USER MANUAL

REVO Controller

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Installation

2.   Introduction

Introduction

The **Revo Controller** is an advanced automation controller developed as a **direct replacement for the IHC Visual Controller** (versions 1, 2, and 3). It is designed to provide a seamless upgrade path for existing installations by maintaining **full pin compatibility** with the original IHC Visual hardware. This ensures that the transition requires minimal effort and no major rewiring.

Purpose

The Revo Controller combines proven compatibility with modern connectivity options, enabling users to maintain their existing infrastructure while gaining access to enhanced functionality and integration capabilities.

Scope

This device is suitable for:

- **Residential automation systems** where IHC Visual controllers are currently installed.

- **Professional and industrial environments** requiring integration with PLCs or advanced smart home platforms.

Key Features and Benefits

- **Pin-Compatible Replacement**
  Directly replaces IHC Visual Controller versions 1, 2, and 3 without hardware modifications.

- **Flexible Operating Modes**

  o **Standalone Mode**: Operates independently for basic control needs.

  o **Home Assistant Integration**: Supports **auto-discovery**, enabling quick and easy integration into smart home ecosystems.

  o **PLC Connectivity via MODBUS**: Provides robust communication for industrial automation and advanced control scenarios.

- **Future-Ready Design**
  Built to support modern protocols and integrations, ensuring long-term usability and adaptability.

3.   Safety precautions

> ⚠ **WARNING**
>
> - Ensure all power to the control panel is switched **OFF** before installation.
> - Only qualified personnel should install or service the device.
> - Follow all applicable local electrical regulations and standards

3.1.   Safe installation

Please follow the safe installation checklist below:

Checklist for safe installation
Check wiring connection between all system parts before connecting to supply mains
This equipment is not suitable for use in locations where children are likely to be present
Maximum ambient temperature: 5 - 40℃
Do not use in a wet environment – protect from liquid
Do not use damaged equipment and cabeling

4.   Installation and mounting

Required Equipment

- 3 mm flat-head screwdriver

Mounting on DIN Rail

1. Pull back the spring latch located at the lower part of the device.

2. Position the device so that the upper mounting clips engage with the top edge of the 36 mm DIN rail.

3. Push the lower part of the device toward the rail until it seats firmly.

4. Release the spring latch to secure the device to the rail.

5. Gently pull the device to ensure it is properly locked and cannot move freely along the rail.

Positioning

- Mount the device vertically with adequate clearance for airflow and cable routing.

- Avoid mounting near high-heat components or electromagnetic noise sources unless properly shielded.

Final Check

- Ensure the device is fully secured to the DIN rail.

5.   Electrical connection

> ⚠️ **SAFETY INSTRUCTIONS**
> **Do not connect or disconnect cables to the unit's connector while the unit is powered on. Failure to do so may result in damaged electronics.**
>
> **Use only an approved insulated 24 VDC power supply to power the Revo.**
> The supply must limit output current to a **maximum of 8 A** or provide equivalent protection to meet the requirements of a **PS2 energy source** as defined in IEC 62368-1. Failure to comply may result in damage to the device, loss of safety protection, or non-compliance with regulatory standards.

Revo is "pin compatible" with older IHC Controllers, meaning that all input and output terminals are located approximately at the same position at the IHC Controller allowing seamless wire installation.

5.1.   Revo upper and lower terminals.

Revo has two sets of terminals named upper and lower terminals. The terminals are terminal blocks from WAGO provided with leaver for easy wiring. Simply open the leaver to upright position, insert the wiring and close the leaver again.
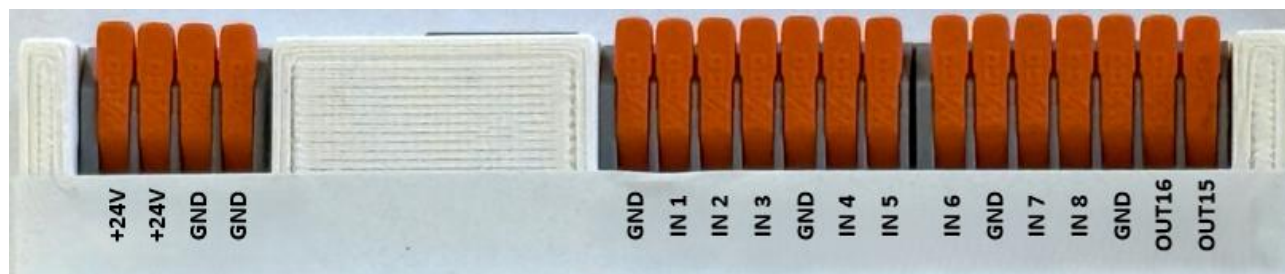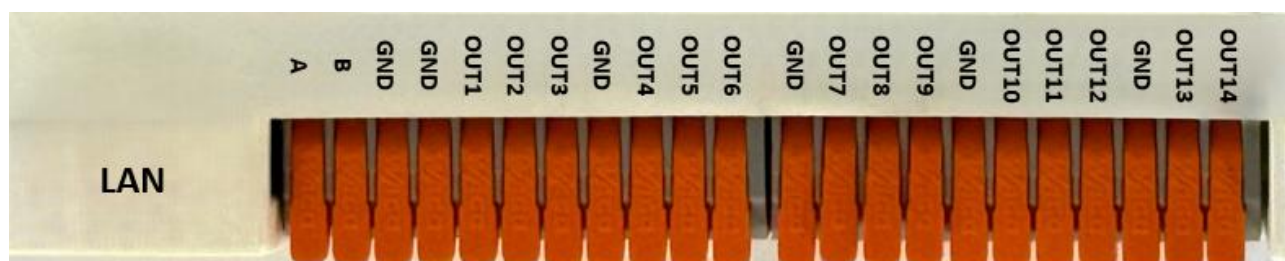
Fig 1: upper terminals

Fig 2:lower terminals

5.2.   24VDC supply terminals

Connect +24 to terminal marked "+24V" and GND wire to terminal marked "GND". The additional terminals marked "+24V" and "GND" may be used to daisy chain power to other modules.
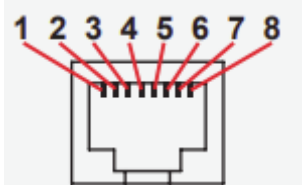
5.3.   Input terminals

Connect all IHC input modules to terminals marked "IN 1" through "IN 8". Use twisted pair wire and connect the ground wire to "GND" terminals on the Revo and on the IHC module. Several GND wires may be fitted into one terminal

5.4.   Output terminals

Connect all IHC output modules to terminals marked "OUT 1" through "OUT 16" Use twisted pair wire and connect the ground wire to "GND" terminals on the Revo and on the IHC module. Several GND wires may be fitted into one terminal

5.5.   LAN connector

Connect Revo to the local network (LAN) via the LAN port. The follows the Type T568B layout as shown below.

8-pin RJ-45 10/100Mbps LAN/Ethernet

Pin 01	TDP Transmit Differential Pair (Positive)
Pin 02	TDN Transmit Differential Pair (Negative)
Pin 03	RDP Receive Differential Pair (Positive)
Pin 04	NC Not Connected
Pin 05	NC Not Connected
Pin 06	RDN Receive Differential Pair (Negative)
Pin 07	NC Not Connected Pin 08 - NC Not Connected

5.6.   RJ12 connector

#TBD

5.7.   USB connector

#TBD

5.8. RS485 terminals

Overview

The Revo communicates with other modules via the RS485 bus. Proper wiring is essential to ensure reliable communication and prevent data errors.

Wiring Instructions

1. Connect the Revo to RS485-compatible modules using the terminals labeled **"A"** and **"B"**.

2. Ensure consistent polarity across all devices: terminal **"A"** to **"A"**, terminal **"B"** to **"B"**.

3. Use twisted-pair cables for the RS485 bus to minimize electromagnetic interference (EMI).

4. Keep cable lengths as short as practical; do not exceed the maximum recommended bus length (typically 1200 m for RS485).

5. Avoid running RS485 cables parallel to high-voltage or noisy power lines.

Termination

- For long RS485 lines or networks with multiple devices, place a 120 Ω termination resistor at each end of the bus to prevent signal reflections.

- Some devices may have built-in termination; verify if external resistors are required.

Shielding

- If using shielded twisted-pair cable, connect the shield to ground at one end only to prevent ground loops.

- Avoid connecting the shield to multiple points along the bus.

Verification

- After wiring, check that all connections are secure and that there are no loose strands of wire.

- Power on the network and confirm communication between all RS485 modules.

6.   Display and LED's

The front enclosure is provided with two dual color LED and one 1.3" OLED display

6.1.   Indicators:

Left LED (green): Indicates an active Ethernet connection.
Left LED (Red): No connection to the network switch.

- Check the LAN cable is connected to Revo and switch, and connection between switch and router.

Right LED (Green) indicates an active connection to MQTT server

Right LED (Red): No connection to the MQTT server.

- Check MQTT server information has been correctly entered into Revo and Home Assistant.

6.2.   Display:
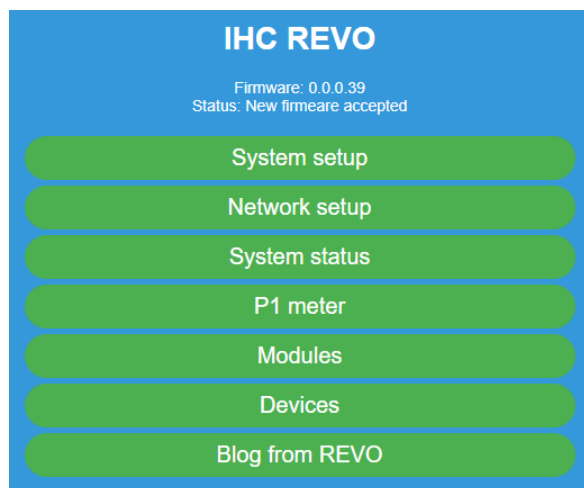
Date (dd:mm:yy)

Time(hh:mm:ss)

IP address. The shown IP address is assigned by the DHCP server
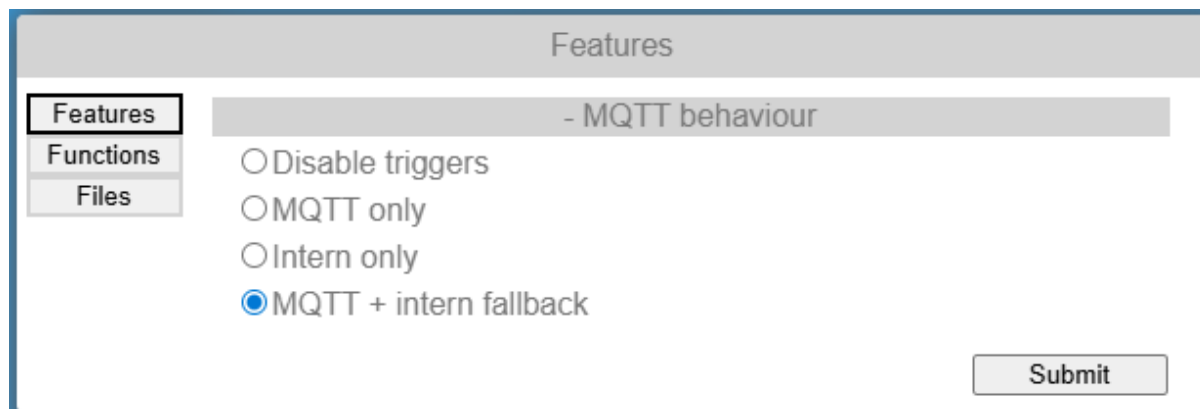
Operation

7.   REVO webinterface:

To access the REVO webinterface, look in the display of REVO, to obtain the IP address, and put it into a browser like eg. 192.168.16.66. The webinterface should run in all browsers, but have been optimized to Chrome.

7.1.   Start menu:

7.2.   System menu:

Here is the overall settings of the system

Features: This is how the system should react on input. There are 4 possible options

- Disable triggers, nothing changes, only internally test functions changes outputs

- MQTT only, is that only input via eg. Homeassistant and MQTT changes outputs

- Intern only, means only the internal programming changes the outputs

- MQTT + intern fallback, is that normally all outputs are controlled via MQTT and eg. Homeassistant, but if MQTT should fall out, the system shifts to internal programmed logic. The purpose of this, is to have a stand-alone programming inside the REVO, that can turn on and off outputs, to keep a functional house, without advanced functions from eg. Homeassistant.

Functions is some actions, that you want to REVO to do, mainly for maintenance or troubleshooting. The text tells what they do. These are expert user only, not normally to be addressed.

Revo has an internal filesystem, to store files. When an internal logic is programmed, where will be a file here. If you want to back it up, simply click on the name, and it will download to your PC. If you want to upload a backup, click <vælg fil> and <upload>. Note, files of same name will be overwritten.

If you have a VIS file from a IHC 2 or 3 system, you can use Upload and convert VIS file. Press <vælg fil>. If there is no errors, a JSON will appear in the Preview field, and the press <Upload> to upload it to REVO. Currently supported is

Input 24 modules

Output 230 modules

Output 24 modules

Functions that is supported is all kinds of function blocks and timers, so all basic stuff from your IHC system should continue to run, including heating function blocks, and all blocks, that uses standard input and output modules – even your custom build blocks.

There will be a separate tutorial about this at a later state

7.3.   Main menu-> Network setup

LAN is where you see your IP and can set a static IP address.

WIFI is currently disabled

LG is if you have a Landis & Gyr meter for your home, you can directly plug it into the RJ12 connector on the REVO, and you can follow your consumption. At a later state, also Kamstrup will be supported.

Carlo is for Carlo Gavazzi meter support via Modbus, if you have submeters. Supported model is EM340 – the variant with modbus interface built in. You can connect it directly to the REVO modbus port RJ12, or use a IP bridge, and Modbus IP.

MQTT is there you set up your connection, eg for Homeassistant. Please put in the IP address for your broker, like eg mqtt://192.168.16.69, the port that normally is 1883, and your user and password to access the broker.

NTP is the server to obtain the realtime clock. You can select the Host, port, set the timezone (For Denmark including summertime its CET-1CEST,M3.5.0,M10.5.0) and the interval used to check the clock, normally 60 minutes.

OTA is the server to get newest firmware. REVO automatically check for updates. Normally these settings should not be changed. You can untick <Enable> and press <Submit> if you want to disable this feature.

7.4.   Main menu-> System status

Tot alloc	Max block	Heap free	Heap min	Core 0 load	Core 1 load	Running time
121.23	188.42	230.00	219.05	45.38%	19.36%	0:00:45:37

OTA	SLAVE	NTP	MQTT
0.0.0.39	404 - Fil	22:11:25	27065
Accepted	Factory	18:39:48	0

Task name	Short	Heap	Free	Prio	Core	Load		Interval	Time	Runs
IDLE0		688	0	0	0	54.62%		0	0	0
IDLE1		696	0	0	1	80.64%		0	0	0
IHC RX	RX	4500	1740	12	0	0.00%		0	0	0
IHC TX	TX	4500	2944	12	0	24.25%		0	0	0
IHC visual	IHC	5000	4192	3	1	0.25%		0	0	0
REVO_JAN	JAN	8000	4576	1	0	0.11%		10052	0	272
REVO_JSON	JSON	4000	1592	1	0	8.26%		1248	211	1948
REVO_MQTT	MQTT	4000	1500	3	0	0.02%		501	0	5458
REVO_OTA	OTA	4100	1156	1	0	0.00%		0	5992	0
SPI	SPI	5000	276	12	1	18.42%		0	0	0
Tmr Svc		1312	0	1	-1	0.00%		0	0	0
esp_timer		2272	0	22	0	0.01%		0	0	0
httpd		1820	0	5	-1	0.66%		0	0	0
ipc0		416	0	24	0	0.00%		0	0	0
ipc1		536	0	24	1	0.00%		0	0	0
main	MAIN	6000	3784	1	0	11.13%		0	0	0
mqtt_task		4004	0	5	-1	0.14%		0	0	0
sys_evt		436	0	20	0	0.02%		0	0	0
tiT		1100	0	18	-1	0.95%		0	0	0
w5500_tsk		2768	0	15	-1	0.47%		0	0	0

Device	Short	Adresse	Port	Status	Sent	Errors	Last message	Last Seen
OTA Service	OTA		0	ONLINE	1	0	FAIL - same	No time
Modbus RTU	RTU		0	DISABLED	0	0		
NTP connection	NTP	dk.pool.ntp.org	0	ONLINE	1	0		No time
Meter P1/MBUS	MBUS		0	ONLINE	1011	0		22:11:25 18:39:46
MQTT	MQTT	mqtt://192.168.16.6	1883	ONLINE	25	0		22:11:25 18:00:54

Here you can see the health of the system. This is considered for experts. But it's a good tool to troubleshoot, and eg look if NTP, OTA MQTT is running, and what version of software.

7.5.   Main menu-> P1 meter
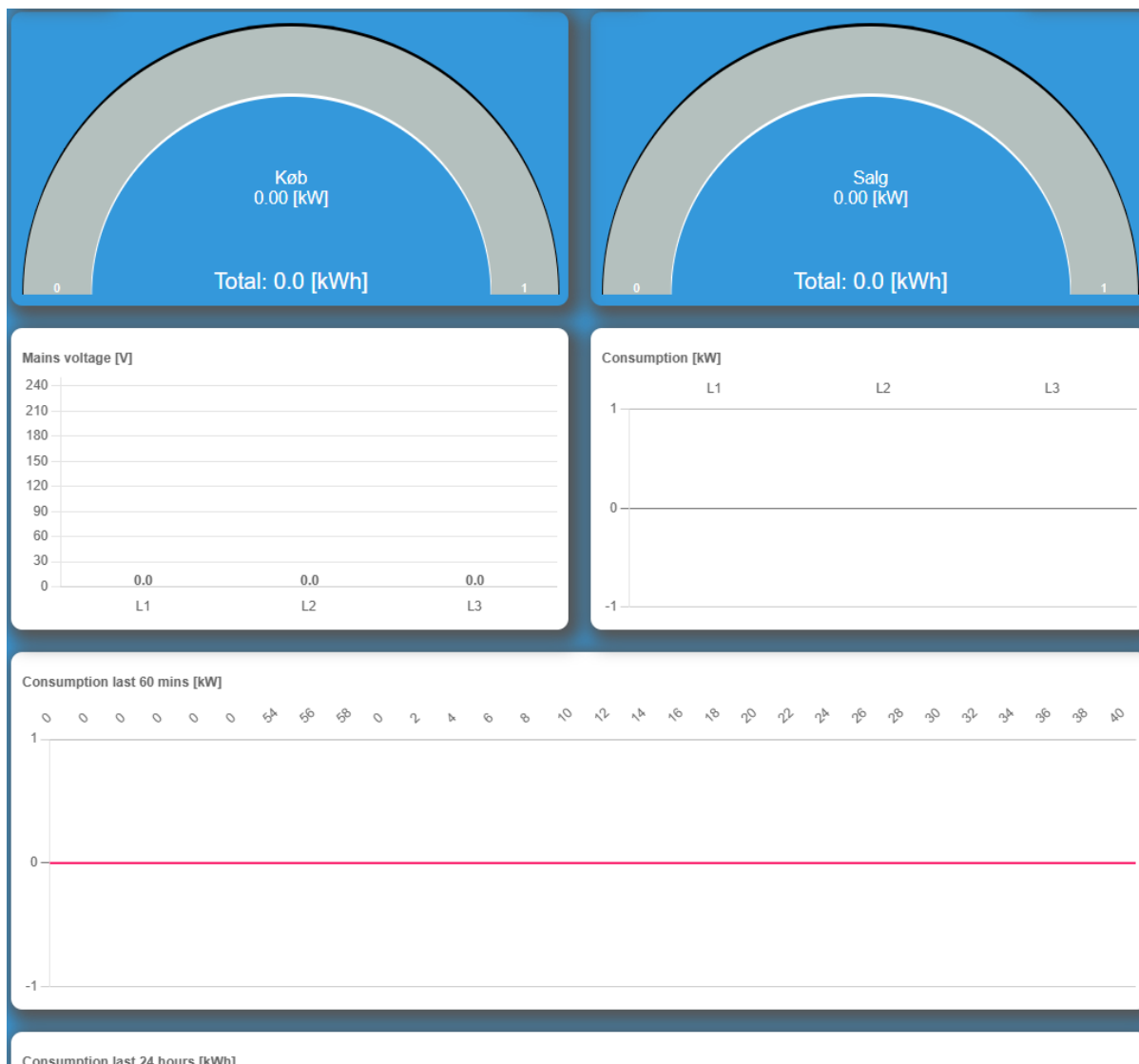
If you have a meter connected, this is where you can see your consumption, and some statistics of your consumption over the last hour, days, months and years.

7.6.   Main menu-> Modules

This is where you have your IHC modules. See programming section

7.7.   Main menu-> Devices

Here you have the raw data from your P1 meter, if you are interested in seeing the values, and not only the consumption under the P1 meter menu.

7.8.   Main menu-> blog

This is the log, mainly for trouble shooting and experts. If you eg have problems connecting to the MQTT, you can press <setup> and for MQTT select ESP_LOG_VERBOSE (maximum logging), and watch the realtime logging. Here you can easily see, why it fails, maybe wrong password, or if it connects at all.

8.   Programming via the web interface

8.1.   Main menu-> Modules

This is the heart of the system. Here you select your modules, that you have. Its possible to have 8 input modules of each 16 channels (128 inputs) and 16 outputs of each 8 channels (128 outputs), exactly like an IHC 2 or 3 controller.

There are 2 symbols here

The pen is used to edit entries, and will be refered in the text as <edit>.

The chain symbol, is how to link things together, and will be refered as <link>.

8.2. How to setup your first module

First select on the left, what module you want to address. In this case Input 1 is active, and click the <edit> button.

A window will open, with the inputs logically named M01 for module 1, and IN01 for input 1 on that module. So M01_IN01 is module 1, input 1. Select <input24> from the list, since it's the only option at this point, and click the <tick> mark. If your Homeassistant is connected and MQTT running, now this module, with same names, will turn up inside Homeassistant.

If you want to, you can name the entries as you wish. Click <edit> to return to above window, and simply just enter the names you want. When you click <tick mark> the screen and also Homeassistant will update the values to match.

Note, there is a length restriction of 16 characters. This will be improved in a future update.

For test purpose, you can actually press the square under state, to activate the input, and again to deactivate. So in other words, to simulate pressing a button, you need to press 2 times, one for down action and one for up action.

To locate your actual buttons, you can also go to a switch in your home, and the input connected will switch to red – and stay red – until next switch is pressed. That makes it super easy to locate your switches in the home. Just go the switch, press it, and go back to the webinterface, to see, what input is red. And optionally name it correctly.

The output side works in the same way. Select an Output module, press <edit>, select output24 or output230, name it correctly and press the <tick mark> to apply. Again it will appear in Homeassistant automatically. You can test the output, by clicking in the grey square under State, and the output will toggle on and off, for easy testing.

Note the modules are numbered from 1 to 24, where M01 to M08 is the input modules and M09 to M24 is output modules.

Also note, if you are trying to test input and outputs manually from the REVO and you are connected to Homeassistant at the same time, the output result can be other than expected, since there can be conflicting wishes for the output.

8.3.   Programming the internal logic

If you don't want to use Homeassistant, and just want to be able to toggle your lights on and off, you can use the built in logic. It is also this logic, that can be used as backup, if the MQTT connection should disappear. For now only simple logic is supported, but things like timers is expected to be added in the near future.

If you want to link an input to an output, it works in this way. It does not matter, if you select the input or the output first, as long as you select both before applying.

Select eg <input 1> on the left meny. Click <link>

Then a window is added at the top, looking like this

As you can see, no input and no output are yet selected. To select the input, what you want to be the trigger for the event, press the <tag> on the line for the channel. Select an output on the left, eg Output 1, and select the wanted output. Now you should have something like this

For the trigger, you have various options

- Falling is on button press

- Rising in on button release

- Both means output only ON when button is pressed

- Long press, is only when button released after aprox 3 seconds.

The Action can be either

- Toggle, to set to opposite state

- On to turn ON

- Off to turn OFF

- Follow to just follow the state of the input

When finished, click the <link> icon

You can now see the linked items under both the input and the output
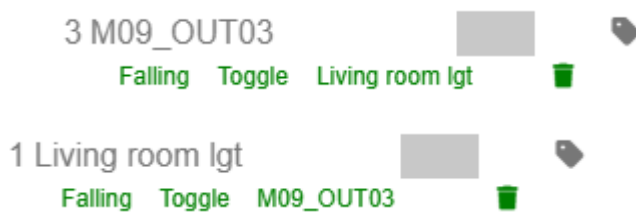
To remove the linked items, just press the bin icon.

Note, on the output modules, there are some extras.

There is a tag saying <All moduler> that means the action is working on all outputs

And the tag <Dette modul> that the action works on only this module.

This makes it really easy to make a turn off everything action.

Just continue programming like this, and you can test if on the fly, by toggling the input, and check the output.

Note, if MQTT is connected, outputs might not behave a expected. Select <Main menu> -> <Features> and select <Intern only> and press <Submit> in order to make sure, MQTT is not disturbing your programming.

To exit the link mode, select <arrow left> in the top left corner of the link input window.

9.   Display menu- programming

#pending

10.   Explanation of symbols

CE	Declaration of Conformity under the Low Voltage Directive
☒	Must be disposed of through correct waste management
REF	Catalogue number
SN	Serial number
▟▙	Manufacturer
📖	Operator's manual
🌡	Temperature Limit
%	Humidity Limitation
⊕•⊕	Atmospheric Pressure Limitation
The CE label is located on the side of the product. A copy of the product label can be seen below.	
<insert marking plate>	

11.   Technical specifications

Specifications for the Revo are provided below.

Communications and programming

Ethernet	100/1000 Mbps, TCP/IP stack, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), FIPS 140-2 compliant encryption, IEEE 802.1X, SNMP, IPv4 or IPv6, Active Directory® authentication, IIS v.6.0 web server
USB	Supports computer console via front panel USB 2.0 device port
Programming	Home Assistant, MQTT, MODBUS

Connectors

USB	(1) USB Type-A connector, female; USB 2.0 host port; For firmware upgrades
LAN	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port; Connects to the customer's LAN
RS485	WAGO connector, terminals marked "A" and "B"
IHC-input	WAGO connector, terminals marked "IN 1" to "IN 8"
IHC-output	WAGO connector, terminals marked "OUT 1" to "OUT 16"
24VDC	(1) 2.1 x 5.5 mm DC power connector; 24VDC power input; PW-2420RU power pack included

Controls & Indicators

LED (front plate)	Bi-color green/red LEDs; Left LED. Green means Ethernet link status and connection speed. Red means no connection to LAN switch. Right LED indicates MQTT activity. Red means no MQTT connection. Green means MQTT connect and data activity
Display	OLED 1.3" white
Switch (left)	Recessed push button for hardware reset

Switch (Right)	Recessed push button for software reset
LAN-connector (lower terminals)	Bi-color green/amber LEDs; Left LED indicates Ethernet link status and connection speed; Right LED indicates Ethernet activity

Power

Power supply	Nominal 24VDC (21.6-26.4 VDC), 0.1A or POE input, 48-57V DC
Power Consumption	##TBD 15 W

Environmental

Temperature	5° to 40°C (41° to 104°F)
Humidity	10% to 90% RH (noncondensing)
Atmospheric Pressure	760 to 1060 hpa

Enclosure

Chassis	PETG,
IP	IP21
Mounting	DIN Rail TS35

Dimensions

Height	60 mm (2.36 in.)
Width	106.8 mm (4.21 in)
Depth	90.2 mm (3.55 in.)

Weight

#TBD 1.42 kg (3.1 lb)

Compliance

#TBD