u-IoT – User Manual

Installation, commissioning, operation and configuration · Version 1.0 · 10 September 2026

ITEM	VALUE
Product	u-IoT
Applies to	UIOT-B, UIOT-BL, UIOT-BS, UIOT-BLS, UIOT-L, UIOT-S, UIOT-LS, UIOT-D, UIOT-X
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1 About this manual

1.1 Purpose

This manual describes the u-IoT: its layout, electrical connection, commissioning, operation and configuration. It leads once from the sealed box to a configured device and then describes day-to-day operation.

1.2 Who it is written for

The manual addresses three people:

- the **qualified electrician** who connects the device (sections 2, 4, 5);
- the **service technician** who commissions and configures it (sections 6 to 13);
- the **instructed operator** who works with it every day (sections 3, 11, 14).

These roles may be filled by one person. Section 2 applies to all three.

1.3 How it is organised

Sections 1 to 5 describe the device and its connection. Sections 6 to 13 describe commissioning, the web interface and configuration. Sections 14 to 16 form the reference part: faults, technical data, contact.

1.4 Conventions

Controls of the web interface are set in *italics*. Device addresses and names are set in `fixed width`. Any statement not yet finally settled at the time of this version is explicitly marked **to follow**; it will be added in the next version. Nothing here is estimated or assumed.

1.5 Validity

This version 1.0 supersedes draft 0.1 of August 2026 in full. Older documents describing door modules of other origin – with different wire colours, a different network name, a different device address or a different supply range – do **not** apply to the u-IoT. Only the wiring given in section 5 is binding.

2 Safety

2.1 Intended use

The u-IoT is a compact controller with two digital inputs and two digital outputs. It calls robots to map points, gives feedback by light and sound, opens doors and gates in its uGate form, and links devices in the building to the uGo/uSuite fleet software. Any other use is considered improper.

2.2 Qualification

The electrical connection must be carried out by a **qualified electrician**. Connection to a door operator must additionally be agreed with the responsible door or building services department.

2.3 Before connecting

- **Disconnect the supply.** Before any wiring work, isolate the supply of the device and of the connected operator and secure it against being switched on again.
- **Check polarity.** Brown is positive, white is 0 V. Reversed supply polarity can destroy the device.
- The relay pair (yellow/green) is **volt-free** and has no polarity; the two conductors are interchangeable.

2.4 Electrical limits

The relay contact is a volt-free (dry) contact rated for a maximum of **250 V AC or 30 V DC at a maximum of 10 A**. These values must not be exceeded, individually or in combination. The contact only switches; it does not supply power to the door operator.

2.5 Doors and gates

> **Warning.** The safety chain of the door must never be bridged, bypassed or disabled. Light curtains, safety edges, emergency stop and end-position monitoring of the door operator remain fully effective in all cases. The u-IoT issues the same open command that a manual push button would issue.

The safety requirements of the door manufacturer apply, as do the local regulations for electrical installations and for power-operated doors. In case of doubt, the door manufacturer decides.

2.6 Network and credentials

- The device interface operates without its own login. It must therefore be run **only in a protected network segment** shielded against external access. Operation on a publicly reachable network is not permitted.
- **Factory passwords must be changed before productive operation.** The device access point is open as delivered; a password of at least eight characters must be set during commissioning.
- The **configuration export contains credentials** – passwords and keys – in readable form. Export files must be treated as credentials, stored securely and never sent by unencrypted message.

2.7 Residual risks

The device contains no user-serviceable parts. The enclosure must remain closed during operation. If the enclosure or the cable shows visible damage, take the device out of service.

3 Product overview and variants

3.1 What the device does

The u-IoT links a simple electrical event in the building – a button press, a switching command to a light, a buzzer or a door operator – with the robot control system. To do so it provides:

- **two digital inputs** for volt-free normally-open contacts (push buttons, feedback contacts);
- **two digital outputs** for a light, a buzzer or a relay;
- an **action engine**: each input, or an event raised by the firmware, triggers a stored task;
- a **web interface** for operation and configuration without additional software;
- **2.4 GHz Wi-Fi** as its own access point and as a client on the site network;
- **device-to-device radio** for a direct link between two u-IoT units, independent of the site network;
- **roles** for operating several units: standalone, coordinator, client, door opener.

One device, one firmware – the form factor and its fitted components decide what an individual unit does in the field.

3.2 Assignment of inputs and outputs

TERMINAL	TYPICAL ASSIGNMENT
Input 1	Call button or other volt-free normally-open contact. Triggers the assigned action. Also used to recover the access point (section 6.4).
Input 2	Second button or feedback contact, for example the "door open" signal of a door operator. Freely assignable.
Output 1	Switching output. In the door opener form factor this is the volt-free relay to the door operator; in the call form factor it is the buzzer. It is also driven by the sound command of the interface and by the open command received over device-to-device radio.
Output 2	Switching output. In the call form factor this is the light. Freely assignable, typically used as the result light of an action.

The inputs are configured active-high and debounced ex works; a closed contact counts as "active". The outputs are off after power-up.

3.3 Order codes

CODE	DESIGNATION	FORM FACTOR	WHAT IT CONTAINS	WHAT IT DOES
UIOT-B	u-IoT Call Button	Call	Button on input 1	Calls a robot to a map point.
UIOT-BL	u-IoT Call Button with Light	Call	Button, light on output 2	As UIOT-B, with visible feedback: the light flashes while the request is pending and stays on until the robot arrives.

CODE	DESIGNATION	FORM FACTOR	WHAT IT CONTAINS	WHAT IT DOES
UIOT-BS	u-IoT Call Button with Sound	Call	Button, buzzer on output 1	As UIOT-B, with audible feedback.
UIOT-BLS	u-IoT Call Button with Light and Sound	Call	Button, buzzer on output 1, light on output 2	As UIOT-B, with visible and audible feedback.
UIOT-L	u-IoT Light	Call without button	Light on output 2	Status light at a handover point; switched by the fleet through an action.
UIOT-S	u-IoT Sound	Call without button	Buzzer on output 1	Arrival signal without a call button.
UIOT-LS	u-IoT Light and Sound	Call without button	Buzzer and light	Signal station without a call button.
UIOT-D	u-IoT Door (uGate)	Door opener	Volt-free relay on output 1, input 1 optionally as "door open" feedback	Opens a door or gate when the robot approaches. Switched by the robot bridge over device-to-device radio.
UIOT-X	u-IoT Bridge	Robot bridge	Device without input/output fitting, powered over USB	Sits on the robot, follows its pose and planned path and switches the uGate units along the route. Can also act as coordinator for several call buttons.

Combination rule. The device has two outputs. Door opener, light and sound therefore cannot run together on one unit. If signalling is also required at a door, place a second unit as a signal station (UIOT-LS) next to it.

Lifts. Connecting lifts through the robot bridge is under trial. It is released individually per lift type. Release status: **to follow**.

4 Scope of delivery and mounting

4.1 Scope of delivery

Each box contains:

- the u-IoT in the ordered form factor, with the device label applied (serial number, access point network name, device identifier);
- for the call, signal station and door opener form factors, the attached four-core cable;
- for the robot bridge, the USB cable;
- a leaflet referring to this manual.

Check the packaging for transport damage after unpacking. Dimensions, weight and degree of protection per form factor: **to follow**.

4.2 Call button box (UIOT-B, -BL, -BS, -BLS)

Mount the call button box where the robot is to be called – next to a door, at a handover point, at a workstation. A sensible height is the usual operating height of about 1.0 to 1.2 m above the floor, easy to reach and clearly visible. Fasten the box to a solid surface and route the cable with strain relief. For the variants with a light, make sure the light is in clear view from the operating position. Mounting dimensions: **to follow**.

4.3 Signal station (UIOT-L, -S, -LS)

Mount the signal station where the feedback is to be perceived – usually at the handover point itself. Place the light so that it is visible from within the working area, and the buzzer so that it remains audible above the ambient noise level. This form factor is not fitted with a call button.

4.4 Door opener box (UIOT-D)

Mount the door opener box close to the door operator, within reach of the four-core cable to the operator control. Position it so that it is not mechanically loaded when the door is closed and so that the radio path to the robot is not shadowed by large metal parts. Agree the mounting position with the door or building services department. Connect it as described in section 5.4.

4.5 Robot bridge (UIOT-X)

The robot bridge is fitted inside the tablet case of the robot:

1. Switch off the robot.
2. Open the tablet case as described in the robot manual.
3. Place the bridge in the case so that it does not press on moving parts or on cables.
4. Connect the bridge to the USB port inside the tablet case. This port is the only supply; a separate power supply is neither required nor provided for.
5. Close the case and apply the device label of the bridge to the outside of the robot, so that serial number and network name remain readable without opening it.
6. Switch on the robot. The bridge starts with the robot.

5 Electrical connection

> **Warning.** Isolate the supply before starting work and secure it against being switched on again. The work must be carried out by a qualified electrician.

5.1 The four-core cable

The call, signal station and door opener form factors are supplied with a four-core cable:

CORE	FUNCTION	NOTE
Brown	Supply + (10 to 40 V DC)	Observe polarity. The usual source is an industrial power supply with 12 or 24 V DC.
White	Supply 0 V	Return conductor of the supply.
Yellow	Relay contact, volt-free	Interchangeable with green – no polarity.
Green	Relay contact, volt-free	Interchangeable with yellow – no polarity.

The supply is rated for **10 to 40 V DC**. Supply from an AC source is not permitted.

5.2 Connecting a call button

The call button is a volt-free normally-open contact on input 1. In the call button box it is wired ex works; an external button is connected in the same way. The contact must not be subjected to external voltage. Keep the cable to the button short and route it separately from power cables. Brief contact bounce is suppressed by the device; a press of about half a second is reliably detected.

5.3 Connecting light and buzzer

In the corresponding form factors, light and buzzer are already wired inside the box and are switched through the driver stage built into the unit. The outputs of the control section itself carry signal level only and must not be loaded directly with a light or a buzzer. If a light provided on site is to be connected, the rating of the driver stage – switching type and operating voltage of the light – must be clarified beforehand: **to follow**.

5.4 Connecting a door operator

The relay contact is wired **in parallel with the open input** of the door operator – that is, to the same terminals a manual push button or an open contact would use (labelled COM and OPEN on many operators).

1. Isolate the supply of the door operator and of the u-IoT.
2. Connect brown and white to the supply of the u-IoT and check polarity.
3. Connect yellow and green to the open input of the door operator. The order does not matter.
4. If the "door open" feedback is used, connect the corresponding volt-free signalling contact of the operator to input 1 or input 2.
5. Check the wiring and restore the supply.
6. Test the function manually as described in section 10.6.

> **Warning.** The relay contact issues the same command as a manual push button. It does not replace any safety device and must not be wired into the safety chain of the door.

5.5 Connecting the robot bridge

The robot bridge is powered exclusively from the USB port inside the tablet case of the robot (section 4.5). It has no input or output wiring. Do not connect a power supply unit.

6 First access

6.1 Access point

The u-IoT always broadcasts its own Wi-Fi network named `u-IoT-XXXXXX`. The six characters are derived from the serial number and are printed on the device label.

6.2 Establishing a connection

1. On a computer, tablet or phone, select the network `u-IoT-XXXXXX` and connect.
2. If a password has already been set, enter it. As delivered, the access point is open.
3. Open `http://192.168.5.1` in a browser.

4. The web interface loads.

> **Note.** Before productive operation, set a password for the access point in the *Wi-Fi* tab (at least eight characters). See section 2.6.

6.3 Access through the site network

Once the device is connected to the site network in the *Wi-Fi* tab, the interface is also reachable at the address the device holds on that network. This address is shown on the *Station address* status card of the dashboard and in the *Wi-Fi* tab.

6.4 Fallback

The access point remains active even while the device is connected to the site network, as long as the *Access point as fallback* setting is switched on. If access through the site network is lost, the device is still reachable at `u-IoT-XXXXXX` and `http://192.168.5.1`.

If the fallback has been switched off and the site network connection has been lost, recovery by hand helps: **hold input 1 closed for ten seconds** – for example by keeping the call button pressed. The device switches the access point back on.

> **Recommendation.** Leave the fallback switched on. Switching it off only makes sense when the site network connection is demonstrably stable – and then only from a connection through the site network.

7 The web interface

The interface is organised in tabs. All values are reloaded from the device continuously; there is no need to refresh the browser.

7.1 Dashboard

The dashboard is the operating screen. It shows the state of the device and allows the outputs to be switched without any prior configuration.

Status cards. Three cards at the top of the page: *Uptime* (time since the last start), *Free memory* (available working memory; persistently low values are a matter for the service department) and *Station address* (address on the site network, otherwise "not connected").

Input and output state table. The table is updated every second and shows, for each terminal, the identifier, the type, the state and the time since the last change. Inputs are shown as *active* or *inactive*, outputs as *on* or *off*.

Quick control. Below the table an output can be selected and switched manually with *On*, *Off* or *Toggle*. This is the shortest way to test an output.

Last action status. This card shows the most recently executed action with its identifier, type, state (*running*, *finished*, *failed*) and the complete response of the remote system. It is the first place to look when an action did not have the expected effect.

Paired devices. If partner devices for the device-to-device radio are configured, a table shows for each partner the name, the identifier, the target output and its state (*on*, *off* or *not reachable*). The *On* button next to a partner sends it an open command – this is how a uGate door is tested manually.

Call message. While a robot request is running, a card appears at the bottom with the request identifier, the target point, the assigned robot, the state and – as long as this is possible – the *Cancel* button. The card closes once the request reaches a final state.

7.2 Actions

The *Actions* tab manages the tasks the device carries out. The table lists, for each action, the identifier, the display name, the type, the triggering input (or "System") and whether it is enabled; plus the *Edit* and *Delete* buttons. Creating actions is described in section 8.

7.3 Wi-Fi

The *Wi-Fi* tab configures the device's own access point and the connection to the site network.

Access point.

SETTING	MEANING
Access point only	The device broadcasts only its own network and does not connect to the site network.
Access point as fallback	The access point stays active even while the site network connection exists. Leave switched on.
Channel	Radio channel 1 to 13. Two devices that talk to each other over device-to-device radio must use the same channel.
Network name	Base name of the access point. The device appends its own identifier automatically.
Password	Password of the access point. At least eight characters. Empty means an open network.

Site network. Reconnect automatically, network name (from the list of networks found), password and address assignment – either automatic or fixed. With fixed assignment, address, gateway and netmask must be entered.

Network scan. *Start scan* searches the surroundings; after a few seconds the list of networks found is available for selection. *Cancel scan* stops a running scan.

Live values. A read-only area shows the serial number, the device identifiers, the current radio channel and the addresses on the site network and at the access point. The *Apply live values* button copies the currently assigned address into the fields for fixed address assignment.

Applying changes. *Save network settings* stores the changes; the device may restart. *Restart device* triggers a manual restart.

> **Caution.** If the fallback is switched off while the interface is being operated through the access point, the connection is lost. Change this setting only through the site network. For recovery see section 6.4.

7.4 Coordination

The *Coordination* tab configures the role of the device, the robot call and the door opening. See sections 9 and 10.

7.5 Diagnostics

The *Diagnostics* tab brings together device information, backup and logs.

Device overview. Serial number, device identifier, firmware version, number of requests answered so far and number of pending commands.

Backup and restore. See section 13.

Log on memory card. If a memory card is fitted, the device writes a structured log. The status card shows whether the card was recognised, how much space is used, whether the clock is synchronised and how many entries are pending. To download, select a period, a time base and a topic filter (all topics, actions, network, system, coordination); the file contains one entry per line. If the card was inserted after start-up, *Read again* helps.

Live views. Three expandable views show the complete device state, the interface counters and the command history. They allow fault-finding without additional tools.

7.6 Help

The *Help* tab explains the fields of the interface and refers to this manual. It does not replace it: for connection, safety and commissioning, this document is binding.

8 Creating actions

8.1 What an action is

An action links a **trigger** with a **task**.

- Trigger: input 1 becomes active, input 2 becomes active, or the firmware itself triggers ("System").
- Task: switch an output, send an HTTP request, call a robot or hand a template over to uGo.

Every action has a unique identifier (letters, digits, underscore and hyphen, at most 64 characters), a display name and an enable switch.

Result light. Actions of the type *HTTP request* and *Call robot* can be assigned an output as a result light. The output switches on when the action starts and off when it has finished.

8.2 Switching an output

1. Open the *Actions* tab and select *Add action*.
2. Enter the identifier and the display name, set *Enabled* to *yes*.
3. Select *Digital input* as the trigger and assign input 1 or input 2.
4. Select *Switch output* as the type.
5. Select the switching mode: *On*, *Off* or *Toggle*.
6. Select the target output: output 1 or output 2.
7. *Save*.

> **Example.** Identifier `light_toggle`, trigger input 1, type *Switch output*, mode *Toggle*, target output 2. Each button press reverses the state of the light.

8.3 Sending an HTTP request

1. *Add action*; enter identifier, name and trigger as above.
2. Select *HTTP request* as the type.
3. Configure the request:

FIELD	MEANING
Method	GET, POST, PUT, PATCH or DELETE.
Address	Complete address of the remote system, starting with `http://` or `https://`.
Timeout	Time to wait for the response before the request counts as failed. Default 2000 ms.
Retries	Number of retry attempts on failure (0 to 5).

4. Add headers as name/value pairs where required.
5. Select the content type (none, JSON or text) and enter the content. The *Validate* button checks JSON content before saving.
6. Select the authentication mode:

AUTHENTICATION MODE	WHEN IT FITS
None	Remote systems without login, or remote systems already protected at network level.
User name and password	Remote systems with simple authentication.
Fixed key	Remote systems with a permanently valid key in the authorisation header.
Login with renewal	Remote systems with expiring keys. The device logs in on its own and renews the key in good time. Enter the login address, user name, password, the path to the key within the response, the validity period and the template for the login content.
Key in header field	Remote systems with their own header field for the key.

7. Optionally assign a result light.
8. *Save*.

Following up on long operations. If an operation takes longer at the remote system, follow-up can be switched on: the device sends the first request, reads a value out of the response – for example a job number –, uses it to query a second address at a configurable interval and completes the action as soon as the stored terminal condition is met. Set the polling interval, the overall timeout, how the terminal conditions are combined (all or any), the extraction rules and the follow-up requests.

> **Note.** Passwords and keys are stored encrypted in the device and are never returned in plain text through the interface. The configuration export is the exception (section 2.6).

8.4 Calling a robot ("Call Me")

This action requests a robot to travel to a named map point.

1. Prerequisite: the call service is configured and enabled in the *Coordination* tab (section 9).
2. *Add action*; enter identifier, name and trigger.
3. Select *Call robot* as the type.
4. Configure:

FIELD	MEANING
Point	Name of the map point the robot is to travel to. The decisive value is the name under which the point is held in the map.
Robot	Which robot is to travel. *Any available* leaves the choice to the device.
Timeout	After this time an unexecuted request is discarded. 0 means no timeout.
Follow-up action	Action carried out after the robot has arrived (optional).

5. Drive the robot to the target point and press *Capture point*. This stores the coordinates of the point in the device, so that later calls do not require another lookup in the map.
6. *Save*.

> **Example.** Identifier `call_dispatch`, trigger input 1, type *Call robot*, point `Dispatch-1`, robot *Any available*, timeout 120000 ms, result light output 2. One button press brings the next free robot to the dispatch point; the light shows that the request is running.

8.5 Handing a template over to uGo

This action starts a workflow template stored in uGo. The device handles login, handover and follow-up queries itself.

1. *Add action*; enter identifier, name and trigger.
2. Select *uGo template* as the type.
3. Configure:

FIELD	MEANING
uGo address	Address of the uGo server including port.
User name, password	Credentials for uGo.
Template	Identifier of the template to be executed.
Polling interval	Interval at which progress is queried.
Timeout	Overall time after which the operation is aborted.

4. *Save*.

> **Example.** Identifier `template_evening_round`, trigger input 2, type *uGo template*, polling interval 3000 ms, timeout 600000 ms. A key switch on input 2 starts the stored evening round.

9 Calling a robot

9.1 Roles

A device operates in one of four roles. The role is set in the *Coordination* tab.

ROLE	TASK
Standalone	The device keeps its own list of robots and dispatches them directly. Suitable for single call buttons with one or a few robots.

ROLE	TASK
Coordinator	Central point for several call buttons. Other devices forward their requests here; the coordinator decides which robot travels.
Client	The device forwards its requests to a coordinator and does not decide itself.
Door opener	The device is dedicated to door opening and does not dispatch robots. See section 10.

9.2 Setting up standalone

1. Open the *Coordination* tab and select the *Standalone* role.
2. Enter an identifier for the requester, for example `station-1`. It will later appear in the robot's travel logs.
3. In the robot table select *Add robot* and enter: address of the robot, display name and – optionally – the standby point the robot returns to when its work is done.
4. Add further robots in the same way.
5. *Save coordination settings*.

9.3 Setting up a client

1. Select the *Client* role.
2. Enter the address of the coordinator and press *Fetch identifier*. The device reads the coordinator's device identifier and stores it; if the coordinator's address changes later, the device finds it again through this identifier.
3. Alternatively press *Find coordinator* and let the device search the network.
4. *Save coordination settings*.

9.4 Setting up a coordinator

1. Select the *Coordinator* role.
2. Enter all robots into the robot table (as in section 9.2).
3. *Save coordination settings*. From now on the clients on the network forward their requests here.

9.5 How a request runs

1. The button is pressed. The request is placed in the queue.
2. The device checks whether a robot is free. A robot counts as free when its last move has finished, been cancelled or failed, or when it has not moved yet. If the robot is travelling, the request waits.
3. The device determines the coordinates of the target point – from the stored point or, if that is missing, from the currently loaded map.
4. The device dispatches the move.
5. The device follows the progress through to a final state.

If the robot is currently travelling to its charging station and the state of charge is sufficiently high, that move may be interrupted for the call. A move that is carrying out work is never interrupted.

9.6 States of a request

STATE	MEANING
Queued	The request is in the queue.
Waiting for robot	All robots are busy; the request is waiting for a free one.
Reading map	The device is determining the currently loaded map.
Resolving point	The device is looking for the target point in the map.
Dispatching	The move is being handed over.
Moving	The robot is travelling.
Arrived	The robot has reached the point. A stored follow-up action now starts.
Failed	The move was not carried out. The cause is shown in the last action status.
Cancelled	The request was cancelled.

As long as a request has not yet been dispatched, it can be cancelled through the call message on the dashboard. After dispatch, cancelling from the device is no longer possible; the move must then be ended at the robot.

9.7 Timeouts and fine settings

In the *Advanced* area of the *Coordination* tab:

SETTING	MEANING
Polling interval	Interval at which the travel state of the robot is queried.
Request timeout	Longest waiting time before a request is discarded.
Interval between requests	Shortest interval between two dispatches.
Map access retries	Number of attempts to determine the coordinates.
Queue length	Maximum number of waiting requests. Once reached, new requests are rejected.

9.8 Fallback rule for clients

If the coordinator cannot be reached, the configured fallback rule applies:

RULE	BEHAVIOUR
None	The request is rejected. The call button has no effect until the coordinator is reachable again.
Dispatch locally	The device dispatches the robots held in its own robot table directly.
Backup coordinator	The device forwards the request to a second, configured coordinator.

For call buttons at critical points, *Dispatch locally* or *Backup coordinator* is recommended; at least one robot then remains reachable if the coordinator fails.

9.9 Automated transfer

Available only in the *Coordinator* role. The coordinator observes the robot positions. When a robot reaches a configured interchange point and stands there for about ten seconds, the stored arrival action is triggered; the coordinator then sends the robot to a configured standby position. Set the enable switch, the arrival action, the polling interval, the timeout, the tolerance for point matching (default 0.35 m) and the interchange points and standby positions. Points are captured by driving the robot to the position and pressing *Capture*.

10 Door opening (uGate)

10.1 Layout

Four parts are involved in an automatic door opening:

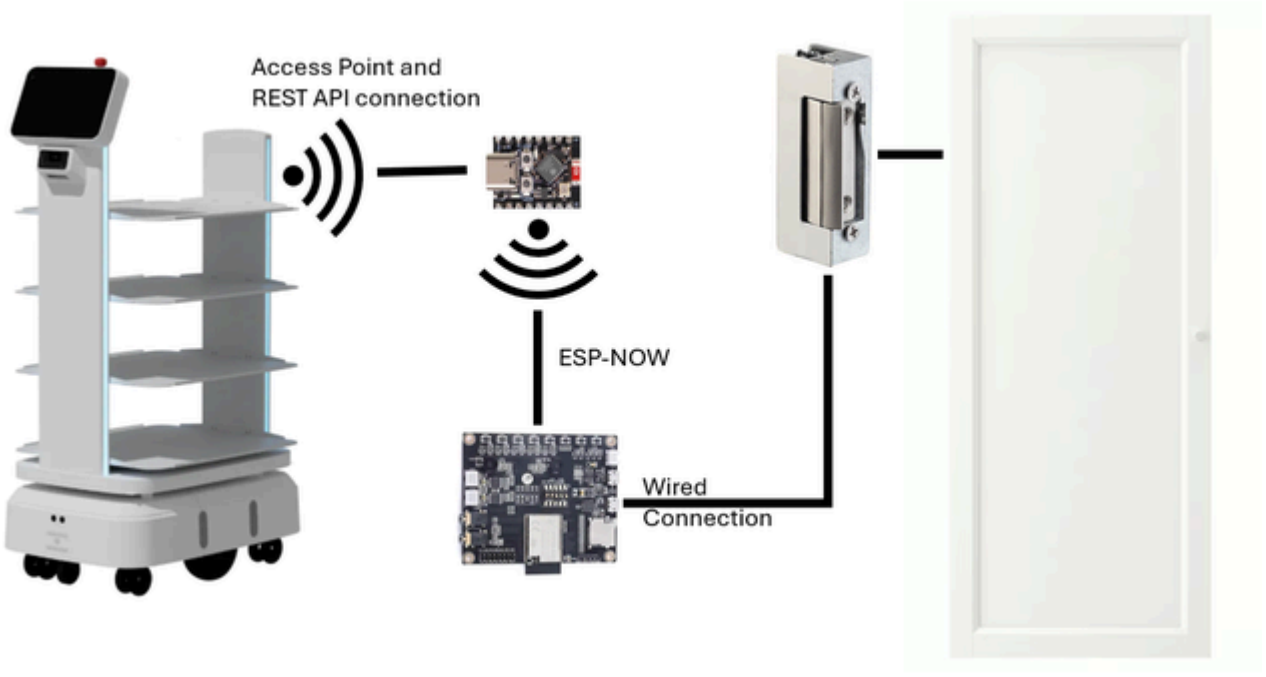


Figure 1: Layout of the door opening. The robot reports its pose and planned path to the bridge; the bridge switches the uGate unit over device-to-device radio; the uGate unit switches the door operator through its volt-free contact. The illustration shows the interaction, not the delivered enclosures.

PART	TASK
Door operator	Opens the door when its open input is switched. Provided on site.
uGate (UIOT-D)	Wired to the door operator. Receives the open command over device-to-device radio, switches output 1 and reports the state of that output back.
Robot bridge (UIOT-X)	On the robot. Follows its pose and planned path and sends the open commands to the responsible uGate.
Robot	Reports pose and planned path, provides the map and carries out the moves.

The bridge stores no path of its own. It reads the path the robot itself has planned and decides from it whether a door has to be opened. Map and routes must therefore be maintained carefully.

10.2 Preparing the map

This work is done in the map tools of the robot before the doors are loaded into the bridge.

1. Open the map used in operation.
2. Create a point of type *Gate* at the centre of the door opening. It must lie in the same coordinate frame as the pose and path of the robot.
3. Assign the device identifier of the corresponding uGate to that point.
4. Create a low-speed area around the opening that encloses the gate point. The bridge uses this area as the keep-open zone.
5. Save and publish the map; the robot must hold this map as its active map.

10.3 Preparing the routes

Whether the door opens reliably depends on the routes.

- The planned path must cross the gate centre within the **door radius** (default 0.5 m).
- The final approach should be aligned with the door. Avoid tight turns inside the trigger zone; a turning point belongs before the trigger zone.
- If the door is used from both directions, check both routes.
- Routes that pass close to the door without going through it deliberately do not trigger.
- Do **not** increase the door radius to compensate for an unfavourable route. Too large a door radius makes neighbouring corridors look like door crossings.

10.4 Setting up the bridge

1. Open the *Coordination* tab and select the *Door opener* role.
2. Switch on the enable setting in the *Door opening* card.
3. Enter the address of the robot whose moves are to be accompanied.
4. Optionally enter the map name. If the field is left empty, the robot's active map is used. If it is filled in, the name must match exactly.
5. Press *Load doors from map*. The bridge reads the gate points from the robot map, associates the low-speed areas, creates the doors and adds the missing partner devices for the device-to-device radio.
6. Check the loaded doors: identifier, device identifier of the uGate, position, door radius, trigger radius, safety radius, and whether a keep-open zone was detected.
7. *Save coordination*.

> **Note.** Both units – bridge and uGate – must use the same radio channel for the device-to-device radio. If both are connected to the same site network, this follows automatically. If neither is connected, the configured access point channel applies; if it is changed on one unit, it must be changed on all partner devices as well.

10.5 Zones and timings

Three distances are stored for each door:

ZONE	DEFAULT	EFFECT
Trigger radius	3.0 m	From this distance the bridge begins to send the open command – provided that the planned path crosses the door and the robot is heading towards it.

ZONE	DEFAULT	EFFECT
Safety radius	2.0 m	If the door has not confirmed by this distance that it is open, the bridge cancels the robot's current move.
Door radius	0.5 m	Disc around the door centre that the planned path must cross for the door to be considered affected at all.

The safety radius must always be smaller than the trigger radius and large enough for the robot to come to a safe stop.

Zone logic in plain words. While the robot is outside the trigger zone, nothing happens. As it approaches, the bridge checks three things at once: does the planned path ahead of the robot cross the door disc, is the robot within the trigger radius, and is it heading towards the door? Only when all three are true is the open command sent, and repeated once per second thereafter. When the uGate reports its output as switched, the door counts as open. If it does not report this – neither within three seconds of the first command nor by the time the safety radius is reached – the bridge cancels the move before the robot reaches the closed door; it keeps requesting the door, and the move can be repeated afterwards. Once the door is confirmed open, the command continues to be sent until the robot has left the keep-open zone; if no keep-open zone is stored, until it leaves the trigger radius again.

Further timings of the bridge:

VALUE	SETTING	EFFECT
Validity of the pose report	15 s	Older pose reports are discarded; no opening takes place.
Validity of the path	60 s	Older path data are discarded; the bridge then checks the heading only. This is degraded operation and must be verified in the field.
Evaluation interval	200 ms	Pose and path are evaluated five times per second.
Repetition of the open command	1 s	For as long as the door is to stay open.
Confirmation period	3 s	If the door does not confirm within this period, the move is cancelled.
Suppression while stationary	5 s	While the robot stands still, new triggers are suppressed – except while it is waiting for a door.

> **Note.** The "door open" confirmation comes from the uGate reporting its switched output. It is not a door position signal, unless a corresponding signalling contact is wired on site to an input of the uGate.

10.6 Manual test

Before handover to operation:

1. **Switch the door manually.** Open the dashboard of the bridge and press *On* next to the relevant uGate in the table of paired devices. The door must open; the state of the partner device must change to *on*.
2. **Check the feedback.** If the state stays at *not reachable*, either the device identifier or the radio channel is wrong (section 14).
3. **Check a run.** Let the robot travel the route. The status card of the door opening must show *monitoring*, then *opening* and then *ready* again. The door must be open before the robot

reaches the safety radius.

4. **Check the opposite direction.** Repeat the same sequence from the other direction.
5. **Check for false triggering.** Let the robot pass the door without going through it. The door must not open.
6. Record the results in the acceptance report.

11 Signals: light and sound

11.1 Result light

Every action of the type *HTTP request* or *Call robot* can be assigned an output as a result light (section 8.1). The output switches on as soon as the action starts and off as soon as it has finished – whether successfully or not. For the operator this means: light on stands for "request running", light off for "operation completed".

For a robot call this produces the familiar behaviour: the light flashes while the request is queued and a free robot is being sought, and stays on until the robot has arrived.

11.2 Sound signal

The buzzer is connected to output 1. It is driven in two ways: by an action of the type *Switch output* and by the sound command of the interface, which switches output 1 briefly. A continuous tone is realised with one *On* action and a second *Off* action.

11.3 Examples per variant

VARIANT	TYPICAL CONFIGURATION
UIOT-BL	*Call robot* action on input 1, result light on output 2. The light accompanies the request until arrival.
UIOT-BS	*Call robot* action on input 1; a second action *Switch output – On* on output 1 as an acknowledgement tone on button press.
UIOT-BLS	As UIOT-BL, plus the acknowledgement tone on output 1. Pressed – a short tone sounds and the light takes over.
UIOT-L	A system action or an *HTTP request* action from the fleet switches output 2. Typical use: "a robot is on its way to this point".
UIOT-S	As UIOT-L, but on output 1 as an arrival tone.
UIOT-LS	Both outputs in use: light for the state, sound for the event.
UIOT-D	Output 1 is the door relay and is not available for signalling. For signals at the door, place a second unit (UIOT-LS).

12 Connecting to uGo and uSuite

12.1 What has to be configured

For a call to arrive, three entries must match:

ENTRY	WHERE IT IS HELD	NOTE
Robot	Robot table in the *Coordination* tab	For each robot: address, display name and optionally a standby point.
Map	On the robot	The map in which the target points are created must be the active map on the robot.
Point	In the map	The target point is addressed by the name under which it is held in the map. Give it a unique name.

After every change to the map – a moved point, a renamed point, a new map – the points stored in the device must be captured again and the doors must be reloaded into the bridge.

12.2 Addressing today

In the firmware currently delivered, the robot is addressed through the **address of its chassis**. It is entered for each robot in the robot table. If the site network assigns addresses automatically, a fixed assignment must be set up for the robots; otherwise the call goes nowhere as soon as an address changes.

12.3 Addressing in future

In future the robot will no longer be addressed through the address of its chassis but through a **uGo service key**. uGo will then map identifier to address; the robots will no longer have to be held individually with their address in the device.

> **From firmware version X – to follow.** The version and date of the changeover, and the procedure for existing installations, will be added in the next version of this manual. Until then, section 12.2 applies.

12.4 Actions towards the fleet

Through the action type *uGo template* (section 8.5), workflows stored in uGo can be started from a button. Through the action type *HTTP request* (section 8.3), any remote system can be addressed – including services of the uSuite. For remote systems with expiring keys, use the authentication mode *Login with renewal* so that the device renews the key on its own.

13 Backup, reset, update

13.1 Backup and restore

In the *Diagnostics* tab:

FUNCTION	EFFECT
Create backup	Stores the currently valid configuration as a restore point inside the device.
Restore backup	Puts the stored restore point back into effect. Available only if a restore point exists.
Export configuration	Downloads the complete configuration as a file – **including passwords and keys**.
Import configuration	Uploads a file and stores it as a restore point. It does not take effect immediately; press *Restore backup* afterwards.

> **Warning.** The exported configuration file contains credentials in readable form. Store it securely and delete it after use. See section 2.6.

Recommendation. After every completed commissioning, create a backup and additionally store the configuration as a file. Both belong in the plant documentation.

13.2 Factory settings

The *Factory settings* function first saves the currently valid configuration as a restore point and then resets the device. After the reset the access point is open again and reachable at `http://192.168.5.1`; all actions, roles and network entries are deleted. Export a configuration file before resetting so that the configuration is not lost.

13.3 Updating the firmware

The firmware of the u-IoT is installed **by URG Service**. Installation through the web interface is not provided for. For an update, contact the service department (section 16) and have the serial number, the form factor and the firmware version shown in the *Diagnostics* tab ready. The firmware version released for delivery: **to follow**.

14 Faults and remedies

OBSERVATION	POSSIBLE CAUSE	REMEDY
Access point `u-IoT-XXXXXX` does not appear	Device without supply; polarity reversed; access point switched off	Check supply and polarity (brown +, white 0 V). Then hold input 1 closed for ten seconds to recover the access point (section 6.4).
Interface not reachable through the site network	Address has changed; site network connection lost	Connect through the access point `u-IoT-XXXXXX` and `http://192.168.5.1` and check the live values in the *Wi-Fi* tab.
Call button has no effect	Action not enabled; wrong input assigned; call service not configured	Check the enable switch and the assigned input in the *Actions* tab. Watch the dashboard to see whether input 1 changes to *active* on the press. Check the call service in the *Coordination* tab.
Robot does not set off	No robot free; target point not found; robot address wrong	Read the last action status on the dashboard. Compare the point name with the map and capture the point again. Check the robot address.
Request is rejected	Queue full; client without a reachable coordinator	Check the queue length (section 9.7). Check that the coordinator is reachable and set a fallback rule (section 9.8).
Partner device shows *not reachable*	Different radio channels; wrong device identifier; partner without supply	Align the radio channel on all units involved (section 10.4). Compare the device identifier with the device label. Check the supply of the partner.
Door does not open on approach	Path does not cross the door centre; robot not heading towards the door; gate point in a different map	Check the route as described in section 10.3. Check the active map on the robot and reload the doors. Check the position of the gate point.
Door opens too late, move is cancelled	Trigger radius too small for the travel speed; door operator too slow	Increase the trigger radius while keeping the safety radius smaller. Check the running time of the door operator.

OBSERVATION	POSSIBLE CAUSE	REMEDY
Door opens without reason	Door radius too large; gate point beside the opening	Reset the door radius to 0.5 m and place the gate point at the centre of the opening (section 10.2).
HTTP request action fails	Address or authentication wrong; remote system answers too late	Read the last action status with the complete response. Check address, authentication mode, timeout and retries.
Light or buzzer stays silent	Output assigned incorrectly; form factor without this fitting	Switch the output manually on the dashboard. Check the assignment of the result light (section 11.1). Check the fitting of the variant (section 3.3).
Log on memory card missing	Card inserted after start-up; card not readable	Press *Read again* in the *Diagnostics* tab. Check the card and restart the device.

If the fault persists, contact the service department (section 16).

15 Technical data (short form)

FEATURE	VALUE
Supply, call, signal station and door opener form factors	10 to 40 V DC through the four-core cable (brown +, white 0 V)
Supply, robot bridge	5 V DC over USB from the tablet case of the robot
Digital inputs	2, for volt-free normally-open contacts, active-high, debounced
Digital outputs	2, routed through a driver stage inside the box
Relay contact (door opener form factor)	Volt-free, maximum 250 V AC or 30 V DC, maximum 10 A
Radio	2.4 GHz Wi-Fi as access point and as client on the site network; device-to-device radio between u-IoT units
Access point	`u-IoT-XXXXXX`, device address `http://192.168.5.1`
Operation	Web interface in a browser, no additional software
Interface	Open interface for state, outputs, actions and robot calls; operation only in a protected network
Log	Structured log on a memory card, if a card is fitted
Roles	Standalone, coordinator, client, door opener
Dimensions and weight per form factor	**to follow**
Degree of protection per form factor	**to follow**
Ambient conditions	**to follow**
CE marking and conformity	**to follow**

Full data are given in the u-IoT data sheet.

16 Service and contact

For questions on connection, commissioning and operation, and for firmware updates:

United Robotics Group GmbH An der Riede 2 28816 Stuhr Germany

health@unitedrobotics.group

Please have ready:

- the serial number and the access point network name from the device label;
- the form factor and order code;
- the firmware version shown in the *Diagnostics* tab;
- a short description of what you observed and, if possible, the last action status from the dashboard.

Version record

VERSION	DATE	WHAT CHANGED	STATUS
0.1	08/2026	First draft.	superseded
1.0	10 September 2026	First released version. Completely rewritten on the basis of variant definition V0.2 and the firmware documentation. Variant matrix with order codes UIOT-B to UIOT-X added; mounting per form factor added; door opening, zone logic and manual test added; signals, connection to uGo/uSuite and fault table added. Language versions DE, EN, FR, ES, IT.	released

This version 1.0 of 10 September 2026 supersedes draft 0.1 of August 2026 in full.

The German text is the source version. Any change of substance to the German text requires all language versions to be reworked. Every change of substance is recorded here.

Open points of this version

NO.	OPEN POINT	SECTION
1	Dimensions, weight and degree of protection per form factor	4.1, 4.2, 15
2	Rating of the driver stage for light and buzzer (switching type, operating voltage)	5.3
3	Ambient conditions	15
4	CE marking and conformity of the box	15
5	Firmware version released for delivery	13.3
6	Firmware version for the changeover to the uGo service key	12.3
7	Release of the lift connection per lift type	3.3

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