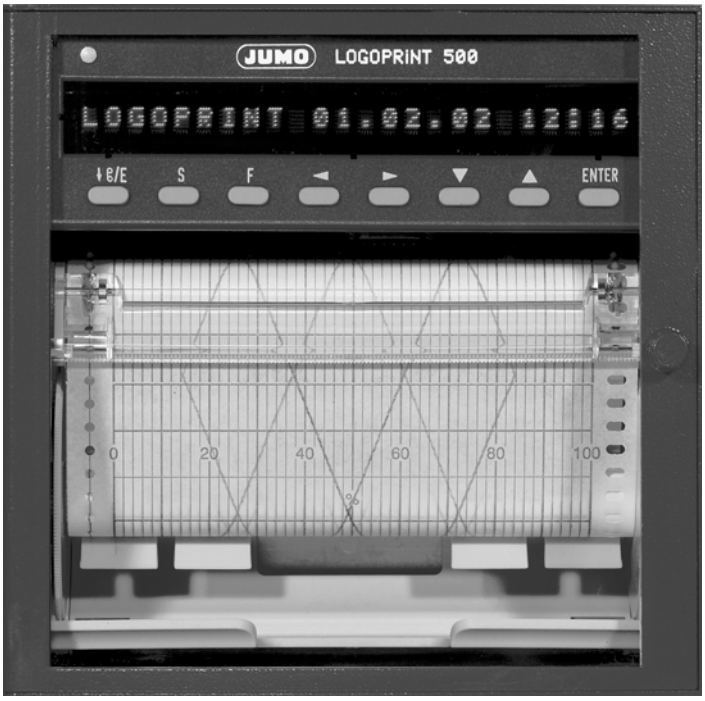


LOGOPRINT® 500

Printing Recorder

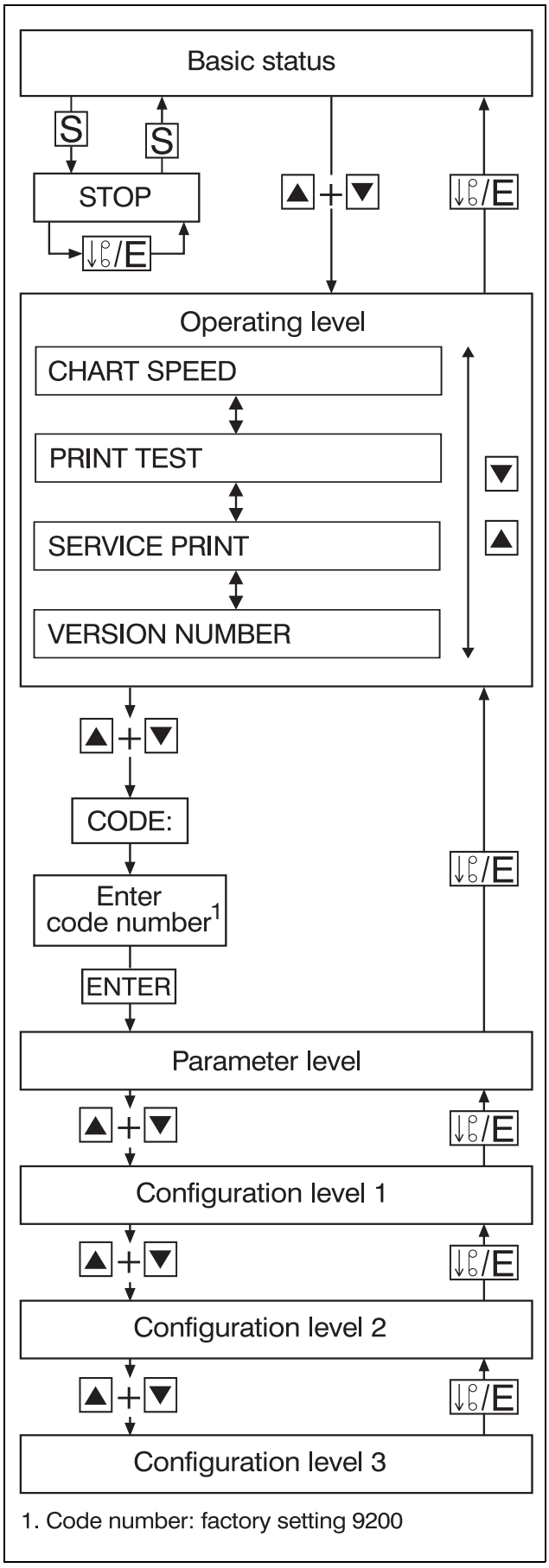
with text printing and

LED dot-matrix display

B 70.6030.0

Operating Manual

2009-06-03/00353037



1. Code number: factory setting 9200

Key functions

↓/E	- Paper (chart) fast-forward, when recording is stopped (in basic status) - Abort parameter entry (**E**xit) - Leave the levels
S	- **S**tart/**S**top of recording - Selection of decimal point position when entering values - For text entry: Fast character selection (jump to " ", "0", "A", "a", "°", "2", "À", "à")
F	- **F**unction key for special functions (press for at least 4 sec) factory setting: print the scaling
◀, ▶	- Shift cursor left/right (selecting position)
▲, ▼	- Select display: - Instrument designation, date & time - Measurements of the channels - System status - Parameter selection - Channel selection - Value selection from a table of values - Increment/decrement present digit
ENTER	- Initiate parameter entry - Confirm entry - Acknowledge error message - Activate/de-activate statistical display (in basic status)
◀ + ▶	- Activate/de-activate the display of status/error messages
▲ + ▼	- Change to next level

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1.1 Preface

Please read this Operating Manual before commissioning the instrument. Keep the operating manual in a place which is accessible to all users at all times.

Please assist us to improve this manual, where necessary.

Your suggestions will be appreciated.

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 the necessary settings are described in this manual. However, if any problems should arise during start-up, you are asked not to carry out any unauthorised manipulations. You could endanger your rights under the warranty!

Please contact the nearest JUMO office or the head office.

When returning modules, assemblies or components, the regulations of EN 61340-5-1 and EN 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

1.2 Arrangement of the documentation

The documentation for this instrument consists of the following parts:

Operating Manual B 70.6030.0

This operating manual is always supplied with the instrument. It is addressed to OEMs (original equipment manufacturers) and users with the appropriate technical know-how.

In addition to installation and electrical connections, it also includes information on commissioning, operation, and setting the parameters in the instrument, on extra codes and accessories.

Interface Description B 70.6030.2

This manual is supplied with the instrument if the Extra Code “RS422” or “RS485” was ordered. It provides information about communication with higher-level (supervisory) systems.

Setup Program B 70.6030.3

This manual describes the installation of the setup program, and also deals with special features in the operation of the setup program.

Online Help

The online help is part of the setup program. It is a Windows[1] online help.

1.2.1 Structure of this operating manual

This operating manual is laid out so that the user is immediately able to get on with operating and configuring the instrument. To this end, the chapters which describe procedures which are usually only carried out once, such as description of the instrument, type designations, assembly and electrical connections, are placed at the end of the manual.

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

1.3 Typographical conventions

1.3.1 Warning signs

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

Danger

This symbol is used where there may be **danger to personnel** if the instructions are disregarded or not followed accurately!

Warning

This symbol is used where there may be **danger to equipment or data** if the instructions are disregarded or not followed accurately!

Warning

This symbol is used where special care is required when handling **components which are liable to damage from electrostatic discharge**.

1.3.2 Note signs

Note

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

Reference

This sign refers to **further information** in other manuals, chapters or sections.

abc[1]

Footnote

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

Marking in the text and the footnote text.

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

*

Action

This symbol shows that an **action to be performed** is described.

The individual steps are designated by the star, for example:

* Press the ▲ key

* Confirm with ENTER

1.3.3 Presentation

Keys

▲ + ENTER

Keys are **shown in a box**. Both **symbols and texts** are possible. If a key has multiple functions, then the text shown is that which corresponds to the **currently active function**.

Screen texts

Program Manager

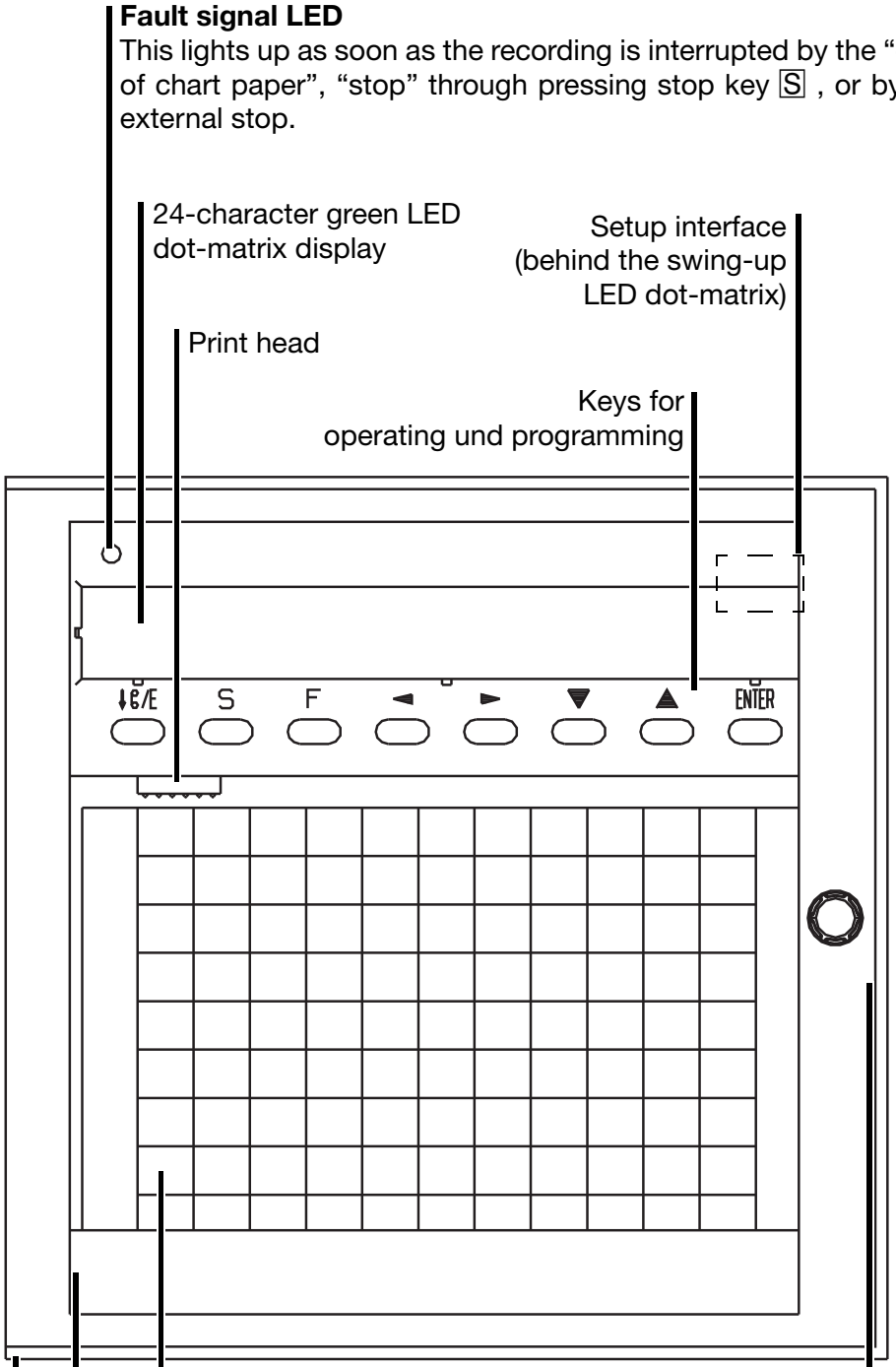
Texts which are displayed in the setup program are distinguished by **italic script**.

Menu items

Edit ➔ instrument data

The menu items in the setup program which are referred to in this manual are shown in italic script. Menu name, menu item, and sub-menu item are separated from one another by "➔".

2.1 Display and controls

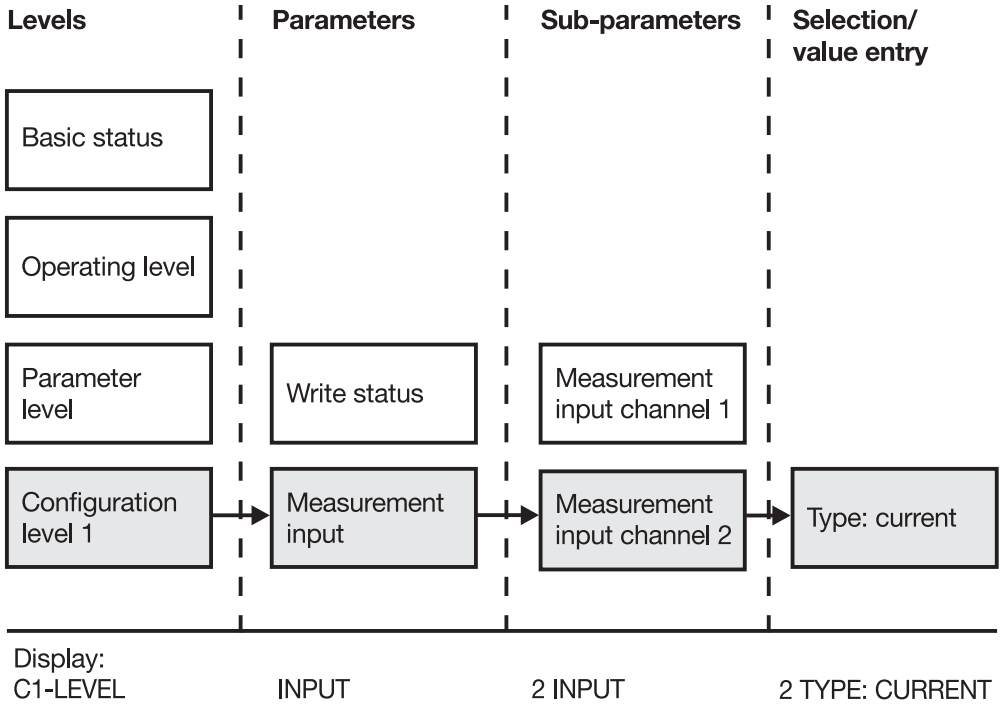


2 Instrument description

2.2 Basics of operation

In order to keep the operating and programming of the printing recorder clear and simple, the individual parameters and functions are divided into several levels:

- Basic status
- Operating level (S-level)
- Parameter level (P-level)
- Configuration level 1 (C1-level)
- Configuration level 2 (C2-level)
- Configuration level 3 (C3-level)



The levels, parameters and sub-parameters are arranged as a tree structure. Starting from the basic status, it branches out into the individual levels, and from there further into the corresponding parameters and, if available, sub-parameters.

If it is necessary to alter a certain parameter, then step through the relevant level until this parameter is reached.

Pressing ENTER starts the editing process.

If a parameter has several sub-parameters, these can also be accessed by pressing ENTER.

Key functions

	Basic status	Operating level	after correct code number in parameter and configuration levels
↓/E	Chart fast-forward, when recording is stopped	- Abort parameter entry (Exit) - Leave the level	- Abort parameter entry - Leave the level
S	Start/stop recording mode	Start/stop recording mode	Step - for values: Select the decimal place - for texts: Quick selection of character: jump to " ", "0", "A"", "a", "°", "²", "À", "à"
F	Function key (reserved for special functions) [1]	Function key (reserved for special functions)	----------
◀, ▶	----------	----------	Shift cursor to left/right (select place)
▲, ▼	Select display: - Instrument name, date & time - Channel measurements - System status	- Select parameter - Select channel - Select value from table - Enter figures: Change the place selection	- Select parameter - Select channel - Select value from table - Enter text/figures: Change the place selection
ENTER	Change-over between cyclic and static display	- Initiate the parameter entry - Confirm the entry - Acknowledge any error messages	- Initiate the parameter entry - Confirm the entry - Acknowledge any error messages
Key combinations			
◀ + ▶	Activate/de-activate the display of status/error messages	----------	----------
▲ + ▼	Change to next level	Change to next level	Change to next level

1. Press the F key for at least 4 sec in the standard version: print out the scaling of all the active channels (writing status = ON).

For all alterations to the parameters (sub-parameters):

Confirmation of parameters

If there are no further sub-parameters available, then ENTER transfers all the data which belong to the parameter into the memory.

Abort programming

Inside a parameter, programming can be abandoned by pressing the ↓/E key.

☞ If the last sub-parameter has not been confirmed, then the data which were already edited for the parameter will be abandoned. The old values for the sub-parameters will be retained.

Error messages during programming

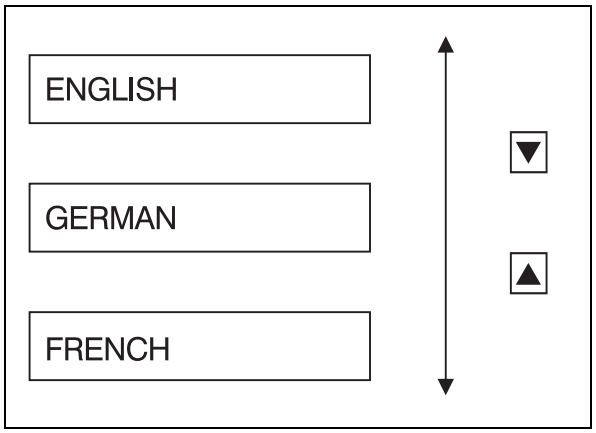
If error messages occur during programming, as a result of erroneous entries, then these messages must be acknowledged with ENTER before the programming can be taken up again.

Selection

A selection consists of a list of several options:

Three keys are used to select an option:

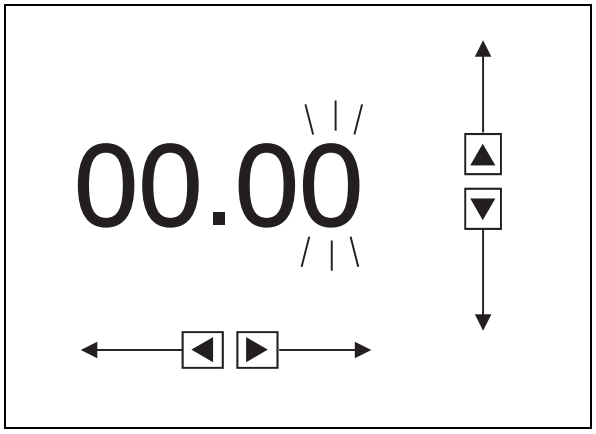
* Select the option with the ▲ and ▼ keys
* Confirm the selection with ENTER



Value/text entry

Five keys are used to enter values:

* select the position to be altered, using the ◀ and ▶ keys
* increment and decrement the selected position with the ▲ and ▼ keys
* move the decimal point with the S key
* confirm the value entered with ENTER



☞ An erroneous entry will cause an error message in the display

⇨ Section 12.1 “Error messages”

The error message must be acknowledged by ENTER

Afterwards, a new value can be entered.

Five keys are used to enter texts:

* select the character to be entered, using the ◀ and ▶ keys
* select the new character with the ▲ and ▼ keys
  (quick character selection with the S key)
* confirm the text entry with ENTER

Key inhibit

If the printing recorder is fitted with the extra code “logic inputs”, then it is possible when a selected logic input is closed, in connection with the parameter *Configuration level 3* ➔ *Inhibit keys*, to inhibit the recorder keys.

The following keys or functions can be inhibited in the basic status:

- [↓/E] chart fast-forward, when the recording mode is stopped
- [S] start/stop of recording mode
- [F] function key, to activate scaling print-out
- [▲] + [▼] change from the basic status to the operating level

Even when the keys are inhibited, certain functions are still possible in the basic status:

- [◄] + [►] switch error messages on/off
- [▲] , [▼] channel selection
- [ENTER] switch between cyclic and static display

Key inhibit has no effect as long as the printing recorder is in the basic status or in one of the configuration levels. On leaving these levels the keys will be inhibited if the logic input is set. It is only possible to call up the operating or configuration levels again after opening this logic input.

Basic status

After the supply voltage has been applied, the printing recorder will be initialised and is then in the basic status. Measurements are made, processed, and recorded.

The 24-character LED dot-matrix display can show:

- instrument designation (name), date and time
  (the time can be switched off via the parameter *Parameter level* ➔ *Display time*)
- channel number and measurements (incl. units) of all active channels (in pairs)
- channel number, name and measurement (incl. units) of all active channels (sequentially)
- status and error messages
- interface texts

  ⇨ Section 10.6 “Interface (RS422/RS485)”
- customer-specific texts

The display can be either cyclic or static:

Cyclic display
The printing recorder switches automatically to the next display after about 3sec.

Static display
In the basic status, the static display is activated and de-activated with ENTER. If it is activated, then the present display remains, and is regularly updated.

In the basic status, the information in the display can be changed over with the ▲ and ▼ keys.

Status and error messages will be identified in plain language by a regularly flashing display, instead of the present display.

The display of status and error messages can be inhibited, or activated again, by pressing ◀ + ▶ .

If a measurement is outside the valid range of the A/D converter (out-of-range), or if a probe break has been detected, then the character combination “>>>>>>” will appear in place of the value.

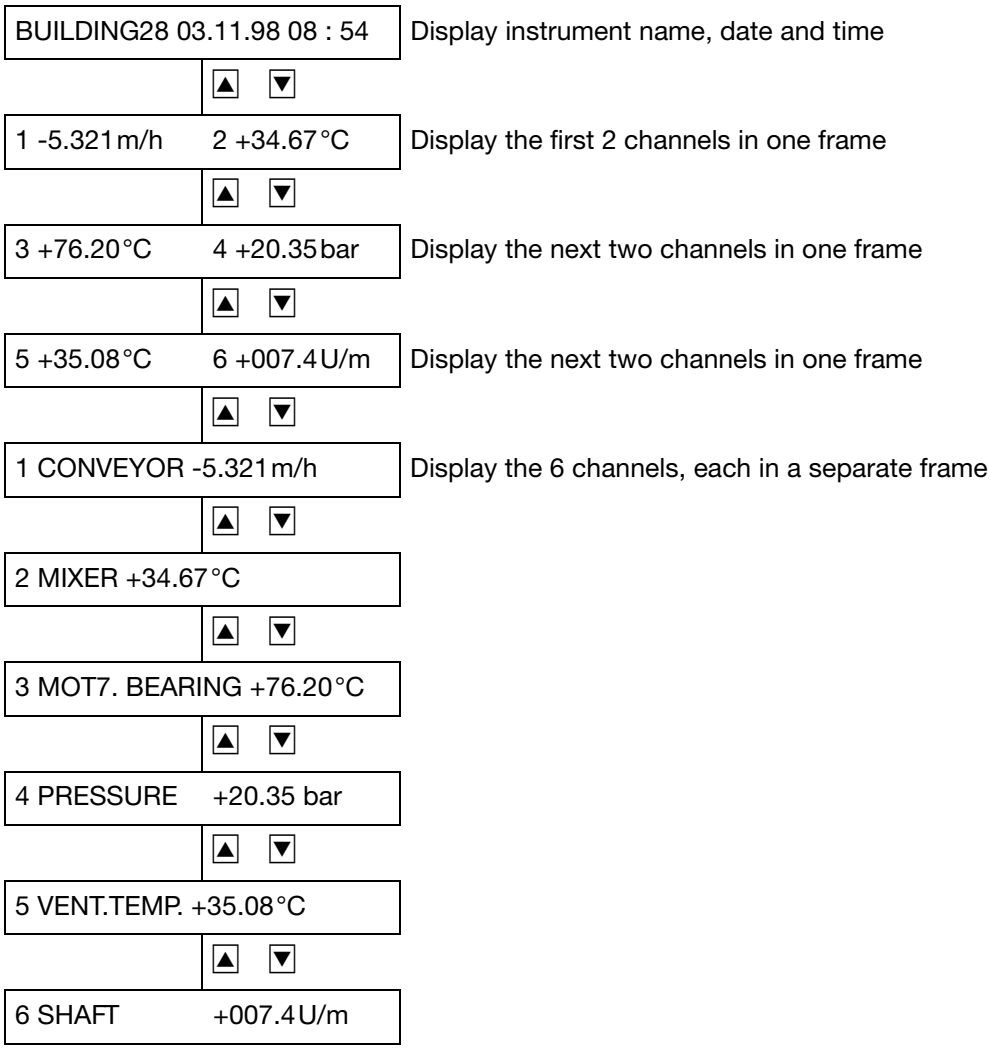
The recording can be stopped or re-started with the S key. In the stop status “STOP” will flash in the LED dot-matrix display.

Using the ⇩/E key, in the stop status, activates the chart fast-forward.

Pressing the F key for at least 4 sec will restart the scaling print-out.

The operating level can be accessed by pressing the ▲ + ▼ keys simultaneously.

Example of the basic status for a 6-channel recorder



Operating level (S-level)

The operating level can be accessed from the basic status with the aid of the ▲ + ▼ keys, from the parameter level by using ↓/E.

Signal acquisition and processing remain active in this level.

The following parameters can be altered:

- chart speed
- print test
- service print
- version number (display only)

☞ It the operating level is active, then signal acquisition, processing and recording, as well as limit monitoring, will all continue to be performed.

Parameter level (P-level)

The parameter level can be accessed from the operating level with the aid of the ▲ + ▼ keys, from the configuration level 1 by using ⇩P/E.

The parameter level and configuration levels are protected by a four-figure code number.

There are two different code numbers:

- Code number for the restricted parameter set (factory setting 9200)
- Code number for the full parameter set (factory setting 9210)

The parameters which belong to the restricted parameter set are defined in the setup program under *Edit* ➔ *Instrument operation …*

Here, parameters which are not needed for the application, or only have to be programmed once, can be appropriately marked. They will no longer be displayed on the recorder after the new setup has been transferred.

If one of the two code numbers is entered, then

- signal acquisition and
- recording

will be interrupted.

Furthermore

- events will no longer be recorded,
- reports will be aborted and reset,
- limits will no longer be monitored,
- the Code for the mathematics module will no longer be applied,
- the fault signal output will be set to fault, and
- all other outputs will remain in their last state.

The parameters can now be programmed.

If the wrong code number is entered, then the recorder will remain in the normal mode. Signal acquisition, processing and recording are still active.

The parameters can be looked at, but not programmed.

The code numbers can be altered through the setup program *(Edit* ➔ *Code numbers …)* or on the instrument.

⇨ Section 4.2 “Table of the configuration parameters”

If customer-specific code numbers are entered, then the original JUMO code numbers will be overwritten, and are no longer valid.

☞ If the same figures are used for both code numbers, then these code numbers will be interpreted as code numbers for the complete parameter set.

☞ The relays in the external relay module ER8 remain in their present state. They will only be switchable again when the printing recorder has been returned to the operating level or the basic status.

After a valid code number has been entered, the following parameters can be altered in the parameter level:

- language
- date & time
- summer time
- display brightness
- display time

Configuration level 1 (C1-level)

Channel-specific parameters can be configured in configuration level 1. This level can be accessed from the parameter level with the aid of the ▲ + ▼ keys, or from configuration level 2 by using ⇩P/E.

☞ If a correct code number is entered when calling up the parameter level, then the signal acquisition and recording will be interrupted in this level. The parameters can be viewed and altered.

☞ The relays of the external relay module ER8 remain in the present state. They will only be switchable again when the printing recorder has been returned to the operating level or the basic status.

Configuration level 1 includes the following channel-specific parameters:

- plot status
- signal input
- scaling
- channel name (word and number)
- limit comparator
- limit feed
- zoom
- presentation range (offset)
- peak value recording

Configuration level 2 (C2-level)

Configuration level 2 can be accessed from configuration level 1 with the aid of the ▲ + ▼ keys, or from configuration level 3 by using ⇓/E.

☞ If a correct code number is entered when calling up the parameter level, then the signal acquisition and recording will be interrupted in this level. The parameters can be viewed and altered.

☞ The relays of the external relay module ER8 remain in the present state. They will only be switchable again when the printing recorder has been returned to the operating level or the basic status.

Configuration level 2 includes the following global parameters:

- unit name
- open-collector output
- chart speed in limit operation
- timed operation (feed time)
- print-out of speed change
- print-out of the “power on” text
- print-out of the “power off” text
- scaling print
- time print
- print channel number
- report
- start text
- end text
- presetting
- code number

Configuration level 3 (C3-level)

Configuration level 3 can be accessed from configuration level 2 with the aid of the ▲ + ▼ keys.

☞ If a correct code number is entered when calling up the parameter level, then the signal acquisition and recording will be interrupted in this level. The parameters can be viewed and altered.

☞ The relays of the external relay module ER8 remain in the present state. They will only be switchable again when the printing recorder has been returned to the operating level or the basic status.

Configuration level 3 contains parameters which mostly belong to the extra codes and the mathematics module:

- relay output[1]
- mathematical module
- interface[2]
- external text[1]
- text logic links[1]
- external stop[1]
- external speed[1]
- event counter[1]
- external scaling[1]
- external report[1]
- key inhibit[1]
- event traces

1. The parameters can only be edited if the extra codes "logic inputs" and "interface for ER8" have been implemented in the recorder.
2. The parameter can only be edited if the extra code "RS 422" or "RS 485" has been implemented in the recorder.

The printing recorder has a large variety of possibilities for presenting the measurements acquired at the signal inputs on the paper, for monitoring them, and for control.

The functions are available for:

- limit monitoring through limit comparators
- open-collector outputs
- different chart paper speeds
- graphics printing
- text printing

3.1 Limit monitoring by limit comparators

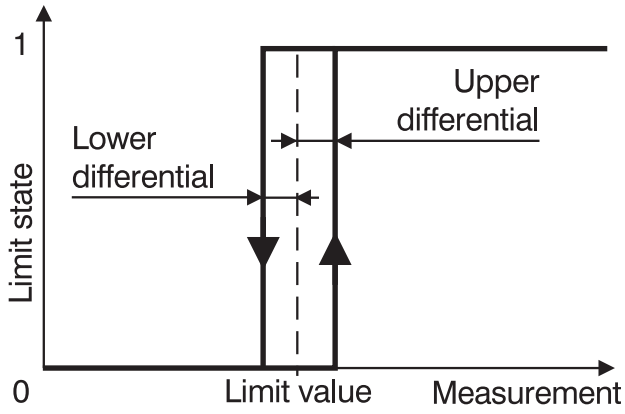
8 limit comparators are available for monitoring limits. They are set up through the parameter *Configuration level 1* ➔ *Limit comparator*. Appropriate sub-parameters can be used to establish the limit values, switching differential (hysteresis) limits, texts, limit comparator functions (lk) and the response to a probe break.

The texts are printed out when the values go out-of-range or exceed the differential values, as described in the section on text printing.

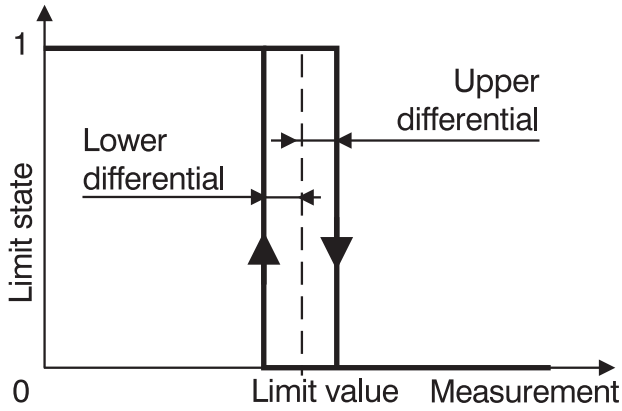
⇨ Section 3.5.4 “Limit comparator texts, external text, binary-linked external text”

The limit comparators produce a logical 0 or 1 as output. The sub-parameter “LK-function” also decides what the result of the limit state is.

LK function: lk7



LK function: lk8



As well as producing the text print-out, the results from

- limit comparators 1 to 3 can be fed to the open-collector outputs 1 to 3,

and/or

- those from limit comparators 1 to 8 to the relay outputs 1 to 8 (option).

The relay outputs are available as an option (extra code ER8).

⇨ Section 10.3 “External relay module ER8”

The state of the limit comparators can be documented by using the event traces on the chart paper.

⇨ Section 3.4.2 “Event traces”

The response of the limit comparators to out-of-range measurements or a probe break can be defined with the parameter *Configuration level 1 ➔ Limit comparator ➔ Probe break*.

The limit values can be printed out in the form of limit marks (“I”) together with the scaling.

⇨ Section 3.5.8 “Scaling”

3.2 Open-collector outputs

The printing recorder is equipped with four open-collector outputs. The outputs 1 to 3 have a fixed assignment to the limit comparators 1 to 3. Output 4 is used as a fault signal output. The outputs can be activated by using the parameter *Configuration level 2* ➔ *Open-collector*.

Fault output

The fault signal output can be used to indicate a fault. During correct operation of the printing recorder this output is active. In the event of a fault or disturbance, or if the status in the parameter *Configuration level 2* ➔ *Open-collector* is OFF, it becomes inactive (open).

The following causes will lead to a fault signal:

- Chart paper end
- Power off
- The battery of the recorder is discharged
- No communication with the external relay module ER8
- Fatal errors

3 Operation and visualisation

3.3 Different chart speeds (paper feed)

The printing recorder is equipped with several different chart speeds, so that the measurements can always be optimally interpreted on the chart.

Normal chart speed

The chart paper is transported with the speed which is programmed in the parameter *Operating level* ➔ *Chart speed*.

Limit operation (limit feed)

If the value goes above or below the programmable limits (*Configuration level 1* ➔ *Limit feed*) then the paper transport will be switched over to the speed programmed in *Configuration level 2* ➔ *Feed limit*.

To avoid excessively frequent chart speed changes, a switching differential (hysteresis) of 0.5% is applied to the switching level. The switching differential is referred to the scaling and zoom.

$$\text{Differential} = \left| \frac{(Se - Sa) \times (Ze - Za) \times 0.01}{100} \right|$$

Se = scaling end
Sa = scaling start
Ze = zoom end
Za = zoom start

External speed

A signal at a logic input (extra code) can be used to switch to a chart paper speed which is programmed in *Configuration level 3* ➔ *External speed*.

Timed operation (feed time)

This chart paper speed is valid for a programmable period of time, and is defined by the parameter *Configuration level 2* ➔ *Feed time*.

If it is set so that start time = end time, then the timed operation is inactive.

Different priorities apply for the various speeds.

⇨ Section 3.5.6 “Switching the chart speed”

3.4 Graphic print-out

The printing recorder is fitted with a print head which always has 6 colour pens, regardless of the number of channels. For the 3-channel version the colour sequence is: violet, red, black, violet, red, black. For the 6-channel version it is: violet, red, black, green, blue, brown. This means that in the 3-channel version the colours last twice as long. When using the setup program, if colours are assigned to a 3-channel recorder which are not available (green, blue, brown), they will automatically be replaced (violet, red, black). The printing of measurements and texts is always made in the same direction (unidirectional printing).

The time which is needed to print out one line depends on the number of points which have to be printed in this line. If the maximum number of points are printed, then about 12 seconds are required for one line.
As the chart speed increases, more and more measurements, and so more and more lines, have to be printed. So the printer must reduce the time which it needs to try and print a line as the speed increases. These times can be seen in the following table.

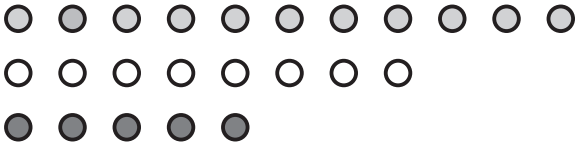
Speed (mm/h)	minimum time per line (sec)
5	288
10	144
20	72
60	24
120	12
240	9
300	6
360	5
600	4.8
720	4

Up to a speed of 120mm/h every line can be printed in the time available, since there are never more than 12 seconds required. At higher speed, if the time taken to print a line is longer than the value in the table, then the lag is compensated for by speeding up to the next line.
Example:
At a speed of 300mm/h the printing recorder attempts to print a line every 6 seconds, according to the table. But it needs 9 seconds to print a line. This is compensated by increasing the speed by 50% for the next line.

The recorder has been so developed that the printed traces are always as visible as possible. For instance, an alternating print of the different colours avoids a mixing and waste of colour if the measurements are the same.

Example:
If three traces lie on top of one another, then the alternating print pattern ensures that no point has a multiple print, but that each channel uses one point at a time, sequentially.

- three traces lie on top of one another



- no point is printed more than once

3.4.1 Measurement traces (signal traces)

In the factory setting, all the measurement traces are printed over the full chart width. The parameters “zoom” and ”presentation range” offer the possibility of altering the print-out.

Zoom (plot area)

Zoom operation is used to record a section of the complete measurement range in an enlargement. Zoom operation is activated by the parameter *Configuration level 1 ➔ Zoom*.

The values to be entered for the start (ZOOM-START) and end (ZOOM-END) are made in %, and can be calculated as follows:

$$\text{ZOOM-START} = \frac{(\text{Mk - Sa}) \cdot 100\ \%}{\text{Se - Sa}}$$

$$\text{ZOOM-END} = \frac{(\text{Mg - Sa}) \cdot 100\ \%}{\text{Se - Sa}}$$

Mk = smallest measurement to be recorded
Mg = largest measurement to be recorded
Sa = scaling start
Se = scaling end

The difference between start and end values must be at least 10 %.

Example:
The selected input signal is a voltage in the range 0 — 10V, and the scaling is set to the range 0 — 2000m/h. The section of the range from 500 — 1500m/h is to be displayed.

$$\text{ZOOM-START} = \frac{(500\text{m/h} - 0\text{m/h}) \cdot 100\ \%}{(2000\text{m/h} - 0\text{m/h})} = 25\ \%$$

$$\text{ZOOM} - \text{END} = \frac{(1500\text{m/h} - 0\text{m/h}) \cdot 100\ \%}{(2000\text{m/h} - 0\text{m/h})} = 75\ \%$$

Presentation range (offset)

This parameter can be used to determine a range of the chart paper on which the trace will be recorded. Either the complete chart paper width of 100 mm can be used, or just a portion. In this way it can be arranged that all the channels are presented next to one another (strip recording). The presentation range is activated by the parameter *Configuration level 1 ➔ Offset.*

Peak value recording

The printing recorder can acquire considerably more values than it can print. At a chart speed of 20 mm/h, for instance, approximately only every 24th measurement is recorded on the chart. The peak value recording function can deal with this situation.

Peak value recording = OFF:
When the peak value recording is switched off, the latest value present at the instant of printing is recorded on the chart.

Peak value recording = ON:
When the peak value recording is switched on, the minimum and maximum measurements are stored internally between two lines which are to be printed.

These minimum and maximum values are printed when peak value recording is activated. One advantage of the peak value recording is that at least an impression of the measurement trace on the chart can be gained, even at slow chart speeds and after text printing in the “Interrupt measurement trace” mode.

The peak value recording can be switched on and off for each channel by using the parameter *Configuration level 1 ➔ Peak value recording.*

Colour assignment

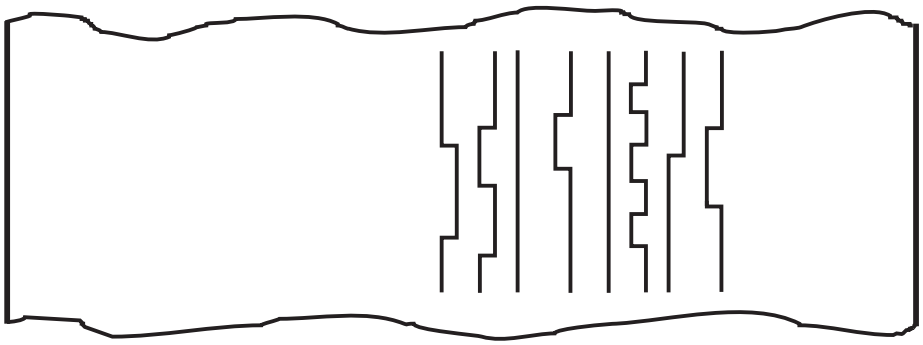
The colours which are used to print the traces can be set with the aid of the setup program.
In the basic status, for a 3-channel recorder, the colours violet, red and black are assigned to the channels 1 — 3.
When using a 6-channel recorder, the colours green, blue and brown are also used, for the additional channels 4 — 6.

3.4.2 Event traces

In addition to the measurement traces, the printing recorder offers the possibility of recording up to 8 event traces. The sources for the events can be the limit comparators as well as the logic inputs (extra code).
The source selection and trace selection are made by the parameter *Configuration level 3 ➔ Event traces*.

The setup program can be used to select the start position of the event traces on the chart paper, between 0 and 100 %.

If not all the event traces are selected, then a gap will appear at the corresponding positions. This means that every trace has the same spacing from the defined start position.



Colour assignment

In the 6-channel version, the colours violet, red, black, green, blue, brown, violet and red are assigned to the event traces 1 — 8. In the 3-channel version the colours green, blue, brown are replaced by violet, red, black.

The colours can be changed with the aid of the setup program.

3.5 Text printing

As well as the traces of the chart, the recorder can also print text. Text printing is used to make comments on the traces and for recording events. The characters are printed in dots in a 7 x 9 matrix.

3.5.1 Printing priorities

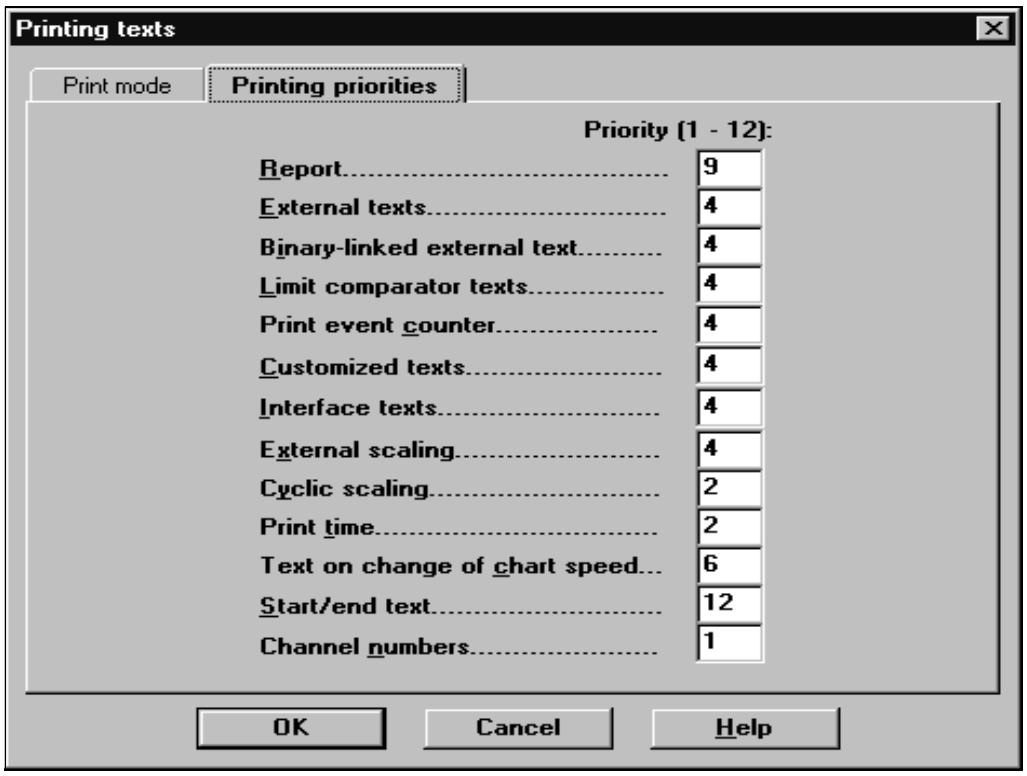
There are different kinds of text which can have priorities and a printing mode assigned to them by the setup program. These priorities determine the criteria for interruption or cancellation when more than one text print is required at the same time.

For all the following explanations, the rule is:

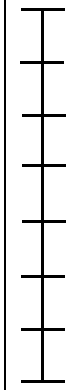
- Text 1 = text with higher priority
- Text 2 = text with lower priority

If Text 2 is being printed when a request for Text 1 appears, then the printing of Text 2 is abandoned and Text 1 is printed. The abandoned text will not be continued and not repeated.

If a request for Text 2 occurs while Text 1 is being printed, then Text 2 will be printed out after Text 1 has been printed.



Example:
A report is printed from 12:00 to 12:05 with high priority. At 12:02 a limit is exceeded, so the corresponding text should be printed out. Since printing this text is not possible at the moment, the text will be printed after the report is finished.

Time		Text-print request	the actual text printed is:	
12:07				
12:06				12:02 Limit exceeded
12:05				
12:04				
12:03				
12:02		Limit exceeded		Report
12:01				
12:00		Report		

If texts with the same priority cannot be printed at once, then the order in which they will be printed is not determined by the order in which the corresponding events occurred, but is determined by an internal order of precedence in the recorder.

- Start text
- Text on change of chart speed
- Report
- External text
- Binary-linked external text
- Limit comparator texts
- Print event counter
- Customized texts
- External scaling
- Print time
- Cyclic scaling
- Channel numbers

Example:
Although the priorities have been configured to be the same, the time will be printed before the cyclic scaling.

If the recorder is put into the stop status, or switched off, then all the printing requests which were already present or which occur during this period will be cancelled. The print-out of the texts will not be dealt with when the recording starts again. Exception: A request for the print-out of a report which occurs during a stop status will not be cancelled. The report will be printed after the stop is ended. But if a report which was being printed is interrupted by a stop it will not be continued after the recording has been restarted.

In the following cases, all current request for text printing will be cancelled, and any fresh ones will be ignored:

- Recorder goes into the stop status
- Recorder is switched off

One exception to this rule is the report.

⇨ Section 3.5.5 “Report”

The following fixed priorities have been assigned for stop, service and print test:

Priority	**Text**
higher  lower	- Stop by S-key, external stop, no chart paper, configuration by keys or via setup - Print test - Service print - Text print according to the configured priority list

3.5.2 Printing modes

Texts can be printed in two modes:

- by interrupting the measurement trace (Outplot)
- overwrite the measurement trace (Inplot)

Interrupt measurement trace

The text is printed as fast as possible. During the text printing there is no recording of measurements or event traces. The chart paper speed is optimised for the text printing. It is not the same as the programmed chart speed.

Typically, a time of 10 — 40 sec is needed to print a line of text.

Advantages:

- rapid text printing
- other messages are blocked for the shortest possible time
- an optimised chart speed ensures that the text is always perfectly legible
- text printing can also be carried out when the chart speed is programmed to 0 mm/h.

Disadvantages:

- measurements and event traces are not recorded during the text printing
- the chart speed is altered during the text printing. The time correlation is lost.

Overwrite measurement trace

The text is printed with the current chart speed. Measurements and event traces are printed at the same time. Text printing is not performed if the chart speed is 0 mm/h. At this chart speed, texts which would be printed in the “Overwrite measurement trace” mode are not recognised in the priority evaluation.

The time taken to print a line of text will vary, depending on the programmed chart speed.

Chart speed	**Time to print 1 text line**
5 mm/h	approx. 43 min.
20 mm/h	approx. 11 min.
120 mm/h	approx. 2 min.

Advantages:

- the time correlation is also preserved during text printing
- the recording of measurements and events is not interrupted at any time.

Disadvantages:

- the text printing can take a very long time
- the printing of other texts is blocked
- text printing is not possible at a chart speed of 0mm/h.

3.5.3 Queuing during text printing

External texts, binary-linked texts, limit comparator texts for going above and below limit values, as well as event texts, are printed through a queue. This means that, as long as the queue is not full, complete documentation is assured.

The print queue has:

- 24 entry positions for external texts
- 48 entry positions for binary-linked texts
- 48 entry positions for limit comparator texts

and

- 20 entry positions for event texts

If the queue has filled its quota of a particular type, then any further texts of this types will be lost, until entry positions are free again in the queue.

If a very large number of events need to be recorded, then use either the print mode “Interrupt measurement trace” or a sufficiently high chart speed, since in this case the entry positions in the queue will be freed much faster.

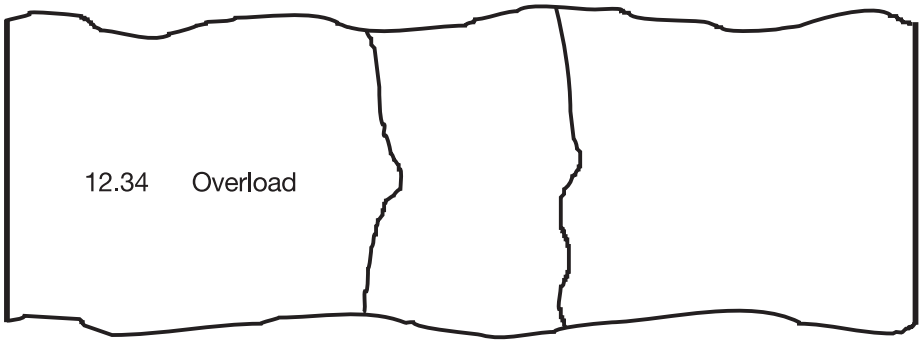
3.5.4 Limit comparator texts, external text, binary-linked external text

Limit comparator texts

Limit comparator texts can be printed out. To do this, the parameter *Configuration level 1* ➔ *Limit comparator* ➔ *Limtext state* must be set to ON and the corresponding texts must be entered. Every time that a measurement goes above or below a limit value, the appropriate text will be printed.

⇨ Section 3.1 “Limit monitoring by limit comparators”

External text



There are eight logic inputs available for external texts.

If a logic input is closed (positive edge triggering) then the corresponding text will be printed. Opening the logic input has no effect.

The function is activated by the parameter *Configuration level 3* ➔ *External text*.

Extra code “Logic inputs” is required.
If this extra code is not present, then the parameter will not be displayed.

Binary-linked external text (text logic links)

It is possible to interpret the signals on the first four logic inputs as a binary number, and to associate a text with each binary number. Up to 16 texts can be defined in this way.

The text which is assigned to the binary number is printed out after every change of state of the logic inputs concerned.

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

Example:
If the binary number 1001 is present on the logic inputs, then text 9 will be printed.
If logic input 1 is opened, then the binary number 1000 is present on the logic inputs, and so text 8 will be printed.

Binary no.	Decimal no. /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

1. logic input

4. logic input

Activation is carried out by the parameter *Configuration level 3* ➔ *Text logic links*.

Extra code “Logic inputs” is required.
If this extra code is not present, then the parameter will not be displayed.

Colour assignment

Print-outs of limit comparator texts are made in the colours of the corresponding measurement traces. The colours which are used for printing external and binary-linked external texts can be selected with the aid of the setup program (normal setting: black).

General

For limit comparator texts, external texts and binary-linked external texts:

As well as the programmed text, the time when the text printing request was initiated is also output.

The time reference mark “_” will not be printed, since the print-out through the queue can happen after some delay.

3.5.5 Report

The report is used to create statistics about the measurements, referred to a definable period of time (statistical period).
The minimum, maximum and average values of the measurements are calculated for the statistical period. The result is printed out at the end of the statistical period, in the form of a table.

When selecting the report it is possible to choose between two types of report. The instance number on the print-out (1 or 2) identifies the type.

The texts “to”, “MIN.”, “MAX.”, “AVER.” and “DIM.” are printed in the language which has been configured. Only channels which are actually present and which have the plot status activated are included in the report.

- -

Report no. and recorder designation

Start report (date + time) till Report end (date + time)

	MIN.	MAX.	AVER.	DIM.
Designation ch. 1	min. value 1	max. value 1	average 1	unit
Designation ch. 2	min. value 1	max. value 1	average 1	unit
Designation ch. 3	min. value 1	max. value 1	average 1	unit
Designation ch. 4	min. value 1	max. value 1	average 1	unit
Designation ch. 5	min. value 1	max. value 1	average 1	unit
Designation ch. 6	min. value 1	max. value 1	average 1	unit

- -

If an overrange or underrange has occurred during the statistical period, then “--------” will be printed out instead of the minimum, maximum and average values.

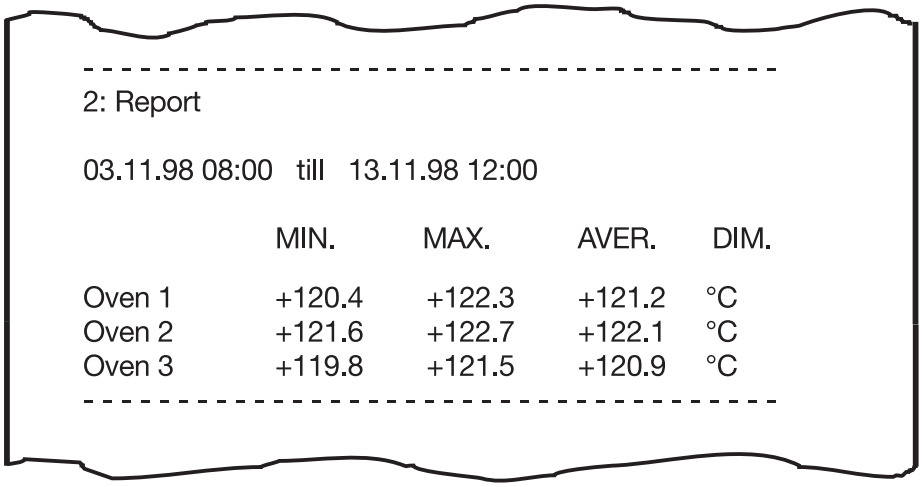
The report is activated through the parameter *Configuration level 2* ➔ *Report*. Available selections are: “periodic”, “weekly”, “monthly” or “external” report.

Please note, that the calculation of the average value is more accurate for the “periodic” report than for all other types of report (statistical period longer than one day).

Example:
A “periodic report” has been selected, with “report time 17:15 hrs.“ and “interval 2 hrs.”. This means that the first report will be produced at 17:15. Further reports will be made at 19:15, 21:15 etc.

External report

The external report is controlled by a selectable logic input. In addition to the parameter *Configuration level 2* ➔ *Report* (EXTERN.CONTACT), the logic input which is wanted must be selected through the parameter *Configuration level 3* ➔ *External report* (e.g. LOG.INPUT 6). The statistical period starts when the logic input is closed. The report is printed out when the logic input is opened (negative-edge triggering).



2: Report

03.11.98 08:00 till 13.11.98 12:00

	MIN.	MAX.	AVER.	DIM.
Oven 1	+120.4	+122.3	+121.2	°C
Oven 2	+121.6	+122.7	+122.1	°C
Oven 3	+119.8	+121.5	+120.9	°C

As a result of the expansion to two reports from software version 105.02.XX, up to two external reports are now available.

☞ When the external report is used, the setting for the parameter *Configuration level 2* ➔ *Report* must define whether it uses the first or second istance of the report.

Right:
Configuration level 2 ➔ ***1.*** *Report* = *EXTERNAL CONTACT*
Configuration level 3 ➔ ***1.*** *External report* = Logic inp. 8

Wrong:
Configuration level 2 ➔ ***2.*** *Report* = *EXTERNAL CONTACT*
Configuration level 3 ➔ ***1.*** *External report* = Logic inp. 8

Colour assignment

The colour which is used to print the instrument designation can be defined with the aid of the setup program (basic setting: black).
The minimum, maximum and average values are printed in the same colours as the corresponding measurement traces. The colours for the traces can also be altered in the setup program.

3 Operation and visualisation

General

For the report:

- If the printing recorder is switched off at the end of the statistical period, then the print-out will be completely cancelled.
  The same applies if the instrument is re-configured from the keys, or if the setup connector is plugged in.
- If the print-out of a report has been interrupted by a stop, new configuration, setup, print test or service print, then the recording will not be continued after the recording has restarted.
- If the recorder is in the stop status at the time when the print-out should begin, then the report will be printed after the stop has been removed.
  The statistics for the new report will already be compiled from the originally planned time.

Sample report

The recorder is configured with the report type “periodic”, “time: 7:00 hrs.“ and “interval: 24hrs.”. This means than the statistical period ends, and the results are printed, every day at 7.00. The switch-on is on 03.11.98 at 10.30. On 05.11.98 it is in the stop status from 2.00 to 8.30. It is also in the stop status from 21.00 on 06.11.98 till 08.00 on 10.11.98. At 11.30 on 11.11.98 a different speed is programmed for the printing recorder, using the setup program on a PC. At 10.00 on 12.11.98 the instrument is switched off.

The recorder will print out the following reports:

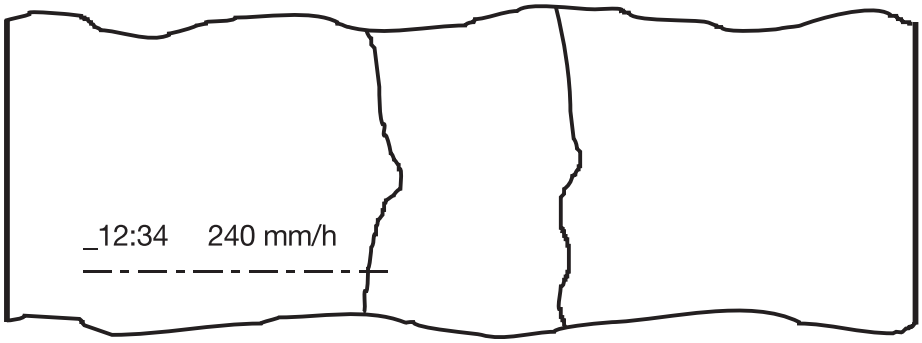
Time of print-out		Statistical period				
04.11.98	7:00	03.11.98	10:30	-	04.11.98	7:00
05.11.98	8:30	04.11.98	7:00	-	05.11.98	7:00
06.11.98	7:00	05.11.98	7:00	-	06.11.98	7:00
10.11.98	8:00	06.11.98	7:00	-	10.11.98	7:00
11.11.98	7:00	10.11.98	7:00	-	11.11.98	7:00
12.11.98	7:00	11.11.98	11:30	-	12.11.98	7:00

The statistical period can be selected from “periodic”, “weekly”, “monthly” or “external”. If monthly report is selected, it is printed out on the first day of each month.

3.5.6 Switching the chart speed

Every change of chart speed is recorded by printing out a line with the time of the change and the new chart speed, if the parameter “Print chart speed” is set to ON in *Configuration level 2* ➔ *Print speed change*.

The style of the line provides information on the type of paper feed which is used for recording after the change:



Normal operation

Limit operation

External speed (feed)

Timed operation

The individual events have different priorities:

Event	**Priority**
Limit operaton	higher
External speed	
Timed operation	
Normal operation	lower

The actual chart speed is that set for the event with the highest priority.

Fixing the printing priority applied to the text for *Speed change-over* affects not only the print-out of the marking at change-over, but also the change-over itself.

⇨ Section 3.5.1 “Printing priorities”

As long as a text with a higher priority is being printed, a change-over will not happen if the parameter *Configuration level 2* ➔ *Print speed change* is set to ON. Otherwise, the change-over takes place at once.

Text printing in the mode “Overwrite measurement trace” can take a very long time.

⇨ Section 3.5.2 “Printing modes”

⇨ In order not to delay the change-over of the paper speed, the priorities for texts which are printed in this mode should be lower than the priority for speed/feed change-over.

The line which indicates the type of change-over will still be printed, even if the corresponding text cannot be printed.

This is the case if, in the setup program, *Text for speed change, measurement trace: overwrite* is configured under *Edit* ➔ *Print texts* in *Print mode* and a paper feed/speed of 0 mm/h has been set.

Text printing is relatively quick in the mode “Interrupt measurement trace”.

⇨ Section 3.5.2 “Printing modes”

In order to avoid text printing in this mode being cancelled by a change-over of the paper feed, the priority for these texts should be higher than the priority for paper feed change-over.

3.5.7 “Power On” and “Power Off” texts

The time of “Power On” and “Power Off” can be documented by using this feature. Both texts are printed in red, with the date and time of the event. The print-out can be inhibited through the configuration.

The priority cannot be assigned. It is always higher than that for the texts which have a configurable priority. Both texts are configured through the parameter *Configuration level 2* ➔ *Print “Power on” text* and *Configuration level 2* ➔ *Print “Power off” text*.

3.5.8 Scaling

The scaling can be printed in two different ways:

cyclic:
for each channel, at a configurable spacing
(*Configuration level 2* ➔ *Print scale*)

triggered:
for each channel, when the F-key is pressed for at least 4 sec, or by closing a logic input
(*Configuration level 3* ➔ *External scaling*)

The basic rule is: scaling can only be carried out when the plot status is activated for the corresponding channel.

Cyclic scaling print

Selectable spacings:

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

The scaling is printed in the colour selected for the channel. In the bottom line is the programmed channel designation and the dimensional unit for the measurements.

If the presentation range of 0 — 100 mm has not been altered, then the scale marks for 0 %, 50 % and 100 % levels will be in the second line. If the presentation range has been restricted, then “I” marks will appear in this line, which indicate the start and end of the presentation range. The corresponding numerical values will be shown in the next line.

Limit marks (“I”) for the channel concerned will be printed in the top line.

The limit marks are the threshold levels for the limit comparators, which are programmed with the aid of the parameter *Configuration level 1* ➔ *Limit comparator* ➔ *Limit value*. The correlation between measurement channels and the limit comparators is set up in the parameter *Configuration level 1* ➔ *Limit comparator* ➔ *Channel*.

The limit marks are only printed if the corresponding limit comparator is active, i.e.:

- Limit-text state = ON
  (*Configuration level 1* ➔ *Limit comparator* ➔ *Limit-text status*)

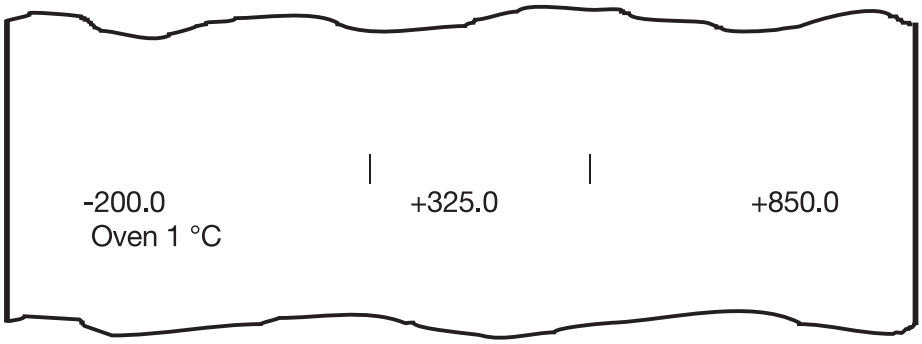
or

- Open-collector output 1 — 3 = ON
  (*Configuration level 2* ➔ *Open-collector output* ➔ *Status*)

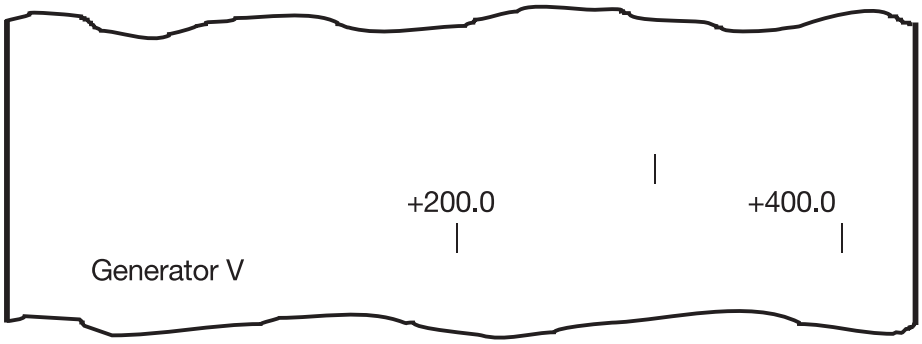
or

- Relay output 1 — 8 = ON
  (*Configuration level 3* ➔ *Relay output* ➔ *Status*)

Example:
- Channel 3
- Presentation range: 0 — 100mm
- Limit comparator thresholds at 200 and 500°C



Example:
- Channel 2
- Presentation range limited to: 50 — 100mm
- Limit comparator threshold at 300V



Triggered scaling print

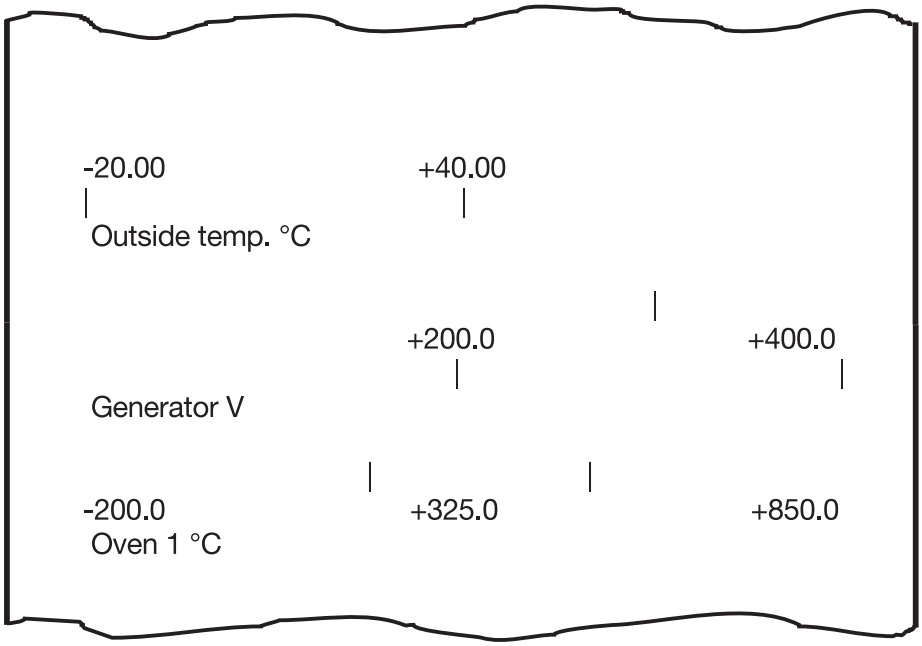
To start the triggered scaling print, the F-key must be pressed for at least 4 seconds.

Alternatively, the triggered scaling print can be initiated by a logic input (extra code).

The scalings are printed out for all channels with an activated plot status.

The print-out is made up in the same layout as described for “Cyclic scaling print”.

Example
- three channels have been activated

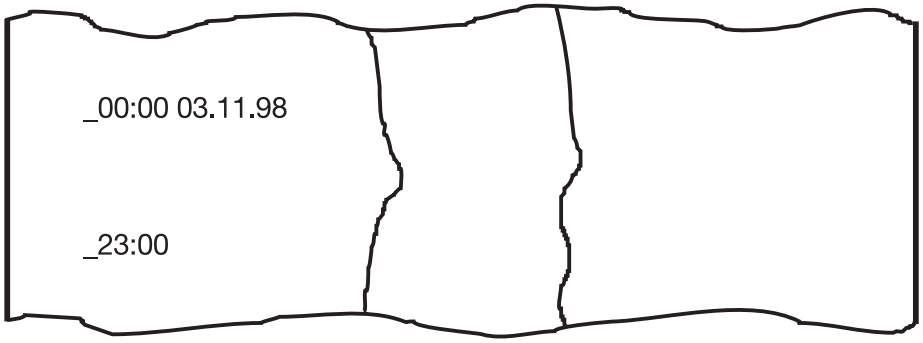


3.5.9 Time

The print-out is performed cyclically, at a configurable spacing (*Configuration level 2* ➔ *Print time*).

Selectable spacings:

- approx. 2 cm
- approx. 4 cm
- approx. 6 cm
- not time printing



The spacings do not depend on the paper feed which has been set up. The spacings listed above are only approximates, since the print is made at round values of time.

For every fourth print-out of the time, there will also be produced, alternating after the time, the actual current chart speed, the programmed instrument name, or the date.

The date is also normally printed out when the date changes at 00:00 hrs.

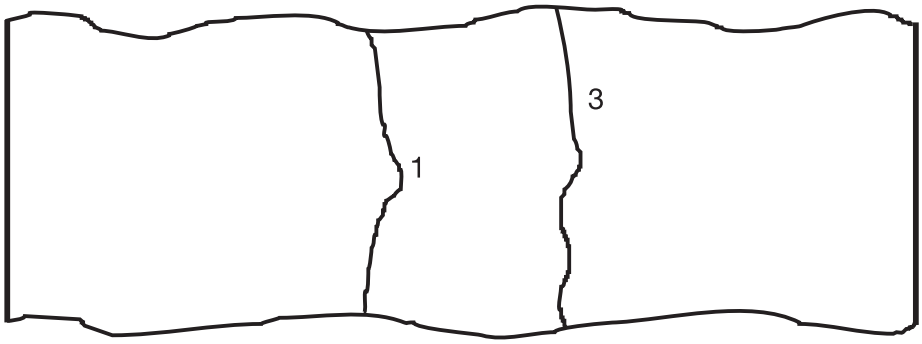
To provide a precise time reference on the chart paper, a time reference mark ("_") is placed before the text.

3.5.10 Print out channel numbers

In order to be able to associate measurements more clearly with a channel, the channel number can be printed next to the trace, in the channel colour. The print-out is made cyclically, at a configurable spacing (*Configuration level 2 ➔ Print channel numbers*).

Selectable spacings:

- 2cm
- 4cm
- 6cm
- print switched off

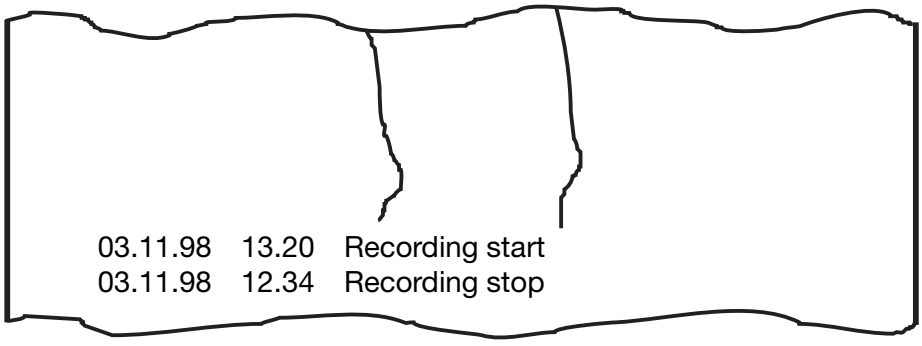


3.5.11 Recording start and stop

The start and stop of recording is registered by a configurable start and end text (*Configuration level 2 ➔ Start text, Configuration level 2 ➔ End text*).

The text printing can be switched on or off independently for the start and end texts. The print-out is made together with the time, and always in red.

Both texts will only be printed while the recording is enabled, i.e. the print of the end text is always made “in arrears”.



☞ The start text should always have the highest priority, to ensure that it is always printed out at the start of recording.

3.5.12 Incrementing the two event counters

The event counter is assigned to a freely selected logic input. Every time the corresponding logic input is closed, the event counter is incremented. It can be pre-loaded with a value through the setup program and the keys on the recorder (*Configuration level 3* ➔ *Event counter*).

Every time it is incremented, the event is registered by printing the time and the programmed text, followed by the current state of the counter.

The time reference mark "_" will not be printed, since the print-out may appear after being delayed in the print queue.

⇨ Section 3.5.4 "Limit comparator texts, external text, binary-linked external text"

If the counter state is larger than 99999, then the number can no longer be displayed. The print-out will be " ***** " for the counter state.

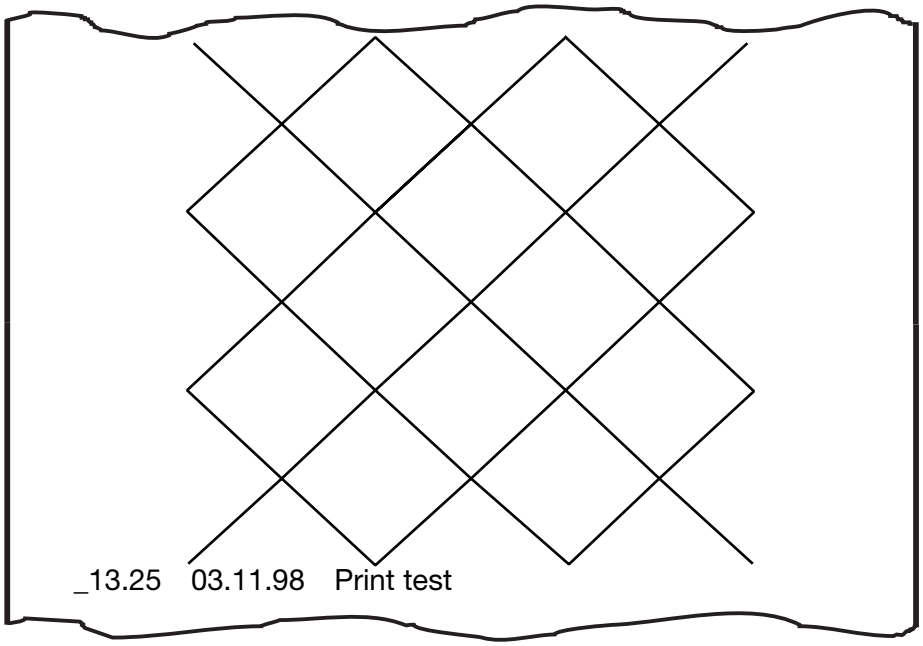
3.5.13 Print test

The print test can only be initiated from the keys on the printing recorder (*Operating level* ➔ *Print test*). It is used to test the function of the printing system and the print head.

The print test carries on until it is stopped by *Test print* = *Off*.

Any text prints which have been started will be aborted and **not** continued after the print test. This **also** applies to the statistical report.

All requests for text printing which occur during the print test will be stored and carried out after the print test.



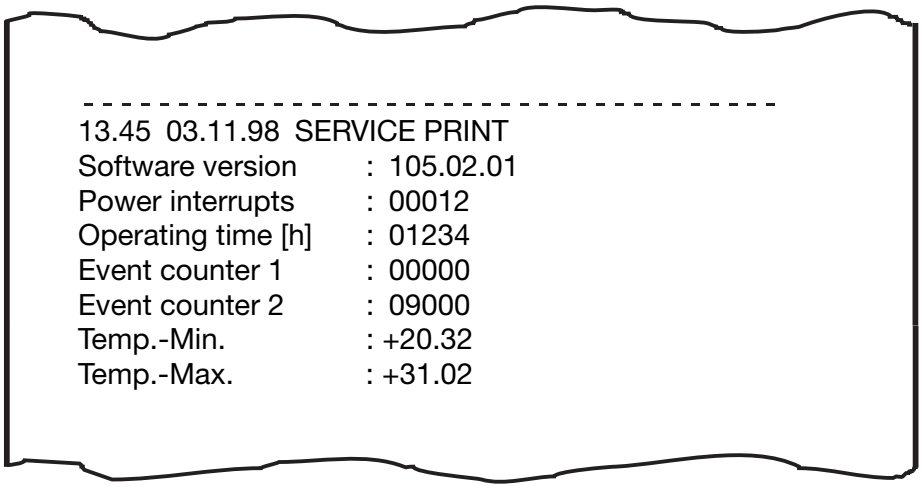
Six traces will also be printed out for the 3-channel version of the recorder, since each colour occurs twice. This means that the functioning of all the pens is tested. In this case, the parameter *Configuration level 1* ➔ *Plot status* has no effect.

3.5.14 Service print

The service print can only be initiated from the keys on the printing recorder (*Operating level* ➔ *Service print*).

The print-out consists of:

- the current date and time
- the software version
- the number of mains power supply interruptions
- the total operational time of the recorder in hours
- the current state of the two event counters
- the minimum and maximum ambient temperatures of the internal Pt100 cold junction



☞ Any text print-outs which were started will be aborted and **not** continued after the service print. This **also** applies to the statistical report.

☞ All requests for text printing which occur during the service print will be stored and carried out after the service print.

☞ If the mathematics/logic module is activated, an “M” will be printed after the software version.

3.6 Colour assignment

With the aid of the setup program you can select the colours which are used for print-outs.

Selections can be made for:

- Measurement traces
- Event traces
- Instrument name
- External text
- Binary-linked external text
- Even texts, event counters

Texts which are associated with a channel (e.g. scaling, channel number, limit comparator texts) are printed in the same colour as the channel concerned. This also applies to the statistical report.

The colours are fixed for:

- Start and end text	always red
- “Power on” / “Power off” text	always red
- Time print	alternating[1]
- Print change of feed/speed	alternating[1]

1. The colour changes for each print-out. This ensures an even consumption of the coloured inks.

3.7 Relationship between measurement range and scaling

The printing recorder offers the facility to differentiate between the measurement range for the input signals which are connected and the scaling on the chart paper.

If the parameter *Configuration level 1* ➔ *Measurement input* ➔ *Characteristic* is not programmed to linear, X1 or X2, then the selected measurement range is automatically applied to the scaling. If the characteristic type is linear, X1 or X2 there is no automatic application of the measurement range to the scaling. So in this case, the scaling should be checked, and altered if necessary (*Configuration level 1* ➔ *Scale*).

Example:
The parameter *Measurement input* is programmed as a resistance thermometer.

Type:	resistance thermometer
Characteristic:	Pt100
Connection:	2/3-wire
Dim. unit:	°C
Range start:	-200°C
Range end:	+850°C
Filter:	0.1sec

The measurement range (-200 to +850°C) is automatically applied to the scaling (-200 to +850%).

Example:
The parameter *Measurement input* is programmed as a current input.

Type:	current
Characteristic:	linear
Range start:	0mA
Range end:	20mA
Filter:	0.1sec

The measurement range is not applied to the scaling. The parameter *Configuration level 1* ➔ *Scale* can be used to alter the scaling (including the dimensional unit).

Unit:	l
Start value:	0l
End value:	1000l
Number format:	AUTO

4.1 Operating examples

Example 1 The date, time and weekday are to be programmed.

Key	Display	Description
	5 AMB. TEMP. +35.08 °C	Recorder is in basic status
▲ + ▼		Call up operating level
	S-LEVEL	(now in operating level)
▲ + ▼		Start code check
	CODE: 9200	Enter 9200, by using the ◄, ►, ▲, ▼ keys
ENTER		Conclude entry of code number
	P-LEVEL	(now in parameter level)
▲		Call 1st. parameter of the parameter level
	LANGUAGE	
▲		Call next parameter
	DATE & TIME	
ENTER		Call parameter to be changed
	DATE: 03.11.98	Alter date, by using the ◄, ►, ▲, ▼ keys
ENTER		Confirm date
	DAY: MONDAY	Alter weekday, using the ▲, ▼ keys
ENTER		Confirm weekday
	TIME: 12:00	Change time, using the ◄, ►, ▲, ▼ keys
ENTER		Confirm time
	DATE & TIME	Parameter entry is finished
C/E		Leave parameter level
	INITIALISATION	As long as the display is flashing, the recorder is being initialised with the new data
	S-LEVEL	Recorder is in the operating level again

Example 2 Starting from example 1, the instrument designation is to be changed.

Key	Display	Description
	S-LEVEL	
▲ + ▼		Start code check
	CODE: 9200	Enter 9200, by using the ◄, ►, ▲, ▼ keys
ENTER		Conclude entry of code number
	P-LEVEL	
▲ + ▼		Call up configuration level 1
	C1-LEVEL	
▲ + ▼		Call up configuration level 2
	C2-LEVEL	
▲		Call 1st. parameter of this level
	UNIT NAME	(the name of the instrument)
ENTER		Call the parameter to be altered
	TEXT: LOGOPRINT 500	Enter the new designation (UNIT NAME), using the ◄, ►, ▲, ▼ and S keys
ENTER		Confirm instrument designation
	UNIT NAME	Parameter entry is finished
↓/E		Leave level
	C1-LEVEL	
↓/E		Leave level
	P-LEVEL	
↓/E		Leave level
	INITIALISATION	As long as the display is flashing, the recorder is being initialised with the new data
	S-LEVEL	Recorder is in the operating level again
↓/E		Leave operating level
	LOGOPRINT 03.11.98 09:45	Recorder is in basic status again

4.2 Table of the configuration parameters

All the parameters for the instrument are presented in the following table. The parameters are explained in the order in which they appear in the recorder.

The first column of the table shows the path through the levels to the particular parameter.

☞ The “X” symbol stands for a number which is to be selected (e.g. channel number 1 — 3 or 1 — 6). This number is shown in the display of the printing recorder for all the sub-parameters.

To preserve a clear layout, the “X” is only shown for the first sub-parameter in the table.

The settings or selections which are available for the parameter are shown in the second column.

The third column contains a description of the parameter or the selection options, if the selection or the function of the parameter are not obvious.

4.2.1 Operating level (S-level)

	Parameter	Value/selection	Description
Chart speed	Operating level ➔Chart speed Chart speed:	0, 5, 10, 20, 60, 120, 240, 300, 360, 600, 720 mm/h	Setting the chart paper speed
Print test	Operating level ➔Print test Print test:	OFF, ON	Start print test The print test can be used to test the functioning of the printing system
Service print	Operating level ➔Service print Service print:	NO, YES	Start service print The service print provides information about the software version, no. of mains power supply interruptions, total no. of operational hours of the recorder, the count states of the event counters 1 and 2, and the minimum and maximum ambient temperatures.
Version number	Operating level ➔Version number Version:	105.02.01	Displays the number of the software version

4 Configuration table

4.2.2 Parameter level (P-Level)

	Parameter	Value/selection	Description
Language	Parameter level ➔Language Language:	 ENGLISH GERMAN FRENCH	Select language The language setting affects all the non-programmable texts in the recorder which can be displayed or printed out.
Date & time	Parameter level ➔Date & time Date: Weekday: Time:	 DD:MM:YY MONDAY TUESDAY WEDNESDAY THURSDAY FRIDAY SATURDAY SUNDAY hh:mm	Programming the system clock The actual time is printed out for certain events, and is used as a reference time for time-dependent events, such as statistical reports, timed operation, and summer time.
Summer time	Parameter level ➔Summer time Summer time: Start: Start: End: End:	 OFF, ON Enter date: DD:MM:YY Enter time: hh:mm Enter date: DD:MM:YY Enter time: hh:mm	Entry of the period during which the system clock of the recorder will be adjusted to summer time. The period of summer time is only valid for the defined period of time. It must be freshly programmed each year. Start and end can only be entered if the status is set to ON.
Display brightness	Parameter level ➔Display Brightness:	 1 — 4	Display brightness 1 = dark 4 = very bright
Display time	Parameter level ➔Display time Display time:	 ON, OFF	Select status for display of time in the basic status

4.2.3 Configuration level 1 (C1-level)

	Parameter	Value/selection	Description
Plot status	Configuration level 1 ➔ Plot status X Plot status Status:	 1 — 3 or 1 — 6 ON, OFF	Setting for each writing channel: should the signal trace be printed on the chart and appear in the statistical report or not.
Measurement input	Configuration level 1 ➔ Measurement input X Measurement input Type:	 1 — 3 or 1 — 6 RES.THERMOMETER THERMOCOUPLE POTENTIOMETER RES. TRANSMITTER VOLTAGE CURRENT SHUNT	Select the type of probe/ sensor and input signal, determine the measure-ment range + filter time constant for each input channel.
	Configuration level 1 ➔ Measurement input Type: Resistance thermometer Characteristic: Connection: Unit: (dimension) Range start: Range end: Filter:	 Pt100, Pt100 JIS, Pt500, Pt1000, Ni100, X1, X2, 2/3-wire 4-wire °C, °F -9999 to +9999 -9999 to +9999 Measurement span ≥ 15 °C 0.0 — 50.0 sec	X1 = customer-specific linearisation 1 X2 = customer-specific linearisation 2 (with X1 or X2 : followed immediately by the entry for the filter parameter. Determine the type of connection for the resistance thermometer. Enter start of measurement range[1] Enter end of measurement range[1] Enter filter constant
	Configuration level 1 ➔ Measurement input Type: thermocouple Characteristic: Unit: (dimension)	 L, J, U, T, K, E, N, S, R, B, X1, X2 °C, °F	X1 = customer-specific linearisation 1 X2 = customer-specific linearisation 2 (with X1 or X2 : followed immediately by the entry for the filter parameter)

1. The limits for range start and range end differ according to the characteristic

4 Configuration table

Parameter	Value/selection	Description
Range start:	-9999 to +9999	Enter start of measurement range[1]
Range end:	-9999 to +9999 Meas. span ≥ 100 °C for Type S, R, B ≥ 500 °C	Enter end of measurement range[1]
Cold junction: (temp. comp.)	INTERN Pt 100 EXT. CONST.	Select cold junction
Cold junct. temp.: (comp. temp.)	Value range: -50 to +100 °C	Enter cold junction temp., if cold junction = EXT. CONST.
Filter:	0.0 — 50.0 sec	Enter filter constant
Configuration level 1 ➔ Measurement input Type: Potentiometer Characteristic:	linear, X1, X2	X1 = customer-specific linearisation 1 X2 = customer-specific linearisation 2 (with X1 or X2 : followed immediately by the entry for the filter parameter)
Connection:	2/3-wire 4-wire	Determine type of connection for the potentiometer
Start res. Ro:	0 ≤ Ro ≤ 4000 Ω	Enter start resistance
Res. range Rp:	6 ≤ Rp ≤ 4000 Ω Ro + Rp ≤ 4000 Ω Meas. span ≥ 6 Ω	Enter measurement range (resistance Rp)
Filter:	0.0 — 50.0 sec	Enter filter constant
Configuration level 1 ➔ Measurement input Type: res. transmitter Characteristic:	linear, X1, X2	X1 = customer-specific linearisation 1 X2 = customer-specific linearisation 2 (with X1 or X2 : followed immediately by the entry for the filter parameter)
Start res. Ra:	0 ≤ Ra ≤ 4000 Ω	Enter start resistance
Res. range Rs:	6 ≤ Rs ≤ 4000 Ω	Enter measurement range

1. The limits for range start and range end differ according to the characteristic

Parameter	Value/selection	Description
End res. Re:	0 ≤ Re ≤ 4000Ω Ra + Rs + Re ≤ 4000Ω Meas. span ≥ 6Ω	Enter end resistance
Filter:	0.0 — 50.0sec	Enter filter constant
Configuration level 1 ➔Measurement input Type: voltage Characteristic:	linear, Pt100, Pt100 JIS, Pt500, Pt1000, Ni100, L, J, U, T, K, E, N, S, R, B, X1, X2	X1 = customer-specific linearisation 1 X2 = customer-specific linearisation 2 (with X1 or X2 : followed immediately by the entry for the filter parameter)
Unit:	mV, V	
Range start:	-9999 to +9999 -10V ≤ range start < 10V	Enter start of measurement range[1]
Range end:	-9999 to +9999 -10V < range end ≤ 10V Meas. span ≥ 5mV	Enter end of measurement range[1]
Temperature: (dimension)	°C, °F	(only for thermocouples and resistance thermometers)
Temp. start:	-9999 to +9999	Enter start of temperature range[1] (only for thermocouples and resistance thermometers)
Temp. end:	-9999 to +9999 Measurement span - Resistance thermometer ≥ 15°C - Thermocouples ≥ 100°C - S, R, B ≥ 500°C	Enter end of temperature range[1] (only for thermocouples and resistance thermometers)
Filter:	0.0 — 50.0sec	Enter filter constant
Configuration level 1 ➔Measurement input Type: current / shunt Characteristic:	linear, Pt 100, Pt 100 JIS, Pt 500, Pt 1000, Ni 100, L, J, U, T, K, E, N, S, R, B, X1, X2	X1 = customer-specific linearisation 1 X2 = customer-specific linearisation 2 (with X1 or X2 : followed immediately by the entry for the filter parameter)
Range start:	-9999 to +9999 -20mA ≤ rge. start < 20mA	Enter start of measurement range[1]

1. The limits for range start (temp. start) and range end (temp. end) differ according to the characteristic

4 Configuration table

	Parameter	Value/selection	Description
	Range end:	-9999 to +9999 -20 mA < rge. end ≤ 20 mA Meas. span ≥ 0.5 mA	Enter end of measurement range[1]
	Temperature: (dimension)	°C, °F	(only for thermocouples and resistance thermometers)
	Temp. start:	-9999 to +9999	Enter start of temperature range[1] (only for thermocouples and resistance thermometers)
	Temp. end:	-9999 to +9999 Measurement span - Resistance thermometer ≥ 15 °C - Thermocouples ≥ 100 °C - S, R, B ≥ 500 °C	Enter end of temperature range[1] (only for thermocouples and resistance thermometers)
	Filter:	0.0 — 50.0 sec	Enter filter constant
Scale	Configuration level 1 ➔ Scale		
	X Scale:	1 — 3 or 1 — 6	Select reference channel
	Unit: (dimension)	5 characters	
	Zero:	-9999 to +9999	Enter start of scaling
	Full:	-9999 to +9999	Enter end of scaling
	Decimal point:	AUTO, x.xxx, xx.xx, xxx.x, xxxx.	Select position of decimal point
Channel name (word and number)	Configuration level 1 ➔ Word and number		Enter the designation for each channel
	X Word and number	1 — 3 or 1 — 6	
	Text:	16 characters	The designation is used, for instance, for the scaling printed in the chart, and is shown in the display, together with the measurement. The complete character set is available for use.

1. The limits for range start (temp. start) and range end (temp. end) differ according to the characteristic

	Parameter	Value/selection	Description
Limit comparator	Configuration level 1 ➔Limit comparator X Limit comparator	1 — 8	Select limit comparator
	Limit value:	-9999 to +9999	Enter value for limit
	Lower differential:	0 — 9999	Enter the hysteresis below the limit value
	Upper differential:	0 — 9999	Enter the hysteresis above the limit value
	LK-function: (LK=limit comparator)	lk7, lk8	Select limit comparator function
	Probe break:	OFF = 0, ON = 1, CONST.	Determine relay state for a probe break (CONST. = constant: limit state will be held)
	Limit-text status:	OFF, ON	Enter status for the print-out of out-of-limit signals (for OFF, text entries are not required)
	TXT L: (L = lower)	16 characters	Text for going below the limit value
	TXT H: (H = higher)	16 characters	Text for exceeding the limit value
	Channel:	1 — 3 or 1 — 6	Select reference channel for the limit comparator
Limit operation (limit feed)	Configuration level 1 ➔Limit feed X Limit feed	1 — 3 or 1 — 6	Select reference channel
	Status:	ON, OFF	Select status for limits
	Low:	-9999 to +9999	Enter lower limit, if status is ON
	High:	-9999 to +9999	Enter upper limit, if status is ON

4 Configuration table

	Parameter	Value/selection	Description
Zoom	Configuration level 1 ➔Zoom		
	X Zoom	1 — 3 or 1 — 6	Select reference channel
	Low:	0 — 90	Enter measurement value for start (in % of measurement range)
	High:	10 — 100 End – start ≥ 10 %	Enter measurement value for end (in % of measurement range)
Presentation range (offset)	Configuration level 1 ➔Offset		
	X Offset	1 — 3 or 1 — 6	Select reference channel
	Low:	0 — 99 mm	Enter offset start in mm
	High:	1 — 100 mm Start < End	Enter offset end in mm
Peak value recording	Configuration level 1 ➔Peak value recording		
	X Peak value recording	1 - 3 or 1 - 6	Select reference channel
	Status:	OFF, ON	Select status

4.2.4 Configuration level 2 (C2-level)

	Parameter	Value/selection	Description
Unit name	Configuration level 2 ➔Unit name Text:	 16 characters	 Enter instrument designation
Open-collector output	Configuration level 2 ➔Open-collector output X Output Status:	 1 — 4 OFF, ON	 Select open-collector output Enter status
Speed in limit operation (feed limit)	Configuration level 2 ➔Feed limit Feed limit:	 0, 5, 10, 20, 60, 120, 240, 300, 360, 600, 720mm/h	Select speed The recorder switches to this chart speed, if the limits configured in the parameter *Configuration level 1* ➔ *Limit feed* are infringed
Timed operation (feed time)	Configuration level 2 ➔Feed time Feed time: from - to: from - to:	 0, 5, 10, 20, 60, 120, 240, 300, 360, 600, 720mm/h Enter any time for “from” Enter any time for “to”	Select speed This chart speed only applies during the defined period of time Enter start time Enter end time
Print speed change	Configuration level 2 ➔Print speed change Status:	 OFF, ON	Select the status for print-out of an alteration or change-over of the chart speed
Print the “Power on” text	Configuration level 2 ➔Print the "power on" text Status: Text:	 OFF, ON 16 characters	 Status for print-out of the “power on” text (if OFF: text entry not required) Enter ”power on” text
Print the “Power off” text	Configuration level 2 ➔Print the “power off” text Status: Text:	 OFF, ON 16 characters	 Status for the print-out of the “power off” text (if OFF: text entry is not required) Enter “power off” text
Print the scaling	Configuration level 2 ➔Print scale Spacing:	 OFF, 30, 60, 90cm	 Determine the regular interval at which the scaling should be printed in the chart

4 Configuration table

	Parameter	Value/selection	Description
Print the time	Configuration level 2 ➔Print time Spacing:	OFF, 2, 4, 6cm	Determine the regular interval at which the time should be printed in the chart
Print the channel numbers	Configuration level 2 ➔Print channel numbers Spacing:	OFF, 2, 4, 6cm	Determine the interval for printing the traces in the chart, labelled with the corresponding channel numbers
Report	Configuration level 2 ➔Report X Report	1 - 2	Select report/instance number
	Type:	OFF, PERIODIC, WEEKLY REPORT, MONTHLY REPORT, EXTERN.CONTACT	Select type of report
	Configuration level 2 ➔Report Type: PERIODIC		
	Report time:	Enter any time	Enter start time for the first report
	Interval	1, 2, 3, 4, 6, 8, 12, 24h	Select a period
	Configuration level 2 ➔Report Type: WEEKLY REPORT		
	Report time:	Enter any time	Enter time
	WEEKDAY:	MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY, SATURDAY, SUNDAY	Select weekday
	Configuration level 2 ➔Report Type: MONTHLY REPORT		The report is made on the first day of the month
	Report time:	Enter any time	Time at which the report is made
	Configuration level 2 ➔Report Type:EXTERN. CONTACT		The report is initiated by a logic input *(Configuration level 3 ➔ External report)*

	Parameter	Value/selection	Description
Start text	Configuration level 2 ➔ Start text Status:	OFF, ON	Select the status for the print-out of the start text (if OFF: text entry not required)
	Text:	16 characters	Enter start text
End text	Configuration level 2 ➔ End text Status:	OFF, ON	Select the status for the print-out of the end text (if OFF: text entry not required)
	Text:	16 characters	Enter end text
Default setting (presetting)	Configuration level 2 ➔ Presetting Presetting:	NO, YES	Overwrite parameters and configuration data with standard values
Code number	Configuration level 2 ➔ Code All parameters:	0 — 9999	Enter new code number for the full parameter set
	Select parameters:	0 — 9999	Enter new code number for the limited parameter set

4.2.5 Configuration level 3 (C3-level)

	Parameter	Value/selection	Description
Relay output	Configuration level 3 ➔Relay output X Relay	1 — 8	Select relay
	Status:	OFF, ON	OFF = relay inactive ON = relay operates as an LK output
Mathematical module	Configuration level 3 ➔Mathematical module Mathematical m.:	OFF, ON	Activate/de-activate mathematics module
Interface	Configuration level 3 ➔Interface		Set up RS422/RS485
	Protocol:	J-BUS, MOD-BUS	Select protocol
	Baud:	0.15, 0.3, 1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 125, 187.5kBaud	Select baud rate
	Data format:	8/1/NO, 8/1/ODD, 8/1/EVEN, 8/2/NO, 8/1/ZERO	Select data format (Data bits / stop bits / parity)
	Address:	1 — 255	Select address
	Min. response time:	0 — 500msec.	Select minimum response time
External text	Configuration level 3 ➔External text X External text	1 — 8	Select the number of the external text
	Contact:	OFF, Log. input 1, Log. input 2, Log. input. 3, Log. input 4, Log. input 5, Log. input 6, Log. input 7, Log. input 8	Select logic input. (if OFF: the text entry is not required)
	Text:	16 characters	Enter text
Binary-linked external text (text logic links)	Configuration level 3 ➔Text logic links Link:	OFF, Log. input 1, Log. input 1-2, Log. input 1-3, Log. input 1-4	Select the inputs which are to be binary-linked, (if OFF, all further sub-parameters are not required)

	Parameter	Value/selection	Description
	Text logic links	00 — 01 (Log. input 1) 00 — 03 (Log. input 1-2) 00 — 07 (Log. input 1-3) 00 — 15 (Log. input 1-4)	Select binary combination (text-no.)
	Text status:	OFF, ON	Select the status for the text printing
	Text:	16 characters	Enter text
External stop	Configuration level 3 ➔External stop Contact:	OFF, Log. input 1, Log. input 2, Log. input 3, Log. input 4, Log. input 5, Log. input 6, Log. input 7, Log. input 8	Select logic input
External speed	Configuration level 3 ➔External speed Contact:	OFF, Log. input 1, Log. input 2, Log. input 3, Log. input 4, Log. input 5, Log. input 6, Log. input 7, Log. input 8	Select logic input
	External speed:	0, 5, 10, 20, 60, 120, 240, 300, 360, 600, 720 mm/h	Select speed when contact <> OFF
Event counter	Configuration level 3 ➔Event counter X Event counter	1 — 2	Select event counter
	Contact:	OFF, Log. input 1, Log. input 2, Log. input 3, Log. input 4, Log. input 5, Log. input 6, Log. input 7, Log. input 8	Select logic input or status (if OFF: all the following sub-parameters are not required)
	EC status:	OFF, ON	Select status
	Start value:	-99999 to +99999	Enter start value for the event counter
	Text:	16 characters	Text for designation of the event counter
External scaling	Configuration level 3 ➔External scaling Contact:	OFF, Log. input 1, Log. input 2, Log. input 3, Log. input 4, Log. input 5, Log. input 6, Log. input 7, Log. input 8	Select logic input

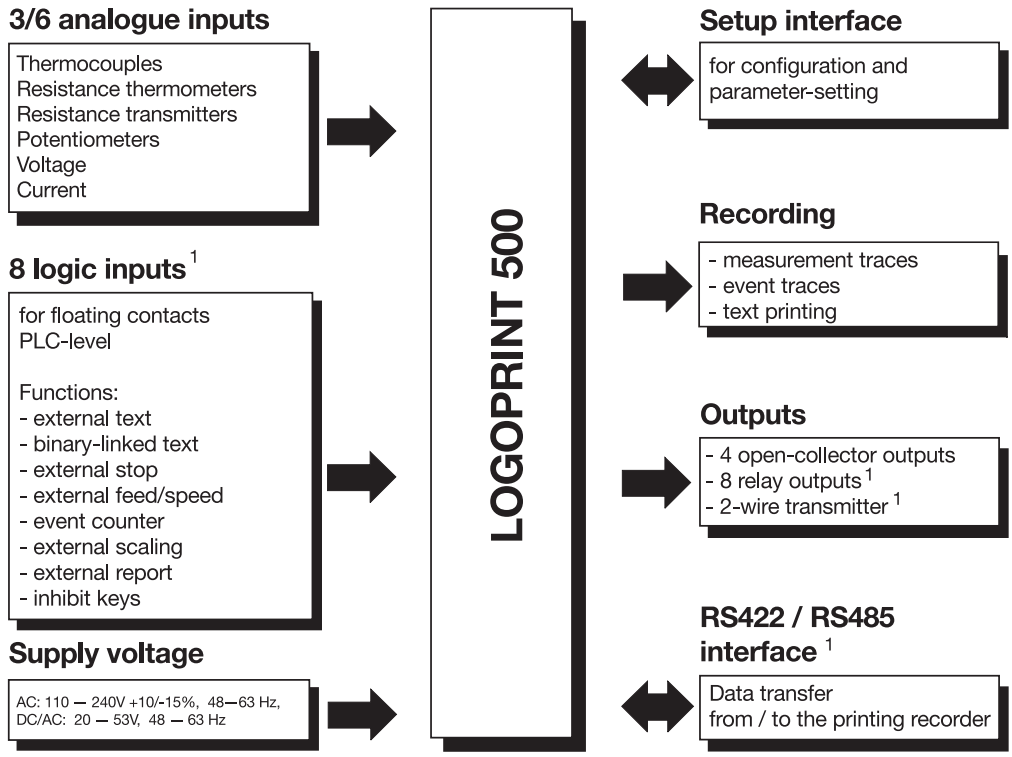
4 Configuration table

	Parameter	Value/selection	Description
External report	Configuration level 3 ➔External report		
	X External report	1 - 2	Select report/instance number
	Contact:	OFF, Log. input 1, Log. input 2, Log. input 3, Log. input 4, Log. input 5, Log. input 6, Log. input 7, Log. input 8	Select logic input
Key inhibit	Configuration level 3 ➔Key inhibit		
	Contact:	OFF, Log. input 1, Log. input 2, Log. input 3, Log. input 4, Log. input 5, Log. input 6, Log. input 7, Log. input 8	Select logic input
Event traces	Configuration level 3 ➔Event traces		
	X Event trace	1 — 8	Select event trace
	Trace status:	OFF, ON	Enter status for the print-out of the event trace
	Source:	LOG.INPUT LIMITCOMP.	Select source for event trace, if status is ON

5.1 Instrument description

The printing recorder is equipped with 3 or (optionally) 6 signal inputs, which are electrically isolated from one another. The evaluation of the measurement traces of the printing recorder can be assisted by printed texts.
The programming of the instrument is possible either by using the 8 keys on the front of the instrument or through a PC setup program. The configuration data are permanently stored in an EEPROM.
A 24-character LED dot-matrix display is available for checking and configuring the parameters and displaying the latest measurements on the instrument.
Thermocouples, resistance thermometers, resistance transmitters, potentiometers, voltages or currents (standard signals) are all possible as input signals.
The appropriate linearisations are carried out automatically, and can also be adjusted to customer-specific linearisation with the aid of the setup program.
Further outstanding features of this instrument, which are already included in the basic model, are four open-collector outputs for signalling infringements of limits and errors, as well as 8 event traces.
Eight logic inputs are available for control functions. The ER8 external relay module, for mounting on standard C-rails, expands the printer with 8 switchable outputs. A 2-wire transmitter can be fed from an electrically isolated supply voltage.
The maths/logic module can be used in most cases to achieve an individual adaptation, even for quite complex tasks.
In the event of a mains supply failure, the real-time clock is buffered by a lithium battery or a storage capacitor.

Block structure



1. available as an option

5 Identifying the instrument version

5.2 Order details

			(1) Basic version
		706030/14	LOGOPRINT 500 with 3 universal inputs
		706030/15	LOGOPRINT 500 with 6 universal inputs
			(2) Inputs 1 — 3 (configurable)
x	x	888	factory setting
x	x	999	configuration to customer specification[1]
			(3) Inputs 4 — 6 (configurable)
x		000	not used
	x	888	factory setting
	x	999	configuration to customer specification[1]
			(4) Interface
x	x	00	not used
x	x	52	RS422, Jbus, MODbus
x	x	53	RS485, Jbus, MODbus
			(5) Supply voltage
x	x	22	20 — 53V AC/DC, 48 — 63Hz
x	x	23	110 — 240V AC +10/-15%, 48 — 63Hz
			(6) Extra codes
x	x	020	lithium battery for memory buffering (ex factory)
x	x	021	storage capacitor (instead of extra code 020)
x	x	030	terminal with shunt (6 items)
x	x	259	8 logic inputs, interface for external relay module ER8, voltage output 24V DC 50mA
x	x	265	door with lock (IP54)
x	x	266	IP65 seal, wide mounting brackets
x	x	350	universal portable housing TG-35[2]
x	x	351	housing with carrying handle[3]
x	x	247	housing for wall mounting (can be rotated through 90°)[3]

	(1)		(2)		(3)		(4)		(5)		(6)	
Order code		-		-		-		-		/		,...[4]
Order example	706030/14	-	888	-	000	-	00	-	23	/	020	

1. Please specify probe types and 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. List extra codes in sequence, separated by commas.

Programming accessories

- Setup program, multilingual
- PC interface with TTL/RS232 converter
- PC interface with USB/TTL converter, adapter (socket) and adapter (pins)

Standard accessories

- 1 Operating Manual B 70.6030.0
- 2 fixing brackets
- cable-tie with foot (can be released) for tension relief of the sensor leads connected
- one 3-colour print head (for 3-channel recorder)
  or
  one 6-colour print head (for 6-channel recorder)
- 1 roll of chart paper, 32m long
  and
  1 block of fanfold paper, 16m long

6.1 Site and climatic conditions

The installation site should be as free as possible from vibration. Stray electromagnetic fields, for instance those caused by motors, transformers and the like, should be avoided where possible.

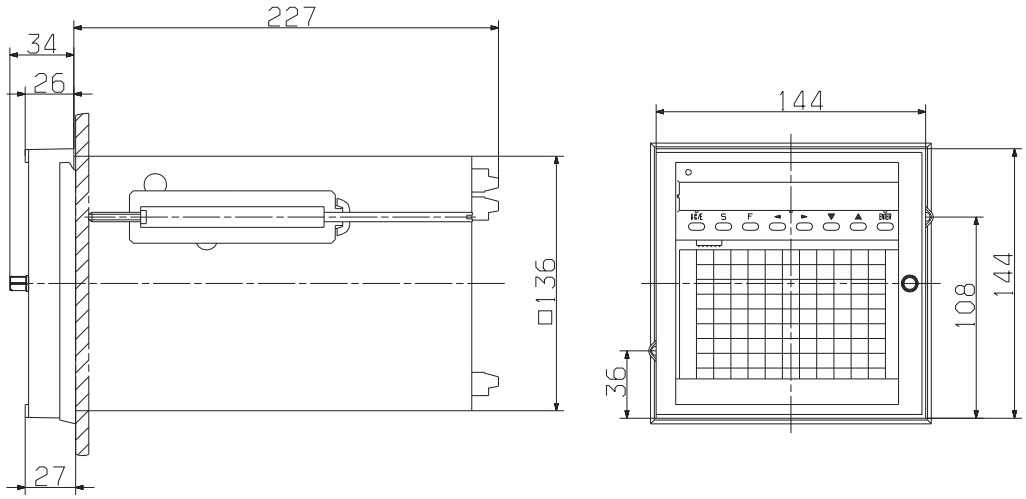
The ambient temperature at the installation site must not go outside the range 0 to +50°C, at a relative humidity of 20 — 70%. No condensation is permitted.

Corrosive gases or vapour can affect the functioning and the operational life of the printing recorder.

⇨ Section 7.1 “Installation notes”

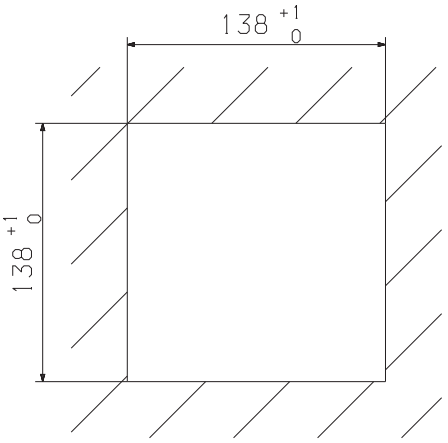
6.2 Assembly in a control panel

Views



Dimension 26 increased to 27 when using the IP65 seal.

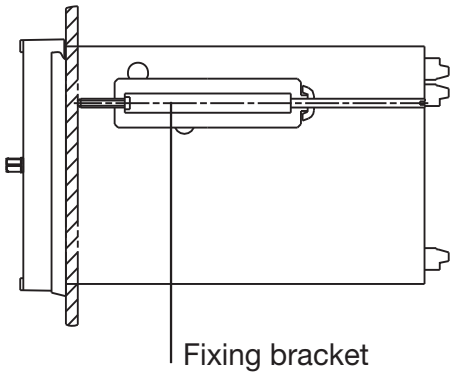
Panel cut-out



6 Installation

Mounting

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



7.1 Installation notes

- The rules of VDE 0100 “Regulations for the installation of high-current equipment with rated voltages below 1000V” or the equivalent national standards must be observed for the selection of cables, installation and electrical connection of the instrument.
- Internal work on the instrument may only be carried out by properly qualified personnel, and then only to the extent described. The same applies to electrical connections.
- Ensure that the instrument is completely isolated from the mains power before carrying out work where live components may be touched.
- The electromagnetic compatibility (EMC) corresponds to that of the standards and regulations cited in the technical data.
- It is recommended that input, output and supply cables are routed separately from one another, and not laid in parallel.
- 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.
- Earth the instrument by connecting the PE terminal on the instrument to the protective earth. This lead must have the same cross-section as the supply cable. Earthing leads must be routed in star configuration to a common earthing point which is connected to the protective earth of the supply voltage. Earthing leads must not be daisy-chained, i.e. led from one instrument to another.
- No other apparatus is permitted to be connected to the mains supply terminals of the instrument.
- The instrument is not suitable for operation in areas with an explosion hazard.
- Inductive components in the neighbourhood of the instrument, such as contactors or magnetic valves, must have RC combinations fitted for interference suppression.
- 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
110 — 240V AC +10/-15%, 48 — 63Hz	fuse 5A slow

7 Electrical connection

7.2 Technical data

Thermocouple input

	Measurement range	Linearisation accuracy[1]
Fe-Con L	-200 to +900°C	±0.2%
Fe-Con J EN 60584	-210 to +1200°C	±0.2% above -200°C
Cu-Con U	-200 to +600°C	±0.3%
Cu-Con T EN 60584	-270 to +400°C	±0.5% above -200°C
NiCr-Ni K EN 60584	-270 to +1372°C	±0.2% above -150°C
NiCr-CuNi E EN 60584	-270 to +1000°C	±0.2% above -200°C
NiCrSi-NiSi N E 60584	-270 to +1300°C	±0.2% above -150°C
Pt10Rh-Pt S EN 60584	-50 to +1768°C	±0.5% above 0°C
Pt13Rh-Pt R EN 60584	-50 to +1768°C	±0.5% above 0°C
Pt30Rh-Pt6Rh B EN 60584	0 to 1820°C	±0.5% above 500°C
Shortest measurement span	Types L, J, U, T, K, E, N: 100°C Types S, R, B: 500°C	
Range start/end	freely programmable within the limits, in 0.1°C steps	
Cold junction	Pt100 internal or thermostat as external constant	
Cold junction accuracy (internal)	± 1°C	
Cold junction temperature (external)	-50 to +100°C, adjustable through setup software	
Measurement time	for 3 channels < 2sec; for 6 channels < 4sec	
Input filter	2nd. order digital filter; filter constant adjustable from 0 to 50.0sec	
Features	also programmable in °F; customer-specific linearisation	

1. The linearisation accuracy refers to the maximum measurement span.
The linearisation accuracy is reduced for shorter spans.

Resistance thermometer input

	Connection	Range	Linearisation accuracy	Meas. current
Pt 100 EN 60751	2/3-wire	-200 to +250°C	±0.6°C	500µA
	2/3-wire	-200 to +850°C	±1.0°C	250µA
	4-wire	-200 to +250°C	±0.5°C	500µA
	4-wire	-200 to +850°C	±0.8°C	250µA
Pt 100 JIS	2/3-wire	-200 to +260°C	±0.6°C	500µA
	2/3-wire	-200 to +649°C	±1.0°C	250µA
	4-wire	-200 to +260°C	±0.5°C	500µA
	4-wire	-200 to +649°C	±0.8°C	250µA
Pt 500 DIN	2/3-wire	-200 to +150°C	±0.6°C	250µA
	2/3-wire	-200 to +850°C	±1.0°C	250µA
	4-wire	-200 to +150°C	±0.5°C	250µA
	4-wire	-200 to +850°C	±0.8°C	250µA
Pt 1000 DIN	2/3-wire	-200 to +250°C	±0.6°C	500µA
	2/3-wire	-200 to +850°C	±1.0°C	250µA
	4-wire	-200 to +250°C	±0.5°C	500µA
	4-wire	-200 to +850°C	±0.8°C	250µA
Ni 100	2/3-wire	-60 to +125°C	±0.6°C	500µA
	2/3-wire	-60 to +180°C	±1.0°C	250µA
	4-wire	-60 to +125°C	±0.5°C	500µA
	4-wire	-60 to +180°C	±0.8°C	250µA
Connection type	2-, 3- or 4-wire circuit			
Shortest measurement span	15°C			
Probe lead resistance	max. 30 Ω per core for 4-wire circuit max. 20Ω per core for 2- and 3-wire circuit for Pt100 up to 260°C max. 10 Ω per core in 2- and 3-wire circuit			

Range start/end	freely programmable within the limits, in 0.1°C steps
Measurement time	for 3 channels < 2sec; for 6 channels < 4sec
Input filter	2nd. order digital filter; filter constant adjustable from 0 to 50sec
Features	also programmable in °F; customer-specific linearisation

Input from resistance transmitter or potentiometer

Measurement range	Accuracy	Measurement current
up to 200Ω up to 400Ω up to 800Ω up to 2000Ω up to 4000Ω	±300mΩ ±600mΩ ±1Ω ±2Ω ±3Ω	500µA 250µA 250µA 500µA 250µA
Connection type	resistance transmitter: 3-wire circuit potentiometer: 2-, 3- or 4-wire circuit	
Shortest span	6Ω	
Probe lead resistance	max. 30Ω per core for 4-wire circuit max. 20Ω per core for 2- and 3-wire circuits up to 200Ω range: max. 10Ω per core in 2- and 3-wire circuits	
Resistance values	freely programmable within the limits, in 0.1Ω steps	
Measurement time	for 3 channels < 2sec; for 6 channels < 4sec	
Input filter	2nd. order digital filter; filter constant adjustable from 0 to 50.0sec	

DC voltage or current input

Measurement range	Accuracy	Input resistance
-25 to +75mV	±100µV	R_E > 10 MΩ
0 to 100mV	±100µV	R_E > 10 MΩ
-100 to +100mV	±150µV	R_E > 10 MΩ
0 to 200mV	±150µV	R_E > 10 MΩ
-500 to +500mV	±1mV	R_E > 10 MΩ
0 to 1V	±1mV	R_E > 10 MΩ
-1 to +1V	±2mV	R_E > 10 MΩ
-5 to +5V	±10mV	R_E > 0.5 MΩ
0 to 10V	±10mV	R_E > 0.5 MΩ
-10 to +10V	±15mV	R_E > 0.5 MΩ
Shortest span	5mV	
Range start/end	freely programmable within the limits (up to 999mV in 0.01mV steps, above 1V in 1mV steps)	
4 — 20mA	±20µA	burden voltage ≤ 2.6V
0 — 20mA	±20µA	burden voltage ≤ 2.6V
-20 to +20mA	±40µA	burden voltage ≤ 2.6V
Shortest span	0.5mA	
Range start/end	freely programmable within the limits, in 0.1mA steps	
Measurement time	for 3 channels < 2sec; for 6 channels < 4sec	
Input filter	2nd. order digital filter; filter constant adjustable from 0 to 50.0sec	
Features	linearisation for thermocouples and resistance thermometers is adjustable (for connecting transmitters without linearisation)	

Transducer short-circuit/ break

	Short-circuit[1]	Break[1]
Thermocouple	not recognised	recognised
Resistance thermometer	recognised	recognised [2]
Resistance transmitter	recognised	recognised
Potentiometer	not recognised	recognised[2]
Voltage up to ± 1V	not recognised	recognised

	Short-circuit[1]	**Break**[1]
Voltage above ± 1V	not recognised	not recognised
Current	not recognised	not recognised

1. The print head is positioned to 0% , “>>>>>>” appears in the LED dot-matrix display.
2. In 4-wire circuit: only recognised at terminals 1 and 2.

Outputs

3 open-collector outputs	to signal over/under limit
one open-collector output	to signal faults (e.g. chart paper end)

Printing system

Drive	stepper motor
Sensitivity	≤ 0.2% referred to 100mm writing width
Reproducibility	≤ 0.25% referred to 100mm writing width
Display and recording accuracy	Class 0.5 referred to the measurement range limits and the basic measurement ranges
Print head	print head with pen-lift function – sufficent for approx. 1 million dots (depending on the ambient temperature)
Print colours	violet, red, black for 3-channel printing recorder and violet, red, black, green, blue, brown for 6-channel recorder. The colour assignment can be changed at will, through the setup program.
Over/underrun	electronically limited to 0 — 100mm writing width
Chart speed	programmable in stages 0, 5, 10, 20, 60, 120, 240, 300, 360, 600, 720mm/h
Paper feed	by stepper motor and gearing
Chart paper cassette	cassettes for roll chart and fanfold chart (with tear-off edge and paper-end switch)
Chart paper total width writing width sprocket roller spacing visible diagram length total length	roll or fanfold chart paper to DIN 16 320 120mm 100mm 110mm roll chart: 60mm; fanfold chart: 30 to 60mm roll chart: 16m or 32m; fanfold chart: 16m

Electrical data

Supply (switch-mode power supply)	AC: 110 — 240V +10/-15% 48 — 63Hz or DC/AC: 20 — 53V 48 — 63Hz
Electrical safety	to EN 61 010, Part 1 of March 1994 overvoltage category II, pollution degree 2
Test voltages (type test)	
- Mains supply to measurement circuits	with AC supply 2.3kV/50Hz, 1min, with DC/AC supply 510V/50Hz, 1min
- Mains supply to housing (protective earth)	with AC supply 1.5kV/50Hz, 1min, with DC/AC supply 510V/50Hz, 1min
- Between measurement circuits	200V/50Hz, 1min
- Between measurement circuits and housing	500V/50Hz, 1min
- Electrical isolation between the analogue inputs	up to 30V AC or 50V DC
Supply voltage sensitivity	< 0.1% of the measurement span

Power consumption	max. 35VA
Data buffering	Through a lithium battery in RAM > 4 years, or with a storage capacitor: 2 days at 15 to 25°C ambient temperature. Additional backup in EEPROM.
Electrical connection	At rear through plug-in screw terminals, conductor cross-section max. 2.5mm^2 or 2x 1.5mm^2 with ferrules. Setup connector at front behind the flip-up dot-matrix display.
EMC - Interference emission - Immunity to interference	EN 61 326 Class B to industrial requirements
Safety standard	to EN 61 010

Housing

Housing type - housing door	Housing for flush-panel mounting to IEC 61 554, in zinc-plated steel sheet die-cast zinc
Transport mechanism	in corrosion-resistant chrome-nickel steel
Chart paper cassette	in plastic (polycarbonate)
Front bezel size	144mm x 144mm
Mounting depth	212mm without screw terminals; 227mm with screw terminals plugged in
Control panel cutout	$138^{+1.0}$mm x $138^{+1.0}$mm
Housing mounting	in a control panel to DIN 43 834
Ambient temperature range	0 to +50°C
Ambient temperature error	0.2%/10°C
Storage temperature range	-20 to +70°C (without print head), -20 to +55°C (with print head)
Climatic conditions	20 to 70% rel. humidity, no condensation
Operating position	NL 90 ± 30, DIN 16 257 (vertical)
Protection	to EN 60 529 Category 2, front IP54 (IP65 with extra code 266), rear IP20
Weight	max. 3.5kg

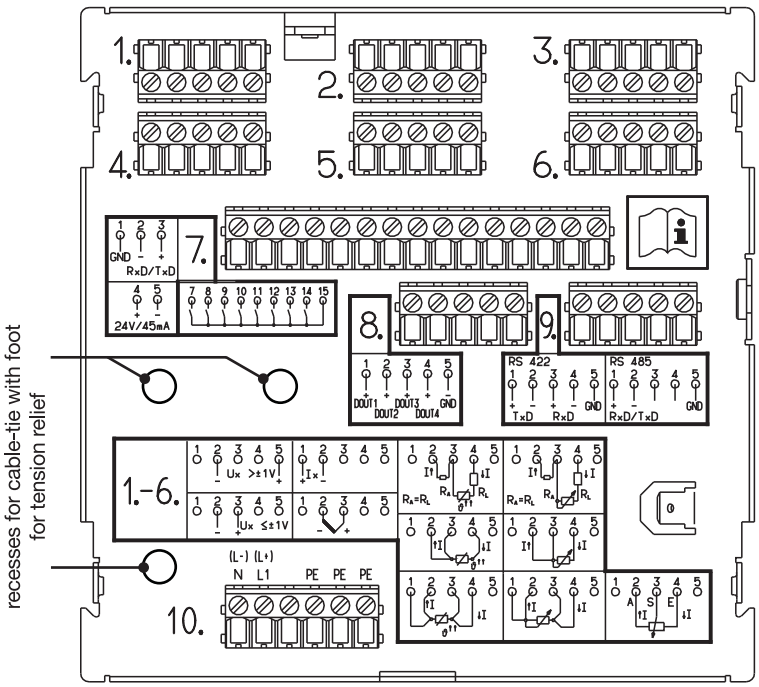
Approvals/ marks of conformity

Mark of conformity	**Testing laboratory**	**Certificates / certification numbers**	**Test basis**	**valid for**
c UL us	Underwriters Laboratories	E 201387	UL 3111-1 CAN/CSA C22.2 No. 1010.1-92	the flush-mounted instrument; not in conjunction with extra codes 350, 351 and 247

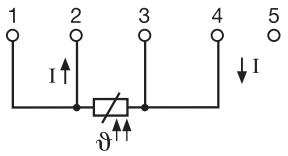
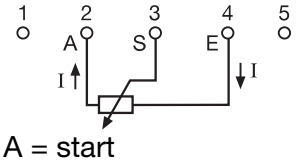
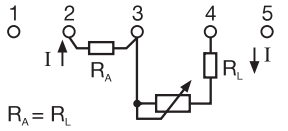
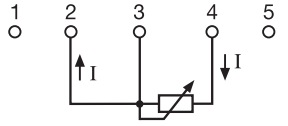
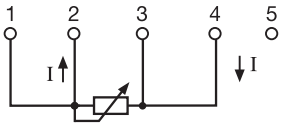
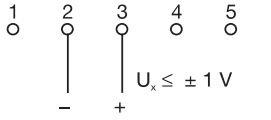
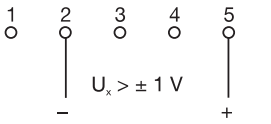
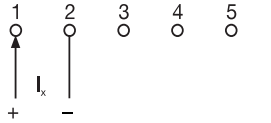
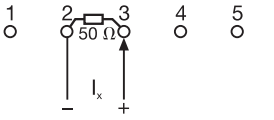
7 Electrical connection

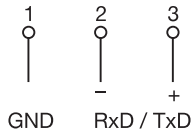
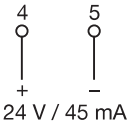
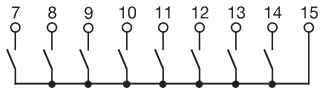
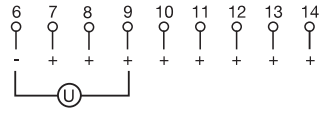
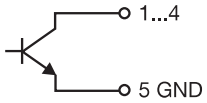
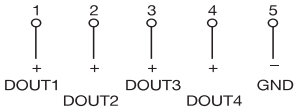
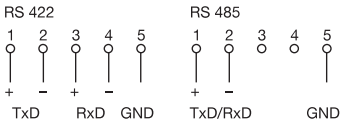
7.3 Connection diagram

Rear view of 3/6-channel version

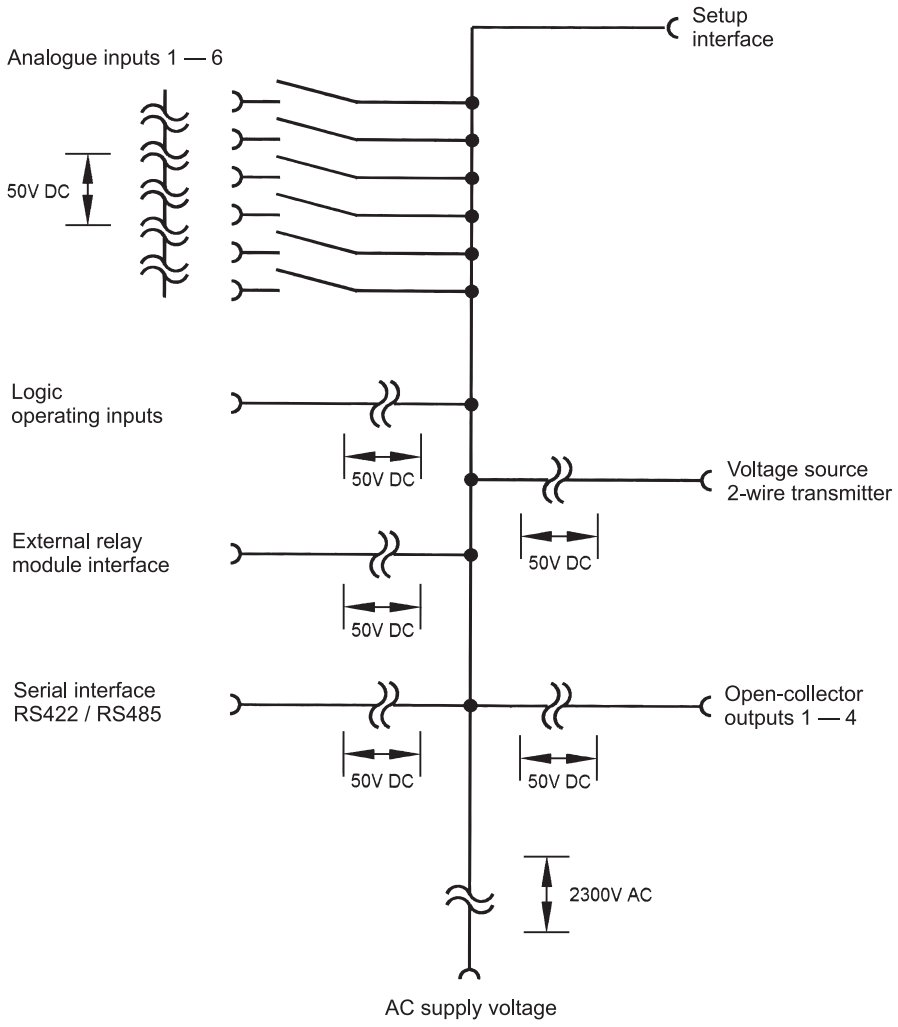


Terminal assignment 3/6-channel version							**Terminal symbol**
Supply as on label	N neutral L1 line PE earth					field 10.	(L-) (L+) N L1 PE PE PE 1 2 3 4 5 6
Analogue inputs	**Inputs**						
	1	2	3	4	5	6	
	field						
Thermocouple	1.	2.	3.	4.	5.	6.	1 2 3 4 5 – +
Resistance thermometer in 2-wire circuit							1 2 3 4 5 I R_A R_L I $R_A = R_L$ ϑ
Resistance thermometer in 3-wire circuit							1 2 3 4 5 I I ϑ

Analogue inputs	**Inputs**						
	1	2	3	4	5	6	
	field						
Resistance thermometer in 4-wire circuit	1.	2.	3.	4.	5.	6.	
Resistance transmitter with 3-wire connection							 A = start S = slider E = end
Potentiometer 2-wire circuit							
Potentiometer in 3-wire circuit							
Potentiometer in 4-wire circuit							
Voltage input ≤ ± 1V							
Voltage input > ± 1V							
Current input ± 20mA							
Current input (shunt) ≤ ±20mA (when using transducers with changeable internal resistance; extra code “terminal with shunt” is required)							

External relay module ER8	Communication with external relay module	Field	
Voltage source for external 2-wire transmitter	24 V / 45 mA ± 5 %		
Logic operating inputs min. pulse length: HIGH 400 msec LOW 400 msec	Contact operation LOW = $R_{OFF} \geq 100\,k\Omega$ HIGH = $R_{ON} \leq 50\,k\Omega$ Voltage operation LOW = DC 0 — 5V (not active) HIGH = DC 20 — 35V (active)	7.	  contact no. 7 = logic input 1 . . . contact no. 14 = logic input 8
Open-collector outputs 	DOUT1 — DOUT4 U_{max} = DC 32V I_{max} = 100 mA “On” voltage DOUT active $U_{DOUTactive}$ = 0.4 — 1.2V	8.	
Serial interface RS 422/RS 485	Communication with higher-level systems	9.	

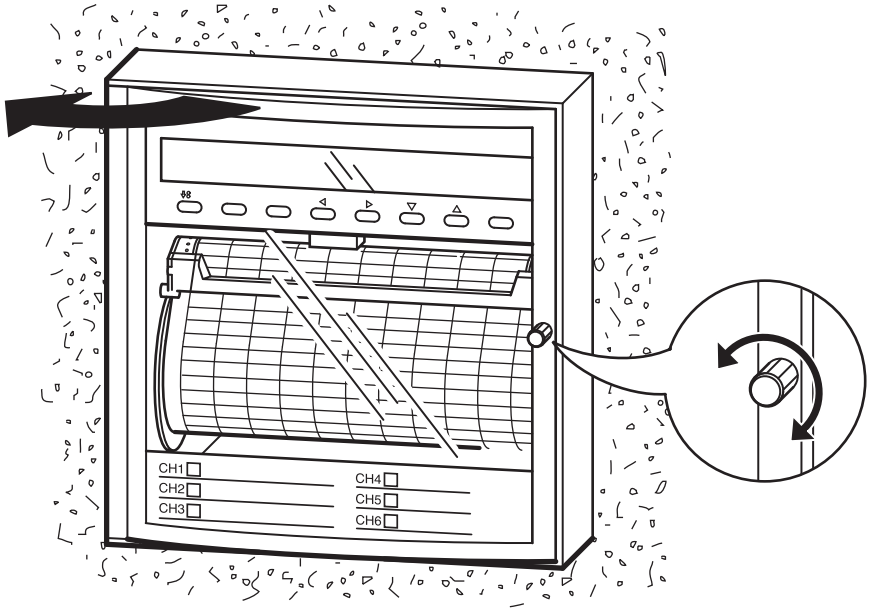
7.4 Electrical isolation



7 Electrical connection

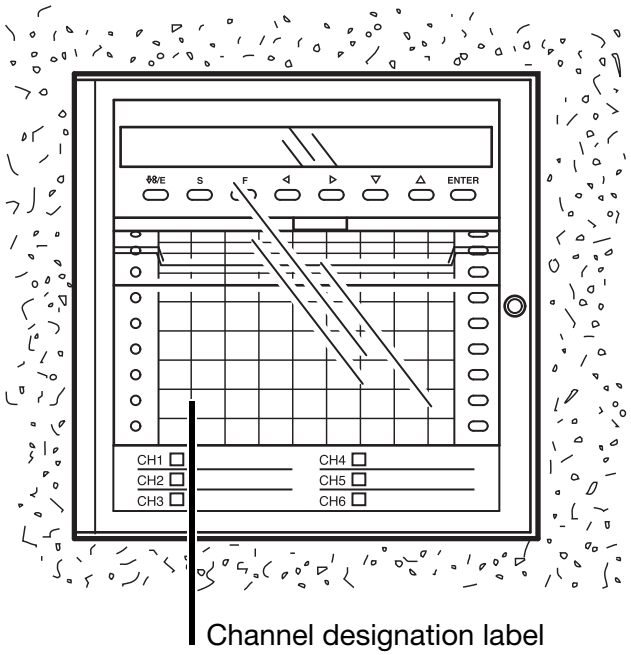
8.1 Opening and closing the door

Turn the knob to open or close the door, .



8.2 Marking the channel label

After the door has been opened, the measurement channel designation label can be removed and marked, as required, with the channel specific data, such as measurement range, zoom, and presentation range.

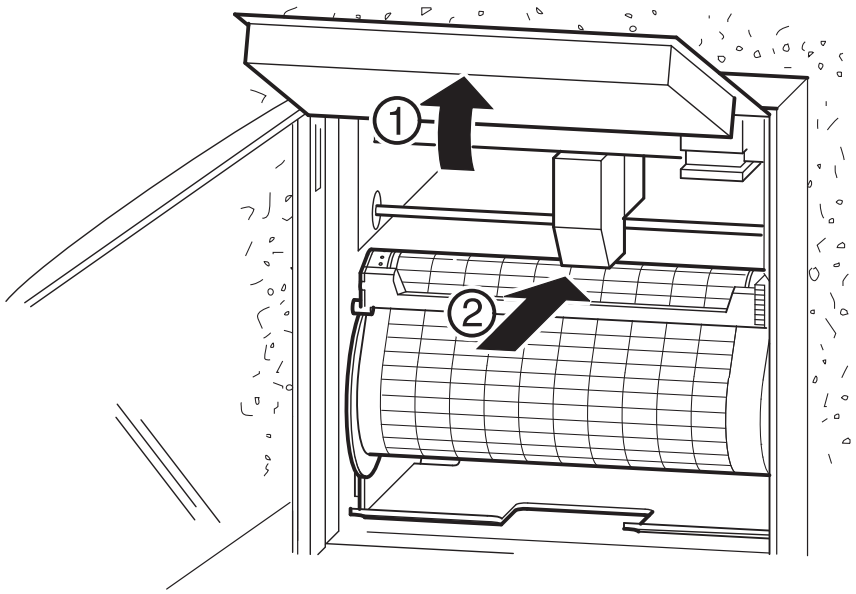


8.3 Fitting the print head

* Open the door
* Stop recording (press the S key)

In the stop state, the print head is always moved to the middle of the recording band.

* Swing the display radially upwards
* Push the print head into the holder, up to the stop
* Swing the display downwards, until it snaps into place
* Start recording again (press the S key)



9.1 Consumables

Print head
3 colours for 3-channel recorder
Packing unit: 2 pieces
Part No.: 00355244

6 colours for 6-channel recorder
Packing unit: 2 pieces
Part No.: 00355255

Roll chart paper
no name, % graduation, linear
overall length: 16m
overall width: 120mm
Packing unit: 5 rolls
Part No.: 00331497

no name, % graduation, linear
overall length: 32m
overall width: 120mm
Packing unit: 5 rolls
Part No.: 00331499

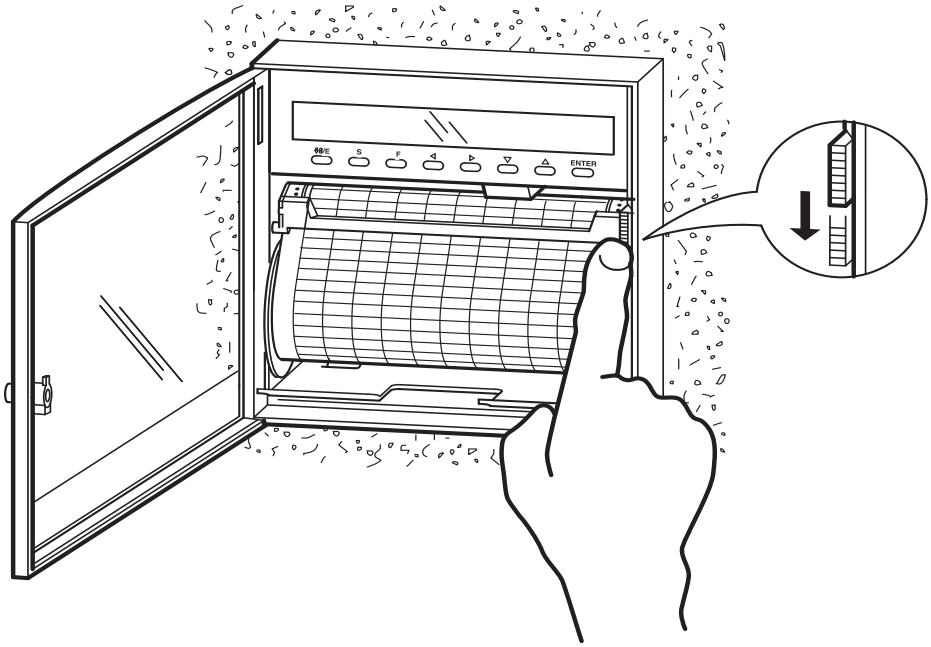
no name, special graduation, linear
(printed as order specification)

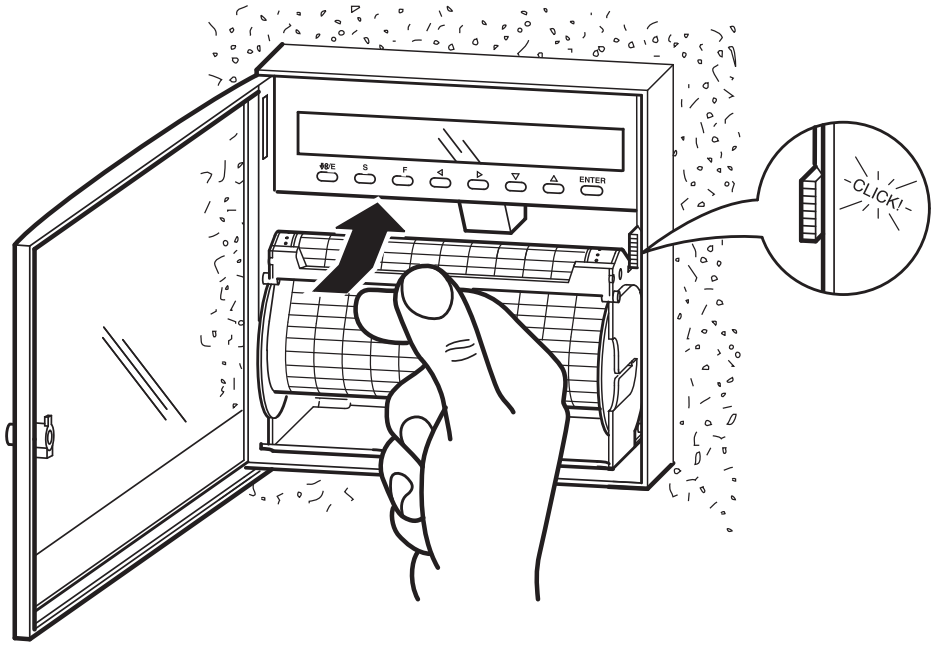
Fanfold chart paper
no name, % graduation, linear
overall length: 16m
overall width: 120mm
Packing unit: 5 packs
Part No.: 00331490

no name, special graduation, linear
(printed as order specification)

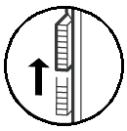
Make sure you use the correct print head.
For instance, it is inappropriate to use a 3-colour print head in a 6-channel recorder.

9.2 Removing and replacing the chart cassette



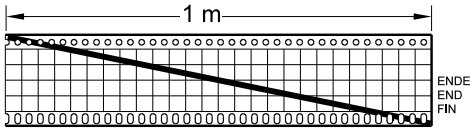


- When inserting the chart cassette, take care that it is centered on the tear-off edge and – guiding it with the thumb and index finger – insert it into the cassette slot and push it up gently, until the holding/ejector catch snaps into position.
- When the cassette has been inserted, the paper feed 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.

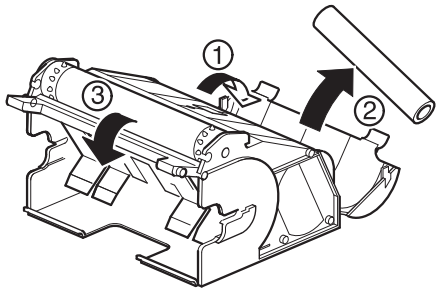


9 Consumables

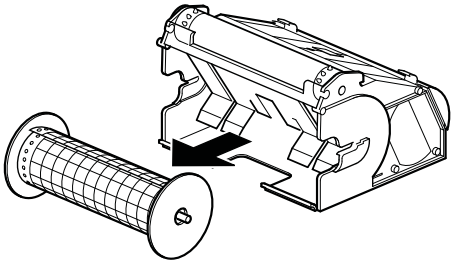
9.2.1 Changing the roll chart



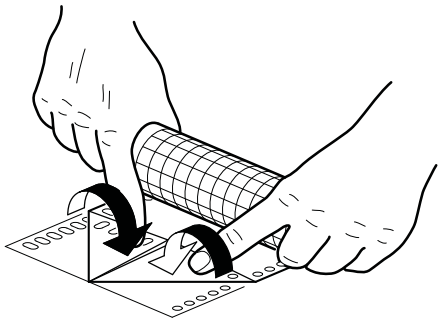
1



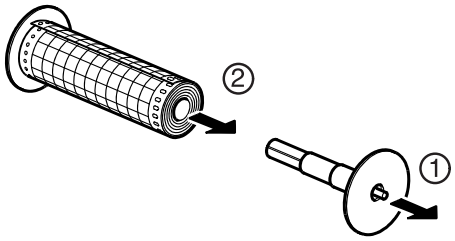
5



2



6



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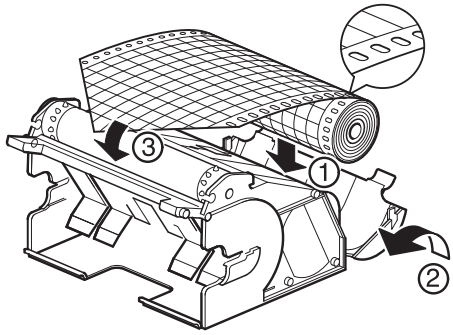
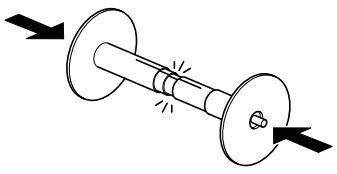
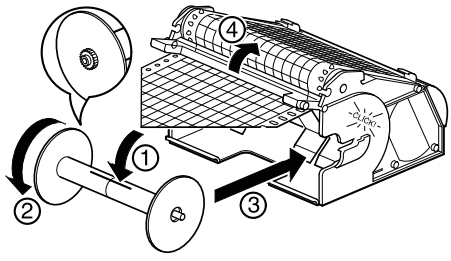


7

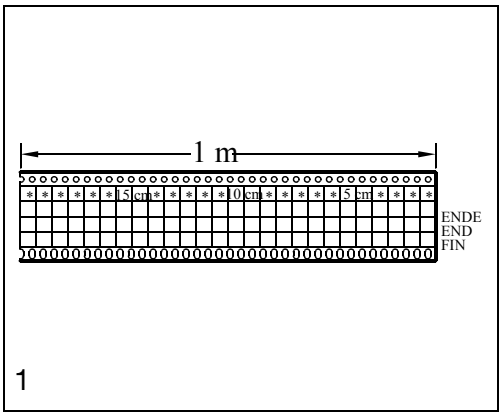


4



8

9.2.2 Changing the fanfold chart



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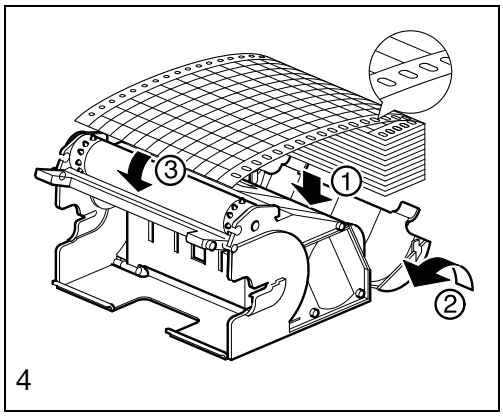
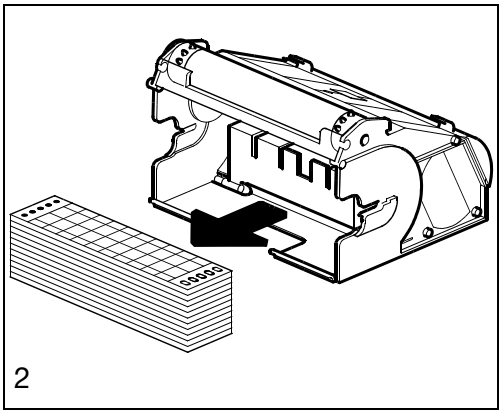
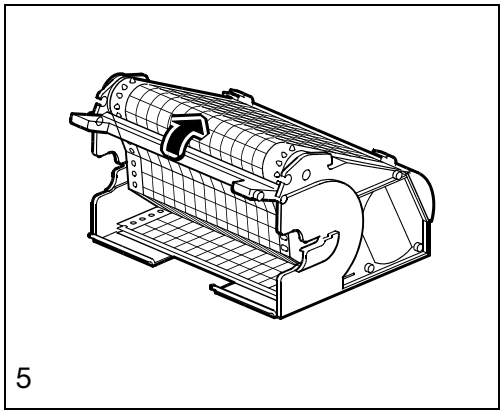


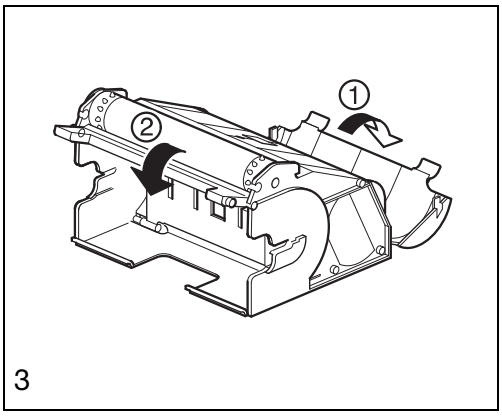
4



2



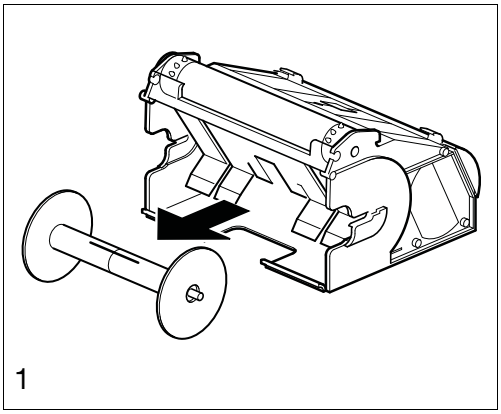
5



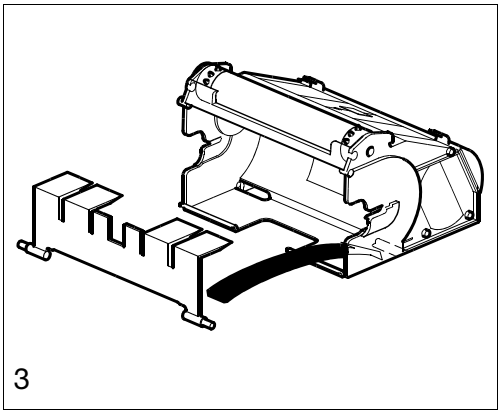
3

9 Consumables

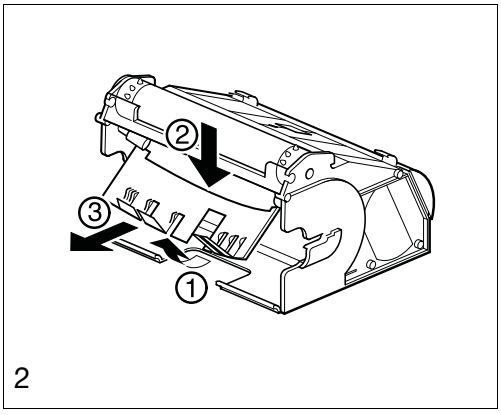
10.1 Converting the chart cassette



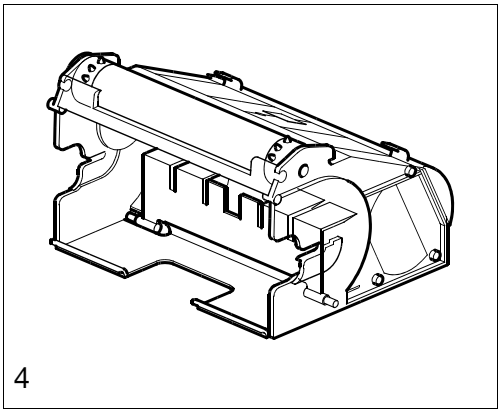
1



3



2



4

10.2 “8 logic inputs”, “interface for ER8”, “voltage output”

The Extra Code provides 8 logic inputs, the serial interface for the external relay module ER8, and an electrically isolated power supply for 2-wire transmitters.

The eight logic inputs can operated by floating contacts or by the following voltage levels:
inactive 0 — 5V
active 20 — 35V

The voltage levels must be applied for at least 0.4sec.

Possible functions:

- external text
- binary-linked external text
- external start/stop
- change chart drive over to external speed
- event counter
- start scaling print
- start/stop of external report
- inhibit keys
- event traces

10.3 External relay module ER8

The external relay module ER8 adds 8 switching outputs to the recorder.

The sequence of the relays 1 — 8 is permanently assigned to the limit comparators 1 — 8 (limit state). The corresponding limit state is only transferred to the relay if the relay has been activated *(Configuration level 3 ➔ Relay output ➔ Status = ON)*.

⇨ Section 3.1 “Limit monitoring by limit comparators”

⇨ Section 3.5.4
“Limit comparator texts, external text, binary-linked external text”

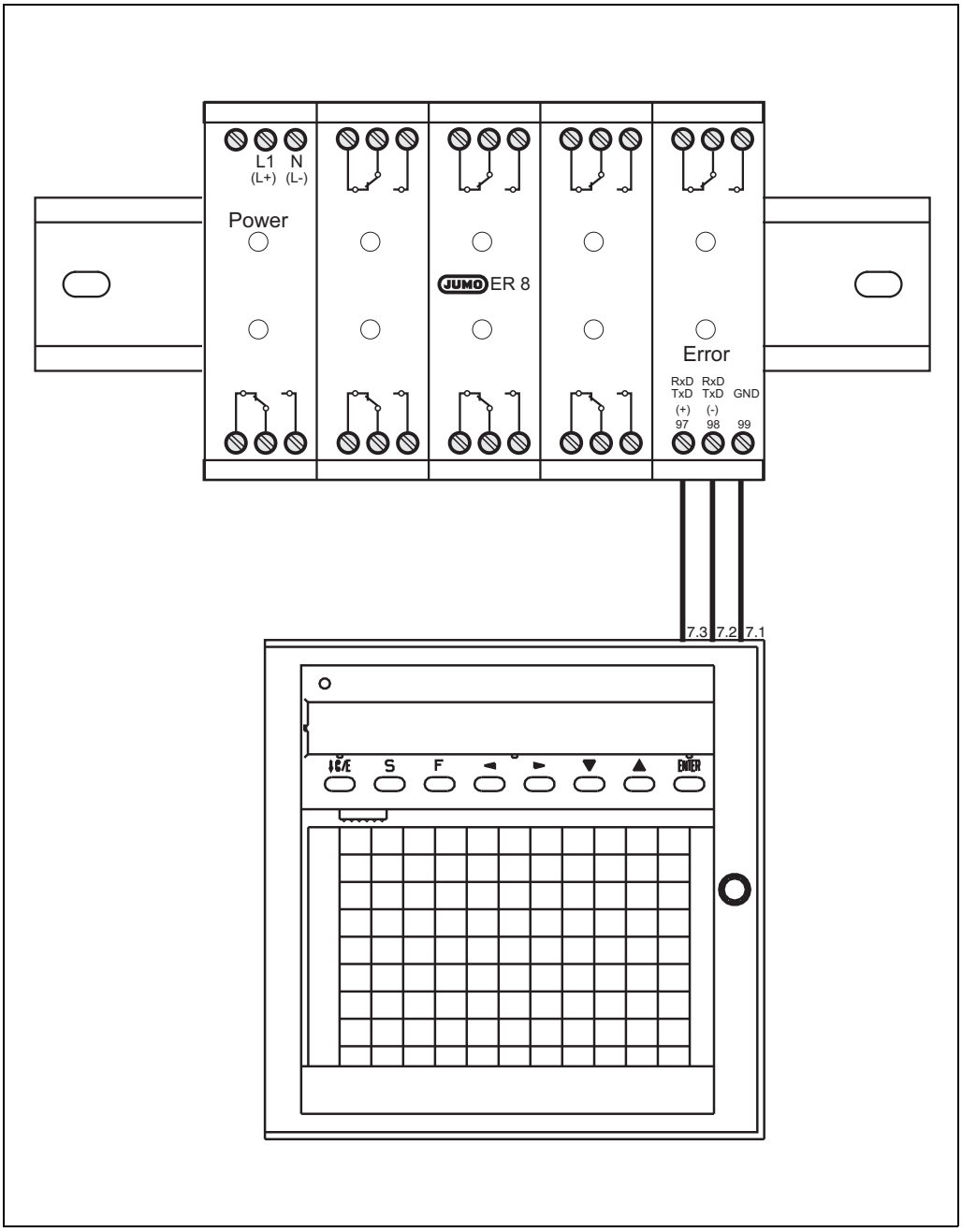
⇨ Section 4.2 “Table of the configuration parameters”

The external realy module ER8 can only be operated when the Extra Code has been installed in the recorder.

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

10 Extra codes and accessories

Connections to ER8



10.4 Setup program

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

In addition, the following functions are available for operating and programming the printing recorder:

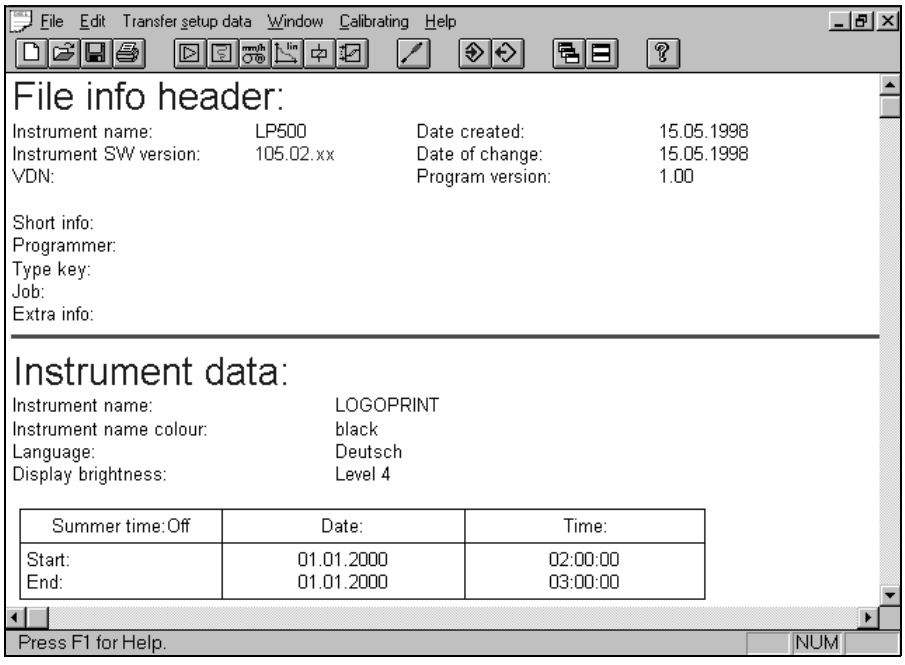
- setting different print colours
- print mode and priorities
- determining which parameters can be set on the printing recorder
- settings can be printed out, using the setup program
- various setup settings can be managed, and transferred to the printing recorder as required
- carry out an instrument test

Hardware requirements

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

Software requirements

- Microsoft Windows[1] 3.1/3.11/95/NT 4.0



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

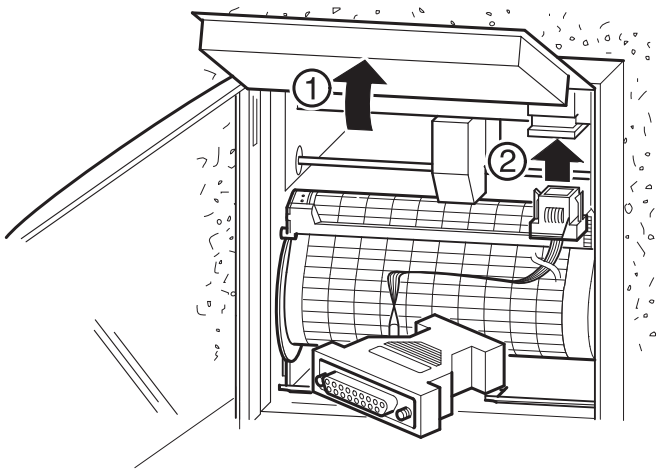
The setup program is installed by means of an installation program for Microsoft Windows.

The operation of the setup program is described in the Installation Manual (B 70.6030.3) and in Windows Online Help.

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

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

⇨Section 12.5 “Summary of the parameters”



If the setup connector is plugged into the recorder, then

- the signal acquisition and
- the recording

are interrupted.

Additionally,

- events are no longer registered,
- reports are aborted and reset,
- limits are no longer monitored and
- the outputs are no longer operated.
  The relays are de-energised.

10.5 Mathematics and logic module

If the maths/logic module is de-activated, then the signals which are measured at the signal inputs are recorded according to the configuration of the inputs. If the maths/logic module is activated, then the measured signals can be mathematically linked.

Example:
The sum/difference of two inputs is recorded on one channel. At the same time, 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.

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

On request, customer-specific maths programs can be created at the factory.

The setup program is then used to transfer these programs to the printing reorder.

Switching on the maths/logic module can have a fundamental effect on the behaviour of the recorder.

The information given in the operating manual may then be largely invalid.

The maths module is activated in the instrument by the parameter *Configuration level 3* ➔ *Mathematical module*.

10.6 Interface (RS422/RS485)

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

With the aid of the interface it is possible to implement the following functions:

- read out measurements from the recorder
- monitor the operating status of the recorder
- transmit values to the recorder, to be printed out
- transmit texts to the recorder, to be printed out
- transmit texts to the recorder, to be displayed

The RS422/RS485 interface is described in detail in the Interface Description B 70.6030.2.

11.1 What to do if …

Display or printing “>>>>>>”	- 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 “ ****”, “ ±*.***”, “ ±**.**”, “ ±***.*”, “ ±****.” is displayed or printed	- The value can no longer be represented: alter the scaling with the setup program, so that the value can always be represented. - In the case of the event counter: reset the event counter using the setup program or the parameter *Configuration level 3* ➔ *Event counter*
No recording	- The S key was pressed - “External Stop” was configured, and the corresponding logic input is closed - The chart cassette has not been fitted correctly ⇨ Section 9.2 “Removing and replacing the chart cassette” 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 “Changing the roll chart” - The end of the chart paper has been reached ⇨ Section 9.2.1 “Changing the roll chart” ⇨ Section 9.2.2 “Changing the fanfold chart” - The chart speed has been programmed to 0 mm/h ⇨ Section 4.2 “Table of the configuration parameters” - The plot status is switched to “OFF” ⇨ Section 4.2 “Table of the configuration parameters” - The setup connector is still plugged in
Print head doesn‘t write	- The print head has not been inserted properly ⇨ Section 8.3 “Fitting the print head” - The ink in the print head has been used up

Chart paper is not moving	- The chart cassette has not been fitted correctly ⇨ Section 9.2 “Removing and replacing the chart cassette” - The take-up roll has not properly engaged with the chart cassette ⇨ Section 9.2.1 “Changing the roll chart” - The chart speed has been programmed to 0 mm/h ⇨ Section 4.2 “Table of the configuration parameters” - The paper perforation is not running correctly over the paper-feed sprocket - The tear-off edge is not properly engaged - The printing recorder is in the stop status
Measurements are not recorded	- Check that the connection terminals are tightened properly - Check the supply - Check the input configuration (measurement range) - Check the transducers and their leads, measure them if appropriate - The plot status may be switched off
Relay does not switch, although limit is exceeded	- The signal inputs are not wired up according to the connection diagram - The recorder and the external relay module ER8 are not connected together properly - The limit differential (hysteresis) has been ignored - The relay status is “OFF” - A wrong signal is being compared against a limit - A signal input is in the “Out of Range” condition, and the response of the limit comparators to a probe break (*Configuration level 2* ➔ *Limit comparator* ➔ *Probe break*) has been configured as “constant”
No programming possible	- A wrong code number has been entered - The code number has been changed
No communication with the setup program	- The setup connector is not properly plugged in - The printing recorder is already being configured by using the keys: leave the parameter and configuration levels by pressing the ⇩/E key

12.1 Error messages

All error messages are displayed by flashing in the LED dot-matrix display at regular intervals.
The other instrument functions remain unaltered, as far as possible.

Display	Cause / Remedy
Status message	
NO PAPER!	- The chart cassette has been removed or the end of the chart has been reached, a fresh chart must be inserted. ⇨ Section 9.2 “Removing and replacing the chart cassette” - The take-up roll has not properly engaged with the chart cassette ⇨ Section 9.2.1 “Changing the roll chart”
Error or fault in recorder	
LOW BATTERY!	- The battery for the real-time clock and for buffering the RAM is discharged. - Please contact the nearest JUMO office or the main factory.
ADJUST TIME!	- This error message is produced if the storage capacitor is discharged to too low a level during a supply failure (Extra Code, ⇨ Section 5.2 “Type designation”) - The event, power-off, and operating time counters, as well as the system clock and the minimum and the maximum ambient temperatures are reset. - The time must be set. ⇨ Section 4.2 “Table of the configuration parameters”
RELAY-ERROR!	- The communication with the external relay module ER8 is faulty. - Check the connection between the printing recorder and the external relay module ER8.
A/D CONVERTER ERROR	- The A/D converter in the printing recorder is faulty. - Please contact the nearest JUMO office or the main factory.

Display	Cause / Remedy
Error in parameter entry!	
ERROR!	- Chart speed is outside the range 0 — 720 mm/h. The entry must be made again. Enter a value which is within the range. - Date is invalid. An invalid date has been entered. The entry must be made again. - Invalid time. An invalid time has been entered. The entry must be made again. - Incorrect value. The value which was entered is outside the range. The entry must be made again, with a different value.

12.2 Hardware fault

If one of the following faults occurs, then the recording is aborted and the error message will be shown in a flashing display.

The relay will react as in the event of a probe break[1]. The instrument no longer responds to any kind of event, and cannot even be operated or controlled. Please contact the nearest JUMO office or the main factory.

Display	**Cause / Remedy**
EEPROM-ERROR!	- The EEPROM in the printing recorder is faulty, the configuration data can no longer be stored. - Please contact the nearest JUMO office or the main factory.
NO ZERO!	- The limit sensor (print head) was not recognised. - Please contact the nearest JUMO office or the main factory,

1. The reaction to a probe break is configured in the setup program or through the parameter *Configuration level 1* ➔ *Limit comparator* ➔*Probe break* (⇨ Section 4.2 “Table of the configuration parameters”)

12 Appendix

12.3 Status messages

The following status messages are indicated in the LED dot-matrix display:

Display	Description
INITIALISATION	- The printing recorder is being initialised.
STOP	- The recorder is in the stop status, because the S key has been pressed.
EXTERNAL STOP	- The recorder is in the stop status, because the “external stop” has been activated by closing the corresponding logic input.
SETUP	- The setup connector has been inserted into the recorder. - The instrument is ready for communication with the PC connected to it.
PLEASE WAIT!	- The configuration data are being written to the EEPROM. The recorder will not respond to any inputs during this time.

12.4 Character set

032		079	O	0126	~	0212	Ô
033	!	080	P	0161	¡	0213	Õ
034	"	081	Q	0162	¢	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	°	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		

The characters which can be accessed with the S key (quick selection) are shown on a black background.

12.5 Summary of the parameters

Parameter	Description	Programming S = via setup R = on recorder
Chart speed	Chart speed in mm/h	R, S
Print test	Test the printing system	R
Service print	Print out information about the recorder	R
Version number	Display the version number	R, S
Code	Code number entry for level inhibit	R, S
Language	Language for printouts and LED dot-matrix display	R, S
Date & time	System clock of the printing recorder	R, S
Summer time	Start and end of summer time	R, S
Display brightness	Display brightness, in four levels	R, S
Display time	Switch on/off display of time in the basic status	R, S
Plot status	Plot status on/off for each channel	R, S
Measurement input	Select the analogue input signals, filters	R, S
- mask out	Number of maskings	S
Scale	Scaling of the measurements for recording, including the units and choice of decimal places for alphanumeric presentation	R, S
Channel name	Designation (word and number) of each channel	R, S
-assign colour	Free assignment of colours to channels	S
Limit comparator	Define monitored limits for measurement values	R, S
Limit operation	Limits for changing chart speed	R, S
Zoom (plot area)	Zoom/magnifier function, value entered in %	R, S
Presentation range	Restrict printing widith, entry in mm	R, S
Peak value recording	Switch on/off the peak value recording of each channel	R, S

Parameter	Description	Programming S = via setup R = on recorder
Unit name	Designation of the printing recorder	R, S
- colour	Colour of the instrument designation	S
Open-collector output	Status (on /off) for each limit signal and the fault signal output	R, S
Speed, limit operation (feed limit)	Chart speed in mm/h, which is activated by going above or below the limits which have been entered	R, S
Timed operation (feed time)	Chart speed for a defined period of time	R, S
Print speed change	Status for the printout of the speed change	R, S
Print “power on ” text	Status and text for the printout when the supply is switched on	R, S
Print “power off” text	Status and text for the printout when the supply is switched off (this printout only appears at the next switch-on)	R, S
Print scaling	Spacing (in cm) of the cyclic scaling printout	R, S
Print time	Spacing (in cm) of the cyclic time printout	R, S
Print channel number	Spacing (in cm) of the cyclic channel-number printout	R, S
Report	Sets the period for the statistical report	R, S
Start text	Text which is printed at the start of recording	R, S
End text	Text which is printed at the end of recording	R, S
Printing priorities	Priorities for printing texts	S
Printing mode	Overwrite/interrupt the measurement curve for printing texts	S
Default setting (presetting)	Reset parameters	R, S
Code number	Alter the two code numbers	R, S

Parameter	Description	Programming S = via setup R = on recorder
Relay outputs	Status (on/off) for each relay of the external relay module	R, S
Mathematical/logic module	Activate/de-activate the module	R, S
	Transfer the mathematics program to the instrument	S
Interface	Report, data format, address, response time for communication via the RS 422 or RS 485 interface	R, S
Logic inputs		
- external text - colour	Text which is printed when a signal is present on the logic input Colour for printing the text	R, S S
- binary-linked external text - colour	Texts which are printed when certain signal combinations are present on the first four logic inputs Colour for printing the text	R, S S
- external stop	A defined logic input stops the recording when a signal is present	R, S
- external speed	A defined logic input causes a switch to a specific chart speed	R, S
- event counter - colour	Level changes on a logic input can be counted and documented Colour for printing the event counter results	R, S S
- external scaling	A logic input can be used to initiate the scale printing for all the active channels	R, S
- external report	Produces a statistical report via a logic input	R, S
- keypad inhibit	Inhibits all the keys through a logic input	R, S
Event traces - track offset - colour	Display logic inputs as signal traces Start position on the chart Colour of the trace	R, S S S
Instrument operation	Determine which parameters are required for the application, limit the parameter set	S

A

B

C

D

E

F

G

I

K

L

M

N

O

P

R

S

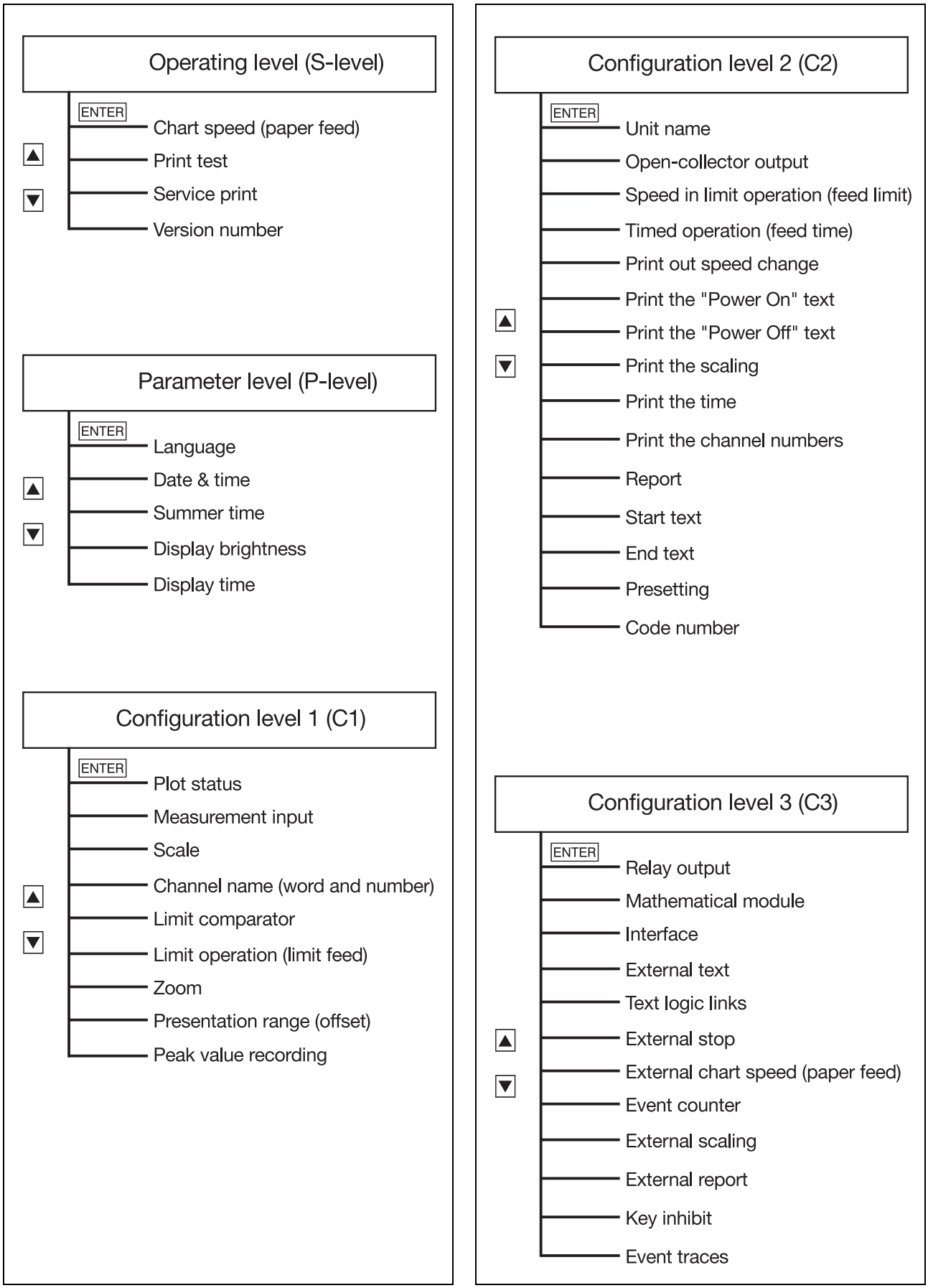
T

U

V

W

Z


Operating level (S-level)
ENTER
Chart speed (paper feed)
Print test
Service print
Version number
Parameter level (P-level)
ENTER
Language
Date & time
Summer time
Display brightness
Display time
Configuration level 1 (C1)
ENTER
Plot status
Measurement input
Scale
Channel name (word and number)
Limit comparator
Limit operation (limit feed)
Zoom
Presentation range (offset)
Peak value recording
Configuration level 2 (C2)
ENTER
Unit name
Open-collector output
Speed in limit operation (feed limit)
Timed operation (feed time)
Print out speed change
Print the "Power On" text
Print the "Power Off" text
Print the scaling
Print the time
Print the channel numbers
Report
Start text
End text
Presetting
Code number
Configuration level 3 (C3)
ENTER
Relay output
Mathematical module
Interface
External text
Text logic links
External stop
External chart speed (paper feed)
Event counter
External scaling
External report
Key inhibit
Event traces

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