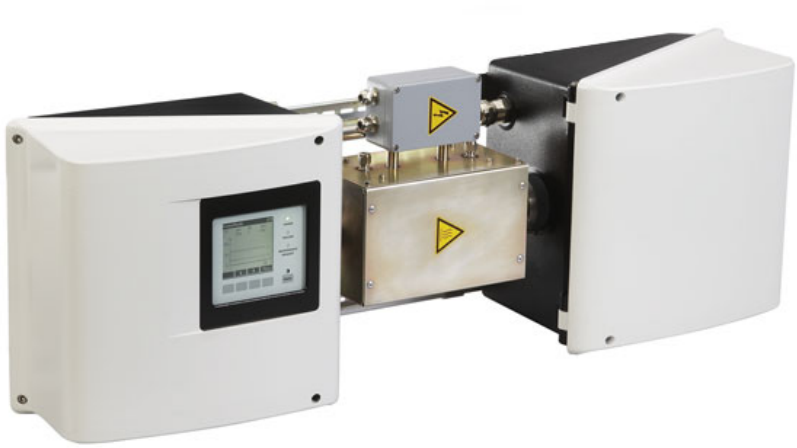
Technical Information
MCS300P

Multicomponent Analyzer System



Endress+Hauser
People for Process Automation

Described product
Product name: MCS300P Multicomponent Analyzer System

Manufacturer
Endress+Hauser SICK GmbH+Co. KG
Bergener Ring 27
01458 Ottendorf-Okrilla
Germany

Legal information

Original document
This document is an original document of Endress+Hauser SICK GmbH+Co. KG.

Warning Symbols


Hazard (general)


Hazard by voltage


Hazard by explosive substances/mixtures


Hazard by corrosive substances


Hazard by toxic substances


Hazard by unhealthy substances


Hazard by high temperature or hot surface

Warning Levels / Signal Words

DANGER
Risk or hazardous situation which *will* result in severe personal injury or death.

WARNING
Risk or hazardous situation which *could* result in severe personal injury or death.

CAUTION
Hazard or unsafe practice which *could* result in less severe or minor injuries *and/or* property damage.

NOTICE
Hazard which *could* result in property damage.

Information Symbols


Important technical information for this device


Important information on electric or electronic functions


Supplementary information


Link to information at another place

MCS300P

1 Important Information

Main hazards
Main instructions for operation
Own responsibility

1.1 Validity

This Manual is valid for the MCS300P and MCS300P-Ex.
It is only valid in combination with the "Operating Instructions MCS300P" or "Operating Instructions MCS300P-Ex".

1.2 Responsibility of user

1.2.1 Designated users

This Technical Information is aimed at qualified persons familiar with the MCS300P and who, based on their device-specific training and knowledge of the device as well as knowledge of the relevant regulations, can assess the tasks given and recognize the dangers involved.

1.2.2 Special local conditions

Follow all local laws, regulations and company-internal operating directives applicable at the respective installation location of the equipment.

MCS300P

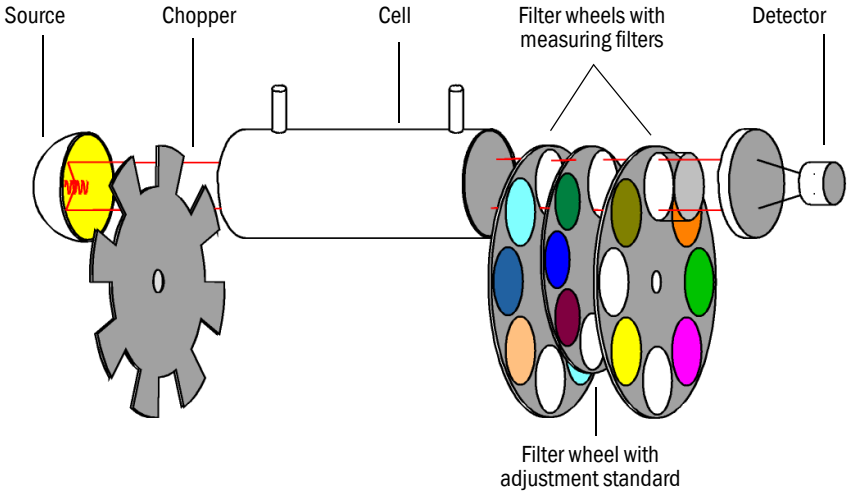
2 Product Description

Functional principle
Characteristics

2.1 **Functional principle**

MCS300P is a non-dispersive process photometer.

Fig. 1 Beam path



- Depending on the device type, the radiation source used is an IR or VIS radiator.
- The measuring beam goes through the sample cell and is specifically absorbed depending on the sample gas composition.
- Interference and gas filters swiveled into the beam path on filter wheels select the measurement wavelength.
- The detector receives the successive measurement and reference radiation.
  - With the measuring filter swiveled in, the signal depends on the sample gas composition.
  - With the reference filter swiveled in, a concentration-independent signal is generated.

  By computation of both signals, the MCS300P determines the measured variable "absorption" which is then, to a wide extent, independent from the changes of the optical characteristics of the photometer.
  After correction of possible disturbance variables, the determined absorption is converted to the concentration value via the linearization function.
- As an option, a filter wheel with an internal adjustment standard is available which simulates a test with a test medium.

2.2 SOPAS ET (PC program)

SOPAS ET can be used to set the MCS300P parameters and provides access to the MCS300P logbook.

SOPAS ET runs on an external PC connected via the Ethernet interface to the MCS300P (→ MCS300P Operating Instructions).

2.2.1 Modbus-TCP

Modbus® is a communication standard for digital controls to connect a »Master« device with several »Slave« devices. The Modbus protocol defines the communication commands only but not their electronic transfer; therefore it can be used with different digital interfaces (for MCS300P: Ethernet).

Configuration: → p. 30, § 3.5.3.3

2.2.2 OPC (option)

OPC is a standardized software interface that allows to exchange data between different applications.

The Endress+Hauser OPC server (part of SOPAS ET) is required.

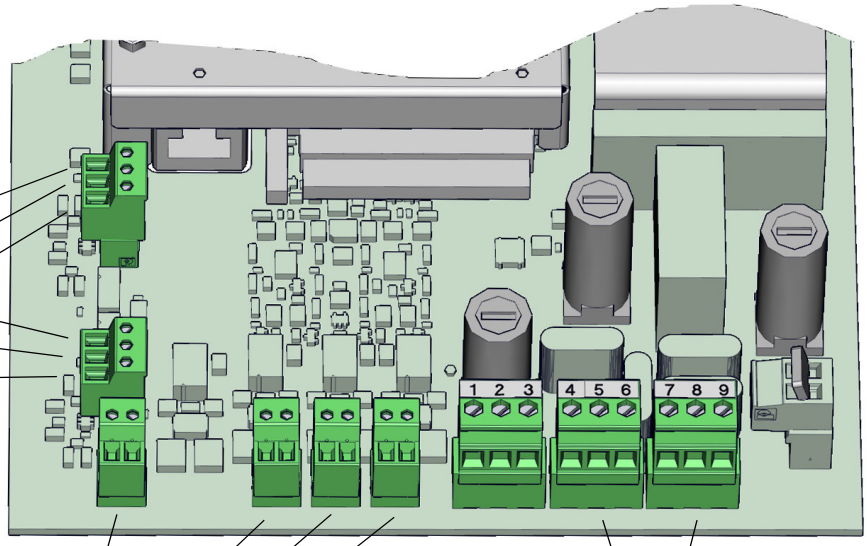
System bus: Ethernet.

Configuration: → p. 30, § 3.5.3.3

2.3 Circuit board

Electrical connections on the circuit board in the sender unit

Fig. 2 Electrical connections in the sender unit



CAN	Line
CAN1 (internal)	ISOGND
	LOW
	HIGH
CAN2 External I/O	ISOGND
	LOW
	HIGH

Pt100 Line: AWG26-15
Controller 2 limiter
Controller 1 limiter
Controller 2
Controller 1 (cell)

Heaters
Output voltage as mains voltage
Capacity: Max. 550 VA (per output)
Line: AWG24-12

Heater	Line	Pin
Heater 1 (cell)	L1	4
	N	5
	PE	6
Heater 2	L1	7
	N	8
	PE	9

MCS300P

3 Operation

Configuration
Advanced operation
Adjustments

3.1 SOPAS ET (Description)

SOPAS ET is on the CD-ROM enclosed with the MCS300P.

Operator menus and measured value displays are also available on an external PC via Ethernet for user comfort (with the engineering tool SOPAS ET).

SOPAS is an engineering tool for communication with analyzers and sensors.

SOPAS is based on the following techniques:

- Device communication via Ethernet (TCP/IP).
- A common engineering tool for the various product lines.
- Universal device description file as the data source for all relevant device data and parameters required for communication and display.

3.1.1 Changing the user level

In SOPAS ET

1 Click: *Authorized Operator* in the dialog window in SOPAS ET

2 Enter the password.

User level	Password
Authorized operator	HIDE[1]

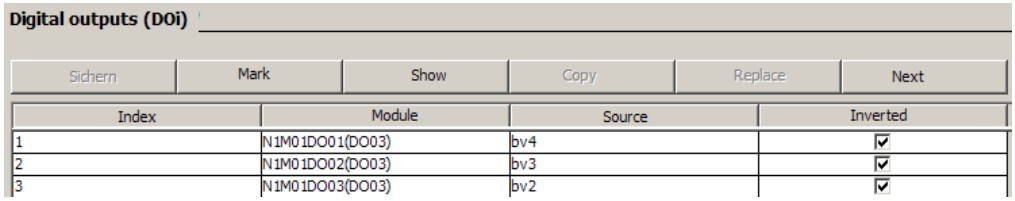
[1] Upper case mandatory

3.1.2 Grayed out fields - input not possible

Displays in *grayed out* fields cannot be changed.

3.1.3 Using menus with assignments and calculations

Example: *Menu: MCS300P/Parameterization/I/O/Data/Digital outputs*



Entry field	Significance
Save	Store current entries
Mark	Create group ► Click "Mark" and then click the desired lines. ► To cancel "Mark": Click "Mark" again and then click on an empty line.
Edit	For editable menus: Call up the Settings menu for the line ► Click the desired line. Then click "Edit".
Show	For non-editable menus: display settings for the line. ► Click the desired line. Then click "Show".
Copy	Copy marked lines
Replace	Insert copied lines before a marked line.
Next	Call up the "Next function group".

(The bottom lines of the example depend on the menu)

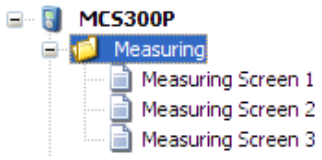
3.2 Menu tree (in SOPAS ET)

Menu	Reference
Measuring screen	→ p. 17, § 3.3
Measuring Screen xx	
Diagnosis	→ p. 20, § 3.4
Control values	→ p. 20, § 3.4.1
Zero drift	
Reference display	
Intensity	
Sensor values	→ p. 21, § 3.4.2
Temperatures	
Hardware	
Signals	→ p. 22, § 3.4.3
Measuring signals	
Digital signals	
Analog signals	
Real values	
Integer and filtered values	
Logbook	→ p. 23, § 3.4.4
System status	→ p. 24, § 3.4.5
System information	→ p. 24, § 3.4.6
Parameterization	→ p. 25, § 3.5
Measuring components	→ p. 25, § 3.5.1
Global definitions	
Definition measured value components	
Measuring component xx	
Measuring screen	→ p. 26, § 3.5.2
Measured value xx	
I/O	→ p. 29, § 3.5.3
Hardware map	
CAN Bus address 0..3 (N1 .. N2)	
Data	
OPC outputs (OPCOi)	
Modbus outputs (MBOi)	
Modbus inputs (MBIi)	
Digital inputs (DIi)	
Digital outputs (DOi)	
Analog inputs (AIi)	
Analog outputs (AOi)	
Variables and Functions	→ p. 32, § 3.5.4
Timer	
Stop watches (SWi)	
Cyclic trigger (CTi)	
Limit values (LIi)	
Real values (RVi)	
Real constants (RCi)	
Integer values (IVi)	
Boolean values (BVi)	
Filtered values (FVi)	
Formulas	→ p. 35, § 3.5.5
Temperature control	→ p. 35, § 3.5.6
Logbook	→ p. 35, § 3.5.7
Instrument display	→ p. 36, § 3.5.8
System parameter	→ p. 36, § 3.5.9
Modbus	→ p. 37, § 3.5.10
Adjustment	→ p. 38, § 3.6
Parameter	→ p. 38, § 3.6.1
Concentration	
Adjustment factors	

Menu	Reference
Start times	
Manual adjustment	→ p. 39, §3.6.2
Automatic adjustment	→ p. 39, §3.6.3
Maintenance	→ p. 40, §3.7
Tests	→ p. 40, §3.7.1
Digital inputs	
Digital outputs	
Analog inputs	
Analog outputs	
Operating states	→ p. 40, §3.7.2
Hardware Reset	→ p. 41, §3.7.3
Reset messages	→ p. 41, §3.7.4
Service log	→ p. 41, §3.7.5

3.3 Measuring Screen

Menu: Measuring



Only the Measuring Screens are shown for which parameters have been set.

► Double-click the desired Measuring Screen.

Parameter settings of Measuring Screens: → p. 26, § 3.5.2
Scaling of Measuring Screens: → p. 19, § 3.3.1.1

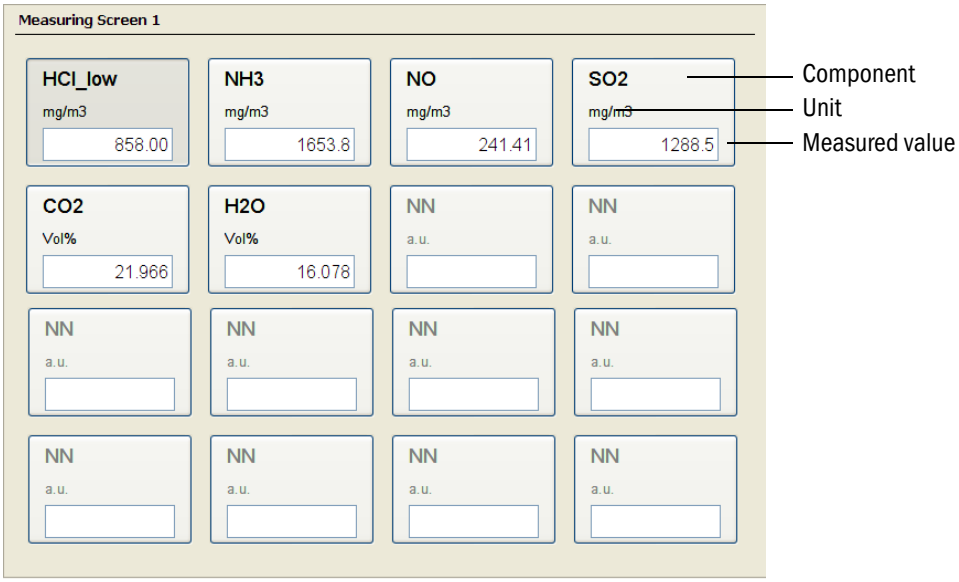
3.3.1 Measuring Screen 1 .. x

Menu: Measuring/Measuring Screen 1 .. x

Depending on the parameters set, the Measuring Screen is shown as measuring box, bar graph or line writer.

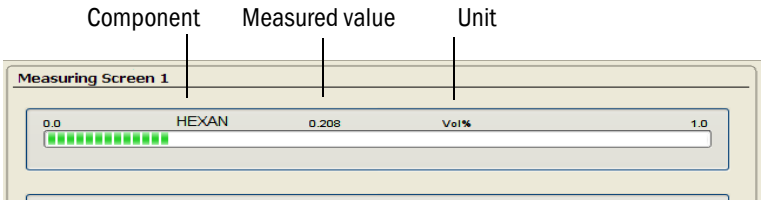
Measuring box

The measured values are shown numerically in the *measuring box*.



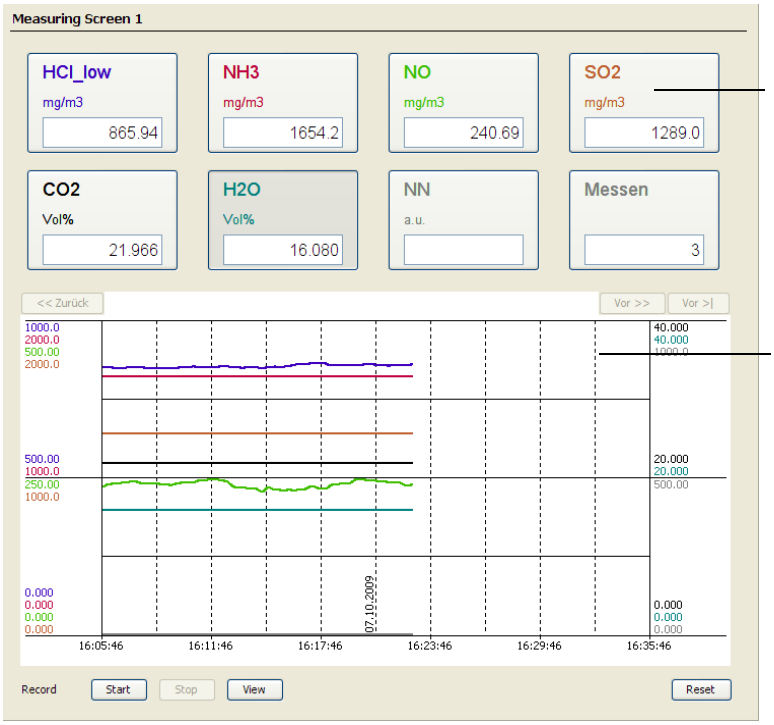
Bar graph

The measured values are shown as a graphic bar in the *bar graph*.



Line writer and data storage

The measured values are shown numerically as measuring box and as time diagram in the *line writer*.



Measuring box

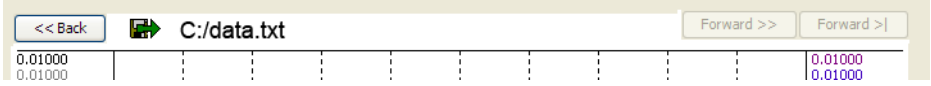
Line writer
The measured values that have been activated are shown (→ p. 19, § 3.3.1.1). The line writer starts with the representation only when the display is called up for the first time.

Changing the user level deletes the history of the line display.

Data memory functions

- Start:
  Start data storage.
  The data for which parameters have been set are saved (independent from the graphic representation) (→ p. 28, § 3.5.2.3).
  Max. 65536 entries per curve are saved in a file, afterwards a new file (with ascending index) is automatically created.
  - A dialog field to enter a target file (.txt) is displayed
    The following is shown above the line diagram:

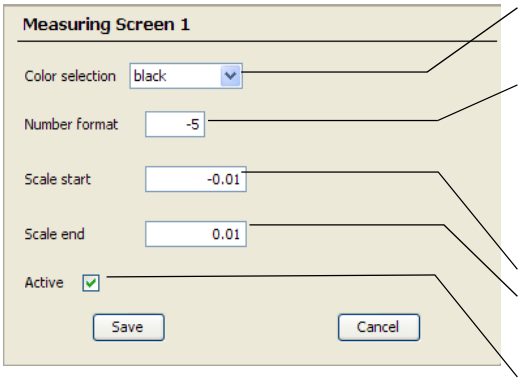
- Stop:
  Stop recording.
- View:
  View the recorded data.
  A dialog field to select the file with the saved values is shown.
  The following is then shown above the line diagram:



- Reset:
  Delete all shown lines (no effect on data storage).

3.3.1.1 Scaling the Measuring Screen

Touch the screen to display a scaling screen:



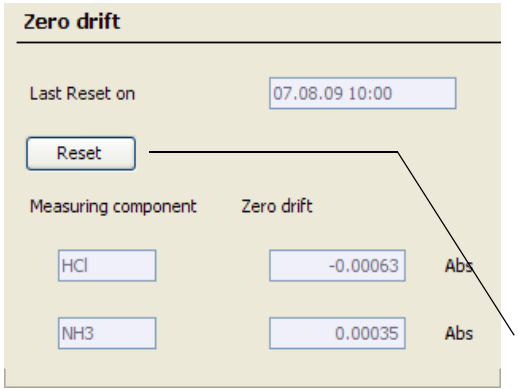
- Font color (The colors of the line writer are predefined)
- Precision of Measuring Screen
  Example:
  -2: 123.45
  -1: 1234.5
  0 : 12345
  1 : 123450
- Scale start value
- Scale end value
  (line diagram: for y-axis)
- Display of lines active / not active
  (for line writer)

3.4 Diagnosis

3.4.1 Control value

3.4.1.1 Zero drift

Menu: Diagnosis/Control values/Zero drift



The zero drift since the last "Reset" of the zero drift (e.g., during maintenance) is shown and reset in this menu.

The zero drift is recalculated during each zero adjustment and displayed in Absorption.

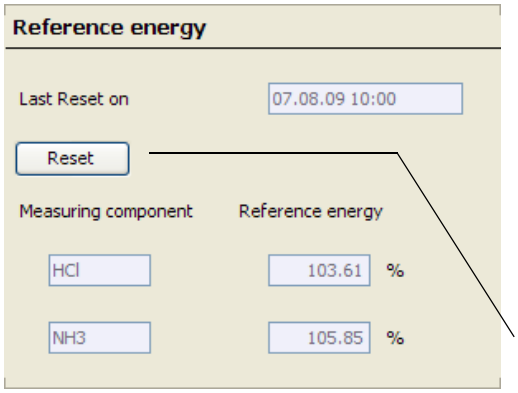
This value can be used for system diagnosis.

Typical cause: Decrease in lamp energy, contamination of cell windows.

► Reset the zero drift

3.4.1.2 Reference energy

Menu: Diagnosis/Control values/Reference energy



The current reference energy (in percent) is shown and reset in this menu.

This value is monitored automatically. If the value is below a limit value (default: 60%) , the MCS300P switches to the "Maintenance request" classification.

Typical cause: Contamination of the cell windows.

► Reset the reference energy

3.4.1.3 Intensity

Menu: Diagnosis/Control values/Intensity

The intensities (energies) and amplification levels of the measured components are shown in this menu.

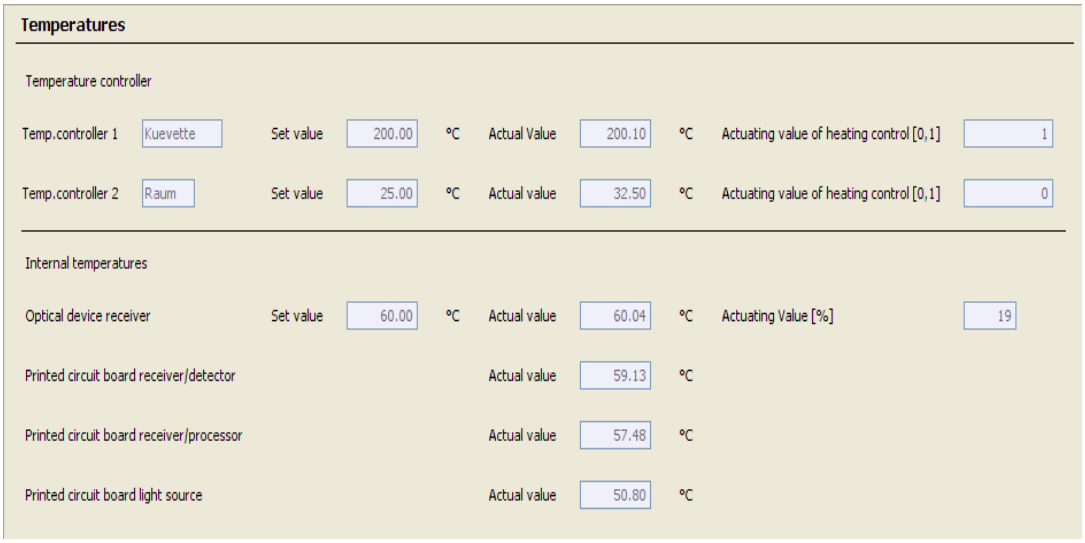
Leave the evaluation of this information to SICK Customer Service.

3.4.2 Sensor values

3.4.2.1 Temperatures

Menu: Diagnosis/Sensor values/Temperatures

Temperatures are shown in this menu.



3.4.2.2 Hardware

Menu: Diagnosis/Sensor values/Hardware

Operational parameters are shown in this menu.

Leave the evaluation of these parameters to SICK Customer Service.

3.4.3 Signals

3.4.3.1 Measuring signals

Menu: Diagnosis/Signals/Measuring signals

Measuring signals are shown in this menu.

Leave the evaluation of these signals to SICK Customer Service.

3.4.3.2 Digital signals

Parameter settings of the signals listed below: → p. 29, §3.5.3 and the following pages.

Menu: Diagnosis/Signals/Digital signals

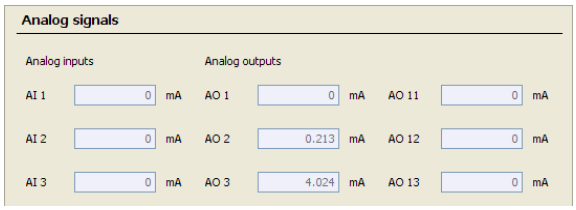
The current states of the digital signals (DIi, DOi, limit values) are shown in this menu.

Digital values:
. = off (0)
I = on (1)

For limit values:
. = within the limit value
I = outside the limit value

3.4.3.3 Analog signals

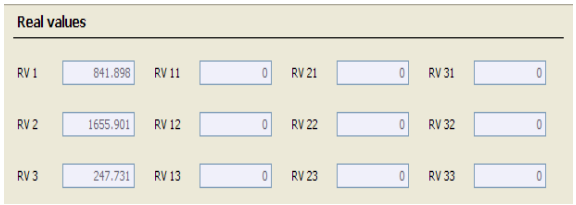
Menu: Diagnosis/Signals/Analog signals



The current values of the analog signals (AIi, AOi) are shown in this menu

3.4.3.4 Real values

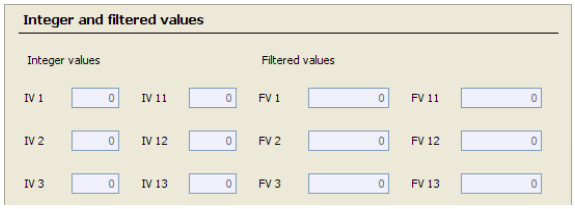
Menu: Diagnosis/Signals/Real values



The current real values (RVi) are shown in this menu.

3.4.3.5 Integer and filtered values

*Menu: Diagnosis/Signals/*Integer and filtered values



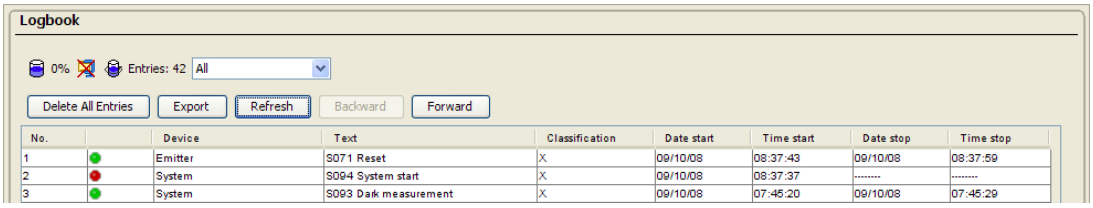
The current integer values (IVi) and filtered values (FVi) are shown in this menu.

3.4.4 Logbook

Menu: Diagnosis/Logbook

Max. number of entries: 6000.

(Representation: Uncompressed data storage)



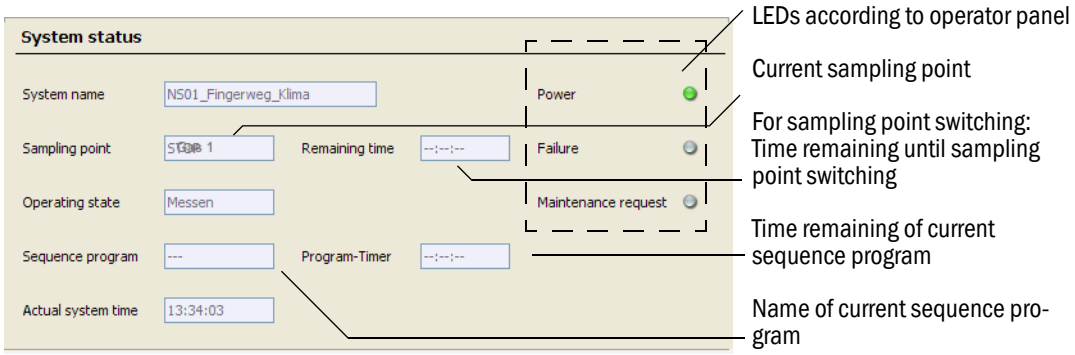
Designation	Remark
	Fill level of logbook in %. When the characters are *red*: The logbook is full. Warning mode: Further entries are not accepted. Circular buffer mode: Oldest entries are overwritten.
	Data storage: Symbol *not crossed out*: Compressed. Symbol *crossed out*: Uncompressed. Significance and default: → p. 35, § 3.5.7
	Circular buffer mode Warning mode Significance and default: → p. 35, § 3.5.7
Entries	Number of entries of selected filter.
Filter for messages	Only the filtered messages are shown. - Failure (active) - Failure (all) - Maintenance request (active) - Maintenance request (all) - Uncertain (active) - Uncertain (all) - Others (active) - Others (all) - All active messages - All messages
Delete all entries.	*Caution:* All logbook entries in the MCS300P are deleted.
Export	All entries selected via the filter (→ further back in this Table) are saved on the PC in *C:\My Documents* as *.log* file. Format: CSV (comma-separated list). Can be read in EXCEL, for example.
Refresh	To refresh the display: Click.
Up	Scroll to older entries
Down	Scroll to newer entries
	Consecutive message number. *Red* LED: Message still pending. *Green* LED: Message no longer pending.
Device	Activating element: System, measured value identifier (sample gas component), subassembly, Evaluation module
Entries[1]	Number of times errors have occurred. Significance and default value: (→ p. 35, § 3.5.7)
Text	Logbook message (error messages → Operating Instructions MCS300P).

Designation	Remark
Classification	F = Failure M = Maintenance request C = Check U = Uncertain X = Extended message
Date Start	Format: yy-mm-dd For "*Uncompressed*": Occurrence of message. For "*Compressed*": Last occurrence of message.
Time Start	Format: hh:mm:ss For "*Uncompressed*": Occurrence of message. For "*Compressed*": Last occurrence of message.
Date stop	Format: yy-mm-dd For "*Uncompressed*": Clearing of message. For "*Compressed*": Last clearing of message.
Time stop	Format: hh:mm:ss For "*Uncompressed*": Clearing of message. For "*Compressed*": Last clearing of message.

[1]Only for compressed data storage

3.4.5 System status

Menu: Diagnosis/System status



3.4.6 System information

Menu: Diagnosis/System information

System information (e.g.: Serial number, software version, cell length, window material) is shown in this menu.

3.5 Parameterization

3.5.1 Measuring components

3.5.1.1 Global definitions

Menu: Parameterization/Measuring components/Global definitions

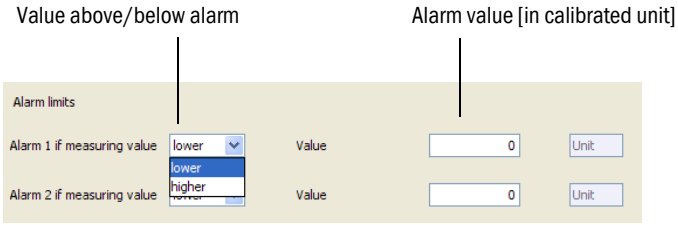
Global system information (e.g.: number of filter wheels, number of activated components) is shown in this menu.

3.5.1.2 Definition measuring components

Menu: Parameterization/Measuring components/Definition measuring components

The setting of the individual measuring components is shown in this menu.

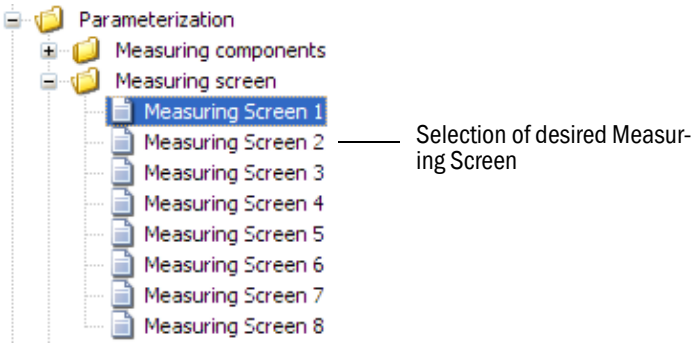
The following settings can be changed:



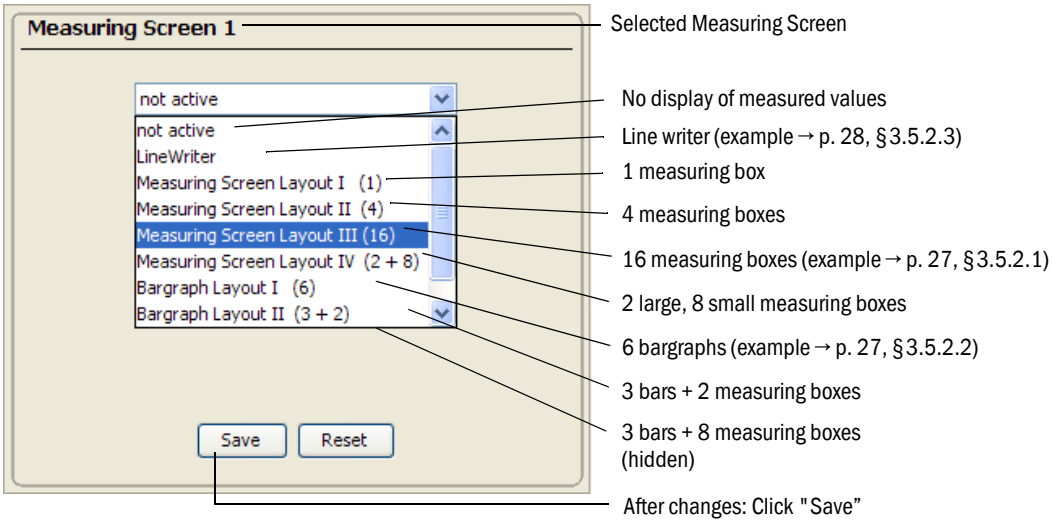
3.5.2 Measuring screen

Menu: Parameterization/Measuring screen

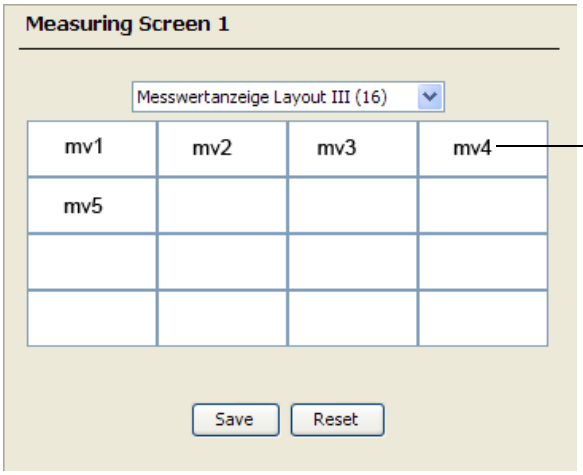
8 Measuring Screens can be parameterized and displayed:



Double-click a Measuring Screen to open the screen to set the parameters for the Measuring Screen.



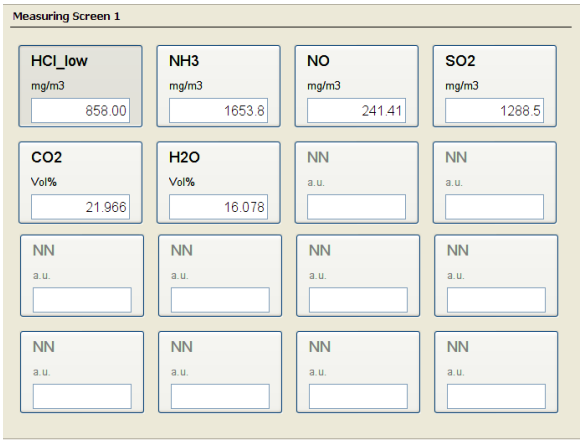
3.5.2.1 Measuring box



Example: Measuring Screen 1 with Layout III (16 measuring boxes)

► Enter the desired identifiers (tags).
Tags MCS300P: → p. 42, §3.8

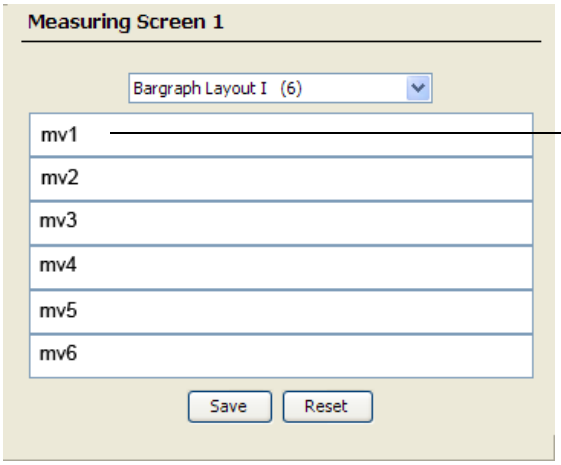
Scaling of measuring box: → p. 19, §3.3.1.1



The Measuring Screen then has the following appearance:

The component names and units come, for example, from the factory settings (e.g., RVi), from a filter source (e.g., FVi) or from the analyzer.

3.5.2.2 Bargraph

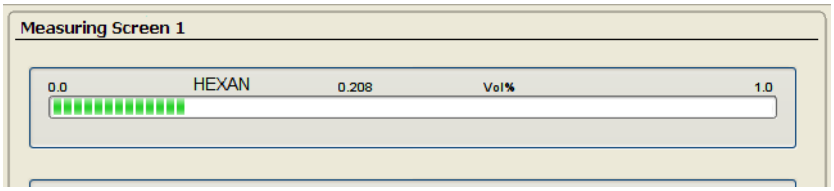


Example: Measuring Screen 1 with bargraph I (6 bars)

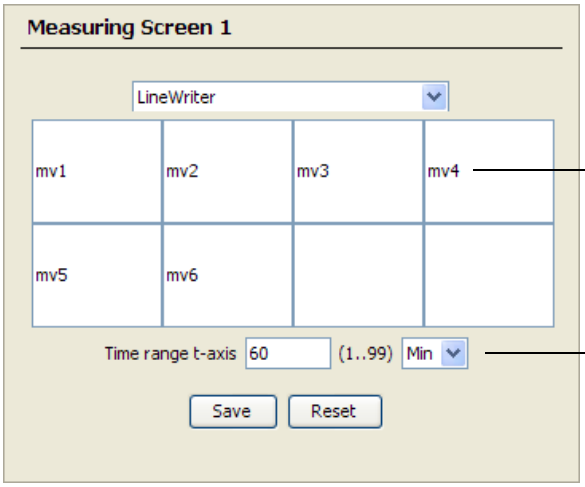
► Enter the desired identifiers (tags).

Scaling of measuring box: → p. 19, §3.3.1.1

The Measuring Screen then has the following appearance:



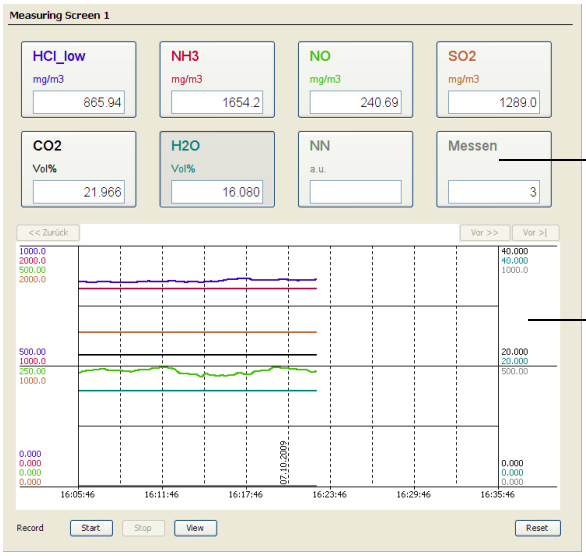
3.5.2.3 Line writer



► Enter the desired identifiers (tags).

Scaling of measuring box: → p. 19, § 3.3.1.1

► Scaling of time axis
[Sec, Min or Hour]
Scaling of y-axis: → p. 19, § 3.3.1.1



The Measuring Screen then has the following appearance:

Measuring box

Line writer

3.5.3 I/O

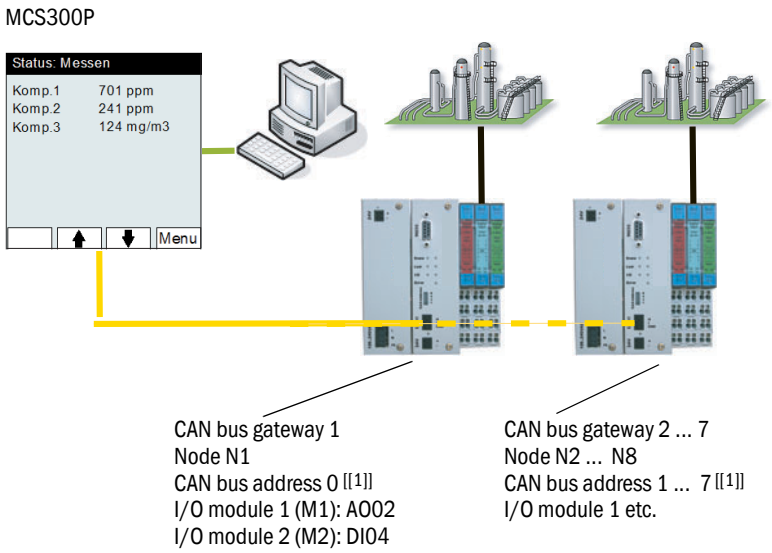
Menu: Parameterization/I/O

This menu displays the data interfaces.

Refer to the System Documentation delivered with your MCS300P for the hardware installed.

3.5.3.1 Addressing system

Fig. 3 MCS300P topography



Topography				Addressing in MCS300P	
Node	CAN bus address[1]	I/O module	I/O module type[2]	Topographical addressing	Functional addressing
N1	0	1	AO02	N1M1AO1(AO02) N1M1AO2(AO02)	AO1 AO2
		2	DI04	N1M2DI1(DI04) N1M2DI2(DI04) N1M2DI3(DI04) N1M2DI4(DI04)	DI1 DI2 DI3 DI4
N2	1	1	AO02	N2M1AO1(AO02)	AO3
...	...	...	...	...	...
N8	7	...	...	...	...

[1]Set with the address switch on the CAN bus gateway (→ Operating Instructions "Modular System I/O)"

[2]As example

Abbreviation	Significance
Nx	Node (N) = CAN bus gateway.
Mx	I/O module (M).
DIx, DOx, AIx, AOx	Digital and analog inputs/outputs.
(DIxy), (DOxy), (AIxy), (AOxy), (DI04ISO), (FDxy)	I/O module type

3.5.3.2 **Hardware map**

Menu: Parameterization/I/O/Hardware map.

CAN bus address x

Display of existing I/O modules in selected CAN bus gateway.

> The sequence of the modules shown must match the sequence of the modules plugged in (starting at the gateway).

Designation	Remark
Index	Consecutive number of module
Plugged in	Checkmark: Module is plugged in.
Type	I/O module type

3.5.3.3 **Data**

Menu: Parameterization/I/O/Data.

OPC outputs (OPCOi)

Menu: MCS300P/Parameterization/I/O/Data/OPC outputs

This menu assigns data from the MCS300P to the OPC output values.

Designation	Remark
Index	Consecutive number of OPC output value.
Source	Tag.

Modbus outputs (MBOi)

Menu: MCS300P/Parameterization/I/O/Data/Modbus outputs

This menu assigns data from the MCS300P. to the Modbus output values.

Designation	Remark
Index	Consecutive number of Modbus output value.
Source	Tag.

Modbus inputs (MBIi)

Menu: MCS300P/Parameterization/I/O/Data/Modbus inputs

This menu serves to assign names to the tags of the Modbus inputs.

Designation	Remark
Index	Consecutive number of Modbus input.
Name	Freely selectable.

Digital inputs (DIi)

Menu: MCS300P/Parameterization/I/O/Data/Digital inputs

This menu displays the digital inputs.

Designation	Remark
Index	Consecutive number of digital input (DI1, DI2, ...).
Module	Topographical addressing (→ p. 29). Generated automatically.
Name	Set fixed.
Inverted	Checkmark: Read in inverted.

Digital outputs (DOi)

Menu: MCS300P/Parameterization/I/O/Data/Digital outputs

This menu displays the digital outputs.

Designation	Remark
Index	Consecutive number of digital output (DO1, DO2, ...).
Module	Topographical addressing (→ p. 29). Generated automatically.
Source	Tag.
Inverted	Checkmark: Output inverted.

Analog inputs (AIi)

Menu: MCS300P/Parameterization/I/O/Data/Analog inputs

This menu serves to configure the analog inputs.

Designation	Remark
Index	Consecutive number of analog input (AI1, AI2, ...).
Module	Topographical addressing (→ p. 29). Generated automatically.
Name	Freely selectable.
Unit	Unit of variable read in.
Zero	Select from input screen.
MR start	Enter scaling for the connected analog signal.
MR end	

Analog outputs (AOi)

Menu: MCS300P/Parameterization/I/O/Data/Analog outputs

This menu serves to configure the analog outputs.

Designation	Remark
Index	Consecutive number of analog output (AO1, AO2, ...).
Module	Topographical addressing (→ p. 29). Generated automatically.
Source	Tag.
Live Zero	Select from input screen.
Progr. behavior	Internal use.
MR start/end 1/2	Scales analog outputs of measuring range 1 or 2.
MR 1/2 active	Checkmark: Measuring range 1 or 2 active.
	Both checkmarks set: Automatic measuring range switch-over. Hysteresis: 10 %.

3.5.4 Variables and Functions

Menu: Parameterization/Variables and Functions

The current values (results) of the variables and function serve controlling the system:
- Formula editor → p. 35, §3.5.5.
- Measuring Screen (configuration → p. 26, §3.5.2).

3.5.4.1 Timer

Menu: MCS300P/Parameterization/Variables and Functions/Timer

Stop watches (SWi)

Menu: MCS300P/Parameterization/Variables and Functions/Timer/Stop watch

Displays the configured stop watches (counts seconds ascending starting at 0).

Designation	Remark
Index	Consecutive number of stop watch (SW01, SW02, ...).
Name	Set fixed.

3.5.4.2 Cyclic trigger (CTi)

Menu: MCS300P/Parameterization/Variables and Functions/Timer/Cyclic trigger

Cyclic triggers (CTi) start system program periodically.

Control option	Remark
x=CTi	Shows the remaining time for an active CTi. Result is 0 when the CTi is inactive.
!+CTi	Starts the CTi immediately. Cycle and next start time remain unchanged.

Designation	Remark
Index	Consecutive number of cyclic trigger (CT01, CT02, ...) .
Name	Freely selectable.
Active	Checkmark: Trigger active.
Cycle	Frequency; Specification in multiple of minutes, hours, days or weeks.
Unit	Minutes, hours, days, weeks.
1st start	Time and date for first start time. Current date used when missing. *Recommendation*: To control the entries made, it is recommended to run "Upload all parameters from device" after completing configuration (*Menu: MCS300P/Upload all parameters from device*) The completed specifications then appear.
Switch-On Period [s]	Duration during which the CTi is active.

Limit values (LIi)

Menu: MCS300P/Parameterization/Variables and Functions/Limit values

This menu shows the configured limit values.

Designation	Remark
Index	Consecutive number of the limit value (LI01, LI02, ...).
Source	Tag.
Threshold	Threshold.
Hysteresis	Hysteresis [threshold unit].
Filter type	Underflow/overflow.

Real values (RVi)

Menu: MCS300P/Parameterization/Variables and Functions/Real Values

This menu shows the configured real values.

Designation	Remark
Index	Consecutive number of the floating point number (RV01, RV02, ...).
Name	Value name. Set fixed.
Unit	Unit. Set fixed.
Start value	Start value after MCS300P start.

Real constants (RCi)

Menu: MCS300P/Parameterization/Variables and Functions/Real constants

This menu shows the configured real constants.

Designation	Remark
Index	Consecutive number of the floating point constant (RC01, RC02, ...).
Name	Name. Set fixed.
Unit	Unit. Set fixed.
Source	Tag.
Save Trigger	Tag.
Save Condition	Rising/falling edge triggers overwriting the *constant* by the *input signal*.

Integer values (IVi)

Menu: MCS300P/Parameterization/Variables and Functions/Integer values

This menu shows the configured integer values.

Designation	Remark
Index	Consecutive number of the integer value (IV01, IV02, ...).
Name	Name. Set fixed.
Start value	Start value after MCS300P start.

Boolean values (BVi)

Menu: MCS300P/Parameterization/Variables and Functions/Boolean values

This menu shows the configured Boolean values.

Designation	Remark
Index	Consecutive number of the Boolean value (BV01, BV02, ...).
Name	Name. Set fixed.
Start value	Checkmark: "True" = 1 (integer). No checkmark: "False" = 0 (integer).

Filtered values (FVi)

Menu: MCS300P/Parameterization/Variables and Functions/Filtered values

This menu shows the configured filtered values.

Designation	Remark
Index	Consecutive number of the filtered value (FV01, FV02, ...).
Source	Tag.
Filter Type	*Average*: Arithmetic mean. Suitable for noise-corrupted data without exceptional values. *Median*: Values are sorted according to size and the mean value is taken. Suitable for data that can contain exceptional values. *1st derivation* *2nd derivation*
Averaging Period	Unit: Seconds.
Interrupt. Source	Source of interruption (IS) from tags. Effective for "Average" and "Median": Filtering is suspended, the unfiltered signal is output.
IS inverted	Checkmark: Interruption source inverted.
IS holds	Checkmark: Hold the filter output for interruption source.

3.5.5 Formulas

Menu: Parameterization/Formulas

"Formulas" are programmable mathematic or logical functions for device control.

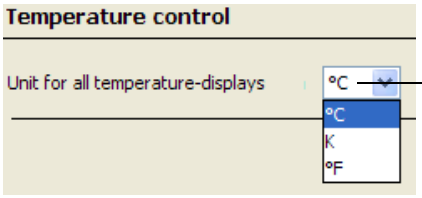
- Mathematical functions serve to compute internal values or values from external sources.
- Logical functions serve, for example, to link internal messages or messages from external sources, or to control functions or sequences.

Leave modification of these formulas to SICK Customer Service.

3.5.6 Temperature control

Menu: Parameterization/Temperature control

Actual temperatures and their default settings are displayed in this menu.



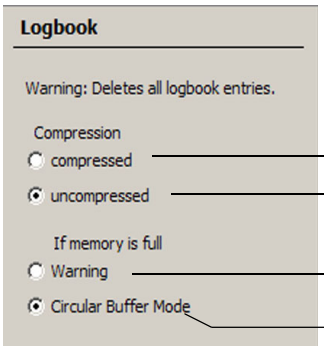
Adjustable: Temperature display unit [°C, K, °F]

3.5.7 Logbook

Menu: Parameterization/Logbook

This menu serves to set the logbook parameters.

All entries are deleted when the setting is changed.



When an error occurs:
- An error counter is incremented.
- The error message is saved.

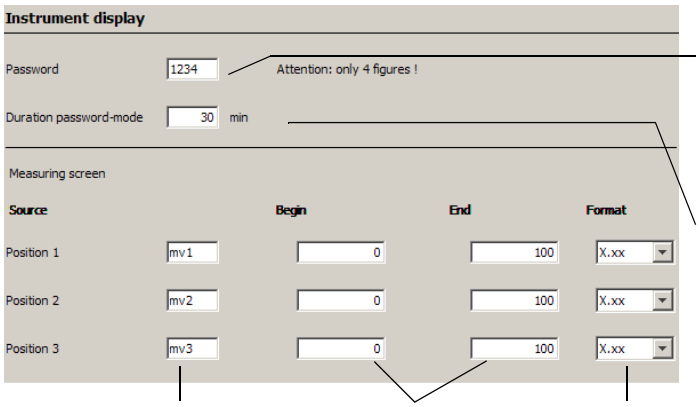
When the logbook buffer is full:
- The message "Logbook error" is output and no further entries are saved.
- The oldest entries are overwritten with the current entries. *No* relevant message is displayed.

3.5.8 Instrument display

Menu: Parameterization/Instrument display

This menu serves to configure the device display:

- Measuring Screen.
- Password for the operator panel on the device.
- ► If parameters have been changed and if the Measuring Screen is currently being displayed on the device: The display on the device must be refreshed so that the changes are shown on the device display.
  a) Press the menu-dependent button "Menu" on the device
  b) Press "MEAS"



► Password, with 4 digits.
(Note: Password will first be saved after a hardware reset (→ p. 41, §3.7.3)

► Validity duration of the password-protected level.
(Note: First saved after a hardware reset (→ p. 41, §3.7.3)

► Configuration (Tags → p. 42, §3.8) of Measuring Screen.

► Start and end values for display range for bar and line diagrams.
Start value must be lower then the end value (no plausibility check during entry).

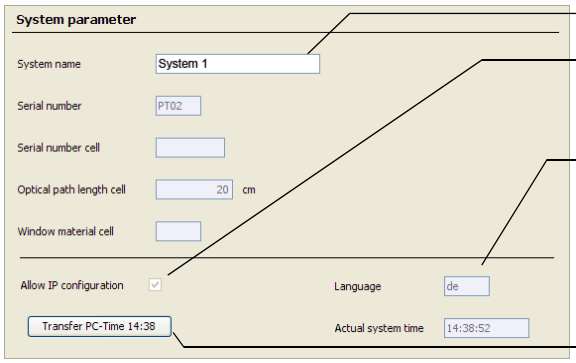
► Number format in display: Number of decimal places.

3.5.9 System parameter

Menu: Parameterization/System parameter

System parameters are shown in this menu.

Instrument name (name of the system) and time of the MCS300P can be set.



► Instrument name

I Allow IP-configuration
Checkmark: MCS300P IP configuration can be modified with SOPAS ET.

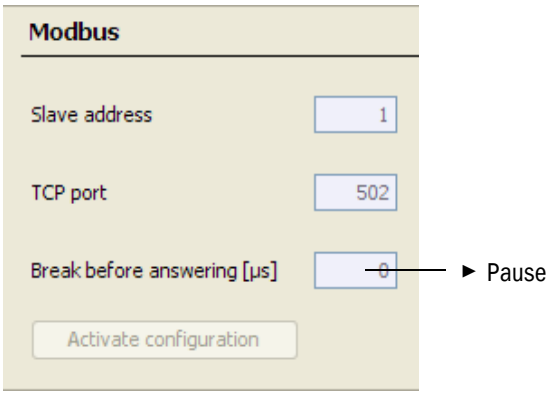
► Instrument language:
de = German, en = English
fr = French, es = Spanish
Save with *"Initialize"* (*menu: Maintenance/ Operating states* → p. 40, §3.7.2)

► Transfer the PC time to MCS300P

3.5.10 Modbus

Menu: Parameterization/Modbus

The parameters for Modbus communication are set in this menu.



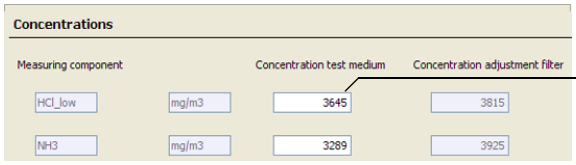
3.6 Adjustment

3.6.1 Parameter

3.6.1.1 Concentration

Menu: Adjustment/Parameterization/Concentration

Information concerning the test media are shown in this menu.



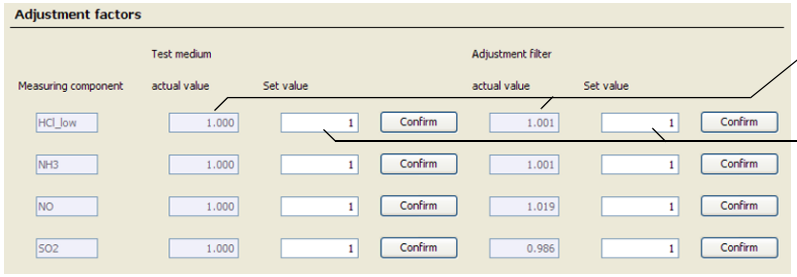
► Input of test medium concentration.

3.6.1.2 Adjustment factors

Menu: Adjustment/Parameterization/Adjustment factors

The adjustment factors (adjusting filter wheel optional) can be adjusted in this menu.

- The measured value is compensated with both adjustment factors.
- When the "test medium" factor is changed, the "Adjustment filter" is automatically set to "1.000".

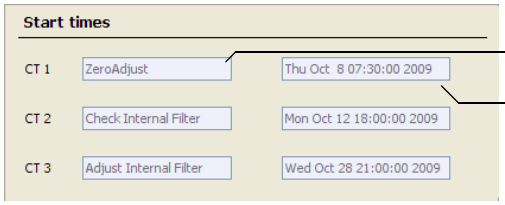


- Display: Actual factor
- ► Input: New factor
- ► Confirm: Save new factor

3.6.1.3 Start times

Menu: Adjustment/Parameterization/Start times

The start times of the "cyclic triggers" (CT1 .. CT16)" are shown in this menu.



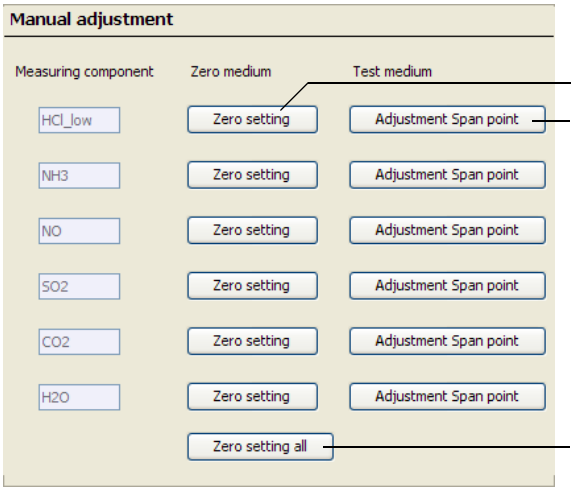
- Cyclic trigger name
- Next start time

Deactivation via operator panel or *Menu: Parameterization/Variables and Functions/ Cyclic trigger (CTi)*

3.6.2 Manual adjustment

Menu: Adjustment/Manual adjustment

Further information → "Operating Instructions MCS300P"

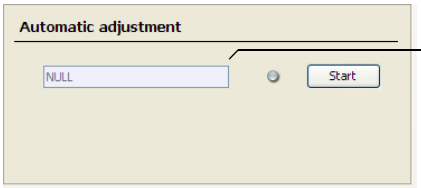


- ► The measured value is set to zero
- ► The measured value is set to the nominal concentration of the test medium
- ► The measured values of all components are set to zero

3.6.3 Automatic adjustment

Menu: Adjustment/Automatic adjustment

Further information → "Operating Instructions MCS300P"



- ► Start of adjustment of the displayed program.

The available programs are system-specific → System Documentation.

3.7 Maintenance

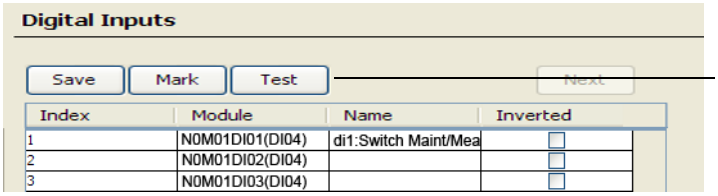
3.7.1 Tests

Menu: Maintenance/Tests

This menu serves to test the analog and digital interfaces.

- Digital inputs
- Digital outputs
- Analog inputs
- Analog outputs

Example: Digital inputs

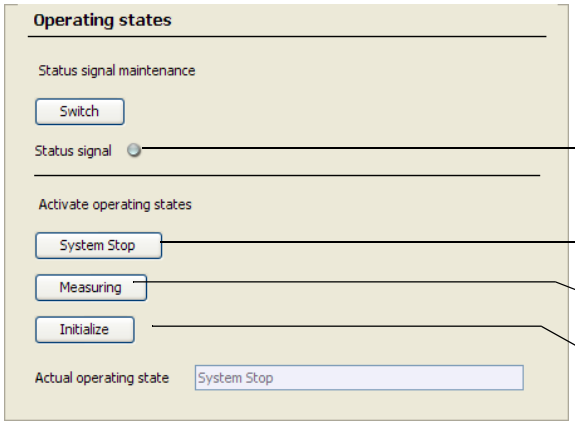


- ▶ Click (highlight) the desired interface and execute with "*Test*".
- The "*Save*" field has no significance.

3.7.2 Operating states

Menu: Maintenance/Operating state

This menu serves to switch on the operating states of the MCS300P.

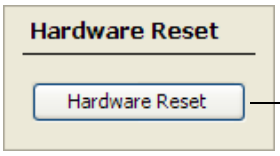


- LED goes on: Status signal "*Maintenance*" is switched on.
- ▶ System stop
- ▶ Switch to measuring operation.
- ▶ Switch to measuring operation (after changes in *menu: Parameterization/ Measuring component/...*)

3.7.3 Hardware reset

Menu: Maintenance/Hardware Reset

This menu starts a hardware reset (same effect as switching the main supply voltage off and on).



3.7.4 Reset messages

Menu: Maintenance/Reset messages

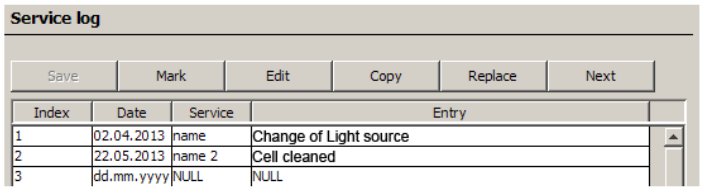
This menu resets all pending error messages.

LED "MAINTENANCE REQUEST" goes off.

3.7.5 Service log

Menu: Maintenance/Service log

This Table serves to enter maintenance work that has been carried out on the device.



3.8 Tags (identifiers)

Tags (identifiers) identify states and variables.

The following Table shows the tags relevant for Measuring Screens.

Tag	Description	R/W[1]	I/R/B[2]
Operating state			
S	Operating state of MCS300P	R/W 1 = Initialization 2 = Heating 3 = Measuring 4 = Manual 5 = System stop	I
Measured value			
MV_i (i=1..6)	Concentration (corrected by all factors) i at the sampling point currently active	R	R
MV_iCU (i=1..6)	Concentration (uncorrected) i at the sampling point currently active	R	R
MV_iAU (i=1..6)	Absorption (uncorrected) i at the sampling point currently active	R	R
MV_iAC (i=1..6)	Absorption (corrected after QE[3] correction) i at the sampling point currently active	R	R
Variables			
RV01..RV80	Floating point number	R	R
BV01..BV150	Boolean variable	R	B
FV01..FV20	Filter value	R	R
LV01..LV20	Limit value exceeded	R 0 = within limit value 1 = exceeds limit value	B
Input/output interfaces			
AO_i (i=01..20)	Output physical value (scaled)	R	R
AO_iO (i=01..20)	Direct value of current output 0..20 mA in mA	R	R
AO_iOR (i=01..20)	Current active display range	R 0 = Measuring range 1 1 = Measuring range 2	B
AI_i (i=01..48)	Read-in and converted physical value	R/W	R
AI_iI (i=01..48)	Direct value of current input 0..20 mA in mA	R/W	R
DO_i (i=01..128)	Activation signal for digital output before a possibly set inversion	R	B
DO_iO (i=01..128)	Direct relay state of switch signal output	R	B
DI_i (i=01..64)	Input signal after a possibly set inversion	R/W	B
Heating control			
HC_i (i=01..2)	Actual value (temperature) of internal heating control i	R	R
HC_iA (i=01..2)	Control variable of internal heating control i	R 0 = do not heat 1 = heat	B

[1] R = Read, W = Write

[2] I = Integer value, R = Real value, B = Boolean value

[3] QE= Cross-sensitivity

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