## PRODUCT PAGE

The product page contains datasheets, application notes, links to software downloads, program examples, videos, case studies, and other documentation.

**https://www.metel.eu/l/plc-gama**

## METEL IEC 61131-3 IDE CONFIGURATION SOFTWARE

METEL IEC 61131-3 IDE is a freeware software for writing and debugging control programs for PLC IPLOG-GAMA in languages defined by the IEC 61131-3 standard:

- ST (Structured Text)
- LD (Ladder Diagram)
- IL (Instruction List)
- FBD (Functional Block Diagram)

**https://www.metel.eu/l/swIDE**

## WIKI PAGES FOR PROGRAMMERS

On the Wiki page wiki.iplog.eu you will find useful information that will be appreciated especially by PLC programmers. The site contains tutorials and practical examples regarding programming in the IEC 61131-3 IDE, a description of available OPKG packages, details on SSH console management, and much more.

**https://wiki.iplog.eu/wiki/Welcome_to_IPLOG_wiki**

## ONLINE CONFIGURATOR

Due to the large number of variants, we recommend selecting the version suitable for your application in the online configurator. The configurator also contains information on the availability of individual types. It will also display the price to logged-in users.

**https://www.metel.eu/configurator/iplog**

### 1. Mounting

PLC IPLOG and their IO modules in BOX design are designed for installation on a flat surface or DIN35. The necessary holders are included. The installation can be vertical or flat surface. You will find the exact dimensions and location of the holders in the catalog sheet.

**Vertical Mounting**     **Flat Mounting**



### 2. Power Connection

Connect the power supply to CONNECTOR B. The power supply is signaled by the PWR LED on the front panel lighting up.



| | |
|---|---|
| 5 PE | |
| 4 GND | |
| 3 GND | |
| 2 VIN | |
| 1 10 - 60 VDC | CONNECTOR B |
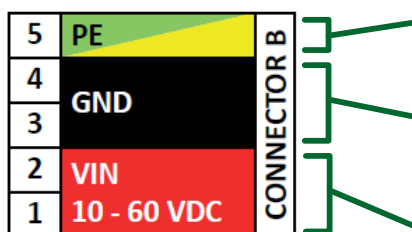
**The PE terminal is connected to the cover and galvanically separated from the internal circuits. This connection eliminates ground loop problems. By conductively connecting the PE terminal or cover to the ground of the building, you will increase the resistance of the device to interference.**

**Connect the (-) power pole to the GND terminals.**

**Connect the (+) pole of the power supply in the range to the VIN terminals. Input voltage 10 to 60 VDC except:**
- **models with AI and AO boards (20 to 60 VDC)**
- **models with MBUS interface (40 to 60 VDC)**

**The average power consumption of IPLOG-G1/G2/G3 is <3/5/6 W.**

### 3. Configuration

PLC IPLOG can be configured and programmed in the following ways:

**Web interface** - setting of IP parameters, setting of access rights, VPN configuration, setting of downloaded opkg, list of available IEC variables, status

**SSH console** - a standard SSH console used, for example, to download opkg packages that extend production firmware with additional tools

**METEL IEC 61311-3 IDE** - IDE for writing and debugging programs in IL, ST, LD and FBD languages

**SIMULand** - setting IP parameters

### Default IP address

By default, the IPLOG is available at the IP address that is affixed to the label. At the same time, the DHCP client is enabled. Therefore, if you connect the IPLOG to a network with a DHCP server, it will be available at two IP addresses. Address changes are then possible via the web interface.

### Default usernames and passwords for web/ssh

| USER | PASSWORD | NOTE |
|------|----------|------|
| root | | Administrator |
| metel | metel | User |

### Default usernames and passwords for SNMPv3

| USER | AUTHENTICATION PW | ENCRYPTION PW | AUTHENTICATION/ENCRYPTION ALGORITHM | NOTE |
|------|-------------------|---------------|-------------------------------------|------|
| user | useruser | useruser | SHA / AES | Read only |
| master | mastermaster | mastermaster | SHA / AES | Read and write |

📖 **The default username for SNMP v1/v2c is not defined.**

### Web interface

After entering the IP address into a web browser, enter the credentials, which are the default settings.

The website is divided into three parts: System, Tools, Status.

📖 In the upper right corner you can switch between CZ, EN and PL.

### System

It contains basic parameters and system configuration.
*Basic:* Listing of basic information about hardware and software.
*Networks:* Setting network parameters for available physical interfaces ETH, WLAN, GPRS.
*Users:* Creating/editing users for access to the web/ssh interface, SNMPv1/v2c, SNMPv3. The **root** user is defined by the manufacturer and cannot be deleted. Password change is allowed.
*Certificates:* Upload your own certificate and key for a secure connection via https.
*Upgrade:* Device firmware upgrade.
*USB:* Manage available volumes of USB memory modules (USB flash memory). In this section it is possible to connect/disconnect individual volumes and modify the path to which the volume is connected (mounted).
*GSM:* GSM interface configuration. Possibility to send a test SMS, set up SMS forwarding or create a TCP tunnel, etc.…
*IO Addressing:* Change Modbus ID on expansion IO modules.

### Tools

Contains a web interface for configuring extension packages installed from the OPKG repository. By default, the following packages are available.
*DNSMASQ:* Configure the IPLOG unit as a DHCP server.
*IEC 61131-3:* Editing aliases for inputs, outputs and creating memory variables.
*NFTABLES:* Creating/editing a network packet filter (firewall).
*OpenVPN:* Creating/editing a secure OpenVPN connection when the device is in client mode.

### Status

Basic information about the device, including temperature display and power supply.
*System:* Basic information about the device.
*GSM:* Basic information about the status of the GSM interface.
*IEC 61131-3 Variables:* Listing of all variables, including the display of their current values at the time of page loading.
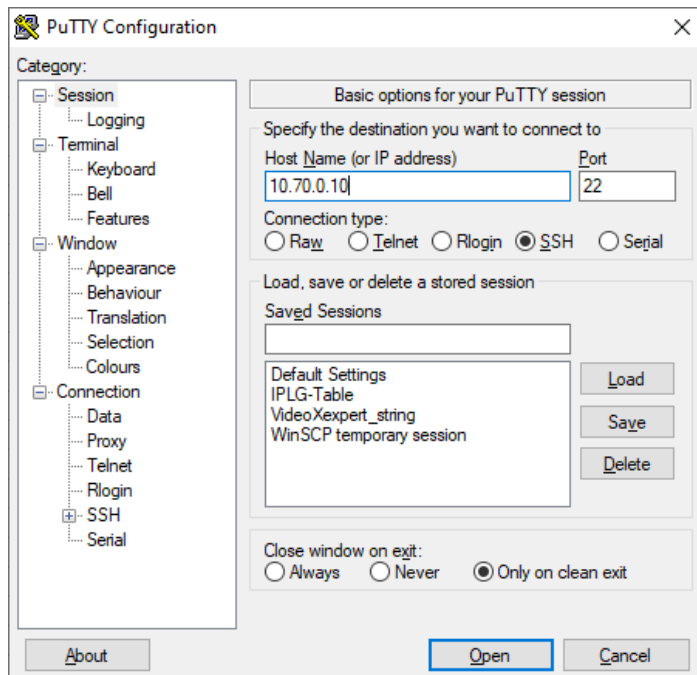
REV:     202107 – Default
         202307 – Changes QR codes

## SSH Connection

SSH connection ensures secure communication with PLC. For example, Putty applications can be used. You can use LAN or USB for SSH access.

**Default LAN interface settings**
Eth0:0 - The default static address that is on the label.
Eth0 - Interface on which the DHCP client is enabled.

The default login to the drive is user: root, no password.

```
login as: root
root@iplog:~#
```

You can use most of the commands available for Linux in the CLI.

**Basic commands for controlling the OPKG repository**
Connect the IPLOG unit to a network where a DHCP server and an Internet connection are available.
**opkg help** - Listing of all available parameters for OPKG.
**opkg update** - Update and download the current package list with the command.

```
root@iplog:~# opkg update
Downloading http://www.iplog.eu/opkg/base/Packages.gz.
Updated source 'base'.
Downloading http://www.iplog.eu/opkg/firmware/Packages.gz.
Updated source 'firmware'.
```

**opkg upgrade** – If there is a package newer than the one that is installed, the upgrade will be performed.
**opkg list** - Listing of the current list with all packages.
**opkg install název_balíčku** – Install the specified package.
**opkg  list-installed** - Listing of all installed packages.

## GETTING STARTED WITH METEL IEC 61131-3 IDE

The application note contains a detailed procedure of steps from the creation of the program, its debugging to its execution in the PLC.

**https://www.metel.eu/l/startIDE**

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## SUMMARY OF THE MOST IMPORTANT STEPS

### 1. Program installation

First, download the METEL IDE from www.metel.eu. Unzip and install the downloaded file. Start the program by right-clicking and selecting **Run as administrator**.

### 2. Creating a project

You create a project in the menu **File->New->New GEB 61131 project**. The project name or POU should not contain accents and spaces, which can be replaced by an underscore, for example!

### 3. Add variables to the project

On the left side of the screen in the "Project Explorer" you will find the created project, which is currently empty. Now create a new **POU** (Program Organizational Unit) inside the project. Hover the mouse cursor over the project and press its right button. Now select the **Create new POU** option.

For a new POU named Variables, select the language ST. Copy the list of available variables from the PLC website **ip-address/metel/webui/en/status/iec_variables/** to the clipboard and overwrite the default text in POU "Variables".
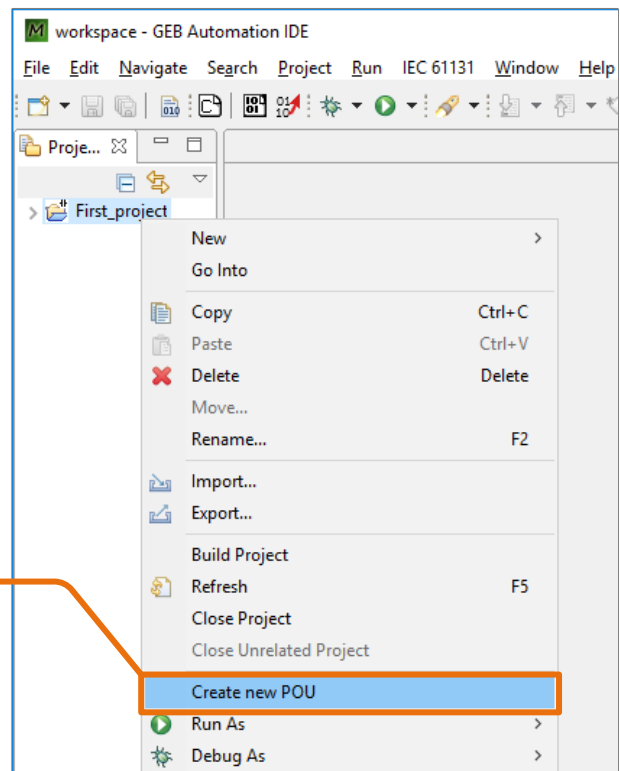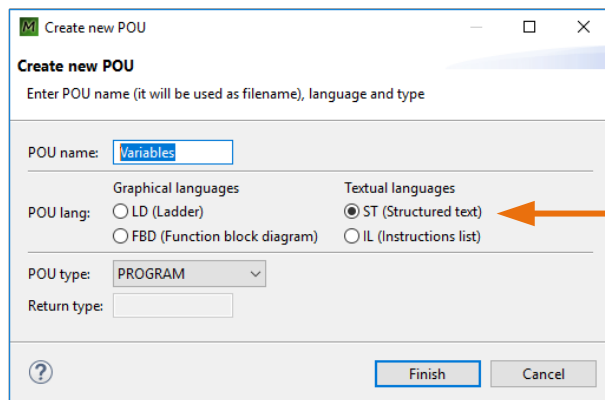
## Adjustable properties of variables in Ladder Variables

All variables used in the program must also be declared in the **Ladder Variables list**. To add them, click the **Add Variable** button in the lower right corner and enter the properties. First, name the variable as in the "Variables" POU and in the Data type specify the data type of the variable that is declared in the POU "Variables".

**Variable's name** – the name of the variable identical to the name of the variable in the "Variables" POU.
**Data type** - data type of the variable identical to the type declared in POU "Variables".
For example, variables of type BOOL can have only two states (log. 1 and log. 0).
**Variable type** – variable type, EXTERNAL is intended for variables that are located in the PLC unit. Others are used inside the program.

## 4. Inserting input/output variables and constants

Inserting I / O variable objects is done by clicking, holding, and dragging to the POU workspace.

**Expression** - input variables and constants
**Variable Ref** - output variables and constants
Variable naming must be identical to names in POU "Variables"
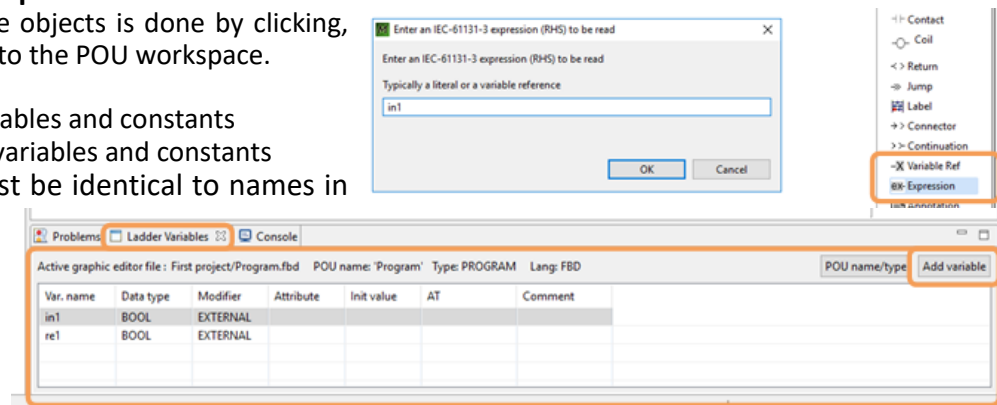
## 5. Linking variables

In the FBD language, function blocks selected from the library available in the IDE are used to link variables. A function block is basically a small program that performs various functions such as logical OR, AND, TIMERS, COUNTERS and many others. Use the F1 key on the function block form to help you select the correct function block. If you select a function block with a declared type such as AND_BOOL, then the input and output variables must be of the same type as declared for the function block. If you select a function block without a data type, the program automatically selects it according to the input, output variables used.
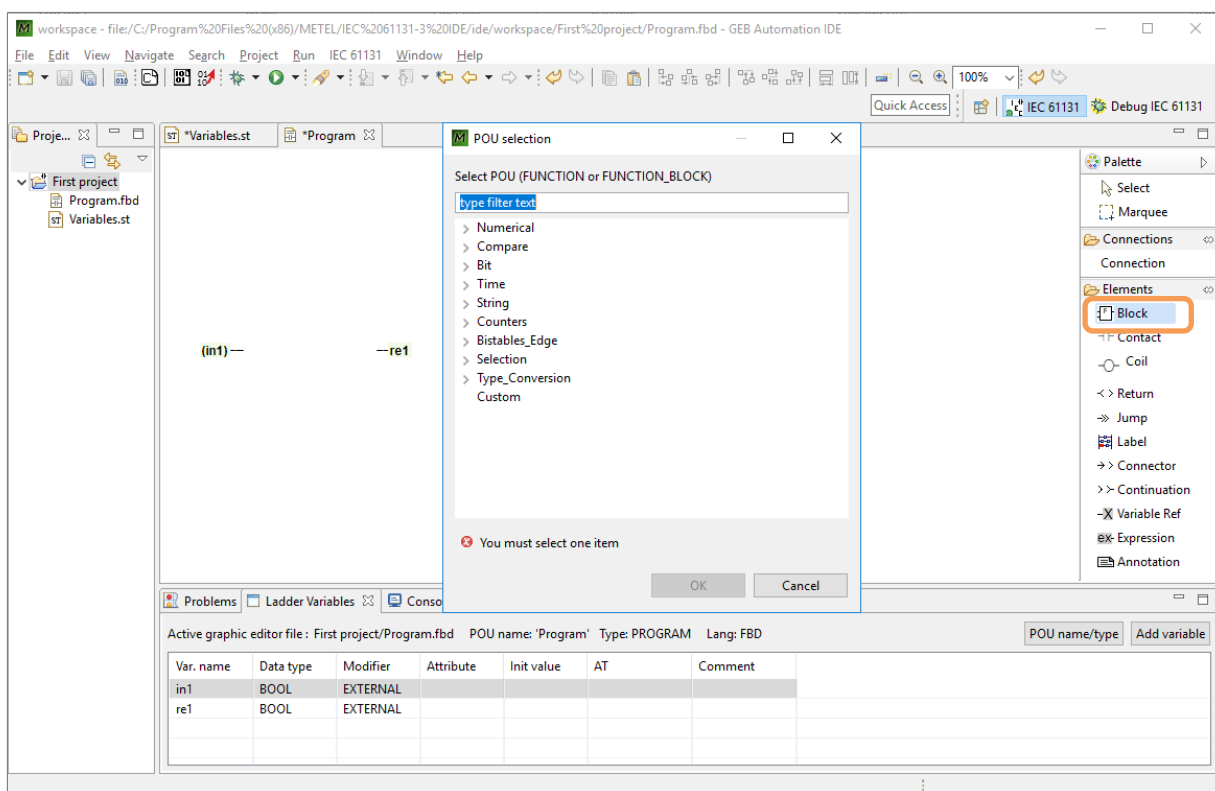
## 6. Display of METEL function blocks

In addition to the standard function block libraries defined in the IEC61131-3 standard, METEL IDE also contains special METEL customer function blocks. These blocks were created during the implementation of projects, where they significantly accelerated the creation of the control program. See. some examples:
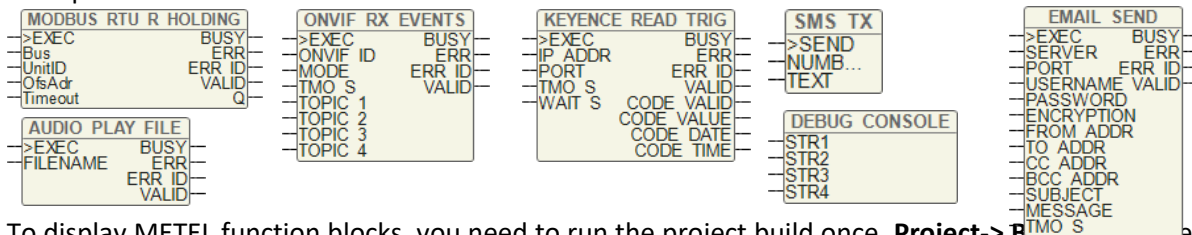


To display METEL function blocks, you need to run the project build once. **Project-> Build all**, in the list of function blocks these blocks will also be visible.
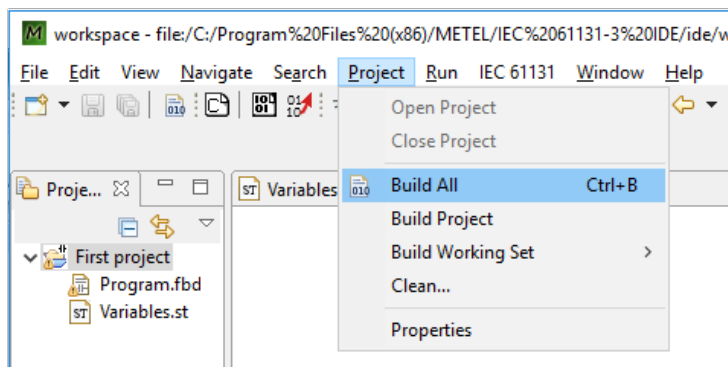


To connect objects on the desktop, drag from left to right.
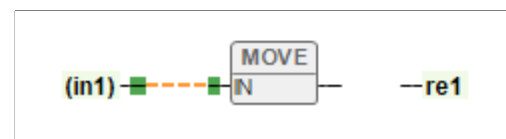


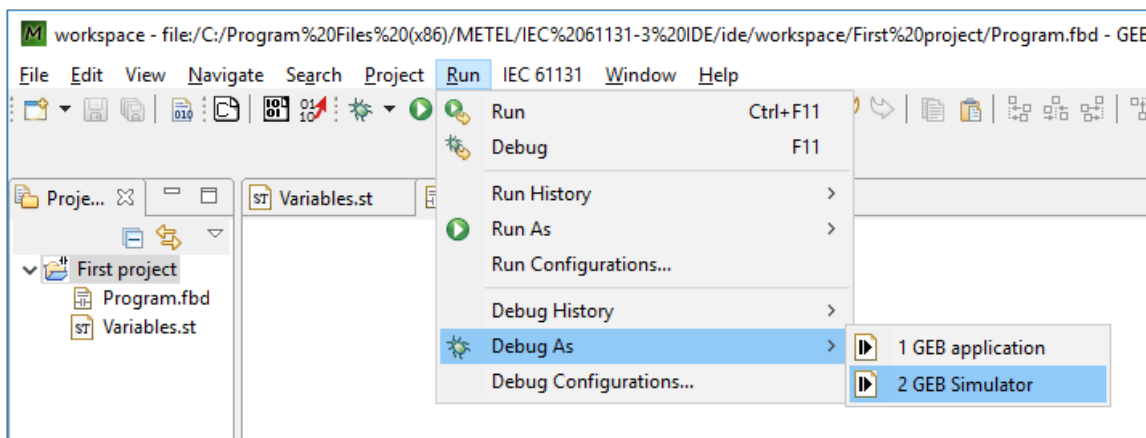## 7. RUN and DEBUG (upload binary file to PLC).

RUN and DEBUG modes allow you to debug the program inside the IDE, both modes can also be used as a Simulator or as an Application in a PLC. The DEBUG debugging tool allows the placement of interrupts, stepping and display of the current states of variables from IEC 61131-3 programs.

**As Simulator** - Program debugging mode without connected PLC.

**As Application** - Compiles, uploads and runs the program in the PLC.

**Compilation of the project and uploading the program to the PLC IPLOG with the possibility of debugging:**

Click the **RUN** button **-> Debug As -> GEB application.**



## RUN and RUN AS (upload binary file to PLC)

If you have the program tested and debugged, you can upload it to the IPLOG unit.

**As Application** - Compiles, uploads and runs the program in the PLC. This binary will be started automatically each time the IPLOG drive is rebooted.

## 8. Setting parameters of compilation and uploading the program to the PLC

**Project** - Select the project to compile.
**Target device** - Select the compiler for **iplog_gama** here.
**Target address** - Write here the IP address of the PLC where the program will be loaded.
**Times to run** - Defines how many times the program loop starts (**0** = infinite loop).

Click on the **Debug** button, METEL IDE will compile the program => generate C code => create a binary file => load the binary file into the PLC and run it => display debugging environment and variable states.
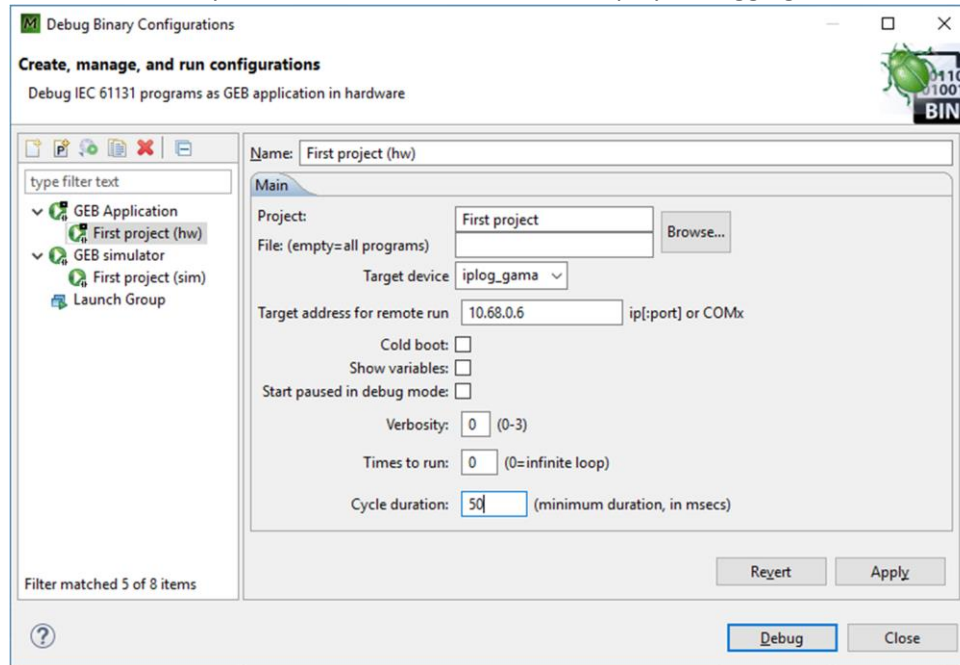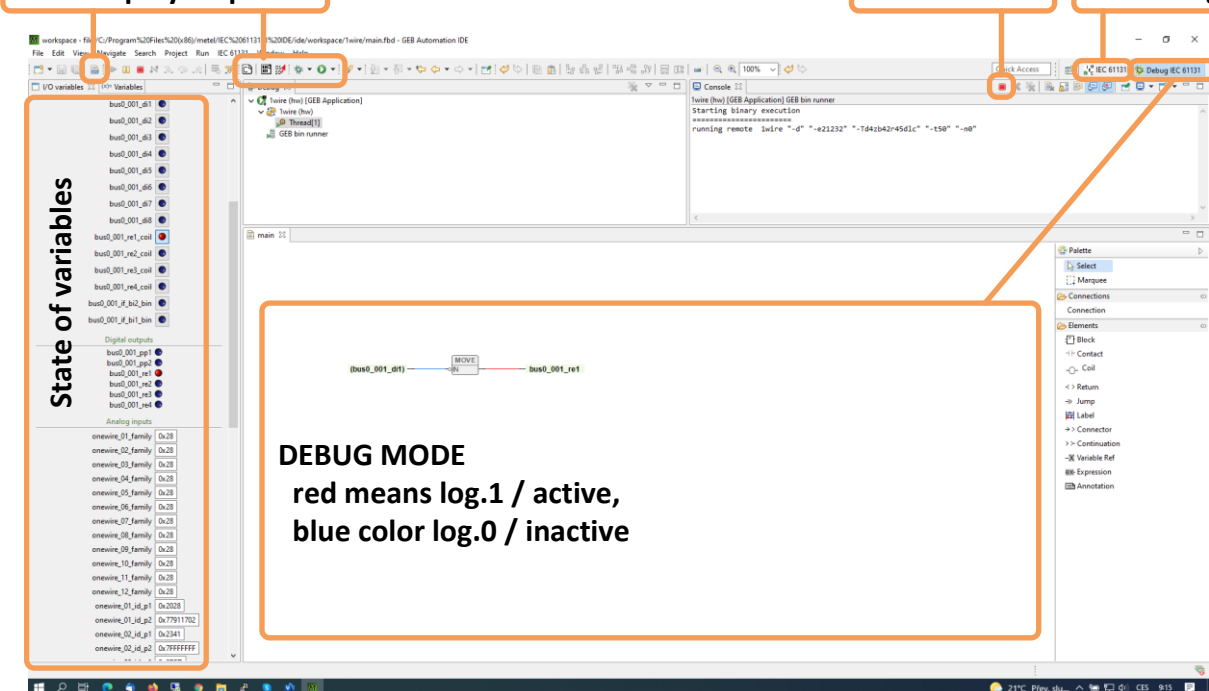


At the end of the program generation and upload of the binary file, the METEL IDE starts the program, displays the debugging environment and the states of the variables.



**DEBUG MODE**
**red means log.1 / active,**
**blue color log.0 / inactive**

METEL IDE remembers the previous settings for DEBUG and RUN, after the initial setup it is possible to use the icons from the main toolbar without the need to reconfigure. If DEBUG has been started, it is necessary to end with the STOP button before re-editing the program.

**PLC IPLOG** is composed of MOTHERBOARD and according to the type also IF and IO boards.

The **IO MODULE** is composed of an IO board and an IF board with a MODBUS RTU interface.

The IF module on the IO module expands the IPLOG by up to 4 inputs, outputs or by a KNX interface (IF-10G).

The IF module communicates with the PLC via Modbus RTU. Some IF modules also have inputs.

The IO module extends the IPLOG with inputs and outputs.

IF SLOT 2

The IO module extends the IPLOG with inputs and outputs.
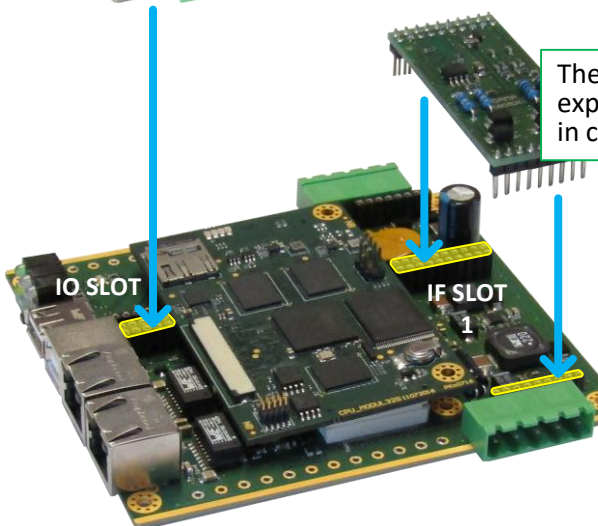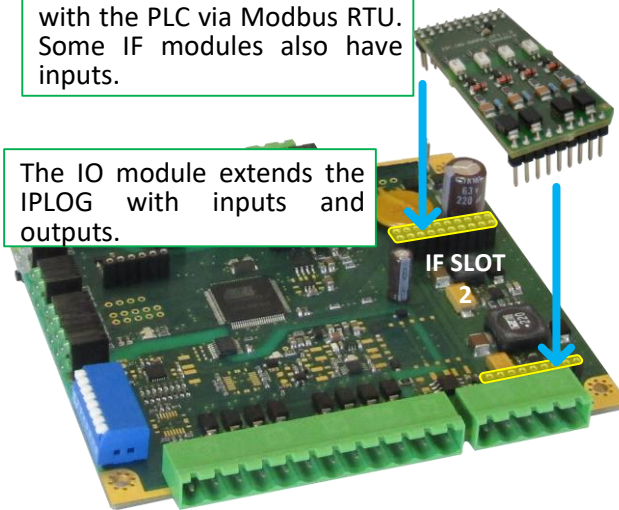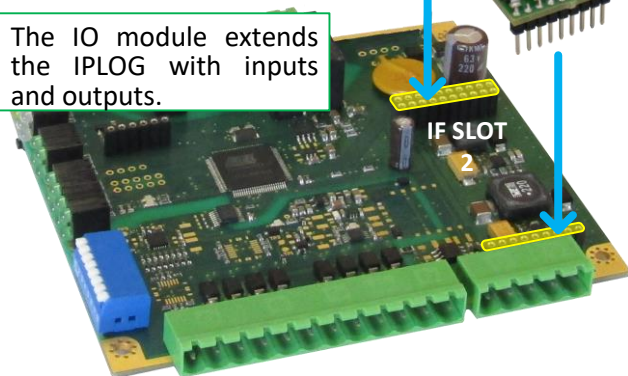
IF SLOT 2

The IF module on the MOTHERBOARD expands the IPLOG with serial interfaces, in case of up to 4 inputs or outputs.

IO SLOT

IF SLOT 1

MOTHERBOARD contains the main CPU module with Linux OS, power input, USB A and B, IO slot and IF Slot 1 for IF modules. Furthermore, depending on the type, it contains GSM and LAN ports. When the NTP server is unavailable, the RTC time is provided by the battery circuit.

We supply **PLC IPLOG-GAMA and IO modules** assembled and tested in covers made of aluminum profile. The delivery includes brackets for installation on a DIN35 rail or on a flat surface.