

Sipcon 3 - Manual

8.0



TÜV SÜD Schweiz AG (Production and Distribution)

Mattenstrasse 24, CH-4002 Basel, Switzerland

www.tuev-sued.ch products.bs@tuev-sued.ch

Cesana AG (Development and Software)

Baiergasse 56, CH-4126 Bettingen, Switzerland

www.cesana-ag.ch info@cesana-ag.ch

| | |
|------------------------------------|----|
| 1. Installation..... | 2 |
| 1.1 Installing the Software | 2 |
| 1.2 Installing the equipment | 4 |
| 2. Operation | 6 |
| 2.1 Main window..... | 6 |
| 2.2 Work - Control | 7 |
| 2.3 Work - Graph..... | 9 |
| 3. Calibration..... | 11 |
| 3.1 Thermocouples..... | 11 |
| 3.2 Pressure sensors | 12 |
| 4. Annex..... | 13 |
| 4.1 Sipcon..... | 13 |
| 4.2 Sip-Power | 13 |



Please read this note!



This information is helpful!



Question and answer! What is to do, when ...



Attention: Please read this safety instruction carefully!

1. Installation

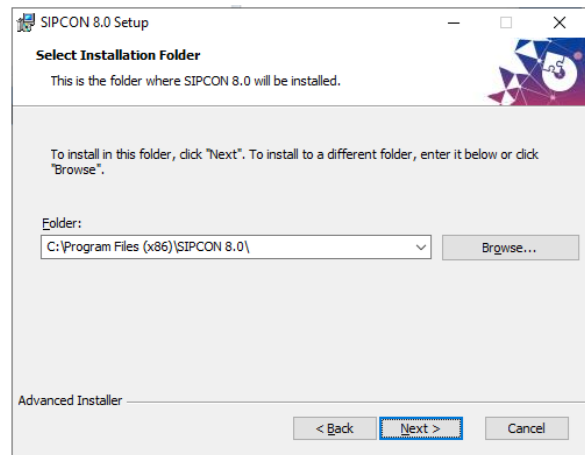
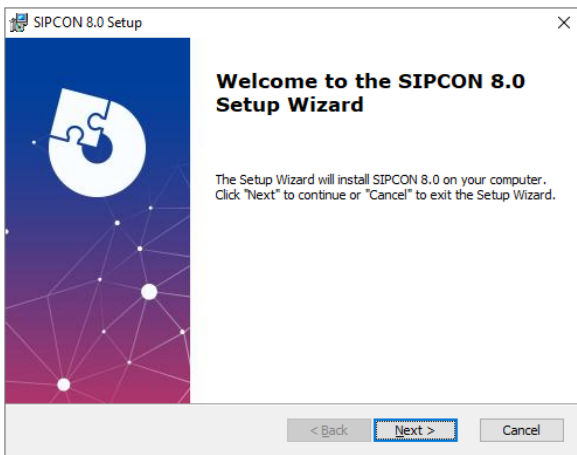
System Requirements:

- Operating system Windows 10, 8.1, 7 (32/64-bit)
- USB port (USB 3.0, USB 2.0 or USB 1.1) on the computer

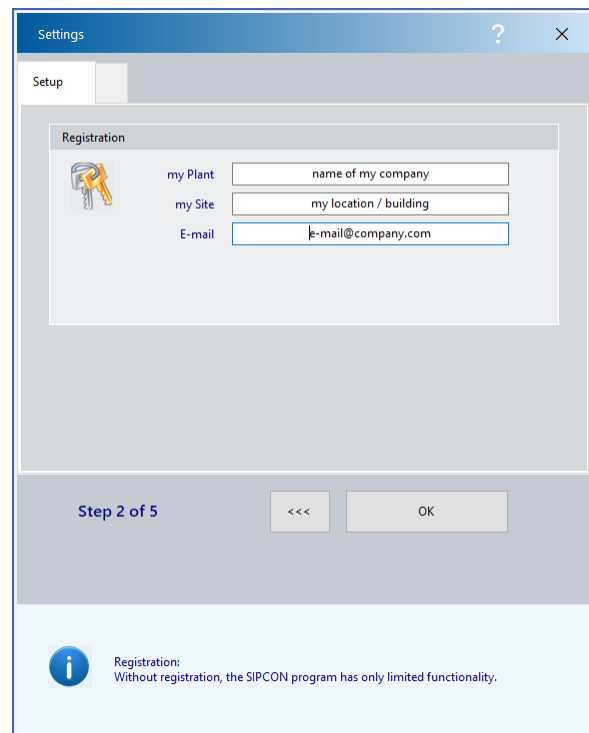
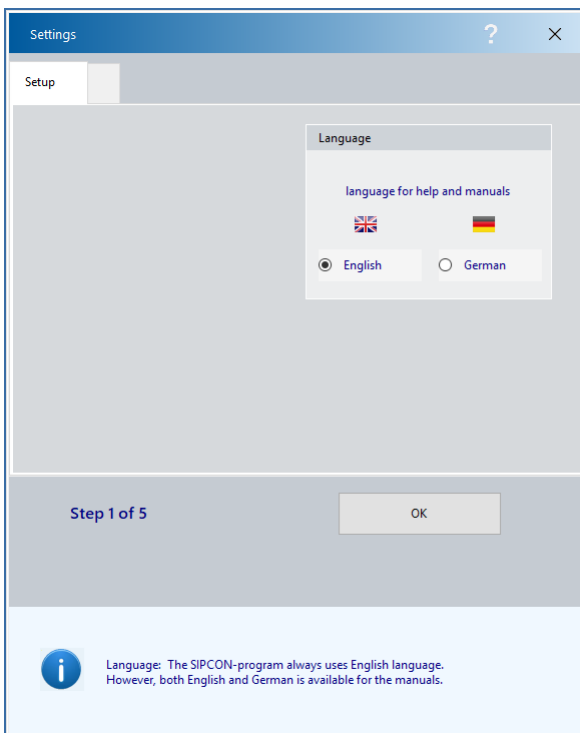
1.1 Installing the Software

Execute the Windows-Installer-file **Sipcon8_setup.msi**.

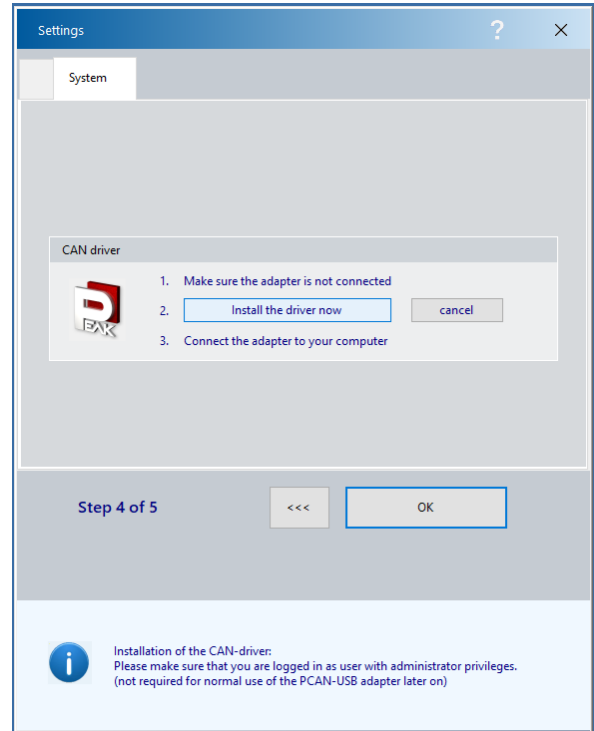
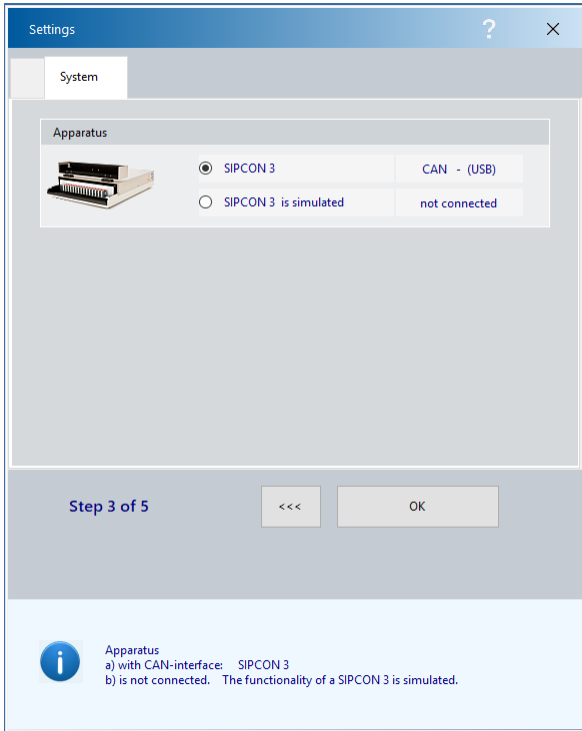
You must have **administrator rights** to install the framework and the CAN-driver.



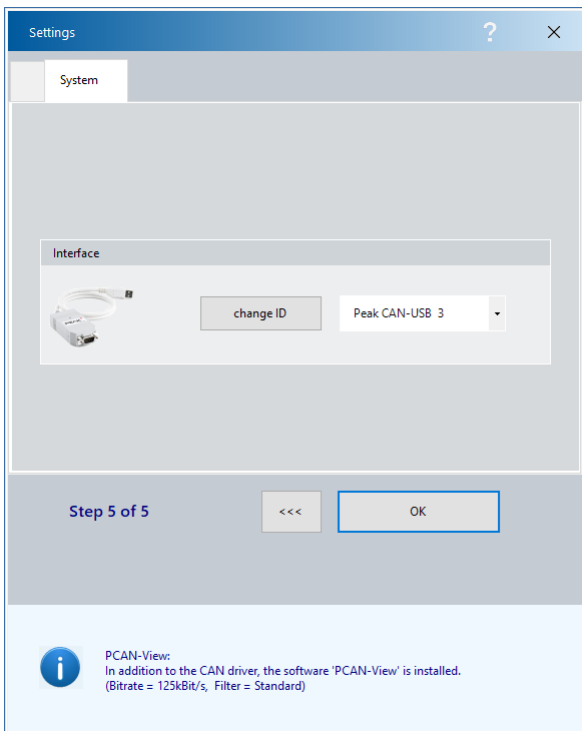
Start the Sipcon software and follow the instructions:



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



- Push the button “**Install the driver now**”. The installation runs in the background.
- Wait until you get a message confirming the Peak-driver has been successfully installed.
- 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. If the LED is red, then the driver was initialized successfully.



Notes:

For multiple Sipcon 3 on the same computer you should assign to each CAN-USB-adapter an individual number “change ID”.

Do not use a 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.

The CAN-USB adapter has a red status LED.

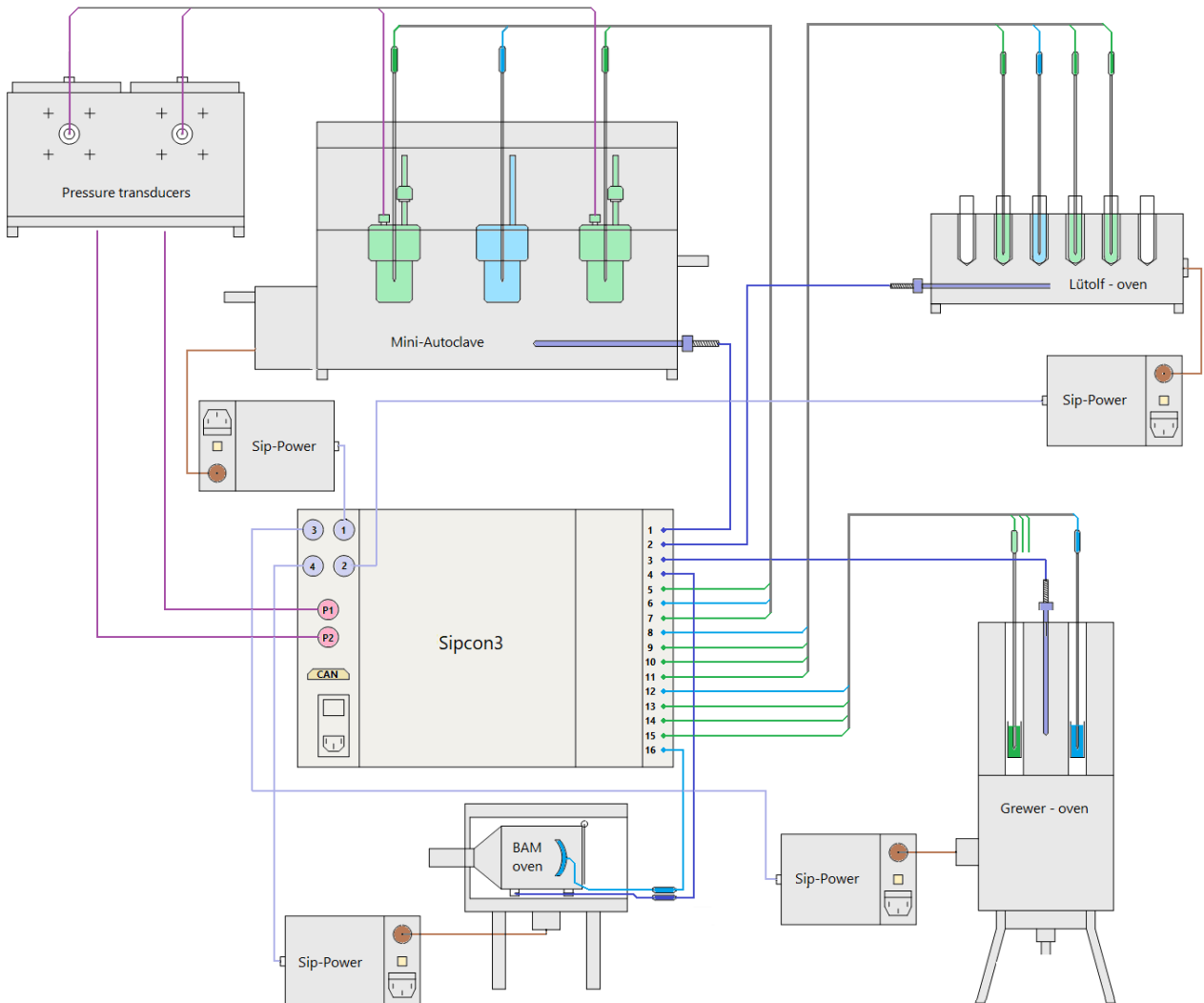
- On: connected with Windows.
 Slow flashing: connected with application.
 Fast flashing: data is transmitted.

1.2 Installing the equipment

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

| 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 - Autoclave | 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 | |

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.

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: For each line one input must be defined! 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 for an absolute representation measuring input and reference are identical.

C This measuring input is also employed as an actual value for the controller, but otherwise 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 to use a directory on the local computer. A network-directory could be too slow.



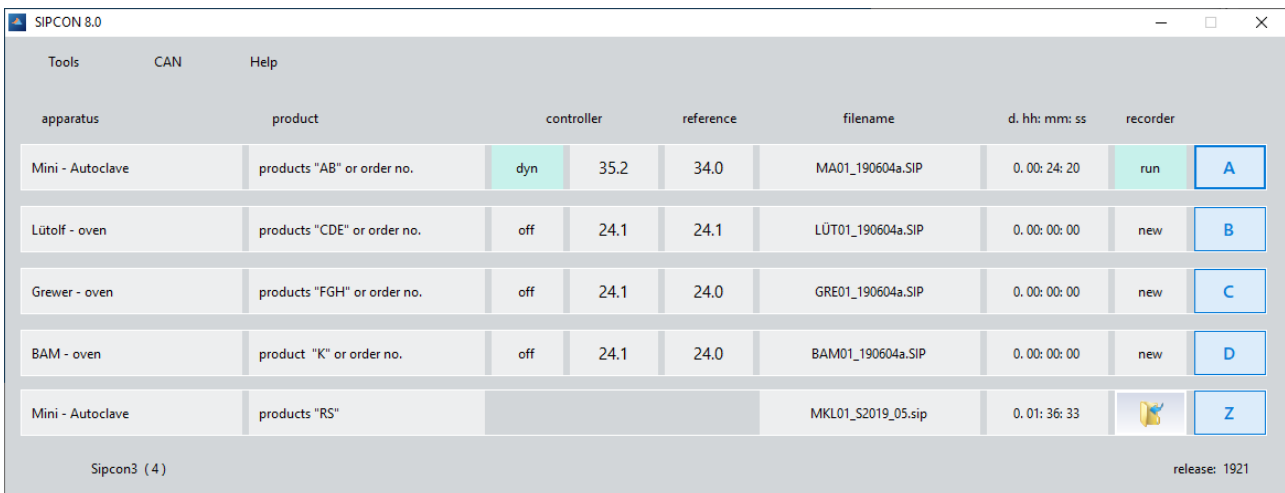
If you have modified the installation, the new configuration is tested and stored. The program tests the rows for completeness (controller, reference) and duplicate definitions. For all modified rows, the associated files are closed and new files opened in accordance with the new installation.

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.

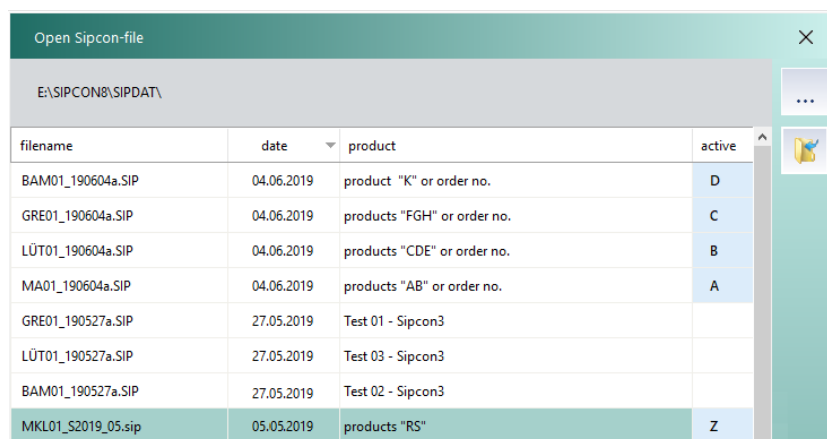


| apparatus | product | controller | reference | filename | d. hh: mm: ss | recorder | |
|------------------|-----------------------------|------------|-----------|--------------------|-------------------|---------------|-----|
| Mini - Autoclave | products "AB" or order no. | dyn | 35.2 | 34.0 | MA01_190604a.SIP | 0. 00: 24: 20 | run |
| Lütolf - oven | products "CDE" or order no. | off | 24.1 | 24.1 | LÜT01_190604a.SIP | 0. 00: 00: 00 | new |
| Grewer - oven | products "FGH" or order no. | off | 24.1 | 24.0 | GRE01_190604a.SIP | 0. 00: 00: 00 | new |
| BAM - oven | product "K" or order no. | off | 24.1 | 24.0 | BAM01_190604a.SIP | 0. 00: 00: 00 | new |
| Mini - Autoclave | products "RS" | | | MKL01_S2019_05.sip | 0. 01: 36: 33 | | |

Sipcon3 (4) release: 1921

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 | date | product | active |
|--------------------|------------|-----------------------------|--------|
| BAM01_190604a.SIP | 04.06.2019 | product "K" or order no. | D |
| GRE01_190604a.SIP | 04.06.2019 | products "FGH" or order no. | C |
| LÜT01_190604a.SIP | 04.06.2019 | products "CDE" or order no. | B |
| MA01_190604a.SIP | 04.06.2019 | products "AB" or order no. | A |
| GRE01_190527a.SIP | 27.05.2019 | Test 01 - Sipcon3 | |
| LÜT01_190527a.SIP | 27.05.2019 | Test 03 - Sipcon3 | |
| BAM01_190527a.SIP | 27.05.2019 | Test 02 - Sipcon3 | |
| MKL01_S2019_05.sip | 05.05.2019 | products "RS" | Z |

The column "active" indicates all actually open files, shown in the main window.



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

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.

| | maximum length, | sampling |
|---|---|----------|
| 1 | <input type="radio"/> 2 hours, | 1 sec |
| | <input checked="" type="radio"/> 4 hours, | 2 sec |
| | <input type="radio"/> 6 hours, | 3 sec |
| | <input type="radio"/> 12 hours, | 6 sec |
| | <input type="radio"/> 1 day, | 12 sec |
| | <input type="radio"/> 2 days, | 24 sec |
| | <input type="radio"/> 5 days, | 60 sec |
| | <input type="radio"/> 10 days, | 120 sec |
| | <input type="radio"/> 20 days, | 240 sec |
| | <input type="radio"/> 30 days, | 360 sec |

2 create new Sipcon-file

recorder



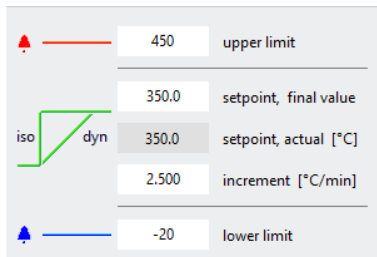
The **maximum length** is stipulated by the sampling time. After elapse of this time, the data acquisition is automatically ended and, on request, the **controller switched off**. You can also shorten this value deliberately. Example: A test runs until late at night and should then be concluded automatically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



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



A limit value monitoring is performed by the Sipcon controllers. If the upper or lower limit is violated by one controller, for safety reasons all controllers of the associated Sipcon are switched off. The fault indicator lamp of the Sip-Power modules will light up. The system can be reset either by switching off the faulty controller or the Sipcon unit.

parameter

The parameter interface is for a 'Mini-autoclave'. It includes a dropdown menu for 'recommended for' (Mini-autoclave) and three control parameters: P: proportional (90.0 [°C]), I: integral time (1050 [s]), and D: derivative time (180 [s]).

For satisfactory operation, the controllers incorporated in the Sipcon measurement and control system must be matched to the process systems.

iso

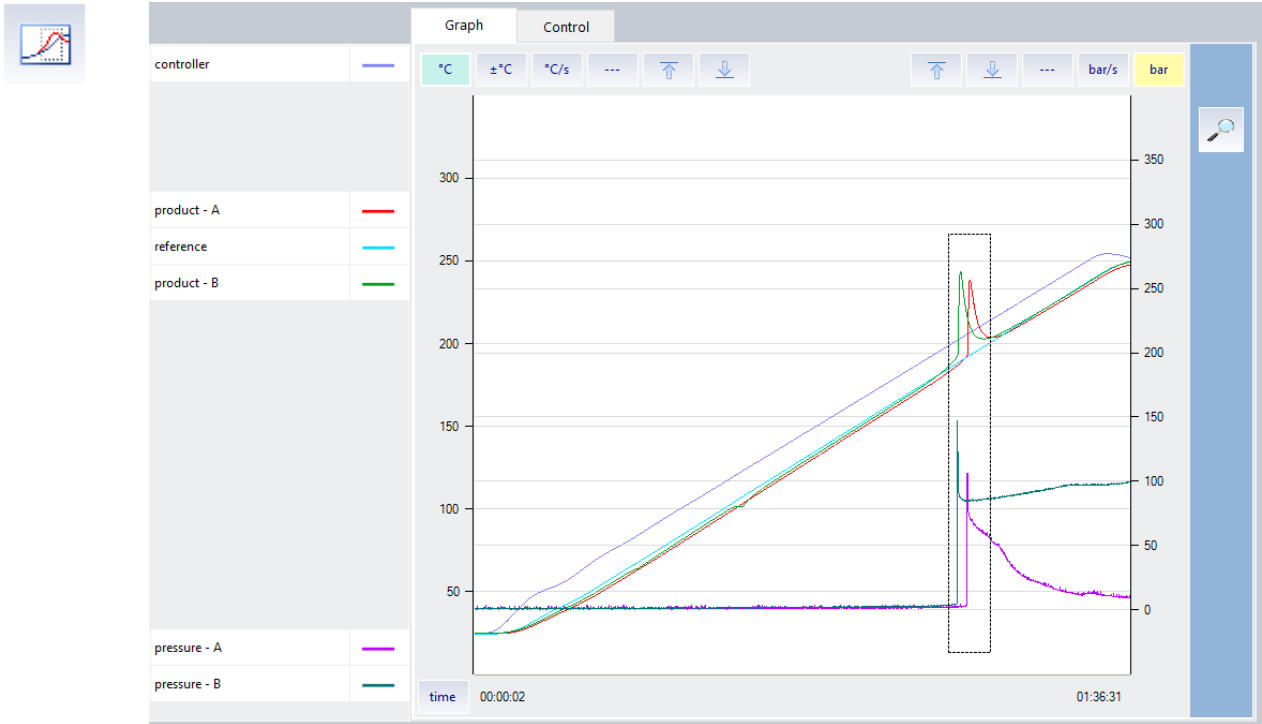
Fixed set point controller to the set value for **isothermal** tests.

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).

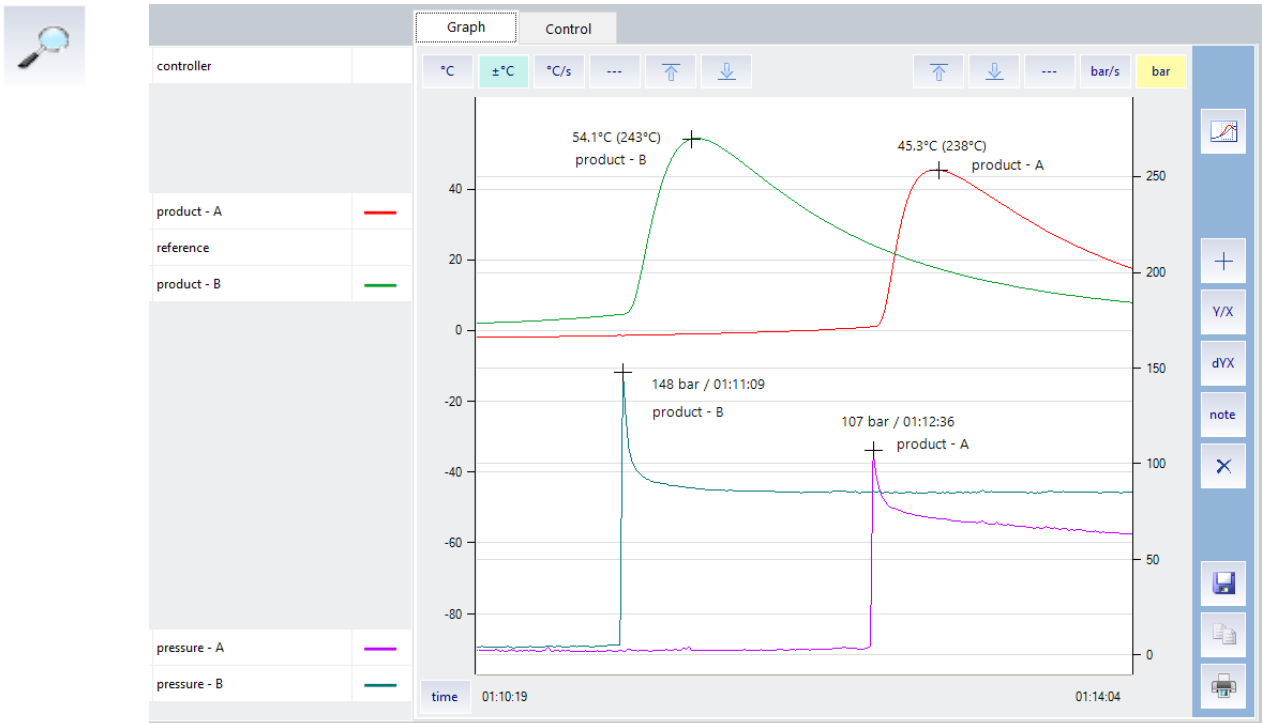
2.3 Work - Graph

Overview



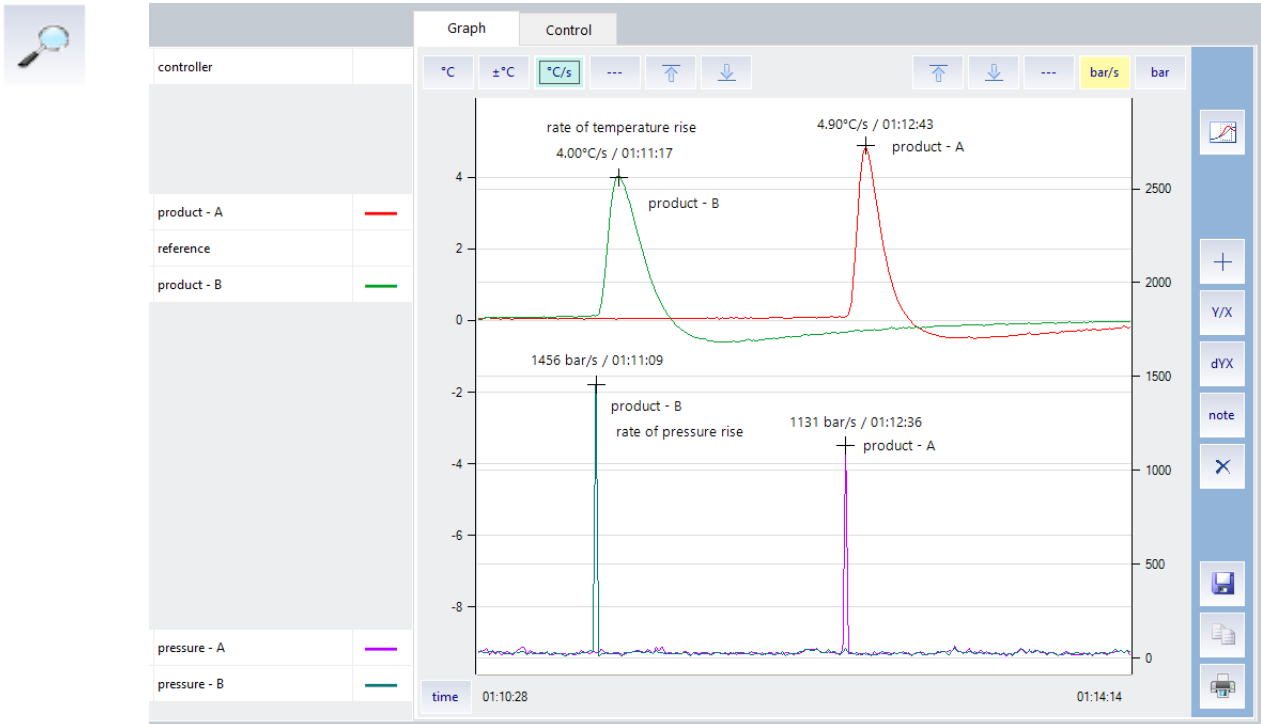
Draw a window around a section in the diagram to zoom in:

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:

| | | | |
|--------------------------|---------------------------|--|-----------------|
| <input type="radio"/> °C | <input type="radio"/> ±°C | <input checked="" type="radio"/> °C/s | for temperature |
| | <input type="radio"/> bar | <input checked="" type="radio"/> bar/s | for pressure |
| | | <input type="radio"/> --- | no scale |

For each active scale (green background color):

| | | |
|-------------------------------------|------------------------------------|---|
| <input type="button" value="↑"/> | <input type="button" value="↓"/> | set the upper or lower limit |
| <input type="button" value="Y/X"/> | <input type="button" value="dYX"/> | measure coordinates / differences and add it to the graph |
| <input type="button" value="note"/> | <input type="button" value="X"/> | add a text-note to the graph / delete the last note |
| | <input type="button" value="+"/> | 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.



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



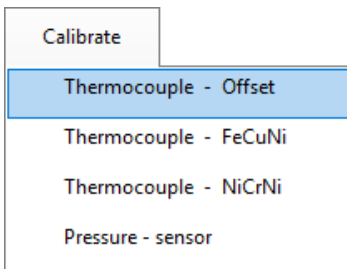
Print a single sheet of the part view together with control-data and comments.

3. Calibration

3.1 Thermocouples

This adjustment takes into account the individual thermal e.m.f.'s of the thermocouples. The adjustment must hence 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.

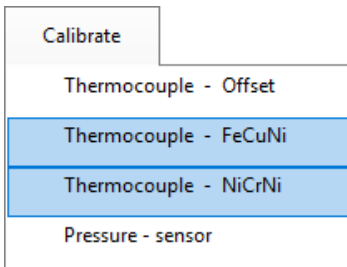


Calibration of offset

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 (ca. 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.

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 with 1 μ s

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

A transducer with 400bar full scale will be converted with a resolution of ± 0.15 bar.



The **thermocouple** inputs are **not** isolated. All negative connections (blue sockets) are connected to one another and to ground! Eliminate double ground faults and equalizing currents across the negative connection to avoid influencing the sensitive temperature measurements.



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

| | 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.