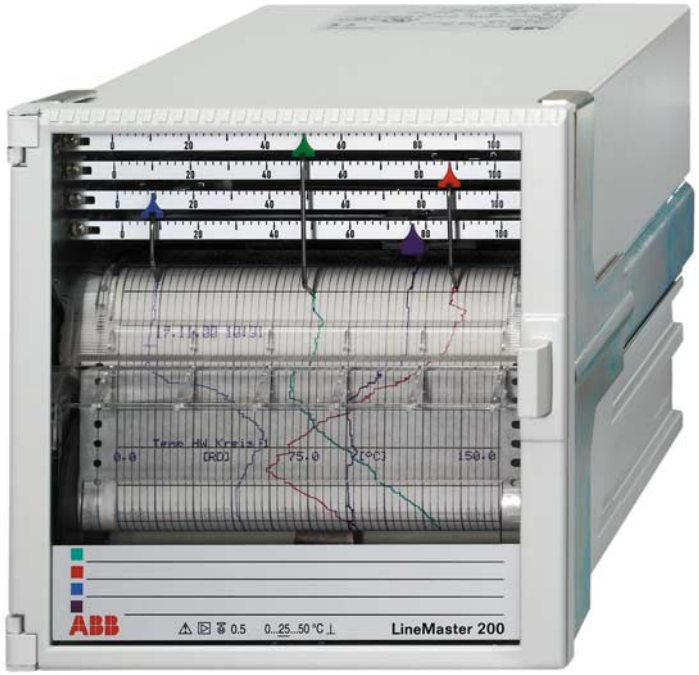
LineMaster 200

Continuous-line recorder

Parameter setting instructions

42/43-28 EN

Rev. 03



Contents

Parameter-definition sequence

Removing the chart unit

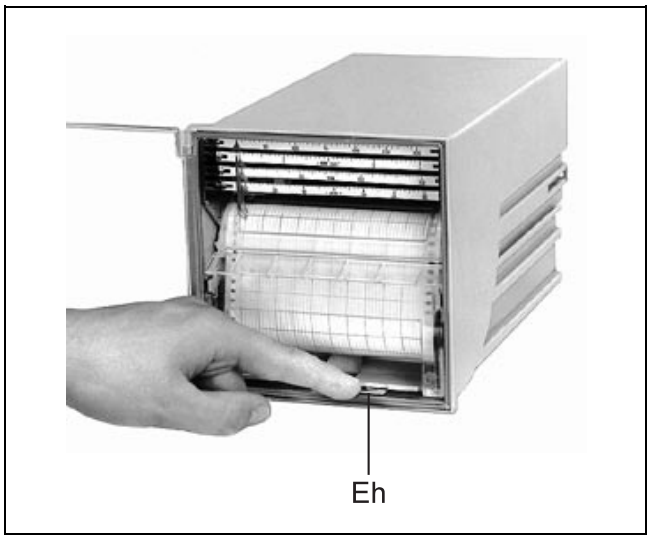


Fig. 1 Unlocking the chart unit
Z-17540 *Eh* Unlocking lever

1. Unlock the chart unit: Press unlocking lever *Eh* (see fig. 1).

Chart unit swings forwards.

2. Remove chart unit.

The display and operator control unit now becomes accessible.

Display and operator control unit

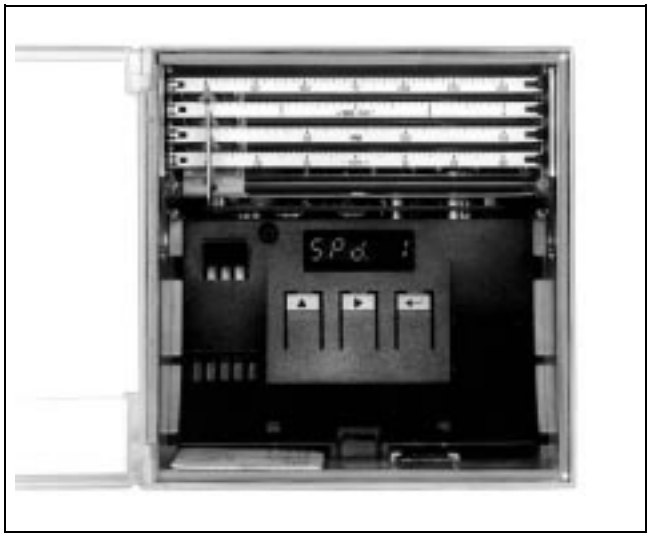


Fig. 2 Display and operator control unit
R-17671

The display and operator control unit contains 5 red 7-segment displays.

and 3 keys:

(hereafter identified as <▲> / <▶> / <↵>).

<▲> next figure when adjusting numerical values
return to main menu

<▶> next main menu item
next parameter
next parameter value
next numerical position

<↵> select parameter or parameter value or quit

Alphanumerical texts can only be input via the RS-485 interface. For the configuration of the recorder via this interface a parameter definition software is provided.

After removing the chart unit, error messages are displayed, if available.

3. These must be acknowledged with <↵>.

The software version of the recorder is displayed in the absence of any error message. If the version number is displayed, it means that the measuring system is active. The current measured values are displayed.

4. Switch on the parameter-definition mode of the recorder with <↵>.

The recorder pens are moved to the parking position:

violet	approx. 5 %	of recording width
blue	approx. 30 %	of recording width
red	approx. 60 %	of recording width
green	approx. 95 %	of recording width

The main menu item “SYS” is displayed if no password has been allotted.

If a password has been allotted, it must now be entered:

Password

5. Select position:
   <▸>, ...
6. Select figure:
   <▴>, ...
7. Select the next position:
   <▸>, ...

...

8. Acknowledge:
   <↵>

The main menu item “System data” is displayed.

Parameter-definition principle

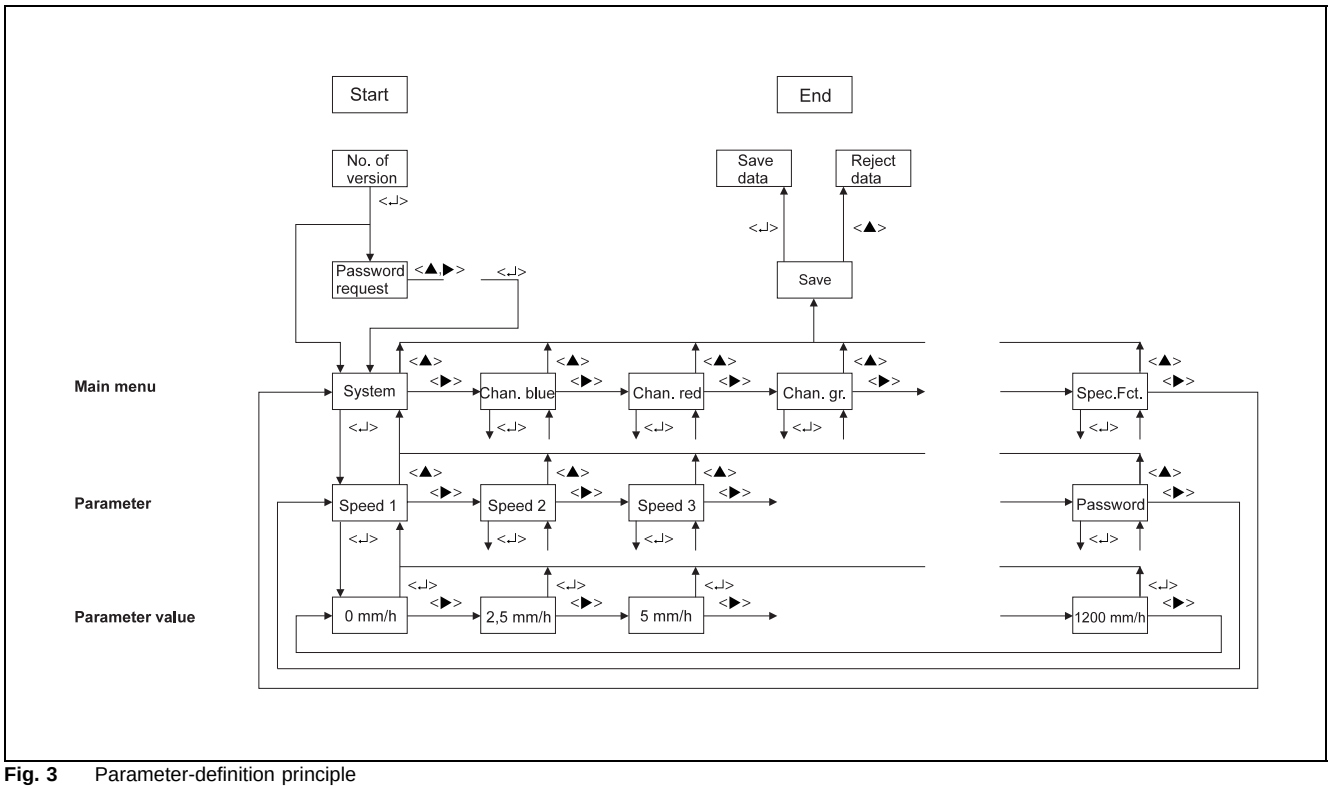


Fig. 3 Parameter-definition principle
Z-20000

Main menu

1. Display the folloing main menu items (consecutively): <▸>, ...

Reading on display	Main menu item
SYS	System data (chart speeds, password, interface parameters, time and date)
CH .bL	Blue system channel data
CH .rd	Red system channel data
CH .gn	Green system channel data
CH .uE	Purple system channel data
PrEiu	Print intervals
PrESY	Print synchronisation times
ASSdi	Assignment of binary inputs to printer functions
SPFnC	Special functions (e.g. simulation)

The main menu items “System data” and “Special functions” are always displayed.

The channel menus are only displayed if the corresponding channel is installed.

Printer head functions like “Printout intervals”, “Synchronous printout times” and “Assignment of binary inputs” are only displayed if the printout channel is installed.

The printout texts can only be input via RS 485.

2. Acknowledging the selected main menu item: <↵>

The first parameter of this main menu item is displayed:

Selecting parameters

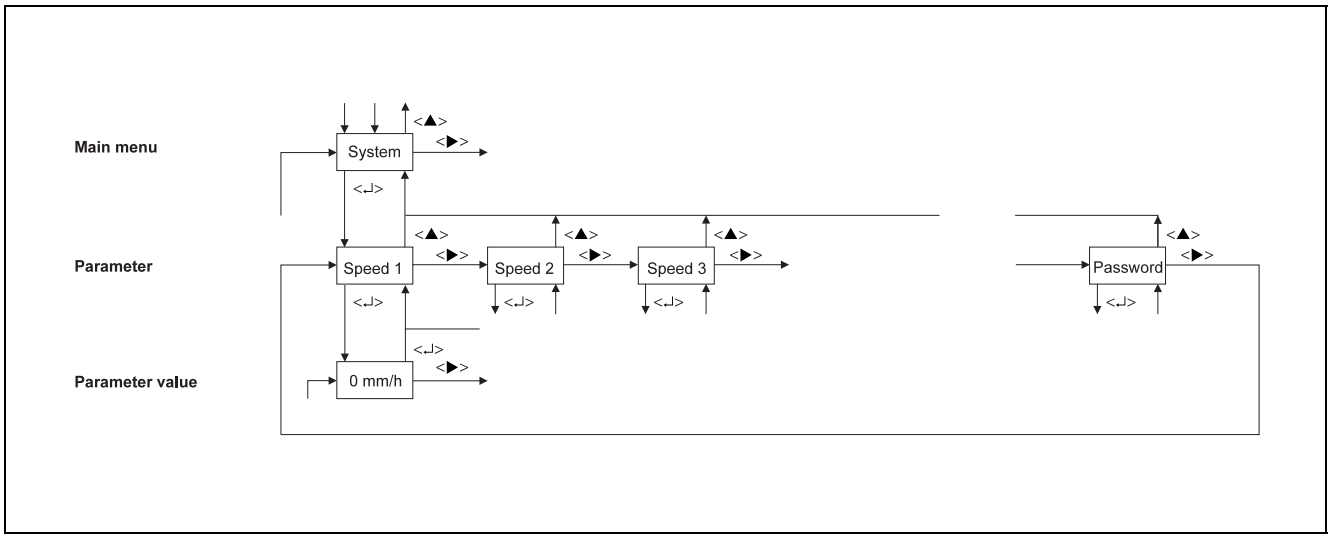


Fig. 4 Selecting parameters
Z-20001

3. Display the parameters of the main menu item (consecutively):
   <▸>
4. Change parameter value: move to the next section
   or
   return to the main menu item:
   <▴>

Selecting parameter values

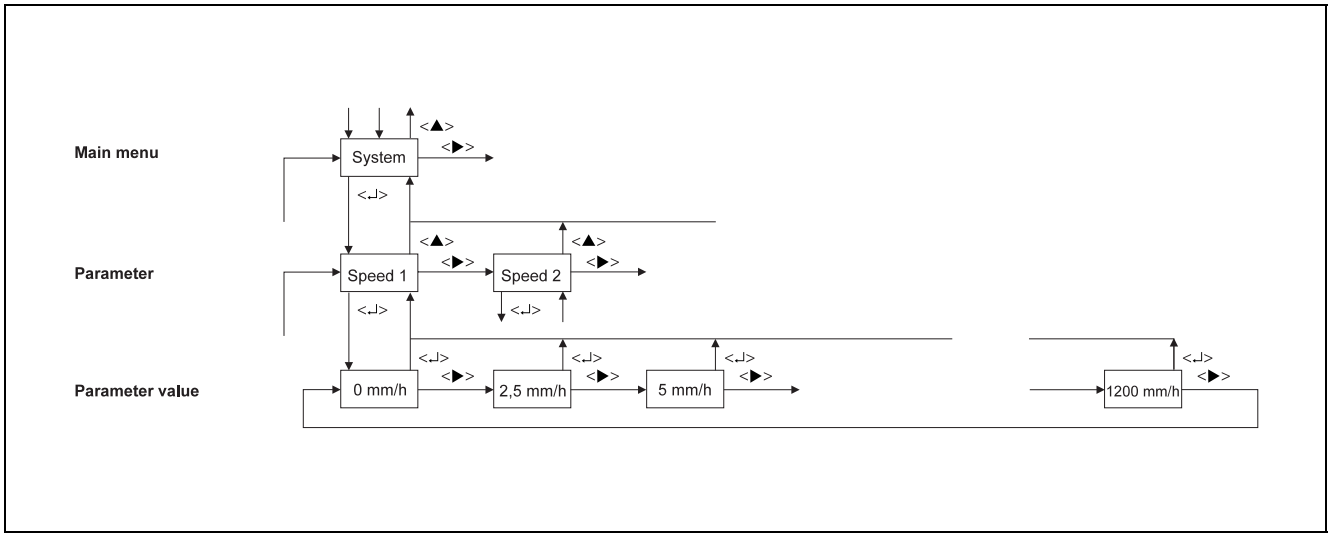


Fig. 5 Selecting parameter values
Z-20002

5. Acknowledge the selected parameter:
   <↵>

Either

Select parameter values from the default values
(see “Parameter description”)

6. Display possile values:
   <▸>
7. Acknowledge parameter value:
   <↵>
8. Return to the main menu item:
   <▸>

or

Input parameter value (see “Parameter description”)

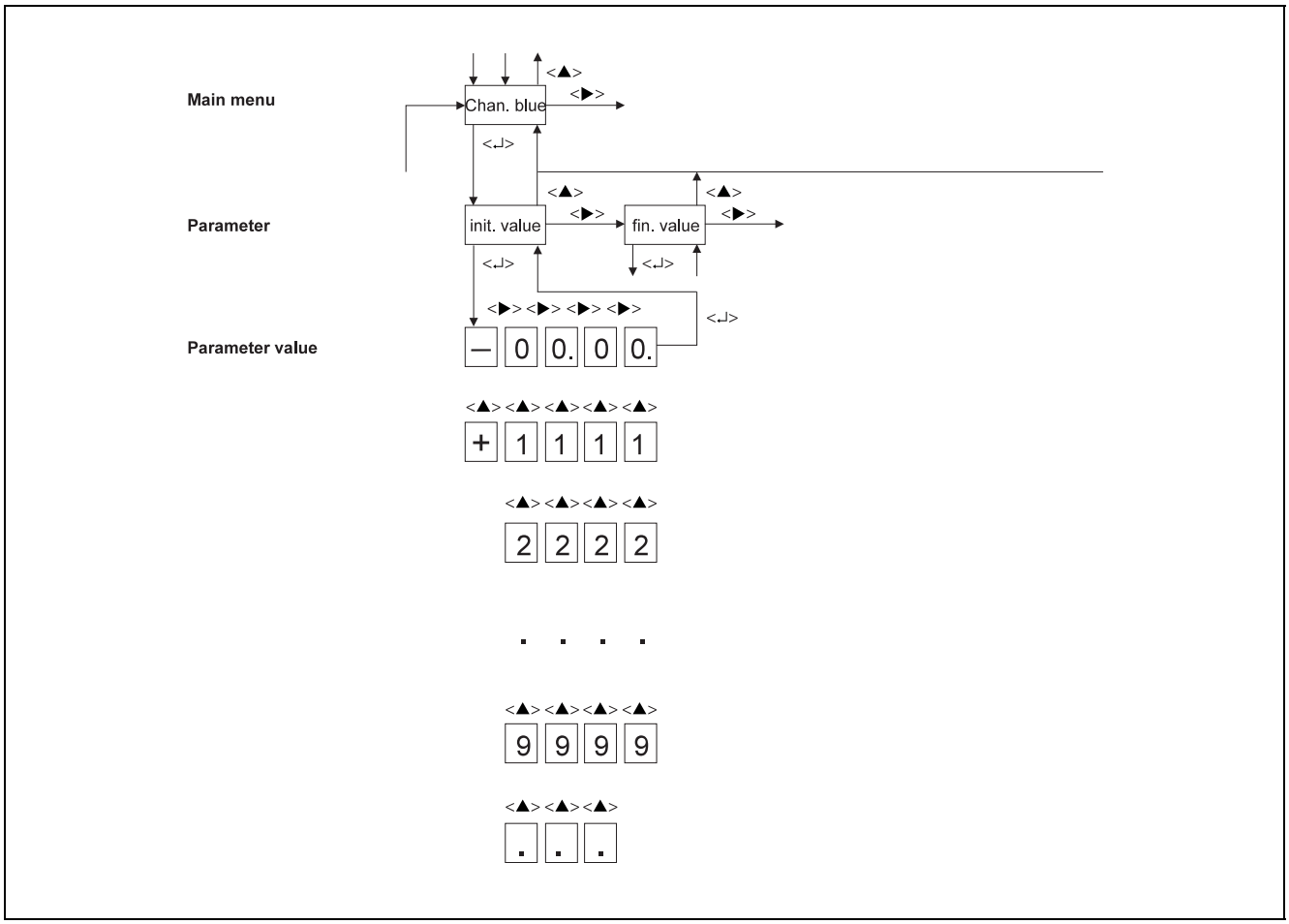


Fig. 6 Input parameter value
Z-20003

6. Select character position:
   <▸>

The selected position flashes.

7. Select figure or character:
   <▲>

The characters “−” and “.” are presented for selection only when stating floating point numbers; these are not offered when stating integer numbers (e.g. password).

8. Acknowledge the parameter value:
   <↵>

9. Return to main menu item
   <▲>

Completing the parameter definition

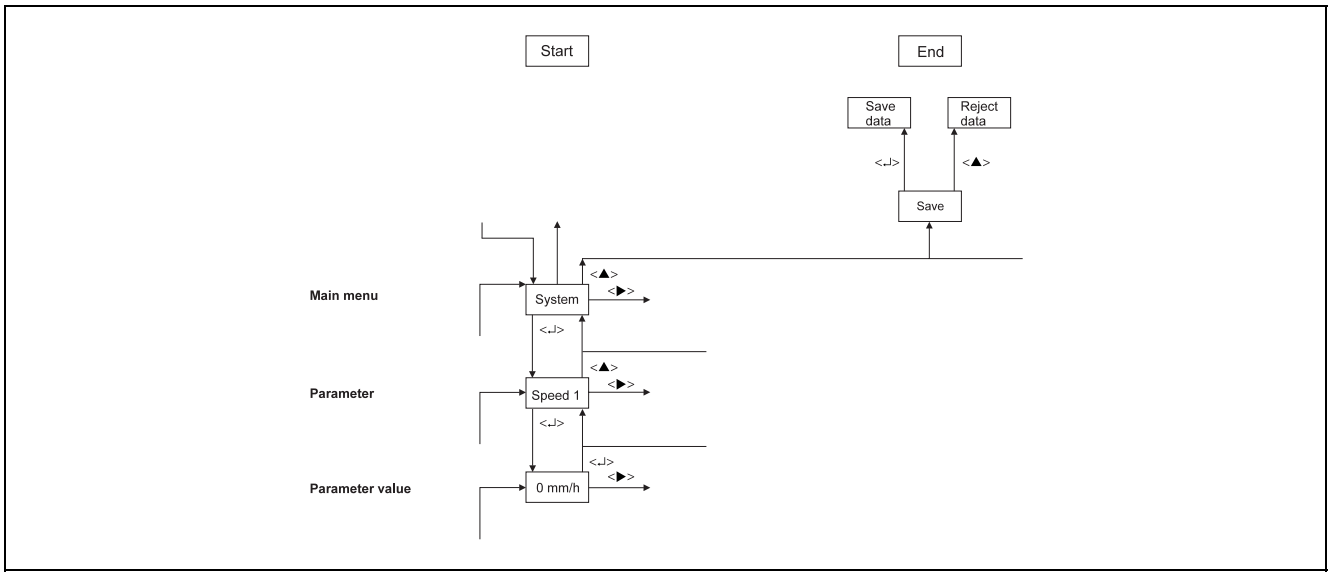


Fig. 7 Completing the parameter definition
Z-20004

10. Return to the main menu:
    <▲>

11. Complete parameter definition:
    <▲>

12. Store changed parameters in EEPROM:
    <↵>
    or
    Reject changes:
    <▲>

If the chart unit is fit in during parameter definition, the parameter-definition mode is left. All data that were input up to this moment are rejected; the old data remain valid.

Parameter description

System parameters

Reading on display	Parameter
SPd .1	Chart speed 1
SPd .2	Chart speed 2
SPd .3	Chart speed 3
CLoC .	Time
dAtE	Date
YEAr	Year
dFor .	Print format for date and time
Addr .	Bus subscriber address for RS 485
bAUd .	Baud rate for RS 485
PSPd .	Printout of current speed
PSCA .	Printout of scaling line
SSCA .	Distance between scaling lines
PASS .	Password

Chart speeds

Three chart speeds can be selected and externally switched. Speed 1 is active, without external selection, in the operating mode. Speed 2 and speed 3 can be activated via binary inputs if the recorder is fitted with option “binary inputs”.

Chart speed 3 has a higher priority vis-à-vis speeds 1 and 2.

The recorder goes to standby on switching on chart speed 3. All measuring systems are stopped at scale start.

Parameter
Chart speed 1
Chart speed 2

Parameter value mm/h
0 / 2,5 / 5 / 10 / 20 / 60 / 120 / 240 / 300 / 600 / 1200

Parameters can be defined for chart speed 3 with the values “on” and “off“. If a parameter has been defined for “off”, the recorder chart speed will be switched off via the corresponding binary input.

Parameter
Chart speed 3

Parameter value
off Chart speed Stop
on Chart speed 1 mm/h

Time, date, year

Parameter
Time
Date
Year

Parameter value
00.....99

Time

To set the time, select the parameters via <▸>. By pressing <↵> the previously set parameter value is displayed:

00:0<u>0</u> (last digit flashes)

The cursor is moved with <▸>, the figure at the cursor position is changed with <▴>. The time is entered by pressing <↵> and the parameter is displayed.

Date and year

The procedure to set time and year is the same as to set time.

Time, date and year are saved as soon as the input is confirmed, whereas all other parameters are saved when the parameter definition mode is left.

The factory setting for time and date is: 01.10.94, 00.00 hours.

Print format for date and time

As data format, “EURO” can be selected for European format e.g. 06.12.91 or “US” for American format e.g. 12/06/91. This setting is active for all time and date printouts.

Parameter
Print format for date and time

Parameter value
EURO
US

To set the date format, the parameter is selected via <▸>. By pressing <↵>, the previously set parameter value is displayed. The format is selected by pressing <▸>. The data format is entered by pressing <↵> and the parameter is displayed.

RS 485 serial interface

Address 132 is the recorder broadcast address. The recorders are addressed simultaneously via the broadcast address. Even parity is permanently set. A special protocol is employed.

Parameter
Address

Parameter value
000...127 (= subscriber addresses)

To set the address, the parameter is selected via <▸>. By pressing <↵>, the previously set parameter value is displayed. The cursor is moved with <▸>, the figure at the cursor position is changed with <▴>. The address is entered by pressing <↵> and the parameter is displayed.

Parameter
Baud rate

Parameter value Baud
600 / 1200 / 2400 / 4800 / 9600 / 19200

Remarks on communication setup

An interface converter is needed (e.g. RS 42x of Datron company) for an RS 485 connection between the recorder and a PC with a RS 232 interface.

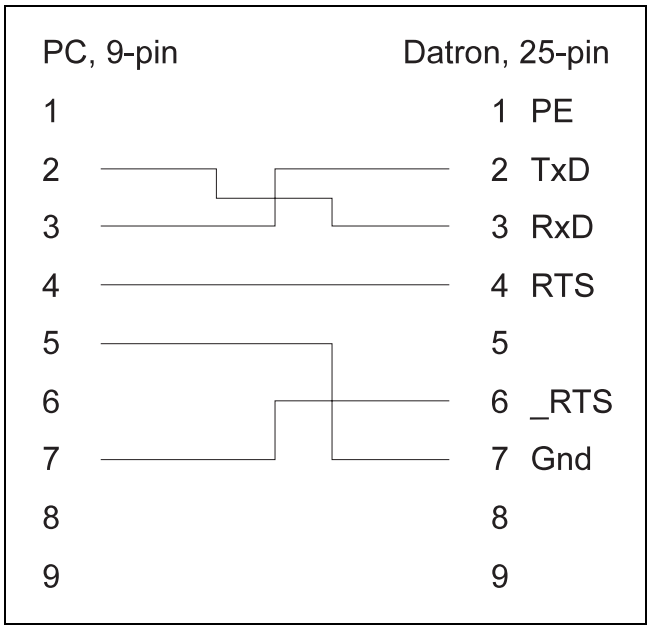


Fig. 8 Connection between PC and interface converter
Z-20005

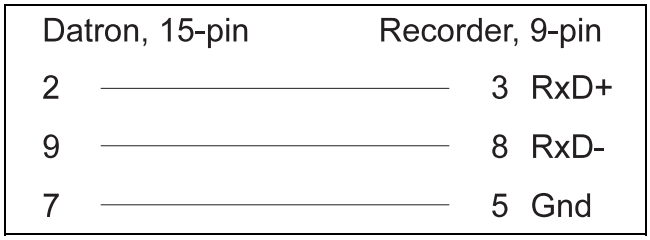


Fig. 9 Connection between interface converter and recorder
Z-20006

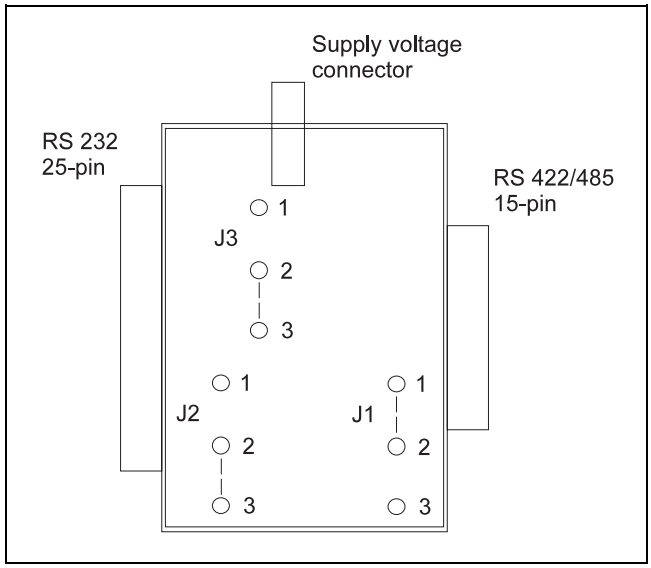


Fig. 10 Jumper assignment in the Datron connector
Z-20007

Enable chart speed printout

If the recorder features a printer system, the current chart speed will be printed out each time the recorder is switched on or the current chart speed is changed. The chart speed printout is switched active or inactive in this parameter.

Parameter value
on Chart speed printout active
off Chart speed printout inactive

Enable scaling lines printout

Four double lines can be recorded if the recorder features a printer system. The first line of the double line is implemented as a scaling line. Double line printout is switched to active or inactive in this parameter.

Parameter value
on Double line printout active
off Double line printout inactive

Distance between scaling lines

The distance between the two double lines is entered in mm in this parameter.

Parameter value
60...500 in mm steps

Setting the password

The password can be defined as a four-digit number within the value range 0000...9999. Password polling is not active for the 0000 setting.

Channel parameters

The recorder can be equipped with up to 4 systems. Depending on the number of measuring systems in use, the corresponding main menu items will be activated:

- Blue channel
- Red channel
- Green channel
- Violet channel

The following parameters can be called in the main menu item “Channel parameters”.

Reading on display	Parameter
tYPE	Signal type
tunit	Temperature unit for temperature measurement
cdJc .	Reference junction compensation
Ptcon	Pt100 connection technique
LEAdr	Line-resistance for 2-wire Pt100
burn	Pointer position for sensor break
rn9Lo	Lower-range value
rn9Hi	Upper-range value
ScALo	Lower-scaling value
ScAHi	Upper-scaling value
Unit	Scaling unit of measurement
rESPt	Attenuation
dirEC	Inversion of recording direction
root	Root extraction
Li-1	1st alarm value
Li1-F	Function 1st alarm value
Li1do	Output 1st alarm value
Li1tE	Text line 1st alarm value
Li-2	2nd alarm value
Li2-F	Function 2nd alarm value
Li2do	Output 2nd alarm value
Li2tE	Text line 2nd alarm value
PAP .L	Setting left chart margin
PAP .r	Setting right chart margin

Signal type

Having selected the signal type parameter, the signal types listed below can be selected as parameter values. On selecting a signal type, the nominal measuring range is also selected. The parameters “Lower-range value” and “Upper-range value” are set to the limits of the nominal measuring range.
If the signal type is not changed, the (previously) set values of the “Lower-range value” parameters and “Upper-range value” also remain unchanged.

Types of measurement and nominal measuring ranges of the standard model

Reading on display	Parameter (measurement type)	Parameter value (nominal measuring range)
oFF	Channel off	off
0..20	0...20 mA	0...20 mA
4..20	4...20 mA	4...20 mA
I-20b	±20 mA	-20...20 mA
U-10b	±10 V	-10...10 V

Types of measurement and nominal measuring ranges of the universal model

⚠ 11 Caution

Modifications of the nominal measuring ranges of universal models partly need material adaptation via plug-in jumpers on the channel card (see Operating Instructions, section “Changing measuring ranges”).

Reading on display	Parameter (measurement type)	Parameter value (nominal measuring range)
oFF	Channel off	off
0..20	0...20 mA	0...20 mA
4..20	4...20 mA	4...20 mA
I-20b	±20 mA	-20...20 mA
U-20b	±20 mV	-20...20 mV
U-75b	±75 mV	-75...75 mV
Pt .I	Pt100 I	-50...150 °C
Pt .II	Pt100 II	- 50...500 °C
tc .b	Thermocouple Type B	100...1820 °C
tc .E	Thermocouple Type E	0...1000 °C
tc .J	Thermocouple Type J	0...1200 °C
tc .K	Thermocouple Type K	0...1372 °C
tc .L	Thermocouple Type L	0...900 °C
tc .n	Thermocouple Type N	0...1300 °C
tc .r	Thermocouple Type R	0...1769 °C
tc .S	Thermocouple Type S	0...1769 °C
tc .t	Thermocouple Type T	0...400 °C
tc .U	Thermocouple Type U	0...600 °C

Unit for temperature measurements

Select the temperature unit. This parameter is displayed only if temperature measurement with thermocouples or resistance thermometers has been selected for signal type.

Parameter

Unit for temperature measurements

Parameter value

°C
°F

Reference junction

An internal or external reference junction temperature compensation is used for thermocouple measurements. This parameter is displayed only if a thermocouple has been selected for signal type.

Parameter
Reference junction compensation

Parameter value
internally / 0 °C / 20 °C / 50 °C / 60 °C

Pt100 connection technique

A 2-wire or 3-wire connection technique can be implemented for temperature measurement with resistance thermometers. This parameter is displayed only if “Pt.1” or “Pt.11” has been selected for signal type.

Parameter
Pt100 connection technique

Parameter value
3L 3-wire circuit
2L 2-wire circuit

Pt100 line resistance

External line balancing is needed for a resistance thermometer connection in a 2-wire circuit. The resistance of the lines must be adjusted to the selected resistance. This parameter is displayed only if the Pt100 connection technique “2−wire circuit” has been selected.

Parameter
Line resistance for 2-wire Pt100

Parameter value
0 Ω / 10 Ω / 20 Ω / 40 Ω

Sensor break for Pt100 and thermocouples

This parameter determines the direction of movement of the measuring system in the event of a sensor break when using Pt100 thermocouples.

Parameter
Pointer position for sensor break

Parameter value

AL.0	the pointer moves to the zero point in the event of a sensor break
AL100	the pointer moves to the scale end in the event of a sensor break

---

Lower-range value and upper-range value for measuring ranges

Fixed nominal ranges are specified with this signal type. A split range can be implemented within the nominal ranges. The measuring range formed may be a minimum of 20 % and a maximum of 100 % of the nominal range. The lower-range value may be between 0...80 % of the nominal range.

Parameter
Lower-range value
Upper-range value

Parameter value
−1000...+9999

Scaling lines

If the recorder is equipped with a printer system, up to four double lines can be recorded. The first line of the double line is implemented as a scaling line. The scaling range is defined in the parameters “Lower-range value” and “Upper-range value”. Both parameters are switched off if parameters have been defined for the thermocouple or thermometer ranges. The following applies for these ranges: Measuring range = Scaling range

Parameter
Lower-scaling value
Upper-scaling value

Parameter value
−1000....9999

Scaling unit of measurement

Previously defined scaling units of measurement can be selected in this parameter. Units of measurements not listed must be defined with the parameter definition programme and entered into the recorder via the RS 485 interface.

Parameter
Scaling unit of measurement

Parameter value
00 Text
01 mA
02 A
03 mV
04 V
05 bar
06 mbar
07 Pa
08 kPa
09 °C
10 °F
11 K
12 m^3/h
13 l/sec
14 %
15 ‰
16 MW
17 1/min

Attenuation

Attenuation can be set for unsteady measured values.

Parameter
Attenuation

Parameter value in s
0...60

Inversion of the recording direction

In this parameter, the movement direction of the pointer can be selected for an increasing measured value. The default setting is: With increasing measured value, the pointer moves from left to right.

Parameter
Inversion of the recording direction

Parameter value
100 − 0 Pointer moves from right to left
0 − 100 Pointer moves from left to right

Square root extraction

A square root extraction function can be switched on for all current and voltage measuring ranges.

Parameter
Square root extraction

Parameter value
on
off

Alarm values

Two alarm values can be set in the recorder for each measuring channel. Minimum or maximum can be selected as alarm value function. The hysteresis is permanently set with 2 %. Four alarm value relays can be installed optionally in the recorder. These relays are freely assignable to the alarm values of the channels. The setting is effected in the value units of the measuring range in relation to the split range.

First/second alarm value

Parameter
1st alarm value
2nd alarm value

Parameter value
−1000...9999

Alarm value function

Parameter
Alarm value function

Parameter value
min
max

Relay output for alarm values

Assignment of the alarm value to the relays and hence to the binary outputs (DO).

Parameter
Output 1st alarm value
Output 2nd alarm value

Parameter value

off	no assignment
DO1	assignment relay 1
DO2	assignment relay 2
DO3	assignment relay 3
DO4	assignment relay 4

Text line printout alarm value

Parameters “Li1.tE” and “Li2.tE” are only displayed if a printer and measuring channel is integrated in the recorder.With these parameters it is possible to assign a text line to an alarm value. The assigned text line is printed in case of an out-of-limit alarm.

Parameter

Li1.tE	Text line for alarm value 1
Li2.tE	Text line for alarm value 2

Parameter value

0	no assignment
1...8	Text line 1...8

Setting scale ⟷ measuring system

With <▲> and <▸>, the zero and span of the channel can be brought into line with the zero and span scale.

Parameter

Setting the scale start
Setting the scale end

Parameter value

press <▲> or <▸> and effect alignment

Print intervals

This main menu item is displayed only if a printer and measuring channel has been installed in the recorder. The following parameters can be called in the main menu item “Print intervals”:.

Reading on display	Parameter
ALPH1	Text line 1
ALPH2	Text line 2
...	
ALPH8	Text line 8
uALUE	Measured value table of the active channels
dAtE	Date/time

Text lines

With cyclical control of the text line printout, the interval times per text line are entered into the parameters “Text line 1” to “Text line 8”.

Parameter

Text line 1
Text line 2
...
Text line 8

Parameter value

off
15 min
30 min
1 h
2 h
3 h
6 h
12 h
24 h

Measured value table of the active channels

If this parameter is set to active mode (by selecting a print interval), the recorder prints cyclically the measured values of the active channels. Printout is effected in the value units of the scaling range. The measured value is completed with the time specification.

Parameter

Measured value table of active channels

Parameter value

off
15 min
30 min
1 h
2 h
3 h
6 h
12 h
24 h

Date / time

This parameter permits recording of time and date at certain intervals (at least once daily). This function obviates the need for daily imprinting of the chart.

Parameter

Date / time

Parameter value

off
15 min
30 min
1 h
2 h
3 h
6 h
12 h
24 h

Print synchronization times

This main menu item is displayed only if a printer and measuring channel has been installed in the recorder. The following parameters can be called in the main menu item “Print synchronization times”:

Reading on display	Parameter
ALPH1	Text line 1
ALPH2	Text line 2
...	
ALPH8	Text line 8
uALUE	Measured value table of the active channels
dAtE	Date/time

Text lines

With cyclical control of the text line printout, the times on which the print intervals of the text lines are based are specified in the parameters “Text line 1” to “Text line 8”.

Parameter
Text line 1
Text line 2
...
Text line 8

Parameter value
off
00:00 time

Measured value table of the active channels

With cyclical control of the printout of the measured value table, the times on which the respective print interval is based are specified in the parameters “Measured value printout of the active channels”.

Parameter
Measured value printout of the active channels

Parameter value
off
00:00 time

Date / time

With cyclical control of the printout of the date/time line, the times on which the respective print interval is based are specified in the parameter “Date / time”.

Parameter
Date / time

Parameter value
off
00:00 time

Assignment of the binary inputs to printer functions

This menu item is displayed only if a printerand measuring channel has been installed in the recorder and the option “binary inputs/outputs” has been selected. Two binary inputs are available for external initiation of the recording of event markers or text printout. The following parameters can be called in the main menu item “assignment of the binary inputs”.

Reading on display	Parameter
EuE .1	Event marker 1
EuE .2	Event marker 2
ALPH1	Text line 1
ALPH2	Text line 2
...	
ALPH8	Text line 8
uALUE	Measured value table of the active channels
dAtE	Date/time

Event markers

Two event markers can be recorded in addition to the measured values. Recording of the event marker 1 is effected at 2.5 % of the scale length. Event marker 2 is recorded at 5 % scale length.

Parameter
- Event marker 1
- Event marker 2

Parameter value
- off
- DI 1
- DI 2

Text lines / measured value table / date/time line

Two binary inputs are available for external print initiation of texts.

Parameter
- Text line 1
- Text line 2
- ...
- Text line 8
- Measured value active channels
- Date / time

Parameter value
- off
- DI 1
- DI 2

Special functions

The following parameters can be called in the main menu item “special functions”:

Reading on display	Parameter	Reading on display	Parameter
SiTYP	Simulation type	Pr.oFS	Printer channel offset alignment
SiPEr	Simulation period	Pr.rnG	Printer channel span alignment
init	Basic setting parameters	TEMP	Terminal temperature display
PEnAb	Interlock of the parameter definition level	PALEn	Paper length entry
TESt	Display test	PAdo	Relay output for end-of-paper signalling
LiSt	Listing	PArSt	Remaining length of recording paper

Simulation

Test signals are generated during simulation in the recorder without having to connect a generator to the input terminals. These signals are subjected to measured value processing and are recorded.

Parameter
Simulation type
Simulation period

Parameter value (simulation type)
off
RAMP
SINUS
STEP (in 10 % steps)

Parameter value (simulation period)
20....2000 s

The chart speed must be set accordingly in the simulation period.

Basic setting parameters

In this menu item, the parameter values of the factory settings are loaded.

Parameter
Basic setting parameters

Parameter value
Press <↵>. The parameter values of the basic setting are entered.

Interlock of the parameter definition level

The parameter definition mode can be inhibited in this parameter. The parameter definition mode becomes accessible only by applying a voltage of 24 V DC to the selected input (DI).

Parameter
Interlock of the parameter definition mode

Parameter value
off
DI 1
DI 2

Display test

All segments of the 7-segment display are switched on in the display test.

Parameter
Display test

press <↵>

Parameter value

Listing

If the recorder features a printer system, the parameter definition is output via the printer system in this parameter. The printing duration can be up to 1 hour, depending on the recorder complement. Printing can be inhibited by removing the chart unit. Listing printout is not resumed after reinstalling the chart unit.

Parameter
Listing

Parameter value
off
on

After selection and confirmation of “on”

is shown on the display. The recorder waits for the chart unit to be installed. Having installed the chart unit, listing printout is immediately resumed.

Printer channel offset / span alignment

With <▲> and <▶>, the zero and span of the printer channel can be brought into line with the zeropoint scale and span.

Parameter
Printer channel offset alignment
Printer channel span alignment

Parameter value
press <▲> or <▶> and effect alignment

Reference junction temperature display

On selecting the menu item “display of the terminal temperature” the temperature of the internal reference junction is displayed.

Parameter
Display of the terminal temperature

Parameter value
press <↵>
e.g. +35 °C is displayed

End-of-paper monitoring

After loading of the recording paper enter paper length in parameter “PA.LEn”, considering the negative paper length tolerance. In parameter “PA.do” select relay contact for end-of-paper signalling. The end-of-paper signal is output 2 hours before the end of paper is reached independently from the feedrate. Parameter “PA.rSt” can display the remaining paper length.

Parameter
Paper length

Parameter value
0.0...32.0

Parameter
Relay contact for end-of-paper signalling

Parameter value
off
DO1
DO2
DO3
DO4

Parameter
Remaining paper length

Parameter value
press <↵>
remaining paper length is diplayed

Error messages

The error messages are displayed on the monitor in the following manner:

E x x z z

The two figures at position xx represent the cause of the error. The two figures yy are arbitrary.

Indication	Error classification
E01 . .	CPU fault
E02 . .	Fault in internal RAM
E03 . .	Fault in external RAM
E04 . .	Clock module fails to respond
E05 . .	Time for measured value acquisition overshot
E06 . .	EEPROM on CPU card does not respond to read command
E07 . .	EEPROM on channel card does not respond to read command
E08 . .	Test sum for calibration data incorrect
E09 . .	Test sum for parameterization incorrect
E10 . .	EEPROM on the channel card cannot be written to
E11 . .	EPROM on the CPU card cannot be written to
E12 . .	Watchdog initiates unit reset
E13 . .	Printer queue is full
E14 . .	Print head does not move
E15 . .	Voltage interruption for clock module
E16 . .	Speed is too high for text print
E17 . .	Channel card cannot process the selected input
E18 . .	Oscillator watchdog initiates unit reset. Further operation of the recorder operator panel is only possible after acknowledgement of the error message. Acknowledgement is effected by pressing <↵>.

The input parameter values are checked for plausibility during parameterization of the recorder. In case of incorrect inputs, the following error messages are displayed: These messages must be acknowledged; only then it is possible to make a new input.

E-Hi	Value is too big
E-Lo	Value is too small
E-rng	Range is too limited

More error messages:

E9000	wrong password
E9001	Values cannot be changed (by stating 9999)
E9002	No access to parameterization (blocked via DI)
E9003	Listing aborted through removal of chart unit

Subject to technical changes.

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