

# **Reference Manual**

URCap VNC Server – Version 1.0



KPI Software GmbH Im Winkel 1 78588 Denkingen Phone: +49 7424 7031610 E-Mail: info@kpi-software.de Internet: www.kpi-software.de Reference Manual Version 1.0

# **Table of Contents**

1 Intro	oduction	4				
1.1	About this document	4				
1.2	Requirements and supported versions	4				
1.3	Update URCap4					
2 Insta	allation	5				
2.1	Installing the URCap	5				
2.2	Uninstall the URCap	8				
3 Insta	allation Node	9				
3.1	Licensing	9				
3.2	Overview	11				
3.2.	1 Connection parameters and status display	12				
3.2.	2 Options	13				
3.2.	3 Action buttons	14				
3.3	Start the VNC server	14				
3.4	Stop the VNC server	15				
4 Tool	lbar	16				
5 Safe	ety	17				
5.1	Remote access with control sovereignty					
6 File	transfer	19				
6.1	UltraVNC Viewer	19				
6.2	6.2 TightVNC Viewer21					
7 Dire	ectories	22				
7.1	List of figures	22				
8 Note	es	23				



## 1 Introduction

The URCap VNC Server is a software extension for the UR robot (Universal Robots). It enables remote access to a UR robot within the same local network using the Virtual Network Computing Protocol for short VNC. By accessing the robot control panel, you can control the robot remotely, make program changes, provide diagnostics and assistance and exchange data.

## 1.1 About this document

The reference manual contains an overview of all functions of the URCap. It was created for robot programmers, software developers and maintenance technicians.

## **1.2** Requirements and supported versions

E-Series robots (UR3, UR5, UR10 or UR16) from PolyScope 5.6.

## 1.3 Update URCap

Attention: Robot programs that were created with a previous version may no longer be used. The robot programs and the robot installation may have to be recreated or adapted. To install the URCap version 1.0 on a system where an earlier version is already installed.

- Uninstall the previous version
- Check the PolyScope version, if necessary update to a newer version (version 5.6)
- To avoid configuration conflicts, create a new robot installation
- Install URCap



## 2 Installation

## 2.1 Installing the URCap

R	Program		<b>₽</b> Move	<u>ک</u> ۳	<b>~</b>		PROGRAM <unnamed> INSTALLATION default</unnamed>	New.	Pin Open	Save	; ; <b>=</b>
											8
							Getting Started				
						What woul	ld you like to d	lo fir	st?		
		RU		R ROGRA	м	PF	ROGRAM THE ROBOT				ROBOT ATION
	Do	n't show f	this me	ssage ag	ain						
•	Power	off				Speed	100%	0	0	0	Simulation

Figure 1: Home screen

- 1. Start the robot
- 2. Insert the USB stick with the URCap
- 3. Click the hamburger menu in the top right corner



Figure 2: Select Settings

4. Click Settings



#### Installation

Run Program Instalation Mov		program <b><unnamed< b=""> installation <b>default</b></unnamed<></b>	<b>i&gt; [] in an an</b>	د د د د
		Settings		
> Preferences	Active URCaps	1	nactive URCaps	
> Password		•	∋ Remote TCP & Toolpath	
Ƴ System				
System Backup				
Robot Registration	5			
URCaps	URCap Information			
Remote Control				
Constrained Freedrive				
Network				
Update				
> Security				
	6			
Exit	+ -			Restart
Power off	Speed 💻	100%	000	Simulation

Figure 3: Add URCap

- 5. Click on URCaps
- 6. Click +

	PROGRAM <unnamed> INSTALLATION default</unnamed>	New Open	Save	сс сс
	Select URCap to install			
New Cut Copy Paste Delete Rename				B ackup
URCaps_Copy_Fol				
Filename: //de.kpi_software.urcap.palletizing-1.0.4.urcap	Filter: URCap Files		8	<b>~</b>
			ľ	Open Cancel

Figure 4: Select URCap on USB stick

- 7. Select the URCap on the USB stick
- 8. Click Open to install the URCap



	Settings				
	Active URCaps	Inactive URCaps			
	O Palletizing	😑 Remote TCP & Toolpath			
> Password					
V System					
System Backup					
Robot Registration					
URCaps	LIBCan Information				
Remote Control	URCap name: Palletizing Version: 1.0.4		•		
Constrained Freedrive	Developer: KPI Software GmbH Contact Info: Im Winkel 1, 78568 Denkingen Description: Advanced palletizing for UR Copyright: (C) KPI Software GmbH 2021 Learnes Times See End uner Misense screament				
Network					
Update	License: End User License Arreament				
> Security	Please read the terms and conditions of this End User License ('Agreement') carefully before you use the Software (as defin a legally binding contract. By assenting electronically installing	Agreement ed below). This is to or using the	rt to take effect.		
Exit	+ –		Restart		

Figure 5: Restart the robot

9. Click Restart to restart the robot

	Set	tings	
> Preferences	Active URCaps	Inactive URCaps	
> Password	✓ Palletizing	😑 Remote TCP & Toolpath	
V System	10		
System Backup			
Robot Registratio	1		
URCaps	URCap Information	1	
Remote Control	URCap name: Palletizing Version: 1.0.4		1
Constraine Freedrive	<ul> <li>Developer: KPI Software GmbH</li> <li>Contact Info: Im Winkel 1, 78588 Denkingen</li> <li>Description: Advanced palletizing for UR</li> </ul>		
Network	Copyright: (C) KPI Software GmbH 2021 License Type: See End-user license agreement		
Update	License: End User License Agreement		
> Security	Please read the terms and conditions of this End User 1 ("Agreement") carefully before you use the Software (a a legally binding contract. By assenting electronically	License Agreement is defined below). This is installing or using the	
Exit	+ -		Restart

Figure 6: URCap is installed

10. A green tick will appear next to the URCap if it has been installed correctly

Installation



## 2.2 Uninstall the URCap

In order to completely remove the VNC server from the robot, the software packages must first be uninstalled in the installation tab before uninstalling the URCap.



Figure 7: Uninstall software

- 1. Open the installation page under Installation
- 2. -> URCaps
- 3. -> VNC Server
- 4. Start the uninstallation using the uninstall button

	Settir	igs				
> Preferences	Active URCaps	Inactive URCaps				
> Password	Palletizing	😑 Remote TCP & Toolpath				
V System	1					
System Backup						
Robot Registratio	n					
URCaps	UBCap Information	1				
Remote Control	URCap name: Palletizing Version: 1.0.4		^			
Constraine Freedrive	d Developer: KPI Software GmbH Contact Info: Im Winkel 1, 78588 Denkingen Description: Advanced palletizing for UR	Developer: KPI Software GmbH Contact Info: Im Winkel 1. 78588 Denkingen Description: Advanced palletzing for UR Copyright: (C) KPI Software GmbH 2021 License: Thom: See Enduster Unerse armement				
Network	Copyright: (C) KPI Software GmbH 2021 License Type: See End-user license agreement					
Update	License: End User License Agreement					
Security     Please read the terms and conditions of this End User License Agreement     ('Agreement') carefully before you use the Software (as defined below). This is     a lenable binding of Q. If B wassemble electronically under the alloware the software is a lenable binding of the software is a l						
Exit	+		Restart			

Figure 8: Select URCap

- 1. Select the URCap to be uninstalled
- 2. Click on -
- 3. Restart the robot



## 3 Installation Node

In the Installation Node you will find current status information about the status of the VNC connection. The VNC server can also be parameterized and controlled there.

## 3.1 Licensing

In order for VNC Server to be used, a valid license key must be entered in advance. This is generated by the manufacturer with the help of the generator string.

			PROGRAM <b><unnamed></unnamed></b> STALLATION <b>default*</b>	New	Open	Save	<b>収</b> +	D C C A	$\equiv$
🔪 General	VNC Server								
> Safety	Connection Parameter								
> Features	Password:	Set							
> Fieldbus	Port:	5900		~0	P address	192.168.56.130:590	00		
VURCaps 2	Remote Timeout (s):	120		0~0 F	Password	generation failed			
VNC Server	3								-1
	Options Auto Charte I	-							
	Auto-Start:	_						istall	
	Multiple connections:	]					the VNC se	entiy rem erver, ple	ove ase
	TightVNC file transfer:	]					also delete t	he URCap	).
	UltraVNC file transfer:	3							
	Start Stop	Access			×	Update Licen	se 🕅 🕅	K	
Power off	Sp	eed	100%			0	Simu	ulation	

Figure 9: Installation Node

- 1. Open the installation page
- 2. Go to URCaps
- 3. Click on Advanced Palletizing
- 4. Click Update License



Figure 10: Generator-String

5. Make a note of the 8-digit generator string and send it together with your contact details to <u>redeemlicense@kpi-software.de</u>





ABC	D EFGH			
Image: Second	ABCD EFGH	% \$ ! 6 7 8	? < > 9 0 =	← Backspace
q	w e r	t y u	i o p	Submit
a	s d f	g h j	k I +	-
🕈 shift	z x c	v b n	m ; ;	{ ( ) ;
				• •

Figure 11: Enter license key

6. You will then receive your 8-digit license key, which must be entered instead of the generator string



Figure 12: Successful licensing

7. You can recognize successful activation by the green tick



## 3.2 Overview

The URCap is divided into 3 sections. The individual sections are explained in more detail below.

- 1. Connection parameters and status display of the current status of the VNC connection
- 2. Setting options that control the behavior of the VNC server
- 3. Action buttons to control the VNC server



Figure 13: Overview



#### 3.2.1 Connection parameters and status display

Connection Parameter		
Password:	Set 1	4
Port:	5900 2	IP address 10.1.1.11:5900
Remote Timeout (s):	0 3	

Figure 14: Connection parameters

- 1. Password: Assign connection password
  - Maximum of 8 characters
  - Standard password: kpivnc
- 2. Port: Use a custom port
  - Standard port VNC protocol: 5900
- 3. Remote timeout (s): Timeout for remote access control, after the set time has elapsed, the continuation of the connection must be confirmed again via the control dialog on the robot control unit
- 4. Status display of the VNC connection, visualizes the current IP address of the robot, the port used and the number of connected clients or the status of the VNC connection



Figure 15: Status display

- 1. Current IP address of the robot
- 2. Current port for the VNC connection (default: 5900)
- 3. Status message

Status message	Description
Waiting for connection	VNC server started, no client connected
{No.} Client{s} connected	Indicates that {No.} clients are currently connected
VNC server not started	VNC server is currently not started, no client con-
	nection possible, VNC server can be parameterized
Installation failed (soft-	The software packages for the VNC server could
ware packages)	not be copied
Installation failed	The VNC server could not be installed, check that
	no other VNC server is installed on your robot, re-
	install the URCap
Password generation	Password assignment failed, check that the pass-
failed	word does not exceed 8 characters, repeat the pro-
	Cess



VNC server has been un- installed	VNC server has been uninstalled to permanently remove the VNC server, please delete the URCap
	and restart the robot
Invalid license key	A license key has not yet been entered or the li-
	cense key entered is invalid

## 3.2.2 Options

Options	5
Auto-Start: 🗹 🚺	Uninstall
	To permanently remove the VNC server, please
TightVNC file transfer: 🗹	also delete the URCap.
UltraVNC file transfer: 🗖 🛛 4	

#### Figure 16: Options

- 1. Auto-start: the VNC server is started automatically after restarting the robot. Attention: only when using the default.installation, because this is loaded when the robot is restarted
- 2. Multiple connections: with this setting it is possible that several clients can connect to the robot at the same time (only in View only mode)
- 3. TightVNC file transfer: when using the TightVNC client and the option activated, it is possible to exchange data with the robot
- 4. UltraVNC file transfer: when using the UltraVNC client and the option activated, it is possible to exchange data with the robot
- 5. Uninstall: If the VNC server is no longer required, the software packages can be uninstalled from the robot with this button



## 3.2.3 Action buttons



Figure 17: Action buttons

- 1. Start: Start the VNC server
- 2. Stop: Stop the VNC server (client connection is terminated)
- 3. Access: opens the control dialog of the current connection
- 4. Update license: Enter or update license key

## 3.3 Start the VNC server

Run Program Installa			PROGRAM <unnamed> NSTALLATION default*</unnamed>	New	Open	Save		DC CA	Ξ
🔪 General	VNC Server								
> Safety	Connection Parameter								
> Features	Password:	Set							
> Fieldbus	Port:	5900	_	$\sim$	P address	192.168.56.130:5	900		
VNC Server	Remote Timeout (s):	120		U P	-สรรพบเน ยู	generation Tailed			
<b>C</b>	Options								
	Auto-Start:	7	4				Ur	install	
	Multiple connections:	-					To perma the VNC	hently rem server, ple	nove ease
	TightVNC file transfer:	3					also delete	the URCap	<b>D</b> .
	UltraVNC file transfer:	3							
	5	0.00000	-			Undata Lia			
	Start Stop	Access			Ă		ense 🛛	SOFTW	ARE
Power off	Sp	eed	100%			0	Sin	nulation	

Figure 18: Start the VNC server

- 1. Open the installation page under Installation
- 2. -> URCaps
- 3. -> VNC Server
- 4. Check the connection and option parameters
- 5. Click the Start button



## 3.4 Stop the VNC server

Run Program Installa			PROGRAM <i< th=""><th>unnamed&gt; efault*</th><th>New</th><th>Open</th><th>Save</th><th><del>ار</del>+</th><th>D C C A</th><th><math>\equiv</math></th></i<>	unnamed> efault*	New	Open	Save	<del>ار</del> +	D C C A	$\equiv$
🔪 General	VNC Server									
> Safety	Connection Parameter									
> Features	Password:	Set								
> Fieldbus	Port:	5900		a	$\sim$	IP address	s 192.168.56.130:59	00		
VNC Server	Remote Timeout (s):	120			0	Password	generation failed			
	Options									
	Auto-Start:	<b>V</b>						Un	install	
	Multiple connections:							To perman the VNC s	ently ren	nove lease
	TightVNC file transfer:	<b>V</b>						also delete	the URCa	p.
	UltraVNC file transfer:									
	4									
	Start Stop	Acces	S			F	Update Licer	ise 🚺	S OFT	
Power off	Sr	oeed		100%			0	Sim	ulation	

Figure 19: Stop the VNC server

- 1. Open the installation page under Installation
- 2. -> URCaps
- 3. -> VNC Server

Check the master control over the robot

4. Click the Stop button



Toolbar

## 4 Toolbar

In addition to the installation node, it is possible to operate the VNC server from anywhere using the UR toolbar. In addition to the status display, you will find the buttons here to start/stop the VNC server and to call up the control dialog.

Neu	Öffnen	Speichern			Lokal	E 2 2 5	≡
			2	NC rver			
		$\sim^{\circ}$	IP-Adresse 1 Client ver	10.1.1.1 bunden	1:5900		
	Start	SI	:op	Zugriff			

Figure 20: Toolbar

- 1. Open the UR toolbar
- Select VNC server entry The functionality of the action buttons and the status display can be found in the Installation Node chapter.



## 5 Safety

For safety reasons, the robot may only ever be controlled from one control point. Therefore, a control dialog opens as soon as the first client connects to the robot. The control dialog on the robot control unit must be used to decide which rights are to be granted remote access and who will have control sovereignty.

R 🗄 🚬	
> Algemein	VNC Server
<ul> <li>Sicherheit</li> <li>Koordnatensys</li> <li>Feldbus</li> </ul>	Verbindungsparameter Peiswort: Setzen Pe
VIICape VIIC Server	Remote-Timeout (s): 120 Warte auf Verbindung
	Incoming remote access, how should the connection be handled? Allow View only Decline 1 2 3
	Start Stop Zugriff R Lizenz aktualisie 🔞 KPI
Reductors	Geschwähiligkeit 📥 200% 🕞 🙆 🙆 Smulecon 🇊

Figure 21: Safety dialogue

- 1. Allow: remote access receives control sovereignty, the touchscreen of the robot control unit is deactivated
- 2. View only: the remote access can only observe the robot control unit, not interact with the robot
- 3. Decline: remote access is not permitted, the VNC server is stopped



## 5.1 Remote access with control sovereignty

Permitted remote access with control sovereignty can be recognized by the red markings on the edge. The touchscreen of the robot control unit is only enabled again when the client disconnects, the set timeout has expired or the control dialog is called up.



Figure 22: Remote access with control sovereignty



## 6 File transfer

The file transfer can be done either with the UltraVNC Viewer or the TightVNC Viewer (Version 1.3.10). You can activate the file transfer in the options.

		PROGRAM <unnamed> INSTALLATION default*</unnamed>	New Open Save	k 🚼 🚍
> General	VNC Server			
> Safety	Connection Parameter			
> Features	Password: Set	:		
> Fieldbus	Port: 5900		IP address 192.168.56.130	5900
✔ URCaps	Remote Timeout (s): 120		Password generation failed	
VNC Server				
	Auto-Start: 🖬 Multiple connections: 📄 Tight/VNC file transfer: 🖬 Ultra/NC file transfer: 📄			Uninstall To permanently remove the VNC server, please also delete the URCap.
	Start Stop A	ccess	🛛 Update Lie	ense KPI
Power off	Speed 🥌	100%	• • •	Simulation

Figure 23: File transfer

#### 6.1 UltraVNC Viewer

Note: The file transfer with the UltraVNC Viewer has been tested with the current versions 1.2.4 and 1.3.2 (<u>https://www.uvnc.com/downloads/ultravnc.html</u>).

Right-click in the top menu bar to open the context menu first. In this you then select File Transfer.



Figure 24: Open UltraVNC context menu





	Wiederhenstellen         tp50           Größe Andem         tp50           Minimieren         default           Maximizeren         stafefen           Schäfelten         Alt+f4	×
stp50	File Transfer.         Q         Cbit-ARe-F7           Chat.         Cbit-ARe-F8         Cbit-ARe-F8           Show Toolbar         Cbit-ARe-F9         Disable Remote Input/Monitor           Disable Remote Input/Monitor         View Only         Cbit-ARe-F3	
status Gestoppt	Clipboard     >       Dipplay     >       Keyboard     >       Connection options     Ctrl+Ak: 5hft+1       Request screen refresh.     Ctrl+Ak: 5hft+R       New connection     Ctrl+Ak: 5hft+N	Keine Variablen
Betriebszeit	Save connection into as Ctrl-AR-F5 About WC Viewer	
0 18 21 59	Wegpunkte anzeigen	

Figure 25: Open UltraVNC file transfer

ur-20215200325:0				– 🗆 ×
as 🅱 🕸 😂 📫 🔝 🕕 😣 🕃				10.1.1.11
	er with < ur-20215200325:0 > - UltraVNC		- • ×	
	V LOCAL MACHINE \	[C:] - Local Disk V	REMOTE MACHINE	
Programm		C.1		
stp ↓ [C:] ↓ [C:]	Size Modimed Local Disk Local Disk CD-ROM Local Disk	3 () () () () () () () () () ()	Size Modimed Folder Folder Folder Folder Folder	
Progra  (My Docume (Network Fo	ents ] avorites ] Network Network	Send >> [acc] (home] (<< Receive [lost+found]	Folder Folder Folder Folder	
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Betriebszeit		(uar) [vagrant] (var)	Folder Folder Folder 8.72 Mb 01/01/1601 02:02 2.97 Mb 01/01/1601 02:02	
Taga Chundan M		Minimize		
rage stunden m		Close		
0 18		Forced Close > 26 File(s)/Folder(s)		
History > I	08/20/21 12:05:20 - Connected		~	
Progress				
Connected			d.	
Reduziert	Geschwindigkeit	53% Fernzugriff	$\mathbf{O}$	Simulation

Figure 26: UltraVNC file transfer



## 6.2 TightVNC Viewer

Note: File transfer with the TightVNC Viewer only works with version 1.3.10 (<u>https://www.tight-vnc.com/download-old.php</u>).

Click the file icon to open the file transfer.



Figure 27: Open TightVNC file transfer

@ ur-20215200325:0		- 🗆 X
	PROGRAMM <b>stp50</b> 🕃 🛅 🕞 INSTALLATION default* Nu Offmen Spedwrn	K+ 🎦 🚍
Progi <sup>ta</sup> mm	Variablen	
stp50	ht/NC File Transfers ? X Local Computer Tight/NC Server	
Programm laden	Name Size D: d-Size D: d-Size Size Size Size Size Size Size Size	
status Gestoppt	E dista dia dia dia dia dia dia dia dia dia di	
Betriebszeit	not devides an devides aten devides devides Cancel Concel	
0 18 44 50	Uwgpunkte anzeigen	
Reduziert	Geschwindigkeit 53%	Simulation

Figure 28: TightVNC file transfer



# 7 Directories

# 7.1 List of figures

Figure 1: Home screen
Figure 2: Select Settings
Figure 3: Add URCap
Figure 4: Select URCap on USB stick
Figure 5: Restart the robot
Figure 6: URCap is installed
Figure 7: Uninstall software
Figure 8: Select URCap
Figure 9: Installation Node
Figure 10: Generator-String
Figure 11: Enter license key10
Figure 12: Successful licensing
Figure 13: Overview
Figure 14: Connection parameters
Figure 15: Status display
Figure 16: Options
Figure 17: Action buttons
Figure 18: Start the VNC server
Figure 19: Stop the VNC server
Figure 20: Toolbar
Figure 21: Safety dialogue
Figure 22: Remote access with control sovereignty
Figure 23: File transfer
Figure 24: Open UltraVNC context menu
Figure 25: Open UltraVNC file transfer
Figure 26: UltraVNC file transfer
Figure 27: Open TightVNC file transfer
Figure 28: TightVNC file transfer



# 8 Notes