

Beckhoff ADS Ethernet Driver for JMobile

This document describes how to use the Beckhoff driver to connect JMobile systems to Beckhoff controllers using the ADS protocol.

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Beckhoff ADS Ethernet Driver

Implementation on the ADS Ethernet protocol for access to Beckhoff controller data is based on the information published by Beckhoff.

Settings

The screenshot shows the 'Beckhoff ADS' configuration window. It includes a 'PLC Network' checkbox, several text input fields for network parameters (Panel AMS Net ID, Panel AMS Port, Target IP Address, Target TCP Port, Target AMS Net ID, Target AMS Port), a spin box for 'Timeout', and a list box for 'PLC Models' with 'PC/CX' selected. 'OK' and 'Cancel' buttons are located on the right side of the dialog.

Figure 1

Panel AMS Net ID	Specifies the AMS net ID of the panel; the first 4 bytes must match the panel IP address assigned to the HMI device
Panel AMS Port	Specifies the panel AMS port number to be used on panel
Target IP Address	Specifies the IP address of the target controller
Target AMS Net ID	Specifies the Target AMS net ID of the target controller
Target AMS Port	Specifies the port number dedicated to the communication on target device
Timeout	The number of milliseconds between retries when communication fails.
PLC models	Select the model which corresponds to the device to be connected. Model selection is very important to be set properly.
PLC Network	The protocol allows the connection of multiple controllers to one operator panel. To set-up multiple connections, check "PLC network" checkbox and enter IP Address for all controllers.

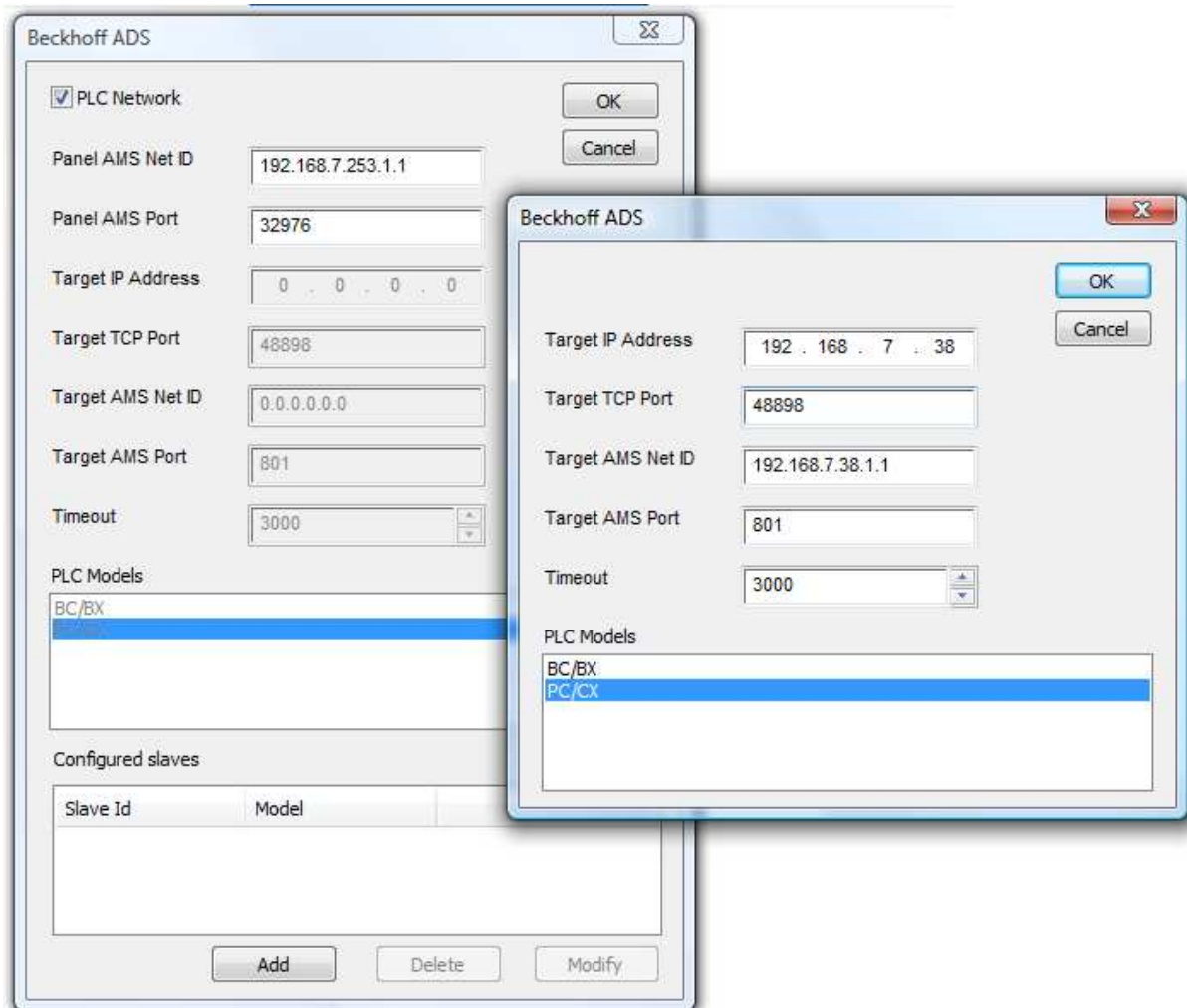


Figure 2

Controller Configuration

Beckhoff controllers require some specific settings to enable communication with HMI devices.

From the TwinCAT system manager you need to configure a route.

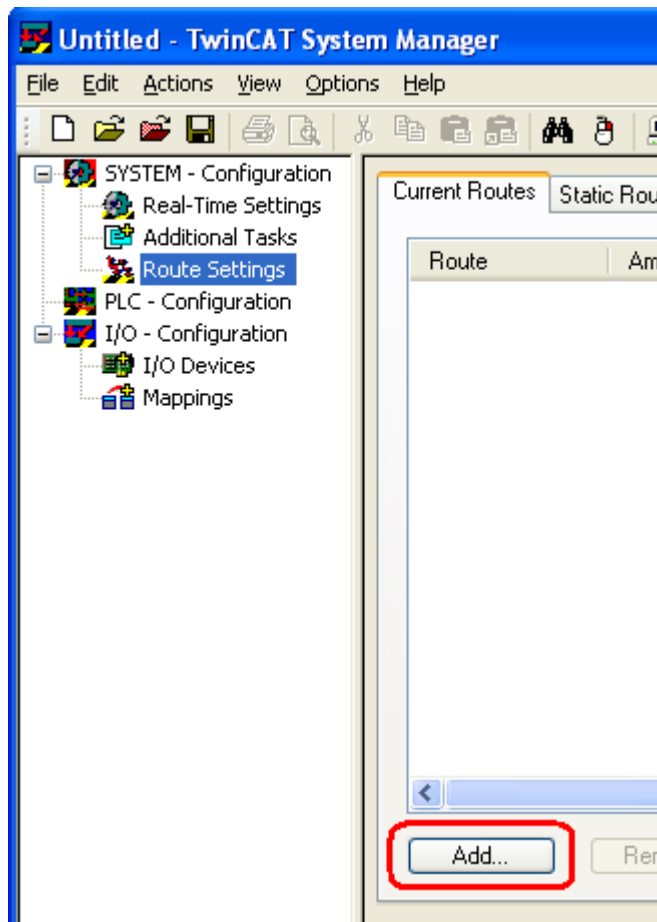


Figure 3

Routes can be added only when the system is in Run mode. Ensure the TwinCAT system is running and click the "Add" button

The "Add route" dialog looks as showed in the following figure.

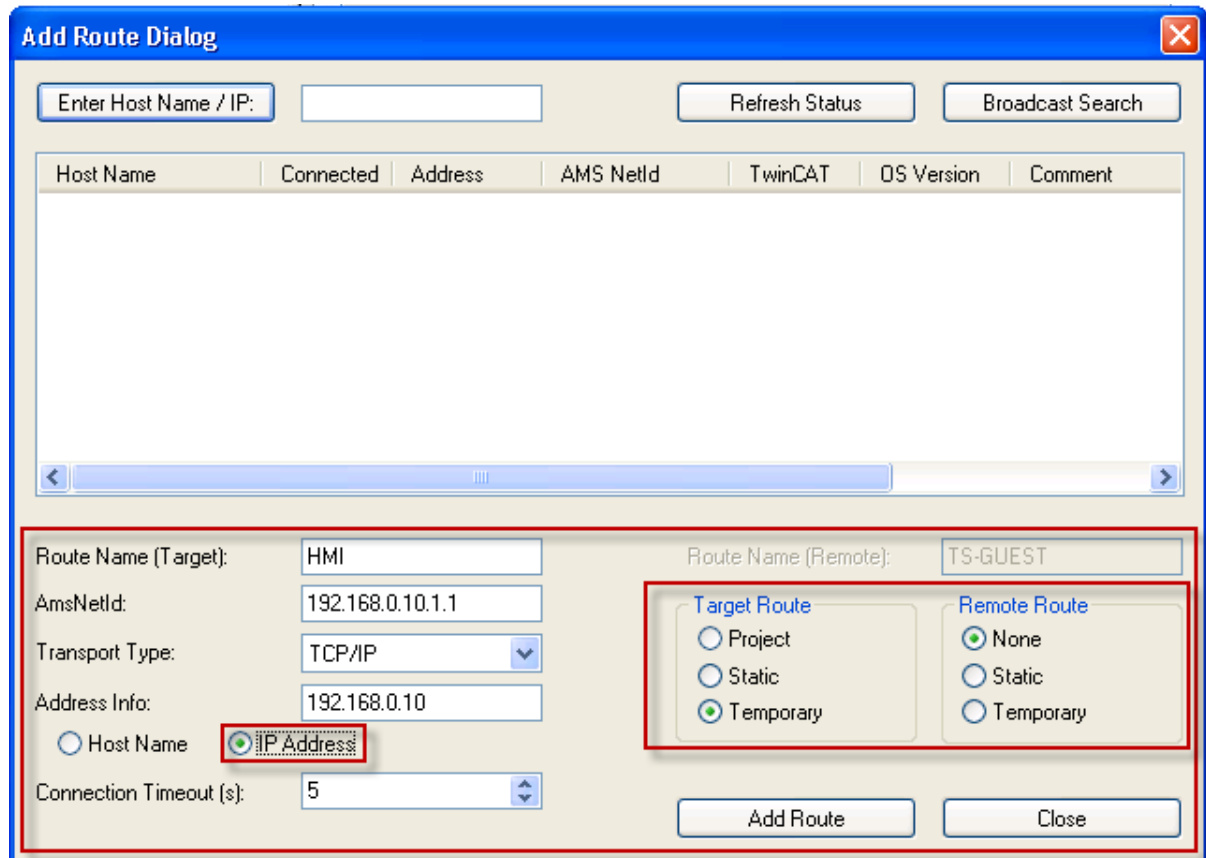


Figure 4

The next step is to Add a "Remote connection".

If the target PLC is a Windows runtime the TwinCAT System properties are accessible from the icon tray as showed in the following figure.

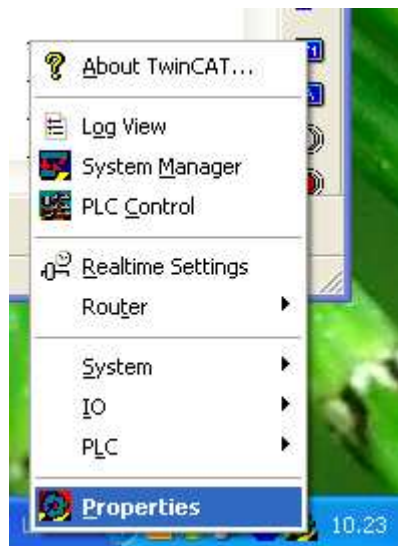


Figure 5

The "Remote connection" has to be defined from the "AMS router" tab as showed in the followign figure.

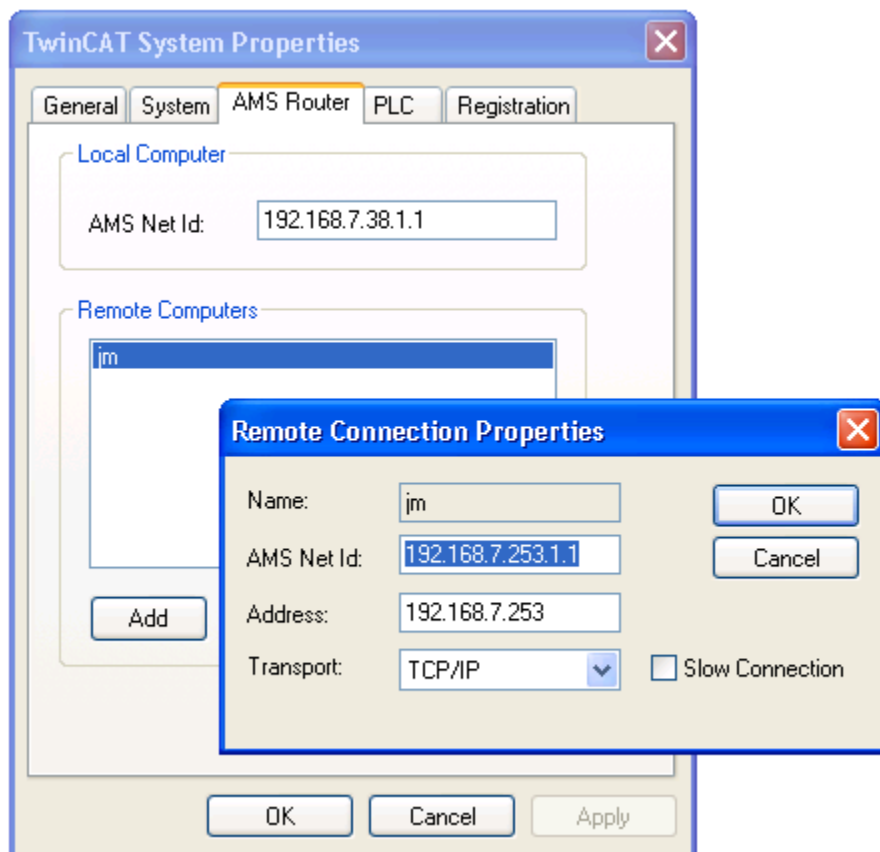


Figure 6

In case the Beckhoff system is based on Windows CE you need to use a specific utility to enable a remote desktop connection with the device operating system. The utility is called CERHOST.EXE (available from the Beckhoff web site).

Go to File – Connect and enter the IP address of the CX device. Leave the Password empty.

Locate on the device disk the program "TcAmsRemoteMgr", start it and configure the Remote Connection.

The configuration dialog looks as showed in the following figure.

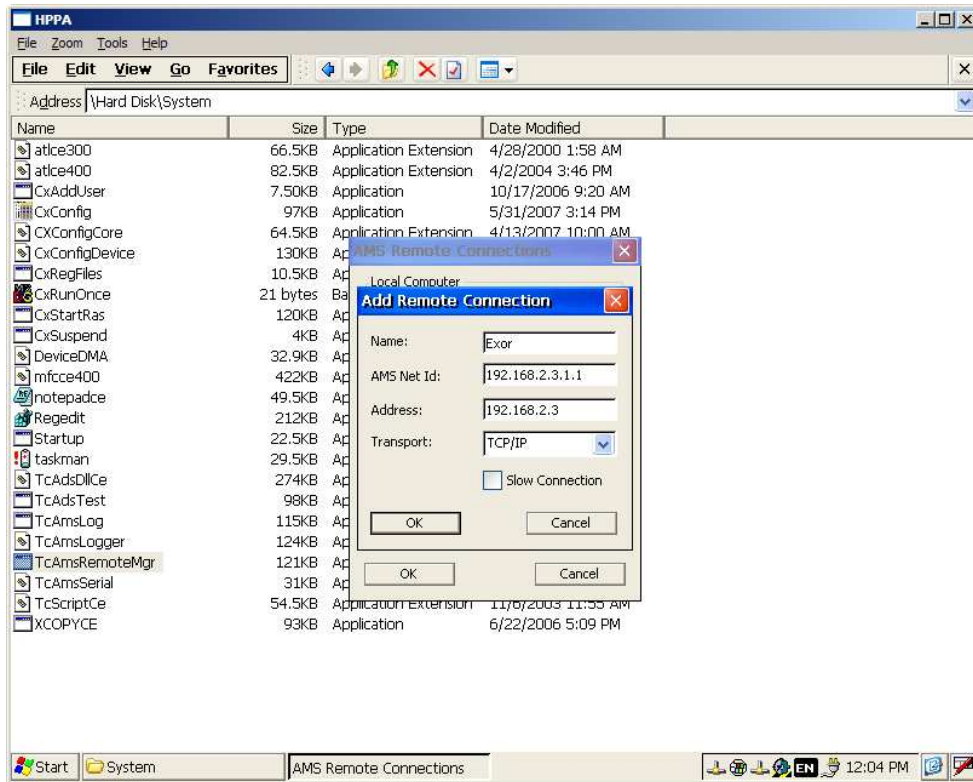


Figure 7

Tag Editor

The data in the Beckhoff system is based on tags.

The organization of the internal memory of the controller is not fixed but it is configured by the user at development time. Each data item can be identified by a string called "tag".

The TwinCAT development environment generates the list of tags created for each controller in the configuration of the application.

The project in the panel must refer to the tag names assigned in the TwinCAT PLC Control programming software at development time. The Designer Tag Editor supports direct import of the tag file generated by the Beckhoff software.

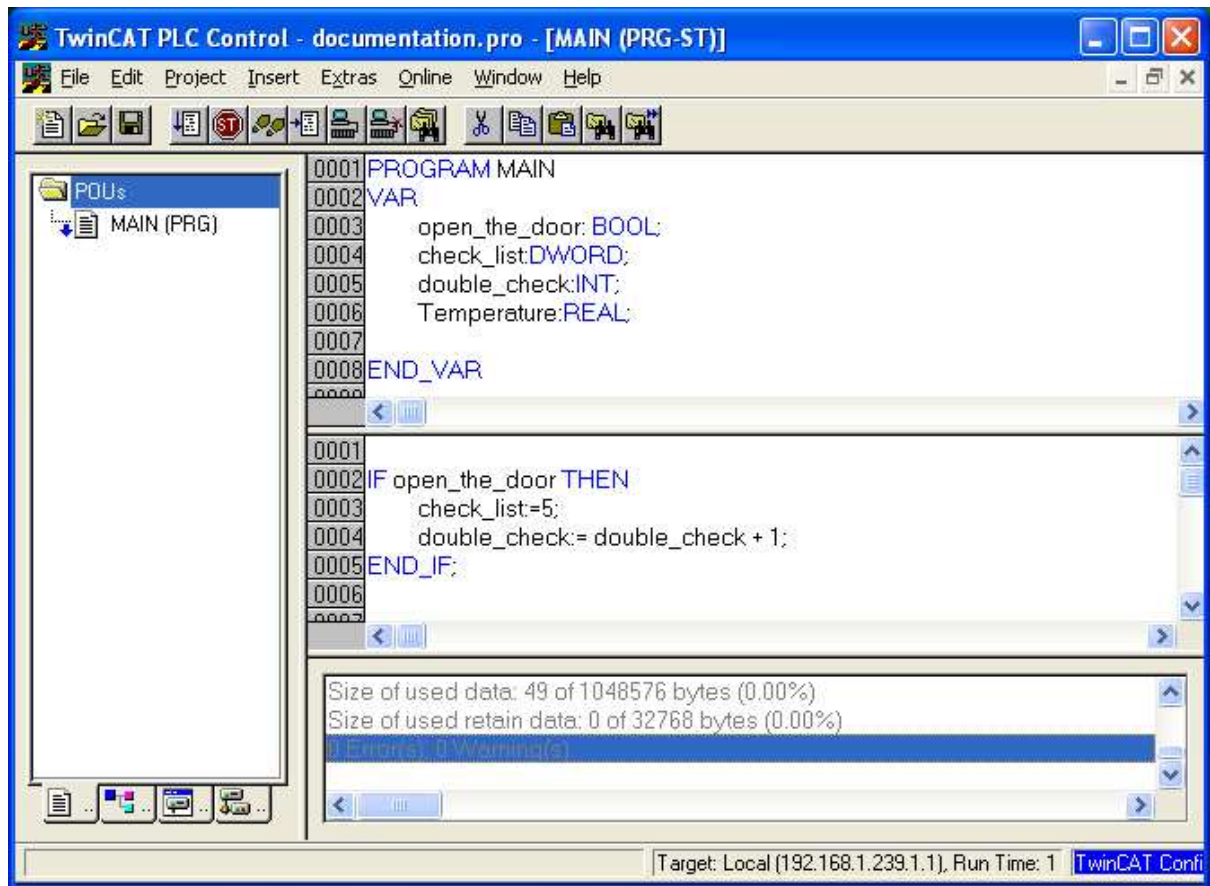


Figure 8

To export the tags defined for the selected controller, click on Project – Build” as shown. The TwinCAT PLC Control software will create a file with extension TPY.

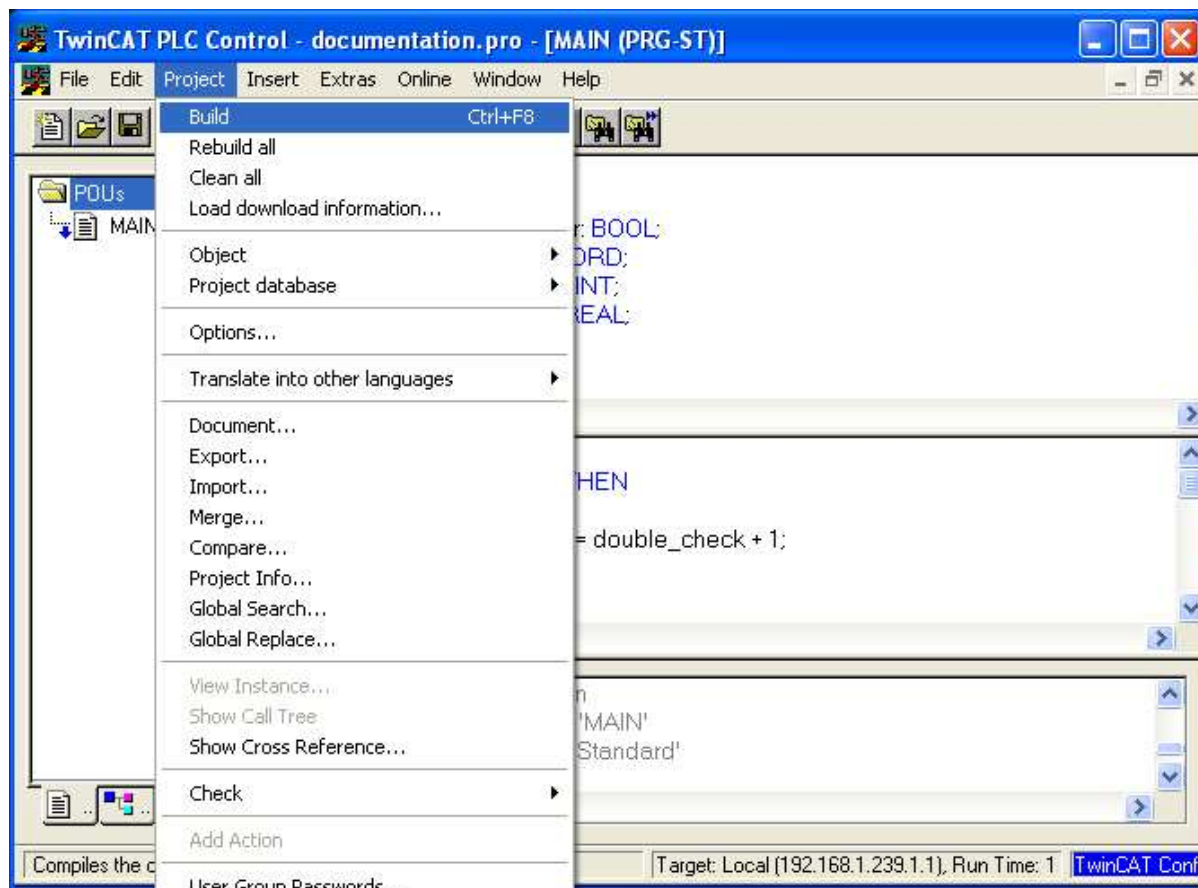


Figure 9

Use then the Import tag facilities of the tag editor to import the tag data into your project.

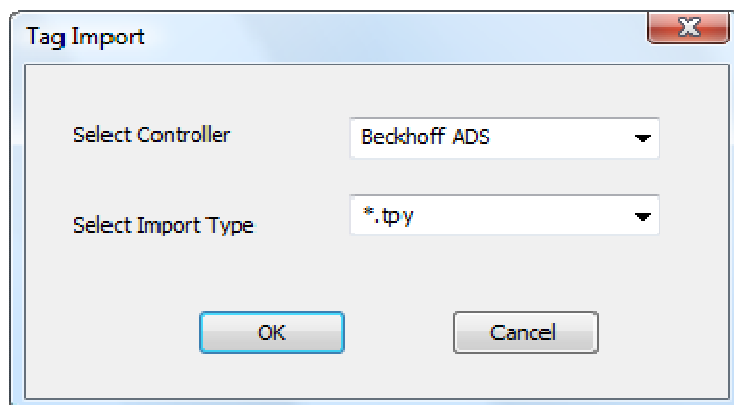


Figure 10

Click OK to locate the .TPY file and confirm.

When importing tags the user can decide to import all the tags from the TPY file or apply a filter importing only a subset of them.

The figure below shows how to specify the filter. The filter consist in a string (no wildcards are supported). The import filter will import only the tags having the specified string in the description.

If the description is applied to an instance declaration of a Function Block, all the tags within the block will be imported.

If the string is contained only as comment of some variables inside the Function Block, only that variables will be imported.

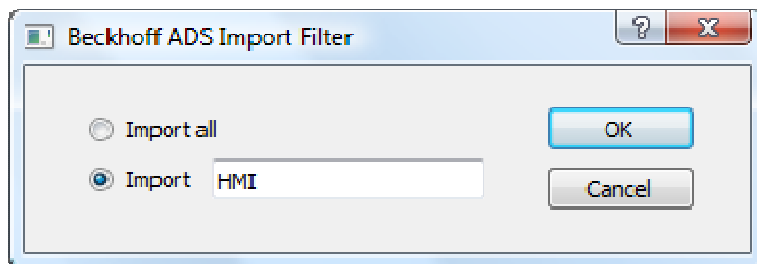


Figure 11

As an example for the use of the import filter, please see the following case.

```
FUNCTION_BLOCK FB_Motor
VAR_INPUT
    bStartMotor      : BOOL;
    bReset           : BOOL;
END_VAR

VAR_OUTPUT
    bMotorOn         : BOOL;
    bAlarm           : BOOL;    (* HMI Thermal alarm *)
END_VAR

VAR_IN_OUT
    sTest            : STRING;
END_VAR

VAR
    sData            : STRING;
    bResetStatistics : BOOL;    (* HMI Reset statistics *)
END_VAR

VAR PERSISTENT
    stStat           : ST_MotorStats; (* HMI Motor statistics *)
END_VAR

Function block instances declaration:
VAR
    fbMotor1        : FB_Motor;
    fbMotor2        : FB_Motor;    (* HMI only show Motor 2!! *)
END_VAR
```

The following tags will be imported:

```
MAIN/fbMotor2/bMotorOn
MAIN/fbMotor2/ST_MotorStats
MAIN/fbMotor2/bResetStatistics
```

Note: the Beckhoff driver supports direct access to the PLC tags using the handles; this means that if no tags are added to the PLC and the PLC program is just re-compiled, you do not need to re-import tags as the access to them does not depend from the offset, but only from name.

Communication Status

The current communication status can be displayed using the dedicated system variables. Please refer to the User Manual for further information about available system variables and their use.

The codes supported for this communication driver are:

Error	Notes
NAK	Returned in case the controller replies with a not acknowledge
Timeout	Returned when a request is not replied within the specified timeout period; ensure the controller is connected and properly configured to get network access
Invalid response	The panel did receive from the controller a response, but its format or its contents is not as expected; ensure the data programmed in the project are consistent with the controller resources
General Error	Error cannot be identified; should never be reported; contact technical support