

Quick Guide for DAQ Manager software

- Version: **1.3.1** or higher



Read the user manual carefully before starting to use the software.
Producer reserves the right to implement changes without prior notice.

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Explanation of symbols used in the manual:



This symbol denotes especially important characteristics of the software operation.
Read any information regarding this symbol carefully.



This symbol indicates additional information that may help operate the program.

1. GENERAL CHARACTERISTICS

DAQ Manager software allows you to download data recorded by the MultiCon devices (e.g. temperature, humidity, pressure) and visualize them as tables and graphs. Data transfer is performed using a portable USB Flash Drive or via an Ethernet network.

2. FIRST LAUNCH OF THE APPLICATION

After completing the installation process, start the application from the system *Start Menu* in the folder “DAQ Manager”. From this folder you can safely uninstall the program and the measurement data archived up to the time of uninstalling will remain on your hard disk for later use.

After first launching of the program, the window shown will look like Figure 2.1.

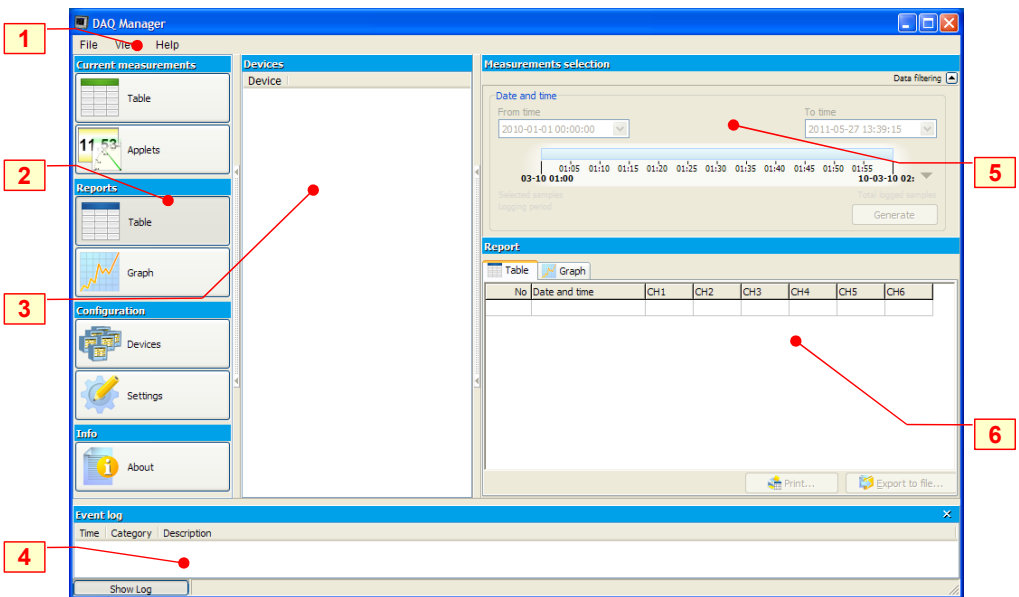


Figure 2.1. The appearance of the interface on the first run

Explanation of elements in the figure above:

- 1 - Main Menu** - provides access to less frequently used functions of the program;
- 2 - Side Menu** - allows access to the main functions of the program;
- 3 - Devices List** - contains a list of devices for which the program has archived data or virtual devices created for communication via Ethernet;

- 4 - **Event Messages Area** – list events occurring in the program; Information that appears here is also saved to a file "EventLog.txt", which is located in the program directory.
- 5 - **Time Area** – select the time period to create a table or graph;
- 6 - **Report Area** – view selected data in table and graph form; Displayed measurement data can be printed or exported to *.csv file.

When you run the program for the first time, the **Devices List** is empty because the program doesn't have any information about devices and their data yet. The creation of a new device on the list is done automatically by importing logged data saved on portable flash memory. To add a new device you only need to import its logged data. It is possible to add a new device manually, which will give the possibility to import data directly from the Ethernet network (see section 4.).

3. IMPORTING DATA FROM A FLASH DRIVE

The user can import measurement data, saved by the data logger on a portable flash drive, to the software database using menu **[File] > [Import measurements...]**. If a flash drive is inserted into USB port while running the program, **DAQ Manager** will check its contents and if any measurement data is found, a window is displayed to select the directory to get the new data.

3.1. SELECTION OF DATA DIRECTORY

The "Browse for Folder" window allows you to choose the folder of one device (with the name of the specific data logger serial number). Selecting the proper directory will activate the **[Import]** button (Figure 3.1). Clicking on this button will start the process of importing data to the program database.

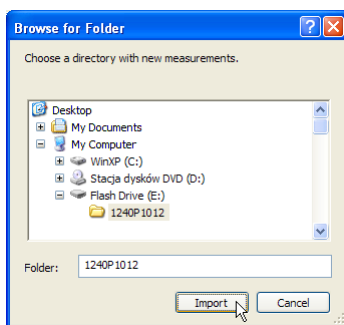


Figure 3.1. "Browse for Folder" window

3.2. IMPORTING DATA

At the beginning of the process of importing data the program analyses the measurement data for changes. After that, software performs importing if it's needed. The user is informed

about progress of operation via a dialogue box, and should wait until the end of the process (when the **[Close]** button becomes active) as shown in Figure 3.2.

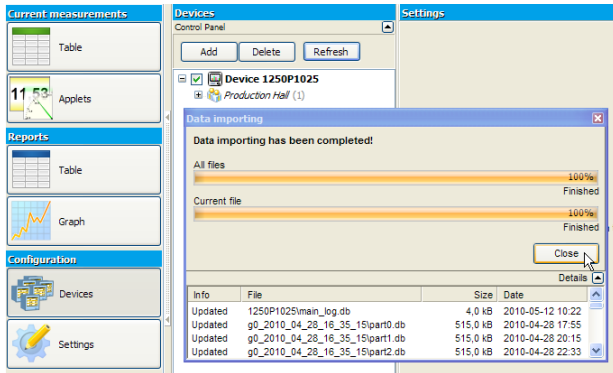


Figure 3.2. The process of data importing was completed

When the importing process was successfully completed a new device called “Device SERIAL_NO” (where SERIAL_NO is the serial number of the device from which data were collected) appears in the **Devices List**.

4. IMPORTING DATA FROM A NETWORK

In addition to importing data from a flash drive, you can also download logged files via an Ethernet network. This possibility exists only if the data logger is equipped with an advanced communication module with an RJ-45 socket (ACM module).

4.1. CONFIGURING NETWORK SETTINGS

To download the measurement data and settings from a device, connected to the Ethernet network, you must add a new undefined one to the list, by going to the **[Devices]** button (see section 5.). Then click **[Add]** button. A device added to the list in this way is a virtual device; its serial number is undetermined yet (Figure 4.1).

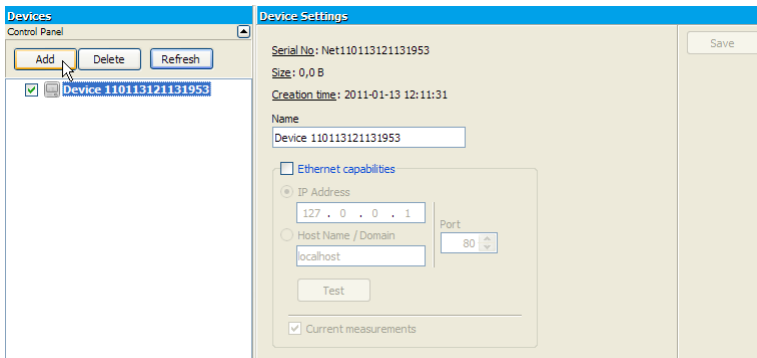


Figure 4.1. Adding the new virtual device to the **Devices List**

This virtual device will be equivalent to the actual real device in Ethernet network when the user specifies its network settings. Please check the **Ethernet capabilities** option, specify the IP address of the real device in the Ethernet network and the correct port if the device is in a subnet and is using port forwarding. Direct communication works on port 80 (http). If the network is managed by a DNS server that specifies assigned IP address to a domain name (or host), then you can choose to access the device by this name, as an alternative to an IP address. This functionality is especially useful if you want to use dynamic allocation of IP addresses with the DHCP option enabled in the device. After setting the network settings, you can immediately test it to see whether the device responds. Please click on the **[Test]** button and read the message at the right side of it (Figure 4.2).

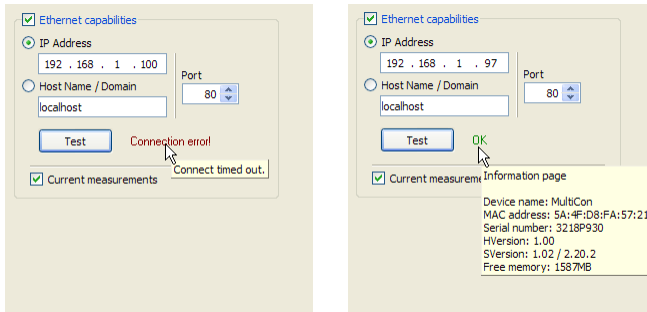


Figure 4.2. Example of network settings for a device that does not exist in the network (on the left) and correctly configured (on the right)

If the device responds correctly, you should save these settings by clicking on the **[Save]** button.

4.2. DOWNLOADING DATA

To download data from the preconfigured virtual device, go to the **Reports** section, right click on the appropriate device and select the **[Download data]** command (Figure 4.3).

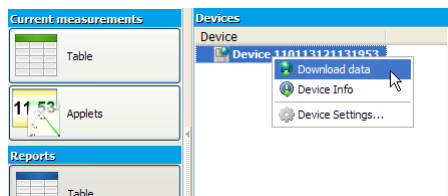


Figure 4.3. Start downloading data

This will start the process of downloading the data in the form of logs and configuration of the device, logged groups and channels. The progress of this operation is located next to the device on the list. By clicking on the progress bar, you can view details of this process (Figure 4.4). If **DAQ Manager** has previously downloaded data for the selected device, then the

update will be made without re-downloading all logs. If during the downloading, the program detects any errors, the user will be informed by an appropriate entry in the **Event Messages Area** (see Chapter 2.).

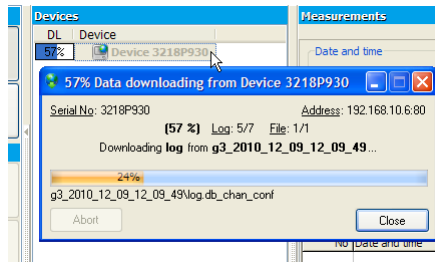


Figure 4.4. Downloading data from an Ethernet network

During the first download the serial number of the virtual device will be updated and will change from virtual to real. After that, any attempt of downloading data from another device, e.g. after changing the IP address, will bring up the warning “Incompatible device!”.

After completion of the download process, you can choose imported logs, and then analyse the data and create reports (Figure 4.5).

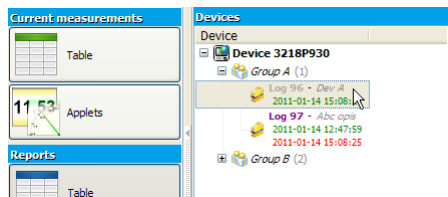


Figure 4.5. Updated logs ready for analysis

5. DEVICE SETTINGS

Access to the settings of devices from which data was collected, their groups, logs and channels can be obtained by clicking on the **[Devices]** button in the **Side Menu**. Certain settings that relate to the displaying and visualization of data, previously set in the device, can be changed here, to allow for more intuitive reports. After making changes, the user must confirm it by clicking the **[Save]** button. The button **[Undo]** is used to restore the last saved settings when an unexpected change happens.

5.1. DEVICES

The number of devices on the list is unlimited. After selecting one device, the program displays its properties (serial number, date and time when it was added to the database and disk space occupied by all its data). The user can change the default name of the device and define the Ethernet Network settings (Figure 5.1).

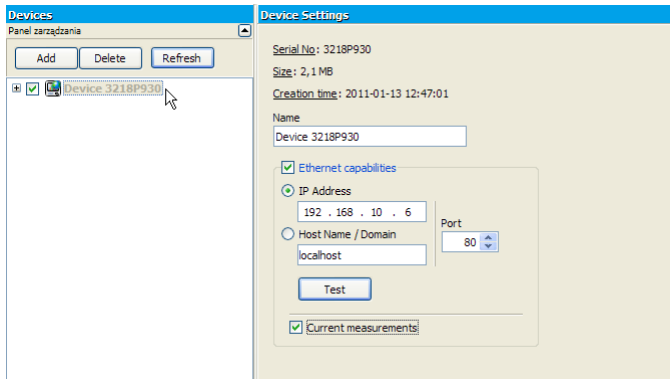


Figure 5.1. Device settings

For convenience (e.g. to make the list more readable) each device can be hidden from the list of devices in the **Reports** and **Current measurements** sections by unchecking it on this list.

The user can also permanently remove the device from the database by selecting a device and clicking the **Delete** button. This operation can also permanently delete all the data related to the selected device, so it is strongly recommended to be very careful while performing this operation because there is no possibility to recover deleted data. To prevent against accidental data deleting, the software asks the user if all data related to device being removed should also be deleted from the hard drive.



The folder with databases that contain imported data is in the installation directory of the program (see section 6.1.). You should take care to backup its contents regularly.

5.2. GROUPS

Each device can have up to 10 groups (depending on the settings of data logger). For each group the user can specify the name and description (Figure 5.2). It is recommended to use groups names similar to names of corresponding groups in MultiCon devices.

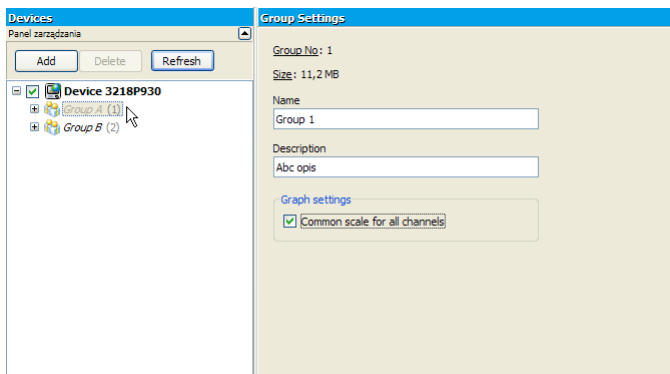





Figure 5.2. Group settings

The **Common scale for all channels** setting is used to force the method of displaying the scale on the graph for creating reports as shown in the table below.

Setting	Description
 (default)	<u>Individually</u> : Displaying a common scale setting will correspond individually for each log setting (see section 5.3).
	<u>Turned Off</u> : The common scale for logged channels will be disabled. Each channel will have an independent scale in the graph. Individual settings for each log will not be accepted.
	<u>Turned On</u> : The common scale for logged channels will be displayed for each log that belongs to this group. Individual settings for each log will not be accepted.

5.3. LOGS

After expanding one of the groups, a list of logs appears (Figure 5.3). Their number is unlimited and depends on how often you change parameters in the data logger device, which causes the creation of a new log, and also on maximum size of single log allowed by the MultiCon device. The name of the log contains the date of its creation and completion. Parameters of each log are for information purposes only. Settings of the graph and a description of the log can be customized.

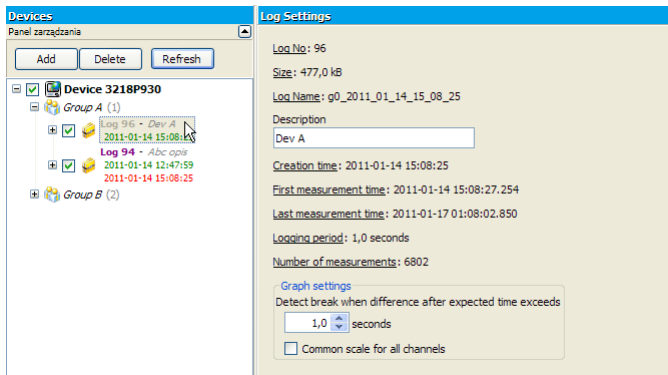




Figure 5.3. Log settings

The **Common scale for all channels** setting is used to set the method of displaying the scale on the graph for creating reports as shown in the table below.

Setting	Description
 (default)	<u>Turned Off</u> : The common scale for logged channels will be disabled. Each channel will have an independent scale in the graph.
	<u>Turned On</u> : Logged channel values will be rescaled to a common scale of all displayed channels. Activating this option is useful when values of several channels are similar.

5.4. CHANNELS

After expanding any log, a list of logged channels is shown (Figure 5.4). The user can specify multiple settings that affect the format of the data which is displayed in reports.

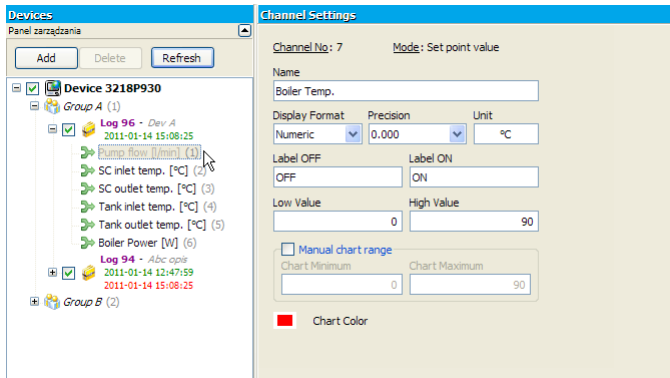


Figure 5.4. Channel settings

6. PROGRAM SETTINGS

Access to the program settings can be reached by clicking on the **[Settings]** button in the **Side Menu**.

6.1. “APPLICATION” TAB

Here are the general settings of the program. The user can check the location of the data stored on his hard drive under **Bases directory** and set the interface language (Figure 6.1).

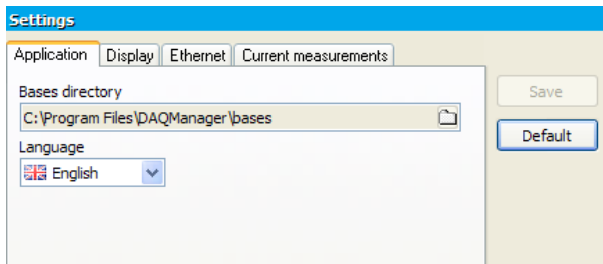
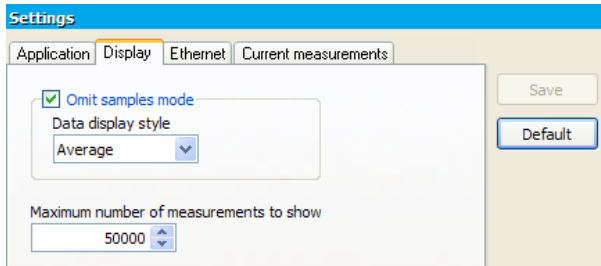


Figure 6.1. Program settings – **Application** tab

6.2. “DISPLAY” TAB

Settings located on this tab are responsible for how data is retrieved from the archive and its presentation (Figure 6.2). Due to the large amount of data, user can set some limitations, which will shorten the waiting time to generate the report and reduce RAM usage.

Figure 6.2. Program settings – **Display** tab

Enabling **Omit samples mode** option will cause that if during the process of creating a report the user selects the time interval which contains larger amount of measurements than specified in **Maximum number of measurements to show** parameter, the program skips appropriate number of samples in a way that the amount of display measurements will not exceed the limit. If **Data display style** is set to **Real logged**, values of omitted samples will not be included in creating a table and graph. If the **Data display style** is set to **Average**, then the displayed values will include the omitted samples as the average value. This allows you to detect temporary jumps of logged values that in **Real logged** style could not be detected (Figure 6.3).

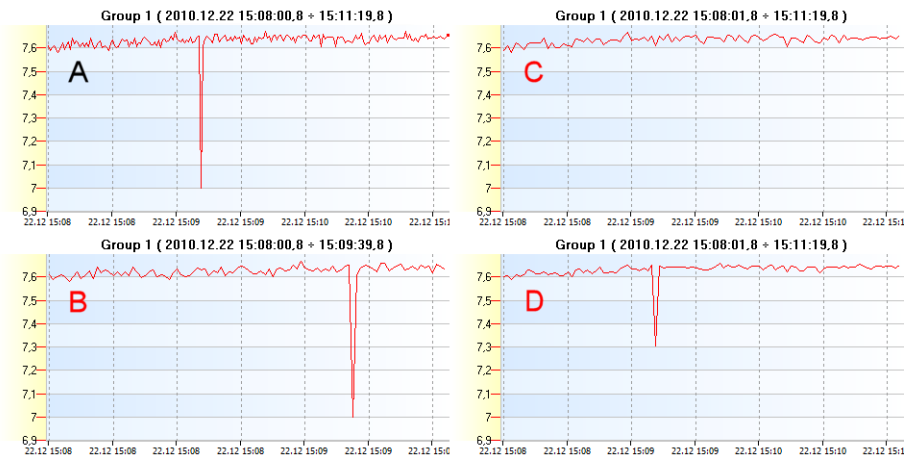


Figure 6.3. Effect of display settings for graphs:

A - all samples (200 samples), B - limit without omitting (100 samples)

C – omit mode: **Real logged** (100 samples), D – omit mode: **Average** (100 samples)

6.3. “ETHERNET” TAB

Here we can find the default settings for the Ethernet devices (Figure 6.4), which are used for creating new virtual devices (see section 4.1).

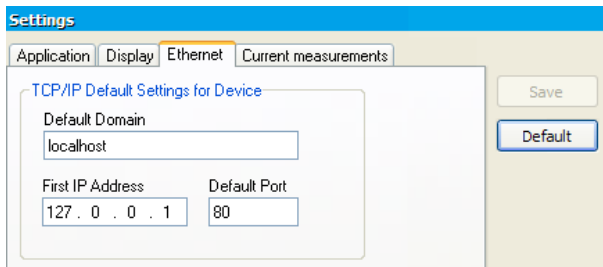


Figure 6.4. Program settings – **Ethernet** tab

6.4. “CURRENT MEASUREMENTS” TAB

These settings concern reading current measurements in real time (Figure 6.5). The period of polling devices can be freely adjusted in the range from 3 seconds to 24 hours. Setting 0 in this box will stop the automatic polling and then the current values are only available on request.

Additional description of the current measurement settings can be found in section 9.1.

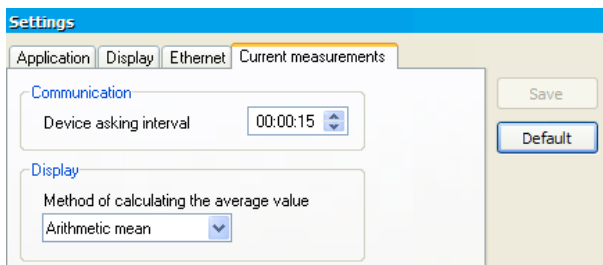


Figure 6.5. Program settings – **Current measurements** tab

7. BROWSING LOGS

Based on measurement data collected from devices, **DAQ Manager** can generate a report as a table with all channels in the current log or in the form of graph to facilitate data analysis.

7.1. SELECTION OF TIME INTERVAL

By selecting desired log in the device list, the program sets internal time intervals, computing data volume and automatically selects the last 3000 samples for displaying.

The time interval can be also defined manually by typing selected dates, or less accurate but faster, using the time line. Blue on the time line means there is no measurement data.

Gray indicates that during this period there is some measurement data, but is not selected to be included in the report. Orange means that the report will be generated just from this time interval. The orange range can be freely modified by using the mouse (Figure 7.1).

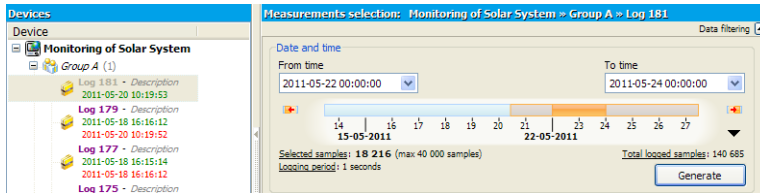


Figure 7.1. Choice of time interval

On the left and right side of the time line there are buttons that allows you to move the specific time period forward or backward. Automatic selection of the time range of the last measurements (Figure 7.2.a) and changing the viewable region of the time line (Figure 7.2.b) are available from the context menu of the time line or down-arrow icon.

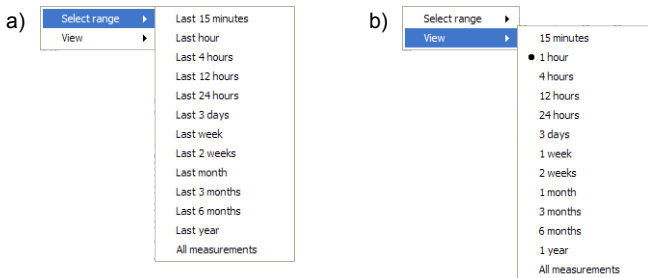


Figure 7.2. Contents of the context menu of the time line:

a) choice one of the predefined time ranges

b) choice one of the predefined views

After selecting a time range, the user can now generate the report as a table or a graph by clicking on the **[Generate]** button or double-click on any log on the list of devices.

7.2. THE TABLE

The created table consists of columns with measure number counted from the time of activation of the log, sample time (time stamp) and the data values of particular channels (Figure 7.3).

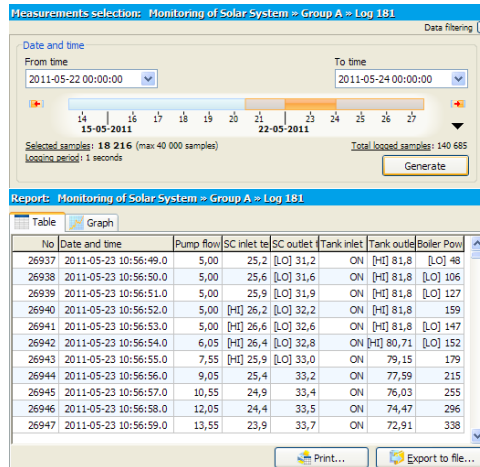


Figure 7.3. Create a report as a table

If the value in the channel exceeds **Low Value** or **High Value** specified in the settings of the selected channel (Figure 5.4), then in the table displays “[LO]” or “[HI]” beside the value. However, if the channel has the setting **Display Format** as **Binary**, then instead of real value, a label is displayed (defined by **Label ON / OFF** settings), where **Label ON** is accepted for values greater than 0.



By pressing the **[Export to file ...]** button You can save the table as a CSV file which can then be opened with any spreadsheet program.

7.3. THE GRAPH

Along with the table, you can create a graph with all logged channels (Figure 7.4).

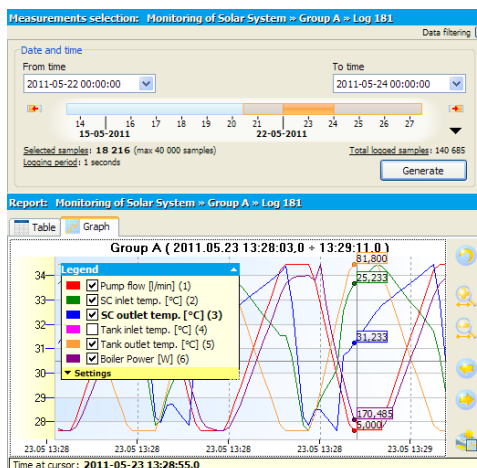


Figure 7.4. Create a report as a graph

7.3.1. Channel Visibility

The legend of the graph is interactive and allows you to select channels to show and adjust their settings.

7.3.2. Scaling the graph

The scale of the graph can be changed by clicking on the time axis or the value axis and dragging it horizontally or vertically.

In addition, the scale of the time axis can also be changed by pressing the **[Zoom In]** or **[Zoom Out]** buttons. A similar effect can be obtained by pointing your mouse any location in the graph and while holding down CTRL key, rotate the mouse wheel.

The last method, which allows you to zoom in a portion of the graph is scaling using a window selection. To do this, click the right mouse button in the upper left portion of the graph, that you want to zoom in, then drag the selection in the direction of bottom right corner of the chosen portion.

The default scale of both axes can be obtained by using the **[Reset view]** button.

7.3.3. Moving the graph

The graph can be moved by clicking on the graph and dragging it by mouse horizontally or vertically.

In addition, the graph can be moved horizontally by pressing **[Move Left]** or **[Move Right]** buttons or by mouse wheel.

8. CREATING REPORTS

8.1. PRINT THE TABLE

After generating data from selected time range, the user can print the table by clicking on the **[Print...]** button at the bottom of the **Table** tab (Figure 8.1). This command will display a printer selection window, if there is more than one installed on the system.

Report: Monitoring of Solar System » Group A » Log 161

No	Date and time	Pump flow	SC inlet te	SC outlet	Tank inlet	Tank outlet	Boiler Pow
26937	2011-05-23 10:56:49.0	5,000	25,233	31,233	12,300	81,800	47,581
26938	2011-05-23 10:56:50.0	5,000	25,567	31,567	12,300	81,800	105,810
26939	2011-05-23 10:56:51.0	5,000	25,900	31,900	12,300	81,800	127,231
26940	2011-05-23 10:56:52.0	5,000	26,233	32,233	12,300	81,800	158,740
26941	2011-05-23 10:56:53.0	5,000	26,567	32,567	12,300	81,800	146,703
26942	2011-05-23 10:56:54.0	6,050	26,405	32,810	12,300	80,708	152,268
26943	2011-05-23 10:56:55.0	7,550	25,913	32,993	12,300	79,148	179,005
26944	2011-05-23 10:56:56.0	9,050	25,422	33,177	12,300	77,588	215,333
26945	2011-05-23 10:56:57.0	10,550	24,930	33,360	12,300	76,028	255,189
26946	2011-05-23 10:56:58.0	12,050	24,438	33,543	12,300	74,468	296,343
26947	2011-05-23 10:56:59.0	13,550	23,947	33,727	12,300	72,908	337,975

Print... Export to file...

Figure 8.1. Print the table



If the printer driver can't preview pages before printing, it is worth thinking of installing a virtual PDF printer in order to be able to view the printed copy and prevent printing too many incorrect pages. With a large number of measurements printout may consume more than 1300 pages (100,000 measurements, A4, 76 measurements per page).

8.2. PRINT THE GRAPH

The graph view specified by the user can be printed using the **[Print Graph...]** button (Figure 8.2).

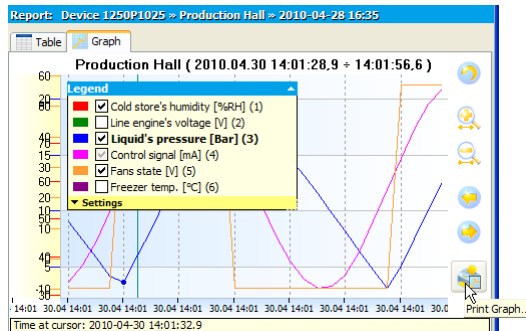


Figure 8.2. Print the graph - individual scales for channels

On the printout, there will be visible only scales of the Y-axis selected by the user and this is consistent with the current view.

If the data of several channels have similar values, then before you print, it may be helpful to change the method of the Y-axis scaling in such a way that the scale will be common to all channels. This can be done by selecting the **Common scale for all channels** in the selected log, accessible from the **[Devices]** side menu (Figure 8.3)

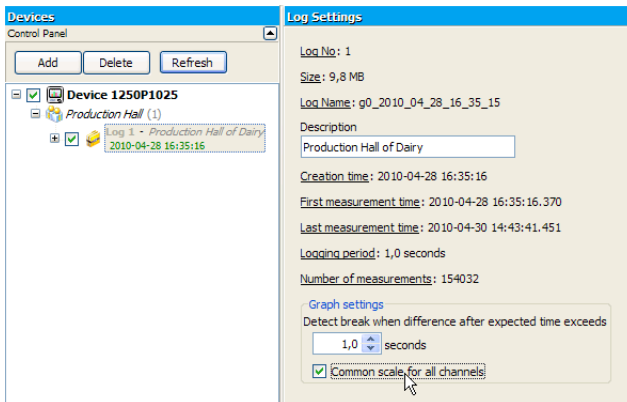


Figure 8.3. Enabling a common scale for all channels in selected log

When you select this option, the scale of the Y-axis will be common for the checked channels (Figure 8.4).

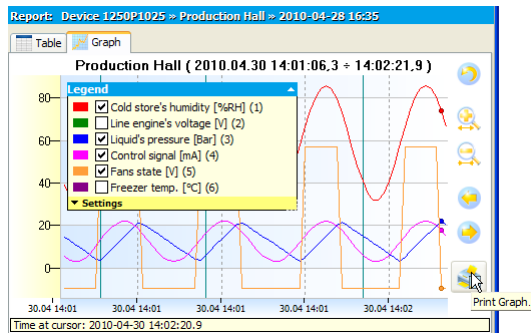


Figure 8.4. Print the graph - common scale for channels

9. CURRENT MEASUREMENTS

DAQ Manager allows you to view current measurements using an Ethernet network connection. Users have two options for previewing data. Current measurements can be displayed in the form of a channels oriented table on the device or in graphical form as a pre-prepared HTML page with embedded Java applets oriented on single channels of the device.



The device, which will be a source for current measurements must be equipped with ACM module, which enables connection to Ethernet network.

9.1. THE TABLE

Access to the table with current measurements is possible by clicking on the **Table** item in **Current measurements** section. There are tabs for each device that has properly configured settings for network connections and the ability to view current measurements is set to active (Figure 9.1).

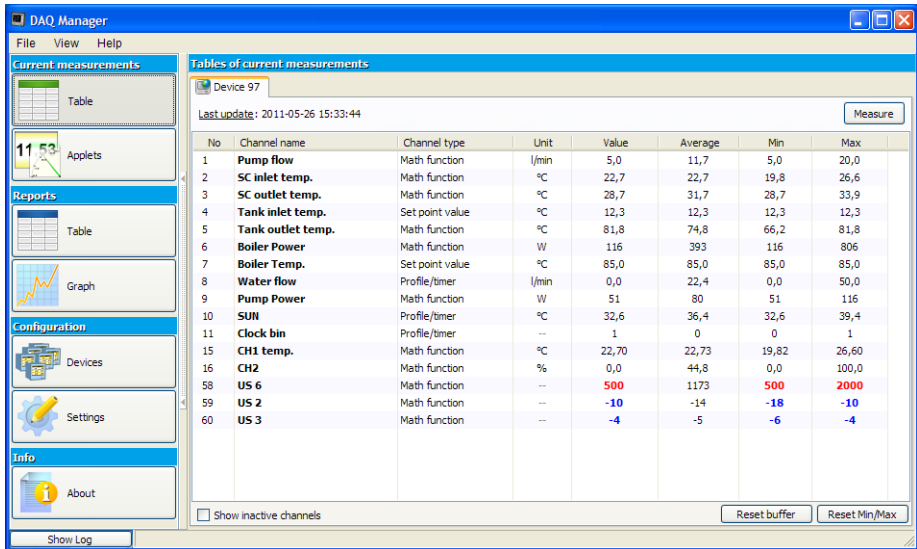


Figure 9.1. Table with current measurements

If there is no a tab for the device, which measurements we want to track, then you should go into your device settings, check the **Current measurements** option (Figure 9.2) and save settings.

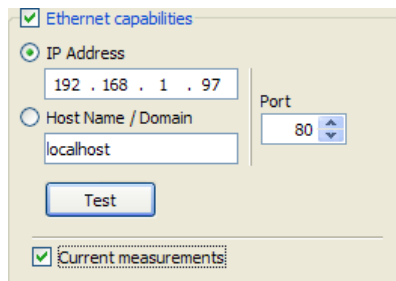


Figure 9.2. Activation of current measurements

The polling interval of devices for new measurements is adjustable in the program settings on the **Current measurements** tab (section 6.4).

Current measurements mode allows you to preview the basic parameters of channels such as channel name, type and the current measured value with set unit. It also calculates the average of the measurements which occurred after the last buffer reset. For minimum and maximum values is also stored with the time of their occurrence, which can be displayed by moving the mouse cursor over the desired value.

All values displayed in the table may be marked according to the following table:

Colour	Event Description
blue	A value in the table is below the graph low value, which was set in the device.
red	A value in the table is above the graph high value, which was set in the device.

Access to the settings of the graph thresholds for selected channel is possible from the MultiCon device as follows:

MENU > Device configuration > Input channels > Displaying
 > **Graph low**
 > **Graph high**

If the display format is set to “binary”, then in the table the user will see the label corresponding to the value of the channel.

The **[Measure]** button is used to take recent data from the device without waiting for automatic read.

9.2. JAVA APPLETS

Java applets have been designed to read the current measurements from the each channel of the selected device. They allow to visualize of the current measurements as various types of graphical presentation. Support for Java applets was introduced in version 2.30 of the device firmware. Before using the Java applets functionality it is recommended that the firmware of the MultiCon device be updated.

9.2.1. Introduction

A Java applet is a special file with the *.jar extension, which requires the Java Virtual Machine (JVM) to be installed on the system. Applets are designed and tested using Oracle JVM. To ensure, that the applets are functioning properly, an user should update the runtime environment of the JVM to the latest version from <http://www.java.com> website.

Applets can be embedded on a page of any Web server. This allows a preview of the current measurements from anywhere using any web browser with the Java plug-in. You can also design an HTML page, which will be placed locally on your hard disk. For this purpose, you can create a subdirectory in the installation directory of the program and put the designed pages there.

The HTML page should be designed in a way, that *.jar files were taken directly from the MultiCon devices. All devices with the ACM module contains a web server that provides the device information. There is a link “[Logical channels graphical view](#)” where you can find a complete functional example of using Java applets embedded on HTML page.

9.2.2. The applets parameters

When an applet is embedding in a HTML document it is necessary to let it some parameters. These parameters configure the applet to work with the selected channel of one device. Some of the parameters are required, which means that without giving any of them, the applet will not run. All parameters possible to set are shown in the table below. Their use is presented in section 9.2.3.

Tab. 9.1: The applets parameters

Name	Default value	Possible values	Description
device.address	required	IP address or domain name	Address of the device. This is the IP address, e.g. "192.168.1.97" or the correct domain name, e.g. "your.device.com".
channel	required	512, 516, ...748 1024, 1028, ...1260	Modbus register address of logical channel specified in decimal format. For ease the list of all measurement registers of MultiCon devices is shown in Table 9.2.
channel.type	required	logchan_float	Specifies that the value returned by the selected register is in the floating-point format. By default for registers 512÷748.
		logchan_int	Specifies that the value returned by the selected register is in the integer format. By default for registers 1024÷1260.
port	502	0÷65535	Port of service running on the MultiCon device used to handle Modbus TCP protocol.
channel.name	empty	any text	Any name used by the applet to represent the channel.
channel.unit	empty	any text	Any unit displayed on the indicator next to the current numerical value.
color	BBBBFF	000000÷FFFFFF	The indicator color as RGB sequence given in hexadecimal format. Selecting the color helps http://html-color-codes.info/ page.
gauge.type	text	text	Type of indicator that displays the value as a text.
		needle	Type of indicator that displays the value as a needle.
		hbar	Type of indicator that displays the value as a horizontal bar.
		vbar	Type of indicator that displays the value as a vertical bar.
		chart	Type of indicator that displays the value as a graph.
range.min	0	The number in IEEE-754 format	Defines the minimum value is displayed. It is used to determine the level of 0% and lower limit on the Y-axis of the graph.
range.max	20	The number in IEEE-754 format	Defines the maximum value is displayed. It is used to determine the level of 100% and higher limit on the Y-axis of the graph.

The size of the letters in the names of parameters and its values does not matter, so the assignment `"Gauge.Type"="HBar"` is equivalent assignment `"gauge.type"="hbar"`.

Tab. 9.2: Addresses of measurement registers of the MultiCon devices

Name	Register Address		Name	Register Address		Name	Register Address	
	float	int		float	int		float	int
Channel 1	512	1024	Channel 21	592	1104	Channel 41	672	1184
Channel 2	516	1028	Channel 22	596	1108	Channel 42	676	1188
Channel 3	520	1032	Channel 23	600	1112	Channel 43	680	1192
Channel 4	524	1036	Channel 24	604	1116	Channel 44	684	1196
Channel 5	528	1040	Channel 25	608	1120	Channel 45	688	1200
Channel 6	532	1044	Channel 26	612	1124	Channel 46	692	1204
Channel 7	536	1048	Channel 27	616	1128	Channel 47	696	1208
Channel 8	540	1052	Channel 28	620	1132	Channel 48	700	1212
Channel 9	544	1056	Channel 29	624	1136	Channel 49	704	1216
Channel 10	548	1060	Channel 30	628	1140	Channel 50	708	1220
Channel 11	552	1064	Channel 31	632	1144	Channel 51	712	1224
Channel 12	556	1068	Channel 32	636	1148	Channel 52	716	1228
Channel 13	560	1072	Channel 33	640	1152	Channel 53	720	1232
Channel 14	564	1076	Channel 34	644	1156	Channel 54	724	1236
Channel 15	568	1080	Channel 35	648	1160	Channel 55	728	1240
Channel 16	572	1084	Channel 36	652	1164	Channel 56	732	1244
Channel 17	576	1088	Channel 37	656	1168	Channel 57	736	1248
Channel 18	580	1092	Channel 38	660	1172	Channel 58	740	1252
Channel 19	584	1096	Channel 39	664	1176	Channel 59	744	1256
Channel 20	588	1100	Channel 40	668	1180	Channel 60	748	1260

9.2.3. Creating HTML pages with applets

Designing entire web sites is so wide topic, that cannot be described in a few words. However, in order to create a simple HTML document you don't have to be an experienced web master. You can use one of free visual editors which generate right HTML code. May be required some minor changes only. More complex pages may require help from the web master. Nevertheless, even the most complex HTML pages, a web master can made in a few hours.

There are a lot of visual editors that allow to build more or less complex HTML pages. One of the best free solution is the Microsoft product named [Office SharePoint Designer 2007](#), which can also be used for commercial purposes. Creating a simple HTML page with this program using the WYSIWYG method is very intuitive and the generated code is quite optimal.

To create a simple web page generally you should follow three steps:

- I. Prepare a drawing (a layout) or take a photo of the monitored room (object or system)
- II. Create a web page using the image file created in step I.
- III. Embedding an applet in the selected location of the page and set its parameters

USING A VISUAL EDITOR

Below is shown an example of these steps with SharePoint Designer 2007 using WYSIWYG technique.

1) **Prepare of the image file**

Creating a background image is not necessary, but improves orientation in the monitored system. To create a room plan, you can use any raster graphics editor and saving the file in one of the formats: *.png, *.jpg, *.gif. Instead of creating a plan, a good solution is to take a photo of the real object on which indicators will be placed.

2) **Create a HTML document**

Main window of the SharePoint Designer 2007, just after start looks like in Figure 9.3.

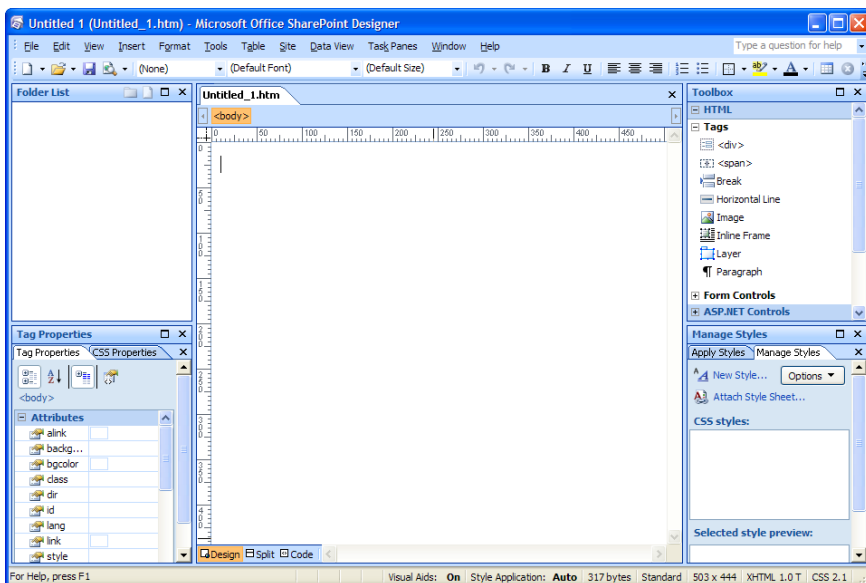


Figure 9.3. Main window of the SharePoint Designer 2007

Main window contains already an empty HTML document, which must be given a name and must be saved. To do this, select command **[File] > [Save As...]** from the menu. In the dialogue box should be given a title of the document by clicking on the **[Change title...]** button, then select the location and enter file name (Figure 9.4). If the page will be stored locally on your PC, it is recommended to create a subdirectory with the name of the monitored system in the subdirectory of **DAQ Manager** installation folder named "AppletSites", which is intended for HTML pages. For the current example the location is `C:\Program Files\DAQManager\AppletSites\ChemLab\chemlab_en.htm`.

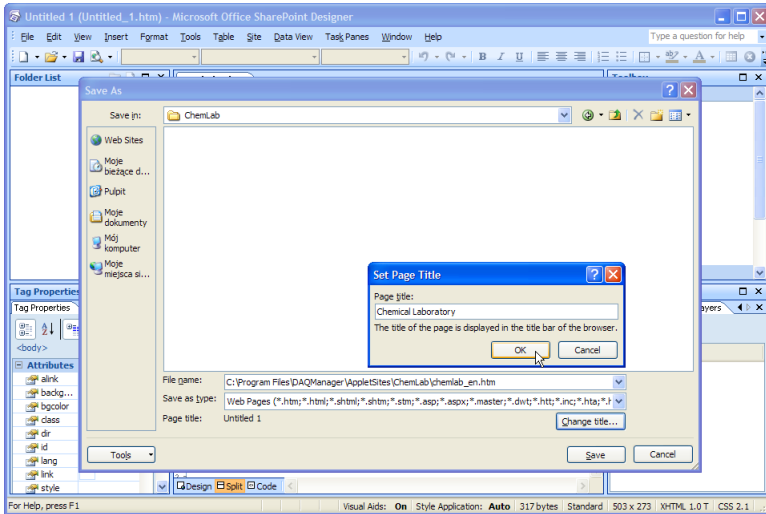


Figure 9.4. Giving a title and saving the page to the disk

3) Division of the document to the header and the indicators area

The document in the example will be composed of two parts: a header and area of indicators. This division obtains using the table. To do this, select the **[Table] > [Insert Table...]**. In the window that appears, set the following parameters:

Rows: 2

Columns: 1

Alignment: Center

and uncheck **Specify width**

4) Prepare of the header

In the first row of the table, enter a name of the system which will be monitored, such as “Chemical Laboratory”. Then click on the icon of the text alignment **[Center]** and it will create a new style named “.style1”. Change its name to “header”. To do this, switch to the **[Manage Styles]** tab and select **[Rename class “style1”...]** from the context menu of the new created style (Figure 9.5).

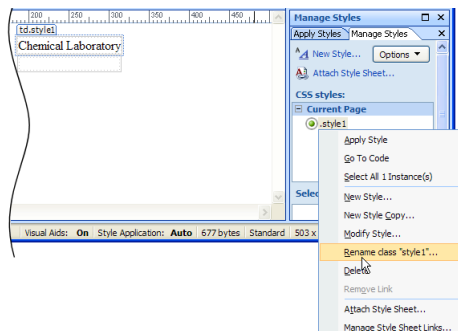


Figure 9.5. Changing the style name

To improve the appearance of the header you should perform a few modifications to its style. Click the command **[Modify Style...]** on its context menu. Window “Modify Style” appears (Figure 9.6).

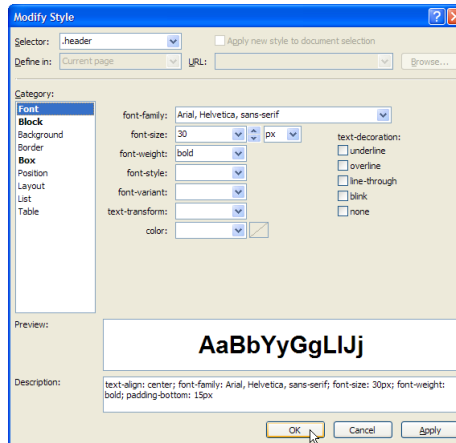


Figure 9.6. “Modify Style” window

In the window you can see that the style has already set a property: **Block > text-align: center**. You need to modify the following properties:

Font > font-family: Arial, Helvetica, sans-serif

Font > font-size: 30 pt

Font > font-weight: bold

Box > padding: bottom: 15 px

and click OK.

5) Prepare of the indicators area

Take a `<div>` tag from the toolbox and drag to the second row of the table (Figure 9.7).

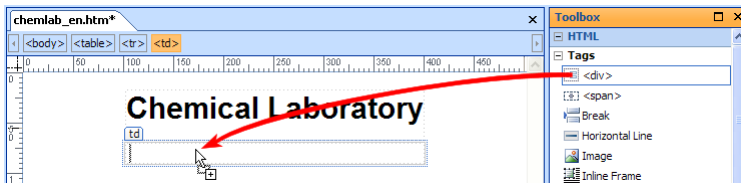
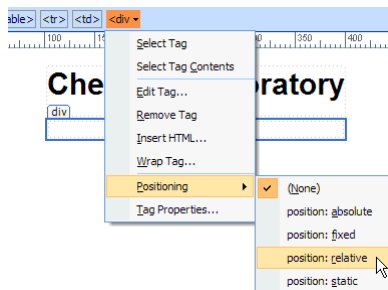


Figure 9.7. Dragging the tag from the toolbox.

Then click on the arrow next to the `<div>` tag on the nesting bar and select the command **[Positioning] > [position: relative]** (Figure 9.8).

Figure 9.8. Creating a new layer from the `<div>` tag



After this operation the <div> tag will be converted to a layer, which you can name. To do this, switch to the **[Layers]** tab. If this tab is not visible, you must first enable it by using the **[Format] > [Layers...]** command. Right click on the layer **<No ID>** and go to **[Modify ID...]**, and then enter the name "background". Created layer will be a container for background image and for applets that will be positioned relative to it.

6) Inserting a background image

Click in the area of the second row of the table, so the label "div#background" should appear. Insert the prepared background image by using the menu **[Insert] > [Picture] > [From File...]**. At the prompt to enter alternative text you can uncheck the box next to it (Figure 9.9).

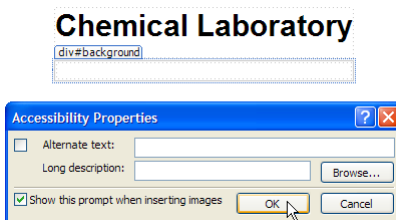


Figure 9.9. Confirmation of inserting a picture

7) Embedding an applet

To add a Java applet into the prepared site, click somewhere on the previously inserted image and press the right arrow key to move the cursor next to the picture. Then choose a command from the menu **[Insert] > [Web Component...] > [Advanced Controls] > [Applet Java]** and click **[Finish]**. You will see a "Java Applet Properties" window. In the **Source applet** field please enter:

```
jmulticon.gauge.McGaugeApplet.class
```

Then add required parameters of the applet (see section 9.2.2.):

Name	Value
device.address	IP address or domain name
channel	516
channel.type	logchan_float

You can also specify additional parameters that are not required, but allow you for adjust of the indicator properties. Parameters that are omitted have default values:

Name	Value	Default value
port	502	502
channel.name	Temp.	empty
channel.unit	°C	empty
color	FF6600	BBBBFF
gauge.type	needle	text
range.min	0	0
range.max	30	20

Window of the applet properties is shown in Figure 9.10.

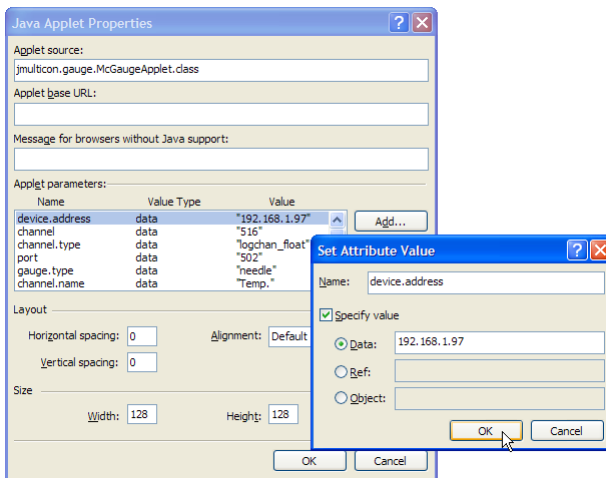


Figure 9.10. Defining a new parameter of the applet

When you finish, set the parameters and click OK. You must still specify the source location from where the applet will be downloaded to the web browser. Each device that is equipped with the ACM module contains applets, which can be accessed using the http protocol. To specify the source location of the applet, select the applet in the design window and in the **[Tag Properties]** tab, in the **archive** attribute write value `http://ADDRESS/channels/jmulticon.jar`, where **ADDRESS** is the IP number or

domain assigned by the DNS server (Figure 9.11).

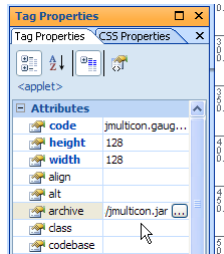


Figure 9.11. Specifying the source location of the applet

The applet is ready to run, but still needs to be positioned on the page.

8) Changing the position of the applet

To change the position of the applet relative to the background image, click on the arrow next to the `<applet>` tag on the nesting bar and select the command **[Positioning] > [position: absolute]** (Figure 9.12). This operation allows you to move the applet freely around the page area and its position will always relative to the previously created “background” layer.

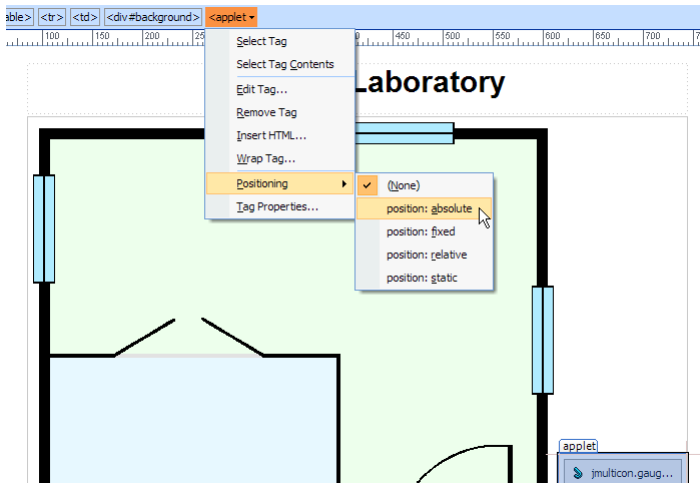


Figure 9.12. Activation the possibility to move freely the applet

By grabbing the “applet” label, you can move it anywhere in the background. With the special holders you can also adjust the size of the applet (Figure 9.13).

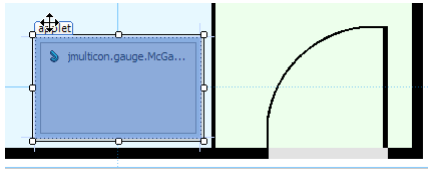


Figure 9.13. Changing the position and size of the applet

9) Duplicate the applets

The easiest way to create another applet on the page, which will represent another logical channel of the specified device is to copy an already existing applet and adjust its parameters. To do this, right-click on an existing applet and select **[Copy]**, then right-click on the background image and select **[Paste]**. This will create a new applet on the top of existing one. The new created applet can be moved to a new position by its label. Adjust its parameters can be done by double-clicking on its surface.

If the above steps have been completed and the page was saved, the project is ready to run using a web browser. This can be done directly from the SharePoint Designer from the menu **[File] > [View in Browser] > [Windows Internet Explorer]** or use the keyboard shortcut F12.

If the IP address identifies the device, which is turned on and is currently in the network, that on the page in a web browser should show a fully working applet (Figure 9.14).

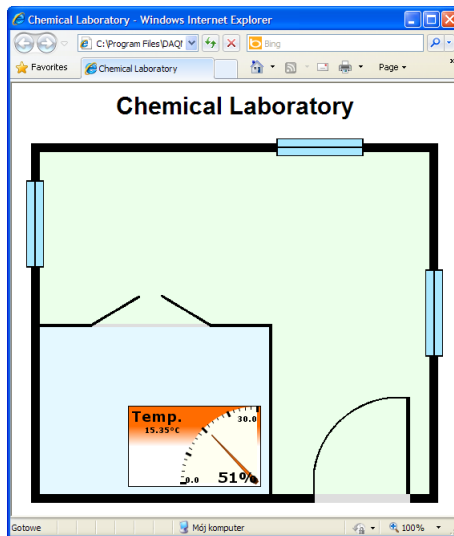


Figure 9.14. Ready web page with the working applet

As you can see, create a simple web page with a single applet is not so difficult, even for a person who had no contact with the HTML language, before. However, basic knowledge of this language is useful for creating more complex pages.

USING A TEXT EDITOR

Steps to create an HTML document in a visual way caused to generate some HTML code. User more familiar with creation of the web sites probably wants to use the possibility to directly intervene to the HTML code, as this gives greater control of its appearance. To display HTML code in the SharePoint Designer, click the **[Split]** or **[Code]** button in the lower left corner of the project. Created code should be similar to the following.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
<meta http-equiv="Content-Language" content="en" />
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
<title>Chemical Laboratory</title>
<style type="text/css">
.header {
    text-align: center;
    font-family: Arial, Helvetica, sans-serif;
    font-size: 30px;
    font-weight: bold;
    padding-bottom: 15px;
}
</style>
</head>

<body>
<table align="center">
<tr>
<td class="header">Chemical Laboratory</td>
</tr>
<tr>
<td>
<div style="position: relative" id="background">

<applet code="jmulticon.gauge.McGaugeApplet.class"
archive="http://192.168.1.97/channels/jmulticon.jar"
style="z-index: 1; position: absolute;
top: 338px; left: 132px; width: 166px; height: 101px">
<param name="device.address" value="192.168.1.97" />
<param name="channel" value="516" />
<param name="channel.type" value="logchan_float" />

<param name="port" value="502" />
<param name="gauge.type" value="needle" />
<param name="channel.name" value="Temp." />
<param name="channel.unit" value="°C" />
<param name="color" value="FF6600" />
<param name="range.min" value="0" />
<param name="range.max" value="30" />
</applet>
</div>
</td>
</tr>
</table>
</body>
</html>
```

The page that looks like this could be a template for further development for other monitoring systems. It may also be the base for duplicate indicators by copying the code one of them, change its parameters and set it to the correct position. Part of the code, which is responsible for the appearance and behaviour of the indicator was marked in purple.

9.2.4. Access to the applets from the software

Clicking on the **[Applets]** button in the **Current measurements** section will display the interface for managing Java applets (Figure 9.15). At the beginning, the list of pages contains only the item “[Demo Site for Device 1]”. After designing a page you can add it to the program by entering the correct URL address or a path to a local file. Paths to files can be defined as relative to the installation directory of the program. This allows for easy transfer all pages, in the future, to a new installation directory.

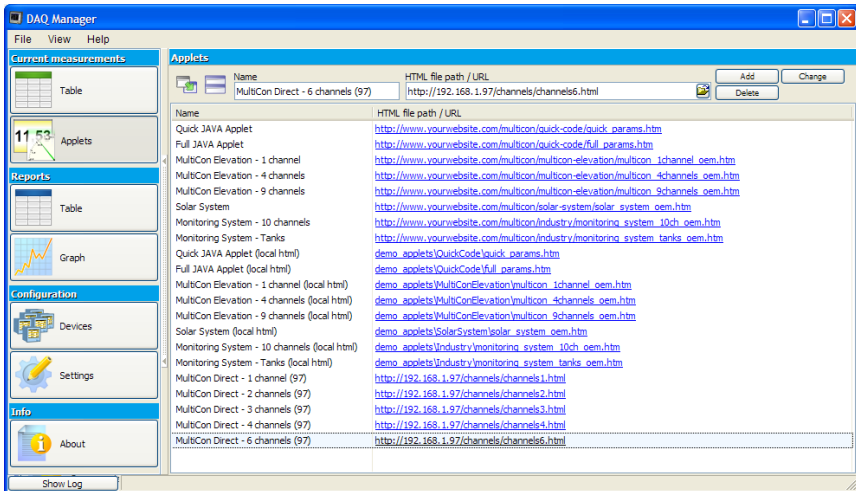


Figure 9.15. The interface for managing pages with Java applets

For more advanced users in creating web pages there is a possibility to transfer several parameters directly from the program to the page that could interpret them. If the page is on a server with PHP, ASP or other scripting language, that can process received parameters using GET method and on this basis generate an HTML document, you can design your site more universal. Read the current measurements by indicators placed on the page can be done from devices with different IP addresses. When the IP address will change in one of the device on the **DAQ Manager** list, web master no longer needs to modify sources of the web site, because information about the current IP address may always be passed as a parameter of the URL. The script allows the interpretation of transmitted parameters even doesn't need to be placed on the server side. This interpretation can be done on the client side in a static HTML document using JavaScript. As example realization of such concept is an entry “[Demo Site for Device 1]”, which is a reference to the demonstration site built-in to the **DAQ Manager** since version 1.3.1. List of all variables that can be used in the URL are in the table 9.3.

Tab. 9.3: List of variables for use in URLs

Variable	Description
{LANG}	Language of the program interface according to ISO 639-1. <u>Example:</u> The entry {LANG} will be replaced by “en” if the interface is in English.
{DEVn_par}	The parameter of the n-th device on the list. Part par may have the following values: <ul style="list-style-type: none"> NAME – the name of the device SERIAL – the serial number of the device IP – the IP address or domain name of the device PORT – the HTTP server port on the device <u>Example:</u> The entry {DEV2_IP} will be replaced by the IP address of the second device on the list, for example by “192.168.1.98”.
{SERs_par}	The parameter of the device from the list, which serial number is equal to s . Part par may have the following values: <ul style="list-style-type: none"> NAME – the name of the device IP – the IP address or domain name of the device PORT – the HTTP server port on the device <u>Example:</u> The entry {SER1010P0909_IP} will be replaced by the IP address of the device from the list, which serial number is equal to 1010P0909, for example by “192.168.1.97”.

The size of the letters in the names of the variables does not matter, so the {Dev4_Name} entry is equivalent to {DEV4_NAME}.

9.2.5. Running the selected HTML page

To view the selected page from the list, double-click on its name. This action opens a dialogue with the designed web page. When you run a page with applets for the first time, the program prompts you for confirmation to run the applets. Please check **Always trust content from this publisher** option and click the **[Run]** button (Figure 9.16).

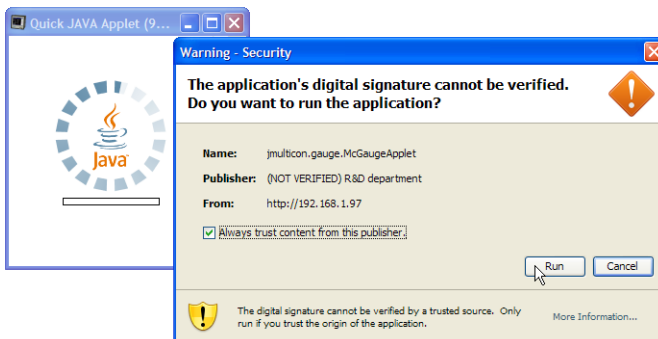


Figure 9.16. Confirmation to run Java applets

9.2.6. Window with a HTML page

When the page with the applets is fully loaded and the applets connected to the devices, the user will have the ability to view measurements in real time. The right side of the window contains the most commonly used operations to help manage the preview window (Figure 9.17). You can scale the page, automatically adjust the size of the window and bring to front the main window. Additional commands can be found in the context menu of the page.

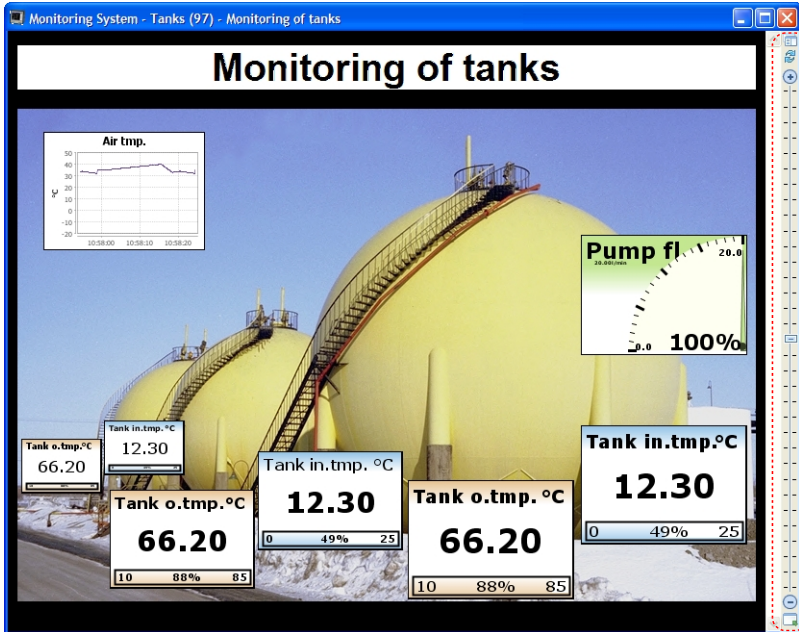


Figure 9.17. A window with a sample HTML page

The default appearance of the indicators is defined on the design level of the HTML page. The context menu for each indicator allows temporary changes of its appearance and provides additional commands for its handling.

If the user does not have a web page designed to his needs, he may use the universal view of all channels taking a page directly from the MultiCon device, which is mentioned in the section 9.2.1. Examples of URLs for this case could be found on Figure 9.15 under the name "MultiCon Direct". A web page with indicators taken directly from the device makes it possible to view all of its channels and allows easy change of the display mode (Figure 9.18).

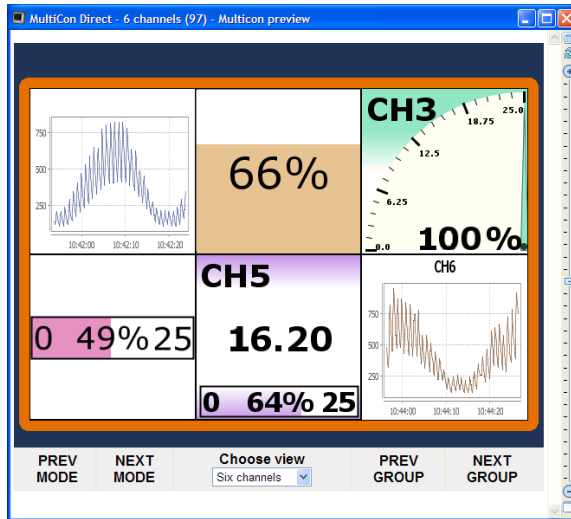


Figure 9.18. Web page with indicators from the device

9.2.7. Automatic arrangement of windows

If user opens too many applet windows and they overlap, it will be helpful to use the **[Windows arrangement]** button, which is located in the upper part of the applets management interface. For example, if you open seven windows that overlap, they can quickly spread out in a 4x2 grid (Figure 9.19).



Figure 9.19. Automatic arrangement of windows in a 4x2 grid

System requirements:



- Operating system: Windows XP (32-bit) or later
- processor Pentium/AMD 600 MHz or faster
- 128 MB of RAM or more
- 2 GB or more free disk space
- monitor with min. resolution SVGA (800x600)
- CD-ROM or DVD-ROM
- network card
- keyboard and pointing device (e.g. mouse)



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