Zimmer Group Premium URCap



Version 2.0

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1 Supporting documents

The following documents are available for download on our website <u>www.zimmer-group.de</u>. Only the documents currently available on the website are valid.

- Operating instructions for the different devices
- Catalog
- Drawings
- Performance Data
- Information on accessory components

2 Proper use



The Zimmer Group URCaps package is proper used for controlling Zimmer Group grippers directly with the Universal Robot Polyscope. Controlling means the manual use and the embedded use of the gripper in the normal robot sequence.

To ensure an easy operation for the IO-Link-Grippers an Easy-To-Use-Package has been defined, as well as the according accessories (part no ZUB068713).

3 Personnel qualification

Installation, commissioning and maintenance may be undertaken by trained specialists only. They must have read and understood the installation and operating instructions in full.

For understanding this manual, it is important to know and understand the Universal Robot manuals and the manual of the used Zimmer grippers.



4 Description

With the Zimmer Group Premium URCap, the customer can use up to 4 IO-Link grippers with one robot at the same time. In principal most of the grippers out of the Zimmer Group product range can be driven via the Premium URCap Software. This includes all of the IO-Link grippers.

The Zimmer Easy-To-Use-Package (part no ZUB068713) is the perfect link to connect a UR-robot with the grippers of the Zimmer Group portfolio. With this package, the user can connect up to 4 IO-Link grippers to the robot. As shown in the Fig. 1, the grippers will connect to the IO-Link Master and this Master will connect via Modbus to the robot controller.

After installing the enclosed Zimmer Premium URCap software, the user can control each gripper directly from the UR-Polyscope in manual mode and in the robot sequence mode.

The following gripper families are useable with the Zimmer Premium URCap and the Easy-To-Use-Package: GEH6000IL / GED6000IL

GEP5000IL / GED5000IL GPP5000IL / GPD5000IL GEP2000IL HRC-01 HRC-03 HRC-04 / HRC-05

For more and detailed information regarding the different grippers, please look in the gripper operating manual.



Fig. 1: An example for the wiring between robot and the Zimmer Easy-To-Use-Package



5 Installation

5.1 Safety instructions

• NOTICE:

Switch off the energy supply for the electronics before any assembly, installation or maintenance work.

► Electronics may get damaged.

• CAUTION:

Switch off the energy supply for the electronics before any assembly, installation or maintenance work.

► Injuries are possible.

• WARNING:

Risk of injury in case of unexpected movement of the machine or system into which the gripper is to be installed.

- ► Switch off the power supply to the machine before all work.
- ► Secure the machine against being switched on unintentionally.
- Check the machine for any residual energy.

5.2 Installing the Easy-To-Use-Package

5.2.1 Installing the Hardware



Fig. 2: Parts of the Easy-To-Use-Package



The Easy-To-Use-Package (part no ZUB068713) includes the following parts (Fig. 2):

- 1. Cable between robot and IO-Link Master
- 2. IO-Link Master with 4 IO-Link ports
- 3. Power-supply cable for the IO-Link Master

Additional, the following parts can be ordered according to the gripper-type and the amount of grippers:

- 4. Power supply unit
- 5. Cable (Y-adapter to power unit)
- 6. Connection cable M12 5pol 5m
- 7. Y-adapter cable (Labeled with "Power" and "IO-Link")

Please refer the tables below for further information.

Article	Description	Part No.
IO-Link Master	Compact Multiprotocol I/O Module	
Connection cable M8 4pol 5m	Cable for power supply of the IO-Link Master	
Connection cable UR Modbus to Master	Communication cable robot Modbus to IO-Link Master RJ45	ZUB068713
Zimmer Premium URCap	HMI for UR Polyscope	

Tab. 1: Zimmer Easy-To-Use-Package for UR*

Article	Description	Part-No	GEH6000IL GEP5000IL GED5000IL	HRC-01	GEP2000IL HRC-03	GPP5000IL GPD5000IL HRC-04
Connection cable M8 3pol 5m	STO-cable	KAG500	-	Х	-	-
Connection cable M12 5pol 5m	Connection Y-adapter to Zimmer gripper	KAG500IL	х	х	х	х
Y-adapter cable	Cable to split power and signal	B12-Y-5IL	Х	Х	х	Х
Cable (Y-adapter to power unit)	Connection cable for power supply unit	KAG500-02	х	Х	х	Х
Power supply unit	Power supply unit 24/ 10A	CELE00611	х	Х	х	Х
Energy chain UR3	Energy chain for the robot type UR3	ZUB000009	0	0	0	0
Energy chain UR5	Energy chain for the robot type UR5	ZUB000010	0	0	0	0
Energy chain UR10	Energy chain for the robot type UR10	ZUB000011	0	0	0	0

Tab. 2: Accessory for Easy-To-Use-Package

- not needed for this gripper type

- X needed for this gripper type
- O optional needed for this gripper type

• NOTICE:

The power supply unit supports 10A (15A peak). Depending on the gripper type and the application, 15A are not enough for supporting four grippers, which moving at the same time.



Install the hardware, as shown in the following figure Fig. 3:



Fig. 3: Wiring between robot and the Zimmer Easy-To-Use-Package

5.2.2 Optional energy chain accessories

It is possible to use optional the accessories below to fit the cable along the robot arm.





5.2.3 Mechanical dimensions for additional components



Fig. 5: Mechanical dimensons for additional components



5.3 Configuration of the IO-Link Master

5.3.1 Connecting the Hardware

It is necessary to make some settings in the IO-Link Master, therefore you have to connect your PC or Laptop with the IO-Link Master.



• NOTICE:

In the delivery status or after a factory reset, access the device via web server. The web server can be opened using the IP address 192.168.1.254. (Requires the PC to be on the same subnet, e.g. set the PCs IP address to 192.168.1.10 and the Subnet Mask to 255.255.255.0).

Fig. 6: Connection for configuration of the IO-Link Master

Please follow the steps below to install the IO-Link Master:

- Connect an Ethernet cable from a PC to the port ETH-1 on the IO-Link Master TBEN-S2-4IOL (Fig. 6).
- 2. Connect the Power cable on Port X1 on the IO-Link Master (Fig. 6).
- 3. Test the connection between IO-Link Master and PC (Ch. 5.3.2)
- 4. Open the IO-Link Master configuration page (Ch. 5.3.3)
- 5. Disable the watchdog timer (*Ch.* 5.3.4)
- 6. Set the correct IP address in the IO-Link Master (Ch. 5.3.5)
- 7. Test the connection with new settings.



5.3.2 Test the connection between IO-Link Master and PC

To check the connection on your Windows PC open the **Command Prompt** and execute the **ping** command:

1. Hit the "Windows" +"r"-button.



2. In the "Run" window, type "cmd" into the Open box, and then hit Enter or click OK.

📨 Run	×
	Type the name of a program, folder, document, or Internet resource, and Windows will open it for you.
<u>O</u> pen:	cmd v
	OK Cancel Browse

3. Write the command "ping 192.168.1.254" at the Command Prompt and press Enter (the IO-Link Master has as default the following IP-address: 192.168.1.254)

C:\>ping	192.168.1.254_

4. The response shows the IP address you are pinging and the size of the packets being sent on the first line. The next four lines show the replies from each individual packet, including the time (in milliseconds) it took for the response and the time-to-live (TTL) of the packet, which is the amount of time that must pass before the packet is discarded.

When the ping does not get a response from the pinging IP, an error report will be shown. In this case, please check if the IO-Link Master is powered on and connected to the PC correctly (Fig. 6).



5.3.3 Open the IO-Link Master configuration page

Write the IP-address in your browser:

📵 Mo:	zilla Firefox-Startseite	×	+	
(+) >	i http://192.168.1.2	54		

The page below should now open

T Station Information	× +					-		×
← → ♂ ☆	Q 192.168.1.254/info.h	tml			$\underline{+}$	lii\ 🗊	۲	Ξ
TURCK.COM For	comments or questions, plea	ase email TURCK Support		TU	R	C	K	
TBEN-S2-4I	OL							
STATION	>	Station Information						
	> [1]	Station Information						
I IO-LINK POR	RT 2 >	Туре	TBEN-S2-4IOL					
I IO-LINK POR	2Т 3 >	Identification Number	6814024					
I IO-LINK POR	RT 4 >	Firmware Revision	V3.3.1.0					
IO-LINK EVEN	TS >	Bootloader Revision	V9.0.2.0					
		EtherNet/IP™ Revision	V2.7.38.0					
		PROFINET Revision	V1.6.6.0					
		Modbus TCP Revision	V2.4.0.0					
		IO Framework Revision	V1.0.24.0					
		IO-Link Master Revision	V2.13.6.0					
		Digital IO Revision	V1.0.23.0					
		Build Number	334					
		Addressing Mode	PGM DHCP					
		PROFINET Station Name						
		Network Settings						
		Ethernet Port 1 setup	100BT-FD					
		Ethernet Port 2 setup	100BT-FD					,

Fig. 7: Start page of the IO-Link Master

Enter the admin password in the top right of the browser. The default password is 'password'.



5.3.4 Disable the watchdog timer

Please make sure the watchdog is turned off, by setting the value to 0. This setting is found under 'Station Configuration'.

STATION	Station Configuration		
Station Information	oution ooninguruton		
I Station Diagnostics	Protocols		
Event Log Ethernet Statistics	Deactivate EtherNet/IP™		
EtherNet/IP™ Memory Map	Deactivate Modbus TCP		
Modbus TCP Memory Map	Deactivate PROFINET		
Links Station Configuration Network Configuration	Deactivate Web Server		
Change Admin Password	EtherNet/IP™ Configura	ation	
BASIC	Activate GW Control Word		
IO-LINK PORT 1	Activate GW Status Word		
I IO-LINK PORT 2	Activate Quick Connect		
I IO-LINK PORT 3	PROFINET Configuration	on	
IO-LINK EVEN IS	PROFINET Station Name		
	Modbus Configuration		To be change
	NOTE: To disable the watchdog timer	, enter 0. Also, the value is in milisecond (ms).	
	Watchdog Timer	0	
	NOTE: To disable connection timeout	, enter 0. Also, the value is in second.	
	Connection Timeout	0	
	Reboo	Submit Reset	

Fig. 8: Station configuration page of the IO-Link Master

5.3.5 Set the working IP address in the IO-Link Master

• NOTICE:

Please contact your system administrator prior to change any network configurations. In the following is a configuration for a standalone robot described.

Under 'Network Configuration' (Fig. 9) change the IP address of the TURCK S2-4IOL to a private address range of the robot.

STATION >	Network Configuration		
Station Information	Network Settings		
Event Log Ethernet Statistics	Ethernet Port 1 setup	100BT-FD ~	
EtherNet/IP™ Memory Map	Ethernet Port 2 setup	100BT-FD ~	
Modbus TCP Memory Map	IP Address	10.0.0.5	Taha
Links Station Configuration	Netmask	255.255.255.0	90.01
Network Configuration	Default Gateway	0.0.0.0	
Change Admin Password	SNMP Public Community	public	
BASIC	SNMP Private Community	private	
IO-LINK PORT 1	MAC Address	00:07:46:85:0b:23	
IO-LINK PORT 2	LLDP MAC Address 1	00:07:46:85:0b:24	
I IO-LINK PORT 3 >	LLDP MAC Address 2	00:07:46:85:0b:25	
IO-LINK EVENTS			

Fig. 9: Network configuration page of the IO-Link Master



We recommend using the IP 10.0.0.5 and the netmask 255.255.0.0, because these settings are the default values in our HMI.

After submitting and rebooting the TURCK TBEN-S2-4IOL, the IP address of the PC needs to be changed to IP 10.0.0.15 and Subnet 255.255.0.0, in order to communicate with the TURCK S2-4IOL in the future.

• NOTICE:

Please make sure, that the UR-robot has an IP-Address e.g. 10.0.0.15 that the robot and the IO-Link-Master are in the same Network.

Now repeat test connection (*Ch. 5.3.2*), but now with the IP address 10.0.0.5 and check, if you have connection between your laptop and the IO-Link Master. If you are not able to connect now to the Master, please repeat chapter 5.3 to find the error.

5.4 Network setup on the robot

5.4.1 Network settings

Once the IO-Link Master has been successfully configured (*Ch. 5.3*), you will need to setup the network connection on the robot.

1. On the teach pendant, tap the **Hamburger Menu** in the Header ...



2. ... and select Settings.



- 3. In the menu on the left, tap System and select Network (Fig. 10).
- 4. Select "Static Address" for the network method.
- 5. Set the IP address and the subnet mask for the robot that the IO-Link Master and the robot are in the same Network.
- 6. Click "Apply" button to apply the new settings.



		Settings		
> Preferences	Naturali			
> Password		work mathed		
System		ork method		
System Backup URCaps Robot Registrati	2. Static Ac Disabled	ldress network d to network! led settinas:		_
Remote Control Network Update	>	IP address Subnet mask: Default gateway:	10.0.0.15 255.255.0.0 0.0.0.0	To be se
	3.	Preferred DNS server: Alternative DNS server:	0.0.0.0 0.0.0.0	
Exit			4. Apply	5

Fig. 10: Network settings on Polyscope

5.4.2 Test Modbus connection

- 1. Please check if the IO-Link Master and the grippers are connected and powered on. The status LED on the IO-Link Master should be green for: PWR, BUS, ETH1 and IOL (of the connected ports).
- 2. Go to the Installation tab and select Fieldbus/MODBUS in the menu on the left.
- 3. Click "Add MODBUS Unit" button.

	U		Move	$\mathbf{R}_{\mathbf{N}}$	Log		PROGRAM INSTALLATION	<unnamed> default*</unnamed>	New	Open	Save		R+	с с с с	Ξ
	>	General	MODBU	S client	t IO Setup										
	>	Safety													
	>	Features				<u> </u>		Add MODE	BUS Unit	t		/			
	\sim	r Fieldbus													
<		MODBUS	\supset	•											
		EtherNet/IP													
		PROFINET													
		117.0													

4. A new Modbus communication unit will be created.



ļ	kun Program Installatio		PROGRAN INSTALLATION	∣ <unnamed> ↓ default*</unnamed>	New Ope	n Save	ارب	
>	General	MODBUS client IO Setup						
> >	Safety Features			Add MODBU	S Unit			
\sim	r Fieldbus							
	MODBUS	IP address	0.0.0.0				D	elete Unit
	EtherNet/IP							
	PROFINET	Туре	Address	Name		Value		
>	URCaps	Please select	▼ 0	MODBUS_1				Delete
Γ				Add New S	ignal			

- 5. Please set the IP address of the IO-Link Master (Fig. *11*) and check the "Show advanced options" on the buttom of the page. Setup the Modbus Signal: select "Register Input" for Type and type 2 for Address.
- 6. If the Modbus communication is running the value of the Signal should not be zero and the Connection status of the unit should be "connected" (Fig. *11*).
- 7. After the Modbus communication was successfully tested, please delete the fort he test created unit with the "Delete Unit" button.

Run Program Installation	PROGRAM <unnamed></unnamed>	
🔪 General	MODBUS client IO Setup	
> Safety		
> Features	Add MODBUS Unit	
✔ Fieldbus		
MODBUS	IP address 10.0.0.5 Sequential mode	Delete Unit
EtherNet/IP	Reconnect count: 1, Modbus packet errors: 0, Connection status: connected	
PROFINET	Type Address Name Value	
💙 URCaps	Register Input 2 MODBUS_1 34880	Delete
	Frequency [Hz] 10 V MODBUS Slave Address 255	
	Response time [ms]: 2. Timeouts: 0. Requests failed: 0. Actual freq.: 10.0Hz	
	Add New Signal	
	Show advanced options	Refresh List
Power off	Speed100% 🕞 🕅 🔲	Simulation

Fig. 11: Polyscope MODBUS client IO Setup page

• NOTICE:

To reduce communication traffic and to increase the throughput rate on the Modbus we highly recommend to delete all unnecessary MODBUS Units and Signals from "MODBUS client IO Setup" page (Fig. *11*) on the robot.



5.5 URCap installation

The UR-Caps Software and the example project is stored on the Zimmer-USB-Stick. Please follow the steps below to install the Zimmer Premium URCap software.

1. Start up the robot and when robot is ready, plug in the Zimmer-USB-Stick.



Run	Program Inst	2	$\mathbf{R}_{\mathbf{N}}$	PROGR/ INSTALLATIO	M <unnamed> M default</unnamed>	New	Open	Save	c c c c	

3. ... and select Settings.



4. In the menu on the left, tap System and select URCaps.



5. Press the + button, select the USB to display content and navigate to the URCap file.

Run	Program Installation Move			PROGRAM <unna< b=""> INSTALLATION default</unna<>	med>	Open Save.	1	د د د د	-
				Settings					
				Settings					
	Preferences	Active URCaps			Inactive U	RCaps			
	> Password				Remote	TCP			
	Ƴ System								
	System								
	URCaps	\triangleright							
	Robot Registration								
	Remote Control	URCap Informa	tion						
	Network								
	Update								
	Exit	+ –						Restart	
•	Power off		Speed	100%	O	00		Simulation	

6. Select the **ZimmerGroup-x.x.x.urcap** and press **Open**.

Sele New Cut Copy Parts Delets Rename USDGEV Timmer Group-1.4.2.urcap	ect URCap to install			Backup
New Cut Copy Paste Delete Rename USDdev Image: Component of the state of the s				Backup
ZimmerGroup-1.4.2.urcap				
Eilename:	Filter			
/usbdev/ZimmerGroup-1.4.2.urcap	URCap Files	:		▼
			Open	Cancer



7. Press **Restart** for activating the new firmware. After the restart, the Zimmer Group Software is installed and ready to be used.

	Set	tings				
> Preferences	Active URCaps	Inactive UR	Caps			
Password	🖏 Zimmer Group Gripper URCap	Remote TCP & Toolpath				
 System 						
System Backup						
URCaps						
Robot Registration						
Remote	URCap Information					
Control	URCap name: Zimmer Group Gripper URCap Version: 1.4.2			^		
Network	Developer: Zimmer Group Contact Info: Im Salmenkonf 5, 77866 Bheinau, Germ	nany				
Update	Description: ZmmerGripperDigital URCap is a URCA Copyright: Copyright (C) 2019-2020 Zimmer Group. A License: Copyright (c) 2019, Zimmer Group All rights reserved.	IP for controlling the Zimmer D All Rights Reserved	igital URCap			
	Redistribution and use in source and binary forms, with modification. are permitted provided that the following	h or without The conditions are met:	ne changes require a restart to take ef	fect. 🥆		
Exit	+ -			Restart		

8. After the restart, you can check if the Zimmer Group file is installed correctly.

	Se	ttings			
> Preferences	Active URCaps	Inactive URCaps			
> Password	🕑 Zimmer Group Gripper URCap	Remote TCP & Toolpath			
 System 					
System Backup					
URCaps					
Robot Registration					
Remote					
Control	URCap name: Zimmer Group Gripper URCap Version: 1.4.2		-		
Network Developer: Zimmer Group Contact Info: Im Salmenkop 5, 77866 Rheinau, Germany					
Update Description: ZmmerGripperDigital URCap is a URCAP for controlling the Zimmer Digital URCap Copyright. Copyright (C) 2019-2020 Zimmer Group. All Rights Reserved License: Copyright (c) 2019, Zimmer Group All rights reserved.					
	Redistribution and use in source and binary forms, wi modification, are permitted provided that the followin	th or without σ conditions are met:	•		
Exit	+ -		Restart		



5.6 First setup with the gripper

Once the IO-Link Master has been successfully configured (*Ch. 5.3*), Network on the robot set up (*Ch. 5.4*) and the Zimmer Premium URCap installed (*Ch. 5.5*), you will need to setup the gripper connection to use the gripper in the robot program sequence.

5.6.1 URCap Installation: controls and indicators overview

			PROGRAM <unnamed></unnamed> INSTALLATION default*	L New	Open	Save		
 General Safety 	ZIMM	ER group						
> Features	•	🍘 Gripper 1	Gripper 2	Gripper 3		Gripper 4		
VURCaps		🕨 Setup	Manual					
	Gripp	er						
Name Gripper 1		Gripper 1						
	Type GEH60xx		▼				\sim	
	Conne	ection						
	Туре	Turck TBEN-S2-410		EL.	8	0 72977 mg		
	IP address 10.0.0.5						The second se	
		Save s	stlings					
	API: 🔵 Actual	position: 99 Dia	gnostics: (0300) See grippers manual					
Power off		Speed	00%				Simulation	

Fig. 12, *Fig.* 13 shows the elements of the installation setup page of the Zimmer Premium URCap. The table *Tab.* 3 contain a short description of these elements.

eatures		Gripper 1	Gripper 2	Gripper 3	Gripper 4
Heidbus URCaps	2	▶ Setup	Manual 12		
ZimmerG	Gripp	er			
	Name	Gripper 1	3		
	Type	GEH60××IL	4		\frown
	Conne	ection	-		
	Туре	Turck TBEN-S2-410	L (MODBUS/TCP)	<u>el</u> 8	· ****** ****
	IP address	10.0.0.5	6	-	
			D		
				105	
					11
		Save se	ttings 7		

Fig. 12: Zimmer Premium URCap: Installation setup page



Run Program Inst		PROGRAM <unnamed> INSTALLATION default*</unnamed>	New Open Save	
 General Safety 				
 Features Fieldbus 	Gripper 1	Gripper 2	Gripper 3	Gripper 4
V URCaps	Setup Manuai			15
2	Manual Operatio	on		
l 1	Device mode	50	Homing ok	Base position
13	Position tolerance	9	Motor on	Teach position
	Grip force[%]	9	In motion	Work position
	Drive velocity[%]	9	Complete movement	Undefined
	Base position [0.01mm]	100	Jog -	Data transfer
	Shift position [0.01mm]	200	Jog +	📕 To Base
	Teach position [0.01mm]	300	Controller active	To Work
	Work position [0.01mm]	3000	Controller error	Error
14	Send data	Homing	Reset direction	Reset gripper
	API: 🔴 Actual position: 100 Diag	nostics: (0000)		
Power off	Speed	100%	\mathbf{D}	Simulation

Fig. 13: Zimmer Premium URCap: Installation manual page

ld	Name	ltem type	Description
1	Gripper1 Gripper2 Gripper3 Gripper4	Selection buttons	The buttons to select current active gripper for setup. The gripper order correspond to the IOL-Port order on the IO-Link Master. The blue triangular arrow on the left of caption indicates the current selection. The caption can be changed by edit of the name field (Id3).
2	Setup	Selection button	The button to activate the page for setup the selected gripper type and connection. The blue triangular arrow on the left of caption indicates the current selection.
3	Gripper Name	Edit field	This name will be used for the program node caption in the robot program sequence and for the caption of the gripper button.
4	Gripper Type	Combo box	Selects the type of the gripper connected to the chosen IOL-Port.
5	Connection Type	Combo box	Should be set to IO-Link Master
6	Connection IP address	Edit field	The configured IP address of the IO-Link Master (Ch. 5.3)
7	Save settings	Button	Control to save the current setup.
8	API	Indicator	Status indicator of background process, is not green if error.
9	Actual position	Value	The position feedback from gripper, see grippers manual for detailed information.



10	Diagnosis	Value/Text	The diagnosis feedback from gripper, see grippers manual for detailed information.
11	Gripper type image	Image	The common image fo the selected gripper type.
12	Manual	Selection Button	The button to activate the page for manual control the selected gripper. The blue triangular arrow on the left of caption indicates the current selection.
13	PDU fields	Edit fields	The IO-Link PDU data to setup the gripper parameters. See grippers manual for detailed information.
14	Manual control	Buttons	Manual control of the gripper. See grippers manual for detailed information.
15	Status	Indicators	The status feedback bits from gripper, see grippers manual for detailed information.

Tab. 3: Elements of URCap Installation page



5.6.2 URCap Installation: setup workflow

- 1. power on the IO-Link Master and the grippers.
- 2. Go to the Installation tab and select URCaps/ZimmerGroup in the menu on the left.
- 3. On the setup page select the gripper type from the list.

		PROGRAM <unnamed></unnamed> INSTALLATION default*	New Open Save	
> General				
 Features Fieldbus 	F Gripper 1	🍘 Gripper 2	Gripper 3	Gripper 4
	Setup	Manual		
2 millitel S	ZimmerG Gripper Name Gripper 1 Type Select gripper]	
Power off	API:	100%		Simulation

4. Change the IP address if it is not the default. The LED indicator should now be green or orange and Diagnostics have a number value.





5. You can change the name of the gripper freely. Just tip on the field with the gripeers name, type the new name and submit it.

Run Program Installation		PROGRAM <unnamed></unnamed> INSTALLATION default*	New Open Save	
 General Safety 				
> Features	Gripper 1	Gripper 2	🌒 Gripper 3	Gripper 4
	▶ Setup	Manual		
ZimmerG	Gripper Name Gripper 1 Type GEH60xxIL			
Esc	() # * & & 1 2 3 4 q w e r	 % %	i o p	Backspace
1	a s d	f g h j c v b n	K I C]	

6. Once you have setup the connection, save the settings with the "Save settings" button.





7. Now click the "Manual" and open the manual page. On On the manual page you can control the gripper manually with the buttons on the bottom, send the PDU data to the gripper, see the current status of the gripper (see grippers manual for detailed information).

Run Program Installation		PROGRAM <unnamed></unnamed> INSTALLATION default*	New Open Save	
 > General > Safety 				
Features Fieldbus	Þ First gripper	Gripper 2	Gripper 3 🌑	Gripper 4
V URCaps	Setup	Manual		
Zimmer G	Manual Operation	on		
	Device mode	50	📕 Homing ok	Base position
	Position tolerance	9	🧧 Motor on	Teach position
	Grip force[%]	9	In motion	Work position
	Drive velocity[%]	9	🥃 Complete movement	🧧 Undefined
	Base position [0.01mm]	100	Jog -	Data transfer
	Shift position [0.01mm]	200	Jog +	🔳 To Base
	Teach position [0.01mm]	300	Controller active	To Work
	Work position [0.01mm]	3000	Controller error	🧧 Error
	To base	To work	Motor on	Motor off
	Send data	Homing	Reset direction	Reset gripper
	API: 🔴 Actual position: 2999 Diag	nostics: (0300) See grippers manual		
Power off	Speed	 100%		Simulation



5.7 Manual control

Please read the complete installation and operating instructions of selected gripper first so you are fully familiar with the gripper control.

Here is the small example to control the GEH6000 manually:

- a) click "Motor on" to switch the motor on, the "Motor on" status indicator is green and "Error" indicator is red now.
- b) cklick "Send data" to transsmit the valid PDU data, the "Error" status bit is clear now.
- c) move the gripper jaws by clicking on the "To work" or "To base" button. After that, please check, if the status indicators.
 Note: if you want to move the gripper a second time in the same direction, please change the

position parameter and "Send data", then press the button "Reset direction". Then you can start your second movement in the same direction. If you toggle all the time between to base and to work, this procedure is not necessary.

• **Notice:** The disk symbol marks not transmitted parameters. With the "Send data" button you can transmit the current data to the gripper.

Run Program Installation		PROGRAM <unnamed> INSTALLATION default*</unnamed>	New Open Save	
 > General > Safety 				
 Features Fieldbus 	First gripper	Gripper 2	Gripper 3	Gripper 4
VIRCaps	Setup	Manual		
	Manual Operation	on		
	🖹 Device mode	50	🚘 Homing ok	Base position
	💾 Position tolerance	100	Motor on	Teach position
	🖪 Grip force[%]	20	In motion	Work position
	🖹 Drive velocity[%]	50	🥃 Complete movement	🧾 Undefined
	Base position [0.01mm]	100	Jog -	📕 Data transfer
	Shift position [0.01mm]	200	Jog +	To Base
	Teach position [0.01mm]	300	🥃 Controller active	To Work
	Work position [0.01mm]	3000	Controller error	📕 Error
	C) To base	To work	a) Motor on	Motor off
	b) Send data	Homing	Reset direction	Reset gripper
	API: 🔴 Actual position: 3000 Diagr	nostics: (0301) See grippers manual		
Power off	Speed 🤇	100%		Simulation



6 Program the gripper in the robot sequence

You ca find the Zimmer Premium URCap on the left side of Polyscope Program tab under section "URCaps/Z_Gripper". In the chapter 6.3 is described how to use "Z_Gripper" node in your robot program.

6.1 Command list of the Zimmer Premium URCap

The table below presets all of the gripper commands available in the robot program sequence (automatic mode). The individual commands are executed until they have been successfully executed or the timeout of approximately 20 seconds has expired. You can check if the command was successfully done by check the value of the "Z_CommandFailFlag" variable after the command end. The variable is "False" if the command was successfully done (see *Ch. 6.2*).

Command Name	Description	Gripper Family
Z_Base	Moves the gripper jaws to the base position. Depending on the gripper family is the base-position a free definable position, or fixed set in the gripper	All IO-Link grippers
Z_Work	Moves the gripper jaws to the work position. Depending on the gripper family is the work-position a free definable position, or fixed set in the gripper	All IO-Link grippers
Z_Write_PDU	This command send new PDU (process data unit) to the gripper. You need this command to change the parameters in the gripper, e.g. teach-position or gripforce	All IO-Link grippers
Z_Motor_ON	This command turns on the motor, if all necessary preconditions are fulfilled	GEH6000IL family, HRC-01 family
Z_Motor_OFF	This command turns off the motor	GEH6000IL family, HRC-01 family
Z_Homing	This command moves the gripper to the reference position, if all necessary preconditions are fulfilled	GEH6000IL family, HRC-01 family
Z_Reset_Direction	This command set the direction flag in the gripper to FALSE. This is helpful, if you want to move the gripper 2 times in one direction.	GEH6000IL family, HRC-01 family GEP2000IL family
Z_Get_Status	Reads the status from the gripper into a set of Universal Robots variables once per call. You can use this variables as shown in the example program (<i>Ch. 6.3.6</i>)	All IO-Link grippers



Z_Reset_Gripper	This command start the gripper reset function	GEH6000IL family, HRC-01 family
Z_check_status	Reads the status from the gripper into a set of Universal Robots variables and make the user defined check in an endless-loop until the expression goes true or time out (see <i>Ch. 6.3.5</i>).	All IO-Link grippers

Tab. 4: Zimmer Premium URCap program sequence commands summary



6.2 Variable list of the Zimmer Premium URCap

The Zimmer Premium URCap creates a list of global variables, which are available for more advanced features. All of these created variables have a "Z_"- prefix (). The variables can be used to check that a calibration has been successful, or to take a special action if the gripper is not in base, teach or work position. Refer the gripper documentation for details about these parameters.

The commands "Z_Get_Status" and "Z_check_status" will update the global variables for the actual gripper. So when you use more than one gripper, the global variables are valid for the last gripper you update the status.

The value of "Z_CommandFailFlag" is set automatically after each command listed in *Tab. 4* and reports the status of last executed command.

The table below shows the summary of the variables used in the Zimmer Premium URCap software.

Variable	Туре	Range	Description	available for gripper family
Z_ActualPosition	INTEGER	0 9999	It shows the gripper jaws position sensor data with a factor of 100: e.g. 149 = 1,49mm.	All IO-Link
Z_AtBasePosition	BOOLEAN	True, False	It corresponds 29ot he Bit8 of StatusWord, it is "True" if the gripper is at the "BasePosition".	All IO-Link
Z_AtTeachPosition	BOOLEAN	True, False	It corresponds 29ot he Bit9 of StatusWord, it is "True" if the gripper is at the "TeachPosition".	All IO-Link
Z_AtWorkPosition	BOOLEAN	True, False	It corresponds 29ot he Bit10 of StatusWord, it is "True" if the gripper is at the "WorkPosition".	All IO-Link
Z_CommandFailFlag	BOOLEAN	True, False	It reports the status of last executed command. It is "False" if the last command was successsfuly done.	All IO-Link
Z_CompleteMovement	BOOLEAN	True, False	It corresponds to the Bit3 of StatusWord, it is "True" after the movement is complete.	GEH6000IL HRC-01
Z_ControlSystemActive	BOOLEAN	True, False	It corresponds to the Bit6 of StatusWord, it is "True" as soon as the gripper has booted up after the cold start".	all IO-Link
Z_ControlWord0x100	BOOLEAN	True, False	It corresponds to the Bit13 of StatusWord. This bit is a direction flag and is active when the last movement order was made in the "BasePosition" direction.	GEH6000IL GEP2000IL HRC- 01/03/04/05
Z_ControlWord0x200	BOOLEAN	True, False	It corresponds to the Bit14 of StatusWord. This bit is a direction flag and is active when the last movement order was made in the "WorkPosition" direction.	GEH6000IL GEP2000IL HRC- 01/03/04/05
Z_ControllerError	BOOLEAN	True, False	It corresponds to the Bit7 of StatusWord. Error in the controller.	GEH6000IL HRC-01



Z_DataTransferOk	BOOLEAN	True, False	It corresponds to the Bit12 of StatusWord. This bit is used for data transmission, using the "handshake".	all IO-Link
Z_Diagnostics	INTEGER	0 65535	The value returned in the "Diagnosis" parameter corresponds to the error code.	all IO-Link
Z_Error	BOOLEAN	True, False	It corresponds to the Bit15 of StatusWord. Error in the gripper, if this bit is active, the error message can be determined using the "Diagnosis" parameter.	all IO-Link
Z_HomingOk	BOOLEAN	True, False	It corresponds to the Bit15 of StatusWord. This bit is required as mandatory.	GEH6000IL HRC-01
Z_InMotion	BOOLEAN	True, False	It corresponds to the Bit2 of StatusWord. This bit is active during the run.	GEH6000IL HRC-01
Z_JogMinus	BOOLEAN	True, False	It corresponds to the Bit4 of StatusWord. Confirmation during the "Jog" run in the direction of "BasePosition".	GEH6000IL HRC-01
Z_JogPlus	BOOLEAN	True, False	It corresponds to the Bit5 of StatusWord. Confirmation during the "Jog" run in the direction of "WorkPosition".	GEH6000IL HRC-01
Z_MotorOn	BOOLEAN	True, False	It corresponds to the Bit2 of StatusWord. This bit is enabled when the motor is switched on.	GEH6000IL HRC-01
Z_UndefinedPosition	BOOLEAN	True, False	It corresponds to the Bit11 of StatusWord, it is "True" if the gripper is neither at "TeachPosition", nor "WorkPosition" and nor "BasePosition".	all IO-Link
Z_Message	STRING	Text	Feedback from background service, for internal usage only.	-

Tab. 5: "Z_"-variables overview



Run Program Installation		PR (INSTAL	DGRAM example_2 LATION default*	New Open	Save		Ξ
> Basic		Q	Command	Graphics	Variables		
 Advanced Templates URCaps Z_Gripper 	10 — ∠_Write_PDU: Gripper 1 11 ▼ Robot Program 12 — Z_Get_Stat: Gripper 1 13 ♥ If Z_AtBasePosition ≠ True 14 — Z_Base: Gripper 1 15 — Z_check_status: Gripper 1 16 — Z_check_status: Gripper 1 17 — Z_work: Gripper 1 18 — Z_check_status: Gripper 1 19 — Z_check_status: Gripper 1 20 — Z_Base: Gripper 1 21 — Wait: 0.1 22 — Z_Get_Stat: Gripper 1 23 — Z_Get_Stat: Gripper 1 24 — Z_Write_PDU: Gripper 1 25 — Z_Work: Gripper 1 26 — Wait: 0.1 27 — Z_check_status: Gripper 1 28 — Z_Base: Gripper 1 29 — Wait: 0.1 30 — Z_check_status: Gripper 1 31 — Z_write_PDU: Gripper 1 31 — Z_write_PDU: Gripper 1		Variable ~ Z_ActualPosition Z_AtBasePosition Z_AtBasePosition Z_AtBasePosition Z_AtWorkPosition Z_CompleteMover Z_ComtrolSystem; Z_ControlWord0x Z_ControlWord0x Z_ControlWord0x Z_ControllerError Z_DataTransferOI Z_DATATransferOI Z_D	Value 1 1		Clear	
Paused	Speed 🥌		100%			Simulation	

Fig. 14: "Z_"-variables on the Polyscope Variables tab



6.3 How to use Zimmer-Node in Polyscope

6.3.1 Generate a new Zimmer- node in the robot program

To use the Zimmer Premium URCap in your robot program, tap the URCaps on the left side of the Program tab and select the "Z_Gripper" node. A Zimmer node will be added to your robot program. Now you can select the gripper that should be used from the gripper list and a command to execute.

💊 😑 🗉 🛛 Universal Rob	ots Graphical Programming Environ	ment				
Run Program Instala		PROGRAM	<unnamed></unnamed>	Open Save		
> Basic		٩ (Command Grap	hics Variables		
> Advanced	1 🔻 Robot Program					
> Templates	<empty></empty>					
VRCaps						
2_Gripper						
	•	Þ	Selec	t a node from th	e Node List	
Normal	Sp	eed 🦳	100%	\mathbf{D}	Simu	lation

Fig. 15: "Z_Gripper" node on the Polyscope Program tab

6.3.2 Choose the used gripper and add a new command node to the sequence

Once the "Z_Gripper" node was added to your robot program, you can see a yellow colored "ZimmerGripper" node in your Robot Program tree, the Command tab with selection control of the used gripper and command for it on the right side of Polyscope Program tab (*Fig. 16*).

😣 🖨 🔲 Universal Robots Graphical Program	ming Environment						
		RAM <unnamed>* [TION default* Ne</unnamed>	н Ореп	Save			≡
> Basic	۹	Command	raphics	Variables			
> Advanced 1 V Robot Pr	ogram	Z Gripper					
> Templates 2 - Zimmer	Gripper						
V URCaps		group					
Z_Gripper		Gripper	or 1	—			
		Gripper Type CEU		•			
			JUXXIL	_			
		Command		•			
	(
	* 🗶 📕 🖥 💼 🔤						
Normal	Speed	100%	0		s	imulation	

Fig. 16: "Z_Gripper" node, the Polyscope Command tab



6.3.3 Define your node command

In general the yellow color of the node on the Polyscope Robot Program tree marks the nodes it still to be parametrized.

For the "Z_Gripper" node, you should at least select the required command from the command drop-down list on the Polyscope Command tab to parametrize it.

The content of the command drop-down list depends on the gripper family. The summary of all commands is listed in the chapter 6.1.



Fig. 17: "Z_Gripper" node, select the command for used gripper

6.3.4 Write new process-data to the gripper (PDU)

You can use the "Z_Write_PDU" command to change the gripper process data within the robot program. Depending on the family of used gripper there are two general types of process data sets.

The first, advanced, type of PDU data set is used in the grippers with extended functionality like the grippers of the 6000 series and HRC-01 grippers (advanced grippers).

The second, basic, type of PDU data set is used in the grippers without extended functionality like the grippers of the 5000 series, 2000 series and HRC-03/04/05 grippers (basic grippers).

You will find the detailed description of the PDU in the gripper manual.

With the manual page descripted in chapter "Manual control 5.7", you can test all settings before you write your robot sequence.

The figures below show the using of "Z_Write_PDU" command within a robot program (*Fig. 18* for advanced gripper, *Fig. 19* for basic gripper).



		PROGRAM WritePDU_e	xample	Open Save	
> Basic		Q Command	Graphics	Variables	
> Advanced	1 🔻 Robot Program	Z Grippe	r		
Templates	2 Start your robot program	ZIMME	R		
V URCaps	4 • Z_Write_PDU: Gripper 2	gro	υρ		
Z_Gripper		Gripper	Gripper 1	▼	
		Gripper Type	GEH60xxIL		
		Command	Z_Write_PDU	▼	
		Device mode	60	Using numbers	▼
,		Position tolerand	e 100	Using numbers	•
		Grip force	40	Using numbers	•
		Drive velocity	50	Using numbers	•
		Base position	100	Using numbers	•
		Shift position	200	Using numbers	•
		Teach position	300	Using numbers	•
		Work position	3000	Using numbers	•
O Normal	Speed 🥌	100%	C		Simulation

Fig. 18: "Z_Gripper" node, "Z_Write_PDU command for advanced gripper



Fig. 19: "Z_Gripper" node, "Z_Write_PDU command for basic gripper

Instead of fixed numbers, you can use the global variables and/or program variables for values in the "Z_Write_PDU" command (or you can combine them). In the following example (*Fig. 20*) is a set of program variables for the first gripper in the "BeforeStart" section defined. These variables are used in the subroutines "SubP_G1_SetPduWorkPiece1" and "SubP_G1_SetPduWorkPiece2". In the subroutines we change the size of the expected workpiece and send it to the first gripper. In this way, we can define the variables and subroutines for the other grippers and change the parameters as required.



Run Program Installation		GRAM WritePDU_exam ATION default	nple_2*	ar Save		
> Basic	Q	Command	Graphics \	/ariables		
✓ Advanced		7.0.				
Loop	2 = g1_PDU_DevMode=60 ^	Z_Gripper	•			
SubProg	4 = g1_PDU_GrForce=80	ZIMMER	Ş			
Assignment	5 g1_PDU_DriveVel:=60	grou	þ			
If	6 g1_PDU_BasePos=100	Gripper G	ripper 1	▼		
	7 III gI_PDU_ShittPos:=500	Crimmon Turne Cl	ELEOnull			
Script	9 1 g1_PDU_WorkPos=2000	Gripper Type G	EHOUXXIL			
Event	10 🔻 Robot Program	Command Z	_Write_PDU	▼		
Thread	11 Call SubP_G1_SetPduWorkPiece1	Device mode	60	Using numbers	•	
Switch	13 - Z check stat	Position tolerance	100	Using numbers		1
Timer	14 – Z_Base: Grip			g1_PDU_BasePos		
Screwdriving	15 Call SubP_G1_SetPduWorkPiece2	Grip force	40	g1_PDU_GrForce		
Home	16 Z_Work: Grip	Drive velocity	50	g1_PDU_TeachPos		
> Templates	18 g1 PDU TeachPos=1500	Base position	100	g1_PDU_WorkPos		
VRCaps	19 - Z_Write_PDU: Gripper 1	Ch.10	200	g1_PDU_PosTol		
	20 L SubP_G1_SetPduWorkPiece2	Shift position	200	g1_PDU_ShiftPos		
	21 gl_PDU_TeachPos=700	Teach position	300	g1_PDU_DevMode		
	<pre></pre>	Work position	3000	g1_PDU_DriveVel		
		OGRAM WritePDU_exar LATION default	nple_2	in Save		
> Basic	م	Command	Graphics \	/ariables		
✓ Advanced	2 g1_PDU_DevMode=60 ^	Z_Gripper	-			
Loop	3 g1_PDU_PosTol=100	ZIMMEE	•			
SubProg	4 g1_PDU_Gr+orce:=80 5 a1_PDU_DriveVel:=60	grou	P			
Assignment	6 g1_PDU_BasePos=100			_		
If	7 g1_PDU_ShiftPos=500	Gripper	ripper 1			
Script	8 g1_PDU_TeachPos=1000	Gripper Type G	EH60xxIL			
Event	10 V Robot Program	Command Z	_Write_PDU	•		
Thread	11 Call SubP_G1_SetPduWorkPiece1	Device mode	g1_PDU_DevMode	g1_PDU_DevMode	•	
Switch	12 – Z_work: Grip 13 – Z check stat	Position tolerance	al PDU Postol		•	1
Timer	14 – Z_Base: Grip	T OSIGOT LOICI GILCC	91_00_000			
Screwdriving	15 Call SubP_G1_SetPduWorkPiece2	Grip force	g1_PDU_GrForce	g1_PDU_GrForce	•	
Home	17 L SubP G1 SetPduWorkPiece1	Drive velocity	g1_PDU_DriveVel	g1_PDU_DriveVel	•	
> Templates	18 g1_PDU_TeachPos=1500	Base position	g1_PDU_BasePos	g1_PDU_BasePos	•	
> URCaps	19 Z_Write_PDU: Gripper 1	Shift position	g1 PDU ShiftPos	g1 PDU ShiftPos	•	1
	20 L SubP_G1_SetPauworkPiece2 21 J g1 PDU TeachPos=700	Taraharakia		-1 PDU TrackDar		
	<pre></pre>	j reach position	JI_PDU_TeachPos		•	
	★ ↓ > < × ■ ■ ■	Work position	g1_PDU_WorkPos	g1_PDU_WorkPos	•	

Fig. 20: "Z_Gripper" node, "Z_Write_PDU command with variables

6.3.5 "Z_check_status" – an advanced loop to check the gripper status

The "Z_check_status" command continuously reads the value of the StatusWord in a loop until the user defined expression becomes true or the timeout occurs (approx. after 20 seconds). The values of global "Z_" variables will be updated while this command (see *Ch. 6.2*).

This command can be useful e.g. to wait and check if the gripper completes the movement in the required position.

In the example below, the loop is active, while the bits "HomingPosition OK", "TeachPosition", "MovementComplete" are not set and the bit "InMotion" is clear in the StatusWord. Read the grippers manual for more information about the StatusWord bits.



Fig. 21: "Z_Gripper" node, a "Z_check_status example

6.3.6 Loop to check the state of the gripper

If you prefer not to use the "Z_check_status" command in your robot program, you can use the "Z_Get_Stat" command combine with the additional conditional expressions.

The "Z_Get_Stat" command refreshes the values of all global "Z_" variables once per call. You can call the "Z_Get_Stat" command for example in an infinite-loop, check for position flag in an if-condition, with a control structure that control the termination of the loop, and a wait for delay (*Fig. 22*). In this way, you can check a lot of states of the grippers.





Fig. 22: Example usage of "Z_Get_Stat" for check position bit

6.4 Startup the gripper

After the power on, the grippers must run through the startup sequence once to be able to work properly. Depending on the family of gripper there are two general scenarios to start the gripper. The first scenario is for the grippers with advanced motor management like the grippers of the 6000 series and HRC-01 grippers. The second scenario for the grippers with common motor management like the grippers of the 5000 series, 2000 series and HRC-03/04/05 grippers.

Normally the startup sequence will execute once before the main program loop is started. In UR Polyscope you can add such Before Start Sequence by activate the "Add Before Start Sequence" check box on the Polyscope like showed on the *Fig. 23*.

Now you can select the "BeforeStart" element and add the program nodes into this section.



Fig. 23: UR Polyscope, add Before Start sequence



6.4.1 Startup the gripper with advanced motor management

		AM StartUp_with_advand ON default	ced_motor	Open Save					
✔ Basic	۹	Command	Graphics	Variables					
Move	1 ▼ BeforeStart	7 Grinner							
Waypoint	2 Z_Get_Stat: Gripper 1	2_Gripper							
Direction	3 ♥ If Z_ControlSystemActive ≠ True								
Wait	4 Hait 5 – Z Motor ON: Gripper 1								
Set	6 Z_Write_PDU: Gripper 1	Gripper Gr	ripper 1	▼					
Popup	7 Z_Get_Stat: Gripper 1	Gripper Type G	EH60xxIL						
Halt	9 Halt	Command Z	_Write_PDU	•					
Comment	10 ♥ ▶ If Z_MotorOn ≠ True	Device mode	50	Using numbers	▼				
Folder	11	P Desition tolerance	100						
> Advanced	13 Z_Reset_Direction: Gripper 1	Posicion colerance	100						
> Templates	14 Z_Base: Gripper 1 15 Robot Program 16 Start your robot program' 17 Z_Get_Stat: Gripper 1	Grip force	4	Using numbers Using numbers					
> URCaps		Drive velocity	50						
		Base position	100	Using numbers	•				
		Shift position	200	Using numbers	~				
		Teach position	300	Using numbers	•				
		Work position	3000	Using numbers	•				
Normal	Speed Contraction	100%	D		Simulation				

Fig. 24: Example startup sequence for grippers with advanced motor management

The grippers with the advanced motor management need the start the servo motor by separate command. If the gripper family supports the advanced motor management then the commands like "Z_Motor_ON" or "Z_Motor_OFF" are added into command list for selection.

The listing in *Fig. 24* shows an example startup sequence for grippers with advanced motor management. Please refer to the gripper manual for further information.

6.4.2 Startup the gripper with common motor management

The listing in Fig. 25 shows an example startup sequence for grippers with advanced motor management. Please refer to the gripper manual for further information.

😣 🖨 🗉 🛛 Universal Robot	s Graphical Programming Environment				
R 🔚 🗎		M StartUp_with_comn	non_motor*		🗏 :: 🔊
Run Program Installation	Move I/O Log		19492	. Open Save	
✓ Basic	Q	Command	Graphics	Variables	
Move	1 V BeforeStart	7 Grippe	r		
Waypoint	2 Z_Get_Stat: Gripper 1				
Direction	3 ♥ ➡ If Z_ControlSystemActive ≠ True				
Wait	5 – Z Write PDU: Gripper 1				
Set	6 Z_Get_Stat: Gripper 1	Gripper	Gripper 1	•	
Popup	7 ♥ ▶ If Z_Error ≟ True 8	Gripper Type	EP20xxIL		
Halt	9 🕈 🕨 If Z_AtBasePosition ≠ True	Command 2	Z_Write_PDU	▼	
Comment	10 Z_Reset_Direction: Gripper 1	Device mode	100	Using numbers	•
Folder	12 Robot Program	Position tolerance	100	Using numbers	
> Advanced	13 – 🗩 'Start your robot program'				
> Templates	14 Carl Z_Get_Stat: Gripper 1	Grip force	4	Using numbers	
> URCaps		Drive velocity	50	Using numbers	•
		Base position	100	Using numbers	▼
		Shift position	200	Using numbers	▼
		Teach position	300	Using numbers	▼
	▲▲┑╱┎╔╔	Work position	1000	Using numbers	▼
			_		
Normal	Speed Contraction	100%		$\bigcirc \bigcirc \bigcirc$	Simulation

Fig. 25: Example startup sequence for grippers with common motor management



6.5 Write a small sequence to move the gripper

The listing below shows a small example program sequence for advanced gripper, where the gripper

- refreshes the values of the global "Z_" variables (line 17)
- checks if no errors (line 18) with some error handling (line 19)
- loads new PDU data for the current workpiece (line 21)
- starts the gripping (23)
- waits a small delay to be sure that the jaws start the movement and status bits are set (line 24)
- checks in loop for jaws stop in teach position to be sure that the right workpiece is gripped (line 26)
- checks if the command error flag is set (line 27), than error handling (line 28)
- starts the release (line 30)
- waits a small delay to be sure that the jaws start the movement and status bits are set (line 31)
- checks in loop for jaws stop in base position to be sure that the workpiece is released (line 33)
- checks if the command error flag is set (line 34), than error handling (line 35)

The Example assumes that the motor has already been started in the "BeforeStart" sequence (see *Ch. 6.4.1*).



Fig. 26: Example to move advanced gripper



The example can also be used for basic grippers, but in this case the query in the Z_check_status nodes should be adapted, e.g. to check the required position flag only (*Fig. 27*).

Run Program Installation		F INST	PROGRAM example FALLATION default	_basic ♪	lew Open.	Save		R+	с с с с	Ξ
> Basic		Q	Command	Gra	ohics	Variables				
> Advanced	15 V Robot Program	~	7 Grinne	r						
> Templates	16 - Move robot to workpiece'		enpp							
✔ URCaps	17 – Z_Get_Stat: Gripper 1			R						
Z_Gripper	18 ♥ ▶ If Z_Error ≟ True 19 ● Halt		Gripper	Grippor	1	-				
	 20 Set process data if required' 21 Z Write_PDU: Gripper 1 22 Scip the workplace with page 5 		Gripper Type	GEP20x:	×IL	•				
	23 - Z_Work: Gripper 1 24 - X Wait: 0.02		Command	Z_check	_status	▼				
	25 - Check and wait for gripping		Homing_ok		Ignore	-	Base Position	Igno	re	-
	27 P If Z_CommandFailFlag ≟ True		Motor on		Ignore	-	Teach Position	True		•
	28 O Halt		In motion		Ignore	-	Work Position	Igno	re	-
	 29 continue your robot program 30 Z Base: Gripper 1 		Complete move	ment	Ignore	-	Undedefined	Igno	re	•
	31 X Wait: 0.02		jog -		Ignore	-	Data transfer	Igno	re	•
	32 — 🗩 'Check and wait for release'		jog +		Ignore	•	To Base	Igno	re	•
	33 - Z_check_status: Gripper 1 34 ● If Z_CommandFailFlag = True		Controller activ	e	Ignore	•	To Work	Igno	re	•
		>	Controller Error		Ignore	•	Error	Igno	re	•
	▲ ♥ ウ ⊄ ※ ■ 箇 面		Z_AtTeachPosition == Tru	e						
Normal	Speed		100%		D			Simula	ation	

Fig. 27: Example to move basic gripper