The right temperature worldwide

LAUDA

Software manual

Wintherm® Plus

Software

Version 3.4

CE

LAUDA DR. R. WOBSER GMBH & CO. KG
Postfach 1251
97922 Lauda-Königshofen
Germany
Phone: +49 (0) 9343 503-0
Fax: +49 (0) 9343 503-222
E-Mail: info@lauda.de
Internet: www.lauda.de

Translation of the original software manual
YAAE0018 V01REV30 22.04.2014

Table of contents

Table of contents

1 Safety

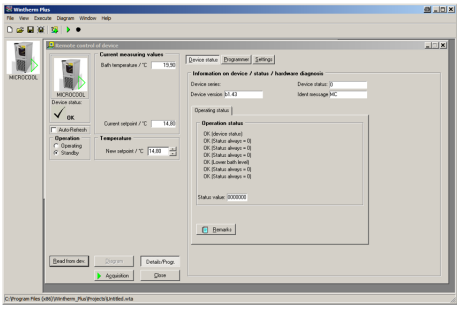
1.1 Additionally required manuals

For correct installation and commissioning of the Wintherm® Plus software on the relevant PC operating system, the following additional manuals must be consulted:

- the operating instructions for the LAUDA device
- the operating instructions for the relevant Microsoft Windows operating system

2 Introduction

2.1 Brief description of the software



The software performs the program-controlled remote control of the thermostatic units. It can read and write setpoints as well as device and control parameters, determine and change the device status and read in measured values (bath temperature and several other values) cyclically. The values read in are saved, displayed online or statically in a table or diagram and can then be edited by means of standard software. In the case of devices with integrated programmer, the segment tables can be read, edited and transmitted again. Additionally all programmer functions can be controlled.

2.2 Overview of the software

The software Wintherm® Plus enables simultaneous and mixed operation of various LAUDA thermostats via a serial interface (RS232/RS485), USB or Ethernet.

- Serial. The connection of a thermostatic unit to the PC occurs through the serial interface by connecting a suitable 9-pole RS232 or RS485 connecting cable to one of the COM ports supported as standard by the operating system. LAUDA offers a suitable PC plug-in card for equipping a PC with several COM ports.

  Most LAUDA devices also support addressed operation (RS485). Here, several devices can be connected to the same serial interface at the same time. Each device uses an individual address (000 to 127). LAUDA offers a suitable RS232<->RS485 interface converter for addressed RS485 operation as an accessory.
- USB. If the device has a USB interface, it can be connected to the USB port of the PC through a USB cable.
- Ethernet. If the device has an Ethernet interface, it can be connected to the network in which the PC is located using an Ethernet cable. The Ethernet link can be used after configuration as a process interface.

For practical reasons, the number of devices supported by the software at the same time is limited to 12 devices.

2.3 Supported device series

The software can be used with devices of the following series:

Device series	RS232	RS485	USB	Ethernet (used as a process interface)
Ecoline Control Head E 200 (Eco-line seriesE/RE 2xx)	x	x	---	---
Ecoline Control Head E 300 (Eco-line seriesE/RE 3xx)	x	x	---	---
Control head P (series P-control-lers)	x	---	---	---
Proline Control Head (Proline (P/RP) Series and Proline Cryomats)	x	x	---	x
Control unit T (Series Integral Txxxxx)	x	x	---	---
WK(L) Class	x	x	---	---
Integral XT	x	x	x	x
ECO Control Head (ECO Series)	x	x	x	x
Microcool	x	---	---	---
Variocool	x	x	x	x
Thermometer DigiCal	x	---	---	---

There are the following restrictions:

- With devices of the series DigiCal values can only be read out. Control of device functions is not possible with DigiCal. In addition, automatic detection for DigiCal devices is not possible.
- Series P-controllers include all RUL xx-CP/KP, RUK xx-CP/KP or C xx-CP/KP devices.

2.4 Supported functions

Wintherm supports numerous device functions of the respective device series. The device series differ in their specific properties so that not all devices include the same functions.

Here are some examples: Some thermostats, for example, have a cooling unit, others do not. With some devices the control can be provided by an internal or external closed-loop control circuit or even be defined in a more advanced manner. Alternatively, there is only the internal controller or, with supplementary devices such as DigiCal, no controller at all. Most devices have a programmer function whereby some devices only support one program and others up to five programs.

Therefore the appearance of the software differs from one device series to the next – sometimes only slightly, but sometimes quite noticeably.

In the following the main differences between the devices supported by Wintherm are listed in a table and some specifications are explained separately.

Device series	Baud rate	Pump	Cooling	Control	Programmer	PID parameters
E 200	1200 - 19200	1 ... 5	0 ... 3	internal	x	Xp, Tn (2)
E 300	1200 - 19200	1 ... 5	0 ... 3	internal	x	Xp, Tn (2)
E 300 S (new)	1200 - 19200	1 ... 5	0 ... 3	internal/ external	x	Xp, Tn / int/ext (4)
Proline	1200 - 19200	1 ... 8	off, on, automatic	int./ext. analog	x	Xp, Tn, Tv, Td (12)
Integral T	1200 - 19200	---	---	internal/ external	x	Xp, Tn / int/ext (4)
WK(L) Class	1200 - 19200	---	---	internal	---	---
P-controller	2400 - 19200	---	---	int./ext. 1/ ext. 2	x	Xp, Tn, Tv (3)
Integral XT	1200 - 19200	1 ... 8	off, on, automatic	int./ext. analog	x	Xp, Tn, Tv, Td (4)
ECO	1200 - 19200	1 ... 6	off, on, automatic	int./ext./ analog/USB	x	Xp, Tn, Tv, Td (4)
Microcool	1200 - 19200	---	off, on, automatic	internal	---	---
Variocool	1200 - 19200	---	off, on, automatic	int./ext./ analog/USB	x	Xp, Tn, Tv, Td (4)
DigiCal	2400	---	---	---	---	---

- **Ecoline E 200 / E 200 Star Edition**: Ecoline E 200 has exclusively internal control and uses the Pump power levels 1 ... 5 and the Cooling levels 1 ... 3. It has no internal device programmer. The two adjustable PID parameters, Xp and Tn, are used for the control.
- **Ecoline E 300 / E 300 Star Edition**: Ecoline E 300 uses the Pump power levels 1 ... 5 and the Cooling levels 1 ... 3. With the series Ecoline E 300/RE 300 there are two versions. Later devices have a programmer with five programs instead of one program and an additional external control. For the control two adjustable PID parameters, Xp and Tn, are used and with the E 300 (new) these parameters are each provided separately for internal and external control.
- **ECO**: ECO devices are supplied with a control panel and can be optionally expanded. As further options, for example, an analog interface module and a serial interface module are available. ECO devices use the Pump power levels 1 ... 6. The programmer has five programs. ECO devices possess an internal and an external (optionally also via the analog module) control. For the control the four adjustable PID parameters, Xp, Tn, Tv and Td, are used, each separately for internal and external control and for the follow-up control, i.e. a total of twelve control parameters. ECO devices accept and supply values for the setpoint, bath temperature and the external temperature with 1/100 °C resolution.
- **P-controller**: The P-controller has two external control circuits. Once remote control has started, the keyboard is always in the locked state, but can be unlocked again on the device keyboard. The P-controller accepts and supplies values for the setpoint, bath temperature, ext. temperatures 1 and 2 with 1/1000 °C resolution. Segment tables and start values can be transmitted to the device, but cannot be read. No cooling is integrated. The delivery capacity of the circulation pump (pump power level) cannot be adjusted. For the control the three adjustable PID parameters, Xp, Tn, and Tv, are used, each applicable to the active control, Internal or External 1 / External 2. The P-controller does not supply any return signal for identifying the device type.
- **Proline Heating and Cooling Thermostats**: Proline is supplied as Master or Command and can be optionally expanded. As further options, for example, an analog interface module and a serial interface module are available. Proline uses the Pump power levels 1 ... 8. The programmer has five programs. Proline possesses an internal and an external (optionally also via the analog module) control. For the control the four adjustable PID parameters, Xp, Tn, Tv and Td, are used, each separately for internal and external control and for the follow-up control, i.e. a total of twelve control parameters. Proline accepts and supplies values for the setpoint, bath temperature and the external temperature with 1/1000 °C resolution.

- **Proline Cryomats**: Proline Cryomats are supplied with a Master control panel and the Command remote control unit and can be optionally expanded. As further options, for example, an analog interface module and a serial interface module are available. Proline Cryomats use the Pump power levels 5 ... 8. The programmer has five programs. Proline possesses an internal and an external (optionally also via the analog module) control. For the control the four adjustable PID parameters, Xp, Tn, Tv and Td, are used, each separately for internal and external control and for the follow-up control, i.e. a total of twelve control parameters. Proline accepts and supplies values for the setpoint, bath temperature and the external temperature with 1/1000 °C resolution.
- **Integral T**: Integral T does not support any adjustable pump power levels, but returns a value via the pump pressure. For the control the two adjustable PID parameters, Xp and Tn, are used and they are each provided separately for internal and external control. The programmer has five programs with a maximum number of 150 segments.
- **Integral XT**: Integral XT devices are supplied with a Master control panel and the Command remote control unit and can be optionally expanded. As further options, for example, an Ethernet/USB interface module and a serial interface module are available. XT devices use the Pump power levels 1 ... 8. The programmer has five programs. Integral XT devices possess an internal and an external (optionally also via the analog module) control. For the control the four adjustable PID parameters, Xp, Tn, Tv and Td, are used, each separately for internal and external control and for the follow-up control, i.e. a total of twelve control parameters. Integral XT devices accept and supply values for the setpoint, bath temperature and the external temperature with 1/1000 °C resolution.
- **WK(L) Class**: Devices in the WK(L) class are intended for continuous operation under constant conditions and therefore do not have any other extensive, programmable functions.
- **Variocool**: Variocool devices are supplied with a control panel and can be optionally expanded. As further options, for example, an analog interface module and a serial interface module are available. The programmer has five programs. Variocool devices possess an internal and an external (optionally also via the analog module) control. For the control the four adjustable PID parameters, Xp, Tn, Tv and Td, are used, each separately for internal and external control and for the follow-up control, i.e. a total of twelve control parameters. Variocool devices accept and supply values for the setpoint, bath temperature and the external temperature with 1/1000 °C resolution.

- **Microcool**: Microcool devices are supplied with a control panel. Furthermore, a serial interface is available. Microcool devices accept and supply values for the setpoint, bath temperature and the external temperature with 1/1000 °C resolution.
- **DigiCal**: DigiCal is a pure temperature measurement device (hand-held or table device), which contains no remotely controllable functions. With DigiCal only the measurement display, the display of the operating status and the selection of the acquisition channels 1 or 2 are activated (External 1 and External 2) in Wintherm. The device does not have any other remotely controllable functions. DigiCal does not supply any return signal for identifying the device type.

3 Installation

3.1 System requirements

Computer	-	PC/AT compatible with 80486 processor or higher
Hard disk	-	at least 8 MB free capacity for installation of software
Memory	-	at least 8 MB free capacity for operation with several devices provide additionally approx. 2 MB per device
Graphics card	-	graphical resolution at least 800 x 600 or higher
Mouse	-	Microsoft Windows compatible mouse or similar device
Supported operating systems	-	Windows XP, Windows Vista, Windows 7 and 8, in both 32 bit as well as 64 bit versions.
RS232, USB or Ethernet	-	at least one freely available COM port (for RS232 or RS485), USB port or Ethernet
Thermostat	-	a device in the above mentioned device series

3.2 Content of the software package

The software package contains the following components:

- CD with the software Wintherm® Plus
- RS232 connecting cable (PC <-> Device)
- USB cable, USB 2.0, USB-A plug for PC connection, mini-USB-B plug for connection to ECO devices
- Operating instructions for the software Wintherm® Plus in the PDF format on CD

3.3 Installing the software

1. Insert the CD into your drive.
2. Most systems will detect the CD automatically and start the installation routine. If not, start the installation via the task bar by selecting *Start → Run → [CD-ROM drive] → Setup.exe*.
3. Follow the instructions of the installation routine.
4. During the installation a target directory "Programs\Wintherm" is suggested which you can change, if required.

   The installation routine creates a program group for the directory selected and a program symbol with the name "Wintherm".

4 Putting the device into operation

4.1 Connecting devices

Establishing a connection

Before connection is made you must determine if the thermostatic unit is to be used in the Ethernet, USB, RS232 or in the addressed RS485 mode. For Ethernet, USB or RS232 mode you only need an appropriate connecting cable, for RS485 mode you must connect an interface converter additionally.

USB or RS232 mode or RS485 connection as single device to the COM interface

- Connect the device to the PC via a USB or RS232 connecting cable (LAUDA accessory)
- Write down the designation of the interface used (e.g. COM1)
- Device adjustment (see the operating instructions for the relevant interface)
- for USB and RS232 set *RS232*
- Configure baud rate

RS485 connection as one of several devices to the same COM interface

- Connect interface converter RS232<->RS485 (LAUDA accessory) to the interface
- Connect the device to the interface converter
- Device adjustment (see the operating instructions for the relevant interface)
- Set the RS485 operating mode
- Check or adjust the device address
- Configure baud rate

Ethernet connection

- Connect the device via an Ethernet cable to the network in which the PC is located
- Device adjustment (see the operating instructions for the relevant interface)

  For operation over the Ethernet interface enter and write down *Process SST on* as well as the LAN settings on the device.
- Carry out TCP settings

Preparations for start

Now check the following:

- Device is switched on
- For RS485: Check if the interface converter is connected and switched on
- Check if the connecting cable is connected

If these preconditions are fulfilled, you can test the connection to the device by clicking on the device symbol in the device bar. If the connection was established successfully, the window for controlling the device with current values is displayed. Otherwise, an error message is displayed.

To connect further devices, repeat the procedure described above. For practical reasons, the number of connections is limited to 12 devices.

4.2 Start the software

Fig. 1: Wintherm symbol

1. Start the software with one of the following operations:
   - by double clicking the Wintherm symbol on the desktop
   - by selection in the program manager using *Start → Programs → Wintherm*

4.3 Basic setup in the software

On first starting the software after the installation, the standard PC language and decimal marker settings are taken over first.

The language and the decimal marker can be selected independent of the language settings of your system. Changes only affect the operation of the Wintherm software and do not affect the system settings and other programs.

The basic settings for using the software include:

- the required language and
- the decimal marker to be used for the representation of numbers

Save accepts the changes made. The changes are active immediately and will be used as standard settings when you start the program again.

Cancel discards the changes made.

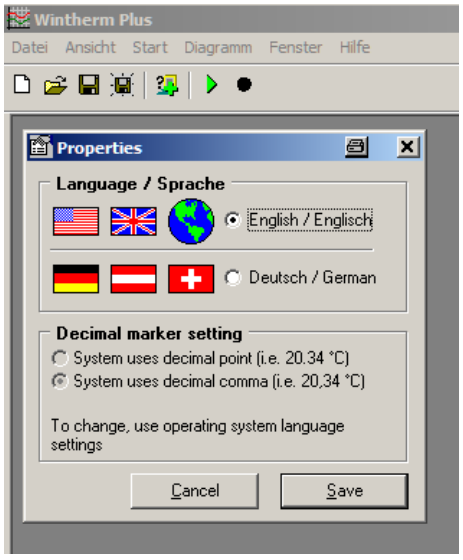


Fig. 2: Window properties

1. Start the program
   ▶ On starting the software the window *Properties* is displayed.

   It shows the interfaces detected, the language settings and the decimal marker.
2. Check the list of detected interfaces and select your language and the decimal marker.
3. Then click on *Save*.
   ▶ After saving the properties, the user interface is still blank. The software can work with various devices. Consequently, you have to select the device with which you want to work.

4.4 Select device

Fig. 3: Connect new device

Fig. 4: Device selection

1. ■ Click on the adjacent symbol in the tool bar or, using the menu bar, select the command *File* → *Connect new device*.

   ▶ A list of device series for which drivers are available in the software will be displayed.

2. Click on the image of the matching device series to install the corresponding driver in the software.

3. If you do not know which type of device you are using, the software can search for a suitable driver. To allow automatic search for a driver, the new device must be connected by means of an RS232 cable and switched on. This device must be the only device currently switched on (switch off other devices already connected). In this case click on the picture named *Automatic detection*. In the opened window, enter all known values in order to reduce the time required for the detection.

4.5 Device setup

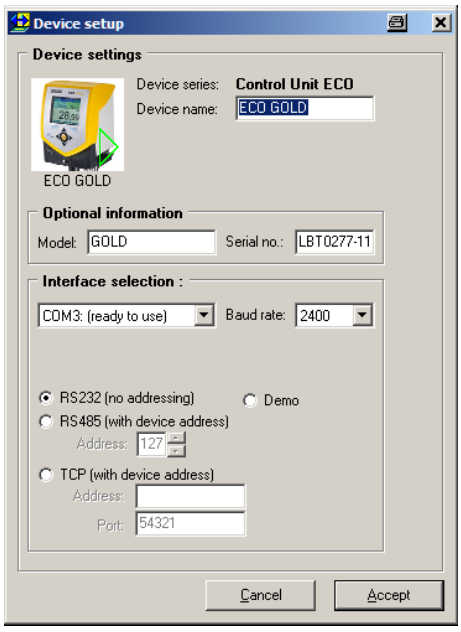


Fig. 5: Device settings

1. After the installation of the driver, a window will be opened where you can specify further device settings. If, for example, you have selected a device in the Variocool equipment line, the adjacent window appears.

2. Carry out the following steps:
   - Enter a designation of your choice (must be unique, however) for the device in the field *Device name*. Specifying the device name is mandatory, it is used by the software for identifying the device unambiguously.
     If you have registered the device via the automatic detection, all other settings have already been made, you can close the window directly by clicking on *Accept*. Otherwise, carry out further settings as described below.
   - Select the Com interface to which the device is connected and adjust the transmission rate (baud rate) such that it is identical to the setting on the device.
     If you are using an RS232 or USB interface, activate the option *RS232 (no addressing)*.
     If you are using a device with addressing, activate the option *RS485* and adjust the address such that it corresponds to the device setting.
     If you are using an Ethernet connection, activate the option *TCP (with device address)* and enter the IP address as well as the TCP port of the Ethernet interface on the device.
   - Enter optional additional information
   - Filling the fields *Model* and Serial number *SL No.* is not obligatory. However, they are useful for better assignment in case several devices are connected.
   - Activating *Demo* enables a simulation mode, without a device having to be connected. If the demo mode is activated for only one device, then it applies automatically for all devices.
3. Click on the *Accept* button to accept the settings.
   - ▶ As soon as a device is set up, the device symbol and the device name you have specified are displayed on the left side of the user interface in the device bar.
     If you have selected an invalid device series, you can return to the device selection menu by clicking on the device symbol. All other information remains unchanged if the new device supports the corresponding, already existing settings. Otherwise, invalid settings (e.g. non-supported baud rate) are replaced by specifications from the device driver.
4. After setting up a new device or changing the device setup, you will be requested automatically to save the new settings. Now, the new device is known to the software, and ready for service.
5. After you have set up all devices you can save the settings via the menu item *Save application as ...*. You can choose any name for the file. The application last saved becomes the standard application and will be loaded automatically when the software is started.

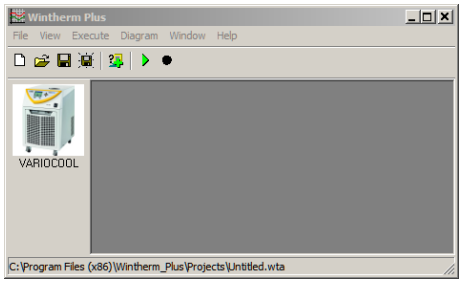
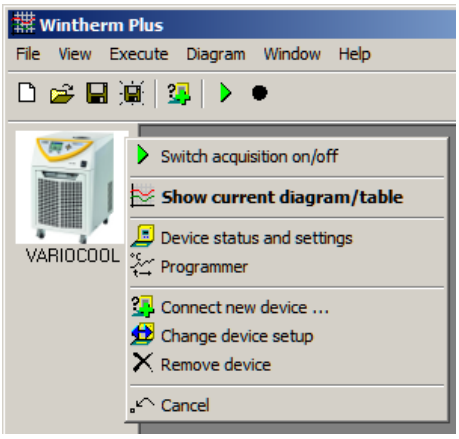


Fig. 6: Set-up device

5 Operation

5.1 User interface

5.1.1 Structure of the user interface

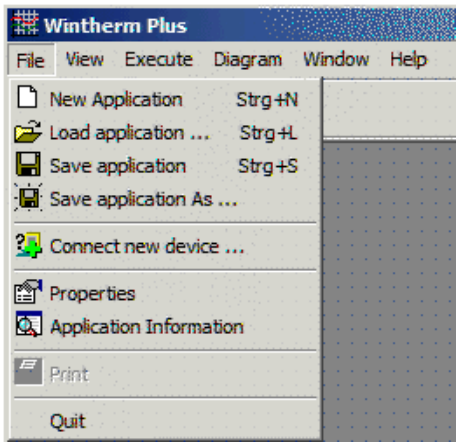


The software is controlled via pull-down and popup menus, the device bar, a tool bar and buttons for different functions.

- **Menu bar** The menu bar contains different groups of the program menu. Click on a group to open the corresponding menu group. Here, you have further selection options.
- **Tool bar** In the tool bar you will find symbols for frequently required functions. Click on the function to have it performed directly, without having to select it via the menu bar.
- **Device bar** The device bar contains the images of all devices registered in the software. Click on an image to establish the connection to the corresponding device. A click with the right mouse key opens a popup menu containing further menu items for definition or for the operation of the device.
- **Popup menu** Via the popup menu you can choose among several functions for quicker access to the definitions or the operation of the corresponding device. For details refer to the section Device actions.
- **Status bar** At the bottom of the window you will find a status bar containing the name of the current application.

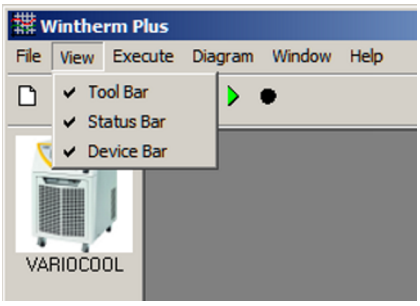
5.1.2 Menu bar

5.1.2.1 Menu *File*



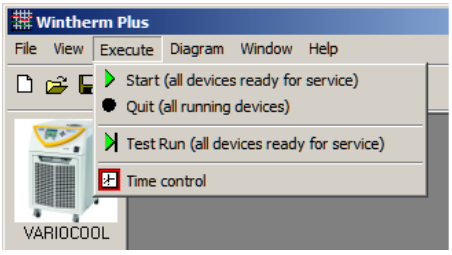
- *New Application* creates a completely new device group
- *Load application* loads a new device group from the stated file (*.wtp)
- *Save application* saves the device group under its current file name
- *Save application as* saves the device group under a new file name. The new name is then used as the standard file
- *Connect new device* inserts a new device to be used in the device group
- *Properties* checks the interfaces present in the system and defines the language and the number format
- *Application Information* contains all information on the devices currently contained in the device groups for viewing or printout
- *Print* prints the diagram of measured values or the corresponding table
- *Quit* terminates the program

5.1.2.2 Menu *View*



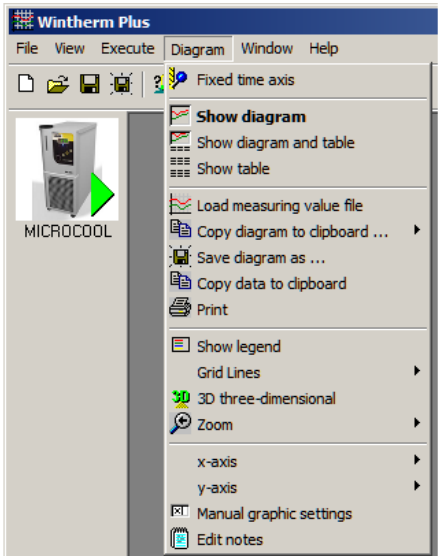
- *Tool bar* opens or hides the tool bar at the top of the window
- *Status bar* opens or hides the status bar at the bottom of the window
- *Device bar* opens or hides the device bar on the left side of the window

5.1.2.3 Menu *Execute*



- *Start (all devices ready for service)* checks the readiness for service of all devices and starts the acquisition with all devices ready for service
- *Quit (all running devices)* stops the acquisition on all operating devices
- *Test run (all devices ready for service)* checks the readiness for service of all devices and reads once only measurements from all devices ready for service
- *Acquisition interval* sets the cycle time for the acquisition

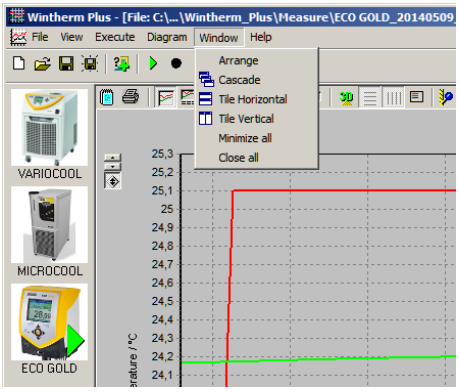
5.1.2.4 Menu *Diagram*



- *Auto refresh* refreshes the diagram display during running acquisition
- *Show diagram and table* displays the diagram and table values
- *Show diagram* displays only the diagram
- *Show table* displays only the table values
- *Load measuring value file* loads an archived file
- *Copy diagram to clipboard* copies a diagram to the clipboard as a bitmap or a metafile
- *Save diagram as* saves a diagram in one of several graphical formats
- *Print* prints a screenshot of the current display
- *Show legend* displays or hides the legend in the diagram
- *Grid lines, horizontal* displays or hides horizontal grid lines in the diagram
- *Grid lines, vertical* displays or hides vertical grid lines in the diagram
- *3D three-dimensional* switches the spatial diagram view on or off
- *Zoom off* restores the diagram to the original size (automatically)
- *x-axis* Entry of minimum, maximum or auto-scaling
- *y-axis* Entry of minimum, maximum or auto-scaling
- *Manual graphic settings* Keyboard entries for defining the diagram

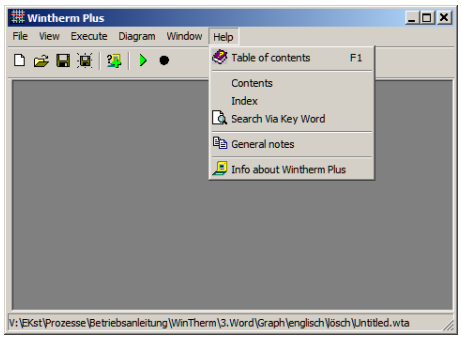
5.1.2.5 Menu *Window*

The menu group Window is important only if you have embedded further windows in the main window of the application (for example diagrams).



- *Arrange* arranges the windows in the order that they arise
- *Cascade* stacks the windows one above the other with an offset
- *Tile horizontal* arranges the windows vertically (more lines than columns)
- *Tile vertical* arranges the windows horizontally (more columns than lines)
- *Minimize all* reduces all windows to symbol size
- *Close all* closes all embedded windows

5.1.2.6 Menu *Help*

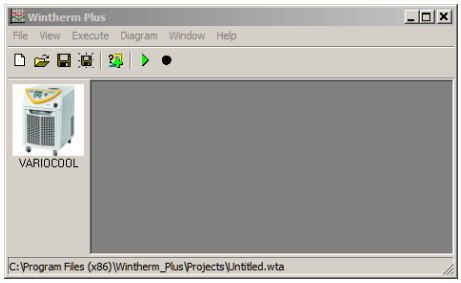


- *Table of contents* Table of contents for the help
- *Contents* Selection of help topics via the table of contents
- *Index* Selection of help topics via the search index
- *Search Via Key Word* Key-word collection and glossary
- *Info about Wintherm Plus* Brief information about the software

5.1.3 Device bar

5.1.3.1 Device bar

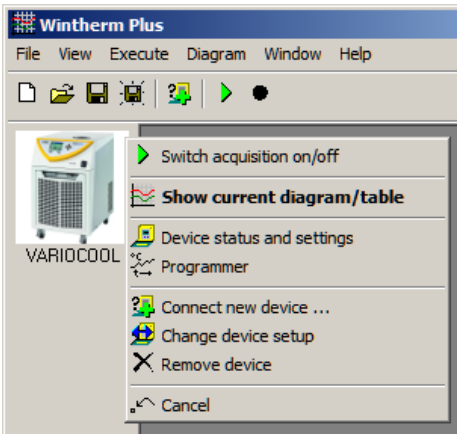
In the device bar on the left side of the window, you will find all devices contained (registered) in the corresponding application. All actions affecting the operation of a device are started by clicking or right-clicking on the corresponding device symbol in the device bar.



- On clicking with the right mouse key a popup menu with a selection of device actions opens.
- On clicking with the left mouse key the software attempts to establish a connection to the device.

5.1.3.2 Functions of the popup menu

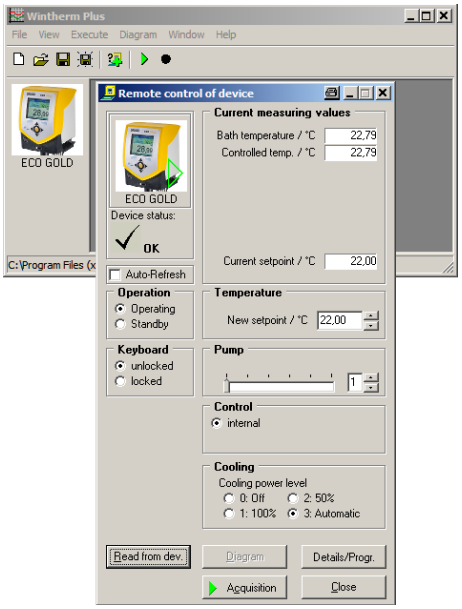
After right-clicking on the device symbol in the device bar, a popup menu will be opened containing further actions available with the corresponding device.



- *Switch acquisition on/off* switches the acquisition of the measuring channels for the corresponding device on or off
- *Show current diagram/table* opens a diagram of the current data or the data last acquired
- *Device status and settings* opens a window where you can change the basic device settings
- *Remove device* Removes the selected device from the device list after you have confirmed that you really want to remove the device
- *Connect new device* opens a window where you can set up a new device
- *Cancel* quits the popup menu without implementing any functions

5.2 Device control

5.2.1 Device control functions



If you click on the device symbol in the device bar with the left mouse key, the software tries to establish a connection to the device. If the attempt fails, an error message will be displayed.

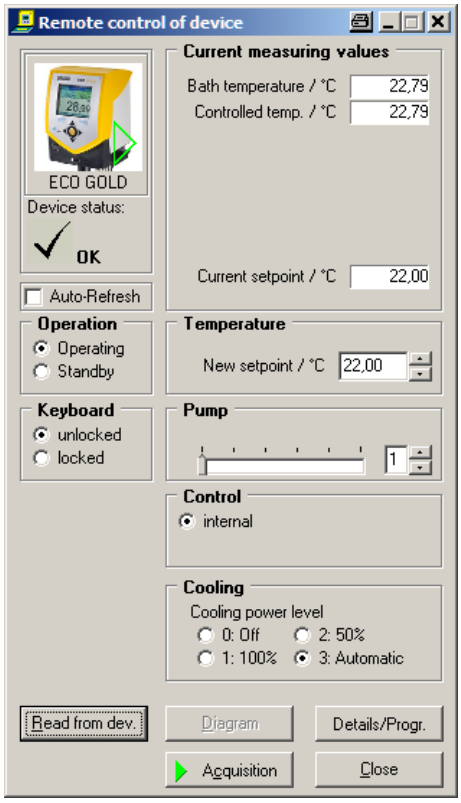
If the connection is successful, a green arrow appears in the device bar above the image of the corresponding device. The most important information about the selected device is displayed. You can change frequently used device settings directly.

For device control a simple and an extended representation are available.

- In the simple representation, only the most important information and setting options for the most frequent functions are displayed.
- Using the button *Details*, you can switch to the expanded display. In the expanded display you have access to all functions supported by a device. Using the button *Details/Progr.*, you can switch back to the simplified display.

5.2.2 Simple device control

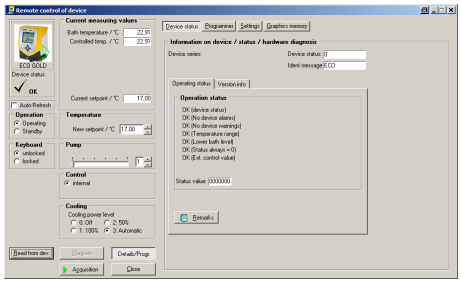
Click on the device symbol in the device bar to open a window where the device status, the current measuring values and further information are displayed. You can change settings such as the setpoint, the operating modes Operating/Standby, internal/external control, pump power level and cooling level as well as keyboard mode locked/unlocked, depending on the device series.



- Here, you can change the setpoint, pump power level and cooling level and transmit them to the device by clicking "Accept".
- *Refresh* reads in all values from the device and updates the display.
- *Diagram* loads the current file or the file last recorded with the device.
- *Accept* transmits your changes to the device, reads in new values and updates the display.
- *Close* terminates the device connection.
- The button *Details* expands the displayed window to the right.

5.2.3 Expanded device control

In the expanded display you have access to all functions supported by a device. Switch-over between different functional groups is obtained via the buttons *Device status*, *Programmer* and *Settings*. Further selection options are available for the relevant functional group in the subordinate register.



By clicking on the button *Details/Progr.* you can switch back to the simple device control.

Device status displays the device version. In addition a selection between operating status, hardware diagnosis, digital I/O and version information is offered.

Device status

- *Operating status*
- *Hardware diagnosis*
- *Version information*
- *Digital I/O*

Programmer

- *Edit segment tables*
- *Display segments*
- *Status/Start/Stop*

Settings

- *Acquisition channels*
- *PID control parameters*
- *Temperature limits*

Graphics memory

- Only available for Proline devices.

5.2.4 *Device status* tab

Operating status

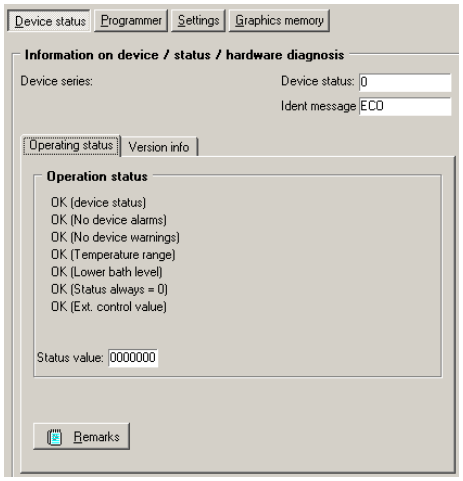


Fig. 7: Device status

Operating status. The operating status provides information on the internal operating status of the device and the status of different input or output channels.

Status messages are device-dependent and different for the various device series. For a list of all messages refer to the Appendix.

Remarks. When the button *Remarks* is pressed, an editor within the program opens in which you can record comments about the description of an application or automatically add current device or program parameters.

Hardware diagnosis

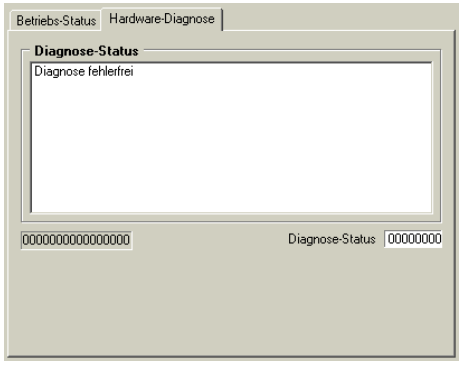
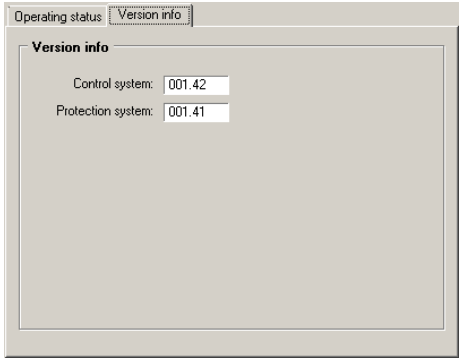


Fig. 8: Hardware diagnosis

Hardware diagnosis. In the case of a device error, the hardware diagnosis provides further information on the type of error occurred.

Status messages are device-dependent and different for the various device series. For a list of all messages refer to the Appendix.

Version information



Due to their modular construction, devices in the series Proline supply not only a version number for the device, but also version information about the integrated modules. With all other devices there is just a device version number which is shown in the field above this window. For modules which are not integrated there is no version information available (it is not displayed).

Possible system modules are the:

- Control system
- Protection system
- Command
- Cooling system

Fig. 9: Version information

- Analog module
- Serial RS232/485 module
- Digital module

Digital I/O

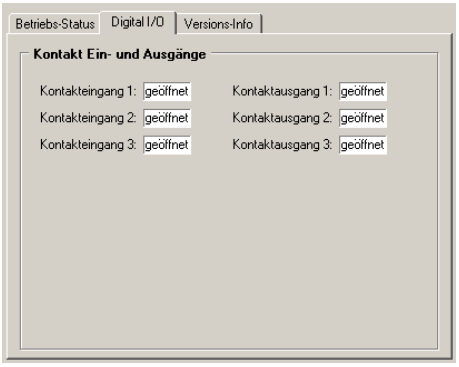


Fig. 10: Digital I/O

Devices in the series Proline can switch contact outputs and determine the state of the contact inputs. Another device series with contact output is the series Integral (control unit T...); here the status of the neutral contact is displayed.

The status of the contact inputs and outputs is transferred from the device and displayed here.

5.2.5 *Settings* tab

In *Settings* you can adjust the acquisition channels used by the software and change the device parameters.

Acquisition channels

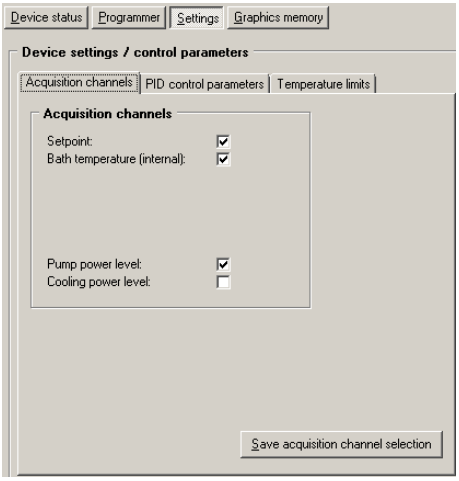


Fig. 11: Acquisition channels

Here you can select the measuring channels to be used for the acquisition of measuring values. For example, if acquisition of the setpoint or the pump pressure is not required, you can deactivate the corresponding entries. This saves considerable time when reading a measuring cycle, which makes sense, for example, if a large number of devices is to be acquired at the same time.

Depending on the device series, different acquisition channels are available. The setpoint and the bath temperature can be measured with all devices. External bath temperatures are supplied by devices with external sensor input only (Extern1 / Extern2). One channel at least must always be marked for acquisition.

The setpoint and bath temperatures can be represented graphically, the pump pressure or pump power level and cooling performance values are only shown in the table of measured values.

PID control parameters

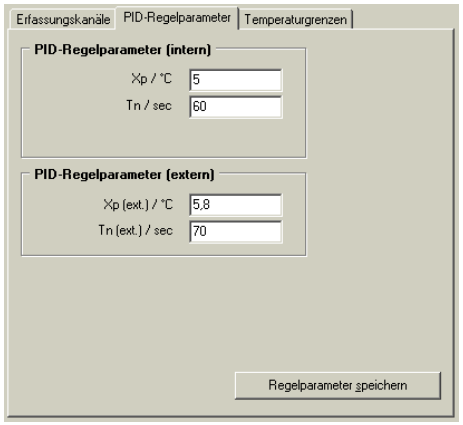


Fig. 12: PID control parameters

With most devices, the control parameters for the proportional band Xp or hold time Tn and the set-up time Tv can be changed within a certain range.

With some devices, different parameter sets are available for internal or external control.

The current settings are displayed and can be changed. Click on the button *Accept* in the main window to transmit the changed values to the device.

Temperature limits

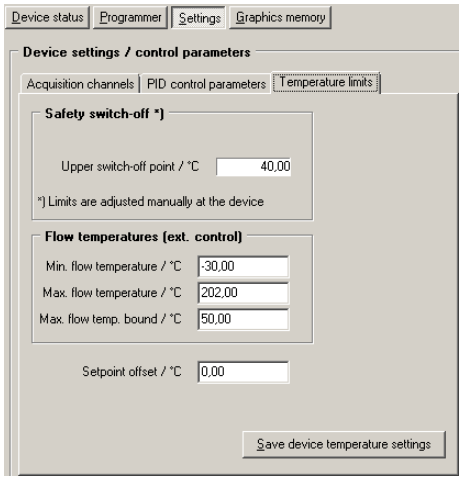


Fig. 13: Temperature limits

All devices feature an excess temperature switch-off function (some devices also feature a low-temperature switch-off function). With some devices the minimum and maximum outflow temperature can be adjusted, too, in combination with the external control system. The safety switch-off values cannot be changed for operational safety reasons, they can only be displayed. Adjustment of the safety switch-off temperatures must always take place at the device directly.

The outflow temperature values (if used by the device) can be read, edited and transmitted to the device again.

Click on the button "Accept" in the main window to transmit the changed values to the device.

5.2.6 *Graphics memory* tab

This selection is only available for a connected Proline with Command. The device enables the autonomous recording of measurement data during operation. These data are the setpoint, bath temperature and, where present, the external temperature. The graphics memory holds recordings up to a maximum of almost 3800 lines; this amount varies according to the chosen recording method (once-only or circulating recording) and the recording duration.

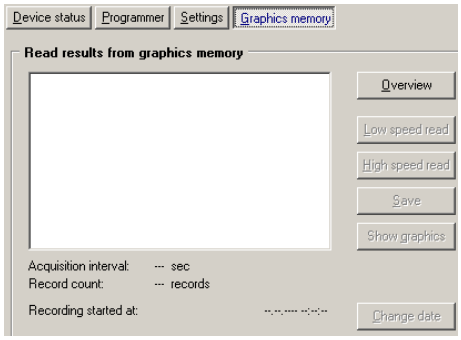


Fig. 14: Graphics memory

- For reading out the graphics memory there are two variants, normal and fast reading. Normal reading is mainly intended for the case in which the PC is not successful with the fast reading or if, with Wintherm, acquisition tasks running in the background should not be interrupted. In contrast, fast reading reads the data in a fraction of the time (at 19200 baud approx. one minute for the complete memory), but it occupies the time completely so that no other actions can be executed in parallel with it – and – fast reading cannot be interrupted. The time saved is however enormous.
- *Overview* Reads information about the recorded data such as starting time, acquisition interval and the expected number of data records (may vary by +/- 32 data recordings after reading in) and displays it. The overview must be first opened before all further actions are executed.
- *Normal reading*. Starts normal reading of the recorded data. Further operation of acquisition tasks or the Wintherm programmer mode (in conjunction with slight temporal restrictions) is still possible in the background.
- *Fast reading*. Starts fast reading of the recorded data. Acquisition tasks running in the background or the Wintherm programmer mode are stopped while reading is taking place. It is not possible to cancel the read-in process. The time saved is enormous.
- *Save*. Saves the read-in data in a measurement file, compatible with other measurement files generated by the system.
- *Show graphics*. If the data have already been saved, the associated diagram is displayed. If the data have not yet been saved, a request is made to save the data.
- *Change date*. Proline supplies the day of the month and the time at which the last recording was started. If you would like to change the start date calculated from this or the time before saving, all data records to be saved are given new date values.

5.2.7 Programmer

The programming function enables you to save a temperature/time program. The program consists of a number of temperature/time segments and details about their repetition (loops). Ramps, temperature step changes or also temperature retention phases for the same start and end temperatures in the segment are possible. On starting, the current setpoint is taken as the starting value of the first segment.

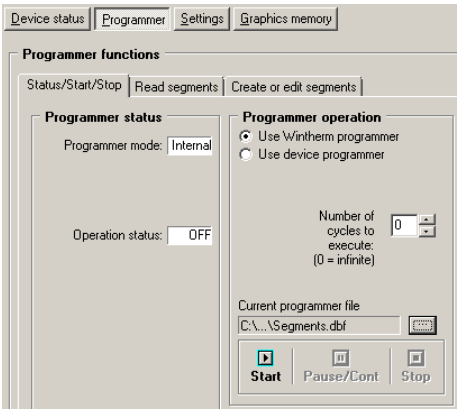


Fig. 15: Programmer

In *Programmer* you will find all functions available for the programmer mode.

- Under *Create or edit segments* you can manage segment tables.
- Under *Read segments* information about single or all segments can be read from a device.
- Under *Status/Start/Stop* the programmer operation of the device is controlled.

Wintherm supports two programmer operating modes:

- the programmer function (if present) integrated in the device
- an internal Wintherm programmer (for use with all devices).

5.2.7.1 Programmer in the devices

Where a device has an integral programmer or can be controlled via the Wintherm programmer, the properties are explained in the following table.

The segment tables are each saved in the device and are also retained after switching off. The segment tables can be entered into the device manually or transferred to the device by Wintherm. Vice versa, existing segment tables can be read out and saved as files (except that segment tables cannot be read out with P-controllers).

Device series	Program (internal)	Available segments	Maximum duration of a segment (minutes)	Quantities in the segment table	Starting values	For use with Wintherm programmer
Ecoline E 200	---	---	---	---	---	yes, pump level maximum 5
Ecoline E 300	1	150	999 (16 h:39 min)	temperature, duration	---	yes, pump level maximum 5
Ecoline E 200 Star Edition	1	20	255	temperature, duration	---	yes, pump level maximum 5
Ecoline E 300 Star Edition	1 ... 5	150	999 (16 h:39 min)	temperature, duration	---	yes, pump level maximum 5
ECO	1 ... 5	150	59999 (999 h:59 min)	temperature, duration, tolerance, pump level	temperature, tolerance, pump level	yes, pump level maximum 8

Device series	Program (internal)	Available segments	Maximum duration of a segment (minutes)	Quantities in the segment table	Starting values	For use with Wintherm programmer
Proline	1 ... 5	150	59999 (999 h:59 min)	temperature, duration, tolerance, pump level	temperature, tolerance, pump level	yes, pump level maximum 8
P-controller	1	99	5999 (99 h:59 min)	temperature, duration	Temperature	yes, pump level is ignored
Integral T	1 ... 5	150	999 (16 h:39 min)	temperature, duration	---	yes, pump level is ignored
Integral XT	1 ... 5	150	59999 (999 h:59 min)	temperature, duration, tolerance, pump level	temperature, tolerance, pump level	yes, pump level maximum 8
Variocool	1 ... 5	150	59999 (999 h:59 min)	temperature, duration, tolerance	temperature, tolerance	yes, pump level is ignored

Temperature starting value for Proline devices and P-controller

Devices in the series P-controllers and Proline use a temperature starting value, which is preset as the setpoint at the start of the programmer mode, in conjunction with the integrated programmer. Proline also uses starting values for the tolerance and pump level. These values are saved in the device. Other devices do not use any starting value so that the required starting setpoint should be specified for the device at the start of the programmer mode in order to start from a defined initial point.

5.2.7.2 Wintherm programmer

Apart from the programmer functions integrated in the device, Wintherm also contains an internal programmer function, which can be used for devices without an internal programmer or as an alternative to the programmer. Whereas the device programmer runs autonomously, the internal Wintherm programmer can only be executed when Wintherm is active. The segment tables of the internal Wintherm programmer are not saved in the device.

On a cycle of two seconds a momentary setpoint is calculated in each case and transmitted to the device. With the change of a segment a new pump level is also transmitted if the device supports this function and the value is not equal to zero. If a tolerance is specified (positive value not equal to zero), then before the transmission of a new setpoint, the tolerance band is checked and the setpoint output or the reaching of the tolerance band is awaited.

For devices in the WK(L) class, the internal programmer function also cannot be used, because these devices are designed for continuous operation at fixed set temperatures and only allow twenty setpoint inputs per hour.

For all the devices mentioned above, the Wintherm programmer mode always uses starting values and segment settings for temperature, tolerance and pump level. The maximum permissible values for duration and tolerance are only restricted by Wintherm itself.

The temperatures and pump levels used are device-dependent. Consequently, neither Integral T nor Variocool have adjustable pump levels. Values in this case are ignored by these devices and are not transmitted. If a device has adjustable pump levels, then the maximum values must fit in the segment table for the device (Proline 1 ... 8, all others 1 ... 5).

Properties of the Wintherm programmer

Software	Programs	Segments	Maximum duration of a segment (minutes)	Segment table	Starting values
Wintherm	any number	999	99999 (1666 h:39 min)	temperature, duration, tolerance, pump level	temperature, tolerance, pump level

Starting values with the Wintherm programmer

The Wintherm programmer always uses starting values for the temperature, tolerance and pump level. The pump level is only used if the device supports the function. The maximum stated pump level must be suitable for the device series (with ECO, Proline and Integral XT 1 ... 8, otherwise 1 ... 5; the value 0 signifies that the setting is retained). The specification of a tolerance starting value is practicable, but is not essential (with a tolerance = 0 the starting value is skipped).

The following sections apply both to the device programmer operation and to the Wintherm programmer operation. Before starting the programmer all that needs to be determined is whether the device programmer or the Wintherm programmer is to be used.

5.2.7.3 Segment table functions

- The table is edited by first clicking the cell to be edited. If a cell is selected, the value can be edited after clicking the same cell again or pressing the [Enter] key. Alternatively, entry can be started immediately in the selected cell. Pressing the [Enter] key, one of the cursor keys [Up], [Down], [Left], [Right] or the [Tabulator] key terminates the entry and accepts the value. Using the cursor keys and the [Tabulator] key you can also navigate between the cells in the table directly during the entry.
- Lines are marked in that the line is clicked to the far left in the first column. A further click cancels the marking of a line. If the [Ctrl] key is pressed at the same time, any other lines can be marked and if the [Shift] key is pressed simultaneously, the complete range between the first and last marked line is marked.
- Clicking any line within the table cancels all markings.
- Inserting or deleting lines occurs after marking the lines by clicking the relevant buttons *Insert line* or *Delete line* or by using the menu items with the same names in the popup menu which appears on pressing the right mouse key.

  On deletion, all marked lines are deleted and on insertion as many blank lines are inserted at the position of the first marked line as were previously marked.
- The *Undo* button restores the status before the last action.
- The starting values are located in the top line of the table.
- If the table is transmitted to a device which does not support any or not all starting values, the corresponding values or the complete line are ignored. In this case the cells may also be blank.
- If the table is to be used for the Wintherm programmer, at least one valid temperature starting value must be entered. A starting value for the tolerance is practicable, but not mandatory. If the field is blank or equal to "0", the starting values are however skipped.
- *Load from file*. Loads a segment table saved in the PC for display or for editing.
- *Save*. Saves the currently displayed segment table under its established name.
- *Save as ...* Saves the currently displayed segment table under a new name and uses this name during later editing.
- *Programmer* . Saves the name of the currently displayed segment table for further use with the internal Wintherm programmer. Alternatively, the table name can also be later selected under *Status/Start/Stop*. With the entry of the table for the Wintherm programmer mode a check is made for permissible values for the device currently connected and for impermissibly blank fields. A valid starting value for the temperature must be entered.
- *Read from device* Recalls the segment table data from the device for display or for editing. With devices which manage a number of programs the program number must also be stated. Note: With the P-controller no segments nor the starting value can be read from the device.

- *Send to device* Sends the currently displayed segment table to the device. With devices which manage a number of programs the program number must also be stated. Before the table is transmitted, a check is made for permissible values for the device currently connected and for impermissibly blank fields. A valid starting value for the temperature must only be entered if the device itself supports the use of starting values.
- *Insert line*. Inserts a new line at the marked position. If a number of lines are marked, as many blank lines are inserted at the position of the first marked line as were previously marked. *Undo* negates the insertion.
- *Delete line*. Deletes a line at the marked position. If a number of lines have been marked, all marked lines are deleted. "Undo" reverses the deletion.
- *Undo* The last respective action (deletion or insertion of lines) is reversed.
- *New / delete all*. Be careful. This function clears the complete, displayed table (not however the associated file from which the table was loaded). If the table has not been saved, it is also impossible to restore it.

Preview of the segment table

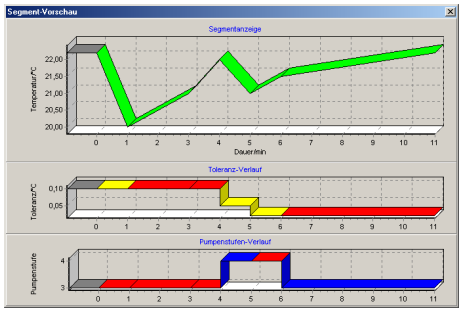


Fig. 16: Preview of segment table

Preview Graphically displays the progression of the programmer function defined by the segment table. The segment table data, the increases and the general progression of the ramps can then be checked more quickly than by a line-by-line comparison of values.

The segment preview always shows the progression of the temperature over the complete cycle time. Valid temperature segments are shown in green. Provided the table also contains entries for the tolerance and pump level, they are also displayed. Valid tolerance segments are shown in yellow and valid segments for the pump level in blue. The starting values are in each case shown in gray to the left of the value 0 on the time axis (approx. 10 % of the diagram width). Blank fields (in the table) are always displayed in red. The preview window is closed again by clicking the close button.

5.2.7.4 *Create or edit segments* tab

On the *Create or edit segments* tab there are functions for editing the segment table, for loading segment tables from a file or for saving in a file as well as for transferring segments to a device or loading segments from a device.

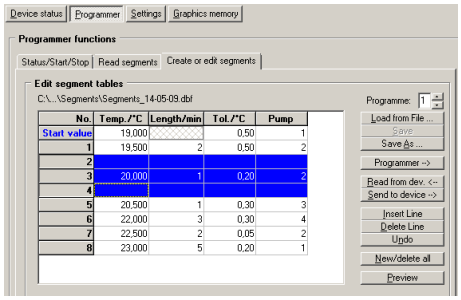


Fig. 17: Segment table

In the table the columns *Temperature* and *Duration* are always initially visible. The two other columns *Tolerance* and *Pump level* in the right half of the table can be rendered visible with the scroll bar below the table or with the cursor keys. Valid values for the temperature (-110 °C to 410 °C) and the duration (0 to 999, 5999, 59999 or 99999 min, depending on the device) must always be entered, whereas valid values for the tolerance (0 =Off) and pump level (0 = Ignore, 1 ... 5 or 1 ... 8, depending on the device) can be entered or the fields can also be left blank (identical to 0).

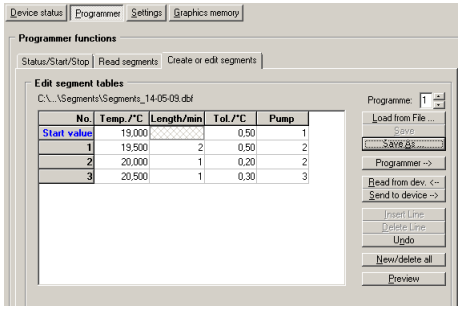


Fig. 18: Segment table

Some devices administrate up to 5 segment tables internally (Programs 1 to 5). When reading or transmitting segment tables, the corresponding program number must be selected first.

5.2.7.5 *Read segments* tab

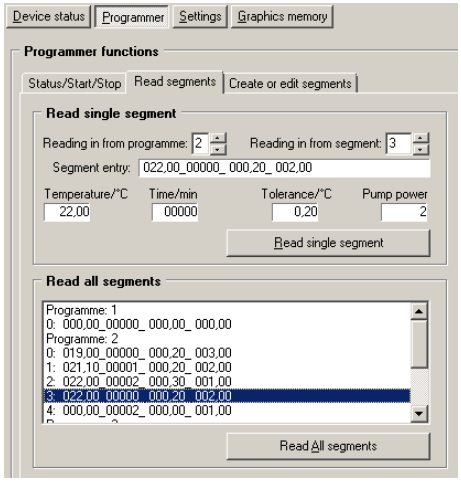


Fig. 19: Read segments

Here you can download segment tables or individual segments from the device for viewing.

- If you select *Read single segment* you must specify the required program number and the number of the segment. If you click on *Read* the corresponding segment will be read and the setpoint and the duration will be displayed.
- If you select *Read all segments*, all segments of all segment tables (in the case of several programs) stored in the device are read and shown in the list. The lines beginning with "0:" are each starting values. If a device does not supply any starting values, the line numbering by contrast begins with "1:".
- To start the transmission click on the button *Read*; the transmission may take several seconds depending on the amount of data and the transmission rate.

5.2.7.6 *Status/Start/Stop* tab

Here, you will find information on the programmer mode. The operating status *On*, *Pause* or *Off* will be displayed and can be controlled using the buttons *Start*, *Pause/Cont* and *Stop*.

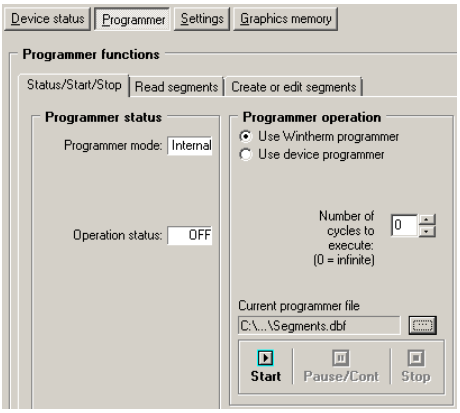


Fig. 20: Wintherm programmer

For the programmer mode, alternatively the device programmer function (if present) or the internal Wintherm programmer can be used. Before starting the programmer mode, the required function must be defined by the selection of *Device programmer* or *Wintherm programmer*.

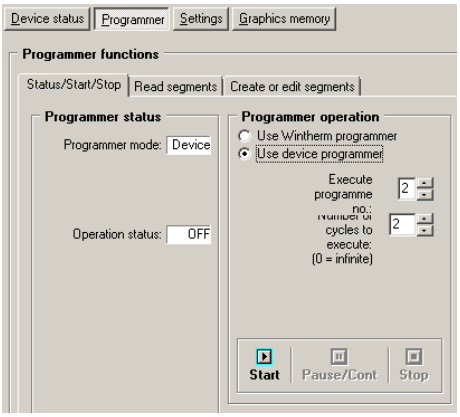


Fig. 21: Device programmer

The window display varies slightly depending on the selection. For the Wintherm mode the programmer file used is shown.

- The desired number of cycles must be chosen and entered on starting the programmer.
- Wintherm programmer Wintherm uses the segment table entered as the programmer file for the calculation and transmission of new setpoints to the device. Changed setpoints are updated on a two-second cycle. The number of the current cycle and current segment are administered by the program and are each displayed again only after the *Refresh* button is clicked.
- Device programmer The device automatically processes the saved segment table. The number of the current cycle and current segment are administered by the device and are each read again and displayed only after the *Refresh* button is clicked.
- *Current programmer file* During the internal Wintherm programmer mode the data are always taken from a file saved in the PC. The file name is displayed or can be redefined here before starting the programmer mode.
- *Start*. If *Wintherm programmer* is selected, the software itself starts with the calculation and cyclical output of setpoints to the device. Changes of setpoint are transmitted to the device on a two-second cycle until the termination of the programmer mode or until held with *Pause*.

  If *Device programmer* is selected, Wintherm only transmits a command to the device to start the device programmer. The device then processes the saved segment table autonomously.

- *Pause/Cont*. If *Wintherm programmer* is selected, the software freezes the recalculation and cyclical output of setpoints to the device until the status terminates due to a renewed *Start* or *Stop* or operation continues via *Continue*.

  If *Device programmer* is selected, Wintherm only transmits a command to the device to freeze the device programmer. If *Pause/Continue* is not supported by a device, the button *Pause/Cont* is masked out.
- *Stop*. If *Wintherm programmer* is selected, the software terminates the recalculation and cyclical output of setpoints to the device. If *Device programmer* is selected, Wintherm only transmits a command to the device to terminate the device programmer. The device then remains in each case with the last updated setpoint.

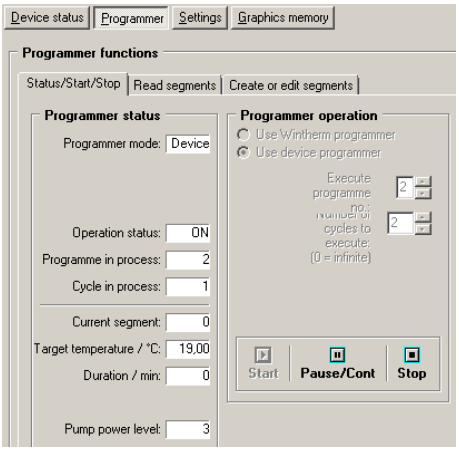


Fig. 22: Device programmer Pause/ Cont., Stop

After the start the window alters its appearance and indicates that the programmer is active. The buttons *Pause/Cont* and *Stop* are from now on unlocked; the button *Start* is locked.

The program number, the current cycle, the current segment and the values of this segment are displayed for the running program (if available as information with the device used). Click on the button *Refresh* to read in the current status.

5.3 Measurement acquisition

The acquisition for a single device is activated, after clicking on the corresponding device symbol in the task bar, by clicking on the item *Activate/deactivate acquisition* in the popup menu. To terminate the acquisition for a single device proceed in the same way. The devices involved in the acquisition are marked with a green, filled triangle in the device bar (here, for example, "Therm12").

Alternatively, you can also start or stop the acquisition for all devices connected at the same time. To do this, in the menu group *Start* the menu items *Start (all devices ready for service)* and *Stop (All running devices)* or the corresponding symbols in the tool bar. To check readiness for service of all devices you can perform a test run. During the test run, no data are saved.

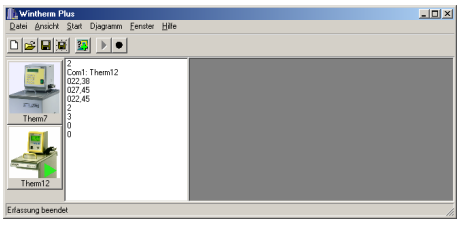


Fig. 23: Acquire measurements

Define the interval

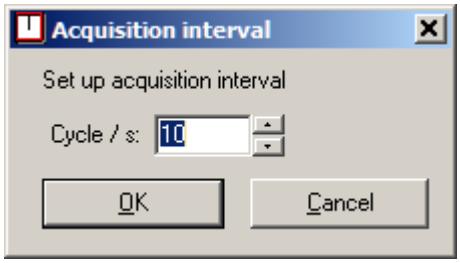


Fig. 24: Define the interval

1. If you select the menu item *Start* → *Time control*, a window will open. Here you can adjust the acquisition cycle for the devices. You can adjust the time in a range from 2 seconds to 600 seconds (10 minutes).

Define acquisition channels

1. You can determine the measuring channels involved in the acquisition via *Extended device control* → *Settings* → *Acquisition channels*.

Error handling during the acquisition

If a device signals an error, the original error messages (e.g. "ERR-8") and a plain text error message created by the software will be displayed.

On starting the acquisition a measurement file is automatically created under the uniquely issued device name, the date and an incremental number (e.g. "Pro_20031125.dbf", provided no other file name has been issued; on termination this file is automatically archived The measurement files are managed in the program directory "...\Measure".

After activating the acquisition, different values (depending on the device function and the activated acquisition channels) are read cyclically by the devices involved and written in a file as a table. The values measured by all devices include the bath temperature and the setpoint. Values measured by certain devices include up to two further external sensor temperatures, the pump pressure or the current pump and cooling power levels. In addition to the measurements the table also contains columns for the serial number ("Index"), a date and time stamp in ISO format ("Timestamp") and an error word ("Errstate").

The error word will be "0000000000" or simply "0" if no error has occurred, otherwise you will see a number representing the error arising on the corresponding measuring channel. The numbers include both the statuses reported by the device as well as communication errors and are largely identical to the relevant error codes quoted in the LAUDA operating instructions (e.g. "3" for ERR-3, "8" for ERR 8). The first character of an error message is always "1". For all messages relating to channels (e.g. no external sensor), the error code is entered at the appropriate point. If the relevant measuring cycle is entirely affected (e.g. device switched off, interface not ready), only the first character is not equal to "0".

The characters contain information on the following channels:

- ·---------- Measuring cycle (an error has occurred generally)
- |·--------- Setpoint
- ||·-------- Bath temperature
- |||·------- Ext. Sensor 1

- ||||·------ Ext. Sensor 2
- |||||·----- Analog temperature
- ||||||·---- (free for expansions)
- |||||||·--- Pump pressure
- ||||||||·-- Pump power level
- |||||||·--- Cooling level
- ||||||||||
- XXXXXXXXXX

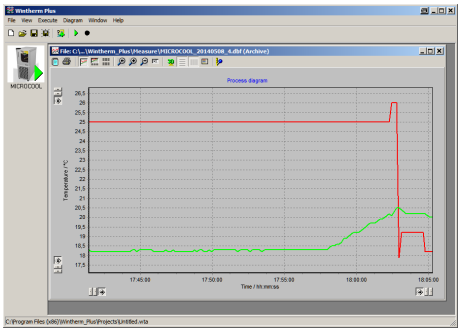
For example, if no external sensor is connected, but the channel was selected for acquisition and no other error occurred, the error word will be "1008000000"; in the case of a device which neither supplies values for a pump power level nor a cooling level, the error word will be "1000000033" (possibly wrong driver); if none of the channels to be acquired supplies a value, the error word will be "10000000" (probably TimeOut due to failed connection).

5.4 Diagrams and tables

5.4.1 Diagrams and tables

- With the first display of a diagram the minima and maxima of the temperature and time axes are automatically selected, as is the subdivision on the axes (grid lines). The axis legends for the temperatures are located at the left margin and the axis legends for the times at the bottom margin.
- Operating elements for quickly changing the axis scaling are provided in the diagram to the left of the temperature axis and below the time axis.
- The displayed minimum or maximum is changed with the buttons Up/Down on the temperature axis or Left/Right on the time axis. In this case the corresponding automatic axis scaling is switched off. The changes always occur in the step width of the current grid line pitch.
- The automatic axis scaling to the corresponding axis minimum or maximum is again reactivated with the automatic buttons Auto-Up/Down or Auto-Left/Right. If only one series of measurements is present, it is shown extended over a time period of one second (otherwise the diagram would appear empty, since a single point is not perceptible).
- Within the diagram the right and left mouse keys can be used to change the image detail.

Diagram (without table)



You can choose between a 2D line diagram or a 3D representation. In the case of the 2D representation you can change the width of the lines.

Fig. 25: Diagram (without table)

Diagram (with table)

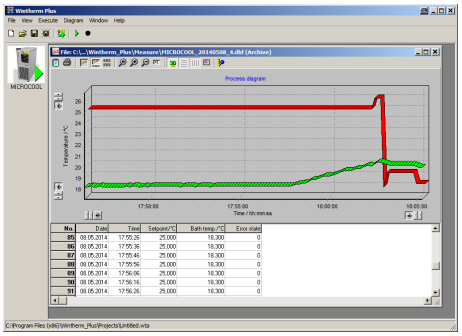


Fig. 26: Diagram (with table)

Table without diagram

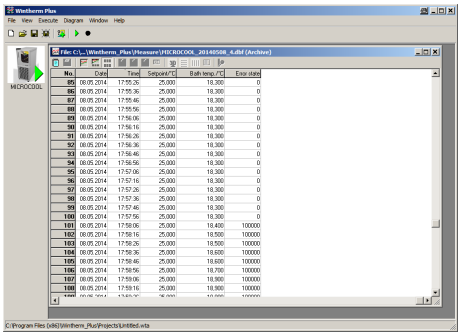


Fig. 27: Table without diagram

- The table contains all measurements recorded so far. The table always has the same layout. The arrangement and number of the table columns is the same for all devices, regardless of whether a device supplies certain measurements or not.
- The first columns Index and Timestamp and the last column Errstate are always used.
- The other columns may contain values depending on the device connected and the acquisition channels selected. Columns for which the connected device cannot supply values (e.g. Ext1Temp, Ext2Temp in the case of a device without external sensor) or which were not set up as acquisition channels will be empty.

5.4.2 Editing functions

When displaying the diagram a range of editing functions are available from the menu or directly by dragging with the mouse.

Functions from the menu or the tool bar

You can use them either via the menu group *Diagram* in the main menu or by using the tool bar in the header of the relevant diagram.

Fig. 28: Diagram tool bar

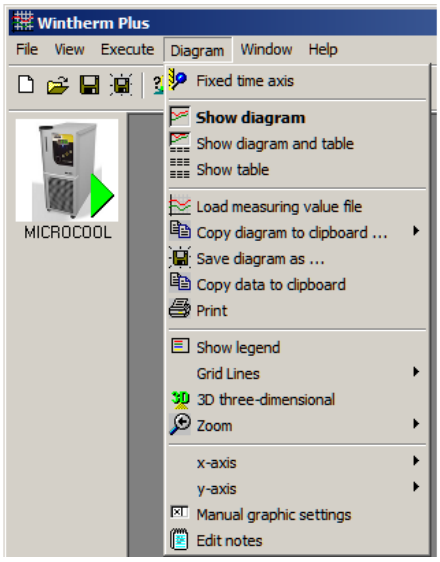


Fig. 29: Diagram menu

- In addition to the functions in the tool bar the menu group includes the following items *Copy*, *Save diagram as* and *Load measuring value file*.
- The editing functions are available both for editing archived data (previous measuring value files) and for editing the diagrams displayed online during the acquisition.
- With diagrams displayed online the option *Refresh* is however also switched on. The diagram is then supplemented with the latest data in time with the acquisition interval. With a diagram displayed online this option is always automatically activated as long as no extracts are displayed or automatic refresh has been switched off for the end of the time axis.

  If refresh has been switched off automatically due to this type of action, it can only be reactivated by switching the zoom function on or off.
- *Automatic refresh* This option is not available with the display of an already archived diagram. With a diagram displayed online however the newest value is always appended at the end of the time axis. Automatic refresh can be switched off if this is not desired. On the other hand, enlarging the diagram detail always switches off automatic refresh. If automatic refresh is again required, the option can be reactivated by clicking it again.
- *Fixed time axis* This option has the effect that always only one time section of the last measurement series, defined to a certain period, is displayed. If this time period is exceeded, then older measurement series move to the left out of the diagram, whereas the new measurement series are appended to the right. The displayed time section remains stationary, fixed to the once-only defined value. The time section can be changed under the point *Manual graphic settings*. The option can be deactivated by clicking it again. The automatic time-axis setting can then be reactivated after a confirmation query.
- *Show diagram* This option only displays the diagram with values and axis legends already entered.
- *Show diagram and table* This option displays the diagram in the upper section and simultaneously the table in the lower third section.
- *Show table* This option only displays the table with values and axis legends already entered.
- *Zoom to original size* The diagram display is reset to its initial values. The automatic axis scaling is switched on.
- *Zoom (+)*. The diagram display is enlarged to approximately 110 percent of its previous size. The automatic axis scaling is switched off. If consequently the grid line pitch becomes less than 1/1000 °C or less than one second, the display is adapted to these minimum values.
- *Zoom (-)*. The diagram display is reduced to approximately 90 percent of its previous size. The automatic axis scaling is switched off. If consequently the scalings of the original display are undercut, further reduction is not carried out.

- *Manual graphic settings* The minima and maxima of the temperature and time axes can be changed to any values using manual entries. The subdivision of the grid lines (ticks) can be varied and the line width in the 2D display can be set within the limits of one to ten pixels. If the display is selected with a fixed time axis, the maximum time period displayed in the diagram is defined here.
- *3D three-dimensional* The normal 2D line display is changed to a 3D display and vice versa.
- *Horizontal grid lines*. The horizontal grid lines are superimposed or masked out.
- *Vertical grid lines* The vertical grid lines are superimposed or masked out.
- *Legend*. The legend (description of the signal curves) on the right diagram margin is superimposed or masked out.
- *Print*. This function starts the printout of the currently displayed diagram detail. Here a choice of various options can be made. Just the diagram or the table values can be printed out or both together.

5.4.3 Functions with the mouse

Apart from the selection of functions from the menu, some functions can be executed directly with the mouse. Here, some functions are activated with the left mouse key, others with the right mouse key

- Selection with the left mouse key A diagram detail can be selected with the left mouse key held down for enlarged display or an already enlarged detail can be reset to its original size.
- Enlarging a diagram detail If, with the left mouse key held down, the mouse pointer is dragged from the top left to the bottom right, the diagram is enlarged on this section when the mouse key is released (with the 3D view the mouse pointer must be located within the axis scalings on the front plane, otherwise there is no reaction). The automatic axis scaling is switched off.
- Resetting the diagram detail If the mouse pointer is dragged from the bottom right to the top left with the left mouse key held down, i.e. opposite to the procedure previously described, then the diagram is reset to its original size when the mouse key is released. The automatic axis scaling is switched on.
- Selection with the right mouse key With the right mouse key held down, the displayed diagram detail can be moved to the left, right, up or down or it can be compressed or extended in all four directions starting from the sides and corners. In this respect the start position at which the right mouse key is pressed determines which action occurs.
- Depending on the starting position, the cursor changes its appearance and indicates the direction of the intended changes. In this connection there are five directions: Left <> Right, Up <> Down, Bottom left <> Top right, Top left <> Bottom right, Move;

- Moving an image detail When the right mouse key is pressed and if the mouse is within a range of approximately 20 % to 80 % in the horizontal or vertical direction (i.e. in the central part of the diagram), the diagram can be moved in the horizontal or vertical direction with the mouse key held down. The automatic axis scaling is switched off.
- Extending or compressing an image detail from the sides When the right mouse key is pressed and if the mouse is within a range of approximately 0 to 20 % or 80 % to 100 % in the horizontal or vertical direction (i.e. centrally on one of the diagram margins), the diagram can be extended or compressed in the horizontal or vertical direction with the mouse key held down. The automatic axis scaling for the affected axes is switched off.
- Extending or compressing an image detail from the corners When the right mouse key is pressed and if the mouse is within a range of approximately 0 to 20 % or 80 % to 100 % both in the horizontal and vertical directions (i.e. in one of the diagram corners), the diagram can be extended or compressed in the horizontal and vertical directions with the mouse key held down. The automatic axis scaling for the affected axes is switched off.

5.4.4 Print diagrams

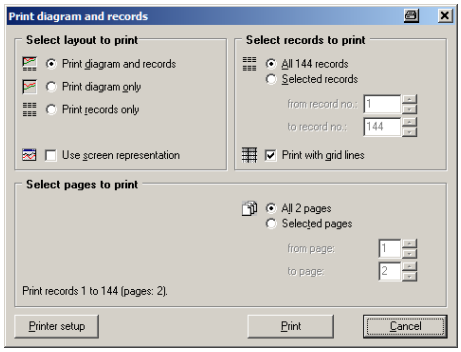


Fig. 30: Print diagram

The diagram and the measurement series can be printed out individually or together. The various possibilities can be selected as options.

- Print diagram and data records. The diagram is printed on the first page of the printout, followed by the table with the measurement series.
- Print diagram only. Only the diagram is printed.
- Print data records only. Only the measurement series are printed.
- Use screen representation If the printout of the diagram is selected above, the layout can be as implemented on the screen (diagram as screen copy) or presented as a drawing. With a printout as a drawing, a white background is always selected and the diagram is "drawn on paper" anew.
- Select data records. If measurement series are to be printed out, the number of data records can be restricted. In this respect a data record selection can be made by entering the first and last data records or the number of pages is limited according to the entries made before the start of the printout.
- Print with grid lines Measurement series can be printed with or without grid lines between the lines and columns.
- Pages to be printed. Once the diagram and data records have been selected, the number of pages needed for the printout is calculated and displayed. By limiting the number of pages, the number of data records (start and finish values) is automatically corrected and displayed for information. This also enables individual pages to be printed.

- Print setup. With setup the options available on the printer can be matched to the printout. These are, for example, paper format (portrait/landscape), printer resolution and quality and the number of copies. The options available depend on the capabilities of the installed printer driver. Possibly however, not all the capabilities of your printer driver will be exploited when printing via Wintherm.
- Print. This starts the printout using the settings previously made.
- Cancel. This terminates the dialog box for printing and returns to the starting point without carrying out any action.

After selection of the options "Print diagram and data records", "Use screen representation", "Print with grid lines" the first page of the printed form appears as follows:

Thermostat: Ecoline E 300 (File: C:\... \Measure \E300_20040905_5.dbf) File date: 05.09.2004 15:39:27

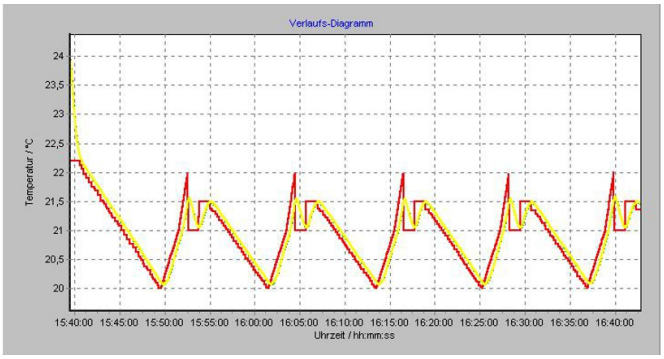


Fig. 31: Measurement trace

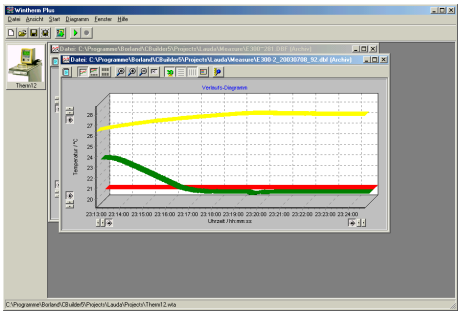
No.	Date	Time	Setpoint/°C	Bath temp./°C	Ext. Temp. 1/°C	Pump level	Cooling level	Error status
1	5.9.2004	3:39:27 PM	22.200	23.980	23.970	3	0	0
2	5.9.2004	3:39:29 PM	22.200	23.950	23.940	3	0	0
3	5.9.2004	3:39:31 PM	22.200	23.910	23.900	3	0	0
4	5.9.2004	3:39:33 PM	22.200	23.860	23.840	3	0	0
5	5.9.2004	3:39:35 PM	22.200	23.800	23.780	3	0	0
6	5.9.2004	3:39:37 PM	22.200	23.740	23.720	3	0	0
7	5.9.2004	3:39:39 PM	22.200	23.670	23.650	3	0	0
8	5.9.2004	3:39:41 PM	22.200	23.600	23.590	3	0	0

9	5.9.2004	3:39:43 PM	22.200	23.530	23.510	3	0	0
10	5.9.2004	3:39:45 PM	22.200	23.460	23.440	3	0	0
11	5.9.2004	3:39:47 PM	22.200	23.390	23.370	3	0	0
12	5.9.2004	3:39:49 PM	22.200	23.320	23.300	3	0	0
13	5.9.2004	3:39:51 PM	22.200	23.250	23.230	3	0	0
14	5.9.2004	3:39:53 PM	22.200	23.180	23.160	3	0	0
15	5.9.2004	3:39:55 PM	22.200	23.110	23.090	3	0	0
16	5.9.2004	3:39:57 PM	22.200	23.040	23.020	3	0	0
17	5.9.2004	3:39:59 PM	22.200	22.980	22.960	3	0	0
18	5.9.2004	3:40:01 PM	22.200	22.910	22.900	3	0	0
19	5.9.2004	3:40:03 PM	22.200	22.860	22.840	3	0	0
20	5.9.2004	3:40:05 PM	22.200	22.800	22.790	3	0	0
21	5.9.2004	3:40:07 PM	22.200	22.750	22.730	3	0	0
22	5.9.2004	3:40:09 PM	22.200	22.700	22.680	3	0	0
23	5.9.2004	3:40:11 PM	22.200	22.650	22.640	3	0	0
24	5.9.2004	3:40:13 PM	22.200	22.600	22.590	3	0	0
25	5.9.2004	3:40:15 PM	22.200	22.560	22.550	3	0	0
26	5.9.2004	3:40:17 PM	22.200	22.520	22.510	3	0	0
27	5.9.2004	3:40:19 PM	22.200	22.490	22.480	3	0	0
28	5.9.2004	3:40:21 PM	22.200	22.450	22.450	3	0	0
29	5.9.2004	3:40:23 PM	22.200	22.420	22.420	3	0	0

30	5.9.2004	3:40:25 PM	22.200	22.390	22.390	3	0	0
31	5.9.2004	3:40:27 PM	22.200	22.370	22.360	3	0	0

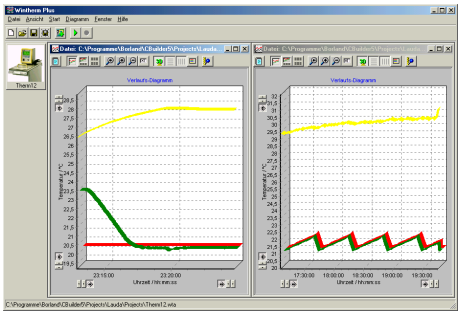
5.4.5 Window management

All graphics windows are embedded in the program interface. The position and size of each window can be customized using the mouse. Additionally, several standard window arrangements are available, e.g. cascade, horizontal, or vertical arrangement.



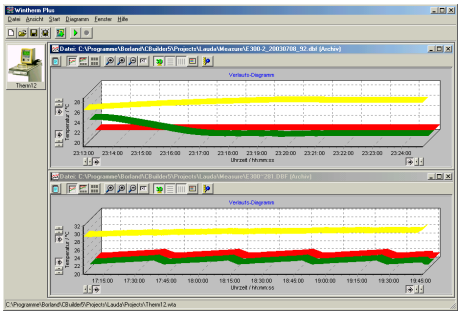
Overlapping representation. The windows are stacked on top of each other with an offset. This arrangement makes sense if many windows are opened. To put the window in the foreground (unchanged in size), simply click on the header of the window.

Fig. 32: Overlapping windows



Two other arrangement patterns are available: Side by side and one above the other.

Fig. 33: Windows side by side



In both cases, all windows are displayed on the program area at the same time. The size of the windows is adjusted to the available space. If only a few windows are open, they are arranged in one line (Tile vertical) or in one column (Tile horizontal). If many windows are open several lines/columns are used for the display. In the case of horizontal arrangement, more columns than lines are used. In the case of vertical arrangement, more lines than columns are used.

Fig. 34: One window above the other

- If you select *Minimize all*, all windows will be minimized and shown as symbols at the bottom of the screen.
- If you select *Close*, the active window will be closed.
- If you select *Close all*, all windows will be closed immediately.

5.5 Wintherm Editor

The editor integrated in Wintherm facilitates the entry of notes on an application or a measurement file and the opening of (unformatted) text files in a way similar to Microsoft® NotePad.

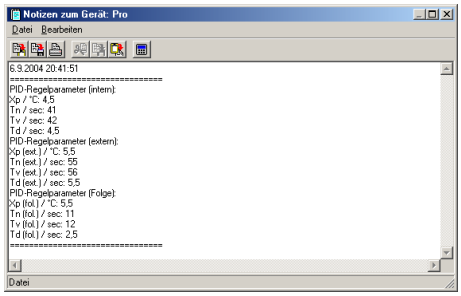


Fig. 35: Device remarks

- The generally available functions are the opening, saving and printing of a file and the insertion, copying or cutting of text for interfacing other applications via the clipboard.
- When the Editor symbol is clicked in the Wintherm environment, a file name is automatically issued which refers to the environment.
- The editor for the device environment receives the name of the device and the extension ".txt" (e.g. "Pro12.txt" for a device designated as Pro12).
- With measurement files the name of the measurement is automatically used and given the extension ".txt" (e.g. the name "Pro12_20040723-1.txt" for the file Pro12_20040723-1.dbf).
- General notes which are saved under the menu item *Help* in the main program receive automatically the name "Wintherm.txt".
- The automatic issuing of names is intended to simplify file allocation. Of course, files can also be saved under other names. However, when the Editor symbol is clicked, Wintherm always attempts to find existing files with the automatically issued name allocation.
- Renamed files must always be explicitly loaded via the menu item *File* → *Open*.

Special editor functions in the active device window

If the Editor is opened in an active device window, then further automated functions are available which insert current program settings or device parameters from the program. If data from this automated function is required at a different location, follow the note at the end of this section.

Apart from manual entries, other current data can be inserted through selection. In this respect a selection of data currently available is shown after pressing the button *Parameter* or in the menu *Edit* → *Insert standard parameters*. The buttons for data which are not available are switched off. A segment table, for example, can therefore only be accepted if it has first been loaded.

The chosen information is always appended at the end of the text. From there it can be moved to other locations by cutting/pasting or copying.

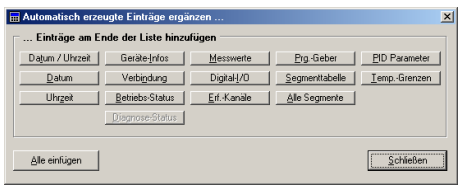


Fig. 36: Supplement entries

The selection of the available parameters can be made individually or by clicking the button *Insert all*; all the information in the block is appended to the existing text.

- The labels on the buttons show on which topics information is available.
- To determine which information in detail is entered with the respective selection start the Editor in the active device window, click each of the selection buttons once and observe which information is then added to the text.
- The automatic entries are only available on opening the Editor in the active device window. In order to use the current device parameters only available here, e.g. also in a measurement file, first of all load the parameters into the Editor in the active device window and copy the desired lines via the clipboard to the editor associated with the measurement file.

5.6 Messages

Wintherm® supplies various types of messages during the evaluation of device status, diagnosis status and errors (ERRxx). The evaluation is different from device to device, for example, due to the different lengths of the status words and due to the different device properties.

Device status

The device status may be, for example, five or seven characters long and include a train of figures, e.g. "0000011". The figures at each point have a different meaning depending on the device type. The corresponding status messages after evaluation of the status are:

- STAT_OK=OK (Device status)
- STAT_ERR=!Device error detected !
- PUMP_OK =OK (Pump status)
- PUMP_ERR=!Pump fault !
- PUMPS_OK=OK (Pumps 1 and 2)
- PUMP1_ERR=!Fault Pump 1 !
- PUMP2_ERR=!Fault Pump 2 !
- PUMPS_ERR=!Fault Pumps 1 and 2 !
- LEVEL_OK=OK (Bath level)
- LEVELL_ERR=!Low level fault !
- TEMP_OK=OK (Temperature range)
- TEMPH_ERR=!Overtemperature fault !
- COOL_OK=OK (Cooling unit)
- COOL_ERR=!Cooling unit fault !
- EXT_OK=OK (External fault)
- EXT_ERR=!No external sensor !
- EXT1_OFF=Ext. Sensor (T1) not detected
- EXT1_ON=Ext. Sensor (T1) connected
- EXT2_OFF=Ext. Sensor (T2) not detected
- EXT2_ON=Ext. Sensor (T2) connected
- AINP_OFF=Analog input switched off
- AINP_ON=Analog input switched on
- AINPS_OK=OK (Analog inputs)
- AINP1_ERR=!Analog setpoint input < 4mA !

- AINP2_ERR=!Analog actual-value input < 4mA !
- AINPS_ERR=!Both analog inputs < 4mA !
- FIXED_0=OK (Status always = 0)
- MICRO2_OK=OK (MicroController 2)
- MICRO2_ERR=!Error MicroController 2 !
- MICRO1_OK=OK (MicroController 1)
- MICRO1_ERR=!Error MicroController 1 !
- PRG_OFF=Programmer off
- PRG_ON=Programmer on
- CTRL_TI=Internal control (Ti)
- CTRL_T1=External control (T1)
- CTRL_T2=External control (T2)
- PORT_OK=OK (Interface module)
- PORT_ERR=!Error in interface module !
- COMM_OK=OK (Communication with controller)
- COMM_ERR=!Transmission error to controller !
- ALERT_OK=OK (Status alarm contact)
- ALERT_ERR=!Alarm contact open !
- FLOW_OK=OK (Status flow contact)
- FLOW_ERR=!Flow contact open !
- SET_OK=OK (Present setpoint)
- SET_ERR =!Setpoint not updated !

Diagnosis status

The diagnosis status is determined differently for different devices. After the read command "IN_ERR", Ecoline E 300 (new) and Integral T supply an eight-character status word, for example "00000000" (no error), from which a 16-bit diagnosis status is derived.

After the read commands "IN_ERR_00" (Master) and "IN_ERR_01" (Slave), other devices each supply the values "0.00" (No error) or values "1.00" to "255.00", which are interpreted differently for master and slave. The P-controller supplies no diagnostic messages.

For each device correspondingly 16 diagnostic messages INERR01 ... 16 can be assigned to the bit pattern.

Diagnostic messages with Ecoline E 300 (new) and Integral T series

E 300 (new) and Integral T supply an eight-character status word. If everything is OK, these devices supply "00000000" as the status word, otherwise a hexadecimal status word.

For example, the mnemonics and diagnostic messages for the E 300 (new) or Integral T are:

- IE_PUMP_LOCK=(01) Pump does not start (it is located at the dead angle)
- IE_PUMP_CURR=(02) Pump draws too much current
- IE_EEPR_LOCK=(03) It is not possible to write to EEPROM
- IE_EEPR_DATA=(04) EEPROM contains data errors
- IE_TEMP_SENS=(05) Control temperature sensor (Pt100): broken or short circuit

- IE_ADCV_TEMP=(06) ADC for temperature measurement not responding
- IE_ADCANALOG=(07) ADC for analog measurement not responding
- IE_SENSDIFMS=(08) Safety temperature and control temperature different (master)
- IE_SENSDIFSL=(09) Safety temperature and control temperature different (slave)
- IE_TMO_MS_SL=(10) Timeout during master-slave communication (slave)
- IE_WATCHD_SL=(11) Watchdog timer has triggered (slave)
- IE_SECSENSSL=(12) Safety temperature sensor (Pt100): broken or short circuit (slave)
- IE_ROMCHKERR=(13) Error during ROM test
- IE_RAMCHKERR=(14) Error during RAM test
- IE_CPUCHKERR=(15) Error during CPU test

Diagnostic messages with Ecoline E 200, Ecoline E 300 (old), WK

With these devices two consecutive values with "IN_ERR_00" (master) and "IN_ERR_01" (slave) are read. Each of the "IN_ERR_xx" read commands supplies a numerical value in the range 0 to 255, which is in each case converted to an 8-bit binary value and is combined by the program to form a 16-bit binary value (slave: bits 0 ... master: bits 8 ... 15). Each bit position stands for the corresponding error number.

For example, the mnemonics and diagnostic messages for the E 200, E 300 (old) are:

- IE_NRAMFAULT=(01) NOVRAM defective
- IE_NRAMERROR=(02) NOVRAM data error
- IE_ADJSENSOR=(03) Control temperature sensor (Pt100): broken or short circuit
- IE_CAL_ERROR=(04) Error during calibration
- IE_MASTERDIF=(05) Difference between temperature probe and safety probe too large
- IE_SLAVE_NAK=(06) Slave controller not responding
- IE_MASTERRES=(07) Watchdog timer (master) has triggered a reset
- IE_MASTERRAM=(08) RAM error (master)
- IE_MOTORCURR=(09) Motor current too high or too low (motor does not start)
- IE_MOTORVOLT=(10) Motor voltage too low
- IE_SECSENSOR=(11) Safety temperature sensor (Pt100): broken or short circuit
- IE_EEPROMERR=(12) EEPROM error (slave)
- IE_SLAVE_DIF=(13) Difference between temperature probe and safety probe too large
- IE_MASTERNAK=(14) Master controller not responding
- IE_SLAVE_RES=(15) Watchdog timer (slave) has triggered a reset
- IE_SLAVE_RAM=(16) RAM error (slave)

Error evaluation

The error messages have the same meaning for all devices. ERR-8, for example, signifies with all devices that an external sensor is not connected.

The corresponding messages are:

- DEVICE_BUSY=(2) Buffer overflow (too many characters or currently busy)
  COMMAND_ERROR=(3) Unknown command
- SYNTAX_ERROR=(5) Syntax error in the value
- VALUE_INVALID=(6) Inadmissible value
- CHANNEL_SYNTAX=(7) Syntax error in the channel number
- CHANNEL_MISSING=(8) Channel (ext. temperature) not present
- FRAME_ERROR=(28) Data transmission error (for example, no stop bit)
- OPERATION_BUSY=(29) Function currently blocked, try again after a few ms
- RAMPINDEX_ERROR=(30) Programmer: all segments allocated
- SETPOINT_EXTERNAL=(31) No setpoint input possible, analog setpoint is
- EIN TEMPBOUNDS_ORDER=(32) Outflow temperature: upper value < lower value
- EXTSENSOR_MISSING=(33) External sensor missing
- CURRENT_ERROR=(34) Current input is < 4 mA
- AUTOUSED_ERROR=(35) Execution not possible, automatic is set
- RAMPUSED_ERROR=(36) Programmer running (or pause), no setpoint input possible
- RAMPSTART_ERROR=(37) Programmer: switch-on not possible, analog input active
- SPCOUNT_ERROR=(38) Setpoint: 20 changes per hour exceeded
- REMOTECOMM_ERROR=(50) Communication between thermostat and remote control interrupted

6 General information

6.1 Copyright

This manual is protected by copyright and is intended exclusively for the purchaser for internal use.

The transfer of this manual to third parties, reproductions of any type and form, whether in whole or in part, and the dissemination and/or communication of the contents other than for internal purposes are not authorised without the written permission of the manufacturer.

Infringements will result in legal action for damages. We reserve the right to assert further claims.

6.2 Technical changes

Technical details subject to change.

6.3 Warranty conditions

LAUDA provides a warranty of one year on equipment as standard. A warranty card is supplied with the machine. Fill this in and return it to LAUDA. In this case, you will have a warranty of two years.

6.4 Contact LAUDA Service Constant Temperature Equipment

Contact LAUDA Service Constant Temperature Equipment in the following cases:

- in the event of faults on the machine
- for spare part orders
- in the case of questions about the machine

Contact details

LAUDA Service Constant Temperature Equipment

Telephone: +49 (0)9343 503 236

Fax: +49 (0)9343 503 283

E-Mail: service@lauda.de

6.5 EC conformity

The machine complies with the applicable occupational health and safety requirements of the directives listed below.

- Low Voltage Directive 2006/95/EC
- EMC Directive 2004/108/EC

LAUDA DR. R. WOBSER GMBH & CO. KG - Pfarrstraße 41/43 - 97922 Lauda-Königshofen - Germany

7 Index

LAUDA DR. R. WOBSER GMBH & CO. KG
Postfach 1251 ◦ 97922 Lauda-Königshofen ◦ Germany
Phone: +49 (0) 9343 503-0 ◦ Fax: +49 (0) 9343 503-222
E-Mail: info@lauda.de ◦ Internet: www.lauda.de