WEISS ROBOTICS

GRIPLINK® UNIFIED COMMAND SET

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1 Introduction

The GRIPLINK Unified Command Protocol provides a standardized and device-independent communication interface for controlling a wide range of robotic components such as grippers, sensors, and actuators over TCP/IP networks.

Originally introduced with the GRIPLINK Controller, the protocol has since evolved into a common communication layer across multiple WEISS ROBOTICS products, including the WPG series servo grippers, the INTRAPAL palletizing gripper, and future GRIPLINK-enabled devices.

By abstracting device-specific IO-Link or Ethernet communication into a unified text-based command set, the GRIPLINK protocol enables seamless integration of different hardware types into robotic automation systems. Each connected device implements the same command syntax and semantics, allowing host applications to interact with any supported device through a consistent, human-readable interface.

This manual describes the structure and operation of the GRIPLINK Unified Command Protocol and provides a complete reference of all supported commands. The following chapters explain how to establish communication with GRIPLINK-compatible devices, how commands and responses are formatted, and how to implement the protocol in host systems or robot controllers.

For simplicity and readability, this document generally refers to a GRIPLINK Controller when describing behavior or functionality that applies equally to any GRIPLINK-compatible device.

While the original GRIPLINK-ET4 controller provides multiple physical IO-Link ports for connecting external field devices, other GRIPLINK-enabled products such as the WPG and INTRAPAL series implement the same logical interface internally. In these devices, all GRIPLINK functions are mapped to a logical port 0, representing the device's built-in actuator or gripper module. Host applications can therefore address both controller-based and integrated GRIPLINK devices using the same unified command syntax.

To get started, we recommend using a Telnet client such as PuTTY for testing and familiarization with the protocol (see section 2.5).

WEISS ROBOTICS also provides pre-tested GRIPLINK Plug-ins for various industrial robot platforms. A list of currently supported systems and software components is available at:

https://weiss-robotics.com/griplink-technology/platforms/

If you intend to use GRIPLINK for a robotic system that is already supported by a GRIPLINK-Plugin, please refer directly to the respective GRIPLINK-Plugin Manual.

1.1 Terminology

The following terminology is used consistently throughout this manual to describe the components and structure of the GRIPLINK Unified Command Protocol:

GRIPLINK Controller

A GRIPLINK Controller is any GRIPLINK-compatible master device that implements the unified command protocol and provides one or more communication ports. Depending on the product type, these ports may represent physical IO-Link interfaces (e.g. GRIPLINK-ET4), logical interfaces (e.g. WPG) or a combination of both (e.g. INTRAPAL). In this document, the term GRIPLINK Controller is used generically to refer to any GRIPLINK-compatible device that can process GRIPLINK commands, regardless of its internal hardware architecture.

Device

A Device is a GRIPLINK-compatible peripheral connected to a controller port or, in the case of integrated products, an internally represented function module. Examples include servo grippers, sensors, or actuators. In integrated products such as the WPG or INTRAPAL series, the built-in gripper functionality is exposed through a logical port 0 and can be addressed using the same unified command interface as external IO-Link devices.

Port

A Port identifies the communication channel between a GRIPLINK Controller and a connected Device. Each port is addressed by a numeric index. The number of available ports depends on the device type:

- GRIPLINK-ET4 Controller: 4 physical IO-Link ports (0–3)
- WPG Series servo grippers: 1 logical port (0)
- INTRAPAL Series palettizing grippers: 1 logical port (0) and two physical ports (1–2)

Commands referring to a port use the notation [<port>].

2 General Notes on Using the Unified Command Set

The Unified Command Set of GRIPLINK is designed as an abstract meta-command layer. It provides a unified interface to control a wide variety of IO-Link and Ethernet-based devices — regardless of their manufacturer, form factor, or internal functionality.

To ensure full flexibility and compatibility, the following best practices should be observed when implementing control applications:

- **Avoid hardcoded parameter limits:**
  Limits (e.g., for position, speed, or force) **must not be fixed or interpreted within the application**. These constraints are device-specific and are internally checked by the GRIPLINK Controller. Violations will be indicated using appropriate error codes (ERR xx).
- **Always pass parameters fully and unfiltered:**
  Applications should **transmit all command parameters directly and completely** to the GRIPLINK Controller. Validation, mapping, and translation into device-specific instructions is handled internally by the controller.
- **Do not make assumptions about device type:**
  Control logic should **not rely on knowing the specific type of connected device** (e.g., gripper, sensor, actuator), but instead determine available functionality using protocol-level queries like DEVVID, DEVPID, DEVNAME, or runtime data such as DEVSTATE and VALUE.

By adhering to these principles, applications can:

- Automatically support future device classes,
- Maintain compatibility across different vendors,
- and adopt protocol upgrades without requiring modifications.

2.1 Command Format Description

All commands sent to the GRIPLINK Controller must be terminated with a Line Feed (LF, 0x0A) character. Any other non-printable ASCII characters in the range 0x01–0x1F are automatically replaced by whitespace and subsequently trimmed. Consequently, Carriage Return (CR, 0x0D) characters that may be automatically appended by some host systems are ignored.

Response messages returned by the GRIPLINK Controller are always terminated with a Line Feed (LF, 0x0A) character.

Example

Read the identification string of the connected GRIPLINK Controller.

Command: "ID?"[CR][LF] *[CR] will be ignored!*

Response: "GRIPLINK-ET4"[LF]

2.1.1 Notation and Data Types

The following data types are supported by the GRIPLINK unified command protocol:

Strings <string>

Strings may be enclosed in either single quotes (e.g. 'Hello World') or double quotes (e.g. "Hello World"). String parameters returned from the device to the host are always enclosed in double quotes (e.g. "answer"). Strings may contain any printable ASCII character with codes between 0x20 (‘ ‘) and 0x254 (‘■’), except for the special characters ', ", and \.

Signed Integer Values <int>

Signed integers are 32-bit values ranging from −2,147,483,648 to 2,147,483,647. Values must be specified in decimal notation. Alternative encodings such as hexadecimal (0x...) or octal (0...) are not supported.

Unsigned Integer Values <uint>

Unsigned integers are 32-bit values ranging from 0 to 4,294,967,295. Values must be provided in decimal notation. Encodings such as binary (0b...) or hexadecimal (0x...) are not supported.

Floating Point Values <float>

Floating point values follow the IEEE 754 standard for 32-bit single-precision representation. They can be specified in standard decimal notation (e.g. 3.456) and may include or omit a fractional part (e.g. 3 or 3.0).

Scientific notation (e.g. 3.14e5) is not supported.

Boolean Values <bool>

Boolean values are represented as integer values:

0 = false, 1 = true.

Glossar

2.2 Connecting to the GRIPLINK Controller

Before connecting to the GRIPLINK Controller, an appropriate IP address must be set using the GRIPLINK Controller’s web interface. Connect the GRIPLINK Controller to the local network or directly to your computer’s network interface and point your favorite web browser to the GRIPLINK Controller’s IP address e.g., by typing the default **http://192.168.1.40** into the address bar and pressing <Enter>. Please make sure that your computer’s network settings are appropriate.

The GRIPLINK Controller’s IP address can be configured by choosing ”Config” from the buttons on the top of the main page.

The GRIPLINK Controller communicates with its client using a text-based protocol. The following chapters describe the general format of these commands.

The GRIPLINK Controller expects commands being submitted as plain ASCII strings. **Each command must be terminated by a line feed character ('\n' or ASCII code 0x0a).** Return messages are submitted in the same format and are terminated by a line feed character, too.

Please note that the commands of the GRIPLINK Controller are not case sensitive, i.e. sending "grip(0,1)" is the same as "GRIP(0,1)" or "gRiP(0,1)". However, it is good practice to send commands in upper case notation. Response messages from the GRIPLINK Controller will always be sent in upper case notation.

2.3 Port count

As the number of ports differ by the different versions of the GRIPLINK compatible hardware used, this manual uses a generic placeholder PORTS for the number of physical device ports, see the following table for common hardware platforms.

Hardware	PORTS
GRIPLINK-ET4	4
WPG Series	1
INTRAPAL Series	3

Table 1: Number of ports depending on device

See your GRIPLINK controller's manual for any information about the number of ports, if not included in this table.

2.4 Error handling

In case of an error, the GRIPLINK Controller returns a message string of the following format:

ERR <error_code>

where <error_code> represents a number referencing an error code. Chapter 4 gives an overview of all available error codes.

If verbose mode is active (cf. chapter 3.1.7), the GRIPLINK Controller submits extended error messages containing an additional text string that describes the type of error:

ERR <error_code> <description_string>

☞ See chapter 3 for a description of the returned error code.
See chapter 3.1.7 on how to enable verbose mode.

2.5 Connecting to the GRIPLINK Controller

2.5.1 Connecting from a computer or laptop using PuTTY

PuTTY is a free Telnet and SSH client that can be used to connect to the GRIPLINK Controller's command interface e.g., for testing purposes or to learn the communication protocol. The following chapter shows how to use PuTTY with the GRIPLINK Controller on Windows. On Unix-like systems (Linux, Mac), you can use command line tools like netcat (nc) instead.

ⓘ The default IP address is 192.168.1.40 with subnet mask 255.255.255.0.
The default TCP/IP listening port is always 10001.

Download and install PuTTY for Windows from **http://www.putty.org**.

After starting PuTTY, a new connection must be configured. Type in the IP address and port number of the GRIPLINK Controller and set the connection type to "raw" (see Figure 1).

As the GRIPLINK Controller does not send a carriage return character ('\r' or ASCII code 0x0d) in its response messages, PuTTY must be configured to explicitly do a carriage return on each line feed character. In the settings window, select the "Terminal" tab and enable "Implicit CR in every LF" (see Figure 2).

Now click the "Open" button to open the connection. A new and empty terminal window will appear (Figure 3), ready to type in your commands.

Typing "HOME(0)" for example, followed by <Enter>, will execute a homing sequence on the gripper device connected to port 0 (see chapter 3.4.1).

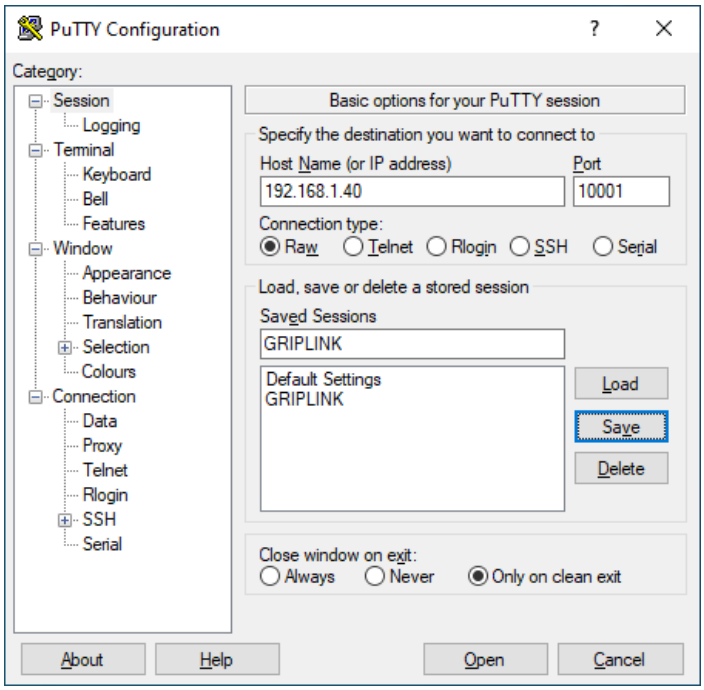


Figure 1: PuTTY session settings

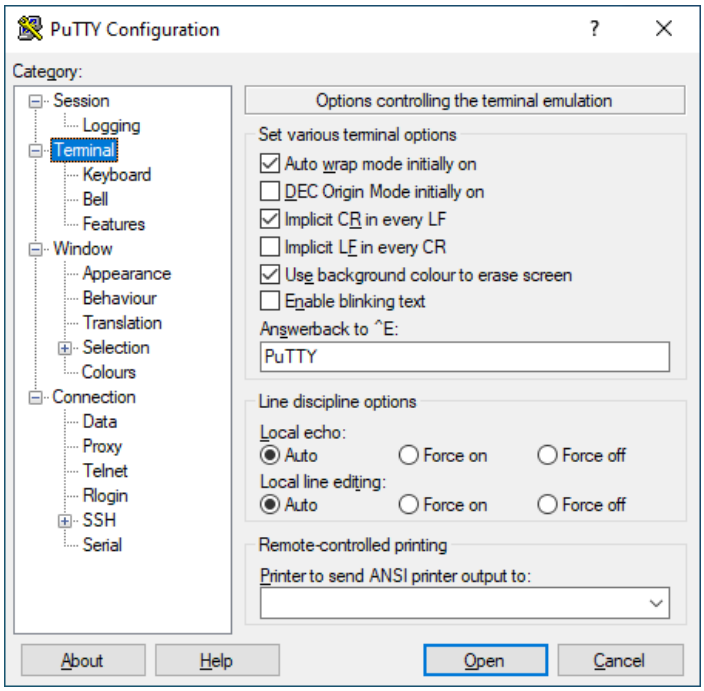


Figure 2: PuTTY terminal settings

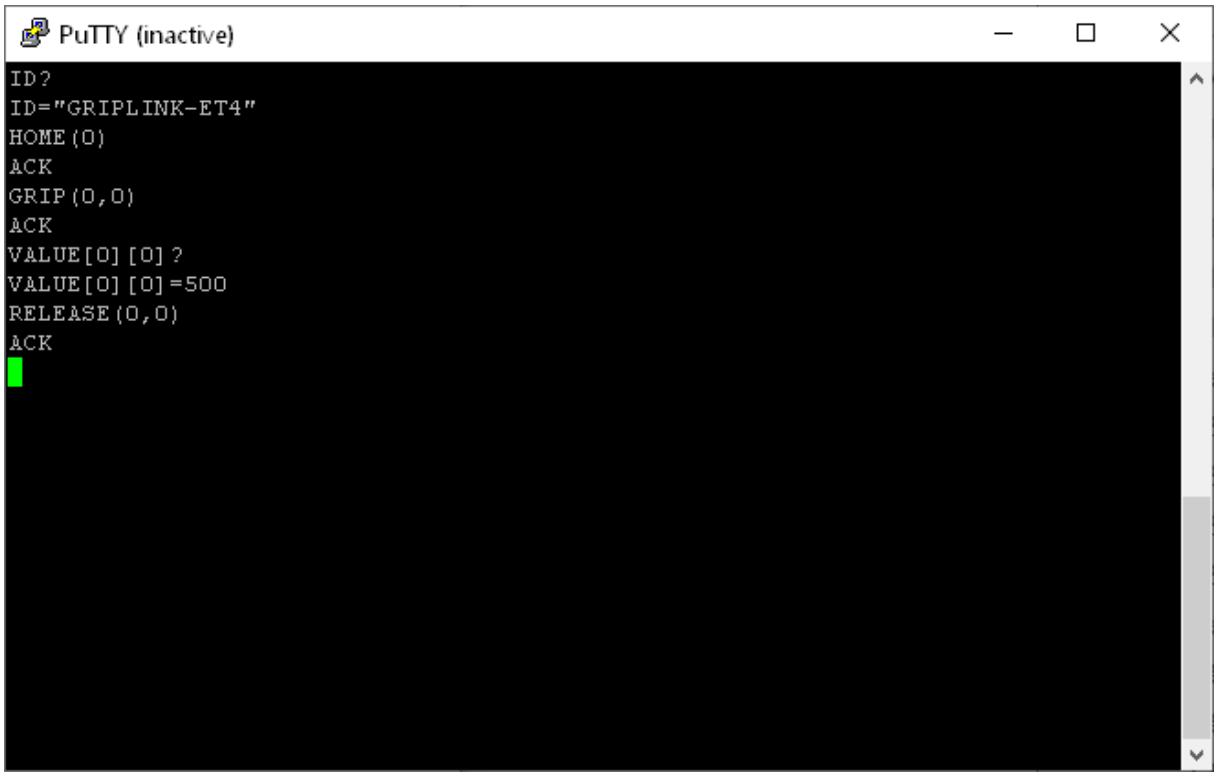


Figure 3: PuTTY terminal window

2.5.2 Connecting from a robot controller

The text-based message protocol described in this manual is intended to control devices from a robot controller. Nowadays, almost every robot controller is able to open up network connections (usually called socket connections) to exchange data with remote hosts like a computer or the GRIPLINK Controller. Please refer to the documentation of your robot controller or ask the robot manufacturer to find out how to use network connections from your robot program and how to send and receive text-based messages.

WEISS ROBOTICS also provides ready-to-use implementations for some robot systems. Please ask our sales and support teams if there is a turnkey solution for your setup.

2.6 Routing of commands

The GRIPLINK Controller supports routing of incoming commands, so that multiple GRIPLINK Controllers and their associated devices can form a “virtual controller network” that behaves like a single large GRIPLINK controller towards the host side (i.e. the robot). The routing depends on the configuration of the GRIPLINK controller network, see the GRIPLINK Controller manual for details.

The GRIPLINK Controller can be configured to play one of three roles:

- Master
- Slave
- Stand-alone

Master mode

In Master mode, up to seven slaves can be assigned to one GRIPLINK Controller. Every slave controller has exactly 4 logical ports that will be mapped to its physical ports. If the slave controller has less than four ports available, the higher ports are left unused and show up as “INVALID” when querying their state.

Example 1

Assuming a virtual GRIPLINK Controller network consisting of one GRIPLINK-ET4 master and seven GRIPLINK-ET4 slave controllers, the ports are assignment as follows:

Master	Ports 0 to 3
Slave #1	Ports 4 to 7
Slave #2	Ports 8 to 11
Slave #3	Ports 12 to 15
Slave #4	Ports 16 to 19
Slave #5	Ports 20 to 23

Slave #6	Ports 24 to 27
Slave #7	Ports 28 to 31

The lowest numbered ports are mapped to the Controller's own hardware, while ports with index > 3 will be routed to the pre-configured slave GRIPLINK Controllers over Ethernet.

Example 2

A network of a GRIPLINK-ET4 master and two WPG Series grippers using the GRIPLINK protocol will use the following port assignment:

Master	Ports 0 to 3
Slave #1 (WPG Series Gripper)	Port 4, Ports 5 to 7 are unused
Slave #2 (WPG Series Gripper)	Port 8, Ports 9 to 11 are unused
	Ports 12 to 31 are unused

Slave mode

In Slave mode, the GRIPLINK Controller will only accept incoming connections from its pre-configured Master GRIPLINK Controller. All other connection attempts will be rejected.

Stand-Alone mode

In Stand-Alone mode, routing is disabled and only the local ports can be accessed.

3 Command Set Reference

This chapter provides a comprehensive reference of all commands supported by the GRIPLINK Unified Command Set. It describes the syntax, parameters, and expected responses for each command category, including system-level queries, device control, motion commands, multi-device operations, diagnostics, and configuration.

The Unified Command Set is designed to abstract the specific capabilities of a wide range of field devices — such as grippers, sensors, and actuators — and present them through a common, device-agnostic interface. Commands are transmitted as plain ASCII strings over TCP/IP and are interpreted by the GRIPLINK Controller, which maps them internally to the appropriate IO-Link or Ethernet protocol commands.

Each command description in this chapter includes:

- Command syntax and format
- Required and optional parameters
- Response messages and expected device states
- Examples for practical usage
- Error handling through standardized status codes

The command set is continuously extended to support new device classes and features. Applications should avoid hardcoded assumptions and rely instead on the dynamic capabilities of the protocol as outlined in section 1.1, “General Notes on Using the Unified Command Set”.

To ensure the connected hardware is using a version of the GRIPLINK protocol that is compatible to your application, the usage of the PROTASSERT command is highly recommended.

Command names are not case-sensitive, but upper case notation is recommended for clarity.

3.1 System Information

The following commands can be used to query information about the GRIPLINK Controller.

3.1.1 Identify controller type – ID

Read device type of the GRIPLINK Controller. This command returns the identification character string of the GRIPLINK Controller and can be used to distinguish different types.

Syntax

ID?

Parameters

-

Response Message

ID=<idstring>

<idstring> String ID of this GRIPLINK Controller.

Example

Ask the connected GRIPLINK Controller for its identification string.

Command: ID?

Response: ID=”GRIPLINK-ET4”

3.1.2 Identify protocol version – PROTOCOL

Read the version of the GRIPLINK protocol used by this GRIPLINK Controller to determine the capabilities of the interface.

Syntax

PROTOCOL?

Parameters

-

Response Message

PROTOCOL=”GRIPLINK-V<pversion>”

<pversion> Protocol version of this GRIPLINK Controller including the protocol identifier.

Example

Ask the connected GRIPLINK Controller for its GRIPLINK protocol version.

Command: PROTOCOL?

Response: PROTOCOL=”GRIPLINK-V2”

3.1.3 Assert protocol version – PROTASSERT

Assert a specific protocol with a given minimum version is running on the GRIPLINK controller.

Syntax

PROTASSERT(<protidentifier>,<minversion>)

Parameters

<protidentifier> Protocol identifier string with enclosing quotation marks (”)

<minversion> Minimum version of the protocol running on the controller.

Response Message

ACK on success or ERR <ERRORCODE> in case of an error.

Example

Assert a GRIPLINK protocol with minimum version 2.

Command: PROTASSERT(“GRIPLINK”,2)

Response on success: ACK

Response if asserted protocol is not supported: ERR 20

3.1.4 Read serial number of the GRIPLINK Controller – SN

Read the serial number of GRIPLINK Controller.

Syntax

SN?

Parameters

-

Response Message

SN=<snstring>

<snstring> Serial number string

Example

Ask for the serial number of the connected GRIPLINK Controller.

Command: SN?

Response: SN=”123456”

3.1.5 GRIPLINK Controller label – LABEL

Set or gead the device label of GRIPLINK Controller. The device label can be used to identify a certain GRIPLINK Controller in a larger network of devices.

Syntax

Assign: LABEL=<label>

Query: LABEL?

Parameters

<label> String label (32 characters max) to be set.

Response Message

LABEL=<label>

Example

1) Ask for the label of the connected GRIPLINK Controller.

Command: LABEL?

Response: LABEL=”Hello World”

2) Set the label of the connected GRIPLINK Controller to ”Marvin”

Command: LABEL=”Marvin”

Response: LABEL=”Marvin”

3.1.6 Read firmware version of the GRIPLINK Controller – VER

Read the firmware version of GRIPLINK Controller. The version is returned as string containing a 3-element version number.

Syntax

VER?

Parameters

-

Response Message

VER=<version>

<version> Version number string

Example

Query the device version:

Command: VER?

Response: VER=”4.0.0”

3.1.7 Verbose mode – VERBOSE

Decodes any returned error codes into a human readable string. Example:

The response ”ERR 04” turns into ”ERR 04 The device is not initialized”.

Syntax

VERBOSE=<enable>

Parameters

<enable> 0: disable verbose mode
1: enable verbose mode

Response Message

VERBOSE=<enable>

Example

Enable Verbose Mode:

Command: VERBOSE=1

Response: VERBOSE=1

3.2 Device Information

The following commands can be used to gather information about the connected field devices.

3.2.1 Read device Vendor-ID – DEVVID

Read the Vendor ID of the connected device. This command returns the Vendor ID as assigned by the IO-Link Association of the device connected to the given port.

☞ See Chapter 7 for a list with Vendor- and Product IDs.

Syntax

DEVVID[<port>]?

Parameters

<port> Port number

Proxy role STANDALONE: 0 to (PORTS-1)

Proxy role MASTER: 0 to 31

Response Message

DEVVID[<uint>]=<vid>

<vid> Vendor ID as assigned by the IO-Link Association (range 1 to 65535). (-1) is returned, if no device was found at the specified port.

Example

Read the Vendor ID of the device connected to GRIPLINK Controller port 2 (Device is IEG 55 gripper with Vendor ID 815):

Command: DEVVID[2]?

Response: DEVVID[2]=815

3.2.2 Read device Product ID – DEVPID

Read the Product ID of the connected device. This command returns the Product ID as assigned by the vendor of the device connected to the given port (i.e. the IO-Link Device ID or Product ID for non-IO-Link devices).

☞ See Chapter 7 for a list with Vendor- and Product IDs.

Syntax

DEVPID[<port>]?

Parameters

<port>	Port number	
	Proxy role STANDALONE:	0 to (PORTS-1)
	Proxy role MASTER:	0 to 31

Response Message

DEVPID[<uint>]=<pid>

<pid> Product ID as assigned by the device vendor (range 1 to 33.554.431).

Error codes

In case of an error, one of the following codes will be returned. Error codes different to this error will indicate protocol and/or parameter errors.

ERR 04 No device connected or device not supported (E_NOT_INITIALIZED)

ERR 11 Port index outside the allowed range (E_INDEX_OUT_OF_BOUNDS)

Example

Read the Product ID of the device connected to GRIPLINK Controller port 2 (Device is IEG 55 gripper with Product ID 20):

Command: DEVPID[2]?

Response: DEVPID[2]=20

3.2.3 Assert type of connected device – DEVASSERT

This function expects a device identification based on Vendor and Product ID and checks, if this device is connected to the specified port. The function returns an error, if either a different device is connected or no device is connected.

☞ See Chapter 7 for a list with Vendor- and Product IDs.

Syntax

DEVASSERT(<port>,<vid>,<pid>)

Parameters

<port> Port number

Proxy role STANDALONE: 0 to (PORTS-1)

Proxy role MASTER: 0 to 31

<vid> Vendor ID of the expected device. The Vendor ID is assigned to the manufacturer by the IO-Link Association.

<pid> Product ID of the expected device. This equals the Device ID the vendor has assigned to its device.

Response Message

ACK if the specified device was found or ERR 25 (E_CMD_FAILED) if not. Error codes different to this error will indicate protocol and/or parameter errors.

Example

The robot program expects a WEISS ROBOTICS IEG 55 servo gripper (Vendor ID = 815, Product ID = 20) to be connected at port 0:

Command: DEVASSERT(0,815,20)

Response: ACK

3.2.4 Retrieve device name – DEVNAME

Retrieve the IO-Link ”ProductName” identification character string as reported from the device connected to the given port.

Syntax

DEVNAME[<port>]?

Parameters

<port>	Port number	
	Proxy role STANDALONE:	0 to (PORTS-1)
	Proxy role MASTER:	0 to 31

Response Message

DEVNAME[<uint>]=<name>

<name> Device name as string

Example

Read the name of the device connected to GRIPLINK Controller port 1:

Command: DEVNAME[1]?

Response: DEVNAME[1]=”IEG 55-020”

3.2.5 Retrieve device vendor name – DEVVENDOR

Retrieve the IO-Link ”VendorName” identification character string as reported from the device connected to the given port.

Syntax

DEVVENDOR[<port>]?

Parameters

<port>	Port number	
	Proxy role STANDALONE:	0 to (PORTS-1)
	Proxy role MASTER:	0 to 31

Response Message

DEVVENDOR[<uint>]=<vendor>

<vendor> Vendor name as string

Example

Read the name of the device connected to GRIPLINK Controller port 1:

Command: DEVVENDOR[1]?

Response: DEVVENDOR[1]=”WEISS ROBOTICS”

3.2.6 Read serial number of a device – DEVSN

Read the serial number (IO-Link ”SerialNumber” value) of the device connected to the given port. The serial number is a device-specific string that can contain alpha-numeric characters. See the device specifications for details.

Syntax

DEVSN[<port>]?

Parameters

<port>	Port number	
	Proxy role STANDALONE:	0 to (PORTS-1)
	Proxy role MASTER:	0 to 31

Response Message

DEVSN[<port>]=<snstring>

<snstring> Serial number in string format

Example

Read the name of the device connected to GRIPLINK Controller port 1:

Command: DEVSN[1]?

Response: DEVSN[1]=”000042”

3.2.7 Read application tag of a device – DEVTAG

Get or set the application tag of a device. This tag can be used e.g., to identify the device in a larger assembly. The tag is transferred to the device as ”Application Tag” and is stored using the IO-Link data storage mechanism. If the connected device doesn’t support application tags, the function will return an error.

Syntax

Assign: DEVTAG[<port>]=<label>

Query: DEVTAG[<port>]?

Parameters

<port> Port number

Proxy role STANDALONE: 0 to (PORTS-1)

Proxy role MASTER: 0 to 31

<label> String label (32 characters max) to be set.

Response Message

DEVTAG[<port>]=<label>

Example

1) Retrieve the label of the device connected to port 1.

Command: DEVTAG[1]?

Response: DEVTAG[1]=”Hello World”

2) Change the label of the device connected to port 1 to ”Device 1”

Command: DEVTAG[1]=”Device 1”

Response: DEVTAG[1]=”Device 1”

3.2.8 Read firmware version of a device – DEVVER

Return the firmware version of a selected device. The content of the returned version string is device-specific (IO-Link parameter ”SWVersion”). See the device manual for details.

Syntax

DEVVER [<port>]?

Parameters

<port>	Port number	
	Proxy role STANDALONE:	0 to (PORTS-1)
	Proxy role MASTER:	0 to 31

Response Message

DEVVER[<port>]=<version>

<version> Version string

Example

Retrieve the version information of the device connected to port 3.

Command: DEVVER[3]?

Response: DEVVER[3]=”1.0.1-RC2”

3.3 Controller Commands

3.3.1 Close connection – BYE

Close the connection from the client side. BYE should be sent at the end of a session to gracefully close the connection. The server will respond with an ACK and will close the connection afterwards.

Syntax

BYE()

Parameters

-

Response Message

ACK on success or ERR <ERRORCODE> in case of an error.

Example

Close current session:

Command: BYE()

Response: ACK

[Server closes connection]

[Client can close socket]

3.4 Device Commands

All device commands return ACK if the command has been received correctly. They return ERR <ERRORCODE> if an error occurred, where <ERRORCODE> indicates the specific error. See Chapter 4 for a list of error codes.

3.4.1 Enable device – ENABLE

Enables the selected device. The action performed by this command depends on the connected device, see the device documentation for details.

Grippers by WEISS ROBOTICS: The device will be (re-)enabled automatically when executing a GRIP(), RELEASE() or HOME() command.

Syntax

ENABLE(<port>)

Parameters

<port>	Port number	
	Proxy role STANDALONE:	0 to (PORTS-1)
	Proxy role MASTER:	0 to 31

Response Message

ACK on success or ERR <ERRORCODE> in case of an error.

Example

Enable the device connected to port 2:

Command: ENABLE(2)

Response: ACK

3.4.2 Disable device – DISABLE

Disables the selected device. The result depends on the connected device, see the device documentation for details.

Grippers by WEISS ROBOTICS: This function will disable the actuator thus allowing to move the fingers by hand.

Syntax

DISABLE(<port>)

Parameters

<port>	Port number	
	Proxy role STANDALONE:	0 to (PORTS-1)
	Proxy role MASTER:	0 to 31

Response Message

ACK on success or ERR <ERRORCODE> in case of an error.

Example

Disable the device connected to port 2:

Command: DISABLE(2)

Response: ACK

3.4.3 Perform a homing sequence – HOME

Perform a homing sequence for the given device. On grippers, this command will move the fingers to either inner or outer mechanical limit to reference its position, depending on the gripper's configuration. See the device manual for further details.

The function will block until the homing sequence is completed and returns the result of that operation.

Syntax

HOME(<port>)

Parameters

<port>	Port number	
	Proxy role STANDALONE:	0 to (PORTS-1)
	Proxy role MASTER:	0 to 31

Response Message

ACK on success or ERR <ERRORCODE> in case of an error.

Example

Home the gripper connected to port 0:

Command: HOME(0)

Response: ACK

3.4.4 Grip with the selected grip preset – GRIP

Perform a grip with the given grip recipe/preset. Depending on the optional parameter <do_block>, the command blocks, until either a workpiece was gripped or none was found, or it returns immediately after starting the gripping process (default behavior). In the latter case, the user is responsible to detect the end of the command by either using the WSTR command or periodically read the device state (device state polling) that will change to

DS_HOLDING	If a workpiece was found and the gripping force is applied
DS_NO_PART	If the fingers reached the "No Part Position" without gripping
DS_FAULT	In case of a fault during motion

A state conflict error is raised, if the device is already in one of the following states when calling this command:

DS_HOLDING, DS_NO_PART

Syntax

GRIP(<port>,<index>,[<do_block>])

Parameters

<port>	Port number	
	Proxy role STANDALONE:	0 to (PORTS-1)
	Proxy role MASTER:	0 to 31
<index>	Grip index. The number of available recipes/presets depends on the connected device.	
<do_block>	Blocking mode. Optional parameter.	
	1: Block, until either workpiece was gripped or not found.	
	0: Return immediately after motion was initiated (default).	

Response Message

ACK on success or ERR <ERRORCODE> in case of an error.

Example 1 (non-blocking)

Grip a workpiece with the gripper on port 2 that was freshly homed using recipe 3:

Command: GRIP(2,3) or GRIP(2,3,0)

Response: ACK

Option 1: State polling

Detect command completion by polling the device state. Be aware that the start state can be different to DS_IDLE and depends on the command issued before:

DEVSTATE[2]?
-> DEVSTATE[2]=2 (= DS_IDLE)

DEVSTATE[2]?
-> DEVSTATE[2]=2 (= DS_IDLE)

…

DEVSTATE[2]?

-> DEVSTATE[2]=5 (= DS_HOLDING)

Option 2: use WSTR command:

Detect command completion by waiting for a state transition:

WSTR[2]?

(the command now blocks, until a state change occurs and returns the new state)

->WSTR[2]=5 (= DS_HOLDING)

Example 2 (blocking)

Command: GRIP(2,3**,1**)

(gripping is performed, i.e. a part was gripped or the no part position was reached)

Response: ACK

3.4.5 Release with the selected grip preset – RELEASE

Perform release with the given grip index. Depending on the optional <do_block> parameter, this command will either return immediately after starting to move the fingers (default behavior) or will block, until a state transition occurs.

If <do_block> is set to 0, you can determine the end of the release process by periodically reading the device state (device state polling). After release is complete, the device state will change to

DS_RELEASED	If the fingers arrived at the ”Release Position”
DS_FAULT	In case of a fault during motion

Syntax

RELEASE(<port>,<index>,[<do_block>])

Parameters

<port>	Port number	
	Proxy role STANDALONE:	0 to (PORTS-1)
	Proxy role MASTER:	0 to 31
<index>	Grip index. The number of available recipes/presets depends on the connected device.	
<do_block>	Blocking mode. Optional parameter.	
	1: Block, until the release motion was finished.	
	0: Return immediately after motion was initiated (default).	

Response Message

ACK on success or ERR <ERRORCODE> in case of an error.

Example 1 (non-blocking mode)

Release the workpiece previously gripped the gripper on port 2 using recipe 3:

Command: RELEASE(2,3) or RELEASE(2,3,0)

Response: ACK

<u>Option 1: Device state polling</u>

Poll the device state to determine the end of the release process:

DEVSTATE[2]?
->DEVSTATE[2]=5 (= DS_HOLDING)

DEVSTATE[2]?
->DEVSTATE[2]=5 (= DS_HOLDING)

…

DEVSTATE[2]?
->DEVSTATE[2]=3 (= DS_RELEASED)

Option 2: use WSTR command:

Detect command completion by waiting for a state transition:

WSTR[2]?

(the command now blocks, until a state change occurs and returns the new state)

->WSTR[2]=3 (= DS_RELEASED)

Example 2 (blocking mode)

Release the workpiece previously gripped the gripper on port 2 using recipe 3 and block, until the workpiece is released (<do_block>=1):

Command: RELEASE(2,3**,1**)

(workpiece will be released now, Function waits, until the fingers reached the release position)

Response: ACK

3.4.6 Flexible gripping using motion parameters – FLEXGRIP, FLEXGRIPF

Perform a grip operation using the given parameters for target position, gripping force in Newton, gripping speed, and acceleration.

Depending on the optional parameter <do_block>, the command blocks, until either a workpiece was gripped or none was found, or it returns immediately after starting the gripping process (default behavior). In the latter case, the user is responsible to detect the end of the command by either using the WSTR command or periodically read the device state (device state polling) that will change to

DS_HOLDING	If a workpiece was found and the gripping force is applied
DS_NO_PART	If the fingers reached the "No Part Position" without gripping
DS_FAULT	In case of a fault during motion

A state conflict error is raised, if the device is already in one of the following states when calling this command:

DS_HOLDING, DS_NO_PART

This command is available as floating point (F-suffix) and scaled integer parameter version.

This command is not available for all devices.

Syntax

FLEXGRIP(<port>,<position>,<force>,<speed>,<acceleration>,[<do_block>])

FLEXGRIPF(<port>,<position>,<force>,<speed>,<acceleration>,[<do_block>])

Parameters

<port>	Port number Proxy role STANDALONE: 0 to (PORTS-1) Proxy role MASTER: 0 to 31
<position>	Target position representing the No Part Limit. Scaled integer command only: Value given in 1/1000 mm.
<force>	Gripping force. Scaled integer command only: Value given in 1/1000 N.
<speed>	Gripping speed. Set to 0 for using the auto-computed speed value based on the selected gripping force. Scaled integer command only: Value given in 1/1000 mm/s.
<acceleration>	Gripping acceleration.

Set to 0 for using the default acceleration value.
Scaled integer command only: Value given in 1/1000 mm/s².

<do_block> Blocking mode. Optional parameter.

1: Block, until the release motion was finished.

0: Return immediately after motion was initiated (default).

Response Message

ACK on success or ERR <ERRORCODE> in case of an error.

Example 1 (non-blocking)

Grip a workpiece with 60 N which is larger than 15 mm with the gripper on port 2. Use a speed of 45.5 mm/s, standard acceleration:

Command: FLEXGRIP(2,15000,60000,45500,0) or FLEXGRIPF(2,15,60,45.5,0)

Response: ACK

(perform state polling here or call WSTR[2]? to wait for state change)

Example 1 (blocking)

Same as above, but the command shall block until the workpiece is gripped/no workpiece was found, so set <do_block>=1:

Command: FLEXGRIP(2,15000,60000,45500,0**,1**) or FLEXGRIPF(2,15,60,45.5,0**,1**)

(gripping is performed now and function waits, until workpiece gripped or no part found)

Response: ACK

3.4.7 Flexible releasing using motion parameters – FLEXRELEASE, FLEXRELEASEF

Perform a release operation using parameters for target position, gripping speed, and acceleration. This command is available in two variants: with floating-point parameters (denoted by the "F"-suffix) and with scaled integer parameters.

The command can also be used to pre-position grippers that support FLEX functionality.

Depending on the optional <do_block> parameter, the command will either:

return immediately after initiating finger movement (<do_block> = 0), or

block until completion (<do_block> = 1), i.e., until the target position is reached or a state transition occurs.

If <do_block> is set to 0, the end of the motion must be detected externally — either by periodically polling the device state using the DEVSTATE command or by issuing a WSTR command. Upon successful release, the device state will change to:

DS_RELEASED – if the fingers have reached the defined release position.

DS_FAULT – if a fault occurred during motion.

Note:
If the device is already in state DS_RELEASED when the command is issued, a state transition may not occur. In this case, use the WAITVAL command to detect motion completion based on finger position feedback.

This command is not available for all devices.

Syntax

FLEXRELEASE(<port>,<position>,<speed>,<acceleration>)

FLEXRELEASEF(<port>,<position>,<speed>,<acceleration>)

Parameters

<port>	Port number
	Proxy role STANDALONE: 0 to (PORTS-1)
	Proxy role MASTER: 0 to 31
<position>	Target position representing the Release Limit. Scaled integer command only: Value given in 1/1000 mm.
<speed>	Release speed.
	Set to 0 for using the default release speed value. Scaled integer command only: Value given in 1/1000 mm/s.
<acceleration>	Release acceleration.

Set to 0 for using the default acceleration value.
Scaled integer command only: Value given in 1/1000 mm/s².

Response Message

ACK on success or ERR <ERRORCODE> in case of an error.

Example 1 (non-blocking)

Preposition the gripper at port 2 to 19.5 mm with default motion parameters, then grip at 5 mm with 100 N using a speed of 20 mm/s. After handling the workpiece, release to 19.5 mm again:

Commands: FLEXRELEASE(2,19500,0,0) or FLEXRELEASEF(2,19.5,0,0)

➔ Use state polling/value polling to determine motion end

FLEXGRIP(2,5000,100000,20000,0)

➔ Use state polling/WSTR to determine workpiece gripped

FLEXRELEASE(2,19500,0,0) or FLEXRELEASEF(2,19.5,0,0)

➔ Use state polling/WSTR to determine workpiece released

Example 2 (blocking)

Set <do_block>=1 to perform all commands in a blocking manner:

Commands: FLEXRELEASE(2,19500,0,0**,1**) or FLEXRELEASEF(2,19.5,0,0**,1**)

FLEXGRIP(2,5000,100000,20000,0**,1**)

…

FLEXRELEASE(2,19500,0,0**,1**) or FLEXRELEASEF(2,19.5,0,0**,1**)

3.4.8 Set LED visualization – LED

Some devices will provide the ability to visualize a certain state. This command allows to control this visualization.

This command is not available for all devices.

Syntax

LED(<port>,<index>)

Parameters

<port>	Port number	
	Proxy role STANDALONE:	0 to (PORTS-1)
	Proxy role MASTER:	0 to 31
<index>	Animation index	

Response Message

ACK on success or ERR <ERRORCODE> in case of an error.

Example

A WEISS ROBOTICS CRG 200-085 servo gripper is installed on port 1. Enable visualization 2 on this gripper:

Command: LED(1,2)

Response: ACK

3.4.9 Control the force retention feature – CLAMP

Enables or disables the mechanical force retention feature of the connected device.

This command is not available for all devices.

WEISS ROBOTICS grippers: The force retention feature can only be controlled manually if the device is disabled. While the device is enabled, force retention will be controlled automatically by the device.

Syntax

CLAMP(<port>, <enable>)

Parameters

<port>	Port number	
	Proxy role STANDALONE:	0 to (PORTS-1)
	Proxy role MASTER:	0 to 31
<enable>	Enable (1) or disable (0) force retention	

Response Message

ACK on success or ERR <ERRORCODE> in case of an error.

Example

A WEISS ROBOTICS CRG 200-085 gripper is installed on port 1. Enable the force retention feature:

Command: CLAMP(1,1)

Response: ACK

3.4.10 Wait for State Transition and Return – WSTR

This query can be used to detect the end of the previous state-manipulating command like GRIP, RELEASE, HOME, etc. The query waits, until a device state transition occurs and returns the new device state. If no state transition occurs, the query returns with a timeout error. When issuing the same command twice, WSTR immediately returns with the current device state. WSTR only cares about manipulating commands. Non-manipulating commands like state queries or LED control are ignored.

Syntax

WSTR[<port>]?

Parameters

<port> Port number

Proxy role STANDALONE: 0 to (PORTS-1)

Proxy role MASTER: 0 to 31

Response Message

WSTR[<port>]=<state>

<state> Device state, see table in chapter 5

ERR <ERRORCODE> in case of an error

Example

Wait for completion of the previous GRIP command with grip index 1 on port 0:

Commands: GRIP(0,1)

WSTR[0]?

[now GRIPLINK blocks until state transition, i.e. GRIP command was finished]

Response: WSTR[0]=5 (= DS_HOLDING)

3.4.11 Set value – SETVAL, SETVALF

This function can be used to set a device value. The behavior strongly depends on the connected device type and the value index.

The values selectable by the value index correspond to the values available in the VALUE query (cf. chapter 3.6.2), i.e. the VALUE query can be used to read the corresponding values before setting them with SETVAL.

This command is available as floating point (F-suffix) and scaled integer parameter version.

Caution Risk of injury: The SETVAL command may lead to sudden movement on actuators!

Syntax

SETVAL(<port>, <index>, <value>)

SETVALF(<port>,<index>,<value>)

Parameters

<port>	Port number	
	Proxy role STANDALONE:	0 to (PORTS-1)
	Proxy role MASTER:	0 to 31
<index>	Value index (0..n-1)	
	The number of provided values depends on the connected device.	
<value>	Value to be set Integer command only: The value must be scaled according the device requirements.	

Response Message

ACK on success or ERR <ERRORCODE> in case of an error.

Example

Change the setpoint 1 of the device at port 0 to a value of 42.3:

Command: SETVAL(0, 1, 42300) or SETVALF(0,1,42.3)

Response: ACK

3.4.12 Wait for indexed value to reach/cross threshold – WAITVAL, WAITVALF

This function can be used to wait until the desired value has reached or crosses a threshold window. The command returns a timeout error when the execution time exceeds the specified timeout.

This command is available as floating point (F-suffix) and scaled integer parameter version.

This command is not available for all devices.

Syntax

WAITVAL(<port>,<index>,<threshold>,<windowsize>,<timeout>)

WAITVALF(<port>,<index>,<threshold>,<windowsize>,<timeout>)

Parameters

<port>	Port number Proxy role STANDALONE: 0 to (PORTS-1) Proxy role MASTER: 0 to 31
<index>	Value index (0..n-1). The number of provided values depends on the connected device.
<threshold>	Target value threshold. For the scaled integer version of this command, this value has to be scaled according to the device settings.
<windowsize>	Size of the window around the threshold value to check for. For the scaled integer version of this command, this value has to be scaled according to the device settings.
<timeout>	Timeout in milliseconds. Must be set to a positive integer or 0.

Response Message

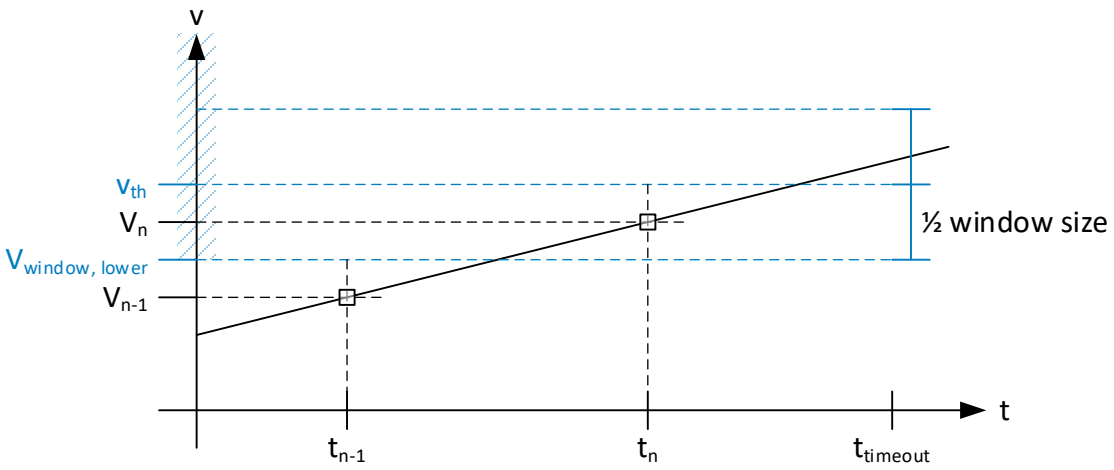
ACK on success or ERR <ERRORCODE> in case of an error.

Explanation

After calling WAITVAL, the selected device value will be polled periodically (corresponds to the values v_0, … v_{n-1}, v_n).

Case 1:

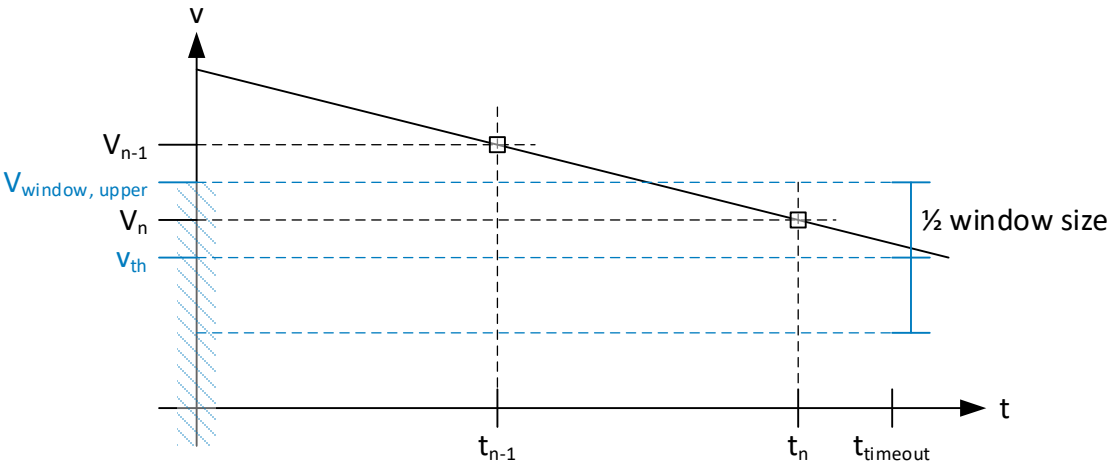
The polled values approach the window defined by threshold value v_{th} and window size at the lower boundary.



If value v_n is larger than the threshold value v_{th} minus half the window size and the timeout duration has not been reached, yet, WAITVAL will return ACK.

Case 2:

The polled values approach the window defined by threshold value v_{th} and window size at the upper boundary.



If value v_n is less than the threshold value v_{th} plus half the window size and the timeout duration has not been reached, yet, WAITVAL will return ACK.

Case 3:

The polled values do not enter the window within the given timeout duration. Then, WAITVAL will return ERR 05 (Timeout).

Example

Set value with index 0 of the device connected to port 0 to 300.

Then wait for value 0 to either be greater or less than 300 ± 50. Wait at most 10 seconds (10,000 milliseconds).

Commands: SETVAL(0,0,300000) or SETVALF(0,0,300)

WAITVAL(0,0,300000,50000,10000) or WAITVALF(0,0,300,50,10000)

For non-steady device values, the sampling time has to be considered in order to detect the value change reliably.
This has to be tested in the real application!

Application example 1

Task

A WPG 300-120 is used for a pick and place application with rings that have to be gripped from the outside and from the inside.

To switch from outside gripping to inside gripping, the gripper should be pre-positioned first.

Solution

1) When the gripper released the ring from the outer diameter d_{outer} and the robot moved to a safe position, the gripper is pre-positioned to a position slightly smaller than the inner diameter d_{inner}.

   SETVAL is used here to perform this operation.

   The set-value v_{set} is calculated as $v_{set} = (d_{inner} - d_{tolerance}) \cdot 1000$

2) Now, the robot shall wait until the target position is reached, to not collide with the workpiece WAITVAL is used here to perform this operation.

   The threshold value v_{th} is chosen to be the same as v_{th}. An appropriate window size of $\frac{1}{2} \cdot d_{tolerance} \cdot 1000$ should be used.

3) WAITVAL will block, until the position is reached or a timeout occurs

4) When WAITVAL returned ACK, the robot can safely move to the pick-position.

Application example 2

Task:

A conveyor belt transports boxes with variable heights (50 cm ≤ h ≤ 90 cm).

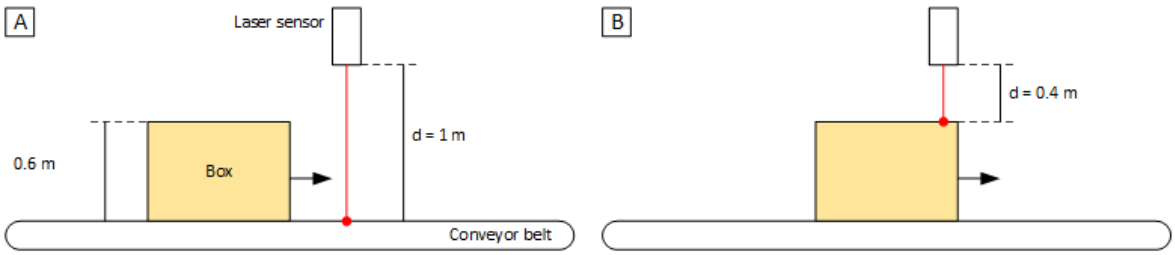
1) The robot program needs to detect, when a box enters and leaves a certain point at the belt.
2) The height of the box needs to be determined, too.

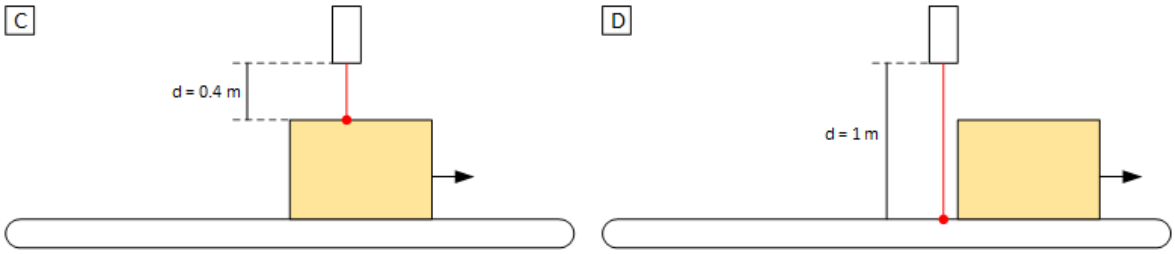
A laser distance sensor is mounted perpendicularly 1 m over the belt at the detection position and measures the distance to the belt surface. It is connected to the GRIPLINK Controller.

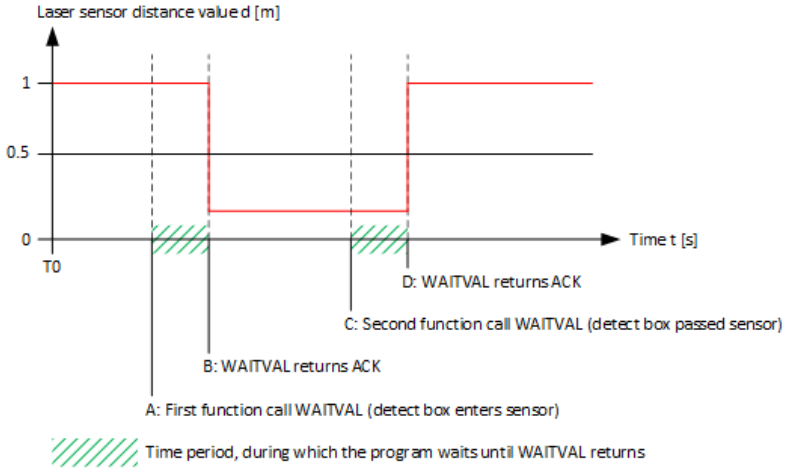
Solution:

With the first call of WAITVAL (image A), the program waits until the sensor value crosses the value of 0.5 m (box enters sensor spot, image B). Then, the application can process the box (time between B and C). At this point, the actual box size can be determined using the VALUE command.

With the second call of WAITVAL (image C), the program waits until the sensor value crosses the value 0.5 m again, now in opposite direction (box has left the sensor spot, image D).


A
Laser sensor
d = 1 m
0.6 m
Box
Conveyor belt
B
d = 0.4 m


C
d = 0.4 m
D
d = 1 m


Laser sensor distance value d [m]
1
0.5
0
T0
Time t [s]
D: WAITVAL returns ACK
C: Second function call WAITVAL (detect box passed sensor)
B: WAITVAL returns ACK
A: First function call WAITVAL (detect box enters sensor)
Time period, during which the program waits until WAITVAL returns

3.5 Multi-Device Commands

Multi-device commands allow to run the same command for a selected list of devices.

Note: Multi-Device Commands are available for backward compatibility with older robot plugins. To handle workpieces in more complex scenarios using multiple grippers simultaneously in new projects, we recommend using non-blocking calls to GRIP/F or RELEASE/F in combination with WSTR and DEVSTATE status queries.

3.5.1 Grip with selected devices – MGRIP

Perform a grip with the selected grippers and with the indexed grip. The function returns immediately after starting the gripping process. Use device state polling to determine the end of the gripping process.

This command is deprecated. Avoid to use it for new projects.

Syntax

MGRIP(<index>,<sel0>, …,<sel*n*>)

Parameters

<index>	Grip index.
<sel*n*>	Select (1) or deselect (0) device on port n. Port number n will be 0 to (PORTS-1) in Stand-Alone mode and 0 to 31 in Master mode. Trailing 0 parameters can be omitted.

Response Message

ACK on success or ERR <ERRORCODE> in case of an error.

Example 1

Grip with grippers on port 0 and 1 using grip index 3:

Command: MGRIP(3,1,1,0,0) or MGRIP(3,1,1)

Response: ACK

Example 2

Grip with grippers on port 0, 1 and 5, 6 on a virtual GRIPLINK controller network of two GRIPLINK-ET4 Controllers using grip index 3:

Command: MGRIP(3,1,1,0,0,0,1,1)

Response: ACK

3.5.2 Release with selected devices – MRELEASE

Perform release with the given grip preset on the selected devices. The function returns immediately after starting the gripping process. Use device state polling to determine the end of the gripping process.

⚠ This command is deprecated. Avoid to use it for new projects.

Syntax

MRELEASE(<index>,<sel0>,…,<sel*n*>)

Parameters

<index>	Grip index.
<sel*n*>	Select (1) or deselect (0) device on port n. Port number n will be 0 to (PORTS-1) in Stand-Alone mode and 0 to 31 in Master mode. Trailing 0 parameters can be omitted.

Response Message

ACK on success or ERR <ERRORCODE> in case of an error.

Example 1

Release a previously gripped workpiece with grippers on port 0 and 1 using grip index 3:

Command: MRELEASE(3,1,1,0,0) or MRELEASE(3,1,1)

Response: ACK

Example 2

Release a previously gripped workpiece with grippers on port 0, 1 and 5, 6 on a virtual GRIPLINK controller network of two GRIPLINK-ET4 Controllers using grip index 3:

Command: MRELEASE(3,1,1,0,0,0,1,1)

Response: ACK

3.5.3 Wait for state transition on multiple devices – MWAITFOR

Whenever an action like GRIP or RELEASE is performed, the device state of the respective devices will be updated upon completion. The MWAITFOR command allows to wait for this state transition on multiple devices. It will return successfully after all selected devices have changed their state, regardless of the new state. If a state transition does not occur on a channel, the function returns with a timeout error.

☞ To determine the current state of the devices of interest, use command DEVSTATE.

⚠ This command is deprecated. Avoid to use it for new projects.

Syntax

MWAITFOR(<sel0>,…,<sel*n*>)

Parameters

<sel*n*>	Select (1) or deselect (0) device on port n. Port number n will be 0 to (PORTS-1) in Stand-Alone mode and 0 to 31 in Master mode. Trailing 0 parameters can be omitted.

Response Message

ACK on success or ERR <ERRORCODE> in case of an error.

Example 1

Release a previously gripped workpiece with grippers on port 0 and 1 using grip index 3 and wait for completion:

Command: MRELEASE(3,1,1,0,0)

Response: ACK

Command: MWAITFOR(1,1,0,0)

Response: ACK

Example 2

Grip a workpiece with grippers on port 0, 1 and 5, 6 on a virtual GRIPLINK controller network of two GRIPLINK-ET4 Controllers using grip index 3:

Command: MGRIP(3,1,1,0,0,0,1,1)

Response: ACK

Command: MWAITFOR(1,1,0,0,0,1,1)

Response: ACK

3.6 Device status and diagnosis

3.6.1 Get device state – DEVSTATE

Each device has a certain status. This command is used to retrieve the device state of the selected device. Possible device state values are given in chapter 5. Grippers are designed in a way that with every active command (i.e. GRIP, RELEASE, HOME, DISABLE/ENABLE) always a state change occurs on completion. It is a common practice to poll the device state and continue, as soon as this state changes.

If no device is installed on the selected port, the function returns 0 (DS_INVALID).

Syntax

DEVSTATE[<port>]?

Parameters

<port> Port number

Proxy role STANDALONE: 0 to (PORTS-1)

Proxy role MASTER: 0 to 31

Response Message

DEVSTATE[<port>]=<state>

<state> Device state, see table in chapter 5

Example

Retrieve the device state of the connected gripper on port 0:

Command: DEVSTATE[0]?

Response: DEVSTATE[0]=3 -> Device state is DS_RELEASED

3.6.2 Get value – VALUE, VALUEF

Read a sensor value from the given device. Devices may support one or more values that can be read. See the device specification for details on provided sensor values.

This command is available as floating point (F-suffix) and scaled integer parameter version.

For gripper devices, the first value (index 0) returns the finger position as integer number in Micrometers (µm) (VALUE) resp. in as floating point number in Millimeters (mm) (VALUEF).

Syntax

VALUE[<port>][<index>]?

VALUEF[<port>][<index>]?

Parameters

<port>	Port number	
	Proxy role STANDALONE:	0 to (PORTS-1)
	Proxy role MASTER:	0 to 31
<index>	Value index (0..n-1). The number of provided values depends on the connected device.	

Response Message

VALUE[<port>][<index>]=<val>

or VALUEF[…

<val>	Sensor data as scaled integer value (command VALUE) Sensor data as floating point value scaled to the device unit (command VALUEF)

If the sensor value is out of range, depending on the direction of overflow, the VALUE function returns 2.147.483.647 (INT32 MAX) or -2.147.483.648 (INT32 MIN) and VALUEF returns “+INF” or “-INF”.

Example

Retrieve the finger position of the connected gripper on port 0:

Command: VALUE[0][0]?

Response: VALUE[0][0]=42456 -> Finger position is 42.456 mm.

Command: VALUEF[0][0]?

Response: VALUE[0][0]=42.456 -> Finger position is 42.456 mm.

3.7 Device Configuration

3.7.1 Grip configuration – GRIPCFG, GRIPCFGF

Read or modify the selected grip recipe/preset. Each recipe consists of a tag string and 8 parameters that have device-specific meaning. The tag string can be used to give the recipe a meaningful name for later identification.

The parameters may have specific limits depending on the connected device. See the device manual for details.

Syntax

Assign:	GRIPCFG[<port>][<index>]=[<tag>,<param0>,<param1>,…,<param7>]
	GRIPCFGF[<port>][<index>]=[<tag>,<param0>,<param1>,…,<param7>]
Query:	GRIPCFG[<port>][<index>]?
	GRIPCFGF[<port>][<index>]?

Parameters

<port>	Port number
	Proxy role STANDALONE: 0 to (PORTS-1)
	Proxy role MASTER: 0 to 31
<tag>	String to name the specific recipe (max. 32 characters)
<param0..7>	Device-specific integer (GRIPCFG) or floating-point (GRIPCFGF) parameter values

*For **WEISS ROBOTICS gripper modules**, the parameters are used as follows:*

<param0>	No-Part limit in Millimeters (integer command: multiplied by 1000, range is device-specific)
<param1>	Release limit in Millimeters (integer command: multiplied by 1000, range is device-specific)
<param2>	Force factor in percent (integer command: multiplied by 1000) (0 to 100 / 0 to 100000)
<param3..7>	not used (set to 0)

*For **WEISS ROBOTICS WPG** series, the parameters 3 to 7 can be used as follows:*

<param3>	Grip speed in Millimeters per Second (integer command: multiplied by 1000, range is device-specific)

<param4> Grip acceleration in Millimeters per Square Second (integer command: multiplied by 1000, range is device-specific)

<param5> Release speed in Millimeters per Second (integer command: multiplied by 1000, range is device-specific)

<param6> Release acceleration in Millimeters per Square Second (integer command: multiplied by 1000, range is device-specific)

<param7> not used (set to 0)

Response Message

GRIPCFG[<port>][<index>]=[<tag>,<param0>,<param1>,…,<param7>]

or GRIPCFGF[…

Example

Set the recipe 0 named “Tube” for the WEISS ROBOTICS servo gripper on port 1 with a No-Part limit of 3.5 mm, a release limit of 10.8 mm and a gripping force of 50%:

Command: GRIPCFG[1][0]=[”tube”,3500,10800,50000,0,0,0,0,0]

or GRIPCFGF[1][0]=[“tube”,3.5,10.8,50,0,0,0,0,0]

Response: GRIPCFG[1][0]=[”tube”,3500,10800,50000,0,0,0,0,0]

or GRIPCFGF[1][0]=[“tube”,3.5,10.8,50,0,0,0,0,0]

4 Status and error codes

After executing a command, the GRIPLINK Controller returns a status code describing the result of the operation.

Status code	Identifier	Description
0	E_SUCCESS	No error. Command successfully executed.
1	E_OVERRUN	Data overrun
2	E_RANGE_ERROR	Value out of range
3	E_NOT_AVAILABLE	Function or data not available
4	E_NOT_INITIALIZED	Device not initialized
5	E_TIMEOUT	Timeout
6	E_INSUFFICIENT_RESOURCES	Not enough memory available
7	E_CHECKSUM_ERROR	Checksum error
8	E_ACCESS_DENIED	Access denied
9	E_INVALID_HANDLE	Invalid handle
10	E_INVALID_PARAMETER	Invalid parameter
11	E_INDEX_OUT_OF_BOUNDS	Index out of bounds
12	E_IO_ERROR	Generic I/O error
13	E_READ_ERROR	Read error
14	E_WRITE_ERROR	Write error
15	E_NOT_FOUND	Resource not found
16	E_NOT_OPEN	File or device not open
17	E_EXISTS	Resource already exists
18	E_NO_COMM	Connection error
19	E_STATE_CONFLICT	Invalid state
20	E_NOT_SUPPORTED	Command or function not supported
21	E_INCONSISTENT_DATA	Data inconsistent

22	E_CMD_SYNTAX	Syntax error
23	E_CMD_UNKNOWN	Unknown command
24	E_CMD_ABORTED	Command aborted
25	E_CMD_FAILED	Command failed
26	E_AXIS_BLOCKED	Axis is blocked
27	E_PENDING	Pending action / Not yet finished

5 Device status codes

The following table lists the possible return values of the DEVSTATE command. Note that some return values are reserved to a certain group of devices (e.g., a DS_RELEASED state will usually be returned by a gripper but not by a sensor).

Code	Identifier	Scope	Description
0	DS_NOT_CONNECTED	UNI	No device connected
1	DS_NOT_INITIALIZED	UNI	Device is not initialized. This state is e.g., used by grippers that need to perform a reference drive at startup.
2	DS_DISABLED	UNI	Idle state. The device is operable and waiting for a command.
3	DS_RELEASED	GRIPPER	Part released. A RELEASE command was issued and the fingers reached the release position.
4	DS_NO_PART	GRIPPER	No part found. A GRIP command was issued, but the gripper didn't detect a part during grasping.
5	DS_HOLDING	GRIPPER	Holding a part. A GRIP command was issued and the gripper is now holding the part.
6	DS_ENABLED	SENSOR	Enabled state. The device is in operating state and performs its function as intended.
7	DS_FAULT	UNI	Fault state. The device is in fault state. See the device manual for possible recovery strategy.

6 Supported commands by device class

Command	Gripper	Sensor
CLAMP	Optional	-
DEVASSERT	Yes	Yes
DEVNAME	Yes	Yes
DEVPID	Yes	Yes
DEVSN	Yes	Yes
DEVSTATE	Yes	Yes
DEVTAG	Optional	Optional
DEVVENDOR	Yes	Yes
DEVVER	Yes	Yes
DEVVID	Yes	Yes
DISABLE	Yes	Yes
ENABLE	Yes	Yes
FLEXGRIP, FLEXGRIPF	Optional	-
FLEXRELEASE, FLEXRELEASEF	Optional	-
GRIP	Yes	-
GRIPCFG, GRIPCFGF	Optional	-
HOME	Optional	-
LED	Optional	-
RELEASE	Yes	-
SETVAL, SETVALF	Optional	Optional
VALUE, VALUEF	Yes	Yes
WAITVAL, WAITVALF	Yes	Yes
WSTR	Yes	Yes

7 List of Product and Vendor IDs

The following table lists selected WEISS ROBOTICS products with their associated Vendor and Product IDs.

Product	Primary control interface	Vendor ID	Product ID
CLG 30-006	IO-Link	815	60
CRG 200-085	IO-Link	815	50
CRG 30-050	IO-Link	815	40
IEG 55-020	IO-Link	815	20
IEG 76-030	IO-Link	815	20
IEG PLUS 260-030	IO-Link	815	24
IEG PLUS 260-080	IO-Link	815	25
IEG PLUS 40-020	IO-Link	815	22
IEG PLUS 40-050	IO-Link	815	23
INTRAPAL 1200-280	Ethernet	815	100
RPG 120-020	IO-Link	815	10
RPG 75-012	IO-Link	815	10
STG 200-030	IO-Link	815	52
STG 200-085	IO-Link	815	51
STG 40-024	IO-Link	815	53
WPG 100-090	Ethernet	815	6050
WPG 300-120	Ethernet	815	6060
ZPG 75-012	IO-Link	815	30

8 Documentation of changes

8.1 Protocol Versions

The following table presents the officially published protocol versions and shows their assignment to supported devices and firmware versions. It thus forms the basis for evaluating compatibility between GRIPLINK-enabled devices, firmware, and host applications.

Protocol		Firmware		
Version	**Publication date**	**GRIPLINK-ET4**	**INTRAPAL Series**	**WPG Series**
3	July 2025	5.1.0, 5.2.0	5.1.0, 5.2.0	2.3.0
2	April 2025	-	-	2.2.0
1	December 2022	4.0.0, 4.0.1, 4.1.0, 4.1.1, 5.0.0, 5.0.1, 5.0.2	-	2.0.0, 2.1.1, 2.1.2
0	May 2022	3.1.0, 3.2.0, 3.3.0, 3.3.1	-	1.2.0, 1.2.1

8.2 Protocol Changelog

During the evolution of the GRIPLINK protocol, the following main changes were made. Some of them marked as (BREAKING) contain changes that will introduce incompatibilities with already existing host implementations.

Protocol V1:

- Support for GRIPLINK networks ("proxy" extension)
- (BREAKING) MDEVSTATE query removed
- New commands added: SETVAL, WSTR, MWAITFOR
- New queries added: PROTOCOL, PROTASSERT, and WAITVAL

Protocol V2:

- (BREAKING) WAITVAL changed from query to blocking command
- New command variants with floating point parameters added: FLEXGRIPF, FLEXRELEASEF, VALUEF, SETVALF, WAITVALF

Protocol V3:

- Introduced optional blocking flag for commands GRIP, RELEASE, FLEXGRIP/F, FLEXRELEASE/F
- Multi-commands are marked as deprecated: MGRIP, MRELEASE, MWAITFOR
- (BREAKING) Changed parameters for WAITVAL

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