

# merbon

## VISUAL

Installation and setup  
(industrial PC)

Powered by

**domat**<sup>®</sup>  
control system



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## Application description

The application displays and allows to edit values from free-programmable controllers (PLC) Domat MiniPLC and mark... The tree menu structure has to be engineered in the HMI Editor, and the exported menu will be open in the application where also the parameters for connection to the controller(s) have to be set. The application is available for **Windows** operation systems.

To communicate to the controllers, the SoftPLC Link protocol for MiniPLC and SSCP (Shark Slave Communication Protocol) for mark and wall are used, which are proprietary communication protocols designed so as to communicate safely over the internet. The application uses LCD menu definition files, which are products of HMI Editor (the editor version must correspond with the firmware version in the PLCs). The application supports Merbon IDE version ER2 and later, and SoftPLC version 2015-12 and later.

## Installation

Merbon Visual is available for free download as installation package for operating system Windows. The size of installation package is approximately 30 MB. After installation, the application takes up about 75 MB of disk space. The size of the installation package and installed application depend on version and may be different.

Before the installation start, it is necessary to accept the licence conditions and choose the installation folder (default folder is C:\Apps).

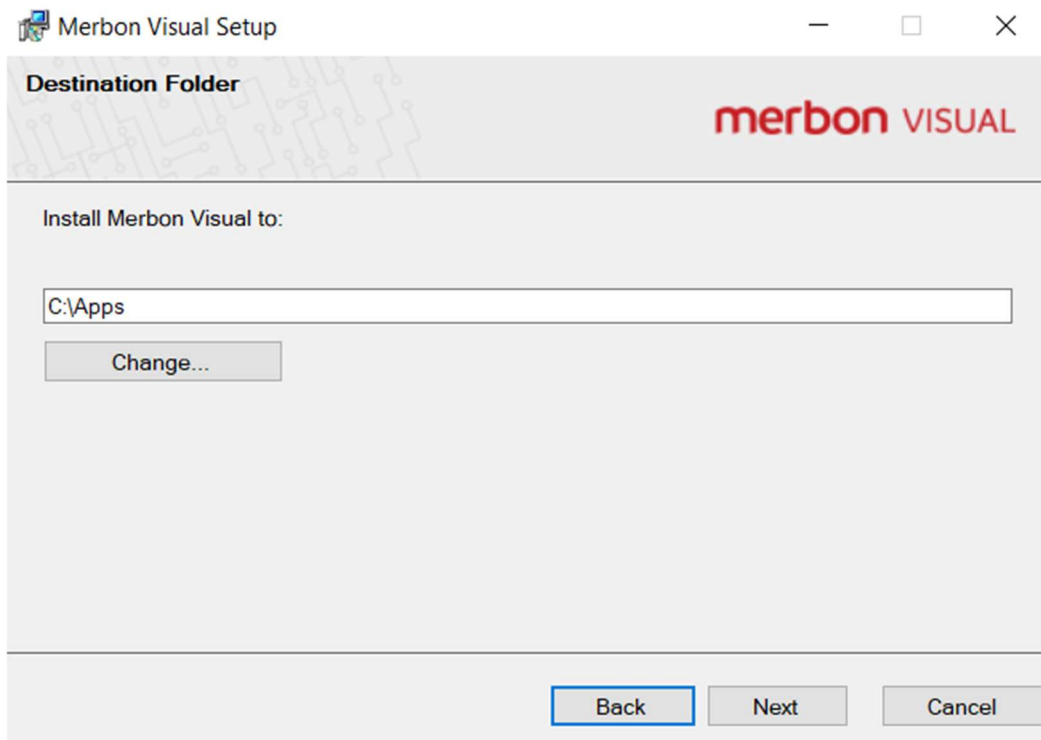
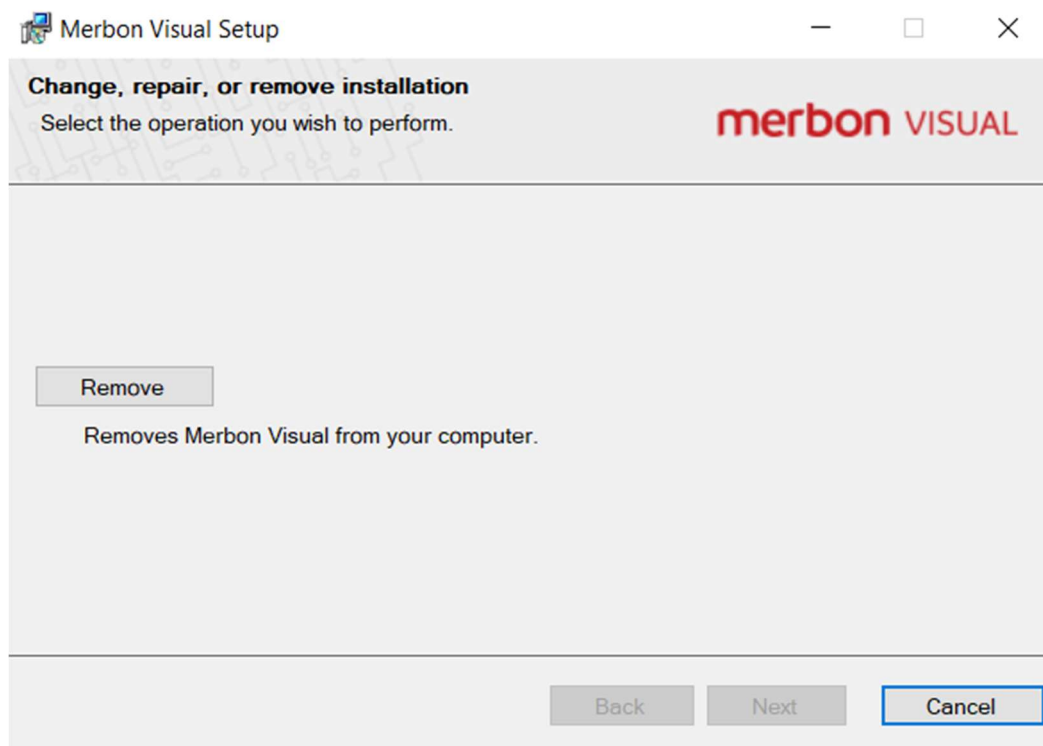


Figure 1: Installation Merbon Visual





























The definition file can be uploaded to the computer using email, external storage, over a cloud storage, etc. Uploading definition direct to Merbon Visual is over a Windows explorer. Another option can be downloading definition from the PLC. Working with the definition is described in more detail in the chapter Definition.

Application can be uninstalled with the same package with which it was installed. For the uninstall select the „Remove“ option.



**Figure 2: Uninstall Merbon Visual**

## Used icons

	No alarm – normal state
	Acknowledged alarm – alarm acknowledged by user, pending
	Acknowledged unreset alarm – alarm acknowledged by user, alarm is off, waiting for reset
	Active alarm – unacknowledged pending alarm
	Unacked, unreset – unacknowledged alarm, alarm is off, waiting for reset
	Text item – informative text, name of group of data points or branch of the menu tree
	Menu branch protected by PIN – PIN must be entered as a 4-digit number
	Current date and time of the controller, as provided by real time clock
	Current date and time of the controller – settings
	Analogue value (indicator) – temperature, humidity, pressure etc
	Digital value (indicator) – device or aggregate status (on / off) etc
	Analogue value (setting) – changing of temperature, humidity, pressure etc. setpoint
	Digital value (setting) – changing operation mode, setting a device or plant on or off, etc.
	Time scheduler (binary – on / off) – weekly time scheduler for control of plant according to a predefined switching table
	Time scheduler (integer) – weekly time scheduler for control of plant according to a predefined switching table, selection of multiple values like Comfort, Standby, Off etc.
	Time scheduler (analogue) – weekly time scheduler for control of plant according to a predefined switching table, each event is assigned an analogue value
	Menu
	Menu for browsing between pages
	Alarm log
	Open – Dialog for reading of the menu definition
	Login
	About
	Settings
	User profile
	Exit
	Open – enter path to menu definition file
	Returns recently used menu definition
	Deletes the menu definition path

## Main screen

After installing and launching the application, the main screen is displayed:

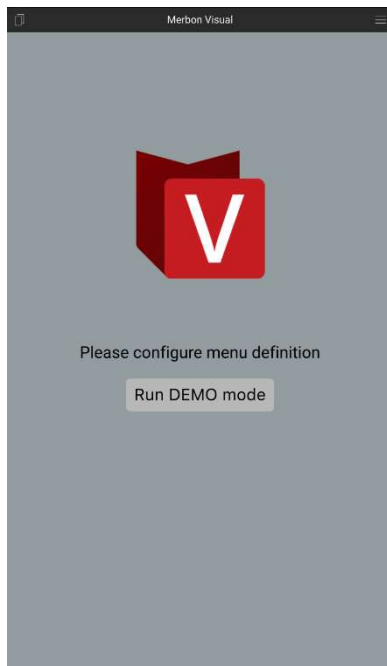


Figure 3: Application without definition file

Merbon Visual	
Gas leak	
Internal temperature	23.5 °C
Outside temperature	27.5 °C
Boiler room	>
Distributor	>
2020/06/29 11:04	>
Pump state	OFF >

Figure 4: Example of text definition

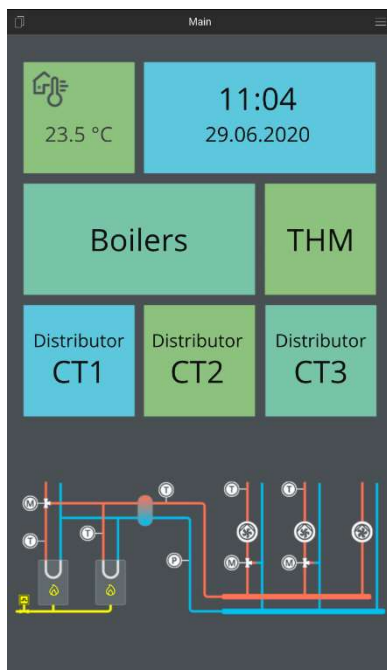


Figure 5: Example of graphic definition

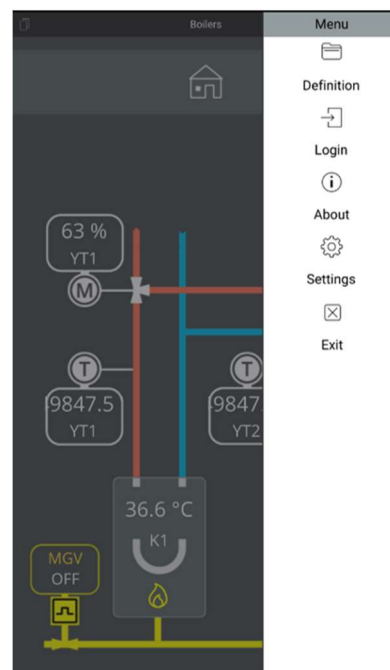


Figure 6: Application menu bar

The screen has 3 parts:

- application name,
- application menu,
- workspace.

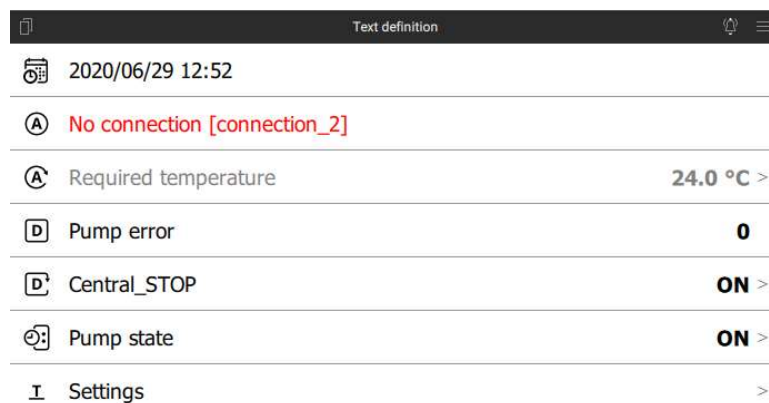


The application name is located in the top area of the application. On the sides there are control buttons. All these components are included in the header.

The workspace is located under the header. The content of the workspace is determined by application programmer. There are panels with plant schemas, measured values, setpoints, and other values there.

## Text definition

The items are listed according to their position in the menu tree. The item which contains a dialogue or submenu is displayed with arrows in the right part of the line. It means that by selecting the item the submenu branch is activated.



**Figure 7: Text definition example**

Each item has a text with colour depending on the variable status:

**Table 1: Colours**

red	Communication error. Included error text
light red	Last known value
green	Manually set value (only in SoftPLC RT)
blue	Bad quality. The value is read from the controller, but it is tagged by the controller as of bad quality – there may be a problem with I/O modules: check if the controller is OK (only in SoftPLC RT)
black	Read value, normal state
grey	Unknown value. Still being read: wait until the readout is complete

The navigation in the tree follows over clicking the menu item which supports this function. It is not possible to change the value if it has not been read or if it is being read, or if it is in communication error or of bad quality.

To make navigation easier, there is the complete menu path listed below the header. By clicking this path the user navigates one level higher. This information is not displayed on the main page and in the value edit mode.

## Editing a value

The editing mode is displayed if the corresponding variable is editable, i.e. if its value can be changed by the user. Editable values are:

- date and time (real time clock in the process station to control the time schedules),
- analog value (temperature, humidity, or pressure setpoint etc.),

- digital value (switching a device on or off, operation mode change etc.), time scheduler (weekly scheduler for time-based automatic switching of operation modes or device states).



**Figure 8: Date and time editing**

In the setting header there is an icon for confirming changes (tick symbol on the right), and cancelling changes (arrow at the left). The symbols are grey until the value is edited. Then they change colours to indicate that the value has been edited. The green tick accepts changes, the red arrow cancels changes.



**Figure 9: Example of changing a value**

A special item is Alarm. If an alarm requires user intervention, like acknowledging or reset, the item is displayed similar to an editable item with alarm status icon as in the table above. Alarm can be acknowledged or reset similarly to editing a multistate value.

Active alarm can be acknowledged, inactive alarm can be acknowledged and reset. The operation depends on how the alarm has been engineered. Mostly, after the alarm is off and reset, the technology resumes normal operation.

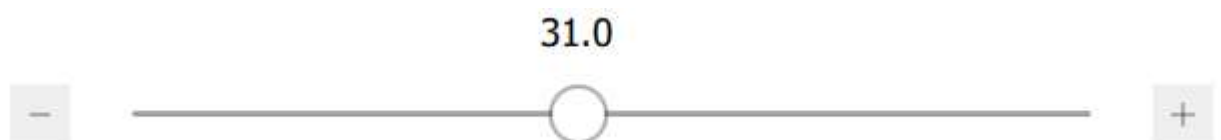
## Date and time

Editing of time is only possible if the time display item has the "editing allowed" arrow at the right-hand side. Date and time are usually just for information, they can be changed only in the PIN-protected menu branches. When editing, the default values are current date and time of the PLC. The date / time format is DD/MM/YY HH:MM. If a date is changed, the number of days in month is recalculated together with the leap year calculation.

## Analogue value

Analogue value is set using a slider or the + or - buttons. The step is defined in the menu definition file for each value separately. The step also specifies the number of decimal places for display.

Default value is the actual read value from the PLC. If the value is out of the preset steps, then it is synchronized with the configuration only after reaching a lower or upper limit value.



**Figure 10: Analogue value setting**

## Digital value

A digital value may be not only a switch (on / off), but also an integer value (selecting from more states). The list of values and their names is defined in the configuration file. After clicking the digital value setter, the list of states is displayed to select from. The control element displays the current state.

 Central\_STOP

ON >


Figure 11: Digital value setting

Default state is the actual (read) state. If the state name is not specified in the configuration file, a „UNKNOWN“ text is displayed, and this variable can not be set to any other state.

## Time scheduler

A time scheduler is a complex object containing more information: actual value, list of transitions within a week, and list of exceptions (intervals of days when the preset value is overridden by another value - used at holidays, factory closures etc.).

If a Time scheduler type is in the menu definition, it displays its current value first, and after it is clicked, it reads and displays the list of transitions and exceptions.

 Pump state

OFF >

Figure 12: Current set value

Text definition		
×	Pump state OFF	✓
Mo 00:00	ON	🗑
Mo 05:00	OFF	🗑
Tu 00:00	ON	🗑
Tu 05:00	OFF	🗑
We 00:00	ON	🗑
We 05:00	OFF	🗑
Th 00:00	ON	🗑
Th 05:00	OFF	🗑
Fr 00:00	ON	🗑
Fr 05:00	OFF	🗑

+ Exceptions


Figure 13: Preview of weekly scheduler

Text definition		
×	Pump state OFF	✓
From: 26.06.2020 08:00		
To: 28.06.2020 20:00	OFF	🗑
From: 29.06.2020 12:00		
To: 30.06.2020 12:00	ON	🗑

+ Plan

Figure 14: Preview of exceptions

**The time scheduler transitions list and exceptions list shall be considered as a single set of data. It means that a change in one list is considered as change in the whole list, and both lists are written to the PLC in a single command.** Both the weekly scheduler and the exception programs are thus read and written in one command. The weekly scheduler and exception list are switched in the editor by clicking on the Exceptions button. The time scheduler event can be deleted by clicking the Wastebasket icon or by sweeping the row to the left, or changed by clicking the Edit icon. At the Embedded Linux devices just click the line. The changes in the whole list are displayed in the same way as changes of analogue values.

	Deleting of an event
---	----------------------

A new item is added by clicking the „+“ button. The item is added to the current list (weekly scheduler or exceptions). Added or edited values are marked by a red stripe at the icon. Maximum number of items depends on the PLC, and is at least 40 events a week and 10 exceptions.



Figure 15: Change value

Time schedulers are of three types:

- binary – true/false (on/off),
- integer – one of several states (selection from more states),
- analogue – analogue value in limits given by definition in the HMI menu editor.

The difference between them is the displayed and editable value type only. While binary and integer schedulers are set as digital value, the analogue scheduler is edited as an analogue value. There is always the time of transition at the event.

The time and date are set according to the type of the event:

- Weekly schedule item – time and date of the event. It is possible to copy the event to more days,
- Exception item – starting and ending time and day of the exception. It is also possible to move the event to other days.

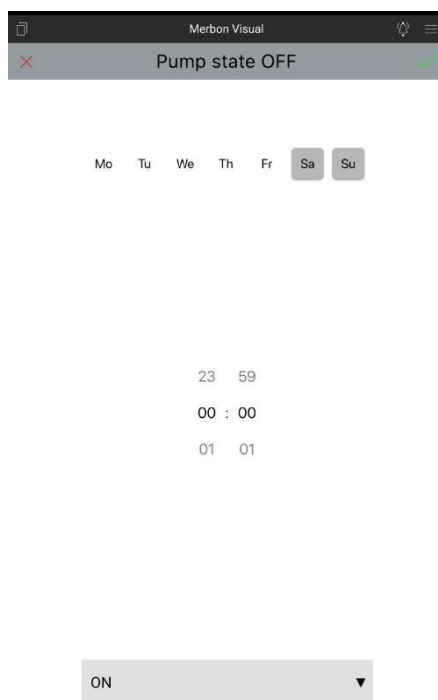


Figure 16: Setting of weekly scheduler



Figure 17: Setting of exceptions

**Every single change must be confirmed by the green tick in the upper right corner. Finally, all changes must be confirmed together to be sent to the PLC.**

Before the complete schedule is sent to the PLC, it is optimized and redundant events are deleted. Default value is the actual read value from the PLC. If the value is out of the preset steps, then it is synchronized with the configuration only after reaching a lower or upper limit value.

## Section protected by PIN

After clicking a menu branch protected by PIN, a PIN must be entered in a dialogue. It is a 4-digit number defined by the application engineer. Users can not change the PINs. If the PIN is mistyped, the application requires a new value. If the PIN is entered correctly, the branch is unlocked and all values are accessible.

In the PIN-protected sections there are usually values like parameters, setpoints, RTC setting, and other values which not every user is expected to change.

A timeout (in minutes) keeps the menu branch open for the user without having to enter the PIN again. After expiration of the timeout, the PIN dialogue displays again. **The user is not logged off automatically.**

9	9	9	9
0	0	0	0
1	1	1	1

OK

Cancel

Central\_STOP

ON >

Pump state

ON >

Settings

>

Figure 18: Dialog to enter the PIN

## Graphic definition

In IDE version 2.3.0.3 and above there is Graphic HMI definition where users may define up to 20 panels with customized user menu. The graphic template contains 14 object types described below. The graphic menu must be assigned to the terminal in the same way as the text definition. Switching between pages follows over the icon at the left upper corner, or by dragging the page from left to right. Then a menu is displayed where in the upper part there is user name of the logged-in user, followed by the list of available panels. The active page is in grey (Figure 19). The menu displays after click in the right upper corner or by dragging the page from right to left (Figure 20).



Figure 19: Panels menu

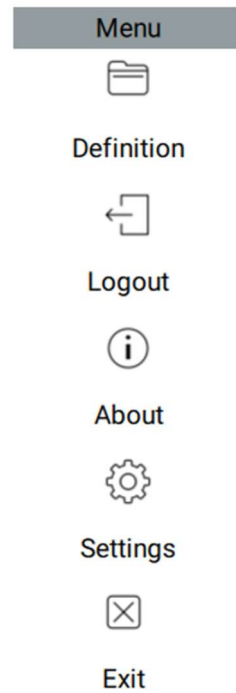


Figure 20: Application menu

If there is no communication with the PLC, a red dot displays above the value (Figure 21).

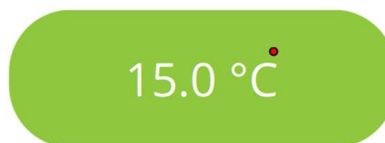


Figure 21: Communication error

If the changed value is being written into the PLC, an amber dot is displayed (Figure 22).

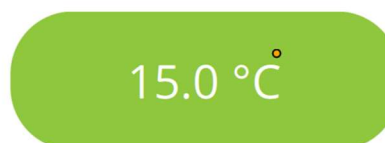


Figure 22: Currently changed value

## Alarm

Indicator of alarm states. The object displays status of an alarm block using text or image. An alarm block has five possible states.



Figure 23: Alarm

## Analogue value

Display a analogue value. The object allows editing a explored value included changing a unit.

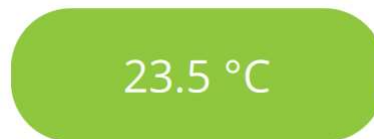


Figure 24: Analogue value

## Analogue setting

Object to set analogue value. Item has a same properties as Analogue value. In addition, it is possible to change the icons for the increase and decrease value.

## Button

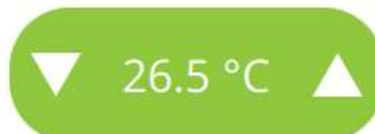


Figure 25: Analogue setter

## Figure 26: Button

This object is a simple button to open another page (panel) to display. Button image can be changed.



## Date and time

This object displays either the PLC time, or any time value of a DT-type variable.



Figure 27: Date and time indicator

### Date and time setter

This object displays either the PLC time, or any time value of a DT-type variable. The date and time can also be set here.



Figure 28: Date and time setter

### Digital indicator

Displays a predefined text according to a discrete numerical value.



Figure 29: Digital indicator

### Digital setter

Sets a predefined discrete numerical value according to a selected state text from the collection.



Figure 30: Digital setter

### Digital setter - ComboBox

Sets a predefined discrete numerical value according to a selected state text from the collection. Clicking the object opens a menu where the required state can be selected.



Figure 31: ComboBox icon



Figure 32: Unfolded ComboBox icon



## Image

This object displays an image taken from an image file.



Figure 33: Image example



Figure 34: Image example

## Text

Displays a fixed text. It is used mostly in the main screen (site name), naming of menu branches (Setpoints, Heating, AHUs, Lights, etc.), or to create a submenu with supplier/service contact data (such as web pages and phone number).

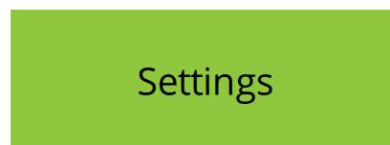


Figure 35: Text field

## Time scheduler

See Time scheduler description in the Text menu.



Figure 36: Time scheduler

## Menu

The Menu contains setting of the application and other functions. It is mostly used by the programmer or user who is setting up the configuration. Menu provides the following functions:

### Definition

Definition file read-in dialog. The definition file must be exported from Merbon IDE. Create a text or graphic HMI template in Merbon IDE, and attach templates to a terminal. Merbon Visual also supports text definitions created in the SoftPLC HMI Editor. Files .txt for a text template and .zip for graphic template are created, and they must be copied to the computer and opened in the Merbon Visual app. Individual definitions can be saved.

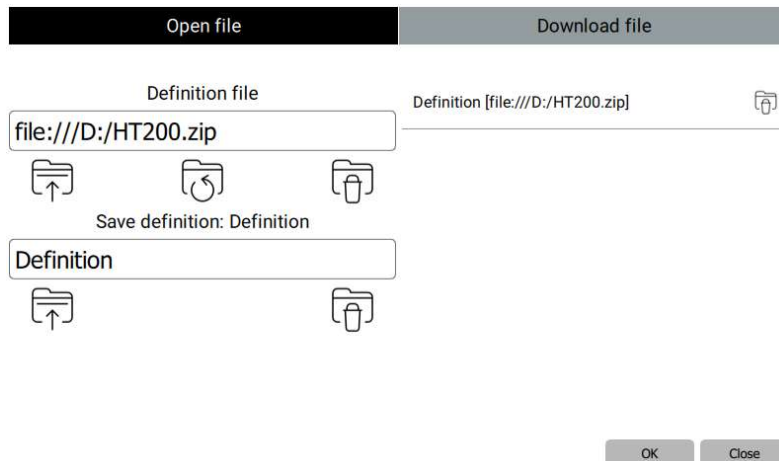


Figure 37: Definition upload

Another way is to download the definition from a PLC. This function is supported on PLCs with Linux OS and downloads the web definition from the PLC over a SSCP connection. Here it is necessary to enter the connection parameters (IP address, port, user name and password, SSCP address, and proxy ID if applicable - default values are New proxy ID - unencrypted communication proxy.merbon.cz:12348. Old proxy ID

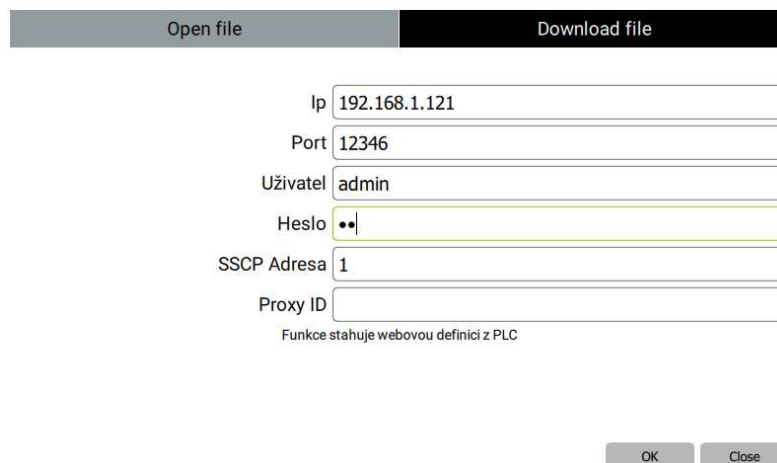


Figure 38: Downloading definition from PLC

starting with PRX2C proxy.mervis.info:12349. If you want to use the user profile in the application, it is necessary to enter the translated address 81.31.38.186 instead of proxy.merbon.cz, or 77.240.189.136 instead of proxy.mervis.info if you are using an old proxy ID starting with PRX2C.

**All changes are applied after they have been confirmed by the user (the „OK“ button).**  
) Default port value is 12346 for SSCP communication protocol.

## Login

User login dialog. The user logs in using a valid user name and password (**default user name:** admin **password:** rw).

## Settings

Application settings provides set the connection parameters of individual network interfaces, language of application and screen customization. In the Network setting there are items to edit:

**Use DHCP** – in this case will be network setting assigned automaticly from DHCP

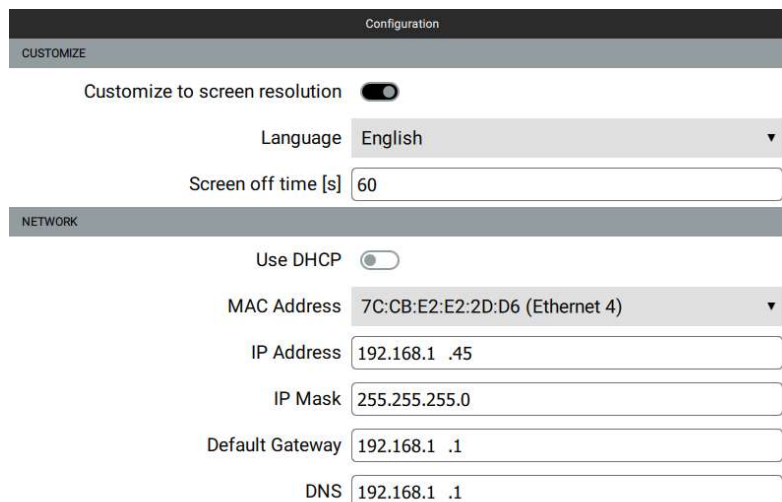
**MAC Address** – unique physical address of a network interface. Select the network interface here.

**IP address** – IP address of the PLC, e.g. 192.168.1.45

**Subnet mask** – the mask determines from which part of the IP address the subnet starts, e.g. 255.255.255.0 for site 192.168.1.0 / 24

**Default gateway** – IP address of the nearest router, which control the communication to other networks

**All changes are applied only after they have been confirmed by the user (the „OK“ button).**



Configuration	
CUSTOMIZE	
Customize to screen resolution	<input checked="" type="checkbox"/>
Language	English ▼
Screen off time [s]	60
NETWORK	
Use DHCP	<input type="checkbox"/>
MAC Address	7C:CB:E2:E2:2D:D6 (Ethernet 4) ▼
IP Address	192.168.1 .45
IP Mask	255.255.255.0
Default Gateway	192.168.1 .1
DNS	192.168.1 .1

**Obrázek 39: Network settings**

## About

Displays application version and other information.

## Exit

The application is terminated, and all connections to PLCs are released. No data are transmitted nor received in the background.

## Problems and solutions

### After the application start, Menu definition missing is displayed

There is no menu definition file present. The file must be created in the HMI Editor, copied to the device, and opened in Merbon Visual, see above: **Menu, Open**

### Menu is displayed, but it reads Timeout rather than the values

The application did not succeed to establish the connection to the PLC. Check if in the selected profile (**menu Settings, Definition file / User profile**) the address, port, password, and other parameters are properly defined.

### Values are displayed but can not be changed

Make sure that your connection credentials (user name and password) are those with the correct access rights (for the SSCP protocol).

### Error messages and their meaning

**Connection definition** missing – PLC connection parameters in the definition file not specified – check the connection settings

**Send data to PLC error** – Communication error while setting value on the PLC – check internet connection:

- GUID for the setting attribute missing
- Wrong connection ID settings for this attribute
- No attributes available at the specified channel
- No network settings for this network ID

**Send data error** – Application error when sending data to PLC (Critical application error, repeat action and contact your supplier if necessary)

**Data update error** – Application error when reading data from PLC (Critical application error, repeat action and contact your supplier if necessary)

**Read value error** – Read value is an empty field – value for the given attribute is not in the returned value of the PLC – menu definition must be corrected

**Value type error** – Error of value type of the read variable (different attribute type than defined) – correct the menu definition please

**Value conversion error** – Read value from PLC can not be transformed to the required (configured) type – correct the menu definition please

**Send request error [<connection id>]** – Error when sending the request to network. Possible reasons: disconnected network card or lost internet connection

**Unknown protocol** – Unsupported communication protocol – correct the menu definition please

**Unknown type** – Unsupported time scheduler type – correct the menu definition please

**User login error [<user name>]** – Wrong user name or password when logging to the PLC – check connection settings

**No connection [<connection id>]** – Device (PLC) at the given IP address is not available – check internet connection settings and router settings at the PLC

**Timeout [<connection id>]** – The PLC did not respond in a specified time

**Not found [<connection id>]** – No such attribute at the PLC – correct the menu definition please

**Break** – PLC communication interrupted by user

**Unknown [<connection id>]** – Error is not in the list – please contact your supplier.