APPLICATION NOTES

Advanced Graphical Interface, AGI 100

- The AGI communication ports
- Modbus details
- Specific DEIF driver
- Example of project creation

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DEIF Screen Designer 1.293

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1. About this document

General purpose

This document is an application note for the AGI 100 product. The document mainly includes general product information, mounting instructions and wiring descriptions.

The general purpose of this application note is to help the user with the first steps of installing and using the AGI 100 touch screen.

Please make sure that you also read the Installation Instructions before starting to work with the Multi-line 2 controller and the genset to be controlled. Failure to do this could result in human injury or damage to the equipment.

Intended users

This document is mainly intended for the panel builder in charge. On the basis of this document, the panel builder designer will give the electrician the information he needs in order to get started to install the AGI 100. For detailed electrical drawings, the Installation Instructions must be used.

Contents/overall structure

This document is divided into chapters, and in order to make the structure simple and easy to use, each chapter will begin from the top of a new page.

2. Warnings and legal information

This chapter includes important information about general legal issues relevant in the handling of DEIF products. Furthermore, some overall safety precautions will be introduced and recommended. Finally, the highlighted notes and warnings, which will be used throughout this document, are presented.

Legal information and responsibility

DEIF takes no responsibility for installation or operation of the generator set. If there is any doubt about how to install or operate the generator controlled by the unit, the company responsible for the installation or the operation of the set must be contacted.

The units are not to be opened by unauthorised personnel. If opened anyway, the warranty will be lost.

Electrostatic discharge awareness

Sufficient care must be taken to protect the terminals against static discharges during the installation. Once the unit is installed and connected, these precautions are no longer necessary.

Safety issues

Installing the unit implies work with dangerous currents and voltages. Therefore, the installation of the unit should only be carried out by authorised personnel who understand the risks involved in the working with live electrical equipment.

Be aware of the hazardous live currents and voltages. Do not touch any AC measurement inputs as this could lead to injury or death.

Definitions

Throughout this document, a number of notes with helpful user information will be presented. To ensure that these are noticed, they will be highlighted in order to separate them from the general text.

Note symbol

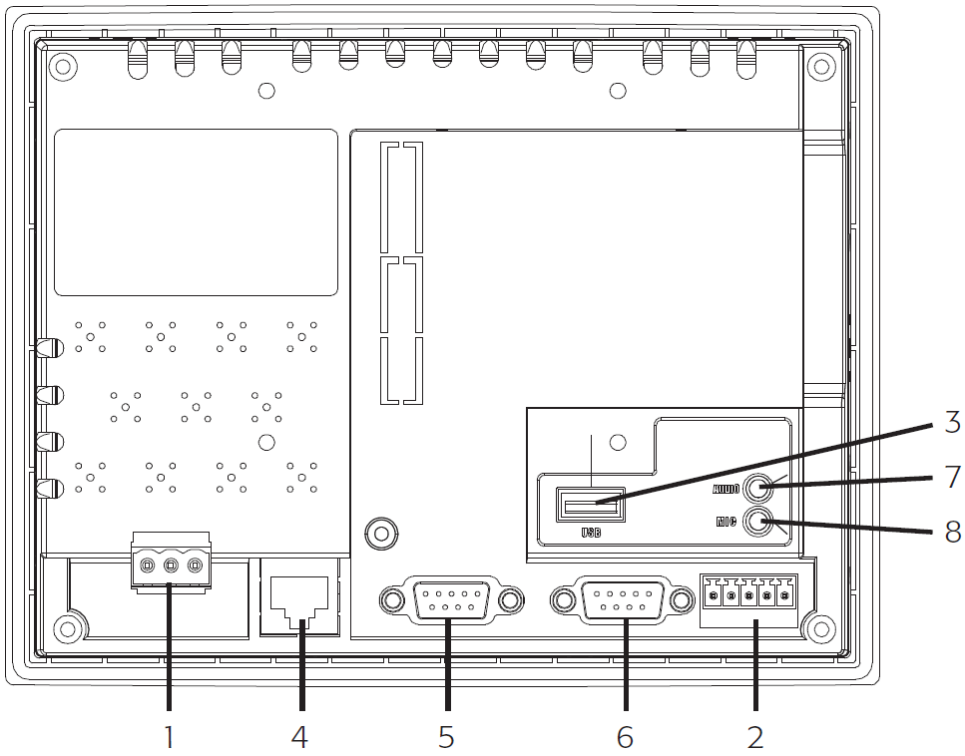
The notes provide general information which will be helpful for the reader to bear in mind.

Warnings

The warnings indicate a potentially dangerous situation which could result in death, personal injury or damaged equipment, if certain guidelines are not followed.

3. The AGI-100 communication ports

AGI 1xx series, AGI 107 rear view

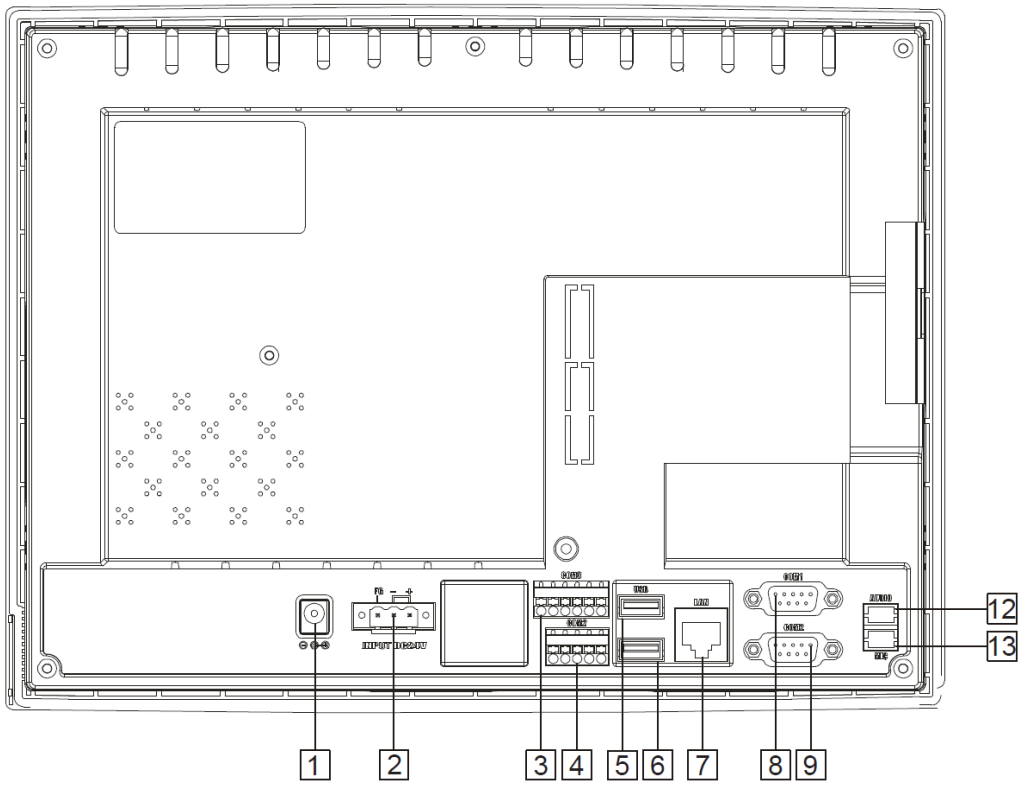


Parts introduction

1. Power connector (24V DC)
2. Com 2 (5 pin) for RS485 or RS422 link and Modbus RTU or Ascii serial communication
3. USB connector for USB memory key
4. Ethernet port (for NT/AT models) for TCP/IP Modbus communication
5. Com 1 (9 pin female) for RS232, RS485 or RS422 link and Modbus RTU or Ascii serial communication
6. Com 2 (9 pin male) for RS232 link and Modbus RTU or Ascii serial communication
7. Audio output
8. Mic input

See the AGI 100 Quick Start Guide for details about the pin out of the connectors.

AGI 112 rear view



Parts introduction

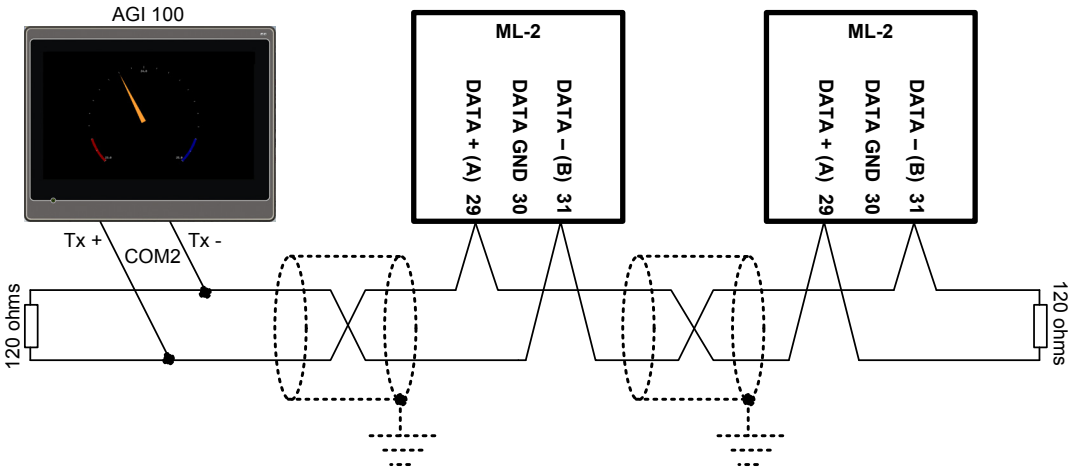
1 & 2 Jack or terminal power connector (24V DC)
3 Com 3 (6 pin) for RS232 link and Modbus RTU or Ascii serial communication
4 Com 2 (5 pin) for RS485 or RS422 link and Modbus RTU or Ascii serial communication
5 & 6 USB connector for USB memory key
7 Ethernet port (for NT/AT models) for TCP/IP Modbus communication
8 Com 1 (9 pin female) for RS232, RS485 or RS422 link and Modbus RTU or Ascii serial communication
9 Com 2 (9 pin male) for RS232 link and Modbus RTU or Ascii serial communication
12 Audio output (not used)
13 Mic input (not used)

See the AGI 100 Quick Start Guide for details about the pin out of the connectors.

4. Examples of application wiring

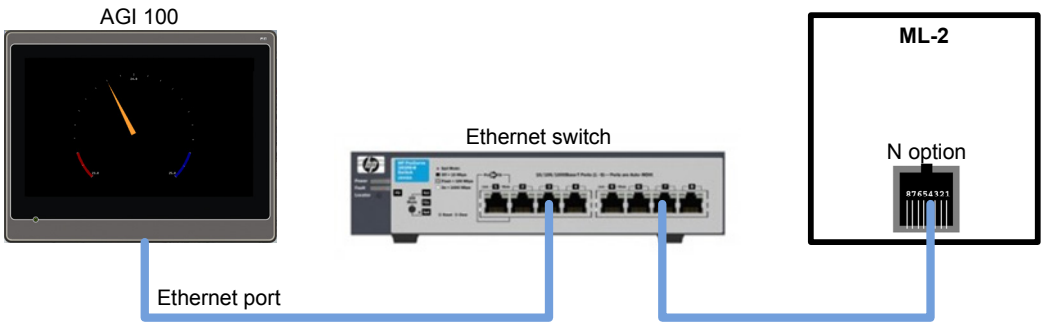
Example of serial link wiring

The AGI 100 is polling data of two PPM-3 units by using a Modbus RTU serial link, its COM 2 port and its RS485 terminals:



Example of Ethernet link wiring

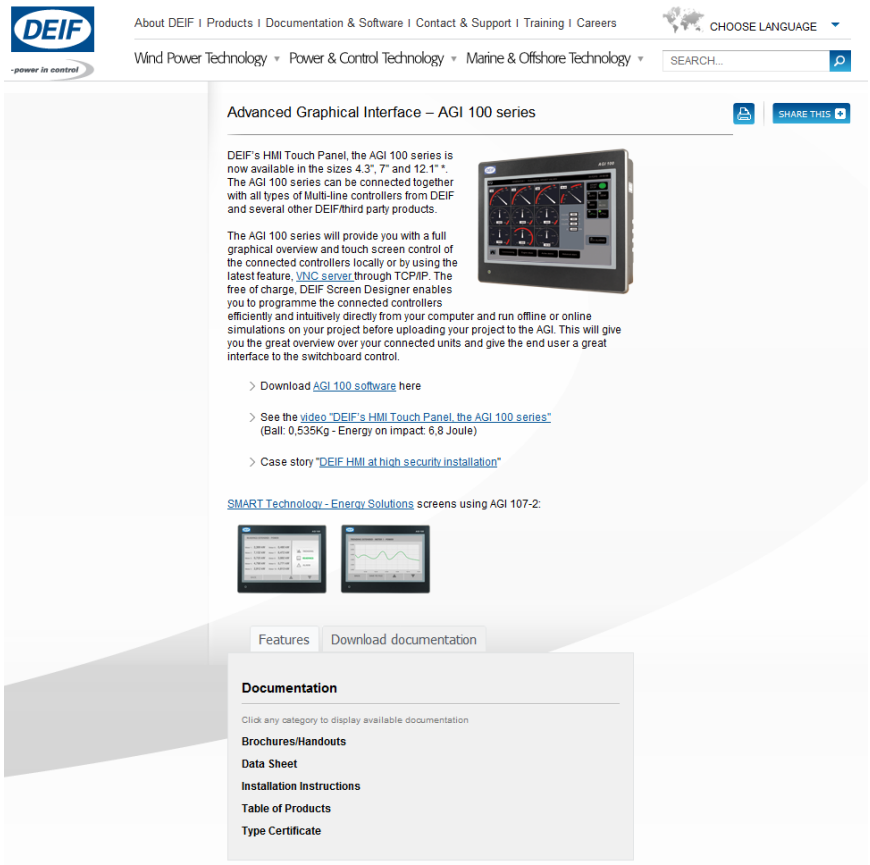
The AGI 100 is polling data of one AGC-3 unit by using a TCP/IP Modbus Ethernet link:



5. The AGI 100 documentation and software

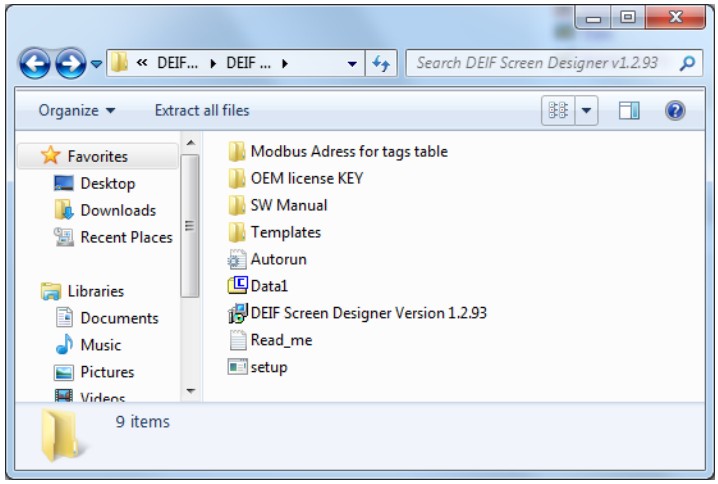
Like all the other DEIF products, the general documentation is freely available from the DEIF web page (www.deif.com). Use either the search field on the DEIF web page or the direct link to "Documentation & Software" page (http://www.deif.com/Download_centre). Type "AGI" in the search field and choose AGI on the product list that pops up.

On the bottom of the page, you are able to choose the documentation which is needed.

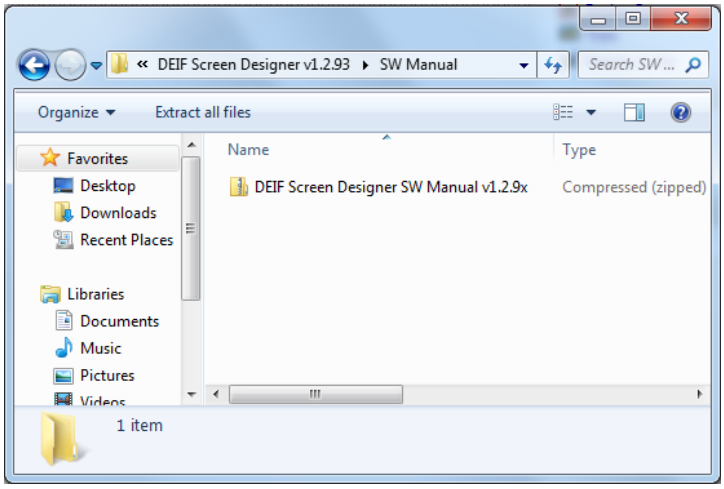


The DEIF Screen Designer documentation is included when downloading the software packaged from the DEIF web page (www.deif.com). Either by using the "Documentation & Software" link on the top of the DEIF web page or using the direct link below: http://www.deif.com/Download_centre/Software_download.aspx
Select the software called "Screen Designer for AGI" inside the software list and follow all the instructions for downloading this software.

When the zip file is successfully downloaded on the PC, the documentation will be stored in the “SW Manual” folder.



This big documentation package is essential when developing an AGI 100 application by using the DEIF Screen Designer software.



6. Connecting AGI-100 to the PC

This connection must be used for linking the DEIF Screen Designer PC SW to the AGI 100 screen. This connection is typically used for downloading or uploading an application to the AGI 100 screen. This link can be made in two different ways, a serial or an Ethernet connection.

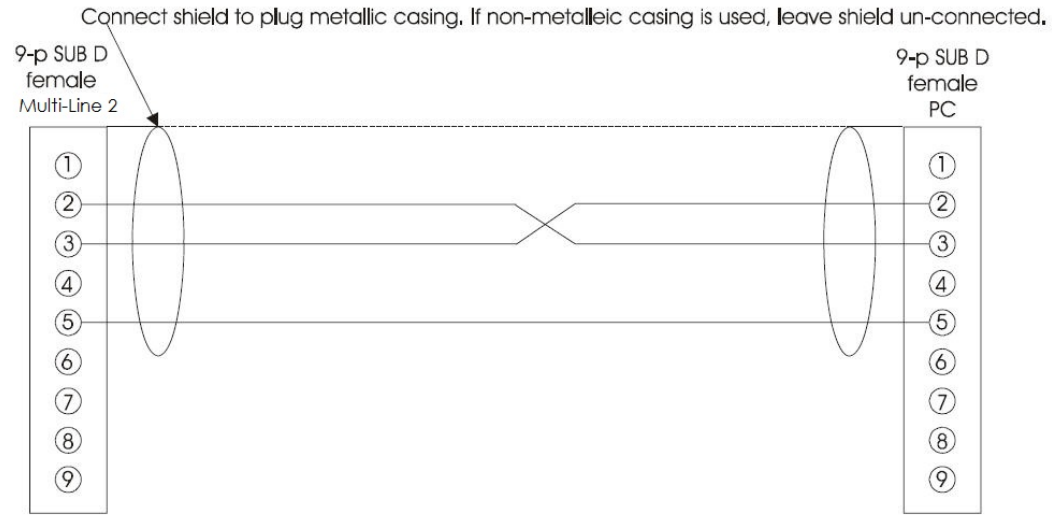
1st possible method: by using a serial link

The COM 1 or the COM 2 port of the AGI 100 can be used for this. We are only documenting here by using COM 2 as only COM 2 can be connected by using a standard DEIF cable, the option J3 (subd9 female to subd9 female crossed cable).

PC (or laptop) + USB to RS232 Converter + serial cable + AGI 100 (6)

The modern laptops do not have any serial COM ports anymore. To solve this, add a USB to the RS232 converter. A good reference for this converter type could be: Moxa UPort1150 (www.moxa.com).

The serial cable must be a subd 9 female to subd 9 female crossed type (null modem cable).



This cable is also called the option J3 for the Multi-line 2 products at DEIF. In case of using COM 1 instead of COM 2 for downloading, a female/male crossed cable must be used.

Select any baud rate for this link up to max 115.2 kbauds. Please note, that on some USB to RS232 converter (not the moxa one), you need to select the same baud rate speed on the USB

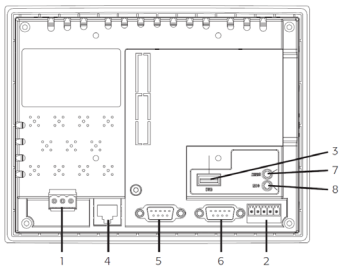
driver also. Please note, that it is not possible to download this way if the application is running on the AGI 100 by using the same COM port. In this case you must stop the application before by selecting the startup panel menu on the AGI 100.

2nd possible method: by using an Ethernet link

The Ethernet port of the AGI 100 can be used for this.

PC (or laptop) + Ethernet or TCP/IP CAT5 cable + AGI 100 (4)





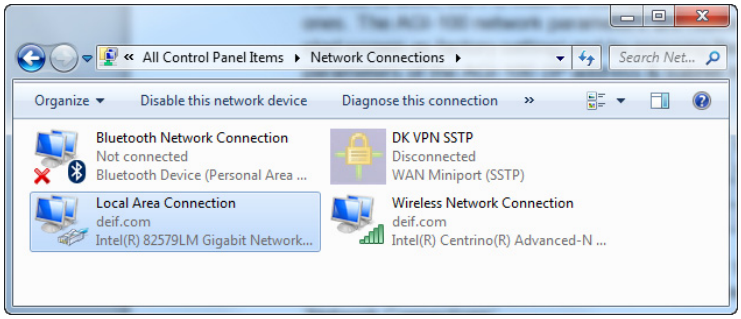
All modern laptops have an Ethernet port, typically for the wired internet connection, and this Ethernet cable is very easy to find. We recommend to use a CAT5 type as minimum. The DEIF option J4 (Ethernet cross over cable) can also be used here.

The Ethernet cable can be straight or crossed type as the AGI 100 Ethernet port is auto-sensing the Ethernet connection type automatically.

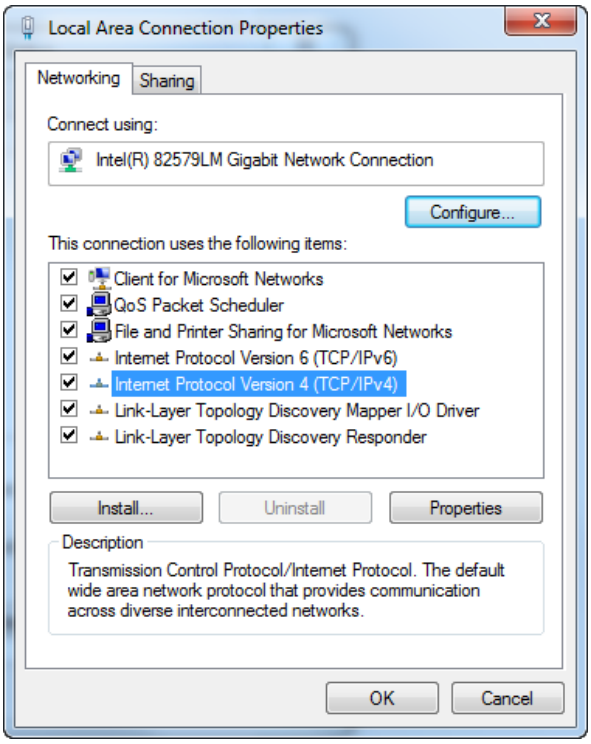
For this to work, the PC must be configured to use the same network parameters as the AGI 100 ones. The AGI 100 network parameters are readable from the Panel Setup screen (the AGI 100 start screen as factory setting) and by pressing the “general” button. Note the network parameters of the AGI 100 (IP address & subnet mask). We will use the below AGI 100 network parameters as example here:

	Example of AGI 100 network parameters
IP address	192.168.20.19
Subnet mask	255.255.255.0

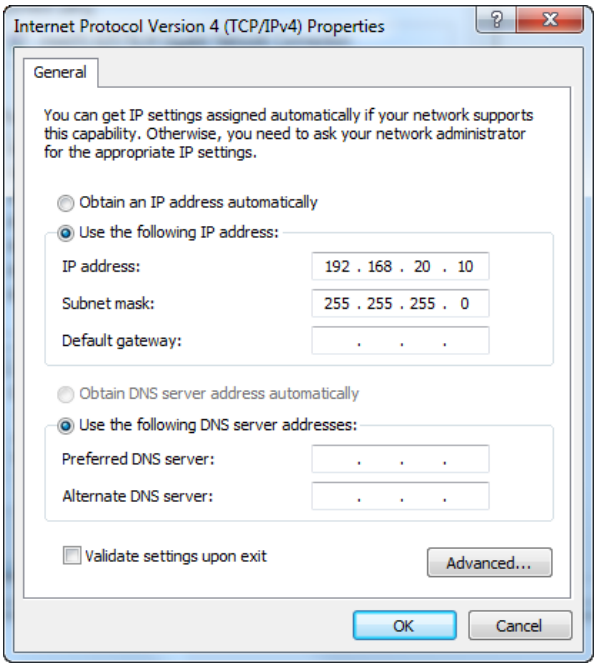
We must now adapt the network parameters of the PC (or laptop) for being compatible to these above network parameters. Go to the control panel via the “Start” button on the PC screen. Select “Network Connections”.



Select the local area connection used.



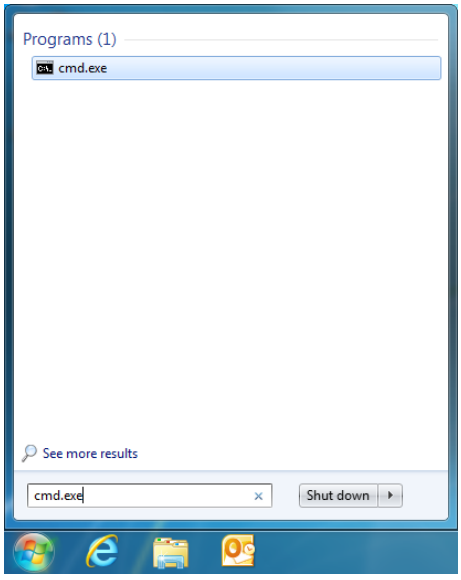
Select “Internet Protocol Version 4 (TCP/IPv4)” and use this setting.



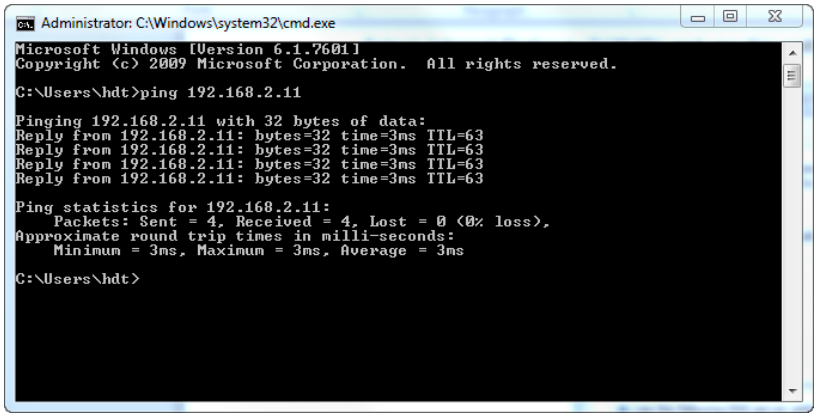
Here we have chosen the IP address = 192.168.20.10, but it could also be 192.168.20.1 to 192.168.20.9 or 192.168.20.11 to 192.168.20.18 or 192.168.20.20 to 192.168.20.254.

When your PC has been set up as described on the previous pages and the PC is connected directly to the Ethernet socket of the AGI 100 port, you must subsequently check if you have access to the AGI 100 port from the internet connection by means of the ping utility programme from your PC.

Click “Start” (lower left corner of the PC screen) and type “cmd” and press the Enter key.



Type “ping” + the IP address of the AGI 100 and press the Enter key (see below).



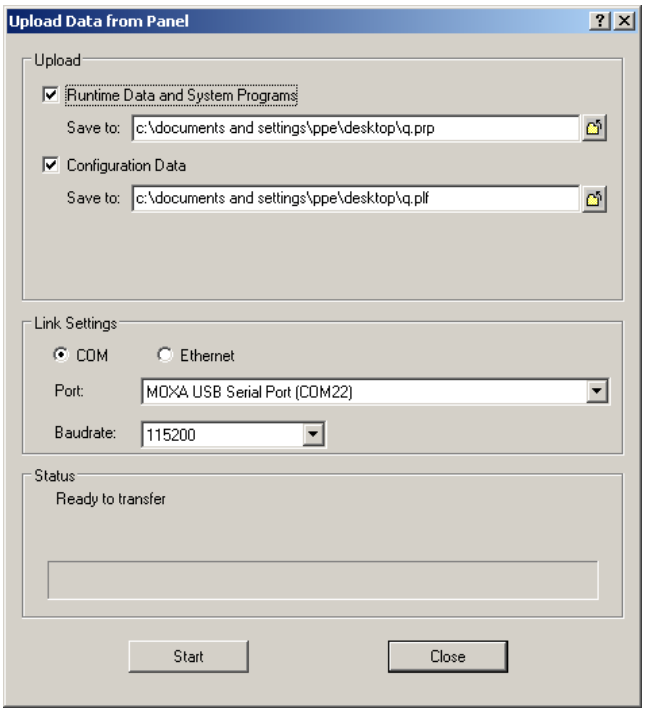
7. Changing or reading the AGI-100 network parameters

Press the “general” button on the AGI 100 Panel setup screen (the AGI 100 start screen as factory setting). All the AGI 100 network parameters (IP address & subnet mask) are readable and selectable from this menu.

8. Uploading an existing application from the AGI-100

The AGI 100 must be connected to the PC that will receive the existing application. See chapter 3 of this document for details about how to do this. We will describe how to upload an existing application from an AGI 100. In this chapter, we will use a serial link through the AGI 100 COM2 port for uploading an application from an AGI 100.

Run the DEIF Screen Designer SW on the PC and open the “Upload” menu from the “Panel” menu:



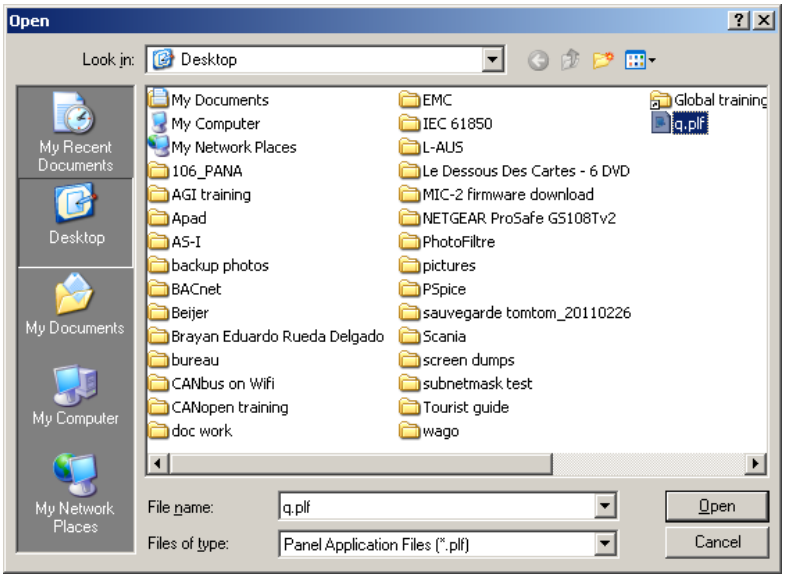
Select the two first choices and write two file names.
Adjust the link setting parameters and click the “start” button.

Enter the password and click the “OK” button:

The standard password is: 000000000 (9 times zero).

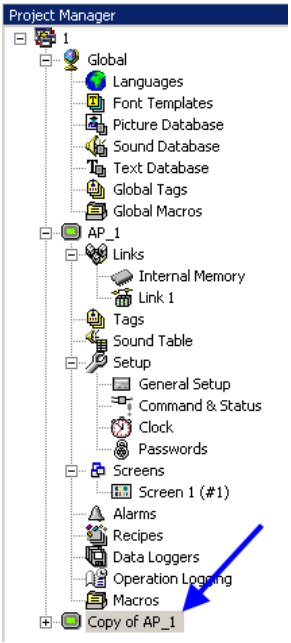
These two files (.prp and .plf) are now well imported in the PC at the right place.

Open the “Import Panel Application” menu from the “Project” menu:



After selecting the previously saved .plf file, click the “Open” button.

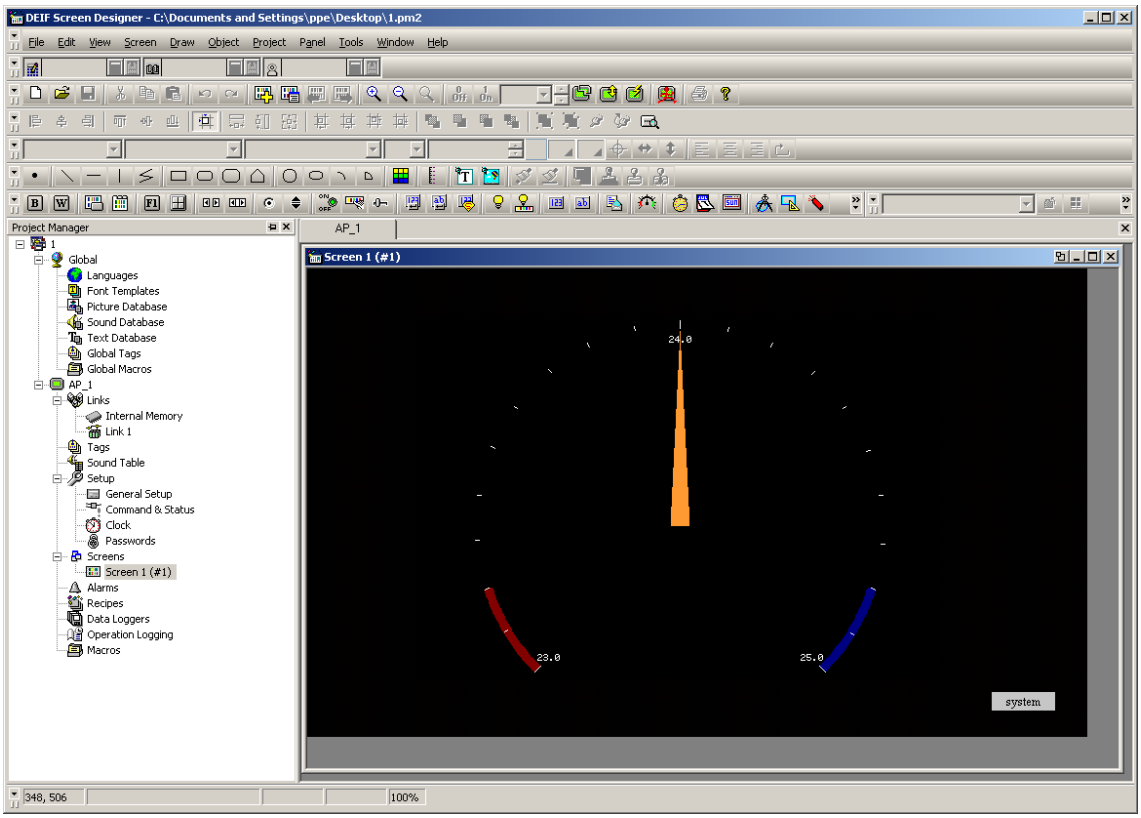
By looking at the Project Manager, this application has now been well imported next to the current application project:



9. Downloading an application to the AGI 100

The AGI 100 must be connected to the PC that will receive the existing application. See chapter 3 of this document for getting details about how to do this. We will describe how to download a designed application from the PC to an AGI 100. In this chapter, we will use a serial link through the AGI 100 COM2 port.

The DEIF Screen Designer SW is supposed to run on the PC with one designed application ready to be downloaded to the AGI 100. It could look like this:

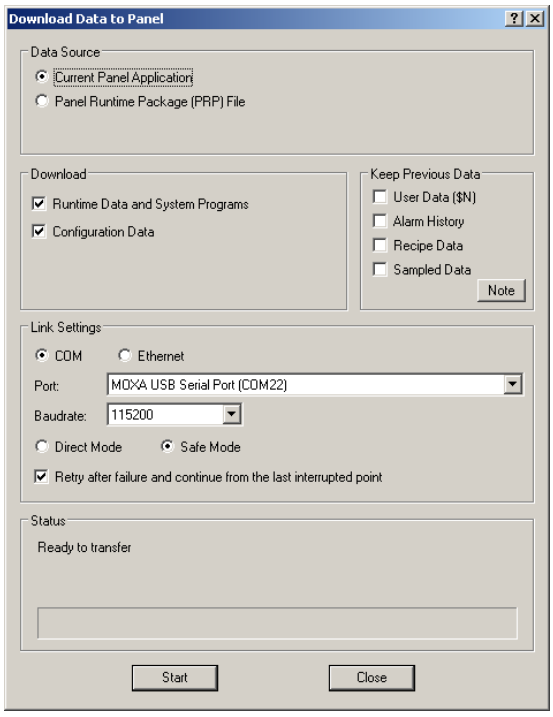


This download operation must be done in three steps:

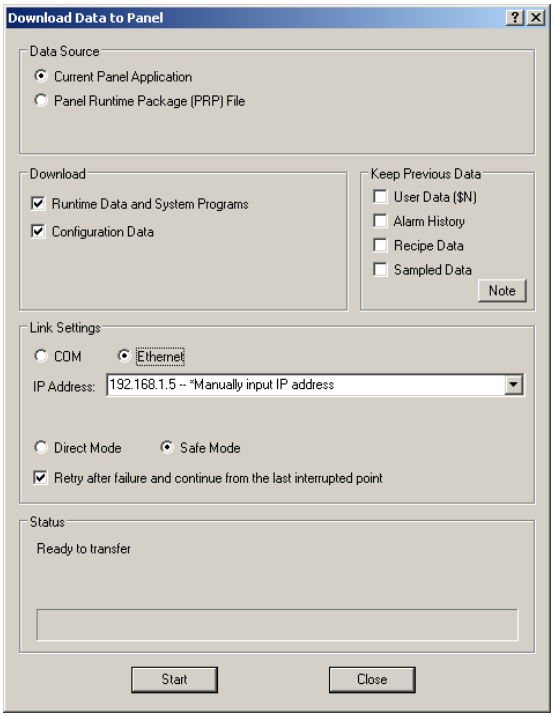
- Save the application: use the “save” menu on the “File” menu. If this menu is not accessible, it means that this application has previously been saved and that no other changes have been applied since then. In this case, do not try to save anymore and continue to the next step.
- Compile the application by using the “Compile” of the “Panel” menu. This step is finished when receiving the message “Compilation completed successfully”, else correct the design according to what is reported inside the compilation log lines and restart from step 1 afterwards.
- Download the compiled application by using the “Download” menu of the “Panel” menu.

Below, a screen dump of the “Download” menu by using a serial link (AGI 100 COM2 port).

Remember to choose “Configuration data”.



Below, a screen dump of the “Download” menu by using an Ethernet link:



After selecting the correct options of this menu, click the “Start” button for starting the download process.

10. Modbus addresses versus PLC addresses

Programming the AGI 100 product must be done by using PLC addresses but the DEIF Modbus documentation is mentioning Modbus addresses instead. Modbus address is the data that is transmitted inside a Modbus data frame, and the PLC address is the address data that will be used when programming the application (ex: programming a scada system, a PLC, an HMI, etc.). Below is a table comparing these two address systems.

PLC addresses	Modbus functions	Modbus addresses (16 bits data)
1	01 & 05 & 15	0
2	01 & 05 & 15	1
...	...	...
65535	01 & 05 & 15	65534
65536	01 & 05 & 15	65535
100001	02	0
100002	02	1
...	...	...
165535	02	65534
165536	02	65535
300001	04	0
300002	04	1
...	...	...
365535	04	65534
365536	04	65535
400001	03 & 06 & 16	0
400002	03 & 06 & 16	1
...	...	...
465535	03 & 06 & 16	65534
465536	03 & 06 & 16	65535

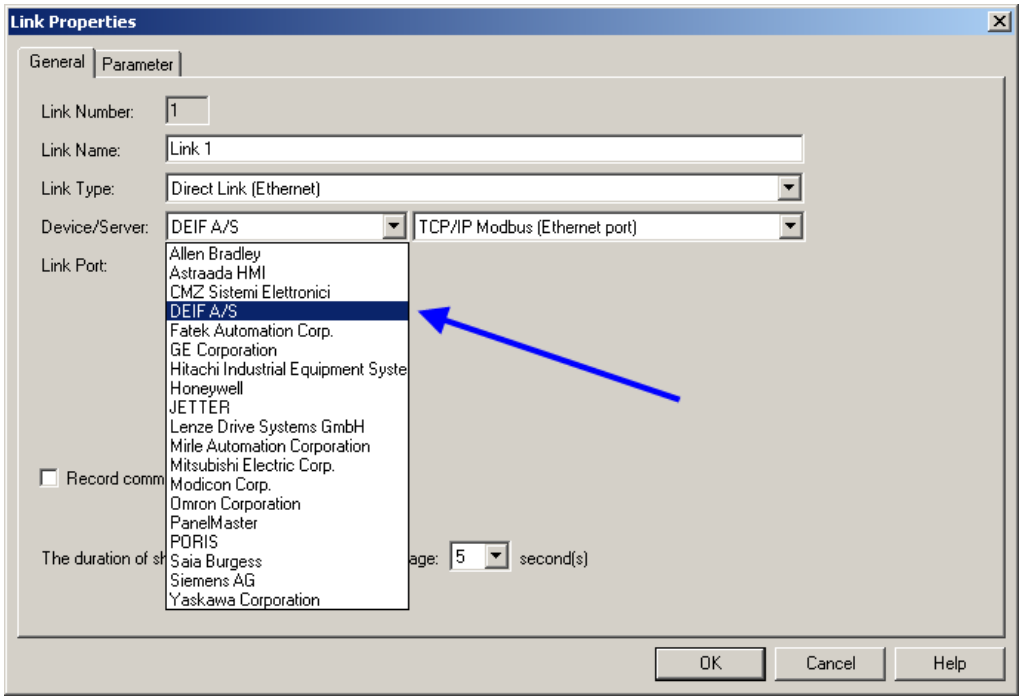
Example: PLC address 436241 = Modbus address 36240 and Modbus functions 03, 06 or 16.

The Modbus protocol specifications are available from the Modbus website (www.modbus.org).

In case of writing only one single data through Modbus (ex: using a single command push button like a genset start command), the AGI 100 will use Modbus functions 5 or 6 but never 15 or 16. It is then important to check that the communicating slave unit is supporting Modbus functions 5 and 6 and not only 15 and 16. This is not a problem for all the Multi-line 2 units with application software in version 3.xx.x.

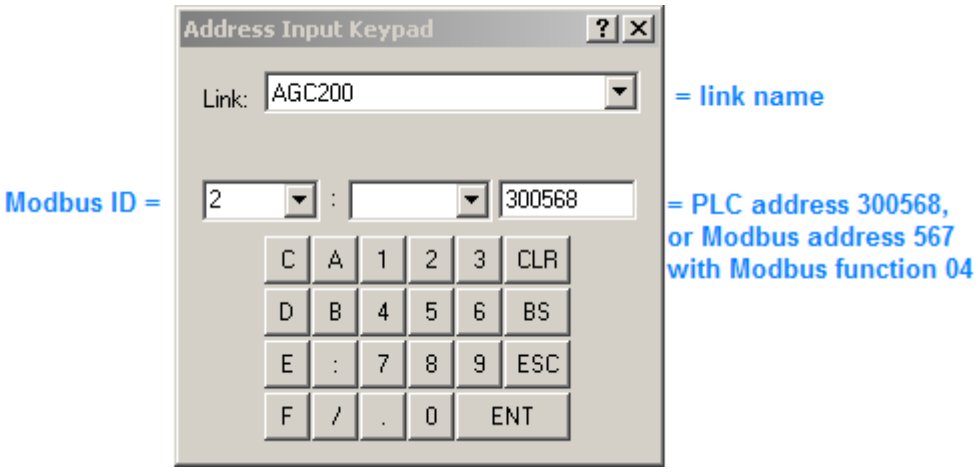
11. Using the DEIF modus drivers

All the DEIF Modbus drivers are selectable from the Link Properties menu:

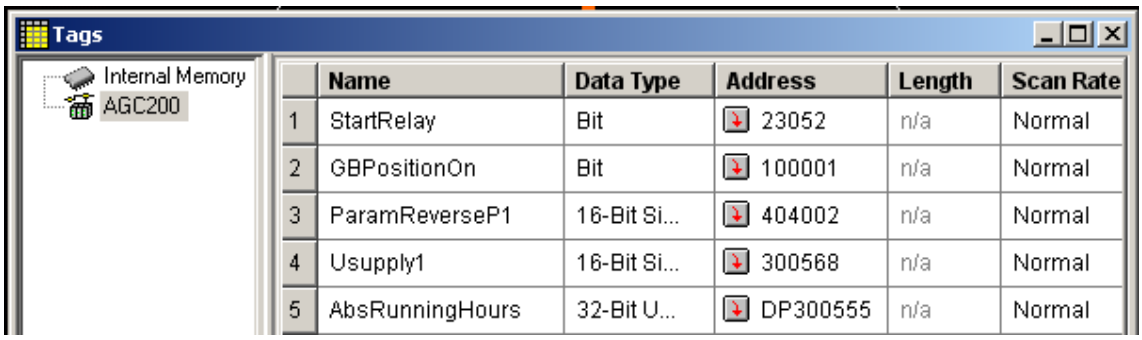


We recommend to use this driver when programming an AGI 100 application together with DEIF Multi-line 2 units as it is specially pre-configured for this. This driver type is supporting Modbus RTU, Modbus Ascii or TCP/IP Modbus.

Below, an example of programming the address input of any component placed on a screen:



Below, an example of programming some Modbus tags:

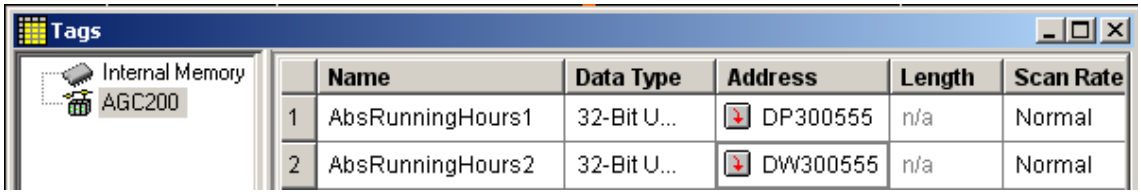


	Name	Data Type	Address	Length	Scan Rate
1	StartRelay	Bit	23052	n/a	Normal
2	GBPositionOn	Bit	100001	n/a	Normal
3	ParamReverseP1	16-Bit Si...	404002	n/a	Normal
4	Usupply1	16-Bit Si...	300568	n/a	Normal
5	AbsRunningHours	32-Bit U...	DP300555	n/a	Normal

The 5 above tags are using the Modbus functions 1, 2, 3, 4 and 5 at Modbus addresses 23051, 0, 4001, 567 and 554. The tag called “AbsRunningHours” is a 32 bits data and uses the DP format instead of the DW format in order to respect the DEIF format: the lowest Modbus address is containing the high value of a 32 bits data.

Example of 32 bits data based on this:

- the PLC addr. 301001 (or Modbus addr. 1000 with Modbus funct. 04) is containing a “1” value
- the PLC addr. 301002 (or Modbus addr. 1001 with Modbus funct. 04) is containing a “2” value.

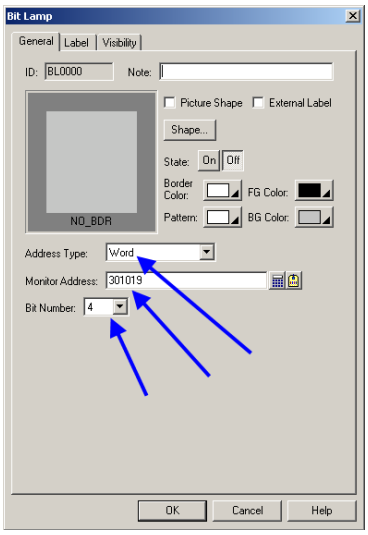


	Name	Data Type	Address	Length	Scan Rate
1	AbsRunningHours1	32-Bit U...	DP300555	n/a	Normal
2	AbsRunningHours2	32-Bit U...	DW300555	n/a	Normal

>>> AbsRunningHours1’s value will be 1 x 65536 + 2 = 65538 as PLC address 300555 is the MSB value.
>>> AbsRunningHours2’s value will be 2 x 65536 + 1 = 131073 as PLC address 300556 is the MSB value.

Please note, that it is not possible to read a bit from a word data at the tag level. To do so, read a word data at the tag level and extract this enclosed bit data by using the bit count function of a screen component or use macro.

Example: display the GB position by using a bit lamp component (Modbus addr. 1018, bit 4):

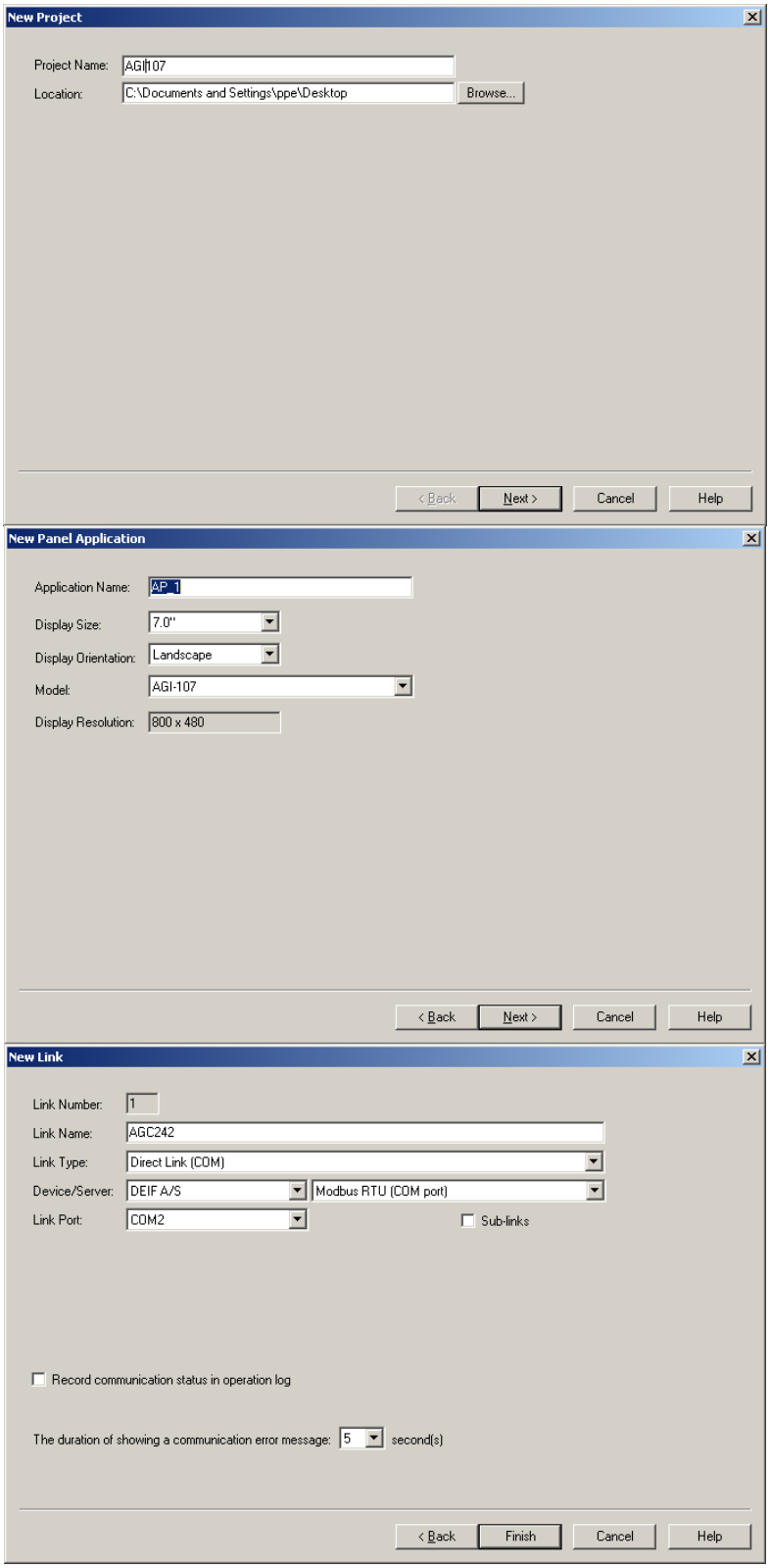


12. A first simple project

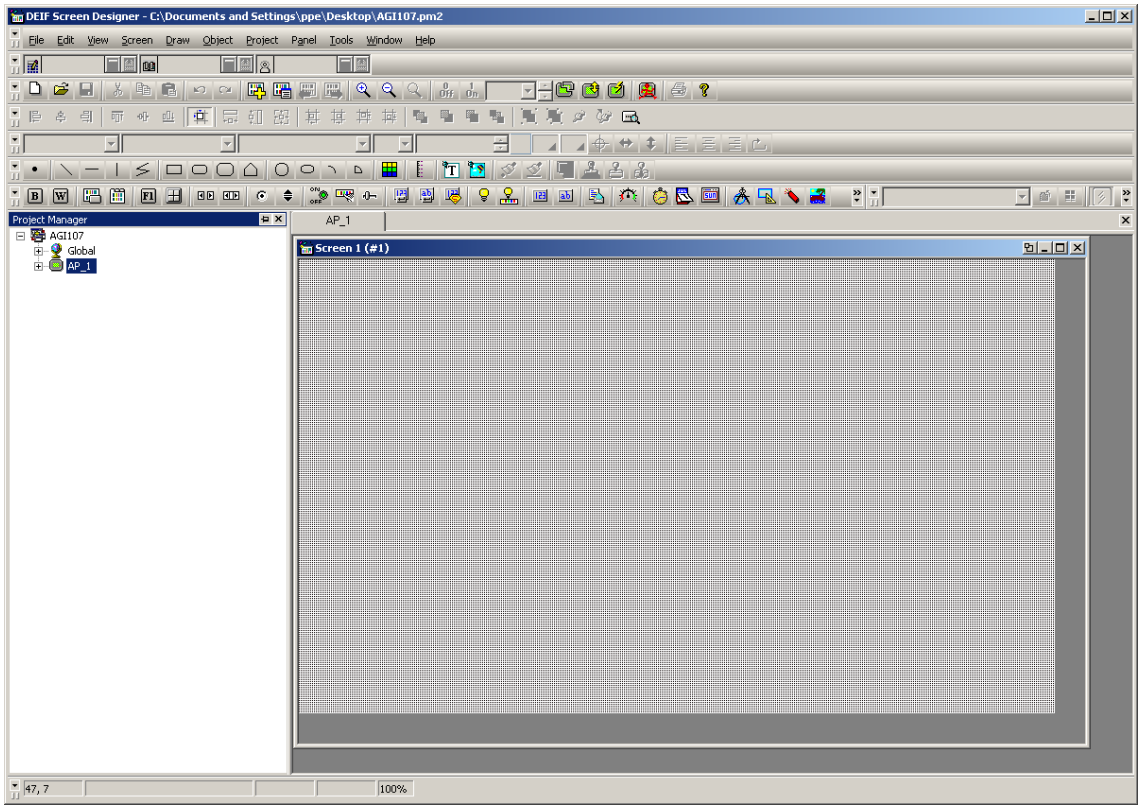
This chapter will describe step by step how to design a simple screen displaying one voltmeter only and the voltmeter will indicate the power supply voltage level of one AGC-3 unit, like this:

In this example, we are using an AGI 107 type connected to one AGC 242 through its option H2 port (RS485, 19200bauds, Modbus ID 2). The AGI 107 IP is connected to my PC by using a direct Ethernet link.

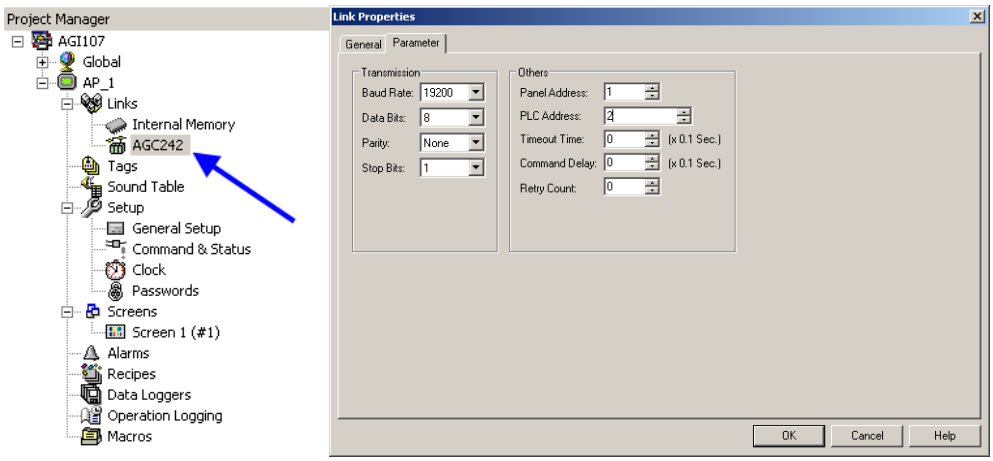
Run the DEIF Screen Designer software from your PC programme list, select “New” from the “File” menu and follow the below screen dumps:



Click the “Finish” button and your screen will now look like this:

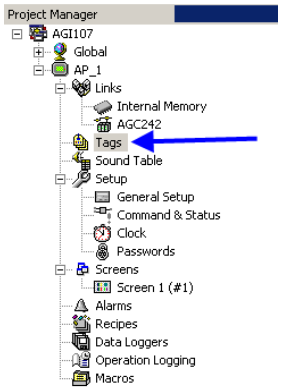


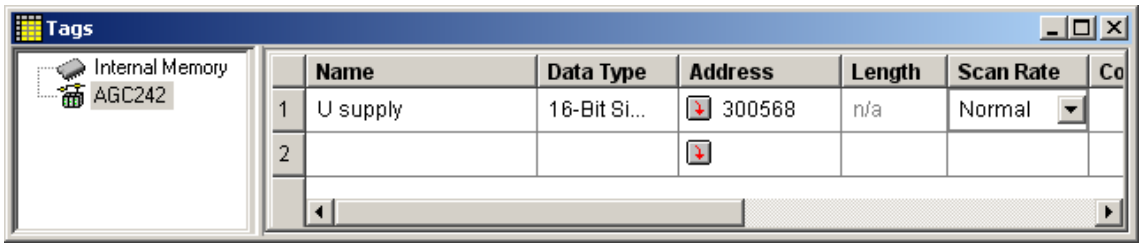
We will start by adjusting the communication parameters of the link between the AGC 242 and the AGI 107. To do so, double-click the link you have created, called “AGC242” here:



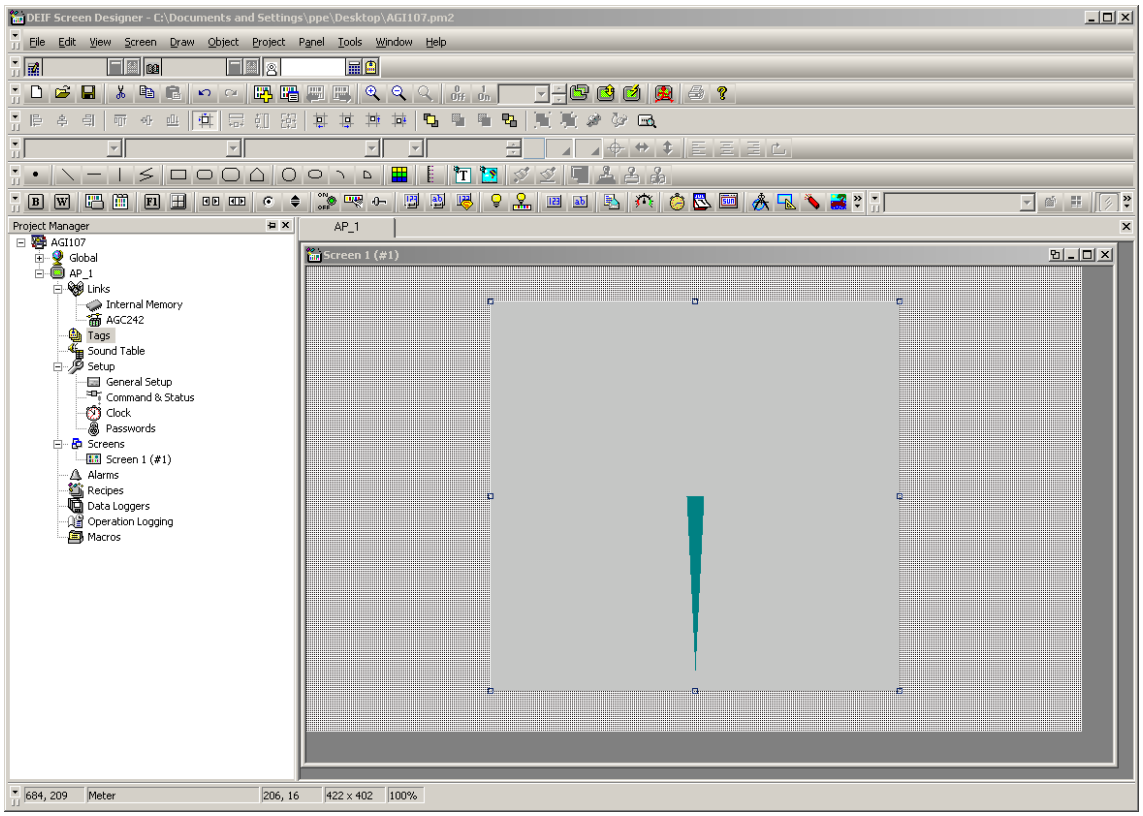
Select the Parameter menu and adjust the Modbus communication parameters.

Double-click the Tags property for creating the “U supply” Modbus value this way:

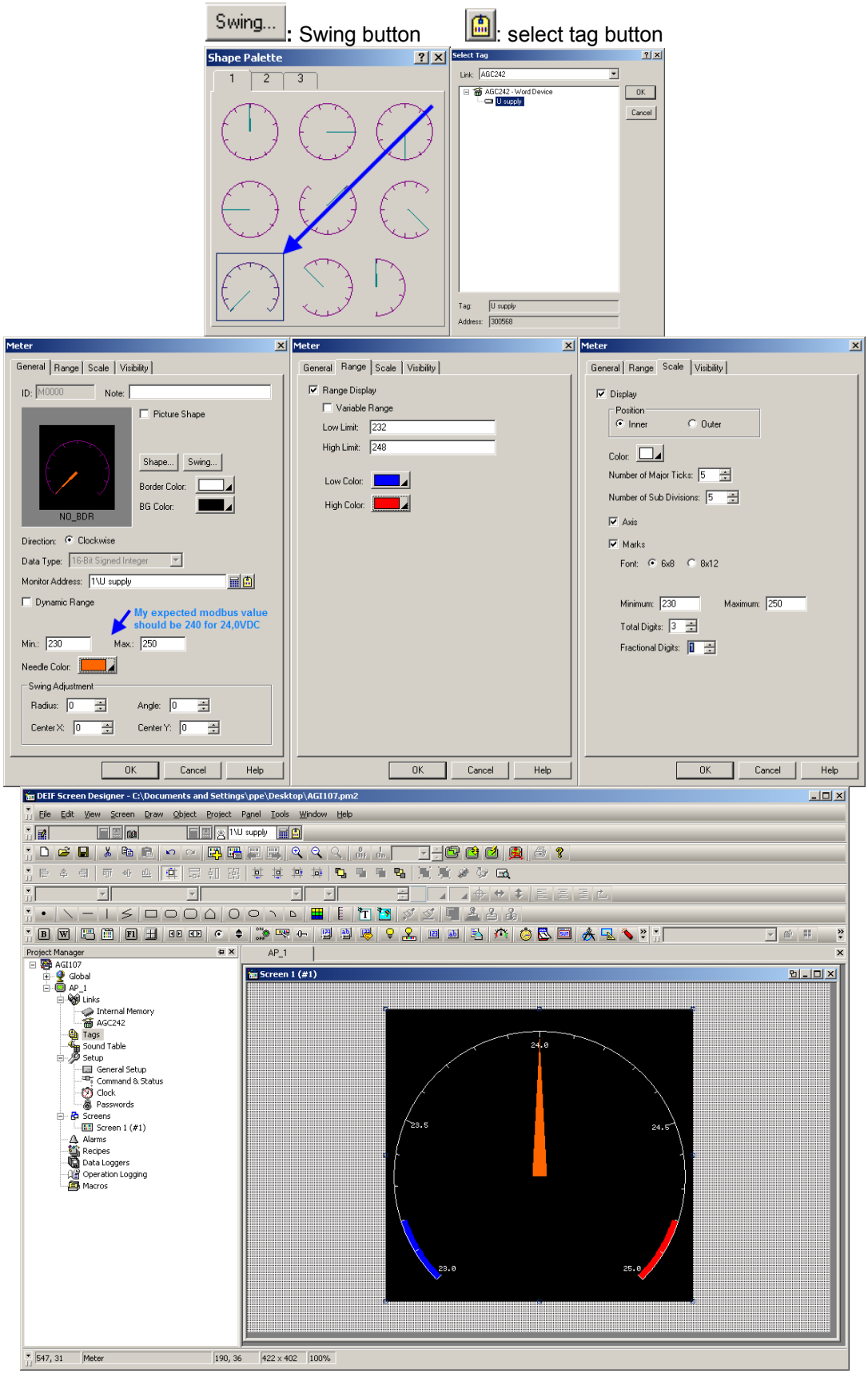




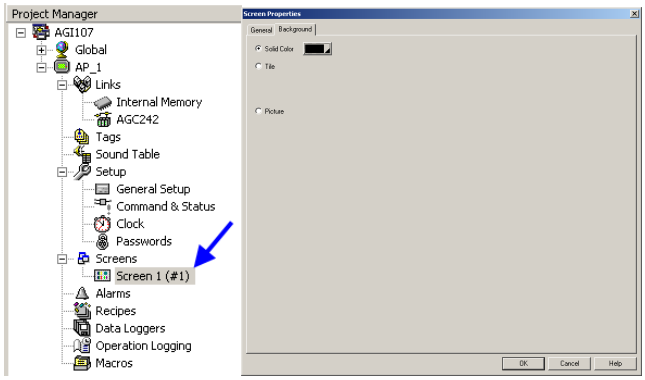
Select the meter component  from the components icon bar and place one on your screen:



Double-click the created meter for adapting its properties this way:

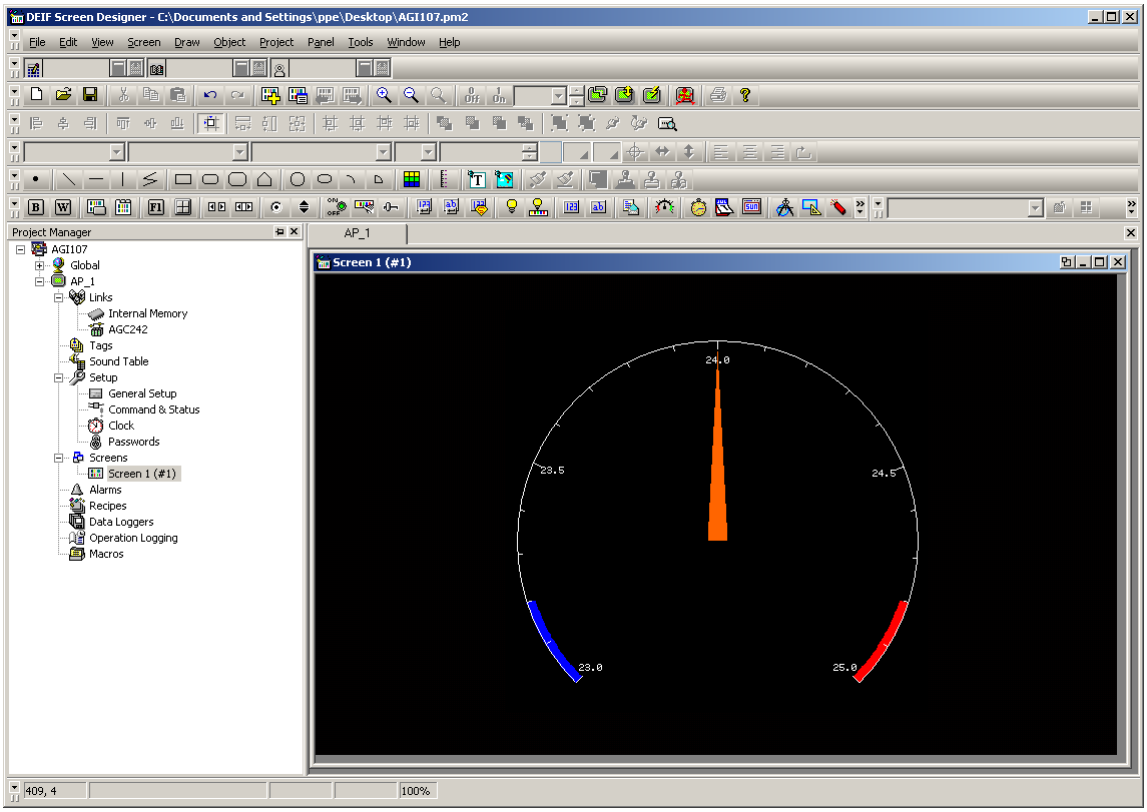


Click the Screen 1 line and select the “Properties” menu:



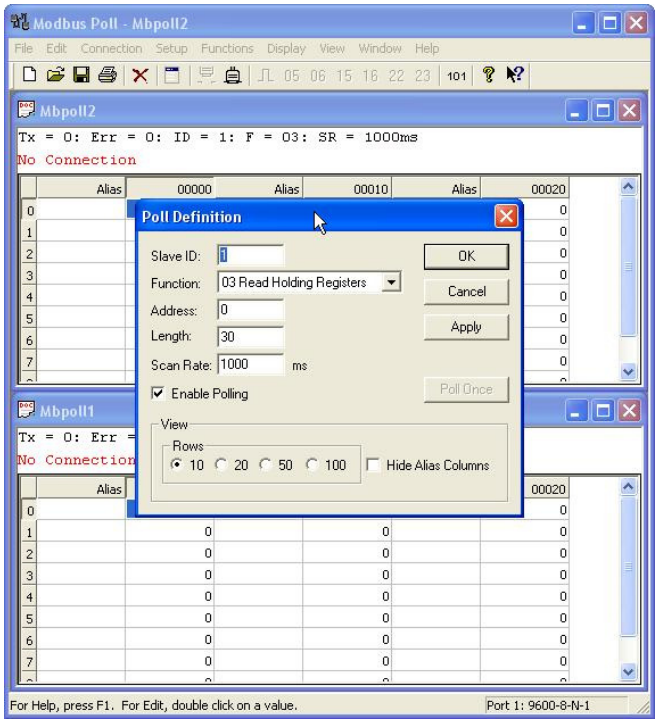
And change the background colour to black.

Save your project , compile it and download it to the AGI screen.



13. Troubleshooting

When designing a touch screen or scada application, we have experimented that most user problems are related to the information to be extracted through the Modbus communication and more rarely from the application itself. The user often forgets in this situation that it is possible to test all data that must be required through this Modbus communication by using a standard Modbus tester tool. One example of a Modbus tester could be the Modpoll software (see http://www.modbustools.com/modbus_poll.asp):



If all the required data are seen available by using this test, it is then the application that is causing the trouble. In this case, we will invite you to read the AGI technical documentation. The chapter 5 of this present document is explaining how to access to all this documentation. If this is not enough, please contact your local DEIF contact for getting professional local support.

DEIF A/S reserves the right to change any of the above.