

## PM DIGITAL Technical Support

### HMS EtherCAT TwinCAT Beckhoff Software Guideline



Demonstrator Consists of these Software tools:

- CubeMX -> L5 config
- CubeIDE -> L5 to NP40 and SGP30

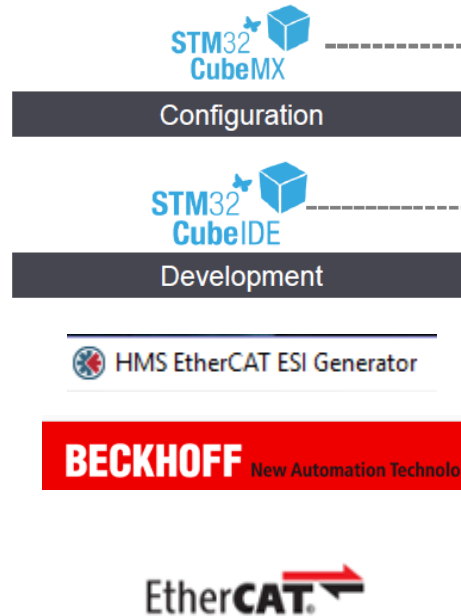
PLC Slave

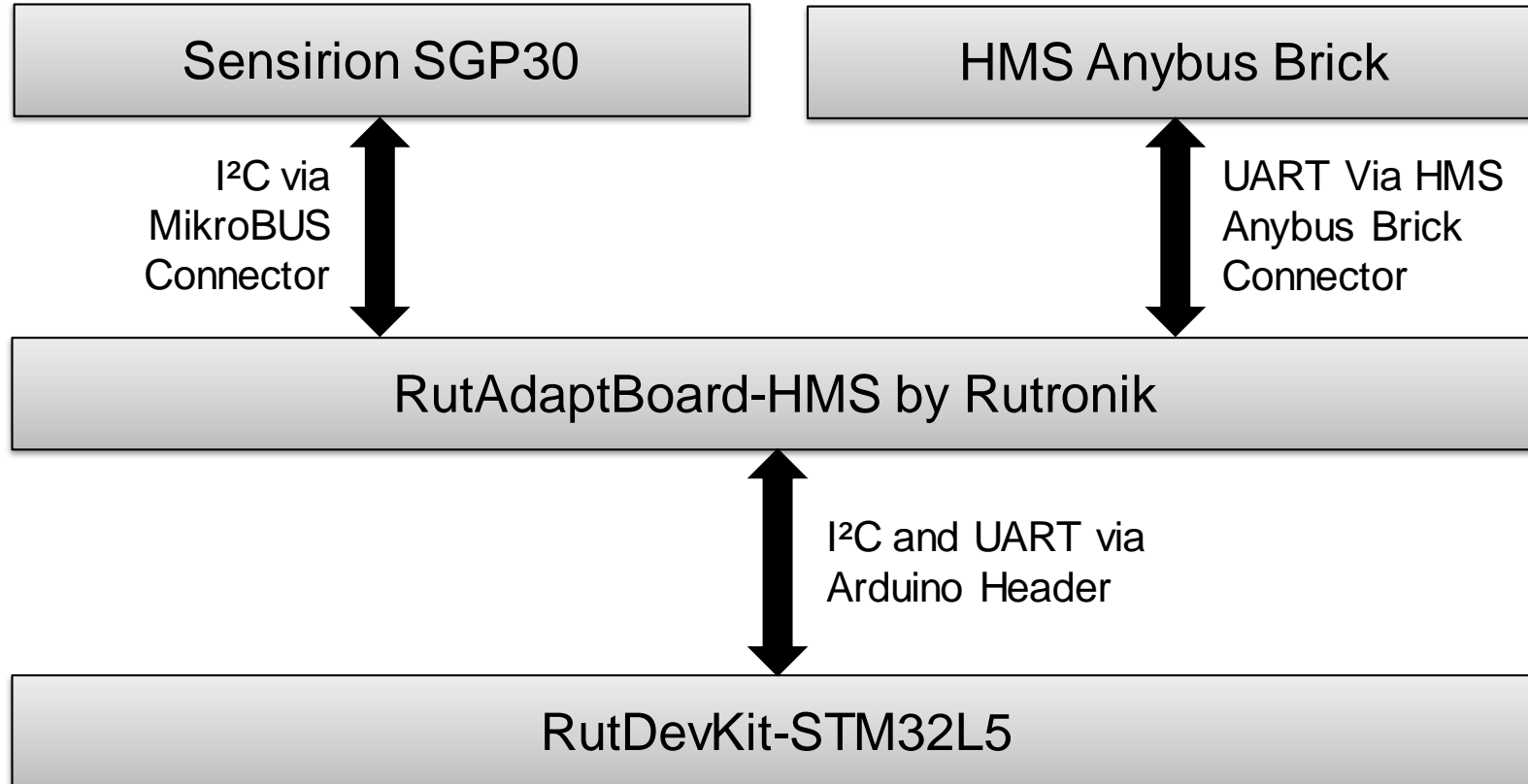
- HMS ESI Generator
- Beckhoff -> TwinCAT VisualStudio 2013

PLC master

- Visual Studio 2017 for GUI

TwinCAT and the GUI share Variables, so both must be running for the software at once.





# Guideline EtherCAT Anybus Demo

## Necessity:

**HMS\_ABCC\_ETH\_RutDevKit.bin // Project Binary**

## COM PORT Connection:

**Check our output in the  
Terminal:**

**Make sure your computer see the  
The plugged Ethernet cable**

```
COM18 - PuTTY
Inside APFL_HandleAbcc
APFL_RUN:
RSP MSG_GET_PARAM_SUPPORT: 1
ABP_ANB_STATE_PROCESS_INACTIVE
Module Running
Inside APFL_HandleAbcc
APFL_RUN:
ABP_ANB_STATE_PROCESS_INACTIVE
Module Running
Inside APFL_HandleAbcc
APFL_RUN:
ABP_ANB_STATE_PROCESS_INACTIVE
Module Running
Inside APFL_HandleAbcc
APFL_RUN:
RSP MSG_GET_MODULE_ID: 0x403
ABP_ANB_STATE_PROCESS_INACTIVE
Module Running
Inside APFL_HandleAbcc
APFL_RUN:
ABP_ANB_STATE_PROCESS_INACTIVE
Module Running
Inside APFL_HandleAbcc
APFL_RUN:
ABP_ANB_STATE_PROCESS_INACTIVE
Module Running
Inside APFL_HandleAbcc
APFL_RUN:
RSP MSG_GET_NETWORK_ID: 0x87
ABP_ANB_STATE_PROCESS_INACTIVE
Module Running
Inside APFL_HandleAbcc
APFL_RUN:
ABP_ANB_STATE_PROCESS_INACTIVE
Module Running
Inside APFL_HandleAbcc
APFL_RUN:
ABP_ANB_STATE_PROCESS_INACTIVE
Module Running
Inside APFL_HandleAbcc
APFL_RUN:
RSP MSG_GET_FW_VERSION: 2.15.1
ABP_ANB_STATE_PROCESS_INACTIVE
Module Running
Inside APFL_HandleAbcc
```

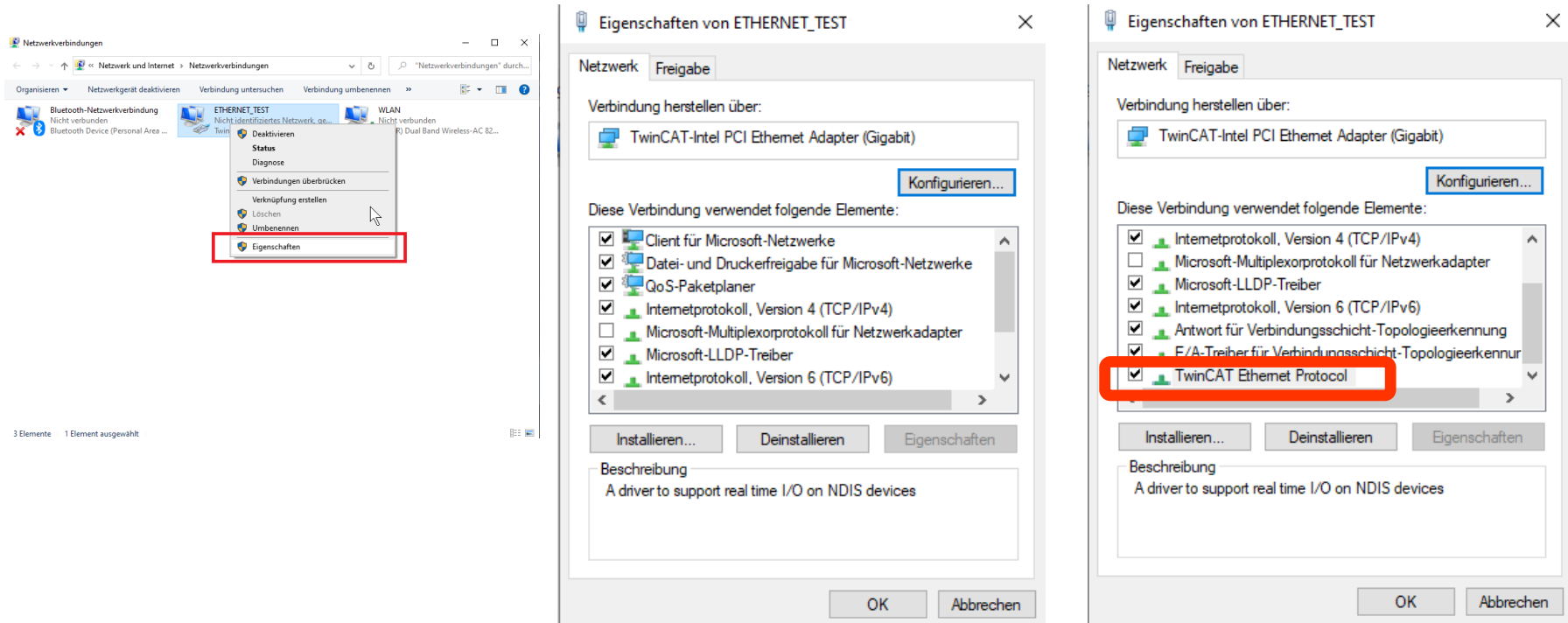


LAN-Verbindung

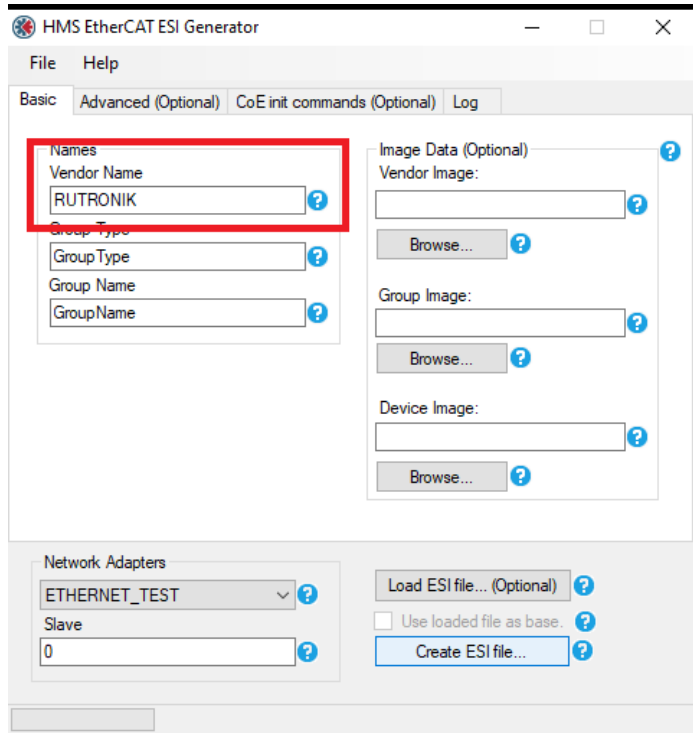


Verbunden ✓

## Necessity: make sure your Ethernet Connection is TwinCAT ready:



## Start your HMS ESI Generator



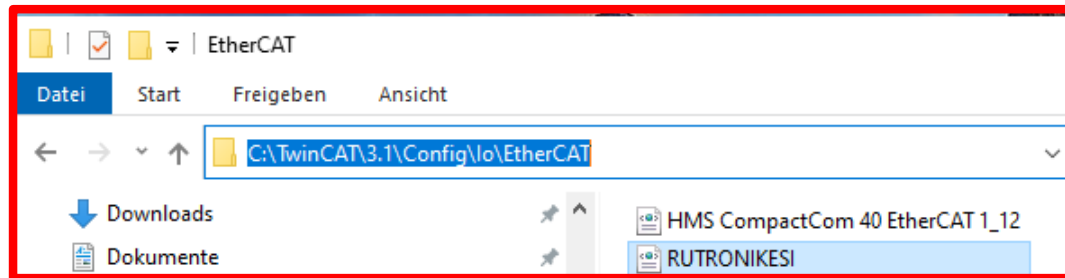
Check the Vendor name in

**ABCC/Inc/abcc\_adapt/abcc\_identification.h**

(EtherCAT object: Attribute 6)

```
240 ** Attribute 6: Manufacturer device name (Array of CHAR)
241 */
242 #ifndef ECT_IA_MANF_DEVICE_NAME_ENABLE
243     #define ECT_IA_MANF_DEVICE_NAME_ENABLE           TRUE
244     #define ECT_IA_MANF_DEVICE_NAME_VALUE           "RUTRONIK"
245 #endif
```

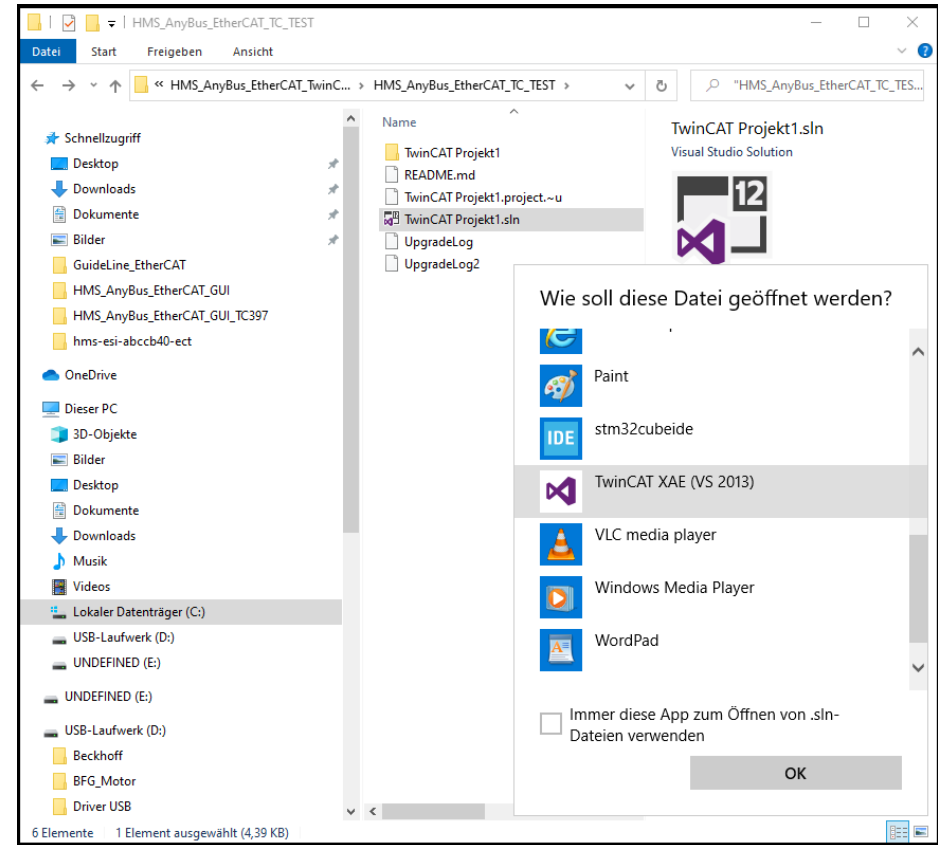
**Put the generated Esi into the folder directory (RUTRONIKESI):**



# Guideline EtherCAT Anybus Demo

**Start the PLC project:  
HMS\_Anybus\_EtherCAT\_TwinCAT**

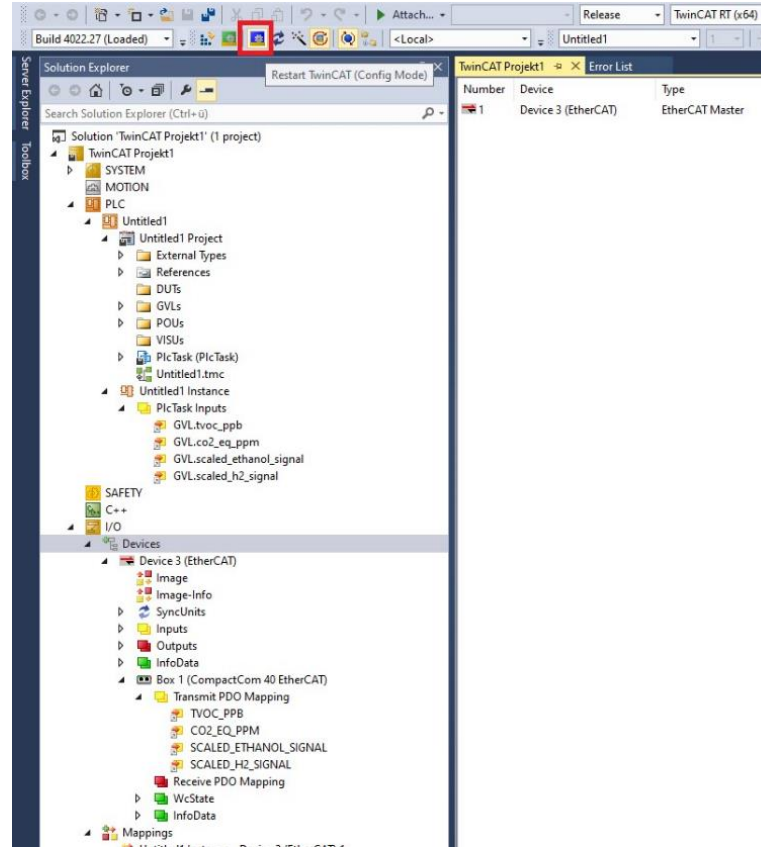
**Start it with TwinCAT XAE (VS 2013)**





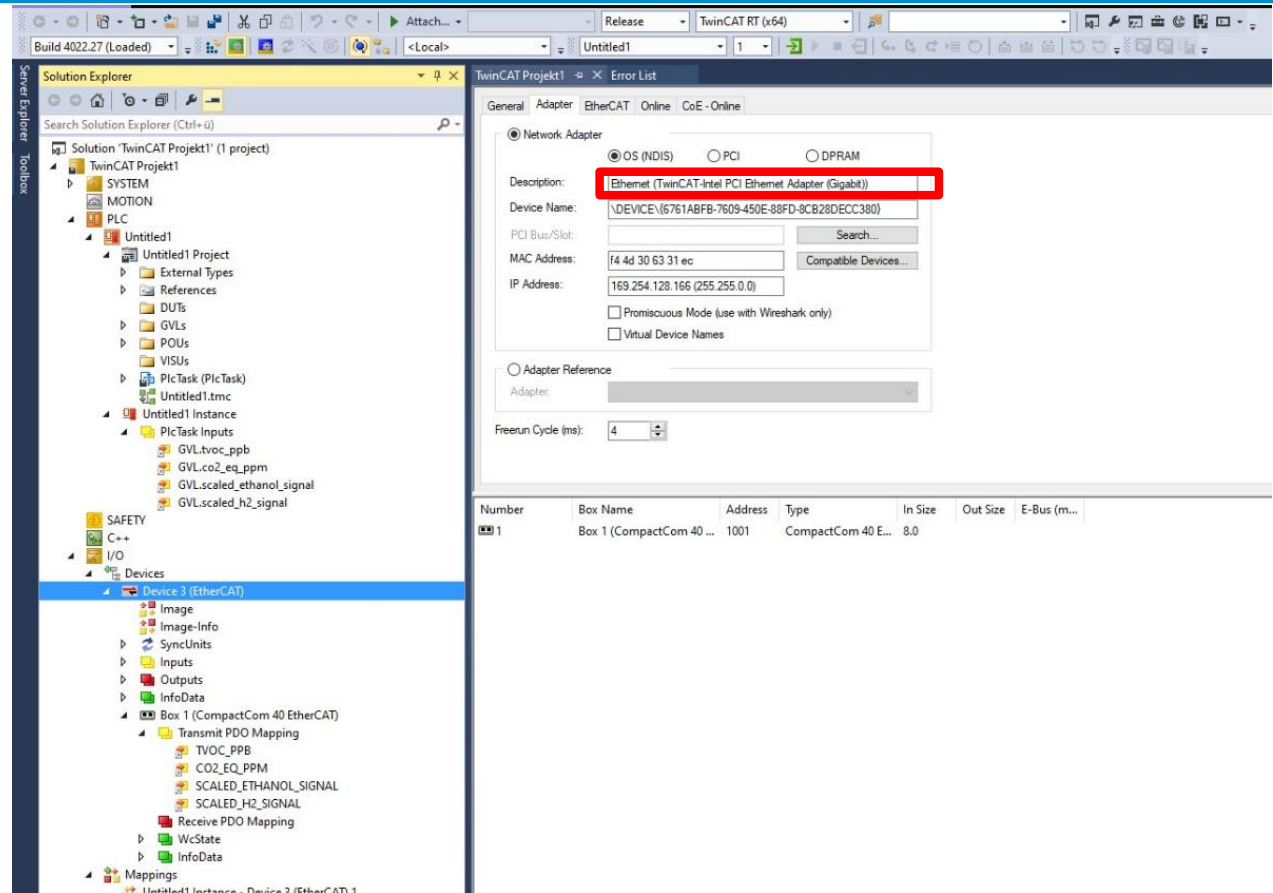
# Guideline EtherCAT Anybus Demo

**Check the settings:**  
**Check if you are in**  
**„Configuartion mode“**  
**If not click on the icon**  
**The I/Os will be loaded**  
**And activate „free run“**



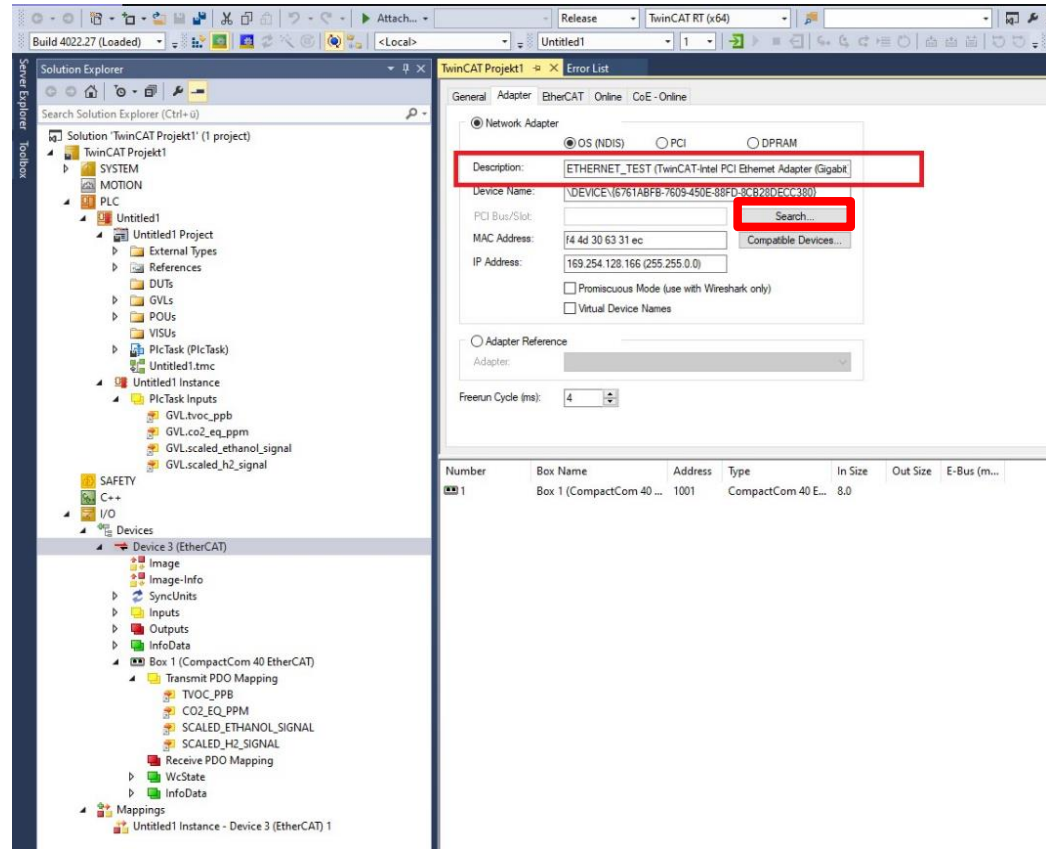
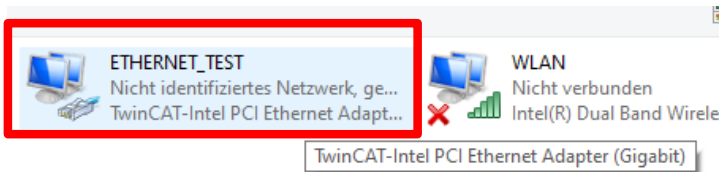
# Guideline EtherCAT Anybus Demo

**Check the settings:**  
**Check if the Ethernet**  
**Adapter is shown to**  
**your Device 3 EtherCAT**



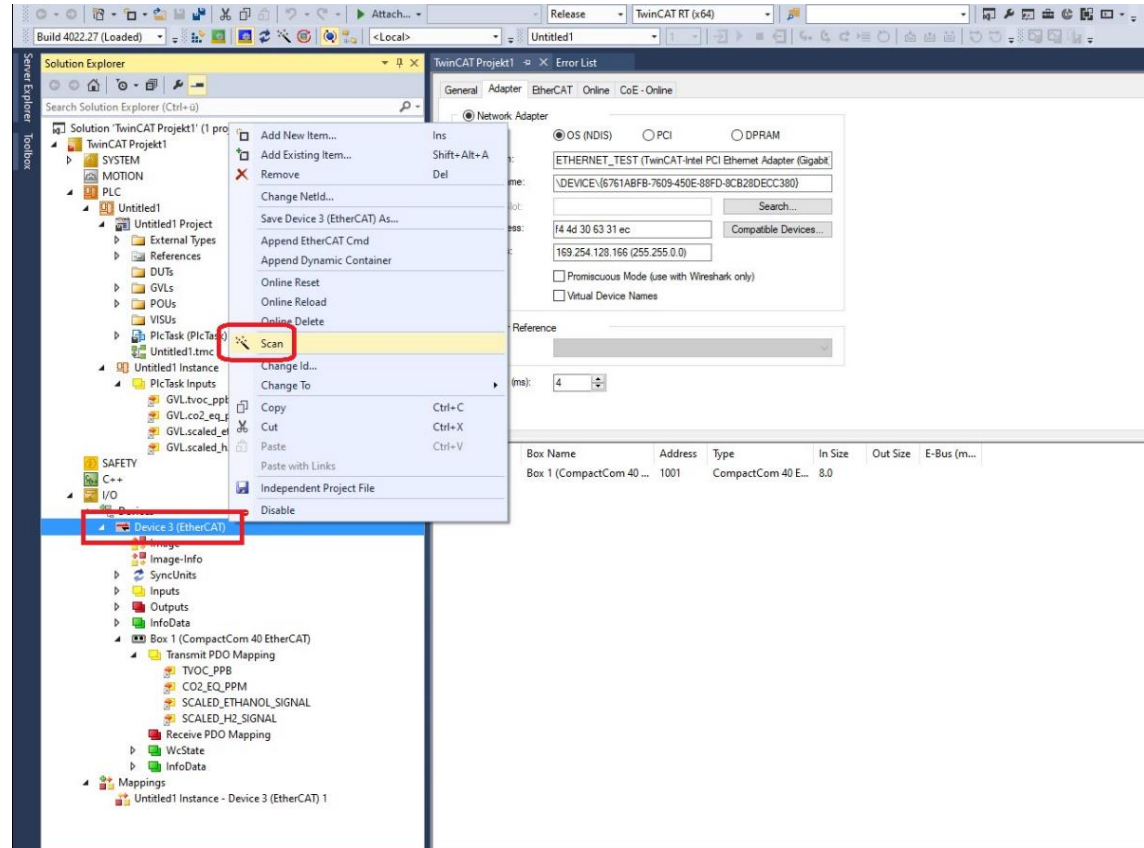
# Guideline EtherCAT Anybus Demo

**Check the settings:  
you should see your  
Ethernet Adapter:  
(if not: press the search button)**



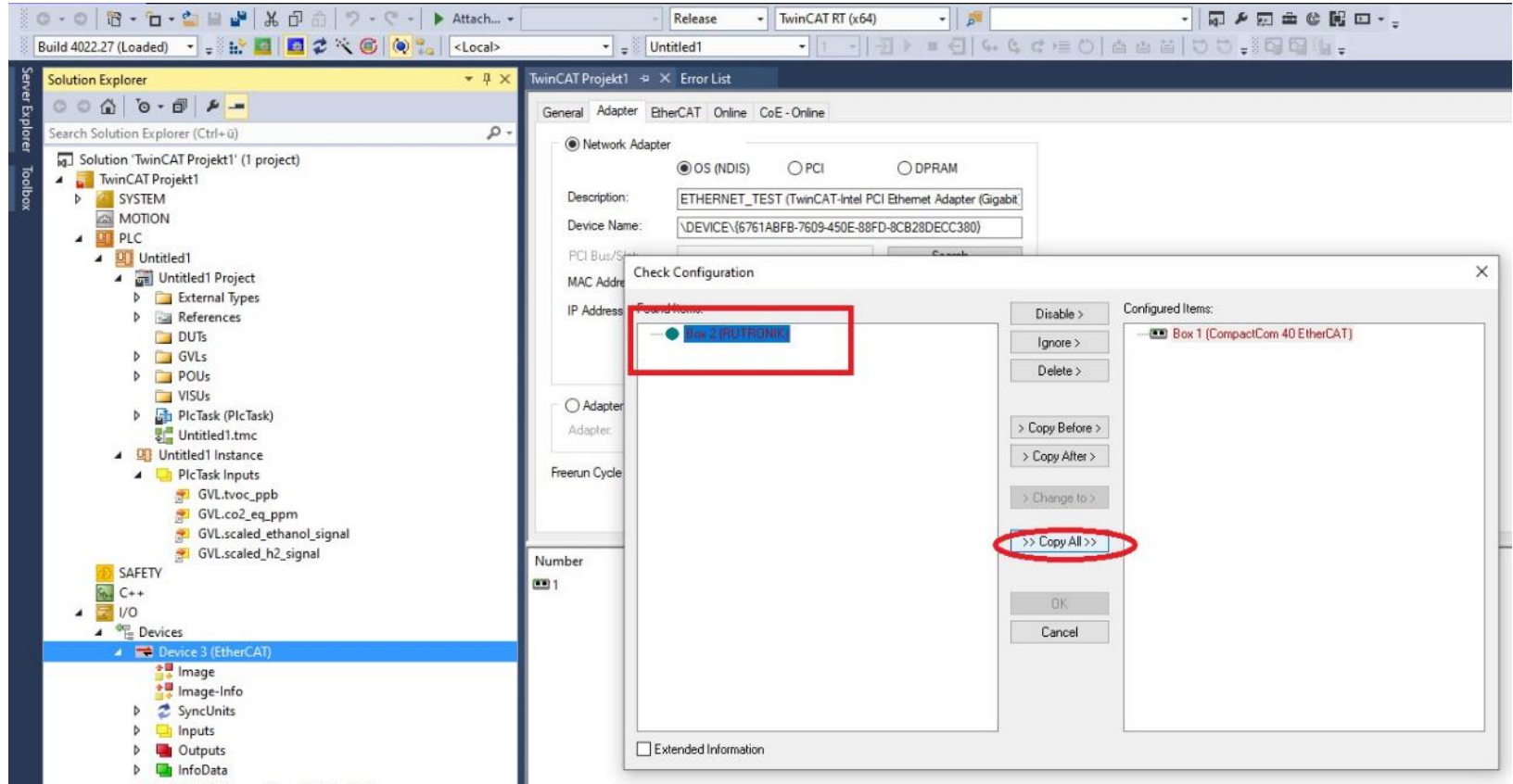
# Guideline EtherCAT Anybus Demo

**Check the settings:  
Scan the Device 3 for Boxes  
(if BOX „Rutronik“  
is not available)**



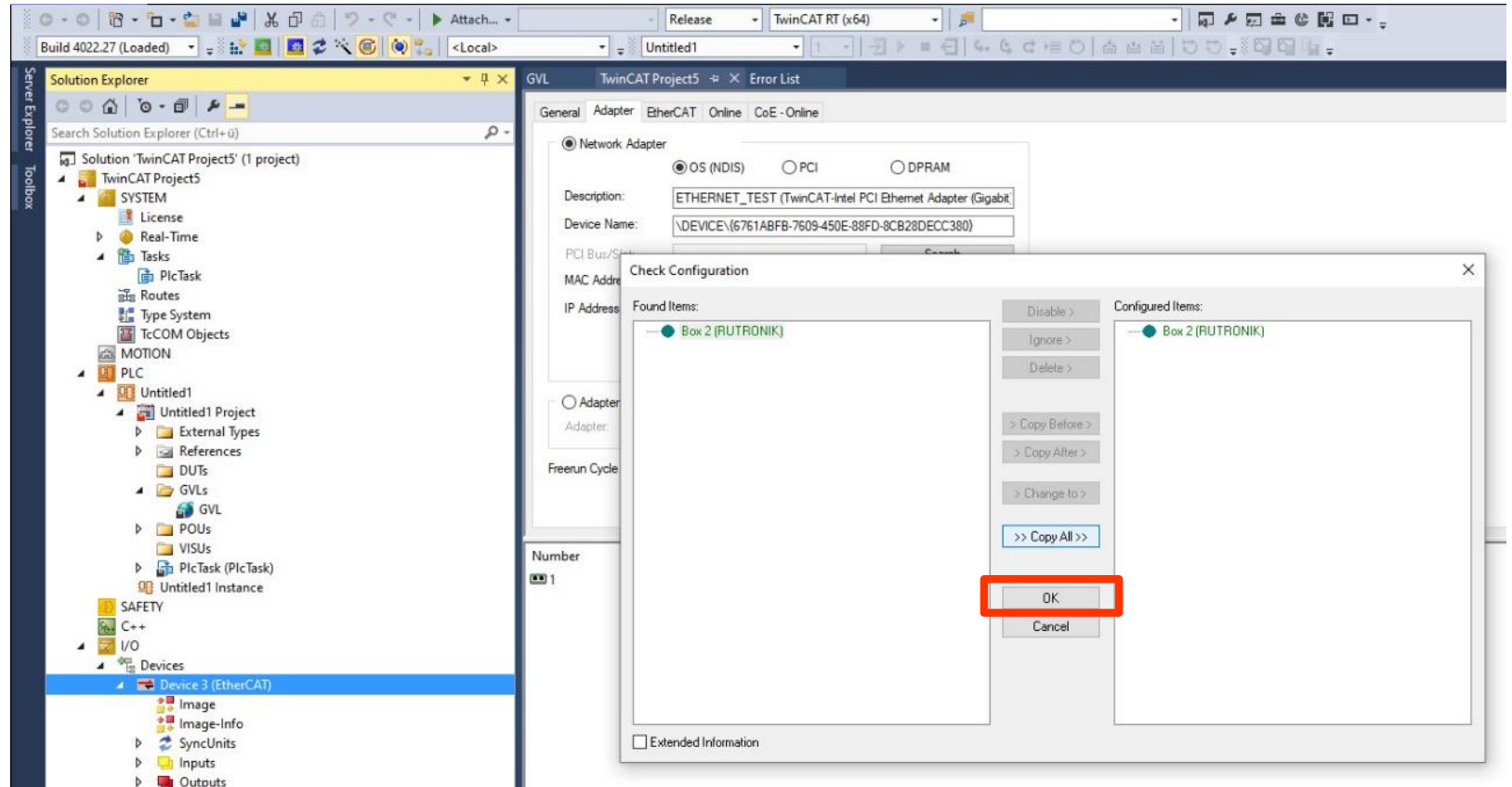
# Guideline EtherCAT Anybus Demo

Box must  
be found  
than  
press  
„Copy All“



# Guideline EtherCAT Anybus Demo

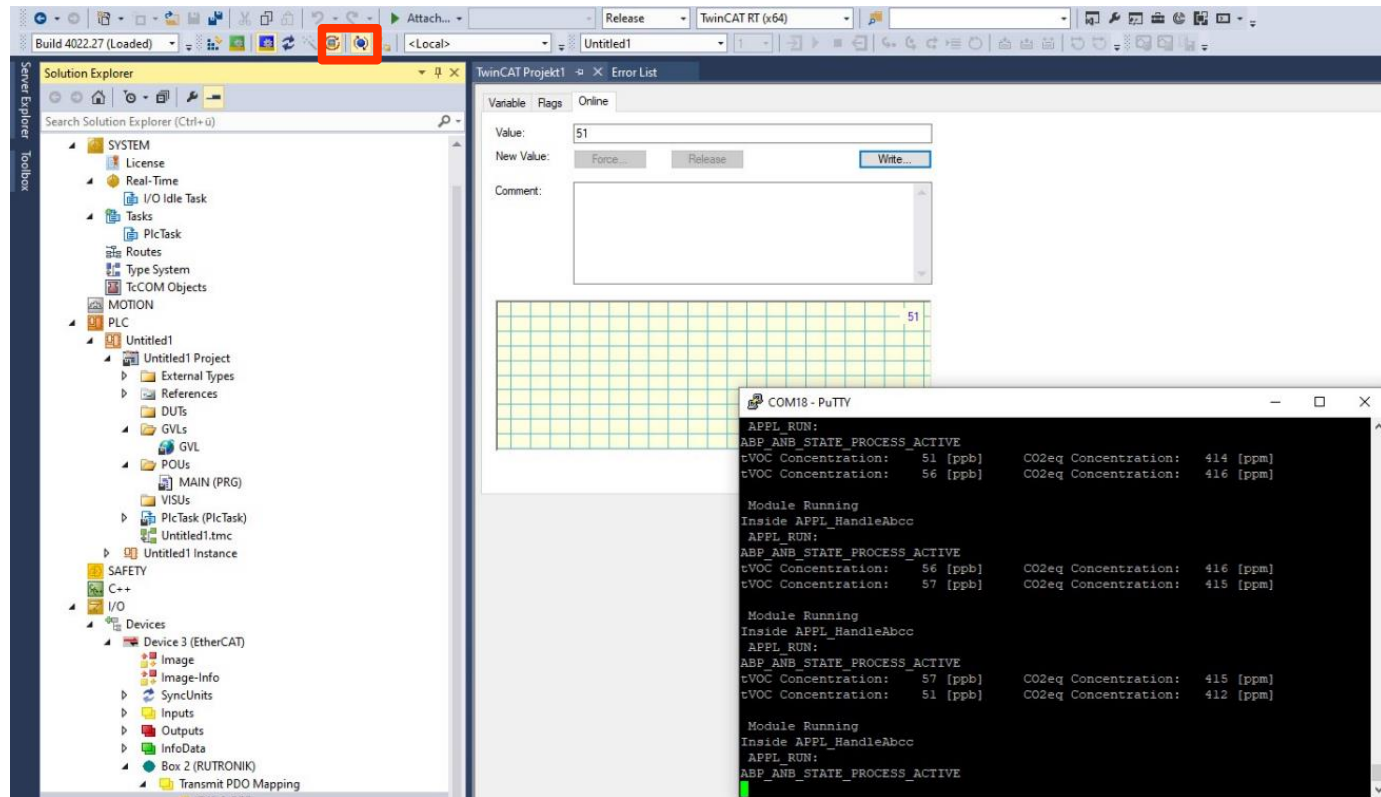
Press „OK“



# Guideline EtherCAT Anybus Demo

**Go Online by  
pressing the Icons  
„Showing Online Data“  
and  
„Toggle Free Run State“**

**Check now the  
Console(PuTTY) output:  
sensor data should be  
shown there and  
transferred via EtherCAT**



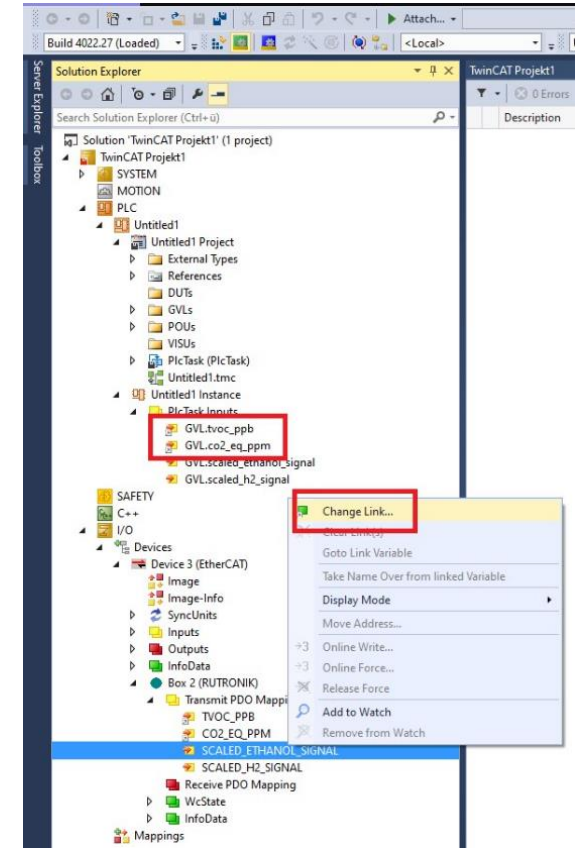
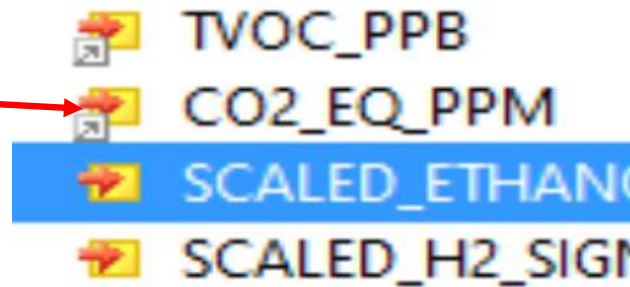


# Guideline EtherCAT Anybus Demo

If you scanned before a new Box „RUTRONIK“  
you must now make available variables for PLC  
Global Variable List (GVL)  
this is most important for the GUI communication

„Right Click“ to one of the variables than  
„Change Link“

Linked variables will  
consist an arrow

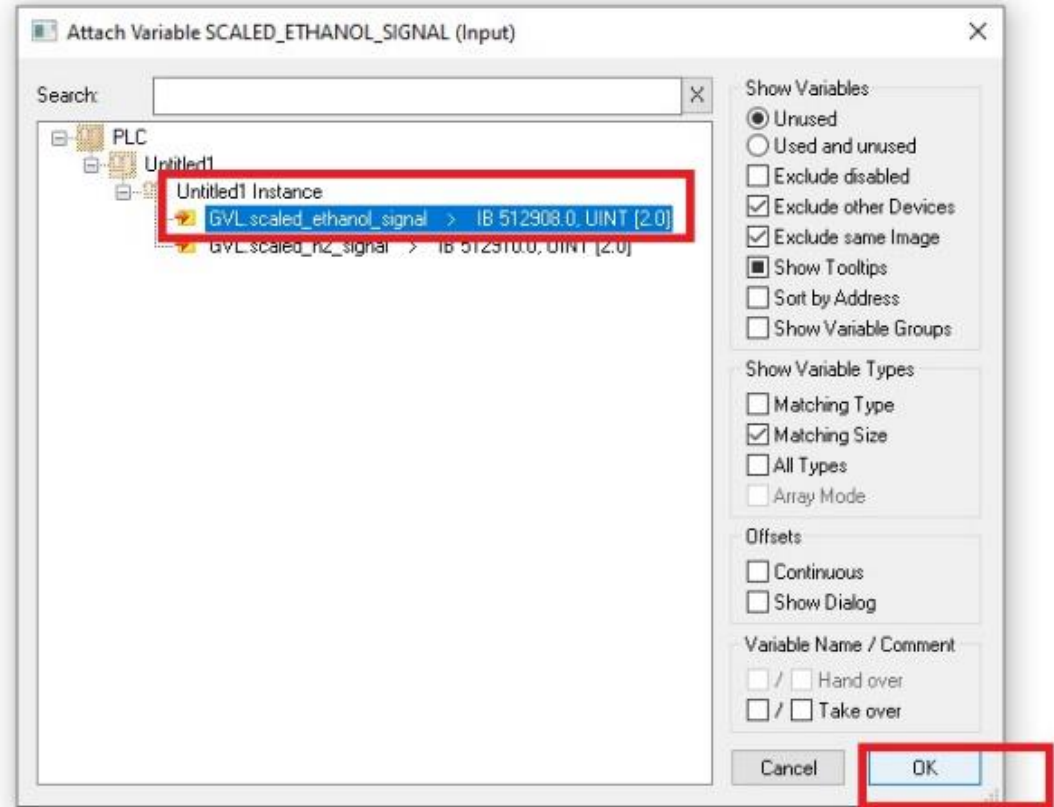




**A new Window will open  
and you will select the variable  
which should be attached**

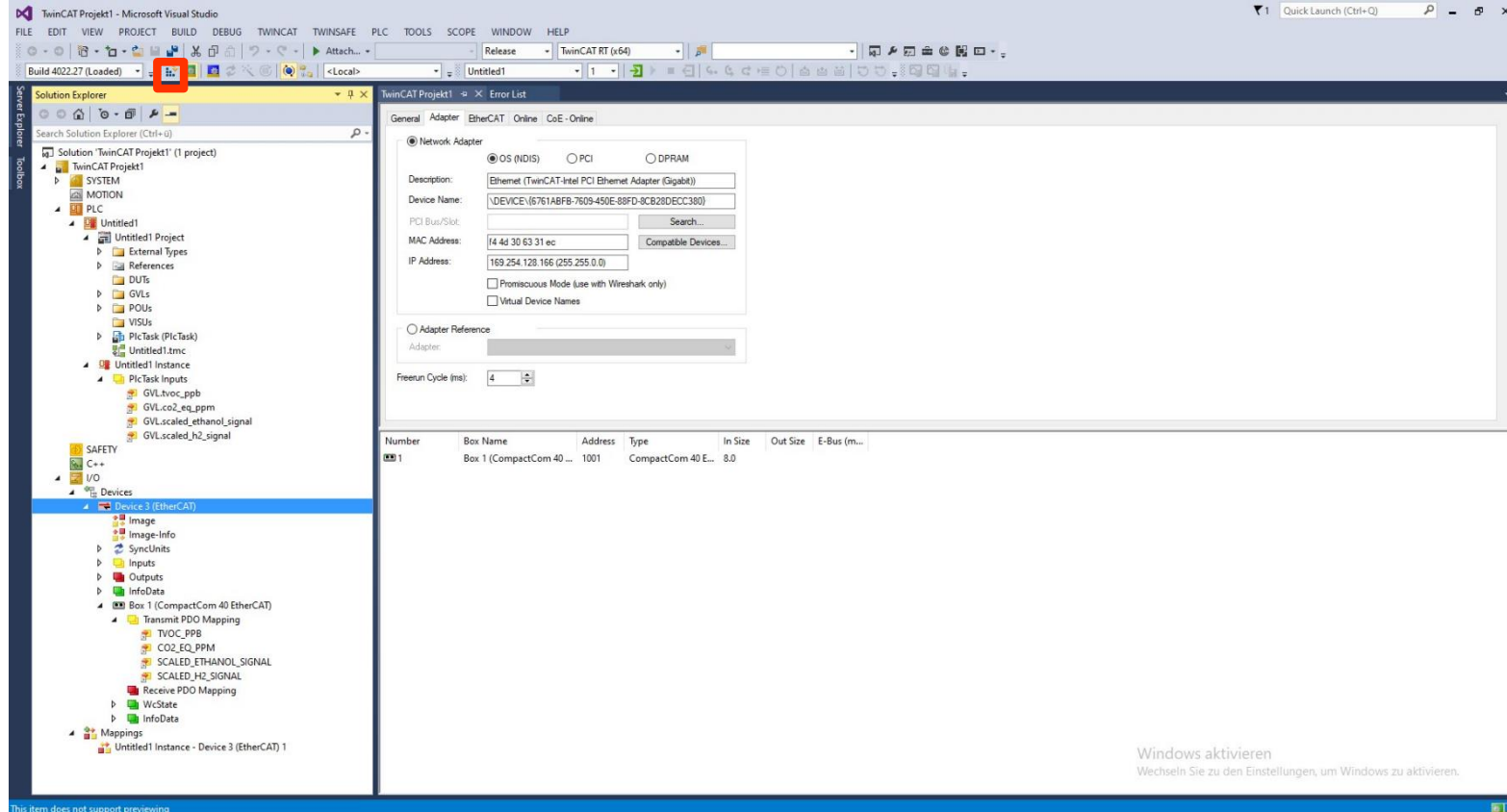
**Press „ok“**

**After all variables are attached  
the main settings are done**



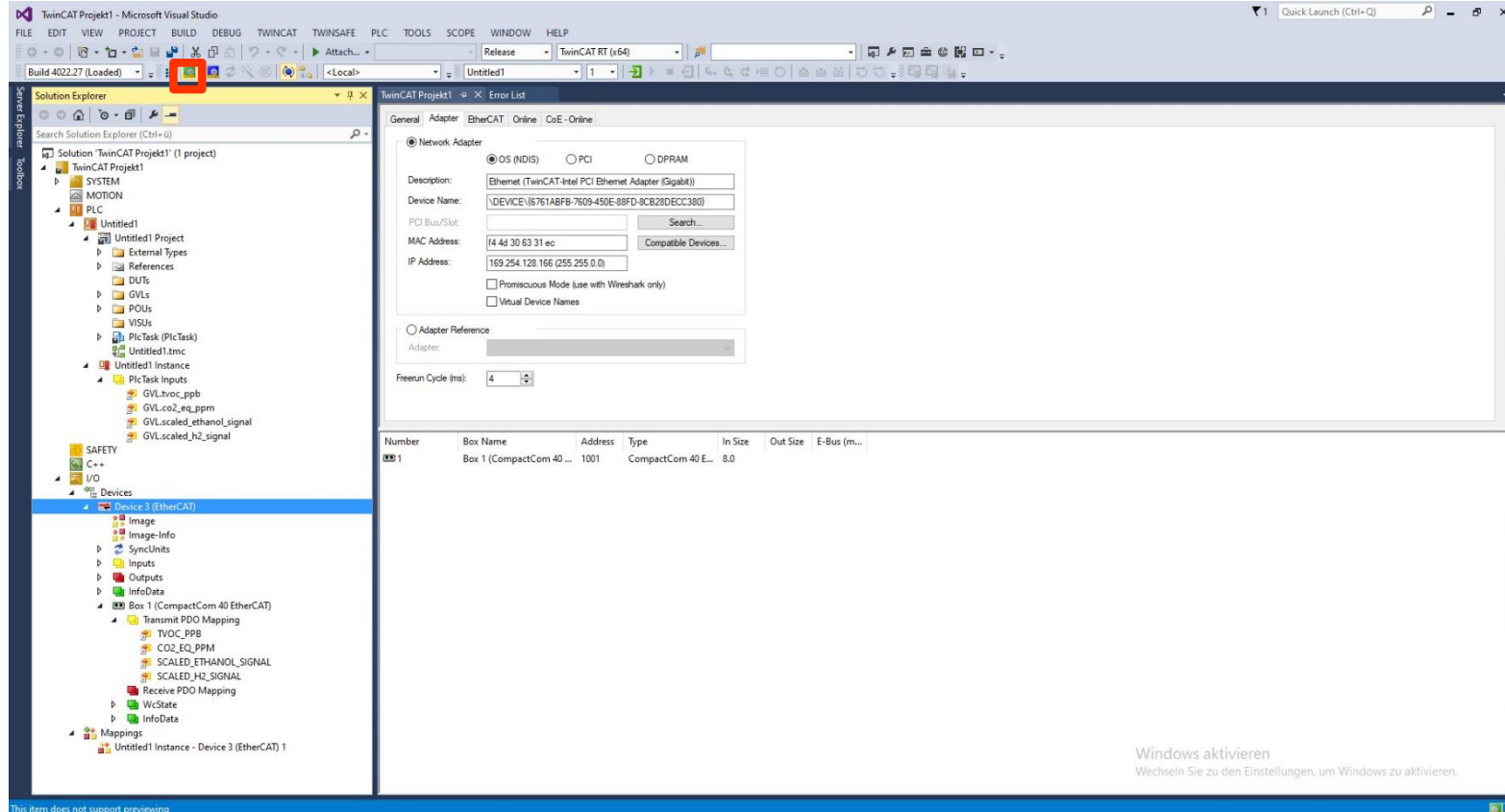
# Guideline EtherCAT Anybus Demo

Now  
Press the icon:  
„Activate  
Configuration“



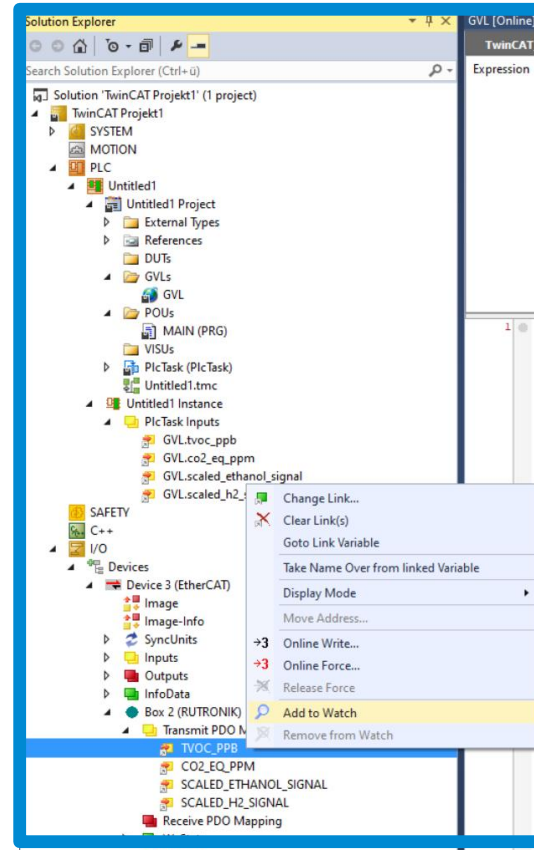
# Guideline EtherCAT Anybus Demo

Now  
Press the icon:  
„Restart  
TwinCat  
System “



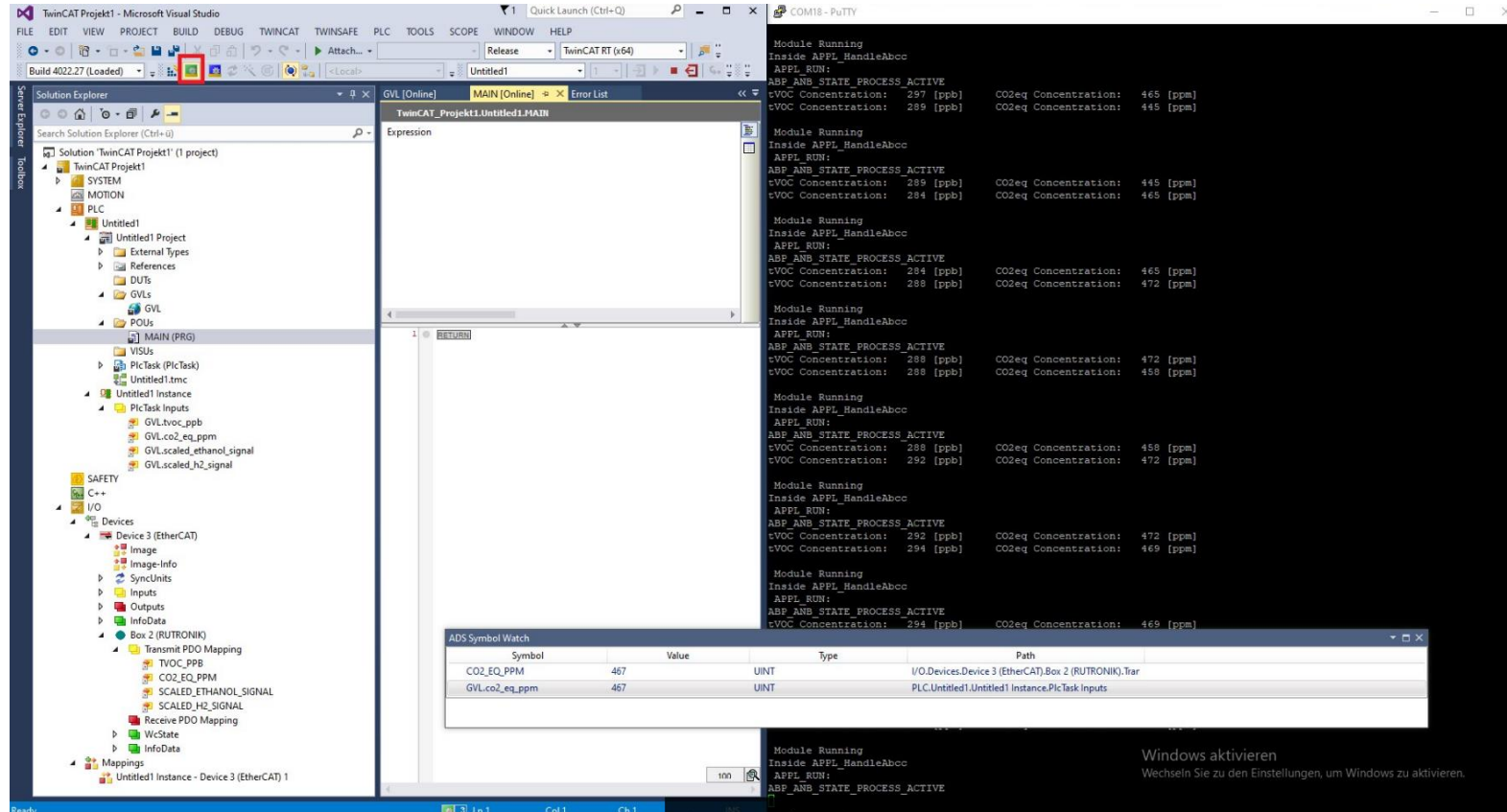
**Check if your variables are  
available in the „Run Mode“**

**Check the Watch Mode  
See attached picture**



# Guideline EtherCAT Anybus Demo

**Yor Box Values  
and GVLs  
should be shown  
In the watch  
window  
and the console  
output should  
show also the  
data values**



The screenshot displays the TwinCAT development environment. The left pane shows the 'Solution Explorer' with a project structure including 'SYSTEM', 'MOTION', 'PLC', and 'SAFETY'. The 'PLC' folder is expanded, showing 'MAIN (PRG)' and 'VISUs'. The 'MAIN (PRG)' folder is further expanded, showing 'GVLs' and 'POUs'. The 'GVLs' folder is expanded, showing 'GVL.co2\_eq\_ppm', 'GVL.scaled\_ethanol\_signal', and 'GVL.scaled\_h2\_signal'. The 'GVL.co2\_eq\_ppm' is selected, and its value is shown as 467 in the 'ADS Symbol Watch' window.

The 'GVL.co2\_eq\_ppm' is selected, and its value is shown as 467 in the 'ADS Symbol Watch' window.

The 'ADS Symbol Watch' window shows the following data:

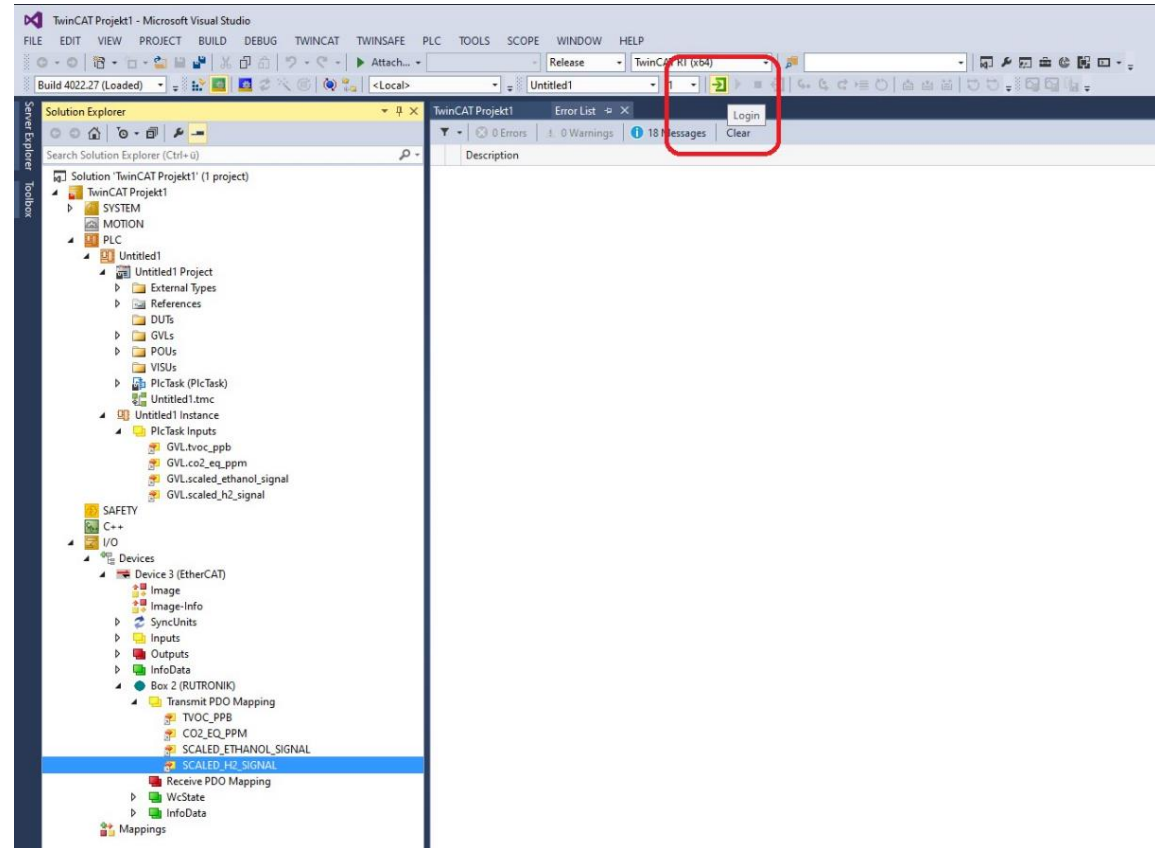
Symbol	Value	Type	Path
CO2_EQ_PPM	467	UINT	I/O.Devices.Device 3 (EtherCAT).Box 2 (RUTRONIK).Tiar
GVL.co2_eq_ppm	467	UINT	PLC.Untitled1.Untitled1.Instance.PlcTask Inputs

The console output shows the following data:

```
Module Running  
Inside APPL_HandleAboc  
APPL_RUN:  
ABP_ANB_STATE_PROCESS_ACTIVE  
tVOC Concentration: 297 [ppb] CO2eq Concentration: 465 [ppm]  
tVOC Concentration: 289 [ppb] CO2eq Concentration: 445 [ppm]  
  
Module Running  
Inside APPL_HandleAboc  
APPL_RUN:  
ABP_ANB_STATE_PROCESS_ACTIVE  
tVOC Concentration: 289 [ppb] CO2eq Concentration: 445 [ppm]  
tVOC Concentration: 284 [ppb] CO2eq Concentration: 465 [ppm]  
  
Module Running  
Inside APPL_HandleAboc  
APPL_RUN:  
ABP_ANB_STATE_PROCESS_ACTIVE  
tVOC Concentration: 284 [ppb] CO2eq Concentration: 465 [ppm]  
tVOC Concentration: 288 [ppb] CO2eq Concentration: 472 [ppm]  
  
Module Running  
Inside APPL_HandleAboc  
APPL_RUN:  
ABP_ANB_STATE_PROCESS_ACTIVE  
tVOC Concentration: 288 [ppb] CO2eq Concentration: 458 [ppm]  
tVOC Concentration: 292 [ppb] CO2eq Concentration: 472 [ppm]  
  
Module Running  
Inside APPL_HandleAboc  
APPL_RUN:  
ABP_ANB_STATE_PROCESS_ACTIVE  
tVOC Concentration: 292 [ppb] CO2eq Concentration: 472 [ppm]  
tVOC Concentration: 294 [ppb] CO2eq Concentration: 469 [ppm]  
  
Module Running  
Inside APPL_HandleAboc  
APPL_RUN:  
ABP_ANB_STATE_PROCESS_ACTIVE  
tVOC Concentration: 294 [ppb] CO2eq Concentration: 469 [ppm]
```

# Guideline EtherCAT Anybus Demo

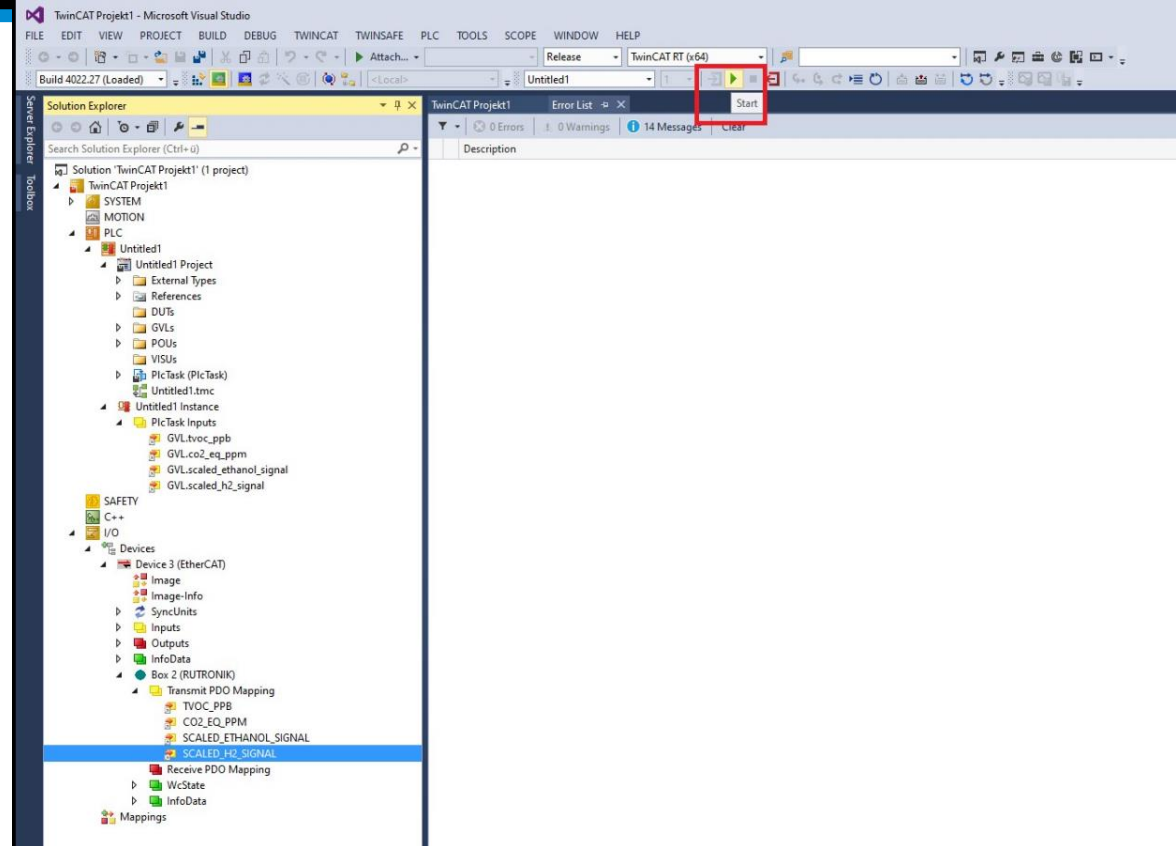
Now press the „Login“ Icon



# Guideline EtherCAT Anybus Demo

Now press the „Start“ Icon

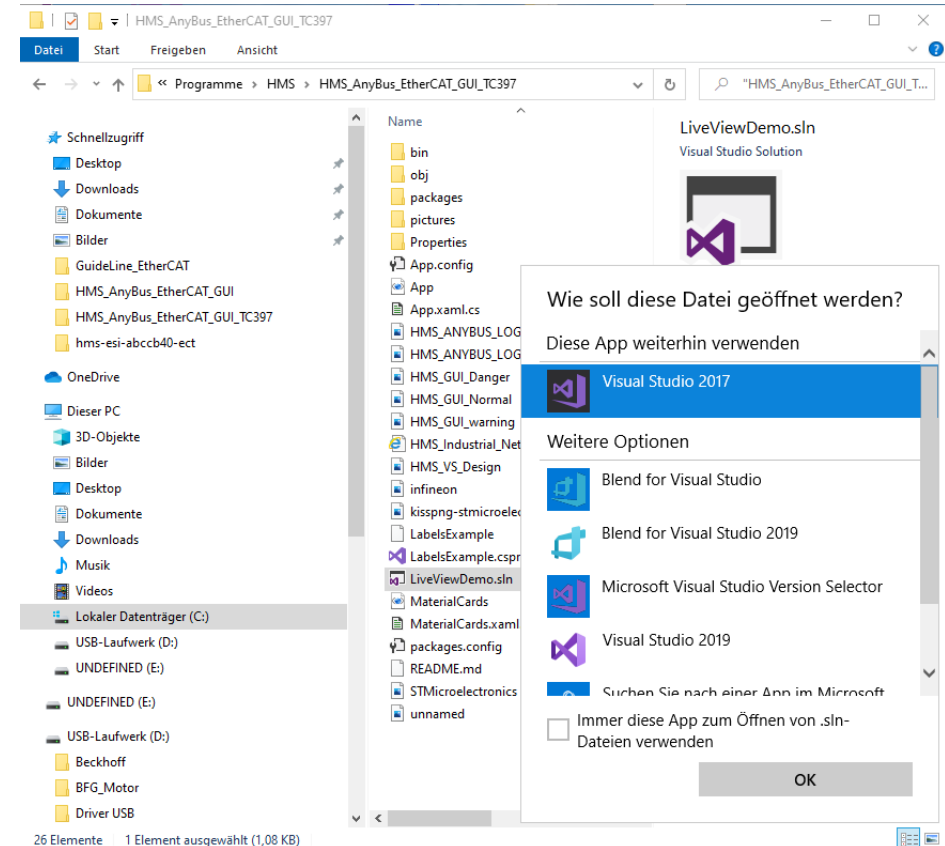
Now the data can be taken  
by the GUI application!



# Guideline EtherCAT Anybus Demo

**Start the GUI project:  
HMS\_Anybus\_EtherCAT\_GUI (TC379)**

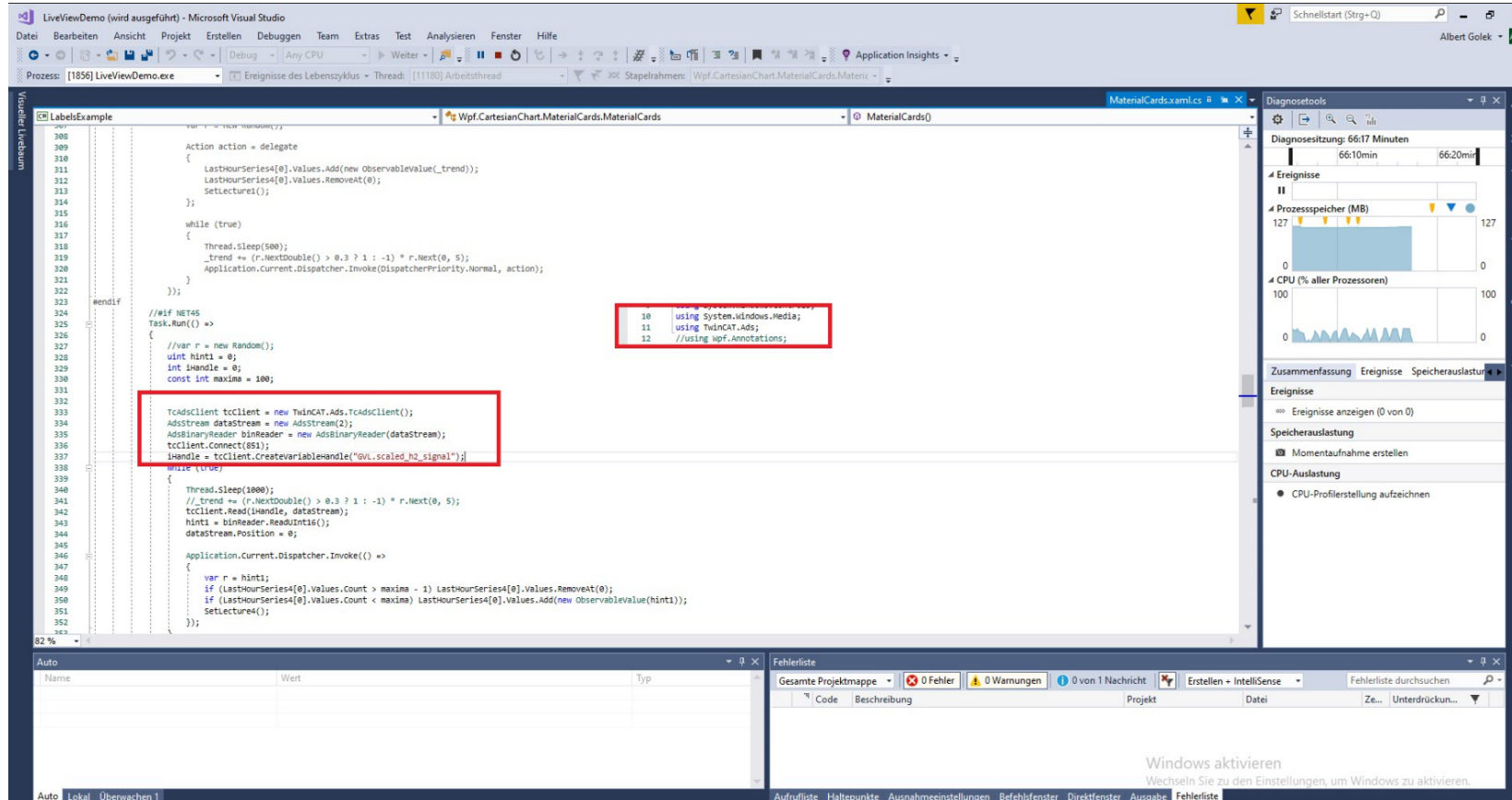
**Start it with Visual Studio 2017**



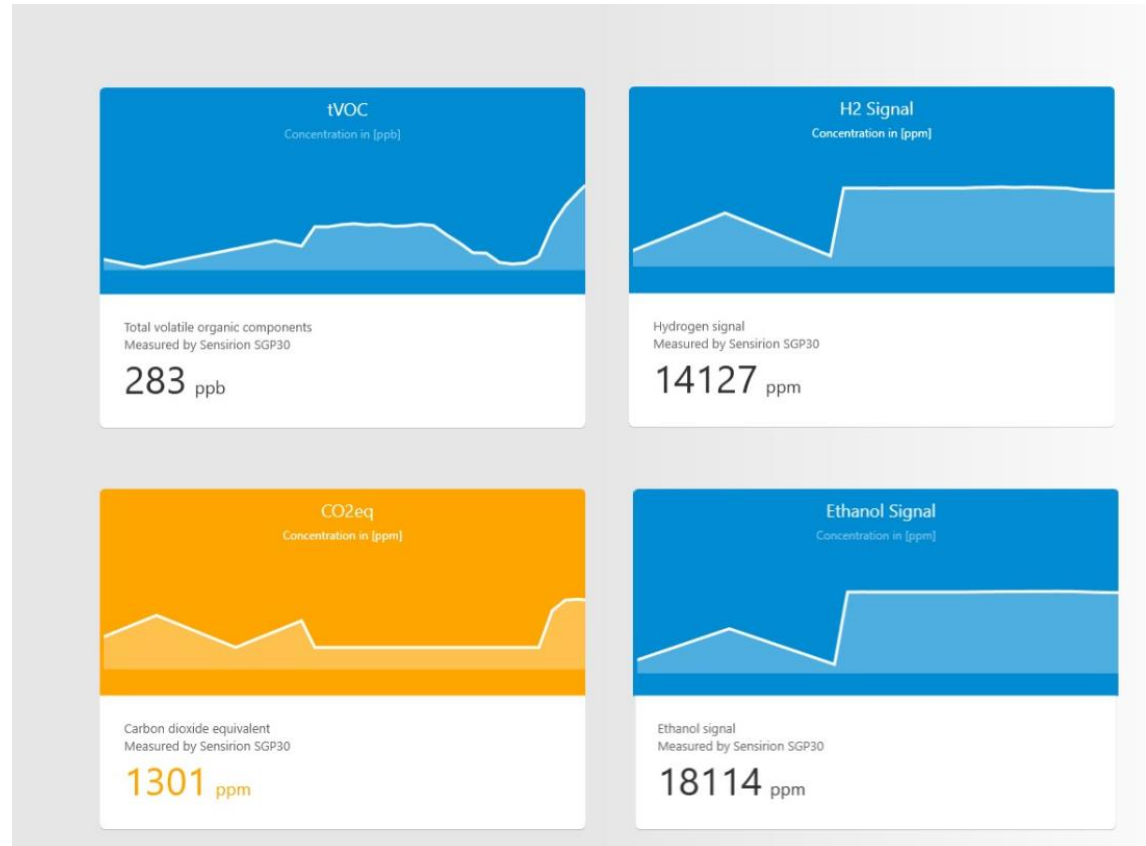


# Guideline EtherCAT Anybus Demo

Start  
the application  
the GVL vals  
are already  
there  
it should work  
at once



## GUI example consisting values from EtherCAT HMS Anybus





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