

AXC F XT ETH 1TX

Axioline F, left-alignable Ethernet interface



Data sheet
107237_en_02

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1 Description

An AXC F ... PLCnext controller can be extended with an additional Ethernet interface using the AXC F XT ETH 1TX left-alignable extension module.

Features

- Left-alignable Gigabit-class Ethernet interface
- Additional independent MAC address
- PROFINET support
- Electrical isolation between Ethernet interface and logic
- Individual expansion option for PLCnext Controls of the Axioccontrol series



You will find information on commissioning the left-alignable extension module in PLCnext Engineer in the PLCnext Info Center (<https://www.plcnext.help>).



Ensure that the left-alignable extension module is only aligned next to a PLCnext controller which has a firmware version that is permissible for this.

AXC F ... PLCnext controllers with the following firmware versions are permitted:

- AXC F 2152 with firmware version \geq 2019.3
- AXC F 3152 with firmware version \geq 2021.0



This data sheet is only valid in association with the UM EN AXL F SYS INST user manual. For information on PROFINET basics, please refer to the UM EN PROFINET SYS user manual.



Make sure you always use the latest documentation. It can be downloaded at: [phoenixcontact.com/product/2403115](https://www.phoenixcontact.com/product/2403115)

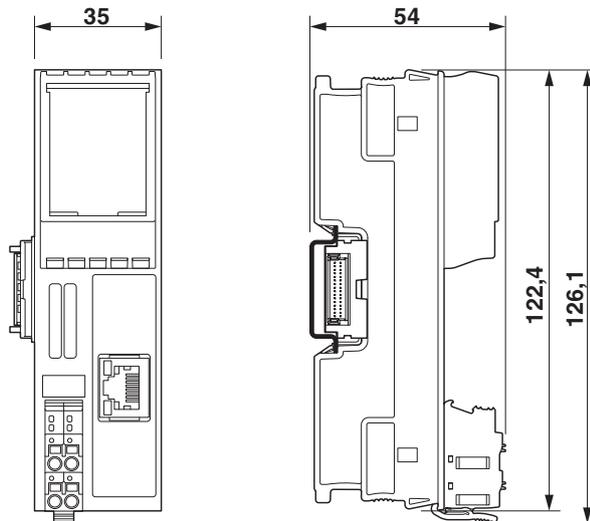
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3 Ordering data

Description	Type	Item no.	Pcs./Pkt.
Left-alignable Ethernet interface, for connection to a compatible modular controller from the PLCnext Control range.	AXC F XT ETH 1TX	2403115	1
Accessories	Type	Item no.	Pcs./Pkt.
PLCnext Control for the direct control of Axioline F I/Os. With two Ethernet interfaces. Complete with connector and bus base module.	AXC F 2152	2404267	1
Axioline F short power connector (for e.g., AXL F BK ...) (Replacement item)	AXL CN S/UL	2701421	5
Bus base module for the left alignment of AXC F XT... type extension modules to AXC F 2152 type controllers (item no. 2404267).	AXC BS L 2	1064312	1
PLCnext Control for the direct control of Axioline F I/Os. With three independent Ethernet interfaces. Complete with connector and bus base module.	AXC F 3152	1069208	1
Documentation	Type	Item no.	Pcs./Pkt.
User manual, English, Axioline F: System and installation	UM EN AXL F SYS INST	-	-
User manual, English, Axioline F: Diagnostic registers, and error messages	UM EN AXL F SYS DIAG	-	-
User manual, English, PROFINET basics	UM EN PROFINET SYS	-	-

4 Technical data

Dimensions (nominal sizes in mm)



Width	35 mm
Height	126.1 mm
Depth	54 mm
Note on dimensions	The depth applies when a TH 35-7.5 DIN rail is used (in accordance with EN 60715).

General data

Type	modular
Mounting type	DIN rail mounting
Color	traffic grey A (RAL 7042)
Weight	106 g (with connector and bus base module)
Ambient temperature (operation)	-25 °C ... 60 °C (up to 2000 m above sea level)
Permissible humidity (operation)	5 % ... 95 % (according to DIN EN 61131-2)
Air pressure (operation)	70 kPa ... 106 kPa (up to 3000 m above sea level)
Degree of protection	IP20
Protection class	III (IEC 61140, EN 61140, VDE 0140-1)

Connection data: Axioline F connector

Connection method	Push-in connection
Conductor cross section rigid/stranded	0.2 mm ² ... 1.5 mm ² / 0.2 mm ² ... 1.5 mm ²
Conductor cross section [AWG]	24 ... 16
Stripping length	8 mm

Interface Ethernet	
Number of interfaces	1
Bus system	RJ45
Connection method	RJ45 jack
Note on the connection method	Auto negotiation and autocrossing
Transmission speed	10/100/1000 Mbps (full duplex)
Transmission length	max. 100 m

Supply of the logic voltage U_L	
Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Current consumption	typ. 54 mA (at $U_L = 24$ V) max. 80 mA
Reverse polarity protection	Polarity protection diode
Transient protection	Suppressor diode



NOTE: Damage to the electronics

Provide external protection for the module to ensure reverse polarity protection. If you use a fuse, the power supply unit must be capable of supplying four times the nominal current of the fuse. This ensures that the fuse trips reliably in the event of a fault.

Error messages to the higher level control or computer system
None

Mechanical tests	
Vibration resistance in accordance with EN 60068-2-6/ IEC 60068-2-6	5g
Shock in accordance with EN 60068-2-27/ IEC 60068-2-27	30g
Continuous shock in accordance with EN 60068-2-27/ IEC 60068-2-27	10g

Conformance with EMC Directive 2014/30/EU	
Immunity test in accordance with EN 61000-6-2/IEC 61000-6-2	
Electrostatic discharge (ESD) EN 61000-4-2/IEC 61000-4-2	Criterion B, 6 kV contact discharge, 8 kV air discharge
Electromagnetic fields EN 61000-4-3/IEC 61000-4-3	Criterion A, Field intensity: 10 V/m
Fast transients (burst) EN 61000-4-4/IEC 61000-4-4	Criterion B, 2 kV
Transient overvoltage (surge) EN 61000-4-5/IEC 61000-4-5	Criterion B, DC supply lines: ± 0.5 kV/ ± 0.5 kV (symmetrical/ asymmetrical)
Conducted interference EN 61000-4-6/IEC 61000-4-6	Criterion A, Test voltage 10 V

Noise emission test in accordance with EN 61000-6-3/IEC 61000-6-3

Approvals

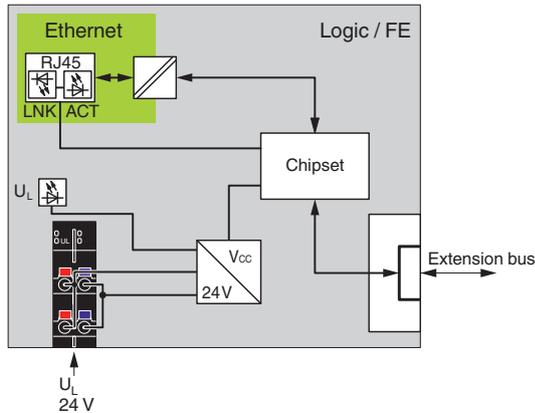
For the current approvals, go to:	www.phoenixcontact.com/product/2403115
ATEX (TÜV 19 ATEX 8356 X)	⊕ II 3 G Ex ec IIC T4 Gc EN IEC 60079-0, EN IEC 60079-7
IECEX (IECEX TUR 19.0031X)	Ex ec IIC T4 Gc IEC 60079-0 Ed. 7, IEC 60079-7 Ed. 5.1
CCC / China-Ex (Ⓒ, 2021122309114456)	Ex ec IIC T4 Gc GB/T 3836.1-2021, GB/T 3836.3-2021
UL Ex, USA / Canada (E366272)	Class I, Zone 2, AEx nA IIC T4 Class I, Div. 2, Groups A, B, C, D Ex nA IIC Gc T4 UL 60079-0, Ed. 6 / CSA C22.2 NO. 60079-0, Ed. 3 UL 60079-15, Ed. 4 / CSA C22.2 NO. 60079-15
UL, USA/Canada (E238705)	cULus
Corrosive gas test	ISA S71.04.2013 G3 Harsh Group A, DIN EN 60068-2-60:2016-06 Method 4

Manufacturer's declarations

For the current manufacturer's declarations, go to: www.phoenixcontact.com/product/2403115

5 Internal circuit diagram

Figure 1 Basic circuit diagram



Key:

RJ45	RJ45 interface
	LED
	Power supply unit with electrical isolation
	Power supply unit
Chipset	Chipset
Extension bus	Axioline F extension modules aligned to the left

6 Security in the network



NOTE: Network security jeopardized by unauthorized access

Connecting devices to a network entails the danger of unauthorized access to the network.

Observe the following safety notes:

- If possible, deactivate unused communication channels.
- Use secure passwords reflecting the complexity and service life recommended in the latest guidelines.
- Only allow authorized persons to access the device. Limit the number of authorized persons to the necessary minimum.
- Always install the latest firmware version. The firmware can be downloaded via the item (www.phoenixcontact.com/products).
- Observe the IT security requirements and the standards applicable to your application. Take the necessary protective measures. These may include, for example, virtual networks for remote maintenance access or a firewall.
- In security-critical applications, always use the device with an additional security appliance. Phoenix Contact offers security appliances in the mGuard product range. The mGuard routers connect various networks for the remote maintenance and protection of the local network and protect these networks against cyberattacks.
- You must take defense-in-depth strategies into consideration when planning networks.



Additional measures for protection against unauthorized network access can be found in the "INDUSTRIAL SECURITY" application note. The application note can be downloaded via the item (www.phoenixcontact.com/products).

German: AH DE INDUSTRIAL SECURITY, 107913

English: AH EN INDUSTRIAL SECURITY, 107913

If a security vulnerability exists for products, solutions, or services from Phoenix Contact, it will be published on the PSIRT (Product Security Incident Response Team) website: www.phoenixcontact.com/psirt

7 For your safety

7.1 Intended use

Use the Axioline F modules exclusively in accordance with the specifications in the accompanying data sheet and the "Axioline F: System and Installation" user manual.

7.2 Qualification of users

The use of products described in this data sheet is oriented exclusively to electrically skilled persons or persons instructed by them. The users must be familiar with the relevant safety concepts of automation technology as well as applicable standards and other regulations.

7.3 Electrical safety



WARNING: loss of electrical safety

If used incorrectly, device safety may be impaired.

The instructions given in this data sheet as well as the UM EN AXL F SYS INST user manual must be observed during installation, startup, and operation.

7.4 Installation



NOTE: Unauthorized physical access

There is a danger of the module being tampered with through unauthorized physical access.

- Protect the module and the aligned modules against unauthorized physical access. Use a lockable control cabinet, for example.

Only install the Axioline F modules in a control cabinet or junction box.

The enclosure must meet the requirements regarding the protection against spread of fire according to the following standards:

- EN 61010-1/IEC 61010-1
- UL 61010-1 (for applications with UL approval)

8 Installation in potentially explosive area



WARNING: Explosion hazard

Before using the device in a potentially explosive area, make sure that your device has the required approval.

The approvals are printed on the device.



WARNING: Explosion hazard

Please make sure that the following notes and instructions are observed.



WARNING: Explosion hazard

In potentially explosive areas, do not connect or disconnect while the power is connected.

- The category 3 device is designed for installation in zone 2 potentially explosive areas.
- The device satisfies the requirements of the following standards:
EN/IEC 60079-0, EN/IEC 60079-7
For detailed information, refer to the accompanying declarations of conformity. For the latest version, go to the item page at www.phoenixcontact.com/products.
- Installation, operation, and maintenance may only be carried out by qualified electricians. Follow the installation instructions as described. When installing and operating the device, the applicable regulations and safety directives (including national safety directives), as well as generally approved technical regulations, must be observed. The safety data is provided in this package slip and on the certificates (conformity assessment, additional approvals where applicable).
- Observe the specified conditions for use in potentially explosive areas! Also observe the requirements of EN 60079-14.
- The device must not be opened or modified. Do not repair the device yourself, replace it with an equivalent device. Repairs may only be carried out by the manufacturer. The manufacturer is not liable for damage resulting from violation.
- The IP20 degree of protection (IEC/EN 60529) of the device is intended for use in a clean and dry environment. Do not subject the device to mechanical and/or thermal loads that exceed the specified limits.
- The device must be stopped and immediately removed from the Ex area if it is damaged, has been subjected to an impermissible load, has been stored incorrectly, or if it malfunctions.

- In potentially explosive areas, only connect and disconnect cables and plug-in connections (e.g., connector, bus base module, SD card, etc.) when the power is disconnected.

Special conditions

- Install the device in such a way that a degree of protection of at least IP54 is achieved in accordance with EN/IEC 60529. To this end, a suitable, approved housing that meets the requirements of EN/IEC 60079-0, GB/T 3836.1 must be used.
- Use the device in an environment that does not exceed pollution degree 2 in accordance with EN/IEC 60664-1, GB/T 16935.1.
- Connect the DIN rail to the protective earth ground.
- For safe operation, lockable plug connections must have a functional interlock (e. g. locking clip, screw connection etc.). Insert the interlock. Repair any damaged connectors immediately.
- Only operate the device when all connectors are fully plugged in.

Areas with a danger of dust explosions

- The device is not designed for use in atmospheres with a danger of dust explosions.

Nominal data

Ambient temperature T_{amb}	-25 °C ... +60 °C
Supply voltage range	19,2 V DC ... 30 V DC
Current consumption from U_L	54 mA
Vibration resistance	5g

9 UL notes

9.1 UL Ordinary Location

- If the device is not used in the specified manner, the protection provided by the device may be impaired.
- Mount and install the device in such a way that the disconnecting device can be operated without restriction.
- The external circuits intended to be connected to this device shall be galvanically separated from the mains supply or hazardous live voltage by reinforced or double insulation and meet the requirements of SELV/PELV (Class III) circuits of UL/CSA/IEC 61010-1, UL/CSA/IEC 61010-2-201.
- Use copper wire, that is approved up to 75 °C.
- The device has to be installed in the final safety enclosure, which has adequate rigidity according to UL 61010-1, UL 61010-2-201 and meets the requirements with respect to spread of fire.

9.2 UL Hazardous Location

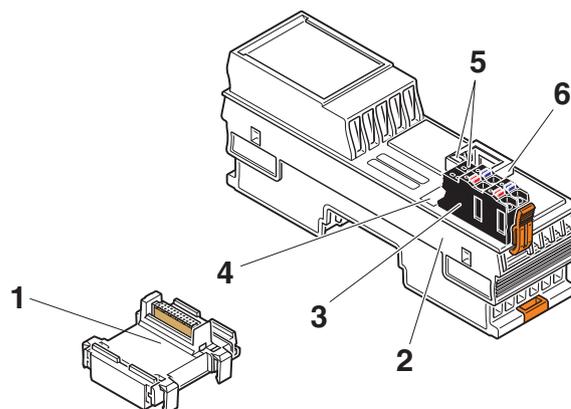
- Ambient temperature: $-25\text{ °C} < T_{\text{amb}} < 60\text{ °C}$
- This device must be installed within an area of not more than pollution degree 2, as defined in IEC 60664-1.
- This device must be installed in a tool only accessible enclosure certified for use in Class I, Zone 2, minimum, and rated IP54, minimum, in accordance with UL/CSA 60079-0 when used in a Class I, Zone 2 environment.

Nominal data

Type	Voltage	Current
Input		
U _L	24 V DC (19.2 V DC ... 30 V DC)	80 mA

10 Module components

Figure 2 Module components



- 1 Bus base module
- 2 Electronics module
- 3 Supply connector
- 4 Function identification
- 5 Diagnostic and status indicators
- 6 Ethernet interface

11 Mounting



Please note:

Only **one** left-alignable extension module of one type can be connected to one PLCnext controller. Connecting additional left-alignable extension modules of the same type is not possible.



Please note:

Mount all the modules required **before** supplying power to the Axioline F station. Modules to which power is only supplied following the controller boot process are not detected or may result in a malfunction.

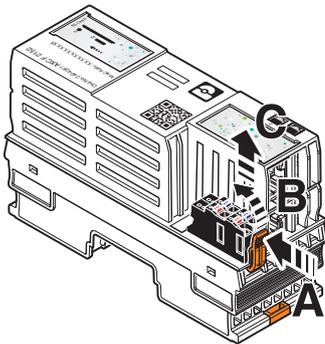
To ensure that the left-alignable extension module is detected correctly, proceed as follows:

- Switch on the power to the left-alignable extension module and to the controller **simultaneously**.

11.1 Removing the controller supply connector

- Disconnect the power to the controller.
- Release the locking latch (A), tilt the supply connector upwards slightly (B), and remove it from the controller (C).

Figure 3 Removing the supply connector



11.2 Removing other connectors from the controller

- Remove all other connectors from the controller.

11.3 Preparing the controller for left alignment: Mounting the special bus base module



Please note:

If you have already operated the controller with left alignment, you can skip this section.

In this case, proceed as described in Section “Mounting the left-alignable extension module”.

A controller needs a special bus base module for operation with left-alignable extension modules.

You must prepare the controller for operation with left-alignable extension modules once by replacing the existing bus base module of the controller with the special bus base module.



The special bus base module is not included in the scope of delivery of all AXC ... type controllers.

For the ordering data, please refer to the user manual for the controller you are using.

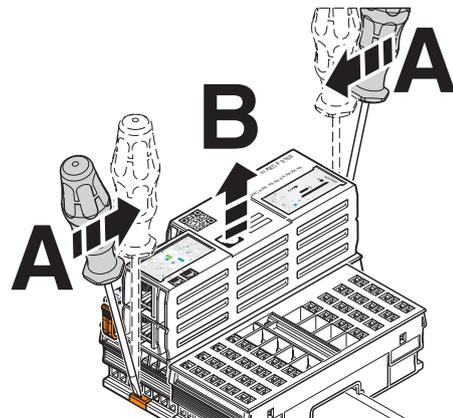
To replace the existing bus base module of the controller with the special bus base module, first remove the electronics module of the controller:

- Insert a suitable tool (e.g., bladed screwdriver) into the upper and lower snap-on mechanisms (base latches) of the controller one after the other and release it (A).

The base latches are locked in place in the open position.

- Remove the electronics module vertically out of the DIN rail (B).

Figure 4 Remove the electronics module of the controller



Once you have removed the electronics module of the controller, remove the existing bus base module:

- Pull the bus base module of the controller off of the bus base of the adjacent module on the right.
- Remove the controller bus base module from the DIN rail.

Then mount the special bus base module (A and B in Figure 5):

- Place the special controller bus base module on the DIN rail (A).
- Push the special bus base module of the controller into the connection for the bus base module of the adjacent module on the right (B).

You can now mount the left-alignable extension module; to do so, see Section “Mounting the left-alignable extension module”.

11.4 Mounting the left-alignable extension module



Please note:

When mounting the bus base module of the left-alignable extension module, the adjacent bus base module on the right may not be equipped with an electronics module.

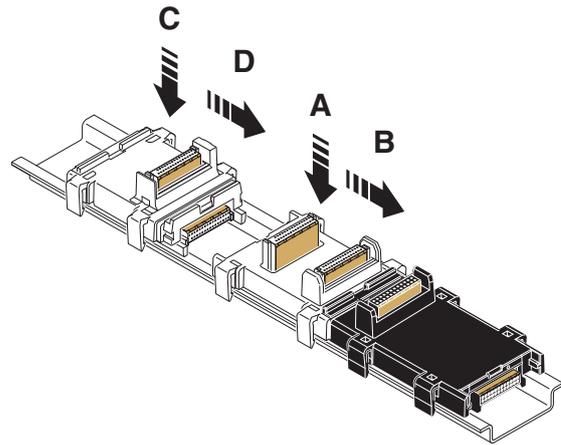
If you have operated the controller so far without left alignment, the controller must first be prepared for left alignment; to do this, refer to Section “Preparing the controller for left alignment: Mounting the special bus base module”.

If you have operated the controller so far without left alignment, align the left-alignable extension module to the controller:

- Place the bus base module of the left-alignable extension module on the DIN rail (C).

- Push the bus base module of the left-alignable extension module into the connection on the special bus base module of the controller (D).

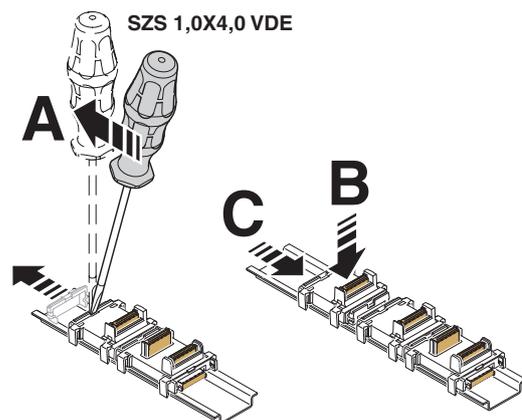
Figure 5 Mount bus base module(s)



If you have already operated the controller with left alignment, align the left-alignable extension module to extension module aligned on the right:

- Remove the electronics module from the adjacent extension module on the right.
- If necessary: Remove the cover cap on the adjacent bus base module on the right (A).
- Place the bus base module of the left-alignable extension module on the DIN rail (B).
- Push the bus base module of the left-alignable extension module into the connection on the adjacent bus base module on the right (C).

Figure 6 Remove cover and mount the bus base module



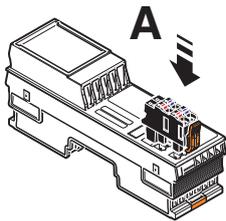
11.5 Snapping on electronics modules

- Working from right to left, place each electronics module vertically on the corresponding bus base module and on the DIN rail until it snaps into place with a click. Make sure that the device plug for the bus base connection is situated above the corresponding socket on the bus base module.

11.6 Inserting supply connector

- Place all supply connectors in position and press firmly. Make sure that the respective locking latch snaps in.

Figure 7 Inserting supply connector



12 Connecting the supply voltage and Ethernet

12.1 Connecting the supply voltage



Please note:

The supply voltage of the controller and the left-alignable extension module must be supplied via a **shared** power supply unit.

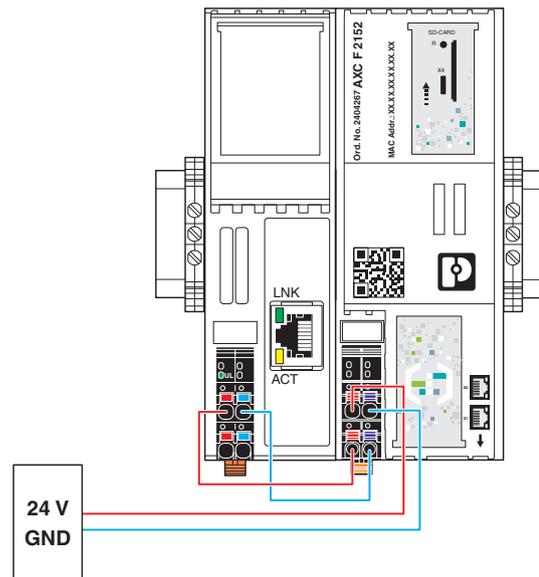
If you want to disconnect the left-alignable extension module from the power supply: **Always disconnect both devices** from the power supply by switching off the supply voltage of the common power supply unit. Error-free operation is not possible if you disconnect the supply voltage of the left-alignable extension module separately.



When the device is switched on, an increased inrush current is temporarily triggered. The device behaves like a capacitive load when it is switched on.

- Connect the supply voltage via the Axioline F connector.

Figure 8 Connecting the supply voltage



Terminal point assignment

Figure 9 Terminal point assignment



Terminal point	Color	Assignment	
Supply voltage input			
a1, a2	Red	24 V DC (U _L)	Supply voltage feed-in (bridged internally)
b1, b2	Blue	GND	Reference potential of the supply voltage (bridged internally)

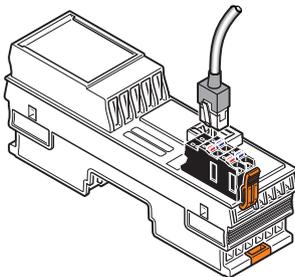
12.2 Connecting Ethernet

- Connect the Ethernet network to the RJ45 socket.



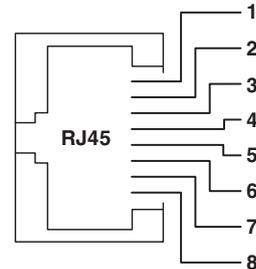
- Use an Ethernet cable that complies with at least CAT5 of IEEE 802.3.
- Observe the bending radii of the Ethernet cable used.

Figure 10 Connecting Ethernet



Pin assignment

Figure 11 Pin assignment of the Ethernet socket (RJ45)

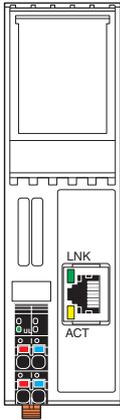


10Base-T (10 Mbps)/100Base-T (100 Mbps)	
Pin	Assignment
1	TxD + (transmit data +)
2	TxD - (transmit data -)
3	RxD+ (receive data +)
4	Reserved
5	Reserved
6	RxD- (receive data -)
7	Reserved
8	Reserved

1000Base-T (1000 Mbps)	
Pin	Assignment
1	DA+ (bidirectional)
2	DA- (bidirectional)
3	DB+ (bidirectional)
4	DC+ (bidirectional)
5	DC- (bidirectional)
6	DB- (bidirectional)
7	DD+ (bidirectional)
8	DD- (bidirectional)

13 Connection example

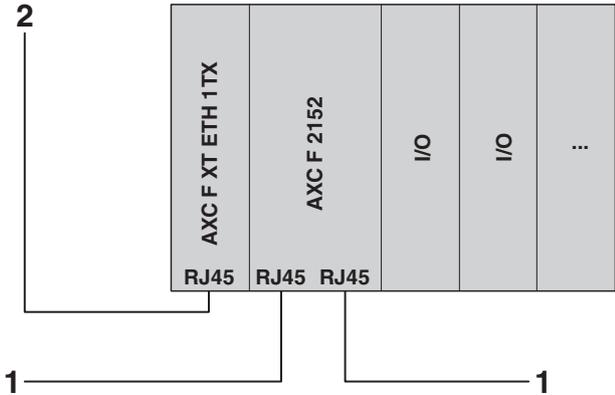
Figure 12 Connection of the cables



14 Application example

With the left-alignable Ethernet interface, you are extending the PLCnext controller by adding another separate network interface. You can thus realize two networks that are independent of each other:

Figure 13 Example application



Key:

- 1 Network 1: Communication with the I/O level, e. g., as a PROFINET device
- 2 Network 2: Communication with another network, e.g., as a PROFINET controller



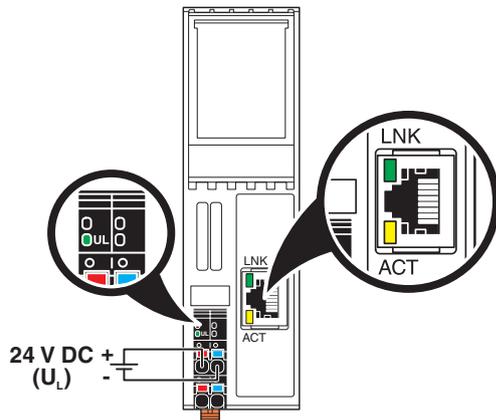
When using an AXC F 2152 controller, please observe the following:

As soon as you have connected the extension module, the PROFINET controller function is only available on the Ethernet interface of the extension module.

15 Diagnostics and status indicators

15.1 Diagnostics and status indicators of the left-alignable extension module

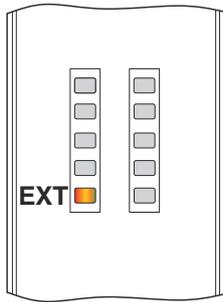
Figure 14 Diagnostics and status indicators of the left-alignable extension module



Designation	Color	Meaning	State	Description
UL	Green	Communica- tions power	On	Communications power present.
			Off	Communications power not present.
LNK	Green	Link status	On	Connection active
			Off	Connection not active
ACT	Yellow	Activity status	On	Data transmission active
			Off	No data transmission

15.2 Diagnostic indicators of the controller

Figure 15 Diagnostic indicators of the controller



The controller has an LED for diagnosing Axioline F extension modules that are aligned to the left.



For information on all other LEDs, please refer to the user manual for the controller you are using.

Designation	Color	Meaning	State	Description
EXT	Red	Left alignment	On	Error at extension module Possible error causes: - Extension module is not supported. - Extension module is not mounted correctly or is defective. - Extension module was disconnected from power during operation or has been removed.
	Yellow		On	Test of the extension module during the boot procedure
	Green		On	Extension module operating without errors