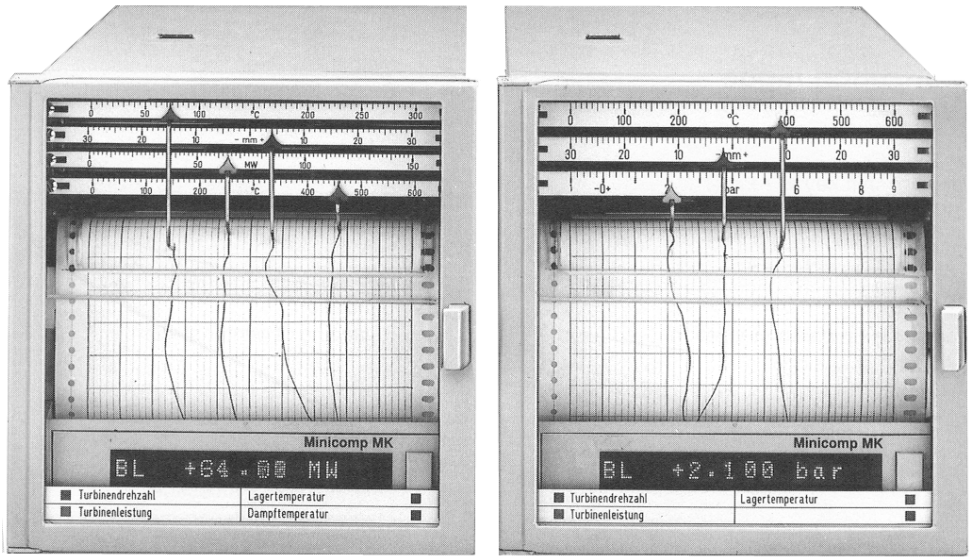
Parameterization instructions

42/43-21 EN

Minicomp MK

Continuous-line recorder with 1...4 measuring channels



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1 Introduction

The recorder Minicomp MK is equipped with a user-friendly operating panel.
Operation is through 8 keys with 2-level assignment and display is via a 16-digit dot matrix display for clear text display.

Note:

Key entries are denoted by	<	> brackets
Display outputs by	{	} brackets
Printouts of the printer channel by	[	] brackets

The full range of parameters is given.
The number of parameters which the recorder offers up for change will depend on the selected recorder version. The recorder recognises the hardware it is provided with. For instance, parameters concerning the printer channel will only be displayed if the unit features a printer channel.

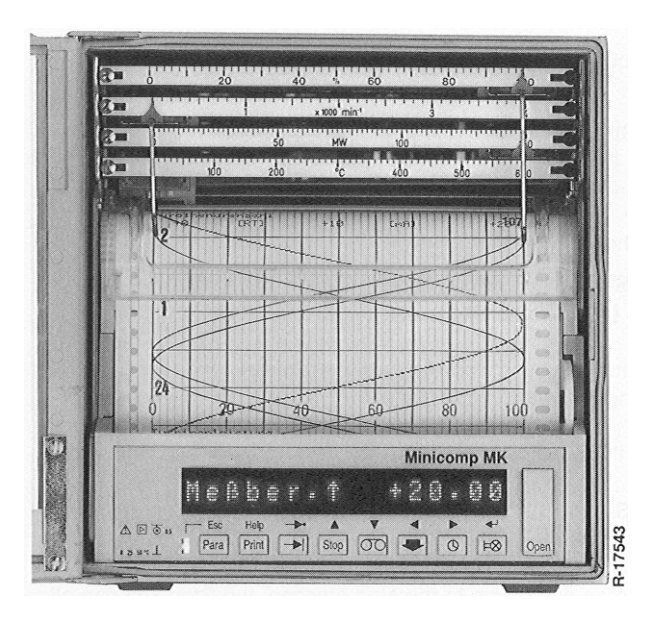


Fig. 1 Minicomp MK with operator keyboard

2 Keyboard

Operation and parameterization are via 8 keys on the operator panel. In operating mode the symbols on the keys apply, whereas in parameterization mode the symbols above the keys apply.

The 8 keys are assigned the following functions:

	Operating mode	**Parameterization mode**
1	**<Para>** Call up for parameterization	**<Esc>** Termination of parameterization or return to the higher level menu
2	**<Print>** Printout of channel designation measured value, units, time	**<Help>** Context-specific help text for the relevant parameters
3	<→| > Switching of channel for display. On standby for measured value display	<↔ • > Movement of decimal point one place to the right
4	**<Stop>** Recording stop or standby (can be activated/deactivated in the parameter definition mode)	< ↑ > Adjustment of number Menu item "Selection"
5	<○—○> Rewind stop	< ↓ > Adjustment of number Menu item "Selection"
6	<◆> Chart time lines setting (Rapid chart speed)	< ← > Editing function, cursor left
7	<⏱> Display of date and time	< → > Editing function, cursor right
8	<|=⊗ Error message acknowledgement	< ↵ > Parameter selection, parameter entry menu item selection

3 Display

Data is displayed by means of a green 16-digit dot matrix display.

Parameterization mode is indicated by a red LED. This LED lights up whilst parameterization is in progress and denotes that the 2nd level keyboard (symbols above the keys) is operative.

4 Key Functions in the Operating Mode

4.1 Displays in operating mode

The measured values for the channels are displayed in operating mode, e.g.,

{BL 253.5 C}

In the event of measuring range overshooting the display is:
e.g. **{BL ↑ }**

In the event of measuring range undershooting the display is:
e.g. **{BL ↓ }**

In the event of sensor break:
e.g., **{BL* }**

4.2 The key <→|>

The active channels are switched cyclically using the <→|> key.

{BL 253.5 C}
< →| >
{RT 22.34 l/min}
The following is displayed in standby:
{Standby}

On pressing the key < →| >, the current measured value of the blue channel is displayed. If the key < →| > is pressed again, the current measured value of the red channel is displayed etc. After 5 s, the display is reset to **{Standby}**.

4.3 The key <Print>

If a printer channel is available, printout of the active channels is in ascending order

<Print>
[BL 253.5 C 11:33 am]
[RT 22.34 l/min 11:34 am]
[GN 19.02 mA 11:34 am]

The display will show
{Printout active} for approx. 2 seconds to acknowledge that the key has been actuated.

If no printer channel is built in, the message

<Print>
{No print system}

is displayed for approx. 1 sec.

The display then reverts to standard operating mode.
e.g.,

{BL 253.5 C}

4.4 The key <Stop>

By holding the < **Stop** > key down for 2 seconds, the recorder switches to the function **"Recording stop"**, if this function has been enabled in parameterization mode.The take-up and chart speed motors are stopped, the servomechanisms go to the parking position:

Upper system	to 100 %
Middle upper system	to 80 %
Middle lower system	to 0 %
Lower system	to 20 %

Printer channel in position 50 % if available.
If in active printout mode, termination takes effect after printout of the current line is completed.

The unit displays

<Stop>
{Recording stop}

After actuating the key again the recorder reverts to nomal operating mode.

If this function is blocked, the unit displays the message:

<Stop>
{Key locked}

As an alternative to the stop function, the Stop key can also be parameterized with the standby function.
To this end, "History" must have been set to active in the main menu item "System data". Standby can be switched on and off by actuating the Stop key.

The following message appears on the display:

<Stop>
{Stdby}

4.5 The key <O‾O>

The take-up motor is stopped upon actuation of the key <O‾O>.

The paper which has been wound on so far can then be taken off and inspected.

{Take-up stop} appears on the display

If the <O‾O> key is actuated again, paper is wound on at a speed of approx. 20,000 mm/h.

4.6 The key <⬍>

This key is used for chart positioning. If the key is kept pressed, the chart speed increases from 2.5 mm/h to approx. 5000 mm/h in about 5 s. The chart speed commences again with 2.5 mm/h after releasing and repressing the key.

4.7 The key <🕒>

The date and time are displayed.

<🕒>
{06/11/91 10:34 am} US format
or
{11.06.91 10:34} European format

The time is displayed for as long as the key is pressed, then the recorder reverts to normal operating mode.

4.8 The key <I=⊗>

If an error message or alarm appears, this is acknoledged by pressing the <I=⊗> key.

All messages must be acknowledged before further key entries can be made.

4.9 Overranging/underranging of the measuring range

Display and recording are proportional within the range -0.25 %... 100.25 % with respect to the selected measuring range. If the measuring range overshoots or undershoots this proportional band, this operating state is signalled as follows:

Display
If a value lies more than 0.25% above or below the selected measuring range, the following is displayed for the affected channel (after a delay of approx. 2 seconds):

e.g., for the blue channel
{BL ↑ } for overranging
{BL ↓ } for underranging

The measured value is displayed as soon as it again falls within the permitted range after approx. 2 seconds.

Recording on paper
If a value lies more than 0.25 % above or below the slected measuring range, the measuring system will switch to approx. -1% or +101% of recording width. This transition is incremental with a delay of approx. 2 seconds.

5 Help text

A context-sensitive Help text can be called for the individual parameters by pressing the key Help. The text is displayed as a scrolling text on the display.

5.1 Help for channel parameters

The Help text for the channel parameter "type" shows the user the nominal measuring range for the input type selected (except where type = off). With the temperature input types (Pt 100, thermocouple), the range displayed is dependent on the chosen temperature unit (°C or °F). Display of the Help text can be aborted by pressing the <Esc> key.
Once the Help text has been scrolled through, the display reverts to the parameter which it displayed before the Help option was selected.

6 Notes on the function of the unit

6.1 Processing of the measured values

Measured value processing is as follows (for one channel, depending on parameterization):

1.) The measured value is related to the calibration value

2.) Thermocouple: reference junction temperature is entered for calculation

3.) The measured value is related to the nominal range

4.) Linearization

5.) The measured value is related to the span

6.) Low pass filter for filtering the measured value

7.) Square root extraction

8.) Inversion of the measured value

9.) The measured value is displayed

10.) Evaluation of the static alarm value

11.) Evaluation of the dynamic alarm value

12.) Transfer of the measured value to the servomechanism

13.) Control of the servomechanism

6.2 Behaviour upon changing the input type

The unit responds as follows to the setting of a new input type, measuring range or physical unit

a) Input type is changed

The measuring range is set to the nominal measuring range
The display range is set to the measuring range
The input limits for the measuring range = the nominal measuring range
The input limits for the display range are -1000...+9999.
The physical unit is set to the unit of the mesured signal. (e.g., type = 0 ... 10: unit="V")

The alarm values are set to the lower range value (for min. function) or upper range value (for max. function) of the display range. This setting is also made if the input type is not changed <see Sections b) and c)>.

If a thermocouple or Pt 100 is chosen as the input type, the menu items
– "User linearization"
– "Square root extraction"
– "Direction"
are reset. The temperature unit is switched to °C.

b) The measuring range is changed

The new measuring range data are activated. The display range is automatically changed if the input type is Pt 100 or thermocouple.
The display format (number of digits after the decimal point) for the digital display is reset.
The alarm values are checked for adherence to the new display range and set to the minimum or maximum value if the range is exceeded.

c) The display range is changed

The display format (number of digits after the decimal point) for the digital display is reset. The alarm values are checked for adherence to the new display range and set to the minimum or maximum value if the range is exceeded.

d) The temperature unit is changed

The measuring range and display range are reset to the nominal measuring range. The input limits are set according to the nominal measuring range. If the temperature unit was switched to °F, the input limits and measuring/display range are converted to °F (°F = 9.0/5.0 * °C + 32.0).

All the remaining procedures in a), b) and c) are executed.

6.3 Split range

Upon input of the measuring range the minimum span of 20 % is checked for undershooting. If the span is too low, the error message **({ "Span > 20 %"})** is displayed.

7 Parameterization mode

The parameterization mode is called up by actuation of the key **<Para>**.

The red LED lights up and indicates that the recorder is in parameterization mode. The symbols above the keys apply. Recording and alarm value monitoring are unaffected.

7.1 Edit and abort functions

7.1.1 The abort key < Esc >

The **< Esc >** key is a general abort function key.
It permits:
- abortion of the entry of a particular value
- reversion to the next highest menu
- termination of parameterization
- new values to be discarded.

7.1.2 The decimal point shift key < → • >

This key is used for editing. Actuation of the key causes the decimal point to move one place to the right.

{Display ↑ 20.00}
< → • >
{Display ↑ 200.0}
< → • >
{Display ↑ 2000.}
< → • >
{Display ↑ 0.200}

7.1.3 The Help key <Help>

The Help texts are appropriate to the particular context.

Assistance is offered to the operator depending on the parameter.

7.1.4 The Keys < ↑ > and < ↓ >

Effect on numbers and characters:

current numerals/characters are incremented and decremented

Effect on menu items:

Selection of the following or preceding menu item

7.1.5 The cursor keys < ← > and < → >

The < ← > and < → > keys move the cursor to the left or right to select the position at which editing is performed.

Example:

{Password 0000}

< ↵ >
{Password 0000} the last digit flashes
< ← >
{Password 0000} the chosen digit flashes

7.1.6 The entry key < ↵ >

Menu items, parameters and parameter values are selected and entered with the key < ↵ >.

7.2 General information on parameterization

7.2.1 Saving the parameter settings

The parameter settings can be saved upon exiting the parameterization mode.

The prompt: **{ Save data? }** appears
the new parameter data are discarded if the **< Esc >** key is actuated
the new parameter data are saved if the < ↵ > key is actuated.

The unit displays the message **{Saving data}** for approx. 2 seconds.

If the mains supply is interrupted during the saving time (approx. 2...4 s), the recorder is loaded with the factory-set parameters, with the channels switched to 0...20 mA. New and old parameter data are lost.

Factory setting: nominal range = measuring range = display range = 0...20 mA.

Servomechanism setting between 5 and 95%, alarm values off.

If the mains supply is interrupted during parameterization, the old parameter settings are retained.

7.2.2 Preparation for parameterization, password

By actuating the **< Para >** key the unit enters the parameterization mode without a password, if

a) the password is 0000

or

b) the plug-in jumper BR1 is on position 2-3 on the CPU card.

If none of these conditions are fulfilled, the password prompt appears as follows:

{Password ? 0000} (the last digit flashes)

The cursor position is changed with the < ← > and < → > keys and the numbers at the cursor position changed with the < ↑ > and < ↓ > keys.

Password entry is acknowledged with the **< ↵ >** key.

If the password is incorrect, the message

{Password incorrect!}

is flashed on the display. Since this is an error message, it has to be acknowledged with < I=⊗ > before the recorder display reverts the to operating mode.

If the number 9999 is entered as the password, the parameter settings of the unit may be viewed but not modified. The service menu and password are not displayed.

If a value between 0001 and 9999 is chosen as the password, the parameter setting may be viewed and changed provided that the correct password is entered.

The type of unit and software version installed is displayed for approx. 1 second before the password prompt appears. The display then switches to the password prompt.

7.2.3 Exiting parameterization mode

The parameterization mode is exited by actuating the key <Esc> in the main menu.

The following message is displayed:

{ Param. ended ? }

1) If the key < ↵ >
is actuated, the message
{Save data ?} appears

If the key < ↵ >
is actuated again, all changes of parameter settings are saved

If the key **< Esc >**
is actuated, the changes are not saved, except for the date and time data. These are accepted directly upon entry. The red LED is extinguished.

or

2) If the key **< Esc >**
is actuated, the display is reset to the main menu, to the last menu item selected.

8 Main menu

The following are displayed in the main menu

(This is the maximum selection. The menu changes according to the recorder model. If it is not equipped with the violet channel for instance, the menu item **{ channel violet ■ }** not in menu) is displayed.

{ **System data** ■ } Definition of drive & display parameters

< ↑ >

{ **Channel BLUE** ■ } Parameters of blue channel

< ↑ >

{ **Channel RED** ■ } Parameters of red channel

< ↑ >

{ **Channel GREEN** ■ } Parameters of green channel

< ↑ >

{ **Channel VIOLET** ■ } Parameters of violet channel

< ↑ >

{ **Text lines** ■ } Input of text lines

< ↑ >

{ **Print intervals** ■ } Time interval-controlled print functions

< ↑ >

{ **Synch. times** ■ } Time instant-controlled print functions

< ↑ >

{ **Communication** ■ } Setting of interface parameters

< ↑ >

{ **Assignment DI** ■ } Assignment of inputs to functions

< ↑ >

{ **Service** ■ } Tests and balancing

< ↑ >

{ **System data** ■ } Setting of interface parameters

..
..
..

The block symbol (■) at the end of the line indicates the main menu items.

8.1 Main menu "System data"

Access is gained to the system data by pressing the key < ↵ > . The following parameters are presented for selection:

{ **System parameter** ■ }

< ↵ >

{ **Chart speed 1 7200** } Standard chart speed with display of the speed set in mm/h

< ↑ >

{ **Chart speed 2 300** } Second chart speed with display of the speed set in mm/h

< ↑ >

{ **Chart speed clock off** } External clock input with setting of the paper feed per pulse

< ↑ >

{ **Time 11:33** }

< ↑ >

{ **Date 11.09.91** }

< ↑ >

{ **Language E** } Selection of language

< ↑ >

{ **Date Format EURO** } Time and date format

< ↑ >

{ **Display cycle 03** } Channel switching of displayed values of the active channels in seconds

< ↑ >

{ **Alarm ackn. AUTO** } Selection of alarm acknowledgement mode

< ↑ >

{ **Stop key on** } Function of stop key

< ↑ >

{ **Group alarm DO1** } Selection of group alarm output

< ↑ >

{ **Password 0000** } Entry of password

< ↑ >

{ **Print functions** ■ } Submenu for print functions

< ↑ >

{ **History** ■ } Submenu for history functions

8.1.1 Chart speed settings

The chart speed can be controlled both internally and externally. The option card has to be installed in the recorder both for external chart speed control and for external switching and switching off of the chart speed.

Internal chart speed control

The internal chart speed 1 and 2 are set independently of each other from the following list.
Chart speed setting 1 is the standard speed, chart speed 2 may be switched in via a selected binary input (precondition: the option card must be installed in the recorder).

Chart speed < mm/h >

0
2.5
5
10
20
30
40
60
120
240
300
600
1200
1800
3600
7200

Parameterization is carried out as follows:

{ Chart speed 1 7200 }

< ↵ >

The chart speed, the parameter value, then starts to flash.

The desired chart speed is then selected using the < ↑ > and < ↓ > keys.
The procedure may be aborted via **< Esc >**, the old chart speed value is retained.
The value is accepted with the < ↵ > key.

The second chart speed is set similarly.

External chart speed setting
With external chart speed control the paper transport is controlled through an external clock generator. The length of paper fed per feed pulse is set by the parameterization.
The pulse frequency at the input is maximum 80 Hz. The following step lengths can be selected:

Parameter:

{ speed pul. off }

Parameter value:

off	
0.025 mm	mm/pulse
0.05 mm	"
0.1 mm	"
0.2 mm	"

If the parameter "off" is selected, the internal chart speeds are used. If a value other than "off" is chosen, the unit is automatically switched to external chart feed control.
Internal feed settings then have no influence on paper transport.

Chart speed shut-off
If the parameter **"Speed pul."** has been set to "off" and the corresponding input is activated, the chart speed that is active will be shut off.

8.1.2 Time and date

Time
To set the time, the parameter is selected by means of the < ↵ > key.

< ↵ >

{ Time 11:33 } The last digit flashes

The cursor position is changed with the < → > and < ← > keys and the numbers at the cursor position changed with the < ↑ > and < ↓ > keys. The time set is accepted by pressing the < ↵ > key again.

Date
The date is set similarly to the time.

The time and date settings are saved immediately, whereas all other parameter data is saved only upon exiting the parameterization level.

The factory setting for time and date are 01.01.90, 00:00 hours.

8.1.3 Date format and language selection

Date format
EURO is selected if the European date format is required (e.g., 06.12.91) and similarly **US** for the American format (12/06/91). This setting holds for all time and date displays and printouts.

Language
The language options are **D** for German, **GB** for English and **F** for French. Once the desired language has been set, the menu items will be switched to that particular language.

8.1.4 Display cycle

The automatic display/switching of active channels in recording mode can be set in seconds intervals. The following are permitted as parameters:

Times

00	Switching to the next active channel is exclusively through the < →I > key	
01	corresponds to	1 second
. .	"	
10	"	10 seconds

8.1.5 Alarm acknowledgement

Acknowledgement of the alarm value signals can be effected in of 3 ways:

AUTO, MAN and off.

AUTO, MAN and off have the following meanings:

AUTO - The first alarm value is displayed and disappears if the alarm condition no longer exists. If alarms occur later they are displayed in chronological order.

MAN - The alarm value has to be acknowledged by hand through the <I=⊗ > key. If further alarm values are present these also have to be acknowledged.

off - No alarm value is displayed.

These settings are not effective for selftest alarms. Selftest alarms are always displayed and must be acknowledged.

8.1.6 The stop key

The function of the stop key is fixed in this parameter

Parameter:
{stop key on }

Parameter value:
off Stop key function disabled
stop Stop key function enabled

Standby
The Stop key can be parameterised with the standby function in the submenu "History". The parameter "Key" in the submenu History has a higher priority than the parameter "Stop key".

8.1.7 Group alarm

If any alarm value is violated, this information can be issued as a floating contact.

Parameter:
{ Group alarm D01 }

Parameter value:
off Group alarm switched off
DO1 Binary output 1
DO2 Binary output 2
DO3 Binary output 3
DO4 Binary output 4
DO5 Binary output 5
DO6 Binary output 6

8.1.8 Password setting

The password may be changed at the parameterization level to block access for unauthorized users. If the password is 0000 no password prompt appears. The password may be changed in the range 0000 to 9999.

8.1.9 Submenu Print functions

The following parameters can be called up in this submenu:

{ Print functions }

<↵>
{ Scal. print on } Double-line printout active, (text and scaling line for each channel)

<↑>
{ Scal. dist. 060 } Distance (mm) between 2 double lines

<↑>
{ Chart sp. print. on } Printout of chart speed date/time after changeover.

<↑>
{ AL text outp. on } Printout of text lines together with measured value in the event of alarm value infringement

<↑>
{ Message bl. 1 0049 } Printout of message block 1.

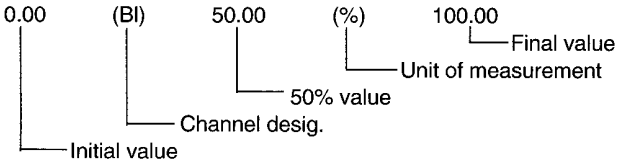
<↑>
{ Message bl. 2 0082 } Printout of message block 2.

<↑>
{ Message bl. 3 0148 } Printout of message block 3.

<↑>
{ Message bl. 4 0280 } Printout of message block 4.

Printout of double lines
A double line that is assigned to each measuring channel can be recorded. The first line of the double line is used as a scaling line.

The second line is a text line that can feature e.g. AKZ. No. etc. In the following parameter, the double line printout is switched on for all active channels. In the scaling line, scaling of the display range is used. The scaling line looks like this:



The texts of the second line of the double line are entered into the respective main menu items of the channels. In this parameter, printout of the double lines of all active channels is enabled.

Parameter:
{ Scal. print on }

Parameter value:
on; off

Distance between the double lines
The distance between the double lines of the channels is defined in this parameter.

Parameter:
{ Scal. dist. 60 }

Parameter value:
60...500 (in mm steps)

Chart speed printout
If the recorder is switched on or the chart speed is changed, a text line featuring the time, date and current speed is recorded. Printout of this line is activated in this parameter.

Parameter:
{ Chart sp. print. on }

Parameter value:
off; on

Text line printout in the event of alarm value infringement
Text lines can be assigned to alarm values. In the event of alarm value infringement, these lines together with the time are shown on the display and printed out. The current measured value can also be featured in the text line printout in this parameter.

Parameter:
{ AL text outp. on }

Parameter value:
off, on

If the parameter value has been set to "on", the line has e.g. the following layout:
[Text line > -23.00 mV 9:45]

Printout of message blocks
The various text lines, measured value lines and the date/time line can be combined as text blocks. Up to four text blocks can be formed. The text blocks are triggered via the binary inputs DI 1 ... DI 4.

Parameters:
{ Message bl. 1 0049 }
{ Message bl. 2 0082 }
{ Message bl. 3 0148 }
{ Message bl. 4 0000 }
Parameter value:
0 ... 8191

A code number has been assigned to each text line. The sum of the code numbers of the text lines combined as one text block must be entered as parameter value. Calculate the parameter value from the table given below.

Code number

0	No block formation
1	Blue channel measured value
2	Red channel measured value
4	Green channel measured value
8	Purple channel measured value
16	Date/time line
32	Text line 1
64	Text line 2
128	Text line 3
256	Text line 4
512	Text line 5
1024	Text line 6
2048	Text line 7
4096	Text line 8

8.1.10 Submenu History

The following parameters can be called in this submenu:

{ History }

<↵>
{ Mode STBY } Standby with/without history function

<↑>
{ Storage time 1h } Storage time with history function

<↑>
{ Input DI 1 } Input for standby triggering of history function.

<↑>
{ System pos. 0 } System stop for last measured value or scale start

<↑>
{ Alarm value 3 } No. of the alarm value for stop standby

<↑>
{ Key on } Triggering of standby with Stop key

<↑>
{ Chart speed on } Chart speed off or 1 mm/h for standby history function.

<↑>
{ Immediate start on }

Operating mode
Standby is activated in this parameter with or without the history function. The history function can only be implemented if a printer channel is available for the blue, red and green line channels. Standby can be switched on in three different ways:

1. By connecting a 24 V DC to a parameterised input (DI 1 ... DI4).
2. By actuating the Stop key, assuming that approprial parameters have been defined (parameter: "Key").
3. On switching on the recorder, assuming that appropriate parameters have been defined (parameter: "Immediate start").

Standby is quit:

In case 1. On alarm value infringement or on switching off the voltage at the parameterised input (DI 1 ... DI 4).

In case 2. On alarm value infringement or by pressing the Stop key.

In case 3. On alarm value infringement.

Measured value processing and alarm value monitoring are active during standby. The measuring systems are positioned at scale start. The chart speed is switched off or set to 1 mm/h.

Functional diagram of standby

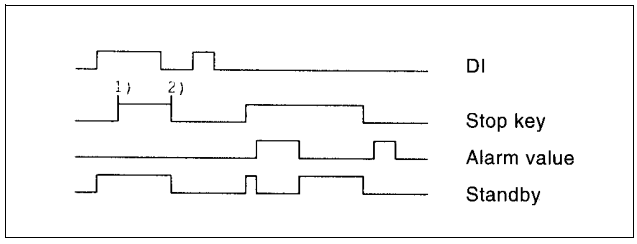


Fig. 2 1) First key actuation
2) Second key actuation

The sequences depicted in the functional diagram illustrate the interaction when the standby triggering facility is parameterised concurrently by a binary input and by the Stop key. The standby is switched on by connecting the voltage to the binary input. The "First key actuation" induces the Stop key to assume standby control.

On selecting the parameter value "MEMO", the recorder manifests a behaviour similar to that described above, with the measured values being written additionally into a FIFO memory. The memory contents are read at standby end and recorded with the maximum speed. Having recorded the memory contents, the recorder changes to the standard speed e.g. 20 mm/h. The recording start and standby end times are marked. The following are recorded at the beginning of recording operation:

1. **[MEMO: Date Time Date Time]**
2. **[V = 120 mm/h (1) t = 10 min.]**
3. **[Text line > -23.00 mV 9:45]**

The storage time employed by the recorder is printed as the storage time [t]. The max. value (see table) is printed if the storage time is entered incorrectly (value > than the speed selected is permitted) Line 3 is recorded only if the standby has been cancelled by alarm value infringement.

Parameter:
{Operating mode STBY}

Parameter value:
off
STBY
MEMO

Storage time
The storage time required is entered into this parameter. The maximum storage time possible is a function of the operational speed selected (operational speed = speed after standby). The following table features the maximum storage times for the corresponding speeds. Shorter storage times can be selected, with 1 minute being the shortest storage time that can be selected.

Speed (mm/h)	Storage time
2.5	2880 min = 48 h
5	1440 min = 24 h
10	720 min = 12 h
20	360 min = 6 h
30	240 min = 4 h
60	120 min = 2 h
120	60 min
240	30 min
300	24 min
600	12 min
1200	6 min
1800	4 min
3600	2 min

Parameter:
{Stor.time 30 min}

Parameter value:
1.....2880 Enter in steps of minutes

Binary input for triggering standby
This parameter is used for selecting the binary input for switching the recorder to standby.

Parameter:
{ Input DI 1 }

Parameter value:
off; DI 1; DI 2; DI 3; DI 4.

Position of the measuring system
The position of the measuring system during standby is selected in this parameter.

Parameter:
{ System pos. off }

Parameter value:
0 Measuring systems positioned at scale start
1 Measuring systems positioned at the last measured value that had been valid before standby was triggered.

Quitting standby
The parameters whose infringement results in standby being quit are selected in this parameter.

Parameter:
{ Alarm value 003}

Parameter value:
0...255

As parameter value, enter the code number of the alarm value that is supposed to cancel standby. Should standby be cancelled by several alarm values, calculate the sum of the code numbers from the table below and enter it as the parameter value.

1	Blue channel	Alarm value 1
2	Blue channel	Alarm value 2
4	Red channel	Alarm value 1
8	Red channel	Alarm value 2
16	Green channel	Alarm value 1
32	Green channel	Alarm value 2
64	Purple channel	Alarm value 1
128	Purple channel	Alarm value 2

Stop key function
The Stop key can be activated in this parameter in order to cancel standby.

Parameter:
{Key on}

Parameter value:
off; on

Chart speed during standby
In this parameter one can select whether the chart speed is to be switched off or set to 1 mm/h during standby.

Parameter:
{ Chart speed on }

Parameter value:
off; on (speed = 1 mm/h)

Standby after switching on the recorder
In this parameter one defines whether the recorder is to go to standby immediately after being switched on.

Parameter:
{ Immediate start on }

Parameter

off	Recorder goes to recording mode on being switched on
on	Recorder goes to standby on being switched on

8.2 Main menu "Channel parameters"

The channel parameters may be set individually and independently of each other for each channel.

The following parameters are offered:

{ Channel BLUE ■ }

< ↵ >		
	{ Type 4...20 mA }	Selection of input signal type
< ↑ >		
	{ Temp. unit C }	Setting of the physical units for Pt 100 and TC
< ↑ >		
	{ Ref. temp 0 C }	Reference junction temperature with TC
< ↑ >		
	{ Pt 100 connect. 2 W }	Selection of the type of connection for Pt 100
< ↑ >		
	{ Line resist. 10 Ω }	Setting of line resistance with Pt 100 2-wire
< ↑ >		
	{ RL measure ffff }	Measurement of line resistance with Pt 100 2-wire
< ↑ >		
	{ Sensor break [0 }	Selection of recording pen position with sensor break
< ↑ >		
	{ Meas. range ↓+4.000 }	Lower-range value
< ↑ >		
	{ Meas. range ↑+20.00 }	Upper-range value
< ↑ >		
	{ Display ↓+50.00 }	Readout range start
< ↑ >		
	{ Display ↑+300.0 }	Readout range end
< ↑ >		
	{ Rec. rang. ↓+00.00}	Recording range start
< ↑ >		
	{ Rec. rang. +100.0 }	Recording range end
< ↑ >		
	{ Decimals 0 }	Number of digits after the dec. point
< ↑ >		
	{ Scal. text }	Text line for scaling line
< ↑ >		
	{ Unit m³/h }	Physical unit
< ↑ >		
	{ Text units ????? }	Physical units freely parameterizable
< ↑ >		
	{ Filter time (< s >) 00 }	Filter time constant in seconds
< ↑ >		
	{ Direction 0 → 100 }	Direction of recording
< ↑ >		
	{ Sq. root extract off }	Square root extraction of the measured value
< ↑ >		
	{ System hold off }	System switch-off via binary input
< ↑ >		
	{ User linear. on }	Enabling of user linearization table
< ↑ >		
	{ Lin. Pt.x1 1000 }	1st coincidence point input value, per thousand
< ↑ >		
	{ Lin. Pt.y1 1000 }	1st coincidence point output value, per thousand
< ↑ >		
	{ Lin. Pt.x2 1000 }	2nd coincidence point input value, per thousand
< ↑ >		
	{ Lin. Pt.y2 1000 }	2nd coincidence point output value, per thousand
< ↑ >		
	{ Lin. Pt.x3 1000 }	3rd coincidence point input value, per thousand
< ↑ >		
	{ Lin. Pt.y3 1000 }	3rd coincidence point output value, per thousand
< ↑ >		
	{ Lin. Pt.x4 1000 }	4th coincidence point input value, per thousand
< ↑ >		
	{ Lin. Pt.y4 1000 }	4th coincidence point output value, per thousand
< ↑ >		
	{ Lin. Pt.x5 1000 }	5th coincidence point input value, per thousand
< ↑ >		
	{ Lin. Pt.y5 1000 }	5th coincidence point output value, per thousand

<↑>
{ Lin. Pt.x6 1000 } 6th coincidence point input value, per thousand

<↑>
{ Lin. Pt.y6 1000 } 6th coincidence point output value, per thousand

<↑>
{ Lin. Pt.x7 1000 } 7th coincidence point input value, per thousand

<↑>
{ Lin. Pt.y7 1000 } 7th coincidence point output value, per thousand

<↑>
{ Lin. Pt.x8 1000 } 8th coincidence point input value, per thousand

<↑>
{ Lin. Pt.y8 1000 } 8th coincidence point output value, per thousand

<↑>
{ Alarm values ■ } Submenu for alarm value settings

<↑>
{ Balance calculation ■ } Submenu for parameter input for balance calculatio

8.2.1 Signal types

The signal type for the particular channel is selected using this parameter.

{ Type off }
<↵>
{ Type off } The parameter value flashes after actuating the key <←>

The signal type is selected with the keys <↑> or <↓>. On selecting the signal type, the nominal measuring range is also selected. This measuring range is illustrated on a display range and a recording range.

The following table gives an overview of the signal types with their corresponding range limits. The range can be modified within these limits.

Signal type	Lower-range value	Upper-range value
off	—	—
4...20 mA	4.000	20.00
0...20 mA	0.000	20.00
0...10 V	0.000	10.00
± 2.5 mA	-2.500	+2.500
± 5 mA	-5.000	+5.000
± 20 mA	-20.00	+20.00
± 0...25 mV	0.000	+25.00
± 25 mV	-25.00	+25.00
± 100 mV	-100.0	+100.0
0 . . . 2.5 V	0.000	2.500
± 2.5 V	-2.500	+2.500
± 20 V	-20.00	+20.00
Pt100-I	-50.00	+150.0
Pt100-II	-200.0	+850.0
THERMO-B	0.000	+1820.
THERMO-E	-270.0	+1000.
THERMO-J	-210.0	+1200.
THERMO-K	-270.0	+1372.
THERMO-L	-200.0	+900.0
THERMO-R	-50.00	+1769.
THERMO-S	-50.00	+1769.
THERMO-T	-270.0	+400.0

The signal type selected and hence the respective nominal measuring range are accepted on actuating the Enter ↵ key. The display range is independent of the measuring range when measuring current and voltage.

If the physical unit is set to "°F" for temperature measurement with a Pt 100 or thermocouple, the permitted range limits are automatically changed.

The calculation is:

°F = 9/5 * °C + 32

8.2.2 Temperature units

Selection of the physical unit

Parameter:
{ Temp. unit C }

Parameter value:
°C
°F

The parameter is only displayed for temperature measurement ranges for direct connection to thermocouples or Pt 100 sensors. It enables selection of the temperature units (Celsius or Fahrenheit).

8.2.3 Reference junction compensation

{ Ref. temp. 0 °C }

The mode of reference junction compensation can be set at this point. The following parameter values are available:

0 °C – external compensation
20 °C – external compensation
50 °C – external compensation
60 °C – external compensation
70 °C – external compensation
int. – internal terminal temperature measuring point adopted.

8.2.4 Selection of Pt 100 2-wire or 3-wire circuit

Parameter:
{ Pt 100-connect. 2w }

Parameter value:
3w – 3-wire circuit
2w – 2-wire circuit

8.2.5 Selection of Pt 100 2-wire circuit

Various line resistances may be selected for the 2-wire Pt 100

Parameter:
{ Line resist. 10Ω }

The following parameters are permitted:

Parameter value:

10 Ω
20 Ω
40 Ω
int.

8.2.5.1 Measurement of the line resistance

If the parameter "internal" has been selected for "line resistance" then the line resistance can be measured after the Pt 100 has been short-circuited at the point of use.

Parameter:

{ RL-measurement 03d2 }

The measured value is displayed after pressing the < ↵ > key.

Parameter value:

{ RL = 1.15 Ω }

The measured value is accepted by pressing the < ↵ > key again.

8.2.6 Sensor break in Pt 100 and thermocouples

Parameter:

{ Sensor break ← 0 }

This menu item enables the direction in which the measuring system moves to be set in the event of sensor breaks with Pt 100 and thermocouples.

Parameter value

The following directions of movement can be selected:

← 0

The pointer moves to the 0 point if there is a sensor break

→ 100

The pointer moves to the end of the scale if there is a sensor break.

8.2.7 Measuring range

{ Meas. range ↓ –50.00 } Data in physical units

{ Meas. range ↑ +150.0 } Data in physical units

The span comprises "Meas. range ↓" and "Meas. range ↑". The lower-range value may lie between 0 and 80 % of the measuring range. The span can be a minimum of 20 % of the nominal range.

Example: with

{ Type 0...20 mA } Nominal range 0.. 20 mA

and setting

{ Meas. range ↓ +4.500 }

{ Meas. range ↑ +19.00 }

the measuring range is 4.5...19 mA (with corresponding restriction of accuracy).

8.2.8 Depiction of the measured values on the display

The chosen measuring range can be displayed digitally from -1000...+9999 for the measured value in physical units.

Example:
If used to display the liquid level, the input current of 10 mA corresponds to a liquid level of 50 cm and an input current of 18 mA corresponds to a liquid level of 300 cm.

Using the cursor keys, the values "Display ↓" (lower value of the display) and "Display ↑" (upper value of the display) can be changed to the values in the example.

{ Display ↓ +50.00 }

{ Display ↑ +300.0 }

8.2.9 Recording range of the measured values

The measured values can be recorded within a defined recording range, with the default value being set as 0..100% = full recording width.

Parameter:

{ Rec. range ↓ 000 }

Parameter values:

0..90 in % steps

Parameter:

{ Rec. range ↑ 100 }

Parameter values:

10..100 in % steps

8.2.10 Decimals

The number of digits after the decimal point to be shown on the display for the measured value can be selected in this parameter. The number of digits after the decimal point selected also affects the scaling range.

Parameter:

{ Decimals auto }

Parameter values:

auto; 0; 1; 2; 3

8.2.11 Text line for scaling line

This parameter is presented for making entries only if the parameter "Scal.print" has been switched on in the main menu "System data" and in submenu "Print functions".

Parameter:

{ Scal.text xxxxxx }

The positions denoted by xxxxx... can be edited using the cursor keys (see Section main menu referring to freely configurable texts).

Up to 32 characters can be entered into the text line. The text line is switched off if a blank character is entered at the first character position.

Parameter value:
Character set from table in Section 11

8.2.12 Physical units

All the common physical units are stored in the firmware of the recorder.
The following may be selected:

Parameter:
{ Unit mA }

Parameter value:

mA	°F
A	K
mV	m^3/h
V	l/sec
bar	%
mbar	‰
Pa	MW
kPa	1/min
°C	-TEXT-

8.2.12.1 Freely definable physical units

With this submenu item any desired physical unit can be expressed. The text may comprise a maximum of 5 characters.

Parameter:
{ TEXT-unit ????? }

Parameter value:
Character set from table in Section 11. Positions marked with ????? can then be edited with the cursor keys (see Section 8.3 main menu referring to freely configurable texts).

For example, in
{ TEXT-unit V/mΩ }

8.2.13 Filter time

The filter time constant is defined here.

Parameter:
{ Filter 00 }

Parameter value:
0...60 in seconds.

The response time of the measuring system is approx. 3.5 * filter time constant.

8.2.14 Direction of recording

The direction of recording is defined here.

Parameter:
{ Direction 0 → 100 }

Parameter value:

0 → 100

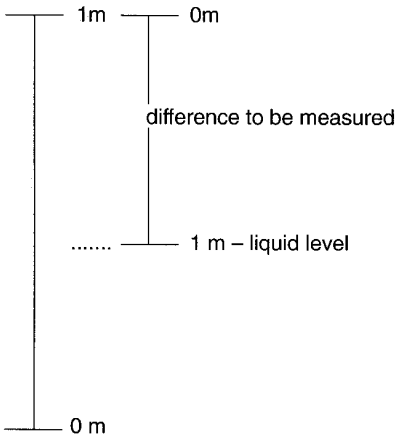
and

100 ← 0

With the parameter setting "100 ← 0", the pointer moves from right to left with an increasing measured value (the normal mode is from left to right).

Example - Direction of recording 100 ← 0:

The difference between the existing liquid level in a container and the maximum liquid level is to be recorded. The container is 1 m high. If the difference to be measured drops below 0.2 m or rises above 0.9 m, an alarm value relay has to be set. The input signal is a current of 0 mA for 0m liquid level and 20 mA for 1 m liquid level.



Signal type setting:	0...20mA
Lower range value:	0.000
Upper range value:	20.00
Display lower value:	0
Display upper value:	1
Text unit:	m
Alarm value 1:	0.200
Function	min.
Alarm value 2:	0.700
Function:	max.

With the direction **"0 → 100"**, the liquid level 0...1 m is displayed and recorded. The minimum alarm is set for 0.2 m liquid level and maximum alarm for 0.7 m liquid level.

To record the difference between the actual liquid level and the maximum liquid level, the direction is switched to **"100 ← 0"**. If the other parameters remain the same, the effect is as follows:

Total capacity	Filling height	Response
1 m	0 m	Readout 0.000 m Printout on paper 0 % Alarm value 1 active
0.8 m	0.2 m	Readout 0.200 m Printout on paper 20 % Alarm value 1 deactivated
0.3 m	0.7 m	Readout 0.700 m Printout on paper 70 % Alarm value 2 is activated
0 m	1 m	Readout 1.000 m Printout on paper 100 %

8.2.15 Square root extraction

The measured value may undergo square root extraction.

Parameter:

{ Square root extraction off }

Parameter value:

off – no square root extraction
on – square root extraction activated

8.2.16 System Hold

In this parameter the measuring system can be held by means of an external contact generation at the last value measured.

Parameter:

{ System Hold off }

Parameter value:

off; DI 1; DI 2; DI 3; DI 4.

8.2.17 User linearization

With "User linearization" activated
(**{ User linear. on }**), 8 freely selected tiepoints may be input for linearization. According to the following pattern (taken from the menu).

{ User linear.on }

< ↑ >
{ Lin. Pt.x1 1000 } 1st tiepoint input value, per thousand

< ↑ >
{ Lin. Pt.y1 1000 } 1st tiepoint output value, per thousand

< ↑ >
{ Lin. Pt.x2 1000 } 2nd tiepoint input value, per thousand

< ↑ >
{ Lin. Pt.y2 1000 } 2nd tiepoint output value, per thousand

< ↑ >
{ Lin. Pt.x3 1000 } 3rd tiepoint input value, per thousand

< ↑ >
{ Lin. Pt.y3 1000 } 3rd tiepoint output value, per thousand

< ↑ >
{ Lin. Pt.x4 1000 } 4th tiepoint input value, per thousand

< ↑ >
{ Lin. Pt.y4 1000 } 4th tiepoint output value, per thousand

< ↑ >
{ Lin. Pt.x5 1000 } 5th tiepoint input value, per thousand

< ↑ >
{ Lin. Pt.y5 1000 } 5th tiepoint output value, per thousand

< ↑ >
{ Lin. Pt.x6 1000 } 6th tiepoint input value, per thousand

< ↑ >
{ Lin. Pt.y6 1000 } 6th tiepoint output value, per thousand

< ↑ >
{ Lin. Pt.x7 1000 } 7th tiepoint input value, per thousand

< ↑ >
{ Lin. Pt.y7 1000 } 7th tiepoint output value, per thousand

< ↑ >
{ Lin. Pt.x8 1000 } 8th tiepoint input value, per thousand

< ↑ >
{ Lin. Pt.y8 1000 } 8th tiepoint output value, per thousand

Linearization is carried out between the fixed external tiepoints
x0 = 0000 ‰, y0 = 0000 ‰ and
x9 = 1000 ‰, y9 = 1000 ‰.
Unassigned points are assigned x = 1000 ‰, y = 1000 ‰. When saving the parameterization settings, the tiepoints are sorted in ascending x-value order. Intermediate values can thus be easily set later. The curve must be monotonous/ascending.

8.2.18 Submenu "Alarm Values"

The alarm value parameters are grouped in a submenu.

This submenu is comprises the following:

{ Alarm values }

< ↵ >
{ AV1 +4.000 } Input in physical units

< ↑ >
{ AV1 Funct. min. } Setting of alarm value function

< ↑ >
{ AV1 Text No. 0 } Assignment of a text line

< ↑ >
{ AV1 DO No. DO3 } Assignment of the binary output

< ↑ >
{ AV2 +15.00 } Input in physical units

< ↑ >
{ AV2 Funct. max. } Setting of alarm value function

< ↑ >
{ AV2 Text No. 1 } Assignment of a text line

< ↑ >
{ AV2 DO No. DO6 } Assignment of the binary output

< ↑ >
{ AV Hysteresis 05 } Data per thousand

< ↑ >
{ Gradient 03 } Dynamic alarm value (input in seconds)

< ↑ >
{ Gradient text 0 } Assignment of a text line

< ↑ >
{ Gradient DO off } Assignment of the binary output

Two alarm values are assigned to each channel. The parameters for alarm value 1 are described below.

Parameter:
{ AV1 +4.000 } Input in physical units

The alarm value is entered at this point. The input limits equal the display range.

{ AV1 Funct. MIN }

The alarm value function is defined.

The following parameters are permitted:

min Minimum alarm value (activated if the value falls below the alarm value)

max Maximum alarm value (activated if the value exceeds the alarm value)

{ AV1 Text No. 0 }

A text line may be assigned to the alarm value. The text line is printed out if the alarm value is violated provided that a printer channel is installed in the recorder.
If the alarm value is violated, the text line is displayed (flashing) if the menu item "Alarm ackn." is set to "manual" or "auto".
No text is printed out if the text No. = 0.

See also the section on freely configurable texts.

{ AV1 DO No. DO3 }

The alarm value relay assigned to the alarm value.

{ AV1 DO No. off } = no display

{ AV Hysteresis 05 }

Hysteresis of the channel alarm values, expressed in ;. The valid range of values extends from 5 to 99 ; inclusive.

{ Gradient 03 }

Data expressed in seconds for the range 3 sec. to 30 sec. for a maximum 3 % change in the measured value. If the rate of change reaches or exceeds the set value the alarm is activated.

{ Gradient Text 0 }

A text line may be assigned to the alarm value. The text line is printed out if the alarm value is violated provided that a printer channel is installed in the recorder. If the alarm value is violated, the text line is displayed (flas- hing) if the menu item "Alarm ackn." is set to "manual" or "auto".
No text is printed out if the text No. = 0.

{ Gradient DO No. DO4 }

The alarm value relay assigned to the alarm value.

{ Gradient DO No. off } = no output

8.2.19 Submenu Balance calculation

The balance calculation function permits printout of the following table at selectable intervals:

1. Channel designation with comment
2. Time/date interval start and time/date interval end
3. Smallest measured value during the interval with time and date
4. Biggest measured value during the interval with time and date
5. Mean value across interval
6. Total value across interval

Example:
1. **[Bl. text line]**
2. **[15.07.94 15:00 - 15.07.94 15:15]**
3. **[Min: +36.7 MW - 15.07.94 15:12]**
4. **[Max: +150 MW - 15.07.94 15:03]**
5. **[x: +115.2 MW]**
6. **[x: 2.881E1 MWh]**

The table with 6 lines is about 20 mm long (about 17 mm in the case of 5 lines). The minimum chart speed for balance calculation with one measuring channel must be calculated acc. to the following unequation.
P_V [mm/h] > 20 /17) [mm] / interval [h]
or
P_V [mm/h] 20 /17) [mm] *60 / interval [min]

If balance calculation is effected with several channels, the result calculated for one channel must be multiplied with the number of channels used for the balance calculation. The max. chart speed possible for printing text is 300 mm/h.

The following parameters can be called up in the balance calculation submenu:

{ Balance calculation ▒ }

< ↵ >
{ Operating mode Σx } Select operating mode

< ↑ >
{ Recording Σ on } Analog recording of the total value

< ↑ >
{ Ext. control on} Interval control via binary inputs

< ↑ >
{ Control input DI 1 } Select binary input for external interval control

< ↑ >
{ Interval 1h } Interval

< ↑ >
{ Sync. time 08:30 } Orientation time for interval

<↑>
{ Sync. day 25 } Orientation time for interval

<↑>
{ Bal. text 2 } Comment text line

<↑>
{ Max. value 5.000E2} Alarm value sum

<↑>
{ Max.-DO DO2 } Relay output for alarm value infringement

Operating mode
The balance calculation mode is defined in this parameter.

Parameter:
{ Operating mode Σx }

Parameter value:
off

$\bar{x}$
Σx
ΔΣx
Δx

Operating mode $\bar{x}$
With this operating mode, line 1..5 is recorded in the balance calculation table (see example). No summation is effected.

Operating mode Σx
Summation is effected in this operating mode. Lines 1..6 are recorded in the balance calculation table.

The following applies for the measuring ranges of the sum: the final value of the selected channel measuring range multiplied by the time of the balance calculation interval (in h) returns the maximum value of the sum (unit of measurement*h). This value can be displayed in any display range while taking account of the maximum numerical value that can be displayed (= max. counter reading) of 7500E6 (7 500 000).

Example:
Measuring range = 0...20 mA;
Display range = 0...300 m^3/h
Interval = 1 month = 24*31 = 744 h

Final value Σx = 20 * 744 h = 14 880 mAh
If summation recording is switched on instead of instantaneous value recording, pointer deflection is reached at 14 880 mAh 100 %.

Max. display = Σx = 744 * 300 = 223 200 m^3 = 2.232E5 m^3

Summation is effected in the operating modes ΔΣx and Δx. Alarm value monitoring can be performed additionally.

Operating mode ΔΣx
The alarm value set is referred to the end of the balance calculation interval and is given in the following unit of measurement: unit of measurement of the display range * time e.g. kW = * h = kWh. Based on the instantaneous summation value, a check is carried out to verify whether the alarm value is overshot, while the instantaneous measured value remains constant (floating alarm value monitoring, see Fig. 3).

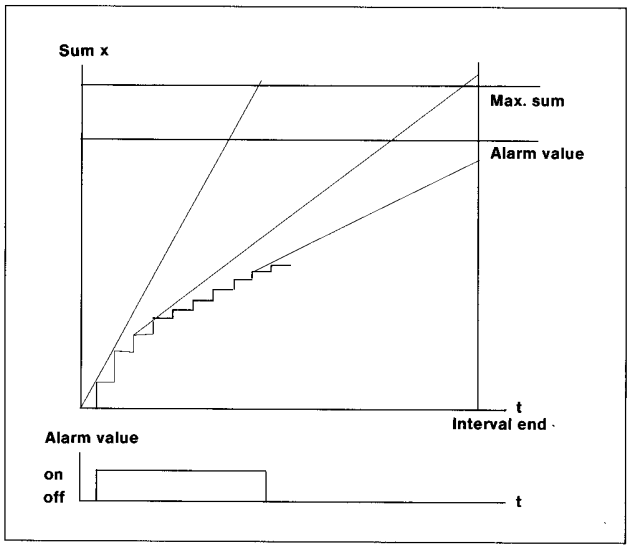


Fig. 3 Operating mode **ΔΣx**

Operating mode Δx
The alarm value set is used for absolute value monitoring of the total value. As soon as the total value has reached the alarm value, a signal is emitted for one second (contact output). Concurrently, the summation counter of the alarm value is set to 0. The alarm value cycle begins again from the start. The alarm value can be repeatedly reached during a single interval.

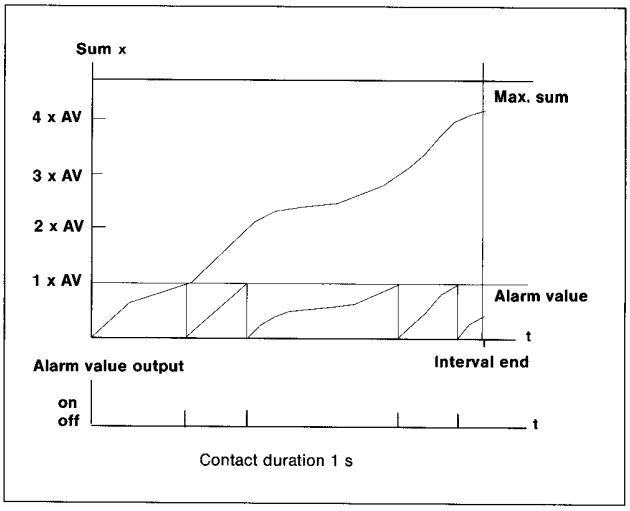


Fig. 4 Operating mode**Δx**

Recording
The Σx can be recorded as an analog curve in addition to the printout. Measured value recording is not necessary then for this channel.

Parameter:
{ Recording. Σ on}

Parameter value:
on, off

External interval control
The balance calculation interval can be controlled internally by the inbuilt real-time clock. External control of the interval is effected by contact generation via a binary input of the recorder.

Parameter:
{ Ext.control on }

Parameter value:
off; on

Control input
Parameter:
{ Control input DI 1 }

Parameter value:
off; DI 1; D1 2; DI 3; DI 4

Internal interval control
Parameter:
{ Interval 1h }

Parameter value:
15 min.; 30 min.
1 h; 2 h; 3 h; 6 h; 8 h; 12 h
1 day; 7 days
1 month

Synchronisation time with internal interval control
Parameter:
{ Sync.time 08:30 }
Orientation time for interval

Parameter value:
00.00 time

Parameter:
{ Sync.day 25 }
Orientation time day of month

Parameter value:
00...31

Comment line
One of the 8 freely definable text lines can be used as a comment line in the balance calculation table (first line).

Parameter:
{ Bal. text 2 }

Parameter value:
None
Text line 1
Text line 2
:
:
Text line 8

Value entry for alarm value
Values are entered in the units used for the display range, multiplied with the time.

Examples: kWh →; m^3/h → m^3

Parameter:
{ Max. value 5.000E2 }

Parameter value:
0...5.000E6

Assignment of alarm value to relay output
Parameter:
{ Max. DO DO2 }

Parameter value:
None; DO 1; DO 2;.....DO 6

8.3 Main menu Text line

The user may select 8 different text lines with a length of 32 characters each for text printouts on the printer or for display.

{ Text lines ■}

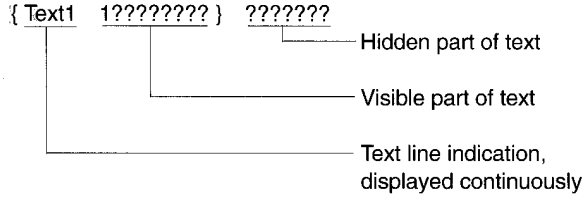
< ↵ >
{ Text1 1????????? }

< ↑ >
{ Text2 2????????? }

< ↑ >
"

< ↑ >
{ Text8 8????????? }

Construction of the display:



The whole 32-character text may be scrolled through using the cursor keys. Every symbol of the Table can be set as required using the < ↑ > and < ↓ > keys.

8.4 Main menu "Print intervals"

The following parameters are available:

{ Print intervals ■ }

<↵>

{ Text1 15 min } Printout of text line 1

<↑>

{ Text2 30 min } Printout of text line 2

<↑>

:

:

<↑>

{ Text8 6 h } Printout of text line 8

<↑>

{Measured values 12 h} Printout of measured values of the active channels

<↑>

{ Date/time 24 h } Printout of date and time

Examples:
Measured value **[BL 59.73 l/min 11:33 am]**

Date and time **[06.07.91 07:33]**

Text1 **[Text line 1 07:59]**

Parameter values:
off; 15 min; 30 min;
1h; 2h; 3h; 6h; 12h; 24 h

These values may be parameterized independently for each individual print function. The print function is cyclically printed out at the preselected intervals.

These intervals are synchronized to the time 0:00 h. The printout can be synchronized for any chosen time in the main menu "Synch. times".

Example:
{ Date/time off }

<↵>

{ Date/time off }
Parameter value flashes

<↑>

{ Date/time 15 min }

<↑>

{ Date/time 30 min }

<↑>

{ Date/time 1 h }
Date and time are printed once every hour.

8.5 Main menu "Synchronous times"

{ Synch. times ■ }

<↵>

{ Text1 00:00 } Printout of text line 1

<↑>

{ Text2 00:00 } Printout of text line 2

<↑>

...

<↑>

{ Text8 00:00 } Printout of text line 8

<↑>

{ Measured values 00:00} Printout of the measured values for the active channels

<↑>

{ Date/time 00:00 } Printout of date and time

Example:
{ Date/time 1 h } (From the main menu item "Print intervals")
and
{ Date/time 13:10 }

The first printout commences, for instance, at

Time	
11:10	**[06.05.93 11:10]**
12:10	**[06.05.93 12:10]**
13:10	**[06.05.93 13:10]** Synchronous time
14:10	**[06.05.93 14:10]**

8.6 Main menu "Communication"

Communication parameters can only be set if a serial interface card is available.
If no interface is present, the main menu "Communication" is not displayed.

8.6.1 Parameterization in the recorder

Actuation of <↵>
in the main menu item

{ Communication ■ }

yields the following parameters:

{ Address 001 } Address of bus subscribers

<↑>

{ Baud rate 4800 } Transmission rate

<↑>

{ Parity EVEN } Parity check

<↑>

{ Interface RS232C } Interface type

Address
The subscriber address required for bus communication is set here. The address is only displayed with the RS 485 interface. With point-to-point connection the recorder responds to all questions, independently of the address (except for broadcast messages).

The following subscriber addresses are permitted:

000..126

Global address
Address 131 is the broadcast address, i.e., all recorders are addressed at the same time.

Baud rate
The following baud rates can be set:

300
600
1200
2400
4800
9600
19200

Parity
the parity can be set as follows:

EVEN
ODD
NONE

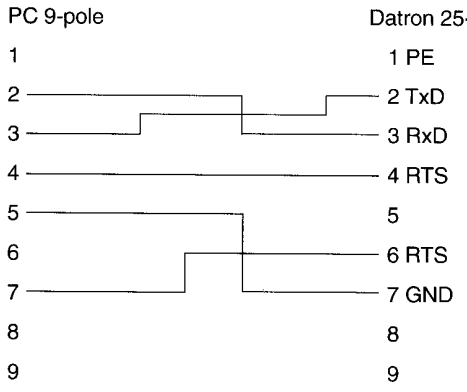
Interface
The serial interface is defined.

RS 232C	Point-to-point connection
RS 485	Bus connection

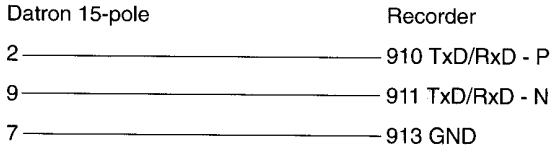
8.6.2 Communication

An interface converter is required for an RS 485 connection between the recorder and a PC with an RS 232C interface (e.g., RS 42x supplied by Datron).

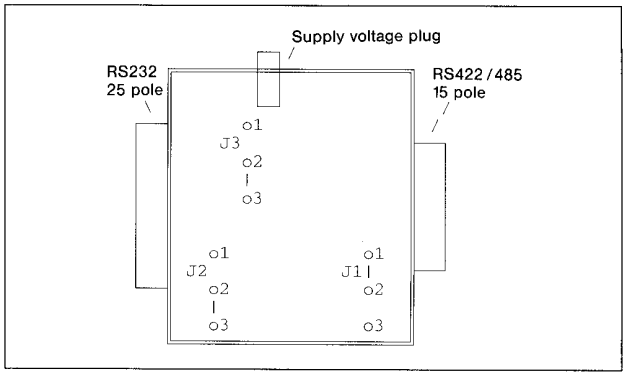
Connection between the PC and interface converter



Connection between the interface converter and the recorder



Jumper assignment in the Datron connector



Parameterization programme PARALINE MK
In the menu "Setup", the RS 485 interface is selected and the item **< x > inverse control logic** activated.

8.7 Main menu "Assignment DI"

Four binary inputs can be used for functions in the recorder.

{ Assignment DI ■ }

< ↵ >
Parameter:

{ Event marker1 DI 2 }	As soon as the corresponding input is activated, a time marker is printed for this time (only if the printer channel is present).
< ↑ > **{ Event marker2 off }**	Not activated as it is "off".
< ↑ > **{ Event marker3 off }**	- " -
< ↑ > **{ Event marker4 off }**	- " -
< ↑ > **{ Text1 DI1 }**	As soon as the corresponding input is activated the assigned text line is printed out (only if the printer channel is available).
< ↑ > **{ Text2 off }**	Not activated as it is "off".
< ↑ > **{ Text3 off }**	Not activated as it is "off".
< ↑ > **{ Text4 off }**	- " -
< ↑ > **{ Text5 off }**	- " -
< ↑ > **{ Text6 off }**	- " -
< ↑ > **{ Text7 off }**	- " -
< ↑ > **{ Text8 off }**	- " -

< ↑ >

{ Measured values DI 3 } As soon as the corresponding input is activated, the measured values of all active channels are printed out (only if the printer channel is present).

< ↑ >

{ Date/time DI 4 } As soon as the corresponding input is activated, the current date and time are printed out (only if the printer channel is present).

< ↑ >

{ Para. enabled DI1 } As soon as the corresponding input is active, parameterization is enabled.

The following binary inputs can be set:
Parameter value:
off, DI1, DI2, DI3, DI4

8.8 Main menu "Service"

The main menu "Service" contains test and setting functions

{ Service ■ } Tests and balancing

{ Channel BLUE ■ } Settings for the BLUE channel

< ↑ >

{ Channel RED ■ } Settings for the RED channel

< ↑ >

{ Channel GREEN ■ } Settings for the GREEN channel

< ↑ >

{ Channel VIOLET ■ } Settings for the VIOLET channel

< ↑ >

{ Ref. temp displ } Display of the internal reference junction temperature

< ↑ >

{ Display test } The test symbols are displayed

< ↑ >

{ Initialization } Load factory setting

< ↑ >

{ Listing } Printout of parameter settings

< ↑ >

{ Sim. type off } Printout of various test curves on paper. The signals are treated as analog input signals

< ↑ >

{ Sim. period 0020 } Period of duration of the test curves in seconds

Print head ← 000
Print head → 0240

8.8.1 Setting the channels

The following functions are available for channel balancing:

{ Channel BLUE ■ }
< ↵ >

{ Paper |← 0064 } Balancing of paper 0 % with system 0 %.

< ↑ >

{ Paper →| 0f4e } Balancing of paper 100 % with system 100 %

< ↑ >

{ Offset corr.0000 } Active with Pt 100 and TC. Asymmetry in the supply lines and thermoelectric voltages can be offset with this function.

8.8.1.1 Balancing of recording system

The zero point and final value of the channel can be reconciled with the zero and end position for paper using the "→" and "←" cursor keys.

{ Paper |← 0036 } Setting of zero for channel

< ↵ >
{ Paper |← 0036 } The numerals flash and may be reset with the cursor keys.

The other recording pens move to a central position to facilitate the setting. If balancing is necessary, the < ← > key is actuated until the recording pens are within the recording range.
The < → > key is actuated to carry out zero balancing. The 4-digit number represents internal recorder values and may be changed decimally within the range 0001 .. 2047 (The display is hexadecimal).

The set value is accepted with

< ↵ >

< ↑ >

{ Paper →| 076C }

The end value is set as described above. The paper is transported in the recording direction if the < ↓ > key is actuated during balancing.

8.8.1.2 Offset correction

Offset correction only functions with TC and Pt 100 measurements.

{ Offset-corr. 0000 }

The display upon actuation of the < ↵ > key is, for example,

{+8.79 0000 }

If the value should read 10 °C, then the < ↑ > key can be used for an offset to the measured value so that the recorder displays 10 °C.

8.8.2 Reference junction temperature display

The temperature of the internal reference junction is displayed if the menu item "Ref. temp. displ." is selected.

{ Ref. temp. displ }

< ↵ >

{ Temp: +35 °C }

The menu item is exited if the < Esc > key is actuated.

8.8.3 Display test

The display test is used to determine whether all points of the dot matrix display light up.

8.8.4 Initialization

The factory settings are loaded with this menu item.

{ Initialization }

< ↵ >
{ Yes = ← , No = Esc }

The factory setting is accepted by pressing < ↵ >, the procedure is aborted if **< Esc >** is pressed.

8.8.5 Listing

The parameter settings are printed out via the printer channel if it is available. The recorder must remain in parameterization mode for the duration of printing (up to approx. 1h depending on the equipment). The printing procedure can be aborted with the **< Esc >** key.

8.8.6 Simulation

Test signals are created in the recorder without having to connect a generator to the input terminals. These signals are subjected to measured value processing and are passed to the display and recording systems.

{ SIM.type off }

The parameters
off, RAMP, SINUS, STEP (in 10 % increments) can be set.

Paper feed is set to correspond to the Sim. period.

{ Sim. period 1300 }

The period duration is selected for the function to be simulated. Range 20 ... 2000 seconds.

8.8.7 Balancing of printer system

The zero and final value of the channel can be reconciled with the zero and final position for paper using the " → " and " ← " cursor keys.

{ Print head |← 0036 } Setting of zero for channel

< ↵ >

{ Print head |→ 0036 } The nummerals flash and may be reset with the cursor keys.

The other recording pens move to a central position to facilitate the setting.
If balancing is necessary, the < → > key is actuated until the recording pens are within the recording range. The < ← > key is actuated to carry out zero balancing. The 4-digit number represents internal recorder values and may be changed decimally within the range 0001..2047
(The display is hexadecimal). The selected value is accepted with

< ↵ >

< ↑ >
{ Print head →| 076C }

The end value is set as decribed above.

9 Hardware error messages

9.1 Self-test error messages

Self-test 00:	CPU fault
Self-test 01:	Fault in internal RAM
Self-test 02:	Fault in external RAM
Self-test 03:	Clock module fails to respond
Self-test 04:	Relay driver for AV relay fails to respond
Self-test 05:	Channel card does not respond
Self-test 06:	Self Test error for the blue channel of the channel card
Self-test 07:	Self Test error for the red channel of the channel card
Self-test 08:	Self Test error for the green channel of the channel card
Self-test 09:	Self Test error for the violet channel of the channel card
Self-test 10:	EEPROM on CPU does not respond to read command
Self-test 11:	EEPROM on channel card does not respond to read command
Self-test 12 :	Interface-CPU fault or does not respond

9.2 Operating error messages

F: Cal. sum:	Test sum for calibration data incorrect
F: Para. sum:	Test sum for parameterization incorrect
F: EEPROM 1:	EEPROM on the CPU cannot be written to
F: EEPROM 2:	EEPROM on the channel card cannot be written to
F: BUFFER FULL:	No room for further character chains to the print head
F: PRINT HEAD:	Print head does not move (any more) within the prescribed periods
F: TIME:	Clock module has lost the time
F: FEED PRINT:	The chart speed set is too great for text printout
F: INPUT TYPE:	Parameterized input type cannot be processed by channel card (set to 4...20 mA)
F: CHANNEL blue:	Communication error to blue channel of channel card
F: CHANNEL red:	Communication error to red channel of channel card
F: CHANNEL green:	Communication error to green channel of channel card
F: CHANNEL violet:	Communication error to violet channel of channel card

9.3 Messages during parameterization

Password incorrect:
Password entered does not correspond to that which has been parameterized, access to parameterization denied

Value < xxxx:
The value entered is lower than the minimum value

Value > xxx:
The value entered exceeds the maximum value

Incorrect entry:
The value entered is not permitted (date/time)

Abort, wait:
Listing is aborted with Esc

No access:
The displayed parameter cannot be changed (with password 9999).

10 General Instructions

10.1 Installation instructions

To enable proper functioning of the recorder, the measurement and control cables must be laid separately from the power supply lines.

11 Character set table

Character	Coding [dec.]	[hexadec.]
µ	12	C
π	13	D
σ	14	E
Σ	15	F
τ	16	10
Φ	17	11
Ω	18	12
Å	19	13
å	20	14
Ä	21	15
ä	22	16
Ö	23	17
ö	24	18
Ü	25	19
ü	26	1A
←	27	1B
√	28	1C
	29	1D
£	30	1E
¥	31	1F
	32	20
!	33	21
"	34	22
#	35	23
$	36	24
%	37	25
&	38	26
’	39	27
(	40	28
)	41	29
*	42	2A
+	43	2B
,	44	2C
-	45	2D
.	46	2E
/	47	2F
0	48	30
1	49	31
2	50	32
3	51	33
4	52	34

Character	Coding [dec.]	[hexadec.]
5	53	35
6	54	36
7	55	37
8	56	38
9	57	39
:	58	3A
;	59	3B
<	60	3C
=	61	3D
>	62	3E
?	63	3F
@	64	40
A	65	41
B	66	42
C	67	43
D	68	44
E	69	45
F	70	46
G	71	47
H	72	48
I	73	49
J	74	4A
K	75	4B
L	76	4C
M	77	4D
N	78	4E
O	79	4F
P	80	50
Q	81	51
R	82	52
S	83	53
T	84	54
U	85	55
V	86	56
W	87	57
X	88	58
Y	89	59
Z	90	5A
[	91	5B
\	92	5C
]	93	5D

Character	Coding [dec.]	[hexadec.]
^	94	5E
_	95	5F
‘	96	60
a	97	61
b	98	62
c	99	63
d	100	64
e	101	65
f	102	66
g	103	67
h	104	68
i	105	69
j	106	6A
k	107	6B
l	108	6C
m	109	6D
n	110	6E
o	111	6F
p	112	70

Character	Coding [dec.]	[hexadec.]
q	113	71
r	114	72
s	115	73
t	116	74
u	117	75
v	118	76
w	119	77
x	120	78
y	121	79
z	122	7A
{	123	7B
i	124	7C
}	125	7D
~	126	7E
	127	7F
³	128	80
‰	129	81
°	130	82

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