Operating Manual

USB
Temperature measurement system
570.70
Mesy 3.0
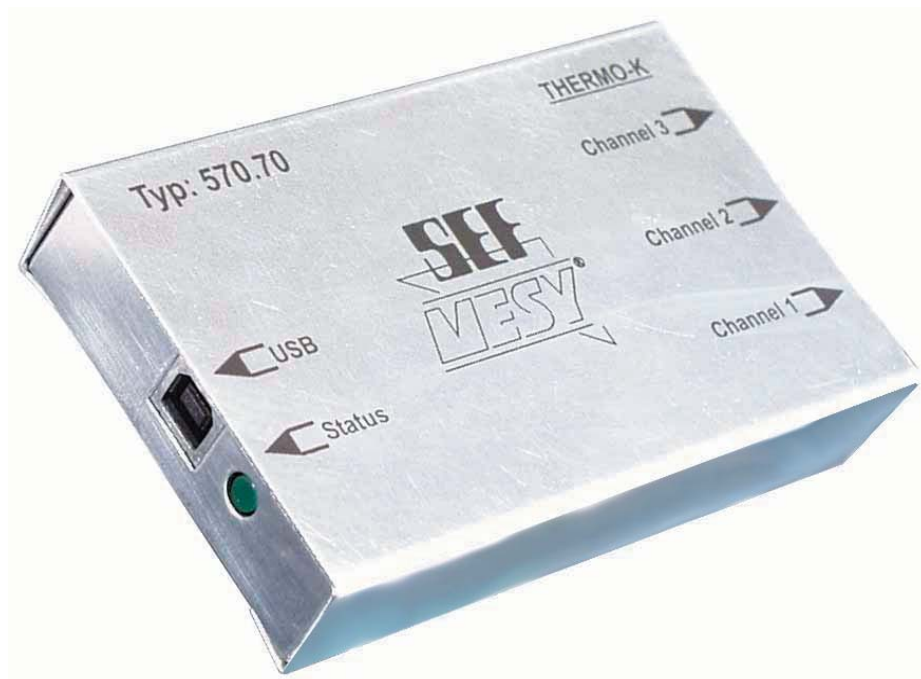
Year of manufacturing:

_____

Serial no.:

_____

Please keep this manual for later disposal

Table of contents

Chapter 1 preface

Chapter 2 safety instructions

Chapter 3 installation

Chapter 4 system configuration

Table of contents

Chapter 5 Measurement assembly and measurement

Chapter 6 Measurement analysis

Chapter 7 Notes

1.0 Preface

Introduction

Dear customer,

this operation manual is made for the authorized user. Basic knowledge and the handling of a personal computer and its operation system is presumed.

Please take care for the instructions about the hardware and software installation in this manual. Thereby you prevent damage at the hardware and software.

The measurement system was developed state of the art and was tested for proper function before delivery. Anyway there could be danger for health and life of the user or third persons and for damage at the measurement system if it is not used according to this manual.

Read this manual before working with the measurement system. Use the measurement system only in good order and condition and according to all regulations, safety and danger instructions in this manual.

This operation manual contains rules and instructions for a proper use of the measurement system. Only the compliance of this rules and instructions is obtained as a proper use. Risks due to other use are accounted for the operator.

Please contact us if you have further questions to the measurement system or if you like to order accessories or spare parts.

You can get through to us under:

Phone: 0049 (0)4136 / 909-0
Fax: 0049 (0)4136 / 909-11

1.0 Preface

Intended operation

The MESY 3.0 is designed for a measurement of temperatures from 0°C – 400°C.

Damages due to higher temperatures are accounted to the operator.

Please take care for:

◆ An intended or proper use also contains the compliance of the installation, operation and disposal instructions.

◆ Only qualified and trained staff is allowed to work with the measurement system.Each person who is working with the measurement system must have read and understood the important parts of the manual, especially chapter 2 „ Safety instructions". In addition the operator must inform the staff about possible dangers.

◆ The operator must ensure that the operation manual was understood by all persons who are working with the measurement system.

◆ One copy of the operation manual must be kept at the place of installation of the measurement system.

1.0 Preface

Rights of use

The SEF Eltronic GmbH allows the customer the not exclusive and not negotiable use of the delivered hardware and software (further named „product") subject to the following regulations:

◆ The rights of use authorises the customer to use the product and the necessary documentation.

◆ The SEF Eltronic GmbH is owner of all rights at the product. The customer is allowed to make a safety backup. The SEF Eltronic GmbH reserves all rights of publication, editing and utilisation at the product and the documentation.

◆ The warranty is effective ex works SEF Eltronic GmbH, D-21379 Scharnebeck and is valid in consideration of our general terms and conditions. The warranty claim expires if the assembly / board is opened or changed by unauthorized persons, if the type label was removed or changed or if the inscriptions of the warranty paper were changed or made irrecognisable.

◆ The SEF Eltronic GmbH does not assume any liability for a faultless function of the product or the accuracy of the parameters.

◆ The SEF Eltronic GmbH is authorised to effect changes and upgrades of the product in its sole discretion. The SEF Eltronic GmbH is not bound to provide these changes and upgrades unasked free of charge. The SEF Eltronic GmbH is always anxious to update the software. You can ask for a software update for a nominal fee before the warranty time expires.

1.0 Preface

**Special restric-
tions**

◆ It is forbidden to copy the product or the written documentation complete or in parts. It is forbidden to change the product, especially to translate, to redevelop, to decompile or to disassemble the enclosed software.

**General regula-
tions**

◆ For perfective maintenance reasons it is necessary to inform the manufacturer in case of donation or hire of the product, otherwise the warranty claim would expire.

**Assignment of
the rights of use**

◆ The general terms and conditions of the SEF Eltronic GmbH are valid. These rights of use succumb the right of the Federal Republic of Germany. Court of jurisdiction and place of fulfilment is Lüneburg.

(c) SEF Eltronic GmbH
USB-MESY® 3.0, June 2003

1.0 Preface

About this manual

This operation manual shall explain the handling of the measurement system and shall help you with the work with the MESY 3.0.

Therefore we divided this manual in different chapters.

◆ **Chapter 1, preface**
In this chapter you get knowledge about the intended use and the rights of use.

◆ **Chapter 2, safety instructions**
Safety must be. Here we give you important instructions for the handling of the measurement system and about what you should take care for in the environment. In addition you get advices about the disposal of the measurement system.

◆ **Chapter 3, function description**
In this chapter you will get knowledge about the general function. We will show you, how you can install the software and how to prepare the system for measurement.

◆ **Chapter 4, system configuration**
In this chapter we describe how you can start the software and which general adjustments you can make.

◆ **Chapter 5, measurement assembly and measurement**
How to fix temperature sensors to a PCB and how to operate the measurement system will be described in this chapter.

◆ **Chapter 6, measurement analysis**
In this chapter you will learn how to change the diagram after recording a temperature profile.

◆ **Chapter 7, notes**
In this chapter you will find free space for your own notes.

1.0 Preface

Special hints and conventions

For an easier reading and consulting in this manual we marked some parts of the text.

! Marks descriptions, advices for a better handling of the system or cross references corresponding with other text passages.

◆ Listings with a previous rectangle are work or operation steps which must be done in the mentioned order.

▌ Listings with protrusive rhombus are general listings.

<Enter> These parts mark enters with the PC keyboard and text inscriptions for operation and programming.

At the beginning of this operation manual you will find a table of contents, which helps you to find the single topics.

01.eng USB-Mesy 3.0

1.0 Preface

Technical data

Size of the measurement box (lxwxh):	120 x70 x 23 mm
Weight of the measurement box:	180 g
Voltage supply:	via USB-connector
Data transfer:	via USB-connector
Operation temperature:	0°C – 50°C
Number of temperature sensors:	3
Type of temperature sensors:	thermocouple type K
Measurement- (temperature-) range:	0°C – 400°C
Measurement accuracy:	+/-1°C (after adjustment)

1.0 Preface

2.0 Safety instruction

General safety instructions

This measurement system is manufactured state of the art. Anyway the system can cause danger if it is not used in compliance with the instructions. The operation manual serves for an intended and safety work with the measurement system.
Each person who is working with this measurement system must have read and understood the complete operation manual, especially this chapter. Safety instructions serve for occupational safety and health and for accident protection.

Safety instructions must be observed.

Keep this operation manual next to the measurement system, so that you have it always to your disposal. Your attentive cooperation is necessary to prevent you and your colleagues from injuries. Work with care and safety awareness.

The following warning and instruction symbols are used to mark text passages with safety instructions. Keep this symbols and their meaning in mind.

Important symbols

Warning sign: This safety symbol warns of a possible danger. Non-observance can cause injury or damage of the system.

Commandment sign that rules a special behaviour. Non-observance can cause heavy injuries.

Remain dangers are not obvious risks given to the use of the measurement system. Although the measurement system is developed state of the art and is constructed and manufactured according to the generally accepted safety regulations, even with intended use remain dangers cannot be eliminated. Therefore use the measurement system only in unobjectionable condition and take care for all possible dangers and for the rules for the prevention of accidents.

Remain dangers

2.0 Safety instructions

Important instructions

Owner

Owner is every individual and legal person who has bought the measurement system.

Operator

Operator is every individual and legal person who uses the measurement system or gives the order to use it.

Competent and qualified persons

Only competent, qualified and briefed persons are allowed to operate the measurement system. These persons must have sufficient knowledge of the special subject area and of the relevant working safety and accident prevention regulations.

Accident prevention regulations

Accident prevention regulations must be followed. Please inform yourself about the accident prevention rules which are relevant for your company and for the work with the measurement system.

We want to refer to the following accident prevention rules (valid in Germany):

UVV "First Aid" (BGV A59)
UVV "General regulations" (BGV A1)

Please take also care for the following regulations:
◆ Safety regulations VDE,
◆ Safety regulations IEC,
◆ Safety instructions of the chip glue and solder paste manufacturer

2.0 Safety instruction

This you should know for operating the measurement system

Only assigned and instructed persons are allowed to use the   measurement system. The state of health of these persons must be okay so that they are in a position to operate the system and these persons must not come under the influence of pharmaceuticals which reduce the reaction time. The operator is obliged to make sure that the measurement system is used only in a safety and operable state.

General safety instructions

The measurement system is inapplicable for the operation inside the temperature zone you want to measure. Make sure that the operation tempera-ture of the system is not higher than 50°C.

The operation staff must also take care that only assigned persons work with the measurement system. Every procedure which affects the safety of the measurement system is not allowed. If a fault appears which may cause danger for persons, for the measurement system and / or for the environment, the system must put out of operation immediately. It is allowed to put the system on stream again only if the fault was eliminated before and if there is no danger any longer. The operation staff is obliged to inform the operator or the owner about any changes at the system which may take effect to the safety.

Only original spare parts are allowed for repair.

Take care for the safety and operation instructions of the chip glue and solder paste manufacturer.

Read also the operation manual of the soldering system

Reference to other manufacturers

2.0 Safety instructions

Disposal advices

The system contains materials which can cause danger to the environment when disposed. The operator is obliged that these materials will be disposed conform to the law.

For Germany is valid:
It is mentioned in the federal law how to dispose these materials. Not all of these materials will be disposed by the communes. In this cases the operator is obliged to dispose these materials by himself conform to the laws.

! Ask the communes, the federation or the country for information about the disposal.

◆ Keep the original packing for later return shipment to the manufacturer.

◆ The electronic assemblies must be disposed conform to the law.

02.DE USB-Mesy 3.0

3.0 Installation

Functional description

The measurement system 570.70 was especially designed for the use at wave and reflow soldering systems. The measurement recording is taking place with a PC in an Excel form. The measurement values are transferred from the system to the PC. The temperatures are measured via 3 thermocouple sensors of type K. These sensors are connected with sockets at the rear side of the measurement system. The duration of the measurement recording acts in accordance with the adjustments in the user software. All operation and indicator elements are arranged at the front side. A LED shows the status of the system. If it flashes green, the system is ready for initialisation and for recording measurement data.

Intended application

Assembly

The demonstration of the measurement data occurs via the measurement system software. This software can be installed on any AT compatible personal computer which is equipped with the operation system Windows 2000© or Windows XP©. Microsoft Excel© from the software packages Office 2000© or Office XP© is also needed. The hardware requirement is a PC with a VGA graphics board, one free USB port 1.1 and 4,5 MB free hard disk space. The software can be installed with the included setup file.
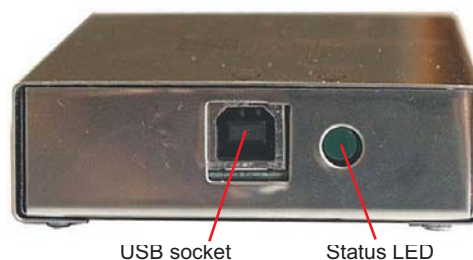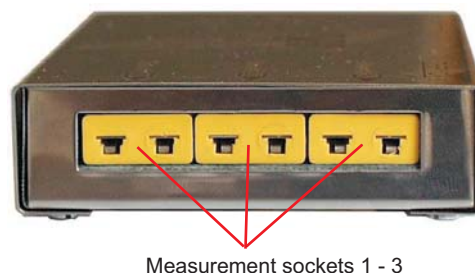
Software

Indication and connections

Front view

USB socket   Status LED

Rear view

Measurement sockets 1 - 3

03.eng USB-Mesy 3.0

3.0 Installation

Functional description

Measurement data

With the measurement system software the recorded data can be displayed, analysed, organized and printed. For the display of the measurement data in a graph, the temperature and the time axis can be adjusted, grid and measurement graph symbols can be faded in and out.

Analysis

The analysis functions allow to show information about the peak temperature and peak duration of a measurement graph according to a previous selected melting point. A further function is the calculation of the maximum increase rate of a temperature graph. It is possible to save a graph together with positive and negative tolerance values as a reference curve. This reference curve can be compared with following measurements to get an easy control about the process accuracy.

Print function

A printout is possible via a printer which is connected to the PC.

3.0 Installation

Scope of delivery

The measurement system will be shipped in a special packing by post or another forwarder.

You have received a measurement system 570.70 including the standard scope of delivery:

1	**Measurement box 570.70**
3	**Thermocouple sensors type K, length 2,5 m**
1	**USB cable, length 3,0 m**
1	**Installation CD-ROM**
1	**Quick reference guide**
1	**operation manual**
2	**self-sealing magnetic stripes**

You will find all additional accessory deliveries on the delivery note.

▌ Check immediately if there are any transport damages

▌ If there is a transport damage, please contact us and the forwarder.

⚠ **Attention, danger of life**
Don't operate the system if there are any perceptible damages. The damage can cause danger to your life.

▌ Check if the contents correspond with the details on the delivery note. If the delivery and the delivery note don't correspond please contact us at once.

▌ After you have unpacked the measurement system and checked the unobjectionable condition and the correct delivery, you can start the beginning of operation.

3.0 Installation

Software installation

Computer requirements

These are the computer requirements for an unobjectionable measurement:

- ◆ Windows 2000© or Windows XP©
- ◆ VGA graphics board
- ◆ 1 USB interface 1.1 or higher
- ◆ 1 CD-ROM drive
- ◆ Microsoft Excel 2000© / XP© or Microsoft Office 2000© / XP©

Copy the software on your hard disk

The measurement system software will be started directly from the Microsoft Excel program.

For a correct installation Microsoft Windows 2000© or Microsoft Windows XP© and Microsoft Excel 2000 XP© or Microsoft Excel XP© must be installed to your computer.

Before connecting the measurement box with the PC the measurement software must be installed.

❙ Insert the included CD-ROM in the CD-ROM drive of your PC.

❙ Open the file "Setup.exe" on the CD-ROM.

❙ Follow the instructions which appear on the screen.

❙ If necessary it is possible to create a new path.

❙ The software of the MESY 3.0 is installed on your PC after the installation procedure is finished.

03.eng USB-Mesy 3.0

3.0 Installation

Software installation

For a better distinction of the separate measurement graphs it may be helpful to create order or PCB specific subdirectories.

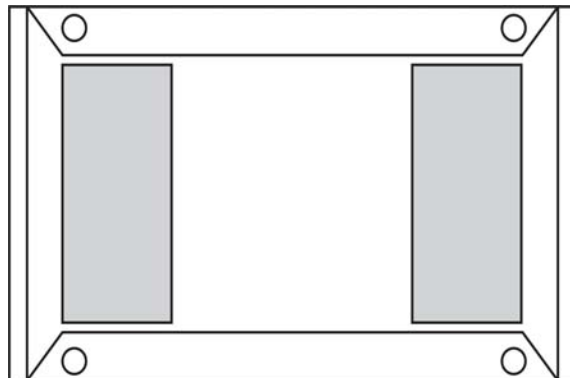!   For this work you should also read the help instructions of Microsoft Excel 2000.

!   For storing the measurement graphs you should make a back up from time to time.

Installation of the magnetic stripes

For a better adhesion on metal surfaces the included magnetic stripes can be fixed to the bottom side of the box.

Mounting example:

3.0 Installation

Hardware installation

Connectors and indication

Front view
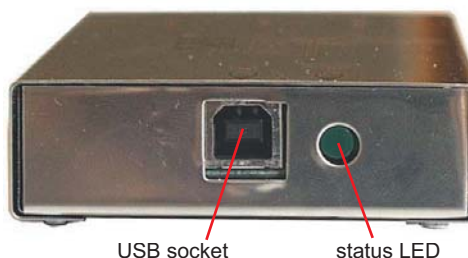
USB socket   status LED

Rear view
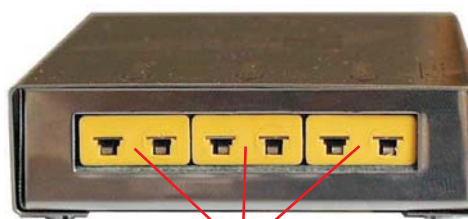
measurement socket 1 - 3

Front side

At the front side of the measurement box you will find all connection and indication elements.

USB socket: Here you must connect the included USB cable.

Status LED: The LED shows the actual status of the measurement box. A green signal shows that the measurement box is ready for operation . A green signal that blinks 5 times shows the initialisation of the box.

Rear side

Measurement sockets: At the rear side of the measurement box there are 3 sockets for thermocouple sensors. The numbering of the channels on the bottom side of the case is identical with the numbering in the software.

03.eng USB-Mesy 3.0

3.0 Installation

Hardware installation

▌ Connect the thermocouple sensors, type K with the sockets in the measurement box. Take care for the coding of the plugs.

▌ Connect the included USB cable with the MESY 3.0 and with a free USB port at your PC.

▌ The new USB device will be detected and the required driver will be installed automatically.

!

Attention
To receive measurement data with high accuracy, it is necessary to adjust the complete measurement system as described in chapter 4.

Pic. 2

Pic. 1

3.0 Installation

4.0 System configuration

Starting the software

Important: For a correct execution of the MESY 3.0 form it is necessary that the macro function of Microsoft Excel 2000© is enabled. If this is not the case please mark the according function in the menu:

-Extras / Macros / Safety

Enable the macro function

❚ Choose Start / Programs / MESY III or open the link >MESY III< on your desktop.

Start the program from the hard disk

❚ Microsoft Excel 2000© will be started and the MESY 3.0 form will be opened.

❚ The information >Download OK< shows, that your MESY 3.0 was connected correctly with the measurement form.

❚ Confirm this information with >OK<.

❚ The LED will blink 5 times to confirm the procedure and then will flash all the time.

Your MESY 3.0 is now ready for measurement.

4.0 System configuration

4.0 System configuration

General layout of the measurement forms

After the program was started, the main window will be shown on the screen.

For a better view the measurement form was divided into 4 sheets. To shift between the sheets use the register switches at the left bottom side.

In detail you will find the following sheets in the measurement form:

1. **Configuration**
   Here you can make adjustments concerning the measurement. It is possible to adjust and configure the measurement box.

2. **Diagram**
   Here you can see a graphical display of the measured values. It is also possible to read the analysed values. Several analysis functions can be used to optimize the soldering process.

3. **Values**
   Here you can see the measured values in tabulated form. Via this sheet you can save series of measurements for a later analysis.

4. **Reference**
   Here you can see a list of the reference values in tabulated form. Reference values can be edited manually to proportion them to the ideal form of a measurement graph.

Layout of the measurement form

04.eng USB-Mesy 3.0

4.0 System configuration

4.0 System configuration

The configuration form

In the table the following information can be displayed respectively can be chosen:

- ◆ Used name (1)
- ◆ Check (2)
- ◆ Channel no. (3)
- ◆ Available (4)
- ◆ Measurable (5)
- ◆ Use channel (6)
- ◆ Initialize (7)
- ◆ Interval (8)
- ◆ Duration (9)
- ◆ Duration in seconds (10)
- ◆ In diagram shown time window (11)
- ◆ Automatically analyze graphic for soldering profiles after measurement (12)
- ◆ Activating temperature (13)
- ◆ Melting temperature (14)
- ◆ Set for channel (15)
- ◆ Show reference (16)
- ◆ Adjust (17)

Fields in the table which include a small red triangle contain additional short information. You will see this information if you touch the field with the mouse pointer.

On the following pages you will get a description of each menu function.

4.0 System configuration

Menüstrukturen

4.0 System configuration

The configuration sheet

In the upper area the following information is shown respectively can be chosen.

◆　　Used name (1)

For a better overview the channels are displayed with names. You can create your own names if you click in the referring field and edit the name.

◆　　Check (2)

With this button you can check which channels are equipped with thermocouple sensors.

◆　　Channel no. (3)

Here you can see the channel numbers of your MESY 3.0. Actually only the channels 1-3 and channel 8 are available. Channel 5-7 are reserved for a later extension. Channel 8 shows the values of an internal sensor which measures the temperature inside the measurement box.

◆　　Available (4)

Here you can see which channels are provided by the hardware. Actually only the channels 1-3 and channel 8 are available. The fields "available" and "measurable" will be filled by pressing the button >Check<.

A × means "not available" respectively "disabled".

A ✓ means "available" respectively "enabled".

◆　　Measurable (5)

In this field you can see if a thermocouple sensor is connected to the channel.

Used name

Check

Channel no.

Available

Measurable

04.eng USB-Mesy 3.0

4.0 System configuration

6   8   10   9   7

4.0 System configuration

The configuration sheet

◆   Use channel (6)

In this field you can select which channel should be used for measurement. You can enable or disable the channel by clicking in the referring field.

◆   Initialize (11)

With this button you can initialize your MESY 3.0 again. This is maybe necessary if the screen saver has started in the meantime or any error messages have appeared. A successful initialisation will be confirmed by the message "Download OK"and the status LED will blink 5 times.

◆   Interval (8)

In this field you can choose the measurement interval. Click on the choice field and choose one of the offered intervals.

◆   Duration (9)

Enter the desired measurement duration in this field and confirm it with the >Enter< key. You can also choose if your entry should be in seconds or in minutes.

!   Information: Please note that a combination of interval and duration which results in more than 3000 measurement values is not possible. A warning will appear and the values will be reset to the possible maximum.

◆   Duration in seconds

In this field the entered measurement duration will be shown again in seconds for control purposes.

Use channel

Initialize

Interval

Duration

Duration in seconds

04.eng USB-Mesy 3.0

4.0 System configuration

4.0 System configuration

The configuration sheet

◆   In diagram shown time window (11)
Here you can enter the time window in seconds in which the measurement will be shown on the diagram sheet.

◆   Automatically analyze graphic for soldering profiles after measurement (12)
If you enable this function, the graphic analysis will start automatically after the end of the measurement.

◆   Activating temperature (13)
Here you can enter the temperature at which the activation of the flux will start.

◆   Melting temperature (14)
Here you can enter the melting temperature for the calculation of the melting duration in the measurement analysis.

◆   Set for channel (15)
Here you can select the channel for which the analysis calculations should be done. The length of the melting phase, the length of the preheating phase, the maximum peak temperature, the time from the beginning of the measurement til the max. peak temperature and the maximum temperature slope will be shown for the selected channel.

◆   Show reference (16)
If you enable this function an additional reference graph will be displayed on the diagram sheet.

◆   Adjust (17)
Here you can open the menu for the adjustment of the measurement box and the thermocouple sensors.

◆   Language (18)
With this button you can choose the language between German and English.

	In diagram shown time window
	Automatically analyze graphic for soldering
	Activating temperature
	Melting temperature
	Set for channel
	Show reference
	Adjust
	Language

4.0 System configuration
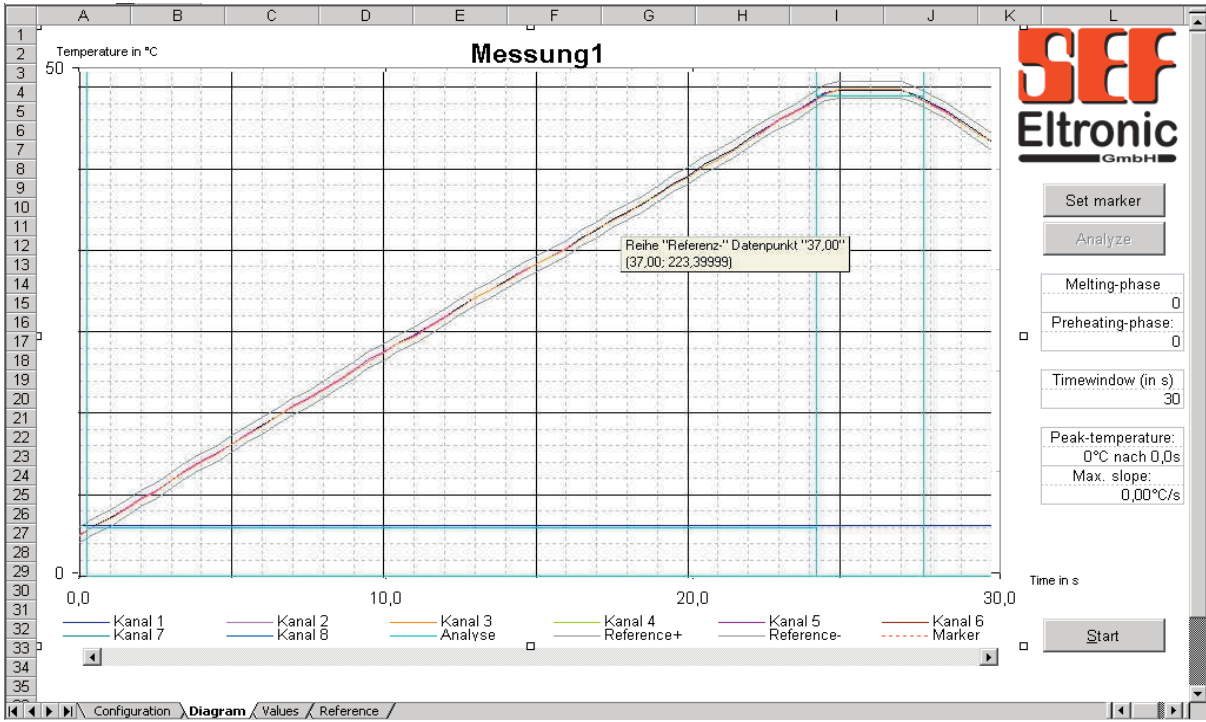
4.0 System configuration

The diagram sheet

In the diagram sheet the graphic display of the measurement analysis takes place. The temperature profile is shown as a coloured graph. The colour of this graph can be changed to any in Excel© available colour.
With the help of a reference graph the measured temperature profile can be compared with the optimum temperature range graph (range between reference positive and reference negative, see page "reference sheet" in this chapter). The activating and the melting display are also available in the diagram for analysis.

In the table the following information is shown respectively can be chosen:

◆ Channel name (1)
◆ Channel colour (2)
◆ Analyze (3)
◆ Melting phase (4)
◆ Preheating phase (5)
◆ Time window (6)
◆ Peak temperature (7)
◆ Max. slope (8)
◆ Start (9)

On the following pages the menu functions will be described.

Overview diagram sheet

4.0 System configuration

4.0 System configuration

The diagram sheet

In the table the following information will be shown respectively can be chosen.

◆   Channel name (1)

    Display of the channel name referring to the entry in the field "Used name" on the configuration sheet.

◆   Channel colour (2)

    Colour display of each channel. The colour can be changed. Choose the graph you want to change with the mouse pointer and press the right mouse button. The menu >Format legend symbol< appears and you can choose the colour you like.

◆   Analyze (3)

    Here you can repeat the analysis. This is only necessary if the automatic analysis is disabled on the configuration sheet or if you want to start the analysis again for another channel (change the field "Set channel" on the configuration sheet before).

◆   Melting phase (4)

    In this field the length of the melting phase will be shown (time in which the temperature is higher than the entered melting temperature).

◆   Preheating-Phase (5)

    The preheating phase is the duration between the activating and the melting temperature

◆   Time window (6)

Here you can enter the length of the time axis shown in the diagram (> 10 seconds).

◆   Peak temperature (7)

	Channel name
	Channel colour
	Analyze
	Melting phase
	Preheating-Phase
	Time window

4.0 System configuration

4.0 System configuration

The diagram sheet

Display of the maximum peak temperature and of the duration between the beginning of the measurement and the reach of the peak temperature.

Peak temperature

◆   Max. slope (8)

Max. slope

Display of the maximum temperature slope during the soldering process.

◆   Start (9)

Start

Press this button to start the measurement.

4.0 System configuration

2 1   5   3   4

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Time	Kanal 1	Kanal 2	Kanal 3	Kanal 4	Kanal 5	Kanal 6	Kanal 7	Kanal 8				
2	0,0												
3													
4												Clear list	
5													
6												Save graph	
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													
32												Start	
33													
34													
35													

Configuration / Diagram \ **Values** / Reference /
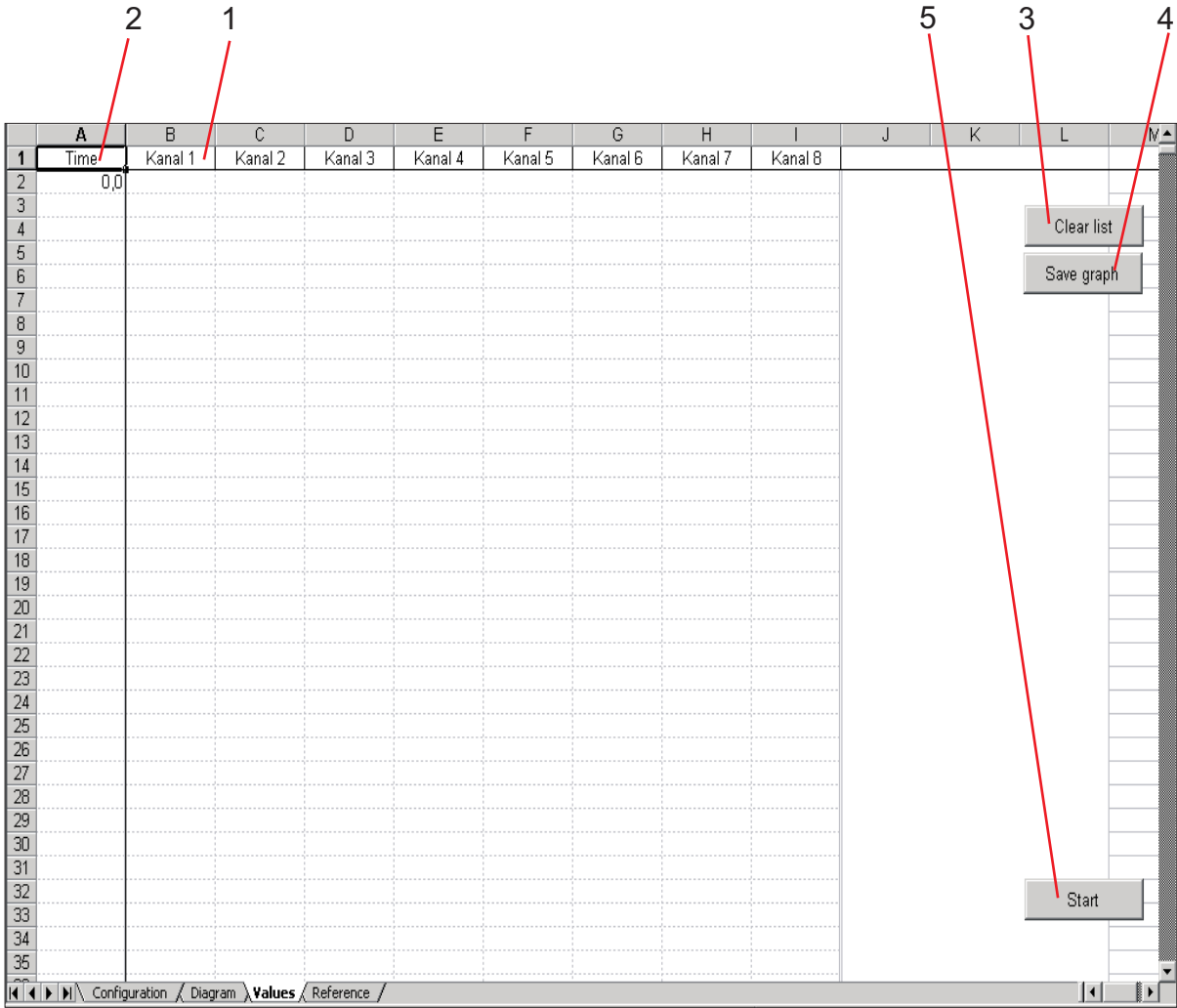
4.0 System configuration

The value sheet

On the value sheet the numeric diplay of the measurement values takes place. In the table the following information will be diplayed respectively can be chosen.

- ◆ Channel name (1)
- ◆ Time (2)
- ◆ Clear list (3)
- ◆ Save graph (4)
- ◆ Start (5)

On the following pages the menu functions will be described.
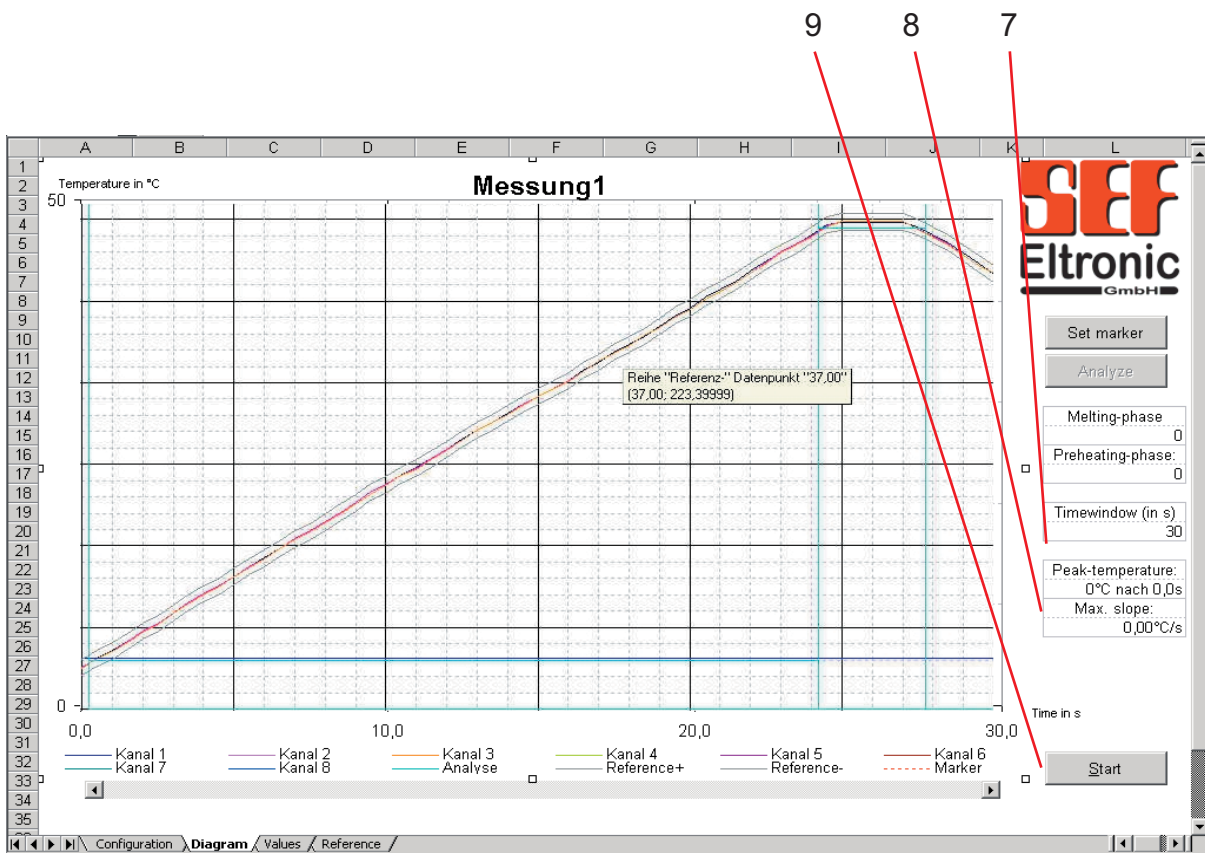
4.0 System configuration
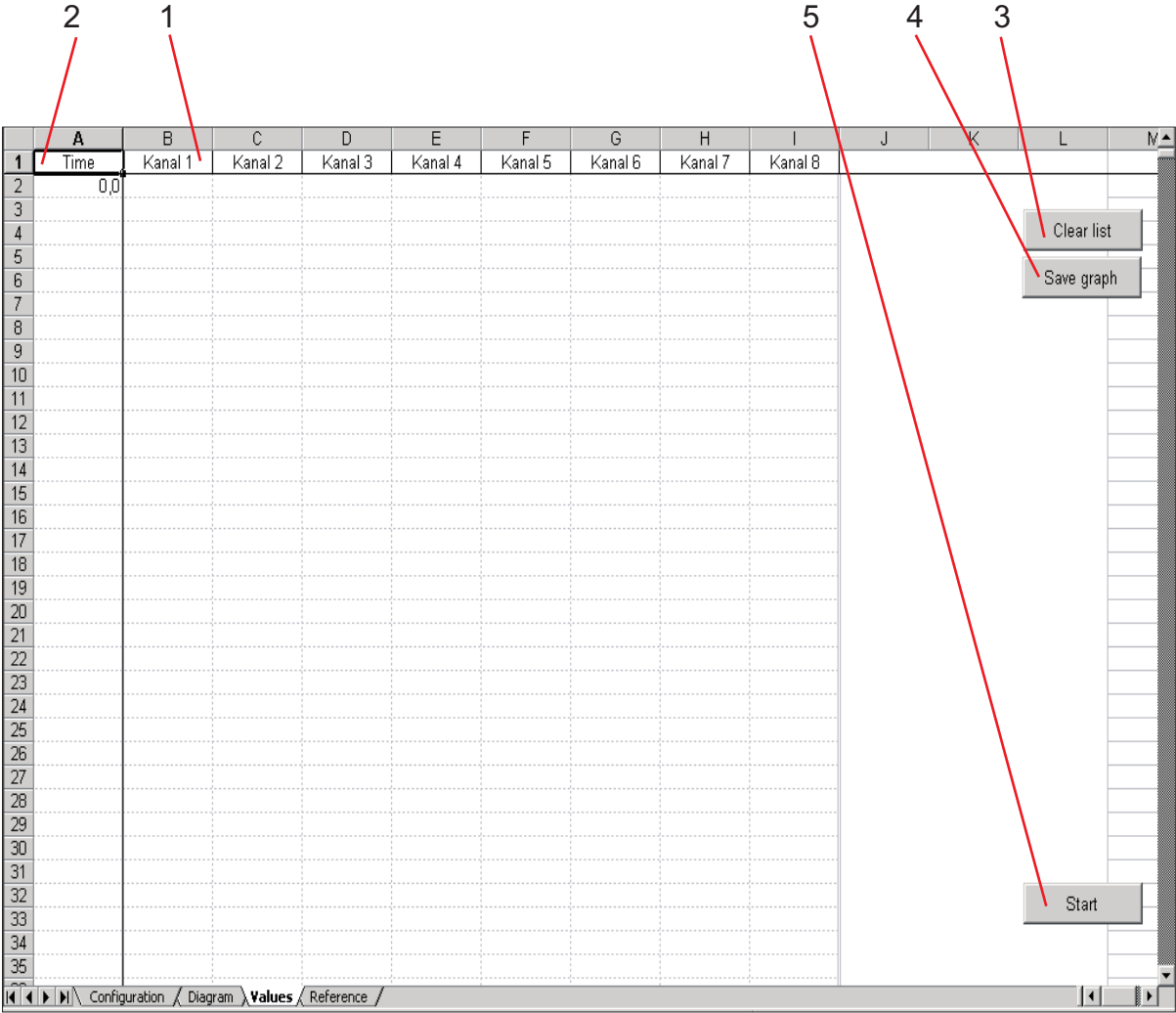
4.0 System configuration

The value sheet

In the table the following information will be diplayed
respectively can be chosen.

◆ Channel name (1)

Display of the channel name referring to the entry
which was made on the configuration sheet. It
is possible to edit the name. The changes will
be transferred in all other sheets. In the column
underneath you will find the measurement result of
this channel in numeric form.

◆ Time (2)

Listing of the measurement intervals referring
to the entry on the which was made on the
configuration sheet. Each measurement will be
recorded chronological.

◆ Clear list (3)

With this button you can clear the values of the
complete list.

▌ Press the button >Clear list< (3)

▌ The following message will appear.
Are you sure to clear the list?

▌ If you press >Yes< the complete list will be cleared
and a measurement can be started.

Channel

Time

Clear list

4.0 System configuration

2   1   5   4   3

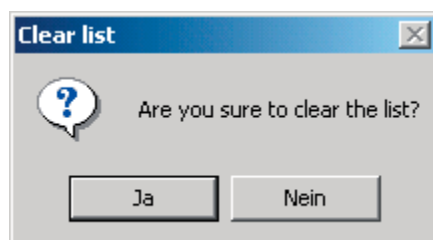|	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Time	Kanal 1	Kanal 2	Kanal 3	Kanal 4	Kanal 5	Kanal 6	Kanal 7	Kanal 8				
2	0,0	25,50000	25,60000	25,20000					31,20000				
3	1	31,10000	31,20000	30,80000					31,30000				
4	2,0	35,70000	35,60000	35,20000					31,20000				
5	3,0	41,60000	41,70000	41,10000					31,20000				
6	4,0	47,60000	47,70000	47,30000					31,30000				
7	5,0	52,60000	52,90000	52,10000					31,30000				
8	6,0	59,00000	58,90000	58,50000					31,30000				
9	7,0	64,90000	64,80000	64,40000					31,30000				
10	8,0	70,50000	70,40000	70,00000					31,30000				
11	9,0	74,90000	75,20000	74,80000					31,30000				
12	10,0	81,30000	81,10000	80,80000					31,30000				
13	11,0	87,30000	87,50000	86,70000					31,30000				
14	12,0	92,40000	92,30000	91,90000					31,30000				
15	13,0	98,40000	98,60000	98,30000					31,30000				
16	14,0	104,00000	104,20000	103,80000					31,30000				
17	15,0	108,80000	109,00000	108,60000					31,30000				
18	16,0	114,40000	114,60000	114,20000					31,30000				
19	17,0	120,70000	120,10000	119,80000					31,30000				
20	18,0	126,30000	126,50000	126,10000					31,30000				
21	19,0	132,70000	132,90000	131,70000					31,30000				
22	20,0	137,50000	137,60000	137,30000					31,30000				
23	21,0	143,10000	143,20000	142,90000					31,30000				
24	22,0	147,80000	147,20000	146,80000					31,30000				
25	23,0	153,40000	153,60000	153,20000					31,30000				
26	24,0	159,00000	159,10000	158,80000					31,30000				
27	25,0	165,40000	164,70000	164,40000					31,30000				
28	26,0	171,00000	171,10000	170,70000					31,30000				
29	27,0	175,70000	175,80000	175,50000					31,30000				
30	28,0	181,30000	180,60000	180,30000					31,30000				
31	29,0	186,90000	187,00000	185,90000					31,30000				
32	30,0	191,70000	191,80000	191,40000					31,30000				
33	31,0	196,50000	196,50000	196,20000					31,30000				
34	32,0	201,30000	201,30000	201,00000					31,30000				
35	33,0	207,60000	206,90000	206,60000					31,30000				

Clear list

Save graph

Start

Configuration / Diagram / **Values** / Reference /

4.0 System configuration

The value sheet

◆ Save graph

This button allows to save a graph for a later use as a reference graph. The save menu can be also called up by pressing the right mouse button on the channel name.

▌ Press the button >Save graph< (4)

▌ The following entry request will appear:

Save graph	✕
Number of graph to save:	OK
	Abbrechen
1	
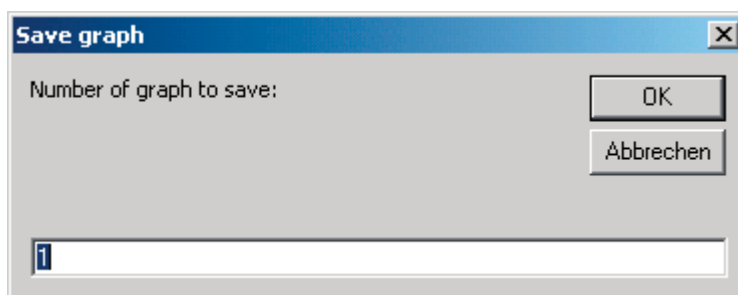
▌ Enter the number of the channel which you want to use as a reference channel and confirm it with >OK<.

▌ The following entry request will appear:

Save graph	✕
Please type in an identifying name for the graph.	OK
	Abbrechen
Kanal 101	

▌ Enter a new name for the graph and confirm your entry with >OK<.

04.eng USB-Mesy 3.0

4.0 System configuration

2   1   5   4   3

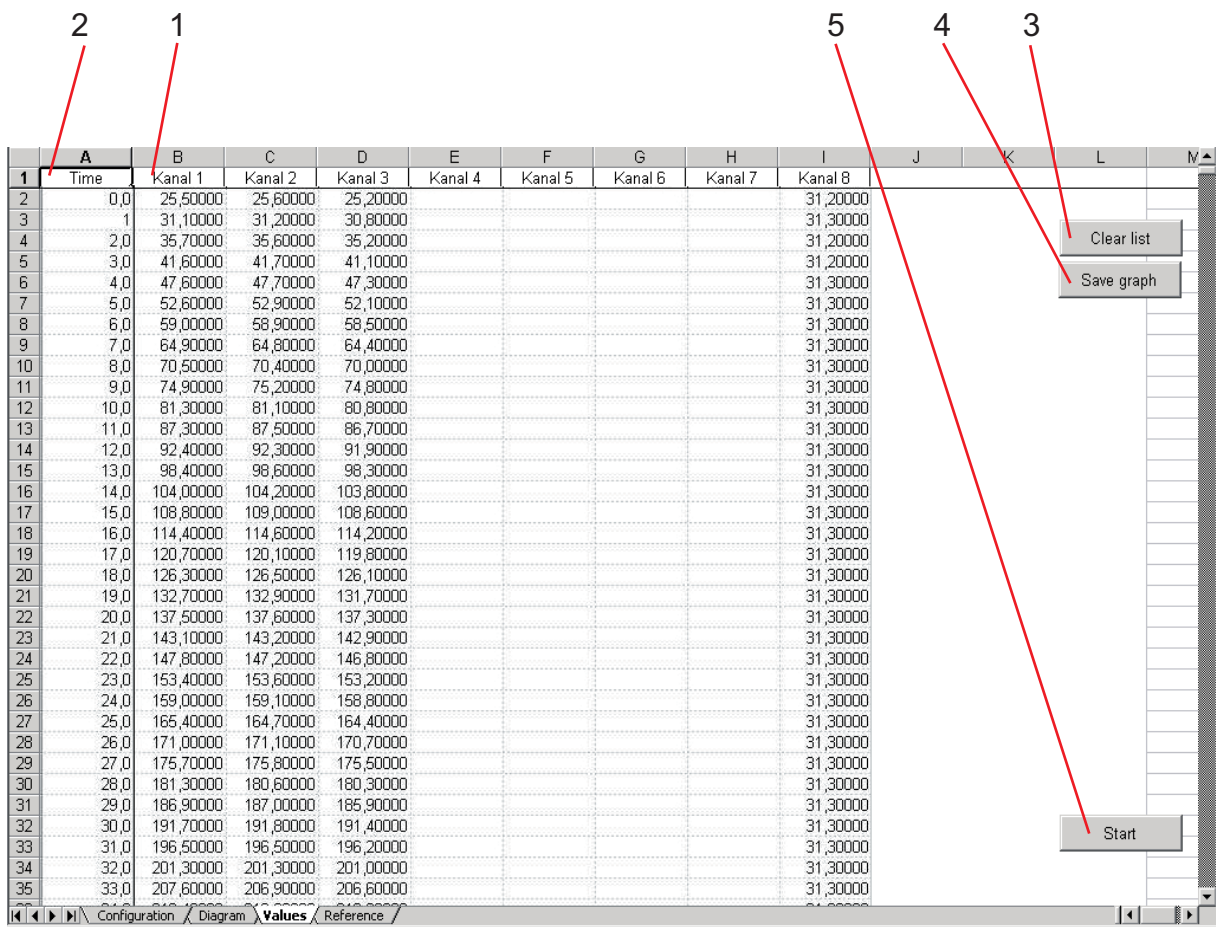|	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Time	Kanal 1	Kanal 2	Kanal 3	Kanal 4	Kanal 5	Kanal 6	Kanal 7	Kanal 8				
2	0,0	25,50000	25,60000	25,20000					31,20000				
3	1	31,10000	31,20000	30,80000					31,30000				
4	2,0	35,70000	35,60000	35,20000					31,20000			Clear list	
5	3,0	41,60000	41,70000	41,10000					31,20000				
6	4,0	47,60000	47,70000	47,30000					31,30000			Save graph	
7	5,0	52,60000	52,90000	52,10000					31,30000				
8	6,0	59,00000	58,90000	58,50000					31,30000				
9	7,0	64,90000	64,80000	64,40000					31,30000				
10	8,0	70,50000	70,40000	70,00000					31,30000				
11	9,0	74,90000	75,20000	74,80000					31,30000				
12	10,0	81,30000	81,10000	80,80000					31,30000				
13	11,0	87,30000	87,50000	86,70000					31,30000				
14	12,0	92,40000	92,30000	91,90000					31,30000				
15	13,0	98,40000	98,60000	98,30000					31,30000				
16	14,0	104,00000	104,20000	103,80000					31,30000				
17	15,0	108,80000	109,00000	108,60000					31,30000				
18	16,0	114,40000	114,60000	114,20000					31,30000				
19	17,0	120,70000	120,10000	119,80000					31,30000				
20	18,0	126,30000	126,50000	126,10000					31,30000				
21	19,0	132,70000	132,90000	131,70000					31,30000				
22	20,0	137,50000	137,60000	137,30000					31,30000				
23	21,0	143,10000	143,20000	142,90000					31,30000				
24	22,0	147,80000	147,20000	146,80000					31,30000				
25	23,0	153,40000	153,60000	153,20000					31,30000				
26	24,0	159,00000	159,10000	158,80000					31,30000				
27	25,0	165,40000	164,70000	164,40000					31,30000				
28	26,0	171,00000	171,10000	170,70000					31,30000				
29	27,0	175,70000	175,80000	175,50000					31,30000				
30	28,0	181,30000	180,60000	180,30000					31,30000				
31	29,0	186,90000	187,00000	185,90000					31,30000				
32	30,0	191,70000	191,80000	191,40000					31,30000			Start	
33	31,0	196,50000	196,50000	196,20000					31,30000				
34	32,0	201,30000	201,30000	201,00000					31,30000				
35	33,0	207,60000	206,90000	206,60000					31,30000				

Configuration / Diagram \ **Values** / Reference /

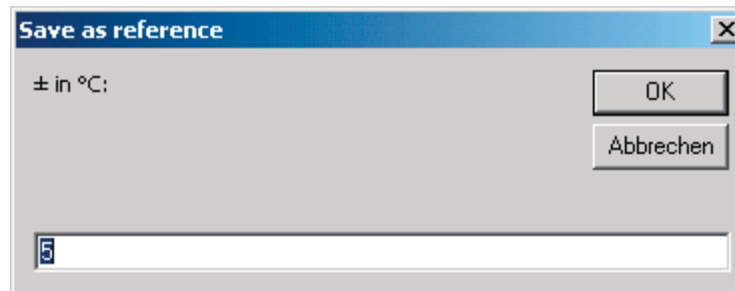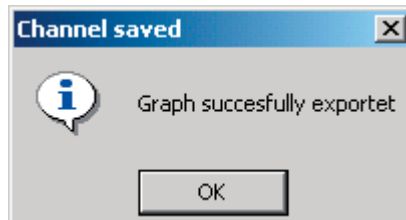# 4.0 System configuration

The value sheet

▌ The following entry request will appear:

▌ Enter a value in °C. This value will appear later in the column „reference ±" while loading this graph. The value is a size for the upper and lower tolerance of the reference graph.

▌ Confirm your entry with >OK<.

▌ The following message appears:

▌ Confirm the message with >OK<.

▌ The values of the saved channel are now available for loading as a reference graph in the reference sheet.

◆ Start (5)

With this button you can start and stop the measurement of the MESY 3.0

Start

4.0 System configuration

Page 4.26

4.0 System configuration

The reference sheet

On the reference sheet the reference values will be displayed in numeric form. In the table the following information is shown respectively can be chosen.

Overview reference sheet

- ◆ Time (1)
- ◆ Temperature (2)
- ◆ Reference± (3)
- ◆ Reference + (4)
- ◆ Reference – (5)
- ◆ Load reference (6)
- ◆ Save reference (7)
- ◆ Clear list (8)
- ◆ Start (9)

On the following pages the menu functions will be described.

4.0 System configuration

4.0 System configuration

The reference sheet

In the table the following information will be shown respectively can be chosen.

◆ Time (1)

Listing of the measurement intervals

◆ Temperature (2)

Listing of the temperature values of the loaded reference graph. These values can be edited manually for an optimized profile. Afterwards the values will be transferred to the graphic sheet automatically.

◆ Reference± (3)

While saving a graph as a reference graph you will be asked for the tolerance in°C. While loading a reference graph the tolerance will be listed in the column reference± in °C.The tolerance can also be edited manually for optimization. The changes will be transferred to the diagram sheet automatically.

◆ Reference +

The addition of the temperature values and the tolerance values will be listed in this column.

◆ Reference- (5)

The subtraction of the temperature values and the tolerance values will be listed in this column.

Time

Temperature

Reference±

Reference+

Reference-

4.0 System configuration

1 2 3 4 5 9 8 7 6

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Time	Temperature	Reference±	Reference+	Reference-								
2	0,00	25,50000	5,00000	30,50000	20,50000								
3	1,00	31,10000	5,00000	36,10000	26,10000								
4	2,00	35,70000	5,00000	40,70000	30,70000								Load reference
5	3,02	41,60000	5,00000	46,60000	36,60000								
6	4,02	47,60000	5,00000	52,60000	42,60000								Save reference
7	5,00	52,60000	5,00000	57,60000	47,60000								
8	6,00	59,00000	5,00000	64,00000	54,00000								Clear list
9	7,00	64,90000	5,00000	69,90000	59,90000								
10	8,00	70,50000	5,00000	75,50000	65,50000								
11	9,00	74,90000	5,00000	79,90000	69,90000								
12	10,02	81,30000	5,00000	86,30000	76,30000								
13	11,02	87,30000	5,00000	92,30000	82,30000								
14	12,00	92,40000	5,00000	97,40000	87,40000								
15	13,00	98,40000	5,00000	103,40000	93,40000								
16	14,00	104,00000	5,00000	109,00000	99,00000								
17	15,00	108,80000	5,00000	113,80000	103,80000								
18	16,00	114,40000	5,00000	119,40000	109,40000								
19	17,02	120,70000	5,00000	125,70000	115,70000								
20	18,02	126,30000	5,00000	131,30000	121,30000								
21	19,00	132,70000	5,00000	137,70000	127,70000								
22	20,00	137,50000	5,00000	142,50000	132,50000								
23	21,00	143,10001	5,00000	148,10001	138,10001								
24	22,00	147,80000	5,00000	152,80000	142,80000								
25	23,00	153,39999	5,00000	158,39999	148,39999								
26	24,02	159,00000	5,00000	164,00000	154,00000								
27	25,02	165,39999	5,00000	170,39999	160,39999								
28	26,00	171,00000	5,00000	176,00000	166,00000								
29	27,00	175,70000	5,00000	180,70000	170,70000								
30	28,00	181,30000	5,00000	186,30000	176,30000								
31	29,00	186,89999	5,00000	191,89999	181,89999								
32	30,00	191,70000	5,00000	196,70000	186,70000								
33	31,02	196,50000	5,00000	201,50000	191,50000								Start
34	32,02	201,30000	5,00000	206,30000	196,30000								
35	33,00	207,60001	5,00000	212,60001	202,60001								

Configuration / Diagram / Values / Reference /

4.0 System configuration
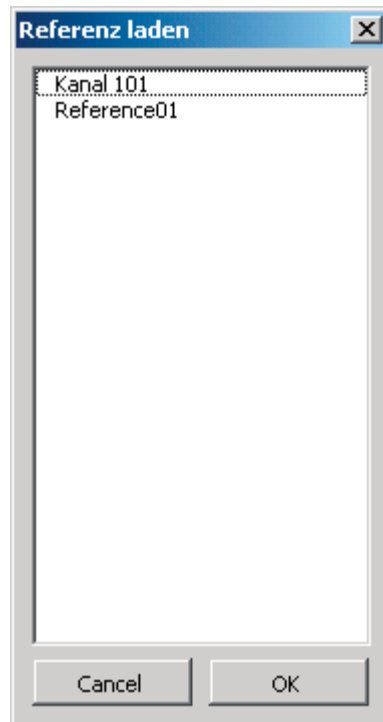
The reference sheet

◆   Load reference

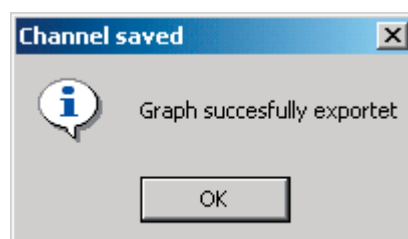   With the button >Load reference< it is possible to load a previous saved graph as a reference graph.

▌   Press the button >*Load reference*< (6). The following menu will appear:

Referenz laden   ✕

Kanal 101
Reference01

Cancel   OK

▌   Select a graph by clicking and confirm your choice with >OK<.

▌   Confirm the following message with >*OK*<, too.

Channel saved   ✕

(i)   Graph succesfully exportet

OK

04.eng USB-Mesy 3.0

4.0 System configuration

1   2   3   4   5   9   8   7   6

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Time	Temperature	Reference±	Reference+	Reference-								
2	0,00	25,50000	5,00000	30,50000	20,50000								
3	1,00	31,10000	5,00000	36,10000	26,10000								
4	2,00	35,70000	5,00000	40,70000	30,70000								
5	3,02	41,60000	5,00000	46,60000	36,60000								
6	4,02	47,60000	5,00000	52,60000	42,60000								
7	5,00	52,60000	5,00000	57,60000	47,60000								
8	6,00	59,00000	5,00000	64,00000	54,00000								
9	7,00	64,90000	5,00000	69,90000	59,90000								
10	8,00	70,50000	5,00000	75,50000	65,50000								
11	9,00	74,90000	5,00000	79,90000	69,90000								
12	10,02	81,30000	5,00000	86,30000	76,30000								
13	11,02	87,30000	5,00000	92,30000	82,30000								
14	12,00	92,40000	5,00000	97,40000	87,40000								
15	13,00	98,40000	5,00000	103,40000	93,40000								
16	14,00	104,00000	5,00000	109,00000	99,00000								
17	15,00	108,80000	5,00000	113,80000	103,80000								
18	16,00	114,40000	5,00000	119,40000	109,40000								
19	17,02	120,70000	5,00000	125,70000	115,70000								
20	18,02	126,30000	5,00000	131,30000	121,30000								
21	19,00	132,70000	5,00000	137,70000	127,70000								
22	20,00	137,50000	5,00000	142,50000	132,50000								
23	21,00	143,10001	5,00000	148,10001	138,10001								
24	22,00	147,80000	5,00000	152,80000	142,80000								
25	23,00	153,39999	5,00000	158,39999	148,39999								
26	24,02	159,00000	5,00000	164,00000	154,00000								
27	25,02	165,39999	5,00000	170,39999	160,39999								
28	26,00	171,00000	5,00000	176,00000	166,00000								
29	27,00	175,70000	5,00000	180,70000	170,70000								
30	28,00	181,30000	5,00000	186,30000	176,30000								
31	29,00	186,89999	5,00000	191,89999	181,89999								
32	30,00	191,70000	5,00000	196,70000	186,70000								
33	31,02	196,50000	5,00000	201,50000	191,50000								
34	32,02	201,30000	5,00000	206,30000	196,30000								
35	33,00	207,60001	5,00000	212,60001	202,60001								

Load reference

Save reference

Clear list

Start

\ Configuration / Diagram / Values / **Reference** /
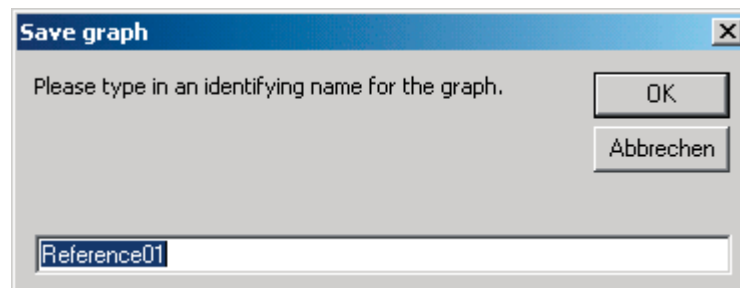
4.0 System configuration

The reference sheet

▌ The values of the loaded graph will be listed in the column „Temperature" (2).The software will calculate the results for "Reference+" (4) and "Reference-" (5) according to the values in the columns "Temperature" (2) and "Reference±" (3).

◆ Save reference (7)

It is necessary to save a reference graph if you have changed single values and if you want to use this changed values for further measurements.
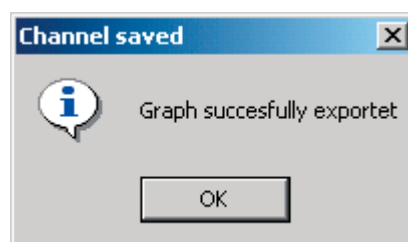
▌ The following entry request will appear by pressing the button >Save reference<.

Save graph ✕

Please type in an identifying name for the graph.   [OK]

[Abbrechen]

Reference01

▌ Enter a new name for the graph and confirm your entry with >OK<.

▌ The following message confirms a successful procedure.

Channel saved ✕

ⓘ Graph succesfully exportet

[OK]

4.0 System configuration

1   2   3   4   5   9   8   7   6

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Time	Temperature	Reference±	Reference+	Reference-								
2	0,00	25,50000	5,00000	30,50000	20,50000								
3	1,00	31,10000	5,00000	36,10000	26,10000								
4	2,00	35,70000	5,00000	40,70000	30,70000								
5	3,02	41,60000	5,00000	46,60000	36,60000								
6	4,02	47,60000	5,00000	52,60000	42,60000								
7	5,00	52,60000	5,00000	57,60000	47,60000								
8	6,00	59,00000	5,00000	64,00000	54,00000								
9	7,00	64,90000	5,00000	69,90000	59,90000								
10	8,00	70,50000	5,00000	75,50000	65,50000								
11	9,00	74,90000	5,00000	79,90000	69,90000								
12	10,02	81,30000	5,00000	86,30000	76,30000								
13	11,02	87,30000	5,00000	92,30000	82,30000								
14	12,00	92,40000	5,00000	97,40000	87,40000								
15	13,00	98,40000	5,00000	103,40000	93,40000								
16	14,00	104,00000	5,00000	109,00000	99,00000								
17	15,00	108,80000	5,00000	113,80000	103,80000								
18	16,00	114,40000	5,00000	119,40000	109,40000								
19	17,02	120,70000	5,00000	125,70000	115,70000								
20	18,02	126,30000	5,00000	131,30000	121,30000								
21	19,00	132,70000	5,00000	137,70000	127,70000								
22	20,00	137,50000	5,00000	142,50000	132,50000								
23	21,00	143,10001	5,00000	148,10001	138,10001								
24	22,00	147,80000	5,00000	152,80000	142,80000								
25	23,00	153,39999	5,00000	158,39999	148,39999								
26	24,02	159,00000	5,00000	164,00000	154,00000								
27	25,02	165,39999	5,00000	170,39999	160,39999								
28	26,00	171,00000	5,00000	176,00000	166,00000								
29	27,00	175,70000	5,00000	180,70000	170,70000								
30	28,00	181,30000	5,00000	186,30000	176,30000								
31	29,00	186,89999	5,00000	191,89999	181,89999								
32	30,00	191,70000	5,00000	196,70000	186,70000								
33	31,02	196,50000	5,00000	201,50000	191,50000								
34	32,02	201,30000	5,00000	206,30000	196,30000								
35	33,00	207,60001	5,00000	212,60001	202,60001								

Buttons: Load reference, Save reference, Clear list, Start

Tabs: Configuration / Diagram / Values / **Reference**
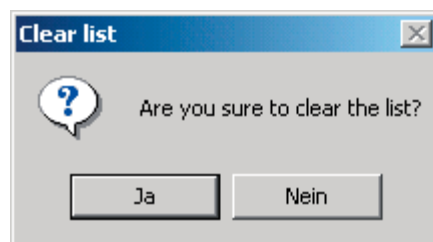
4.0 System configuration

The reference sheet

◆ Clear list (8)

It is possible to delete and load different referent graphs for comparison with the measured graph. The diagram will be updated automatically.

▌ Press the button >Clear list< (8).

▌ Confirm the following message with *>OK<*.

▌ The complete list will now be deleted. The reference sheet is now ready for loading a new reference graph.

◆ Start (9)

Here you can start the measurement. The software will change to the diagram sheet automatically.

4.0 System configuration

4.0 System configuration

Adjustment of measurement box and temperature sensors

Thermocouple sensors are available in different accuracies.
With this function it is possible to adjust each connected
thermocouple sensor with the measurement box.
The adjustment is a 2-point-adjustment. The temperature
measured with the measurement system will be compared
with a second calibrated temperature.

> **!** Please note that the adjustment is valid for
> the complete chain of measurement box and
> thermocouple sensor. You should not connect a
> thermocouple sensor to another channel after the
> adjustment otherwise the adjustment is invalid.
> For normal measurement purposes the use of the
> standard parameters is sufficient. The complex
> adjustment is only advisable, if a high
> measurement accuracy is required.

▌ Take the USB cable and connect the measure-
ment box with the PC.

▌ Connect the thermocouple sensors with the
measurement box.

▌ Start the MESY 3.0 software.

▌ Press the button >Adjust< on the configuration
sheet.

▌ Provide two pots filled with a non-conducting fluid
(e.g. oil) with two different temperatures. For
example 25°C and 100°C.

⚠ **Attention:** Don't use water, danger of short circuit

⚠ **Danger of burns:** Be careful while handling hot
fluids.

**Connect measure-
ment box with PC**
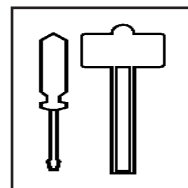
4.0 System configuration

Adjust thermo-couple sensors

▌ The channels will be adjusted together first with 25°C and then with 100°C.

▌ Insert the tips of all 3 thermocouple sensors in the pot with the 25°C fluid.

▌ Start with channel 1.

▌ Select channel 1 in the adjustment menu.

Adjust low tem-perature

▌ Enter the value 250 (Temperature in 1/10°C) in the field >Adjust Lo<.

▌ Press the button <Adjust Lo>.

▌ In the table you will now see your entry and the recorded value of the MESY 3.0.

▌ Follow the same procedure for the channels 2 and 3 for 25°C.

Adjust high tem-perature

▌ Now the channels will be adjusted with 100°C.

▌ Insert the tips of all 3 thermocouple sensors in the pot with the 100°C fluid.

▌ Start with channel 1.

▌ Select channel 1 in the adjustment menu.

▌ Enter the value 1000 (temperature in 1/10°C) in the field >Adjust Hi<.

▌ Press the button <Adjust Hi>.

▌ In the table you will now see your entry and the recorded value of the MESY 3.0.

4.0 System configuration

▌ Follow the same procedure for the channels 2 and 3 for 100°C.

▌ Close the menu >Adjust<.

▌ If you press the button >Start< now, a measurement will begin. If the adjustment procedure was successful you should see now a graph at 25°C and at 100°C depending on the fluid the sensor tips are inserted in.

4.0 System configuration

5.0 Measurement assembly and measurement

Preparing the PCB

The thermocouple sensors are capable for the measurement directly at a component or at the PCB. The sensors can be fixed with a heat-conductive paste temporarily or with chip glue permanently.

Attention, danger
Observe the instructions of the manufacturer when using heat-conductive paste or chip glue. Otherwise there may be danger for your life.

Attention, danger
The maximum inside temperature of the measurement box is not allowed to be higher than 50°C. The box is not capable for an operation inside the temperature zone you want to measure.

▌ Put the sensor tip at, on or under the component you want to measure. Fix it with heat-conductive paste or with chip glue.
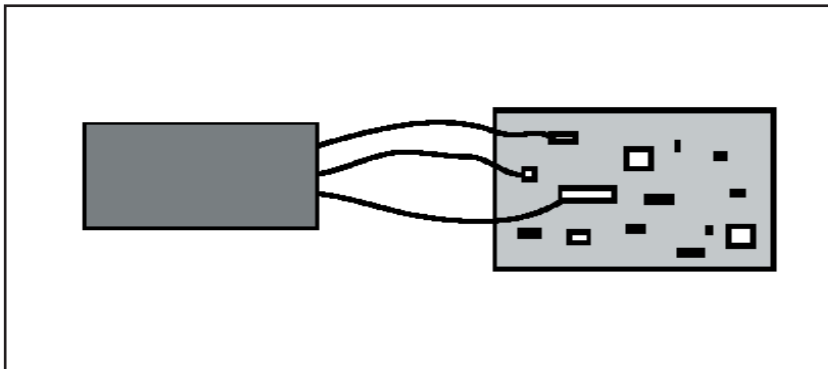
▌ After you have fixed the sensors to the PCB or to a component you should also fix the cable of the sensor with a non-isolated wire to the PCB. By this way the sensors are fixed with a pull relief and can't be peeled away.

5.0 Measurement assembly and measurement

Configuration for the measurement analysis

05.eng USB-Mesy 3.0

5.0 Measurement assembly and measurement

Configuration for the measurement analysis

If you have enabled the automatic analysis on the configuration sheet, it will start directly after the measurement. You can start analysis again by pressing the button "Analyze" on the diagram sheet.

Automatic analysis and display

On the configuration sheet you can enter the activating- (1) and the melting temperature (2). They will be shown in the diagram. The length of the preheating phase (5) and of the melting phase (6) will be calculated and also shown on the diagram sheet.

Activating- and melting temperature

If required it is possible to display a reference area in the diagram. If "Show reference" is enabled on the configuration sheet, two reference graphs will be shown according to the values on the values sheet. So you receive a tolerance area between the upper and the lower reference graph.

Reference graph

5.0 Measurement assembly and measurement
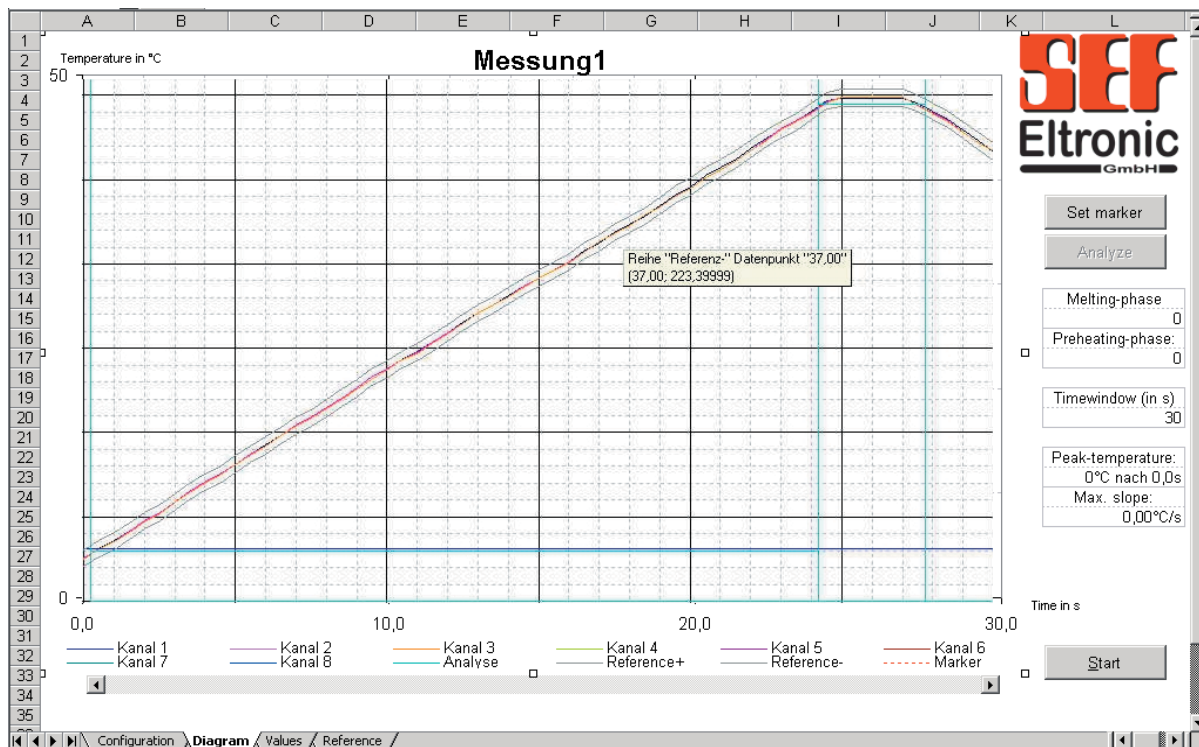
5.0 Measurement assembly and measurement

Starting the measurement

▌ Insert the PCB with the fixed thermocouple sensors in the measurement zone.	**Prepare PCB**
▌ Configure all settings on the configuration sheet referring to the instructions in chapter 4.	
▌ Press the button <Start>.	
▌ The measurement will now start.	
▌ For checking purposes the status LED will blink at each measurement (referring to the interval you have selected).	**Start measurement**
▌ On the diagram sheet you can now see the run of the graphs and on the values sheet the incoming temperatures.	
▌ After the measurement is finished, the status LED will flash permanently again.	**Stop measurement**
▌ Take the PCB out of the measurement zone.	

Attention, danger of burns
The PCB can be very hot.

Use heat resistant gloves.

5.0 Measurement assembly and measurement

❚ After the measurement is finished the recorded values can be used for further processing with all functions offered by Microsoft Excel 2000©.

❚ Save the file with a new name when closing the software. The original file"Mesy3.xls" will be retained with the standard settings.

❚ The measurement is finished now.

6.0 Measurement analysis

The display supports

After recording the measurement values you can analyze the graphs on the diagram sheet.

◆ The main- and the auxiliary interval help to read time-and temperature relations.

**Main- and auxil-
iary interval**

◆ Popup functions give short information in ap-pearing windows.

Popup function

◆ The peak temperature is the maximum tem-perature reached during a measurement. On the right area of the diagram sheet the peak temperature and the maximum slope will be displayed.

Peak

◆ The preheating phase is the time between the activating- and the peak temperature.

Preheating phase

◆ The melting phase is the time above the melt-ing temperature.

Melting phase

◆ The reference graph allows to compare a measured graph with an ideal profile.

Reference graph

06.eng USB-Mesy 3.0

6.0 Measurement analysis

6.0 Measurement analysis

The display supports

The measurement graphs for each single channel are shown in a different colour. The software offers the option to save a recorded graph as a reference profile. See section " Reference graph" on the following page.

Measurement graph

You can:

◆ Analyze which temperature acts in which heating-phase.

◆ Recognize which profile should be optimized.

◆ Read data directly by moving the mouse pointer on a graph (4).

◆ Navigate between the different form sheets (3) with the mouse pointer and the left mouse button.

6.0 Measurement analysis
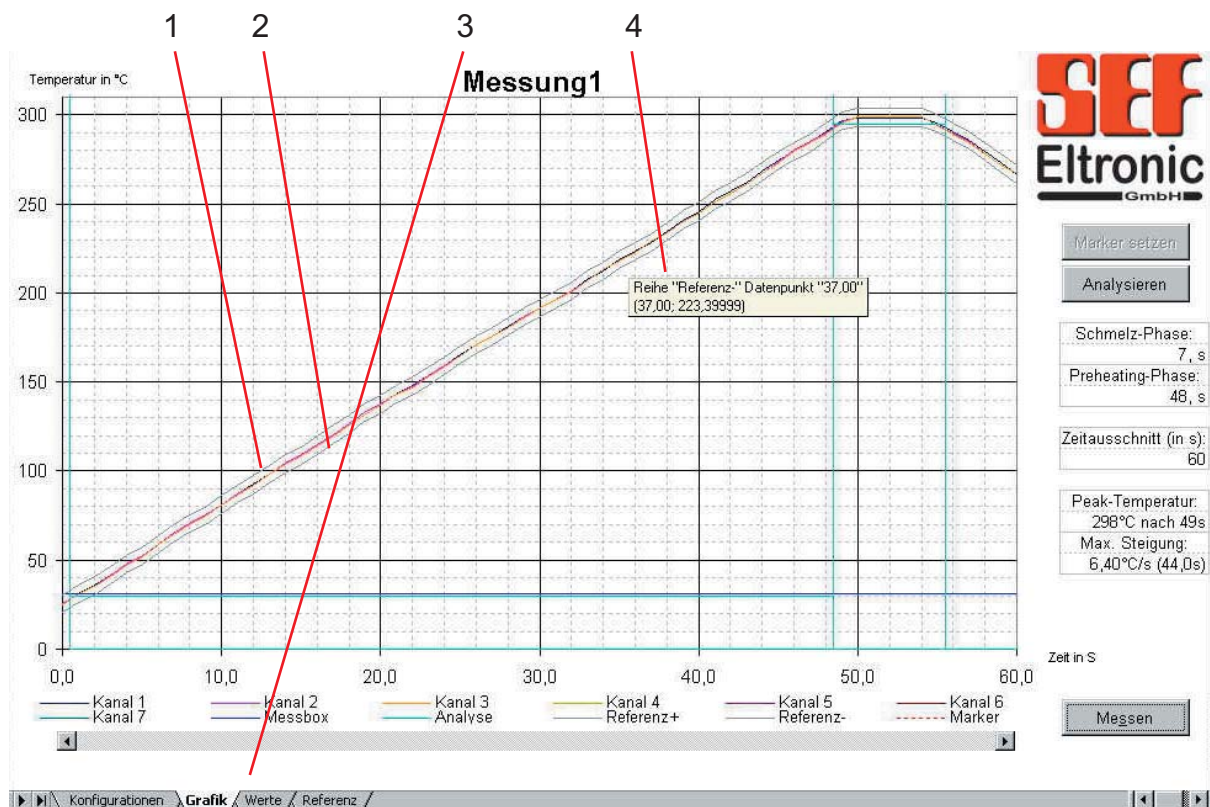
6.0 Measurement analysis

The display support reference graph

In first line reference graphs are a criterion for further measurement graphs. The software offers the option to define and to save a measured graph as a reference graph. The reference graphs can be edited or created new on the reference sheet. The reference graph will be provided with a difference and the software calculates a positive (1) and a negative (2) tolerance out of it. For future measurements you can use this reference range to compare and to optimize your temperature profile.

Reference graph

With the help of the reference graph you can analyze:

◆ At which heating phase which temperature acts in which temperature zone.

◆ At which part the temperature profile probably should be optimized.

❙ Load a reference graph in the reference sheet like described in chapter 4 "system configuration – the reference sheet".

Load a reference graph

❙ On the diagram sheet you will see two graphs then, which mark the tolerance range (1 and 2).

A prerequisite for the display of the tolerance range is, that a reference graph was created and loaded before. Please read also in chapter 4 system configuration, section "reference sheet", paragraph "load reference" and the section "value sheet", paragraph "save graph".

◆ If you move the mouse pointer on a graph, it is possible to read the referring data directly. (4)

Popup display

6.0 Measurement analysis
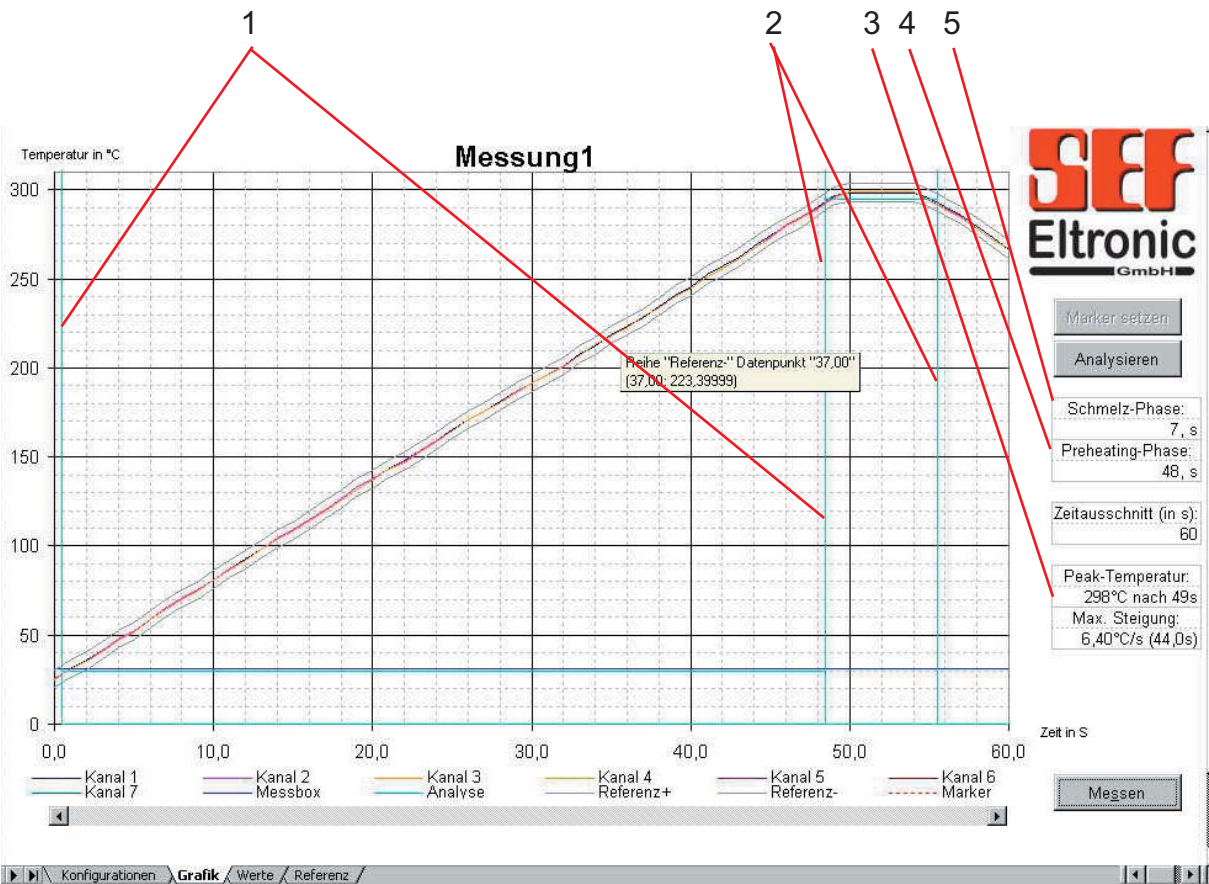
6.0 Measurement analysis

The display support time and temperature value

◆ Peak temperature

The peak temperature is the maximum temperature of a graph. In the foot line the peak temperature, the time between the beginning of the measurement and the peak and the max. slope will be shown (3). These values can be displayed for always one graph.

◆ Preheating phase

The preheating phase is the time between the activating temperature and the melting temperature. You will see the duration of the preheating phase at the right side of the diagram sheet (4). This duration is valid for that graph, that you have selected before on the configuration sheet under "set for channel". In the diagram the preheating phase will be marked by two vertical lines (1).

◆ Melting phase

The melting phase (5) is the duration above the melting temperature that you have set on the configuration sheet under "Melting temperature". In the diagram the melting phase will be marked by two vertical lines (2).

Peak temperature

Preheating phase

Melting phase

06.eng USB-Mesy 3.0

6.0 Measurement analysis
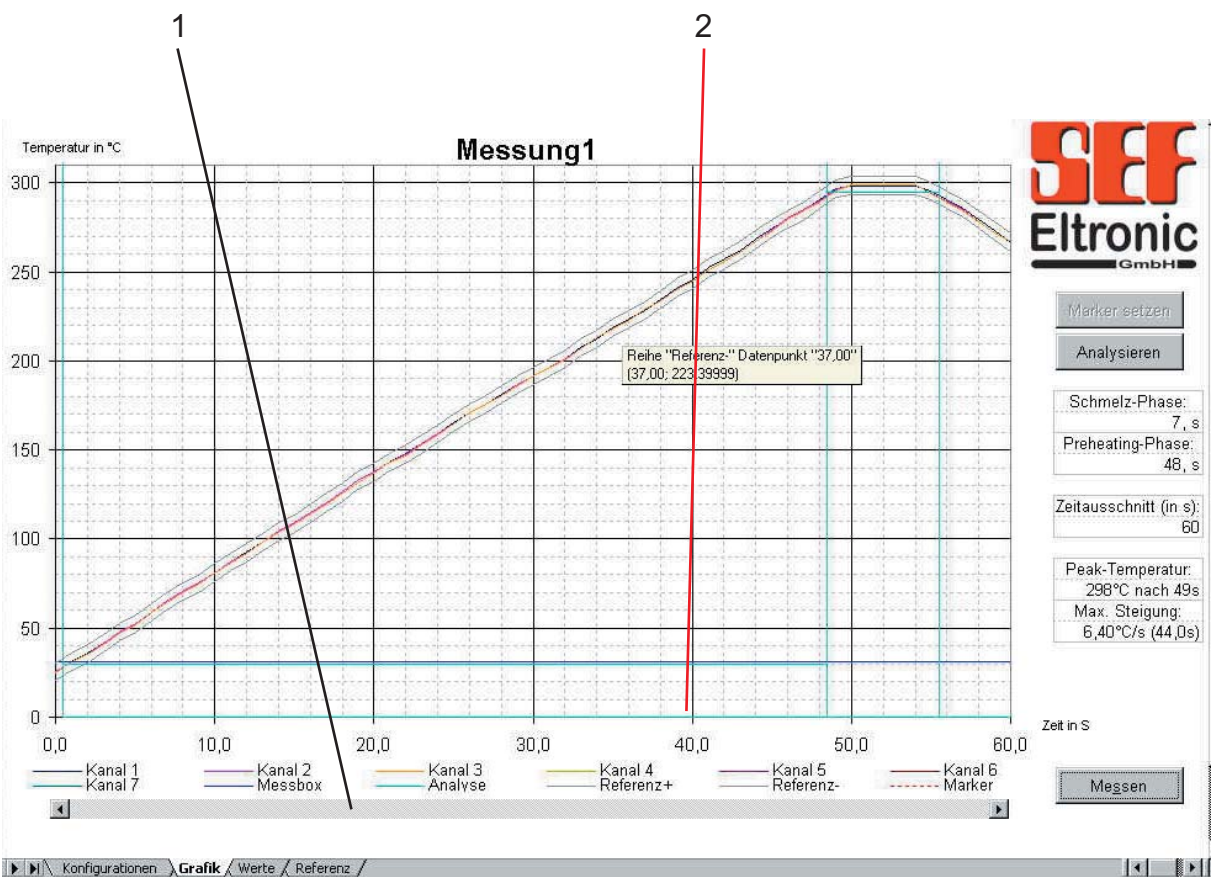
6.0 Measurement analysis

Streching and compressing the time axis

For a better analysis of the measurement graphs it is possible to stretch and to compress the time axis and to change the size of the time raster.
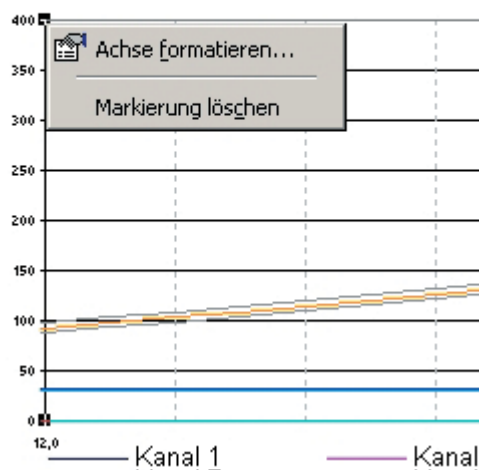
▋ Change to the configuration sheet and enter a new value in the field "In diagram shown time window".

▋ Change back to the diagram sheet and click with the left mouse button on the scroll bar (1).

▋ Now the time axis will change according to your entry.

▋ Now you can navigate with the scroll bar in the time range.

For a better view of the measurement graph it is possible to change the size of the time raster (help lines).

▋ Move the mouse pointer on the time axis until a popup menu „scale axis X" (2) appears.
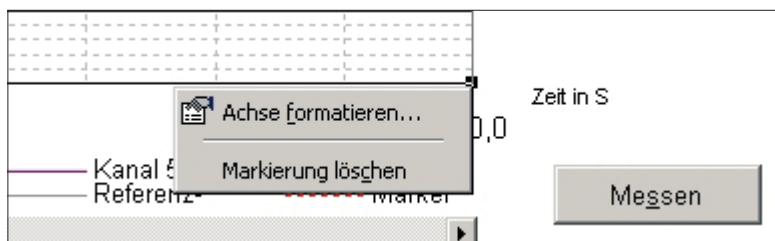
▋ After pressing the right mouse button the following menu appears.

▋ Select >Format axis<.

6.0 Measurement analysis
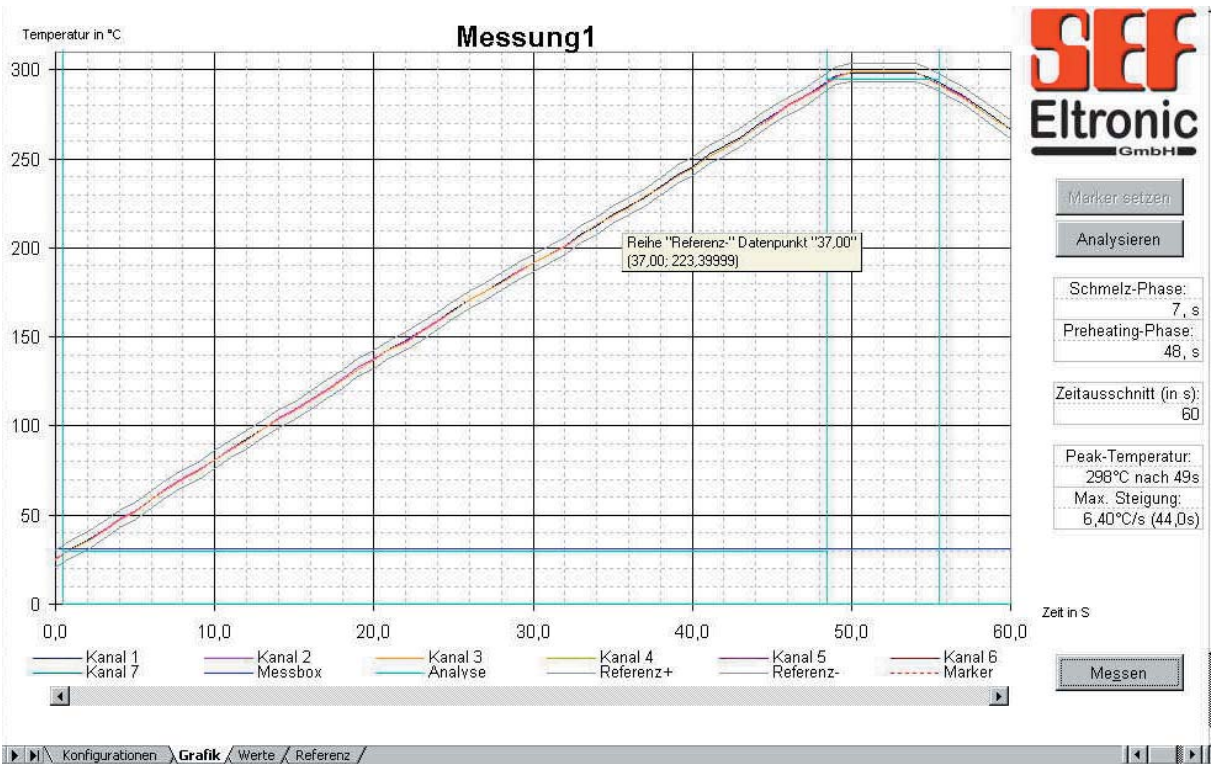
6.0 Measurement analysis

Streching and compressing the time axis

▌ The following dialog appears:
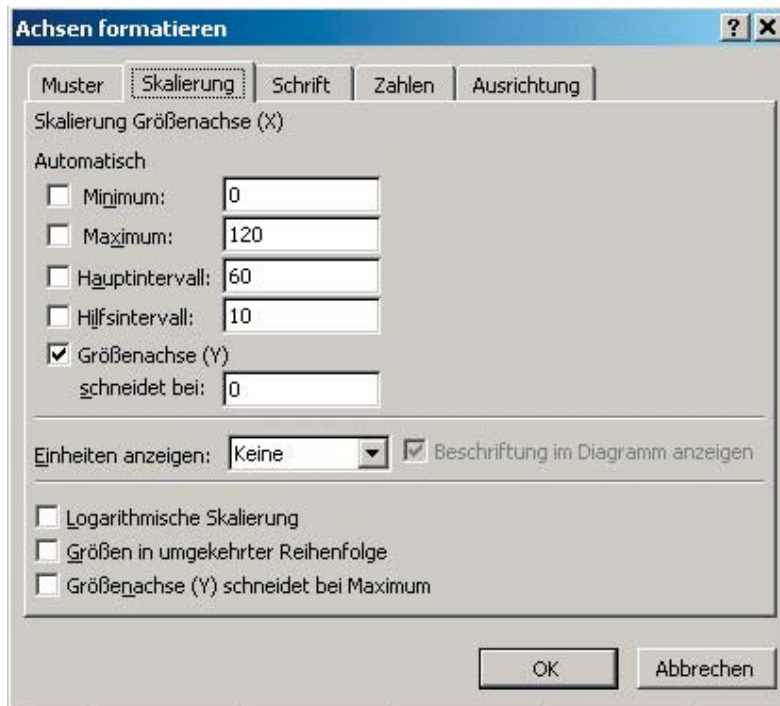
Achsen formatieren — Skalierung tab:
Skalierung Größenachse (X)
Automatisch
- Minimum: 0
- Maximum: 120
- Hauptintervall: 60
- Hilfsintervall: 10
- ☑ Größenachse (Y)
  - schneidet bei: 0

Einheiten anzeigen: Keine — ☑ Beschriftung im Diagramm anzeigen

- Logarithmische Skalierung
- Größen in umgekehrter Reihenfolge
- Größenachse (Y) schneidet bei Maximum

OK   Abbrechen

▌ You can enter the graduation of scale in the fields main interval and help interval according to your wishes.

▌ Confirm your entry with >OK<.

▌ The new graduation of scale is now available.

On the following page you will learn how to change the help lines of the temperature axis.

6.0 Measurement analysis

6.0 Measurement analysis

Compressing and stretching the temperature axis

For a better analysis of the measurement graphs it is possible to compress or stretch the temperature axis and to change the size of the temperature raster.
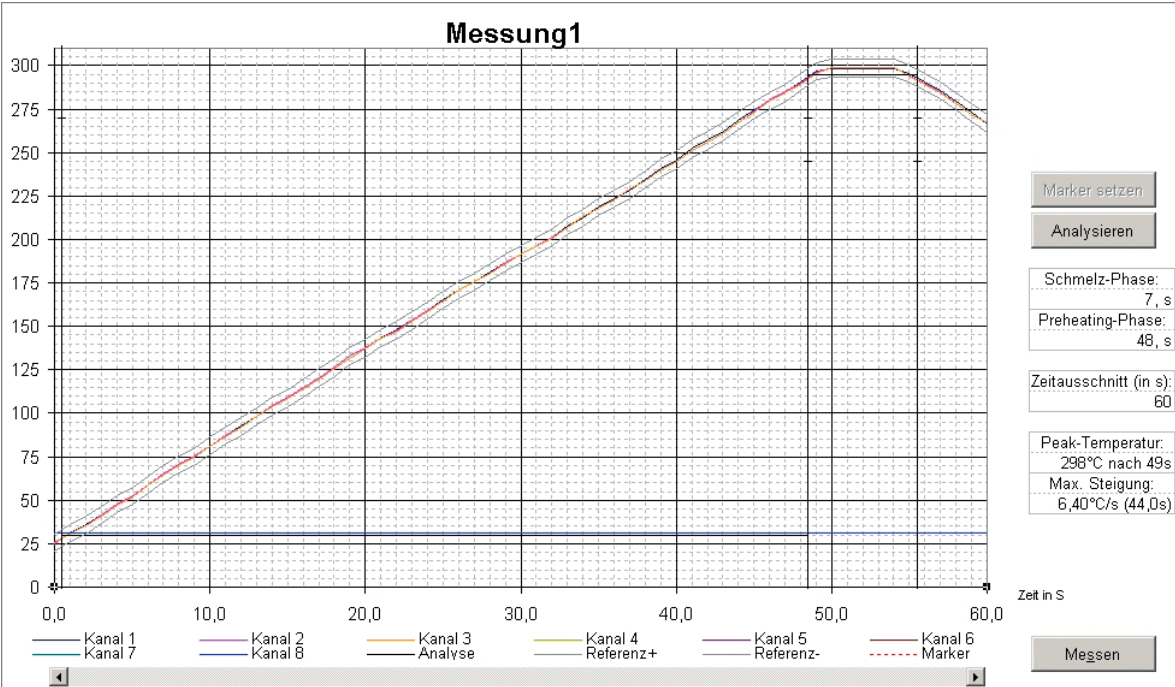
▌ Move the mouse pointer on the temperature axis (1) until the popup menu "scale axis Y" appears.

▌ After pressing the right mouse button the follow-ingmenu appears:
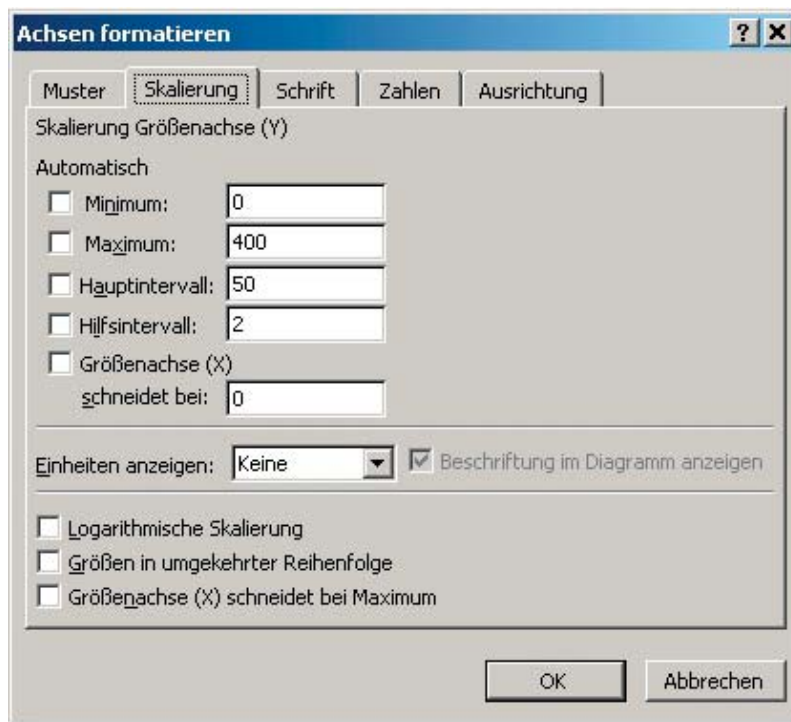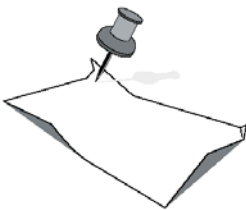

▌ Select >Format axis<.

6.0 Measurement analysis

Messung1

Schmelz-Phase:	7, s
Preheating-Phase:	48, s
Zeitausschnitt (in s):	60
Peak-Temperatur:	298°C nach 49s
Max. Steigung:	6,40°C/s (44,0s)

6.0 Measurement analysis

Compressing and stretching the temperature axis

▎ The following dialog appears:

▎ You can enter the graduation of scale in the fields main interval and help interval according to your wishes.
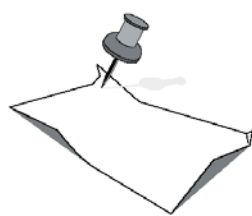
▎ Confirm your entry with >OK<.

**Help lines
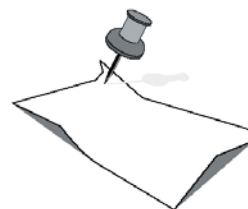temperature axis**

6.0 Measurement analysis

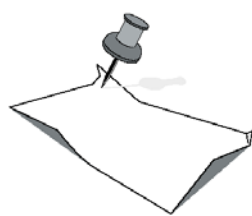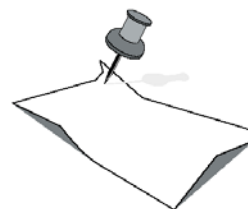# 7.0 Notes

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