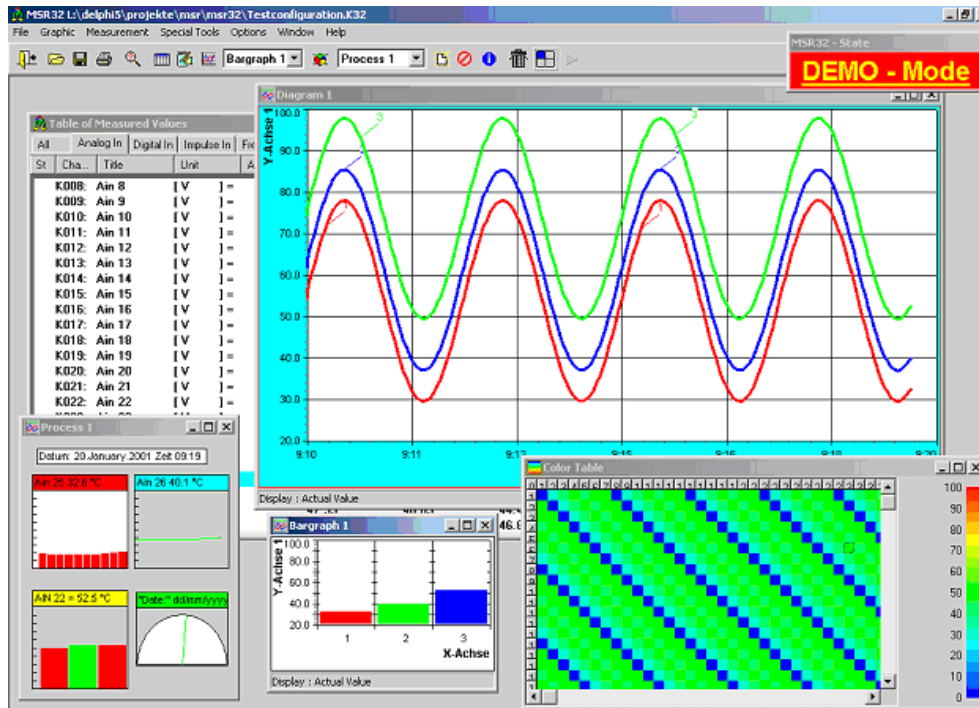




MSR32 for Win9x/2000/NT/Xp

Manual



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Contents

1.	General Information.....	7
1.1	About MSR32	7
1.2	Features of MSR32.....	8
1.3	First Steps.....	9
1.4	Control the Software	10
1.4.1	Main Menu	10
1.4.1.1	Main Menu MSR32	10
1.4.1.2	Main Menu MSR32	12
1.4.2	Main Tool Bar	14
1.4.2.1	Main Tool Bar MSR32	14
1.4.2.2	Main Tool Bar MSR32	15
1.4.3	Pop up Menu	15
1.4.4	Dialogs	15
1.4.5	Drag & Drop.....	15
2.	The Main Forms	16
2.1	Channel Configuration Setup.....	16
2.2	Channel Configuration Setup (MSRW32)	17
2.3	Graphic.....	17
2.4	Graphic (MSRW32).....	18
2.5	Table of measured Values.....	19
2.6	Table of measured Values (MSRW32)	19
2.7	Process Graphic	20
2.8	Process Graphic (MSRW32).....	21
2.9	LogPH Graphic.....	21
2.10	LogPH Graphic (MSRW32)	22
2.11	Color Table.....	22
2.12	Color Table (MSRW32)	22
2.13	ILK LogPH Graphic	23
2.14	ILK LogPH Graphic (MSRW32).....	23
2.15	Arrow button in the main forms	24
3.	Dialogs.....	25
3.1	Change Refrigerant	26
3.2	Configuration Assistant.....	26

3.2.1	Hardware.....	26
3.2.2	Formulas Constants Graphic screens.....	26
3.3	Configuration Changed.....	26
3.4	Configuration File Info.....	27
3.5	Configuration overview.....	27
3.6	Configuration Print Setup.....	27
3.7	Edit Constants	27
3.8	Edit Graph.....	27
3.9	Edit MSR Channel Kxxx.....	28
3.10	Find.....	29
3.11	Formula Assistant	29
3.11.1	Coefficients	29
3.11.2	Mathematics.....	29
3.11.3	Special Functions	30
3.11.3	Thermodynamics	30
3.11.5	ILK Functions	31
3.12	Graphic Setup.....	31
3.12.1	Y-t Style.....	31
3.12.2	X-Y Style.....	32
3.12.3	Y - Axis.....	32
3.12.4	Graphs.....	33
3.12.5	General.....	33
3.12.6	Text.....	34
3.13	Channel Setup.....	34
3.14	LogPH Graphic Setup	34
3.14.1	Logph setup circuits	34
3.14.2	Enthalpy Axis.....	35
3.14.3	General.....	35
3.14.4	Graphs.....	35
3.14.5	Pressure.....	35
3.15	Monitoring Measurement	36
3.16	MSR Channel Settings (MSRW32).....	37
3.17	MSR Measurement Information(MSRW32).....	37
3.18	Navigator	37
3.19	PID Controller.....	38
3.20	Print Preview	38

3.21	Print Selected Graphics.....	39
3.22	Print Setup	39
3.23	Process Graphic Setup.....	39
3.24	Protocol of Measurement.....	40
3.25	Quick Setup.....	40
3.25.1	Quick Setup Text	40
3.25.2	Quick Setup Hardware.....	40
3.26	Setup.....	40
3.26.1	General.....	41
3.26.2	Graphics	41
3.26.3	Cycles / Buffer	41
3.26.4	Preset Auto configuration	42
3.26.5	Day Protocol File.....	42
3.26.6	General.....	42
3.26.7	Setup Graphics (MSRW32).....	43
3.26.8	Text (MSRW32)	43
3.26.9	Picture Output (MSRW32).....	43
3.27	Select Channel Group.....	43
3.28	Set Channel Range.....	43
3.29	Setup and start Measurement	44
3.30	Setup Color Table	44
3.30.1	Channelsettings	44
3.30.2	Colors and Grid.....	45
3.30.3	Table View	45
3.31	Setup Process Symbol	45
3.32	Setup Time Switch	47
3.33	State of Measurement	47
3.34.1	Template for Export to Excel.....	47
3.34.2	Template for Export to Excel (MSRW32)	48
3.35	View Loglist.....	48
3.36	Time Step Control	48
3.36.1	General.....	49
3.36.2	Parameter	49
3.36.3	Allowed channel types.....	50
3.36.3	Channel Selection	50
3.37	Setup and Start Excel - Measurement	50

3.38	Export to Excel (MSRW32).....	52
3.39	Setup and Start Excel XY Measurement.....	52
3.40	Edit Excel XY Measurement (MSRW32)	53
3.41	Excel XY Measurement control (MSRW32).....	54
3.42	ILK LogPH Channel Setup	54
3.43	ILK LogPH Graphic Setup.....	54
3.43.1	Logph setup circuits	54
3.43.2	Enthalpy Axis.....	55
3.43.3	General.....	55
3.43.4	Graphs.....	55
3.43.5	Pressure.....	56
3.44	Change ILK Refrigerant	56
3.45	ILK Setup.....	56
3.46	Adjust Symbols.....	57
4.	Formula Interpreter	58
4.1	Working with formulas	58
4.2	Additional Formulas in MSRW32	59
4.3	Cycle Control	59
4.4	Day Simulation	60
4.5	Group Function.....	61
4.6	Measurement State.....	62
4.7	PID - Controller	63
4.8	Integrator	63
4.9	Time Switch	64
4.10	Two Position Controller.....	64
4.11	Bit Function.....	64
4.12	Time Step Function.....	65
4.13	Impulse Function	65
4.14	Stable Function.....	66
4.15	Ramp Function	66
4.16	COM Function.....	67
5.	Definitions and Terms	68
5.1	Channel	68
5.2	Constants.....	69
5.3	Graphic.....	69

5.4	Calculation of mean values	69
5.5	Cursor.....	69
5.6	MSR32 file types.....	70
5.7	Loglist.....	71
5.8	VDE-mode.....	71
5.9	Start parameter	71
5.10	Excel Measurement.....	71
5.11	Excel Export of an evaluation (MSRW32).....	72
5.12	Excel XY Measurement	72
5.13	Excel XY Measurement (MSRW32).....	73
5.14	Process Symbols	74
5.15	Active Symbols	75
5.16	Day Protocol File.....	75
5.17	ILK Refrigerants.....	76
6.	How to.....	77
6.2	Create a new configuration file.....	77
6.3	Edit a channel.....	77
6.4	Edit a color table.....	77
6.5	Edit a graphic	77
6.6	Edit a Logph diagram	77
6.7	Edit a process graphic	77
6.8	Edit a process symbol.....	78
6.9	Edit a table.....	78
6.10	Take a measurement	78
6.11	Mark, move and adjust symbols	78

1. General Information

1.1 About MSR32

This software was designed for industrial measuring and controlling.
The MSR32-series contains 3 different applications:

MSR32

This is the main application of the MSR32-Series. Only MSR32 performs the measurement and controlling by hardware access.

You can display the values from the test stand as diagrams, process graphics or tables. Changes of settings will be performed online, there is no need to stop the test stand.

You can also take up to 5 different measurements at one time, In this measurements not only the data itself but all the graphic settings were saved in the measurement files

MSRW32

If You have taken measurements with MSR32, MSRW32 displays the measurements.

You can analyse the data and create new diagrams or rearrange existing.

MSRF32

This application is for the remote monitoring of an MSR32 programs that runs at a different location.

Every feature for displaying the data is equal to MSR32 but you cant change the settings of the channel

To use MSRF32 a network is needed.

The data exchange from then measuring system to then monitoring system is only one way from MSR32 to MSRF32.

Remote controlling is not available.

1.2 Features of MSR32

On this page the features of MSR32 are listed:

▶ **Hardware Access**

MSR32 does not depend on the hardware which is used. There is only one program for every kind of hardware. MSR32 supports up to 8 COM ports (Windows 2000 only).

▶ **Channels**

Up to 512 individual channels are possible. In opposite to the former DOS version there are no limits for the channel types, 512 AIN channels are also possible as 512 DOT channels, (but this will make no sense). With the formula you have access to the value delivered from the hardware and the value after the calculation of the formula.

▶ **Graphics**

You can create 25 different graphic screens each with up to 30 graphs and up to 4 Y-axis.

▶ **Process Graphics**

You can create 10 Process graphics each with up to 100 symbols

▶ **Controller**

50 different controllers can be designed.

▶ **Buffersize**

The buffersize is only limited by the size of your harddisk (and by the time you want to wait if a large buffer has to be shown in a diagram)

1.3 First Steps

After you have installed the software perform the following steps

1. Connect the hardware

Shut down the computer before connecting any hardware to the COM ports.

Refer to the hardware manual for the correct connection and settings of the hardware.

2. Connect the Dongle with a COM port

You can use the same port for hardware and dongle or a separate one.

If you don't have a valid dongle MSR32 will only work in Demo mode, i.e. there is no communication with the hardware. All information about the hardware are located in the dongle, so be sure there in one connected.

3. Start the computer and start MSR32

MSR32 first starts with a demo configuration which is provided with the install program.

4. Setup the hardware

Choose the menu item "**Options / Hardware Setup**" to setup your hardware. Depending on the connected hardware the corresponding dialog will be shown. Enter all the settings that have to be done. This can be the selection of modules and boards in case of a μ Mac 1050 or just the right COM port for Gantner Modules.

Check the setting of the COM ports. Refer to the hardware manual.

Settings will be saved when leaving the dialog, you can save the settings under a new name for backup or later use as well.

5. Create a new configuration file

The easiest way to create a new configuration file is using the **Configuration Assistant** from "**File / New**".

This dialog shows the connected hardware to your system. You can create even graphics within this dialog, see under for more information about the settings.

After leaving this dialog, MSR32 has created a channel for every hardware channel of your hardware and the program runs with hardware access.

6. Setup the channels

To enter only new titles, units and comments use the dialog "Quick Setup" in "Options | Quick Setup".

This dialog shows all channels in a table where you can edit all entries in one step. To change other settings edit the channel individual see "How to edit a channel". This have to be done individual e.g. for scaling a 0 - 20 mA input signal to a physical unit, see working with formulas

7. Setup the graphics

After finished the channel setup you can create you own graphics. Open "Graphic 1" from the drop down list in the main tool bar or with the button left from this list. For the setup of the graphic see "How to edit a graphic" and "How to edit a process graphic"

8. Save all settings

After you have finished the setup save this configuration.

1.4 Control the Software

This Software is designed for Windows95/98/2000/NT.
To work with MSR32 it is necessary to know how to use Windows.

MSR32 can be controlled with the following options:

1.4.1 Main Menu

The main functions such as **Save, Open, Exit,..** are available in the main menu like in every Windows software.

The second entry in the menu is variable and depends on the active windows, e.g. if a graphic is active, a graphic menu is shown at this place.

1.4.1.1 Main Menu MSR32

To select an entry from the main menu click on the menu item or use the shortcut, i.a. press the key [Alt] + the underlined character, e.g. [Alt] + "f" for "**File**"

Note.

The second menu is variable and depends on the form which is active, see **Main Forms**

The main menu contains the following topics

Menu "**File**"

New	Creates a new configuration file, see " How to create a new configuration "
Open	Opens a dialog to choose an existing configuration file to load
Save	Saves the actual configuration
Save As	Saves the actual configuration to an other filename
Backup File	Saves the actual configuration to another file without changing the configuration name
Import	Imports configuration files from older DOS - versions
File Info	Opens the dialog " Configuration File Info "
Page Setup	Opens a dialog to select the print format (not ready yet, sorry!)
Printer Setup	Opens a Windows dialog to setup the printer
Print Selected Graphics	Opens the dialog " Print Selected Graphics "
Print	Prints the actual form, see Main Forms
Exit	Exits MSR32

Menu "**Measurement**"

Start MSR Measurement	Opens the " Setup and Start Measurement " dialog to define a new measurement
MSR Measurement from Buffer	Opens the " Setup and Start Measurement " dialog to take a measurement from values already saved in the buffer
MSR-Measurement in Excel	Opens the " Setup and Start Excel Measurement " dialog to take a measurement with Excel
MSR-XY Measurement in Excel	Opens the " Setup and Start Excel XY Measurement " dialog to take a measurement with Excel
Monitor MSR Measurement	Opens the " Monitoring measurement " dialog
Input Protocol Text	Opens the " protocol of measurement " dialog
Save for Remote Monitoring	Opens a save dialog to choose the name of the remote net file

Menu "Special Tools"

Time controlled Switch	Opens the " Setup Time Switch " dialog"
PID Controller	Opens the " PID Controller " dialog
Time Step Control	Opens then " Time Step Control " dialog
Logph Diagram *	Opens the " LogPH graphic " or brings this to the front
Change Refrigerant *	Opens then " Change Refrigerant " dialog
ILK Logph Diagram **	Opens the " ILK LogPH graphic " or brings this to the front
Change ILK Refrigerant***	Opens then " Change ILK Refrigerant " dialog
ILK Setup **	Opens a dialog to change the setting of ILK DLL INI file
Color Table	Opens the " Color Table " or brings this to the front

*** only available if allowed in Your MSR Version

Menu "Options"

Setup	Opens the " Setup " dialog
Find	Opens the " Find " dialog
Quick Setup Text	Opens the " Quick Setup Text " dialog
Quick Setup Hardware	Opens the " Quick Setup Hardware " dialog
Constant Setup	Opens the " Edit Constants " dialog
Hardware Setup	Opens a dialog for hardware setup, look for the help available on this form
Hardware State	Opens the " Configuration overview " dialog

Menu "Window"

Tile	Shows all forms tiled
Cascade	Shows all forms cascaded
Close All	Closes all forms
Refresh Graphics	Refreshes all displayed graphics
Channel Setup	Opens the " Channel Configuration Setup " or brings this to the front
Table	Opens the active " Table of measured Values " or brings this to the front
Graphic	Opens the active " Graphic " or brings this to the front
Process Graphic	Opens the active " Process graphic " or brings this to the front

Menu "Help"

Find	Opens the index of the help file
Contents	Opens the help file
Log List	Open the Dialog " View Loglist "
About	Shows information about the software

1.4.1.2 Main Menu MSR32

To select an entry from the main menu click on the menu item or use the shortcut, i.e. press the key [Alt] + the underlined character, e.g. [Alt] + "f" for "**File**"

Note.

The second menu is variable and depends on the form which is active, see **Main Forms**

The main menu contains the following topics

Menu "File"

Open	Opens a dialog to choose an existing measurement file to load
Save	Saves the actual measurement
Save As	Saves the actual measurement to an other filename
Save as MSR32 Configuration	Saves the actual measurement as a MSR32 configuration file
Import	Imports configuration files from older DOS - versions
Export	Exports the measurement as a ASCII-File or a Dia-PC header file
File Info	Opens the dialog " MSR Measurement Information "
Page Setup	Opens a dialog to select the print format (not ready yet, sorry!)
Printer Setup	Opens a Windows dialog to setup the printer
Print Selected Graphics	Opens the dialog " Print Selected Graphics "
Print	Prints the actual form, see Main Forms
Exit	Exits MSR32

Menu "Evaluation"

Calculate Mean Values	calculates the mean, min and max values
Export to Excel	calculates the mean, min and max values and opens the " Export to Excel " dialog
XY Export to Excel	opens the " Edit Excel XY Measurement " dialog
VDE - Prüfschein	Select whether the "VDE-Prüfschein" will be printed or saved to a Txt-file
Protocol File	Opens the " protocol of measurement " dialog

Menu "Options"

Setup	Opens the " Setup " dialog
Find	Opens the " Find " dialog
Logph Diagram *	Opens the " LogPH graphic " or brings this to the front
ILK Logph Diagram **	Opens the " ILK LogPH graphic " or brings this to the front
ILK Setup **	Opens a dialog to change the setting of ILK DLL INI file
Color Table	Opens the " Color Table " or brings this to the front
Load Process Graphic	Loads an existing process graphic file
Save Process Graphic	Saves the actual process graphic to a file
Navigator	Opens the " Navigator " dialog
Display all Values	Displays all values in the measurement by changing the X-axis of the graphics

*,** only available if allowed in Your MSR Version

Menu "Window"

<i>Tile</i>	Shows all forms tiled
<i>Cascade</i>	Shows all forms cascaded
<i>Close All</i>	Closes all forms
<i>Refresh Graphics</i>	Refreshes all displayed graphics
<i>Channel Setup</i>	Opens the " <i>Channel Configuration Setup</i> " or brings this to the front
<i>Table</i>	Opens the active " <i>Table of measured Values</i> " or brings this to the front
<i>Graphic</i>	Opens the active " <i>Graphic</i> " or brings this to the front
<i>Process Graphic</i>	Opens the active " <i>Process graphic</i> " or brings this to the front

Menu "Help"

















<i>Find</i>	Opens the index of the help file
<i>Contents</i>	Opens the help file
<i>Log List</i>	Open the Dialog " <i>View Loglist</i> "
<i>About</i>	Shows information about the software

1.4.2 Main Tool Bar

Important functions are located in the main tool bar. This makes the software much more easier to control. Some important information such as the state of the hardware communication is also located in the tool bar. A windows quick help is displayed when the mouse is placed over the button















1.4.2.1 Main Tool Bar MSR32

The main tool bar gives you easy access to main function of the program and shows some important information

	Exits MSR32
	Loads an existing configuration file
	Saves the configuration
	Prints the active form
	Opens the " Find " dialog
	Opens " Table of measured Values "
	Opens " Channel Configuration Setup "
 Grafik 1	The first button opens the " Graphic " shown in the list. By selecting a graphic from the list the graphics is displayed also
 Process 1	The first button opens the "Process Graphic" shown in the list, By selecting a process graphic from the list, this graphic is displayed also.
	Refreshes all graphics
	Stops refreshing of the graphic, should be used when the buffer set to high values and the refreshing takes very long time.
	Shows the " Configuration Overview "
	If a channel is dragged on this button it will be deleted.
	Shows the state of the COM ports. The colors are Grey - COM not used Blue - Demo mode Green - Status ok Yellow - Problems in communication Red - No communication
	Opens the dialog " Monitoring Measurement ". Available only if at least one measurement is defined.
	Shows the state of the remote option. A green circle means there is no error in saving to the remote buffer, red means, an error has occurred.

1.4.2.2 Main Tool Bar MSR32

The main tool bar gives you easy access to main function of the program and shows some important information.

	Exits MSR32
	Loads an existing measurement file
	Saves the measurement
	Prints the active form
	Opens the " Find " dialog
	Opens " Table of measured Values "
	Opens " Channel Configuration Setup "
 Grafik 1	The first button opens the " Graphic " shown in the list. By selecting a graphic from the list the graphics is displayed also
	Refreshes all graphics
	Shows the " MSR Measurement Information "
	If a channel is dragged on this button it will be deleted.
	Opens the " Navigator "
	Activates the left, mid or right cursor. The pressed button shows the active cursor.
 Process 1	The first button opens the "Process Graphic" shown in the list, By selecting a process graphic from the list, this graphic is displayed also

1.4.3 Pop up Menu

Some components of the software can be controlled with a pop up menu, available with a click with the right mouse button. Pop up menus are available in the main display components "*Graphic*", "*Process graphic*", "*Table of measured Values*"; "*Color Table*"; "*LogPH Graphic*" and the "*Channel Configuration Setup*".

1.4.4 Dialogs

Every Dialog has at least three buttons:

- OK** Closes the dialog and accepts the settings
- Cancel** Closes the dialog without accepting any setting
- Help** Opens the online help

Closing a dialog via Window (Alt+F4) is equal to Cancel

1.4.5 Drag & Drop

Drag & Drop is available only with channels. You can drag a selected channel from "**Channel Configuration Setup**" and "**Table of measured Values**" in a graphic or in a process graphic or from the graphic legend to another graphic.

2. The Main Forms

There are 6 forms (or windows if you like better) to show all the information within the program These forms can be opened by the corresponding buttons in the main tool bar or with the menu items from then main menu.

if one of these forms is on the screen it is also listed in the menu "**Windows**". All actions from this menu will only affect these forms. You can minimize, maximize or close this form with the symbols at the to right edge of the form.

Main Forms in MSR32

Channel Configuration Setup
Table of measured Values Graphic
Process graphic
Color Table
LogPH Graphic
ILK LogPH Graphic

Main Forms in MSR32

Channel Configuration Setup
Table of measured Values Graphic
Process graphic
Color Table
LogPH Graphic
ILK LogPH Graphic

Note:

In MSR32 some properties of this forms are different, e.g. there are arrow keys to navigate through the values.

Some menu items are not available in MSR32 because you cannot change the channel settings in MSR32.

2.1 Channel Configuration Setup

This form show all defined channels in a numeric order. The channels are divided by the channel type for a better overview.

Changing of the register will show the defined channels of this type.

Information about the channel are listed in columns which are sizable, you cannot edit the entries directly.

To open / edit a channel just double click on a selected channel or use the main menu item "**Channel / Open channel**" or pop up menu item "**Open Channel**". Changes can be made in the Dialog "**Edit MSR-Channel Kxxx**".

Column 1 show the state of the channel. There are the following states of a channel shown as a graphic:



Red	Channel is active in a measurement, no changes of the channel can be done
Green	Channel is used in a formula
Fuchsia	Channel is displayed in a graphic
Blue	Channel is displayed in a process symbol
Light blue	Channel is used in a LogPH graphic

Column 2 shows the channel number

Column 3 - 5 shows title, unit and comment of the channel

Column 6 shows the connected hardware module an its location

You can delete a selected channel by then pop up menu item "**Delete**"

Note : if you delete a channel check whether this channel is assigned to a formula or graphic. No warning is given.

You can create a new channel by "**New**" from the main menu or the pop up menu.

Note: if you change the channel type in the setup dialog, the created channel will appear on the corresponding register.

Drag&Drop is available from this form. You can easily drag a selected channel from this form to a graphic so that a new graph is inserted in the graphic or to a process graphic so that a new symbol is created.

2.2 Channel Configuration Setup (MSRW32)

This form show all defined channels in a numeric order. The channels are divided by the channel type for a better overview.

Changing of the register will show the defined channels of this type.

Information about the channel are listed in columns which are sizable, you cannot edit the entries directly.

To open / edit a channel just double click on a selected channel or use the main menu item "**Channel / Edit channel**" or pop up menu item "**Edit Channel**". Changes can be made in the Dialog "**MSR-Channel Settings**".

Column 1 show the state of the channel. There are the following states of a channel shown as a graphic:

To create an additional formula select the menuitem „**Create Additional Formula**“.. This will open the dialog „**Edit MSR-Channel Kxxx**“. See also "**Additional formulas**".



Red	Channel is active in a measurement, no changes of the channel can be done
Green	Channel is used in a formula
Fuchsia	Channel is displayed in a graphic
Blue	Channel is displayed in a process symbol
Light blue	Channel is used in a LogPH graphic

Column 2 shows the channel number

Column 3 - 5 shows title, unit and comment of the channel

Column 6 shows the connected hardware module an its location

Drag&Drop is available from this form. You can easily drag a selected channel from this form to a graphic so that a new graph is inserted in the graphic or to a process graphic so that a new symbol is created.

2.3 Graphic

This form displays a graphic. To setup the graphic use menu items "Graphic Setup" in main menu or pop up menu. In the "**Graphic Setup**" Dialog you can edit all properties of this graphic.

Using the menus you can switch to the three kinds of graphic direct, i.e. "**y-t Graphic**", "**x-y Graphic**" and "**Bar Graphic**".

If you like to display values within this form check the option "**Legend**" in the menu. The values are shown above the diagram, you can adjust the height of the legend area by dragging the upper limit of the diagram.

"**Displayed Values**" give you a choice, which values are to be displayed in the legend.

The kind of values shown will be displayed below the diagram.

Double clicking on a legend item opens the dialog "**Edit Graph**".

Note: This will only affect the legend but not the graphs itself.

Its possible to print the graphic as a formatted chart.

Use the menu item **Screen Copy** and its sub menus to make a hardcopy from the graphic. You can select between a hardcopy to the printer (portrait or landscape) or you can send the screen copy to a file or the clipboard

"**Refresh**" performs a new drawing of the diagram with actual time values, see note below

To change the axis it is possible just to click at special positions on the axis:

first third of an axis

left button will scroll the diagram to smaller values, right button will scroll to higher value

second third of an axis

left button will expand the diagram range, right button vice versa

last third of an axis

left button will scroll the diagram to higher values, right button will scroll to smaller value

Note:

If the actual time is out of the setting of the x axis the diagram, e.g. greater than the maximum value of the axis after changing the axis settings the diagram is "frozen", i.a. it will not be refreshed until the x-axis changes or the "**Refresh**" is executed

2.4 Graphic (MSRW32)

This form displays a graphic. To setup the graphic use menu items "Graphic Setup" in main menu or pop up menu. In the "**Graphic Setup**" Dialog you can edit all properties of this graphic.

Using the menus you can switch to the three kinds of graphic direct, i.e. "**y-t Graphic**", "**x-y Graphic**" and "**Bar Graphic**".

If you like to display values within this form check the option "**Legend**" in the menu. The values are shown above the diagram, you can adjust the height of the legend area by dragging the upper limit of the diagram.

"**Displayed Values**" give you a choice, which values are to be displayed in the legend.

The kind of values shown will be displayed below the diagram.

Double clicking on a legend item opens the dialog "**Edit Graph**"

Note: This will only affect the legend but not the graphs itself.

Its possible to print the graphic as a formatted chart.

Use the menu item **Screen Copy** and its sub menus to make a hardcopy from the graphic. You can select between a hardcopy to the printer (portrait or landscape) or you can send the screen copy to a file or the clipboard

"**Refresh**" performs a new drawing of the diagram with actual time values, see note below.

"**X-Axis scaled to 0**" changes the numbers at the X-axis from time values to a decimal time, where "0" means the first values of the measurement, so you have a display showing the time of the measurement starting with "0".

To change the axis it is possible just to click at special positions on the axis:

first third of an axis

left button will scroll the diagram to smaller values, right button will scroll to higher value

second third of an axis

left button will expand the diagram range, right button vice versa

last third of an axis

left button will scroll the diagram to higher values, right button will scroll to smaller value

Note:

If the actual time is out of the setting of the x axis the diagram, e.g. greater than the maximum value of the axis after changing the axis settings the diagram is "frozen", i.a. it will not be refreshed until the x-axis changes or the "**Refresh**" is executed

With the arrow keys at the bottom panel you can navigate through the measured values. The actual time at the selected value is displayed in the time box.

"**Help**" opens the online help

2.5 Table of measured Values"

This form displays the defined channels in a table style. As in the "**Channel Configuration Setup**" the channels are divided to different registers. The first register shows all channels.

Selecting a channel group via menu item "**Channel Group**" will filter the channels. Only channels which are assigned to this channel group will be displayed.

Aside from the channel number, title and unit of a channel the table shows the actual value, the mean value and the min and max value. The last two values types can be cleared by menu items "**Clear all min values**" or "**Clear all max values**".

You can adjust the format of the displayed values by "**Decimals +**" and "**Decimals -**". This will only affect the display not the value itself.

It is possible to print the table or to export the table to a text file

Double click on a selected channel open the Dialog "**Edit MSR-Channel Kxxx**", so you can edit a channel from this form.

Drag&Drop is available from this form. You can easily drag a selected channel from this form to a graphic so that a new graph is inserted in the graphic or to a process graphic so that a new symbol is created.

2.6 Table of measured Values (MSRW32)

This form displays the defined channels in a table style. As in the "**Channel Configuration Setup**" the channels are divided to different registers. The first register shows all channels.

Selecting a channel group via menu item "**Channel Group**" will filter the channels. Only channels which are assigned to this channel group will be displayed.

Aside from the channel number, title and unit of a channel the table shows the actual value, the mean value and the min and max value. The last two values types can be cleared by menu items "**Clear all min values**" or "**Clear all max values**".

You can adjust the format of the displayed values by "**Decimals +**" and "**Decimals -**". This will only affect the display not the value itself.

It is possible to **print** the table or to **export** the table to a text file

Double click on a selected channel open the Dialog "**MSR-Channel Settings**", so you can edit a channel from this form.

Drag&Drop is available from this form. You can easily drag a selected channel from this form to a graphic

so that a new graph is inserted in the graphic or to a process graphic so that a new symbol is created.

With the arrow keys at the bottom panel you can navigate through the measured values. The actual time at the selected value is displayed in the time box.

"**Help**" opens the online help

2.7 Process Graphic

This form is for a presentation of the values in a more visual style.

You can load a background image from a file. Use the menu items "**Setup Process Graphic**" to open the dialog "**Process Graphic Setup**". It is possible to load bitmaps, metafiles, JPEG-files or icons. It is not possible within MSR32 to edit the loaded graphic so you have to create or edit the graphic with another software. The loaded picture will be displayed in the original size. You don't have to load a background picture.

NOTE : It is possible to lock all functions that can change the symbols, see "Setup - General**". If editing is locked all functions for changing a symbol are not available.**

Existing symbols can be moved and sized with the mouse, when the left mouse button is pressed on the symbol.

To change the size and the position please hold the "shift" button down.

You can mark a symbol by a simple click at it. Multiselection is also available. See also "**Mark and adjust symbols**" for more information.

The menu item "**Adjust Symbols**" is only available if at least one symbol is marked. This item opens the dialog "**Adjust Symbols**".

Double clicking on a symbol opens the dialog "**Setup Process Symbol**" to edit the symbol.

Note:

A double click on the button of the symbol "**On/Off Button**" changes the state of the button and of the corresponding constant channel. A double click on text of the symbol "**Value Input**" opens an input dialog to set the value of the corresponding constant channel, see also active symbol. All other areas except these hot-spots opens the dialog "Setup Process Symbol"

Right mouse click on a symbol opens a pop up menu to for "**Properties**", "**Delete Symbol**" and items to change the value of active symbols. These items are only available if an active symbol is selected.

You can create a new symbol with the menu item "**Add New Symbol**" of the pop up menu.

It is possible to adjust the size of the form to the size of the background picture with the pop up menu item "**Optimize Window size**", Scrollbars appear if a symbol is out of the background picture.

It is possible to print the graphic as a formatted chart.

Use the menu item "**Screen Copy**" and its sub menus to make a hardcopy from the graphic. You can select between a hardcopy to the printer (portrait or landscape) or you can send the screen copy to a file or the clipboard

It is possible to save the settings of this process graphic or to load an existing process graphic file.

Note:

Within this form you can only save and load a single process graphic, refer to MSR32 file types

2.8 Process graphic (MSRW32)

This form is for a presentation of the values in a more visual style.

You can load a background image from a file. Use the menu items "**Setup Process Graphic**" to open the dialog "**Process Graphic Setup**". It is possible to load bitmaps, metafiles, JPEG-files or icons. It is not possible within MSR32 to edit the loaded graphic so you have to create or edit the graphic with another software. The loaded picture will be displayed in the original size. You don't have to load a background picture.

Existing symbols can be moved and sized with the mouse, when the left mouse button is pressed on the symbol. To change the size of please hold the "shift" button down.

Double clicking on a symbol opens the dialog "**Setup Process Symbol**" to edit the symbol.

You can create a new symbol with the menu item "**Add New Symbol**" of the pop up menu.

It is possible to adjust the size of the form to the size of the background picture with the pop up menu item "**Optimize Window Size**", Scrollbars appear if a symbol is out of the background picture.

It is possible to print the graphic as a formatted chart.

Use the menu item **Screen Copy** and its sub menus to make a hardcopy from the graphic. You can select between a hardcopy to the printer (portrait or landscape) or you can send the screen copy to a file or the clipboard

It is possible to save the settings of this process graphic or to load an existing process graphic file.

Note:

Within this form you can only save and load a single process graphic, refer to MSR32 file types

With the arrow keys at the bottom panel you can navigate through the measured values. The actual time at the selected value is displayed in the time box.

2.9 LogPH Graphic

This is a special form to display a LogPH diagram for selected refrigerants as R12, R22 or others.

For more information about a logPH diagram and the thermodynamic properties refer to the literature.

To setup the graphic you have to edit the graphic and the channel settings or you can load an existing file.

Open dialog "**LogPH Graphic Setup**" to change the graphic with menu item "**Graphic Setup**"

Open dialog "**LogPH Channel Setup**" to change the channels connected with the graphic with menu item "**Channel Setup**"

It is possible to print the graphic as a formatted chart.

Use the menu item **Screen Copy** and its sub menus to make a hardcopy from the graphic. You can select between a hardcopy to the printer (portrait or landscape) or you can send the screen copy to a file or the clipboard

It is possible to save the settings to a file or to load existing configurations.

Note: There is no check whether a channel defined in a configuration actually exists or has the correct value.

2.10 LogPH Graphic (MSRW32)

This is a special form to display a LogPH diagram for selected refrigerants as R12, R22 or others.

For more information about a logPH diagram and the thermodynamic properties refer to the literature.

To setup the graphic you have edit the graphic and the channel settings or you can load an existing file.

Open dialog "**LogPH Graphic Setup**" to change the graphic with menu item "**Graphic Setup**"

Open dialog "**LogPH Channel Setup**" to change the channels connected with the graphic with menu item "**Channel Setup**"

Its possible to print the graphic as a formatted chart.

Use the menu item **Screen Copy** and its sub menus to make a hardcopy from the graphic. You can select between a hardcopy to the printer (portrait or landscape) or you can send the screen copy to a file or the clipboard

It is possible to save the settings to a file or to load existing configurations.

Note: There is no check whether a channel defined in a configuration actual exists or has the correct value.

With the arrow keys at the bottom panel you can navigate through the measured values. The actual time at the selected value is displayed in the time box.

2.11 Color Table

The color table is mainly designed for a display of a temperature profile over a surface.

Every cells of the table can be assigned to one channel. You can change the display style by using the menu items "**Colors**", "**Values**" or "**Channel Numbers**" in the menu item "**Viewstyle**".

Colors will display all values in the corresponding color as it is set in dialog "**Setup Color Table**".

Values will display the value itself and **channel number** will show the channel connected to this cell.

If a cells is empty or a channel is not defined the cells is drawn white.

You can adjust the size of the form to the size of the table by using "**Optimize Size**".

"**Setup**" and "**Edit Channels individual**" opens the dialog "**Setup Color Table**" for the setup of the table.

Its possible to print the table as a formatted chart.

Use the menu item **Screen Copy** and its sub menus to make a hardcopy from the table. You can select between a hardcopy to the printer (portrait or landscape) or you can send the screen copy to a file or the clipboard

The settings can be saved to a file and existing setting can be loaded.

Note:

There is no check whether a channel number in a table setting corresponds to a defined channel or not.

If the channel doesn't exists the cell is drawn white.

2.12 Color Table (MSRW32)

The color table is mainly designed for a display of a temperature profile over a surface.

Every cells of the table can be assigned to one channel. You can change the display style by using the menu items "**Colors**", "**Values**" or "**Channel Numbers**" in the menu item "**Viewstyle**".

Colors will display all values in the corresponding color as it is set in dialog "**Setup Color Table**".

Values will display the value itself and **channel number** will show the channel connected to this cell.

If a cells is empty or a channel is not defined the cells is drawn white.

You can adjust the size of the form to the size of the table by using "**Optimize Size**".

"**Setup**" and "**Edit Channels individual**" opens the dialog "**Setup Color Table**" for the setup of the table.

Its possible to print the table as a formatted chart.

Use the menu item **Screen Copy** and its sub menus to make a hardcopy from the table. You can select between a hardcopy to the printer (portrait or landscape) or you can send the screen copy to a file or the clipboard

The settings can be saved to a file and existing setting can be loaded.

Note:

There is no check whether a channel number in a table setting corresponds to a defined channel or not. If the channel doesn't exists the cell is drawn white.

With the arrow keys at the bottom panel you can navigate through the measured values. The actual time at the selected value is displayed in the time box.

2.13 ILK LogPH Graphic

This is a special form to display a LogPH diagram for selected refrigerants as R12, R22, R744 or others. The data source is the **ILK module**.

This form is only available if ILK functions are allowed within the dongle and all necessary files are found, see also **ILK module**

For more information about a logPH diagram and the thermodynamic properties refer to the literature.

To setup the graphic you have edit the graphic and the channel settings or you can load an existing file.

Open dialog "**ILK LogPH Graphic Setup**" to change the graphic with menu item "**Graphic Setup**"

Open dialog "**ILK LogPH Channel Setup**" to change the channels connected with the graphic with menu item "**Channel Setup**"

Its possible to print the graphic as a formatted chart.

Use the menu item **Screen Copy** and its submenus to make a hardcopy from the graphic. You can select between a hardcopy to the printer (portrait or landscape) or you can send the screen copy to a file or the clipboard

It is possible to save the settings to a file or to load existing configurations.

Note: There is no check whether a channel defined in a configuration actual exists or has the correct value.

2.14 ILK LogPH Graphic (MSRW32)

This is a special form to display a LogPH diagram for selected refrigerants as R12, R22 or others.

The data source is the ***ILK module***.

This form is only available if a measurement was taken with ILK functions and all necessary files are found.

see also ***ILK module***

For more information about a logPH diagram and the thermodynamic properties refer to the literature.

To setup the graphic you have edit the graphic and the channel settings or you can load an existing file.

Open dialog "***ILK LogPH Graphic Setup***" to change the graphic with menu item "***Graphic Setup***"

Open dialog "***ILK LogPH Channel Setup***" to change the channels connected with the graphic with menu item "***Channel Setup***"

Its possible to print the graphic as a formatted chart.

Use the menu item ***Screen Copy*** and its submenus to make a hardcopy from the graphic. You can select between a hardcopy to the printer (portrait or landscape) or you can send the screen copy to a file or the clipboard

It is possible to save the settings to a file or to load existing configurations.

Note: There is no check whether a channel defined in a configuration actual exists or has the correct value.

With the arrow keys at the bottom panel you can navigate through the measured values. The actual time at the selected value is displayed in the time box.

2.15 Arrow buttons in the main forms (MSRW32 only)

With the arrow buttons in the main forms you can change the position of the active cursor



Moves the cursor one value to the left as long as the first value is not reached. If you hold down the button a little longer, the cursor starts moving automaticly



Moves the cursor one value to the right as long as the last value is not reached. If you hold down the button a little longer, the cursor starts moving automaticly.



Only with a graphic you can activate a graph on which the active cursor moves. This button activates the next defined graph.



Only with a graphic you can activate a graph on which the active cursor moves. This button activates the previous defined graph

3. Dialogs

In MSR32 there are several dialog boxes to change settings, start measurement and so on. To get help on that dialog just press the "Help" - Button in the dialog (if there is one). Help on the dialogs are available for the following dialogs:

Dialogs in MSR32

Adjust Symbols
 Change Refrigerant
 Change ILK Refrigerant
 Configuration Changed
 Configuration Assistant
 Configuration Overview
 Configuration Print Setup
 Edit Constants
 Edit Graph
 -
 Edit MSR Channel
 -
 -
 -
 Find
 Formula Assistant
 Graphic Setup
 ILK LogPh Channel Setup
 ILK LogPh Graphic Setup
 ILK Setup
 LogPh Channel Setup
 LogPh Graphic Setup
 Monitoring Measurement
 -
 -
 PID Controller
 Print Setup
 Print Selected Graphics
 Print Preview
 Process Graphic Setup
 Quick Text
 Select Channel Group
 Set Channel Range
 Setup
 Setup and Start Excel Measurement
 Setup and Start Excel XY Measurement
 Setup and Start Measurement
 Setup Color Table
 Setup Process Symbol
 Setup Time Switch
 State of Measurement
 Template for Export to Excel
 Time Step Control
 View Loglist

Dialogs in MSR32

-
 -
 -
 -
 -
 -
 Configuration Print Setup
 -
 Edit Excel XY Measurement
 Edit Graph
 Edit MSR Channel
 Excel XY Measurement Control
 Export to Excel
 MSR Channel Settings
 Find
 -
 Graphic Setup
 ILK LogPh Channel Setup
 ILK LogPh Graphic Setup
 ILK Setup
 LogPh Channel Setup
 LogPh Graphic Setup
 -
 MSR Measurement Information
 Navigator
 -
 Print Setup
 Print Selected Graphics
 Print Preview
 Process Graphic Setup
 -
 Select Channel Group
 -
 Setup
 -
 -
 -
 Setup Color Table
 Setup Process Symbol
 -
 -
 Template for Export to Excel
 -
 View Loglist

3.1 Dialog "Change Refrigerant"

In this dialog You can change the refrigerent used in formulas in one step.

The first selection box show the first refrigerant found in a formula channel. Select a refrigerant to be replaced with the refrigerant from selection box beyond.

With "**OK**" all refrigerants in formulas will be replace as selected.

In the third box You can change the refrigerent n the **LogPH-graphic**.

The selection boxes are only available if there are formulas with LogPH-function.

3.2 Dialog "Configuration Assistant "

This dialog will help you to create a new configuration depending on the hardware connected or in case of demo mode a configuration with demo settings.

There are two registers to setup the configuration

"Hardware"

This register shows all channels that are found from the connected hardware

"Formula, Constants and Graphic Screens"

Here you can enter the number of formula and constant channels to be created and you can create graphics screens with the new channels.

3.2.1 Register "Hardware"

The upper text gives you an overview about the hardware found at the COM ports.

The numbering start with the order of channel types, i.e. analog input channels are the first channels no matter from which hardware or port the input comes.

Only checked input types are taken into the new configuration, so if you don't need for example a digital output simply uncheck "**Accept digital outputs**". You can create a digital output channel later if you need one by creating a new channel and set the channel type to "Digital Output" or by changing the channel type of an existing channel.

You can enter a start number for each channel type if you like to get a better overview, but remember the maximum channel number is 512.

3.2.2 Register "Formulas Constants Graphic screens"

Constants and formulas can be created in advance. Enter the desired number of channel and the starting number for each channel type. The channels will be created empty, i.e. no formula will be created.

To create graphic screen enter the number of graphs in a graphic, the starting number of the channel from which the filling should start and the first screen to be filled.

The graphics will be filled with channels starting with the entered channel number up to then number of graphs. Then the next graphic is filled in the same way.

If you enter a number in "**Show graphic screens..**" these graphics will be shown after leaving this dialog

After you leave this dialog with "**OK**" a new configuration will be created.

The dialog "Quick Setup" will be displayed to change or edit title, unit or comment.

"**Cancel**" will do nothing with the existing configuration.

"**Default**" will set all entries to the start values

3.3 Dialog "Configuration Changed"

If this small dialog appears something was changed in the configuration. If you click on "**Yes**" the

configuration will be saved immediately, "**No**" closes this dialog without saving. The changed flag will be set to unchanged.

3.4 Dialog "Configuration File Info"

This Dialog shows the contents of the configuration info file (see *MSR32 File types*). Enter text as you like to note details of this configuration.

"**Default**" writes some default terms if the info file is empty or overrides all entries with this terms.
 "**OK**" saves the text to the info file

3.5 Dialog "Configuration overview"

This dialog gives you an overview about the actual configuration. You can see the name of the configuration file and the name of the remote buffer file.

For all COM ports the connected hardware is displayed. In case of an communication error the color of the corresponding text changes.

In the table below the number of channels of each channel type is listed.

3.6 Dialog "Configuration Print Setup"

With this dialog you can print the configuration or save it to a text file. The "**Actual Printer**" of your system is shown in the box at the top. You can change the settings of the printer by "**Setup**"

Select the kind of configuration to be printed in "**Document**":

Channel List	prints a list of all defined channels with title, unit and channel group
Channel Configuration	prints a detailed list of all channels
Graphic Configuration	prints the settings of all graphic screens

You can select the range of the document by choosing items from the drop down list in "**Selection**". Within a selected range you can limit the list by entering numbers in "**From**" and "**To**".

Select the **Format** and the number of printouts ("**Copy**").

If you check "**Print to Text File**" the document will be saved to a Txt - file when clicking on "**OK**" otherwise the document will be send to the printer.

3.7 Dialog "Edit Constants"

The value of a constant channel can be set with this dialog. The first column displays the channel number, the second the actual value. Enter a new value for the constant in the third column. This dialog is available even if this channel is assigned to a measurement and therefore the editing of the formula is disabled. See *constants* and *working with formulas*. The changes will be executed with "**OK**"

3.8 Dialog "Edit Graph"

In this dialog you can change the settings of a graph. Select a channel from the drop down list "**Channel**". You can filter this list by selecting a channel group "**Cgr**".

To change the drawing style enter or select the values for "**Style**", "**Color**" and "**Width**". If a graph should not be visible, uncheck "**Show**". Don't forget to check this option if you want to see this graph again.

If you check "**Set Width to all graphs**" all graphs will set to the entered width when leaving this dialog with "**OK**"

If your graphic has more than one Y-axis you can assign this graph to one of these axis by entering the axis number.

There are four axis available.

To format the value displayed in the legend you can enter the number of decimals.

3.9 Dialog "Edit MSR-Channel KXXX"

In this dialog a channel can be edited, deleted or copied.

For detailed information about then properties of the channel see *channel*

Note:

It is possible to select a different channel number from the drop down list. This will perform a copy of the original channel to the new number, you cannot change the channel number of the channel itself. Only not defined channels are shown in the list.

Buttons

OK

Exits this dialog and accepts the settings. In case of a formula error, a message is displayed and the dialog cannot be closed.

New

Sets all properties to default values. **Note:** No new channel will be created

Cancel

Exits this dialog without accepting changes

Delete

This channel will be deleted

Help

Opens the help file according to the page

Formula Testing

The formula will be tested and the result is shown in a dialog

Formula Assistant

Opens the Formula Assistant



Enables the section of the channel type

The following buttons are only enabled when then the cursor is on then formula field, F2..F4 means Key "F2" .. Key "F4" for faster access.

Channel F2

A dialog shows all defined channels. If the cursor is one character beyond a channel type definition (e.g. **K** in K123), this channel is selected in the dialog, provided that this channel is already defined. In this case the first channel is selected. If the dialog is close with OK, the selected channel will be inserted at the cursor position or will replace a selected text in the formula.

Function F3

All available function are displayed in a dialog. If the formula contains on of these functions, this function is selected in the dialog. Ok accepts the function as above.

Character F4

All available mathematics characters are displayed in a dialog, see above

3.10 Dialog "Find"

To find a term within the configuration enter the term to find and select the range for the search. All terms that are found will be listed with the icon of the range ahead. Double click in a selected entry opens the corresponding setup dialog.

Note: To find a channel you have to enter K123 not only the number

3.11 Dialog " Formula Assistant "

The formula assistant helps you to create a formula.
There are 4 basic kinds of formulas:

3.11.1 Register "Coefficients"

In this dialog you can create a formula based on a table of up to 10 value couples.

Enter the measured values in the left column and the desired values in the right column. After leaving an input field the diagram shows the values with a red cross. You can also drag the value shown above the diagram ("Measured value of hardware channel") direct to a field in then left column. After you have entered all values you need, choose a polynome level and calculate the polynome by the "Calculate Polynome" button.

The results are shown in the coefficient table an in the diagram. By using different polynome levels you can select the best fit to the values.

If the polynome level is to high for the number of value couples, a warning is given.

You can edit the coefficients, but its will only change the proposed formula text, not the calculation within the diagram.

<Space> deletes an entry in the table. Only complete pairs of values are used in the calculation.

There are two formula fields in this dialog

The upper one shows the proposed formula from the calculation, the lower one shows the actual formula in the channel definition.

If the proposed formula is ok you can

- Accept the formula and exchange the actual formula text with the proposed formula.
- Insert the proposed formula at the position of the text, entered in the input field
- Add the formula to the actual one

Attention

If you don't select one of these options, the actual formula will not be changed by leaving this dialog with <OK>

3.11.2 Register "Mathematics"

This register shows all available mathematics functions within MSR32.

Square Root	square root of the argument in brackets
Sine	sine value of the argument in brackets based on PI
Cosine	cosine value of the argument in brackets based on PI
Tangent	tangent value of the argument in brackets based on PI

Absolute	absolute value of the argument in brackets
e-function	exponential function
In-function	logarithm to the Base <i>e</i>
Pi	Number PI as 3.1415..

To choose an argument for the selected function, you can select a defined channel from the drop down list or you can enter an argument in the edit field. By clicking on "**Accept Channel**" the channel will be written in the edit field.

If the "**Accept Function and Channel**" is checked, the proposed formula shows the function with its argument from the edit field. In the other case, only the function with empty brackets is shown.

If the proposed formula is ok you can

- Accept the formula and exchange the actual formula text with the proposed formula.
- Insert the proposed formula at the position of the text, entered in the input field
- Add the formula to the actual one

Attention

If you don't select one of these options, the actual formula will not be changed by leaving this dialog with **<OK>**

3.11.3 Register "Special Functions"

This register shows all available special functions within MSR32.

If you select one of these function, the necessary arguments for this function will be shown in the arguments bo3.

For detailed information about the special function see under:

- ▶ PID - Controller
- ▶ Two Position Controller
- ▶ Day Simulation
- ▶ Time Switch
- ▶ Cycle Control
- ▶ Group Function
- ▶ Integrator
- ▶ Measurement State
- ▶ Bit Function
- ▶ Time Step Function
- ▶ Impulse Function
- ▶ Stable Function
- ▶ Ramp Function
- ▶ COM Function

If the proposed formula is ok you can

- Accept the formula and exchange the actual formula text with the proposed formula.
- Insert the proposed formula at the position of the text, entered in the input field
- Add the formula to the actual one

Attention

If you don't select one of these options, the actual formula will not be changed by leaving this dialog with **<OK>**

3.11.4 Register "Thermodynamics"

„This register shows all available thermodynamic functions within MSR32.

First you have to select a refrigerant (in case of Humid Air, the available functions will change)
Depending on the selected function, the number of argument fields will change. It is only possible to enter a channel.

A detailed information about thermodynamic function cannot be given within this software

If the proposed formula is ok you can

- Accept the formula and exchange the actual formula text with the proposed formula.
- Insert the proposed formula at the position of the text, entered in the input field
- Add the formula to the actual one

Attention

If you don't select one of these options, the actual formula will not be changed by leaving this dialog with **<OK>**

3.11.5 Register "ILK Functions"

„ This register shows all available ILK functions within MSR32.

This register is only available when the **ILK Module** is registered in the dongle.

First you have to select a refrigerant.

Depending on the selected function, the number of argument fields will change. It is only possible to enter a channel.

A detailed information about thermodynamic function cannot be given within this software

If the proposed formula is ok you can

- Accept the formula and exchange the actual formula text with the proposed formula.
- Insert the proposed formula at the position of the text, entered in the input field
- Add the formula to the actual one

Attention

If you don't select one of these options, the actual formula will not be changed by leaving this dialog with **<OK>**

3.12 Dialog "Edit Graphic"

This dialog has the following registers to setup the graphic:

3.12.1 Register "Y-t-Style"

On this register you can edit the time axis of the graphic. The time axis is described by the following properties:

Start and End Value

Enter the date for the beginning and the ending of the time axis. The End value must be later than the Start value.

Axis Text

Enter a text which will be shown at the Time Axis

Major Grid As, Minor Grid As

Select whether the grid is displayed as a net or only as ticks on the axis

Number of Major Grid Ticks, Number of Minor Grid Ticks

Enter the number of ticks. Text is only displayed at the main grid ticks.

Time Format

Enter a mask to display the time at every main grid tick (e.g. hh:mm:ss will display 08:30:55)

Use this values in all Diagrams

if you check this option, the settings of the time-axis will be written to all graphics

3.12.2 Register "X-Y Style"

On this register you can edit the x- axis of the graphic. Every value of a channel assigned to this graphic is shown at the x-position given by the MSR Channel, which represents the x-axis, see below.

The x- axis is described be the following properties:

Start and End Value

Enter the value for the beginning and the ending of the X axis. The end value must be greater than the start value.

Axis Text

Enter a text which will be shown at the X Axis

Major Grid As, Minor Grid As

Select whether the grid is displayed as a net or only as ticks on the axis

Number of Major Grid Ticks, Number of Minor Grid Ticks

Enter the number of ticks. Text is only displayed at the main grid ticks.

Axis Style

Select a linear or a logarithm style of the axis.

Integer Places, Decimal Places

These properties will format the values, displayed at the main grid ticks, where the decimal places stand for the accuracy of the value, the integer places are place holders for the length of the value. Integer places don't cut a text if the value is greater then the integer places.

MSR Channel

Select channel for the x axis. Instead at the position of the actual time value in y-t-style the values of a graph are shown at the x-position of this selected channel

3.12.3 Register – "Y – Axis"

On this register you can edit the y- axis of the graphic. There are up to 4 Y-Axis possible. Only Y-Axis 1 gives access to the Axis Style and the Grid itself

The Y- axis is described be the following properties:

Start and End Value

Enter the value for the beginning and the ending of the Y-axis. The end value must be greater than the start value.

Axis Text

Enter a text which will be shown at the Y-Axis

Major Grid As, Minor Grid As

Select whether the grid is displayed as a net or only as ticks on the axis

Number of Major Grid Ticks, Number of Minor Grid Ticks

Enter the number of ticks. Text is only displayed at the main grid ticks.

Axis Style

Select a linear or a logarithm style of the axis.

Integer Places, Decimal Places

These properties will format the values, displayed at the main grid ticks, where the decimal places stand for the accuracy of the value, the integer places are place holders for the length of the value. Integer places don't cut a text if the value is greater then the integer places. Integer and decimal places are used to set the space between the axis and the axis text

Use Y-Text in all Diagrams

if you check this option, the Y-text will be written to all graphics

3.12.4 Register "Graphs"

A list shows all channels which are represented as graphs in this graphic.

You can add or delete channels to this list by using the right mouse button and select the topic from the pop up menu.

Double clicking on a selected graph shows the Dialog "**Edit Graph**" for the setup of the graph

3.12.5 Register "General"

On this register general settings of the graphic can be made.

Colors and Font

You can set the colors for the diagram area, the border area, the grid lines and the font used in the graphic. You can also change the font settings A mouse click on the color field opens a color dialog.

Number of Y-Axis

Enter the number of desired Y-Axis (1 to 4 is possible). The number of available registers in the dialog will change according to the number of Y-Axis

Number of Graphs

Enter the number of graphs which are displayed in the graphic. Changing this value doesn't change any setting of an existing graph.

For example: if you have defined 10 graphs in this graphic a value of 5 will display only the first 5 graphs.

Number of values for X/Y-Graphic.

A graph in a X/Y graphic must e limited to an number of values to avoid a total filling of the graphic screen when refreshing the graphic. In case of a refresh only the number of values are drawn not as the values in the buffer.

Graphic Title

If you enter a graphic title, this title will be displayed in the drop down list in the main tool bar, then window menu and as a header in the graphic window itself.

You can divide the title in a short and a long title by entering "|" (Alt Gr + "<"), so that the short title appears only in the drop down menu while the long title is displayed as a header.

Use same Color and Fonts in all diagrams

if this option is checked the setting are set to all defined graphics

3.12.6 Register "Text"

On this register text settings for the printout of the graphic can be made.
All these properties will only appear on a printout.

Logo

This text is the main header of a printout

Line 1 - 3

There are three text lines available for every printout

Project, Author, Date

Additional text for the printout

Note:

All these settings in Graphic 1 are used when a table or a process graphic is printed, so make sure that Graphic 1 is filled correct

3.13 Dialog "LogPH Channel Setup"

To create a dynamic circuits you have to assign two channels for each point of the circuit.
The first channel is for the temperature the second for the corresponding pressure of each point.
If you don't need all the point just take the channels of an existing point but you have to set all channels, you cannot leave a channel unsetted.

3.14 Dialog "LogPH Graphic Setup"

This dialog sets the LogPH graphic. Refer to literature if you have any questions about thermodynamics, this cannot be handled within this manual

To setup a LogPH graphic you have to set the following registers:

3.14.1 Register "Circuits"

You can define up to 5 circuits for a LogPH graphic.

Select the color, the width of the graph and a marker for each circuit.

A circuit can be a circuit of fixed values or a of measured values.

In the first case enter all 7 pairs of temperature and pressure for the circuit points and don't forget to check "**Graph of Setpoints**".

If you want to create a circuit with measured values uncheck "**Graph of Setpoints**". You have to define the channels in the dialog "**LogPH Channel Setup**".

You can switch a circuit visible / invisible with the check box "**Show Graph**".

A point in a circuit can be labeled with the "**Text**" field for each point. This option is available for setpoints and measured points.

The used abbreviations are:

O1	Evaporator Entrance
O2	Evaporator Exit
V1	Compressor Entrance
V2	Compressor Exit
C1	Condenser Entrance
C2	Condenser Exit
Ex1	Ahead of E3.-Valve

3.14.2 Register "Enthalpy Axis"

Start and End Value

Enter the value for the beginning and the ending of the enthalpy axis. The end value must be greater than the start value.

Axis Text

Enter a text which will be shown at the enthalpy axis

Major Grid As, Minor Grid As

Select whether the grid is displayed as a net or only as ticks on the axis

Number of Major Grid Ticks, Number of Minor Grid Ticks

Enter the number of ticks. Text is only displayed at the main grid ticks.

Axis Style

Select a linear or a logarithm style of the axis.

Integer Places, Decimal Places

These properties will format the values, displayed at the main grid ticks, where the decimal places stand for the accuracy of the value, the integer places are place holders for the length of the value. Integer places don't cut a text if the value is greater then the integer places. Integer and decimal places are used to set the space between the axis and the axis text.

3.14.3 Register "General"

Here you can set the colors of the diagram area and the border area and the settings of the major and minor grid (color and line width)

3.14.4 Register "Graphs"

A LogPH diagram contains several graphs of the thermodynamic properties of the refrigerent.

Select a refrigerant from the drop down list.

You can set the color and the width of each graph. If you don't need the graphs for vapour content, isotherms and isentrops you can switch them off by unchecking the "*y/n*" switch.

Check "**Show values at Graph**" if you want to get values at the isotherm and isentrops.

Check "**Isotherms in solid Style**" if the isotherm should be drawn from dew point to boiling point.

3.14.5 Register "Pressure"

Start and End Value

Enter the value for the beginning and the ending of the pressure axis. The end value must be greater than the start value.

Axis Text

Enter a text which will be shown at the pressure axis

Major Grid As, Minor Grid As

Select whether the grid is displayed as a net or only as ticks on the axis

Number of Major Grid Ticks, Number of Minor Grid Ticks

Enter the number of ticks. Text is only displayed at the main grid ticks.

Axis Style

Select a linear or a logarithm style of the axis.

Integer Places, Decimal Places

These properties will format the values, displayed at the main grid ticks, where the decimal places stand for the accuracy of the value, the integer places are place holders for the length of the value. Integer places don't cut a text if the value is greater then the integer places. Integer and decimal places are used to set the space between the axis and the axis text.

3.15. Dialog "Monitoring Measurement"

In this dialog the state of all five measurements is displayed.

The first Register displays the standard measurement type the second is for the **Excel measurement type** the third is for **Excel XY measurements**

"**State**" gives you the information about the current state of the measurement. There are the following states available:

Measurement free	Measurement is not defined
Measurement initialized	Measurement is defined and is waiting for the start time
Measurement running	Measurement is running
Measurement interrupted	Measurement is stopped

"**Count**" shows the values been taken in this measurement

You can start a new measurement in this dialog by the button "**Init**".

Register1:

This will open the Dialog "**Setup an Start Measurement**".

Register2:

This will open the Dialog "**Setup an Start Excel Measurement**".

Register3:

This will open the Dialog "**Setup an Start Excel XY Measurement**".

You can edit a measurement in this dialog by the button "**Edit**".

Register1:

This will open the Dialog "**Setup an Start Measurement**".

Register2:


This will open the Dialog "**Setup an Start Excel Measurement**".

Register3:

This will open the Dialog "**Setup an Start Excel XY Measurement**".

If a measurement is initialized you can start it immediately by using the button "**Start**".

If a measurement is running you can stop it immediately by using the button "**Stop**".

Warning: There is a very important difference between "**Stop**" and then trash button . The trash button cancels the measurement end deletes the measurement files. The "**Stop**" button quits a measurement correct. This is the same for the Buttons "**Cancel all Measurement**" and "**Stop all Measurements**" so be careful when using a "cancel" option.

Note:

"**Cancel all Measurement**" and "**Stop all Measurements**" will only work for the actual register. You

can only delete/cancel measurements of the same type.



As explained above this button cancels a measurement and deletes all files.



When using this button you can enter additional text about this measurement, see dialog "**Protocol of Measurement**" (**Register 1 only!**)



With this button a XY data point can be taken in the measurement, see **Excel XY Measurement** (**Register 3 only!**)



This button will interrupt the measurement until this button is pressed again. This function is useful e.g. when you have to change some sensors, No values are taken, while the measurement is interrupted.

3.16 Dialog "MSR Channel Settings" (MSRW32)

This is nearly the same dialog as the dialog "**Edit MSR Channel Kxxx**" in MSR32, but you can only change the text fields.

All other properties are for information only and can not be changed.

3.17 Dialog "MSR Measurement Information"(MSRW32)

This dialog shows all information about the measurement. This dialog is nearly the same as the dialog "Setup and start measurement" in MSR32, but you can only change the text properties of the measurement.

All changes will be saved within the measurement when you press "**OK**".

"**Start Measurement**" and "**End Measurement**" shows the time of the measurement and "**Interval**" shows the interval in which the values are taken.

"**Channel Group**" gives information about the used channel group.

"**Store mean values**" shows the type of values stored in the measurement

You can change the settings of "**Project**" , "**Author**" and "**Comments**".

3.18 Dialog "Navigator" (MSRW32)

With this Dialog you can navigate through your measured values.

If you use the slide button or the cursor buttons all changes will be displayed in the main forms, the use of the slide button is equal of the use of the arrow button in the main forms

The range of the slide buttons corresponds to the number of measured values.

The dialog shows the number of values and the index of the actual value and the time value of the actual point.

You can move the slide button using the mouse or with the arrow keys.

Key "**Page up**" or "**Page down**" moves through the values in larger steps, where a step is a tenth of the number of values.

Button "**L**" activates the left cursor

Button "**M**" activates the middle cursor

Button "**R**" activates the right cursor

The position of the slide button will set to the cursor value.

Button "**A**" starts the calculation of mean values

With the "**Save Button**" You can save the part of the measurement between left and right cursor to a measurement file. It is not allowed to use the actual filename.

3.19 Dialog "PID Controller"

To use a PID - Controller, you have to define the properties of the controller in this dialog. See "**Working with formulas**" for more information about the use of a PID - controller within a formula.

The PID-Controller works with an equation like this:

$$\text{Output} = P * \Delta + I * \Sigma \Delta + D * dx/dt$$

were:

Output is the result of the formula

Δ is the difference of Actual value an the setpoint

$\Sigma \Delta$ is the integrated difference from Δ

dx/dt is the inclination of the actual value determined by the last 6 values

P,I,D are the factors as explained below

Select an existing controller from the list or create a new controller by execute "**New**", this will set the values to default settings.

Enter a "**Controller Title**" to identify the controller more easier. In the formula you will only need the number given by its position in the list.

With "**Amplification (P)**", "**I - Parameter (I)**" and "**D Parameter (D)**" you can set the main function of the controller.

Example:

$P = 1, I = 0, D = 0$ works as a only with amplification, no integrated or differential calculation will be done.

"**Min Output Value**" and "**Max Output Value**" are the limits for the calculated output value in the upper equation, e.g 4 - 20 for a typical current output signal.

"**I- Factor (integrated)**" shows the integrated term of the equation ($I * \square \square$). The value can be set to an other value to avoid long response times if the controller cannot work properly due to a missing output or other errors. Use this value only in case of errors.

Existing PID files can be loaded and all settings can be saved to a file. The files were loaded automatically when the program starts, see "**MSR file types**"

Refer to literature for more information about PID-controllers.

3.20 Dialog "Print Preview"

This preview displays the printout of the loglist. You can "**Print**" the list and change the "**Printer Setup**".

Navigate through the pages with the arrow buttons or zoom the display with "**Zoom**".

"**Clipboard**" copies the list to the clipboard.

3.21 Dialog "Print Selected Graphics"

With this dialog you can print graphics without opening the corresponding main form.

Select the graphic(s) you like to print by checking the box left from the graphic title.

To check the box you can just double-click on a selected graphic or click right into the box.

Select the print **format**. This format is the same for all graphics.

If you like to have copies from each graphic, enter the **number of printouts**.

You can decide whether the diagrams will be printed with or without a legend.

Page is an optional text. Enter as you like.

"**Setup**" opens a windows printer dialog to change the settings of your printer show in "**Actual Printer**"

Note:

Each graphic is printed with the properties of the graphic settings you have entered in the dialog

"**Graphic Setup**".

Don't forget to enter all text items you want to see in a printout.

Note (MSRW32 only):

The graphics will be printed with the option you have selected in the dialog "**Setup - Text**".

3.22 Dialog "Print Setup"

This dialog is displayed whenever you want to print a graphic or table.

The upper box shows the current printer of your system. You can change the printer and the printer settings with "**Setup**".

A preview displays the printout but in a very simple form, don't rely on this.

You can select the printout format ("**Portrait**" or "**Landscape**") and the number of printouts in "**Copy**".

If you want to print a graphic you can select whether it is printed with or without a legend ("**Options for Graphic**")

If you want to print the table of measured values you can select which values should be printed ("**Options for Table**").

You can enter or change three comment lines for the printout. All other text items even for tables are to be set in the "**Graphic Setup**" for diagrams, in case of a none graphic object the settings of "Graphic 1" are taken.

"**Print**" opens the Windows Print dialog.

Instead of printing you can create a picture with the same layout as the printout. You can enter the default picture settings in the **setup dialog**

"**As File**" saves the graphic as a graphic file (bitmap or JPG-file)

"**To Clipboard**" sends the graphic to the clipboard.

3.23 Dialog "Process Graphic Setup"

This dialog is for the setting of the background picture of a process graphic.

You can load an existing picture from a file ("**Load Background**") or you can load a picture from the clipboard, if there is a picture ("**from Clipboard**").

"**Delete Background**" removes the picture.

You cannot change the size and the position of the picture within MSR32, so you have to create or

change a picture with an other software.

3.24 Dialog "Protocol of Measurement"

This dialog shows the text of the measurement protocol file (see MSR file types).

The actual time is displayed in the last topic.

Enter the text after the last topic which shows the actual time.

You can change every text in this dialog but it will be saved as it is when pressing "**OK**".

"**OK**" saves the text to the file.

"**Cancel**" closes this dialog, no changes will be saved.

3.25 Dialogs "Quick Setup..."

3.25.1 Dialog "Quick Setup Text"

This dialog helps you to change the settings of all channels in one step.

the first column shows the channel number and the second the current title. These columns cannot be changed.

You can change the title, the unit and the comment of the channel.

Right mouse button opens a pop up menu for copy, cut, paste and delete as in every text software.

3.25.2 Dialog "Quick Setup Hardware"

This dialog helps you to change the settings of all channels in one step.

the first column shows the channel number and the second the current title. These columns cannot be changed.

Select the channel type in the third column. The hardware channel in column 4 will be changed according to the selected channel type. If your hardware doesn't support the selected channel type, no hardware channel will be displayed.

Select the hardware channel in column 4. A drop down list displays all hardware channels for this channel type.

Select the channel group in the last column. Enter the desired channel group simply as a text.

Examples:

0,1,2,6,7

0,1..10,17

0,5-9;11;14

3.26 Dialog "Setup"

In this dialog general program settings can be made. These settings are global not only for the actual configuration. All settings were saved to an INI-file (see MSR32 file types)

The dialog in MSR32 has four registers:

- ▶ **General**
- ▶ **Graphics**
- ▶ **Cycles / Buffer**
- ▶ **Preset Autoconfiguration**

The dialog in MSRW32 has four registers:

- ▶ **General**
- ▶ **Graphics**
- ▶ **Text**
- ▶ **Picture Output**

3.26.1 Register "General"

Check "**Show Quick Help**" for a short hint on buttons or other components

Check "**Shut down without confirmation**" if you use a non interruptible power supply which is able to shut down your computer. If you don't use this option, a power supply is not able to exit windows because MSR32 is waiting for an input

Check "**Save process graphic with measurement**" if you want a process graphic to be saved with the measurement. A measurement file doesn't contains a process graphic, so with this option the current process graphic will be save with the name of the measurement as well. see "MSR32 file types"

Check "**Lock process graphic for editing**" to lock all symbols. All functions that can change the symbol are not available. Printing and picture output are still available.

3.26.2 Register "Graphics"

Check "**Turbo graphic**" if you want to draw graphs as fast as possible. With this option a single point of a graph is only drawn if its screen coordinates are different from the last point to avoid more than one drawing of a screen pixel.

Choose the style of the legend text:

MSR Channel Number will display the legend as "**K123: title 1.234 °C**"

Graph Number will display the legend "**1 : title 1.234 °C**" where 1 is the number of the graph

Check "**Draw Number at Graphs**" if you want a number to be drawn at the graph. This option will draw the number at the graph as selected above. This option is for the printout also. The drawing starts at the first value in the graphic and will start again in the middle of the x axis. If there are too many graphs in the graphic the numbering will only performed once to avoid an overdrawing.

If You want to print to a graphic file instead of the printer, you can change the settings of this picture export file.

Enter the format and the size of the picture, the default graphic format and the directory for the output.

Attention:

Don't select high resolution with a large picture size, the size of the graphic file will be very large.

3.26.3 Register "Cycles / Buffer"

Enter the main measurement cycle in seconds. Default value is 2 seconds with a minimum input value of 1 second.

Enter the interval for the remote buffer in units of the MSR interval.

Example:

MSR interval is set to 2 sec, Buffer interval is set to 5

MSR32 is running with a complete cycle every 2 second, every 10 seconds the values are saved in the remote buffer.

You can set the default values for the measurement cycle and the measurement time of a new

measurement.

Also you can set the default kind of measurement controlling. Enter a value in minutes as a preset for a measurement, which is controlled over a time period.

These values are the default setting in the dialog "**Setup and Start Measurement**"

Note: You have to enter the measurement time in decimals

You can setup the buffer with the following values:

Enter the desired Path of the buffer file, default setting is the MSR32 start directory.

Enter a value between 1000 and 100000 for the buffersize:

Note:

If You change the buffersize, the buffer will be cleared.

You can also clear the buffer with the button "**Clear buffer**".

Check "**Save Buffer every Cycle**" if the buffer should be saved in every MSR interval to avoid a long saving time at the end of the program. This is only important when using a buffer with a buffer size of more than 10.000.

3.26.4 Register "Preset Auto configuration"

These are the default settings for the "**Configuration Assistant**".

You can enter the default title for every channel type which will be created with the assistant. If you check "**con. No**" the number of the channel is added to the default title.

Enter the number of "**floating Inclination**" and "**floating mean value**" for analog inputs channels and all other channels.

The option "**Always Temp.-Diff. to K001**" should be used when starting the program in VDE-mode. It creates a formula in every analog input channel for calculation of a temperature difference with channel K001.

Option "**Alow. Temp.-Dev. (VDE)**" see VDE-mode

3.26.5 Register " Day Protocol File "

You can define a **Day Protocol File** in this dialog.

Enter the **Path of Protocol File** and select the **Channelgroup(s)** for the protocol file.

Enter an interval and decide whether You want to **store mean values** or actual values in the protocol file.

With **Decimals** You can format the values within the file.

You can delete an existing file with "**Delete File**".

The protocol starts after closing the dialog when "**activate**" is checked

After opening the dialog this checkbox displays the state of the day protocol.

You can choose the maximum number of protocol files in the directory.

Every time, a new protocol file is been created an the number of files within the directory exceeds the maximum number the oldest file will be deleted. The file date will be calculated from the file name. All files, which names cannot be converted into a date will be ignored.

3.26.6 Register "General" (MSRW32)

Check "**Show Quick Help**" for a short hint on buttons or other components

Check "**Shut down without confirmation**" if you use a non interruptible power supply which is able to shut down your computer. If you don't use this option, a power supply is not able to exit windows because MSR32 is waiting for an input

Check "**Save process graphic with measurement**" if you want a process graphic to be saved with the measurement. A measurement file doesn't contains a process graphic, so with this option the current process graphic will be save with the name of the measurement as well. see "MSR32 file types"

3.26.7 Register "Graphics" (MSRW32)

Check "**Turbo graphic**" if you want to draw graphs as fast as possible. With this option a single point of a graph is only drawn if its screen coordinates are different from the last point to avoid more than one drawing of a screen pixel.

Choose the style of the legend text:

MSR Channel Number will display the legend as "**K123: title 1.234 °C**"

Graph Number will display the legend "**1 : title 1.234 °C**" where 1 is the number of the graph

Check "**Draw Number at Graphs**" if you want a number to be drawn at the graph. This option will draw the number at the graph as selected above. This option is for the printout also. The drawing starts at the first value in the graphic and will start again in the middle of the x axis. If there are too many graphs in the graphic the numbering will only performed once to avoid an overdrawing.

3.26.8 Register "Text" (MSRW32)

Choose between three options for the preset of the comment lines in every printout.

- **use comment lines from graphic configuration**
- **use the first three lines from measurement comment**
- **use individual lines**

If you select the third option the text you have entered in the dialog "**Print Setup**" will be saved to the INI-file

3.26.9 Register "Picture Output" (MSRW32)

If You want to print to a graphic file instead of the printer, you can change the settings of this picture export file.

Enter the format and the size of the picture, the default graphic format and the directory for the output.

Attention:

Don't select high resolution with a large picture size, the size of the graphic file will be very large.

3.27 Dialog "Select Channel Group"

This dialog opens when you have to select a channel group.

Select channel group 1 to 15 by checking them or select channel group 0 by clicking on "**Cgr.0**". This will uncheck all buttons. Channel group 0 means all channels are selected.

3.28 Dialog "Set Channel Range"

With this dialog you can easily create a number of new channels.

Enter the "**Number of First Channel**" to be created and the "**Number of channels to insert**".

Enter a "**Default Text**" for the channel title. The Channel number is added to this text when the channels are inserted.

3.29 Dialog "Setup and Start Measurement"

If you want to take a measurement you have to define the measurement in this dialog. Enter the time when the measurement should start and the time, when the measurement is over ("**Start Measurement**", "**End Measurement**").

Optional you can use a period in [min] to control the end of the measurement. In this case you have to activate the checkbox

"**Control measurement with a time period..**". Enter a value in minutes for the desired period of the measurement. The time starts with the first measured value of the measurement.

Enter the "**Interval**" for the time, values are taken to the measurement.

Select a "**Channel Group**" for this measurement. See also **Channel**. Every channel in the selected channel group cannot be edited while a measurement with this channel group is running. If you select Channel group 0, all channels are used in the measurement.

Check "**Store mean values**" if you want to store a mean value instead of the actual value.

Note: This mean value is determined by the relation of measurement cycle and interval, that means if your measurement cycle is 2 seconds and your interval for the measurement is 10 second the mean value is determined by the last 5 values. It is not the mean value of a channel.

You can enter additional information in "**Project**", "**Author**" and some notes in "**Comments**".

While the measurement is running, you can change the settings of the end of the measurement and all text options, see also "**Monitoring Measurement**" and "**State of Measurement**".

If you create a new measurement "**OK**" opens a dialog to enter the filename of this measurement. If a measurement is running, the program will update the measurement file.

With the two Load and Save buttons you can load a text file to fill the text fields or you can save all text-settings to a file.

3.30 Dialog "Setup Color Table"

To create or change a color table all settings have to be done in this dialog. There are three register for the setup

3.30.1 Register " Channelsettings "

To setup the table you have to assign a channel to every cell of the table.

This register help you to fill the table more easier.

Select the kind of value in the table in "**Values in Table are**".

Choose whether the table will be filled new "**By Line**" or "**By Column**".

Select the channels to be used for the table in "**Channelselection...**".

You can enter the channels in any order, not defined channels are not used.

If the table has more cells than selected channels you have to select in which form the surplus cells should be treated.

If you choose "**Leave empty**" nothing will happen with the surplus cells, "**Start from beginning**" starts at the first selected channel and so on.

You can set the surplus cells to a single channel as entered in "**Set to Channel**"

To execute this settings and to fill the table you have to click on the button "**Fill Table New**".

Warning:

This will override all individual setting from register "Table View"

3.30.2 Register "Colors and Grid"

This dialogs sets the kind of the color table.

Select the kind of the **Display**:

Colors	displays colors corresponding to the values in every cell of the table
Values	displays the values in every cell
Channelnumbers	displays the number of the channel assigned to the cell

Set the size of the table by "**Number of Columns**", "**Number of Rows**", "**Columnwidth**" and "**Rowheight**"

Note:

The left and upper cells doesn't count, so enter only the number of columns/rows for inner cells

Select the "**Color Profile**" the profile is displayed in the "**Color Temperature Dependency**" box. You have to enter the **limits** for the color profile, that means, which value is assigned to the "left" and the "right" color of the profile. "**Invers Limits**" inverses in fact the profile.

Enter the "**Decimal Places**" to format the values when using the display kind "**Values**".

Tip:

If you only need a part of the color profile set the limits to higher values, so that the actual values are in the desired color range.

Note:

If a value is not in within the limits either the maximum or the minimum color is displayed for this value.

3.30.3 Register "Table View"

In this dialog individual settings of the table can be made.

Enter the desired Channel in a cells or remove a channel. from the cell.

Not defined channel will produce a white cells in the table.

Use the following abbreviations (see also "**Working with formulas**")

K001	for the actual value channel 1
M102	for the mean value channel 102
P333	for the ma3. value channel 344
I004	for the min. value of channel 4

- ▶ **Colors and Grid**
- ▶ **Channelsettings**
- ▶ **Table View**

The settings can be saved to a file or an existing file can be loaded. The files were loaded automatically when the program starts, see also "**MSR File Types**"

3.31 Dialog "Setup Process Symbol"

In this dialog you can change the settings of a process symbol.

The symbol is displayed in the "Display Symbol" box. Every change of setting can be control in this display.

Attention: If you press the "Delete" Button, this symbol will be deleted in the process graphic.

A symbol has the following properties which are visible according to the selected type.

Width and Height

The size of the symbol can be adjusted in the display by using the mouse. If you press the left mouse button on the bottom or right border of the symbol, the size can be changed while holding the the left mouse button and the "shift"-button down an move the mouse. To adjust the hight and width of the symbol You can also enter the values directly.

Position

Within this dialog you can change the position of the symbol by dragging it with the left mouse button. The position will not be change the position of the symbol in the process graphic.

Style

There are 15 different types of symbol. Select a style and it will be shown in the "Display Symbol" box, see also „*Process Symbols*“ and "Active symbols" for the types "*ON/OFF button*" and "*Value Input*"

Note:

With the symbols "*On/Off Button*" and "*Value Input*" You can set the value of the coresponding constant channel.

A click on the "*On/Off Button*" switches the value of the contsant channel from 0 to 1 or vice versa. Other values will be overridden.

With a double click on the text of "*Value Input*" You can enter a new value of the constant channel in an input dialog.

Setup Measured Channel

A symbol is connected with a channel. You can select a defined channel from the upper drop down menu. The lower drop down menu selects the value, which will be displayed in the symbol. Integer and decimal places formats the displayed value

Min and max values are used for scaling the display of the value and important for the alarm values.

Note:

With the symbols "*On/Off Button*" and "*Value Input*" You have to select a constant channels.

Colors and Font

You can change the color for several different parts of a symbol

Frame

if the frame option is active, a frame will be drawn around the symbol

Alarm Values

You can enter a value in percent according to the difference between max value and min value for an upper and a lower alarm value. If the value exceeds this range the color changes to the alarm color but nothing else happens.

Example:

Min value : 50, max value: +50 (=difference: 100), lower alarm value: 10%, upper alarm value: 90%:
All values from -50 to -40 or from +40 to +50 will set the alarm color.

Text

Enter a text which is displayed left from the value and a unit which is displayed right of the value. Text will only be visible if the Show Text Button is checked. If you have selected Date/Time Display you can enter a date/dime mask to format the display.

3.32 Dialog "Setup Time Switch"

This dialog shows the setting of the time switches. Select the time switch you want to edit from the drop down list.

Enter a name to identify the setting more easier.

There are 24 different switch points available,

To change a switch point select a point from the switch point list and enter the desired values for **Time**. Select the "**State**" as "**ON**" or "**OFF**". In the formula the state **ON** delivers a value of "1" ,**OFF** a value of "0".

Changes were taken into the list when selecting another switch point.

You can enter the time as you like, Click on "**Sort**" to set all switch points in a correct order.

Switches points with the sate "ON" will appear in red color.

You can save the settings to a file or load an existing file. See **MSR-File Types**

3.33 Dialog " State of Measurement "

This Dialogs shows the state of all measurements. It is only visible when a measurement is running. The first register shows the state of the standard measurement, the seconds is for the **Excel measurements**.

The first column displays the current state of the measurements with the following text:

free Measurement is not defined
init Measurement is defined and is waiting for the start time
runs Measurement is running
pause Measurement is interrupted

The second column shows the values been taken in this measurement.

Double Clicking opens the dialog "**Monitoring Measurement**"

3.34.1 Dialog "Template for Export to Excel"

This Dialog helps you to export the values from the **Table of Measured Values** to Excel or other software.

You can save the shown values to a text file with the menu item "**File / Save**".

You can select an individual range of cells by using the left mouse button or you can use

"**Edit / Mark All**" marks all cells in one step

"**Edit / Copy**" copies the selection to the clipboard

"**File / Exit**" quits this dialog

Buttons



Selects all cells and copies them to the clipboard, same as "**Edit / Mark All**" and "**Edit / Copy**"



is the same as "**File / Save**"



quits this dialog, same as "**File / Exit**"

3.34.2 Dialog "Template for Export to Excel (MSRW32)"

This Dialog helps you to export all values of the measurement to Excel or other software.

You can save the shown values to a text file with the menu item "**File / Save**".

You can select an individual range of cells by using the left mouse button or you can use "**Edit / Mark All**" marks all cells in one step

"**Edit / Copy**" copies the selection to the clipboard

"**File / Exit**" quits this dialog

"**Edit / Select Channels**"

Opens a dialog to select channels for the template. Just click on the little box left of the title to select a channel. Only "checked" channels will appear in the export table. With a right click on this dialog You can select channelgroup(s)

When the dialog opens next time, all channels of the measurement will appear unchecked again.

Buttons



Selects all cells and copies them to the clipboard, same as "**Edit / Mark All**" and "**Edit / Copy**"



is the same as "**File / Save**"



quits this dialog, same as "**File / Exit**"



Opens a dialog to select channels, same as "**File | Select Channels**"

Note:

Excel doesn't supports more than 255 columns, so in this case You have to select the channels before copying the selection to the clipboard.

3.35 Dialog "View Loglist"

This dialogs shows the loglist of MSR32. All activities and errors were written in the Log-file

You can print the list with "**File / Print**" or just make a hardcopy with "**File / Hardcopy**".

If you are looking for a special event try "Edit | Find" and enter the term to find. With "Edit | Next" and "Edit | Previous" you can navigate to the list

Attention:

This dialog is only available if You have a general access to LogPH-functions.

3.36 Dialog " Time Step Control "

Create or edit a time step control in this dialog. Enter set points for a selection of channels for a set of time steps.

All channels return to their original values, when the last time step is over, except constant channel, which will hold the last value set by the control.

In the status bar the actual state of the time step control is shown.

You can edit a running control setting online.

Buttons

Close	Closes this dialog
Start ("Apply")	Starts a time step control at the start time. When the control is running, the button text turns to "Apply"
Start now	Starts a time step control with the next MSR cycle, only available when no control running
Stop	Stops a running control, only available when a control is running
Help	Opens this help file

With the -Button it is possible to jump to the next time step. This is useful when testing the setting.

Note:

The real time naturally has not reached this time step. Internally the start time is set to an earlier value.

3.36.1 Register "General"

The list box displays the channels used in the control setting. The column "state" shows whether the channel is defined or not available. Not available channels can appear when loading an existing time step file while some of the channels are not present in the actual MSR configuration, see also Allowed Channel types

With a right mouse click you can edit, insert or delete channels.

Use "**New Channel Selection**" to create a new list of channels with a channel selection dialog, which appears also, when you want to insert channels.

Enter the starting date and time for the control. Use "**Set to actual time**" to set the starting time to then actual time.. "**actualize Date after loading**" actualizes only the date after loading a time step control file.

With "**Load Control Setup**" and "**Save Control Setup**" you can load and save the settings, see also "MSR-file types"

You can edit or create a configuration while control is running. Changes were only taken into the program by pressing the "**Apply**" button.

3.36.2 Register "Parameter "

Enter the desired time steps and the set points at these points.

You can delete, edit, insert a time step with the buttons or you can delete all time steps.

All time steps will be sorted after editing. You have to edit a time step in an input dialog. In this dialog

You can apply the set points of the previous time step.

The same effect is given by the button "**Apply set point of previous time step**"

Enter a time step starting with the start time in **hours:minutes:seconds**.. It is recommended to start with 0:00:00. There is no limit for the hours , 1234:00:00 is possible. The time step starts 1234 hours after the start time: If You use seconds in a time step, don't enter steps which are smaller than the MSR-cycle. Small steps may be be skipped.

Enter a set point for each channel of this time step. Values are taken as the channel values of the channel in MSR32. You can even override an analog input channel, if this is allowed. When the time step control is over, every channel turns to its original value except constant channels, where the last value set will be stored.

If You enter a wrong number, a message will be displayed an You cannot save, start or apply this setting.

To change the time step just click at an items at the list.

If You change settings of a running control, the information in the status bar may not correspond to the setting until You press "**Apply**"

3.36.3 Allowed channel types "

You can use all channel types. In MSR32.INI constant channels (type=10) were used as a preset. Change the line the the INI-file. Use the numbers of the channel types as shown in the channel configuration setup, the numbers corresponds to the registers (analog inputs=1, digital inputs=2 ..)-

Example:

TimeStepTypes=10 (only constants)

TimeStepTypes=1..10 (all types)

TimeStepTypes=5..7,10 (all outputs and constants)

The allowed channel types are used also for the filter function in the Channel Selection Dialog

3.36.4 Dialog " Channel Selection "

Select the channels for the actual time step control setting. To select a channel just check the box left to the title of the channel.

With the right hand mouse button you can filter the available channels in the list, see also Allowed channels

"**All Channels**" displays all allowed channels.

"**Accept**" inserts all checked channels in the control configuration-

"**Cancel**" closes the dialog.

3.37 Dialog " Setup and Start Excel - Measurement"

If you want to take a **Excel Measurement** you have to define the measurement in this dialog. Enter a value in minutes for the desired **periode** of the measurement. The time starts with the first measured value of the measurement.

Select a "**Channel Group**" for this measurement. See also **Channel** . Every channel in the selected channel group cannot be edited while a measurement with this channel group is running. If you select Channel group 0, all channels are used in the measurement.

You can enter additional information in "**Project**" ,"**Author**" and some notes in "**Comments**". With the two Load and Save buttons you can load a textfile to fill the comment field or you can save theh comments to a file.

Select a template File (**Select**) or choose **No template file** if you want to create a new Excel File.See also **Excel Measurement**

The **Actual Filename** will be displayed when You edit a running measurement.

Options

***Open Excel with data file
Run Msr-Measurement
parallel***

Opens Excel with the data file after the measurement is over
A standard MSR measurement runs with the same settings and
the same file name parallel. This is only possible if there is one
MSR-measurement free

***Transfer all channels to
Excel***

Only channels corresponding to the channelsgroup are taken into
the measurement. If You check this option, the measured channels
will always appear at the same position in the Excel sheet. Not
measured channels are empty. So You can create templates
which will find a specific channel always at the same cell, e.g.
K005 =>A5 (in Excel).

Without this option only measured channels will be listed in the
sheet starting with A1 in Excel

While the measurement is running, you can change the settings of the end of the measurement and all
text options, see also "***Monitoring Measurement***" and "***State of Measurement***".

Buttons:

Start now

Starts this measurement in the next cycle. Enter the desired file name
for this measurement. Only available for a new or initialized
measurement.

Start later

Initializes the measurement. You can start it with ***Start now*** or from
the dialog "***Monitoring Measurement***". Only available for a new
measurement.

Apply

Accepts changes in the setting for a running measurement. Only
available for a running measurement.

Cancel

Closes the dialog

Help

Opens this help

3.38 Dialog " Export to Excel"(MSRW32)

You can write the results of an evaluation directly in an Excel file-

The values for "**Time left cursor**", "**Periode**" und "**Number of values**" displays hte actula position of the evaluation cursors.

The values for "**Project**" , "**Author**" and "**Comments**" come from the loaded measurement. You can change these settings for the Excel Sheet, but changes are not saved in the MSR32 -measurement file. Select a template File (**Select**) or choose **No template file** if you want to create a new Excel File. See also Excel Export of an Evaluation

Options

Open Excel with data file
Transfer all channels to Excel

Opens Excel with the data file
Only channels corresponding to the channelsgroup are taken into the measurement. If You check this option, the measured channels will always appear at the same position in the Excel sheet. Not measured channels are empty. So You can create templates which will find a specific channel always at the same cell, e.g. K005 =>A5 (in Excel).
Without this option only measured channels will be listed in the sheet starting with A1 in Excel

Buttons:

Export Data

Accepts changes in the setting. In an file dialog you have to enter the file name for the Excel file

Cancel

Closes the dialog

Help

Opens this help

3.39 Dialog " Setup and Start Excel XY Measurement"

If you want to take a **Excel XY Measurement** you have to define the measurement in this dialog. Select the desired channels from the listbox by checking the little square on the lefthand side. You have to select at least one channel and You can select up to 250 channels. With a right click You have a menu to "**Select all channels**" or to "**Clear Selection**".

Select a "**Channel Group**" for this measurement. See also **Channel** . Every channel in the selected channel group cannot be edited while a measurement with this channel group is running. If you select Channel group 0, all channels are used in the measurement.

Choose a trigger channel, if you want to take the values automatically. A value is taken, when the value of the trigger channel changes from 0 to 1 (or higher).

It is possible to enter the desired number of values for this measurement. The measurement will stop when this value is reached. With "**Stop measurement after xx values**" you have to stop the measurement manual, the previous setting will be ignored.

You can enter additional information in "**Project**" , "**Author**" and some notes in "**Comments**". With the two Load and Save buttons you can load a textfile to fill the comment field or you can save the comments to a file.

Select a template File (**Select**) or choose **No template file** if you want to create a new Excel File. See

also **Excel XYMeasurement**

The **Actual Filename** will be displayed when You edit a running measurement.

Options

Open Excel with data file Opens Excel with the data file after the measurement is over
Run Msr-Measurement parallel A standard MSR measurement runs with the same settings and the same file name parallel. This is only possible if there is one MSR-measurement free

While the measurement is running, you can change the settings of the end of the measurement and all text options, see also "**Monitoring Measurement**" and "**State of Measurement**".

Buttons:

Start now Starts this measurement in the next cycle. Enter the desired file name for this measurement. Only available for a new or initialized measurement.
Start later Initializes the measurement. You can start it with **Start now** or from the dialog "**Monitoring Measurement**". Only available for a new measurement.
Apply Accepts changes in the setting for a running measurement. Only available for a running measurement.
Cancel Closes the dialog
Help Opens this help

3.40 Dialog "Edit Excel XY Measurement"(MSRW32)

If you want to take a **Excel XY Measurement** you have to define the measurement in this dialog. Select the desired channels from the listbox by checking the little square on the lefthand side. You have to select at least one channel and You can select up to 250 channels. With a right click You have a menu to "**Select all channels**" or to "**Clear Selection**".

You can enter additional information in "**Project**", "**Author**" and some notes in "**Comments**". With the two Load and Save buttons you can load a textfile to fill the comment field or you can save theh comments to a file.

Select a template File (**Select**) or choose **No template file** if you want to create a new Excel File.See also **Excel XY Measurement**

The **Actual Filename** will be displayed when You edit a running measurement.

Options

Open Excel with data file Opens Excel with the data file after the measurement is over

Buttons:

Start Measurement Starts the measurement and opens the dialog "**Excel XY Measurement Control**" Enter the file name now.

Cancel	Close the dialog
Help	Opens this help file

3.41 Dialog "Excel XY Measurement control"(MSRW32)

In this dialog you can control the measurement in MSR32.

The number of data points is displayed.

Buttons:

Save Data	Saves the channel values
Stop Measurement	Stops the measurement
Cancel	Cancel the measurement
Help	Opens this help file

3.42 Dialog "ILK LogPH Channel Setup"

To create a dynamic circuits you have to assign two channels for each point of the circuit.

The first channel is for the pressure value the second is either for the corresponding temperature or for the enthalpy of this point according to the settings made in "**ILK LogPH Graphic - Circuits**". This is also important for the kind of calculation when You use a temperature value

Note:

Enthalpy channels are used for points within the cooling circuit which cannot be measured directly, e.g. internal heat exchanger. You have to define a formula channel to calculate the enthalpy value of this point.

3.43 Dialog "ILK LogPH Graphic Setup"

This dialog sets the LogPH graphic. Refer to literature if you have any questions about thermodynamics, this cannot be handled within this help.

To setup a LogPH graphic you have to set the following registers:

3.43.1 Register "Circuits"

You can define up to 5 circuits for a LogPH graphic.

Select the **color**, the **width** of the graph and a **marker** for each circuit.

A circuit can be a circuit of fixed values (**Graph of Setpoints**) or a of measured values.

You can switch a circuit visible / invisible with the check box "**Show Graph**".

The number of points in a cooling circuit are unlimited. "**Default Settings**" are a typical cooling circuits for R134a with 7 points in the circuit.

Mark a point in the left point list to see the properties of the point. With right click you can **Insert a new point, delete a point, delete all points** and set to "**Default Settings**"

Use the arrow buttons to move a point up or down in the list to change the order in the circuit.

Every point within a cooling circuits has the following properties:

Title	text in the list box
Text at Point	text at point in circuit, e.g.. O1, O2, C1 etc
show	shows the point or hide it
Text Orientation	sets the orientaon of the text according to the point in the circuit

Pressure setpoint of the pressure coordinate (y-axis)

The x-coordinate can be selected with

Temperature setpoint of the temperature, enthalpy will be calculated

or

Enthalpy setpoint of the enthalpy direct, no calculation

Calculation Enthalpy

If You select **Temperature** as X-coordinate You have to decide whether the enthalpy is calculated as a function of temperature or a function of temperature and pressure.

Note:

You can enter enthalpy value directly or You can enter a temperature to calculate the enthalpy.

These settings are used in the dynamic circuit also, see also "**ILK LogPH Channel Setup**".

3.43.2 Register "Enthalpy Axis"

Start and End Value

Enter the value for the beginning and the ending of the enthalpy axis. The end value must be greater than the start value.

Axis Text

Enter a text which will be shown at the enthalpy axis

Major Grid As, Minor Grid As

Select whether the grid is displayed as a net or only as ticks on the axis

Number of Major Grid Ticks, Number of Minor Grid Ticks

Enter the number of ticks. Text is only displayed at the main grid ticks.

Axis Style

Select a linear or a logarithm style of the axis.

Integer Places, Decimal Places

These properties will format the values, displayed at the main grid ticks, where the decimal places stand for the accuracy of the value, the integer places are place holders for the length of the value. Integer places don't cut a text if the value is greater then the integer places. Integer and decimal places are used to set the space between the axis and the axis text.

3.43.3 Register "General"

Here you can set the colors of the diagram area and the border area and the settings of the major and minor grid (color and line width)

3.43.4 Register "Graphs"

A LogPH diagram contains several graphs of the thermodynamic properties of the refrigerant.

Select a refrigerant from the drop down list.

You can set the color and the width of each graph. If you don't need the graphs for vapor content,

isotherms and isentrops you can switch them off by unchecking the "*y/n*" switch.

Check "**Show values at Graph**" if you want to get values at the isotherm and isentrops.

Check "**Isotherms in solid Style**" if the isotherm should be drawn from dew point to boiling point.

Enter a value for "**Isotherm steps**" to change the step between two isotherms in [K].

Impotent note for CO2 (R744):

Don't choose the display of isentrops when using R744. The ILK module needs a lot of calculation time and this can cause longer times for the graphic refresh.

3.43.5 Register "Pressure"

Start and End Value

Enter the value for the beginning and the ending of the pressure axis. The end value must be greater than the start value.

Axis Text

Enter a text which will be shown at the pressure axis

Major Grid As, Minor Grid As

Select whether the grid is displayed as a net or only as ticks on the axis

Number of Major Grid Ticks, Number of Minor Grid Ticks

Enter the number of ticks. Text is only displayed at the main grid ticks.

Axis Style

Select a linear or a logarithm style of the axis.

Integer Places, Decimal Places

These properties will format the values, displayed at the main grid ticks, where the decimal places stand for the accuracy of the value, the integer places are place holders for the length of the value. Integer places don't cut a text if the value is greater then the integer places. Integer and decimal places are used to set the space between the axis and the axis text.

3.44 Dialog " Change ILK Refrigerant "

In this dialog You can change the ILK refrigerant used in formulas in one step.

The first selection box show the first refrigerant found in a formula channel. Select a refrigerant to be replaced with the refrigerant from selection box beyond.

Select the channelgroups in which the replacment should take place, all unchecked channelgroups remain unchanged.

With "**OK**" all refrigerants in formulas will be replace as selected.

In the third box You can change the refrigerant in the **ILK LogPH-graphic** but only if it is visible.

Attention:

This dialog is only available if You have a general access to ILK-functions.

3.45 Dialog " ILK Setup "

In this dialog You can change the settings of the ILK-DLL's.

This dialog comes from the used ILK-DLL's and is not a component of MSR.

Therefore Kohlenberg Software is not responsible for this dialog and cannot change or replace it.

Refer to the actual manual for the ILK-DLL's (actual file: REFLIBDLL21_E.PDF).

3.46 Dialog " Adjust Symbols "

In this dialog You can adjust the position and the size of marked symbols.
Adjust the symbols to the left or the right side or adjust the symbols to equal distances between the symbols, the most left and the most right symbol remains in its position.
Adjusting the symbols in vertical direction works in the same way.

Note:

See "***Mark and adjust symbols***" because the kind of marking the symbols is very important.

You can also change the width and the height of the symbols in a similar way. Enter the value for width and height or set all symbols to the maximum or minimum value of all symbols.
If You choose "***No Change***" nothing happens to this item.

4. Formula Interpreter

4.1 Working with formulas

The formula text of a channel will be interpreted in every measurement cycle for each channel. You can enter a formula as on a table calculator, spaces and line feeds can be entered without any problem. Functions can be entered in small or large letters or mixed. There are up to 9 bracket levels possible. Errors can occur when you enter a wrong formula, in this case you cannot close the dialog and a message is displayed. If the formula is entered correct an error can occur when the formula is interpreted. If there is any error in the formula, the result is set to "0" or in case of special functions to error codes¹

For more information about available function see "**Formula Assistant**"

If you enter only a number the output of the channel is set to this value.

Note! If you do this (or a similar formula) in a channel with an input channel no value from the hardware will be displayed.

Note! If you enter a formula (not only a number) in the formula of a constant channel, the formula text will be set internal to the result of the formula in the next cycle

You have access to all defined channels with the following expressions

- H123** Value delivered from the hardware or sent to the hardware in case of an output channel
- K123** Actual value of the channel after the calculation of the formula
- M123** Mean value of the channel depending on the setting of the number of floating mean values
- P123** Max value, as above
- I123** Min value, as above
- X123** Inclination, depends on the setting of the number of floating inclination

There are 3 additional variables

- zeit** A time value in days elapsed since 01.01.1900
- dt** The time difference between two cycles in hours
- zz** The time of a complete cycle in ms

In MSR32 there are three more variables (when using additional formulas)

- Index** index of a values in a measurement
- Anzahl** number of measured values
- Zeit** a time value in days starting with 0 at the first value of a measurement

If a channel is not defined an error occurs an the result is set to "0"

Note! The formulas of the channel are interpreted in the order of the channel number. If you want to get access to the value of a channel that has a higher number, Kxxx represents the value from the last cycle not from the actual.

Examples:

Formula	Result
---------	--------

¹If there is an error in a special function, for example a not defined channel, the output value is set to an error code, which is a negative number in the range of **-9990** to **-9999**. See the information to the corresponding special function

1	1
(1+2)*3	9
H123*5+3	Value from the connected hardware * 5 plus 3 e.g. for scaling a mA input to physical units
sin(K123*100)	Value from Channel 123 in a mathematics function

If there is an error in a special function, for example a not defined channel, the output value is set to an error code, which is a negative number in the range of **-9990** to **-9999**. See the information to the corresponding special function

4.2 Additional Formulas in MSR

In MSR32 it is possible to create additional formula channels. You can use these channels as in MSR32, see also **"working with formulas"**.

To create a new formula channel open the main form "Channel Configuration Setup" and choose the menu item **"Create Additional Formula"**. The dialog **"Edit MSR Channel Kxxx"** opens. Some of the properties are disabled, because they are connected with the measurement

There are some differences with MSR32:

- An additional formula will be calculated when a measurement is loaded or when the channel dialog is closed. The calculated values are not stored in the data file.
- Within MSR32 not all functions are available, e.g. PID controller. An error will occur if You try to use disabled functions
- It is only possible to use the syntax Kxxx to get access to a channel value, (Mxxx, Hxxx are not available)
- If You want to use an additional formula within another additional formula, You have to use the channels in an correct order to avoid problems. When You change the formula of a channel, all channels with higher number will be calculated new also.
- You can use all measured channels in an order as you like

Example:

K010 has the formula "index"

K011 has the formula "K010 + 5"

if K011 will be calculated new, the values of K010 are already calculated an the result is correct

K010 has the formula "K011 + 5"

K011 has the formula "K012+5"

if K010 will be calculated, the correct values of K011 may be incorrect at this moment.

Try to avoid a call to a channel which is behind the active one, because it will be calculated later.

4.3 Special function "Cycle Control"

The cycle control is a special formula for creating a cycle. The Output value of the formula is **"0"** or **"1"**. A complete cycle can have up to four conditions: **High Low High Low** or **1010** see the examples. Times for the cycle parts, that are set to "0", doesn't really perform this part. This is a possibility to switch off a part of the cycle control. The syntax of the formula is

ZYKLUS(n,Kxxx,a,b,c,d,i)

Where:

n is a number for this cycle within 1 - 9,(must be individual if you use more than one cycle

formulas)

Kxxx is the start channel of the function, a value of this channel of greater or equal "1" starts the cycle.

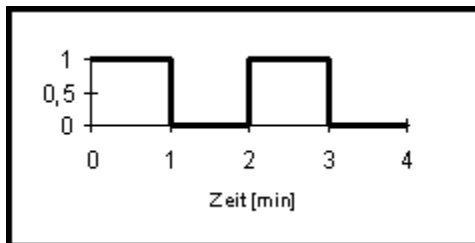
a,b,c,d are the times of each cycle in [min], You have to enter the values with the decimal separator "."

i is the number of cycles, if you enter "0" the function will run continuously otherwise the function stops after **i** cycles

Examples:

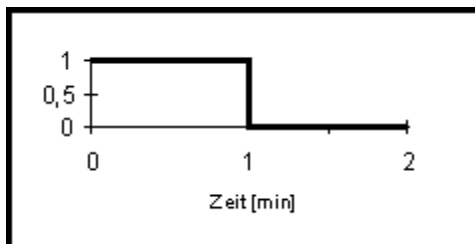
ZYKLUS(n,Kxxx,1,1,1,1,i)

Every part of the complete cycle is set, after 4 minutes the cycles starts again



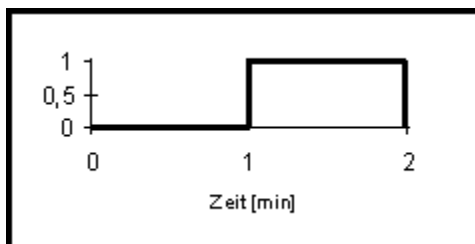
ZYKLUS(n,Kxxx,1,1,0,0,i)

This cycle has only two parts, The third and fourth part is switched off.



ZYKLUS(n,Kxxx,0,1,1,0,i)

This cycle has only two parts as above, but here The first and fourth part is switched off. Note that the cycle starts with the output value of "0".



ZYKLUS(n,Kxxx,1,1,1,1,i)

4.4 Special function "Day Simulation"

This is a special function to create an output signal for a time period.

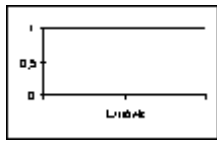
TAG(a,b,Kxxx,Kyyy)

Where:

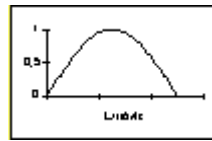
- a** is a number for this simulation within 1 - 9,(must be individual if you use more than one simulation formulas)
- b-** is the type of output signal, see examples
- Kxxx** is the time channel of the function which sets the length of the time period in [h]
- Kyyy** is the start channel, a value grater/equal then "1" starts the simulation.
After the time period is over this channel is set back to "0" are the times of each cycle in [min],
You have to

Examples for the type of output signal:

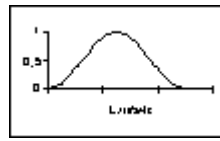
All graphics display the output signal over the time pride (Kxxx)



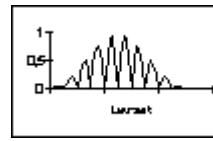
Type 1



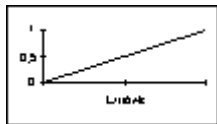
Type 2



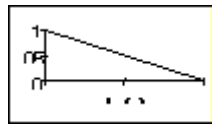
Type 3



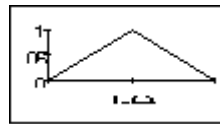
Type 4



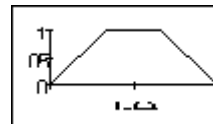
Type 5



Type 6



Type 7



Type 8

Type 9 : random numbers

4.5 Special function "Group Function"

With this formula you can examine a list of channels and the result is a number which depends on the type of the first parameter. The formula is

GRUPPE(T,O,Selection)

Or optional

GRUPPE(T,O,Selection,[Maximum Difference])

where:

- T** is a character for the type of function
- O** is an override flag
- Selection** is a list of channels to be examined
- [Maximum Difference]** allowed difference to the last valid result of the function

The possible types of **T** are:

- H** The result is the mean value of all selected channels calculated by the value from the hardware
Hxxx
- K** The result is the mean value of all selected channels calculated by the actual value **Kxxx**
- M** The result is the mean value of all selected channels calculated by the floating mean value **Mxxx**
- I** The result is the minimum value of all selected channels calculated by the floating min value **Ixxx**
- J** The result is the channel number of the minimum value from all selected channels
- P** The result is the maximum value of all selected channels calculated by the floating max value
Pxxx

- Q** The result is the channel number of the maximum value from all selected channel
- R** The result is the maximum value of all selected channels calculated by the actual value **Kxxx**
- S** The result is the maximum value of all selected channels calculated by the actual value **Kxxx**, the channel number used with the override flag is calculated by the floating maximum value **Pxxx**

If the override flag is set to "J", the title, comment and unit of this channel is set to the title, unit and comment of the channel with the minimum or maximum value. All other override flags will do nothing. This option is only available when using type "I" , "P", "R" or "S".

Selection is a list of channels to be examined, e.g. **1..512**, **1,3,4..12.400..512**, **1,2,10,5**

If you use the optional maximum difference [**100**] you can prevent the group-function from using a channel value as a result of e.g. a broken thermocouple. If a new calculated result of a group function is smaller or greater than the amount of maximum difference and the last value, the new value will be ignored and the result will be set to the last value. If you add this option to a defined group function, make sure that the last value is not set to a maximum value greater/smaller than the maximum difference already. In this case you have to reset the "wrong" maximum channel value to set the group function to a correct value.

Example 1:

GRUPPE(P,J,1..10,12..512)

In every cycle the maximum value from all channels except channel 11 is identified, the channel title of this maximum channel is set to the title of the formula channel.

Example 2:

GRUPPE(P,J,1..10,12..512,[100])

As in Example 1 but the group function will ignore all channel values greater/smaller than the last value +/- 100.

Error codes

- 9990** wrong channel number(s) (only 0..512)
- 9991** no defined channel in selection

4.6 Special function "Measurement State"

The formula gives access to a measurement. The result of this function is the state of the measurement:

- 0** measurement is not defined
- 1** measurement is defined and is waiting for the start time
- 2** measurement is running

MSTATUS(n)

where:

n is the number of the measurement (1 - 5)

4.7 Special function "PID - Controller"

A PID-Controller creates a closed-loop control by a formula. To use this function you have to enter the parameters of the controller in the dialog "**PID Controller**". The formula is

PID(No,Kxxx,Kyyy,Kzzz,Cycle,Startvalue,Limit)

where

- No** is the number of the controller setting, see "**PID Controller**". You have to enter this value in the format "**01**" to "**50**"
- Kxxx** is the channel of the actual value to be controlled
- Kyyy** is the channel of the setpoint, typical a constant channel
- Kzzz** is the channel of the on/off channel, typical a constant channel, a value greater/equal 1 starts the calculation of the output value
- Cycle** is a number to choose, on which cycle the calculation is executed, enter **01** for a calculation in every cycle. You have to enter this value in the format "**01**" to "**99**"
- Startvalue** This is the first value of the output when the calculation start the first time, you have to enter this value in the format "**00**" to "**99**"
- Limit** This value defines a limit to stop the calculation if the difference of **Kyyy-Kxxx** is within this limit. You can enter this value in a valid decimal format

Example:

PID(01,K001,K002,K003,01,03,1.23)

This formula uses the setting **01** with the actual value from channel **K001** and the setpoint in channel **K002**. **K003** switches the output on/off. The calculation is executed in every cycle **01** and starts with an output value of **3**. No calculation will be done if the difference K002-K001 is smaller than **1.23**

4.8 Special function "Integrator"

To perform an easy integration function e.g. for calculation of energy, volume use the function

INTEGRATOR(Kxxx,m,s,n)

where

- Kxxx** is the channel of the measured value to be integrated.(You can also use **Mxxx, Ixxx, Pxxx, Hxxx**)
- m** is a flag for the mode of the integration
- s** is a flag for the state of the integration
- n** is the number of the measurement, which is assigned to this function

Possible types **m** are

- 0** The result is the actual value of **Kxxx** (or **Mxxx,Pxxx, Ixxx, Hxxx**)
- 1** The result is calculated by the multiplication of the channel value with the time difference K000 in [h] and the addition of this product to the previous value, i.a. an integration
- 2** The result is the addition of the actual value to the previous value without any multiplication

Possible states **s** are

- 0** The result is set to "0", the integration function is switched off
- 1** The integration function is active
- 2** The result is set to "0" when the measurement **n** starts
- 3** The integration function is only active is the measurement **n** is running

Error codes

- 9990 Wrong channel number (only 1..512)
- 9991 Channel not defined
- 9992 Error mode m
- 9993 Error state s
- 9994 Error measurement number

4.9 Special function "Time Switch"

This formula set the output value of a channel to "0" or "1" depending on the settings of the time switch. To setup the time switch see "*Setup time switch*".

The formula for the time switch is

SCHALTUHR(x)

where

x is the time switch configuration (1 - 4)

4.10 Special function "Two Position Controller"

This formula creates a simple two position controller which gives **0** or **1** as a result. the formula is

ZWEIPUNKT(No,Kxxx,Kyyy,Output,Hysteresis)

where

No is the number of the controller setting. You have to enter this value in the format "**01**" to "**50**". This option is used only intern to store the calculated values.

Kxxx is the channel of the actual value

Kyyy is the channel of the switch point, typical a constant channel

Output Sets the type of output. "**1**" means, if the actual value **Kxxx** is greater or equal **Kyyy** the result is "1" otherwise "0". If the type is "**0**" the output value is vice versa

Hysteresis Set the hysteresis of the switch point, that means, if the actual value is greater than the switch point, the output value changes as explained above. If the value decreases, the output state will change, when the value is smaller than the switch point minus the hysteresis.

Note:

This is for output type "1", for output type "0" the hysteresis works in the other direction.

Example:

ZWEIPUNKT(01,K001,K002,1,0.5)

If K001 is greater K002 the output changes to "1". If K001 is smaller than K002-0.5 the output is set back to "0"

4.11 Special function "Bit Function"

With the BIT-function it is possible to get the value of a single bit from a channel value. This is important for some kinds of hardware which supplies the state of digital inputs in a single value, one bit for each input but not in separated channels.

The syntax of the formula is

BIT(Kxxx,B)

where:

Kxxx Channel, which is connected to the hardware. You can use **Kxxx** or **Hxxx**

B Number of the bit to examine (0 - 31)

Example:

BIT(K123,10)

Result is the state of bit 10

4.12 Special function "Time Step Function"

With the Time Step Function You can display the state of a running time step control as a value in a MSR channel.

The result of the formula depends on the parameter X.

The syntax of the formula is:

TSC(X)

where **X** delivers:

X Result of formula

0 result is **1** for a running or initialized control else **0**

1 result is the number of the actual time step. If the control is waiting for the starting point the result is **0**.

2 Number of remaining steps

3 Number of steps

4 Elapsed time in [h] since start

5 Remaining time in [h]

6 Total time in [h] of the control

7 Elapsed time in [h] of the actual time step

8 Remaining time in [h] of the actual time step

9 Total time in [h] of the actual time step

Example:

TSC(0)

Result is the state of the control (**0** or **1**)

4.13 Special function "Impulse Function"

With the Impulse Function it is possible to create a pulse signal from an analog channel. The function result is 0 or 1. A single pulse (value "1") will be created when the rounded value of channel Kxxx minus the rounded value of the last pulse is greater than 0. The impulse function works also with negative differences. (calculation formula : $Abs(Round(channel\ value\ Kxxx) - Round(last\ pulse\ value)) > 0$) The last

pulse value is always the value of the channel Kxxx when the calculation formula delivers a value greater than 0, the last pulse value is set to 0 when the program starts

The syntax is:

IMPULS(Kxxx)

where

Kxxx Channel to be examined

Note:

This function can be used to trigger an external counter over an digital output channel. You have to format the values of channel Kxxx to get correct pulses. If the differences between two values of channel Kxxx are too high the impulse function delivers always "1", if the differences are too small no pulse signal can be created.

4.14 Special function "Stable Function"

The stable function offers a simple way to check if a process runs to stability or not. The formula is:

STABIL(Kxxx,Kyyy,o,u,t)

where:

Kxxx is the channel to be overviewed.
Kyyy is the channel with the setpoint.
o is the upper allowed deviation from setpoint
u is the lower allowed deviation from setpoint
t is the time periode in minutes to be overviewed

The function delivers "1" if in the last t minutes all values from Kxxx are within the range of **Kyyy-u** to **Kyyy+o** . If these conditions are not given the function delivers "0".

4.15 Special function "Ramp Function"

With the Ramp function it is possible to create a slow changing signal instead of a jump. The formula is:

RAMPE(Kxxx,d)

where:

Kxxx is the setpoint channel.
d is the gradient in 1/min

The ramp function changes its output value with the gradient d. If You change the Setpoint **Kxxx** the output signal of the ramp function changes slowly with the gradient d towards the new setpoint. The function remains at the setpoint value if the setpoint is reached.

Note:

If You enter **d=0** the setpoint value is taken as output value, no ramp will be created.

Example:

The setpoint **Kxxx = 10** is stable, the gradient is **d = 60/min**, Your MSR cycle is 2 s.
If You change the setpoint towards **Kxxx = 20** the outputs value of the ramp function increases by 2 in every cycle. The new setpoint will be reached after 5 cycles..

4.16 Special function "COM Function"

With the COM function You can get the actual state of a COM port:

The syntax of the formula is:

COMx

where:

x Number of COM-Ports between 1 and 4

The result of the function are:

- 1 COM port not in use
- 0 COM-port ok
- 1 Bad communication
- 2 No communication
- 3 Demo modus at port x

5. **Definitions and Terms**

5.1 **Definition "Channel"**

In MSR up to 512 different channels can be used.

A Channel is defined by the following properties:

Number

The channel number is unique to each channel. You cannot edit the channel number directly. The channel number gives you direct access to the specific values of the channel in a formula, *see working with formulas*

Title

Name of the channel with up to 10 characters. The title will be displayed in connection with the channel number wherever a channel can be selected or is displayed. It is recommended to use different titles for each channel but its not necessary to do so.

Unit

The unit describes the physical unit of the channel. Its only a text property, changes of the unit will not cause a change of the values itself

Comment

Up to 80 Characters to further information of the channel

Formula

A formula can be edited like on a calculator. You can enter up to 255 characters, see *working with formulas*

Hardware channel

The hardware channel represents hardware module connected. This property can only be selected from the drop down list. The text shows the internal index number of the hardware, the module type and the location of the selected module

Number of floating mean value

A value of "1" means, no floating operation is performed. The mean value is set to the actual value, the min/max value are the maximum/minimum values of this channel as long as these values are not reseted. A value (n) greater than "1" (and smaller than 100) will cause a calculation, which only use the last n values for the determination of mean, min and max value. Min and max values can change and do not display global min/max values, see also *working with formulas*

Number of floating inclination

As above, but the minimum input value is "2". The inclination is a value that is calculated by a first order polynome to show the rising or falling of the value, see also *working with formulas*

Channel group

Each channel can be assigned to up to 15 channel groups. If you take a measurement, you have to select a channel group to assign channels to a measurement. Every channel is internal set also to Channel group "0", so this group contains all defined channels.

Channel type

Every channel is assigned to one of the 10 channel types. The first 8 types are hardware dependent, so the hardware channel of an analog Input displays only hardware of this type, an digital output type. Formula and constant types cannot connected to any hardware.

A constant channel in opposite to a formula channel give you access to the channel value even if the

channel is defined in a running measurement, see **Constants**

5.2 Definition "Constants"

A constant (or constant channel) is a special kind of a formula channel. There are two differences between these to channel types.

If you enter a formula in a constant channel, the result of the formula will exchange the formula text after the formula is interpreted the first time. You cannot store a formula in the formula field, only a value.

Example :

if you enter : **1+2+3+4** in the formula, the next time, you opens the channel the formula text is : **10**

The value of a constant channel can be changed while the channel is assigned to a running measurement by "**Options / Constant Setup**", which will opens the dialog "Edit Constants". This is the only way to change a channel value within the program, which is active in a measurement

5.3 Definition "Graphic"

A graphic is the main component to display measured values.

In MSR 25 graphic screen are available. To show one of these you have to select a graphic from the drop down box in the main tool bar or, if the graphic is already opened, you can select it from the Window menu, which displays all opened windows.

There are three graphic styles to choose:

Y-t graphic	displays values over the time
X/Y graphic	displays values over a defined channel
Bar graphic	displays the values as bars

Within a graphic 30 graphs are allowed.

If the option for more multiply y-axis are available to you, it is possible to create a graphic with up to 4 different y-axis.

see "**Graphic Setup**" for more information.

5.4 Definition "Calculation of mean values"(MSRW32)

Im MSRW32 the calculation of the mean, min and max values will be performed in a separate calculation. This calculation of the values uses only the range of values within the position of the left and right cursor. Move the left and the right cursor at the desired position, the middle cursor doesn't count for this and start the evaluation by the menu item "**Evaluation / Calculation of Mean Values**" oder with the button "**A**" from the **Navigator**.

The evaluation calculates the mean, min and max values from the selected range. When moving the left or the right cursor the calculated values will be cleared,

5.5 Definition "Cursor" (MSRW32)

The main form "Graphic" in MSRW32 shows three cursors-

The left and the right cursor set the range for the calculation of the mean values. With the mid cursor you can navigate through the values within the range.

Activate the desired cursor with the buttons "**L**", "**M**" or "**R**" from the main tool bar or use the buttons from the **Navigator**.

The activated cursor is marked with the button displayed pressed.

You can move the active cursor with the following options

- use the slide button in **Navigator**
- use the arrow buttons from the main forms
- move the cursor with the left mouse button down in the main form graphic

The position of the non-active cursor will be corrected, i.a. you can move the left or right cursor with the middle cursor.

5.6 MSR32 file types

The main executable files are:

MSR32.EXE	Measurement program
MSRW32.EXE	Evaluation program
MSRF32.EXE	Remote monitoring program

You must have the next files in your MSR32 start directory

MSRLIB.DLL	Library for the hardware communication
MSR32.HLP	Online help for MSR32

When starting the application the first time you will find some new files:

MSR32.INI	Global program settings
MSR32.DAT	File of the buffer

MSR32 uses configuration files with the following extensions:

The following file types are the main configuration files. They all have the same name, but different extension. If you want to load a configuration, only K32 files will be listed, the other files will be loaded automatically.

.K32	File of channel settings.
.P32	File of prozessgraphic setting (without the background image)
.G32	File of graphic settings
.I32	File of additional information about the configuration
.T32	File of interrupted measurements, is used for the restart of a measurement .

The following files can be named as you like:

.L32	File of LogPH settings.
.PRZ	File of a single prozessgraphic
.UHR	Settings of the time switch
.PID	Settings of the PID controller
.ftb	Settings of the color table

If you are taking a measurement, the data will be saved in the following files

.MW3	contains all settings of the measurement
.DW3	contains the data only

5.7 Definition "Loglist"

A Loglist contains information about all activities and errors happened when using MSR32. The size of the list is 2000 lines, the next new entry then will overwrite the oldest entry. The Log file will be saved and loaded automatically with MSR32.

5.8 Definition "VDE-mode"

The German VDE uses some special options in MSR32. To have access to VDE-Mode start MSR32 with the start parameter "VDE", but this option is only convenient when you know VDE tests.

5.9 Definition "Start parameter"

You can start MSR32 with the following parameters.

/Demo The program runs in demo mode without hardware access. All value will be simulated.

/VDE The program runs in VDE mode

To use one (or both) of these parameter change the corresponding entry.

Example:

C:|Program Files|Kohlenberg Software|msr32|msr32.exe /demo

5.10 Definition "Excel Measurement"

You can take a measurement which will create an Excel file as a result.

Microsoft Excel must be installed on Your computer!

In opposite to the standard measurement in this type there are only mean, min and max value for each channel over the measured periode.

The format of the Excel sheet is always the same, see picture

	A	B	C	D	E	F	G	H	I	J
1	k005	Ain 5	V		10,00	10,00	10,00		Datum	25.01.2002
2	k006	Ain 6	V		1,16	1,15	1,18		Zeit	15:14:33
3	k008	Ain 8	V	akku	1,23	1,21	1,24		Messdauer S	1
4	k025	Ain 25	°C		0,00	0,00	0,00		Messdauer Is	0,36684999
5	k026	Ain 26	°C		0,00	0,00	0,00		Bearbeiter	KS
6	k027	Ain 27	°C		0,00	0,00	0,00		Projekt	Test
7	k028	Ain 28	°C		0,00	0,00	0,00		Anzahl Werte	12
8	k043	System 43	°C		3,00	2,98	3,01		Kanalgruppe	2
9	k044	System 44	V		3,03	3,01	3,04		Kommentar	Zeile1
10	k045	System 45	°C		0,00	0,00	0,00			Zeile2
11										

Column	Contents
A	Channel number
B	Title
C	Unit
D	Comment
E	Mean value
F	Minimum value
G	Maximum value
I,J	Text items

If you start a measurement without template file, a new Excel file will be created and a new table will be added. The title of this table is "**MSR-Data**" (see picture)

If You want to use a template file, just create an Excel file and name one of the tables "**MSR-Data**". The

data will be written in this table as seen above.

Note:

See the options in the dialog "**Setup and start Excel Measurement**"

To create the Excel file a program called **MSR2Excel.Exe** starts and displays the state of the transaction.

5.11 Definition " Excel Export of an evaluation" (MSRW32)

You can make an evaluation of a measurement which will create an Excel file as a result.

Microsoft Excel must be installed on Your computer!

In this type there are mean, min and max value for each channel over the measured periode.

The format of the Excel sheet is always the same, see picture

	A	B	C	D	E	F	G	H	I	J
1	K005	Ain 5	V		10,00	10,00	10,00		Datum	25.01.2002
2	K006	Ain 6	V		1,16	1,15	1,18		Zeit	15:14:33
3	K008	Ain 8	V	akku	1,23	1,21	1,24		Messdauer S	1
4	K025	Ain 25	°C		0,00	0,00	0,00		Messdauer Is	0,36684999
5	K026	Ain 26	°C		0,00	0,00	0,00		Bearbeiter	KS
6	K027	Ain 27	°C		0,00	0,00	0,00		Projekt	Test
7	K028	Ain 28	°C		0,00	0,00	0,00		Anzahl Werte	12
8	K043	System 43	°C		3,00	2,98	3,01		Kanalgruppe	2
9	K044	System 44	V		3,03	3,01	3,04		Kommentar	Zeile1
10	K045	System 45	°C		0,00	0,00	0,00			Zeile2
11										

Column	Contents
A	Channel number
B	Title
C	Unit
D	Comment
E	Mean value
F	Minimum value
G	Maximum value
I,J	Text items

If you start a measurement without template file, a new Excel file will be created and a new table will be added. The title of this table is "**MSR-Data**" (see picture)

If You want to use a template file, just create an Excel file and name one of the tables "**MSR-Data**". The data will be written in this table as seen above.

Note:

See the options in the dialog "**Export to Excel**"

To create the Excel file a program called **MSR2Excel.Exe** starts and displays the state of the transaction.

5.12 Definition " Excel XY Measurement"

You can take a measurement which will create an Excel file as a result.

Microsoft Excel must be installed on Your computer!

This measurement type is designed to get the values in an X-Y-mode for up to 250 channels.

Values can be taken manual, see "**State of Measurement**" and "**Monitoring Measurement**" or with a trigger channel.

A values than is taken when the value of the trigger channel changes from 0 to 1 (or higher). Additional values can be taken manual also.

The number of values is restricted by Excel to 65000.

The format of the Excel sheet is always the same, see picture

	A	B	C	D	E	F	G	H	I
1	Datum	18.04.2002							
2	Zeit	07:55:47							
3	Bearbeiter	KS							
4	Projekt	XY-Test							
5	Anzahl Werte	10							
6	Kanalgruppe	1							
7	Trigger-Kanal								
8	Kommentar								
9	Testkommentar über mehrere Zeilen								
10									
11									
12									
13									
14									
15									
16									
17	K001	K002	K003	K004	K005	K006	K007	K008	
18	Ein 3	DIN1	DOT1	DOT1	Konst 5	Form1	Form2	zz	Zeit
19	°C	°C	°C	°C	°C	°C	°C	ms	dd.mm.yyyy hh:mm
20									
21	1,0	1,1	2,2	6,3	1,2	11,0	44,6	1,012	01.03.2002 07:50
22	2,0	1,1	0,0	1,0	1,0	0,0	0,0	1,012	01.03.2002 07:50
23	3,0	2,2	1,5	2,5	2,5	1,5	1,5	1,012	01.03.2002 07:50
24	4,0	3,3	3,0	4,0	4,0	3,0	3,0	1,012	01.03.2002 07:50
25	5,0	4,4	4,5	5,5	5,5	4,5	4,5	1,012	01.03.2002 07:50
26	6,0	5,5	6,0	7,0	7,0	6,0	6,0	1,012	01.03.2002 07:50
27	7,0	6,7	7,5	8,5	8,5	7,5	7,5	1,012	01.03.2002 07:50
28	8,0	7,8	9,0	10,0	10,0	9,0	9,0	1,012	01.03.2002 07:50
29	9,0	8,9	10,5	11,5	11,5	10,5	10,5	1,012	01.03.2002 07:50
30	10,0	10,0	12,0	13,0	13,0	12,0	12,0	1,012	01.03.2002 07:50

Textitems are located in column A and B up to row 9. The comment of the measurement is in cell A9. Number, title, unit and comment of the channels are placed in rows 17 to 20. Datapoint starts from row 21.

The last column displays the time of taking this datapoint.

If you start a measurement without template file, a new Excel file will be created and a new table will be added. The title of this table is "**MSR-Data**" (see picture)

If you want to use a template file, just create an Excel file and name one of the tables "**MSR-Data**". The data will be written in this table as seen above.

Note:

See the options in the dialog "**Setup and start Excel XY Measurement**"

To create the Excel file a program called **MSR2Excel.Exe** starts and displays the state of the transaction.

5.13 Definition "Excel XY Measurement" (MSRW32)

You can take a measurement which will create an Excel file as a result.

Microsoft Excel must be installed on Your computer!

This measurement type is designed to get the values in an X-Y-mode for up to 250 channels.

Value are taken in the dialog "**Excel XY Measurement Control**"

The values are the mean values between the left and the right cursor, see also *cursor* and *evaluation*
The number of values is restricted by Excel to 65000.

The format of the Excel sheet is always the same, see picture

	A	B	C	D	E	F	G	H	I
1	Datum	18.04.2002							
2	Zeit	07:55:47							
3	Bearbeiter	KS							
4	Projekt	XY-Test							
5	Anzahl Werte	10							
6	Kanalgruppe	1							
7	Trigger-Kanal								
8	Kommentar								
9	Testkommentar über mehrere Zeilen								
10									
11									
12									
13									
14									
15									
16									
17	K001	K002	K003	K004	K005	K006	K007	K008	
18	Ein 3	DIN1	DOT1	DOT1	Konst 5	Form1	Form2	zz	Zeit
19	°C	°C	°C	°C	°C	°C	°C	ms	dd.mm.yyyy hh:mm
20									
21	1,0	1,1	2,2	6,3	1,2	11,0	44,6	1,012	01.03.2002 07:50
22	2,0	1,1	0,0	1,0	1,0	0,0	0,0	1,012	01.03.2002 07:50
23	3,0	2,2	1,5	2,5	2,5	1,5	1,5	1,012	01.03.2002 07:50
24	4,0	3,3	3,0	4,0	4,0	3,0	3,0	1,012	01.03.2002 07:50
25	5,0	4,4	4,5	5,5	5,5	4,5	4,5	1,012	01.03.2002 07:50
26	6,0	5,5	6,0	7,0	7,0	6,0	6,0	1,012	01.03.2002 07:50
27	7,0	6,7	7,5	8,5	8,5	7,5	7,5	1,012	01.03.2002 07:50
28	8,0	7,8	9,0	10,0	10,0	9,0	9,0	1,012	01.03.2002 07:50
29	9,0	8,9	10,5	11,5	11,5	10,5	10,5	1,012	01.03.2002 07:50
30	10,0	10,0	12,0	13,0	13,0	12,0	12,0	1,012	01.03.2002 07:50

Textitems are located in column A and B up to row 9. The comment of the measurement is in cell A9.
Number, title, unit and comment of the channels are placed in rows 17 to 20. Datapoint starts from row 21.

The last column displays the time of taking this datapoint.

If you start a measurement without template file, a new Excel file will be created and a new table will be added. The title of this table is "**MSR-Data**" (see picture)

If you want to use a template file, just create an Excel file and name one of the tables "**MSR-Data**". The data will be written in this table as seen above.

Note:

See the options in the dialog "**Edit Excel XY Measurement**"

To create the Excel file a program called **MSR2Excel.Exe** starts and displays the state of the transaction.

5.14 Definition "Process Symbols"

There are 15 possible symbol styles :

Text only

Only a text field not a graphical display. You should adjust the height of the symbol to the text field

Horizontal Bar

The current Value will be displayed as a horizontal bar from left to right.

Vertical Bar

The current Value will be displayed as a vertical bar from bottom to top.

Pie

Value will be displayed a "piece of pie" in clockwise direction

Needle

Value will be displayed as a needle in clockwise direction

Lines Graphic

Simple line graphic with an internal buffer of 10 values

Bar Graphic

Simple bar graphic with an internal buffer of 10 values

Clock

see Pie but with a needle

Min./ Max. Bars

Three bars with the minimum value of the last 10 values left, the maximum value of the last 10 values right and the current value in the middle

Up / Down Style

Display of the inclination calculated from the last 10 values

On / Off LED I

Display of a value equal/greater 1 as "ON", otherwise as "OFF"

Date/Time Display

Date and/or Time according to the date time format

On / Off Button

Active symbol to change the channels value of a constant channel with text on the righthand side

On / Off LED II

Like On/OFF LED I but with text on the right side

Value Input

Active symbol to change the channels value of a constant channel with text on the righthand side

5.15 Definition "Active Symbols"

Within all possible symbols in a process graphic there are two types which allows direct channel access. Both channels must be connected to a constant channel . The value of this channel can be changed using one of these symbols.

On/Off Button

A click on the button of this symbol changes the value of the constant channel which is connected. There are only two values possible, "1" for state "ON" and "0" for state "OFF". You can also use the menu items "**Button ON**" or "**Button OFF**" in the pop up menu (right mouse cclick on the symbol).

Note:

If You set the value of the constant to other values than 0 or 1 this setting will be overwritten be using the ON/OFF Button.

Value Input

Double clicking on the text of this symbol or using the menu item "Value Input" in the pop up menu opens an input dialog to enter a new value for the connected constnt channel. The valid range of values is defined by the values for Min Value and Max Value in the dialog "Setup Process Symbol".

5.16 Definition "Day Protocol File"

For a special supervision a day protocol file can be activated. The selected channels will be stored in a text file. The protocol runs automatically even after new start when activated.

Each day the protocol file will be created new. The filename corresponds to the actual date, e.g.. **14062002.CSV** for the 14. June 2002.

As you can see from the extension (CSV) the file format is a comma separated text file with semicolon (;) as separator.

This file can be read directly from EXCEL.

Setup the protocol file in "**Setup - Day Protocol File**"

Important note:

If You change channelgroups or channels or anything that changes the channels which are connected to the protocol file the protocol file will store wrong values, because every new line is added to the existing file so after changes this new line can contain more or less columns than before or the values doesn't fit to the titles.

If You have to make changes just deactivate the protocol **and** delete the current file.

Example for a file:

```
Time;K001;K002;K003;
Time;Test1;Test2;Test3;
Date and time;°C;°C;°C;
14.06.2002 11:38:10;1,00;2,00;3,00;
14.06.2002 11:38:20;2,00;4,00;6,00;
14.06.2002 11:38:30;3,00;6,00;9,00;
14.06.2002 11:38:40;4,00;8,00;12,00;
```

5.17 Definition "ILK Refrigerants"

In MSR32 and MSR32 refrigerant data from the ILK (Institut für Luft- und Kältetechnik, Dresden) can be used for online logPH graphic and for the formula interpreter. ILK refrigerant data are well known and accepted.

With the ILK modul 31 refrigerants are available including CO2 (R744) and 35 formulas for calculation of values.

The ILK modul is not included in the MSR Standard version and must ordered separate.

The ILK main forms and the calculation formulas are only visible if the ILK modul is a legal component of Your MSR version and all ILK files are correct installed.

If You have any questions about calculation of the refrigerant data, the accuracy or value ranges please contact :

Institut für Luft- und Kältetechnik
 Gemeinnützige Gesellschaft mbH
 Fachbereich Kältetechnik
 Bertold-Brecht-Allee 20
 D-01309 Dresden
 Phone.: (0049) 351 / 4081 630
 Fax.: (0049) 351 / 4081 635
 e-mail Kaelte@ilkdresden.de

6. How To...

6.1 How to Change the Buffersize

Select "**Options / Setup**" and select the register "**Cycles/Buffer**".
Enter the desired Path of the buffer file, default setting is the MSR32 start directory.
Enter a value between 1000 and 100000 for the buffersize:

Note:

If You change the buffersize, the buffer will be cleared.

You can also clear the buffer with the button "**Clear buffer**".

Check "**Save Buffer every Cycle**" if the buffer should be saved in every MSR interval to avoid a long saving time at the end of the program. This is only important when using a buffer with a buffer size of more than 10.000.

6.2 How to create a new configuration file

Use the menu item "**New**" from the main menu. If you want to get help by the "**Configuration Assistant**" choose this option in the first dialog, otherwise you have to create all channels individual.

6.3 How to edit a channel

You can edit a channel in the **Channel Configuration Setup** and the **Table of Measured Values** by double click on the selected row or by using the menu item **Open Channel** (right mouse click or the main menu).

The following window **Edit MSR Channel Kxxx** will display all properties of the selected channel.

Note: If you cannot edit some properties the channel is defined in a running measurement. These channels were handled as read only to avoid the change of a measurement.

6.4 How to edit a color table

Use the dialog "**Setup Colortable**" for all settings of a color table. See "**Color Table**" for more information.

6.5 How to edit a graphic

You can edit a graphic when the graphic is shown on the screen by using the menu item "**Graphic Setup**".

If you want to add channels to a graphic just drag a channel from "**Table of measured values**" or "**Channel configuration Setup**" into the graphic.

To change the axis only you can click on the axis as it is described in "**Graphic**".

6.6 How to edit a Logph diagram

Set all properties of a logph diagram with the dialogs "**LogPH Channel Setup**" and "**LogPH Graphic Setup**".

6.7 How to edit a process graphic

To edit a process graphic you can select a picture for the background. Use menu item "**Setup Process Graphic**" to open the dialog "**Process Graphic Setup**".

To add or edit a process symbol see "***How to edit a process symbol***"

6.8 How to edit a process symbol

You can edit a process symbol by simply double click on an existing process symbol.

The dialog "***Setup Process Symbol***" shows all properties of the symbol.

If you want to create a new symbol use menu item "***Add new Symbol***" from the pop up menu.

The dialog "***Setup Process Symbol***" opens as if you want to edit an existing symbol.

6.9 How to edit a table

You cannot edit a table directly. You can only choose the type of channels and the channel group for each type.

Select the channel type with the registers and the channel group with the menu item "***Select Channel group***".

To format the displayed values use the items "***Decimals +***" and "***Decimals -***" for setting the decimal places.

You can reset the max. values and the min. values with the menu items "***Clear all Min. Values***" and "***Clear all Max. Values***".

6.10 How to take a measurement

Within MSR32 there are three ways to take a measurement. The first is the standard method by choosing "***Measurement / Start MSR Measurement***" from the main menu. This will open the dialog "***Setup and start Measurement***".

If you want to save values that are already in the buffer you can choose "***Measurement / MSR Measurement from Buffer***". This will open the upper dialog also, but you can select values from the buffer.

The last possible kind of measurement is a measurement which will create an Excel Workbook. In opposite to the first kinds this measurement will only give the mean value, then minimum and the maximum value for each channel.

Choose "***Measurement / MSR Measurement in Excel***". For further Information see "***Setup and start Excel Measurement***".

6.11 How to mark, move and adjust symbols

Mark

Mark a single symbol just with a mouse click. To select more than one symbol hold the "***Ctrl***"-Key pressed. Clicking on a marked symbol with "Ctrl"-key pressed unmarks the symbol.

Another way to mark symbols is to click on the background with "***Ctrl***"-key pressed and move the mouse ("***Ctrl***" key and left mouse button pressed).

This will display a frame. You can adjust the frame so that all symbols You want to mark are completely inside the frame.

The symbols inside the frame will be marked after You release the left mouse button. Previous marked symbols will be unmarked.

Adjust

When You adjust the symbols in the dialog "***Adjust symbols***" it is important how You have selected the symbols:

If You select symbols one by one the first selected symbol sets the positions for "***left***", "***right***", "***top***" and "***bottom***". All marked symbols will be adjusted to the first symbol.

If You select symbols with a frame, the positions as seen above will be set from the position of that

symbol which is the most left, most right, most top or most bottom symbol.

"**Equal Distance**" sorts the marked symbols intern, so the kind of marking doesn't matter.

Move:

You can move marked symbol with "Ctrl" pressed and the arrow keys.

You can move marked symbols with the mouse by moving one of the marked symbol with the "ALT"- Key pressed.

Important:

This functions are only available if editing of the symbols is not locked. See also "**Setup - General**".

A

About MSR32 7
Active Symbols 75
Additional Formulas 59
Adjust Symbols 57
Arrow button in the main forms 24

B

Bit Function 64

C

Calculation of mean values 69
Change ILK Refrigerant 56
Change Refrigerant 26
Channel 68
Channel Configuration Setup 16
Channel Configuration Setup (MSRW32) 17
Channel group 68
Channel type 68
Channelsettings 44
Coefficients 29
Color Table 22
Color Table (MSRW32)" 22
Colors and Grid 45
COM Function 67
Comment 68
Configuration Assistant 26
Configuration Changed 26
Configuration File Info 27
Configuration overview 27
Configuration Print Setup 27
Constants 69
Control the Software 10
Create a new configuration file 77
Cursor 69
Cycle Control 59

D

Day Protocol File 42, 75
Day Simulation 60
Definitions and Terms 68
Dialog Time Switch 47
Dialogs 15, 25
Drag & Drop 15

E

Edit a channel 77
Edit a color table 77
Edit a graphic 77

Edit a Logph diagram 77
Edit a process graphic 77
Edit a process symbol 78
Edit a table 78
Edit Constants 27
Edit Excel XY Measurement (MSRW32) 53
Edit Graph 27
Edit MSR-Channel Kxxx 28
Enthalpy Axis 35, 55
Error codes 59
Excel Export of an evaluation (MSRW32) 72
Excel Measurement 71
Excel XY Measurement 72
Excel XY Measurement (MSRW32) 73
Excel XY Measurement control (MSRW32) 54
Export to Excel (MSRW32) 52

F

Features of MSR32 8
Find 29
First Steps 9
Formula 68
Formula Assistant 29
Formula Interpreter 58
Formulas Constants Graphic screens 26

G

General 33, 35, 55
General Information 7
General Settings - General 42
General Setup 40
Graphic 69
Graphic 17
Graphic (MSRW32) 18
Graphic Setup 31
Graphs 33, 35, 55
Group Function 61

H

Hardware 26
Hardware channel 68
How to... 77

I

ILK Functions 31
ILK LogPH Channel Setup 54
ILK LogPH Graphic 23
ILK LogPH Graphic (MSRW32) 23
ILK LogPH Graphic Setup 54
ILK Refrigerants 76

ILK Setup 56
Impulse Function 65
Integrator 63

L

Loglist 71
LogPH Channel Setup 34
LogPH Graphic 21
LogPH Graphic (MSRW32) 22
LogPH Graphic Setup 34
Logph setup circuits 34, 54

M

Main Menu 10
Main Menu MSR32 10
Main Menu MSRW32 12
Main Tool Bar 14
Main Tool Bar MSR32 14
Main Tool Bar MSRW32 15
Mark, move and adjust symbols 78
Mathematics 29
Measurement State 62
Monitoring Measurement 36
MSR Channel Settings (MSRW32) 37
MSR Measurement Information(MSRW32) 37
MSR32 file types 70

N

Navigator 37
number 68
Number of floating inclination 68
Number of floating mean value 68

P

Picture Output 43
PID - Controller 63
PID Controller 38
Pop up Menu 15
Prep Auto configuration 42
Print Preview 38
Print Selected Graphics 39
Print Setup 39
Process Graphic 20
Process graphic (MSRW32) 21
Process Graphic Setup 39
Process Symbols 74
Protocol of Measurement 40

Q

Quick Setup Hardware 40
Quick Setup Text 40

R

Ramp Function 66

S

Select Channel Group 43
Set Channel Range 43
Setup and Start Excel - Measurement 50
Setup and Start Excel XY Measurement 52
Setup and start Measurement 44
Setup Color Table 44
Setup Cycles 41
Setup General 41
Setup Graphics 41
Setup Graphics (MSRW32) 43
Setup LogPH Pressure 35, 56
Setup Process Symbol 45
Special Functions 30
Stable Function 66
Start parameter 71
State of Measurement 47

T

Table 19
Table of measured Values (MSRW32) 19
Table View 45
Take a measurement 78
Template for Export to Excel 47
Template for Export to Excel (MSRW32) 48
Text 34, 43
The main forms 16
Thermodynamics 30
Time Function 65
Time Step Control 48
Time Step Control - Allowed channel types 50
Time Step Control - Channel Selection 50
Time Step Control - General 49
Time Step Control - Parameter 49
Time Switch 64
Title 68
Two Position Controller 64

U

Unit 68

V

VDE-mode 71
View Loglist 48

W

Working with formulas 58

X

X-Y Style 32

Y

Y - Axis 32
Y-t-Style 31