

# VISOR

**Version 5.3**

**Manual**

Rev. 02B-01/10

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## INTRODUCTION

Production technologies are being improved and complicated to increase productivity and production quality. This is achieved by using more complicated intellectual automated control systems. The number of sensors and actuating devices, the information content and speed of its processing are increasing, algorithms and hardware of automation are being complicated - all this makes difficulties for adjustment and troubleshooting. In this connection it is necessary to observe not only current data, but to have a possibility to search and study of data for the past period of time. Traditional instruments such as oscilloscope and recorder are limited in using capabilities, because there are a lot of signals and they are distributed over the workshop or machine.

The system of automation comes to help itself; it measures and uses practically all necessary information about object of production. Reading and storage this information allows realizing the following tasks:

- qualitative adjustment of automation systems;
- monitoring of production process parameters;
- possibility of process technology control algorithms optimization;
- finding of improper operation and troubleshooting of equipment;
- supervision of operations of operators and maintenance personnel.

The requirements for such systems of reading and data storage are following:

- high speed of reading and data recording of technological process;
- multichanneling;
- compact data storage;
- enough number of variables;
- quick access to the historical data base.

The software "**VISOR**" allows realizing all above-listed points and provides continuous high speed technological process data recording, using existing automation system based on PLC and personal computer. Any additional equipment is not required.

## 1. OVERVIEW

Software "VISOR" contains the following applications:

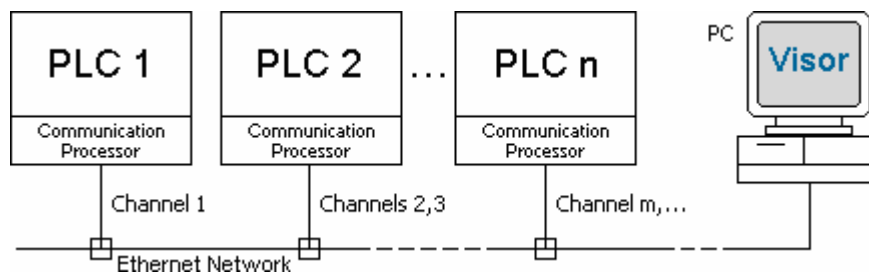
- **Visor\_On** - communication server, performing the reading of data from programmable logic controllers (PLC), packing and saving of their in database on the PC hard disk;
- **Visor** - data viewer, provides direct or remote access to the database of saved data, navigation, display and prints them in graphical and tabular representations, as well as the monitoring process variables in real time; in addition, it allows you to save interesting fragment of data in the off-line file, which can be viewing by the data viewer.

Both applications are independent and run autonomously. The flow of data is a unidirectional diagram:

**Process Data -> PLC -> Visor\_On -> Database -> Visor**

### 1.1. EQUIPMENT

The typical structure of data acquisition using "VISOR" is shown in Figure 1-1.



**Figure 1-1.** The typical structure of data acquisition

The workstation (PC) with installed and configured software "VISOR" connects to an automation system (PLC) using "Ethernet" network.

Detailing of historical data (sampling frequency) is dependent on the network performance. But for a certain of data, "VISOR" provides a reading of the data synchronously with the cycle of PLC program (every cycle), in the ["SYNCHRONOUS"](#) mode.

Software "VISOR" can be installed on IBM-compatible personal computer (PC) with the recommended minimum configuration:

- CPU Pentium IV 1600 MHz;
- 1024MB RAM;
- hard disk 100GB;
- video with a resolution 1024x768, RAM video 16MB;
- Ethernet Network card.

Supported operating systems:

- Windows 2000 Pro/Server;
- Windows XP;
- Windows 2003 Server;
- Windows Vista.

Supported types of PLC:

- Siemens SIMATIC S7/C7.

## 1.2. DATA ACQUISITION

In order to communication server **Visor\_On** could read the required data, they must be pre-prepared in PLC. To do this you have to create the data block in PLC and to provide recording of necessary variables.

Data is read in parts, the maximum size of them - 2048 bytes. To read the part of data from the PLC communication server **Visor\_On** uses the channel. Channels are Independent, each channel individually configurable. For each PLC can be one or more channels, due to this proportionally increase the size of the read data. The maximum number of channels is 30 (depending on license). Thus the communication server can read up to 61440 bytes data, while the number of PLC can reach 30.

The main variants for acquisition and analyzing of data presented in the block diagram shown in Figure 1-2.

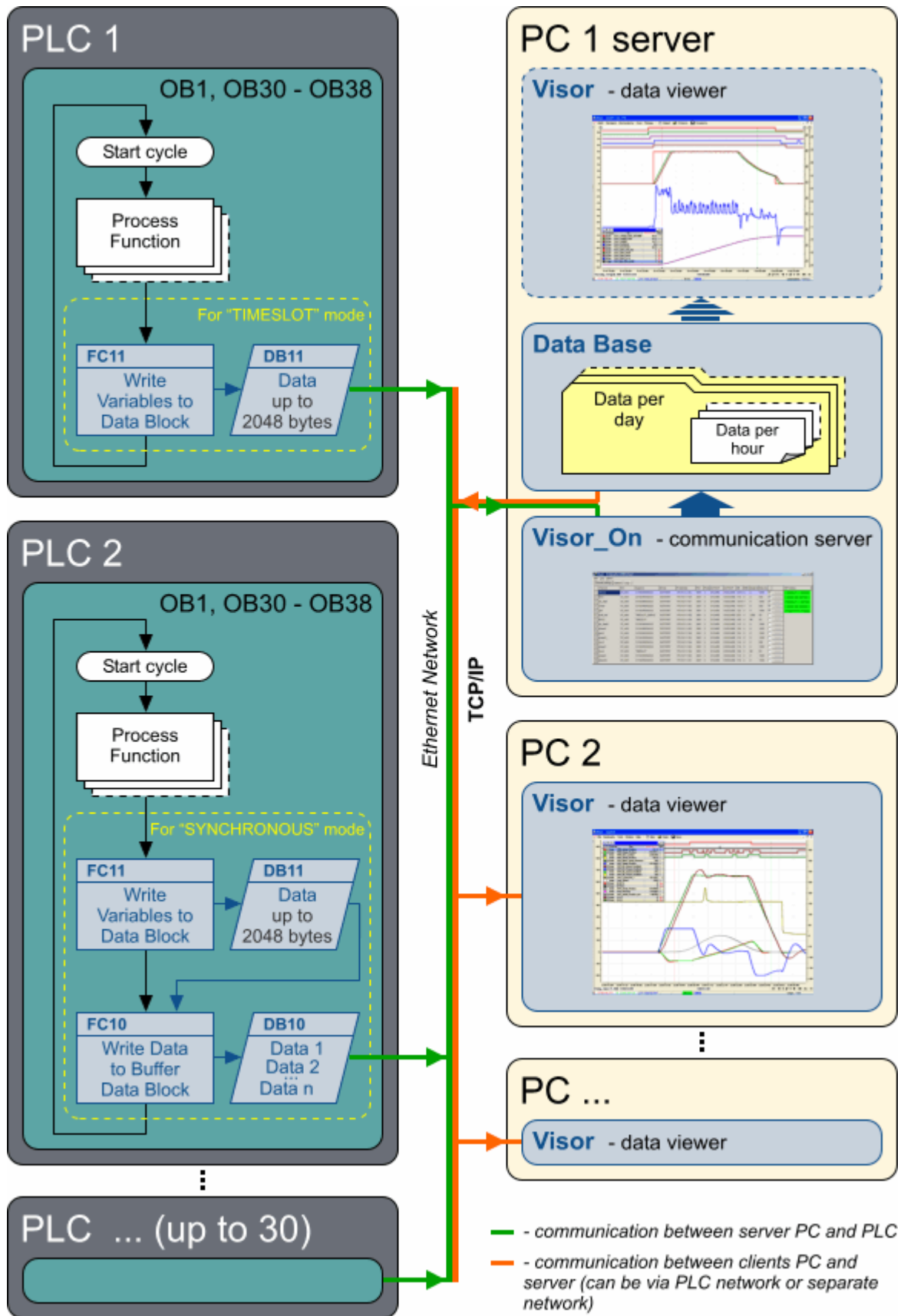


Figure 1-2. Variants for acquisition and analyzing of data

### 1.3. MODES OF DATA ACQUISITION

"VISOR" supports 3 modes of read data from the PLC:

- TIMESLOT - with a fixed period of samples;
- TIMESLOT\_SIMPLE - with a fixed period of samples, simplified;
- SYNCHRONOUS - synchronous with the PLC scan cycle.

#### 1.3.1. THE "TIMESLOT" MODE

This is a direct reading of the data. For the "TIMESLOT" mode the data block, in addition to variables, should have the header that contains the time of PLC clock. This time can be obtained using standard functions of the processor (CPU). Time format in the header of the data block coincides with the "DATE\_AND\_TIME" data type of PLC SIMATIC S7 and has the size of 8 bytes:

- |                   |             |                                 |
|-------------------|-------------|---------------------------------|
| • Byte 0:         | Year        | 90H ... 89H (from 1990 to 2089) |
| • Byte 1:         | Month       | from 01H to 12H                 |
| • Byte 2:         | Day         | from 01H to 31H                 |
| • Byte 3:         | Hour        | from 00H to 23H                 |
| • Byte 4:         | Minute      | from 00H to 59H                 |
| • Byte 5:         | Second      | from 00H to 59H                 |
| • Byte 6:         | 2 MSD of ms | from 00H to 99H                 |
| • Byte 7: (4 MSB) | LSD of ms   | from 0H to 9H                   |
| • Byte 7: (4 LSB) | Day of week | from 1H to 7H (not used)        |

All bytes must be in accordance with the binary-coded decimal (BCD) format presentation of Siemens specifications.

Communication server **Visor\_On** periodically, at regular parametrized intervals, reads the data from the PLC and stores them in the database of historical data on the workstation (PC). The period of reading data is selected on the basis of the desired detail. If the PLC is not able to provide data within a specified time interval, the period of reading increases automatically. Usually in this mode is not possible to reach the highest of detail (read data every program execution cycle), because it requires high bandwidth data transfer, which sometimes is not physically possible. This mode should be used if you do not need to write fast changing variables.

The flow of data in this mode:

***Process Data -> PLC data block -> Visor\_On -> Database***

Advantages of the "TIMESLOT" mode:

- easy to use and configure;
- does not require any additional software in the PLC.

Disadvantages of the "TIMESLOT" mode:

- low detailing values of variables for fast programming cycles, when the PLC scan cycle time much less than data reading period;
- reducing of the period of reading data from the PLC imply increasing load on network equipment.

### 1.3.2. THE "TIMESLOT\_SIMPLE" MODE

This is the easiest mode of data collection. The "TIMESLOT\_SIMPLE" mode differs from "TIMESLOT" so that a time of each data block reading is taken from internal workstation (PC) clock. In this mode the header of the data block containing the time of PLC clock is not required.

Advantages of the "TIMESLOT\_SIMPLE" mode:

- same as in the "TIMESLOT" mode.

Disadvantages of the "TIMESLOT\_SIMPLE" mode:

- same as in the "TIMESLOT" mode;
- as being the time is used from internal workstation (PC) clock, it is some mistiming between real time of data changes and time of receiving them, this shift occur because there is the delay of data transporting through the network, which is variable.

### 1.3.3. THE "SYNCHRONOUS" MODE

In this mode data is read not directly from the data block containing variables, but from the data block of the circular buffer. Filling the circular buffer occur synchronously with the PLC scan cycle by using a special software written on the language of used PLC. The flow of data in this case is as follows:

***Process Data -> PLC data block -> PLC buffer data block -> Visor\_On -> Database***

Thanks to the use the buffer there is no need to read data from the PLC often, thus reducing load on network equipment. In addition, the buffer allows reading of data synchronously with the scan cycle of the program PLC (each cycle). Performance of this mode depends on:

- throughput and the load of PLC communication processor;
- number of variables (data size);
- rate of change of variables.

Table 1-1 shows examples of the "SYNCHRONOUS" mode performance for PLC S7-400 at different times of the program execution cycle. The variables are read in each cycle.

**Table 1-1.** Examples of the "SYNCHRONOUS" mode performance

PLC cycle time, msec	Data changes frequency	Buffer size in PLC, KBytes	Periodicity of buffer reading from PLC, msec	Read data size, Bytes	Data flow, KBytes/sec
2	every cycle	16	500	40	~ 18 - 20
2	every 5th cycle	16	500	200	~ 16 - 18
10	every cycle	16	500	200	~ 16 - 18
10	every 10th cycle	16	1000	1000	~ 8 - 10
20	every cycle	16	500	400	~ 8 - 9
20	every 10th cycle	16	1000	2000	~ 4 - 5



Advantages of the "SYNCHRONOUS" mode are obvious:

- synchronism between data changing and data reading (reading synchronously with the PLC scan cycle);
- guaranteed maximum detail of variables values;
- low load on network equipment.

Disadvantages include:

- require additional memory for the circular buffer in PLC.

**Attention!** The "SYNCHRONOUS" mode is more perfect and it is recommended for a priority using.

## 2. COMMUNICATION SERVER VISOR\_ON

The communication server performs the reading of data from programmable logic controllers (PLC), packing and saving of their in database on the PC hard disk.

### 2.1. DATABASE STRUCTURE

Physically the database is a folder named "DATA", located in the working directory of the application. Its contents - it subfolders with names consisting of the date:

"YY\_MM\_DD" - year\_month\_day.

Thus each folder contains the data for one day.

Inside each of these folders stores files, organized in hourly array separately for each channel as files collection with ".dat", ".pnt", ".min" extensions. The file name consists an hour and name of the channel:

"hh\_xxxxxx" - hour\_channel name.

Example of the database is shown in Figure 2-1.

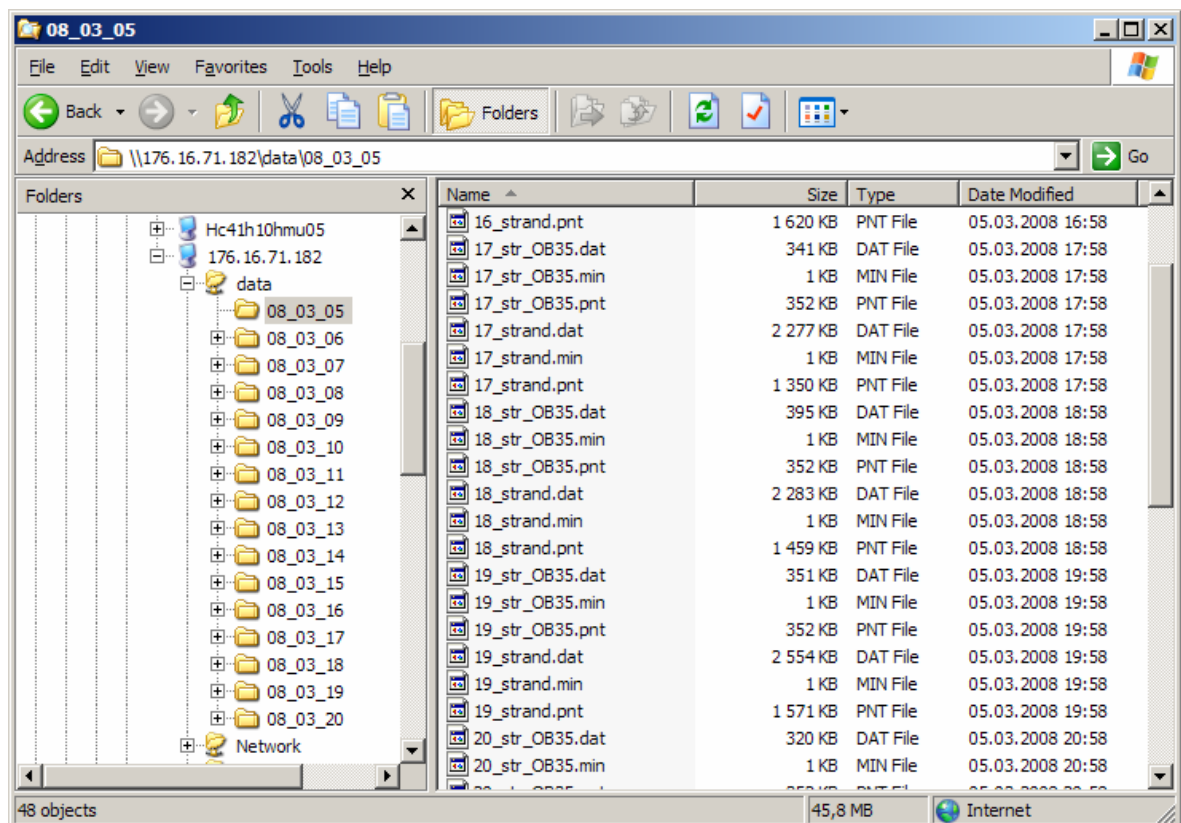


Figure 2-1. Example of the database structure

## 2.2. CONFIGURATION

The window of application **Visor\_On** contains pages selected by tabs:

- “Channel settings” - table of channels configuration;
- “Options”;
- “Logs” - protocol of messages and errors.

### 2.2.1. CHANNEL SETTINGS

For start of the channel is necessary to describe it in the row of the channels table and activate. Example of channels configuration is shown in Figure 2-2.

	Channel	PLC	Capture	Driver	IP address	Port	Ports	locTSAP	remTSAP	DB	DBB	length, b	time, ms		NET status	
1	strand	S7_400	SYNCHRONOUS	ISOTCPS7	176.16.11.181	3001	3	01CARD	0103CARD	1018	0	0	1000	<input checked="" type="checkbox"/>	Apply	1000ms 0.1 1369b/s
2	BOC	S7_400	SYNCHRONOUS	ISOTCPS7	176.16.11.184	3001	3	01CARD	0103CARD	116	0	0	500	<input checked="" type="checkbox"/>	Apply	500ms 0.2 5371b/s
3	str_fast	S7_400	SYNCHRONOUS	ISOTCPS7	176.16.11.181	3001	3	01CARD	0103CARD	1019	0	0	1000	<input checked="" type="checkbox"/>	Apply	1000ms 0.1 1487b/s
4	shear	S7_400	SYNCHRONOUS	ISOTCPS7	176.16.11.183	3001	3	01CARD	0103CARD	1018	0	0	500	<input checked="" type="checkbox"/>	Apply	500ms 0.2 5280b/s
5	gen	S7_400	SYNCHRONOUS	ISOTCPS7	176.16.11.180	3001	3	01CARD	0103CARD	120	0	0	1000	<input checked="" type="checkbox"/>	Apply	1000ms 0.0 1410b/s
6	soft_red	S7_400	TIMESLOT_SIMPLE	ISOTCPS7	176.16.11.182	3001	3	01CARD	0103CARD	220	0	1200	50	<input type="checkbox"/>	Apply	
7	BOC2	S7_400	TIMESLOT	ISOTCPS7	176.16.11.184	3001	3	01CARD	0103CARD	108	0	96	30	<input type="checkbox"/>	Apply	
8	str_fast2	S7_400	SYNCHRONOUS	ISOTCPS7	176.16.11.181	3001	3	01CARD	0103CARD	110	0	0	1000	<input type="checkbox"/>	Apply	
9	shear2	S7_400	SYNCHRONOUS	ISOTCPS7	176.16.11.183	3001	3	01CARD	0103CARD	109	0	0	1000	<input type="checkbox"/>	Apply	
10	gen2	S7_400	SYNCHRONOUS	ISOTCPS7	176.16.11.180	3001	3	01CARD	0103CARD	120	0	0	1000	<input type="checkbox"/>	Apply	
11	shear2_	S7_400	SYNCHRONOUS	ISOTCPS7	176.16.11.183	3001	3	01CARD	0103CARD	119	0	0	1000	<input type="checkbox"/>	Apply	
12	boc3	S7_400	SYNCHRONOUS	ISOTCPS7	176.16.11.184	3001	3	01CARD	0103CARD	119	0	0	500	<input type="checkbox"/>	Apply	
13	shear3	S7_400	SYNCHRONOUS	ISOTCPS7	176.16.11.183	3001	3	01CARD	0103CARD	119	0	0	1000	<input type="checkbox"/>	Apply	
14	boc4	S7_400	TIMESLOT	ISOTCPS7	176.16.11.184	3001	3	01CARD	0103CARD	108	0	96	50	<input type="checkbox"/>	Apply	
15	shear4	S7_400	SYNCHRONOUS	ISOTCPS7	176.16.11.183	3001	3	01CARD	0103CARD	119	0	0	1000	<input type="checkbox"/>	Apply	
16	strand3	S7_400	SYNCHRONOUS	ISOTCPS7	176.16.11.181	3001	3	01CARD	0103CARD	119	0	0	1000	<input type="checkbox"/>	Apply	

**Figure 2-2.** The application **Visor\_On** on the page “Channel settings”

Table 2-1 shows description of the channel configuration columns.

**Table 2-1.** Description of the channel configuration

Name	Description
Channel	The channel name. The length of the channel name no more than 20 characters, without spaces and inadmissible to use in file names of the operating system characters.
PLC	PLC type. Available “Siemens”: S7-200; S7-300; S7-400.
Capture	TIMESLOT / TIMESLOT_SIMPLE / SYNCHRONOUS, modes of data acquisition.
Driver	ISOTCPS7 / TCPS7, communications protocol with PLC “Simatic S7”. ISOTCPS7 – native “Siemens” communications protocol of direct data reading from a processor (CPU); TCPS7 – TCP protocol FETCH/WRITE, for that in the “Hardware configuration” of PLC creates a TCP connection FETCH-passive for a certain port.
IP address	IP address of PLC.
Port	The initial port number in PLC (only for the TCPS7 protocol).
Ports	The number of available ports in the PLC. Parameter indicates how many there are available ports, starting with the initial port (only for the TCPS7 protocol).
locTSAP	The local TSAP. Currently not used and is reserved for compatibility with PLC “Siemens S5”.
remTSAP	The remote TSAP. This is the position of CPU Siemens S7 in the rack, XXYYCARD: <ul style="list-style-type: none"> <li>• XX – the rack number;</li> <li>• YY – CPU position in the rack.</li> </ul> Numbers are assigned according the “Hardware configuration” of PLC.
DB	Number of the data block in PLC to read. For TIMESLOT and TIMESLOT_SIMPLE modes specifies the number of data block of variables. For SYNCHRONOUS mode specifies the number of data block of the buffer.
DBB	First byte address of the read data in the data block. Recommendation: to avoid confusion with tag addresses, assign this parameter is always zero. Is not using for SYNCHRONOUS mode.
Length	Length of the read data in bytes. Is not using for SYNCHRONOUS mode.
Time	Period of reading data from PLC, ms.
NET status	Displays the current state of the channel.

**Attention!** Be careful when assigning parameter “Time” is too small, it loads the processors of PLC and network equipment.

### 2.2.2. OPTIONS

Here you can set the duration of data storage in the database, for automatic cleaning the hard disk from the outdated information. Duration of data storage is specifying in days. If you specify "0" then data will not be removed.

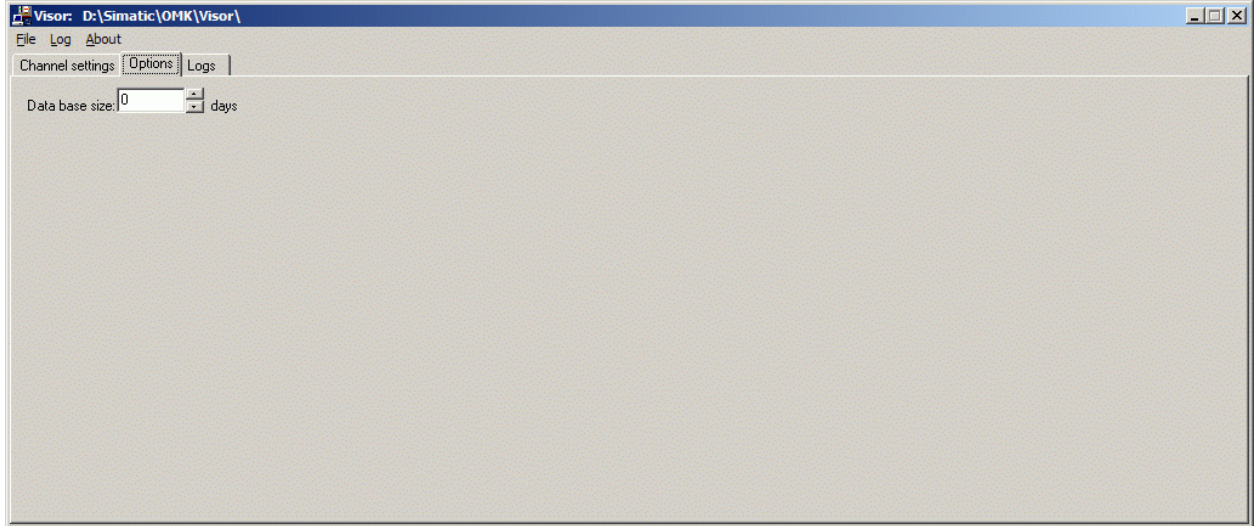


Figure 2-3. The application **Visor\_On** on the page "Options"

### 2.2.3. LOGS

The application provides logs of messages and errors. Messages that contain the label of the three characters "#" are errors and mean the loss of data.

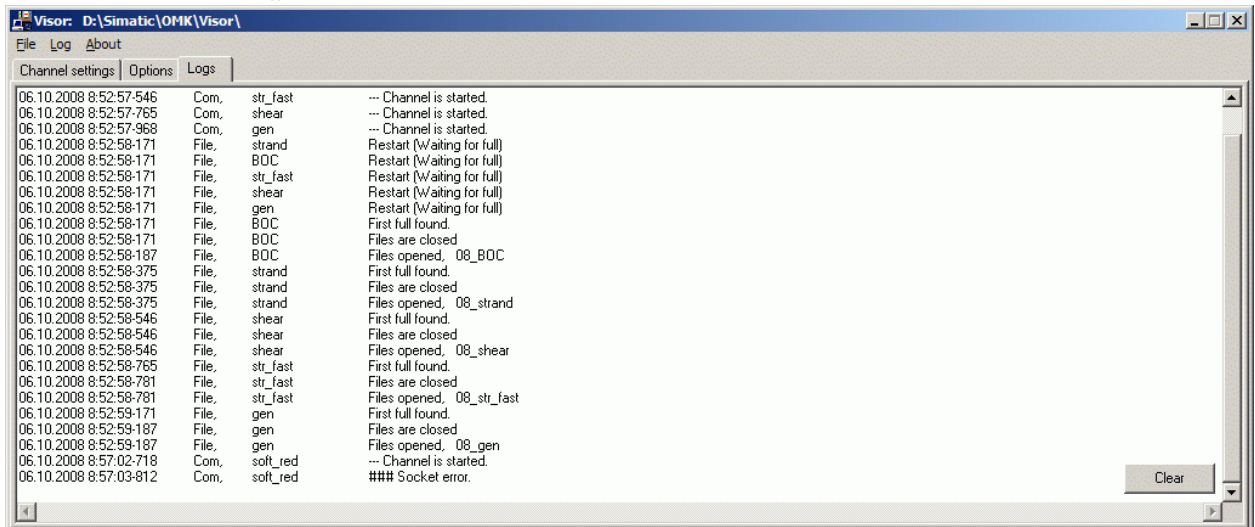


Figure 2-4. The application **Visor\_On** on the page "Logs"

All messages and errors separate by days and stored in files with the extension ".log" in the folder "DATA".

### 3. DATA VIEWER VISOR

The data viewer provides access to the database of saved data, navigation, display and prints them in graphical and tabular representations, as well as the monitoring process variables in real time.

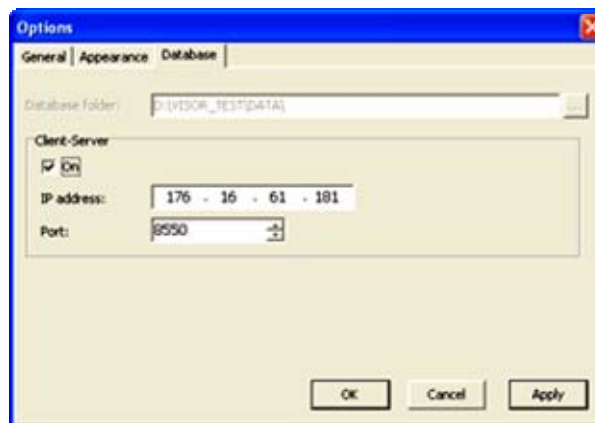
There are three operating modes of application:

1. with historical data base is located in the working directory;
2. with historical data base is located on the remote computer;
3. with off-line files (diagram only).

In the first case, the data viewer **Visor** is located in the same directory with the communication server **Visor\_On**. **Visor** uses the historical data base located in the folder "DATA", which directly generate the communication server.

In the second case, the data viewer **Visor** installed separately and the user gets access to the historical data base formed by **Visor\_On** communication server on a remote computer via a network. In this case the result is a multiuser architecture with one server and many clients.

The operating mode can be selected in the menu "Tools" - "Options" - "Database".



**Figure 3-1.** The window "Options" of application **Visor** on the page "Database"

To work with the historical data base needed tag lists and tag groups located in the folders "DBV" and "GRV" in the working directory as files with the extension ".dbv" (tag list) and ".grv" (tag group).

To work offline need only the off-line file with the extension ". visor", containing a clipping data for the selected tags for a certain period of time.

The transition from the off-line file views mode to the database operation mode is at the moment of choice of the time interval that goes beyond the data recorded in the off-line file. In the window that appears warning you can click the appropriate buttons or remain in the range of data stored in the off-line file, or leave it.

Current mode is indicated in the status bar at the bottom.

### 3.1. TAGS

Before using the variables is necessary to describe them. The tag is a description of a single variable in the data block.

#### 3.1.1. TAG STRUCTURE

The tag is a string containing several options separated by symbol ";". It looks as follows:

***Format\_and\_Address; Name; Type; [Factor]; [Comment]***

Options in square brackets are optional.

Table 3-1 shows the list of the **"Formats"** and **"Types"** presentation variables on the screen.

**Table 3-1.** The formats and types of presentation variables on the screen

Size	Format	Type	Presentation	Description
Bit	DBX	BOOL	Bit	0 ÷ 1
Byte	DBB	INT UINT HEX BIN CHAR	Integer Unsigned Integer Hexadecimal Binary Character	-128 ÷ +127 0 ÷ 255 00 ÷ FF 00000000 ÷ 11111111 1 ASCII character
Word	DBW	INT UINT HEX BIN CHAR	Integer Unsigned Integer Hexadecimal Binary Character	-32768 ÷ +32767 0 ÷ 65535 0000 ÷ FFFF 00000000 00000000 ÷ 11111111 11111111 2 ASCII characters
Double Word	DBD	INT UINT HEX BIN CHAR REAL	Integer Unsigned Integer Hexadecimal Binary Character Real	- 2147483648 ÷ + 2147483647 0 ÷ 4294967295 0000 0000 ÷ FFFF FFFF 00000000 00000000 00000000 00000000 ÷ 11111111 11111111 11111111 11111111 4 ASCII characters +1.175495e-38 ÷ +3.402823e+38, -1.175495e-38 ÷ -3.402823e+38

**"Address"** - variable address in the data block.

**"Name"** - symbolic name of variable, up to 24 characters.

**"Factor"** - factor that will multiply the value of the variable. By default it is 1 and could be: 0.001, 0.01, 0.1, 1, 10, 100, 1000. The factor makes sense only for the types of "INT", "UINT" and "REAL". Using this ratio is convenient for a variable conversion order if it was done in the PLC.

**"Comment"** - description of variable, length up to 79 characters.

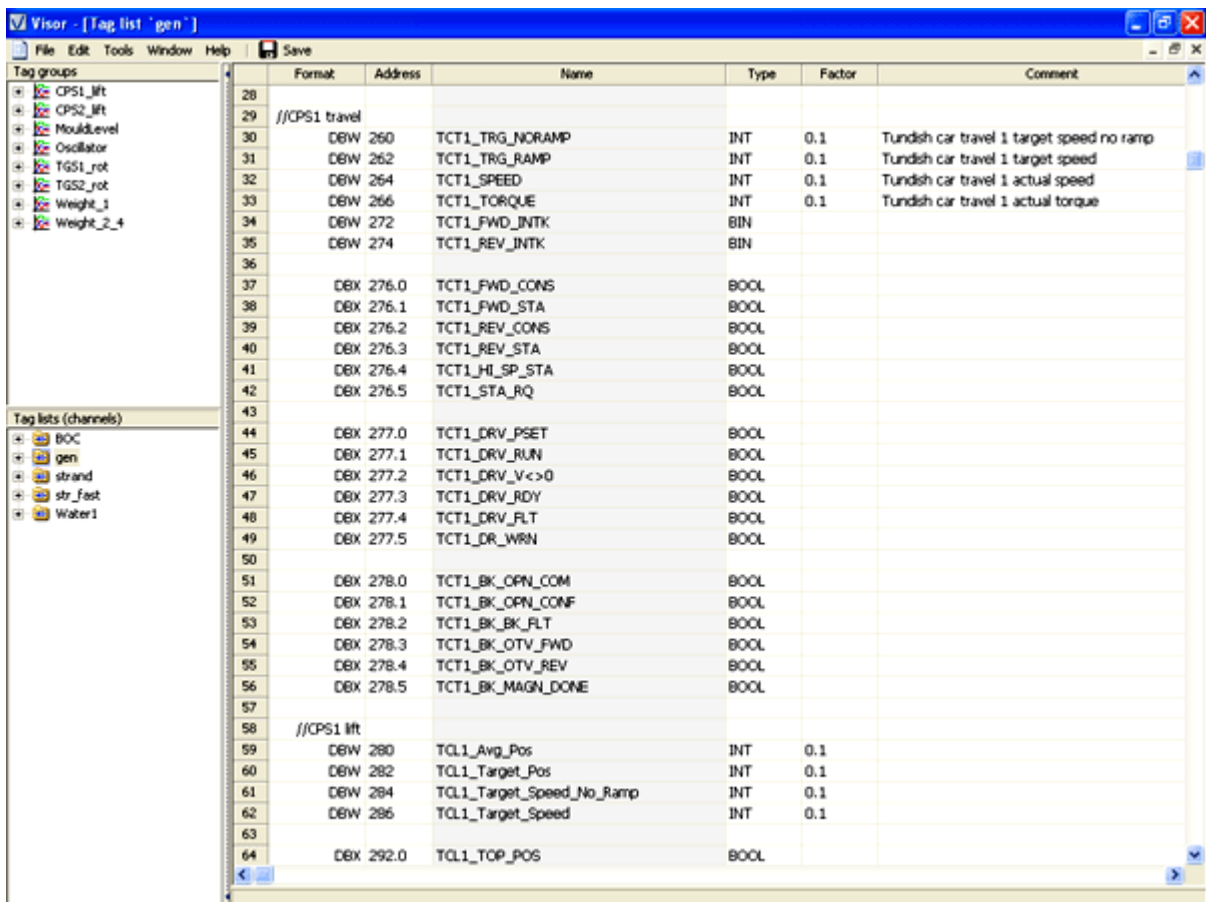
Example of tags:

```

DBX10.0 ;Q10.0 ;BOOL ; ;Valve
DBD250 ;SPEED ;REAL ;1 ;Speed, mm/min
DBD344 ;ENCODER ;UINT ;1 ;Encoder value, pulse
DBW845 ;VERT_POSITION ;INT ;0.1 ;Vertical position, mm
    
```

### 3.1.2. TAGS CREATION AND EDITING

Every channel corresponds to its list of tags. The tags can be created in the application **Visor**. To do this there is the built-in tag editor, which can open from the context menu by right-clicking on the list of tags. Tags are presented in tabular form and have the parameters described in [Chapter 3.1.1](#).



**Figure 3-2.** The window of application **Visor** with open “Tag editor”

Lists of tags are stored in files with the extension “.dbv” in text format and are located in the folder “DBV” of the working directory “VISOR”. The name of this file - “channel\_name”.

### 3.1.3. TAG GROUPS

For convenience use the tags could be merged into the group. Tags grouping lets you create sets of frequently used variables and quickly open them for reviewing. Tag groups can be created in the application **Visor** by recruiting interest from the lists of tags and stored in files with the extension “.grv” in a folder “GRV” inside the working directory “VISOR”. The group may contain the tags from different lists. The maximum number of tags in the group is 50.



### 3.1.4. TAGS MANAGEMENT

In the left side of the main window of application there is a retractable tags panel. The panel is divided into two parts: the top contains the groups of tags, at the bottom - the channels with the corresponding lists of tags. Tags and tag groups are chosen by simple drag-and-drop to the chart window.

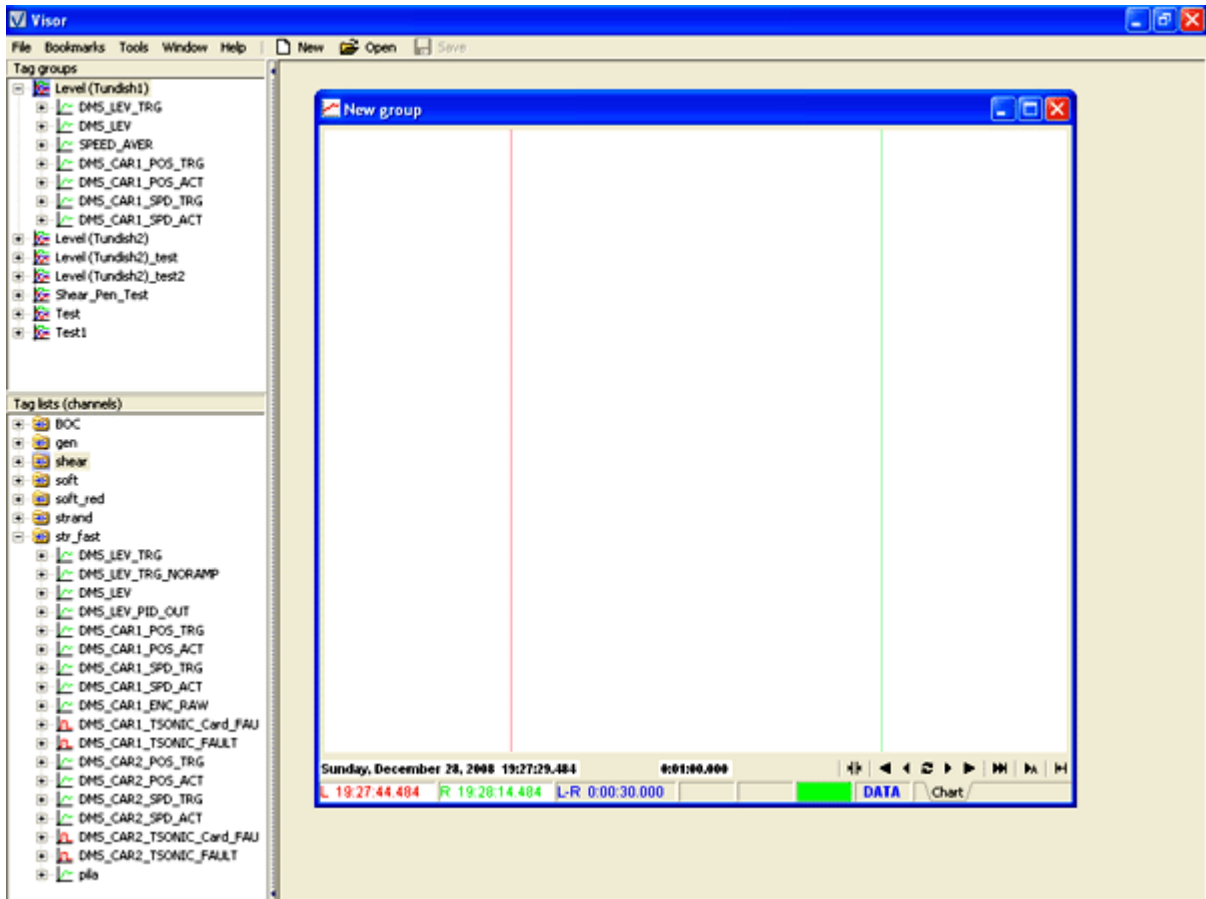


Figure 3-3. The window of application **Visor** with open “Tag manager” panel

### 3.2. CHART

The tab "Chart" contains the page where you can create windows which displayed variables in graph form in the time.

The initial parameters of time are the start time and the time interval in the window. At the bottom of the chart has everything required elements for navigation in the time.

**Attention!** You should not assign too long period of time, because the amount of information can be very much, resulting in extraction of data from the database and drawing charts can take a long time, causing the user a false view suspension program.

The list of tags displayed on the charts is located in the window "Legend", where you can customize the display properties of variables on the screen. The maximum number of tags in the window is 50.

Are available ten vertical axes (five left, five right) and one time axis. Axes are defined to variables in the window "Legend". Bit variables are displayed without reference to the vertical axes, placed on the diagram top-down and highlighted background with the color of the grid.

There are two cursors: the left (primary) and right (auxiliary). The value of variables in the cursor position is displayed in the window "Legend" in the appropriate columns. Cursor position in the time is displayed in the window "Legend" and the status bar. It is possible to observe in the window "Legend" difference variables and time in different positions of the left and right cursors. Left and right cursors can not be interchanged.

For control of cursors, set of axes, scaling and shift of the image using the mouse. Available following manipulations:

- double click the left button in the window sets the left cursor to position of the mouse pointer;
- double click the right button in the window sets the right cursor to position of the mouse pointer;
- all axes can move by mouse. In combination with the keyboard keys "Alt", "Ctrl" and "Shift" may be different behavior of axes: "Alt" - accelerates the movement axis; "Ctrl" - changes the lower limit; "Shift" - changes the upper limit;
- holding the right mouse button in the window you can shift the entire chart (except for bit curves along the vertical). Status of shift indicate in the status bar at the bottom of the window;
- selection of area in the window by left mouse button to top-down and left to right produces a scaling of the entire chart (except for bit curves along the vertical). Selection in the opposite direction cancels the scaling and shift (rollback). Status of scaling indicate in the status bar at the bottom of the window;

**Explanation!** Scaling and shift in the window it is possibility of increase/decrease and moves the chart by the mouse pointer without navigating in the time and changes any settings of the axes. This is kind of focus on the interested part of the chart with possibility to roll back to the original view. Time navigation commands cancel scaling and shift.

It is possible to observe the values of variables in real time by clicking the auto refreshing. The update of the screen depends on the time interval and rate of change of variables.

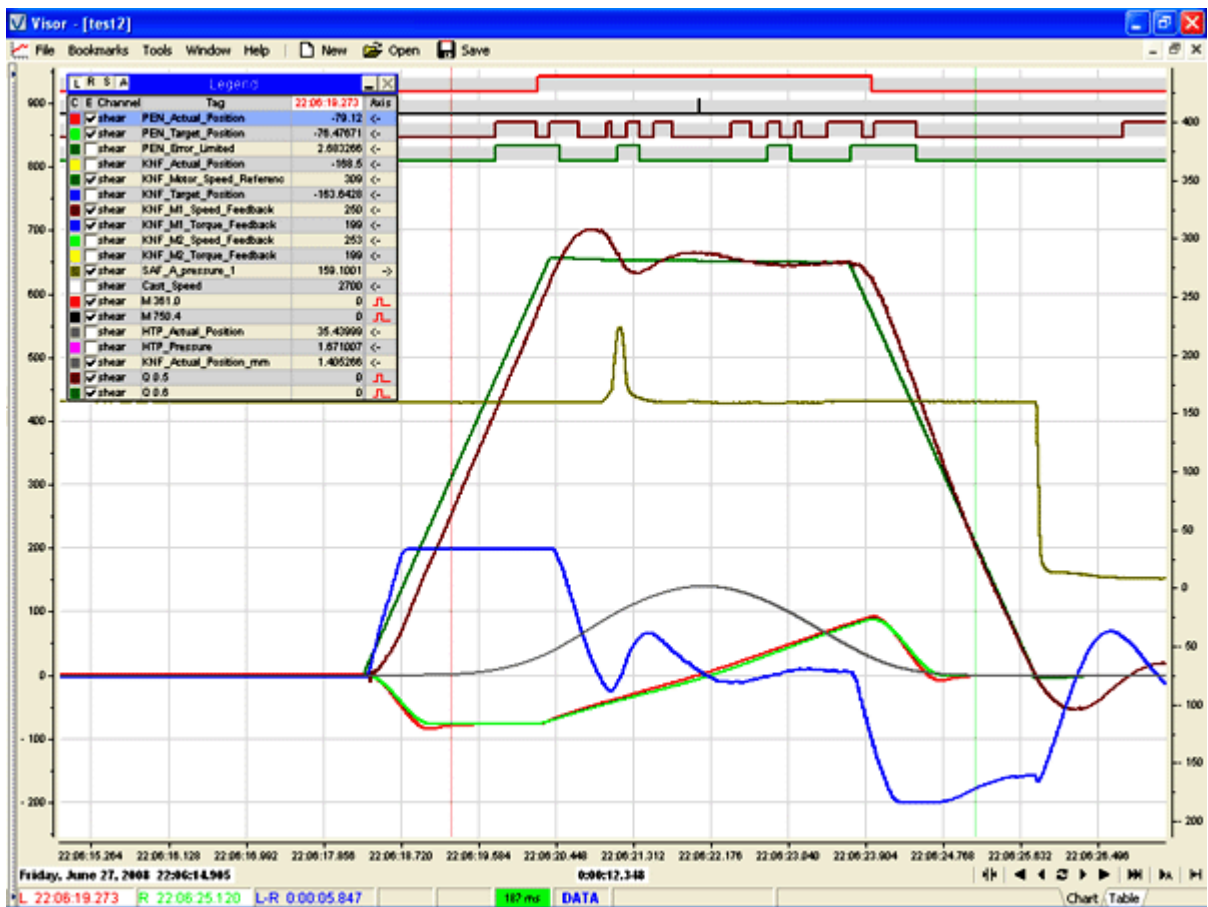


Figure 3-4. The window of application Visor on the page "Chart"

### 3.3. TABLE

Value of variables can be displayed in the table. The tabular representation can be selected by the tab "Table", and you open the instant time of the left cursor.

The tabular representation has features in comparison with the chart. The table is always filled for the one minute. To switch to the next or previous minute use the navigation bar or shortcut keys of keyboard.

Filling the table, unlike in the chart, does not occur evenly in the time, but according to change of variables, i.e. the discretization of time between adjacent rows is not constant and depends on how frequently changing variables.

Time	shear	PEN_Actual	PEN_Target	PEN_Error_Li	KNF_Actual	KNF_Motor	KNF_Target	KNF_M1_Spe	KNF_M1_Tor	KNF_M2_Spe	KNF_M2_Tor	SAF_A_press	Cast_Speed	M 361.0	M 750.4
22:06:19.882	-76.81	-76.50803	0.3119812	-146	501	-138.703	454	199	453	199	159.4039	2701	0	0	
22:06:19.887	-76.81	-76.53934	0.2706528	-145.8	503	-138.4498	455	199	454	199	159.6065	2702	0	0	
22:06:19.891	-76.79999	-76.57066	0.2393341	-145.6	504	-138.1958	457	199	456	199	159.5052	2703	0	0	
22:06:19.896	-76.79999	-76.60197	0.1980133	-145.3	505	-137.9921	459	199	458	199	159.5052	2704	0	0	
22:06:19.901	-76.79999	-76.66461	0.135376	-145.2	507	-137.7367	460	199	460	199	159.4039	2706	0	0	
22:06:19.906	-76.78998	-76.69593	0.1040573	-144.9	509	-137.4805	462	199	461	199	159.3027	2707	0	0	
22:06:19.910	-76.77997	-76.72726	0.06272125	-144.7	510	-137.2235	464	199	462	199	159.3027	2708	0	0	
22:06:19.915	-76.76001	-76.75857	0.02140045	-144.5	512	-136.9657	466	199	464	199	159.2014	2709	0	0	
22:06:19.920	-76.75	-76.75857	0.001441956	-144.2	513	-136.759	467	199	466	199	159.4039	2709	0	0	
22:06:19.925	-76.73999	-76.78989	-0.03988647	-144	515	-136.4997	469	199	467	199	159.3027	2710	0	0	
22:06:19.929	-76.73999	-76.82121	-0.0812149	-143.8	516	-136.2397	469	199	469	199	159.4039	2711	0	0	
22:06:19.934	-76.71997	-76.82121	-0.0812149	-143.5	518	-135.9789	471	199	471	199	159.3027	2711	0	0	
22:06:19.939	-76.70996	-76.85252	-0.1325531	-143.3	519	-135.7690	473	199	472	199	159.3027	2712	0	0	
22:06:19.944	-76.70001	-76.85252	-0.1425629	-143	521	-135.5075	474	199	474	199	159.1001	2712	0	0	
22:06:19.949	-76.70001	-76.88384	-0.1838303	-142.8	522	-135.2445	476	199	476	199	159.2014	2713	0	0	
22:06:19.954	-76.67999	-76.88384	-0.1838303	-142.6	524	-134.9807	478	199	476	199	159.1001	2713	0	0	
22:06:19.958	-76.67999	-76.88384	-0.2038498	-142.3	525	-134.7161	479	199	478	199	158.9988	2713	0	0	
22:06:19.963	-76.66998	-76.88384	-0.2038498	-142.1	526	-134.5039	480	199	480	199	159.1001	2713	0	0	
22:06:19.968	-76.65997	-76.88384	-0.2138596	-141.8	528	-134.2379	482	199	482	199	159.2014	2713	0	0	
22:06:19.973	-76.64001	-76.88384	-0.2238693	-141.6	530	-133.971	484	199	483	199	159.2014	2713	0	0	
22:06:19.977	-76.63	-76.88384	-0.2438278	-141.4	531	-133.7034	486	199	486	199	159.3027	2713	0	0	
22:06:19.983	-76.62	-76.88384	-0.2538376	-141.1	532	-133.4388	486	199	486	199	159.5052	2713	0	0	
22:06:19.987	-76.60999	-76.88384	-0.2638474	-140.9	534	-133.1658	488	199	489	199	159.3027	2713	0	0	
22:06:19.992	-76.58997	-76.88384	-0.2738571	-140.6	536	-132.9499	488	199	490	199	159.4039	2713	0	0	
22:06:19.997	-76.58002	-76.88384	-0.2938766	-140.3	537	-132.6793	491	199	491	199	159.5052	2713	0	0	
22:06:20.002	-76.57001	-76.88384	-0.3038254	-140.1	539	-132.4078	493	199	493	199	159.3027	2713	0	0	
22:06:20.007	-76.56	-76.85252	-0.2825165	-139.9	540	-132.1356	493	199	495	199	159.3027	2712	0	0	
22:06:20.012	-76.56	-76.85252	-0.2925262	-139.6	542	-131.8626	496	199	496	199	159.4039	2712	0	0	
22:06:20.016	-76.56	-76.82121	-0.2612076	-139.4	543	-131.5888	496	199	497	199	159.5052	2711	0	0	
22:06:20.021	-76.56	-76.82121	-0.2612076	-139.1	545	-131.3142	500	199	500	199	159.5052	2711	0	0	
22:06:20.026	-76.54999	-76.82121	-0.2612076	-138.8	546	-131.094	500	199	500	199	159.4039	2711	0	0	
22:06:20.031	-76.54999	-76.78989	-0.2398987	-138.7	548	-130.818	502	199	503	199	159.3027	2710	0	0	
22:06:20.035	-76.54999	-76.78989	-0.2398987	-138.4	550	-130.5412	504	199	504	199	159.3027	2710	0	0	

Figure 3-5. The window of application Visor on the page "Table"

### 3.4. FINDING

The finding is used to determine the state of variable. The finding can be performed on the chart and table. In the chart the window of finding can be open from the window “Legend” by clicking the right mouse button on the tag name. The search direction in the time is always forward.

The search criterion for bit values can be:

- “0”;
- “1”;
- “Positive edge”;
- “Negative edge”.

The search criterion for analog values can be:

- “Equal”;
- “Not equal”;
- “More”;
- “Less”;
- “Limits” membership.

The search is performed for the single variable.

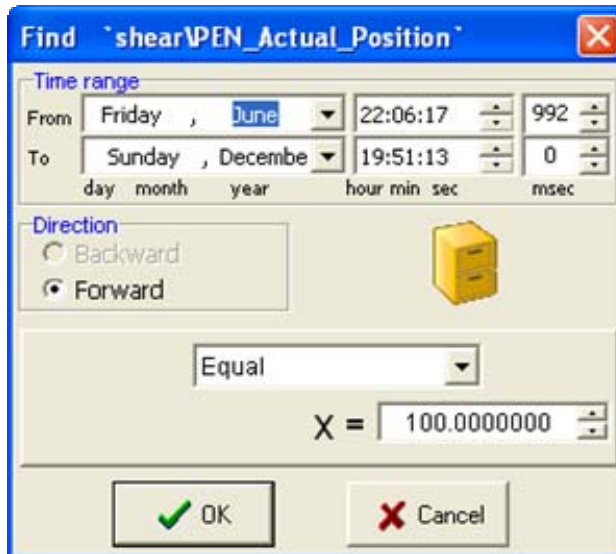


Figure 3-6. The window of variable value finding

### 3.5. OFF-LINE FILES

Visor allows you to save interesting fragment of data in the off-line file. The file extension is ".visor" and contains a clipping data for the selected tags for a certain period of time. To view the off-line files just need to have the data viewer. Using off-line files is suitable for saving interested fragments, as well as to transfer them to others for study. Another useful purpose of off-line files is creation of bookmarks, for future quick access to the desired location in the database. In the chart window menu has all the necessary commands to create and open off-line files.

**Attention!** Off-line files are used for the chart only.

## 4. INSTALLATION PROCEDURE

### 4.1. SOFTWARE COMPONENTS

The software "VISOR" includes:

- installation file of the communication server *Visor\_on\_setup.exe*;
- installation file of the data viewer *Visor\_setup.exe*;
- driver *Visor\_USBkey.inf* for the hardware protection USB key "Visor-Key";
- program block **FC10**, written in Step7, which is used to fill the circular buffer in the "SYNCHRONOUS" mode (block number can be changed).

### 4.2. INSTALLATION SEQUENCE

The sequence of software installation is shown below.

1. Start *Visor\_on\_setup.exe* file and install the communication server. In the installation procedure you must specify the installation path.
2. Start *Visor\_setup.exe* file and install the data viewer. If you plan to use it together with the communication server, then in the installation procedure you must specify the same installation path.
3. If the lists and groups of tags already exist, you should place them in folders "DBV" and "GRV" inside the working directory "VISOR".
4. Insert the **Visor-Key** into a free USB port of your PC and install the driver by the operating system request, using the supplied file *Visor\_USBkey.inf*.
5. Start *Visor\_on.exe* communication server and configure the channel parameters in accordance with the project without activating them.
6. Create in all PLC the data block (for example DB11) and provide filling of necessary variables. If you use "SYNCHRONOUS" mode, then in addition to create in PLC the data block of the circular buffer (for example DB10) and program the call of functional block FC10 from the program cycle. Block numbers can be arbitrary. Figure 4.1 shows the example of organization in the PLC program. Block FC11 writes data to the data block DB11. The first input parameter of block FC10 "IN\_DB\_Source" describes the last read byte of source data block; the second parameter "OUT\_DB\_Buffer" describes the last byte of circular buffer data block.
7. Set the actual time and time synchronization of PLC processors, using standard software.
8. Activate the necessary channels.

**Attention!** Communication server **Visor\_On** will not start if USB key is not inserted. Also do not remove the dongle from the USB port of your PC during the application working. This will lead to emergency work of applications **Visor\_On** and appearance of errors in historical data base.

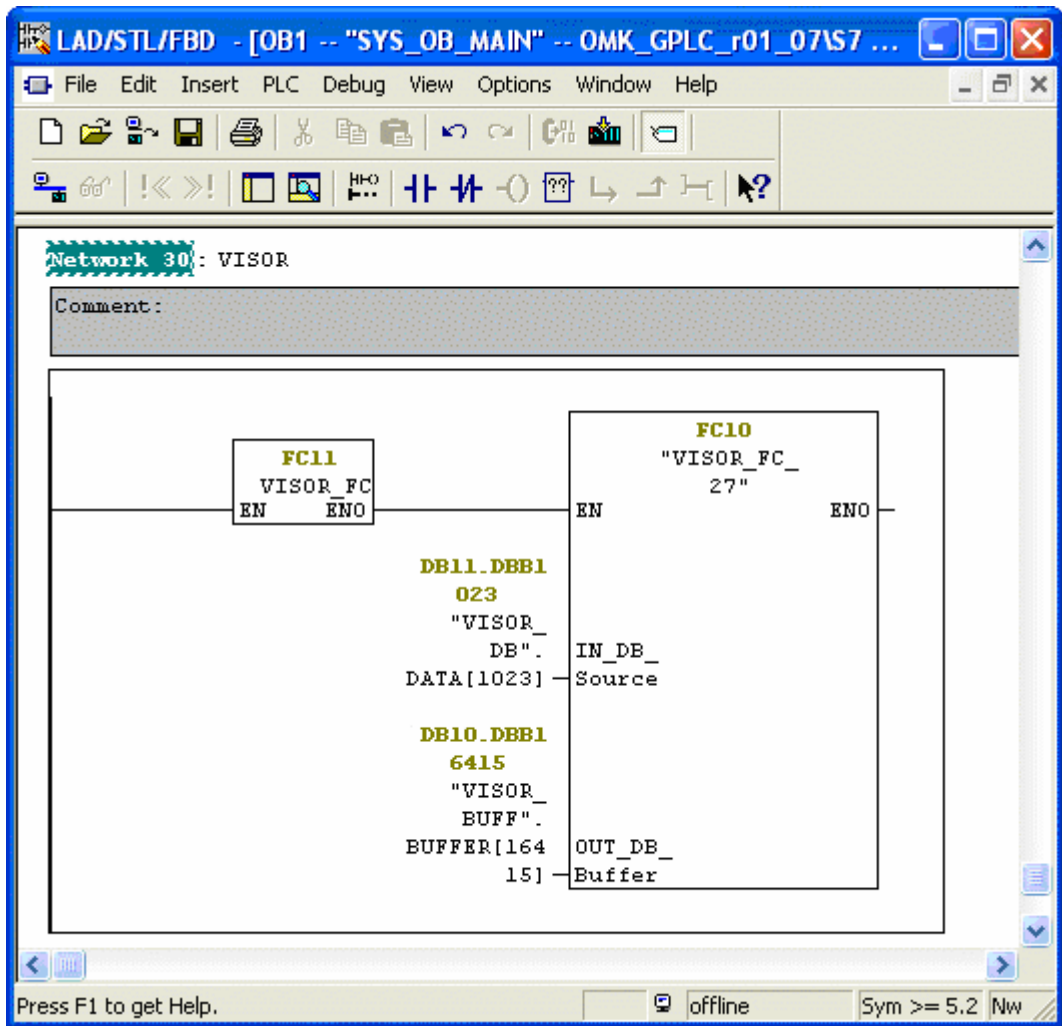


Figure 4-1. Example of functional block call for the circular buffer service

## 5. HARDWARE PROTECTION USB KEY VISOR-KEY

To protect against unauthorized use the software "**VISOR**" supplies with the USB key **Visor-Key**. Protected only communication server **Visor\_On**, data viewer **Visor** can be used without restrictions.

The key contains a license for 1, 5, 10, 20 or 30 communication channels. In case of the demo version, the key contains a time-limited license, which can be then replaced by unlimited. License replacement procedure built into the application **Visor\_On**. The license file can be received by e-mail. License information locates in the window "*About*" of **Visor\_On** application.



## 6. SUPPORT AND CONTACTS

Get the latest version of software, product descriptions, prices and other information you can on our website: <http://visor.su>

Any remarks, comments, suggestions and questions you can send to our e-mail: [visor@visor.su](mailto:visor@visor.su)

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