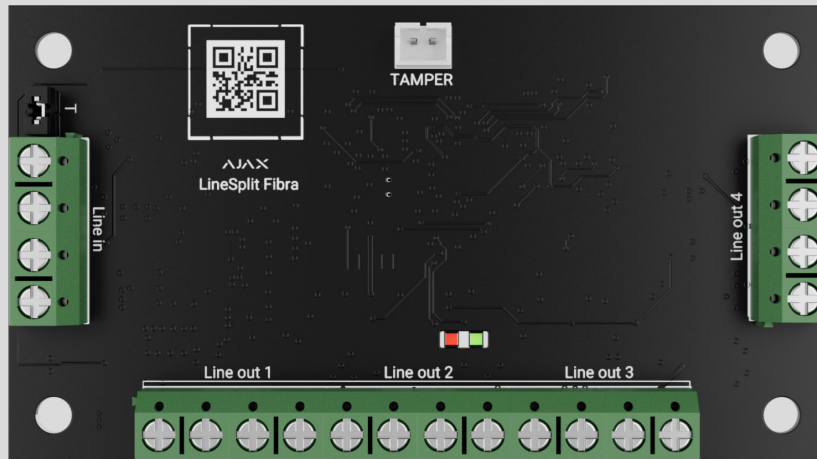


# LineSplit Fibra User manual

Updated September 6, 2023



**LineSplit Fibra** is a module designed to split one Fibra line into four ones. Each device output line can have a length of up to 2,000 meters when connected using the U/UTP cat.5 twisted pair cable. LineSplit can be installed at any point of the line, in particular after another LineSplit.

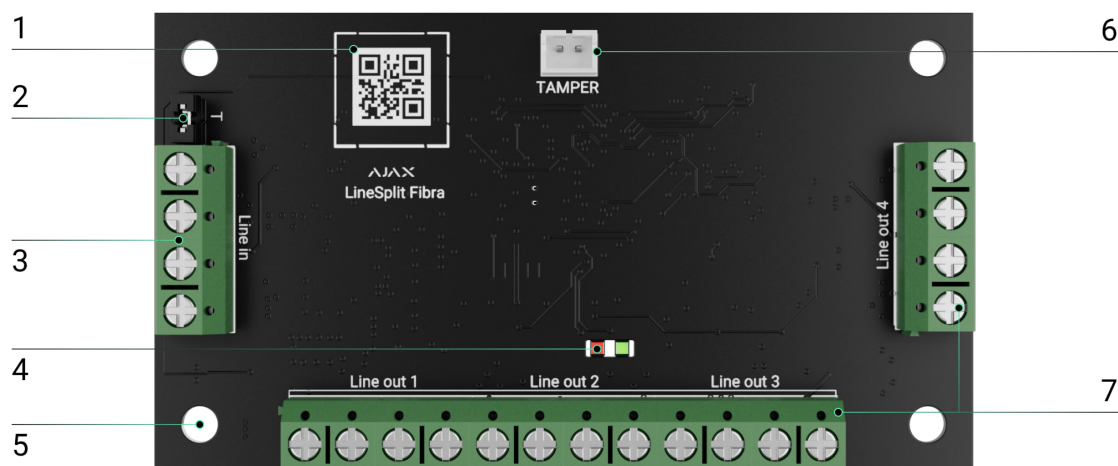


The device is compatible with [Hub Hybrid \(2G\)](#) and [Hub Hybrid \(4G\)](#). Connection to other [hubs](#), [radio signal range extenders](#), [ocBridge Plus](#) and [uartBridge](#) is not provided.

LineSplit is part of an Ajax system and exchanges data with the hub using the secure Fibra wired communication protocol.

LineSplit relates to the Fibra product line of wired devices. Only accredited Ajax Systems partners can buy, install, and administer Fibra products.

## Functional elements



1. QR code with the device ID. It is used to pair the device with an Ajax security system.
2. Terminating resistor jumper. It is installed on two contacts if LineSplit is the last device on the Fibra line. Otherwise, the jumper is installed on one contact.
3. LineSplit input terminals.
4. LED indicators.
5. Holes to install the device inside Case (the casing is sold separately).
6. Connector to fasten the tamper board to the module. The tamper board is in Case.
7. Output terminals for connecting wired devices.

## Operating principle

00:00

00:12

the U/UTP cat.5 twisted pair cable.

LineSplit modules can be connected one after another. The total output current on the hub lines and the hub specifications limits the number of connected devices. You can connect up to 100 devices to Hub Hybrid.



Do not connect Fibra output lines created with LineSplit in a **Ring** topology.

[Learn more](#)

LineSplit is designed for indoor installation. We recommend installing LineSplit into Case (the casing is sold separately). The casing is available in multiple versions.

The module is equipped with a connector for a tamper board (included in the Case complete set). The tamper reacts if someone tries to break or open the casing lid. If it triggers, the notification is sent to the Ajax apps.

### What is the tamper

## Fibra data transfer protocol

LineSplit uses Fibra technology to transmit alarms and events. It is a wired data transfer protocol for fast and reliable two-way communication between the hub and connected devices.

## Sending events to the monitoring station

The Ajax system can transmit alarms to the [PRO Desktop](#) monitoring app, as well as to the central monitoring station (CMS) using **SurGard (Contact ID)**, **SIA (DC-09)**, **ADEMCO 685**, and [other protocols](#).

### LineSplit can transmit the following events:

1. Tamper alarm. Tamper recovery.
2. Low supply voltage and when voltage returns to normal.
3. Loss of communication between LineSplit and the hub. Reconnecting.
4. Temporary deactivation/activation of the device.
5. Short circuit on the Fibra line and when the power supply is restored.
6. Overvoltage on the Fibra line and when voltage returns to normal.

When an alarm is received, the CMS operator knows exactly what happened and where to send the rapid response team. The Ajax devices are addressable, meaning that PRO Desktop app and CMS receive events, device type, assigned name, and location (room, group). The list of transmitted parameters may differ depending on the type of CMS and the selected communication protocol.



You can find the device ID, loop (zone) number, and the line number in the device [States](#).

## Selecting the installation site for LineSplit

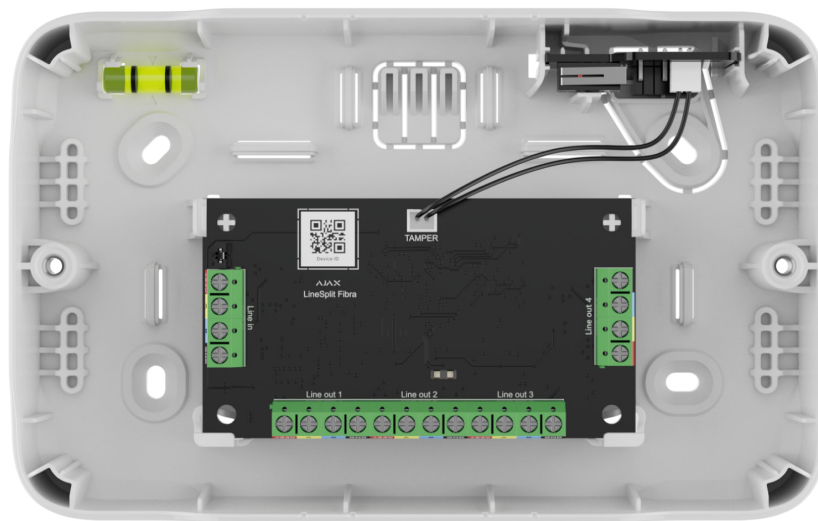
When choosing a spot to install LineSplit, consider the parameters that affect the operation of the device:

- Fibra signal strength.

- The length of the cable used to connect LineSplit.
- Length of the cable used to connect wired devices to LineSplit.

Follow these recommendations when designing the Ajax system project for an object. The security system should be designed and installed by professionals. The list of authorized Ajax partners is [available here](#).

## Installing into Case



LineSplit is designed for indoor installation only. It is recommended to install device into Case. The casing is available in multiple versions. Installing a single LineSplit module, several modules, or several other devices into Case is possible.

Case has mounts for the modules, wire channels, and a tamper that connects to LineSplit. The CMS and users receive notifications if someone tries to break the casing or open the lid.





Case is sold separately from LineSplit.

[Learn more about Case](#)

## LineSplit cannot be installed

1. Outdoors. This could damage the module.
2. Inside premises with temperature and humidity values that do not correspond to the operating parameters. This could damage the module.
3. In places with low or unstable Fibra signal strength.
4. Without Case.

## Fibra signal strength

Fibra signal strength is determined by the ratio of the number of undelivered or corrupted data packages to those expected over a specific time. The icon  in the **Devices**  tab in Ajax apps indicates the signal strength:

- **Three bars** – excellent signal strength.
- **Two bars** – good signal strength.
- **One bar** – low signal strength; stable operation is not guaranteed.
- **Crossed out icon** – no signal; stable operation is not guaranteed.

The following factors affect the signal strength:

- The number of devices on the Fibra line.
- Cable length and type.
- The correctness of the wire connections to the terminals.

### What is Fibra Signal Strength Test

## Lines Power Test

The test simulates the maximum energy consumption of devices connected to the control panel: the detectors give alarms, sirens turn on, and keypads activate. If the system passes the test successfully, all its devices have enough power in any situation.

If at least one Fibra line does not have enough power, the app displays a notification with the status of each line:

- Test passed.
- Test passed with malfunctions.
- Test failed.

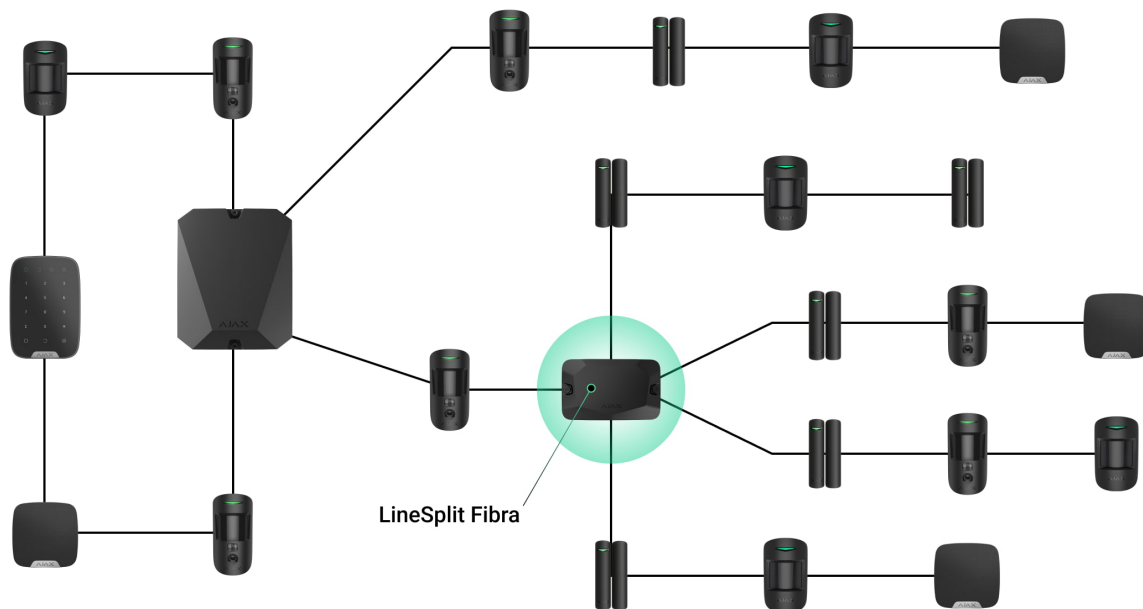
### What is Lines Power Test

## Designing the system project

It is crucial to properly design the system project to install and configure the devices correctly. The project must take into account the number and types of devices at the object, their exact location and installation height, the length of wired Fibra lines, the type of cable used, and other parameters. Read [the article](#) to learn tips for designing the Fibra system project.

LineSplit can be connected at any point of the Fibra line, splitting it into four lines. Each output line of the device can have a length of up to 2,000 meters when connected using the U/UTP cat.5 twisted pair cable.

Different types of devices can be connected to the same Fibra line. For example, you can use opening detectors, motion detectors supporting photo verification, sirens, keypads, and LineSplit modules on the same line.



Connecting multiple LineSplit modules one after the other allows you to expand the Ajax system by splitting lines. One Fibra line splits into four, four into sixteen, and so on. The number of wired devices in the system is limited by the output current of the hub and its specifications. You can connect up to 100 devices to Hub Hybrid.

If LineSplit is the last device on the line, the terminating resistor jumper is installed on two contacts.



Ajax systems also support **Beam (Radial)** and **Ring** topologies. The output lines created when using LineSplit do not support the **Ring** topology.

### More about topologies

## Cable length and type

Recommended cable types:

- U/UTP cat.5, 4 × 2 × 0.51, copper conductor.
- Signal cable 4 × 0.22, copper conductor.





The wired connection range may vary if you use a different cable type. No other types of cables have been tested.

## Verification using a calculator

To make sure that the project is designed correctly and that the system will work in practice, we have developed a [Fibra power supply calculator](#). The calculator helps to check the communication quality and cable length for wired Fibra devices when designing the system project.

## Preparing for installation

### Cable arrangement

When preparing to lay cables, check the electrical and fire safety regulations in your region. Strictly follow these standards and regulations. Tips for cable arrangement are available [in this article](#).

### Cable routing

We recommend you to carefully read the [Selecting the installation site](#) section before installation. Avoid deviations from the system project. Violating the basic installation rules and the recommendations of this manual may lead to incorrect operation and loss of connection with LineSplit. Tips for cable routing are available [in this article](#).

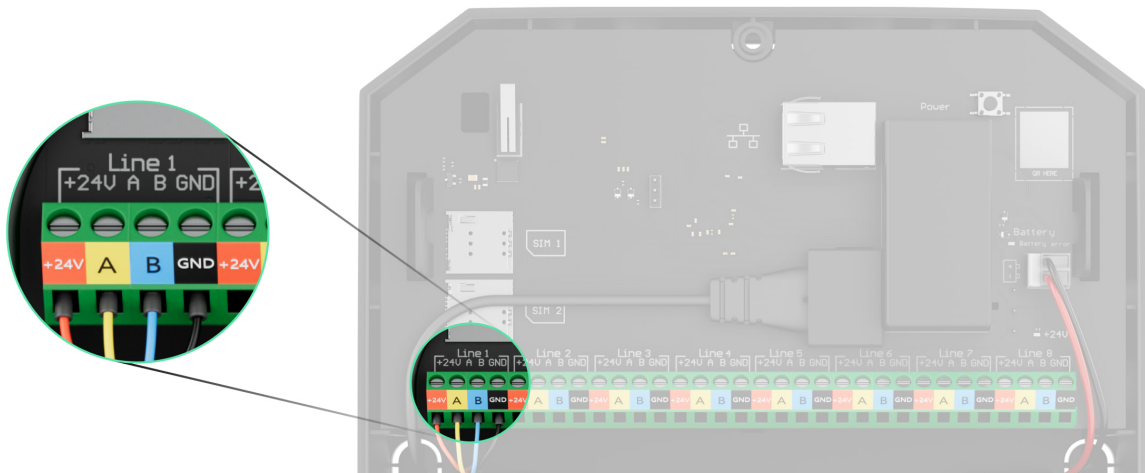
## Preparing cables for connection

Remove the insulating layer and strip the cable with a special insulation stripper. The ends of the wires inserted into the device terminals must be tinned or crimped with a sleeve. This ensures a reliable connection and protects the conductor from oxidation. Tips for preparing the cables are available [in this article](#).

# Installation and connection

## Connecting LineSplit Fibra to the hub

1. Prepare cable holes in advance by carefully breaking out the perforated parts of Case.
2. Secure Case with the bundled screws using at least two fixing points. For the casing tamper to respond to disassembly attempts, fix Case at a point with a perforated area.
3. Turn off the power of lines in the [Ajax PRO app](#). The function is available in the **Lines** menu:
  1. Hub → Settings → Lines → Lines Power Supply.
4. Route the cable to connect the LineSplit to the hub casing. Connect the wires to the required hub line.

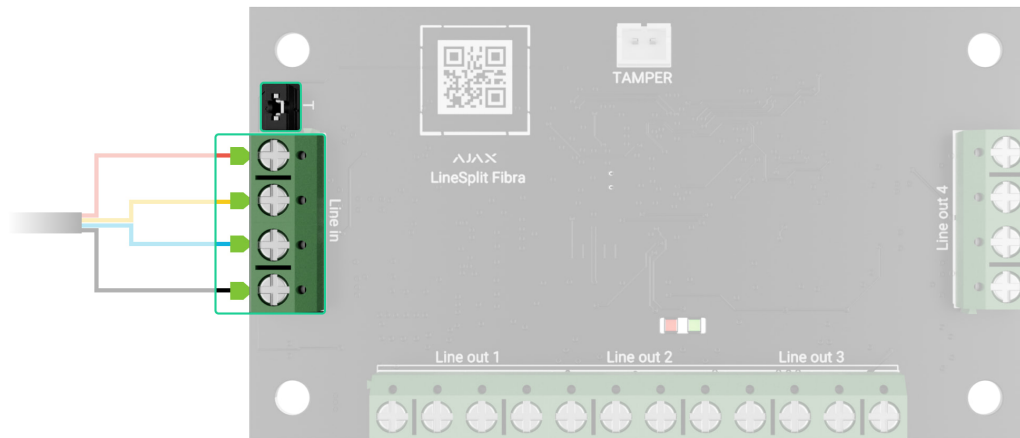


**+24V** – 24 V= power terminal.

**A, B** – signal terminals.

**GND** – ground.

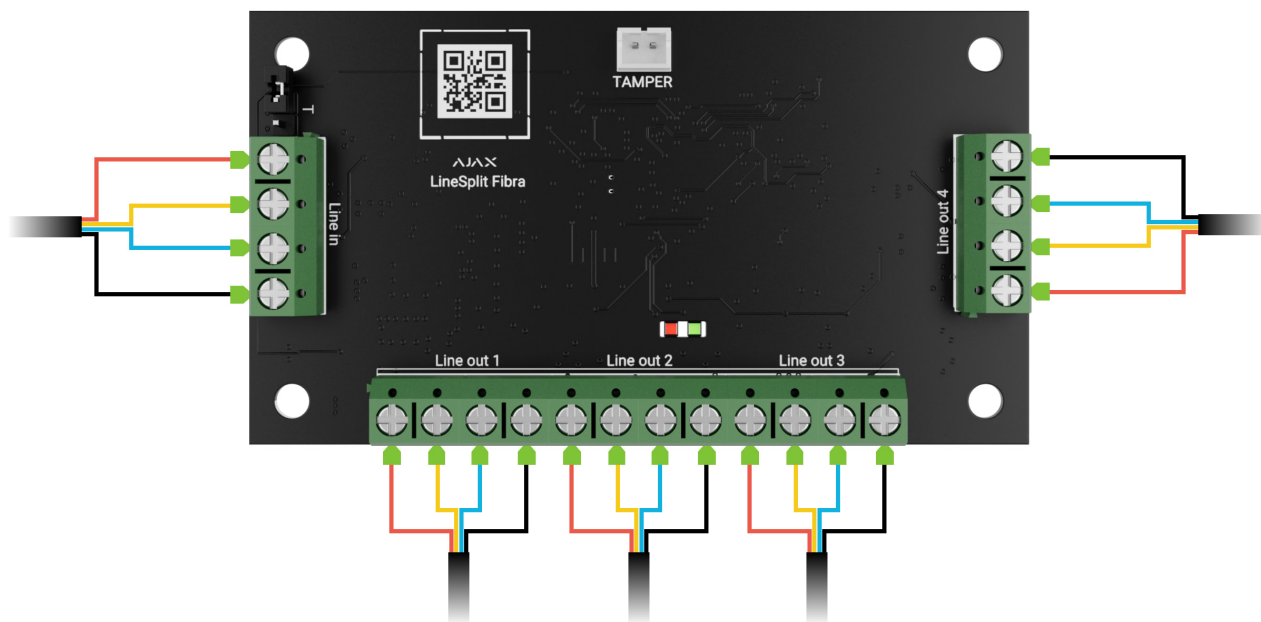
5. Connect the wires to the LineSplit input terminals according to the diagram below. Follow the polarity and connection order of the wires. Securely fasten the cable to the terminals.



6. If LineSplit is the last on the line, install a terminating resistor jumper on the two contacts. Otherwise, the terminating resistor jumper should remain set on one contact.
7. Connect wired devices to LineSplit Fibra output lines.
8. Secure the module in Case using the holes in the board. Secure the cable with ties.
9. Connect the Case tamper to the appropriate board connector.
10. Place the lid on the casing and fasten it with the bundled screws.
11. Turn on line power in the Ajax PRO app (Hub → Settings → Lines → Lines Power Supply). When power is applied, the green LED will indicate that the device is turned on.
12. Add LineSplit to the hub.
13. Perform the Fibra Signal Strength Test. The recommended signal strength is two or three bars. If the signal strength is one or zero bars, check the connection correctness and the cable integrity.
14. Run Lines Power Test.

# Connecting wired devices to LineSplit Fibra

1. Turn off a line power in the [Ajax PRO app](#). The function is available in the **Lines** menu:
  1. Hub → Settings → Lines → Lines Power Supply.
2. Connect the wires of the connectable devices to the LineSplit output terminals according to the diagram below. Observe the polarity and connection order of the wires. Securely fasten the cable to the terminals.



3. Turn on a line power in the [Ajax PRO app](#) (Hub → Settings → Lines → Lines Power Supply). When power is applied, the green LED will indicate that the device is turned on.
4. Add connected wired devices to the hub. The algorithm for adding and configuring is described in the user manual of each device.
5. Run the [functionality testing](#).

## Adding to the system



LineSplit Fibra is compatible with [Hub Hybrid \(2G\)](#) and [Hub Hybrid \(4G\)](#) only. Only verified partners can add and configure Fibra devices in [Ajax PRO apps](#).


## Before adding a device

1. Install the Ajax PRO app. Sign in to the PRO account.
2. Add a hub compatible with LineSplit to your app. Adjust the settings and create at least one virtual room.
3. Make sure that the hub is on and has Internet access via Ethernet and/or mobile network. You can do this in the Ajax app.
4. Check the hub status in the Ajax app. Make sure the hub is disarmed and does not start updates.
5. Make sure the module is physically connected to the hub.


## How to add LineSplit Fibra

Two ways to add devices are available in the Ajax PRO app: automatically and manually.

### To automatically add a device:

1. Open the Ajax PRO app. Select the hub to which you want to add LineSplit Fibra.
2. Go to the **Devices**  tab and click **Add Device**.
3. Select **Add All Fibra Devices**. The hub will scan the Fibra lines. After scanning, all devices connected to the hub that have not yet been added to the system will be shown.
4. Select the device from the list. After pressing, the LED indicator will flash to identify this device.
5. Set the device name, and specify the room and security group if Group Mode is enabled. Press **Save**.

### To add a device manually:

1. Open the [Ajax PRO app](#). Select the hub to which you want to add LineSplit Fibra.
2. Go to the **Devices**  tab and click **Add Device**.
3. Assign a name to the device.
4. Scan the QR code or enter it manually. The QR code is located on the board.
5. Select a virtual room and a security group (if [Group Mode](#) is enabled).
6. Press **Add**.

If the connection fails, check the wired connection's correctness and try again. If the maximum number of devices (100 for Hub Hybrid) has already been added to the hub, you will receive an error notification while adding.



LineSplit only works with one hub. When the device is paired with a new hub, the module stops exchanging data with the previous hub. When LineSplit is added to a new hub, it remains in the list of devices on the previous hub. You can remove the device manually.

## Functionality testing

Available for LineSplit:

- **Fibra Signal Strength Test** – to determine the strength and stability of the signal at the device installation site.
- **Lines Power Test** – to determine if there is enough power for all devices connected to the hub.

### How to run Fibra Signal Strength Test:

1. Select a hub in the [Ajax PRO app](#).
2. Go to the **Devices**  menu.
3. Select LineSplit.
4. Go to the LineSplit settings by clicking on the gear icon .

5. Select Fibra Signal Strength Test.


6. Run the test following the prompts on screen.

### How to run Lines Power Test:

1. Select a hub in the Ajax PRO app.

2. Go to the **Devices**  menu.

3. Select a hub.

4. Go to the hub settings by clicking on the gear icon .

5. Open the **Lines** menu.

6. Select Lines Power Test.

7. Run the test following the prompts on the screen.



## Icons

The icons show some statuses of the device. You can check them in the Ajax apps:

1. Select a hub in the Ajax app.

2. Go to the **Devices**  tab.

3. Find **LineSplit** in the list.

Icon	Meaning
	Fibra Signal Strength – displays the signal strength between the hub and the detector. Recommended values: 2–3 bars.  <a href="#"><u>Learn more</u></a>
	LineSplit is temporarily deactivated.  <a href="#"><u>Learn more</u></a>




In LineSplit, events of tamper triggering are temporarily disabled.

[Learn more](#)

## States

The states display information about the device and its operating parameters. You can check the LineSplit states in the Ajax apps:

1. Select a hub in the Ajax app.
2. Go to the **Devices**  tab.
3. Select **LineSplit** from the list of devices.

Parameter	Meaning
Temperature	<p>Module temperature.</p> <p>The acceptable error between the value in the app and the temperature at the installation site: 2 °C.</p> <p>The value is updated as soon as the module detects a temperature change of at least 1 °C.</p> <p>You can create a scenario by temperature to control automation devices.</p> <p><a href="#">Learn more</a></p>
Fibra Signal Strength	<p>Signal strength between the hub and LineSplit Fibra. Recommended values: 2–3 bars.</p> <p>Fibra is a protocol for transmitting events and alarms.</p> <p><a href="#">Learn more</a></p>





Connection via Fibra	<p>The status of connection between the hub and the module:</p> <ul style="list-style-type: none"><li>• <b>Online</b> – the module is connected to the hub.</li><li>• <b>Offline</b> – the module has lost connection with the hub. Check the module connection to the hub.</li></ul>
Line Voltage	<p>The voltage value on the Fibra line to which the module is connected.</p>
Lid	<p>The tamper status that responds to the detachment of the device from the surface or violation of the device’s casing integrity:</p> <ul style="list-style-type: none"><li>• <b>Not connected</b> – the tamper is not connected to LineSplit.</li><li>• <b>Closed</b> – the module is installed into Case; the tamper is connected. Normal state of the casing.</li><li>• <b>Front lid open</b> – the integrity of the casing is violated. Check the state of the casing.</li><li>• <b>Detached from surface</b> – the board is removed from the casing. Check the mounting.</li></ul> <p><a href="#"><u>Learn more</u></a></p>
Temporary Deactivation	<p>Shows the status of the device temporary deactivation function:</p> <ul style="list-style-type: none"><li>• <b>No</b> – the device operates in normal mode and transmits all events.</li><li>• <b>Entirely</b> – the device does not follow system commands and does not report alarms or other events.</li><li>• <b>Lid Only</b> – notifications on the tamper triggering are disabled.</li></ul> <p><a href="#"><u>Learn more</u></a></p>

Firmware	LineSplit firmware version.
Device ID	LineSplit ID/Serial Number. Also available on the device board and its packaging.
Device No.	LineSplit loop (zone) number.
Line No.	The Fibra line number of the hub to which LineSplit is connected.

## Settings

To change module settings in an Ajax app:

1. Go to the **Devices**  tab.
2. Select **LineSplit** from the list of devices.
3. Go to **Settings** by clicking on the gear icon .
4. Set the required parameters.
5. Click **Back** to save the new settings.

Settings	Meaning
Name	<p>Name of the module. Displayed in the list of hub devices, text of SMS and notifications in the events feed.</p> <p>To change the name of the module, click on the text field.</p> <p>The name can contain up to 12 Cyrillic characters or up to 24 Latin characters.</p>
Room	Selection of the LineSplit virtual room.

	The room name is displayed in the text of SMS and notifications in the events feed.
Alert with a siren if malfunction on output lines detected	If the option is enabled, the <a href="#">siren</a> is activated in case of detection of a malfunction of the output lines.
Fibra Signal Strength Test	<p>Puts the module into the Fibra Signal Strength Test mode.</p> <p>The test allows you to check the signal strength between the hub and LineSplit via the wired Fibra data transfer protocol to select the optimal installation site.</p> <p><a href="#">Learn more</a></p>
User Guide	Opens LineSplit User Manual in an Ajax app.
Temporary Deactivation	<p>Allows the user to disable the device without removing it from the system.</p> <p>Three options are available:</p> <ul style="list-style-type: none"> <li>• <b>No</b> – the device operates in normal mode and transmits all events.</li> <li>• <b>Entirely</b> – the device will not execute system commands, and the system will ignore alarms and other notifications from the device.</li> <li>• <b>Lid Only</b> – notifications on the tamper triggering are disabled.</li> </ul> <p><a href="#">Learn more</a></p>
Unpair Device	Unpairs LineSplit from the hub and deletes its settings.

## Indication

Event	Indication	Note
Adding a module	<p><b>When added automatically</b> – the green LED flashes quickly when LineSplit is selected from the list. When you click Add device, the green LED flashes once.</p> <p><b>When added manually</b> – the green LED flashes once.</p>	
Removing the module	The green LED flashes six times.	
Tamper triggering	The green LED flashes once.	
Lines Power Test	The green and red LEDs are glowing continuously during the test.	
Low voltage on the input line	The green LED lights up smoothly and goes out smoothly.	Voltage of 7 V <sub>DC</sub> or less is considered low.
Short circuit on the line	The red LED flashes 4 times per second for 12 seconds.	After 12 seconds, LineSplit attempts to restore power to the output lines, but if the fault has not been cleared, the module repeats turning off. The actions are repeated until the correct state of the line is restored.
Overvoltage on the line	The red LED flashes 4 times per second for 12 seconds.	After 12 seconds, LineSplit attempts to restore power to the output lines, but if the fault has not been cleared, the module repeats turning off. The actions are repeated until the correct state of the line is restored.

## Maintenance

The device does not require maintenance.

## Technical specifications

All technical specifications of LineSplit Fibra

Compliance with standards

## Warranty

Warranty for products of Limited Liability Company “Ajax Systems Manufacturing” is valid for 2 years after purchase.

If the device does not function correctly, please contact Ajax Technical Support first. In most cases, technical issues can be resolved remotely.

Warranty obligations

User Agreement

### Contact Technical Support:

- e-mail
- Telegram

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