

## Sipcon 3 - Manual

8.0



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Please read this note!



Attention: Please read this safety instruction carefully!

## 1. Installation

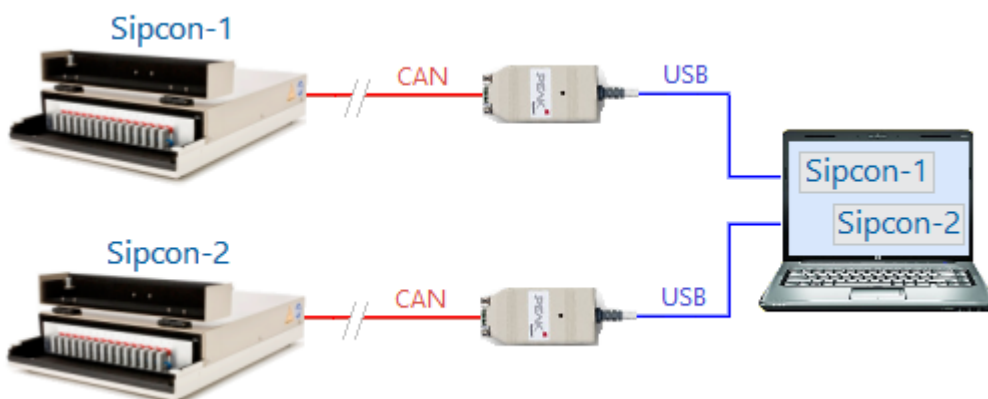
### 1.1 Installation of Hardware

**Concept:** The CAN bus (Controller Area Network) is a serial bus system. The CAN bus originally developed by the Bosch company for the automobile industry in 1983, is internationally standardized and is now widely used in industry as a fieldbus under various designations and data protocols. This bus is characterized by its robustness. Even cable lengths of up to 100m between Sipcon and CAN-USB adapters are possible.

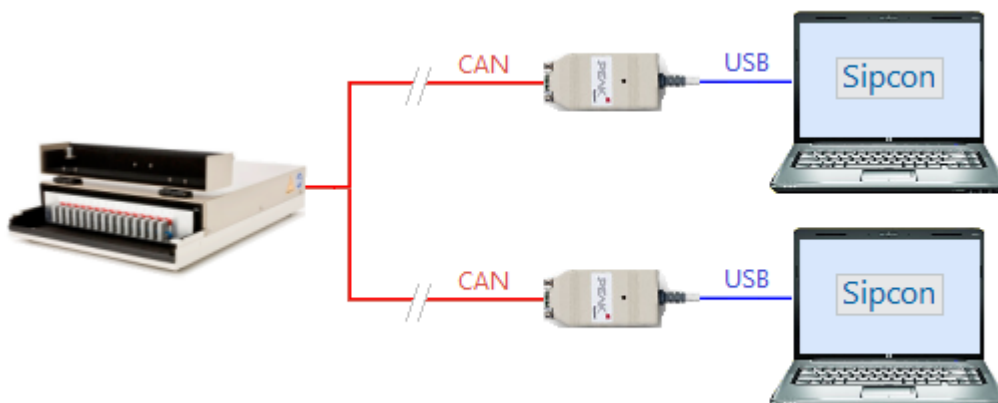
Connection of **one** Sipcon to one PC:



Connection of **several** Sipcon to one PC



Connection of one Sipcon to **several** PC's:



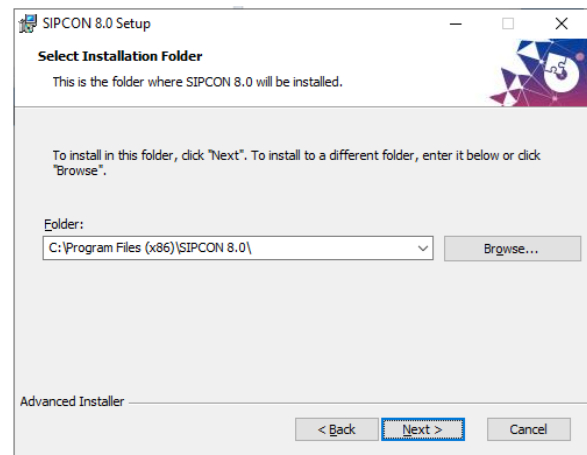
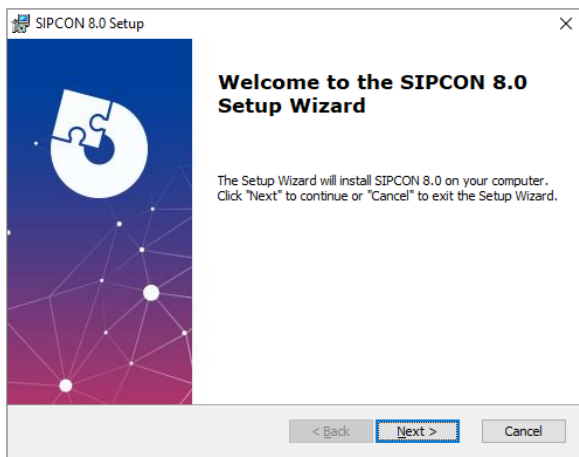
## 1.2 Installing the Software

### System Requirements:

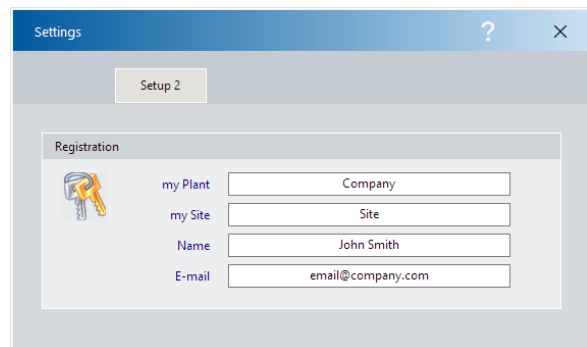
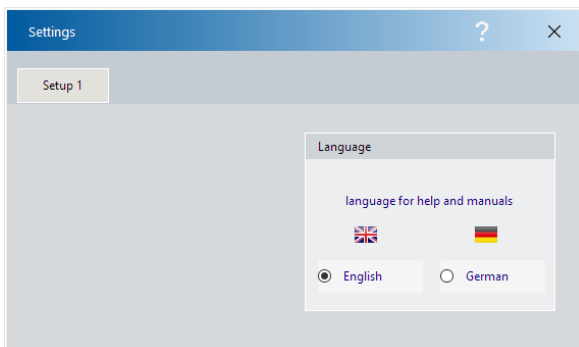
- Operating system Windows 7 ...10 (32/64-bit)
- USB port (USB 3.0, USB 2.0 or USB 1.1) on the computer

Please run the following Windows setup file: **Sipcon8\_setup.msi**

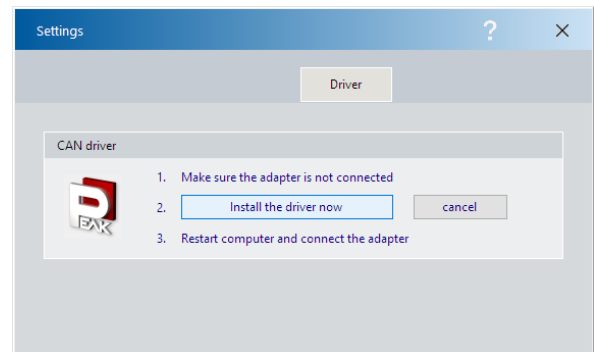
You must have **administrator rights** to install the CAN-driver.



Start the Sipcon software and follow the instructions:



Note: Install the CAN-driver **before** connecting the CAN-USB adapter to the computer



- Install the Peak-driver.
- Connect** the adapter to an USB port. The computer can remain powered on.
- Windows detects the new hardware and completes the driver installation.
- Check the LED on the adapter. The driver was initialized successfully when the LED lights up.
- Restart the Sipcon program and complete the installation in "Settings"



The CAN-USB adapter has a status LED.

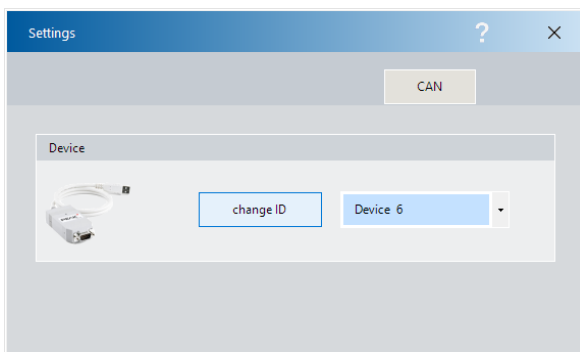
Always On: connected with Windows.

Slow flashing: connected with application.

Fast flashing: data is transmitted.

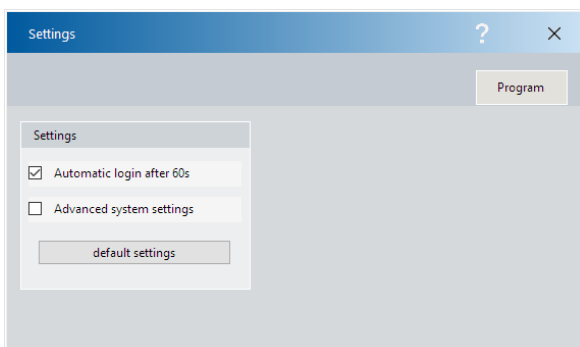


Do not use an USB extension cable to connect the CAN-USB adapter to the computer.  
The use of an extension cable can result in malfunction of the adapter.



If several equipment with CAN adapter are connected to your PC, these adapters must be clearly identified.

With a new adapter, this number is usually 255 (0xFF). However, you can easily change this number: *change ID*



*Automatic login ...*

automatic program start after 60s.

*Advanced ...*

allows access to service-programs.

### 1.3 Installing the Equipment

Up to 4 independent test instruments can be served by a single Sipcon unit. Below an example:

Installation

controller

reference

temperature

pressure

no	apparatus	prefix	C1	C2	C3	C4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	P1	P2
A	Mini - Autoklav	MA01	C				T	R	T										P	P
B	Lütolf - Oven	LÜT01		C						R	T	T	T							
C	Grewer - Oven	GRE01			C									R	T	T	T			
D	BAM - Oven	BAM01				C												R		

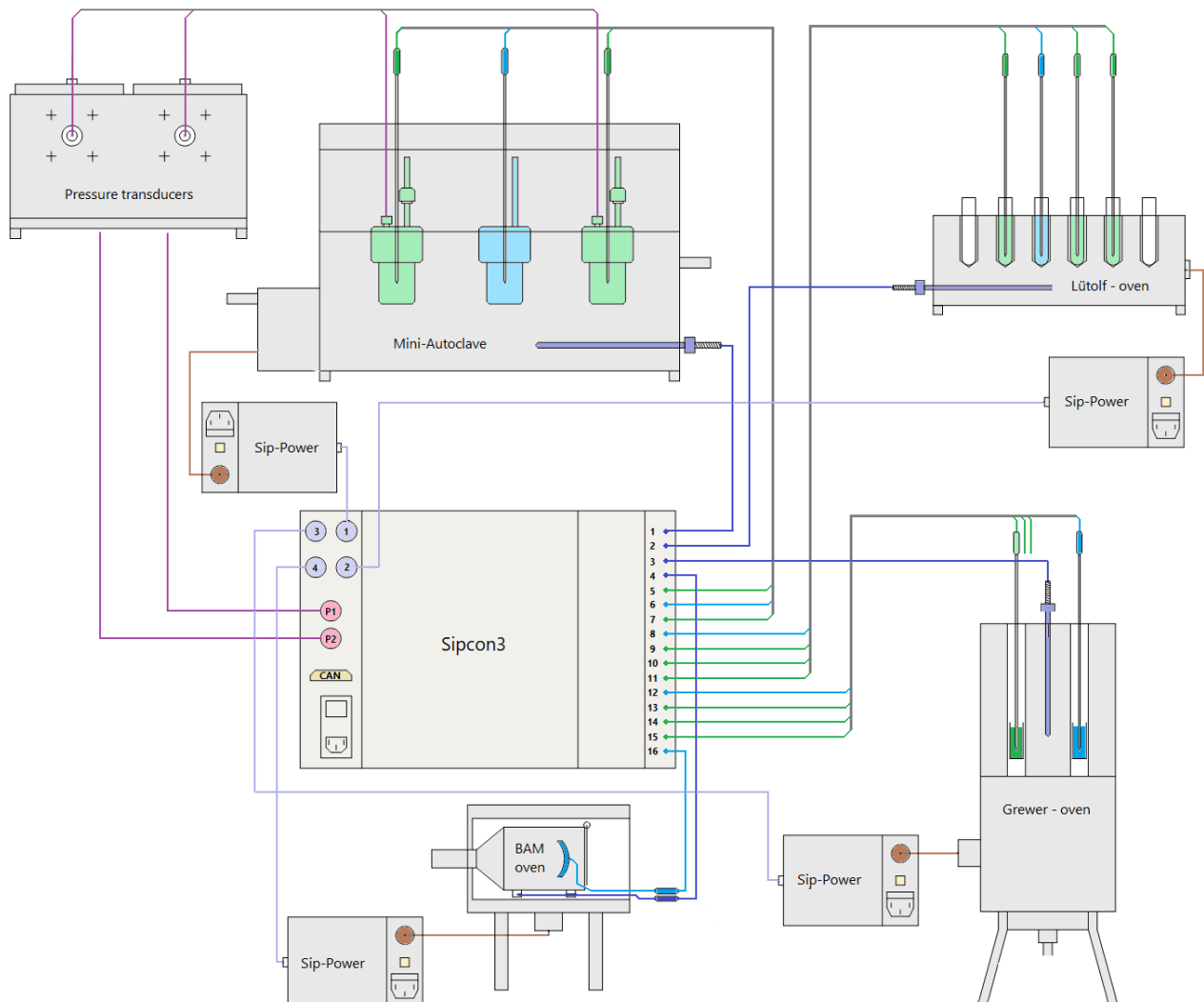
Sipcon name

ET023.S04

C:\Program Files (x86)\SIPCON 8.0\SIPDAT\

...

✓



**apparatus:**

Name each piece of equipment. This characteristic name will accompany the apparatus in the various displays.

**prefix:**

Automatic generated filenames always start with this prefix, followed by the opening date of the file. The subsequent letter distinguishes files which are generated on the same day.

Example: prefix\_190325a.SIP

Of course you can overwrite this generated suggestion and enter your own filename.

The extension is always ".SIP" and will be added automatically.

**Sipcon name:**

See chapter: *4.4 Several Sipcon on one PC*

**controllers / general purpose inputs:**

**M** A normal measuring input (e.g. for products) may be defined at any position and has no additional function.

**R** A measuring input used as reference in the relative representation.  
(e.g. as input for temperature measurement in graphite as reference substance).  
Important: One input must be defined as reference in every row! In other words, even if you do not require a relative representation, you must still have one input as a reference. This is no restriction. In absolute representation are measuring input and reference identical.

**C** This measuring input is also employed as an actual value for the controller, but otherwise it is used in the same manner as a normal measuring input. Important: Only inputs 1-4 are available for the controllers! Once again, one input must have the additional function "controller", even if you do not need one.

**P** These measuring inputs are reserved for pressure transducers.



Here you can select the default directory for all newly created Sipcon-files.  
We recommend using a directory on the local computer. A network-directory may be too slow.



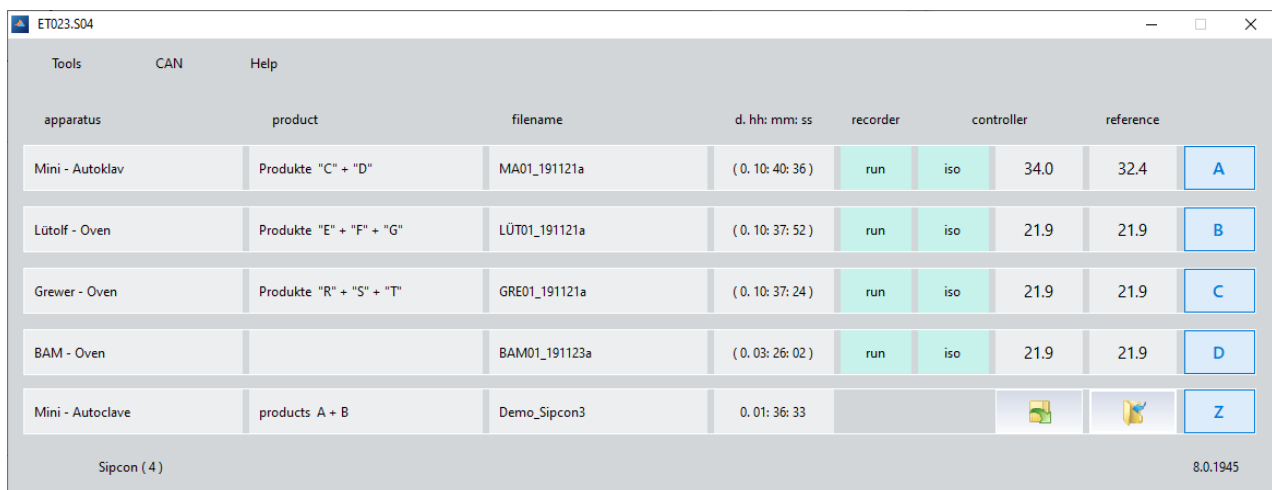
If you have modified the installation, the new configuration is tested and stored. The program tests the rows for completeness (controller, reference) and duplicate definitions. For all modified rows, the associated files are closed and new files opened in accordance to the new installation.

## 2. Operation

### 2.1 Main window

A

Corresponding to your installation, the screen display shows an overview of all current tests, the current status of the controllers and their actual value, the actual value of the reference and the data acquisition with the file name, status and recording time.

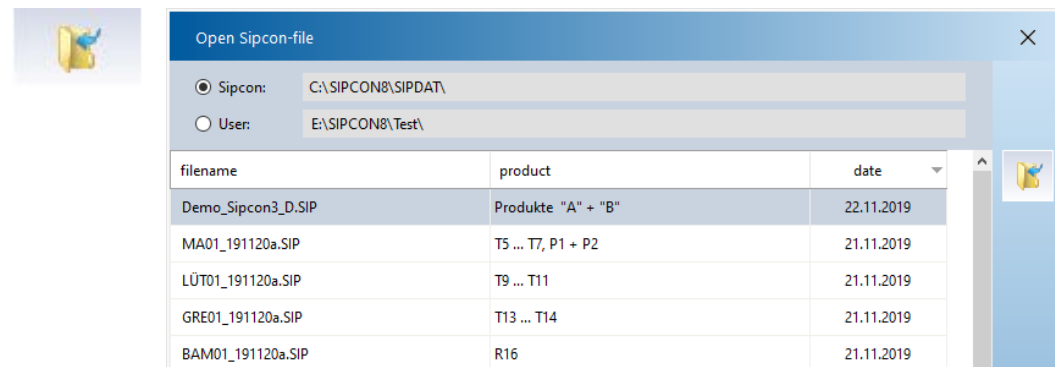


apparatus	product	filename	d. hh: mm: ss	recorder	controller	reference
Mini - Autoklav	Produkte "C" + "D"	MA01_191121a	( 0. 10: 40: 36 )	run	iso	34.0
Lütolf - Oven	Produkte "E" + "F" + "G"	LÜT01_191121a	( 0. 10: 37: 52 )	run	iso	21.9
Grewer - Oven	Produkte "R" + "S" + "T"	GRE01_191121a	( 0. 10: 37: 24 )	run	iso	21.9
BAM - Oven		BAM01_191123a	( 0. 03: 26: 02 )	run	iso	21.9
Mini - Autoclave	products A + B	Demo_Sipcon3	0. 01: 36: 33			

Sipcon ( 4 ) 8.0.1945

Z

We make a fundamental distinction between current tests being performed "**A...D**" and those already completed "**Z**". Once a test is complete, its data remain stored on the hard disk of the computer. You can process, evaluate, print and copy these data.



filename	product	date
Demo_Sipcon3_D.SIP	Produkte "A" + "B"	22.11.2019
MA01_191120a.SIP	T5 ... T7, P1 + P2	21.11.2019
LÜT01_191120a.SIP	T9 ... T11	21.11.2019
GRE01_191120a.SIP	T13 ... T14	21.11.2019
BAM01_191120a.SIP	R16	21.11.2019

All actually open files, shown in the main window, are hidden in this list.



The software Sipcon 8.0 can read all previous Sipcon1,2-files. These files are converted to the new file format and saved under a new filename.

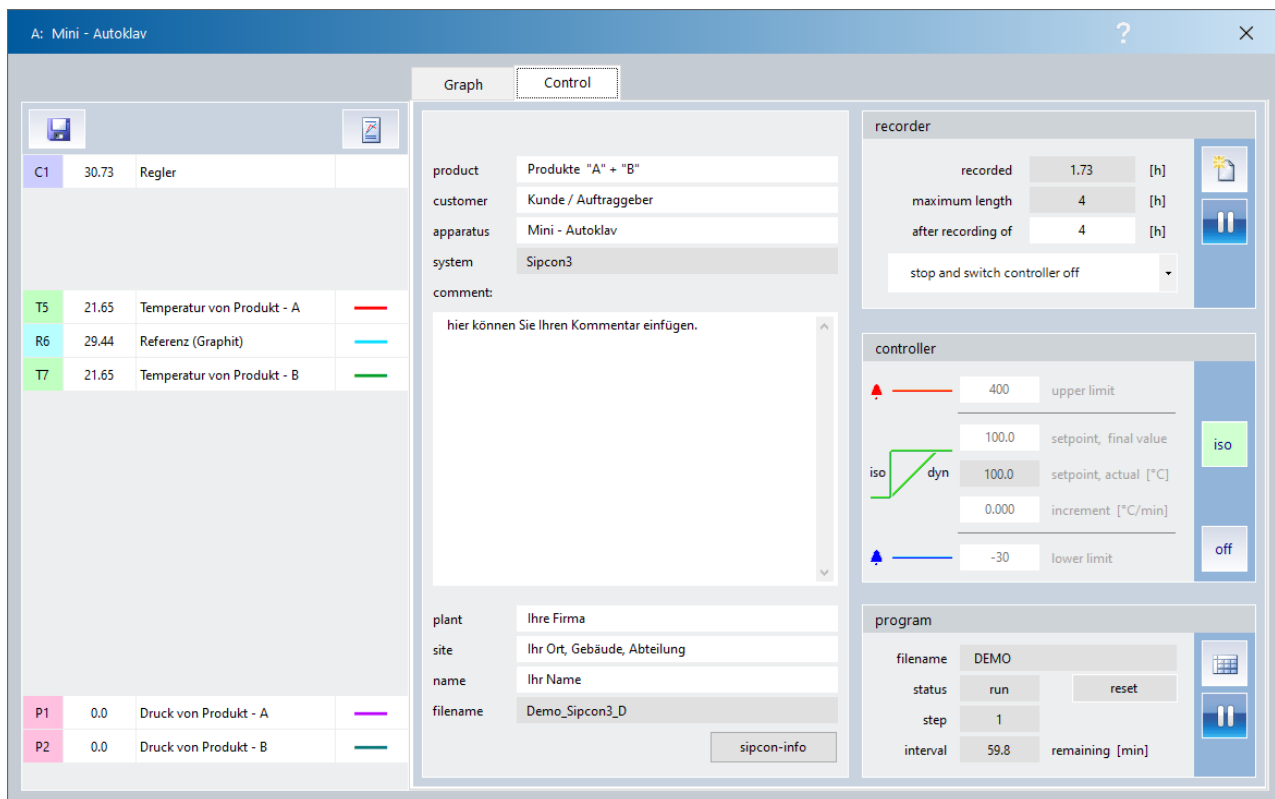
Example: M990527A.GRE will be converted to M990527A\_GRE.SIP



An easy-to-use file manager for copying (importing, exporting) Sipcon files is built-in. Only Sipcon files are displayed.

## 2.2 Work - Control

The following display is the most important working screen for the numeric representation and processing of any one of the current tests. Only the channels associated with this apparatus are displayed.



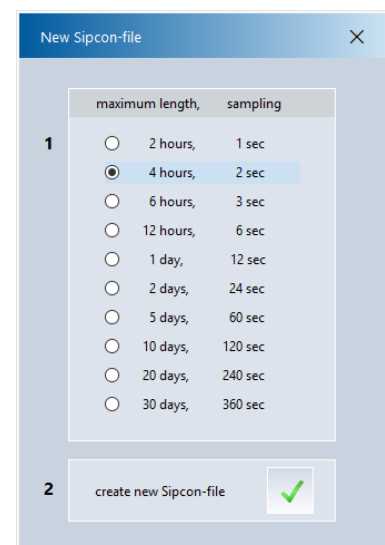
### recorder



When a new file is opened, the sampling time, i.e. the time interval between two measured values, is defined. The maximum recording length is a function of the sampling time.



After a new file has been opened, the recorder remains switched off, i.e. the measured values are displayed but not yet stored on the hard disk. The recorder must be explicitly switched on and off using this command. It is allowed to interrupt the recording (off/on switching) to cut out sections of no interest.





## recorder



The **maximum length** is stipulated by the sampling time. After elapse of this time, the data acquisition is automatically ended and, on request, the **controller switched off**. You can also shorten this value deliberately. Example: A test runs until late at night and should then be concluded automatically (*stop recording and switch the controller off*).



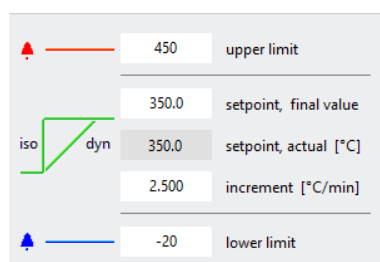
Option **endless recording**: The length of the recording corresponds to the length of the overview (width of overview). After that, new data will be added at the end and the oldest data will be deleted - similar to an endless tape.



**Temperature**: The Sipcon internal sampling time is **1s** and it always collects the **peak values**. Therefore, independent from the sampling time of the file the maximum temperature of each channel is recorded.

**Pressure**: The Sipcon internal sampling time is **50ms** and it always collects the **peak pressure** and **peak rate of pressure rise**. Therefore, independent from the sampling time of the file the peak values of each pressure channel are recorded.

## controller



## parameter

The parameter interface is configured for a 'Mini-autoclave'. It includes the following settings:

recommended for:	Mini-autoclave
P: proportional	90.0 [°C]
I: integral time	1050 [s]
D: derivative time	180 [s]

Each Sipcon controller carries out a limit value monitoring. When exceeding the limits (Upper, lower limit), the controller is switched off for safety reasons. The fault indicator on the SIP-POWER modules lights up.

The reset is done by switching off the faulty controller.

For good control behavior, the parameters of the Sipcon controllers must be adapted to the controlled system. Proven settings for commonly used equipment are already given

iso

Fixed set point controller to the set value for **isothermal** tests.

dyn

Controller for a linear ramp with a defined, positive increment up to the final value then automatic changeover to fixed set point control ( **dynamic** test ).

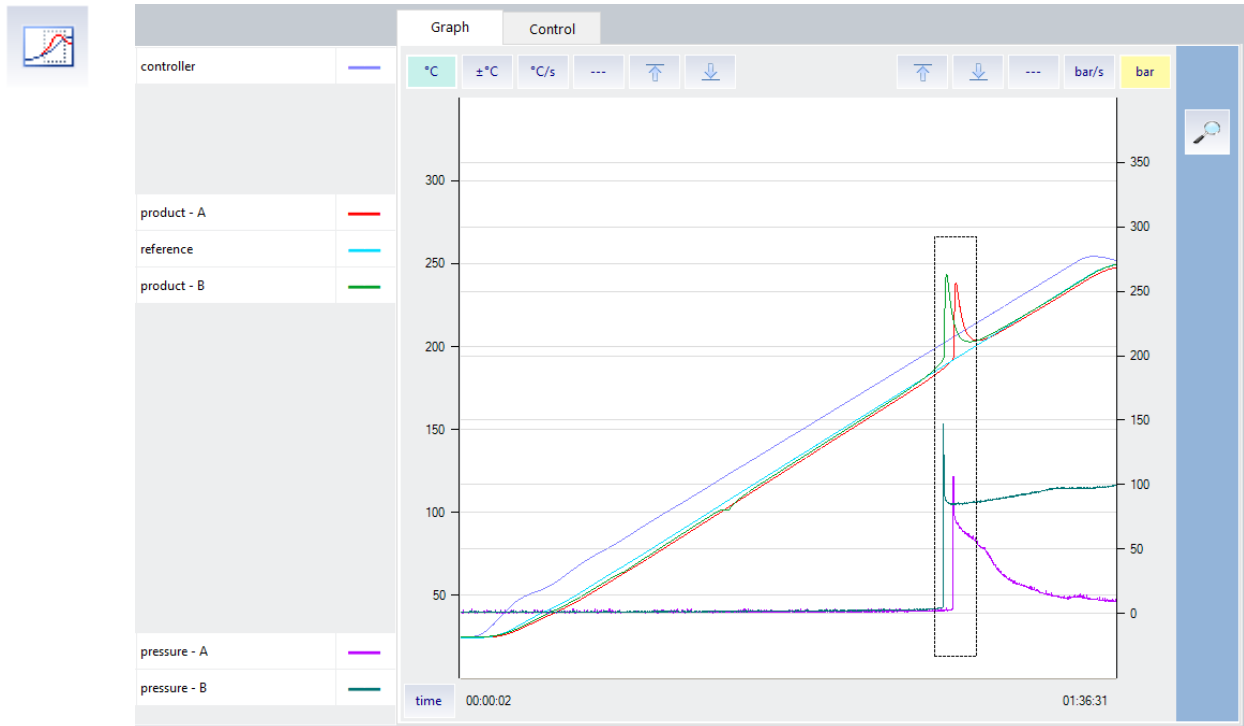


These buttons can be used for quick operation.  
The buttons **A ... Z** for calling the corresponding worksheet.



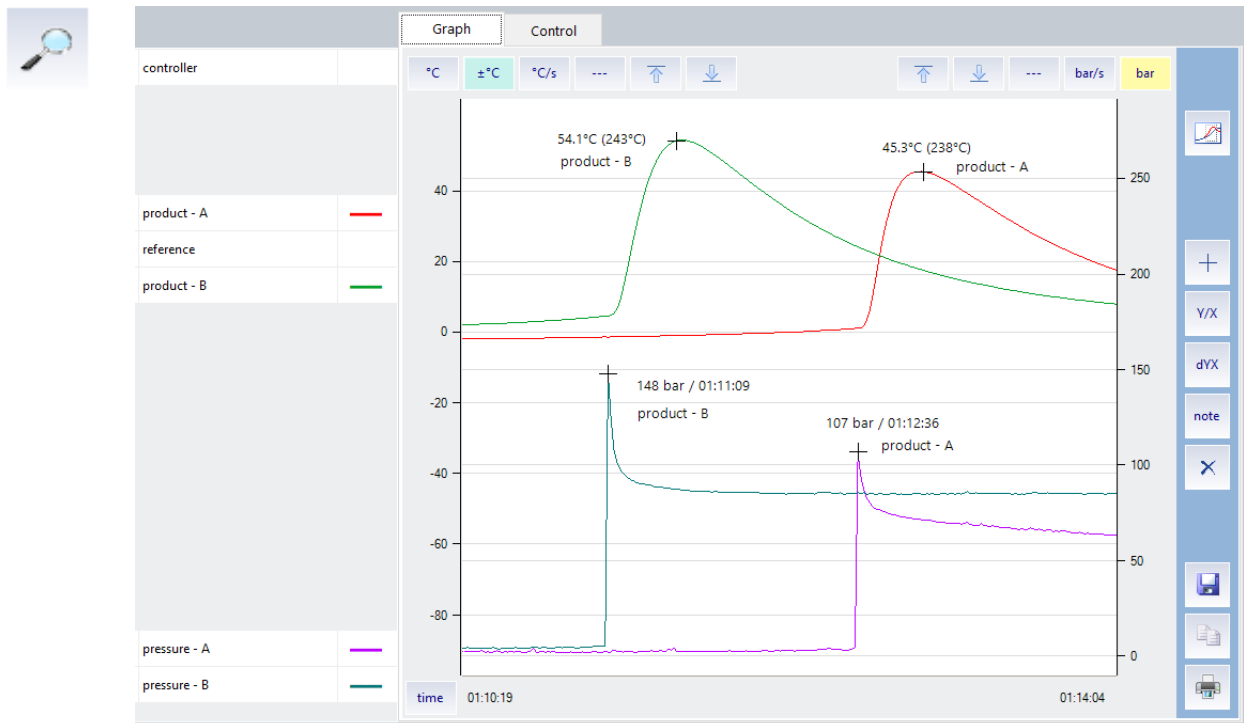
## 2.3 Work - Graph

### Overview



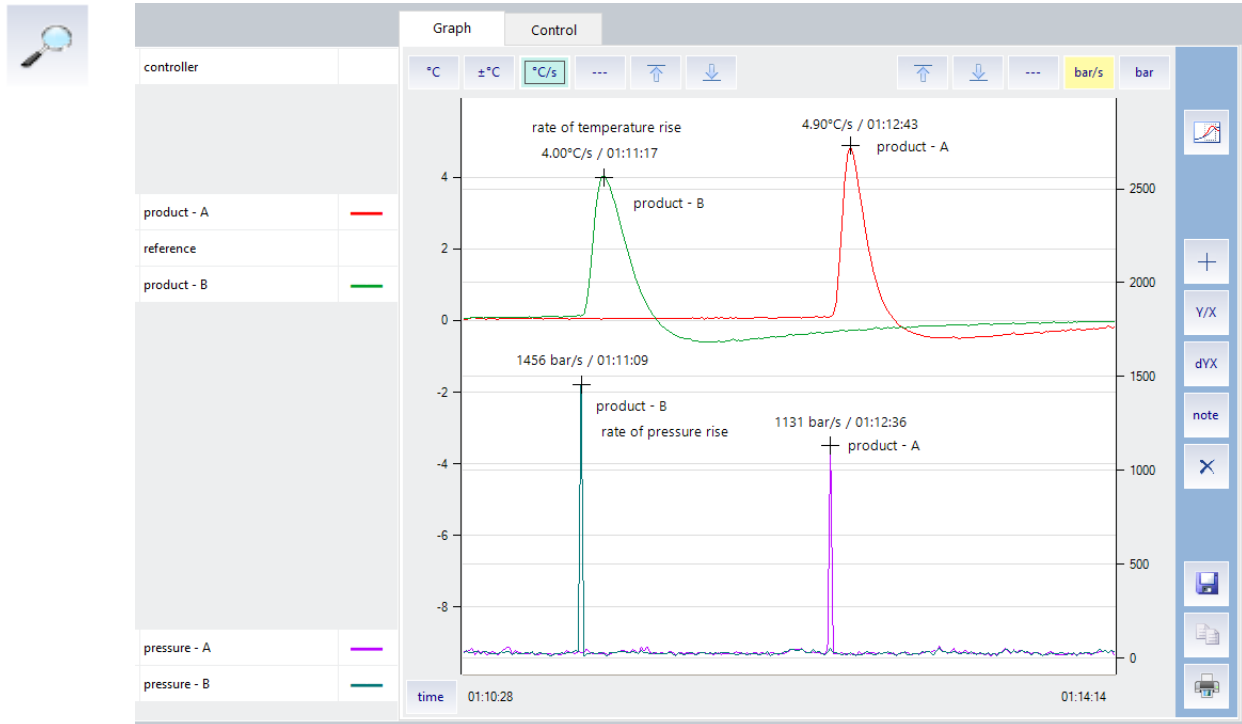
Draw a window around a section in the diagram to zoom in:

**Part view**, example with  $\pm^{\circ}\text{C}$  (relative to reference) and bar



Each measured value will be recorded with date and time. Any interruption of the data recording will be displayed as a vertical grey line.

### Part view, example with °C/s and bar/s



Different scales can be selected:

°C	±°C	°C/s	for temperature
	bar	bar/s	for pressure
	---		no scale

For each active scale (green background color):

↑	↓	set the upper or lower limit
Y/X	dYX	measure coordinates / differences and add it to the graph
note	✕	add a text-note to the graph / delete the last note
	+	show the XY-coordinates of the cross hair cursor

#### time

The time can be displayed as **absolute** (date; time) or **relative** (time after start of data recording). This selection can be changed at any time, without influencing the measurements.



All recorded data can be saved together with your evaluation and comments in a separate file and in a directory of your choice.



see: 2.5 Report



see: 2.6 Clipboard

## 2.4 Controller - program

program

filename	DEMO	
status	run	reset
step	2	
interval	222.2	remaining [min]

Icons: [Grid], [Pause]

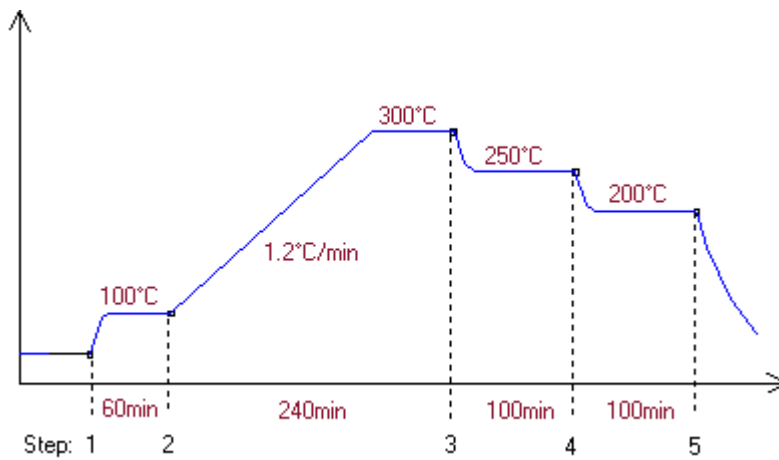
The status and the settings of a controller are programmable. This tool helps you set up such a controller program:

DEMO

step	interval [min]	setpoint [°C]	controller	incr. [°C/min]
1	60	100.0	iso	
2	240	300.0	dyn	1.20
3	100	250.0	iso	
4	100	200.0	iso	
5	1	10.0	off	
6				

Icons: [Check], [Add], [Folder], [Save]

example:

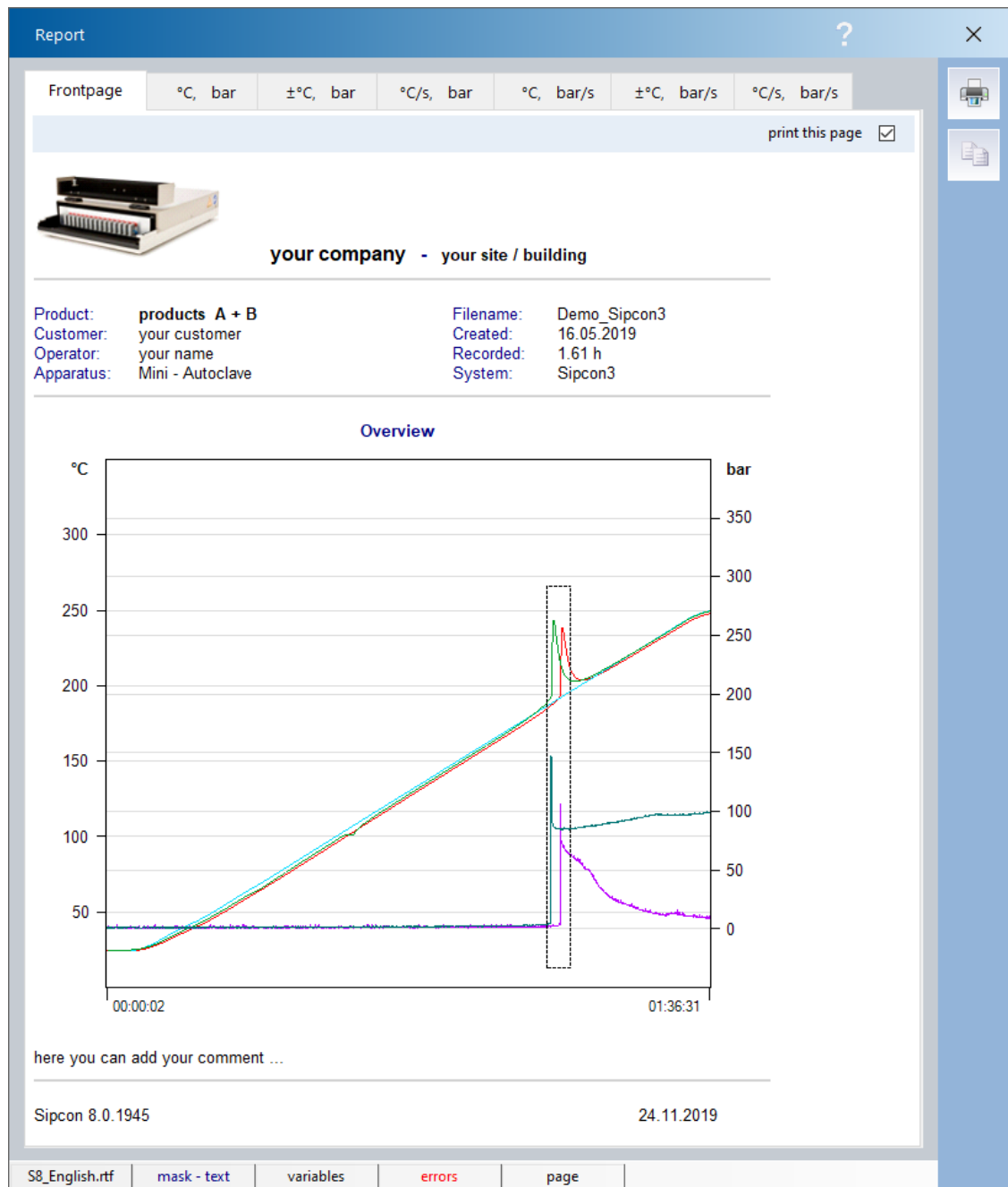


The software Sipcon 8.0 can import and execute all previous Sipcon1,2-files.

## 2.5 Report



First select a mask for the report. The program then automatically inserts all information, the graphics and the comment into the mask and produces a report.



We recommend to enter all information (customer, test reason, etc.) in the corresponding fields in the "Control" worksheet. It is possible to edit the report in this form and afterwards print it, but all changes will be lost once you leave the form!

For further information, see: [4.3 Report - Mask](#)

## 2.6 Export



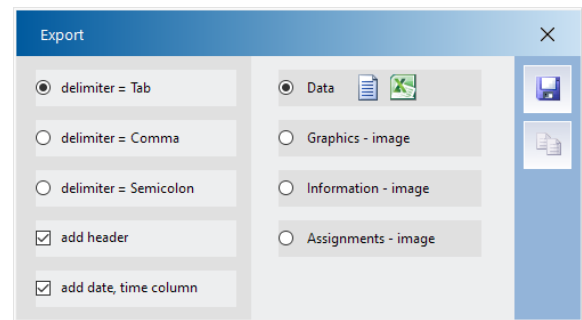
Export of data to other programs.  
Optionally for the entire recording  
or for only a section.



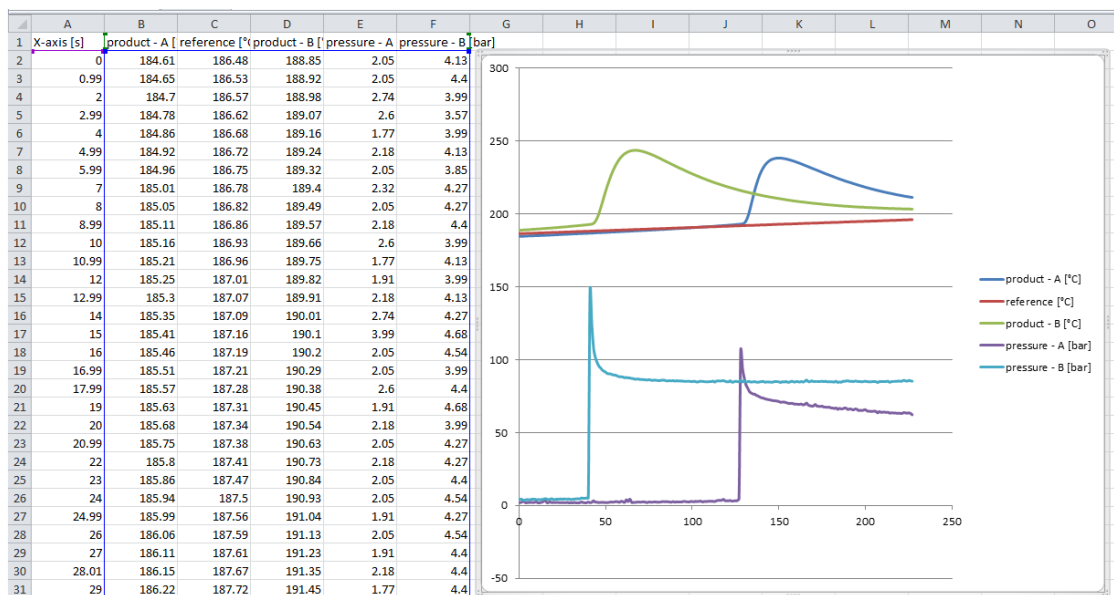
Export as text file (\*.txt)  
or via the clipboard.



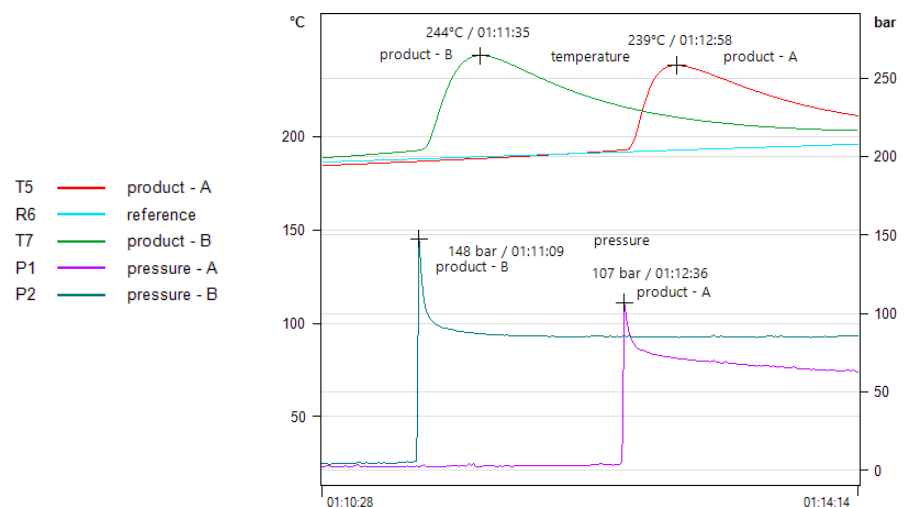
Because Sipcon runs in a multitasking operating environment along with other applications, you can easily exchange information by copying and pasting data and graphics.



Example 1: send data to e.g. Excel



Example 2: Image transfer to word processing

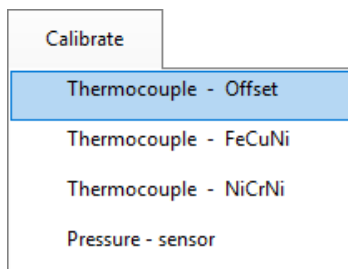


### 3. Calibration

#### 3.1 Thermocouples

This adjustment takes into account the individual thermal e.m.f.'s of the thermocouples. Hence the adjustment must be repeated each time a thermocouple is replaced. For accurate, relative temperature measurements, it is advisable to perform the adjustment for all thermocouples at the same time.

The adjustment of the measuring system and the linearization of the sensors are usually performed using 2 points. In the case of thermocouples, the first point is defined by inserting the supplied shorting jumpers in the input terminals. For the second point, the thermocouples are raised to a high and exactly known temperature.

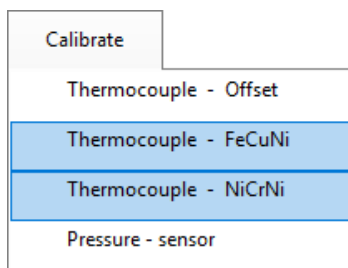


##### Calibration of offset

The zero-point error of the measuring system is compensated by this adjustment. Short the measuring inputs directly at the sockets using the supplied shorting jumpers and follow the instructions.

##### Note:

Set this once on a new Sipcon. This has been factory preset!



##### Calibration of final position with a calibrator

Connect the calibrator and select the type of thermocouple.

Calibrate with a final value of 500°C (turning point of linearization curve).

##### Calibration of final position with thermocouples

Insert thermocouples and close the Sipcon housing. Wait for isothermal conditions inside the Sipcon unit (approx. 30 min). Raise the thermocouples to a high and known temperature, e.g. heated oil bath or heated aluminum block. Follow the instructions of the program.



Best results in relative temperature measurements are achieved when all thermocouples are part of the same production lot.



The temperature of the thermocouple terminals is detected by a Pt-100 sensor. It is important to avoid further thermoelectric voltages. The thermocouples are therefore connected inside the housing via plugs.

### 3.2 Pressure sensors

Calibrate

Thermocouple - Offset  
 Thermocouple - FeCuNi  
 Thermocouple - NiCrNi  
**Pressure - sensor**

1. Select channel: click on sensor-field

2. Select type of sensor:

☐ 0 ... 20 mA
 ☒ 4 ... 20 mA

lower reading (0 or 4mA) =  [bar]

full scale (20mA) =  [bar]



Pressure sensors are usually already calibrated. Therefore it is sufficient to enter the calibration data. The calibration of 20mA is factory pre-set.

The analogue to digital conversion time for the pressure sensors is very fast: **1µs**

But the resolution is lower than for thermocouples. An example:

A transducer with 400bar full scale will be converted with a resolution of  $\pm 0.15\text{bar}$ .



The **thermocouple** inputs are **not** potential-free. All negative connections (blue sockets) are connected to each other and to earth! Avoid double earthing and equalizing currents across the negative terminals.



The inputs for the **pressure transducers** are also **not** isolated. If your sensor does not have an isolated output, it is recommended to use an additional buffer amplifier between the sensor and Sipcon.



## 4. Annex

### 4.1 Sipcon comparison

	Sipcon 1 & 2	Sipcon 3
Channels (Temperature + Pressure)	15	18
Thermocouple - inputs (FeCuNi, NiCrNi)	(15)	16
Thermocouple - sampling time	≥ 1s	1s
Thermocouple - resolution	18-bit	24-bit
Pressure - inputs (4...20mA)	-	2
Pressure- / Pressure raise - sampling time	-	50ms
Pressure - resolution	-	12-bit
Microprocessor	8-bit	32-bit
Variables, Parameters	Integer	Floating point
Firmware-Update (Flash)	-	yes
Data transmission to the PC	9.6K RS232	125K CAN-Bus
PC-interface	RS 232 or USB	USB
Multiple Sipcon on a single PC	with SIPNET	yes
Multiple PC on a single Sipcon	no	yes
Mains supply	230VAC	85...264VAC

### 4.2 Sip-Power

External module for the attachment of a heating unit.

Attachment of max. 4 Sip-Power modules to one Sipcon unit.

Quasi-continuous matching of the heating power by multi-cycle control via a semiconductor relay.

Low power line disturbances since heating switched in zero crossing of voltage wave.

Safety relay for switching off the heating circuit if the programmable temperature limit is exceeded.



The PC program periodically sends a signal (heartbeat) to the Sipcon. If this signal remains off for more than 5 minutes, then all heaters are switched off for safety reasons.

### 4.3 Report - Mask



The Sipcon program comes with some sample masks. These masks can be easily adapted to your wishes. Open one of these masks with a text editor that supports **rich text (.rtf)** format. We recommend the program **WordPad** (in Windows Accessories).

The screenshot shows a report mask template with the following structure:

- Header:**
  - @Definitions
  - Type: SIPCON
  - Version: 8.0
  - @Frontpage
- Image:** A small image of a Sipcon device.
- Fields:**
  - #Plant - #Site
- Product Information:**
  - Produkt: #Product
  - Auftraggeber: #Customer
  - Prüfperson: #Operator
  - Apparatur: #Appar
- Date and Recording Information:**
  - Dateinamen: #Filename
  - Erstellt am: #CreDate
  - Aufzeichnung: #Recorded
  - System: #Sipcon
- Section: Übersicht**
- Fields:**
  - #Gr\_Over
  - #Comment
- Section: @DataPage**
- Image:** A small image of a Sipcon device.
- Fields:**
  - #Plant - #Site
- Product Information:**
  - Produkt: #Product
  - Auftraggeber: #Customer
  - Prüfperson: #Operator
  - Apparatur: #Appar
- Date and Recording Information:**
  - Dateinamen: #Filename
  - Erstellt am: #CreDate
  - Aufzeichnung: #Recorded
  - System: #Sipcon
- Section: Ausschnitt**
- Fields:**
  - #Gr\_Part
  - #Input\_1 to #Input\_9
  - #Input\_10 to #Input\_18
- Footer:**
  - #Version
  - @End
  - #PriDate



The Sipcon-image is just a suggestion and can be replaced with your company logo.

The masks are divided into sections, these sections begin with a "**@:-control code**". Please do not change these codes under any circumstances. The fields for the variables are identified by a "**#control code**".

@:Definitions	Section for type and version of the mask
@:Frontpage	Section for the title page
@:DataPage	Section for the data pages
@:End	End of the report

#Appar	apparatus
#Comment	comment
#Ccreate	date of file creation
#Customer	customer
#Email	e-mail
#Filename	filename
#Gr_over	graphic-overview
#Gr_part	graphic-part view
#Input_1 ...	input 1 ...
#Input_18	input 18

#Operator	operator
#Plant	plant
#Prefix	prefix for filename
#Pridate	print date
#Product	product
#Recorded	recording time
#Sampling	sampling
#Sipcon	Sipcon designation
#Site	place, building
#Version	program version



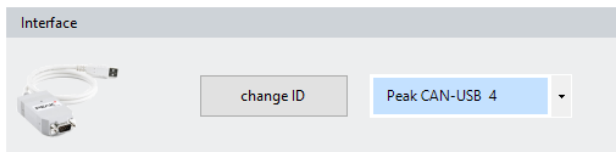
There is **no** distinction between uppercase and lowercase letters.

## 4.4 Several Sipcon on one PC

In the following example, a Sipcon with the designation "ET023.S04" and another Sipcon with the designation "ET023.S05" are connected to a PC. The terms were chosen arbitrarily for this example.

### 4.4.1 Preparation of Sipcon „ET023.S04“

1. Only connect the Sipcon **"ET023.S04"** to the PC with its CAN-USB adapter.
2. Start the Sipcon program and select *"Settings"*.
3. Each CAN-USB adapter must be assigned an individual number: *"change ID"*.  
Permitted range = 1 ... 254. In this case, enter the number **4**:



4. Save the new settings and start the Sipcon main program.
5. Define the equipment of Sipcon **"ET023.S04"** *„Tools / System: Installation“*  
See: *"1.3 Installing the equipment"*

no	apparatus	prefix	controller				reference temperature										pressure			
			C1	C2	C3	C4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	P1	P2
A	Mini - Autoklav	MA01	C				T	R	T										P	P
B	Lütolf - Oven	LÜT01		C						R	T	T	T							
C	Grewer - Oven	GRE01			C									R	T	T	T			
D	BAM - Oven	BAM01				C												R		

Sipcon name: ET023.S04

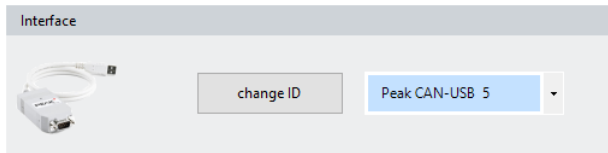
C:\Program Files (x86)\SIPCON 8.0\SIPDAT\

Enter the name "ET023.S04". This will simplify the distinction of the Sipcon in the future.  
The directory "SIPDAT" can be common to all Sipcon.

6. Close the Sipcon program. Your settings are saved in the file **"User\_4.dat"**.
7. Disconnect the CAN-USB adapter of Sipcon **"ET023.S04"** from the PC.

#### 4.4.2 Preparation of Sipcon „ET023.S05“

1. Only connect the Sipcon "**ET023.S05**" to the PC with its CAN-USB adapter.
2. Start the Sipcon program and select "*Settings*".
3. Each CAN-USB adapter must be assigned an individual number: "*change ID*".  
Permitted range = 1 ... 254. In this case, enter the number **5**:



4. Save the new settings and start the Sipcon main program.
5. Define the equipment of Sipcon "**ET023.S05**" „*Tools / System: Installation*“

no	apparatus	prefix	controller						reference										pressure	
			C1	C2	C3	C4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	P1	P2
A	Hot Storage 1	HS01	C				R	T	T	T										
B	Hot Storage 2	HS02		C							R	T	T	T						
C	Hot Storage 3	HS03			C										R	T	T	T		
D																				

Sipcon name: ET023.S05

C:\Program Files (x86)\SIPCON 8.0\SIPDAT\

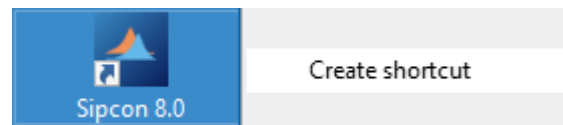
Enter the name "ET023.S05". This will simplify the distinction of the Sipcon in the future.  
The directory "SIPDAT" can be common to all Sipcon.

6. Close the Sipcon program. Your settings are saved in the file "**User\_5.dat**".

**More Sipcon can be added with the same procedure.**

#### 4.4.3 Create shortcuts on the PC desktop

1. Right-click on the Sipcon-icon and create a new shortcut.



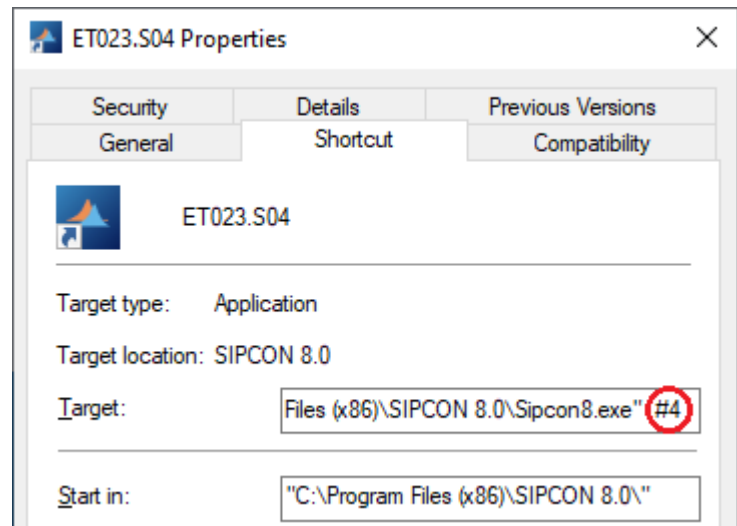
2. Right-click on the new link and rename it.  
Example: „**ET023.S04**“



3. Right-click on the renamed link and display the properties.



4. Add the argument **#4** to the target.



5. Repeat steps 1 ... 4 for "**ET023.S05**" with the argument **#5**.

6. The "Sipcon 8.0" link is no longer needed and can now be deleted.



Only the links to ET023.S04 and ET023.S05 remain on the desktop.

