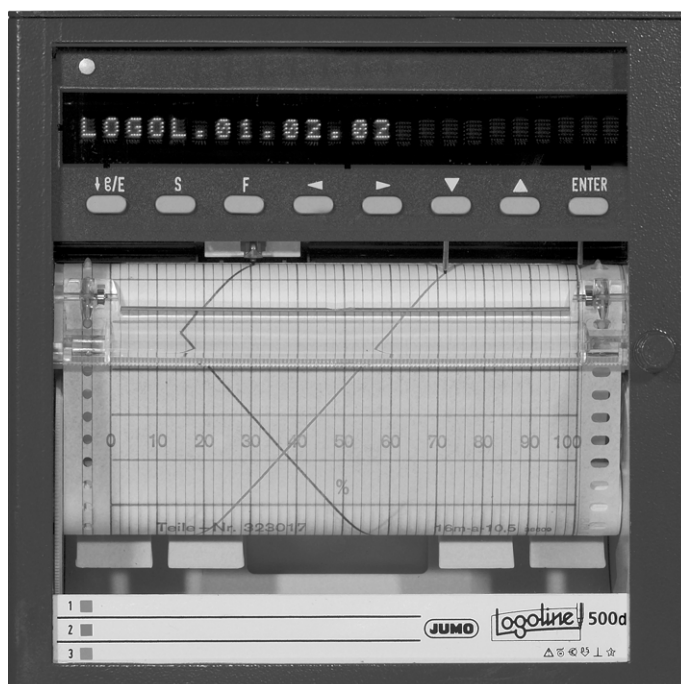


c **RA**[®] **US**



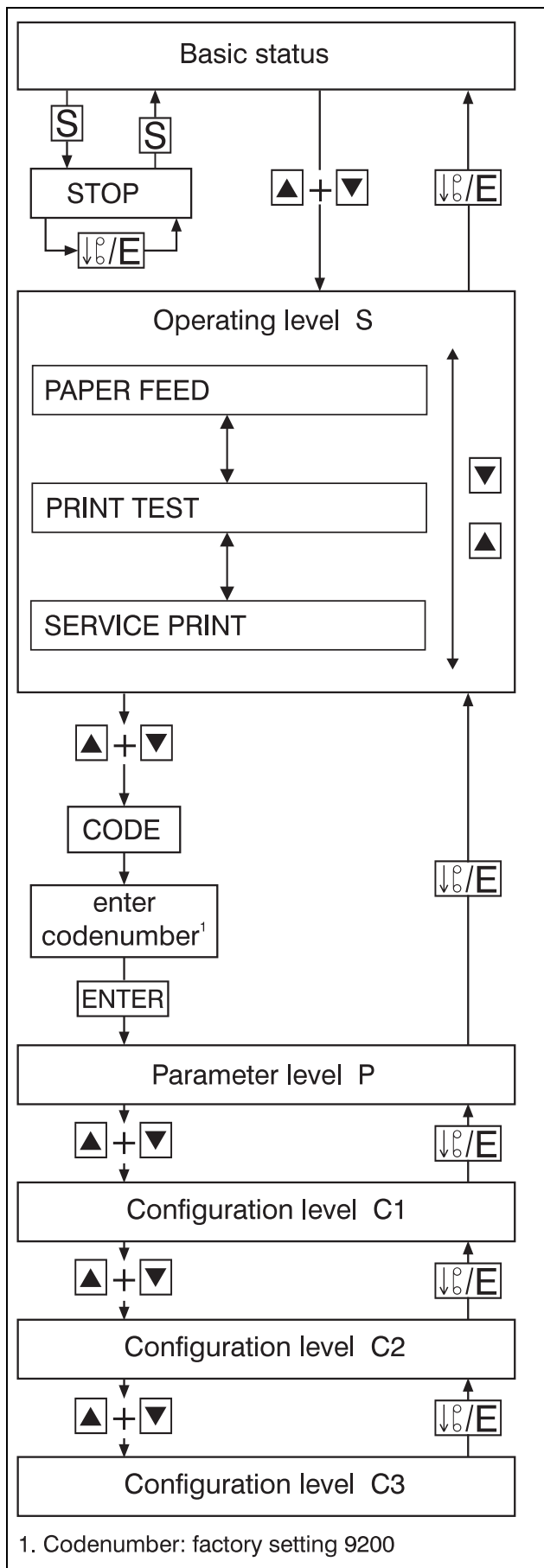
LOGOLINE 500d

Pen recorder with text printing
and LED dot matrix display

B 70.6021.0 **Operating Manual**

2011-01-19/00331468

Levels and key functions



Key functions

	<ul style="list-style-type: none"> - Chart fast forward when recording is stopped (in basic status) - Aborting parameter input (Exit) - Level change backwards
	<ul style="list-style-type: none"> - Start/Stop recording - Decimal place selection during value input - For text input: rapid character selection (jump to " ", "0", "A", "a", "o", "2", "À", "à")
	<ul style="list-style-type: none"> - Function key for special function (hold down at least 4sec) <p>factory setting: scale printout</p>
	- Cursor left/right (select digit)
	- Deactivate/activate display of status/error messages
	<ul style="list-style-type: none"> - Select display: <ul style="list-style-type: none"> - date and time - channel measurements - bargraph - system states - Parameter selection - Channel selection - Value selection from value table - Increment/decrement current digit
	- Level change forwards
	<ul style="list-style-type: none"> - Initiate parameter input - Enter input - Acknowledge error message - Activate/ deactivate static display (in basic status)

Contents

1	About this Manual	6
1.1	Introduction	6
1.2	Arrangement of the documentation	7
1.3	Typographical conventions	8
1.3.1	Warnings	8
1.3.2	Notes	8
1.3.3	Presentation	9
2	Identifying the instrument version	10
2.1	Instrument description	10
2.2	Type designation	11
2.3	Accessories	12
3	Installation	13
3.1	Location and climatic conditions	13
3.2	Fitting in position	14
4	Electrical connection	15
4.1	Notes on installation	15
4.2	Connection diagram	16
5	Starting up	18
5.1	Display and controls	18
5.2	Opening and closing the door	18
5.3	Marking the channel label	18
5.4	Fitting the fibre pens	19
6	Preparation	20
6.1	Operating modes and status	20
6.2	Operating principle	22
7	Text printing	30
7.1	Printing priorities	30
7.2	Printing modes	33
7.3	Clock time	35
7.4	Scaling	36
7.5	Changing the chart speed	38
7.6	Recording start and end	40
7.7	External text, binary-linked text, relay texts	41
7.8	Incrementing the event counter	43
7.9	Statistical report	44
7.10	Print test	45
7.11	Service print	46

Contents

8	Programming	47
8.1	Basic status	47
8.2	Operating level	49
8.2.1	Chart speed	50
8.2.2	Print test	51
8.2.3	Service print	52
8.2.4	Level inhibit and code request	53
8.3	Parameter level	55
8.3.1	Language	56
8.3.2	Date and time	57
8.3.3	Summer time	58
8.3.4	Display brightness	59
8.3.5	Relay limits	60
8.3.6	Display of time	61
8.4	Configuration level 1	62
8.4.1	Writing status	63
8.4.2	Measurement/signal input	64
8.4.3	Scaling	73
8.4.4	Channel designation	74
8.4.5	Limit operation	75
8.4.6	Plotarea (zoom)	76
8.4.7	Presentation range (offset)	77
8.5	Configuration level 2	78
8.5.1	Instrument designation	80
8.5.2	Speed programming mode	81
8.5.3	Speed limit operation	82
8.5.4	Timed operation	83
8.5.5	Scale printing	84
8.5.6	Time printing	85
8.5.7	Pen offset compensation	86
8.5.8	Statistical report	87
8.5.9	Text at beginning	88
8.5.10	Text at end	89
8.5.11	Presetting	90
8.5.12	Codenummer	91
8.6	Configuration level 3	92
8.6.1	Relay output	93
8.6.2	Maths and logics module	95
8.6.3	Interface	96
8.6.4	External text	98
8.6.5	Binary-linked external text	99
8.6.6	External stop	100
8.6.7	External speed	101
8.6.8	Event counter	102
8.6.9	External scaling	103
8.6.10	External report	104

Contents

9	Consumables	105
9.1	Summary of consumables	105
9.2	Removing and replacing the chart cassette	106
9.2.1	Changing the roll chart	108
9.2.2	Changing the fanfold chart	109
10	Extra Codes and accessories	110
10.1	Converting the chart cassette	110
10.2	Extra Code 259	111
10.3	External relay module ER8	112
10.4	Setup program	115
10.5	Maths and logics module	117
10.6	Interface (RS422/RS485)	118
11	Fault finding	119
11.1	What to do if... ..	119
12	Appendix	121
12.1	Technical Data	121
12.2	Error messages	125
12.3	Hardware fault	127
12.4	Status messages	128
12.5	Character set	129
12.6	Summary of the parameters	130
13	Index	132

1 About this Manual

1.1 Introduction



Please read this Manual before starting up the instrument. Keep the Manual in a place which is at all times accessible to all users.

Please assist us to improve this Manual where necessary.

Your suggestions will be most welcome.

Phone

in Germany (0661) 6003-727

from abroad (+49) 661 6003-0

Fax

in Germany (0661) 6003-508

from abroad (+49) 661 6003-607



All necessary settings and, where appropriate, alterations inside the instrument are described in this Operating Manual. However, if any difficulties should arise during start-up, please do not carry out any manipulations. You could endanger your rights under the instrument warranty!

Please contact the nearest subsidiary or the head office in such a case.



When returning modules, assemblies or components, the regulations of EN 61340-5-1 and 61340-5-2 "Protection of electronic devices from electrostatic phenomena" must be observed. Use only the appropriate **ESD** packaging for transport.

Please note that we cannot accept any liability for damage caused by ESD.

ESD = electrostatic discharge

1 About this Manual

1.2 Arrangement of the documentation

The documentation for this instrument consists of the following parts:

Operating Manual B 70.6021.0

This Operating Manual is always supplied with the instrument. It is addressed to the OEM (original equipment manufacturer) and to the user with appropriate technical know-how.

In addition to installation and electrical connection it contains all the information on instrument start-up, operation and parameter setting.

Interface Description B 70.6001.2

This Operating Manual is supplied with the instrument, if one of the interfaces (RS422 or RS485) has been ordered. It provides information on communication with higher-level (supervisory) systems.

Online help

The online help is part of the setup program. It is a Windows¹ online help.



Section 10.4

1. Microsoft und Windows are registered trademarks of the Microsoft Corporation

1 About this Manual

1.3 Typographical conventions

1.3.1 Warnings

The signs for **Danger** and **Warning** are used in this Manual under the following conditions:



Danger This symbol is used when there may be **danger to personnel** if the instruction is disregarded or not followed accurately.



Warning This symbol is used when there may be **damage to equipment or data** if the instruction is disregarded or not followed accurately.



Warning This symbol is used where precautions have to be observed during the handling of components which may be damaged by electrostatic discharges.

1.3.2 Notes



Note This symbol is used if your **special attention** is drawn to a remark.



Reference This symbol refers to additional information in other handbooks or sections.

abc¹

Footnote Footnotes are notes which refer to certain points in the text. Footnotes consist of 2 parts:


Markings in the text and the footnote text.

The markings in the text are arranged as continuous raised numbers.

1 About this Manual

* **Action** This symbol indicates that an action is being described.

The individual steps are indicated by this symbol, e.g.:

* press key 

* enter with 

1.3.3 Presentation

+

Keys Keys are shown as boxes. Both symbols and text are possible. Where a key has multiple functions, the text shown is the one corresponding to the actual functions discussed.

*Program
manager*

**Screen
texts** Texts displayed in the setup program are identified by italics.

*Edit →
instrument data...*

Menu items Menu items of the setup program which are referred to in this Manual are shown in italics. Menu name, menu item and submenu item are each separated by the symbol "→".

2 Identifying the instrument version

2.1 Instrument description

The pen recorder provides 1, 2 or 3 channels for recording; the channels are isolated from each other by optocouplers. Channel 1 can be used to write text in addition to the signal trace. All three channels are zeroed using Hall sensors.

A 24-place 5x5 LED dot matrix display is available for signal indication and programming. Operation is by eight keys on the instrument front and via a setup program using a PC. The configuration data are stored permanently in EEPROM.

Input signals include resistance thermometers, resistance transmitters, thermocouples, standard current and voltage signals. The necessary linearisation is performed automatically. Eight logic inputs are available for operating functions. An external relay module ER8 for rail mounting supplements the pen recorder by eight switching outputs. A 2-wire transmitter can be operated from an isolated supply. The watchdog monitors the recorder operation and triggers a restart in case of a fault. On a power failure the real-time clock is supplied by a lithium battery or a storage capacitor.

A summary of all recorder parameters is given in the Appendix (⇒ Section 12.6).

2 Identifying the instrument version

2.2 Type designation

The label is affixed to the housing. The instrument version can be identified from the type designation.

The extra Codes are listed in sequence and separated by a comma.

The voltage of the supply must agree with the voltage shown on the label.

(1) Basic version

706021	LOGOLINE 500d with 1 universal input and text output
706022	LOGOLINE 500d with 2 universal inputs and text output (via channel 1)
706023	LOGOLINE 500d with 3 universal inputs and text output (via channel 1)

(2) Inputs 1 — 3 (programmable)

x x x	8	factory-set
x x x	9	configuration to customer specification ¹

(3) Interface

x x x	00	not assigned
x x x	52	RS422, Jbus, Modbus
x x x	53	RS485, Jbus, Modbus

(4) Supply

x x x	22	20—53V AC/DC +0/-0% 48—63Hz
x x x	23	110—240V AC +10/-15% 48—63Hz

(5) Extra codes

x x x	020	lithium battery for RAM buffer (ex-factory)
x x x	021	storage capacitor for RAM buffer (instead of extra code 020)
x x x	259	8 logic inputs, interface for external relay module (ER8), voltage output 24V 50mA DC
x x x	265	door with lock (IP54)
x x x	266	IP65 seal, wide fixing brackets
x x x	350	universal carrying case TG-35 ²
x x x	351	housing with carrying handle ³

	(1)	(2)	(3)	(4)	(5)					
Order code	<input type="text"/>	/	<input type="text"/>	-	<input type="text"/>	-	<input type="text"/>	/	<input type="text"/>	, ... ⁴
Order example	706023	/	8	-	00	-	23	/	020	

1. Please specify probe types and measurement ranges in plain text.
2. This extra code is available in combination with supply voltage 110—240V AC, not with low supply voltage. UL approval is not available.
The protection type in the carrying case corresponds to IP20, outside IP20D.
3. UL approval is not available.
4. Extra codes are listed in sequence and separated by a comma.

2 Identifying the instrument version

Standard accessories

- 1 Operating Manual B 70.6021.0
- 2 Mounting brackets
- 3 cable-tie with foot (can be released)
for tension relief of the sensor leads
connected
- 1 Fibre pen, disposable, for each channel
- 2 Chart rolls 16m long
or
1 Chart roll 32m long
(with Code r32)
or
1 Fanfold chart pack 16m long
(with Code fp)

2.3 Accessories

- PC interface with TTL/RS232 converter
- PC interface with USB/TTL converter
- Setup program



Section 10.4

External relay module ER8



Section 10.3

3 Installation

3.1 Location and climatic conditions

The instrument location should as far as possible be free from shock and vibration. Stray electromagnetic fields, e.g. from motors, transformers etc., should be avoided where possible.

The ambient temperature at the location may be between -10 and $+50$ °C at a relative humidity not exceeding 75 %, without condensation.

Corrosive air or fumes may interfere with the function and life of the recorder.

 Section 4.1

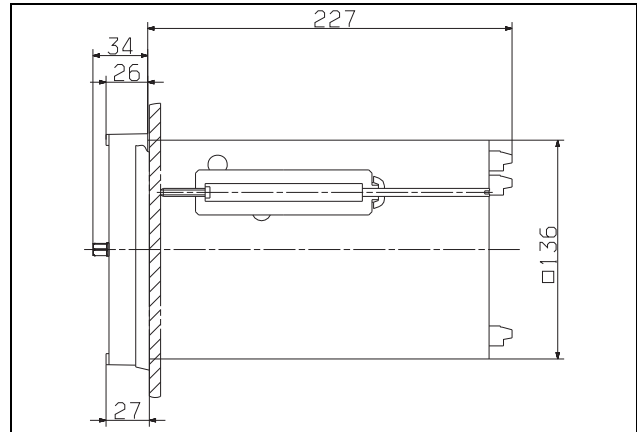
 Section 12.1

3 Installation

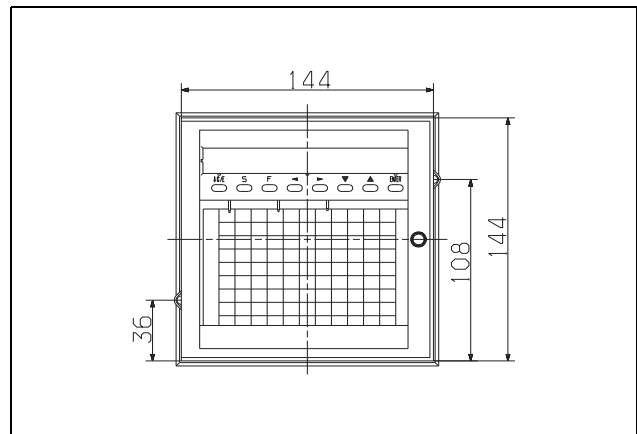
3.2 Fitting in position

Side view

(dimension 26 increased to 27 when using the IP65 seal)

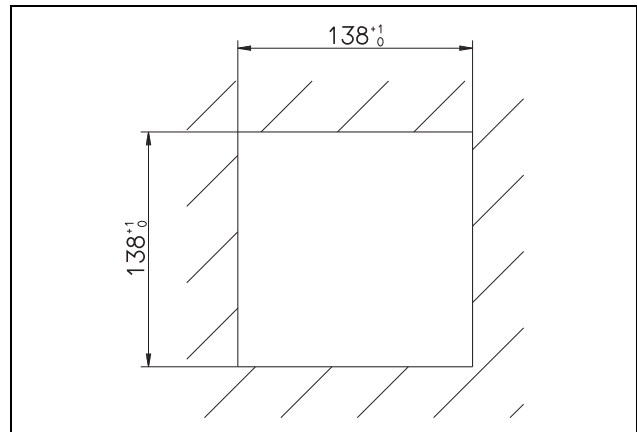


Front view

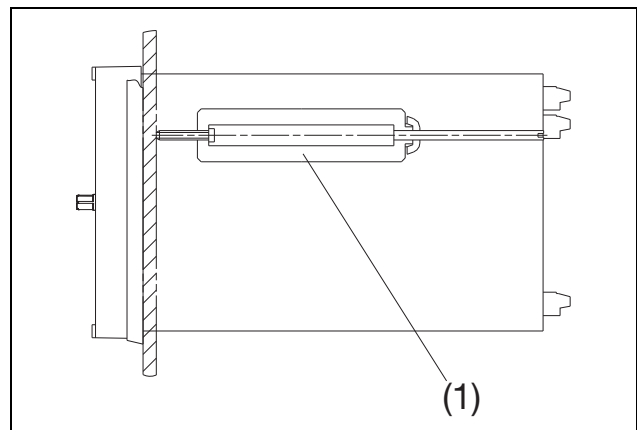


Panel cut-out

mm	inch
22.5	0.89
30	1.2
36	1.42
60	2.4
100	3.94
108	4.25
110	4.33
120	4.72
136	5.35
138 ⁺¹	5.43 ^{+0.04}
144	5.67
227	8.94
16 m	53 ft
32 m	107 ft
1.5 mm ²	0.0025 in ²
2.5 mm ²	0.004 in ²



- * Insert the recorder from the front into the panel cut-out.
- * From the back of the panel, hook the mounting brackets (1) into the cut-outs in the sides of the housing. The flat bracket faces must lie against the housing.
- * Place the brackets against the rear of the panel and tighten them evenly.



4 Electrical connection

4.1 Notes on installation

- ❑ The choice of cable, the installation and the electrical connection of the instrument must conform to the requirements of VDE 0100 “Regulations on the Installation of Power Circuits with nominal voltages below 1000V” or the appropriate local regulations.
- ❑ Earth the instrument at terminal PE to the earth conductor. This line should have at least the same cross-section as the supply lines. Earth lines should be run in a star layout to a common earth point which is connected to the earth conductor of the supply. Do not loop the earth connections, i.e. do not run them from one instrument to another.
- ❑ Work inside the instrument must only be carried out to the extent described and, like the electrical connection, only by properly qualified personnel.
- ❑ Do not connect any additional loads to the supply terminals of the instrument.
- ❑ If contact with live parts is possible when working on the instrument, it has to be isolated on both poles from the supply.
- ❑ The instrument is not suitable for installation in hazardous areas.
- ❑ Electromagnetic compatibility (EMC) conforms to the standards and regulations listed under Technical Data.
⇒ Section 12.1
- ❑ Inductive loads in the neighbourhood of the instrument, such as contactors or solenoid valves, should be fitted with RC modules for interference suppression.
- ❑ Run input, output and supply lines separately, and not parallel to each other.
- ❑ The instrument must be provided with external fusing and disconnection. Depending on the supply voltage, the following fuse values apply for the external fusing:

20 — 53V AC/DC, 48 — 63Hz
fuse 5A slow

93 — 263V AC, 48 — 63Hz
fuse 5A slow
- ❑ All input and output lines that are not connected to the supply network must be laid out as shielded and twisted cables. The shielding must be grounded to the earth potential on the instrument side.

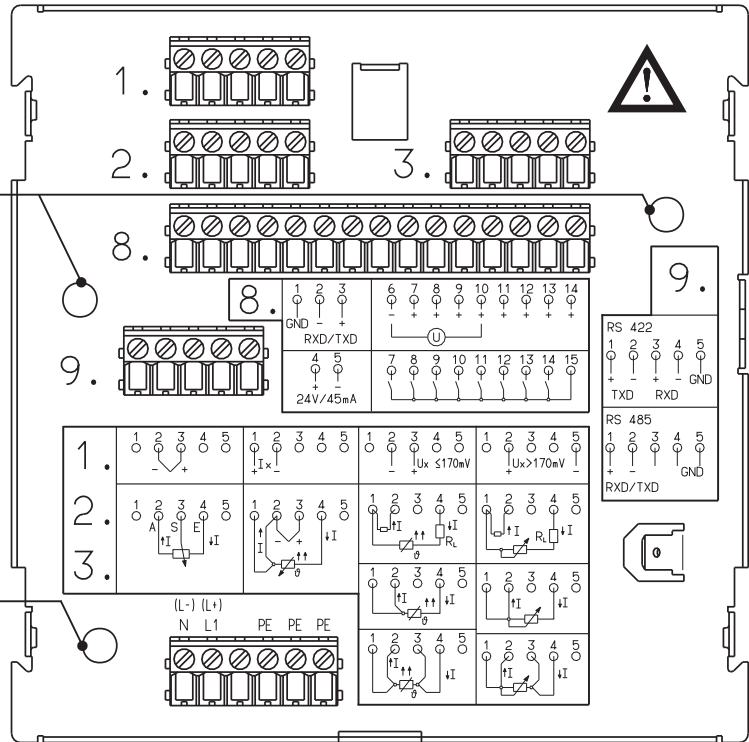
4 Electrical connection

4.2 Connection diagram



The electrical connection must only be carried out by properly qualified personnel.

recesses for cable-tie with foot for tension relief



Rear view with screw-clamp connectors

Terminals				
Supply as on label	N neutral L1 line PE potential earth	N (L-) L1 (L+) PE		(L-) (L+) N L1 PE PE PE 1 2 3 4 5 6
Analogue inputs	Input 1	Input 2	Input 3	
Voltage input up to 170 mV	Field	Field	Field	1 2 3 4 5 - + U _x ≤ 170mV
Voltage input above 170 mV				1 2 3 4 5 + U _x > 170mV -
Current input				1 2 3 4 5 + I _x -
Thermocouple				1 2 3 4 5 - +
Thermocouple with external Pt 100 cold junction				1 2 3 4 5 + I _x -

4 Electrical connection

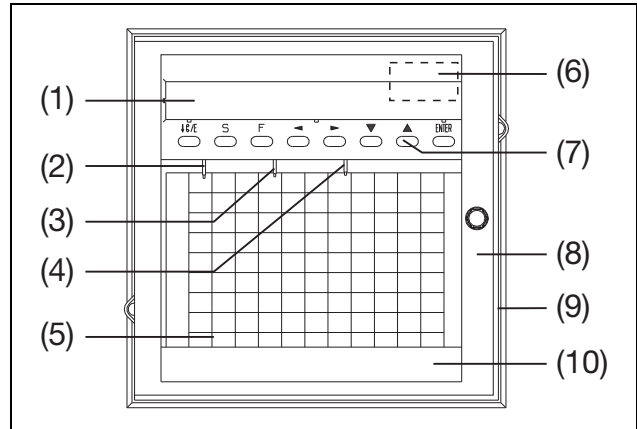
Analogue inputs	Input 1	Input 2	Input 3	
Resistance thermometer/ potentiometer in 2-wire circuit	Field	Field	Field	<p>* $R_{comp} = R_{line}$</p>
Resistance thermometer/ potentiometer in 3-wire circuit	1.	2.	3.	
Resistance thermometer/ potentiometer in 4-wire circuit				
Resistance transmitter with 3-wire connection				<p>A = start S = slider E = end</p>

External relay module ER8	Communication with ex- ternal relay module ER8	Field	
Supply for external 2-wire transmitter	24V \pm 5%, 45 mA	8.	
Logic operating inputs	Contact operation LOW = $R_{OFF} \geq 100k\Omega$ min. HIGH = $R_{ON} \leq 50\Omega$ max.		<p>Terminal 7 = logic input 1 ... Terminal 14 = logic input 8</p>
Minimum pulse duration: HIGH 500 msec LOW 500 msec	Voltage operation LOW = 0 — 5 V DC (not activated) HIGH = 20 — 35 V DC (activated)		<p>Terminal 7 = logic input 1 ... Terminal 14 = logic input 8</p>
Serial interface RS422 or RS485	Communication with higher-level systems	9.	<p>RS 422 RS 485</p>

5 Starting up

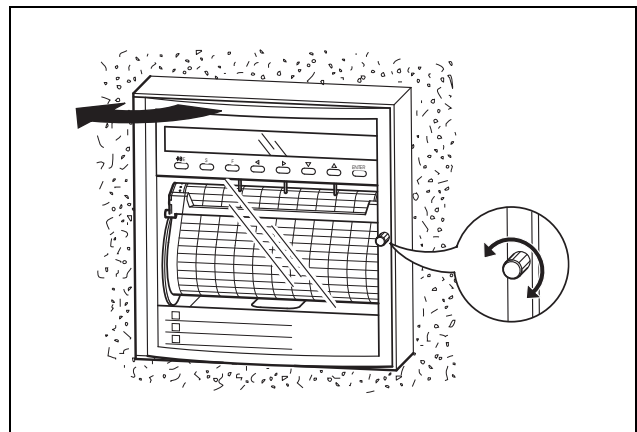
5.1 Display and controls

- (1) 24-position 5x5 dot matrix LED display
- (2) fibre pen, channel 3, green
- (3) fibre pen, channel 2, red
- (4) fibre pen, channel 1, blue
- (5) chart
- (6) setup interface
(behind swing-up LED dot matrix display)
- (7) keys for operation and programming
- (8) door
- (9) housing to DIN 43700 for flush panel mounting, galvanised steel
- (10) channel marker label



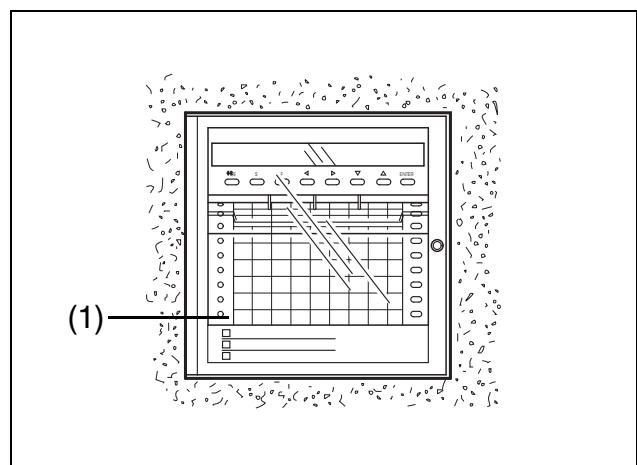
5.2 Opening and closing the door

Turn the knob to open or close the door.



5.3 Marking the channel label

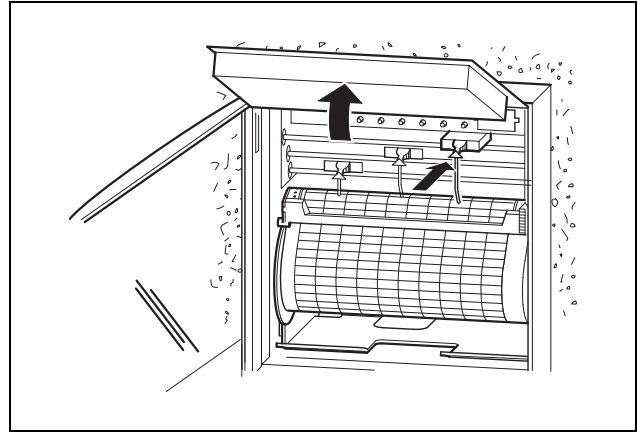
Please mark the channel label (1) with the measurement channel designation and the corresponding range (plot area and offset where appropriate).



5 Starting up




5.4 Fitting the fibre pens

- * Open the recorder door
- * Stop recording
(e.g. press key **S**)
- * Swing display upwards
- * Slide the fibre pen into the holder up to the stop
- * Swing display down again until it clicks home.



6 Preparation

6.1 Operating modes and status

Operating mode/status	Description
Basic status	<p>Basic status of the recorder with signal acquisition and processing.</p> <p>The display shows, depending on setting:</p> <ul style="list-style-type: none">- instrument designation, date and time- one channel and its measurement as number or bargraph- or status/error messages. <p>The display can be altered during recording, using the keys  and .</p> <p>If there is a status/error message, it is shown flashing at regular intervals instead of the current display.</p>
Stop	
Stop by key	Recording is stopped and continued using key  . In the stop status the display flashes STOP.
Stop via external stop	External stop can be operated through a signal at a logic input on the back of the recorder. In the external stop status the display flashes EXTERNAL STOP.
Chart speeds	
Normal chart speed	The chart is advanced at the speed programmed under chart speed. ⇒ Section 8.2.1
Limit operation	When input goes above/below the programmed limits, the recorder switches to the chart speed programmed under "limit feed". ⇒ Section 8.4.5 Section 8.5.3 Section 10.4
External speed	On a signal applied to a logic input at the back of the recorder, it switches to the chart speed programmed under "feed extern". ⇒ Section 8.6.7 Section 10.4

6 Preparation

Operating mode/status	Description
Timed operation	<p>This chart speed applies within a programmable time period. Outside this period the chart is advanced at the speed programmed as normal speed.</p> <p>⇒ Section 8.5.4 Section 10.4</p>
Recording	
Scaling	<p>The scale can be printed in two different modes:</p> <p>cyclic: for each channel at a configured spacing</p> <p>triggered: for all channels by pressing key (key F, hold down at least 4 sec) or by closing a logic input</p> <p>⇒ Section 7.4 Section 8.4.3</p>
Plotarea	<p>During plotarea operation a portion of the total measuring range of a trace is recorded to a larger scale.</p> <p>⇒ Section 8.4.6 Section 10.4</p>
Offset	<p>Using the parameter “offset” it is possible to define the presentation range of a trace on the chart.</p> <p>⇒ Section 8.4.7 Section 10.4</p>
Pen offset compensation	<p>There is an offset of several millimetres between the fibre pens of the individual channels.</p> <p>When pen offset compensation is switched on, this pen offset is compensated automatically.</p> <p>⇒ Section 8.5.7 Section 10.4</p>

6 Preparation

6.2 Operating principle

The individual parameters and functions are divided into three levels for clearer operation of the recorder:

Basic status

Basic status of the recorder with signal acquisition, recording, indication and processing.

The display shows, depending on setting:

- instrument designation, date and time (the time can be switched off via the parameter *parameter level* → *display time*)
- one channel and its measurement as a number or bargraph
- or system error messages.

The display can be altered during recording using the keys ▲ and ▼.

If there is a system error message, it is shown flashing at regular intervals instead of the current display.

Operating level

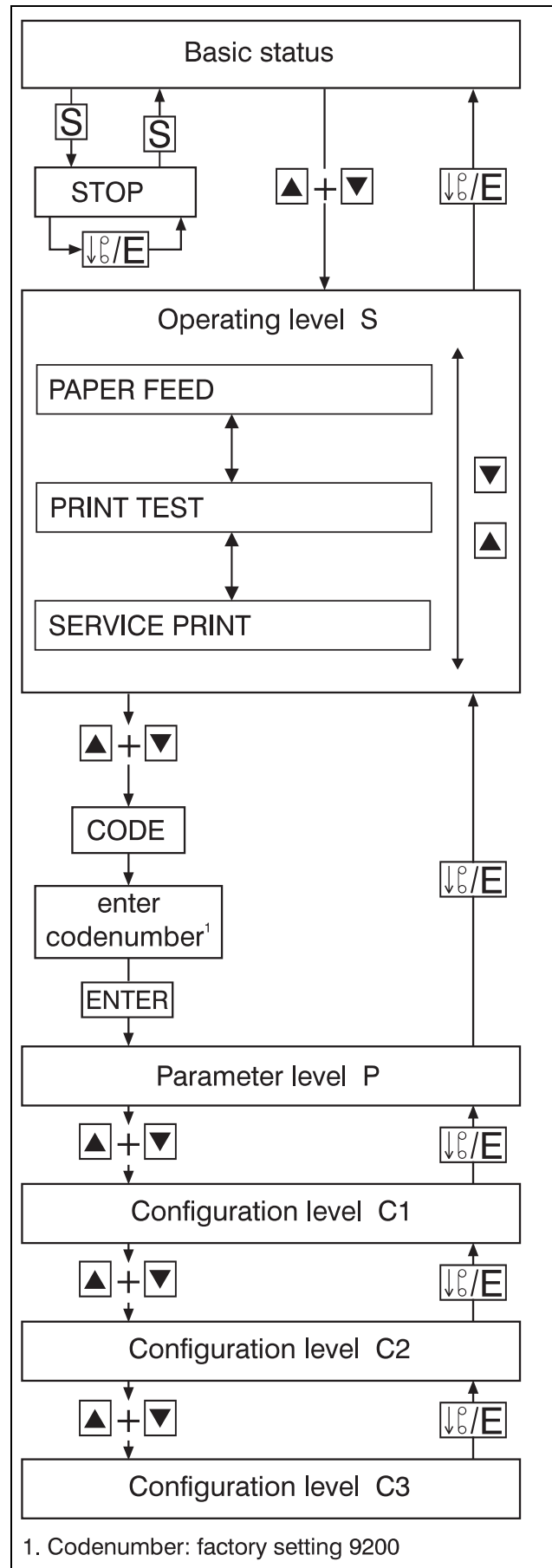
At this level, signal acquisition and processing remain activated.

The following parameters can be altered at the operating level:

- chart speed
- print test
- service print.

A summary of all parameters of the recorder is given in the Appendix.

⇒ Section 12.6



6 Preparation

Parameter level

The parameter level is protected by a code-number to prevent unauthorised access.



There are two different codenumbers:

- Codenumber for limited parameter set
- Codenumber for complete parameter set



Section 8.2.4
Section 12.6

If a wrong codenumber is input, the individual parameters can be viewed, but not programmed.

Following input of the correct codenumber, the recorder interrupts signal acquisition and recording at this level. Statistical reports are re-started on leaving the parameter level.



Section 7.9

The following parameters are altered at the parameter level:

- language
- date and time
- summer time
- display brightness
- relay limit
- display time

6 Preparation

Configuration level 1



If a correct codenumber has been input when calling up the parameter level, the recorder interrupts signal acquisition and recording at this level. The parameters can be viewed **and** altered.

Configuration level 1 includes the following channel-specific parameters:

- writing status
- signal input
- scaling
- channel designation
- limit operation
- plotarea (zoom)
- offset (presentation range)

6 Preparation

Configuration level 2



If a correct codenumber has been input when calling up the parameter level, the recorder interrupts signal acquisition and recording at this level. The parameters can be viewed **and** altered.

Configuration level 2 includes the following global parameters:

- instrument designation
- chart speed programming mode
- chart speed limit operation
- timed operation
- scale printing
- time printing
- pen offset compensation
- report
- start text
- end text
- pre-setting
- codenumber

6 Preparation

Configuration level 3



If a correct codenumber has been input when calling up the parameter level, the recorder interrupts signal acquisition and recording at this level. The parameters can be viewed **and** altered.

Configuration level 3 includes parameters which belong to Extra Codes and the maths module.

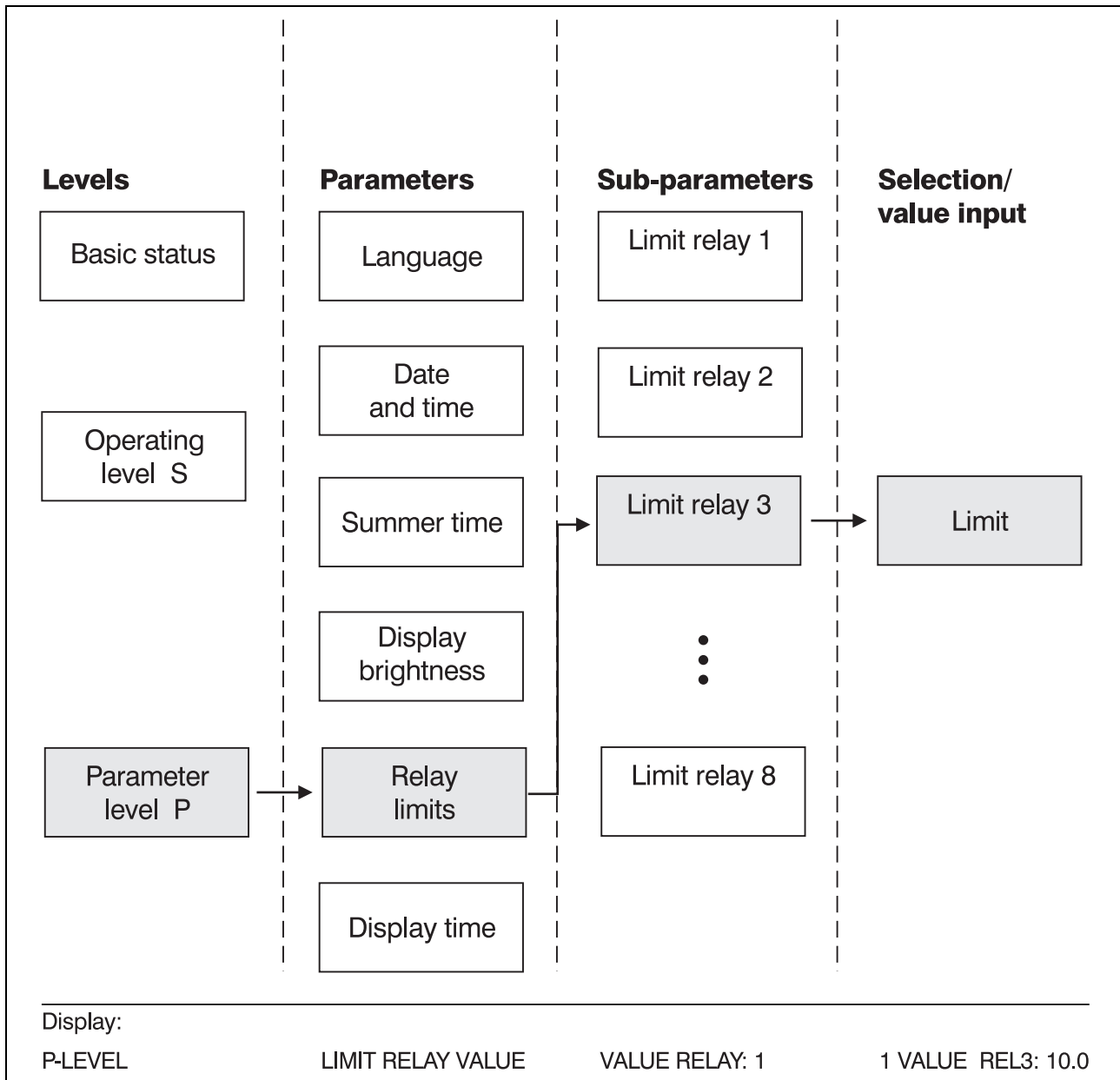
- relay output
- maths and logics module
- interface
- external text
- binary-linked external text
- external stop
- external speed
- event counter
- external scaling
- external report

For a summary of all the parameters of the recorder see the Appendix.



Section 12.6

6 Preparation



The levels, parameters and subparameters are arranged in a tree structure. Starting from the basic status the program branches to the individual levels and from there into the corresponding parameters, and also into any sub-parameters.

To alter a certain parameter, run through the relevant levels up to this parameter.

The editing process is started with **ENTER**.

If a parameter has several sub-parameters, these are reached with **ENTER**.

6 Preparation

Entering parameters

Where there are no further sub-parameters, **ENTER** transfers all the data of the parameter to the memory.

Aborting programming

Programming can be aborted within a parameter by pressing the key **↓P/E**.



If the last sub-parameter has not yet been entered, the parameter data which have already been edited are discarded. The old sub-parameters are retained.

Error messages during programming

If there are error messages during programming due to incorrect inputs, these have to be acknowledged with **ENTER** before programming can be repeated.

Key functions

↓P/E	<ul style="list-style-type: none"> - Chart fast forward when recording is stopped (in basic status) - Aborting parameter input (Exit) - Level change backwards
S	<ul style="list-style-type: none"> - Start/Stop recording - Decimal place selection during value input - For text input: rapid character selection (jump to " ", "0", "A", "a", "o", "2", "À", "à")
F	<ul style="list-style-type: none"> - Function key for special function (hold down at least 4 sec) <p>factory setting: scale printout</p>
◀, ▶	<ul style="list-style-type: none"> - Cursor left/right (select digit)
◀ + ▶	<ul style="list-style-type: none"> - Deactivate/activate display of status/error messages
▲, ▼	<ul style="list-style-type: none"> - Select display: <ul style="list-style-type: none"> - date and time - channel measurements - bargraph - system states - Parameter selection - Channel selection - Value selection from value table - Increment/ decrement/ current digit
▲ + ▼	<ul style="list-style-type: none"> - Level change forwards
ENTER	<ul style="list-style-type: none"> - Initiate parameter input - Enter input - Acknowledge error message - Activate/ deactivate static display (in basic status)

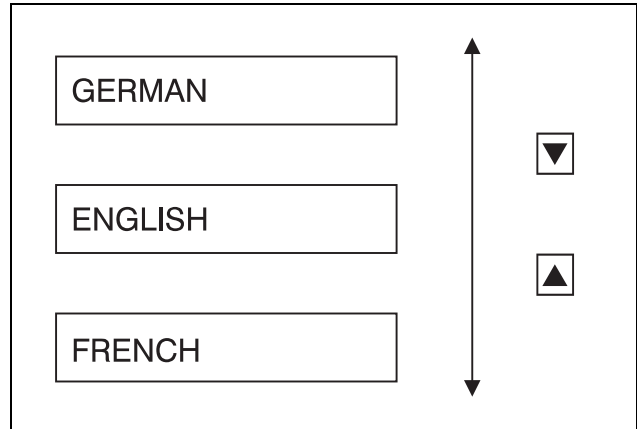
6 Preparation

Selection

Selection consists of a list of several options.

Three keys are used to select an option:

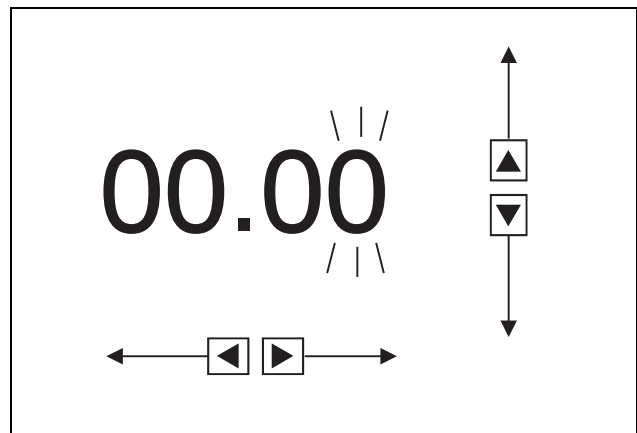
- * select option with the ▲ and ▼ key
- * enter selection with **ENTER**



Value/text input

Five keys are used to input values:

- * select the digit to be altered with the ◀ and ▶ keys
- * increment and decrement the selected digit with the ▲ and ▼ keys
- * shift the decimal point with the **S** key
- * enter value input with **ENTER**



An incorrect input produces an error message on the display.

⇒ Section 12.2

The error message must be acknowledged with **ENTER**.

A new value can then be entered.

Five keys are used to input text:

- * select the character to be altered with the ◀ and ▶ keys
- * select the new character with the ▲ and ▼ keys
(rapid character selection with the **S** key)
- * acknowledge text input with **ENTER**

7 Text printing

The pen recorder can print text in addition to the trace using the fibre pen of channel 1. Text printing is used for comments on the trace and for event recording. The characters are written in dots on a 9 x 7 matrix.

7.1 Printing priorities

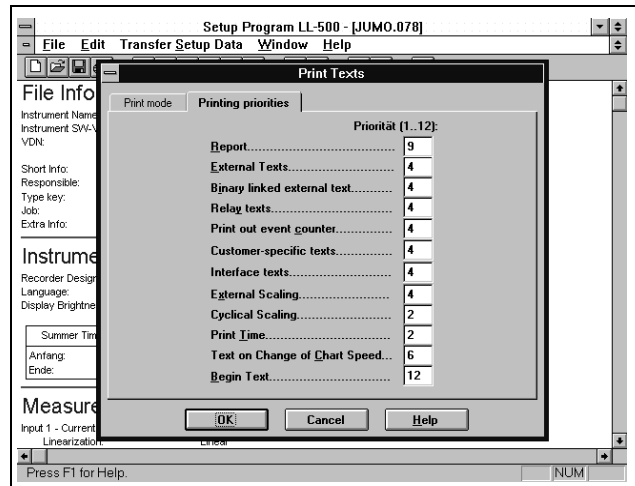
There are various types of text which are assigned priorities in the setup program. These priorities determine abort criteria where printing of several texts is required simultaneously.

The following applies in the explanation below:

- text 1 = text with high priority
- text 2 = text with low priority

If text 2 is being printed while there is a request for text 1, the printing of text 2 is interrupted and text 1 is printed.

If there is a request for text 2 while text 1 is being printed, text 2 is output after text 1 has been printed.



7 Text printing

Only the latest request is stored for each text.

Example: A report with high priority is being printed from 12:00 to 12:05 hrs. While it is being printed a relay goes overlimit twice. Under normal conditions three texts would be printed for this overlimit (low priority), as follows:

“12:01 relay 1 ON”,

“12:02 relay 1 OFF” and

“12:03 relay 1 ON”.

In this example the printing of the report would first be completed. This is followed by the delayed output of

“12:02 relay 1 OFF” and

“12:03 relay 1 ON”.

Time	Text printing request	Actual printing
12:07 —		— “12:03 Relay 1 ON”
12:06 —		— “12:02 Relay 1 OFF”
12:05 —		—
12:04 —		
12:03 —	“12:03 Relay 1 ON”	
12:02 —	“12:02 Relay 1 OFF”	
12:01 —	“12:01 Relay 1 ON”	
12:00 —	Report	

7 Text printing

In the following cases all existing text printing requests are cancelled and new ones received are ignored:

- recorder goes to stop status
- print test is started
- service print is started
- recorder is switched off

An exception is the statistical report:

 Section 7.9

The following fixed priorities are allocated to stop, service print and print test:

Priority	Text
higher ↑ ↓ lower	<ul style="list-style-type: none">- Stop by key [S], external stop, no chart, configuration by keys or setup- Service print- Print test- Text printing as configured in priority list

7 Text printing

7.2 Printing modes

There are two modes for printing text:

- trace is interrupted
- trace is overwritten

Interrupting the trace

The text is printed as quickly as possible. During text printing there is no recording of the trace on channel 1. The chart speed is optimised for text printing; it does not agree with the programmed chart speed.

The time for printing a text is typically 10 — 40sec.

Advantages:

- quick text printing
- minimum blockage of other messages
- text printing also at chart speeds above 360 mm/h
- text printing also when zero chart speed has been programmed

Disadvantages:

- channel 1 is not recording during text printing
- the chart speed is altered during text printing
(time reference of channel 2 and channel 3 traces is no longer correct)
- if pen offset compensation has been switched on it is switched off during text printing. After text printing has been completed, the pen offset compensation is switched on again and re-initialised.

7 Text printing

Overwriting the trace

The text is printed at the normal chart speed. There is only a brief interruption of the channel 1 trace. No text printing at zero chart speed and at a chart speed above 360mm/h.

Printing a text line requires different times, depending on the programmed chart speed.

Chart speed	Printing time for one text line
5mm/h	43min approx.
20mm/h	11 min approx.
120mm/h	2 min approx.

Advantages:

- the time reference is retained during text printing
- recording of signals on channel 1 is only interrupted for a very brief time
- if pen offset compensation has been switched on it need not be switched off during text printing

Disadvantages:

- text printing may take a very long time
- there is no text printing at zero chart speed and at chart speeds above 360mm/h

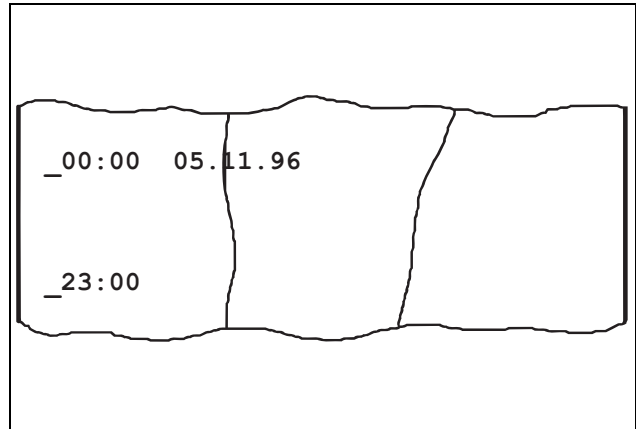
7 Text printing

7.3 Clock time

This is printed cyclically at a configurable spacing.

The following spacings can be set:

- 4 cm approx.
- 6 cm approx.
- 12 cm approx.
- no time printing



The spacings are independent of the selected chart speed. Clock speed is only printed at even times and the spacings given above are only approximate.

Every fourth clock time print is followed alternately by the current chart speed, the programmed recorder designation, and the date.

The date is always printed on the date change at 00:00 hrs.

For an accurate time reference on the chart the clock time is preceded by a time reference mark ("_").



If the symbol "?" is printed after the clock time, the time has to be checked and re-programmed if necessary (⇒ Section 8.3.2).

7 Text printing

7.4 Scaling

The scaling can be printed in two ways:

cyclic: for each channel at a configured spacing

triggered: for all channels on pressing the (\boxed{F}) key (hold down for at least 4 sec) or by closing one of the logic inputs.

Cyclic scaling print-out

Spacing which can be selected:

- 30 cm approx.
- 60 cm approx.
- 90 cm approx.
- off

The lowest line shows the channel number, the corresponding pen colour, the programmed channel designation and the unit of the measured value.

If the range 0 — 100mm has not been altered by offset, the next line shows the scale values for 0%, 50% und 100%. If the range has been restricted, this line contains marks for the start and the end of the range. The corresponding numbers are printed in the next line.

The limit marks for the current channel are printed in the top line.

7 Text printing

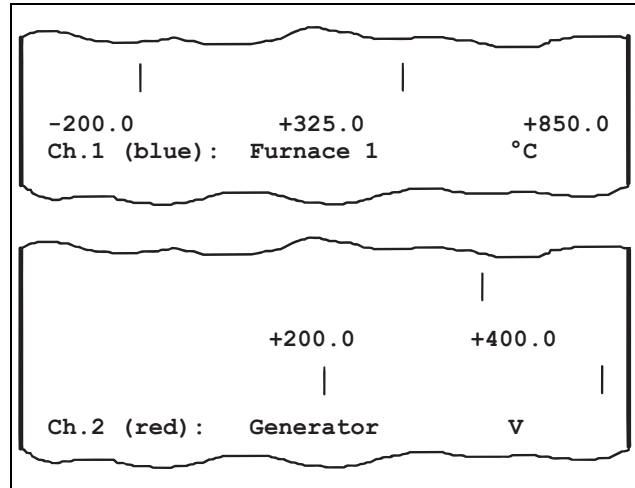
Example:

a) upper chart

- channel 1
- range: 0 — 100 mm
- relay limits at 200 and 500 °C

b) lower chart

- channel 2
- restricted range: 50 — 100 mm
- relay limit at 300V



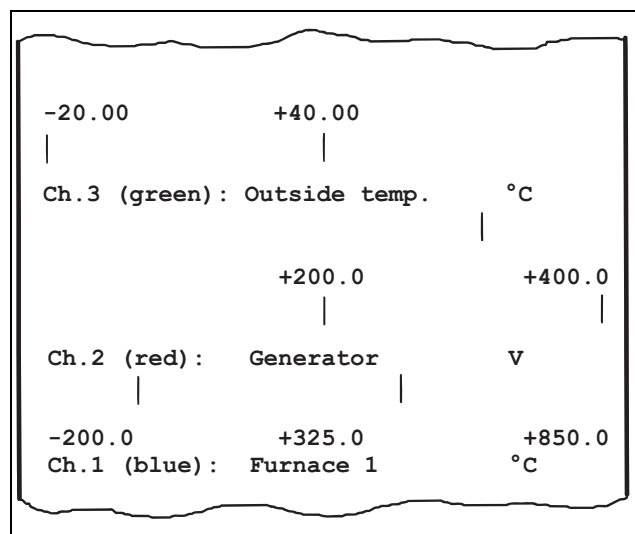
Triggered scaling print-out

To start the triggered scaling print-out the key **F** must be held down for at least 4 sec.

Alternatively, the triggered scaling print-out can be started using a logic input.

The print-out covers the scaling of all channels whose writing status is switched on.

Print-out follows the same arrangement as described under “cyclic scaling print-out”.



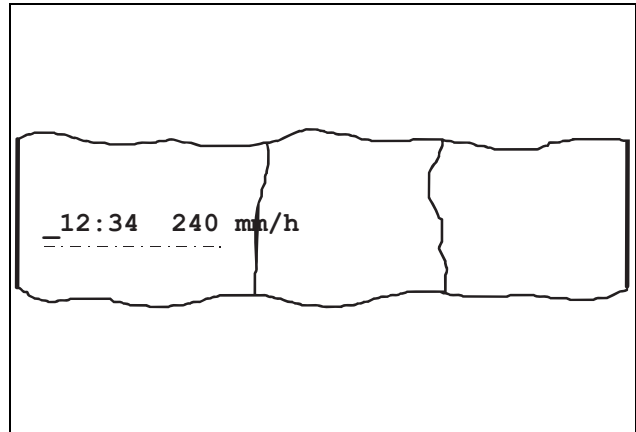
7 Text printing

7.5 Changing the chart speed

Every change in chart speed is reported by printing a line with the current time and the new chart speed.

The type of line indicates the type of chart speed with which recording takes place after the change.

- normal operation
- - - - - limit operation
- . - . - external speed
- timed operation



The individual events have different priority:

Event	Priority
limit operation	higher
external speed	↑
timed operation	↓
normal operation	lower

The current chart speed depends on the event with the highest priority.



Setting the printing priority for *Text on Change of Chart Speed* (⇒ Section 7.1) affects not only the printing of the chart speed change marking but also the change itself.

There is no chart speed change as long as a text with a higher priority is being printed.

7 Text printing



Text printing in the trace overwriting mode (\Rightarrow Section 7.2) may take a very long time.

In order that the chart speed change is not delayed, the priority of texts printed in this mode should be lower than the priority of the chart speed change.



The line to mark the type of speed change is printed even when the corresponding text can not be printed.

This is the case when the setup program has been configured under *Edit*: \Rightarrow *Print out texts in Print mode "Process value overwrite" for Text on Change of Chart Speed* and when a chart speed of zero or greater than 360mm/h is set.



Text printing in the trace interrupting mode (\Rightarrow Kapitel 7.2) is relatively quick.

In order to prevent the printing of texts in this mode being aborted through a chart speed change, the priority of these texts should be higher than the priority of the chart speed change.

7 Text printing

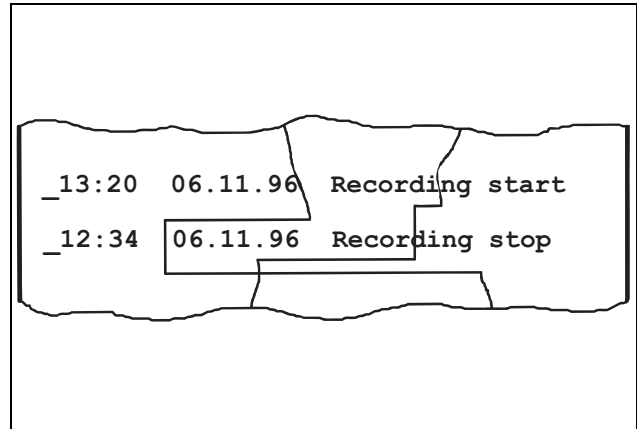
7.6 Recording start and end

Recording start and end are reported by a start and end text which can be programmed.

Text printing for start and end can be switched on and off separately.



Section 8.5.9
Section 8.5.10
Section 10.4



The end text is being printed in the stop status in which no other text can be printed; there is therefore no priority and no trace interrupting/overwriting for the end text.




The start text should always have the highest priority to ensure printing at the start of the recording.



Printing the end text is omitted when the chart sensor recognises "end of chart".



Printing the end text is aborted by pressing the  key.

7 Text printing

7.7 External text, binary-linked text, relay texts



Extra Code 259 required.

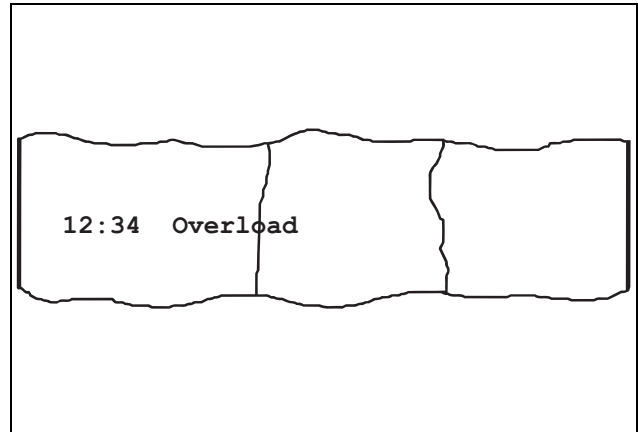
External text

Eight logic inputs are available for external texts.

Closing a logic input causes the corresponding text to be printed. Opening the logic input has no effect.



Section 8.6.4



Binary-linked external text

It is possible to interpret the signals at the first 4 logic inputs as a binary number and to assign a text to each binary number. In this way it is possible to print up to 16 texts.

Following each change of status of these logic inputs, the text corresponding to the binary number is printed.

Text printing can be switched off separately for each of the 16 texts.

Example:

If the state of the logic inputs is the binary number 1001, then text 9 is printed.

If the first logic input on the right is opened, the state of the logic inputs is the binary number 1000. Text 8 is being printed.



Section 8.6.5

Binary number	Decimal number/text
0000	0
0001	1
0010	2
0011	3
0100	4
0101	5
0110	6
0111	7
1000	8
1001	9
1010	10
1011	11
1100	12
1101	13
1110	14
1111	15

logic input 1

logic input 4

7 Text printing

Relay texts

Relay texts are printed when a relay switches.



The request for printing a relay text is ignored if the text consists only of blank characters. There is also no printing of the corresponding time.



Section 8.6.1

Generally for external, binary-linked and relay texts:

In addition to the programmed text, the time is printed at which the text printing has been requested.



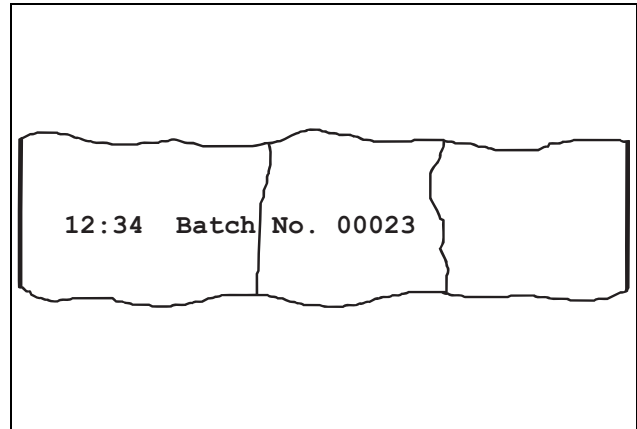
The time reference mark “_”
(⇒ Section 7.3) is not being printed
since printing may be delayed.

7 Text printing

7.8 Incrementing the event counter

Any logic input is assigned to the event counter. Each closing of the corresponding logic input increments the event counter. It can be preset using the setup program.

Each incrementing is reported by printing the clock time and the programmed text, followed by the current counter reading.



Section 8.6.8
Section 10.4



The time reference mark “_”
(⇒ Section 7.3) is not being printed
since printing may be delayed.



If the counter reading exceeds
9999, the number can no longer be
shown. The counter reading is print-
ed as “*****”.

7 Text printing

7.9 Statistical report

This report is printed at the end of the statistical period.

➞ Section 8.5.8
Section 10.4

The texts “to”, “MIN”, “MAX”, “AVER.” and “DIM” are printed in the configured language. Only channels which are actually present and whose writing status is activated are included in the report.

If overrange or underrange has occurred during the statistical period, the minimum, maximum and average values are replaced by “-----”.

External report

The external report is compiled as soon as the corresponding (programmed) logic input is closed.

The report is printed as soon as the logic input is opened again.

Generally for the statistical report:

- If the recorder is switched off at the end of the statistical period, the report is cancelled. The same applies if the recorder is re-configured from the keys or if the setup connector is plugged in.
- If printing of the statistical report is interrupted by stop, re-configuration, setup, or a print test or service print, printing the statistical report is not continued when recording is re-started.
- If the pen recorder is on stop when printing the statistical report should start, the report is printed after the stop is cancelled. The statistic of a new report runs from the selected starting time for this new report, even if the printing of the old report should be delayed.

Recorder designation				
Report start (Date + time)		to	Report end (Date + time)	
	MIN.	MAX.	AVER.	DIM.
Name Ch.1	Min. value 1	Max. value 1	Average 1	Unit
Name Ch.2	Min. value 2	Max. value 2	Average 2	Unit
Name Ch.3	Min. value 3	Max. value 3	Average 3	Unit

Shop 2				
05.11.96 08:00		to	06.11.96 08:00	
	MIN.	MAX.	AVER.	DIM.
Furn. 1	+329.2	+395.1	+370.8	°C
Generator	-----	-----	-----	V
Ext. temp	-11.02	+24.31	+18.75	°C

7 Text printing

7.10 Print test

The print test can only be initiated on the recorder using the keys. It is used to check the function of writing system and fibre pens.



Started text printing is aborted and **not** continued after the print test.

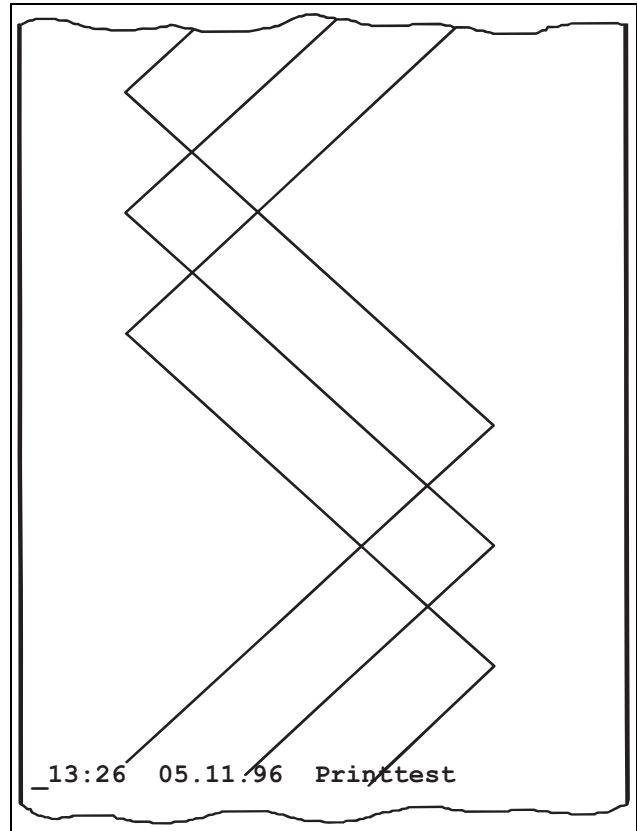


All text printing requests arriving during the print test are rejected.

The only exception is the statistical report.



Section 8.2.2



7 Text printing

7.11 Service print

The service print can only be initiated on the recorder using the keys.

It prints the software version, the number of supply interruptions and the total operating time of the recorder in hours.



Started text printing is aborted and **not** continued after the service print.

```
-----  
SERVICE PRINT  
software version   : 078.02.01.2  
no. of power downs: 00012  
operation time [h]: 01234  
event counter     1: +54321  
event counter     2: -12345  
-----
```



All text printing requests arriving during the service print are rejected.

The only exception is the statistical report.



If the maths and logics module is activated, an “M” is printed after the software version



Section 8.2.3

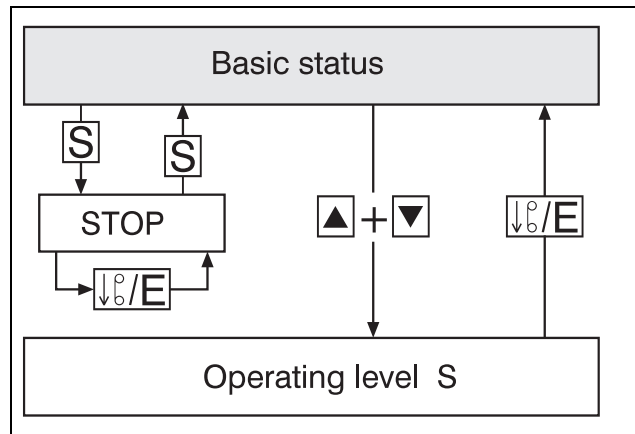
8 Programming

8.1 Basic status

The recorder is in the basic status after the supply has been applied and it has been initialised. The measurement signals are acquired, processed and recorded.

In the basic status the following are indicated, depending on the setting:

- the instrument designation, date and time (the time can be switched off via the parameter *parameter level* → *display time*)
- the measurements of all active channels
- one channel, its measurement, designation and unit
- one channel and its measurement as a bargraph
- or status/error messages



Display can be cyclic or static:

cyclic display

After approx. 3 sec the pen recorder switches automatically to the subsequent display.

static display

In the basic status the static display is activated and deactivated with **ENTER**.

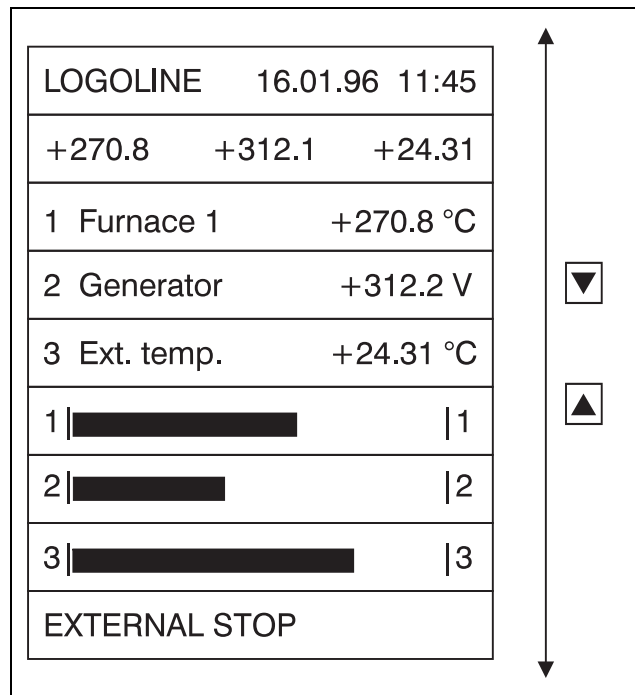
When it is activated, the current display is maintained and updated at regular intervals.

The indication can be altered during recording with the **▲** and **▼** keys.


Status and error messages are always shown in plain language, flashing regularly, instead of the current display.


The display of status and error messages can be stopped and re-activated by pressing **◀+▶**.

Using the **S** key, the recording is stopped and re-started. In the stop status the LED matrix display flashes "STOP".



8 Programming

Pressing the  key in the stop status activates the chart fast forward.

Pressing the  key (hold down at least 4 sec) starts the scaling print-out.

Pressing the + keys simultaneously changes to the operating level.

8 Programming

8.2 Operating level

The operating level is used to perform simple operating actions.

It is reached from the basic status by pressing the $\blacktriangle + \blacktriangledown$ keys simultaneously, from the parameter level by pressing the $\downarrow \text{P}/\text{E}$ key.

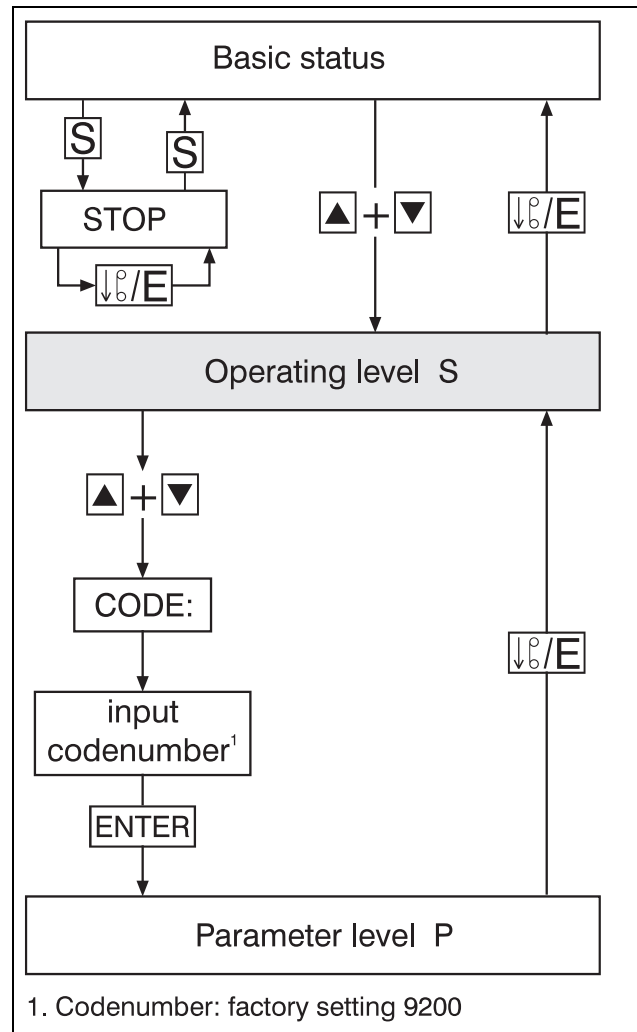
The operating level includes the following parameters:

- chart speed
- print test
- service print



While the operating level is activated, signal acquisition, processing and recording as well as limit monitoring are continuing.

A summary of all parameters of the recorder is given in the Appendix. (\Rightarrow Section 12.6).



Display	Edit	Selection/input	with keys	Enter	Continue with
S-LEVEL				<div>ENTER</div>	<div>\blacktriangle forwards</div> <div>\blacktriangledown backwards</div>

8 Programming

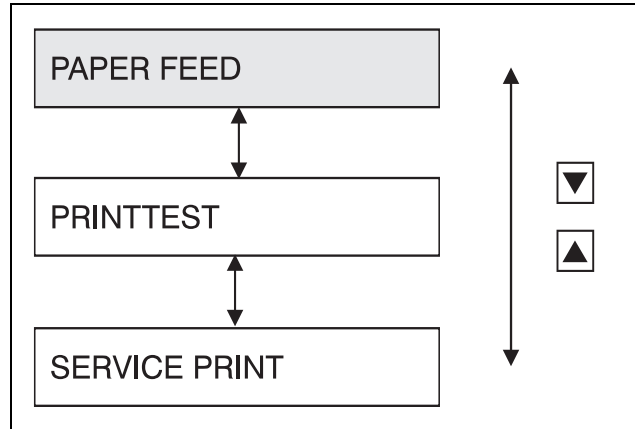
8.2.1 Chart speed

The standard chart speed for signal tracing is set here.

The chart speed is selected in steps from a table of standard chart speeds, or can be programmed continuously to any value between 0 and 7200 mm/h.

Standard chart speeds are:

0, 5, 10, 20, 60, 120, 240, 300, 360, 600, 720, 1800, 3600 und 7200 mm/h.



The programming mode is factory-set to standard chart speeds.

In the setup program the programming mode can be changed to continuous under

Edit → Chart Speed...

For alteration on the instrument

⇒ Section 8.5.2



Please note Section 7.2

Display	Edit	Selection/input	with keys	Enter	Continue with
FEED PAPER	<div>ENTER</div> <p>⇒ with step speed programming:</p>	FEED PAPER: 0240 mm/h Select chart speed: 0, 5, 10, 20, 60, 120, 240, 300, 360, 600, 720, 1800, 3600, 7200 mm/h	▲, ▼	<div>ENTER</div>	▲ forwards ▼ backwards
	<p>⇒ with continuous speed programming:</p>	0000 set required chart speed value range: 0 — 7200 mm/h	▲, ▼ ◀, ▶	<div>ENTER</div> <p>test: speed value</p>	▲ forwards ▼ backwards

8 Programming

8.2.2 Print test

Print test is used to check the function of writing system and fibre pens.

Print test can only be initiated on the recorder using the keys.



PRINTTEST = ON continues until it is terminated by PRINTTEST = OFF.

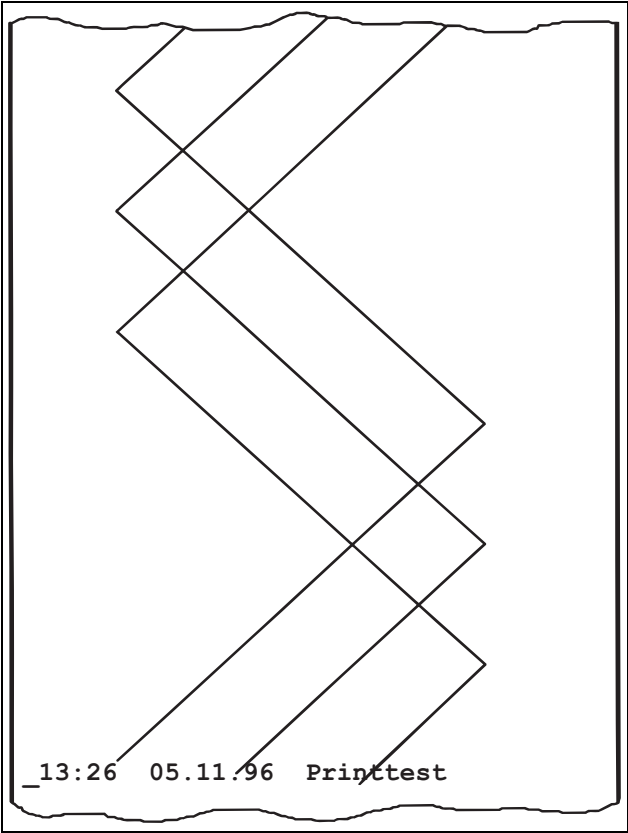
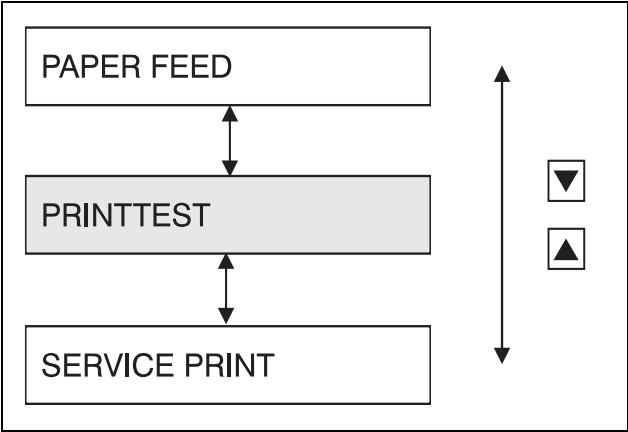


Started text printing is aborted and is not continued after the print test.



All text printing requests arriving during the print test are ignored and rejected.

The only exception is the statistical report.



Display	Edit	Selection/input	with keys	Enter	Continue with
PRINTTEST	<input type="text" value="ENTER"/>	PRINTTEST: OFF, ON Select status of print test	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	<input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards

8 Programming

8.2.3 Service print

The service print prints the software version, the number of supply interruptions and the total operating hours of the recorder.

It can only be initiated on the recorder using the keys.



Started text printing is aborted and is not continued after the service print.

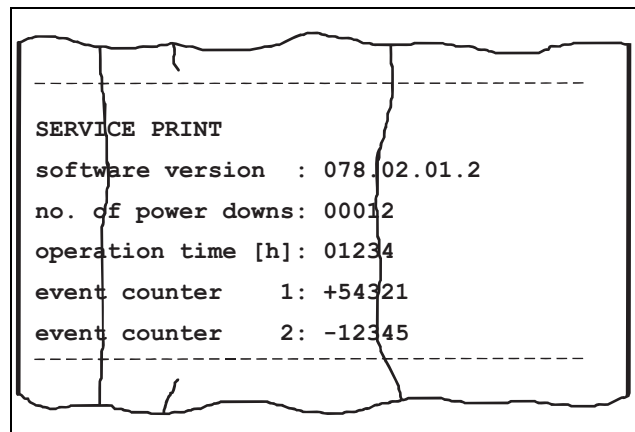
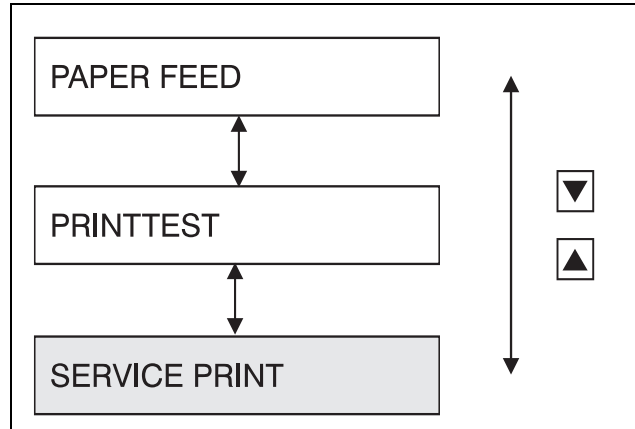


All text printing requests arriving during the service print are ignored and rejected.

The only exception is the statistical report.



If the maths and logics module is activated, an "M" is printed after the software version.



Display	Edit	Selection/input	with keys	Enter	Continue with
SERVICE PRINT	<input type="text" value="ENTER"/>	SERVICE PRINT: NO, YES	<input type="text" value="▲, ▼"/>	<input type="text" value="ENTER"/>	<input type="text" value="▲"/> forwards <input type="text" value="▼"/> backwards

8 Programming

8.2.4 Level inhibit and code request

The parameter level is protected by a 4-digit codenumber.

Two codenumbers are available:

- codenumber for a limited set of parameters (factory-set to 9200)
- codenumber for a full set of parameters (factory-set to 9210)

Which parameters belong to the limited set of parameters is defined in the set-up program under *Edit* → *Instrument operation*.

Parameters which are not required for the applications or which are only programmed once can be marked there accordingly. After the new set-up has been transferred to the pen recorder, they are not indicated any more on the instrument, .

If one of the two codenumbers is entered, the following are interrupted:

- signal acquisition, and
- recording

Additionally:

- events are no longer acquired,
- reports are aborted and reset,
- limit values are no longer monitored, and
- the outputs remain in their latest status.

The parameters can now be programmed.

CODE: 0000

◀, ▶, ▼, ▲

ENTER

8 Programming



If a wrong codenumber is entered, the recorder remains in normal operation. Signal acquisition, processing and recording remain activated.

The parameters can be viewed but not programmed.



The codenumbers can be altered in the setup program under *Edit → Codenumber...* or on the instrument (⇒ Section 8.5.12).

Display	Edit	Selection/input	with keys	Enter	Continue with
	<div>ENTER</div>	CODE: <u>0000</u> Input codenumber	<div>▲, ▼</div> <div>◀, ▶</div>	<div>ENTER</div>	⇒ 2
P-LEVEL					<div>▲ forwards</div> <div>▼ backwards</div>

8 Programming

8.3 Parameter level

At the parameter level it is possible to configure general parameters.

From the operating level, the parameter level is reached by simultaneously pressing keys $\blacktriangle + \blacktriangledown$, from the configuration level 1 by pressing the $\downarrow \text{P}/\text{E}$ key.

The parameter level covers the following parameters:

- language
- date and time
- summer time
- display brightness
- relay limit settings
- display time



If an incorrect codenumber is entered, the recorder remains in normal operation. Signal acquisition, processing and recording remain activated.

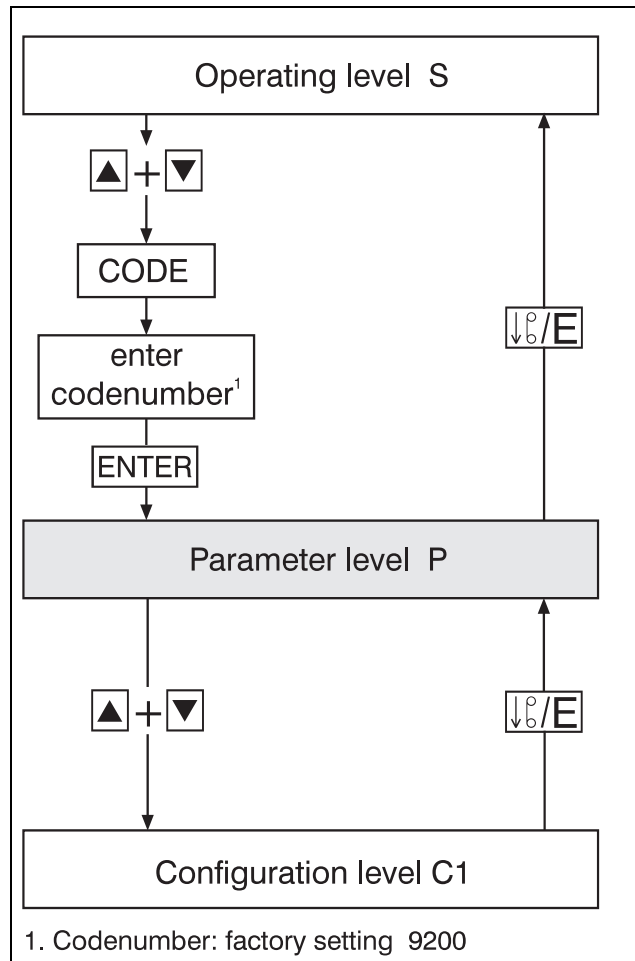
The parameters can be viewed but can not be programmed.



Following entry of a correct codenumber the normal operation is interrupted.

There is no signal acquisition, processing or recording.

The relays of the external relay module ER8 remain in their current status. They are only operated again when the recorder is at the operating level or in the basic status.



Display	Edit	Selection/input	with keys	Enter	Continue with
P-LEVEL					\blacktriangle forwards \blacktriangledown backwards

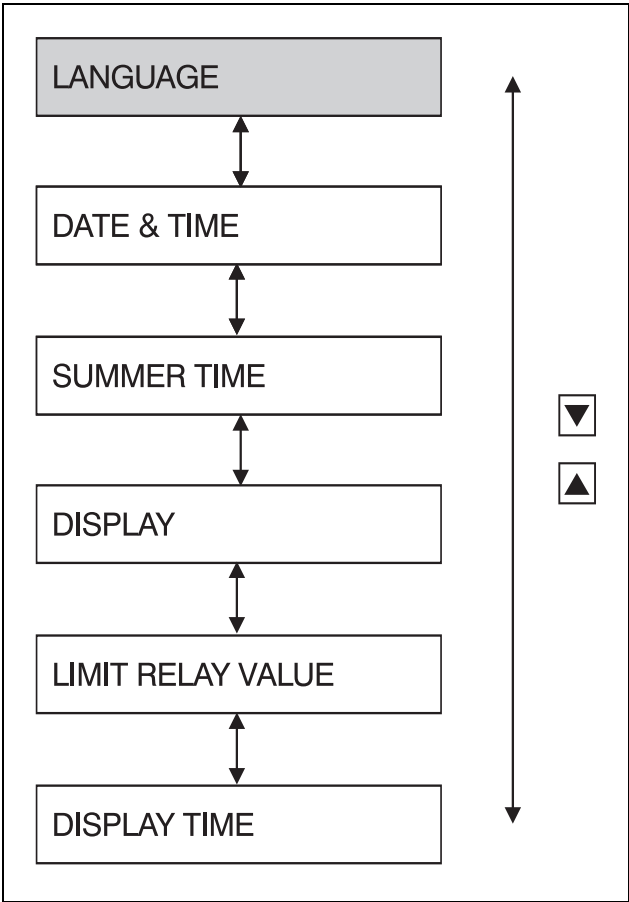
8 Programming

8.3.1 Language

There is a choice of the following languages:

- English
- French
- German

The language setting affects all non-programmable texts in the recorder which are printed or indicated.



Display	Edit	Selection/input	with keys	Edit	Continue with
LANGUAGE	<input type="text" value="ENTER"/>	Language: ENGLISH Select language: GERMAN ENGLISH FRENCH	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	<input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards

8 Programming

8.3.2 Date and time

Programming the system clock of the recorder. The following are programmed: day, month, year, weekday, hour and minute.

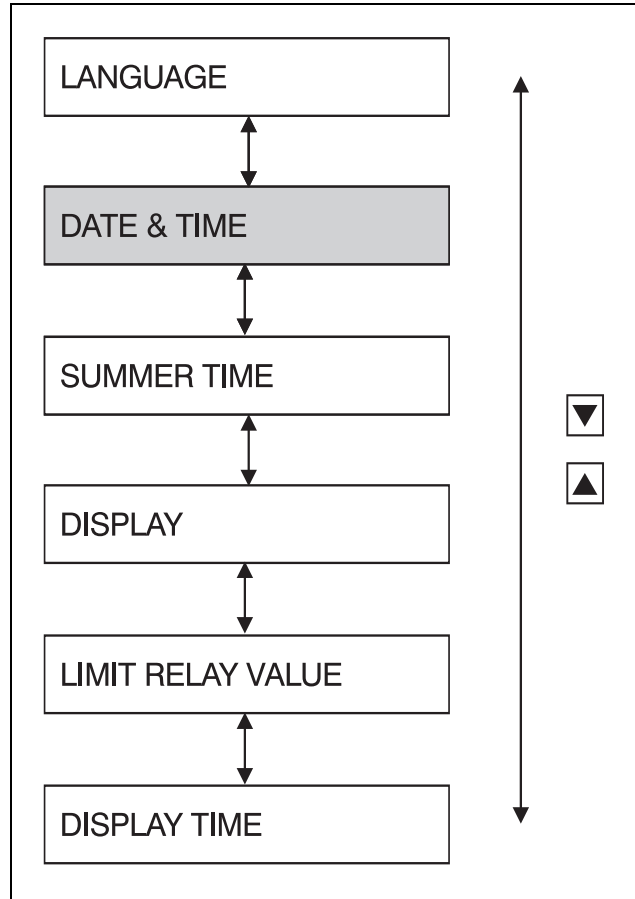
The current clock time is printed at certain events.

It serves as reference time for timed events, such as statistical reports, timed operation and summer time.



Date and time are checked for plausibility after input. An error message is output where appropriate.

The error message is acknowledged with **ENTER** and the data can then be re-entered.



Display	Edit	Selection/input	with keys	Enter	Continue with
DATE & TIME	ENTER	DATE: <u>09.03.96</u> Input date: DD:MM:YY	▲, ▼ ◀, ▶	ENTER Check date	⇒ 2
	⇒ 2	Day: MONDAY Select weekday: MONDAY TUESDAY WEDNESDAY THURSDAY FRIDAY SATURDAY SUNDAY	▲, ▼	ENTER	⇒ 3
	⇒ 3	TIME: 00:00 Input clock time: hh:mm	▲, ▼ ◀, ▶	ENTER Check time	▲ forwards ▼ backwards

8 Programming

8.3.3 Summer time

Input of a time interval during which the system clock of the recorder is changed to summer time.

Example:

Summer time start: 31.03.96, 2:00 hrs

Summer time end: 27.10.96, 3:00 hrs

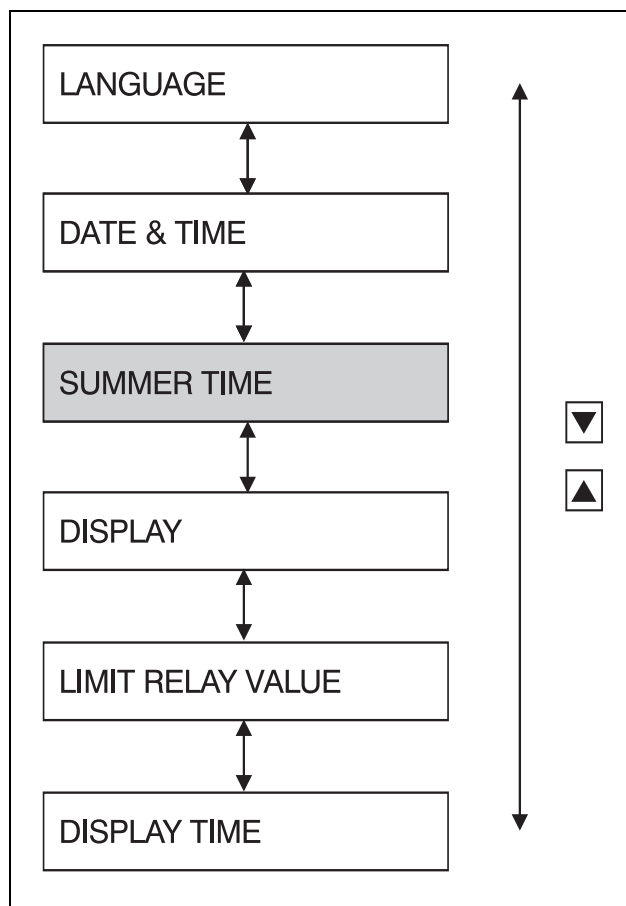
On 31.03.96 at 2:00 hrs the system clock is advanced automatically one hour to 3:00 hrs.

On 27.10.96 at 3:00 hrs the system clock is automatically put back one hour to 2:00 hrs.



The time interval for summer time always applies only to the period indicated.

It has to be re-programmed afresh for each year.

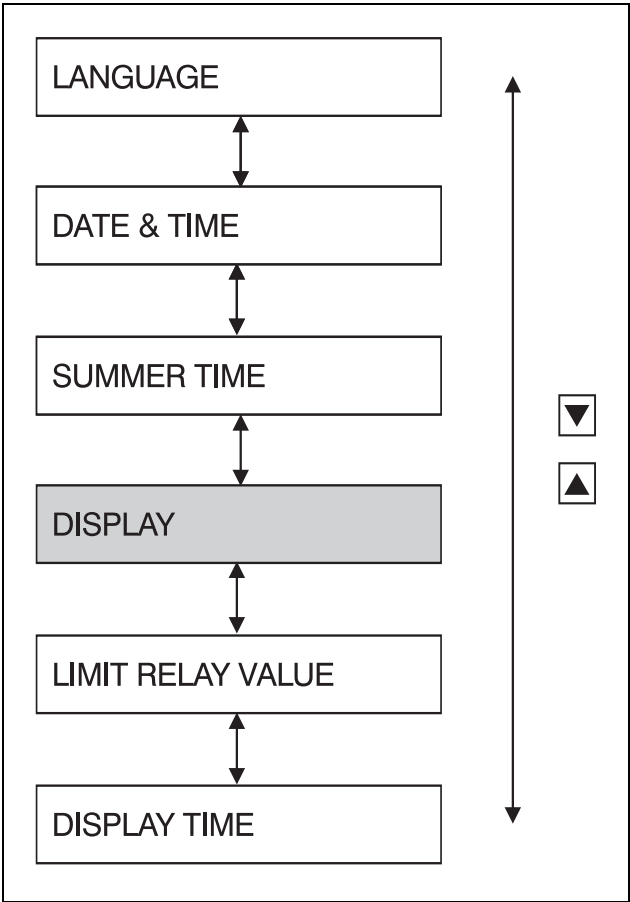


Display	Edit	selection/input	with keys	Enter	Continue with
SUMMERTIME	<input type="button" value="ENTER"/>	SUMMERTIME: OFF, ON Input status	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="button" value="ENTER"/>	ON: ⇒ 2 OFF: <input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards
⇒ 2 (ON)		BEGIN: <u>31.03.96</u> 00:00 Input date: DD:MM:YY	<input type="button" value="▲"/> , <input type="button" value="▼"/> <input type="button" value="◀"/> , <input type="button" value="▶"/>	<input type="button" value="ENTER"/> Check date	⇒ 3
⇒ 3		BEGIN: 31.03.96 <u>02:00</u> Input time: hh:mm	<input type="button" value="▲"/> , <input type="button" value="▼"/> <input type="button" value="◀"/> , <input type="button" value="▶"/>	<input type="button" value="ENTER"/> Check time	⇒ 4
⇒ 4		END: <u>27.10.96</u> 00:00 Input date: DD:MM:YY	<input type="button" value="▲"/> , <input type="button" value="▼"/> <input type="button" value="◀"/> , <input type="button" value="▶"/>	<input type="button" value="ENTER"/> Check date	⇒ 5
⇒ 5		END: 27.10.96 <u>03:00</u> Input time: hh:mm	<input type="button" value="▲"/> , <input type="button" value="▼"/> <input type="button" value="◀"/> , <input type="button" value="▶"/>	<input type="button" value="ENTER"/> Check time	<input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards

8 Programming

8.3.4 Display brightness

The brightness of the display can be programmed in four different steps.



Display	Edit	Selection/input	with keys	Enter	Continue with
DISPLAY	<div>ENTER</div>	BRIGHTNESS: STEP 1...4	<div>▲, ▼</div>	<div>ENTER</div>	<div>▲ forwards</div> <div>▼ backwards</div>

8 Programming

8.3.5 Relay limits



This parameter is only visible when the recorder is fitted with the interface for the external relay module ER8 (extra Code 259 is required)

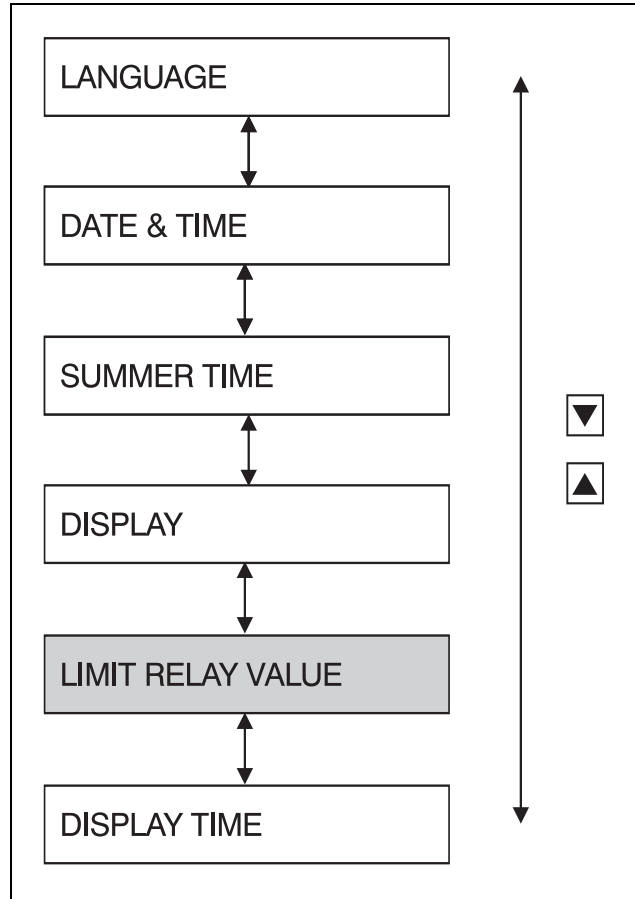
For each relay, a separate limit value is programmed at which it switches on or off.

In addition, it is determined to which recorder channel the particular relay is assigned and whether limit monitoring is activated or not.

The switching differential to the left and right of the limit can be freely selected, also the limit comparator function (switch on or off at overlimit or underlimit lk7, lk8).



Section 8.6.1



concerning lk7 und lk8



Section 10.3

Display	Edit	Selection/input	with keys	Enter	Continue with
LIMIT RELAY VALUE	<input type="text" value="ENTER"/>	VALUE RELAY:1 Input relay number: 1...8	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	⇒ 2
	⇒ 2	X VALUE RELY:0.000 Input limit for relay. X = channel number Y = relay number	<input type="button" value="▲"/> , <input type="button" value="▼"/> <input type="button" value="◀"/> , <input type="button" value="▶"/> <input type="text" value="S"/> (decimal place)	<input type="text" value="ENTER"/>	<input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards

8 Programming

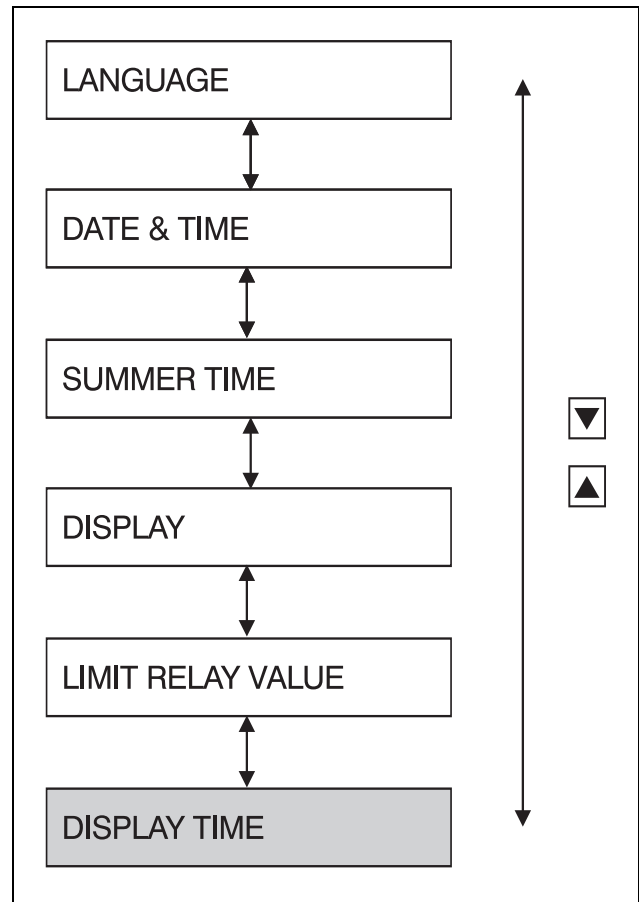
8.3.6 Display of time

The parameter “Display time” has been added to the parameter level with effect from the instrument version 078.03.01.1.

The time is indicated on the display when the recorder is in the basic status. The time display can be suppressed (status = OFF) by using this parameter.



The instrument version can be determined by the parameter *Operating level* → *Service print*.



Display	Edit	Selection/input	with keys	Enter	Continue with
DISPLAY TIME	ENTER	DISPLAY TIME: <u>ON</u> Select status (ON, OFF) for display of time in the basic status	▲ , ▼	ENTER	▲ forwards ▼ backwards

8 Programming

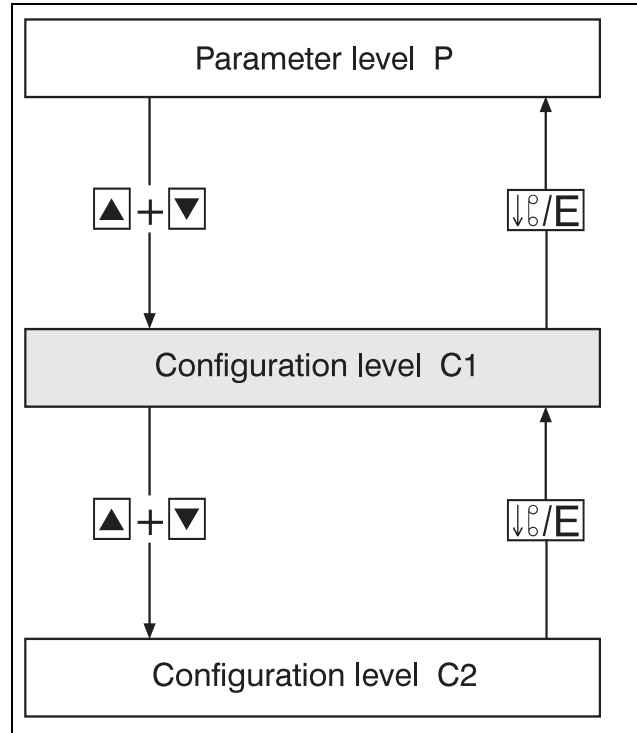
8.4 Configuration level 1

At the configuration level 1 it is possible to configure channel-specific parameters.

From the parameter level, the configuration level 1 is reached by simultaneously pressing keys $\blacktriangle + \blacktriangledown$, from the configuration level 2 by pressing the $\downarrow \text{P}/\text{E}$ key.

The parameter level 1 covers the following parameters:

- writing status
- measurement/signal input
- scaling
- channel designation
- limit operation
- plotarea (zoom)
- offset (presentation range)



Following the input of a correct codenumber when calling up the parameter level, the recorder interrupts signal acquisition and recording at the configuration level 1. The parameters can be viewed **and** altered.



Signal acquisition, processing and recording are interrupted.

The relays of the external relay module ER8 remain in their current status. They are only operated again when the recorder is at the operating level or in the basic status.

Display	Edit	Selection/input	with keys	Enter	Continue with
C1-LEVEL					\blacktriangle forwards \blacktriangledown backwards

8 Programming

8.4.1 Writing status

Setting for each recording channel: whether the trace is printed on the chart and appears in the statistical report or not.

Display	Edit	Selection/input	with keys	Enter	Continue with
PLOTSTATE	<input type="text" value="ENTER"/>	1 PLOTSTATE Select number of the recording channel	<input type="text" value="▲"/> , <input type="text" value="▼"/>	<input type="text" value="ENTER"/>	⇒ 2
	⇒ 2	1 STATE: <u>ON</u> Select status of the recording channel: ON, OFF	<input type="text" value="▲"/> , <input type="text" value="▼"/>	<input type="text" value="ENTER"/>	<input type="text" value="▲"/> forwards <input type="text" value="▼"/> backwards

8 Programming

8.4.2 Measurement/signal input

The input signal/sensor type is selected and the measurement ranges as well as the filter time constants for each input channel are defined.



If customized tables are used for the linearisation of the input signals, the measurement inputs and the customized tables have to be set using the setup program.



With inputs for resistance thermometer, thermocouple, current or voltage, the temperature values set at the signal input are automatically copied to the scaling after editing.

This does not apply, if linear, customized table 1 or customized table 2 has been configured as linearisation.

Display	Edit	Selection/input	with keys	Enter	Continue with
INPUT	<input type="text" value="ENTER"/>	<u>1</u> INPUT Input number of input channel	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	⇒ 2
	⇒ 2	1 TYPE: RTD THERMOCOUPLE ¹ POTENTIOMETER RES.TRANSMITTER VOLTAGE CURRENT	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	⇒ 3 ⇒ 4 ⇒ 5 ⇒ 6 ⇒ 7 ⇒ 8

1. The cold junction temperature of the internal cold junction is measured on channel 1. It is also valid for channels 2 and 3. If one or more thermocouple inputs are configured with an internal cold junction, a thermocouple with internal cold junction measurement or external constant cold junction temperature has to be configured for channel 1.

8 Programming

Display	Edit	Selection/input	with keys	Enter	Continue with
	⇒ 3 (RES.THERM.)	1 CHARACTER: <u>Pt100</u> Pt 100 (–200 to +850°C) Pt 100 (–200 to +649°C, JIS) Pt 500 (–200 to +850°C) Pt 1000 (–200 to +850°C) Ni 100 (–60 to +180°C) X1 customized 1 X2 customized 2	▲, ▼	ENTER	customized X1 or X2: ⇒ 10 (FILTER) otherwise: ⇒ 31
	⇒ 31	1 CONNECTION: <u>2/3-wire</u> 2/3-wire 4-wire Define type of connection of resistance thermometer: (2/3-wire or 4-wire)	▲, ▼	ENTER	⇒ 32
	⇒ 32	1 UNIT: <u>°C</u> °C, °F	▲, ▼	ENTER	⇒ 33
	⇒ 33	1 RANGE BEG: <u>–200.0</u> °C Input start of measurement range	▲, ▼, ◀, ▶, S	ENTER Check range start according to characteristic	⇒ 34
	⇒ 34	1 RANGE END: <u>+850.0</u> °C Input end of measurement range	▲, ▼, ◀, ▶, S	ENTER Check range end according to characteristic end – start ≥ 15°C	⇒ 10 (FILTER)
	⇒ 4	see table below!			
	⇒ 10	1 FILTER: <u>+0.800</u> sec Input filter constant (value range: 0.0 — 10.0)	▲, ▼, ◀, ▶, S	ENTER Check value range 0.0 — 10.0	▲ forwards ▼ backwards

8 Programming

Display	Edit	Selection/input	with keys	Enter	Continue with
(Continued: INPUT)	⇒ 4 (THERMO- COUPLE)	1 CHARACTER: <u>L</u> L (–200 to +900°C) J (–210 to +1200°C) U (–200 to +600°C) T (–270 to +400°C) K (–270 to +1372°C) E (–270 to +1000°C) N (–270 to +1300°C) S (–50 to +1768°C) R (–50 to +1768°C) B (0 — 1820°C) X1 (customized lin. 1) X2 (customized lin. 2)	▲, ▼	ENTER	customized X1 or X2: ⇒ 10 (FILTER) otherwise: ⇒ 41
	⇒ 41	1 UNIT: <u>°C</u> °C, °F	▲, ▼	ENTER	⇒ 42
	⇒ 42	1 RANGE BEG: <u>–200.0</u> °C Input start of measurement range	▲, ▼, ◀, ▶, S	ENTER Check range start according to characteristic	⇒ 43
	⇒ 43	1 RANGE END: <u>+900.0</u> °C Input end of measurement range	▲, ▼, ◀, ▶, S	ENTER Check range end according to characteristic end – start ≥100°C S,R,B ≥ 500°C	⇒ 44
	⇒ 44	1 TEMP. COMP: <u>INTERN Pt 100</u> INTERN Pt 100 EXTERN Pt 100 EXT. CONST.	▲, ▼	ENTER	INTERN Pt 100 ¹ : EXTERN Pt 100: ⇒ 10 (FILTER) EXT. CONST.: ⇒ 45
	⇒ 45 (only with EXT. CONST.)	1 COMP. TEMP.: <u>+0020.</u> °C Input cold junction temperature (value range: –20 to +100°C)	▲, ▼, ◀, ▶, S	ENTER Check value range	⇒ 10 (FILTER)

1. The cold junction temperature of the internal cold junction is measured on channel 1. It is also valid for channels 2 and 3.
If one or more thermocouple inputs are configured with an internal cold junction, a thermocouple with internal cold junction measurement or external constant cold junction temperature has to be configured for channel 1.

8 Programming

Display	Edit	Selection/input	with keys	Enter	Continue with
	⇒ 5 (POTENTIO- METER)	1 CHARACTER: <u>linear</u> linear X1 (customized lin. 1) X2 (customized lin. 2)	▲, ▼	ENTER	customized X1 or X2: ⇒ 10 (FILTER) otherwise: ⇒ 51
	⇒ 51	1 CONNECTION: <u>2/3-wire</u> 2/3-wire 4-wire Define type of potentio- meter connection: (2/3-wire circuit or 4-wire circuit)	▲, ▼	ENTER	⇒ 52
	⇒ 52	1 Ro: <u>+300.0</u> Ohm Input start resistance	▲, ▼, ◀, ▶, S	ENTER Check $0 \leq R_o \leq$ 3900 Ohm	⇒ 53
	⇒ 53	1 Rp: <u>+900.0</u> Ohm Input measurement range (resistance Rp)	▲, ▼, ◀, ▶, S	ENTER Check $0 \leq \text{RANGE} \leq$ 3900 Ohm Total resistance $R_o + R_p$ $\leq 3900 \text{ Ohm}$ min. span: 6 Ohm	⇒ 10 (FILTER)
	⇒ 6	see table below!			

8 Programming

Display	Edit	Selection/input	with keys	Enter	Continue with
(Continued: INPUT)	⇒ 6 (RES. TRANS- MITTER)	1 CHARACT.: <u>linear</u> linear X1 (customized lin. 1) X2 (customized lin. 2)	▲, ▼	ENTER	linear characteristic: ⇒ 61 customized X1 oder X2: ⇒ 10 (FILTER)
	⇒ 61	1 Ra: <u>+300.0</u> Ohm Input start resistance	▲, ▼, ◀, ▶, S	ENTER Check $0 \leq \text{start res.}$ $\leq 3900 \text{ Ohm}$	⇒ 62
	⇒ 62	1 Rs: <u>+300.0</u> Ohm Input measurement range	▲, ▼, ◀, ▶, S	ENTER Check $0 \leq \text{range}$ $\leq 3900 \text{ Ohm}$ min. span: 6 Ohm	⇒ 63
	⇒ 63	1 Re: <u>+900.0</u> Ohm Input end resistance	▲, ▼, ◀, ▶, S	ENTER Check $0 \leq \text{end res.}$ $\leq 3900 \text{ Ohm}$ total resistance $R_a + R_s + R_e \leq$ 3900 Ohm	⇒ 10 (FILTER)
	⇒ 7	see table below!			

8 Programming

Display	Edit	Selection/input	with keys	Enter	Continue with
(Continued: INPUT)	⇒ 7 (VOLTAGE)	1 CHARACT.: <u>linear</u> linear Pt 100 (–200 to +850°C) Pt 100 (–200 to +649°C, JIS) Pt 500 (–200 to +850°C) Pt 1000 (–200 to +850°C) Ni 100 (–60 to +180°C) L (–200 to +900°C) J (–210 to +1200°C) U (–200 to +600°C) T (–270 to +400°C) K (–270 to +1372°C) E (–270 to +1000°C) N (–270 to +1300°C) S (–50 to +1768°C) R (–50 to +1768°C) B (0—1820°C) X1 (customized lin. 1) X2 (customized lin. 2)	▲, ▼	ENTER	customized X1 ¹ or X2 ¹ : ⇒ 10 (FILTER) otherwise: ⇒ 71
	⇒ 71	1 UNIT: <u>mV</u> mV, V	▲, ▼	ENTER	⇒ 72
	⇒ 72	1 RANGE BEG: <u>+0.000</u> mV Input start of measurement range	▲, ▼, ◀, ▶, S	ENTER Check range start (–10.0V ≤ range start < 10.0V or 0.0V < range start ≤ 22.0V)	⇒ 73
	⇒ 73	1 RANGE END: <u>+999.0</u> mV Input end of measurement range	▲, ▼, ◀, ▶, S	ENTER Check range end (–10.0V ≤ range end < 10.0V or 0.0V < range end ≤ 22.0V) min. span: 5 mV	linear characteristic: ⇒ 10 (FILTER) otherwise: ⇒ 74

1. If required, gain factors of transmitters must be taken into account when entering the characteristics in the setup program.

8 Programming

Display	Edit	Selection/input	with keys	Enter	Continue with
	⇒ 74 (only with thermocouples and resistance thermometers)	1 TEMP.: °C °C, °F	▲, ▼	ENTER	⇒ 75
	⇒ 75	1 TEMP. BEG: -200.0 °C Input start of temperature range	▲, ▼, ◀, ▶, S	ENTER Check temp. start according to characteristic	⇒ 76
	⇒ 76	1 TEMP. END: +900.0 °C Input end of temperature range	▲, ▼, ◀, ▶, S	ENTER Check temp. end according to characteristic end – start: Res.therm. ≥ 15°C thermo-couple. ≥ 100°C, S, R, B ≥ 500°C	⇒ 10 (FILTER)
	⇒ 8	see table below!			

8 Programming

Display	Edit	Selection/input	with keys	Enter	Continue with
(Continued: INPUT)	⇒ 8 (CURRENT)	1 CHARACT.: <u>linear</u> linear Pt 100 (–200 to +850°C) Pt 100 (–200 to +649°C, JIS) Pt 500 (–200 to +850°C) Pt 1000 (–200 to +850°C) Ni 100 (–60 to +180°C) L (–200 to +900°C) J (–210 to +1200°C) U (–200 to +600°C) T (–270 to +400°C) K (–270 to +1372°C) E (–270 to +1000°C) N (–270 to +1300°C) S (–50 to +1768°C) R (–50 to +1768°C) B (0 — 1820°C) X1 (customized lin. 1) X2 (customized lin. 2)	▲, ▼	ENTER	customized. X1 ¹ or X2 ¹ : ⇒ 10 (FILTER) otherwise: ⇒ 81
	⇒ 81	1 RANGE BEG: <u>+0.000 mA</u> Input start of measurement range	▲, ▼, ◀, ▶, S	ENTER Check range start (–20,5mA ≤ range start < 20.5 mA or 0.0mA ≤ range start ≤ 45.0 mA or –4,0mA ≤ range start ≤ 21.0 mA)	⇒ 82

1. Gain factors of transmitters must, if required, be taken into account when entering the characteristics in the setup program.

8 Programming

Display	Edit	Selection/input	with keys	Enter	Continue with
	⇒ 82	1 RANGE END: <u>+020.0</u> mA Input end of measurement range	▲, ▼, ◀, ▶, S	ENTER Check range end (-20,5mA ≤ range end < 20.5mA or 0.0mA ≤ range end ≤ 45.0mA or -4.0mA ≤ range end ≤ 21.0 mA) min. span: 0.5mA	linear characteristic: ⇒ 10 (FILTER) otherwise: ⇒ 83
	⇒ 83 (only with ther- mocouples and resistance thermometers)	1 TEMP.: °C °C, °F	▲, ▼	ENTER	⇒ 84
	⇒ 84	1 TEMP. BEG: <u>-200.0</u> °C Input start of temperature range	▲, ▼, ◀, ▶, S	ENTER Check temp. start according to characteristic	⇒ 85
	⇒ 85	1 TEMP. END: <u>+900.0</u> °C Input end of temperature range	▲, ▼, ◀, ▶, S	ENTER Check temp. end according to characteristic end – start: Res.therm. ≥ 15°C, thermocouple. ≥ 100°C S, R, B ≥ 500°C	⇒ 10 (FILTER)

8 Programming

8.4.3 Scaling

The scaling start/end value and the dimension (unit) are defined to record the measurement. For the alpha-numerical presentation of the measurement on the display and on the chart, the number format is selected.

⇒ Section 7.4

Example:

A temperature transmitter supplies a voltage within the range of 0 — 10V. This range corresponds to a temperature of 200 — 600°C.

Programming:

Unit: °C
 Scaling start: 200
 Scaling end: 600
 Number format: XXX.X

Display	Edit	Selection/input	with keys	Enter	Continue with
SCALING	<input type="button" value="ENTER"/>	3 SCALING Select recording channel	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="button" value="ENTER"/>	⇒ 2
	⇒ 2	3 DIMENSION: _ _ _ _ 5 digits freely selectable	<input type="button" value="▲"/> , <input type="button" value="▼"/> , <input type="button" value="S"/>	<input type="button" value="ENTER"/>	⇒ 3
	⇒ 3	3 ZERO +200.0 °C Input start of scaling	<input type="button" value="▲"/> , <input type="button" value="▼"/> , <input type="button" value="◀"/> , <input type="button" value="▶"/> , <input type="button" value="S"/>	<input type="button" value="ENTER"/>	⇒ 4
	⇒ 4	3 FULL +600.0 °C Input end of scaling	<input type="button" value="▲"/> , <input type="button" value="▼"/> , <input type="button" value="◀"/> , <input type="button" value="▶"/> , <input type="button" value="S"/>	<input type="button" value="ENTER"/> Check zero <> full	⇒ 5
	⇒ 5	3 DECIMAL POINT: <u>x.xxx</u> Select decimal place : AUTO, x.xxx, xx.xx, xxx.x, xxxx.	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="button" value="ENTER"/>	<input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards

8 Programming

8.4.4 Channel designation

Defines the channel designation for each recording channel. During scaling the designation is printed on the chart and shown on the display together with the measurement value. The complete character set is available. (⇒ Section 12.5).

Display	Edit	Selection/input	with keys	Enter	Continue with
WORD AND NUMBER	<div>ENTER</div>	2 WORD AND NUMBER Select recording channel	<div>▲, ▼</div>	<div>ENTER</div>	⇒ 2
	⇒ 2	2 _ _ _ _ _ Input channel designation (16 characters, complete character set)	<div>▲, ▼, ◀, ▶, S</div>	<div>ENTER</div>	<div>▲ forwards ▼ backwards</div>

8 Programming

8.4.5 Limit operation

On overlimit or underlimit, the chart print-out is continued with the chart speed set under parameter LIMIT FEED (\Rightarrow Section 8.5.3). Status and limits are set separately for each channel.

A switching differential of 0.5% is set about the switching point to avoid that the chart speed is changed too frequently. The switching differential is referred to scaling and plotarea (zoom).

Differential =

(end of scaling – start if scaling) * (end of plotarea – start of plotarea) * 0.01/100

Display	Edit	Selection/input	with keys	Enter	Continue with
LIMIT FEED	<input type="text" value="ENTER"/>	<u>2</u> LIMIT FEED Select recording channel	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	\Rightarrow 2
	\Rightarrow 2	2 STATE LIMIT FEED: <u>ON</u> Select status for limits: ON, OFF	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	FROM: <input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards otherwise: \Rightarrow 3
	\Rightarrow 3	2 LOW: <u>-200.0</u> unit Input low limit	<input type="button" value="▲"/> , <input type="button" value="▼"/> , <input type="button" value="◀"/> , <input type="button" value="▶"/> , <input type="text" value="S"/>	<input type="text" value="ENTER"/>	\Rightarrow 4
	\Rightarrow 4	2 HIGH: <u>600.0</u> unit Input high limit	<input type="button" value="▲"/> , <input type="button" value="▼"/> , <input type="button" value="◀"/> , <input type="button" value="▶"/> , <input type="text" value="S"/>	<input type="text" value="ENTER"/> Check low < high	<input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards

8 Programming

8.4.6 Plotarea (zoom)

Defines the range of the input signal to be recorded on the chart. The complete range or an enlarged section can be recorded. Input is in percent. The low value designates the point of the measurement range which becomes the new zero. The high value designates the new end value. The entire measurement range (scaling start to scaling end) corresponds to 100%.



The difference between low and high value must be at least 10%.

The low value is calculated as follows:

$$\frac{(\text{smallest value to be recorded} - \text{start of scaling})}{(\text{end of scaling} - \text{start of scaling})} * 100\%$$

The high value is calculated as follows:

$$\frac{(\text{largest value to be recorded} - \text{start of scaling})}{(\text{end of scaling} - \text{start of scaling})} * 100\%$$

Display	Edit	Selection/input	with keys	Enter	Continue with
PLOTAREA	<input type="text" value="ENTER"/>	2 PLOTAREA Select recording channel	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	⇒ 2
	⇒ 2	2 LOW: <u>010</u> % Input start of presentation range of measurement value (in percent of the measurement range)	<input type="button" value="▲"/> , <input type="button" value="▼"/> , <input type="button" value="◀"/> , <input type="button" value="▶"/>	<input type="text" value="ENTER"/> Check: 0 ≤ start ≤ 90%	⇒ 3
	⇒ 3	2 HIGH: <u>100</u> % Input end of presentation range of measurement value (in percent of the measurement range)	<input type="button" value="▲"/> , <input type="button" value="▼"/> , <input type="button" value="◀"/> , <input type="button" value="▶"/>	<input type="text" value="ENTER"/> Check: end ≤ 100% and end – start ≥ 10%	<input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards

8 Programming

8.4.7 Presentation range (offset)

Defines the range on the chart on which a trace is to be recorded. Either the entire width of 100 mm or a strip can be selected for the display. Sets the start and end of the trace on the chart. The input is made in mm steps.

Display	Edit	Selection/input	with keys	Enter	Continue with
OFFSET	<input type="text" value="ENTER"/>	<u>2</u> OFFSET Select recording channel	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	⇒ 2
	⇒ 2	2 LOW: <u>20</u> mm Input start of offset	<input type="button" value="▲"/> , <input type="button" value="▼"/> , <input type="button" value="◀"/> , <input type="button" value="▶"/>	<input type="text" value="ENTER"/> Check: $0 \leq \text{start} \leq 99$	⇒ 3
	⇒ 3	2 HIGH: <u>060</u> mm Input end of offset	<input type="button" value="▲"/> , <input type="button" value="▼"/> , <input type="button" value="◀"/> , <input type="button" value="▶"/>	<input type="text" value="ENTER"/> Check: start < end, end ≤ 100	<input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards

8 Programming

8.5 Configuration level 2

At the configuration level 2 it is possible to configure global parameters.

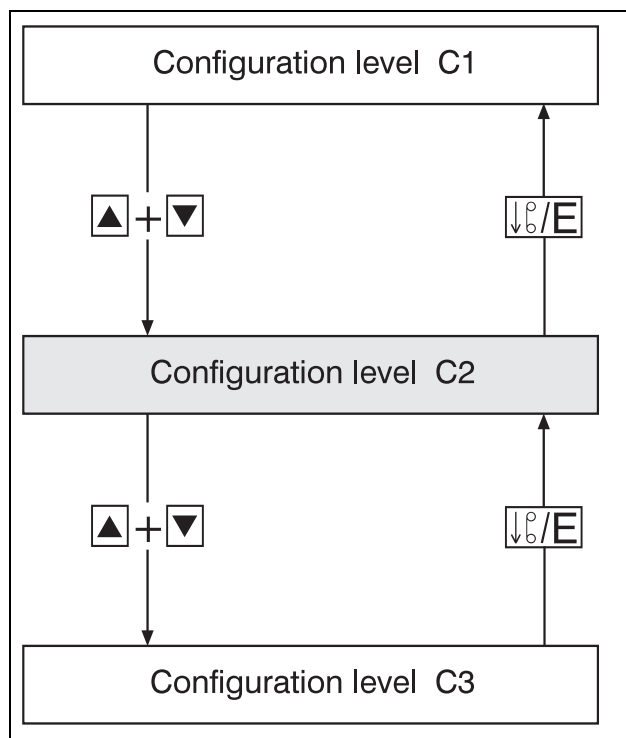
From the configuration level 1, the configuration level 2 is reached by simultaneously pressing keys $\blacktriangle + \blacktriangledown$, from the configuration level 3 by pressing the $\downarrow \text{P}/\text{E}$ key.

The configuration level 2 covers the following parameters:

- instrument designation
- chart speed programming mode
- chart speed limit operation
- timed operation
- scale printing
- time printing
- pen offset compensation
- statistical report
- start text
- end text
- presetting
- codenumber



If a correct codenumber has been entered when calling up the parameter level, signal acquisition and recording are interrupted at the configuration level 2. The parameters can be viewed **and** altered.



8 Programming



Signal acquisition, processing and recording are interrupted.

The relays of the external relay module ER8 remain in their current status. They are only operated again when the recorder is at the operating level or in the basic status.

Display	Edit	Selection/input	with keys	Enter	Continue with
C2-LEVEL					<div><div>▲</div>forwards</div> <div><div>▼</div>backwards</div>

8 Programming

8.5.1 Instrument designation

Defines the instrument or system designation. The complete character set is available. (⇒ Section 12.5).

Display	Edit	Selection/input	with keys	Enter	Continue with
UNITWORD	<div>ENTER</div>	TEXT: _____ Input instrument designation (16 characters, complete character set)	<div>▲, ▼,</div> <div>◀, ▶,</div> <div>S</div>	<div>ENTER</div>	<div>▲ forwards</div> <div>▼ backwards</div>

8 Programming

8.5.2 Speed programming mode

For programming the chart speed, this parameter is used to choose between standard steps, i.e. selection of a chart speed from a table of values, and continuous programming of the speed (speed programming in unit steps).

Display	Edit	Selection/input	with keys	Enter	Continue with
KIND OF FEED PROGRAMMING	<input type="text" value="ENTER"/>	PROGR.: <u>STANDARD STEPS</u> Select programming mode: STANDARD STEPS (value from table of values) CONTINUOUS (can be programmed freely)	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	<input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards

8 Programming

8.5.3 Speed limit operation

Chart speed on limit operation. It is possible to change to this chart speed, if the signal goes above/below the limit values entered under the parameter LIMIT FEED.



Please observe priorities within the different chart speeds.

⇒ Section 7.5

Display	Edit	Selection/input	with keys	Enter	Continue with
FEED LIMIT	<div>ENTER</div> <p>⇒ with step speed programming:</p>	FEED LIMIT: <u>7200</u> mm/h Select chart speed: 0, 5, 10, 20, 60, 120, 240, 300, 360, 600, 720, 1800, 3600, 7200 mm/h	<div>▲, ▼</div>	<div>ENTER</div>	<div>▲ forwards</div> <div>▼ backwards</div>
	<p>⇒ with continuous speed programming:</p>	FEED LIMIT: <u>0000</u> mm/h Set required chart speed, value range: 0 — 7200 mm/h	<div>▲, ▼, ◀, ▶</div>	<div>ENTER</div> Check speed value	<div>▲ forwards</div> <div>▼ backwards</div>

8 Programming

8.5.4 Timed operation

Chart speed which is only valid within the entered time span.

On reaching the start time, the chart speed is changed over to the value configured here.

When the end time has been reached, the chart speed is switched back to the standard chart speed.

If start time = end time, the timed operation is switched off.



Please observe priorities within the different chart speeds.

⇒ Section 7.5

Display	Edit	Selection/input	with keys	Enter	Continue with
FEED TIME	<input type="text" value="ENTER"/>	FEED TIME: <u>7200</u> mm/h Select speed: 0, 5, 10, 20, 60, 120, 240, 300, 360, 600, 720, 1800, 3600, 7200 mm/h	<input type="text" value="▲"/> , <input type="text" value="▼"/>	<input type="text" value="ENTER"/>	⇒ 2
	⇒ with step speed programming:				
	⇒ with continuous speed programming:	FEED TIME: <u>0000</u> mm/h Set required chart speed, value range: 0 — 7200 mm/h	<input type="text" value="▲"/> , <input type="text" value="▼"/> , <input type="text" value="◀"/> , <input type="text" value="▶"/>	<input type="text" value="ENTER"/> Check: speed value	⇒ 2
	⇒ 2	FROM-TO: <u>21</u> : <u>30</u> <u>06</u> : <u>30</u> h min Input start time (seconds = 0 sec)	<input type="text" value="▲"/> , <input type="text" value="▼"/> , <input type="text" value="◀"/> , <input type="text" value="▶"/>	<input type="text" value="ENTER"/> Check time	⇒ 3
	⇒ 3	FROM-TO: <u>21</u> : <u>30</u> <u>06</u> : <u>30</u> h min Input end time (seconds = 0 sec)	<input type="text" value="▲"/> , <input type="text" value="▼"/> , <input type="text" value="◀"/> , <input type="text" value="▶"/>	<input type="text" value="ENTER"/> Check time	<input type="text" value="▲"/> forwards <input type="text" value="▼"/> backwards

8 Programming

8.5.5 Scale printing

Defines the regular spacing in which the scaling is to be printed on the chart. The values which are set are guide values and may differ according to the chart speed.



Scale printing can also be started manually on the recorder. Hold **F** key down for at least 4 sec.

Display	Edit	Selection/input	with keys	Enter	Continue with
PRINT SCALE	ENTER	SPACING: <u>60</u> cm Select spacing of scaling on the chart: OFF 30 cm 60 cm 90 cm	▲ , ▼	ENTER	▲ forwards ▼ backwards

8 Programming

8.5.6 Time printing

Defines the spacing in which the time is to be printed on the chart. The values which are set are guide values and differ according to the chart speed.



Section 7.3

Display	Edit	Selection/input	with keys	Enter	Continue with
PRINT TIME	<input type="text" value="ENTER"/>	DISTANCE: <u>6</u> cm Select spacing of time on the chart: OFF 4 cm 6 cm 12 cm	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	<input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards

8 Programming

8.5.7 Pen offset compensation

There is an offset of 2mm each between the fibre pens from channel 1 to channel 2 and from channel 2 to channel 3. This offset is compensated by a buffer storage of the measured values when the pen offset compensation is switched on.

Display	Edit	Selection/input	with keys	Enter	Continue with
PEN DISPLACE COMPENSATION	<input type="text" value="ENTER"/>	COMPENSATION: <u>OFF</u> Switch pen offset compensation on or off: OFF, ON	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	<input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards

8 Programming

8.5.8 Statistical report

Keeping statistics with a print-out of a table of statistics at the end of the statistical period.
(⇒ Section 7.9).

The statistical period as well as the starting time for the print-out of the table of statistics are printed here.



If EXTERN CONTACT (logic input) is selected as report, it must be defined at the configuration level 3 under External Report, which logic input has to operate the report.
(⇒ Section 8.5.10).

Display	Edit	Selection/input	with keys	Enter	Continue with
REPORT	<input type="text" value="ENTER"/>	TYPE: <u>OFF</u> Set period of statistical report: OFF DAILY WEEKLY MONTHLY EXTERN CONTACT	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	OFF, EXTERN CONTACT: <input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards otherwise: ⇒ 2 ⇒ 3 ⇒ 4
	⇒ 2 (DAILY) ⇒ 3 (WEEKLY) ⇒ 4 (MONTHLY ¹)	TIME: <u>08 : 00</u> Input time when the statistical table has to be printed	<input type="button" value="▲"/> , <input type="button" value="▼"/> , <input type="button" value="◀"/> , <input type="button" value="▶"/>	<input type="text" value="ENTER"/> Check time	DAILY, MONTHLY: <input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards WEEKLY: ⇒ 31
	(WEEKLY) ⇒ 31	WEEKDAY: <u>THURSDAY</u> Select day of the week: MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY, SATURDAY, SUNDAY	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/> Check time	<input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards

1. On each first day of the month

8 Programming

8.5.9 Text at beginning

Defines the text which is printed after a stop at the re-start of the recording (⇒ Section 7.6). The complete character set is available. (⇒ Section 12.5).

Display	Edit	Selection/input	with keys	Enter	Continue with
BEGIN TEXT	<div>ENTER</div>	STATE: <u>ON</u> Select status for printing text at beginning: OFF, ON	<div>▲, ▼</div>	<div>ENTER</div>	OFF: <div>▲</div> forwards <div>▼</div> backwards ON: ⇒ 2
	⇒ 2	TEXT: _____ Input text at beginning (16 characters, complete character set)	<div>▲, ▼, ◀, ▶, S</div>	<div>ENTER</div>	

8 Programming

8.5.10 Text at end

Defines the text which is printed after a stop command before reaching the stop status.

(⇒ Section 7.6).

The complete character set is available.

(⇒ Section 12.5).

Display	Edit	Selection/input	with keys	Enter	Continue with
END TEXT	<div>ENTER</div>	STATE: <u>ON</u> Select status for printing the text at end: OFF, ON	<div>▲, ▼</div>	<div>ENTER</div>	OFF: <div>▲</div> forwards <div>▼</div> backwards ON: ⇒ 2
	⇒ 2	TEXT: _____ Input text at end (16 characters, complete character set)	<div>▲, ▼, ◀, ▶, S</div>	<div>ENTER</div>	

8 Programming

8.5.11 Presetting

Presets the parameter/configuration data for commissioning and re-commissioning the recorder. The instruments are supplied factory-set with this setting.



This does not apply to the customized linearisation tables.

Display	Edit	Selection/input	with keys	Enter	Continue with
PRESETTING	<input type="text" value="ENTER"/>	PRESETTING: <u>NO</u> Overwrite parameter/ configuration data with standard values: NO, YES	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	<input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards

8 Programming

8.5.12 Codenumber

Exchanges JUMO codenumbers for customized codenumbers.

Two different codenumbers are available:

- The codenumber for a restricted parameter set (factory-set to 9200).
- The codenumber for a complete parameter set (factory-set to 9210).

The parameters which belong to the restricted parameter set are defined in the setup program under *Edit → Operation...*

⇒ Section 8.2.4



When customized codenumbers are input, the original JUMO codenumbers are overwritten and are then no longer valid.



If the same numbers are defined for both codenumbers, this codenumber is interpreted as the codenumber for the complete parameter set.





Section 8.2.4

Display	Edit	Selection/input	with keys	Enter	Continue with
CODENUMBER	<input type="text" value="ENTER"/>	ALL PARAMETERS: <u>9210</u> Customized codenumber for the complete parameter set	<input type="text" value="▲, ▼, ◀, ▶"/>	<input type="text" value="ENTER"/>	⇒ 2
	⇒ 2	SELECT PARAMETERS: <u>9200</u> Customized codenumber for the restricted parameter set	<input type="text" value="▲, ▼, ◀, ▶"/>	<input type="text" value="ENTER"/>	<input type="text" value="▲ forwards"/> <input type="text" value="▼ backwards"/>

8 Programming

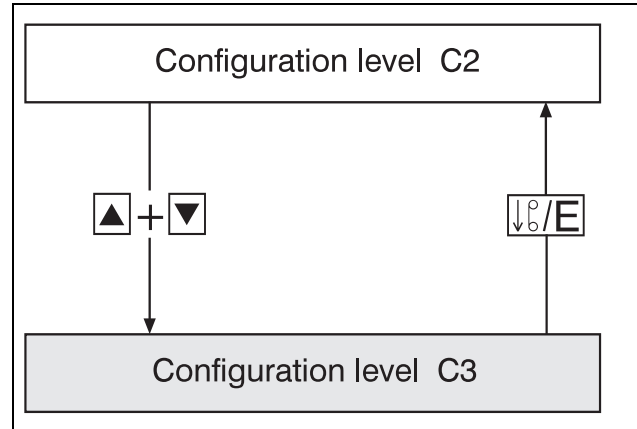
8.6 Configuration level 3

At the configuration level 3 parameters of the Extra Codes and the maths and logics module are configured.

It is reached from configuration level 2 by simultaneously pressing the  +  keys.

The configuration level 3 covers the following parameters:

- relay outputs
- maths and logics module
- interface
- external text
- binary-linked external text
- external stop
- external speed
- event counter
- external scaling
- external report





If a correct coden

umber has been input when calling up the parameter level, signal acquisition and recording are interrupted at configuration level 3. The parameters can be viewed **and** altered.



Signal acquisition, processing and recording are interrupted.

The relays of the external relay module ER8 remain in their current status. They are only operated again when the recorder is at the operating level or in the basic status.

Display	Edit	Selection/input	with keys	Enter	Continue with
C3-LEVEL					 forwards  backwards

8 Programming

8.6.1 Relay output



Extra Code 259 is required.



Accessory “External relay module ER8” is required.

The external relay module ER8 is connected to the recorder via a serial interface. It adds 8 switching outputs to the recorder. The channels which are recorded can be freely assigned to relays 1 to 8. The limit value belonging to the relays is set at the parameter level. (⇒ Section 8.3.5).

Texts TEXT L and TEXT H, which can be freely configured, report the limit transitions. (⇒ Section 7.7).

For Ik7 and Ik8

⇒ Section 10.3

Display	Edit	Selection/input	with keys	Enter	Continue with
RELAY-OUTPUTS	<input type="text" value="ENTER"/>	RELAY: <u>3</u> Select relay: 1 — 8	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	⇒ 2
	⇒ 2	REL3 STATE: <u>ON</u> Input relay status: OFF, ON	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	OFF: <input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards ON: ⇒ 3
	⇒ 3 (ON)	REL3 CHANNEL: <u>2</u> Select channel belonging to relay : 1 — 3	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	⇒ 4
	⇒ 4	2 REL3 HYST.L: <u>x.xxx</u> Input differential left of the limit	<input type="button" value="▲"/> , <input type="button" value="▼"/> , <input type="button" value="◀"/> , <input type="button" value="▶"/> , <input type="button" value="S"/>	<input type="text" value="ENTER"/>	⇒ 5

8 Programming

Display	Edit	Selection/input	with keys	Enter	Continue with
	⇒ 5	2 REL3 HYST.H: <u>X.XXX</u> Input differential right of the limit	▲, ▼, ◀, ▶, S	ENTER	⇒ 6
	⇒ 6	2 REL3 LK: <u>LK7</u> Select limit comparator function: LK7, LK8	▲, ▼	ENTER	⇒ 7
	⇒ 7	2 REL3 SENS BR: <u>CONST.</u> Define relay position on sensor break: OFF, ON, CONST. (CONST.= constant, relay position is maintained.)	▲, ▼	ENTER	⇒ 8
	⇒ 8	TEXT L: _____ Input text for underlimit (16 characters)	▲, ▼, ◀, ▶, S	ENTER	⇒ 9
	⇒ 9	TEXT H: _____ Input text for overlimit (16 characters)	▲, ▼, ◀, ▶, S	ENTER	▲ forwards ▼ backwards

8 Programming

8.6.2 Maths and logics module

Sets the status of the maths and logics module..



The recorder response can, in principle, change when the maths and logics module is switched on.

The information given in the Operating Manual can then become partially invalid.



Section 10.5

Display	Edit	Selection/input	with keys	Enter	Continue with
MATHEMATICAL MODULE	<div>ENTER</div>	MATHEMATICAL MODULE: <u>ON</u> Deactivate/activate the maths module: OFF, ON	<div>▲, ▼</div>	<div>ENTER</div>	<div>▲ forwards</div> <div>▼ backwards</div>

8 Programming

8.6.3 Interface



Extra Code 52 or 53 is required.

Sets the parameters of the RS 422/RS 485 interface:

- protocol
- baud rate
- data format
- instrument address
- minimum response time













The minimum response time is the **minimum** time span between the query of an instrument in a data network and the answer of the pen recorder.



B 70.6001.2

Display	Edit	Selection/input	with keys	Enter	Continue with
INTERFACE	<input type="text" value="ENTER"/>	PROTOCOL: <u>J-BUS</u> Set protocol: J-BUS MOD-BUS	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	⇒ 2
	⇒ 2	BAUD: <u>9.6kBAUD</u> Select baud rate (values in kbaud): 0.15, 0.3, 1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 125.0, 187.5kbaud	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	⇒ 3
	⇒ 3	DATA FORMAT: <u>8/1/NO</u> Select data format (data bits/stop bits/ parity): 8/1/NO, 8/1/ODD, 8/1/EVEN, 8/2 NO, 8/1/ZERO	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	⇒ 4

8 Programming

Display	Edit	Selection/input	with keys	Enter	Continue with
	⇒ 4	ADDRESS: <u>001</u> Select address: 1 — 255	 ,  ,  , 	 Check: $1 \leq \text{address}$ ≤ 255	⇒ 5
	⇒ 5	MIN. RESPONSE TIME: <u>000</u> Tmsec Select minimum response time: 0 — 999 msec	 ,  ,  , 	 Check: $0 \leq \text{resp.time}$ ≤ 999	 forwards  backwards

8 Programming

8.6.4 External text



Extra Code 259 is required.

A signal at one logic input (external contact) can prompt the recorder to print a text/commentary which is programmed here.



Section 7.7

Display	Edit	Selection/input	with keys	Edit	Continue with
EXTERNAL TEXT	<input type="text" value="ENTER"/>	<u>2</u> EXTERNAL TEXT Select text number: 1 — 8	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	⇒ 2
	⇒ 2	2 CONTACT: <u>LOG.INPUT 3</u> Select logic input: OFF LOG.INPUT 1 LOG.INPUT 2 LOG.INPUT 3 LOG.INPUT 4 ... LOG.INPUT 8	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	OFF: <input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards otherwise: ⇒ 3
	⇒ 3	2 TEXT: _____ Input text (16 characters)	<input type="button" value="▲"/> , <input type="button" value="▼"/> , <input type="button" value="◀"/> , <input type="button" value="▶"/> , <input type="button" value="S"/>	<input type="text" value="ENTER"/>	<input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards

8 Programming

8.6.5 Binary-linked external text



Extra Code 259 is required.

The signals which are present at the first four logic inputs are interpreted as a binary number. A text of 16 characters can be assigned to each of these 16 possible binary numbers ($2^4 = 16$).

A change of at least one signal at the first four logic inputs results in a new binary number.

If the printing status of the text belonging to this binary number is programmed to ON, the text is printed. (⇒ Section 7.7).

Display	Edit	Selection/input	with keys	Enter	Continue with
TEXT LOGIC LINKS	<input type="text" value="ENTER"/>	LINK: <u>BIN.INPUT 1-4</u> Select inputs which are to be binary-linked: OFF no text BIN.INPUT 1 text 00 text 01and BIN.INPUT1-2 text 00 ... text 03 BIN.INPUT1-3 text 00 ... text 07 BIN.INPUT1-4 text 00 ... text 15	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	OFF: <input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards otherwise: ⇒ 2
⇒ 2		<u>07 TEXT LOGIC LINKS</u> Select binary combination (text no.): 00 — 15	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	⇒ 3
⇒ 3		<u>07 TEXT STATE:ON</u> Select status for text printing: OFF, ON	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	⇒ 4
⇒ 4		<u>07 TXT: _ _ _ _ _</u> Input text (16 characters, complete character set)	<input type="button" value="▲"/> , <input type="button" value="▼"/> , <input type="button" value="◀"/> , <input type="button" value="▶"/> , <input type="button" value="S"/>	<input type="text" value="ENTER"/>	<input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards

8 Programming

8.6.6 External stop



Extra Code 259 is required.

Stops the recorder via a signal at the logic input. As long as the signal is present, the recording is interrupted.

Display	Edit	Selection/input	with keys	Enter	Continue with
EXTERNAL STOP	<div>ENTER</div>	CONTACT: LOG.INPUT 3 Select logic input: OFF LOG.INPUT 1 LOG.INPUT 2 LOG.INPUT 3 LOG.INPUT 4 ... LOG.INPUT 8	<div>▲, ▼</div>	<div>ENTER</div>	<div>▲ forwards</div> <div>▼ backwards</div>

8 Programming

8.6.7 External speed



Extra Code 259 is required.

The chart speed changed to when the logic input which has the function FEED EXTERN assigned to it is closed.

Display	Edit	Selection/input	with keys	Enter	Continue with
FEED EXTERN	<input type="text" value="ENTER"/>	CONTACT: LOG.INPUT 3 Select logic input: OFF LOG.INPUT 1 LOG.INPUT 2 LOG.INPUT 3 LOG.INPUT 4 ... LOG.INPUT 8	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	OFF: <input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards otherwise: ⇒ 2
	⇒ 2 (with step speed programming)	FEED EXTERN: 7200 mm/h Select speed: 0, 5, 10, 20, 60, 120, 240, 300, 360, 600, 720, 1800, 3600, 7200 mm/h	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	<input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards
	⇒ 2 (with continuous speed programming)	FEED EXTERN: 0000 mm/h Set the required chart speed value range: 0 — 7200 mm/h	<input type="button" value="▲"/> , <input type="button" value="▼"/> , <input type="button" value="◀"/> , <input type="button" value="▶"/>	<input type="text" value="ENTER"/> Check speed value	<input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards

8 Programming

8.6.8 Event counter



Extra Code 259 is required.

The recorder features two event counters which can each be assigned to a logic input. Any start value can be configured. When a signal is applied to the corresponding logic input (external contact), the counter is incremented by one each time, if it is switched on (status=ON).

Event counters are reset via programming the start value. A text can be entered in each event counter for designation.



Section 7.8

Display	Edit	Selection/input	with keys	Enter	Continue with
EVENT COUNTER	<input type="text" value="ENTER"/>	2 EVENT COUNTER Select event counter: 1 — 2	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	⇒ 2
	⇒ 2	2 CONTACT: <u>LOG.INPUT 3</u> Select logic input or status: OFF LOG.INPUT 1 LOG.INPUT 2 ... LOG.INPUT 8	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	OFF: <input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards otherwise: ⇒ 3
	⇒ 3	2 EC STATE: <u>ON</u> Select status: OFF, ON	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	⇒ 4
	⇒ 4	2 BEG VALUE: <u>0.000</u> Input start value of the event counter	<input type="button" value="▲"/> , <input type="button" value="▼"/> , <input type="button" value="◀"/> , <input type="button" value="▶"/>	<input type="text" value="ENTER"/>	⇒ 5
	⇒ 5	2 TEXT: _____ Input text to designate the event counter (16 characters)	<input type="button" value="▲"/> , <input type="button" value="▼"/> , <input type="button" value="◀"/> , <input type="button" value="▶"/> , <input type="button" value="S"/>	<input type="text" value="ENTER"/>	<input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards

8 Programming

8.6.9 External scaling

Defines the logic input from which the scale printing is initiated.

⇒ Section 7.4

Display	Edit	Selection/input	with keys	Enter	Continue with
EXTERNAL SCALING	<div>ENTER</div>	CONTACT: LOG.INPUT 3 Select logic input: OFF LOG.INPUT 1 LOG.INPUT 2 LOG.INPUT 3 LOG.INPUT 4 ... LOG.INPUT 8	<div>▲, ▼</div>	<div>ENTER</div>	<div>▲ forwards</div> <div>▼ backwards</div>

8 Programming

8.6.10 External report

Defines the logic input from which the statistics are compiled and the report is printed.

Statistics are initiated by the recognition of the low-high edge, terminated with the recognition of the high-low edge and printed out in table format.



In the case of a report via external contact, (⇒ Section 8.5.8) the REPORT TYPE in the parameter REPORT has to be set to EXTERN CONTACT.

Display	Edit	Selection/input	with keys	Enter	Continue with
EXTERNAL REPORT	<input type="text" value="ENTER"/>	CONTACT: LOG.INPUT 3 Select logic input: OFF LOG.INPUT 1 LOG.INPUT 2 LOG.INPUT 3 LOG.INPUT 4 ... LOG.INPUT 8	<input type="button" value="▲"/> , <input type="button" value="▼"/>	<input type="text" value="ENTER"/>	<input type="button" value="▲"/> forwards <input type="button" value="▼"/> backwards

9 Consumables

9.1 Summary of consumables

Fibre pens, disposable

blue, Part No.: 00309750
red, Part No.: 00309751
green, Part No.: 00309753

Roll chart

overall width: 120 mm

no name, % graduation, linear
overall length: 16 m
Packing unit: 5 rolls
Part No.: 00331497

no name, % graduation, linear
overall length: 32 m
Packing unit: 5 rolls
Part No.: 00331499

no name, special graduation
(printing as order specification)
overall length: 16 m/32 m

Fanfold chart

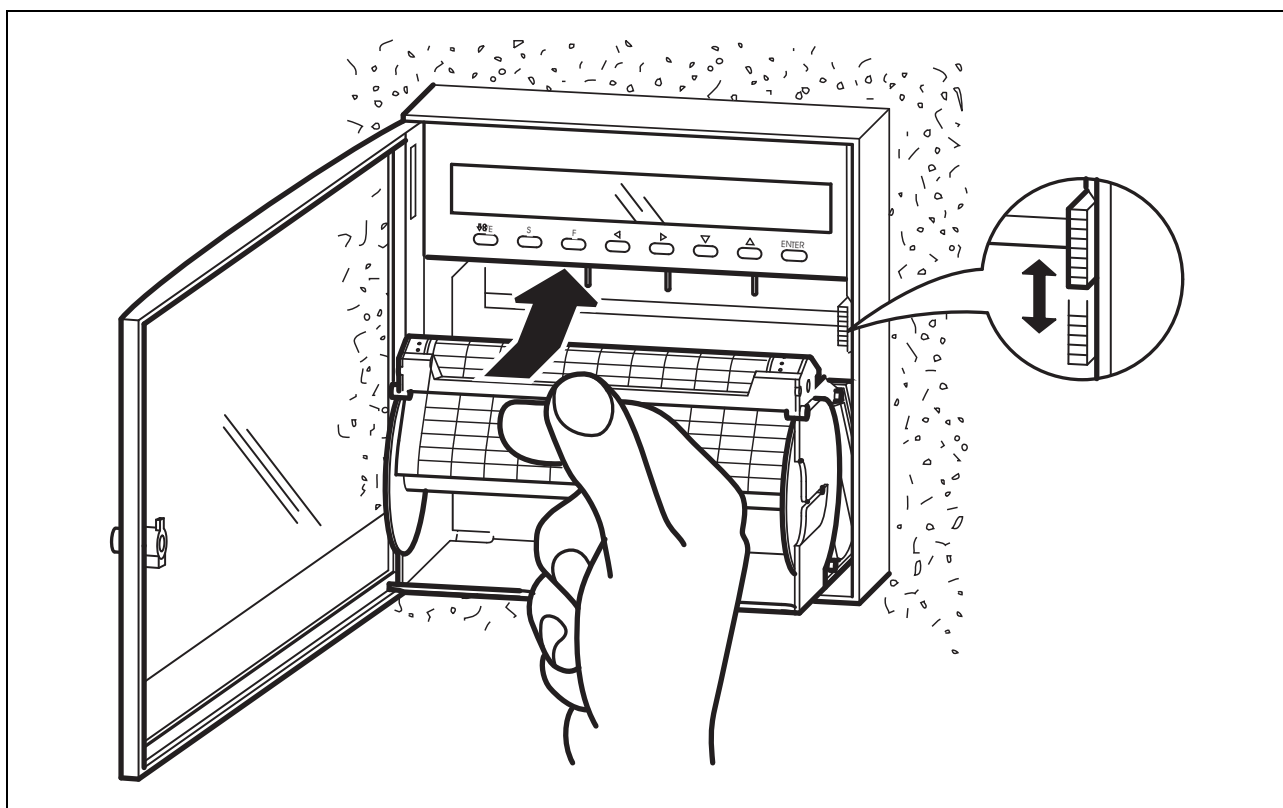
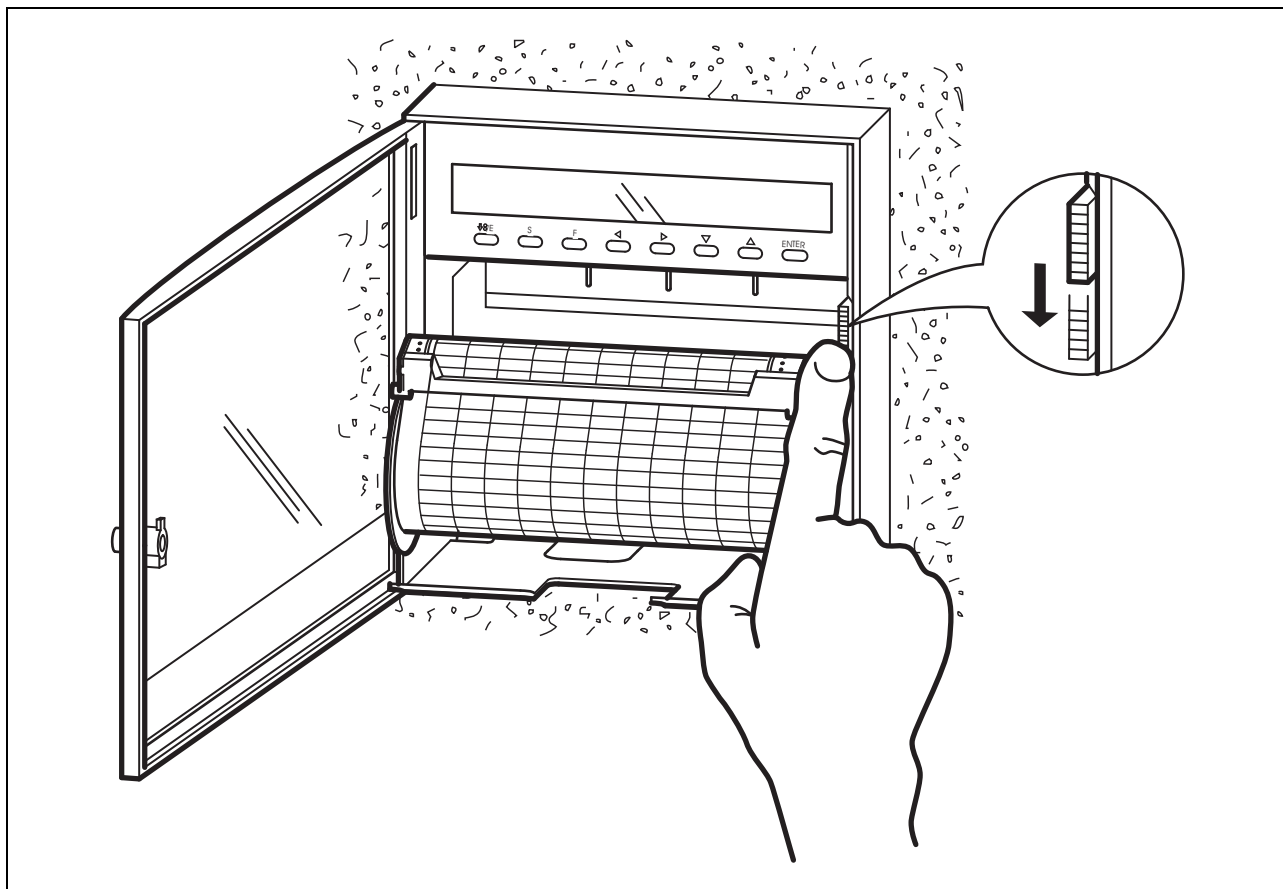
overall width: 120 mm
overall length: 16 m

no name, % graduation, linear
Packing unit: 5 packs
Part No.: 00331490

no name, special graduation
(printing as order specification)

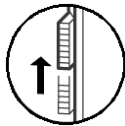
9 Consumables

9.2 Removing and replacing the chart cassette



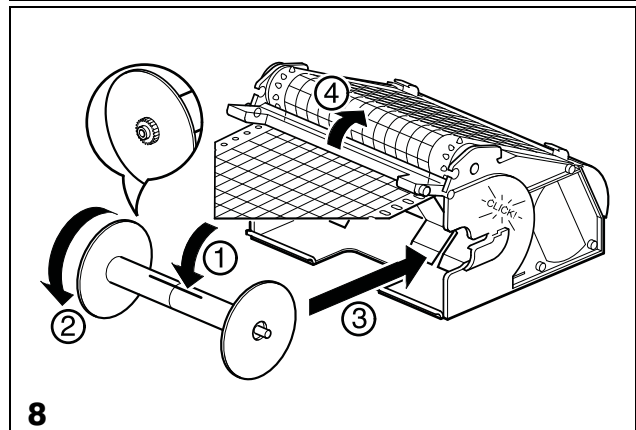
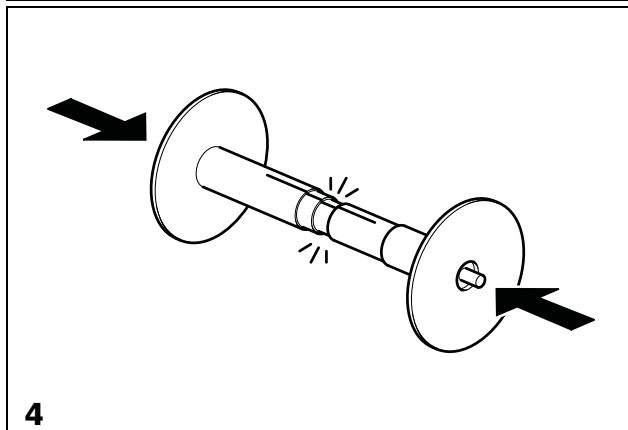
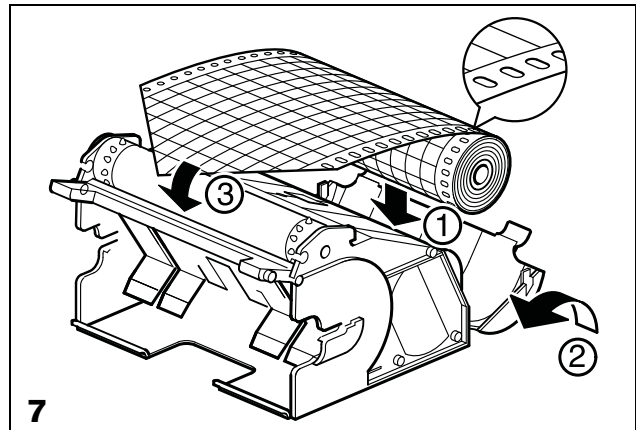
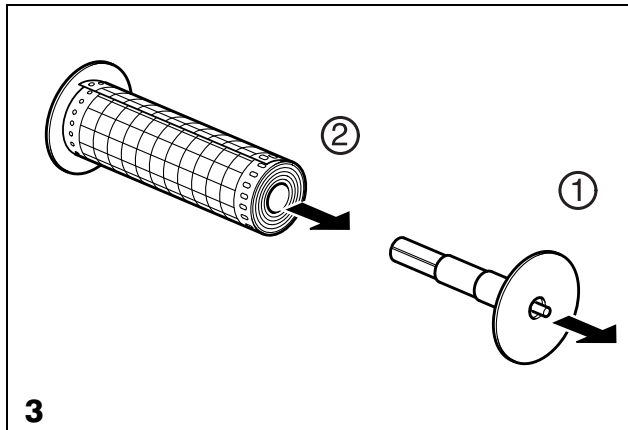
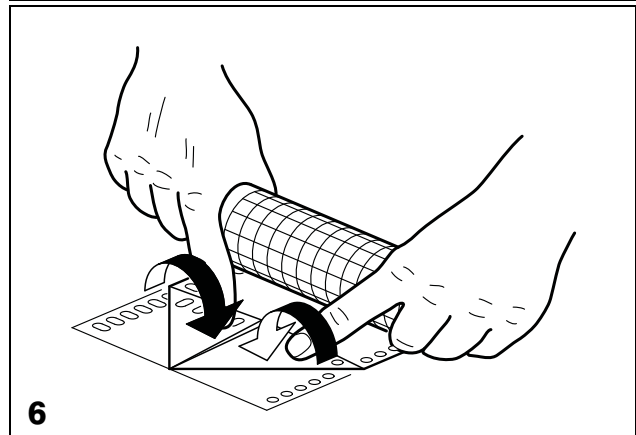
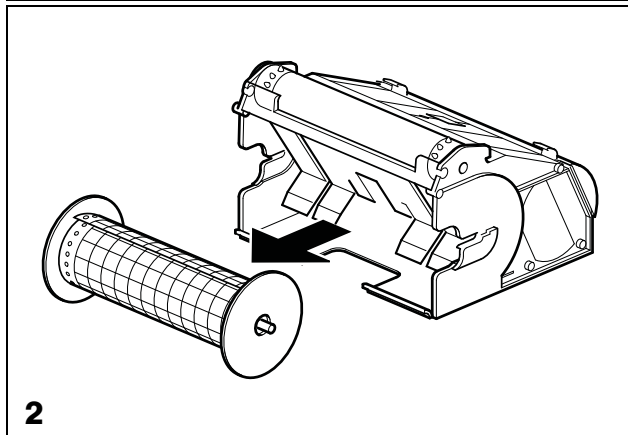
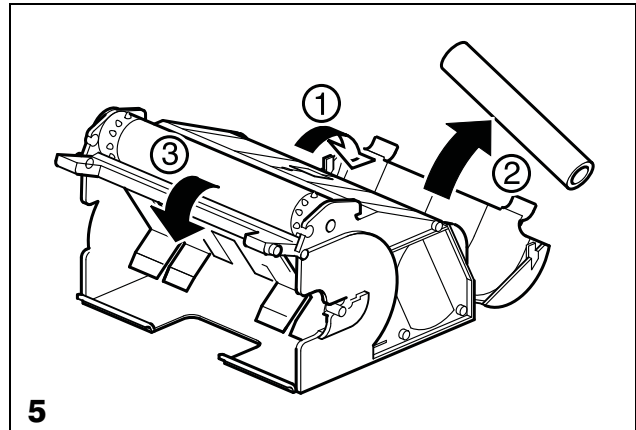
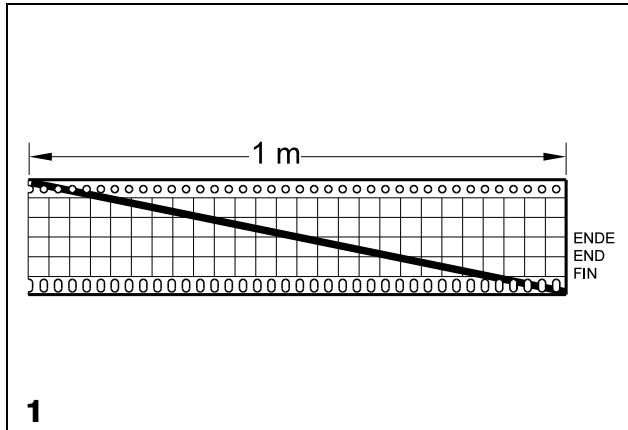
9 Consumables

- When inserting the chart cassette, take care that it is centered on the tear-off edge and – guiding it with the thumb and index finger – insert it into the cassette slot and push it up gently, until the holding/ejector catch snaps into position.
- When the cassette has been inserted, the paper feed should immediately take up the slack in the paper (about 10mm feed).
- If the paper feed does not start up, then the cassette will have to be removed and replaced in the correct position.
- Check that the holding catch is in the final (latched) position.



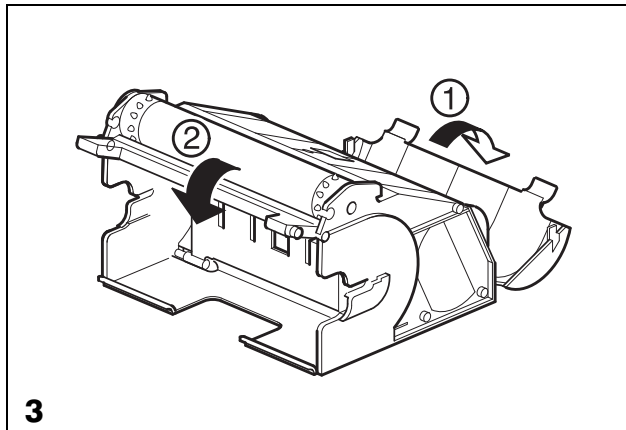
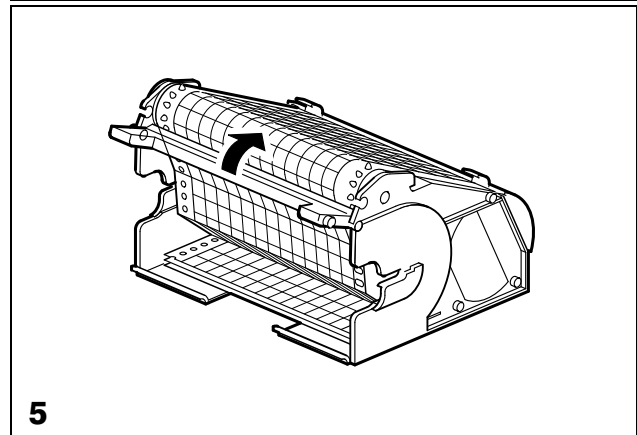
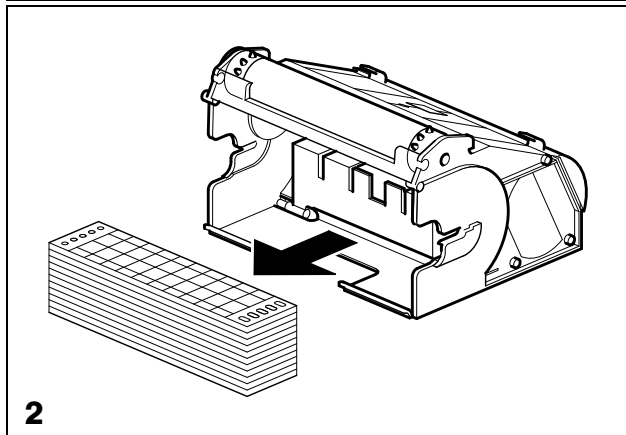
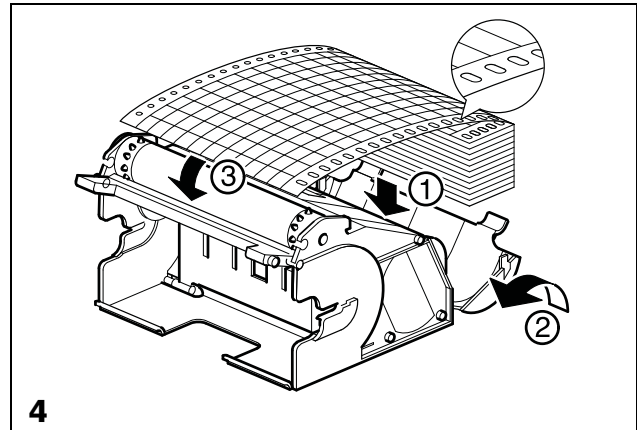
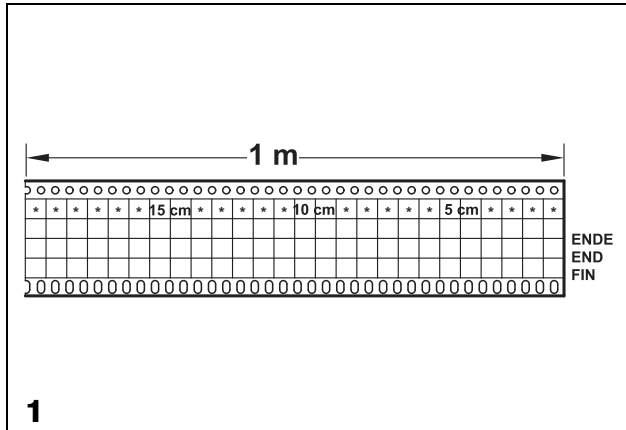
9 Consumables

9.2.1 Changing the roll chart



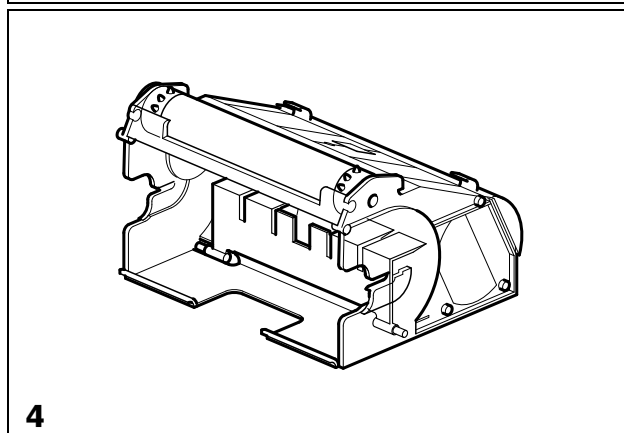
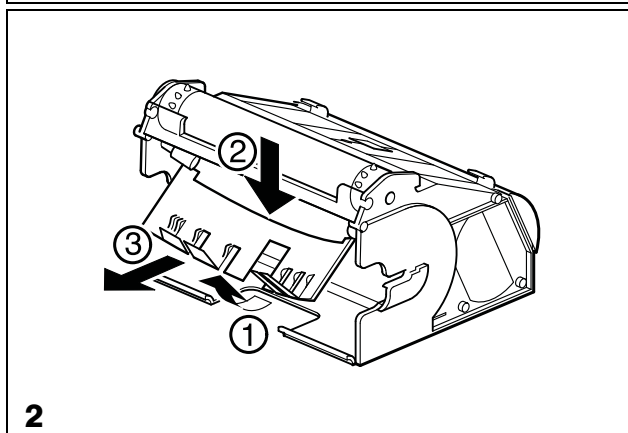
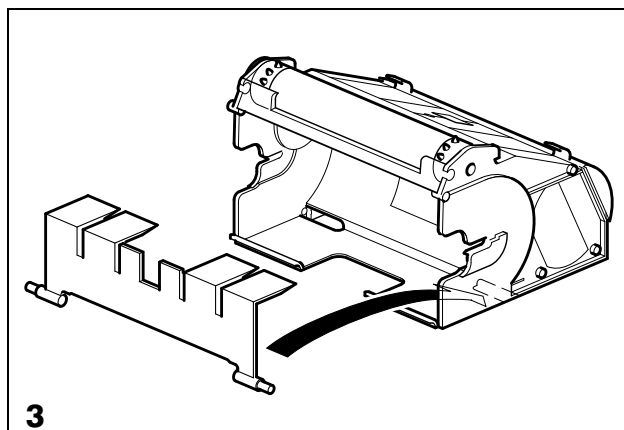
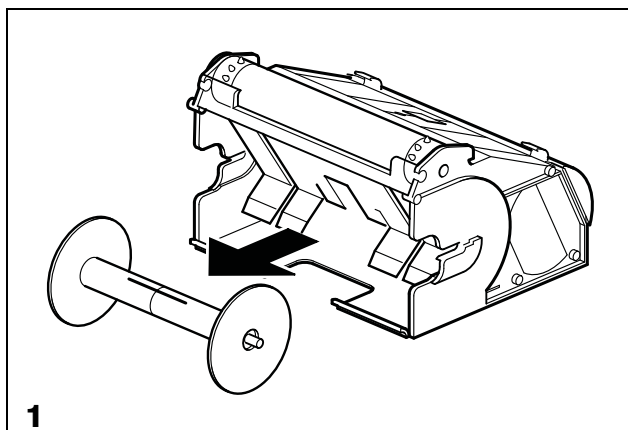
9 Consumables

9.2.2 Changing the fanfold chart



10 Extra Codes and accessories

10.1 Converting the chart cassette



10 Extra Codes and accessories

10.2 Extra Code 259

The extra Code 259 features 8 logic inputs, one electrically isolated supply for 2-wire transmitter and the serial interface for the external relay module ER8.

The 8 logic inputs can be operated through floating contacts or at the following voltage levels:

inactive 0—5V

active 20—35V

The voltage level must be applied for at least 0.5sec.

Functions available:

- external start/stop
- change to external chart speed
- text writing
- external report start/stop
- start of printing of scaling
- event counter

10 Extra Codes and accessories

10.3 External relay module ER8

The external relay module ER8 adds eight switching outputs to the recorder. The relays are freely assigned to the recorder channels in the setup program (⇒ Section 10.4).

The limit for each relay is programmed at the parameter level.

⇒ Section 8.3.5

The switching differential about the limit setting can be freely configured in the setup program. The limit comparator functions lk7 and lk8 are available

⇒ Section 8.6.1

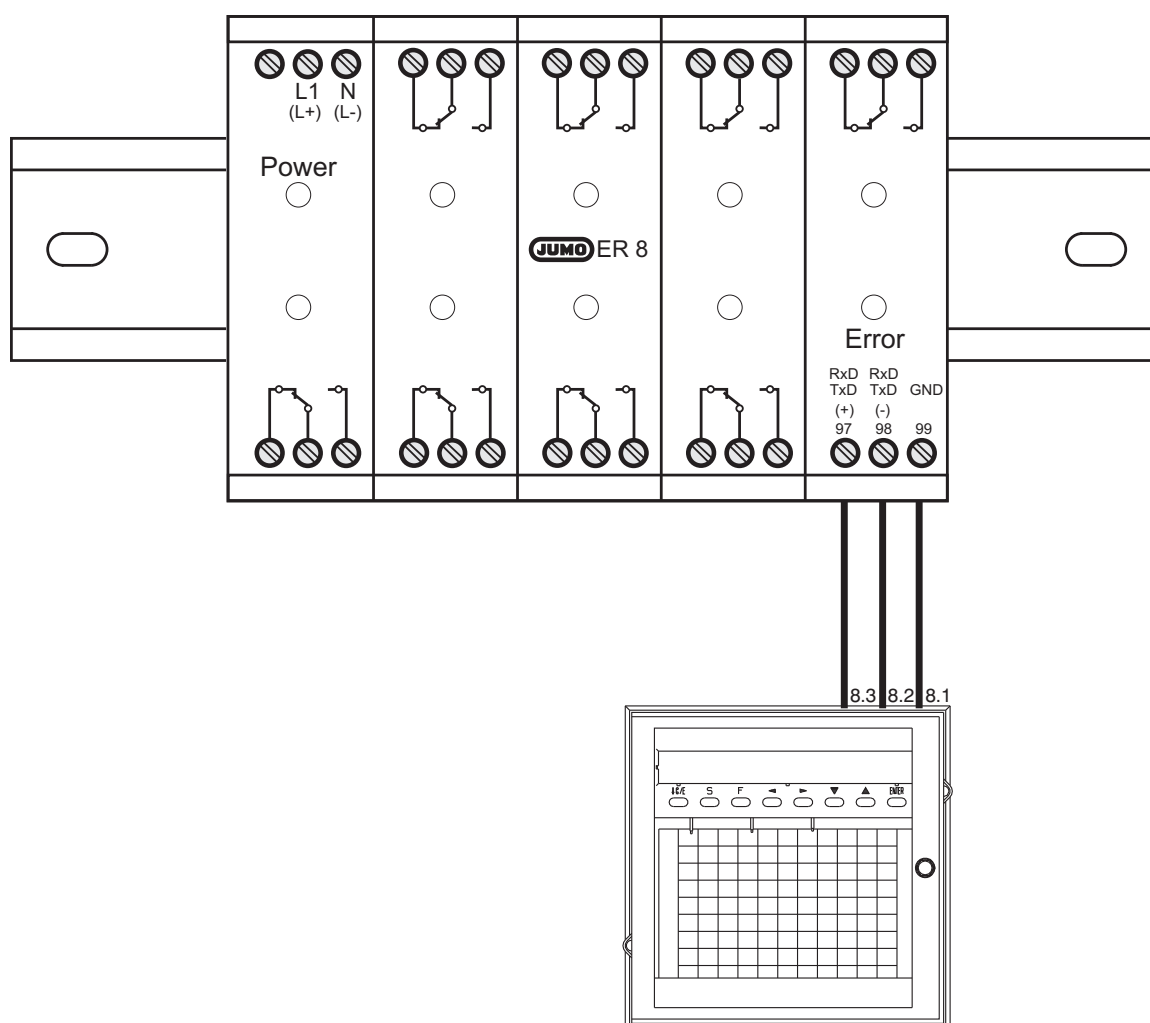


The external relay module ER8 can only be operated when the Extra Code 259 is installed.



When the setup connector is plugged into the recorder all relays are de-energised.

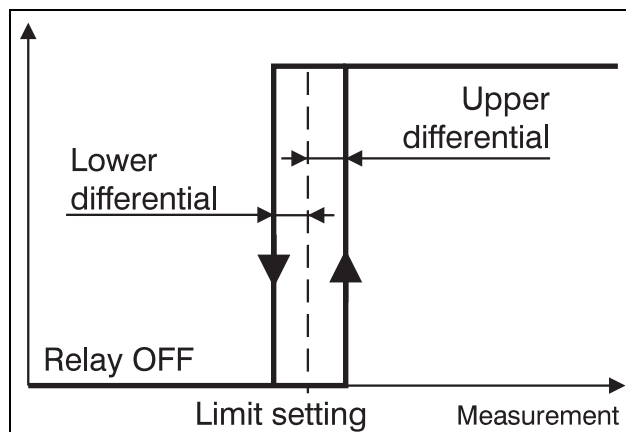
10 Extra Codes and accessories



10 Extra Codes and accessories

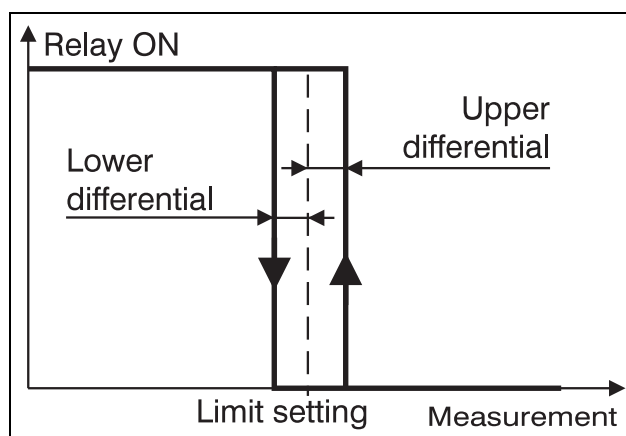
Ik7

The relay is energised when the measurement goes above the limit setting.



Ik8

as Ik7 but relay action reversed.



10 Extra Codes and accessories

10.4 Setup program

The setup program provides convenient configuration of the recorder using an IBM-PC compatible PC.

Hardware requirements:

- IBM-PC or compatible computer
- CPU from Intel 386
- 4 MB RAM
- 3.5" disk drive
- hard disk (at least 6 MB free)
- one free serial interface RS232 (data interchange)
- mouse
- VGA graphics

Software requirements:

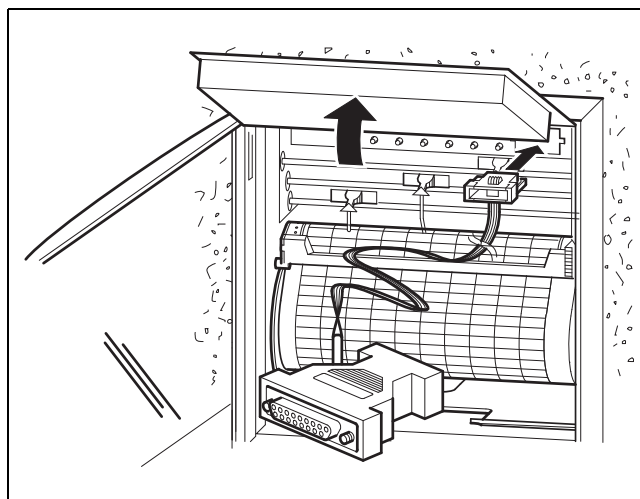
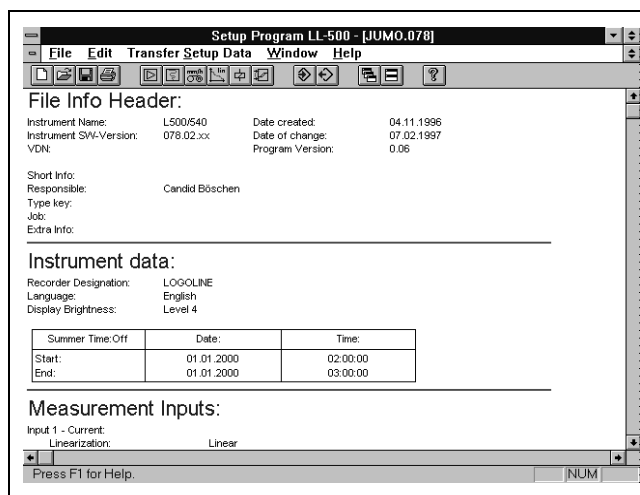
- Microsoft Windows¹ 3.1/3.11/95/NT4.0

The setup program is installed with an installation program for Microsoft Windows.

The operation of the setup program is described in the Windows Online Help.

All parameters of the recorder can be programmed with the aid of the setup program.

A summary of all parameters of the recorder is given in the Appendix. (⇒ Section 12.6).



1. Microsoft and Windows are registered trademarks of the Microsoft Corporation

10 Extra Codes and accessories



Plugging the setup connector into the recorder interrupts:

- signal acquisition and
- recording

In addition:

- events are no longer covered,
- statistical reports are aborted and reset,
- limit values are no longer monitored, and
- the outputs are no longer operated; the relays are de-energised.

10 Extra Codes and accessories

10.5 Maths and logics module

If the maths and logics module is deactivated, the signals measured at the signal inputs are recorded in accordance with the configuration of the signal inputs. If the maths and logics module is activated, the measured signals can be mathematically linked.

Example:

The sum/difference of two inputs is recorded on one channel. Simultaneously, on another channel, a maximum value is recorded for as long as a specific logic input is open. Closing the logic input resets the maximum value recording.

Thanks to the many functions, operators and variables which are available for the maths module, an individual adjustment to the requirements of the task can be made in most cases.

On request, customized maths programs can be set up in the main factory.

The setup program is used to transfer these programs to the recorder.



If the maths and logics module is switched on, the recorder response can be fundamentally changed.

The information given in the Operating Manual can then be partially invalid.

10 Extra Codes and accessories

10.6 Interface (RS422/RS485)

This interface is intended for communication with higher-level systems (e.g. bus systems). It is **not** the setup interface, which is used to transfer the data between the setup program and the pen recorder.


The RS422/RS485 interface is described in detail in the Operating Manual B 70.6001.2.

11 Fault finding

11.1 What to do if...

Display or printing “>>>>>”	<ul style="list-style-type: none"> - The value is outside the measuring range (Out Of Range) - The transducer has been connected up incorrectly - The signal inputs are configured incorrectly - Probe break
Instead of a value, the printing or the display shows “****”, “±*.***”, “±**.*”, “±***.*”, “±****.”	<ul style="list-style-type: none"> - The value can not longer be represented; alter the scaling with the setup program so that the value can always be represented. - In the case of event counter, reset the event counter using the setup program
No recording	<ul style="list-style-type: none"> - Key S has been pressed ⇒ Section 6.1 - “External Stop” has been configured and the corresponding logic input is closed - The chart cassette has not been fitted correctly ⇒ Section 9.2 Caution: Insert the chart cassette by applying light upwards pressure - The take-up roll has not properly engaged with the chart cassette ⇒ Section 9.2.1 - The end of the chart has been reached ⇒ Section 9.2.1, Section 9.2.2 - The chart speed has been programmed as 0 mm/h ⇒ Section 8.2.1 - The writing status is switched off (“OFF”) - The setup connector is still plugged in
Fibre pen does not write	<ul style="list-style-type: none"> - The fibre pen has not been fitted correctly ⇒ Section 5.4 - The ink in the fibre pen is used up
No chart feed	<ul style="list-style-type: none"> - The chart cassette has not been fitted correctly ⇒ Section 9.2 - The chart speed has been programmed as 0 mm/h - The pin roller does not engage with the chart perforations - The tear-off edge is not correctly engaged - The pen recorder is in the STOP status - With a newly inserted chart, the start of the chart must be straight and smooth so that the chart can be taken up automatically
Measurements are not recorded	<ul style="list-style-type: none"> - Check that the connecting terminals are tightened properly - Check the supply - Check the input configuration (range) - Check the transducers and cables, measure them where appropriate - The write status may be switched off

11 Fault finding

Relay does not switch although limit is exceeded	<ul style="list-style-type: none">- The signal inputs are not wired up according to the connection diagram- Pen recorder and external relay module ER8 are not connected together correctly- The switching differential at the limit has been disregarded- The relay status is "OFF"- A wrong signal is being monitored against the limit
No programming possible	<ul style="list-style-type: none">- A wrong codenumber has been input- The codenumber has been altered
No communication with the setup program	<ul style="list-style-type: none">- The setup connector has not been plugged in correctly- The recorder is already being configured using the keys; leave parameter and configuration level by pressing the  key.

12 Appendix

12.1 Technical Data

Analogue inputs (measurement channels)

Measurement time

240 msec for all three channels

Input filter

digital second-order filter

filter time constant adjustable 0 — 10.0sec.

Thermocouples

Type	Range limits	
Fe-Con L	–200	+900°C
Fe-Con J	–210	+1200°C
Cu-Con U	–200	+600°C
Cu-Con T	–270	+400°C
NiCr-Ni K	–270	+1372°C
NiCr-Con E	–270	+1000°C
NiCrSi-NiSi N	–270	+1300°C

shortest span: 100°C

Measurement accuracy:

±0.1% referred to range limits. On Type J this applies only from –200°C upwards, on Type U and T only from –150°C, on Type K only from –80°C and on Types E and N only from –100°C upwards.

Type	Range limits	
Pt10Rh-Pt S	–50	+1768°C
Pt13Rh-Pt R	–50	+1768°C
Pt30Rh-Pt6Rh B	0	+1820°C

shortest span: 500°C

Measurement accuracy:

±0.15% referred to range limits. On Type B this applies only from 400°C upwards, on Types S and R only from 0°C upwards.

Within the range limits the start and end of range can be freely programmed in 0.1°C steps.

Cold junction

internal: Pt100

Accuracy of internal cold junction: ±1.0°C

external: cold junction thermostat

The cold junction temperature is set in the setup program to a constant value between –20 and +100°C.

external: Pt100 in 3-wire circuit

Resistance thermometers

Type	Range limits		Linearisation
Pt100	–200	+850°C	IEC
Pt100	–200	+649°C	JIS
Pt500	–200	+850°C	IEC
Pt1000	–200	+850°C	IEC
Ni100	–60	+180°C	

shortest span: 15°C

Measurement accuracy:

Range		2-wire 3-wire	4-wire
–200	+100°C	±0.4°C	±0.4°C
–200	+850°C	±0.8°C	±0.5°C

Within the range limits the start and end of range can be freely programmed in 0.1°C steps.

lead resistance:

3-wire circuit 30Ω max. per lead

2-wire circuit 15Ω max. per lead

measurement current:

0.4mA on Pt100 und Ni100

0.05mA on Pt500 und Pt1000

Resistance transmitters with 3-wire connection

3.9 kΩ max.

min.span: 6Ω

12 Appendix

Measurement accuracy:

up to 130Ω: ±150 mΩ
 up to 390Ω: ±300 mΩ
 up to 1600Ω: ±1.6 Ω
 up to 3900Ω: ±2 Ω

The resistance can be programmed in 0.1Ω steps.

Potentiometers in 2-wire, 3-wire and 4-wire circuit

3.9 kΩ max.

min.span: 6Ω

Measurement accuracy:

up to 130Ω: ±150 mΩ
 up to 390Ω: ±300 mΩ
 up to 1600Ω: ±1.6 Ω
 up to 3900Ω: ±2 Ω

The resistance can be programmed in 0.1Ω steps.

Voltage

Voltages can be measured in the following basic ranges:

Basic ranges	Measurement accuracy
-15 +77 mV	± 80μV
0 +170 mV	±120μV
-76 +76 mV	±120μV
-162 +880 mV	± 1 mV
0 +1930 mV	± 1 mV
-880 +880 mV	± 1 mV
-1.84 +10 V	± 6 mV
0 +22 V	± 12 mV
-10 +10 V	± 12 mV

shortest span: 5 mV

Within these basic range limits the start and end of range can be freely programmed, up to 999 mV in 0.01mV steps, from 1 V in 1 mV steps.

Current

Currents can be measured in the following basic ranges:

Basic ranges	Measurement accuracy
-4 +21 mA	±20μA
0 +45 mA	±40μA
-20.5 +20.5 mA	±40μA

shortest span: 0.5 mA

Within these basic range limits the start and end of range can be freely programmed in 0.01 mA steps.

Customized linearisation

In the setup program there is a choice between linear, square law and cube law linearisation. There can be up to 41 calibration points for linear and square law linearisation, and up to 61 calibration points for cube law linearisation. These calibration points are used to determine the coefficients for polynomials defined for each section so that even a few calibration points produce a smooth graph.

Accuracy: depends on shape of graph

Action on transducer short-circuit and break

Input	Break
Thermocouple	X
Resistance thermometer	X
Resistance transmitter	-
Potentiometer	X
Voltage up to 170 mV	X
Voltage above 170 mV	-
Current	X*

X = is recognised, - = is not recognised

* 0 mA is recognised.

In case of a break at the transducer all pens are positioned on 0 %. The LED dot matrix display shows ">>>>>".

12 Appendix

General Data

Zero adjustment

self-compensating system using Hall sensors

Recording system

drive by stepping motor

sensitivity:

0.2 % or better referred to 100 mm recording width

reproducibility:

0.25 % or better referred to 100 mm

recording width

response time:

1 sec referred to 100 mm recording width

Indication and recording accuracy

Class 0.5 referred to range limits and basic ranges

Writing system

fibre pen

Colour sequence

channel 1: blue

channel 2: red

channel 3: green

Ink capacity

sufficient for approx. 1000 m trace;
on channel 1 depending on text printing

Pen offset

2(4) mm between pen 1 and pen 2(3).

Can be corrected by pen offset compensation

Overrun/underrun

electronic limitation to 0 — 100 mm writing width

Chart speed

programmable from keys:

0, 5, 10, 20, 60, 120, 240, 300, 360, 600, 720, 1800, 3600, 7200 mm/h

or freely programmable in 1 mm/h steps

Chart drive

by stepping motor and gearbox

Chart cassette

cassette for 16 m or 32 m roll chart or 16 m fanfold chart, with tear-off edge and electronic chart end switch.

Chart

roll or fanfold chart to DIN 16 230

overall width: 120 mm

writing width: 100 mm

pin spacing: 110 mm

visible chart length

roll chart: 60 mm

fanfold chart: 30 — 60 mm

overall length

roll chart: 16 m or 32 m

fanfold chart: 16 m

Supply

AC: 93 — 263 V 48 — 63 Hz

or

DC/AC: 20 — 53 V 48 — 63 Hz

Test voltages (type test)

To EN 61 010, Part 1 (March 1994)

overvoltage Category II,

pollution Grade 2

supply against input circuit:

on AC supply

3.7 kV 50 Hz, 1 min,

on DC/AC supply

510 V 50 Hz, 1 min

supply against case

(protective earth):

on AC supply

2.3 kV 50 Hz, 1 min,

on DC/AC supply

510 V 50 Hz, 1 min

inputs against inputs and inputs against case:

510 V 50 Hz, 1 min

isolation between analogue inputs up to

30 V AC/50 V DC

Supply voltage error

less than 0.1 % of range span

12 Appendix

Power consumption

35 VA max.

Data back-up

by lithium battery in RAM, more than 4 years;
by storage capacitor 2 days at 15 — 25 °C
ambient temperature.
Additional back-up in EEPROM.

Electrical connection

at the back through screw-clamp connectors, max. conductor cross-section 2.5 mm²
or 2 x 1.5mm² with core sleeves.
Setup connector behind the swing-up LED
dot-matrix display.

Permitted ambient temperature range

–10 to +50 °C

Ambient temperature drift

0.3 % per 10 °C

Permitted storage temperature range

–20 to +70 °C

Climatic conditions

rel. humidity 75 % max., no condensation

Operating position

NL 90 ± 30 to DIN 16 257 (vertical)

Protection

to EN 60 529 Category 2

- front IP54
- front IP65 (with extra code 266,
without extra code 265)
- rear IP20

Electromagnetic compatibility (EMC)

EN 61 326

Interference emission:

Class B

Immunity to interference:

industrial requirements

Electrical safety

to EN 61 010

Approvals/marks of conformity

Mark of conformity:

c UL us

Testing laboratory:

Underwriters Laboratories

Certificates/certification numbers:

E 201387

Test basis:

UL 3111-1

CAN/CSA-C22.2 No. 1010.1-92

valid for:

the flush-mounted instrument;

not in conjunction with any housing extra
code

12 Appendix

12.2 Error messages

All error messages are displayed flashing on the matrix display at regular intervals. The other instrument functions remain unaffected as far as possible.

Display	Cause / Remedy
Status message	
NO PAPER!	<p>The chart cassette has been removed or the end of the chart has been reached; a fresh chart has to be fitted. ⇒ Section 9.2 ff</p> <p>Caution: Insert the chart cassette by applying light upwards pressure</p> <p>The take-up roll has not properly engaged with the chart cassette ⇒ Section 9.2.1</p>
Error or fault on recorder	
LOW BATTERY!	<p>The battery for the real time clock and for RAM back-up is discharged.</p> <p>Please contact the nearest office or the factory.</p>
ADJUST TIME!	<p>This error message is produced when the storage capacitor (Code 021, ⇒ Section 2.2) is discharged too far during supply failure.</p> <p>Event, supply failure and operating hour counters and the system clock are reset.</p> <p>The time must be set. ⇒ Section 8.3.2</p>
RELAY-ERROR!	<p>The communication with the external relay module ER8 is faulty.</p> <p>Check the connection between the recorder and the external relay module ER8.</p>

12 Appendix

Display	Cause / Remedy
Errors on parameter input	
ERROR!	<ul style="list-style-type: none">- Chart speed outside 0—7200mm/h. The input has to be repeated. Input a value within the range of values.- Date is invalid. An invalid date has been input. The input has to be repeated.- Time is invalid. An invalid time has been input. The input has to be repeated.- Error in value input. The input is outside the range of values. The input has to be repeated with another value.

12 Appendix

12.3 Hardware fault

In case of one of the following faults the recording is aborted and the error message flashes on the display.

The relays are operated as for probe break¹.
The recorder does not react to any event and can not be operated.
Please contact the nearest office or the factory.


Display	Cause / Remedy
EEPROM FAULTY!	The EEPROM in the recorder is faulty, the configuration data can no longer be stored.
ADC FAULTY!	The A/D converter of the recorder is faulty.
HALLSENSOR FAULTY!	The writing system is faulty.

1. The action on probe break is configured using the setup program or the parameter relay output (⇒ Section 8.6.1).

12 Appendix

12.4 Status messages

The following status messages are indicated on the matrix display:

Display	Description
INITIALISING	The recorder is being initialised. Please wait.
STOP	The recorder is in the Stop status because key  has been pressed.
EXTERNAL STOP	The recorder is in the Stop status because external stop has been activated by closing the appropriate logic input.
SETUP	The setup connector has been plugged into the recorder. The recorder is ready for communication with the PC connected to it.
PLEASE WAIT!	The configuration data are being written to EEPROM. During this time the recorder does not respond to any inputs.

12 Appendix

12.5 Character set

032		079	O	0126	~	0212	Ô
033	!	080	P	0161	ı	0213	Õ
034	"	081	Q	0162	ç	0214	Ö
035	#	082	R	0163	£	0215	×
036	\$	083	S	0164	¤	0216	Ø
037	%	084	T	0165	¥	0217	Ù
038	&	085	U	0166	|	0218	Ú
039	'	086	V	0167	§	0219	Û
040	(	087	W	0168	”	0220	Ü
041	)	088	X	0170	ª	0221	Ý
042	*	089	Y	0171	«	0222	Þ
043	+	090	Z	0172	¬	0223	ß
044	,	091	[	0173	-	0224	à
045	-	092	\	0175	-	0225	á
046	.	093	]	0176	º	0226	â
047	/	094	^	0177	±	0227	ã
048	0	095	_	0178	²	0228	ä
049	1	096	`	0179	³	0229	å
050	2	097	a	0180	´	0230	æ
051	3	098	b	0181	µ	0231	ç
052	4	099	c	0182	¶	0232	è
053	5	0100	d	0183	·	0233	é
054	6	0101	e	0184	¸	0234	ê
055	7	0102	f	0185	¹	0235	ë
056	8	0103	g	0186	º	0236	ì
057	9	0104	h	0187	»	0237	í
058	:	0105	i	0191	¸	0238	î
059	;	0106	j	0192	À	0239	ï
060	<	0107	k	0193	Á	0240	ð
061	=	0108	l	0194	Â	0241	ñ
062	>	0109	m	0195	Ã	0242	ò
063	?	0110	n	0196	Ä	0243	ó
064	@	0111	o	0197	Å	0244	ô
065	A	0112	p	0198	Æ	0245	õ
066	B	0113	q	0199	Ç	0246	ö
067	C	0114	r	0200	È	0247	÷
068	D	0115	s	0201	É	0248	ø
069	E	0116	t	0202	Ê	0249	ù
070	F	0117	u	0203	Ë	0250	ú
071	G	0118	v	0204	Ì	0251	û
072	H	0119	w	0205	Í	0252	ü
073	I	0120	x	0206	Î	0253	ý
074	J	0121	y	0207	Ï	0254	þ
075	K	0122	z	0208	Ð	0255	ÿ
076	L	0123	{	0209	Ñ		
077	M	0124	|	0210	Ò		
078	N	0125	}	0211	Ó		

12.6 Summary of the parameters

Parameter	Description	Programming S = via setup R = on recorder
Instr. designation	Designation of recorder	R, S
Language	Language (for print-outs and matrix display)	R, S
Display brightness	Display brightness in four steps	R, S
Summer time	Start and end of summer time	R, S
Display time	Switch on/off display of time in the basic status	R, S
Inputs	Selection of analogue input signals	R, S
Writing status	Writing status ON/OFF for each channel	R, S
Scaling	Scaling of measurements for recording	R, S
Unit	Unit of recorded measurements	R, S
Number format	Selection of decimal places in alpha-numerical presentation	R, S
Channel designation	Designation of the channel	R, S
Plotarea (zoom)	Magnifier function, input in %	R, S
Offset (presentation range)	Restriction of recording width, input in mm	R, S
Chart speed	Chart speed in mm/h	R, S
Limit operation	Chart speed on overlimit/underlimit	R, S
Logic input	Assigning the logic input to a particular function (e.g. external stop)	R, S
Timed operation	Chart speed within a specified time period	R, S
Pen offset compensation	Compensation of offset between the pens	R, S
Scale printing	Spacing of the cyclic scaling print-out in cm	R, S
Time printing	Spacing of the cyclic time print-out in cm	R, S
Text at recording start	Text printed at start of recording	R, S

12 Appendix

Parameter	Description	Programming S = via setup R = on recorder
Text at recording end	Text printed at end of recording	R, S
Report	Setting the period of statistical report	R, S
Printing priorities	Priorities in printing text	S
Printing mode	Trace interrupted or overwritten when printing text	S
Code	Codenumbers for level inhibit	R, S
Relay outputs		
- relay function	Function of the limit relays	R, S
- relay limit	Limit at which the particular relay switches	R, S
- relay text	Text reporting the switching of the relay	R, S
Logic inputs		
- external text	Text printed when signal is applied to logic input	R, S
- binary-linked external text	Texts printed when certain binary signals are applied to the first four logic inputs	R, S
- external stop	A definable logic input stops the recording when a signal is applied	R, S
- external speed	A definable logic input switches over to a certain chart speed	R, S
- event counter	Level changes at a logic input can be counted and reported	R, S
- external scale printing	Printing the scaling of all activated channels can be initiated from a logic input	R, S
- external report	Producing a statistical report via a logic input	R, S
Maths and logics module	Activating/deactivating the module	R, S
	Transferring the maths programs to the instrument	S
Interface	Protocol, data format, address, response time for communication via the RS422 or RS485 interface	R, S
Instrument operation	Determining which parameters are required for the application, limiting the parameter set	S

13 Index

A

accessories 12
address 96
analogue inputs 16

B

bargraph 47
basic status 22, 47
baud rate 96
binary-linked external text 41, 99

C

channel designation 74
channel label 18
character set 129
chart cassette
 changing fanfold chart 109
 changing roll chart 108
 converting 110
 removing and fitting 106
chart fast forward 48
chart speed 38, 50
chart speed limit operation 82
chart speed programming mode 81
chart speed timed operation 83
clock time 35, 57
codenumber 23, 53, 91, 131
codenumber, customized 91
cold junction 16, 66, 121
cold junction temperature 66, 121
commissioning 6
configuration level 1 24, 62
configuration level 2 25, 78
configuration level 3 26, 92
connection
 2/3-wire, 4-wire circuit 17, 65, 67
 potentiometer 17
connection diagram 16
consumables 105

current input 16, 64, 122
customized linearisation 64, 122
cyclic display 47

D

data format 96
date and time 57
decimal place 29, 73
differential
 limit operation 75
 relay output 93
differential of limit see limit 112
display 47
 cyclic 47
 indication 47
 static 47
display and controls 18
display brightness 59
display time 61
documentation 7
door 18
dot matrix display 18

E

earth line, protective 15
electrical connection 16
electromagnetic compatibility (EMC) 124
electrostatic discharge (ESD) 6
end text 89
entering parameters 28
error messages 28, 125
event counter 43, 102
external relay module ER8 112
external report 44, 87, 104
external scaling 103
external speed 101
external stop 100
external text 41, 98
extra codes 110–118

13 Index

F

fanfold chart 105
fault finding 119
faults, remedy of 119
fibre pen 105
filter time constant 65
fitting fibre pen 19
fitting in position 14
front view 14

H

hardware fault 127
hazardous area (EX) 15

I

input signal 10, 64
installation notes 15
instrument address (interface) 96
instrument description 10
instrument designation 80
interface 96, 118
interface description 7

L

language 56
level inhibit and code request 53
levels 22
 basic status 22
 operating level 22
 parameter level 23
limit 60, 112
limit comparator
 lk7 114
 lk8 114
limit mark 36
limit operation 75
limit, differential of 60, 112
linearisation 64, 122

location 13
logic inputs 111

M

maths and logics module 95, 117
measurement range 65–72
measurement/signal input 64

N

number format 73

O

offset 21, 36, 77
online help 7
operating level 22, 49
operating manual 6
operating mode
 basic status 20, 22
 external chart speed 20
 limit operation 20
 normal chart speed 20
 timed operation 21
operation 22

P

panel cut-out 14
parameter level 23, 55
parameter summary 130
parameter, entering 28
pen offset compensation 21, 86
plotarea (zoom) 21, 76
potentiometer 17, 122
presentation range (offset) 21, 36, 77
presetting 90
print test 45, 51
printing mode 33
printing priority 30
probe break 127

13 Index

programming
 abort 28
 binary-linked external text 99
 channel designation 74
 chart speed 50
 chart speed limit operation 82
 chart speed programming mode 81
 codenumber, customized 91
 configuration level 1 62
 date and time 57
 display brightness 59
 end text 89
 event counter 102
 external report 104
 external scaling 103
 external speed 101
 external stop 100
 external text 98
 instrument designation 80
 interface 96
 language 56
 level inhibit and code request 53
 limit operation 75
 maths and logics module 95
 measurement/signal input 64
 pen offset compensation 86
 plotarea (zoom) 76
 presentation range (offset) 77
 presetting 90
 print test 51
 relay limits 60
 report, statistical (table of statistics) 87
 scale printing 84
 scaling 73
 selection 29
 service print 52
 start text 88
 summer time 58
 text input 29
 time printing 85

 timed operation 83
 value input 29
 writing status 63

R

recording
 pen offset compensation 21
 plotarea (zoom) 21
 presentation range (offset) 21
 scaling 21
 start and end text 40
reference time 57
relay limits 60
relay text 42, 93
report, statistical (table of statistics) 44, 87, 104
resistance thermometer 17, 64, 121
resistance transmitter 17, 121
response time (interface) 96
Returning 6
roll chart 105
RS422/RS485 17, 96, 118

S

scale printing 84
scaling 21, 36, 73
 cyclic scale print 36
 triggered scale print 37
selection 29
service print 46, 52
setup program 10, 115
side view 14
software version 46, 52
start text 88
statistical report 44, 87, 104
status
 external stop 20
 stop 20
status messages 128

13 Index

sub-parameters 27
summary of parameters 130
summer time 58
switching outputs 112
system clock 57, 58

T

technical data 121
text input 29
text printing 30
 abort criteria 30
 chart speed 38
 clock time 35
 cyclic scale printing 36
 event counter 43
 external report 44
 external text, binary-linked text, relay
 texts 41
 fixed priorities 32
 interrupting trace 33
 limit mark 36
 overwriting trace 34
 presentation range (offset) 36
 print test 45
 printing mode 33
 printing priority 30
 recording start and end 40
 relay text 42
 scaling 36
 scaling, triggered 37
 service print 46
 statistical report 44
text printing request, latest 31
thermocouple 16, 64, 121
time printing 85
time reference mark 35
timed operation 21, 83
trace
 interrupting 33
 overwriting 34

tree structure 27
type designation 11
typographical conventions 8

U

unit 73

V

value input 29
voltage input 16, 64, 122

W

warranty 6
weekday 57, 87
writing status 63

Z

zoom 21, 76



JUMO GmbH & Co. KG

Street address:
Moritz-Juchheim-Straße 1
36039 Fulda, Germany
Delivery address:
Mackenrodtstraße 14
36039 Fulda, Germany
Postal address:
36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
E-mail: mail@jumo.net
Internet: www.jumo.net

JUMO Instrument Co. Ltd.

JUMO House
Temple Bank, Riverway
Harlow - Essex CM20 2DY, UK
Phone: +44 1279 63 55 33
Fax: +44 1279 63 52 62
E-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

JUMO Process Control, Inc.

6733 Myers Road
East Syracuse, NY 13057, USA
Phone: 315-437-5866
1-800-554-5866
Fax: 315-437-5860
E-mail: info.us@jumo.net
Internet: www.jumousa.com