Lesson 03

Lesson 03 will show how to connect a SMART PLC, discover it on the Network, download software and debug application.

Contents

Hardware

There are two ways to connect to a SMART PLC, with a standard USB-RS485 converter or with a dedicated Eliwell USB-TTL converter. For installation details refer to relevant manuals.

USB-RS485 converter

There are a lot of different makes. For easier use we recommend to use a USB-powered device that doesn't need external power supply. The connections for the mini USB displayed would be X-GND, A-PLUS and B-Minus (GND, +, - represent the connections

MINI USB	SMART	SMART 485-cable
X	GND	Grey
A	+	White
B	-	Black

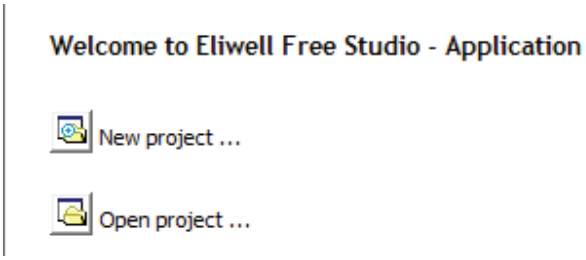
USB-TTL converter

The DMI 100-3 MANUFACTURER is an Eliwell dedicated device and will connect to the SMART TTL port. SMART PLCs without Modbus option need to be programmed with the DMI100-3. Also BIOS updates can only be done via DMI100-3.

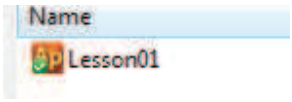
Opening an existing program

Start Free Studio Application program by clicking on

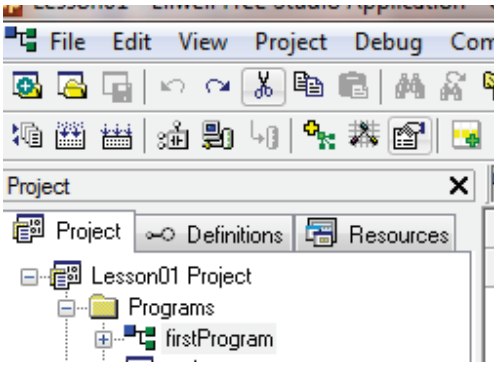
Click on Open project ….



Select the program with icon Ap you want to open.



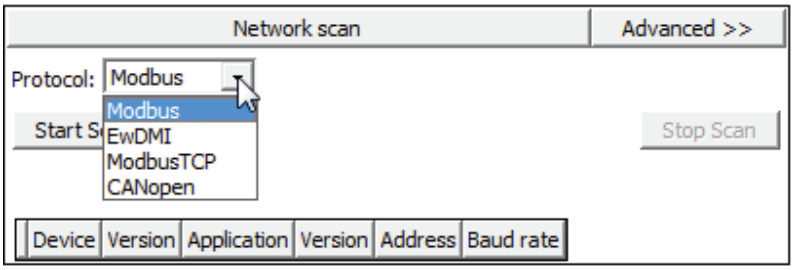
Open Project Tab and double click on firstProgram from Lesson 01 in the tree view.



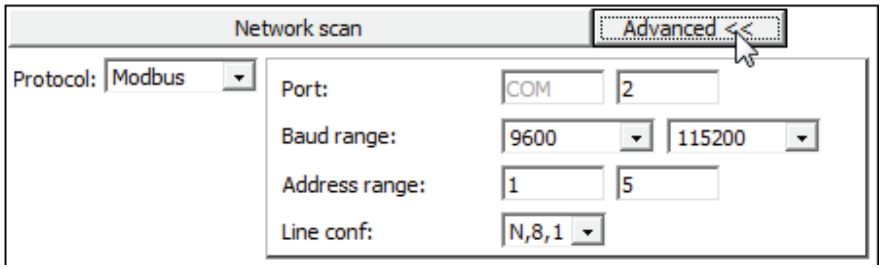
PLC search

If the address and communication settings are not known the Network can be searched for connected devices with ***FREEStudio*** Device.

In ***FREEStudio*** Device selcecte correct Protocol – Modbus for RS485 or EwDMI for TTL connection.

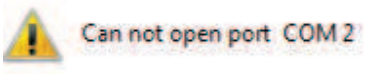


Click on Advanced to open Protocol parameters.

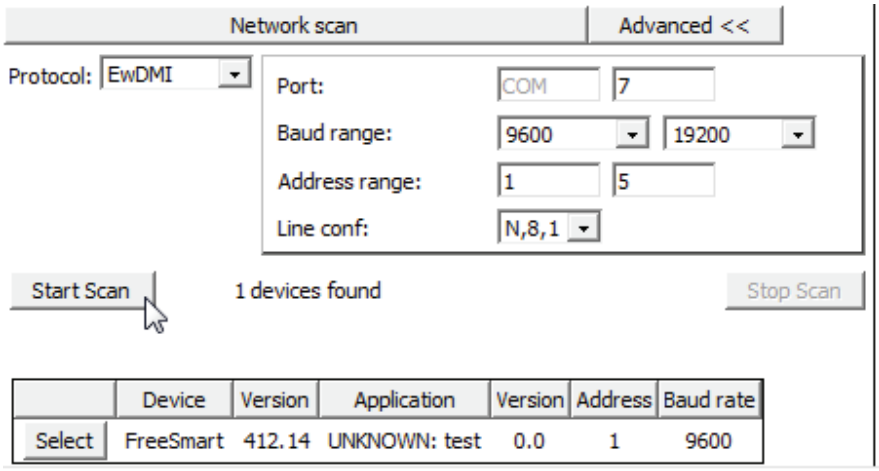


Port: You need to select the Com port where your converter is connected to
Baud range: Search will run through all selected Baud ranges in order to search for a device
Address range: Search will run through all selected Address ranges in order to search for a device
Line conf: Default in SMART is E,8,1 but N,8,1 is also a very commonly used configuration.

A message that the Com port can't be opened either indicates that converter is not connected, not properly installed or on a different Com port number.



Click on Start Scan. If no Devices are found try to change Line Conf or Address range.

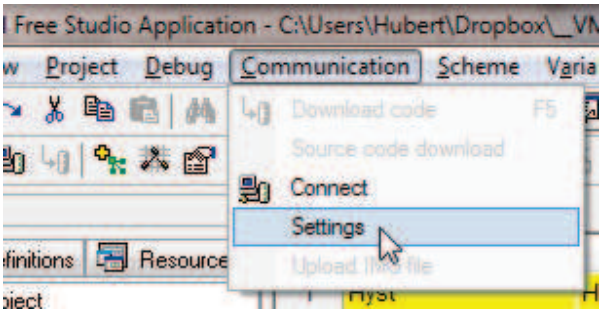


Make a note of all the settings as you need them to set up the communication in ***FREEStudio*** Application.

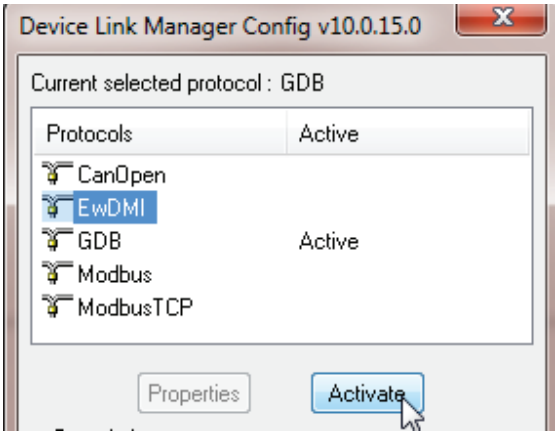
FREEStudio Application

Connection

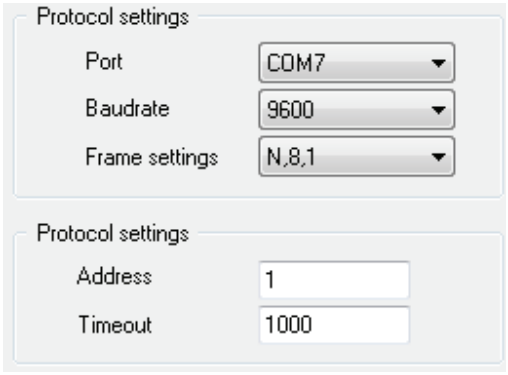
In ***FREEStudio*** Application open the communication Settings.



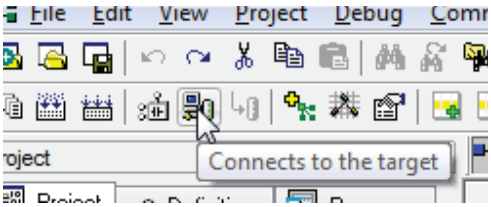
Activate the Protocol that you are using for communicant either Modbus or EwDMI.

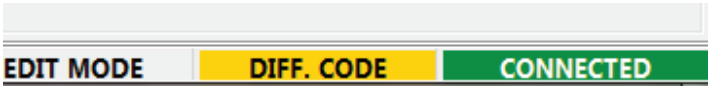


Click on Properties and enter the recorded Selections from the previous chapter.



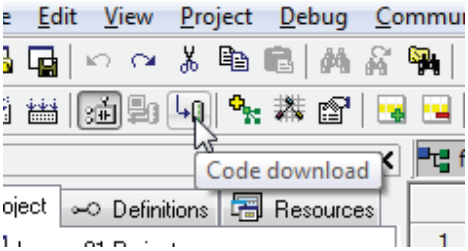
Click on the connect button and check that communication is established.





Downloading the program

Either select *Communication > Download Code* from the menu or press *F5* or click on *Code download* icon to start download.



If program hasn't been compiled before it will be compiled and saved now and then downloaded to the simulation file.

SOURCE OK green indication shows that code has been downloaded and program is the same as it is in FREEStudio Application.

Changing Menu Parameters

If the PLC has a display, parameters can be changed with the front buttons. If it is a 'blind' PLC (no display) connect a SKP10 Terminal to the PLC to do the changes.

Click on F4 (Set) to enter Setpoint menu.

Click on F4 again to display Setpoint parameter.

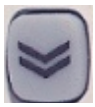
Click on F4 again to display Setpoint value.

Change value with F1 and F3 (Up and Down button).

Click on F2 (Esc) to go back to Setpoint parameter.

Click on F1 (Up) to go to Differential parameter.

Click on F4 to display Differential value. 

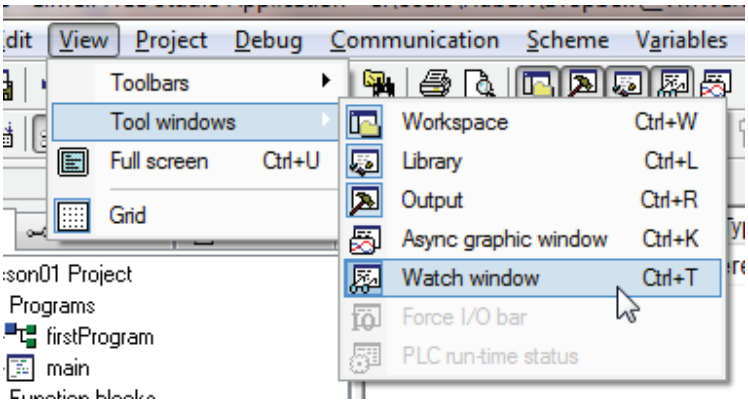
Change value with F1 and F3 (Up and Down button).  

IF the Analog Input 1 reaches a value higher than Setpoint + Differential (in our example 310 = 31.0 degree C) the Digital Output 1 will be energized and the cooling Indicator on main display is on. Main Display shows Temperature value of Analog input 1.

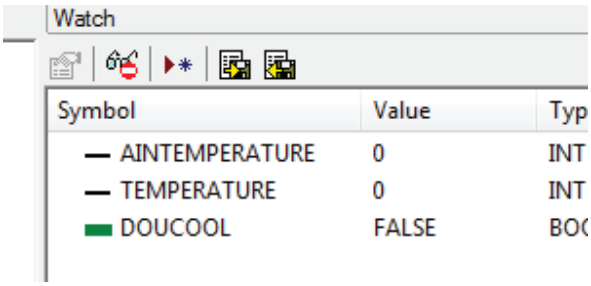
When Analog Input 1 reaches a value smaller than Setpoint, the Digital Output1 and on Screen Cooling display will turn Off again.

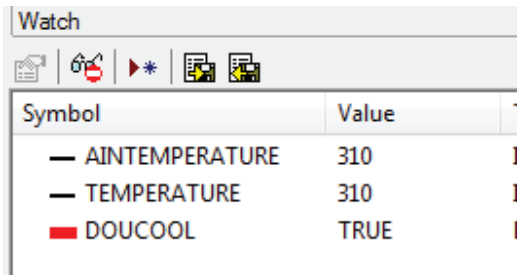
Monitor values on Screen

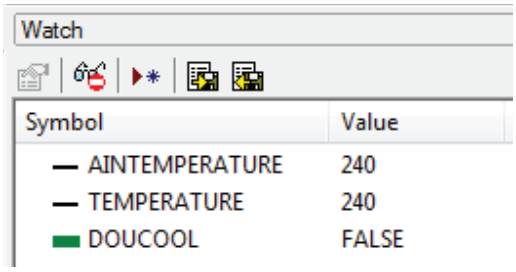
If it is not visible yet open the Watch window.



To monitor a variable in the Watch window either click on Variable and drag it while holding mouse button into the Watch window, or click on variable and press F8.



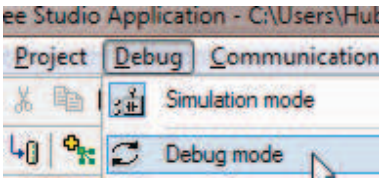


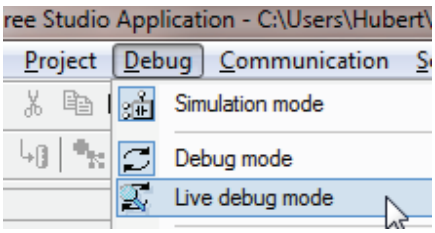


Debugging mode

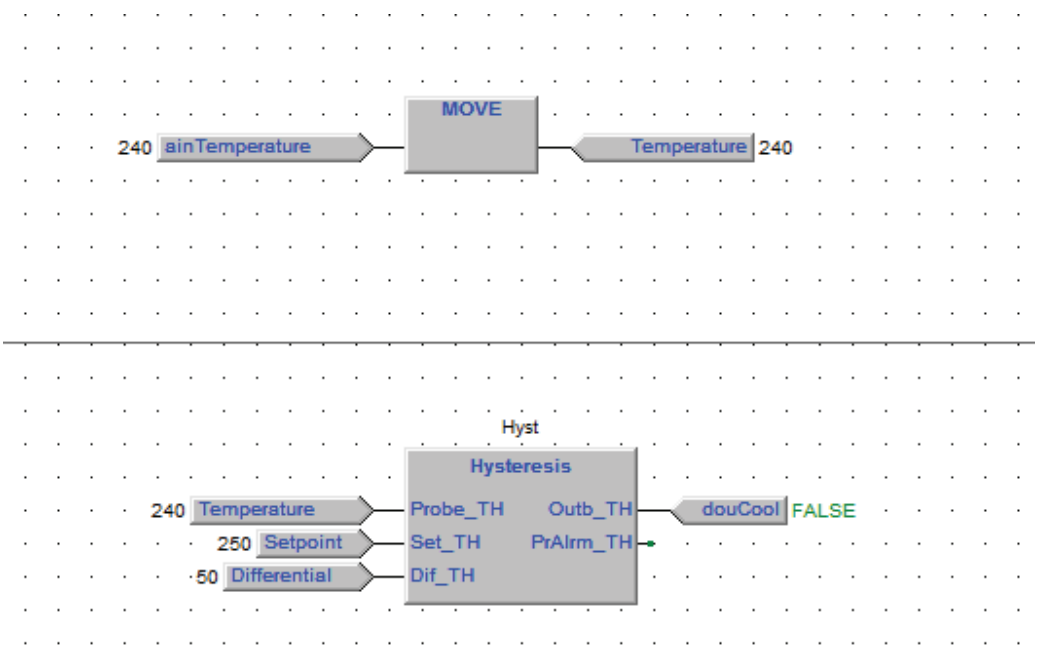
There is also an onscreen debugging mode available in ***FREEStudio*** Application.

Activate Debug mode and Live Debug.





The values of variables are now displayed on the screen (in the Function block layout).



Conclusion

This was an example how to work with PLC connected to ***FreeStudio.***

In the next Lesson we will explain Operator and Standard Blocks used in ***FreeStudio*** Application.