www.WuT.de

Operating instructions

Commissioning and use

logic.hub

valid for the product:
#50506

v1.04, 11.2025, english

Subject to errors and changes:

Since we can make mistakes, none of our statements may be used without verification. Please notify us of any errors or misunderstandings you become aware of so that we can identify and correct them as quickly as possible.

Only carry out work on or with W&T products if it is described here and you have read and understood the instructions in full. Unauthorized actions can cause hazards. We are not liable for the consequences of unauthorized actions. If in doubt, please ask us or your dealer!

Contents

1. Security and law

Notes

These instructions contain information relating to your personal safety. They are introduced by a signal word that expresses the severity of the danger:

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING indicates a possible danger that can lead to death or serious injury.

CAUTION indicates a possible danger that may result in injury.

The signal word of the highest applicable hazard level is used in a warning. This means that if a warning indicates a danger to life, there may also be a risk of injury.

If a warning refers to an entire section or a sequence of work steps, it is placed in front of these and structured as follows.

⚠ SIGNAL WORD **Type and source of danger**
consequences of the hazard
➔ An action step to avert the consequences of the hazard
➔ Another action step to avert the consequences of the hazard.

A warning that refers to an individual work step immediately precedes it and is structured as follows:

1. Preceding work step

   ⚠ **SIGNALWORD: Type and source of the hazard**
   Consequences of the hazard
   ➔ Action step to avert the hazard
   ➔ Further action step to avert the danger
2. Work step to which the note refers
3. Subsequent work step

Some further information within these instructions is also highlighted:

! Note: Risk of material damage imminent
Circumstances that could lead to material damage

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i **General information**
General information on the following text section

Further information
Reference to further information.

P Product
The following section only refers to a specific product.

Target groups
The following section or sequence of actions is aimed at a specific target group.

Instructions for action

Tasks for achieving specific goals are instructions in the form of step-by-step instructions. They have the following structure:

Solving the task

The introductory paragraph summarizes the task and points out general prerequisites that are required to carry it out. This is followed by a list of

- objects and
- specific requirements that must be met

1. first action step
2. second action step
3. third action step

Result achieved and, where applicable, a performance review.

Further design elements

References to websites:
www.wut.de

User input:
129.11.121.1

Source code:
```
print(„This is a programming example“)
```

Highlighting in the text:
Identifiers, such as button labels, are highlighted in the body text.

Qualified personnel

⚠ WARNING **Danger to life due to electric current**

Improper installation can lead to accidents with electric current

➔ Installation by qualified personnel only

➔ Observe documentation

➔ Observe safety regulations

The products described in these instructions may only be installed and commissioned by personnel who are qualified for the respective task. The documentation corresponding to the respective task must be observed, in particular the safety instructions and warnings contained therein.

Qualified personnel are able to recognize risks and avoid potential hazards when handling the described products due to their training and experience.

Intended use

The logic.hub is an IoT gateway for networking devices, databases, etc. in the context of the Internet of Things and Industry 4.0. They serve as data aggregators and as a switching and control center. Any other use is not in accordance with the intended purpose. Wiesemann & Theis GmbH is not liable for damage resulting from improper use. Product modifications Product modifications are not permitted. Wiesemann & Theis GmbH is not liable for damage resulting from unauthorized product modifications.

Product modifications

Product modifications are not permitted. Wiesemann & Theis GmbH is not liable for damage resulting from unauthorized product modification.

Electrical safety

- Before starting any work on the logic.hub, disconnect the power supply completely using suitable measures and secure it against being switched on again.
- Only use the device in closed and dry rooms.
- Do not expose the device to high ambient temperatures or direct sunlight. Observe restrictions with regard to the maximum ambient temperature.
- Keep ventilation openings clear and maintain a distance of at least 10 cm between the logic.hub and neighboring heat sources.
- Observe the nominal values for input voltage and output currents.
- During installation, ensure that no free-hanging wires protrude into the interior of the device. Ensure that no individual wires protrude from strands. Use wire end ferrules.
- Screw the terminals tight.
- Tighten unused terminals.
- Only use power supply units that ensure safe isolation of the low-voltage side from the mains supply in accordance with EN62368-1 and have the “LPS” feature.

Electromagnetic compatibility

! Note: Electromagnetic interference
To ensure electromagnetic compatibility, only use shielded network cables!

The logic.hub meets the industrial limits for interference immunity as well as the stricter emission limits for households and small businesses. There are no EMC-related restrictions with regard to the usability of the devices in these environments.

Conformity to standards

Complete declarations of conformity
The complete declarations of conformity for your device can be found on the corresponding online data sheet at www.wut.de

- The Logic.hub conforms to the following standards and normative documents:
- EN 55032: 2012 cl. B
- EN 61000-3-2: 2014
- EN 61000-3-3: 2013
- EN 61000-4-2: 2009
- EN 61000-4-3: 2006 + A1: 2008 + A2: 2010
- EN 61000-4-4: 2012
- EN 61000-4-5: 2014 +A1
- EN 61000-4-6: 2014
- EN 61000-4-8: 2010
- EN 61000-4-11: 2004
- EN 61000-6-2: 2005
- EU Directive 2011/65/EU (RoHS)

Storage

Store the logic.hub in a dry room. Ensure that the ambient conditions are observed. The temperature must be between -40°C and +70°C, the humidity must not exceed 95% relative humidity. We recommend storage in the original packaging.

Transportation

There are no special restrictions regarding transportation. However, to protect the product from mechanical stress, we recommend that it is only transported in its original packaging.

Disposal

Electronic devices must not be disposed of with household waste, but must be disposed of properly as electrical waste. The logic.hub is labeled in accordance with 2012/19/EU on waste electrical and electronic equipment. This directive regulates the Europe-wide take-back and recycling of old electronic devices. You can dispose of the device via existing collection and return systems or return it to your specialist dealer.

2. Product information

Manufacturer

Wiesemann & Theis GmbH
Porschestr. 12
42279 Wuppertal Germany

Tel: +49 (0)202 26800
Fax: +49 (0)202 2680265
E-Mail: info@wut.de
www.wut.de

WEEE registration: DE 77008276
BattG registration: 21000788

Product identification

The product type is uniquely identified by the article number on the device sticker. The unique device identification can be found in the form of the MAC address on the underside of the device. This consists of twelve characters (six bytes in hexadecimal notation), starting with the manufacturer identification 00:c0:3d. The following 6 characters uniquely identify your device.

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i **Damage to or loss of the device sticker**
The article number and MAC address can be read out via the web interface and the WuTility tool (www.wut.de/wutility) if the device sticker is damaged or lost.

Scope of delivery

The scope of delivery includes

- logic.hub 4.0 (#50506)
- Connector (#11111)
- Quick guide
- Device passport
- Risk information

Accessories and spare parts

For reliable operation, we recommend the use of original W&T accessories:

Connector (#11111)
2-pin, 5.08 mm pitch for connecting the power supply
www.wut.de/11111

Power supply unit with Euro plug (#11021)
Output: 24V DC, 500mA, energy efficiency: Level VI, no-load power < 0.075W
www.wut.de/11021

15-watt DIN rail power supply unit (#11080)
Universal LPS power supply unit with wide-range input 100-240V, 1 TE
www.wut.de/11080

Ethernet switch industry, 4 port (#55614)
Industrial switch with four ports.
www.wut.de/55614

Symbols on the products

Symbol	Explanation
CE	**CE marking** The product complies with the requirements of the applicable EU directives.
UK CA	**UKCA marking** The product complies with the requirements of the applicable United Kingdom (UK) directives
	WEEE marking The product may not be disposed of with household waste, but must be disposed of in accordance with the disposal regulations for electrical waste applicable at the place of installation.

3. Installation

Fitters
The following section is aimed at the installers of the logic.hub and requires appropriate specialist knowledge.

Installation in the control cabinet

Mounting on top-hat rail

Note: Risk of material damage
Please observe the safety instructions in chapter 1.

The logic.hub can be mounted on a DIN rail (TH 35).

1. Place the logic.hub slightly angled upwards with the holder on the top edge of the DIN rail.
2. Press the device against the top hat rail from the front until the holder engages with an audible click.

The logic.hub is now firmly mounted on the top-hat rail.

Setting up the power supply

Setting up the power supply via PoE

As a power class 2 device, the logic.hub can be supplied with power via PoE in accordance with IEEE802.3af. To do this, you need

- A PoE switch or a PoE injector

1. Connect the logic.hub to “Network” via a shielded network cable to the PoE switch / PoE injector.

The logic.hub starts operation.

Set up power supply via external power supply unit

WARNING **Danger to life due to electric current**

Using the wrong power supply unit can lead to accidents involving electric current and fire

- Only use power supply units in accordance with the specification
- Observe the documentation
- Observe safety regulations

The logic.hub can be supplied with power via an external power supply unit. Such a power supply unit must be potential-free and the reference ground for the output voltage must not have a direct connection to the protective earth conductor. Furthermore, safe isolation between the extra-low voltage side and the supply network in accordance with EN60950-1 and LPS characteristics are mandatory.

- A power supply unit that meets the specifications (see Accessories section)
- A screwdriver

1. Attach the green terminal adapter to the power supply unit
2. Plug the green terminal adapter into the socket on the device

The logic.hub starts operation.

Connecting the network cable

The logic.hub is equipped with a network interface. To connect to a network, you will need:

- A Patch cabel

1. Use a patch cable to connect the logic.hub to the network into which you want to integrate the device.

The logic.hub is connected to the network.

4. commissioning

Network administrator
This section is aimed at network administrators and requires knowledge of network configuration. If you as a user do not know what to do with the steps described here, please contact your system administrator.

Making network settings

You will need the following information to carry out the tasks described below:

- MAC addresses of the devices to be configured
- Network parameters of the device to be configured: IP addresses, subnet definitions, gateways, DNS and time servers.

Making network settings via the WuTility

In this section, you assign a basic network configuration to the logic.hub using the WuTility configuration software. If you want to configure several devices, make a note of the respective MAC addresses, which you will find on the underside of the device.

To do this, you will need:

- a current web browser
- the WuTitliy software (www.wut.de/wutility)

1. Open Wutility
2. Select the device you want to configure from the list of available devices using its MAC address.
3. Click the **IP address** button in the toolbar at the top
4. Set the desired network parameters
5. Click on **Next**

The logic.hub accepts your settings and then restarts.

Making network settings via DHCP

If automatic configuration via DHCP is activated in your network, your box obtains a configuration after you have connected it to the network. To find out the IP address of your logic.hub, you need either

- Access to the leases of your DHCP server, for example via the log file or via the display of network subscribers on your router.
- the WuTitliy software (www.wut.de/wutility)

1. Open the log file of your DHCP server or the overview of the network participants on your router to determine your IP address using the MAC address of the logic.hub.
2. If necessary, configure a fixed lease for the logic.hub so that it can always be reached .under the same IP address

The logic.hub can now be reached via the IP address assigned by the DHCP server.

Making network settings via the default IP

In this section you assign an IP configuration to the logic.hub via the web interface. To do this, use the preset default IP of the device. To do this, you need:

- Administration rights for the network interface of your PC
- A current web browser

1. Assign your network interface a temporary or secondary IP configuration in the network 190.107.233/24
2. Open your web browser
3. Enter the IP address 190.107.233.110 in the address bar
4. Log in as the administration user
5. Click on **Basic settings**
6. Click on **Network**
7. Enter the desired network configuration
8. Click on the **Save** button at the bottom right

The logic.hub accepts your settings and can be reached via the assigned IP address

Call up the web interface

Call up the web interface via IP address

The web interface can be accessed via the IP address of the logic.hub.

1. Open your web browser
2. Enter the IP address of the logic.hub in the address bar

The web interface is displayedt

Accessing the web interface via WuTility

The web interface can be accessed via WuTility.

1. Open WuTility
2. Select the device whose web interface you want to call up from the list of available devices
3. Click on the **Browser** button in the toolbar at the top

The web interface of the logic.hub opens in your web browser

Making language settings

The web interface is available in German and English translation

1. Click on the circle with the national flag in the top right-hand corner of the web interface
2. Use the national flag to select the language in which the web interface should be displayed

The language of the web interface changes

Make further settings via the web interface

General notes on the web interface

All other settings for the logic.hub are made in the administration area of the web interface. Here you will find the following controls.

- Crumb navigation (top)
- Administration menu (left)
- Save button
- Reload button
- Buttons in dialog boxes

Log in as administration user

To make settings via the web interface, you must first log in as an administration user. No password is set on delivery.

1. Call up the web interface.
2. Click on the **Log in** button in the top right-hand corner of the user interface.
3. Enter the password for the administration user, if you have assigned one.
4. Click on **Log in.**

You can now make settings via the web interface.

Setting the date and time

Manually set time is not saved permanently

Please note that a manually set time will be lost after a few days if the power supply is interrupted.

By default, the logic.hub is set so that the time is automatically obtained from ntp.org when Internet access is functioning. Alternatively, you can configure your own time server or enter the time manually.

1. Open the web interface as an administration user.
2. Click on the **Basic settings** button in the **administration menu.**
3. Then click on the **Date and time** button.
4. Activate the **External time server** option and enter up to two time servers. Alternatively, deactivate the **External time server** function and enter the current time under **Manual configuration**.
5. Select the appropriate **time zone** for the device location.
6. Click on the **Save** button.

The logic.hub adopts the configuration for the date and time.

Change device information

The logic.hub displays information about the device and the manufacturer on the web interface. As delivered, this information refers to the product and to Wiesemann & Theis as the manufacturer. You can change this information, for example if you are using the logic.hub as a component in your own product.

7. Select the Information button under the Basic settings menu item in the administration area.

1. Enter details about the product in the **Device information** area.
2. Enter information about the manufacturer in the Manufacturer information area.
3. Save the changes.

The changed information is displayed on the start page of the logic.hub under the “Properties” menu item.

Set/change passwords

Note: Danger from cyber attacks

Please assign secure passwords for all users to ensure the highest possible level of information security.

The logic.hub has four different user roles: The administrator, who can make the device settings, a user who can define the logic editor flow, a dashboard user who can access the dashboards associated with the flows and a database user who has write and read rights for the internal database.

1. Open the web interface with administrator rights.
1. Select the **Users button** in the left-hand menu under **Basic settings**.
2. If necessary, adjust the user names for the two users.
3. Assign secure passwords for all users.
4. Then click on the **Save** button.

You have protected the accesses for the different user roles with a password.

5. Clamp inventories

Adding W&T clamps

To add an MQTT-capable S&T device, you can easily add the clamps for your W&T device automatically in the “Clamp inventories” tab under “ADD W&T clamps”. To do this, enter the article number of the device and the device name. You can find this information either on the device itself, in the Wutility tool or on the web interface of your W&T device. The device name is made up of “wut-” and the last 6 characters of the MAC address. Once your W&T device has been successfully found, click on “ADD SELECTED CLAMPS” and then on the diskette symbol to save the changes. To edit individual clamps, click on the pencil symbol to the right of the clamps. There you can change the clamps as required. To delete clamps from the inventory, click on the trash can icon to the right of the pencil icon.

Managing the input and output clamps

Input clamps

To add an MQTT device that is to work as an input, click on the plus symbol on the right next to “Manage your input clamps here”. Enter the name of your MQTT device, an optional description for better identification and the MQTT topic (in this case read). You can also set the MQTT payload to “digital” or “analog” to change the payload format. Under “Advanced options”, you have the option of activating logging, for example to create a diagram with this clamp in the dashboard. You can also specify the unit of the measured value, such as °C.

Output clamps

To add an MQTT device that is to work as an output, click on the plus symbol to the right of the “Manage your output clamps here” tab. Enter the name of your MQTT device, an optional description for better identification, the MQTT topic for setting the output and the MQTT topic for reading the current value. You can also set the MQTT payload to “digital” or “analog” to change the payload format. Under “Advanced options”, you have the option of checking the “Prefix” or “Suffix” box and specifying your desired topics.

Prefix

An MQTT prefix is a component of the topic name that appears at the beginning and is used to organize or categorize messages thematically. Prefixes can be used to differentiate between different device groups, locations or data types. Example:

sensor/: could be used to mark all messages that originate from sensors.

office/room1/: could be used to mark messages that refer to office 1.

Suffix

An MQTT suffix is the part of the topic name that appears at the end and often describes a specific piece of information or a detailed aspect of the message. Suffixes can be used to identify specific data points or actions. Example:

/status: could be used to indicate the status of a device.

/temperature: could be used to indicate the temperature data of a sensor.

Interaction of prefix and suffix

Complex and structured message hierarchies can be created by combining prefixes and suffixes in MQTT topics. This facilitates the management, filtering and processing of messages in an IoT network.

Advanced options / Manual input configuration

JSON path

In the world of IoT, efficient and structured data transfer is crucial. MQTT and JSON play a central role in this. The combination of these technologies enables effective organization, transmission and processing of data.

JSON data format

JSON is a simple, text-based format for structuring and transferring data. It is both human-readable and easy for machines to process.

JSON paths in MQTT

A JSON path describes the access to specific parts of a JSON data structure. In combination with MQTT, a JSON path can be used to describe and specifically process the structure of the data transmitted in MQTT messages.

Example

A sensor collects data about temperature and publishes it as a JSON message in the **`wut-ab1234/get/sensors1`:**

MQTT topic: `wut-ab1234/get/sensor/1`

Publish message(JSON):

json

{

„temperature“: 23.5,

}

JSON path for processing:

- **`temperature`** -> 23.5

A recipient that has subscribed to this topic can receive the JSON message and extract specific values using JSON paths.

By combining MQTT and JSON paths, IoT applications can effectively structure, transfer and process data, resulting in improved efficiency and organization.

Regular expression

A regular expression (RegEx) is a powerful tool for pattern recognition in texts.

Basic RegEx examples

Character classes

- `.` : Any character except a line break.

- `[abc]`: Any character from the set `a`, `b`, or `c`.

- `[^abc]`: Any character other than `a`, `b`, or `c`.

- `[a-z]`: Any character in the range from `a` to `z`.

Quantifier

- `*`: Zero or more repetitions of the previous character.

- `+`: One or more repetitions of the previous character.

- `?`: Zero or one repetition of the previous character.

- `{n}`: Exactly `n` repetitions.

- `{n,}`: At least `n` repetitions.

- `{n,m}`: Between `n` and `m` repetitions.

Anchor

- `^`: Start of a line.

- `$`: End of a line.

- `\b`: Word boundary.

- `\B`: No word boundary.

Character class abbreviations

- `\d`: One digit (corresponds to `[0-9]`).

- `\D`: No digit character (corresponds to `[^0-9]`).

- `\w`: A word character (letters, digits, underscores) (corresponds to `[a-zA-Z0-9_]`).

- `\W`: No word character (corresponds to `[^a-zA-Z0-9_]`).

- `\s`: A space character (space, tab, line break).

- `\S`: No space character.

Examples of regular expressions

1. validate e-mail address:

   ^[a-zA-Z0-9._%+-]+@[a-zA-Z0-9.-]+\.[a-zA-Z]{2,}$

2. validate IP address:

   ^(\d{1,3}\.){3}\d{1,3}$

3. date format (YYYY-MM-DD):

   ^\d{4}-\d{2}-\d{2}$

4. telephone number in international format

   ^\+?[0-9]{1,3}?[-.\s]?([0-9]{1,4}[-.\s]?){1,4}$

Applications of RegEx

Text search

RegEx is often used to search for certain patterns in texts. For example, you could search for all occurrences of email addresses in a text

Text processing

You can use RegEx to replace or change text patterns. For example, you could bring all telephone numbers in a text into a standardized format.

Validation

RegEx can be used to validate input, e.g. to ensure that a user input is a valid e-mail address.

Examples of the use of RegEx in different programming languages

JavaScript

```
const pattern = /^[a-zA-Z0-9._%+-]+@[a-zA-Z0-9.-]+\.[a-zA-Z]{2,}$/;

const text = „test@example.com“;

if (pattern.test(text)) {

   console.log(„Valid e-Mail adress“);

} else {

   console.log(„Invalid e-Mail adress“);

}
```

RegEx are extremely versatile and can be used in many areas of text processing and data validation.

Default value

The default value is a predefined value that is used if no other value is specified. In many applications, it makes sense to set default values to "True" or "False", especially when binary states are involved.

Last Will-Message (LWT)

In MQTT (Message Queuing Telemetry Transport), "Last Will and Testament" (LWT) refers to a special message that is published by a client if it unexpectedly loses the connection to the broker. This message is used to inform other clients that the client is no longer available and can have various applications, such as 1. status update: The LWT can be used to communicate the last known status of the client. For example, a sensor could publish its last measured value or a special status ("offline").

2. clear resource release: If a client controls a specific resource, such as a specific topic, the LWT can be used to inform other clients that this resource is no longer available.

How LWT works in MQTT:

- Configuration: A client can configure an LWT message when connecting to the MQTT broker. This is done by specifying a topic and a message with which the message is to be sent.

- Triggering: If the client loses the connection to the broker (logic.hub) unexpectedly (e.g. due to a network error), the broker automatically sends the previously configured LWT message to all subscribing clients.

- Application scenarios: LWT messages are useful to ensure that other clients are informed about the status of a client, especially if it is no longer reachable for any reason. This can be crucial when monitoring IoT devices, sensors or other client applications.

Example of the configuration of an LWT:

Suppose a web thermometer regularly sends temperature data to the logic.hub and wants to ensure that other clients are notified if the connection to the broker is lost:

- LWT-Topic: `wut-ab1234`

- LWT-Payloud: `{ „status“: „offline“ }`

If the device loses the connection to the broker, the broker automatically sends a message with `{ “status”: “offline” }` in the topic `wut-ab1234` to all subscribing clients.

Using LWT in MQTT improves communication and reliability in IoT and messaging applications by ensuring that other subscribers are immediately informed of changes in status.

6. Configuration of the MQTT broker

Introduction to the MQTT protocol
These instructions cover the commissioning and configuration of the logic.hub. For an overview of the functionality and various application scenarios for the MQTT protocol, please visit our topic page at www.wut.de/mqtt.

Basic settings for the MQTT service

Configuring the MQTT port

The standard port assigned by the IANA for the unencrypted MQTT service is port 1883. The standard port for TLS-encrypted MQTT is 8883. You can adapt these ports to your requirements.

1. Click on the **Broker** button in the left-hand menu under **MQTT settings**.
2. In the **Broker** area, enter the desired port in the **MQTT port** field.
3. Click on the **Save** button to apply the changes.

The MQTT port is now configured.

Activate TLS encryption for the MQTT service

Note: Risk due to cyber espionage
Unencrypted MQTT communication can be read.

To encrypt communication between the logic.hub and its clients, activate TLS (Transport Layer Security).

1. Click on the **Broker** button under **MQTT settings** in the administration menu.
2. In the **Encryption** section, select the **SSL/TLS certificate option.**

Set access rights for the MQTT service

Access to the MQTT service can be granted in three different ways:

- anonymous access
- Access with user name and password
- Access restrictions through access control lists (ACL)

! Note: Danger from cyber attacks
Only allow anonymous access if you can assume a secure environment. This option enables an attacker to read or manipulate MQTT communication.

i **Information: Greater security through the use of ACLs**
By using ACLs for access control of anonymous and authenticated users, read and write permissions can be reduced to individual topics.

Enable user management

Access via user and password allows authenticated users to participate in MQTT communication.

1. Open the web interface as an administration user.
2. Click on the **User management** button in the left-hand menu under **MQTT**.
3. Activate the **User** and **password** option under **Authentication**.
4. Click on **save**.

MQTT communication for authenticated users is now activated. If the use of ACLs is deactivated, every user created has full access to all topics.

Set up users

By setting up users, you grant different systems access rights to the MQTT service.

1. Open the web interface as an administration user.
2. Click on the **User administration** button in the left-hand menu under **MQTT**.
3. Click on **Add**.
4. Enter a user name and password in the following dialog.
5. Accept the entries with **Add**.
6. Click on **save**.

MQTT communication is now activated for the created user. Set up ACLs to further restrict access rights.

Allow anonymous access

By activating the anonymous user, any system can access the MQTT service without having to authenticate itself.

1. Open the web interface as an administration user.
2. Click on the **User administration** button in the left-hand menu under **MQTT**.
3. Activate the **Anonymous** access option under **Authentication**.
4. Click on **save**.

Anonymous systems can now access the MQTT service. If the use of ACLs is deactivated, these systems have full access to all topics.

Activate access restrictions via access control lists

With ACLs activated, the access rights of users (including those of the anonymous user) can be configured.

1. Open the web interface as an administration user.
2. Click on the **Access Control List (ACL)** button in the left-hand menu under **MQTT.**
3. **Set** the Enable option in the **Access Control List (ACL)** area.

   The control of access rights via ACLs is now activated.

Setting up Access Control Lists (ACL)

Setting up access control lists allows you to configure the access rights for all MQTT users, including the anonymous user, at topic level.

- To create an authorization, at least one user must be created or anonymous access must be permitted.

1. Click on the **Access Control List (ACL)** button in the left-hand menu under **MQTT**.
2. Click on the **Add** button to create an authorization.
3. In the **Add ACL entry dialog**, select the user for whom a permission is to be created.
4. Select the **access type** (read, write, read + write) for the authorization.
5. Then enter the **topics** for which you are creating this authorization in a comma-separated list. In addition to the wildcards # and +, you can also use the variables %c for the client ID and %u for the user name.
6. Accept the entries with **Add**.
7. Click on **Save**.

The access restriction is now activate.

MQTT log

The logic.hub records events of the broker and makes this data available for evaluation. The following event types are available:

- Error: Error
- Warning: Circumstances that can lead to errors
- Notice: Information that is worth noting
- Information: General information about the broker
- Subscribe: MQTT subscribe events

- Unsubscribe: MQTT unsubscribe events
- Debug: Debug information.

Configure log level

You can use the log level to determine which broker events should be recorded.

1. Open the **Log** menu item under the **MQTT** section in the administration navigation.
2. In the **Log level** area, select the events that you want to record.
3. Click on the **Save** button.

The selected events are now recorded.

Downloading log outputs

The log outputs are available for viewing and downloading in the web interface.

1. Open the Log menu item under the MQTT section in the administration navigation.
2. You can view the past events in the upper area.
3. Click on the **DOWNLOAD MQTT-LOG** button to download the log outputs.

You will now find the log file with the name **mqtt.log** in your download folder.

Empty log outputs

Log outputs that are no longer required can be deleted.

1. Open the **Log** menu item under the **MQTT** section in the administration navigation.
2. Click on the **Clear log** button.

The memory is now deleted and the recording of events starts again based on the selected log level.

7. Use

IoT developers and users

The following section is aimed at developers and users of the logic editor and dashboard.

Logic editor

Opening the editor

1. Open the web interface of the logic.hub.
2. Click on the **Logic Editor** button in the left-hand menu.
3. If necessary, enter the user name and password for the logic editor to log in.

The editor is loaded.

Create page

To create a new page, either click on "Create new page" in the middle or on the plus symbol at the top. Assign a label to the page and start compiling your program.

When you make changes, a blue dot will appear on the diskette symbol at the top left. This reminds you to save the changes you have made.

Logic nodes

Inputs and outputs

INPUT:
For setting the signal source, e.g. the input of a WEB-IO.

The INPUT node has two pins for connection:

- VAL(Value) to pass on the current value of the selected terminal.

-ERR(Error) to indicate faulty values.

These pins enable a clear separation between the normal signal flow and the error display

OUTPUT:
For setting an output, e.g. the output of a WEB-IO.

CONST:
For setting the output type, which you can change to "Digital" or "Analog". In "Digital" mode, you can set the value to either True(1) or False(0). For the "Analog" output type, you can specify a fixed value.

Logic

AND:
The logic gate & outputs True(1) if all inputs are True(1). You can implement two to ten inputs with this node.

OR:
The OR logic gate outputs True(1) as soon as at least one input is True(1). You can implement two to ten inputs with this node.

NOT:
The NOT(Inverter) logic gate inverts or negates the signals.

XOR:
The logic gate XOR(Exclusive-OR) outputs True(1) if the number of True(1) inputs is odd. You can use this node to implement two to ten inputs.

NAND:
The logic gate NAND(non-AND) outputs False(0) if all inputs are True(1). You can realize two to ten inputs with this node.

NOR:
The NOR(non-OR) logic gate outputs True(1) if none of the inputs are True(1). You can implement two to ten inputs with this node.

XNOR:
The logic gate XNOR(Exclusive-OR) outputs True(1) if the number of True(1) inputs is even. You can implement two to ten inputs with this node.

Special elements

RS node:
Also called RS flip-flop (reset set flip-flop) is a basic bistable multivibrator that has two stable states and is used to store a bit. The RS element has two inputs called Set(S) and Reset(R) and one output Q. The basic function of the RS element is to set or reset the state of output Q.

SR node:
Also called SR flip-flop (set-reset flip-flop) is a basic memory component. It is used to store a single bit and has two stable states. With two inputs, referred to as Set(S) and Reset(R), and an output Q. The basic function of the SR element is to set or reset the state of output Q.

F_TRIG:
Falling Edge Trigger is a useful tool to react to the falling edge of a signal. It helps to perform precise control and synchronization tasks by emitting a short pulse each time a falling edge of a signal is detected.

R_TRIG:
Rising Edge Trigger The R_TRIG detects the transition of a signal from (0) to (1) and outputs a short pulse signal for one clock cycle. It helps to perform precise control and synchronization tasks by emitting a short pulse each time a rising edge of a signal is detecte

SEL:
Selector Digital multiplexer with one control input (G) and two data or signal lines (IN0) and (IN1). The stereo input (G) determines which of the two inputs (IN0 or IN1) is forwarded to the output (Q). If (G) = (0), then (IN0) is output at (Q). If (G) = (1), then (IN1) is output to (Q).

Algebra

+ADD:
Adder adds the signal from both inputs and outputs the result to the output = 1 + 1 = 2

-SUB:
Subtractor subtracts the signal from both inputs and outputs the result to the output. 1 - 1 = 0

XMUL:
Multiplier multiplies the signal from both inputs and outputs the result to the output. 1 X 1 = 1

DIV:
Divider divides the signal of both inputs and outputs the result to the output. 1 / 1 = 1

MOD:
The modulo operation, often referred to as MOD, is a mathematical operation that determines the remainder of a division of two numbers. This operation is widely used in computer science and mathematics, especially when working with integers.

ROUND:
The Round function is an operation that rounds a number up or down to the nearest whole number or to a specified decimal place. Rounding to whole numbers: If the decimal place is less than 0.5, the number is rounded down. If the decimal place is 0.5 or greater, round up. Rounding to a specific decimal place: The value is rounded to the nearest number based on the specified decimal place. There are three variants in the logic.hub: Commercial rounding: Standard rounding rule, where the value is rounded up to the nearest whole number if the decimal place is 0.5 or greater. Rounding down(FLOOR) Always rounds down. Round up(CEIL) Always rounds up.

=EQ Equel:
Switches the output to True(1) as soon as the same signal is present at both inputs.

>GT Greater:
Outputs True(1) if the signal of the upper input is greater than that of the lower input.

<LT Smaller:
Outputs True(1) if the signal of the lower input is smaller than that of the upper input.

>GE Greater than or equal:
As soon as a greater signal is present at the upper input or the same signal as at the lower input, the output switches to True(1).

<LE Smaller than or equal:
Outputs True(1) if the signal of the lower input is less than or equal to that of the upper input.

Timer

TON(TimeOnDelay):
Input singal(IN) Time value(PT) The elapsed time since the start of the timer(ET) Output singal(Q). It delays the switch-on process of an output signal by the set time after an input signal is switched on. As soon as (IN=1) the time (PT) starts to run. Output Q is not set to (1) until PT has elapsed. The input signal is switched off (IN=0) The timer is reset, the current time (ET) is set to zero and the output signal (Q) is switched off (Q=0).

TOF(TimeOffDelay):
Input signal(IN) Time value(PT) The elapsed time since the timer was started (ET) Output signal(Q). It delays the switch-off of an output signal after the switch-off of an input signal by the set time. As soon as (IN=1), output(Q) becomes (1) immediately. If (IN=0), the timer starts to run and the current time (ET) is increased. When the delay time (ET = PT) is reached, output (Q = 0). If the input signal is switched on again (IN = 1) during the delay time, the timer is reset and the output signal (Q) remains switched on.

TP (Timer Puls):
Generates an output pulse of a set duration after the input signal is switched on, regardless of how long the input signal remains active. Input signal(IN) Time value(PT) Current time(ET). The elapsed time since the timer was started. Output signal(Q) The output signal that is active for the duration of the pulse. Input signal (IN=1) The timer starts to run and the output signal (Q=1). Elapsed time (ET) is increased, the timer counts up to the preset pulse duration (PT). When the delay time is reached (ET=PT), the output signal (Q=0) becomes independent of whether the input signal (IN) is still active. If the input signal (IN=0) is active, the timer is reset and the output signal (Q) remains deactivated.

Operating instructions

All nodes can be highlighted in color.

To be able to connect your nodes or node points to one another, you must connect the nodes to one another by clicking on them and holding them down. Once you have selected the desired input or output, you can drag it to the node to be linked. A connection should now have been created from one node to the other. Make sure that all nodes are linked so that no errors occur. To remove pages, you must go to the page you want to remove. The Delete page icon will then appear on the right to **permanently delete** the page or the check mark “Page active” will appear on the right to deactivate the page but not delete it.

To delete individual nodes, you can click on them and press (delete) on your keyboard or click on “DELETE ELEMENT” at the bottom right.

The first position on the node corresponds to the first pin of the node. In other words, the top pin of the node represents the first value. Example: If you perform the SUB- (2-1) operation, the 2 would be at the top pin and the 1 at the bottom pin, so the result would be 1. However, if you calculate (1-2), the 2 would be at the bottom, so the result would be -1.

Priority mode:
You can activate priority mode by clicking on a node and then expand the expert options. Priority mode is particularly important for recursions. If priority mode is activated, the output value of the block is calculated earlier than the order in the chain would correspond.

Truth Tables Logic Editor

A	B	OUT
0	0	0
0	1	0
1	0	0
1	1	1

A	B	OUT
0	0	0
0	1	1
1	0	1
1	1	1

A	OUT
0	1
1	0

A	B	OUT
0	0	0
0	1	1
1	0	1
1	1	0

A	B	OUT
0	0	1
0	1	1
1	0	1
1	1	0

A	B	OUT
0	0	1
0	1	0
1	0	0
1	1	0

=

A	B	OUT
0	0	1
0	1	0
1	0	0
1	1	1

RS

R	S	Q
0	0	X
0	1	1
1	0	0
1	1	X

SR

S	R	Q
0	0	Q
0	1	0
1	0	1
1	1	X

SEL

G	IN0	IN1	OUT
0	0	X	0
0	1	X	1
1	X	0	0
1	X	1	1

Dashboard

Opening the dashboard

1. Open the web interface of the logic.hub.
2. Click on the **Dashboard** button in the left-hand menu.
3. If necessary, enter the user name and password for the Dashboard user to log in.

The dashboard is loaded.

Populating the dashboard

1. add dashboard:

- Click on the three dashes at the top left
- Select “Add dashboard”
- Label the dashboard

2. add and edit tiles:

- Click on the icon with the three rectangles and the plus in the top right
- Select “Edit tiles”
- A full-width tile appears, click on it to access the tile selection

Tile types and their function

1. Switch label

A switch that you can connect to the output of a WEB-IO, e.g. to switch the output.

2. LED label

The LED tile can show you when, for example, the input of a WEB-IO is set.

3. Placeholder label

Used for the visual design and structuring of the dashboard.

4. Slider label

Displays the current counter status, for example, or allows you to set a counter if you specify this as the target. You can set the minimum and maximum value, e.g. to set the counter to 0.

5. Ticker label

Displays the current temperature, for example. To do this, you must select a web thermometer as the source, for example. The tile can display up to three decimal places.

6. Progress label

Displays the current counter reading, for example. You can set a minimum and maximum value. You can also change the colors from a certain value defined by you.

7. Gauge label

The gauge label is similar to the progress label, but in a different form. You can also change the color from a certain value defined by you.

8. Diagram label

You can use the diagram label to display values in a diagram. You can select several sources, e.g. to make comparisons. To add a source, go to the desired terminal in the terminal inventory and activate logging to be able to select the source. You can customize the display format (linear, step and soft). You can log values up to a quarter. You can also specify a minimum and maximum value to keep the diagram clear.

9. Header label

Gives your dashboard a heading.

Customization and storage

All tiles can be colored according to your wishes and you can also adjust the size of the tiles.

All changes must be saved. If you have made a change in the dashboard, a blue dot will appear on the diskette icon at the top, indicating that you still need to save. If you have made a mistake while editing, you can simply undo or redo the changes using the arrows.

8. Maintenance

Opening the housing

Note: Risk of material damage due to electrostatic discharge

Electrostatic discharge can destroy components on the circuit board. If you do not have ESD equipment, touch the metal frame on the network interface before opening the housing in order to achieve potential equalization.

Some maintenance work requires access to the circuit board. You can open the housing for this purpose.

1. Remove the power supply and network cable.
2. Remove the logic.hub from the top-hat rail.
3. Touch the metal edge of a network socket to carry out potential equalization.
4. Gently press the narrow sides of the logic.hub housing together so that the plastic lugs on the long sides of the cover are released from the housing body.
5. Pull off the front panel.

You can now pull the circuit board out of its guide to carry out maintenance work.

Restoring the factory settings on the hardware side

The logic.hub can be reset to the factory settings using a jumper inside the device.

1. Open the housing of the logic.hub according to the previous instructions.
2. Pull the circuit board out of the rail.
3. In the middle of the circuit board you will find two jumpers, each of which is only connected to one contact pin.
4. Close the contact bridge of the jumper that points to the rear of the device.
5. Supply the circuit board with voltage.
6. The recovery process is indicated by the following flashing code: short on, long off.
7. After successful completion, the flashing pattern is inverted: Long on, short off.
8. Disconnect the circuit board from the power supply.
9. Set the jumper back to the uncontacted initial position.
10. Close the housing.

You can now reassemble the logic.hub and put it back into operation.

Restore factory settings immediately

You can also reset the logic.hub in the administration area of the web in-terface.

1. Click on the **Maintenance** menu item in the administration navigation.
2. Click on the **FACTORY SETTINGS** button in the Reset area.
3. Confirm the reset in the following dialog.
4. Observe the status LED. During the reset, it flashes in the following pattern: short on, long off.
5. After successful completion, the flashing pattern is inverted: Long on, short off.

You can now restart the logic.hub.

Firmware update

This section describes a firmware update using the WuTility tool.

To carry out the update, you will need

- The WuTility software

  www.wut.de/wutility

  The current firmware for your product

  www.wut.de/50506

1. Download the latest firmware from one of the Internet addresses listed above.
2. Unzip the zip file.
3. Open WuTility.
4. Select the device whose firmware you want to update from the list of available devices.
5. Click on the **Firmware** button in the toolbar.
6. Select the UHD file with the current firmware.
7. Click **Next** to perform the update.
8. Wait for the confirmation in WuTility.
9. After a successful update, click on the Finish button to complete the process.

The logic.hub restarts with the modified firmware and can be reached again via the network after a short time.

Warm start

You can restart the logic.hub in the administration area of the web interface.

1. Click on the **Maintenance** menu item in the administration navigation.
2. Click on RESTART DEVICE in the Reset area.
3. Confirm the restart in the following dialog.

After a successful restart, the web interface is reloaded.

9. Decommissioning

Removing the device from the DIN rail

The logic.hub can be easily removed from the top-hat rail. You will need the following to do this:

- A small slotted screwdriver

1. Remove the network cable and the power supply.
2. There is a black tab underneath the logic.hub at the height of the top-hat rail. Use the screwdriver to pull it downwards.
3. Tilt the front of the logic.hub upwards to lift the deThere is a black tab underneath the logic.hub at the height of the top-hat rail. Use the screwdriver to pull it downwards.vice off the top-hat rail.

You can now service, store or dispose of the logic.hub.

Proper disposal

Electrical appliances must not be disposed of with household waste.

1. Please dispose of the logic.hub at the local collection point or return it to your specialist dealer.

Thank you very much!

10. Technical data

Online data sheets
Detailed information about the product, as well as tools and the latest firmware, can be found in the online data sheet at www.wut.de

Connections and displays

Network:	1 x 100/1000BaseT Autosensing/Auto-MDIX, RJ45
Supply voltage:	Power over Ethernet (PoE) or 24 ... 48V DC (+/- 10%) via screw terminal
Power consumption:	PoE Class 2 (3,84 ... 6,49W) typ. 140mA with 24V DC external supply
Indicators:	LEDs for system, error and network status

Hardware and software

Hardware:	Marvell 88F6820 Flash: 4GB (eMMC) RAM: 1GB (DDR3)
Software:	Mosquitto: v2.0.20

Housing and other data

Housing:	Plastic housing with integrated DIN rail mounting 105 x 22 x 77mm (L x W x H)
Storage temperature:	-40...+70°C
Operating temperature:	0...60°C
Permissible humidity:	0...95% relative humidity, non-condensing

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