FL TIMESERVER NTP

Time server with GNSS receiver

Data sheet 109040_en_02

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1 Description

The FL TIMESERVER NTP receives the time from the global navigation satellite system. As an NTP server, it provides this time in the network. This enables devices in the network to be synchronized precisely, for example in mobile applications with different stations.

Thanks to the integrated antenna and robust housing, you can easily mount the device outdoors. A separate antenna installation is not necessary. Supply with Power over Ethernet is possible so that you only need one Ethernet cable for connection.

For UL-compatible installation outdoors, you will also need a plastic outdoor housing.

Possible applications

- Video surveillance
- Infrastructure
- Water and wastewater
- Remote control

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- Process industry and pipelines
- Power automation

Features

- High availability thanks to a range of different satellite systems
- Automatic switching between GPS, Galileo, and GLONASS
- Robust IP68 housing with integrated antenna for easy installation outside the control cabinet
- Fast, inexpensive connection with just one Power over Ethernet cable
- Precise position determination via web-based management, SNMP, NMEA, or JSON streaming
- Extended temperature range, -40 °C ... +70 °C
- Alternative external power supply 10 V DC ... 30 V DC
- Diagnostics LEDs for power supply and satellite reception

Make sure you always use the latest documentation.

It can be downloaded at: phoenixcontact.net/product/1107132





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3 Ordering data

Description	Туре	Order No.	Pcs./Pkt.
GNSS receiver and NTP (Network Time Protocol) for Ethernet networks, receives time, date, and location via GPS, GLONASS, or Galileo, web-based management, supply via PoE (af) or 24 V DC, integrated antenna, IP68 housing	FL TIMESERVER NTP	1107132	1
Accessories	Туре	Order No.	Pcs./Pkt.
Accessories for FL-WLAN 1100 series: Optional cable feed-through for sealing (IP67) the FL-WLAN 110x connection (IP20), if the device is not directly integrated onto the closed housing. Not needed when mounting on a control cabinet, etc.	FL M32 ADAPTER	2702544	1
RJ45 connector, degree of protection: IP20, number of positions: 8, 1 Gbps, CAT5 (IEC 11801:2002), material: zinc die-cast, connection method: IDC fast connection, connection cross section: AWG 26- 24, cable outlet: straight, color: green, Ethernet	CUC-IND-C1ZNI-S/R4IE8	1421607	1
PCB connector, nominal cross section: 1.5 mm ² , color: green, nominal current: 8 A, rated voltage (III/2): 160 V, contact surface: tin, type of contact: female connector, number of potentials: 3, number of rows: 1, number of positions per row: 3, number of connections: 3, product range: FMC 1,5/STF, pitch: 3.5 mm, connection method: Push-in spring connection, conductor/PCB connection direction: 0 °, plug-in system: MINI COMBICON, Locking: screw locking, type of packaging: packed in cardboard	FMC 1,5/ 3-STF-3,5	1966101	50
Patch cable, CAT5, assembled, 1.5 m	FL CAT5 PATCH 1,5	2832221	1
PoE injector, 30 W, two RJ45 jacks, 10/100/1000 Mbps, DIN rail mounting, IP20	INJ 1000	2703005	1
PoE injector, 30 W, RJ45 jack on Push-in terminal blocks, 10/100/1000 Mbps, DIN rail mounting, IP20, potential separation, shield contacting with strain relief, shield current monitoring, surge protection	INJ 2103-T	1004065	1
PoE+ Ethernet switch conforms to IEEE 802.3at. Includes four 10/100/1000 Mbps PoE+ ports, one standard 10/100/1000 Mbps RJ45 port, a total PoE system budget of 120 W, and jumbo frames up to 10240 bytes.	FL SWITCH 1001T-4POE-GT	1026937	1

4 Technical data

Dimensions



Dimensions W/H/D

62.8 mm / 36.5 mm / 113.2 mm (Outside dimensions)

Outdoors in the open	
Outside of control cabinets or other metal housings	
IP68 (Manufacturers declaration, not evaluated by UL) UL/CSA: Enclosure Type Rating 1 (indoor use)	
NTP server (NTPv4) stratum 1	
<15 seconds/month in offline mode (no GNSS reception or Internet connection, no temperature fluctuations) <60 seconds/month in offline mode (no GNSS reception or Internet connection, with temperature fluctuations)	
 ≤ 2 ms (NTP, dependent on Ethernet network and available network capacity) 1 s (Polling rate of NMEA position data via TCP) 	
\leq 100 s (Time until sat fix (cold restart, incl. device start)) ~ 40 s (Device start)	

MTBF (Mean Time Between Failure)			
SN 29500 standard, temperature 40°C, operating cycle 100%	60 Years		
SN 29500 standard, temperature 40°C, operating cycle 34.25%	168 Years		
SN 29500 standard, temperature 25°C, operating cycle 21%	316 Years		
Connection data	Push-in spring connection		
pluggable	Yes		
Stripping length	10 mm		
Conductor cross section			
flexible	0.2 mm ² 1.5 mm ²		
rigid	0.2 mm ² 1.5 mm ²		
AWG	24 16		
Flexible with ferrules without plastic sleeve	0.25 mm ² 1.5 mm ²		
Flexible with ferrules with plastic sleeve	0.25 mm ² 0.75 mm ²		
Note on the connection method	Recommended conductor cross section: 0.75 mm ² Recommended ferrule: connection length 10 mm Recommended crimping pliers: trapezoidal or square		
Power supply for module electronics			
Supply voltage	24 V DC (SELV)		
Supply voltage range	10 V DC 30 V DC (SELV)		
	Power over Ethernet (PoE IEEE 802.3af or higher)		
Power consumption	≤ 2.5 W		
Current consumption	≤ 104 mA (24 V)		
	max. 175 mA (UL, 10 V)		
	max. 60 mA (PoE)		
Connection method	Push-in spring connection		
Wireless interface			
Designation	GNSS (GPS / Galileo / GLONASS)		
Frequency	1575.42 MHz (GPS, L1C/A) 1602 MHz +k*562,5 kHz (GLONASS, L1OF) 1575.42 MHz (Galileo, E1-B/C)		
Antenna connection method	(Internal)		
Accuracy class	CEP ₅₀ = 5 m (Outdoor assembly)		

RJ45 (Auto negotiation and autocrossing)	
10/100/1000 Mbps	
Copper	
100 m (per segment)	
1 (RJ45 port)	
SNTP NTP (v1, v2, v3, v4, without authentication) NMEA 0183 (via TCP) HTTP HTTPS SNMP SSH DHCP VLAN Telnet	
-40 °C 70 °C	
-40 °C 85 °C	
10 % 95 % (non-condensing)	
5 % 95 % (non-condensing)	
CE-compliant	

5 Safety regulations and installation notes



CAUTION:

Observe the following safety notes when using the device.

- 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 general technical regulations, must be observed. The technical data is provided in the package slip and on the certificates (conformity assessment, additional approvals where applicable).
- 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 device is designed exclusively for operation with SELV/PELV from a Class ES1 "electrical energy source" in accordance with EN/IEC 62368-1 and VDE 0868-1. The device may only be connected to devices that meet the requirements of class ES1 in accordance with EN/IEC 62368-1.
- The device complies with the EMC regulations for industrial areas (EMC class A). When using the device in residential areas, it may cause radio interference.

5.1 UL note



- If the equipment is used in a manner not specified, the protection provided by the equipment may be impaired.
- Minimum temperature rating of the cables to be connected to the field wiring terminals: 80 °C
- AWG 24 ... 16
- Use copper conductor only.
- The external circuits intended to be connected to this device shall be galvanically separated from MAINS supply or hazardous live voltage by reinforced or double insulation and meet the requirements of SELV/PELV of UL/CSA 61010-1, -2-201.



Amb. Temp: 70 °C

6 Application

Figure 1 Example application



The real-time clocks of computers are based on quartz oscillators, similar to the ones in commercially available wristwatches. Over time, these clocks lose or gain time.

In a network environment, slightly deviating device times can cause serious problems. For functions such as data logging, controlling, and monitoring in particular, all network devices must be reliably synchronized.

With the time server, you can synchronize the devices in a network precisely. It receives the time via the global navigation satellite system. It provides this time to the network via NTP.

The time server synchronizes servers, workstation monitors, network infrastructure such as routers and switches, CCTV cameras, telephone systems, and more.

NTP (Network Time Protocol)

NTP is a packet-based protocol for transmitting time information in networks with variable packet run-times. It has a hierarchical structure: the stratum 1 server receives the exact time via GNSS. The information is forwarded to the lower levels (stratum 2, stratum 3). In this manner, thousands of clients can be synchronized without the clients themselves having access to the top level.

GNSS (Global Navigation Satellite System)

GNSS is a general term for various satellite systems such as :

- GPS (USA)
- GLONASS (Russian Federation)
- Galileo (EU)

7 Product description

Figure 2 LED indicators



- 1 US
 Flashing
 Device is booting.

 On
 Supply voltage OK, PoE or 10 ... 30 V

 2 LOCK
 Flashing
 No satellite signal
- On Satellite signal, location, and time information available

Figure 3 View from below



- 1 RJ45 Ethernet port 10/100/1000 Mbps
- 2 Reset button
- 3 Not used
- 4 Ground
- 5 10 ... 30 V DC

7.1 Reset button

Press the button with a nonconductive object. The button only functions if the US LED is permanently on. The reset button has two functions:

Reboot

- Press and hold the reset button for at least three seconds.
- \Rightarrow The reboot is started. Both LEDs go out.

Reset to the default settings

- Press and hold the reset button for at least 10 seconds.
- ⇒ The device will be reset to the default settings. The LOCK LED lights up.

8 Installation



NOTE: Electrostatic discharge

Electrostatic discharge can damage or destroy components.

> When handling the device, observe the necessary safety precautions against electrostatic discharge (ESD) according to EN 61340-5-1 and IEC 61340-5-1.



NOTE: device damage

Only mount and remove devices when the power supply is disconnected.

8.1 Installation location

The device is designed for outdoor installation, e.g., on the following equipment:

- Control cabinets
- Machinerv
- Automated guided vehicle systems (AGVS)

NOTE: device damage

The device can become too hot in direct sunlight.

- Make sure that the ambient temperature does not exceed 70°C.
- Install a suitable, non-metallic shading device if necessary.
- Check the CPU temperature in the webbased management software under "HOME, System". The CPU temperature must not exceed 105°C.

Ensure satellite signal 8.2

The device has an internal antenna. To secure satellite reception, follow the same rules that apply for antenna installation when you install the device:

- Mount the housing in the open (Clear Sky View).
- Obstructions such as tall buildings, mountains, and awnings in close proximity will have a negative effect on the device function.
- Mount the device on the outside of the control cabinet or other metallic housings.
- Mount the device as far as possible from conductive objects (at least 10 centimeters away).
- Mount the device horizontally, so that the LEDs point upward.

If you follow these rules for installation, the positioning accuracy is 7 to 10 meters.

8.3 Installation in accordance with UL

The device has been granted UL approval for indoor use. Follow the instructions below for UL-compliant installation:

- Mount the device in a UL-compliant outdoor plastic . housina.
- Mount the housing outdoors in the open.
- Obstructions such as tall buildings, mountains, and awnings in close proximity will have a negative effect on the device function.

8.4 Mounting on a level surface



- Drill a hole for the mounting flange with a diameter of 40 mm. Additional reinforcement with two M6 screws is optional (see drilling diagram).
- To ensure a proper seal, attach the nut to the mounting flange with a maximum of 8 ... 10 N.
- Secure the device using two M6 screws if desired.

Figure 5 Mounting on the control cabinet



8.5 Mounting on a mounting bracket



The mounting bracket is not supplied as standard.

When mounting the device on a mounting bracket, you can use a cable feed-through with seal to seal the connection:

- FL M32 ADAPTER, 2702544

Alternative:

- Standard M32 cable gland with seal insert for thin cables or with multiple seal insert
- Screw the cable feed-through into the M32 internal thread of the device.

Figure 7 FL M32 ADAPTER



8.6 Power supply voltage



CAUTION: Electric shock

The device is designed exclusively for operation with SELV/PELV from a Class ES1 "electrical energy source" in accordance with EN/IEC 62368-1 and VDE 0868-1.



- 4 Ground
- 5 10 ... 30 V DC
- Use the appropriate conductor cross sections and/or ferrules to ensure that the cable is seated securely. A cable with a cross section of 0.75 mm² and a trapezoidal or square crimped ferrule that is 10 mm long is recommended.

8.7 Grounding

• Establish a low-resistance connection between the device and the ground via the metallic part of the housing (functional ground). If this not be possible, ensure a low-resistance ground connection (functional ground) of the Ethernet cable shield.

9 Web-based management

Default IP parameters or after reset

Static IP address	192.168.0.254
Subnet mask	255.255.255.0
Gateway and DNS server	192.168.0.1

Commissioning web-based management

- To call up web-based management via HTTP, enter the IP address in any web browser.
- Select a user name and a secure password.

At initial login, self-signed certificates for HTTPS and SSH access will be created automatically. After around two minutes, the device will be ready to operate.

Protection against vandalism

To make the device less visible, you can deactivate the two LEDs.

• Deactivate the LEDs in the web-based management system under "System, Settings, LEDs".

Position data

You have two options to read out the device's position data:

- Via the SNMP protocol
- NMEA or JSON streaming via TCP port 2947

Figure 8 Web-based management

