

# GraphMaker TOOL

1. edition March 2003

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## 1. INTRODUCTION

GraphMaker Tool is used for graphical display of up to sixteen variable processes of the PLC. The tool can operate within two basic modes. In the first mode, the GraphMaker evaluates variable's values from the PLC memory using the common accessible communication services (max sampling density is then determined by the communication cycle of the Mosaic environment), in the second mode, it uses the support of the logic analyzer function that is ready to be applied into new versions of central units firmware and is fully supported by the simulator.


## 2. ANALYZER

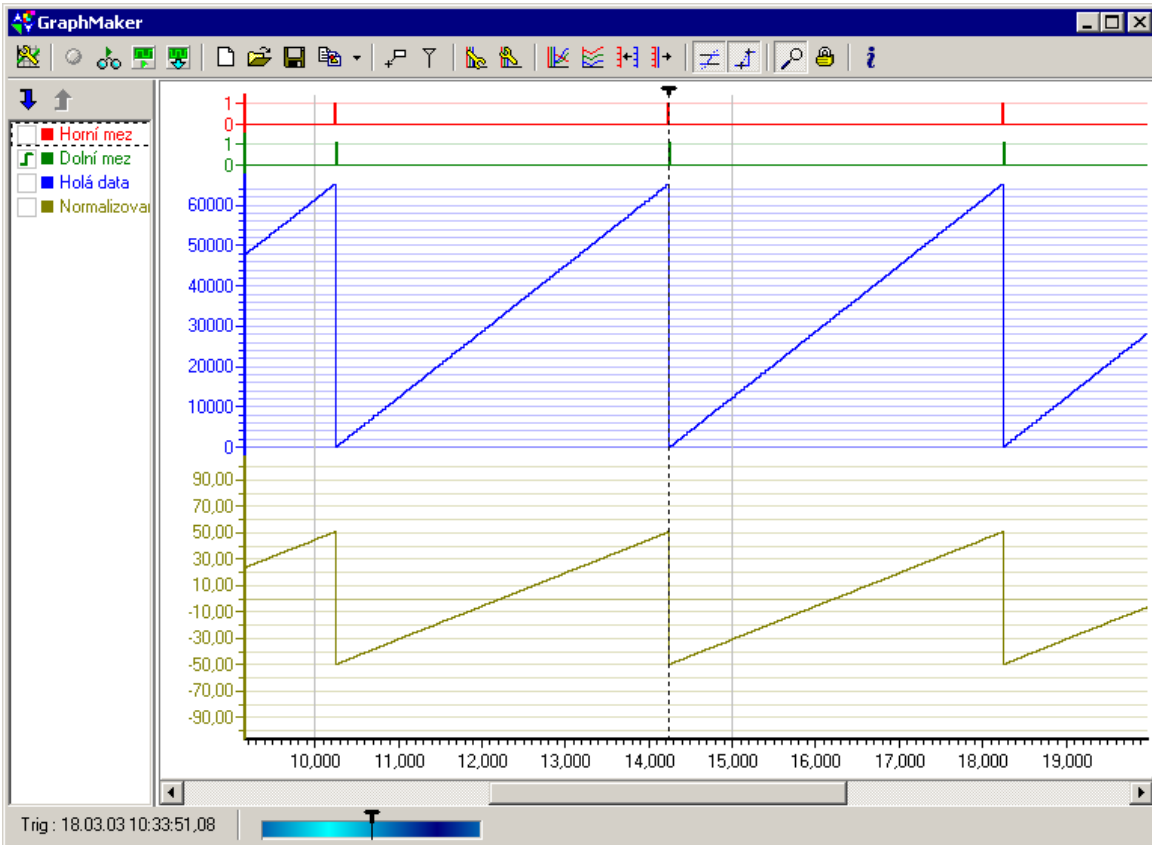
Analyzer function enables to save values of up to sixteen variables into the internal PLC memory. These values can be loaded anytime from the PLC memory and display them using the GraphMaker Tool.

Analyzer discriminate free mode of sample saving: PostTrig – Trig will launch the sample record, PreTrig – Trig will stop continuous sample saving, MidTrig – half of the samples is left from the continuous saving and the second half is sampled by Trigs successively. Trig is defined by the edge or the level of the condition set by the product (AND) of logic values of observed variables and by the number of passes through the condition satisfied. The logic value of the variable is designated by its flag that can take values:

Flag	Symbol	Logic value
none	-	Constantly 1
Equal zero	0	1 when the variable is equal 0, otherwise 0
Varies from zero	1	0 when the variable is equal 0, otherwise 1








### 3. GRAPHMAKER

GraphMaker Tool is possible to actuate by the tap on the  icon on the Mosaic tool bar or by the selection from the menu Tools – GraphMaker. After the GraphMaker is actuated, the main window with the tool bar will appear enabling the configuration and tool control.




















#### 3.1 Tool bar



-  Process manager – acuates a window with the setup of the input variables.
-  Signalization of the communication status – indicates optically the communication status.
-  Visualization – switch on/off the values evaluation from PLC communication.
-  Analyzer switch on – switch on/off the analyzer, course of sample's reservoir filling and Trig execution, can be watched on the bottom bar of the PIDMaker window
-  Load the analyzer buffer – enables to download manually the content of sample's reservoirs of the analyzer
-  New graph – deletes samples taken up to this moment
-  Load graph – loads graph saved in the file (\*.grm).

## Nástroj GraphMaker

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-  Save graph – saves graph into the file (\*.grm) for later use, the axis setup is saved together with the graph
-  Copy graph into the box as a Windows metafile – saves the copy of the graph screen into the box in a Windows metafile format.
-  Save graph as a Windows metafile – saves the copy of the graph screen into the file in a Windows metafile format.
-  Save the graph as a text divided by tabulators – saves values shown in the graph into the text file for manipulation using external tools (MS Excel, ...).
-  Note – display progression point coordinates , closest to the cursor.
-  Metering signs – switches on the metering mode, outcomes of which are displayed in the left window panel. Active mode is indicated by a change of the cursor and by displaying of metering values in the left window panel. This mode is not in compliance with the zoom mode.
-  Axe X setup – invokes the dialog with the X axe setup where also the maximum number of saved samples is set. This dialog can also be invoked by a double click on the axe or via the local axe menu.
-  Axe Y setup – invokes the dialog with the setup of the Y axe and individual progressions. This dialog can also be invoked by the double click on the axe name, right on the axe or via the local axe menu.
-  Stretch axes to the whole active height – stretch axis Y to the whole active height of the graph screen
-  Align axis underneath each other – align axis Y underneath each other to the graph screen height
-  Merge axis with the same range – merge axis Y with the same maximum and minimum value
-  Divide merged axis – divide all merged axis
-  Cut progresses according to the axe range – cut progresses that overreach the range of their axe
-  Interpolation between samples – switches sample´s interlay by a bisector or polyline
-  Zoom – switch the mode of zoom in/out by the change of the axe X range. The mode is indicated by the change of the cursor to the zoom symbol. This mode is not in compliance with the mode of metering signs and monitoring of the last sample.
-  Monitor the last sample – switch on the mode of monitoring of the last sample. In this mode, the graph overranging the axe X range automatically displaced so, that the visible measured sample is visible. This mode is not in compliance with the zoom mode.
-  Tool information – invoke the dialog with the tool version

### 3.2 Zoom mode

The mode is activated via the button on the tool bar (see Tool bar). When the mode is on, the cursor within the graph screen will change to the zoom symbol. Using the right-

## Nástroj GraphMaker

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mouse button, the X axe resolution is zoomed in 2x and using the left-mouse button it is zoomed out 2x.

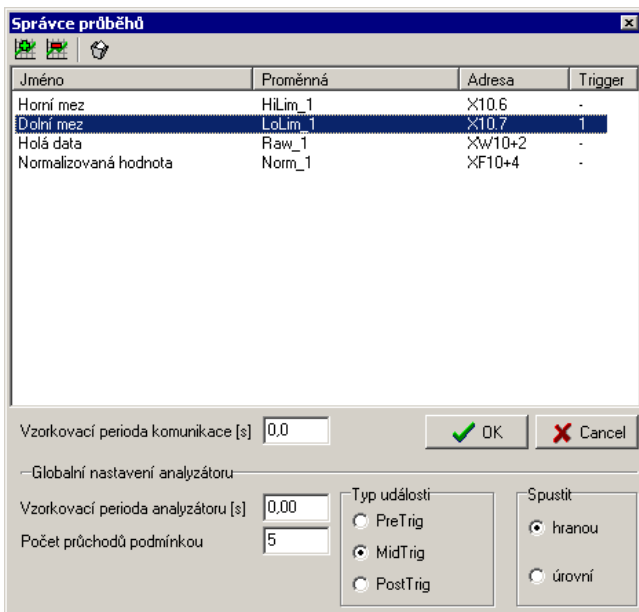
During the push-button operation it is possible to mark a section of X axe that is required to be zoomed in. The beginning of the section is determined by the push-button operation and the end of the section is determined by the button release.

## 3.3 Gauging signs mode

The mode is activated by the button on the tool bar (see Tool bar). When the mode is activated, the cursor within the graph screen will be changed to black-and-white sign. Using the right-mouse button, it is possible to place a white sign within the graph screen and using the left-mouse button a black sign as the cursor shows.

After the sign is placed, values of all progresses within its location will appear in the left panel as well as corresponding time. If both signs are placed, differences of all values are displayed.

## 3.4 Process manager



### 3.4.1 Tool bar



Add process – invoke a dialog for variable addition



Delete process – delete the process chosen in the progression table



Delete all processes – delete all processes

### 3.4.2 Process table

The process table contains a list of all variables monitored. The first column contains names of processes shown on axis of individual progressions, the second column contains the name of the variable in the PLC, the third column contains the absolute name of variable and the fourth one contains the flag determining the logical value for the analyzer.

### 3.4.3 Communication setup

#### *Sampling period of communication [s]*

The parameter indicates the sampling period within which the tool will require new values. When 0 value is set, communication is in progress within every cycle turn of the Mosaic environment.

### 3.4.4 Global setup of the analyzer

#### *Sampling period [s]*

The parameter indicates the sampling period of the analyzer. When 0 value is set, values are sampled within every cycle turn of the PLC.

#### *Event type*

Sets the mode of samples saving, see analyzer description

#### *Run*

Sets whether the Trig will be actuated by level or by edge of the logic condition of the analyzer satisfaction

#### *Number of progressions through the condition*

Set the required number of samples when the condition will be met (if ran by the level) or the number of samples when the condition is alternated (if ran by the edge).

Note: If the condition is met during the analyzer initiation, the edge is always evaluated!

## 3.5 Axis X setup

The dialog box 'Nastavení osy X' has the following fields and controls:

- Rozsah:** Input field with value '2,97' and a 'Vše' button.
- Mřížka po:** Input field with value '5,00' and a checked checkbox 'Zobrazit mřížku'.
- Formát času:** Dropdown menu with 'sekundy' selected.
- Poččet uložených vzorků:** Input field with value '10000'.
- Buttons:** 'Použít' (with a green checkmark) and 'Zrušit' (with a red X).

The axe range in seconds can be set in the dialog. By pressing the button „all“, this range will be set according to data measured.

If the box „display the grid“ is thicked, it is possible to set in „Grid after“ field in which time intervals should be the graph grid be displayed.

In the action menu called „Time format“, it is possible to set the format of axe X description. This option will affect also the time display in the callout of progression point coordinates.

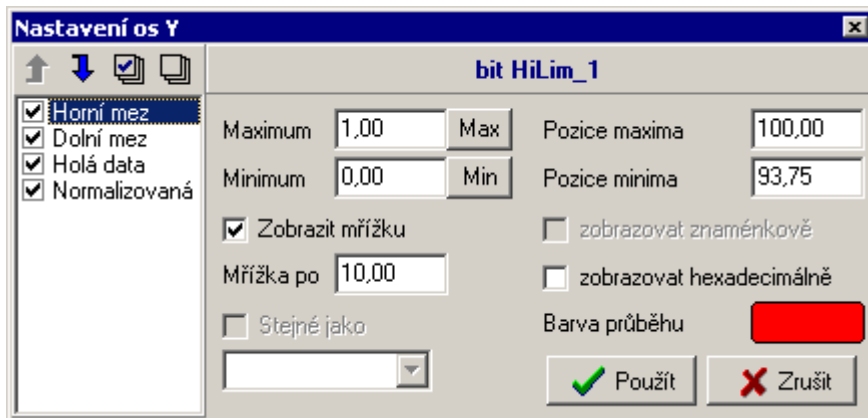
## Nástroj GraphMaker

The item „Number of samples saved“ indicates the size of the measured values buffer. If, during the data capturing, the set value of measured samples is exceeded, the oldest samples are overwritten by new values.

**Warning:** Samples are stored in the PC RAM memory. GraphMaker allocates the memory according to the set number of samples, see the following table.

Number of samples	Memory allocated [MB]
10 000 (preset)	1,4
2 000 000 (maximum)	275

### 3.6 Axis Y setup



The list on the left side of the dialog contains all displayable processes. The thick box next to the process name determines whether the progression will be depicted. It is possible to tick all progressions via the tool bar above the list. The adjacent button undo all ticks apart from actually chosen.

Using blue arrows, it is possible to change the sequence of axis depiction, apart from those that are consolidated with another axe by thicking the box „Same as“. The higher the name of the progression in the list is, the earlier its axe depicted will be. The position of consolidated axis processes has no effect.

In the upper part of the dialog the name of the monitored variable together with its data type is inscribed.

Items „Maximum“ and „Minimum“ determine max and min of the axe in per cents. By using buttons „Max“ and „Min“, these values can be set according to the max and min of data measured.

If the grid drawing is enabled by thicking the option „Display the grid“, the value „Grid after“ indicates the space between particular grid lines.

„Position of maximum“ and „Position of minimum“ determine the position of axe margins on the graph screen in per cents. The value 100 agree with the top margin of the area and 0 agree with the bottom margin. These values are automatically set by buttons of the tool bar „Consolidate axis with the same range“, „Stretch axis to the whole height“ and „Align axis under each other“.

Options „Display signs“ and Display hexadecimal“ determine the representation of values sampled. By clicking on the colour field, the dialog for the colour selection will appear. The selected colour is used for selected process and its axe.

When the option „Same as“ is thicked, it is possible to choose from the action menu the axe which the actual axe consolidated should be with. By thicking the option, other options, that are received from the axe chosen from the action menu, are disabled.