



# GRILINK CONTROLLER OPERATING INSTRUCTIONS

July 2023



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# 1 Introduction

These instructions are part of the GRIPLINK controller and describe the safe and proper use in all operating phases. It is exclusively valid for this model and contains important information on installation, commissioning, maintenance and service.

## 1.1 Product description

The GRIPLINK Controller is a network-compatible interface converter for building intelligent gripping heads. It simplifies the integration of IO-Link based sensors and actuators into robot systems. For this purpose, the GRIPLINK Controller has a driver-based architecture that makes it possible for the first time to implement a universal, cross-device command protocol on automation components from different manufacturers and thus provide a uniform interface on the robot controller.

A list of supported sensors and actuators can be found here:

[www.griplink.de/devices](http://www.griplink.de/devices)

WEISS ROBOTICS offers already extensively tested plug-ins for GRIPLINK on different robot platforms. A list of the supported robot platforms can be found at

[www.griplink.de//plugins](http://www.griplink.de//plugins)

Various sensors and actuators can be connected to the GRIPLINK controller via up to four device ports. Communication with the higher-level controller takes place via Ethernet TCP/IP using an open text-based communication protocol. The connected automation components can be conveniently parameterized and monitored via the integrated web interface of the GRIPLINK Controller. A current output as well as an integrated Ethernet switch allow easy cascading of several GRIPLINK controllers to build larger gripping heads. Figure 1 shows the connections of the GRIPLINK controller.

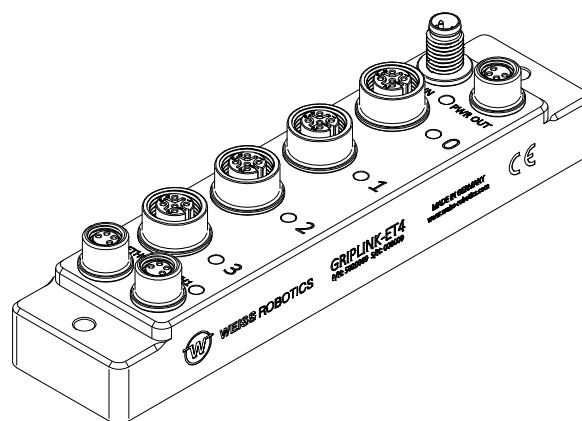


Figure 1: General view of the GRIPLINK controller

## 1.2 Related documents

The following additional documents for the operation of the GRIPLINK controller are available on the Internet at [www.griplink.de](http://www.griplink.de) for download:

- Technical drawing
- 3D model (STEP)
- GRIPLINK Controller Command Reference
- GRIPLINK plugins for various robot controllers (incl. documentation)
- Compatibility lists
- Sample programs

For warranty information, please refer to our General Terms and Conditions, available at [www.weiss-robotics.com/agb/](http://www.weiss-robotics.com/agb/).

## 1.3 Validity of these instructions

This manual is valid for the GRIPLINK Controller GRIPLINK-ET4 with the following version data:

- Hardware revision: 2 and higher
- Firmware version: 4. 1.0



An update of the firmware to 4. 1.0 is only possible for GRIPLINK-ET4 with hardware revision 2 or higher! Updates on older hardware revisions may lead to unusability of the GRIPLINK controller.

If you are unsure, contact support at [support@weiss-robotics.com](mailto:support@weiss-robotics.com).

## 1.4 Target groups

The target group for these instructions are, on the one hand, plant manufacturers and operators who should keep this and other documents supplied accessible to personnel at all times and, in addition, encourage them to read and observe the safety and warning instructions in particular.

In addition, it is intended for qualified personnel, programmers and installers, who should read these instructions and observe and comply with the safety and warning instructions at all times.

## 1.5 Notation and symbols

For a better overview, the following symbols are used in these instructions:



Function or safety-relevant note. Non-observance may endanger the safety of personnel and plant, damage the device or impair the function of the device.



Additional information for a better understanding of the described facts.



Reference to further information.

## 2 Basic safety instructions

### 2.1 Intended use

The GRIPLINK controller was designed as a link between IO-Link-capable automation components and a higher-level controller via Ethernet TCP/IP and is intended for installation in a machine. The requirements of the applicable directives and the installation and operating instructions in this manual must be observed and complied with. The GRIPLINK controller may only be used within the scope of its defined application parameters and only in industrial applications.

Any other use or use beyond this is considered improper, e.g. the operation of devices that are not listed on the compatibility list or have not been approved by WEISS ROBOTICS for operation with the GRIPLINK controller. The manufacturer is not liable for any damage resulting from this.

### 2.2 Ambient and operating conditions

The GRIPLINK controller may only be used within the scope of its defined application parameters. A stable supply voltage with sufficient current carrying capacity must be ensured. The housing must be grounded. To achieve the specified protection class, the unused connections must be closed with caps.

### 2.3 Product safety

The GRIPLINK Controller corresponds to the state of the art and the recognized safety rules at the time of delivery. However, hazards may emanate from it if, for example:

- the module is not used as intended
- the EC Machinery Directive, the VDE Directives, the safety and accident prevention regulations applicable at the place of use or the safety and assembly instructions are not observed

### **2.3.1 Structural changes, additions or conversions**

Additional holes, threads or attachments that are not offered as accessories by WEISS ROBOTICS may only be attached after written approval by WEISS ROBOTICS.

### **2.3.2 Special standards**

The following standards are complied with:

- Radio interference voltage, interference field strength and radiation according to EN 61000-6-3
- Fast transients on signal and data lines according to EN 61000-4-4
- HF current injection on signal and data lines according to EN 61000-4-6
- RF irradiation according to EN 61000-4-3
- Interference emission according to EN 61000-6-4 Class A
- Discharge of static electricity according to EN 61000-4-2
- IO-Link communication standard according to IEC 61131-9

## **2.4 Personnel qualification**

Installation, initial start-up, maintenance and repair of the GRIPLINK Controller may only be carried out by trained specialist personnel.

Every person who is assigned to work by the operator must read the complete operating instructions, in particular chapter 2 "Basic safety instructions" must have read and understood. This also applies to personnel who are only occasionally deployed, e.g. maintenance personnel.

## **2.5 Safety conscious work**

Observe the safety and accident prevention regulations applicable at the place of use.



Disconnect the power supply to the GRIPLINK controller before carrying out any work.

### 3 Warranty

The warranty period is 12 months from the date of delivery to the factory for intended use in single-shift operation. Please also refer to the General Terms and Conditions (GTC).

### 4 Scope of delivery and accessories

The scope of delivery includes:

- GRIPLINK Controller in the ordered version
- Accessories (protective caps for M8 and M12 sockets)
- Quick start guide

Variant	GRIPLINK Controller	By-pack	Quick guide
ET4	5020069	5020070	5080035

Table 1: Part numbers Scope of delivery

The following accessories are available separately:

- Ethernet data cable
- Power supply connection cables
- Connection cables for sensors and actuators
- Licenses for activating additional functions (see chapter 10)



Please order accessories separately. You will find further accessories on our website at [www.griplink.de](http://www.griplink.de)



## 5 System requirements

A PC or mobile device with a current web browser is required to open the configuration interface. The following browsers are compatible with GRIPLINK:

- Google Chrome version 89.0 or newer
- Mozilla Firefox version 88.0 or newer
- Microsoft Edge version 90.0 or newer
- iOS 12.4 or newer
- Android 7 (Nougat) or newer

It is recommended to always use an up-to-date browser.

## 6 Technical data

### 6.1 Mechanical nominal data

Mechanical operating data	Unit	GRIPLINK-ET4
Ambient temperature	°C	-5 ... 60
Humidity	%	0 ... 100
Protection class (all connectors connected or covered)	IP	65
Dimensions (L x W x H)	mm	145 x 34 x 32,5
Mass	g	220
Housing material		Aluminum, epoxy resin
Surface		Chem. nickel
Sealing material (connector)		NBR, FKM 75

Table 2 : Nominal mechanical data

### 6.2 Electrical nominal data



If the specified nominal data are exceeded, the GRIPLINK controller and/or the connected devices may be damaged. In case of doubt, clarify your application with our technical sales department.

Electrical operating data	Unit	GRIPLINK-ET4
Supply voltage	V	18 ... 30
Type. Current consumption (Ethernet communication, all device ports unused)	mA	70
<b>Power supply output (X2)</b>		
Max. perm. output current	A	6
<b>Device port (X3 to X6)</b>		
Max. perm. continuous output current L+	A	2
Max. perm. continuous output current C/Q	A	0.2
Communication standard		IO-Link V1.1
Supported bitrates	kBit/s	4.8 (COM1); 38.4 (COM2); 230.4 (COM3)
Type. Start time GRIPLINK controller ready for operation <sup>1</sup>	s	0,2
Type. Start time Device connected until ready for operation <sup>2</sup>	s	0,3

Table 3 : Electrical nominal data

## 6.2.1 Pin assignment

The GRIPLINK controller has four device ports for connecting automation components, one input and one output for the power supply and two Ethernet connections. The pin assignment is shown in Figure 2 shown.

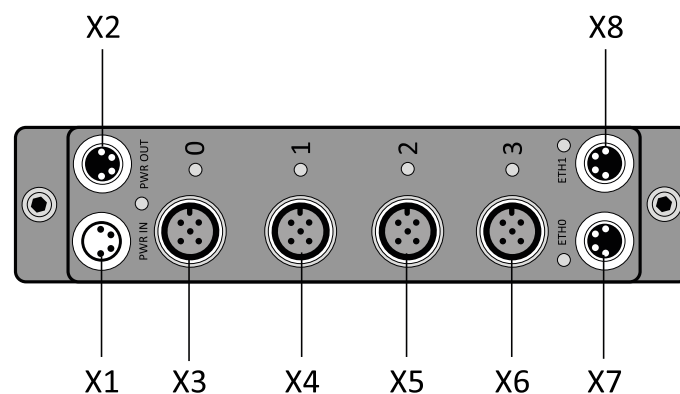
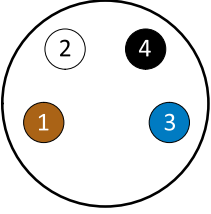


Figure 2 : Connector

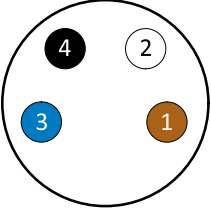
<sup>1</sup> Time from supply voltage  $\geq 18V$  until the GRIPLINK controller is ready for operation.

<sup>2</sup> Time from connecting a WEISS ROBOTICS IEG 55-020 gripping module to an unoccupied device port until the gripping module is ready for operation.

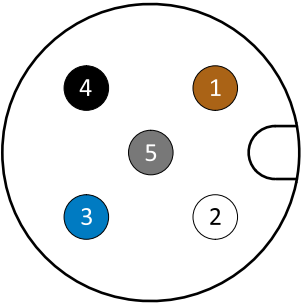
**X1 (power supply input), M8 connector**

	Pin	Strand color	Signal	Function
	1	brown	+UB	Power supply +24 V
	2	white	+UB	Power supply +24 V
	3	blue	GND	Power supply 0 V
	4	black	GND	Power supply 0 V

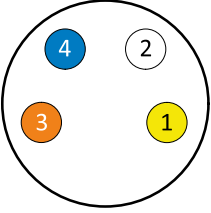
**X2 (power supply output), M8 socket**

	Pin	Strand color	Signal	Function
	1	Brown	+UB	Power supply +24 V
	2	White	+UB	Power supply +24 V
	3	Blue	GND	Power supply 0 V
	4	Black	GND	Power supply 0 V

**X3 to X6 (device port 0 to 3), M12 socket**

	Pin	Strand color	Signal	Function
	1	Brown	L+	Power supply +24 V
	2	White	RES0	Reserved
	3	Blue	L-	Power supply 0 V
	4	Black	C/Q	IO-Link communication
	5	Gray	RES1	Reserved

### X7, X8 (Ethernet 0 and 1), M8 socket

	Pin	Strand color	Signal	Function
	1	Yellow	TD+	Send Ethernet line pair
	2	White	RD+	Ethernet line pair received
	3	Orange	RD-	Ethernet line pair received
	4	Blue	TD-	Send Ethernet line pair

### 6.3 Nameplate

The nameplate (Figure 3) is located on the side of the GRIPLINK controller and contains the serial number (C), part number (B) and the exact type designation (A).

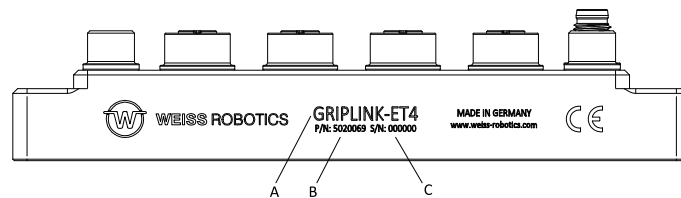


Figure 3 : Name plate

### 6.4 Display of the operating status

The operating status is indicated by several LEDs, some of which are multicolored, see Figure 4.

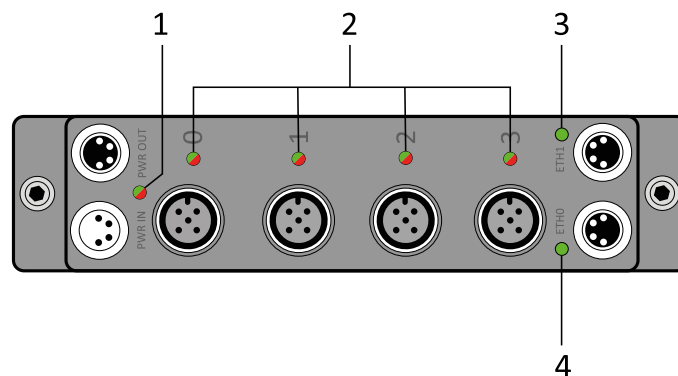


Figure 4 : Display of the operating status

LED	Display	Meaning
<b>Module state (1)</b>	Green	GRIPLINK Controller is ready for operation
	Flashing orange	GRIPLINK controller has received an incorrect command
	Red	GRIPLINK Controller Error
<b>Device port (2)</b>	Green flashing	Connected device is initialized
	Green continuous light	Connected device is ready for operation
	Red continuous light	No driver found for the connected device
	Red flashing	Device driver error
	Red fast flashing	Port error (overtemperature, current consumption)
<b>Ethernet (3, 4)</b>	Green continuous light	Network connection established
	Green flashing	Network activity



If the LEDs (1) and (2) flash alternately red-green, the GRIPLINK controller is in update mode (see chapter 8).

## 7 Assembly and commissioning

Connect the GRIPLINK controller to the robot controller via the Ethernet cable. Connect up to four supported IO-Link devices. Now connect the GRIPLINK controller to the power supply.

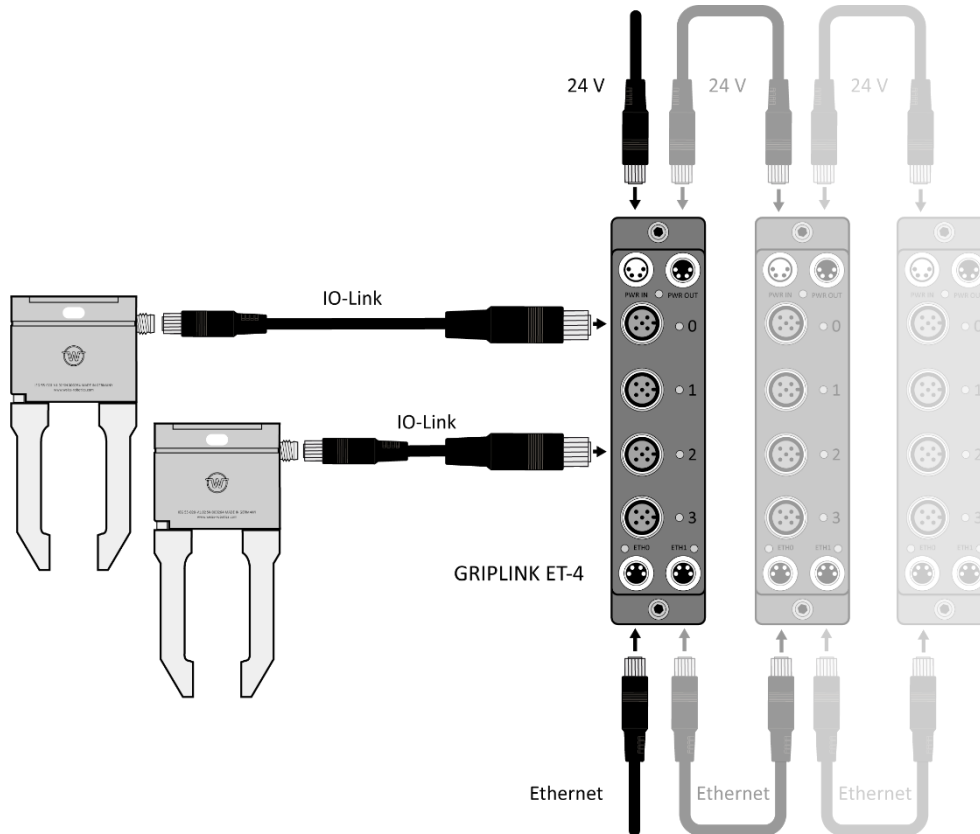


Figure 5: Cascading of several GRIPLINK controllers



Make sure that the housing of the GRIPLINK controller is grounded (mount on conductive surface or clamp a separate grounding cable with cable lug under one of the two mounting screws).



Ensure that the power supply can permanently provide the required maximum operating current of all IO-Link devices in total.

### 7.1 Cascading of several GRIPLINK controllers

Several GRIPLINK controllers can be cascaded via the power supply output X2 and the Ethernet connection X8.



Damage to the controller possible. Make sure that the current consumption at X2 is not exceeded.

The current consumption of a GRIPLINK controller is determined by its quiescent current consumption and the current consumption of the connected IO-Link devices. If the value exceeds the current carrying capacity of X2, connect the GRIPLINK controller to a separate power supply.



For easy control of multiple GRIPLINK controllers from the robot plugin, the proxy feature can be used (license required).

## 7.2 Commissioning and configuration

For easy commissioning and configuration, the GRIPLINK Controller has an integrated web-based configuration interface that allows configuration via a common web browser. To do this, connect the GRIPLINK Controller to a local network or directly to the network interface of your computer and open the web interface by typing the IP address of the GRIPLINK Controller into the address bar of your web browser. The IP address is set to 192.168.1.40 in the delivery state, so that the web interface is available at <http://192.168.1.40> can be reached.



To be able to reach the web interface, your computer must be in the same subnet as the GRIPLINK controller. For this purpose, the network settings of your computer may have to be adjusted. Please contact your system administrator.



The web interface is not compatible with Microsoft Internet Explorer. If possible, use an up-to-date Chrome, Firefox, or Edge browser.



OVERVIEW

GRIPLINK > OVERVIEW

LANGUAGE

WEISS ROBOTICS

DEVICE OVERVIEW

PORT	DEVICE	VALUES	STATE	HEALTH	
0	IEG 55-020 S/N: 000295 Weiss Robotics	Opening width Device temperature	- 31.5 °C	<input type="button" value="NOT INITIALIZED"/> <input type="button" value="TEMP OK"/>	
1	IEG 55-020 S/N: 000267 Weiss Robotics	Opening width Device temperature	- 26.3 °C	<input type="button" value="NOT INITIALIZED"/> <input type="button" value="TEMP OK"/>	
2	NOT CONNECTED				
3	NOT CONNECTED				

PROXY CONFIGURATION

Proxy role  
Stand-alone

4.0.0

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Device type  
GRIPLINK-ET4

Serial number  
63

Device tag

Robot  
Not connected

Figure 6: GRIPLINK web interface

For operation with a robot controller, it may be necessary to adjust the IP address of the GRIPLINK controller. This is possible in the "Settings" menu.



Incorrect settings can result in the GRIPLINK controller and its configuration interface no longer being accessible.

### 7.2.1 Locating the GRIPLINK Controller

To easily find the GRIPLINK controller in a plant at , the "Find" button can be used on the overview page. After clicking on the button, the status LED (marked "1" in Figure 4) starts to flash alternately in color for a few seconds.

## 7.2.2 Configuration of the GRIPLINK controller

Call up the web interface of the GRIPLINK controller and navigate to the Settings page via the menu. The following settings can be changed on the configuration page that now appears:

- Configuration of the network interface
- Designation of the GRIPLINK controller
- Executing software updates (see chapter 9.1)
- Adding licenses (see chapter 10)

## 7.2.3 Event log

The GRIPLINK controller keeps an event log in which messages are stored non-volatile. This log can be viewed via the web interface and exported as a csv file.

The screenshot displays the 'LOG' page of the GRIPLINK controller web interface. On the left is a blue navigation menu with options: Overview, Settings (selected), Proxy, Robot, Log, and About. Below the menu, device information is shown: Device type (GRIPLINK-ET4), Serial number (63), Device tag, and Robot status (Not connected). The main content area shows the 'EVENT LOG' with a table of entries. The table has columns for 'TIMESTAMP', 'MESSAGE', and 'SEVERITY'. The log entries include connection status changes and warnings about failed socket reads. At the bottom of the log table are 'EXPORT' and 'REFRESH' buttons. The footer contains the version number '4.0.0' and the copyright notice '© 2022 WEISS ROBOTICS'.

TIMESTAMP	MESSAGE
00:04:44.380	I [iface] Connection to 192.168.1.1 closed
00:04:21.216	I [iface] Incoming connection from 192.168.1.1 accepted
00:03:44.766	I [iface] Connection to 192.168.1.1 closed
00:03:44.765	W [iface] Failed to read from socket
00:03:14.156	I [iface] Incoming connection from 192.168.1.1 accepted
Session started (ID: 72)	
00:31:19.431	I [iface] Connection to 192.168.1.1 closed
00:30:56.667	I [iface] Incoming connection from 192.168.1.1 accepted
00:30:51.216	I [iface] Connection to 192.168.1.1 closed
00:30:51.216	W [iface] Failed to read from socket
00:30:32.862	I [iface] Incoming connection from 192.168.1.1 accepted
00:29:51.812	I [iface] Connection to 192.168.1.1 closed
00:29:51.812	W [iface] Failed to read from socket
00:29:48.325	I [iface] Incoming connection from 192.168.1.1 accepted
00:29:28.175	I [iface] Connection to 192.168.1.1 closed
00:28:56.699	I [iface] Incoming connection from 192.168.1.1 accepted
00:28:42.899	I [iface] Connection to 192.168.1.1 closed
00:28:42.899	W [iface] Failed to read from socket
00:28:37.825	I [iface] Incoming connection from 192.168.1.1 accepted
00:28:33.275	I [iface] Connection to 192.168.1.1 closed

Figure 7: Event log of the GRIPLINK controller

## 7.2.4 Configuration of connected devices

Connected devices can also be parameterized and monitored via the web interface of the GRIPLINK controller. To do this, first select the desired device on the overview page either via the tab of the corresponding port or by clicking on the respective table line in the device overview. Different settings are then available depending on the device.

The screenshot displays the 'SETTINGS' page for a WEISS ROBOTICS servo gripper. The interface is divided into a sidebar and a main content area. The sidebar on the left contains navigation options: 'Status', 'Settings' (highlighted with a '0'), and 'Diagnosis'. Below these are port indicators for ports 1, 2, and 3. At the bottom of the sidebar, the 'State' is shown as 'NOT INITIALIZED' and the 'Opening width' is '-'. The main content area has a breadcrumb 'GRIPLINK > 0 > SETTINGS', a language selector for 'LANGUAGE' with a US flag, and the 'WEISS ROBOTICS' logo. The 'BASIC SETTINGS' section includes a 'TAG' field with an edit icon and a text box labeled 'Application tag'. Below this is the 'RECIPES' section, which contains a table with the following data:

	TAG	NO PART LIMIT	RELEASE LIMIT	FORCE FACTOR	WIZARD
0	Grip 1	0,5 mm	19,5 mm	100 %	☆
1	Grip 2	0,5 mm	19,5 mm	100 %	☆
2	Grip 3	0,5 mm	19,5 mm	100 %	☆
3	Grip 4	0,5 mm	19,5 mm	100 %	☆

Below the table are 'APPLY' and 'DISCARD' buttons. At the bottom of the main content area is a '+ ADVANCED SETTINGS' button. A vertical 'CONTROL' bar is visible on the right side of the interface.

Figure 8: Device configuration menu for a WEISS ROBOTICS servo gripper of type IEG 55-020

## 7.2.5 Event log of the port and the connected n devices

For each port, the GRIPLINK controller keeps a separate, non-volatile event log, which can be viewed in the configuration page of the respective device and exported as a csv file. Figure 9 shows the corresponding page of the web application.



The log messages are not deleted after disconnecting the port and device. This means that messages from previously connected devices are still stored!

In addition to the port log, log messages from the connected device can also be displayed. With the "Refresh" button, the messages can be loaded manually from the device to the web application and also exported here via a button as a csv file.



These messages are not loaded automatically, because this would affect the timing when a robot application is running. Reload the messages only when no robot application is running!

DIAGNOSIS

GRIPLINK > 0 > DIAGNOSIS

LANGUAGE WEISS ROBOTICS

PORT LOG

TIMESTAMP	MESSAGE
00:00:00.311	I Driver for device 815/20 loaded.
Session started (ID: 14)	
00:00:00.294	I Driver for device 815/20 loaded.
Session started (ID: 13)	
00:00:00.294	I Driver for device 815/20 loaded.
Session started (ID: 12)	
01:44:46.248	I Driver for device 815/20 loaded.
Session started (ID: 11)	
00:00:25.457	I Device disconnected
00:00:01.036	I Driver started for VID/PID 350/605
00:00:01.017	I Driver for device 350/605 loaded.
Session started (ID: 253)	
00:00:01.036	I Driver started for VID/PID 350/605
00:00:01.018	I Driver for device 350/605 loaded.
Session started (ID: 252)	
00:00:01.038	I Driver started for VID/PID 350/605
00:00:01.018	I Driver for device 350/605 loaded.

EXPORT REFRESH

DEVICE LOG

TIMESTAMP	MESSAGE
Press Refresh button to load current logs	

State: NOT INITIALIZED

Opening width: -

CONTROL

Figure 9: Event log of port 0

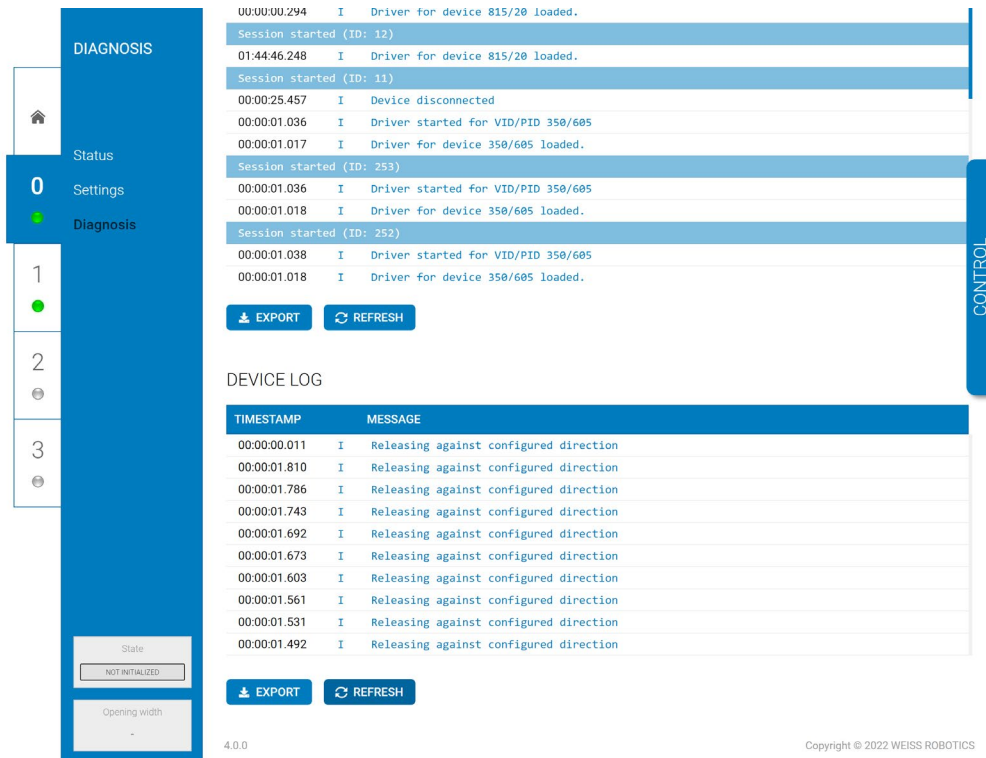


Figure 10: Event log of a device connected to port 0

### 7.3 Setting up a proxy network (license required)

In applications where more than four devices are to be used, the optionally available proxy license (OPT-GL-PROXY) can be used to set up a network of several GRIPLINK controllers, one of which acts as a master and forwards incoming commands from the higher-level controller to up to seven slaves. The master remains the only contact for the robot controller, which greatly simplifies implementation in an existing system.

#### Advantages:

- + Easy integration into existing plants
- + No additional devices or options required compared to the simple solution with only one GRIPLINK controller
- + Fast configuration via the web interface
- + Simple realization of complex applications with multiple gripping systems and sensors possible

For the exact configuration of a proxy network, please refer to the document "an\_griplink\_proxy".



The proxy functionality is only available if has been activated on the GRIPLINK controller working as "master" the optionally available license OPT-GL-PROXY . Contact our sales department at [sales@weiss-robotics.com](mailto:sales@weiss-robotics.com) for further information.

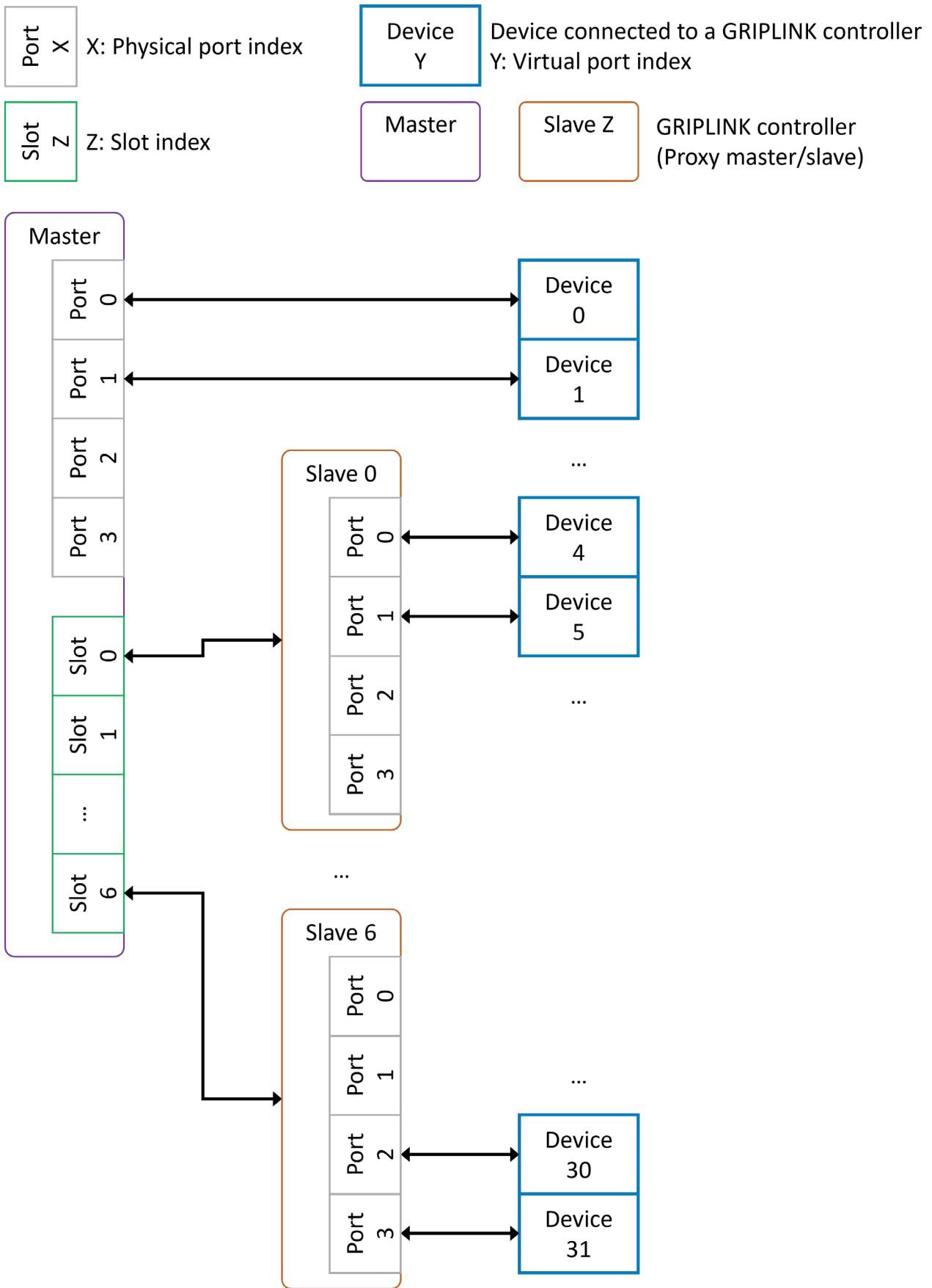


Figure 11: Network topology with proxy master and proxy slaves

## 7.4 Connection with a robot controller

### **Ready-made *GRIPLINK PLUGIN* solutions**

WEISS ROBOTICS provides ready-to-use tested software modules for robot controllers of leading manufacturers, with which the GRIPLINK technology can be quickly and conveniently integrated into your own robot application .



A continuously growing list of supported manufacturers and control models can be found at [www.griplink.de/plugins](http://www.griplink.de/plugins)

For further information on the operation of the GRIPLINK controller with the respective software modules, please refer to the documentation of the respective GRIPLINK PLUGIN, which can also be downloaded from the aforementioned address.

### **Operation on controllers without *GRIPLINK PLUGIN***

In addition to the ready-made GRIPLINK PLUGIN integration solutions, the GRIPLINK controller can be used with any robot controller capable of sending and receiving text-based data via TCP/IP network connections (socket connections) due to its open communication protocol.



For self-integration, the communication protocol is described in the separate document "GRIPLINK Controller Command Set Reference Manual".

## 7.5 Control concept

The GRIPLINK controller provides the functions of the connected devices via a generic command set. A text-based communication protocol via Ethernet TCP / IP is used for this purpose. The generic commands are converted into device-specific commands via a "command unifier" located on the GRIPLINK controller. The command unifiers are part of the scope of delivery and already pre-installed.

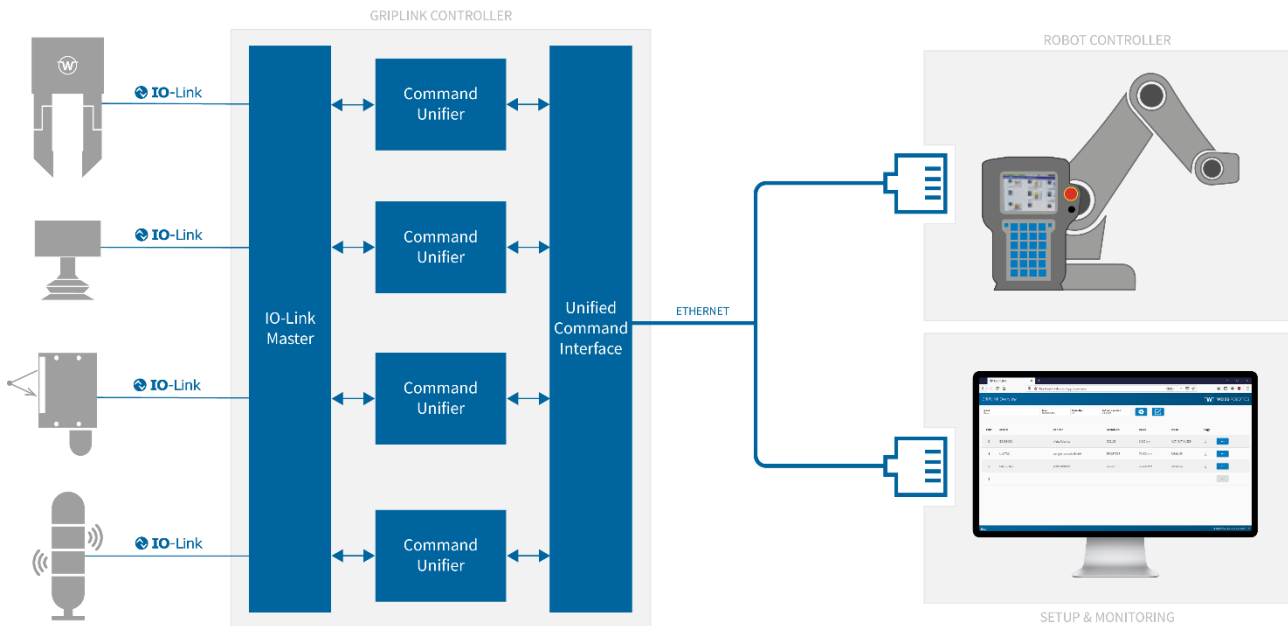


Figure 12: GRIPLINK controller architecture

### 7.5.1 Supported devices

GRIPLINK supports a range of IO-Link based automation components. The command unifiers required to operate a compatible device are part of the GRIPLINK firmware and already installed on the GRIPLINK controller.



In the basic version, GRIPLINK supports all devices from WEISS ROBOTICS. An additional license is required to use compatible third-party devices. The list of GRIPLINK-compatible devices can be found under

[www.griplink.de/devices](http://www.griplink.de/devices)



Third party devices can only be used with activated license (OPT-GL-3RDPARTY).

[sales@weiss-robotics.com](mailto:sales@weiss-robotics.com) for more information.

#### ***Gripping modules***

GRIPLINK -compatible gripping modules use the device state to display the current state of the gripping process. The device state changes according to the action being performed.

#### ***More actuators***

Other GRIPLINK-compatible actuators, such as vacuum grippers and rotary or linear axes, are handled in the same way as gripping modules. For the respective scope of functions, refer to the documentation belonging to the actuator module.



## Sensors

In addition to the control of gripping modules, GRIPLINK also supports the readout of sensors. Depending on the model, sensors provide one or more measured values that can be read out via the VALUE command. The transmission of the measured value always takes place as an integer, therefore the measured values are usually scaled with a factor.



For the number of measured values, type of value, scaling and unit, please refer to the documentation of the respective sensor.

### 7.5.2 Device status

Each connected device has a device state. In addition to universal states (e.g. DISABLED), states are also available for specific device classes. An overview of the available device states is given in Table 4:

Code	Device status	Description	Device class
0	NOT CONNECTED	No device connected	Universal
1	NOT INITIALIZED	Not initialized	Gripper
2	DISABLED	Ready for operation, but not activated	Universal
3	RELEASED	Workpiece released	Gripper
4	NO PART	No workpiece found	Gripper
5	HOLDING	Workpiece is held	Gripper
6	OPERATING	Ready for operation	Sensors
7	FAULT	Error condition	Universal

Table 4 : Overview of device states

### 7.5.3 Commands

During operation, the connected device changes its state depending on the command received. A change of state can also occur via an external event, e.g. if the connected gripping module loses its workpiece or if a device error occurs (overtemperature, fault, etc.).

The possible state changes are shown for sensors in Figure 13 and for gripping modules in Figure 14 for gripping modules.

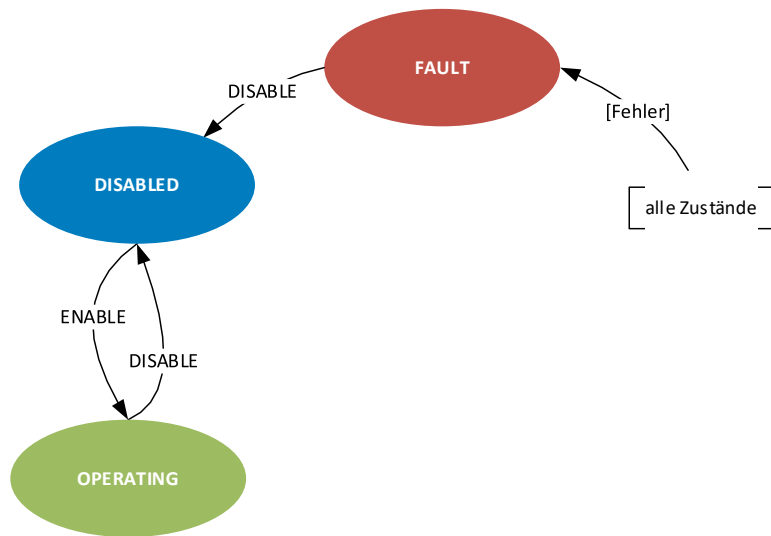


Figure 13 : State changes sensor

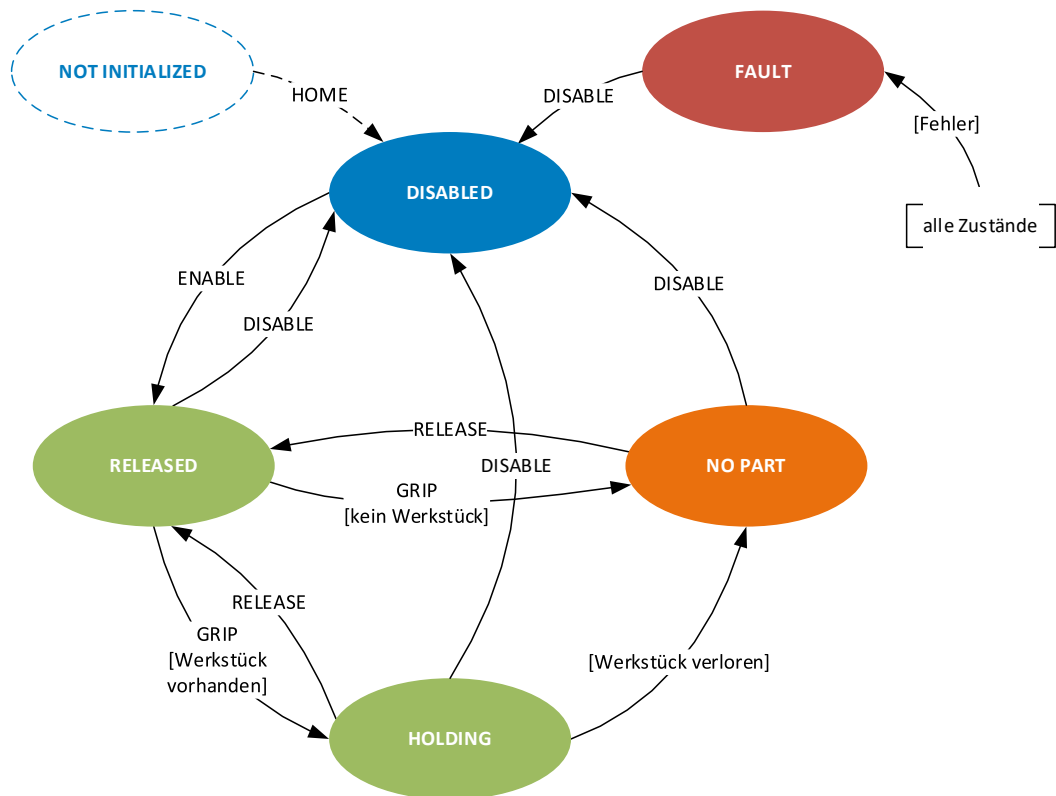


Figure 14 : Change of state of the gripping module

A command is composed of the actual triggering of the action and the waiting for a change of state. This is shown in Figure 15 using the example of gripping a workpiece. The robot controller initiates the gripping command for the gripping module at device port 0 with parameter set 1 by sending the command word "GRIP(0,1)". The successful end of the gripping process is detected by cyclic polling of the device state with the command word "DEVSTATE[0]?" (device state changes from RELEASED (3) to HOLDING (5) ). Note: If no

gripping part was found during gripping, the device state would change to NO\_PART (4) or to FAULT (7) in case of an error such as overtemperature or device fault.



The detailed list of available commands can be found in the separate document "GRIPLINK Controller Command Set Reference Manual".

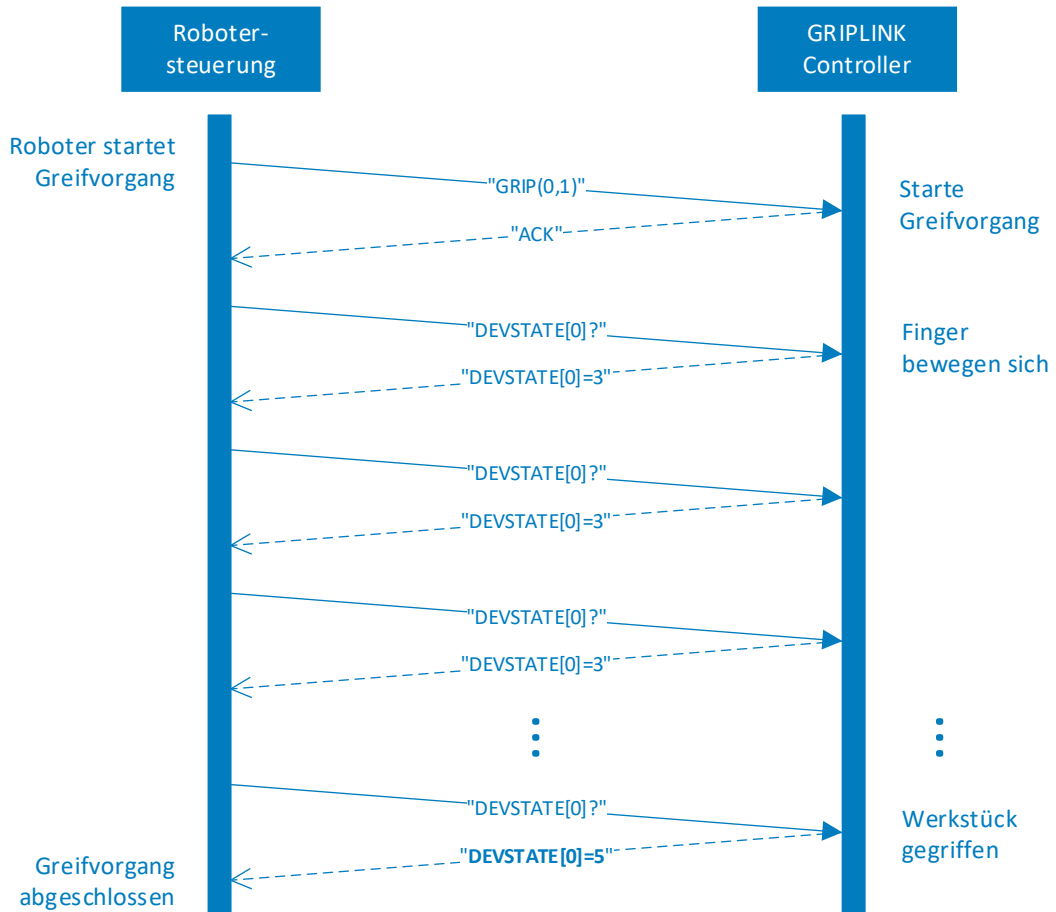


Figure 15 : Sequence diagram for a gripping process

## 8 Export of process data via MQTT (license required)

Via the optionally licensable MQTT service, the process data of the GRIPLINK controller can be made accessible to the IT management level in standardized form. In this way, the running process can be monitored, documented and optimized by third-party software products. The evaluation can take place both in the local machine network and on remote systems ("cloud").



The MQTT service is only available with activated license (OPT-GL-MQTT). Contact our sales department at [sales@weiss-robotics.com](mailto:sales@weiss-robotics.com) for more information.

A typical application is shown in Figure 16, where the GRIPLINK controller is connected to an MQTT broker, which in turn is connected to a time series database. This stores the process data of the gripping modules retentively and makes them available to analysis and visualization software.

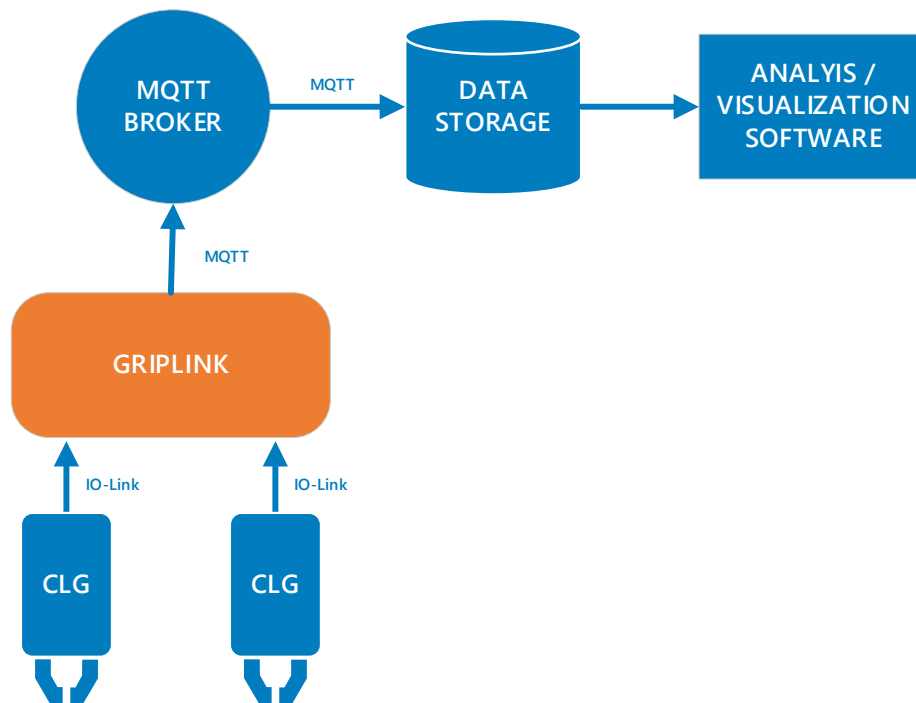


Figure 16: Provision of the process data via MQTT


### 8.1 Configuration of the MQTT -Services

To be able to use the MQTT service, the GRIPLINK controller must be connected to an MQTT broker. The MQTT broker is the central component of every MQTT system. It receives the data published by the GRIPLINK controller ("Publisher") and forwards it to other systems that have registered with the broker to receive the data ("Subscriber").

First create a user for the GRIPLINK controller via the management console of the MQTT broker and set its rights according to your IT security requirements.

Now switch to the web application of the GRIPLINK controller. The MQTT service is configured via the "MQTT" tab (see Figure 17), which can be opened via the sidebar menu.

### CONTROL

Enable MQTT service  Connecting...

### CONFIGURATION

#### BROKER

Broker URL or IP address	192.168.1.1
Port	1883
Custom Device Alias	000172
User name	user
Password	*****
Transport Layer Security (TLS)	Plain text transmission

Figure 17: Configuration of the MQTT service

If a connection to a broker already exists, disconnect it now by moving the activation switch to the left. Then click on the round pencil icon and enter the address of the MQTT broker and the access data for the previously created user account of the GRIPLINK controller on the broker. The "Custom Device Alias" is an alphanumeric string that you can use to describe your application in a meaningful way, e.g. "Assembly cell" or "MT007". The alias is inserted into the published MQTT data and is used for its unique assignment. Test the entered address and access data by activating the MQTT service.



The "Custom Device Alias" must be unique in the network, otherwise there is a risk that data from different GRIPLINK controllers will be mixed up.



Always assign a unique custom device alias for your GRIPLINK controller and transfer this if you need to replace the GRIPLINK controller. This way, the MQTT paths always retain their validity.

## 8.2 Provided data

The GRIPLINK controller provides the process data it collects in its own directory space. This is composed as follows:

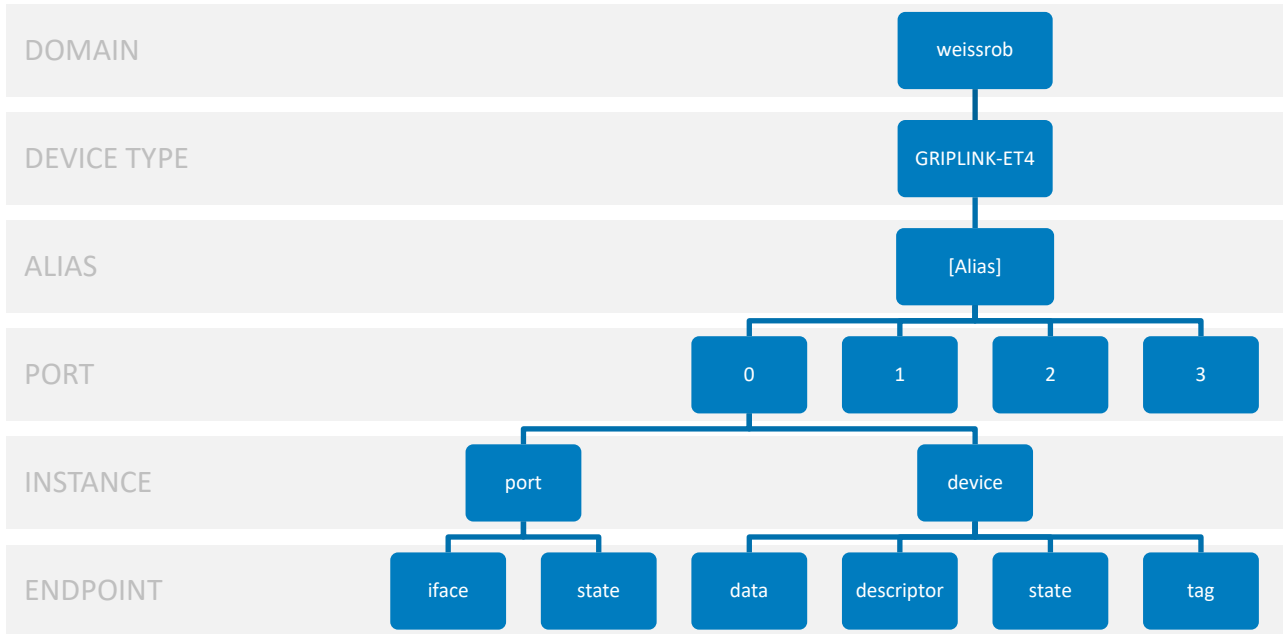


Figure 18 : MQTT directory space of the GRIPLINK controller

The data of the end points are always provided as JSON objects. To receive the process data of a gripping module connected to port 0 of a GRIPLINK-ET4 controller with the alias "MT007", subscribe to the path

*[weissrob/GRIPLINK-ET4/MT007/0/device/data](#)*

at the MQTT broker.

## 9 Software updates

Software updates are provided as files with the extension "wup".



The update package with the latest firmware is available at [www.griplink.de](http://www.griplink.de) for download.

Basically, a distinction is made between updates of the firmware/UI and the bootloader. Both types of update can be made via the configuration page in the settings of the GRIPLINK controller.

### SOFTWARE UPDATES

COMPONENT	INSTALLED	AVAILABLE	ACTIONS
Firmware/UI	4.0.0-RC4	Visit <a href="http://www.griplink.de">www.griplink.de</a>	UPDATE
Bootloader	2.0.0-RC2	2.0.0-RC2	UPDATE

Figure 19: Software updates



Never update the firmware during operation! This will lead to undesired behavior!



The GRIPLINK controller must be restarted for the firmware update. The connection to a robot controller and all connected IO-Link devices will be lost as a result!

### 9.1 Firmware/UI update

In the "Firmware/UI" line, first click on the "Update" button. After confirming the warning, the GRIPLINK controller restarts and the update page opens automatically. If not, reload the page.

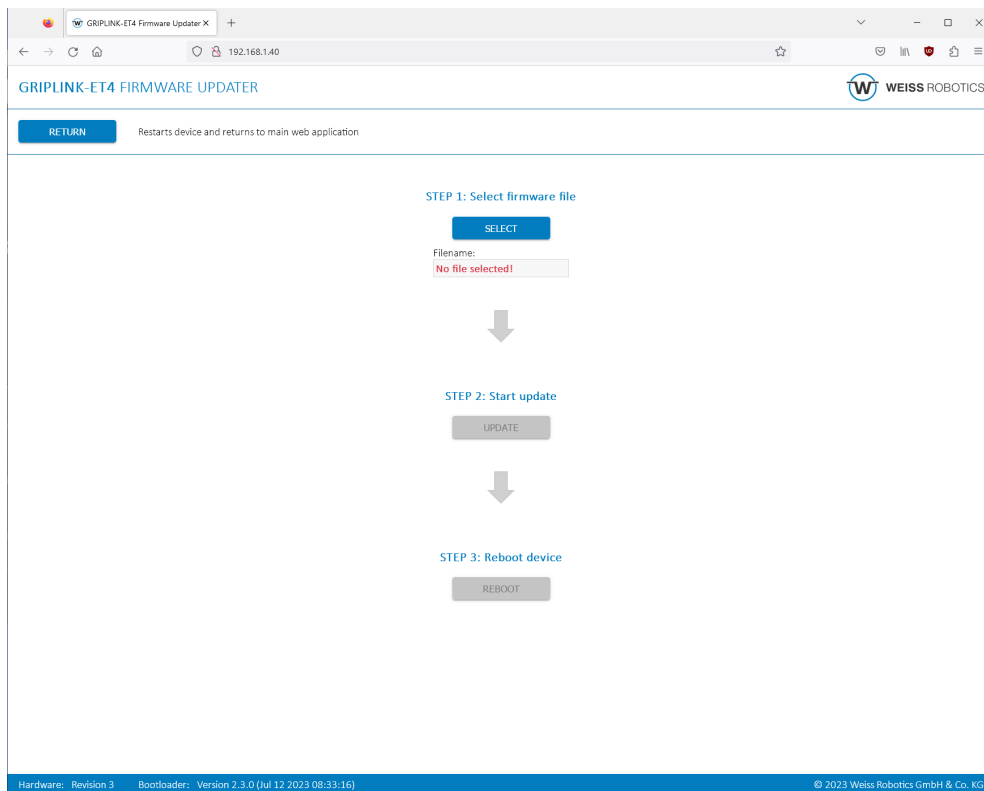


Figure 20 : Execute firmware update

First select the update package via "SELECT". Then click on "UPDATE" to start the update. This process may take several minutes. The LEDs (1) and (2) flash alternately red-green during this process, see chapter 6.4. If the update was successful, the GRIPLINK controller can then be restarted via the "REBOOT" button. The updated firmware is now active.

Use the "RETURN" button to exit bootloader mode without installing an update and return to the web application.

## 9.2 Bootloader update

A new boot loader may also be available with a firmware update. If this is the case, the button in the line "Bootloader" (see Figure 19) is activated. Click on "Update" to update the bootloader directly. A restart of the GRIPLINK is not necessary afterwards.



Always install the bootloader version that matches the firmware. Otherwise, the GRIPLINK controller may malfunction under certain circumstances!



## 10 Licenses

For the GRIPLINK controller, software functions can be enabled by license. The description of the individual options can be found in the associated documentation package.

Option	Description
OPT- GL -DDK	OEM Driver Development Package
OPT-GL-PROXY	Proxy functionality
OPT-GL-MQTT	Export of process data via MQTT
PT-GL-3RDPARTY	Support for third-party devices

Table 5: Available license options

To unlock an option, go to the " Settings" page on the web interface and click the "Plus" button in the Licenses section. Enter the license key and confirm with "Ok". Reload the website if the license status has not changed (press F5). After successfully adding the key, you may need to restart the GRIPLINK controller.

### LICENSES



FEATURE	STATE	REMAINING
OPT-GL-DDK	Not activated	—
OPT-GL-PROXY	Not activated	—
OPT-GL-MQTT	Persistent	—
OPT-GL-3RDPARTY	Not activated	—

Figure 21: License options

## 11 Troubleshooting

### 11.1 No communication with the GRIPLINK controller

Possible cause	Remedy
Power supply interrupted	<ul style="list-style-type: none"><li>• Check power supply</li></ul>
No connection, Ethernet LED is not lit	<ul style="list-style-type: none"><li>• Check communication cable and connections</li></ul>
No connection, but Ethernet LED is on	<ul style="list-style-type: none"><li>• Check the IP settings of the controller. The GRIPLINK controller must be in the same subnet as the controller/PC.</li></ul>
GRIPLINK is in UPDATE mode (LEDs flash alternately red-green)	<ul style="list-style-type: none"><li>• Module is in UPDATE mode. Switch to the web interface and upload the current firmware.</li><li>• If the UPDATE mode was not actively started: Disconnect power supply and restart GRIPLINK controller.</li></ul>

### 11.2 No communication with the connected device

Possible cause	Remedy
Operating voltage too low or power supply insufficient	<ul style="list-style-type: none"><li>• Check power supply</li><li>• Check maximum current consumption of the connected device</li></ul>
Connection is not completely established (port LED flashes GREEN)	<ul style="list-style-type: none"><li>• Check communication cable and connections</li><li>• Check compatibility</li><li>• Check device version</li></ul>
Device is not supported (port LED lights RED)	<ul style="list-style-type: none"><li>• Check compatibility</li><li>• Check device version</li><li>• Check version of GRIPLINK controller firmware</li></ul>
Driver error (port LED flashes RED)	<ul style="list-style-type: none"><li>• Check device version</li><li>• Check version of GRIPLINK controller firmware</li></ul>
Overcurrent, overtemperature or connection error (port LED flashes rapidly RED).	<ul style="list-style-type: none"><li>• Check communication cable and connections</li><li>• Check current consumption of the connected device</li><li>• Remove devices and allow GRIPLINK controller to cool down</li></ul>

### 11.3 GRIPLINK Controller reports a port error

The port LED lights up or flashes red.

Possible cause	Remedy
<b>Connected device is not supported (port LED lights up red)</b>	<ul style="list-style-type: none"> <li>• Check compatibility</li> <li>• Check device version</li> </ul> Check version of GRIPLINK controller firmware
<b>Driver error (port LED flashes red)</b>	<ul style="list-style-type: none"> <li>• Check device version</li> <li>• Check version of GRIPLINK controller firmware</li> </ul>
<b>Overcurrent or connection error (port LED flashes red quickly)</b>	<ul style="list-style-type: none"> <li>• Check communication cable and connections</li> <li>• Check current consumption of the connected device</li> </ul>

## 11.4 GRIPLINK Controller reports an error

The status LED lights up or flashes red.

Possible cause	Remedy
<b>Command format error (Status LED lights up RED during reception)</b>	An error occurred during the evaluation of the incoming command. <ul style="list-style-type: none"> <li>• Check version of GRIPLINK controller firmware</li> <li>• When using an official GRIPLINK plugin: Make sure that the version of the GRIPLINK plugin works together with the version of the GRIPLINK firmware.</li> <li>• When using your own software: Check protocol conversion</li> </ul>
<b>Malfunction of a component (Status LED flashes permanently RED)</b>	At least one component of the controller required for operation could not be initialized. <ul style="list-style-type: none"> <li>• Restart the GRIPLINK controller. If the error persists, send in the GRIPLINK Controller with a repair order.</li> </ul>

## 11.5 GRIPLINK web application does not start

The home page of the web application does not load.

Possible cause	Remedy
<b>Incorrect IP address entered</b>	Make sure you have entered the correct IP address in the browser line. The default IP address is 192.168.1.40.
<b>Incompatible browser</b>	The web application is not compatible with Internet Explorer. If possible, use Google Chrome or Mozilla Firefox.

## 12 EC Declaration of Incorporation

In the sense of the EC Machinery Directive 2006/42/EC, Annex II B

Manufacturer WEISS ROBOTICS GmbH & Co KG  
Karl-Heinrich-Käferle-Str. 8  
D-71640 Ludwigsburg

Distributor WEISS ROBOTICS GmbH & Co KG  
Karl-Heinrich-Käferle-Str. 8  
D-71640 Ludwigsburg

We hereby declare that the following product:

Product Name: GRIPLINK Controller  
Type designation: GRIPLINK-ET4  
Part numbers: 5020069

complies with the applicable essential requirements of the **Machinery Directive (2006/42/EC)**.

The partly completed machinery must not be put into service until it has been established that the machine into which the partly completed machinery is to be incorporated complies with the provisions of the Machinery Directive (2006/42/EC).

Applied harmonized standards, in particular:

EN ISO 12100-1 Safety of machinery - Basic concepts, general principles for design, Part 1: Basic terminology, methodology

EN ISO 12100-2 Safety of machinery - Basic concepts, general principles for design, Part 2: Technical principles and specifications

The manufacturer undertakes to submit the special technical documents relating to the partly completed machinery to national authorities on request. The special technical documents belonging to the partly completed machinery according to Annex VII Part B have been prepared.

Responsible for documentation: Dr.-Ing. Karsten Weiß, Tel.: +49(0)7141/94702-0

Place, Date/Signature:

Ludwigsburg, May 15, 2020



Signatory details

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