AXL F BK SAS

Axioline F, bus coupler, Ethernet (IEC 61850, MMS, and GOOSE)



Data sheet
105645_en_04

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1 Description

The bus coupler is intended for use within an Ethernet network (IEC 61850, MMS, GOOSE).
The bus coupler creates the link to the Axioline F I/O system and the industrial I/O signals connected to it.
Up to 63 Axioline F devices can be connected to the bus coupler.

Features

- 2 Ethernet ports (with integrated switch)
- Transmission speed of 10 Mbps and 100 Mbps
- Rotary coding switches for setting the IP address assignment and other functions
- Supports IEC 61850, MMS, and GOOSE
- BootP and DHCP
- Firmware can be updated
- Web-based management
- Supports operation of the digital and analog modules of the Axioline F and Axioline SE product families

NOTE: In the event of a connection abort, outputs retain their last state
Take this behavior into consideration in your application.

This data sheet is only valid in association with the UM EN AXL F SYS INST user manual.
Further notes on startup can be found in the bus coupler quick-start guide.

Make sure you always use the latest documentation.
It can be downloaded at: phoenixcontact.com/product/2701457

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3 Ordering data

Description	Type	Item no.	Pcs./Pkt.
Axioline F, Bus coupler, Ethernet (IEC 61850, MMS, GOOSE), RJ45 jack, transmission speed in the local bus: 100 Mbps, degree of protection: IP20, including bus base module and Axioline F connector	AXL F BK SAS	2701457	1

Accessories	Type	Item no.	Pcs./Pkt.
Axioline F bus base module for housing type BK (Replacement item)	AXL F BS BK	2701422	5
RJ45 connector, design: RJ45, degree of protection: IP20, number of positions: 8, 1 Gbps, CAT5 (IEC 11801:2002), material: Plastic, connection method: Crimp connection, connection cross section: AWG 26- 24, cable outlet: straight, color: green, Ethernet (Plug/ Adapter)	FL PLUG RJ45 GR/2	2744856	1
RJ45 connector, design: RJ45, degree of protection: IP20, number of positions: 8, 1 Gbps, CAT5 (IEC 11801:2002), material: Plastic, connection method: Crimp connection, connection cross section: AWG 26- 24, cable outlet: straight, color: green, Ethernet (Plug/Adapter)	FL PLUG RJ45 GN/2	2744571	1
CAT5-SF/UTP cable (J-02YS(ST)C HP 2 x 2 x 24 AWG), heavy-duty installation cable, 2 x 2 x 0.22 mm^2, solid conductor, shielded, outer sheath: 7.8 mm diameter, inner sheath: 5.75 mm ± 0.15 mm diameter (Cable/conductor)	FL CAT5 HEAVY	2744814	1
By the meter, Installation cable, Ethernet CAT5 (100 Mbps), shielded, PUR halogen-free, water blue RAL 5021, 4-wire (2x2xAWG26/7; SF/UTP), color single wire: white/orange-orange, white/green-green, cable length: Free entry (1.0 ... 1000.0 m) (Cable/conductor)	FL CAT5 FLEX	2744830	1
Crimping pliers, for assembling the RJ45 plugs FL PLUG RJ45..., for assembly on site (Tool)	FL CRIMPTOOL	2744869	1
Zack marker strip for Axioline F (device labeling), in 2 x 20.3 mm pitch, unprinted, 25-section, for individual labeling with B-STIFT 0.8, X-PEN, or CMS-P1-PLOTTER (Marking)	ZB 20,3 AXL UNPRINTED	0829579	25
Zack Marker strip, flat, Strip, white, unlabeled, can be labeled with: PLOTMARK, CMS-P1-PLOTTER, mounting type: snapped, for terminal block width: 10.15 mm, lettering field size: 4 x 10, 15 x 5 mm, 1 x 5.8 x 5 mm, Number of individual labels: 50 (Marking)	ZBF 10/5,8 AXL UNPRINTED	0829580	50

Accessories	Type	Item no.	Pcs./Pkt.
Insert label, for marking Phoenix Contact Axioline modules, Roll, white, unlabeled, can be labeled with: THERMOMARK E.300 (D)/600 (D), THERMOMARK ROLL 2.0, THERMOMARK ROLL, THERMOMARK ROLL X1, THERMOMARK ROLLMASTER 300/600, THERMOMARK X1.2, mounting type: insert, lettering field size: 35 x 18.7 mm, Number of individual labels: 500 (Marking)	EMT (35X18,7)R	0801831	1
Fine surge protection for data networks up to 1 Gbps. For use in Ethernet, Power over Ethernet (PoE, mode A and mode B), token ring, ISDN, and DS1. RJ45 attachment plug with separate grounding cable and snap-on foot for NS 35 DIN rails.	D-LAN-CAT.5-FP	2800723	1
1-channel, electronic circuit breaker for protecting loads at 24 V DC against overload and short circuit. Easy potential distribution with components from the CLIPLINE complete terminal block system. With electronic interlock of the set nominal currents. For installation on DIN rails.	PTCB E1 24DC/1-8A NO	2908262	1
Connecting cable, for connecting the controller to a PC for PC Worx and LOGIC+, USB A to micro USB B, 2 m in length. (Cable/conductor)	CAB-USB A/MICRO USB B/ 2,0M	2701626	1

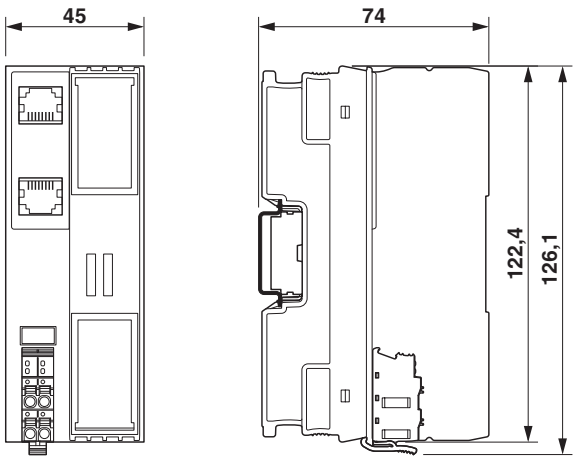
Recommendation:

Connect the USB interface of the bus coupler to your PC in such a way that it is electrically isolated. To do this, use a USB isolator.

Documentation	Type	Item no.	Pcs./Pkt.
Quick start guide, English, Starting up the Axioline F bus coupler AXL F BK SAS	UM QS EN AXL F BK SAS	-	-
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	-	-
Quick start guide, English, Handling an Axioline F station under Startup+	UM QS EN STARTUP+	-	-
Application note, English, Protection of the FTP access on bus couplers	AH EN AXL F BK - SECURITY ADVISORY	-	-
Application note, English, Measures to protect network-capable devices with Ethernet connection against unauthorized access	AH EN INDUSTRIAL SECURITY	-	-
User manual, English, Installation and operation of the PC Worx Firmware Updater software	UM EN PC WORX FIRMWARE UPDATER	-	-
Application note, English, PC WORX FIRMWARE UPDATER – Change notes at a glance	AH EN PC WORX FIRMWARE UPDATER - CHANGE NOTES	-	-
User manual, English, IEC 61850 configuration of a Phoenix Contact IED	UM EN PHOENIX CONTACT IEDs – IEC 61850	-	-

4 Technical data

Dimensions (nominal sizes in mm)	



Width	45 mm
Height	126.1 mm
Depth	74 mm
Note on dimensions	The depth applies when a TH 35-7.5 DIN rail is used (in accordance with EN 60715).

General data	
Color	traffic grey A RAL 7042
Weight	177 g (with connector and bus base module)
Ambient temperature (operation)	-25 °C ... 60 °C (Mounting position: wall mounting on horizontal DIN rail) -25 °C ... 55 °C (Mounting position: any)
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Permissible humidity (operation)	5 % ... 95 % (non-condensing)
Permissible humidity (storage/transport)	5 % ... 95 % (non-condensing)
Air pressure (operation)	70 kPa ... 106 kPa (up to 3000 m above sea level)
Air pressure (storage/transport)	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)
Overvoltage category	II (IEC 60664-1, EN 60664-1)
Degree of pollution	2 (IEC 60664-1, EN 60664-1)
Mounting type	DIN rail mounting
Mounting position	any (observe temperature derating)

Connection data: Axioline F connector	
Connection method	Push-in connection
Conductor cross section, rigid	0.2 mm² ... 1.5 mm²
Conductor cross section, flexible	0.2 mm² ... 1.5 mm²
Conductor cross section [AWG]	24 ... 16
Stripping length	8 mm

Please observe the information provided on conductor cross sections in the “Axioline F: system and installation” user manual.

Interface: Ethernet (IEC 61850, MMS, GOOSE)	
Number of interfaces	2
Connection method	RJ45 jack (Auto negotiation and autocrossing)
Transmission speed	10/100 Mbps (Half or full duplex mode (automatic detection, can be adjusted manually))
Transmission physics	Ethernet in RJ45 twisted pair
Transmission length	max. 100 m

Interface: Axioline F local bus	
Number of interfaces	1
Connection method	Bus base module
Transmission speed	100 Mbps

Interface: Service	
Number of interfaces	1
Connection method	Micro USB type B

System limits of the bus coupler

Use the Project+ configuration software to calculate the individual process or parameter data and the corresponding number of devices that can be connected.

For the Project+ configuration software, go to: www.phoenixcontact.com/product/2701457

Number of local bus devices that can be connected	max. 63

NOTE: Electronics may be damaged when overloaded

Observe the logic current consumption of each device when configuring an Axioline F station. It is specified in every module-specific data sheet. The current consumption can differ depending on the individual module. The permissible number of devices that can be connected therefore depends on the specific station structure.

Supported protocols	
Supported protocols	MMS, GOOSE, SNMP, HTTP, TFTP, FTP, BootP, DHCP, SNTP

Communications power U_L feed-in (the supply of the Axioline F local bus U_{Bus} is generated from 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. 105 mA (without I/Os and U_L = 24 V) max. 570 mA (with 2 A at U_{Bus} for the I/Os and U_L = 24 V)
Power consumption	typ. 2.5 W (without I/Os) max. 13.7 W (2.0 A on U_{Bus}, U_L = 24 V)
Surge protection	electronic
Reverse polarity protection	electronic

NOTE: Electronics may be damaged when overloaded

Provide external fuses for the 24 V U_L area. If you are using an external fuse, the power supply unit must be able to supply four times the nominal current of the fuse. This ensures that it trips in the event of an error.

Axioline F local bus supply (U_{Bus})	
Supply voltage	5 V DC (via bus base module)
Power supply unit	2 A

Electrical isolation/isolation of the voltage areas	
Test section	**Test voltage**
Ethernet interface 1 / Ethernet interface 2	1500 V AC, 50 Hz, 1 min.
Ethernet interface 1 / 24 V communications voltage (U_L) feed-in	1500 V AC, 50 Hz, 1 min.
Ethernet interface 2 / 24 V communications voltage (U_L) feed-in	1500 V AC, 50 Hz, 1 min.
Ethernet interface 1 / functional ground	1500 V AC, 50 Hz, 1 min.
Ethernet interface 2 / functional ground	1500 V AC, 50 Hz, 1 min.
24 V communications voltage (U_L) feed-in / functional ground	500 V AC, 50 Hz, 1 min.

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

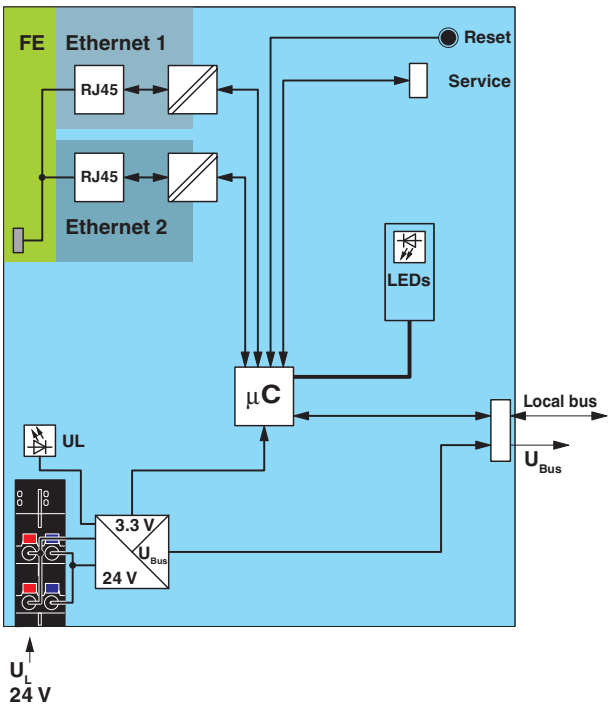
Conformance with EMC Directive 2014/30/EU	
Immunity test in accordance with EN 61000-6-2/IEC 61000-6-2	
Electrostatic discharge (ESD) EN 61000-4-2/IEC 61000-4-2	Criterion B, 6 kV contact discharge, 8 kV air discharge
Electromagnetic fields EN 61000-4-3/IEC 61000-4-3	Criterion A, Field intensity: 10 V/m
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/±1.0 kV (symmetrical/ asymmetrical), fieldbus cable shielding: ±1.0 kV
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	Class B

Approvals	
For the current approvals, go to:	www.phoenixcontact.com/product/2701457

Manufacturer's declarations	
For the current manufacturer’s declarations, go to:	www.phoenixcontact.com/product/2701457

5 Internal circuit diagram

Figure 1 Internal wiring of the terminal points



Key:

FE	Functional ground
Reset	Reset button
Service	Service interface
Local bus	Axioline F local bus (hereinafter referred to as local bus)
RJ45	RJ45 interface
	Power supply unit with electrical isolation
	Power supply unit
µC	Microcontroller
	LED
	Electrically isolated areas

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

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 Connecting Ethernet and supply

8.1 Connecting Ethernet

Connect Ethernet to the bus coupler via an 8-pos. RJ45 connector.

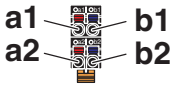
The Ethernet connections are set to “Auto crossover” by default.

Shielding
The shield of the connected twisted pair cables is electrically connected to the socket. When connecting network segments, avoid ground loops, potential transfers, and equipotential bonding currents via the braided shield.

Observe bending radii
The housing dimensions specified under "Dimensions" refer to the bus coupler with I/O connectors without Ethernet connection. When installing the bus coupler in a control box, observe the bending radii of the Ethernet cables and the connectors used (e.g., FL CAT5 FLEX: 30 mm for fixed installation and FL CAT5 HEAVY: 30 mm without outer sheath and 45 mm with outer sheath). If required, use angled RJ45 connectors to maintain these bending radii.

8.2 Connecting the supply voltage - terminal point assignment

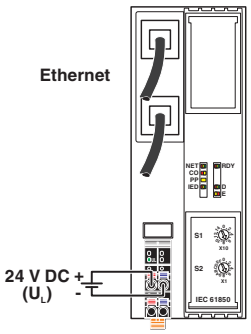
Figure 2 Terminal point assignment



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

9 Connection example

Figure 3 Connection of the cables



10 I/O modules in the station

In a station with this bus coupler, use only the following modules:

Axioline F	Axioline SE
AXL F ...	**AXL SE ...**
... DI..., ... DO..., ... DI... DO..., ... DOR...	
... AI..., ... AO..., ... AI... AO...	
... RTD..., ... UTH...	
	... SC-A

No other types are permitted, as they are not fully stored in the protocol.

11 Configuring the bus coupler

You can configure the bus coupler in two ways:

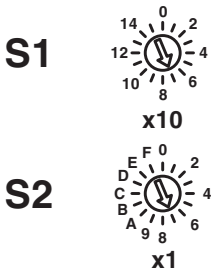
– From a higher-level PC (remote access) via a tool.
– Directly on the bus coupler using the rotary coding switches.

To configure the bus coupler via remote access, set rotary coding switches S1 and S2 to code 00. This code is preset by default in the delivery state.

If you do not want to configure the bus coupler via remote access, use rotary coding switches S1 and S2 with the codes listed in the table below to set the address and other functions.

Every time you change the switch position, restart the bus coupler. A change of the switch position during operation has no effect.

Figure 4 Rotary encoding switch



The code results from the sum of S1 x 10 plus S2 x 1. The image shows code 77 (7 x 10 + 7).

S1	S2	Code	Function
0	0	00	Remote access (default)
0 ... 5	0 ... 9	01 ... 50	Manual address assignment
5 ... 15	0 ... 9	51 ... 159	DHCP name assignment
0	A	0A	Static address
0	E	0E	Resetting IP parameters
1	A	1A	Activate Plug and Play mode
1	B	1B	Deactivate Plug and Play mode
12	C	12C	Resetting to the default settings
Other			Reserved

11.1 Remote access

Switch position 00

With this switch position, you can configure the device remotely using appropriate tools (e.g., Startup+, web-based management (WBM)).

Behavior during initial startup, after resetting the IP parameters or after resetting to default settings

Default: BootP activated, DHCP deactivated

A valid IP address is not assigned (0.0.0.0) and communication is therefore not possible.

The device transmits continuous BootP requests (2 s, 4 s, 8 s, 2 s ...), until a valid IP address has been received.

Valid IP parameters are then automatically saved as configuration data on the device.

Behavior during each additional start-up

BootP activated
Three BootP requests are transmitted even in the case of a valid configuration. If the device receives a BootP reply, the new IP parameters are applied. Otherwise the device starts with the last valid configuration.

DHCP activated
For behavior, see switch position 51 … 159. The station name can be selected in WBM. The default station name is the MAC address with “-” used as the separator.

Static (BootP and DHCP deactivated)
The device starts with the last valid assigned IP configuration.

11.2 Manual address assignment

Switch position 01 ... 50

BootP deactivated, DHCP deactivated

The first three octets in the IP address are preset as 192.168.0.x.
The subnet mask is 255.255.255.0.

Specify the last byte with the switch position.

As such, you can select IP addresses between 192.168.0.**1** and 192.168.0.**50**.

Before transferring the IP address, a test is performed to check for potential IP address conflicts. If a conflict is detected, the bus coupler temporarily switches the IP address to 0.0.0.0 (no IP communication). In this case, the NET LED flashes red. Resolve the conflict and restart the bus coupler.

11.3 DHCP name assignment

Switch position 51 ... 159

This switch position is used to easily specify the DHCP host name for the device.

The host name is provided to the DHCP server via DHCP options. This is therefore able to send a DNS update to the DNS server.

The DNS name consists of a set part and a variable part. The set part is based on the order designation. You specify the variable part via the switch position.

The first part of the station name is AXL-F-BK-SAS-.

The set number is added.

This results in the following station names: AXL-F-BK-SAS-**051** ... AXL-F-BK-SAS-**159**.

Behavior during initial startup, after resetting the IP parameters or after resetting to default settings

A valid IP address is not assigned (0.0.0.0) and communication is therefore not possible.

The device transmits continuous DHCP discover messages until a valid IP address has been received.

Behavior during each additional start-up

Within the first minute, DHCP requests are transmitted with the last valid IP address.

Three cases are possible:

1. The DHCP server accepts the desired address.
   ⇒ The device starts with this IP address.
2. The DHCP server assigns a new IP address.
   ⇒ The device applies the new IP parameters.
3. The DHCP server does not respond.
   ⇒ The device transmits continuous DHCP Discover messages until new IP parameters have been received.

11.4 Static address

Switch position 0A

Behavior during initial startup, after resetting the IP parameters or after resetting to default settings

A valid IP address is not assigned (0.0.0.0) and communication is therefore not possible.

Assign an address initially with another switch position.

Behavior during each additional start-up

After a voltage reset, the device maintains the IP address which was assigned last.



With this switch position, modifying the IP address via tools or web-based management is not possible.

11.5 Resetting IP parameters

Switch position 0E

The IP parameters stored on the device are reset.

All other settings made on the device are retained.

– BootP is activated for switch position 00.
– IP address, subnet mask: 0.0.0.0

As long as the switch position 0E remains selected, no connection to the device can be established.

IP communication is deactivated (LED NET static yellow).

11.6 Plug and Play mode

Switch position 1A: activate Plug and Play mode
Switch position 1B: deactivate Plug and Play mode

In Plug and Play mode, you can use the bus coupler to start up the connected local bus modules in the field without a higher-level PC (engineering system).

If plug and play mode is enabled, then the writing of process data is rejected. Read access to the process data is possible.

If Plug and Play mode is disabled, then the bus will only be commissioned if the configuration of the connected bus matches the saved configuration.

See section “Startup behavior of the bus coupler”.

11.7 Resetting to the default settings

Switch position 12C

All settings are reset to default settings, including IP parameters.

The device is ready for operation after powering up, as soon as the RDY LED lights up green.
A connection to the device however cannot be established in this switch position.
As soon as the RDY LED lights up green, a new switch position can be selected on the rotary encoding switch and the device can be restarted.

Alternatively, the default setting can also be restored via the reset button (see “Reset button”).

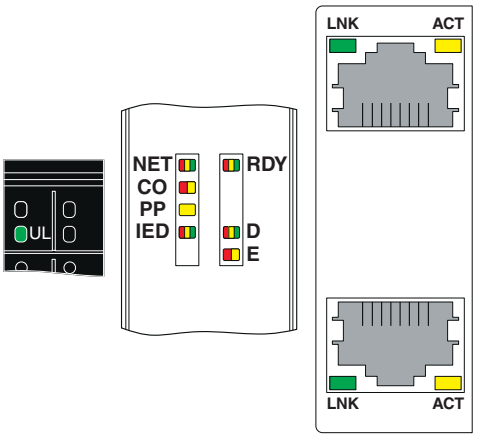
11.8 Reserved/invalid switch position

The device starts with the previous settings, e.g., with the settings that were valid before the device was restarted.

An invalid switch position is indicated by the RDY LED (red on).

12 Local diagnostic and status indicators

Figure 5 Local diagnostic and status indicators



Designation	Color	Meaning	State	Description
UL	Green	U_{Logic}	On	Communications power supply present.
			Off	Communications power supply not present.
NET	Green/ yellow/ red	Network status	Green on	At least one connection has been established to the device.
			Flashing green	A connection can be established to the device.
			Yellow on	IP configuration (IP address) is invalid (0.0.0.0).
			Flashing yellow	BootP requests or DHCP requests/discover messages are being transmitted.
			Flashing red	An IP address conflict has occurred during static configuration via rotary coding switches (IP address assigned twice).
			Off	Device is not ready for operation.
CO	Yel- low/ red	Configuration	Yellow on	Parameterization of the I/O modules failed.
			Red on	The active configuration of the local bus differs from the saved configuration.
			Off	The active configuration of the local bus matches the saved configuration.
PP	Yellow	Plug and Play mode	On	Plug and Play mode is activated.
			Off	Plug and Play mode is deactivated.
IED	Green/ yellow/ red	Intelligent elec- tronic device	Green on	SCD/CID file OK, configuration files available, settings for startup are OK.
			Flashing yellow	SCD/CID file missing.
			Yellow on	SCD/CID file is defective.
			Flashing red	At least one configuration file is missing.
			Red on	Settings for startup are missing or are invalid.
			Off	Device is not ready for operation.

Designation	Color	Meaning	State	Description
RDY	Green/ yellow/ red	Ready	Green on	Device is ready for operation.
			Flashing green/ yellow	Communications power undervoltage or surge voltage
				Overtemperature
			Yellow on	Firmware/bus coupler is booting.
			Flashing yellow	Firmware update is being performed.
			Flashing yellow/red	Firmware update has failed. Check the firmware file and the settings.
			Flashing red	Faulty firmware. Carry out a firmware recovery update.
			Red on	Rotary encoding switches are set to an invalid/reserved position.
			Off	Device is not ready to operate. Check the supply voltage.
D	Red/ yellow/ green	Diagnostics of local bus communication		
		Run	Green on	The station is ready to operate; communication within the station is OK. All data is valid. An error has not occurred.
		Active	Flashing green	The station is ready to operate. Communication within the station is ok. The data are **not** valid. The controller or higher-level network is not providing valid data. The module is not malfunctioning.
			Flashing green/ red	A rest system will be operated; at least one device of the configuration is not available.
		Ready	Yellow on	The station is ready to operate. No data are being exchanged.
		Connected	Flashing yellow	Access from Startup+ in I/O check mode
			Flashing yellow/red	Local bus error during active I/O check (with connected Startup+)
		Not connected	Flashing red	Local bus error on startup
				Possible causes:
				The configuration cannot be generated. Information from one device is missing.
				Chip version of a device is <V1.1
				The desired and actual configuration are different
				No local bus device connected
				The maximum number of local bus devices is exceeded.
		Reset	Red on	The station is ready for operation but has lost connection to at least one device.
				Possible causes:
				Communication error
				Local bus device has been removed or configured device is missing.
				Reset at a local bus device
				Serious device error at a local bus device (local bus device can no longer be reached)
		Power down	Off	Device is in (power) reset.

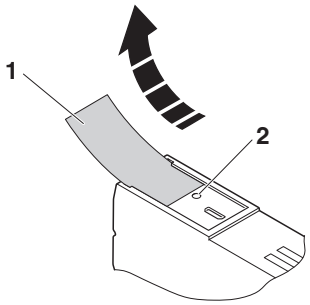
Designation	Color	Meaning	State	Description
E	Yellow/ red	Error	Yellow on	I/O warning at a local bus device
			Red on	I/O error at a local bus device
			Off	No I/O messages present.
LNK 1/2	Green	Link port 1/2	On	Connection via Ethernet to a module via port 1/2 established
			Off	No connection established via port 1/2
ACT 1/2	Yellow	Activity port 1/2	Flashing	Transmission or reception of Ethernet telegrams at port 1/2
			Off	No transmission or reception of Ethernet telegrams at port 1/2

The LED NET then only lights up continuously if a consistent connection is established. GOOSE or MMS are not consistent connections, they are only opened if required and are then closed again.

13 Reset button

The reset button is located beneath the top marking label on the bus coupler.

Figure 6 Reset button



1 Labeling field

2 Reset button

The reset button has two functions:

– Restarting the bus coupler

– Resetting of the default settings

13.1 Restarting the bus coupler

Restart the bus coupler by pressing the reset button during ongoing operation.

The outputs of the station are set to the parameterized substitute values.

The process image of the inputs is not re-read.

13.2 Restoring the default settings

The bus coupler is supplied with the following default settings:

Password	private
IP settings	
IP address	0.0.0.0
Subnet mask	0.0.0.0
Default gateway	0.0.0.0
BootP	activated
Firmware update	
Firmware update on next restart	deactivated
TFTP server IP address	172.16.40.201
Name of firmware update file	c2701457.fw
System identification	
Name of device	AXL F BK SAS
Description	Ethernet bus terminal
Location	Unknown
Contact	Unknown
Plug and Play mode	activated

If you wish to restore the default settings, proceed as follows:

- Disconnect the power to the module.
- Press and hold the reset button.
- Switch on the power.

The LEDs indicate the initialization phase:

LED	State	Meaning
RDY	Off	Starting firmware
RDY	Yellow on	Initializing firmware
RDY	Green	Initialization complete

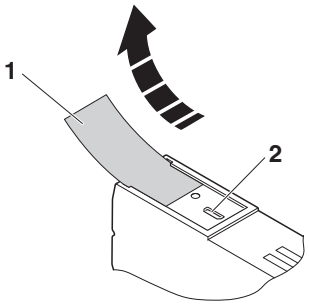
- When the RDY LED lights up green, release the button.

The default settings are restored.

14 Service interface

The service interface is located beneath the top marking field on the bus coupler.

Figure 7 Service interface



1 Labeling field

2 Service interface

Using the service interface via USB, you can connect the bus coupler to a PC on which Startup+, the startup and diagnostic tool, is running.

NOTE: Damage to the USB interface

In PCs, the USB ports are usually not electrically isolated from the rest of the hardware. This does not cause any problems for USB devices that do not have their own reference ground. However, if you connect grounded devices (e.g., the bus coupler), ground loops with undesired compensating currents may occur. These compensating currents can impair data transmission and, in extreme cases, destroy the interfaces.

Recommendation:

Connect the USB interface of the bus coupler to your PC in such a way that it is electrically isolated. To do this, use a USB isolator.

Startup+

Startup+ offers the following functions:

– Parameterization of the station I/O modules
– I/O check
– Diagnostics

For detailed information on Startup+, please refer to the UM QS EN STARTUP+ user manual.

15 Startup behavior of the bus coupler

15.1 Plug and Play mode

Plug and Play mode active

The bus coupler supports Plug and Play mode.

In Plug and Play mode, you can use the bus coupler to start up the connected local bus modules in the field without a higher-level PC (engineering system).

The Plug and Play mode status (active or inactive) is stored retentively on the bus coupler. The current mode is displayed via the PP LED.

In plug-and-play mode, the connected local bus modules are detected (type and installation sequence).

If this physical configuration is ready to operate, it is started; however, writing outputs is not enabled.

To enable writing outputs, Plug and Play mode must be deactivated. The deactivation is to be saved at the same time as saving the signal, active configuration, and reference configuration.

Plug and Play mode inactive

When plug and play mode is deactivated, the reference configuration is compared to the physical configuration. If the configurations are identical, the bus coupler is set to the RUN state on the first write access.

If the reference configuration and the physical configuration differ, the LED CO lights up red. In this case, process data exchange is not possible for safety reasons.

In order to operate the bus despite this, you have the following two options:

1. Restore the original configuration so that the reference configuration and the physical configuration are the same again.
2. Activate plug-and-play mode and restart the bus coupler so that the active physical configuration is accepted as the reference configuration.

15.2 Behavior in case of a fault in the local bus

See UM QS EN AXL F BK SAS.

15.3 Startup parameterization

Some Axioline F modules can be parameterized (e.g., measuring ranges, substitute value behavior in the event of a bus error).

There are two ways to parameterize these modules:

– Parameterization via the Startup+ software.
– Parameterization via a configuration file

15.3.1 Parameterization via the Startup+ software

You can parameterize the local bus modules directly via the Startup+ software. This parameterization is stored retentively on the I/O modules. For this reason, the parameterization only needs to be written once during system startup.

When Plug and Play mode is deactivated, the bus coupler checks the parameterization of the I/O modules as well as the bus configuration. After the bus configuration has been changed (e.g., module replacement), the bus coupler prevents process data from being written, the LED CO lights up yellow. Adapt the parameterization accordingly. The bus coupler will then enable the output of process data.

15.3.2 Parameterization via a configuration file

On power up, the bus coupler can take care of the startup parameterization of the local bus modules. To do this, a configuration file must be loaded in the bus coupler.

You can generate this file with Startup+ and store it on the bus coupler via FTP. See UM QS EN STARTUP+.

The bus coupler transmits the parameters from the configuration file to the connected local bus modules during startup.

As the config.svc configuration file overwrites the parameters stored in the file on the module each time it is powered up, the parameters are always up-to-date.

This makes it easy for you to replace the local bus modules.

If you replace the bus coupler: download the configuration file to the bus coupler before replacing it.

Note that when starting up using a configuration file, any parameters saved on the module will be overwritten.

16 Substitute value behavior

See UM QS EN AXL F BK SAS.

17 WBM: Web-based management

The device has a web server, which generates the required pages for web-based management and, depending on the requirements of the user, sends them to a standard web browser.

You can use web-based management to access static or dynamic information. Examples of static information include technical data or the MAC address. Examples of dynamic information include IP addresses, status information, local bus structure and diagnostics.

You can use web-based management via port 80.

Accessing web-based management

You can address the device's web server using the IP address if it is configured accordingly. The device's homepage (web page) is accessed by entering the URL http://<IP address>.
Example: http://172.16.113.38

The default password is "private".

Recommendation: Assign your own password during startup.

If you cannot access the WBM pages, check the connection settings in your browser. Deactivate the proxy if set.

Controlling access to web-based management

You can block or unblock access to web-based management via SNMP, see Section "SNMP: Simple Network Management Protocol".

18 Firmware update

To update the bus coupler firmware, provide the bus coupler with a firmware container via a TFTP server or load it onto the bus coupler via FTP. You can use any FTP client or TFTP server for this, such as the PC Worx Firmware Updater.
If you do not use the PC Worx Firmware Updater, start the firmware update using the web-based management. When the firmware is being updated, the RDY LED flashes yellow.



For more detailed information regarding the firmware update, refer to the “Installation and operation of the PC Worx Firmware Updater software” user manual.