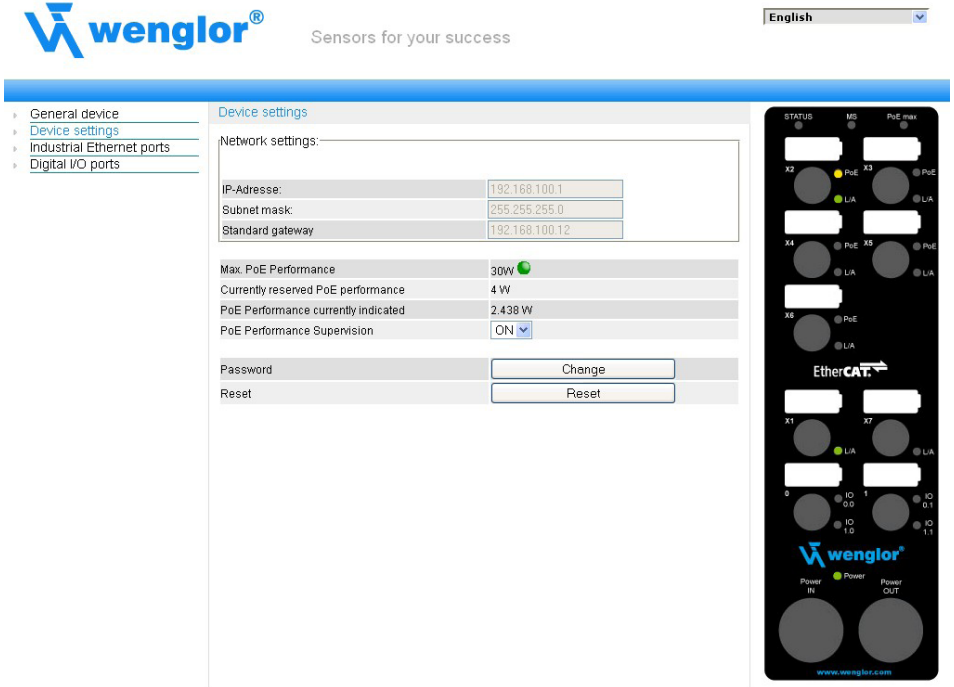
8.2. Overview page



After the connection has been established, the overview page of the Junction is displayed.

Through the language selection, the website can be changed from English (delivery state) to German, Italian, French or Spanish.

8.3. Device settings



Display of the network settings and PoE parameters

PoE information (ZAC50CN01):

Max. PoE Performance Switch	30W
PoE Performance currently	4 W
PoE Performance currently indicated	2.438 W
PoE Performance Supervision	ON

The Junction continuously monitors the current PoE performance consumption. The website displays the maximum available PoE performance of the Junction and the currently reserved and outgoing PoE performance. Every PoE device registers in a specific PoE performance class when starting. This performance is then reserved in the Junction. Mostly, the maximum reserved performance is not demanded, however. By deactivating the PoE performance monitoring it is possible to optimally utilize the maximum PoE performance of the Junction.

If the PoE performance monitoring is deactivated, this can cause performance impairments of the device. In this case, the maximum PoE output performance must not exceed the maximum PoE performance of the Junction. If the performance monitoring is deactivated, this is displayed on the Junction by means of the PoE max-LED flashing red. During operation, the performance monitoring can be changed from inactive to active. Here, all PoE devices are restarted automatically in order to save the reserved performance of the individual ports.

Change password:

Password	Change

An additional window opens, in which the new password can be entered.

Please note: If the password has been forgotten, the delivery state of the Junction can only be restored by means of a reset at the controller using the object “Restore Default Parameter 0x1011”.

Reset:

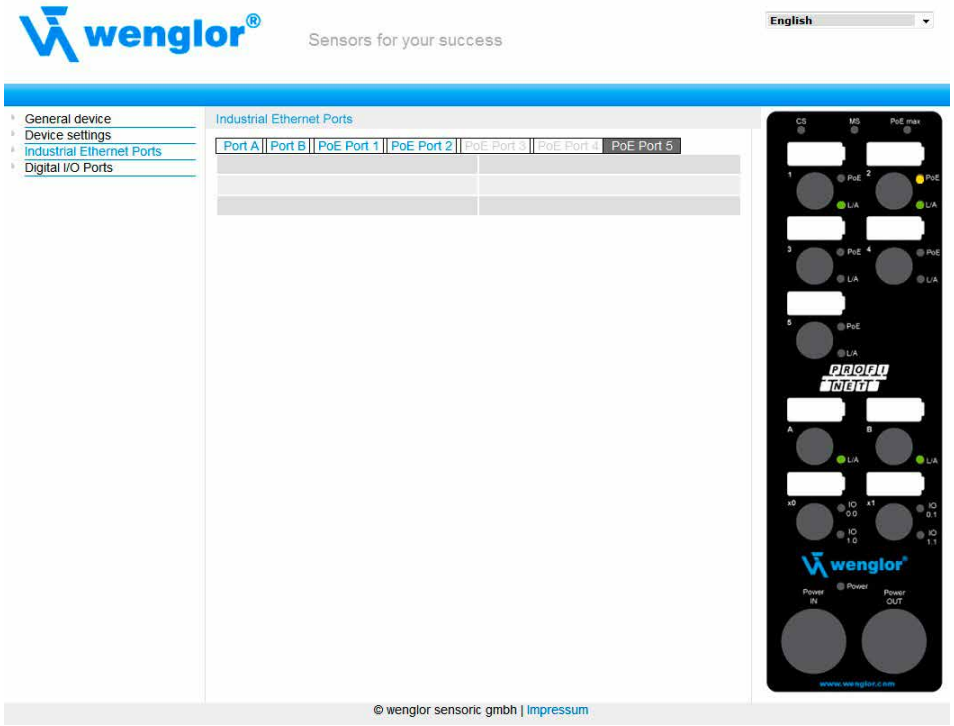
Reset	Reset

The following settings can be reset to the delivery state by pressing the “Reset” button.

- Parameter of the digital I/O ports: All digital I/O ports are switched to input
- Parameter PoE: PoE monitoring is switched to one and on all ports the PoE power supply is activated
- The password is reset to the delivery state (“admin”)

Please note: The network settings are not reset hereby! They are still specified via the controller (EoE).

8.4. Industrial Ethernet Ports Settings



The page **Port Settings/Industrial Ethernet Ports** provides an overview of the individual ports of the Junction. You can switch between the individual ports using the tab on the uppermost level. The Industrial Ethernet ports contain information on the EtherCAT Port status and invalid frames as well as an error counter of the EtherCAT input frames.

PoE Port 2 settings

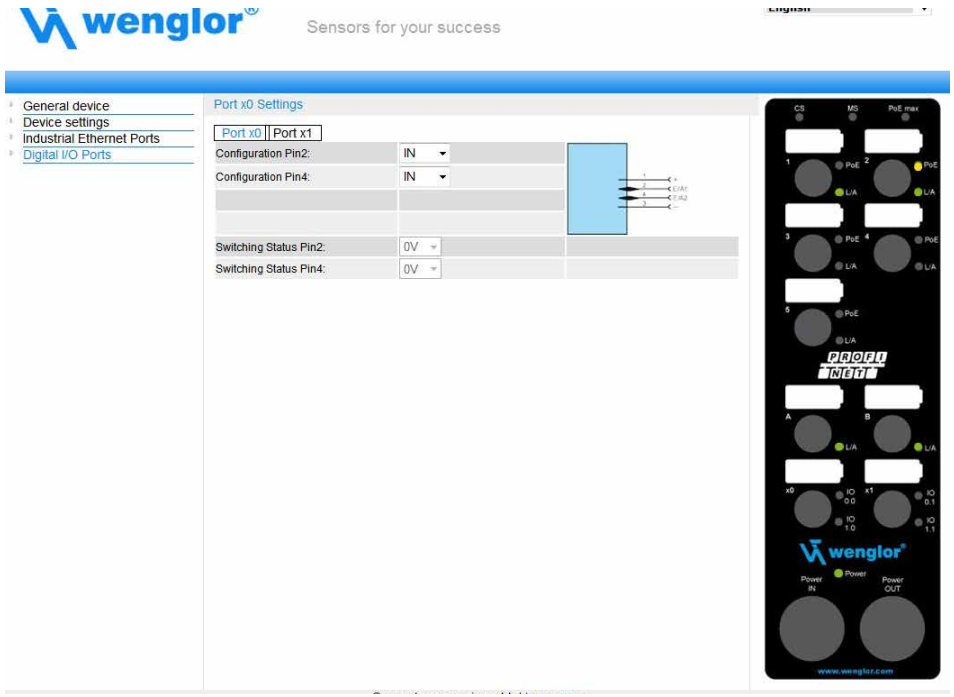
Port A | Port B | PoE Port 1 | PoE Port 2 | PoE Port 3 | PoE Port 4 | PoE Port 5

Number of error-free received packets	683
Number of defective received packets	0
Number of error-free sent packets	1608
PoE in service	ON
Declared power	4Watt
Performance currently displayed	2.625W

In addition to the information on packages, it is possible to activate or deactivate the PoE power supply individually for each PoE port. On the webpage, the amount of PoE performance registered and actual outgoing performance is also documented for each PoE port.

8.5. Digital I/O Ports Settings

The Junction has 2 ports with two digital inputs/outputs each The digital inputs/outputs are parameterized via the page **Digital I/O Ports**.



Please note: Parameterization of the inputs/outputs is only possible with the device in Pre-Op mode.

Pin 2 and pin 4 can each be configured as input or output. If the pin is configured as output, the pin can be set manually to 0 V or UB. A red flashing LED indicates a short-circuit on the respective pin.

9. Maintenance Instructions

This wenglor junction is maintenance-free.
Do not use any solvents or cleaning agents that could damage the device when cleaning the junction.
The following gives a brief overview:

- Always use clean water for cleaning by using neutral detergents together with a soft, non-scratch, non-abrasive and non-fibrous cloth – strong pressure or rubbing must be avoided.
- Coarse soiling of greasy, oily or sooty surfaces and the removal of adhesive residues can be cleaned using aromatic-free white spirit or isopropyl alcohol (IPA).
- Use cleaning agent at a maximum of 25 °C.
- Never use steam cleaners.
- Never use solvents with aromatic compounds, alcohol, ketones, ester, glycol ether or halogenated hydrocarbons for cleaning.
- When cleaning with liquids, all open ports must be locked with the protective caps provided.

10. Proper Disposal

wenglor sensoric gmbh does not accept the return of unusable or irreparable products. Respectively valid national waste disposal regulations apply to product disposal.

The wenglor sensoric gmbh, hereafter called wenglor for short, points out that notes and information in this operating manual may be subject to constant development and technical changes and are therefore only published under reservation.

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