

AXL F CNT2 1H

**Axioline F, function module, counter inputs: 2,
digital inputs: 6, digital outputs: 4**

Data sheet
109924_en_01

© Phoenix Contact

2024-07-17



1 Description

The module is designed for use within an Axioline F station.
This counter module acquires and processes fast pulse sequences from sensors.
The module has two counter channels. For each channel, the module has one counter input (source), one control input (gate), one counting direction input (direction), and two parameterizable outputs.
You can operate the module in four operating modes: event counting, frequency measurement, time measurement, speed measurement.

Features

- 2 counter inputs
- Maximum input frequency: 200 kHz
- 32-bit counter (up and down)
- Control of 2 outputs per channel depending on comparative values
- Counter control using a hardware or software gate
- Single or periodic count
- Device rating plate stored

Observe these notes



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



Make sure you always use the latest documentation.
It can be downloaded at: phoenixcontact.com/product/1028066

2 Table of contents

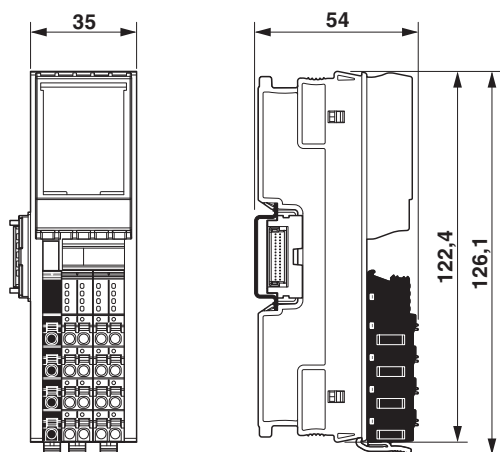
1	Description	1
2	Table of contents	2
3	Ordering data	3
4	Technical data	4
5	Internal circuit diagram	8
6	For your safety	9
6.1	Intended use	9
6.2	Qualification of users	9
6.3	Electrical safety	9
6.4	Installation	9
6.5	Applications with UL approval	9
7	Terminal point assignment	10
8	Connection example	11
9	Local diagnostic and status indicators	12
10	Process data	14
11	Parameter, diagnostics and information (PDI)	14
12	Device descriptions	14

3 Ordering data

Description	Type	Item no.	Pcs./Pkt.
Axioline F, Function module, Counter inputs: 2, Digital inputs: 6, 24 V DC, Digital outputs: 4, 24 V DC, transmission speed in the local bus: 100 Mbps, degree of protection: IP20, including bus base module and Axioline F connectors	AXL F CNT2 1H	1028066	1
Accessories	Type	Item no.	Pcs./Pkt.
Axioline F bus base module for housing type H (Replacement item)	AXL F BS H	2700992	5
Axioline shield connection set (contains 2 shield bus holders and 2 SK 5 shield connection clamps)	AXL SHIELD SET	2700518	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
Insert label, for marking the Axioline F series from Phoenix Contact, 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 28 mm, Number of individual labels: 500 (Marking)	EMT (35X28)R	0801602	1
Documentation	Type	Item no.	Pcs./Pkt.
User manual, English, Axioline F, function module, counter inputs: 2	UM EN AXL F CNT2 1H	-	-
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	-	-

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

Color	Housing: traffic grey A (RAL 7042)
Weight	134 g (with connectors and bus base module)
Ambient temperature (operation)	-25 °C ... 60 °C
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 (no temperature derating)

Connection data: Axioline F connector

Connection method	Push-in connection
Conductor cross section, rigid	0.2 mm ² ... 1.5 mm ²
Conductor cross section, flexible	0.2 mm ² ... 1.5 mm ²
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: Axioline F local bus

Number of interfaces	2
Connection method	Bus base module
Transmission speed	100 Mbps

Axioline F local bus supply (U_{Bus})

Supply voltage	5 V DC (via bus base module)
Current consumption	typ. 90 mA max. 100 mA
Power consumption	typ. 450 mW max. 500 mW

Supply voltage feed-in (U_{IO})

Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Current consumption	typ. 33 mA (Own current consumption; without wiring of the terminal points) max. 4 A
Power consumption	typ. 790 mW max. 96 W
Surge protection	electronic (35 V, 0.5 s)
Reverse polarity protection	electronic

Sensor supply (U_{S1} , U_{S2})

Supply voltage	24 V DC (from U_{IO})
Supply voltage range	19.2 V DC ... 30 V DC
Load current	max. 500 mA
Short-circuit/overload protection	electronic

Counter inputs

Number of inputs	2
Connection method	Push-in connection
Description of the input	EN 61131-2 type 1
Resolution	32 bits
Input frequency	max. 200 kHz
Input voltage	24 V DC
Input voltage range "0" signal	-3 V DC ... 5 V DC
Input voltage range "1" signal	15 V DC ... 30 V DC

Digital inputs

Number of inputs	6
Connection method	Push-in connection
Description of the input	EN 61131-2 type 1
Nominal input voltage	24 V DC
Input voltage range "0" signal	-3 V DC ... 5 V DC
Input voltage range "1" signal	15 V DC ... 30 V DC
Input filter time	< 2.5 µs

Digital outputs

Number of outputs	4
Connection method	Push-in connection
Output description	Push-pull outputs, driver power = 500 mA against GND (high-side switch, PNP), reduced driver power = 100 mA against nominal voltage (low-side switch, NPN)
Nominal output voltage	24 V DC
Output voltage range	19.2 V DC ... 30 V DC
Output current	max. 500 mA (Per channel, high side) max. 100 mA (Per channel, low side)
Nominal load, ohmic	For applications with UL approval, only connect ohmic loads or general loads.
Short-circuit protection	electronic
Overload protection	electronic

Input and output address area

Input address area	28 Byte
Output address area	28 Byte

Configuration and parameter data in a PROFIBUS system

Required parameter data	82 Byte
Required configuration data	7 Byte

Electrical isolation/isolation of the voltage areas

Test section	Test voltage
5 V supply of the local bus (U_{Bus}) / 24 V supply (I/Os)	500 V AC, 50 Hz, 1 min.
5 V supply of the local bus (U_{Bus}) / functional ground	500 V AC, 50 Hz, 1 min.
24 V supply (I/O) / 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 IEC 61000-6-2**

Electrostatic discharge (ESD) IEC 61000-4-2	Criterion B, ± 6 kV contact discharge, ± 8 kV air discharge
Electromagnetic fields IEC 61000-4-3	Criterion A, Field intensity: 10 V/m
Fast transients (burst) IEC 61000-4-4	Criterion B, ± 2 kV
Transient overvoltage (surge) IEC 61000-4-5	Criterion B, DC supply lines: ± 0.5 kV/ ± 1.0 kV (symmetrical/asymmetrical)
Conducted interference IEC 61000-4-6	Criterion A, Test voltage 10 V

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

Class B

Approvals

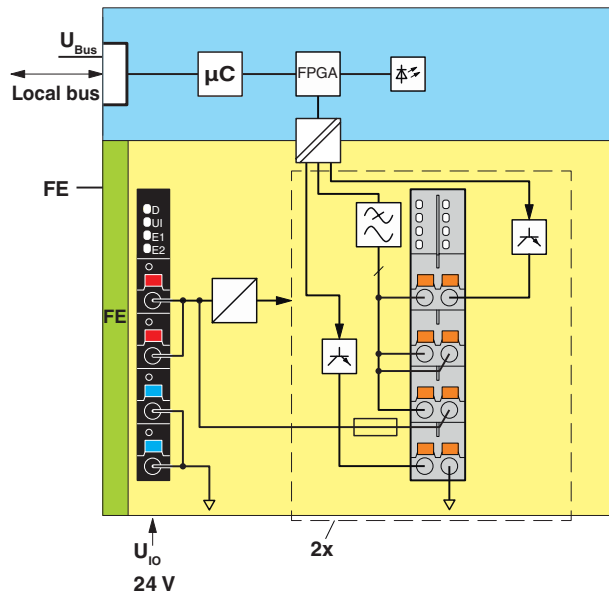
For the current approvals, go to: www.phoenixcontact.com/product/1028066

Manufacturer's declarations

For the current manufacturer's declarations, go to: www.phoenixcontact.com/product/1028066

5 Internal circuit diagram

Figure 1 Internal wiring of the terminal points



Key:

Local bus Axioline F local bus
(hereinafter referred to as local bus)

FE Functional ground



Microcontroller



Hardware monitoring



Electrical isolation



Power supply unit



Transistor



Low pass filter



LED



Electrically isolated areas

6 For your safety

6.1 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.

If the equipment is used in a manner not specified, the protection provided by the equipment may be impaired.

6.2 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.

6.3 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.

6.4 Installation

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

Mount and install the device in such a way that the disconnecting device can be operated without restriction.



CAUTION: Fire hazard

- The device must be installed in the final protective housing, which provides sufficient resistance to mechanical strain and protection against the spreading of fire in accordance with the standards UL/IEC/EN 61010-1 and UL/IEC/EN 61010-2-201.
- The supply and 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/EN 61010-1, UL/CSA/IEC/EN 61010-2-201.



NOTE: damage to the contacts

Physical overloads can result in damage to the terminal points.

- Relieve strain in the connected cables.

6.5 Applications with UL approval



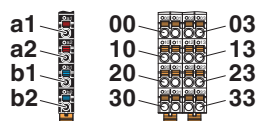
Information:

To install the device in accordance with UL/CSA/IEC standard, the following notes must be observed.

- Minimum temperature rating of the cables to be connected to the field wiring terminals:
85 °C, AWG 24 ... 16
- Use copper conductors only.

7 Terminal point assignment

Figure 2 Terminal point assignment



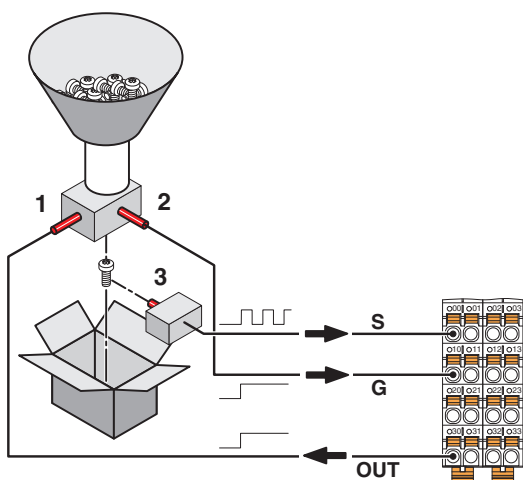
Terminal point	Color	Assignment		Parameterizable as
Supply voltage input				
a1, a2	Red	24 V DC (U _{I0})	Supply voltage feed-in (bridged internally)	
b1, b2	Blue	GND	Reference potential of the supply voltage (bridged internally)	
Connector 2 (counter 1)				
00	Orange	S1	Source 1, counter input for counter 1	
10	Orange	CNT1_IN1 (G1)	Counter 1, input 1	Gate 1, control input for counter 1
20	Orange	CNT1_IN2 (Dir1)	Counter 1, input 2	Direction 1, counting direction specification for counter 1
30	Orange	CNT1_OUT1	Counter 1, output 1	
01	Orange	CNT1_OUT2	Counter 1, output 2	
11	Orange	CNT1_IN3	Counter 1, input 3	
21	Orange	U _{S1}	Sensor voltage +24 V DC, for supplying counter sensor 1	
31	Orange	GND	Reference potential of the I/O supply	
Connector 3 (counter 2)				
02	Orange	S2	Source 2, counter input for counter 2	
12	Orange	CNT2_IN1 (G2)	Counter 2, input 1	Gate 2, control input for counter 2
22	Orange	CNT2_IN2 (Dir2)	Counter 2, input 2	Direction 2, counting direction specification for counter 2
32	Orange	CNT2_OUT1	Counter 2, output 1	
03	Orange	CNT2_OUT2	Counter 2, output 2	
13	Orange	CNT2_IN3	Counter 2, input 3	
23	Orange	U _{S2}	Sensor voltage +24 V DC, for supplying counter sensor 2	
33	Orange	GND	Reference potential of the I/O supply	



In the default setting, the CNTn_INx digital inputs are set to the “Digital input” function. Alternatively, you can parameterize the function according to the “Parameterizable as” table column. See user manual for the module.

8 Connection example

Figure 3 Counter connections for counting piece goods



The example shows a typical wiring for counting screws.



Use shielded cables and connect the grounding rail with PE to ensure error-free counting.

9 Local diagnostic and status indicators

Figure 4 Local diagnostic and status indicators



Designation	Color	Meaning	State	Description
D	Red/ yellow /green	Diagnostics of local bus communication		
		Run	Green on	The device is ready for operation, communication within the station is OK. All data is valid. An error has not occurred.
		Active	Flashing green	The device is ready to operate, communication within the station is OK. The data is not valid. The controller or higher-level network is not delivering valid data. There is no error on the module.
		Device application not active	Flashing green/ yellow	The device is ready for operation, communication within the station is OK. Output data cannot be outputted and/or input data cannot be read. There is a fault on the periphery side of the module.
		Ready	Yellow on	The device is ready for operation but did not detect a valid cycle after power-up.
		Connected	Flashing yellow	The device is not (yet) part of the active configuration.
		Reset	Red on	The device is ready for operation but has lost the connection to the bus head.
		Not connected	Red flashing	The device is ready for operation but there is no connection to the previously existing device.
		Power down	Off	Device is in (power) reset.
UIO	Green	U _{input/output}	On	Supply voltage is present.
			Off	Supply voltage is not present.
E1	Red	I/O error	On	I/O error present.
				Possible causes:
				Short circuit/overload of the sensor supply. Supply voltage faulty (U _{IO})
E2	Red	Channel error	On	Channel error present.
				Possible causes:
				Short circuit/overload of the sensor supply. Short circuit/overload at one or more outputs
			Off	No I/O error.

Designation	Color	Meaning	State	Description
Connector 2 (counter 1)/connector 3 (counter 2)				
00/02	Yellow	Status of counter 1/2, source 1/2 (S1/S2, counter input)	On	Input is set.
			Off	Input is not set.
10/12	Yellow	Status of counter 1/2, input 1 (G1/G2, gate 1/2, control input)	On	Input is set.
			Off	Input is not set.
20/22	Yellow	Status of counter 1/2, input 2 (Dir1/Dir2, Direction 1/2, counting direction input)	On	Input is set.
			Off	Input is not set.
30/32	Red/ yellow	Status of counter 1/2, output 1	Yellow on	Output is set.
			Red on	Short-circuit/overload of the output.
			Off	Output is not set.
01/03	Red/ yellow	Status of counter 1/2, output 2	Yellow on	Output is set.
			Red on	Short-circuit/overload of the output.
			Off	Output is not set.
11/13	Yellow	Status of counter 1/2, input 3	On	Input is set.
			Off	Input is not set.
21/23	Green/ red	Status of sensor supply 1/2 (U_{S1}/U_{S2})	On	Sensor supply is present.
			Red on	Short circuit/overload of the sensor supply.
			Off	Sensor supply not present.

10 Process data

The module uses 14 words of IN process data and 14 words of OUT process data.

One word of the 14 output process data words is assigned, the control word. You can control the counters via the control word.

The remaining output words are not evaluated. They are reserved.

The input process data contain general states of the module, states of the channels, and the corresponding counter values and measured values.



For the assignment of the process data words, please refer to the user manual of the module.

11 Parameter, diagnostics and information (PDI)

Parameter and diagnostic data as well as other information is transmitted as objects via the PDI channel of the Axio-line F station.



You will find detailed information on the PDI objects in the user manual UM EN AXL F SYS INST.



Comprehensive information on all objects created on the module can be obtained from the user manual for the module.



The module is delivered with a default configuration, which allows you to start it up without any parameterization.

12 Device descriptions

The device is described in the device description files. The device descriptions for controllers from Phoenix Contact are included in PC Worx and PLCnext Engineer, as well as in the corresponding service packs. The device description files for other systems are available for download at www.phoenixcontact.com/products in the download area of the bus coupler installed.