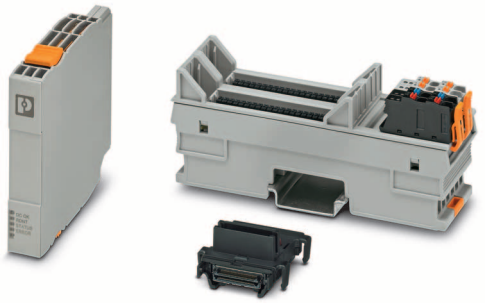
AXL P FBPS power supply

Fieldbus power supply for PROFIBUS PA



Data sheet
4012_en_D

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1 Description

The Axioline P fieldbus power supply for PROFIBUS PA consists of a base (Order No. AXL P FBPS BASE) and redundant power plugs (Order No. AXL P FBPS 28DC/0.5A). Each AXL P FBPS… power supply provides the signal and power for a single PROFIBUS PA segment, allowing up to 32 PROFIBUS PA devices to be connected per segment.

The AXL P FBPS 28DC/0.5A is a 500 mA PROFIBUS PA power supply that can be used in either simplex or redundant mode.

The AXL P FBPS BASE connects to an internal bus and accepts two AXL P FBPS 28DC/0.5A plugs. The AXL P FBPS BASE has two connectors: one for the 24 V DC supply voltage and one for the PROFIBUS PA trunk segment.

Together with the PROFINET bus coupler AXL P BK PN AF, the fieldbus power supplies build a modular proxy allowing up to eight PROFIBUS PA segments. Load sharing between the AXL P FBPS 28DC/0.5A plugs is active when using redundant configuration, two plugs in a single base.

1.1 Features

- A single Axioline P power supply supports up to 32 PROFIBUS PA devices
- Hot-swappable
- DTM environment
- Integrated physical layer diagnostics
- Block modular
- Hot-swappable power plugs
- High operating temperature range
- UL, ATEX, and IECEx
- EMC Class A for industrial environments

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This document is valid for all products listed in the “Ordering data” on page 3

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2 Ordering data

Products

Description	Type	Order No.	Pcs./Pkt.
Base, for Axioline P PROFIBUS PA power supply plugs. Provides fieldbus power redundancy when two plugs are installed.	AXL P FBPS BASE	2316393	1
Plug, redundant power supply, for installation in Axioline P PROFIBUS PA power supply base. Provides 500 mA @ 28 V DC to fieldbus couplers along the trunk.	AXL P FBPS 28DC/0.5A	2316394	1

Accessories

Description	Type	Order No.	Pcs./Pkt.
Axioline P bus coupler for PROFINET. Connects to PROFIBUS PA power supplies and Axioline P I/O modules along the Axioline P local bus. Includes power supply connector and bus socket.	AXL P BK PN AF	2316390	1
Axioline P bus socket module for housing type FBPS base	AXL P BS 35	2316396	1
Axioline P shield connection set, includes two shield bus holders and two shield connection clamps	AXL SHIELD SET	2700518	1
Axioline P system terminator pair (replacement item)	AXL P TERM PAIR	2316402	1

3 Technical data

General data	
Color	Gray
Ambient temperature (operation)	-40…70°C (Mounting position: Wall mounting on horizontal DIN rail)
Ambient temperature (storage/transport)	-40…85°C
Permissible humidity (operation)	5…95% (non-condensing)
Permissible humidity (storage/transport)	5…95% (non-condensing)
Air pressure (operation)	Up to 2000 m above sea level
Air pressure (storage/transport)	Up to 2000 m above sea level
Dimensions	See Figure 1
Degree of protection	IP20
Protection class	III
Mounting position	Wall mount, horizontal
Redundancy	Requires two AXL P FBPS 28DC/0.5A

PROFIBUS PA interface	
Connection method	Removable plug, push-in conductors
Conductor size, solid/stranded/AWG	0.2 mm²... 1.5 mm²/0.2 mm²... 1.5 mm²/24...16
Stripping length	8 mm
Transmission physics	2-wire copper
Number of supported devices	32 in a single segment
Number of supported segments	8
Transmission speed	31.25 kbps
Transmission length	1900 m maximum

Electrical data	
Input voltage, supply	24 V DC
Input voltage range	18.5…30.5 V DC
Trunk output voltage range	28 … 30 V DC
Trunk current, maximum	500 mA
Current consumption, typical	750 mA (24 V DC, 500 mA load)
Current consumption, maximum	950 mA (18.5 V DC, 500 mA load

Mechanical tests	
Vibration resistance (IEC/EN 60068-2-6)	2g
Shock (IEC/EN 60068-2-27)	5g

Conformance with EMC Directive 2004/108/EC	
Electrostatic discharge (ESD) IEC/EN 61000-4-2	Criterion B, 6 kV contact discharge, 8 kV air discharge
Electromagnetic fields (IEC/EN 61000-4-3)	Criterion A, Field intensity: 10 V/m
Fast transients (burst) (IEC/EN 61000-4-4)	Criterion B, 2 kV
Transient overvoltage (surge) (IEC/EN 61000-4-5)	Criterion B, DC supply lines: ±0.5 kV/±0.5 kV (symmetrical/ asymmetrical); fieldbus cable shield: ±1 kV
Conducted interference (IEC/EN 61000-4-6)	Criterion A, Test voltage 10 V
Radio interference (EN 55022/55032)	Class A
Noice immunity (EN 61000-6-2)	
Noise emissions (EN 61000-6-4)	
Ring wave noise immunity (IEC 61000-4-12)	
Namur NE21	
PROFIBUS standardization	IEC 61158-2

Approvals	
ATEX	Ⓔx II 3 G Ex ec IIC T4 Gc IBExU 18ATEXB018X
IECEx	Ex ec IIC T4 Gc IECEx IBE 18.0023X
UL, USA/Canada	Class I, Div. 2, Groups A, B, C, D T4 Class I, Zone 2, IIC T4

3.1 Dimensions

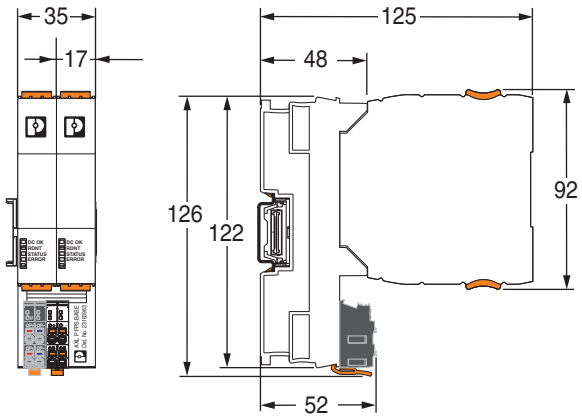
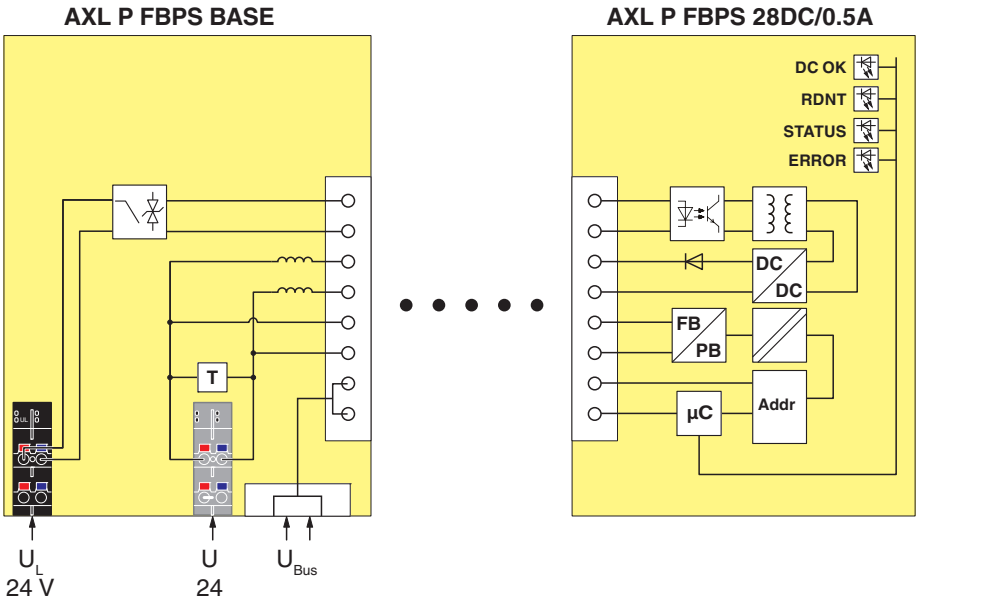


Figure 1 Dimensions of assembly

3.2 Block diagram




Filter/Transient protect

Terminator (PROFIBUS PA)


Isolated supply


Isolator


DC/DC converter


Fieldbus PROFIBUS transceiver


Data isolation


Microcontroller


Dynamic addressing

Figure 2 Block diagram

4 Connections

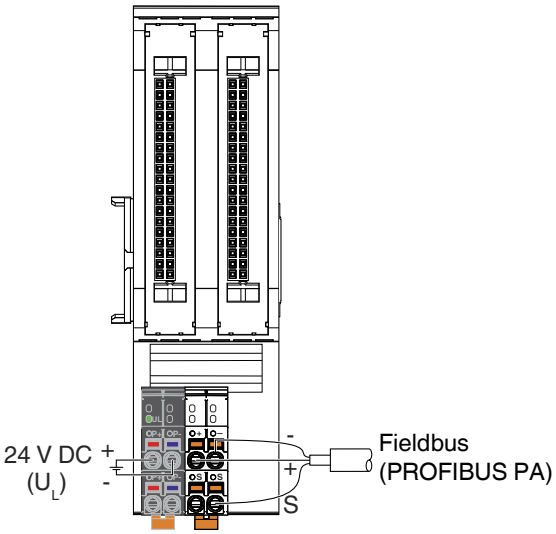


Figure 3 Connections

4.1 PROFIBUS PA

PROFIBUS PA is a fieldbus-based standard of PROFIBUS and PROFINET International (PI) that has proven to be highly useful in the process automation industry.

Figure 4 shows a typical, proper PROFIBUS PA installation. Any PROFIBUS PA installation must be in accordance with the following characteristics:

– 31.25 kbps data rate along a shielded 2-wire twisted pair cable.
– powered bus or segment to power the PROFIBUS PA devices.
– no more than 32 PROFIBUS PA devices per segment.
– 9 - 32 V DC range.
– maximum total segment length of 1900 m.
– terminators required.
– device couplers installed to provide spurs to connect devices.

Fieldbus connections

Terminal point	Color	Assignment	Function
+	Orange	PROFIBUS PA positive signal	Positive signal for the two-wire PROFIBUS PA signal
-	Orange	PROFIBUS PA negative signal	Negative signal for the two-wire PROFIBUS PA signal
S	Orange	Shield	Shield connection (bridged internally)

4.2 Supply voltage

Terminal point	Color	Assignment	Function
P+	Red	24 V DC (U_L)	Supply of the logic voltage (internally jumpered)
P-	Blue	GND	Reference potential of the supply voltage (bridged internally)

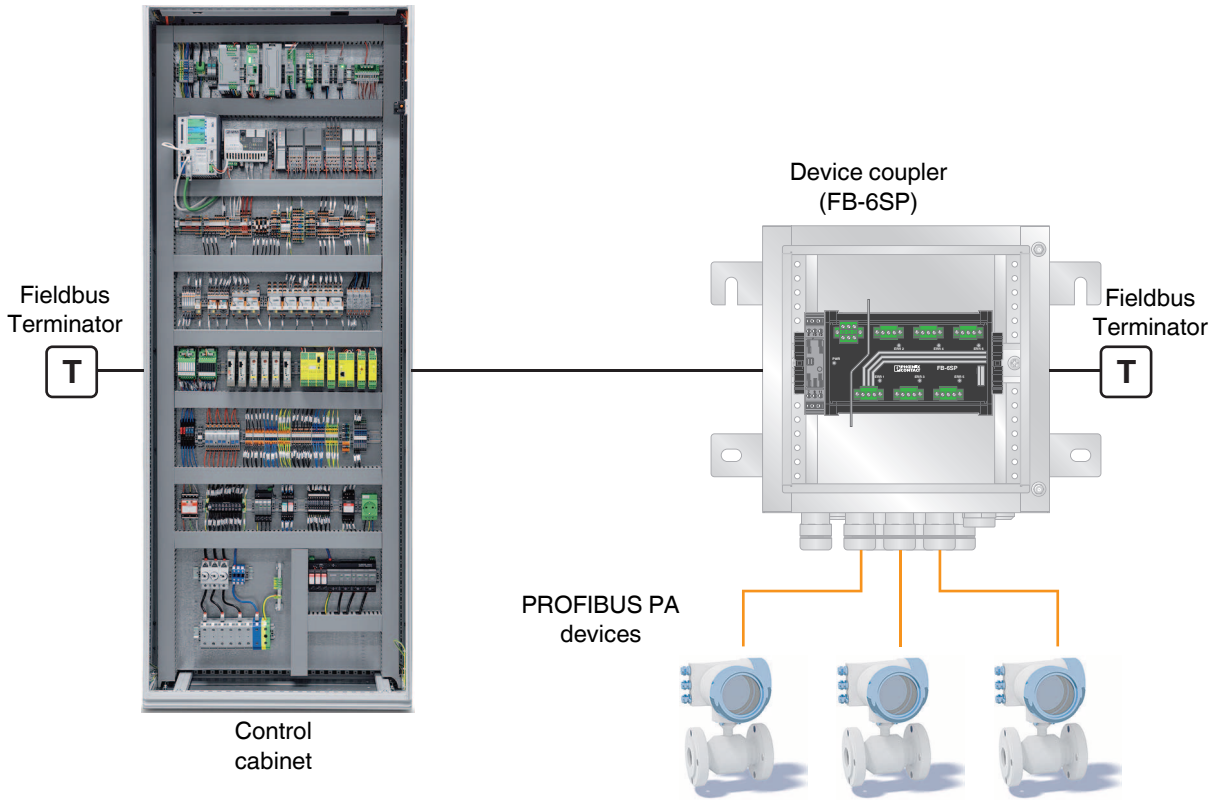


Figure 4 Overview of a PROFIBUS PA network

The AXL P FBPS BASE module contains an internal terminator, but there is still need to install an additional terminator at the end of each PROFIBUS PA segment. Figure 5 shows the Axioline P proxy in a typical application.

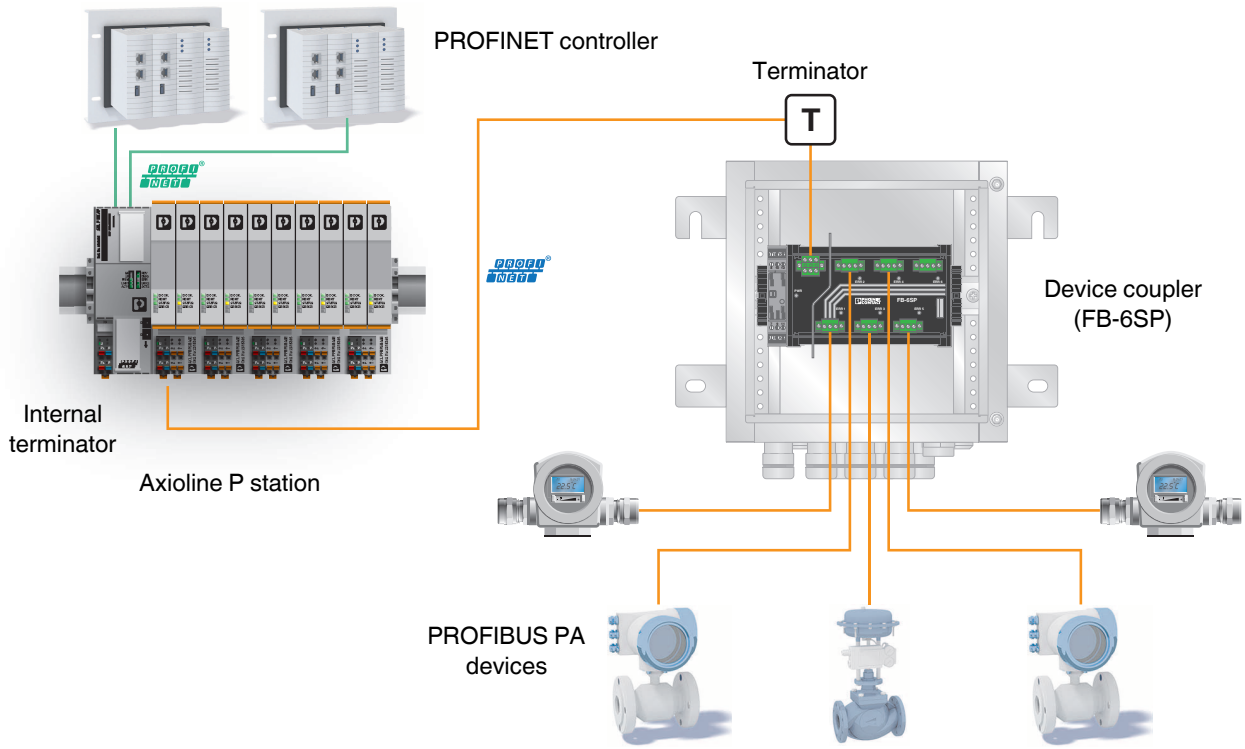


Figure 5 Network overview

5 Operation

5.1 Status and diagnostic indicators

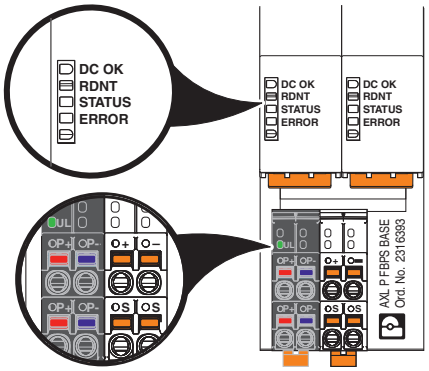


Figure 6 LED locations

Label	Color	Description
DC OK	Green on	DC output voltage is > 26 V DC
	Yellow on	DC input voltage is < 26 V DC
	Red on	Plug failure - undefined status
	Off (all LEDs)	Input voltage < 10 V DC or plug failure
RDNT	Green on	Load sharing with two plugs: > 27.19 V DC; current < 500 mA
	Yellow on	Plug failure - undefined status
	Red on	Redundant output: <27.19 V DC; >500 mA
STATUS	Green on	Primary status
	Yellow on	Secondary status
	Red on	Fault - Unable to initialize as primary or secondary
	Off (all LEDs)	Idle

Label	Color	Description
ERROR	Green on	Retries of any PROFIBUS PA device < 3 per minute
	Yellow on	I/O warning - Retries of any PROFIBUS PA device > 3 per minute
	Red on	I/O error - One or more PROFIBUS PA devices missing from Live List

5.2 Physical layer diagnostics

The AXL P... system is designed to include integrated physical layer diagnostics of the PROFIBUS PA segments in the FBPS plugs. These physical layer diagnostics can be interpreted through the LEDs on the FBPS plugs as well as in further detail in the DTM.

The following chart shows the available physical layer and NE107 diagnostics available in the power supply plugs.

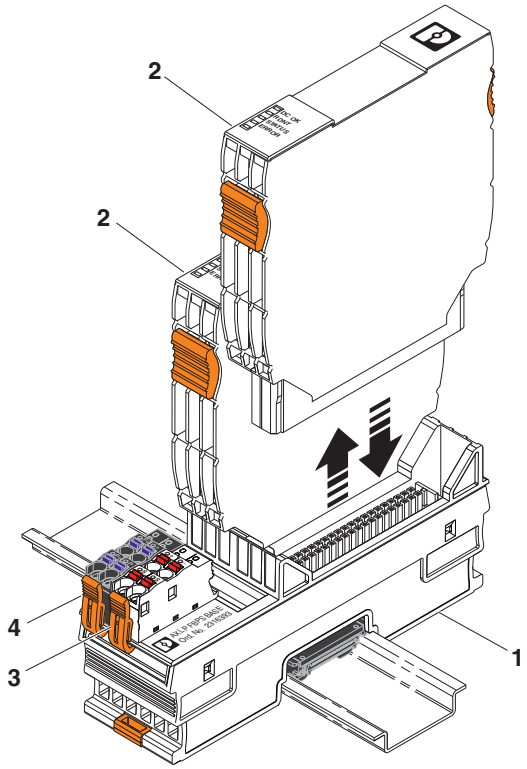
For more information, see the Axioline P diagnostics user manual.

Channel error types and DTM diagnostics (0x0001... 0x001F & 0x0100... 0x7FFF) Manufacturer specific alarms (0x0000 ... 0x007F) Manufacturer specific DAP indexes (0x0000 ... 0x7FFF) Manufacturer specific FAP indexes (0x0000 ... 0x7FFF)	**Type #**	**Limit (if applicable)**	**NE 107 state showing default designation and color code**
Fieldbus power supply (0x0140 ... 0x0180)			
PRM fault (PB) (PA device fault)	0x0140 (320)		Failure (F)
Config fault (PB) (PA device fault)	0x0141 (321)		Failure (F)
FB power supply low output voltage - minimum specified limit	0x0142 (322)	9 V	Out of specification (S)
FB power supply high output voltage - maximum specified limit	0x0143 (323)	32 V	Out of specification (S)
FB power supply maximum output current exceeded - maximum specified limit	0x0144 (324)	600 mA	Out of specification (S)
FB power supply loss of redundancy	0x0145 (325)		Maintenance (Priority High)
Number of retries an any fieldbus device > 3 per minute Raised at the PB slave slot, not the FAP slot	0x0146 (326)	3	Maintenance (Priority High)
Loss of fieldbus communication on one or more channels	0x0147 (327)		Failure (F)
PA power supply firmware upgrade	0x0148 (328)		Failure (F)
FB power supply low output voltage - user setting	0x0149 (329)	24 V	Maintenance (Priority Low)
FB power supply high output voltage - user setting	0x014A (330)	30 V	Maintenance (Priority Low)
FB power supply max output current exceeded - user setting	0x0149 (329)	500 mA	Maintenance (Priority Low)
Shield short	0x014C (332)		Maintenance (Priority Low)
FB power supply (-) to shield short			
FB power supply (+) to shield short			
FB power supply intermittent shield short to (-)			
FB power supply intermittent shield short to (+)			
No short detected			

5.3 Replacement

The AXL P FBPS BASE can be removed and additional bases may be installed while the station is powered, extending the station.

The AXL P FBPS 28DC/0.5A plugs are hot swappable and may be removed and replaced while the station is powered.



1 AXL P FBPS BASE
2 AXL P FBPS 28DC/0.5A
3 Fieldbus trunk connector
4 Power connector

Figure 7 Plug installation

5.4 Startup

The PROFINET slot assignment of the AXL P FBPS 28DC/0.5A plugs and other PROFIBUS PA devices must be configured through the GSDML composer. Once configured, the GSDML may be imported into any engineering control software environment.

The default configuration and PROFINET slot assignment are:

AXL P FBPS… Segment addressing		Segment 1 addressing
100	AXL P FBPS… Segment 1	
		102 PROFIBUS PA device 1
		103 PROFIBUS PA device 2
		104 PROFIBUS PA device 3
		...[1]
200	AXL P FBPS… Segment 2	
		202 PROFIBUS PA device 1
		203 PROFIBUS PA device 2
		204 PROFIBUS PA device 3
		...
300	AXL P FBPS… Segment 3	
		302 PROFIBUS PA device 1
		303 PROFIBUS PA device 2
		304 PROFIBUS PA device 3
		...
400	AXL P FBPS… Segment 4	
		402 PROFIBUS PA device 1
		403 PROFIBUS PA device 2
		404 PROFIBUS PA device 3
		...
500	AXL P FBPS… Segment 5	
		502 PROFIBUS PA device 1
		503 PROFIBUS PA device 2
		504 PROFIBUS PA device 3
		...
600	AXL P FBPS… Segment 6	
		602 PROFIBUS PA device 1
		603 PROFIBUS PA device 2
		604 PROFIBUS PA device 3
		...
700	AXL P FBPS… Segment 7	
		702 PROFIBUS PA device 1
		703 PROFIBUS PA device 2
		704 PROFIBUS PA device 3
		...
800	AXL P FBPS… Segment 8	
		802 PROFIBUS PA device 1
		803 PROFIBUS PA device 2
		804 PROFIBUS PA device 3
		...

[1] 32 devices can reside in each segment