A logo with blue circles and black text

Description automatically generated

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| Technische Hochschule Ulm |
| Digital Twin of Kuka KR3 |
| User Guide |

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| Ibrahim Almohamed, Ahmed  22.09.2024 |

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# Version and Control

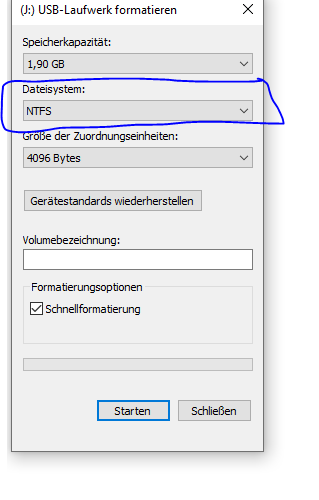
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| --- | --- | --- | --- |
| Version | Name of Editor | Notes | Date |
| 1.0.0 | Ahmed Ibrahim Almohamed | n/a | 22.09.2024 |
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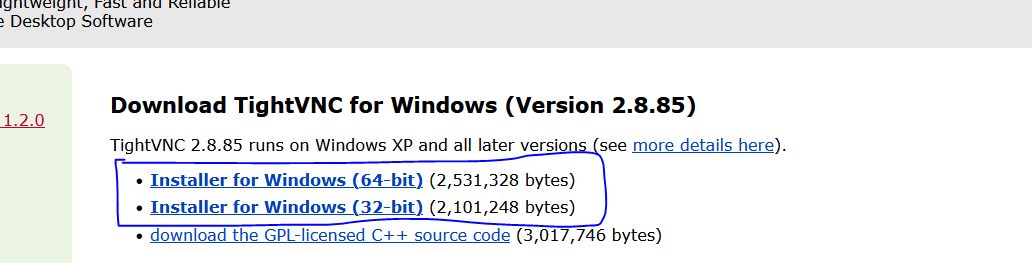
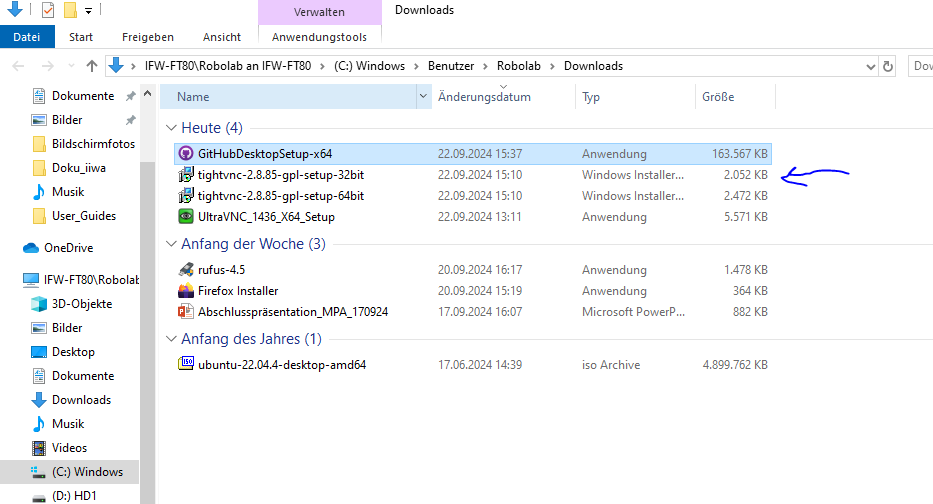
# Setup robot HMI mirroring

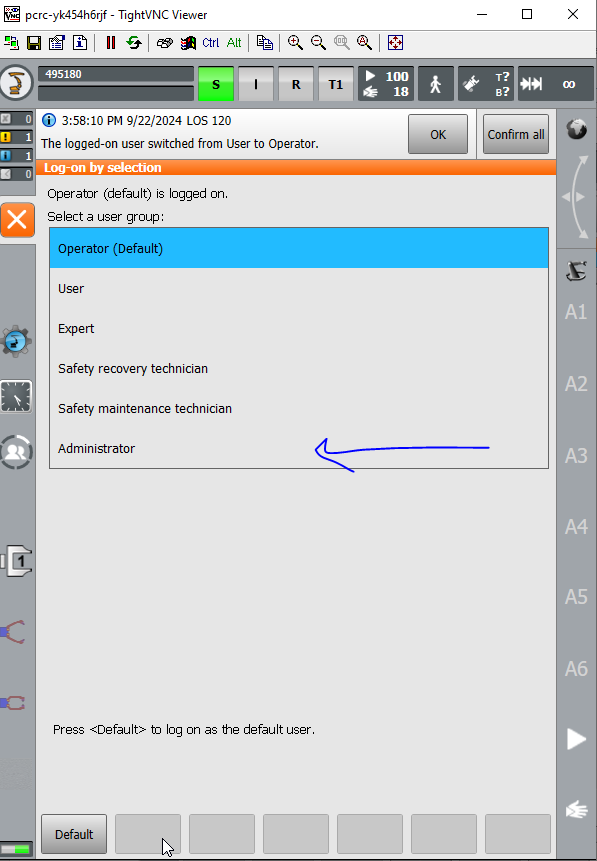
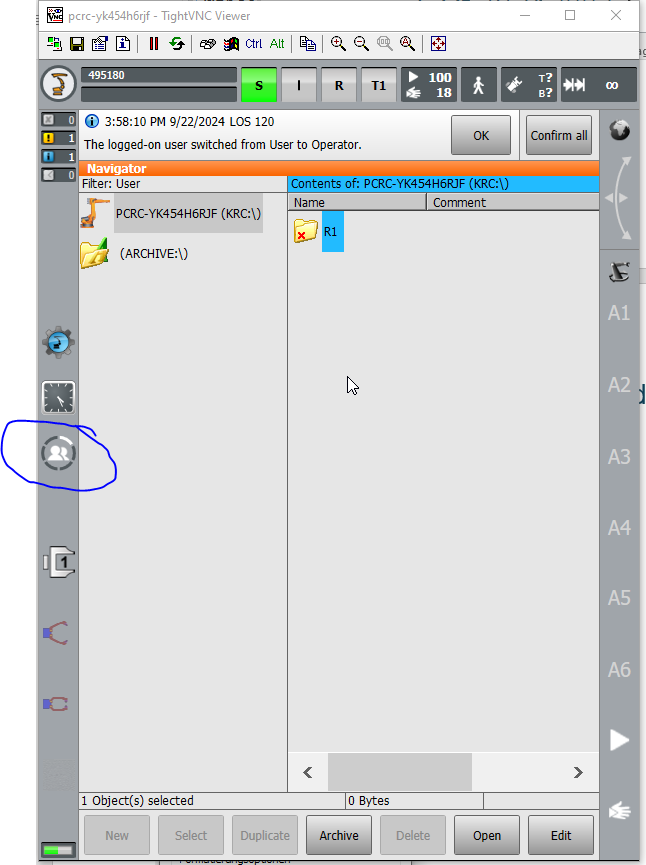
## USB configuration and robot setup

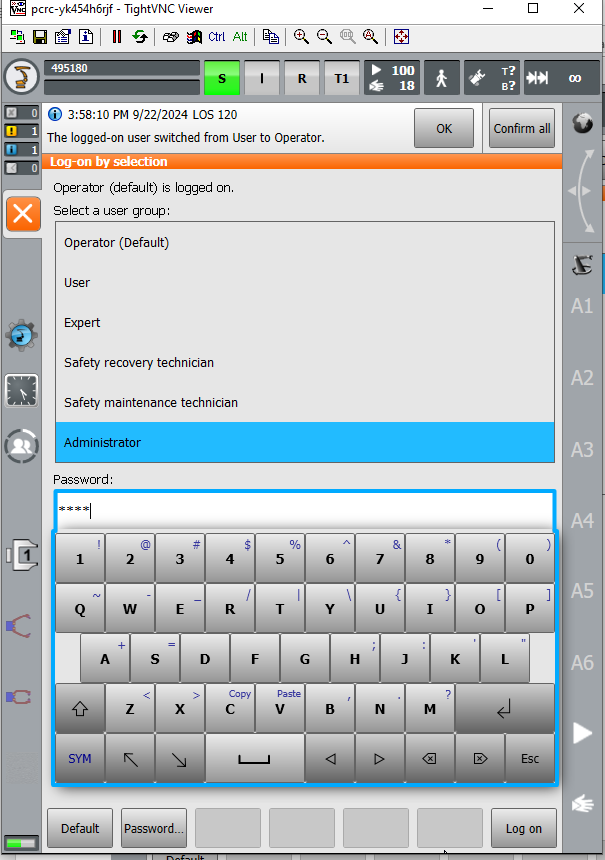
Grab a usb (memory size must be < 4GB) , then on your windows OS do the following :

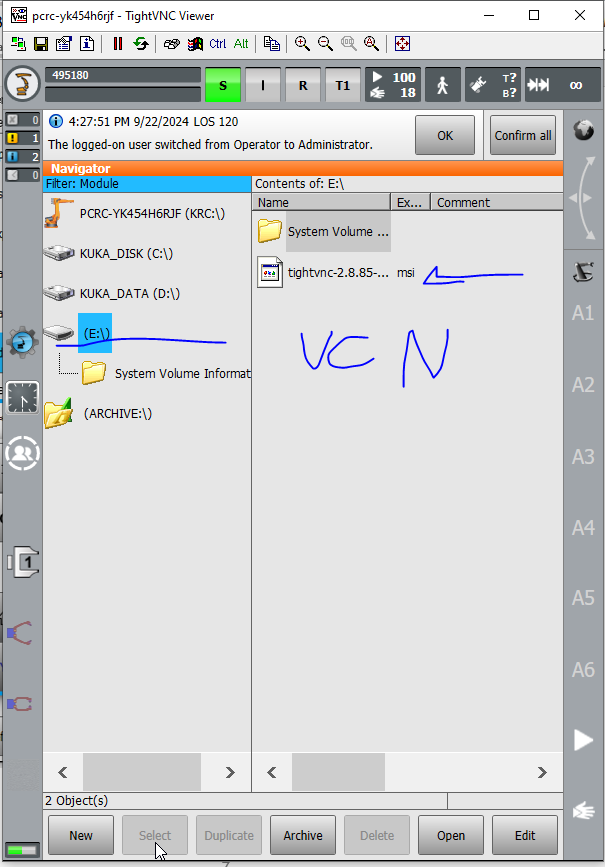
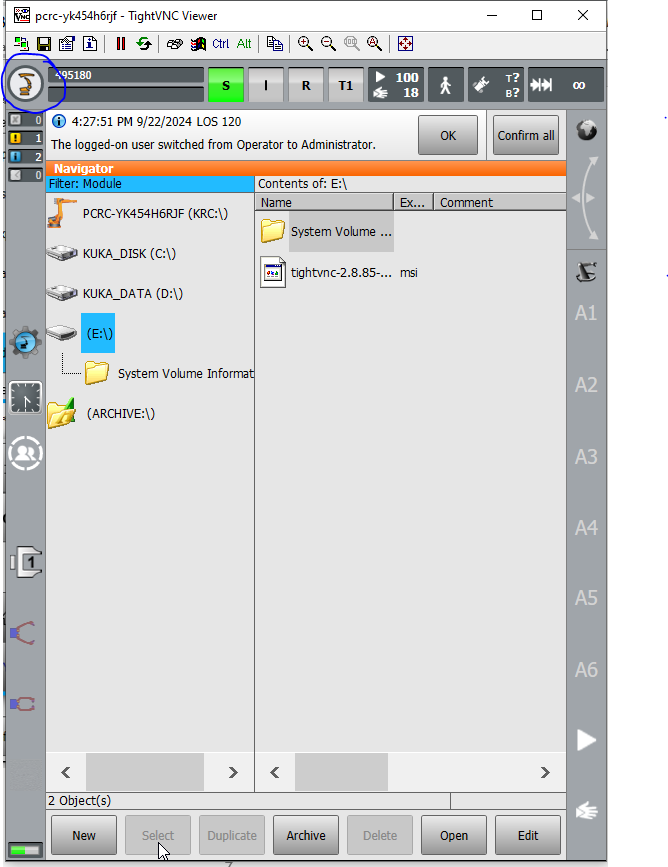
* **format the usb into NTFS file format**.

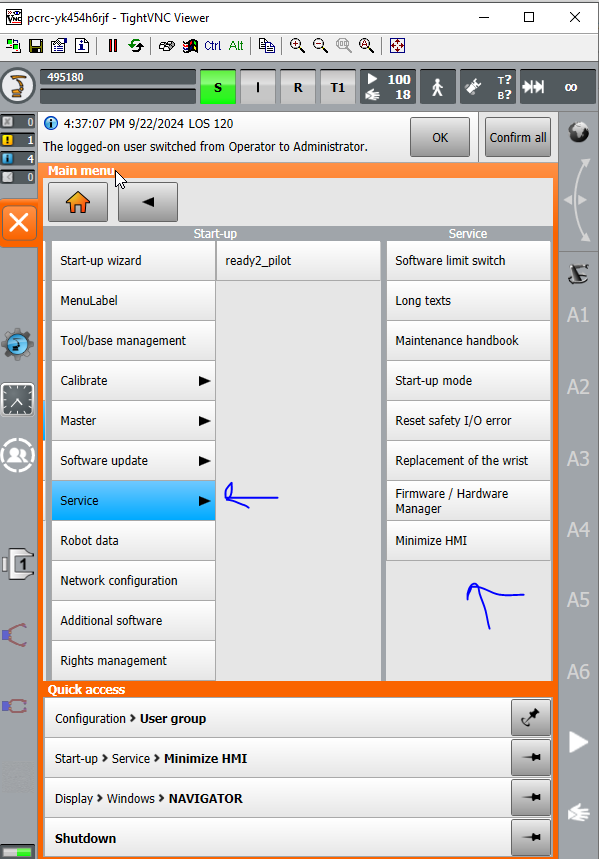


* **go to** [**https://www.tightvnc.com/download.php**](https://www.tightvnc.com/download.php) **and install BOTH of the vnc installers**.
* **Then copy the 32bit installer on the usb** 
* **stick the usb on the usb ports of the robot**. 
* **after that on the SmartPad (you have to start the robot) switch the users to admin (the password is : kuka).**

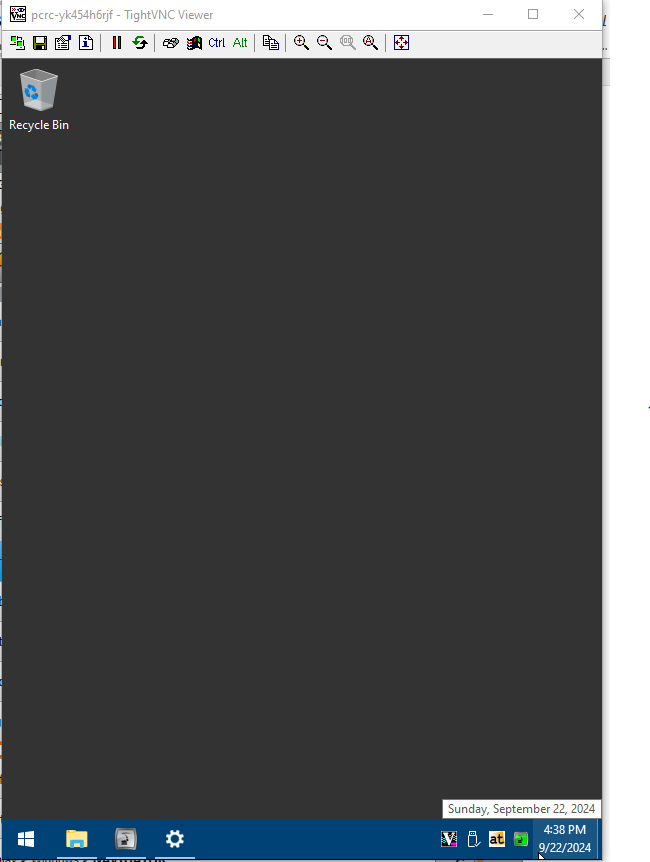




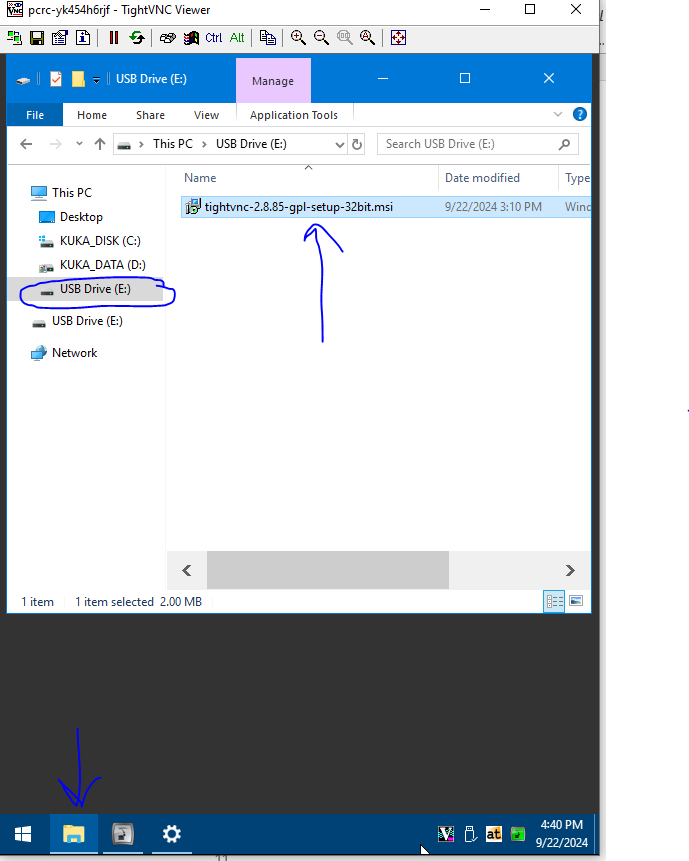
* **after that the usb will show on the HMI with the vnc downloader**. 
* **After that click the robot icon on top left** 
* **go to service -> Minimize HMI then (image) the windows that is running on the KRC4**

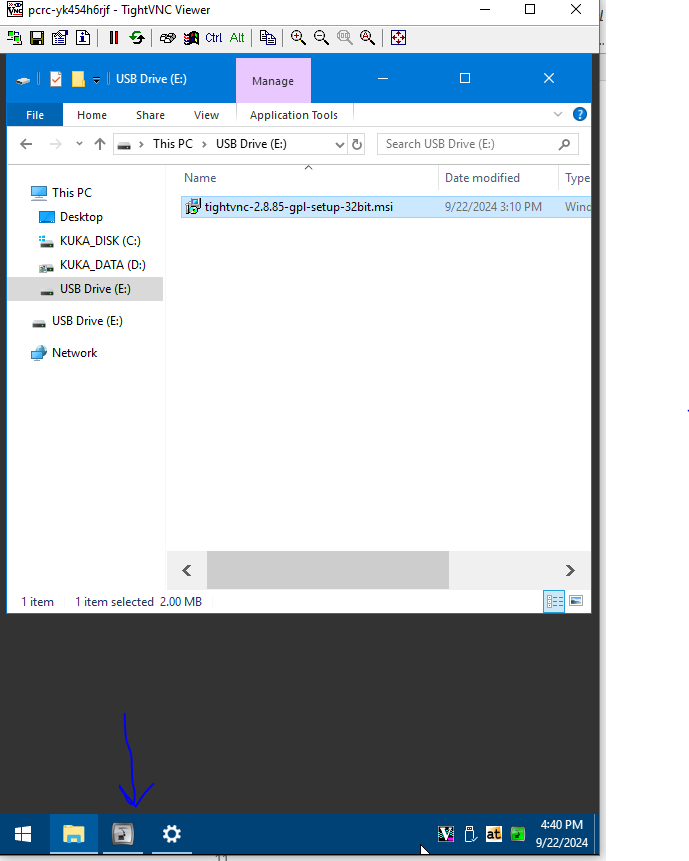


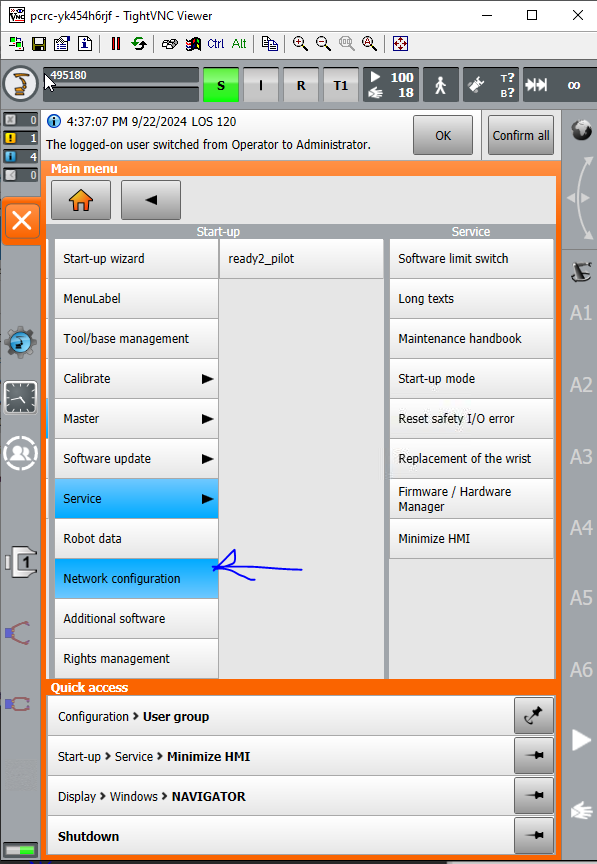
* **shows up (desktop)(image)**



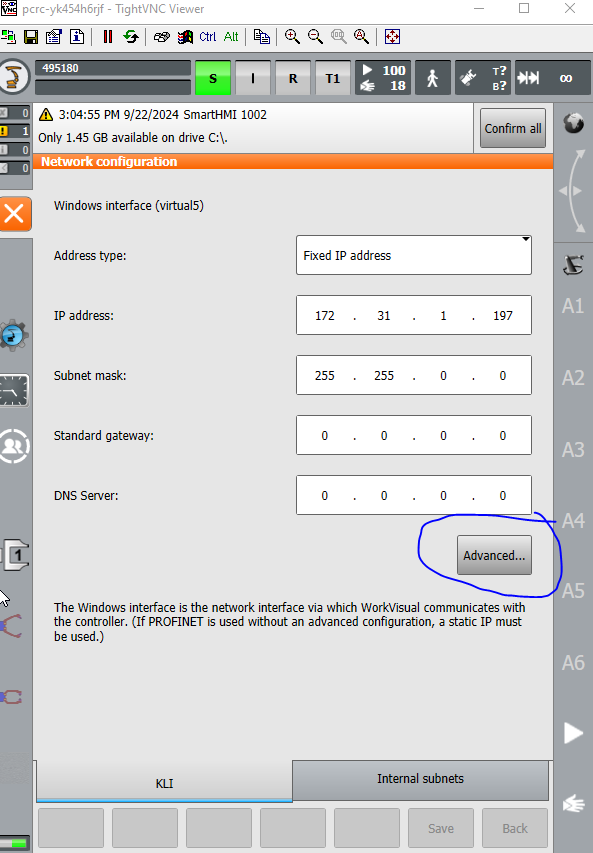
* **after that open the file explorer and go to your usb driver and run the downloader.**

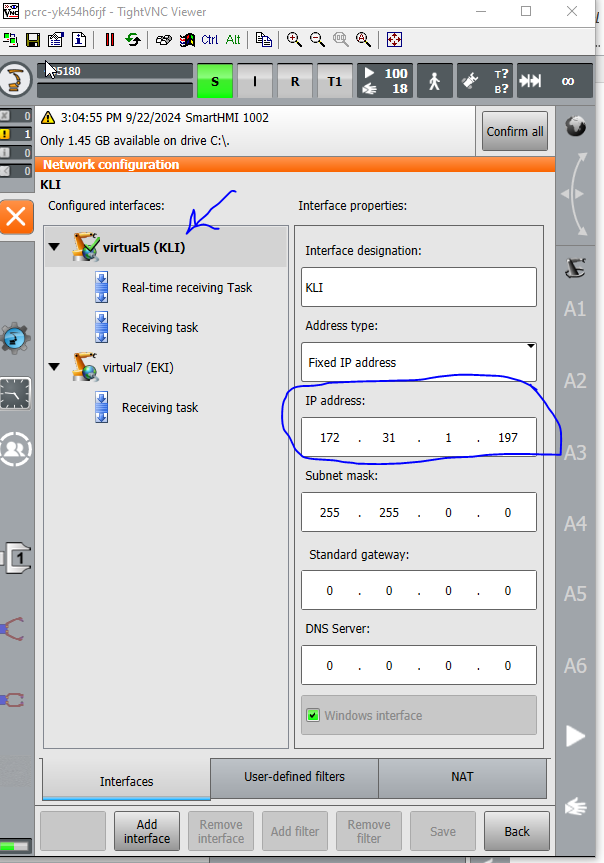
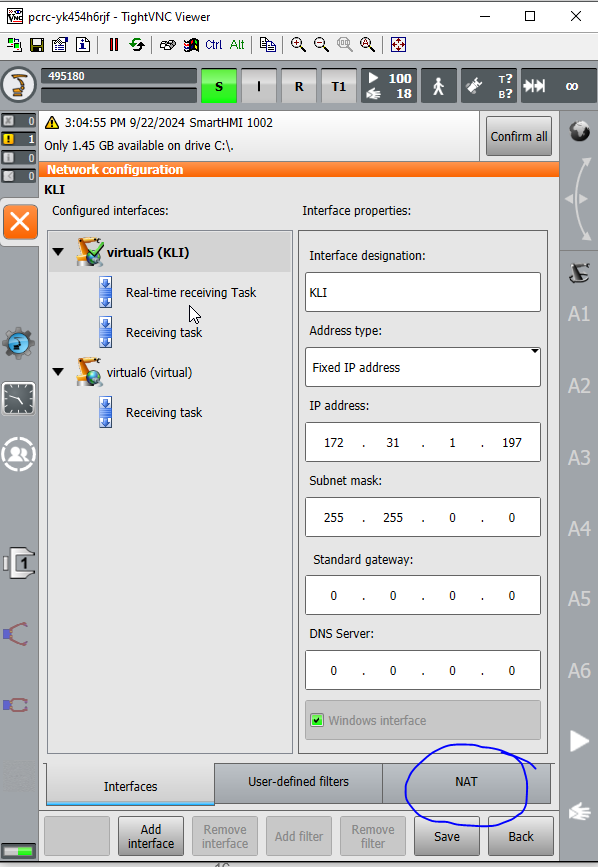
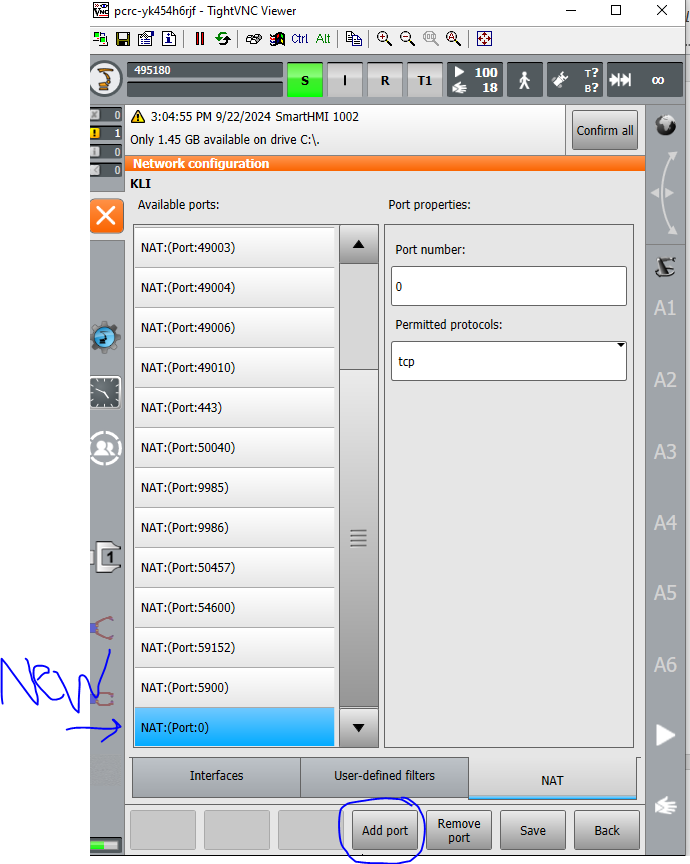


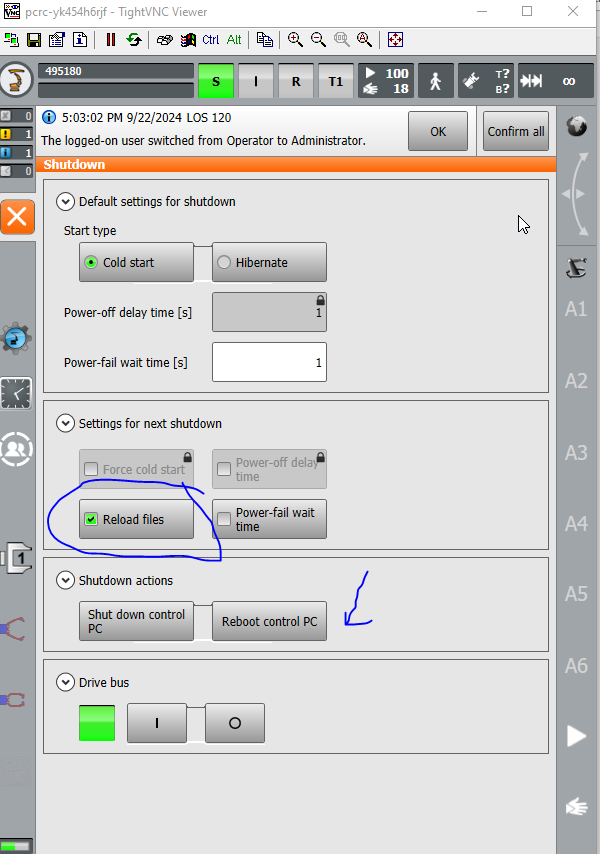
* **just run the downloader with all the default settings .**
* **after finishing go back to the HMI (Image**) 
* **click again on the robot icon and select Network configuration and wait for some seconds till the configuration start.**



* **go the Advanced,**



* **you can see the KLI configuration , this is the connection we are using on this project . now first write down the ip of the KLI (image)** .
* **then go to NAT button (image) -> add port , change the port number to 5900 and the permitted protocols to tcp/udp and click save (image)** .  
* **After that stay as Admin , click on the robot icon -> shutdown , Reload files (check) and Reboot control PC (image)**

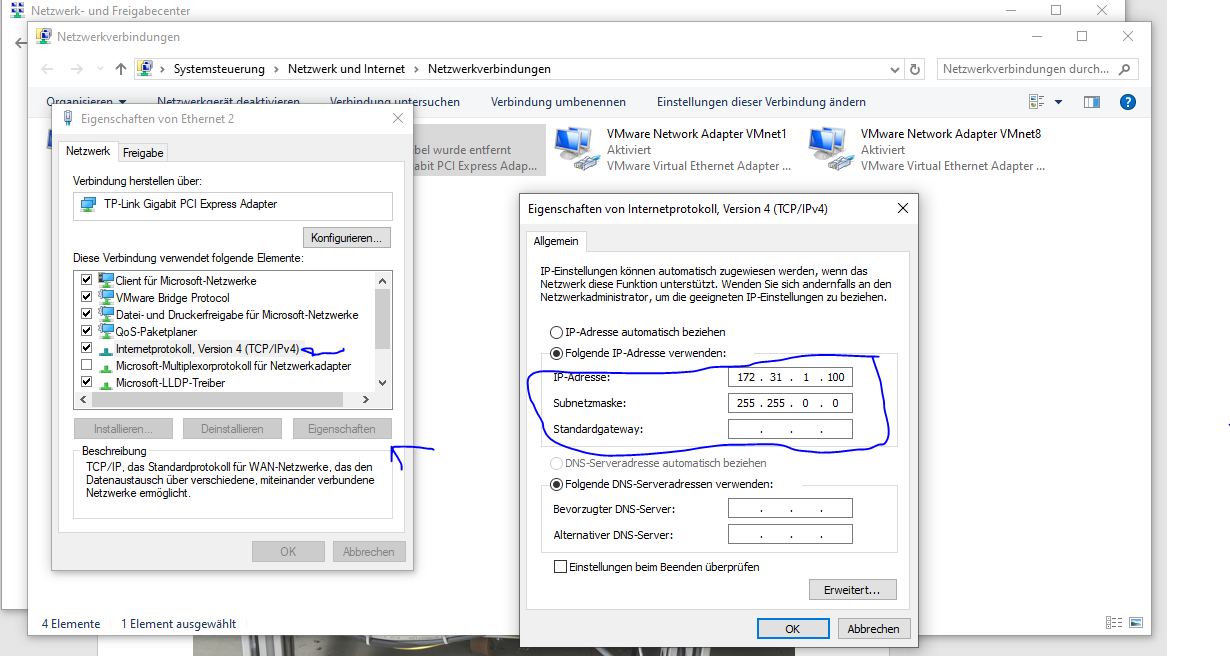
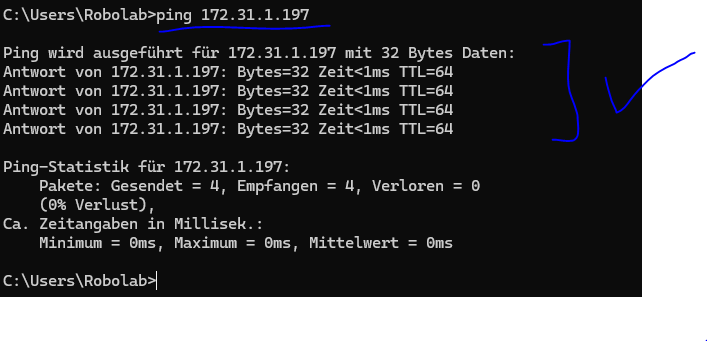


**Now we are done with the robot and from now on we shall only use the mirroring viewer of the TightVNC .**

## Windows IPV4 configuration and VNC viewer

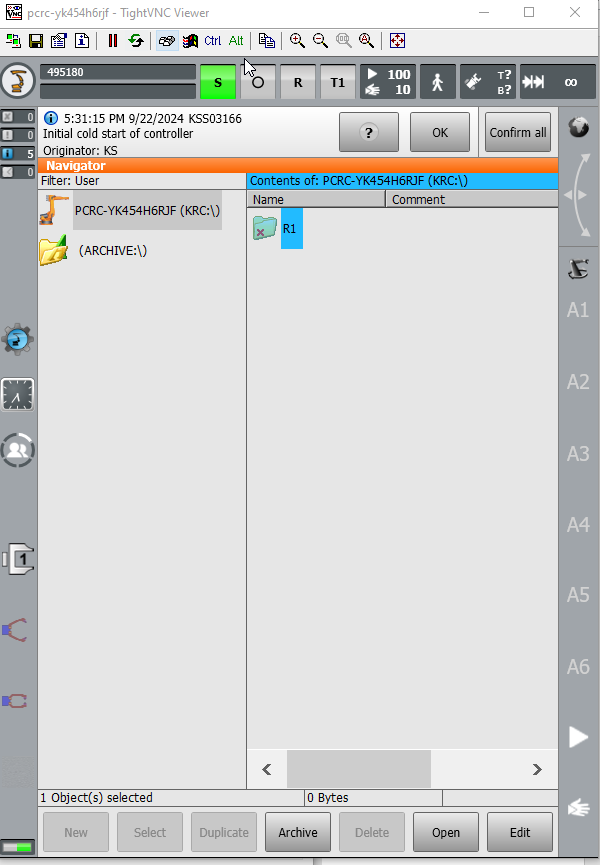
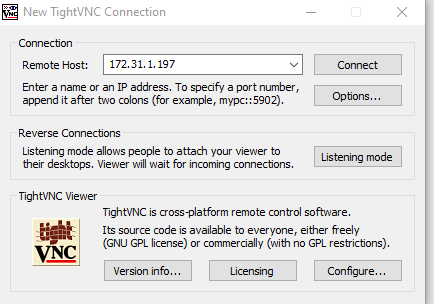
* **After setting up the robot, connect the robot to the PC via a LAN (Ethernet) cable at the KLI port (Fig.).**



* **Then go to Windows Control Panel -> Network and Internet -> Change adapter settings -> Right-click on your Ethernet card -> Properties -> IPv4 and select Properties , change the ip address to something near the one on the robot (by me on the robot it was 172.31.1.197) so i set the ip on windows to : 172.31.1.100. click ok and close the window (image).** 
* **now open a cmd prombt and type : ping <ip\_of\_the\_robot> by me it is ping 172.31.1.197 (image).** 

**if you revice a response then every thing is working right .**

**now we already installed the TightVNC for windows (64 bit) install it and run the viewer(TightVNCViewer)(image).**

* **input the ip and connect , then the HMI of the robot starts on your PC**. 

**(if the HMI is not fully viewed (some parts are not showing ) then go admin -> minize HMI -> right click on the robot desktop -> display setting -> change orientation to landscape).**

**HINT : if when starting the viewer session , the kuka asks you to log in (like windows log in screen ), then please use the following creds : user name : KukaUser , password : 68kuka1secpw59**

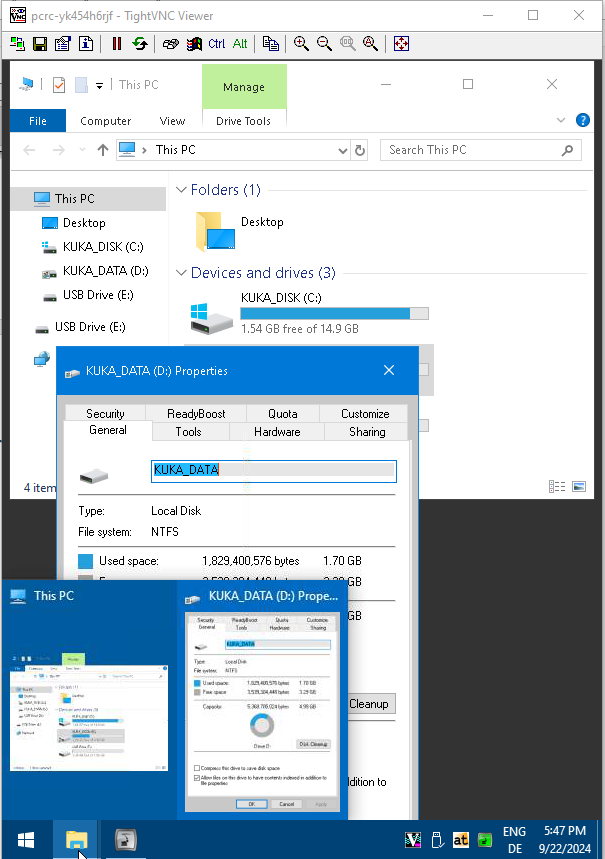
# Shared Data driver

we are not using the usb after this guide we share the data simply between the host PC and the Kuka robot .

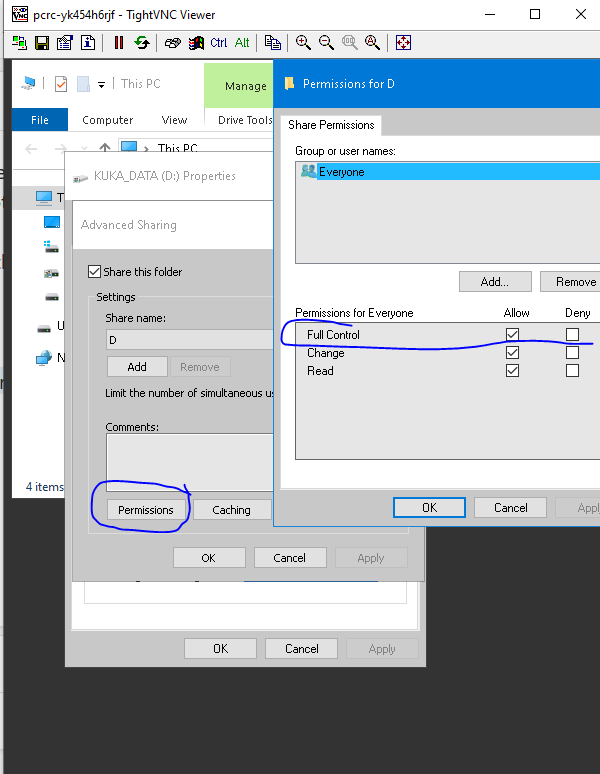
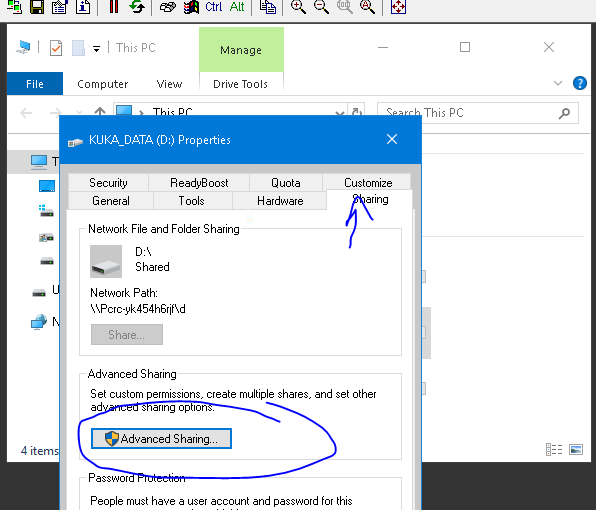
**first start the robot and on the pc start the VNC viewer .**

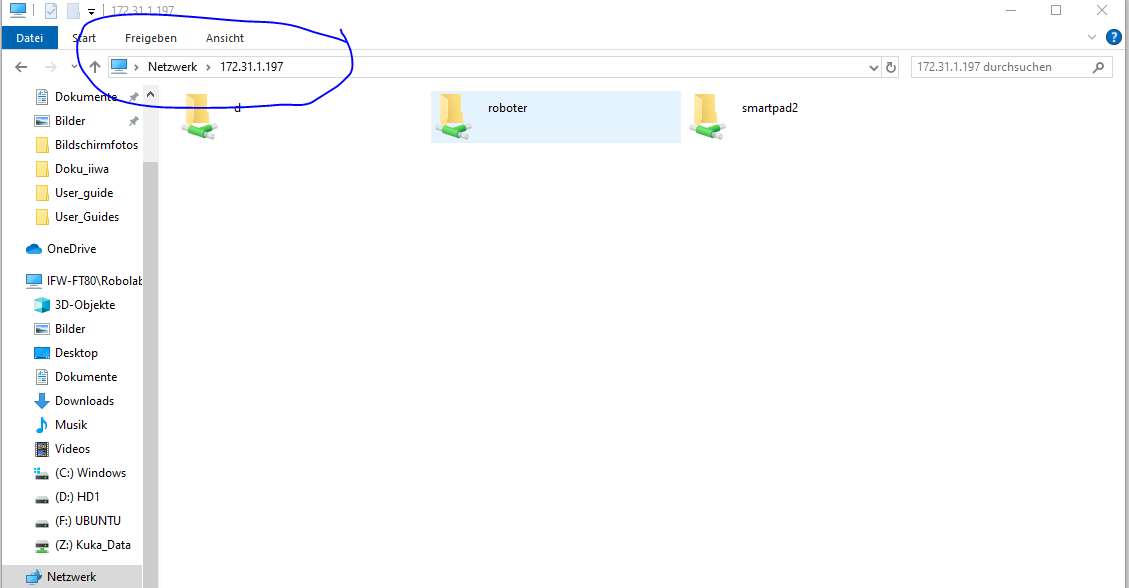
**Log in as admin and minimize the HMI .**

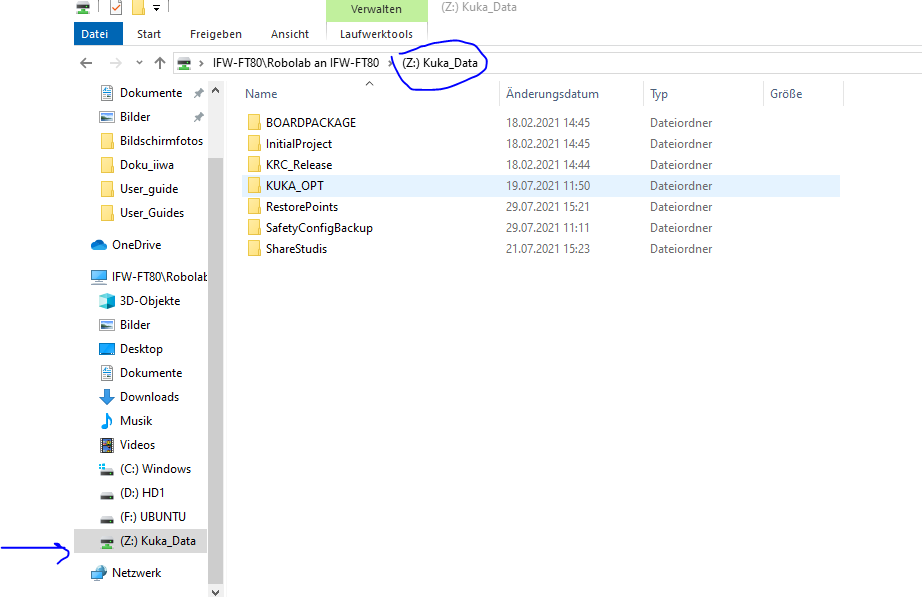
* **Open the file explorer and right click on the KUKA\_DATA(D:) driver and select properties(image**).



* **go to sharing ->Advanced sharing - Permissions -> check full control(image).**

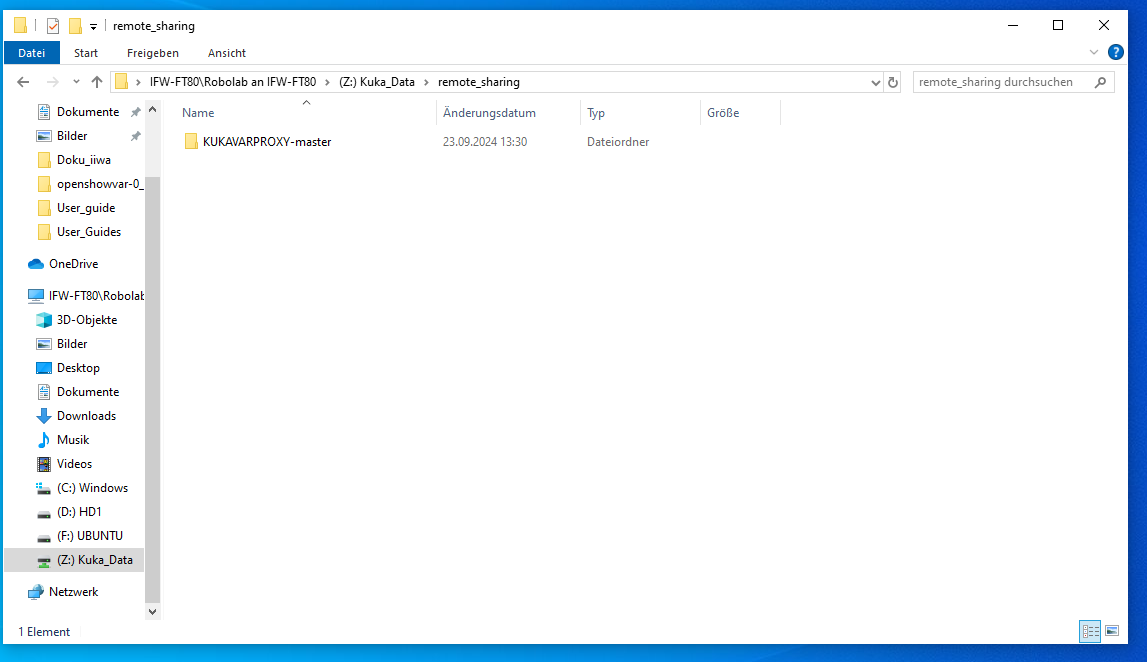


* **after that on your windows PC (host ) open the file explorer and in then type \\<ip\_of\_the\_robot>(image). and that’s it .** 

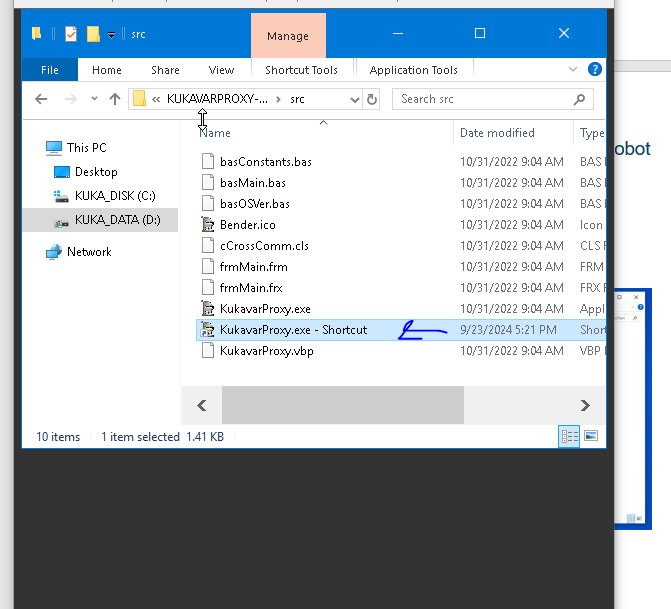
**now if you want to always have the driver on your pc , on your file explorer right click network , connect a network and on the network name insert : \\<ip\_of\_robot>\d. this then create a driver that connects to the robot.**

# Installing KUKAVARPROXY server on the Robot

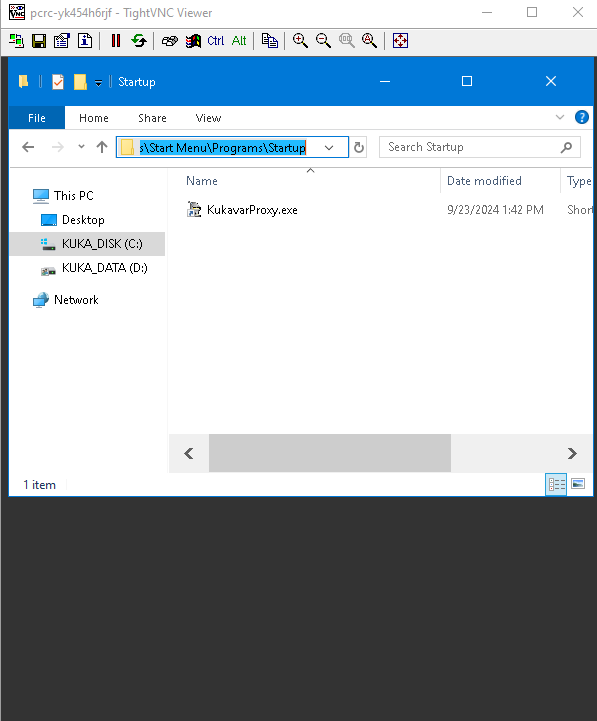
so after creating the shared driver with the robot , its quite easy to install and setup the KUKAVARRPOXY on the robot .

**Start by installing the software from : https://github.com/ImtsSrl/KUKAVARPROXY , install it as a zip file and extract it , now copy the extracted file to the shared driver (image) .** 

**after that start the VNC viewer go as admin and minimize the HMI .**

**now go to KUKA\_DATA(D:)/path/to/KUKAVARPROXY/src and create a shortcut of the KukavarProxy.exe (image).** 

* **after that copy the short cut to :**
* **C:\Users\KukaUser\AppData\Roaming\Microsoft\Windows\Start Menu\Programs\Startup so the program start when the robot is starting(image).**
* **after that go back to the HMI as ADMIN and add a new port (same way as in the VNC server ) the port of KUKAVARPROXY should be 7000 and the typ to TCP/UDP.**



* **After that restart the robot .**
* **on your PC install the openshowvar client (as test client we shall write our own client).**
* **from : https://sourceforge.net/projects/openshowvar/**

**after the go to the directory where you installed the openshowvar , extract it , and first there is a xml-file called "varlist" open it and copy this :**

<VARLIST>

<VARIABLE>

<NAME>$OV\_PRO</NAME>

<ROBOT>172.31.1.197</ROBOT>

</VARIABLE>

<VARIABLE>

<NAME>$AXIS\_ACT</NAME>

<ROBOT>172.31.1.197</ROBOT>

</VARIABLE>

<VARIABLE>

<NAME>MYAXIS</NAME>

<ROBOT>172.31.1.197</ROBOT>

</VARIABLE>

<VARIABLE>

<NAME>$E6AXIS</NAME>

<ROBOT>172.31.1.197</ROBOT>

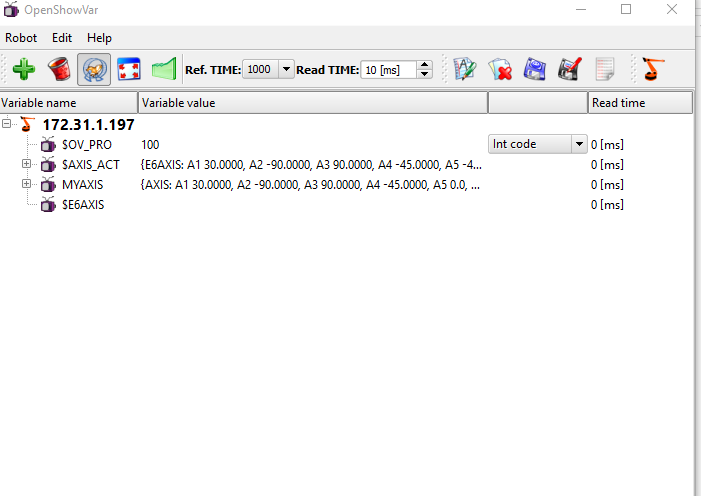
</VARIABLE>

</VARLIST>

**Change the ip to your robot ip !**

**now after that start the openshowvar.exe there you can view the global variables defined in the xml file ( at the beginning the variable : MYAXIS is not shown because we have to create it on the robot ! ).**

**and thats it! you can change the $OV\_PRO and see that its changed on the robot HMI and the VNC viewer.**



HINT : **if the KUKAVARPROXY.exe shows an error “339” then solve with this :**

<https://github.com/ImtsSrl/KUKAVARPROXY/issues/18>