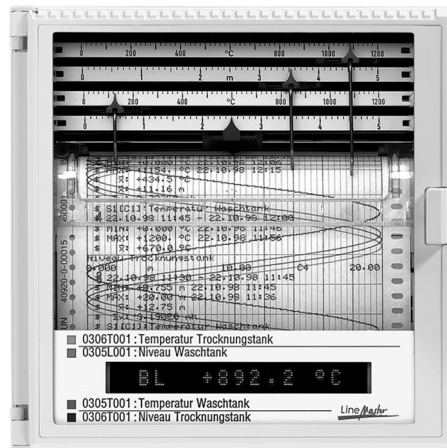


10/43-3.10 EN



- 1 to 4 channels
- 1 to 3 channels plus printer channel
- Compensation of the recording pen offset
- Free assignment of signal inputs to recorders
- 4 virtual channels for mathematical functions
- 4 accounting channels
- 4 pulse inputs (counter inputs)
- Analog scale and digital display
- 64 m roll chart
- Externally adjustable measuring ranges
- RS 485 interface
- Measuring channels electrically isolated and ungrounded
- 3 alarms per channel:
  - absolute value monitoring
  - gradient monitoring
  - bargraph monitoring (floating alarm values)
- Standby with history function

The LineMaster 300 is a microprocessor-controlled continuous-line recorder. It is supplied in two versions possessing different measuring system:

- 1 to 4 measuring channels
- 1 to 3 measuring channels with additional printer channel.

**The printer channel enables text printout and the recording of analog measured values at equidistant dot-spacings.**

The recorder is connected to a transmitter and/or directly to thermocouples or resistance thermometers. It is then adapted to the measuring task with software which is accessed with an internal key panel or with PC and the parameter-definition program PARALINE 300 via the RS 485 interface.

Virtual channels permit the logical or mathematical combination of input channels. This makes it possible to make status corrections and to create complex measuring variables.

Supplementary functions such as a text printout, accounting and event markers enlarge the information content of the process variables logged.

**Technical data**

**Measuring section**

Deviation  
 to IEC 1143-1, in relation to the nominal range  
 class 0.5 for line channels  
 class 1 for printer channel  
 in the event of displacement of lower range and/or upper-range value additionally  
 $\pm (0.1\% \times \frac{\text{nominal range}}{\text{scale span}} - 0.1)$   
 $\pm 0.1\%$  of scale span with linearization  
 $\pm 1$  K with internal reference junction correction

Dead zone: 0.25 % of scale span

Setting time: 1s

Measured value damping  
 with low-pass of the 1st order; time constant 0...60 s  
 can be parameterized per channel

**Measurement variable / nominal ranges**

**Standard version**

Direct current  
 0...20 mA  $R_i = .50 \Omega$   
 4...20 mA  $R_i = .50 \Omega$

Direct voltage  
 0...10 V  $R_i \geq 1 \text{ M}\Omega$

**Universal version**

Direct current  
 0...20 mA  $R_i = .50 \Omega$   
 4...20 mA  $R_i = .50 \Omega$   
 $\pm 2.5$  mA  $R_i = .50 \Omega$   
 $\pm 5$  mA  $R_i = .50 \Omega$   
 $\pm 20$  mA  $R_i = .50 \Omega$

Direct voltage  
 0...25 mV  $R_i \geq 2 \text{ M}\Omega$   
 $\pm 25$  mV  $R_i \geq 2 \text{ M}\Omega$   
 $\pm 100$  mV  $R_i \geq 2 \text{ M}\Omega$   
 0...2.5 V  $R_i \geq 200 \text{ k}\Omega$   
 $\pm 2.5$  V  $R_i \geq 200 \text{ k}\Omega$   
 0...10 V  $R_i \geq 200 \text{ k}\Omega$   
 $\pm 20$  V  $R_i \geq 200 \text{ k}\Omega$

Thermocouples  $R_i \geq 2 \text{ M}\Omega$   
 Type B 100...+1820 °C  
 Type E -270...+1000 °C  
 Type J -210...+1200 °C  
 Type K -270...+1372 °C  
 Type L -200...+ 900 °C  
 Type N -270...+1300 °C  
 Type R -50...+1769 °C  
 Type S -50...+1769 °C  
 Type T -270...+ 400 °C  
 Type U -200...+ 600 °C  
 Parameters can be defin. internally or externally for ref. junction.  
 Parameters can be defined for sensor break monitoring

Resistance thermometers  
 Pt 100 in 2- or 3-wire circuit; -50...+150 °C, -200...+850 °C

Max. line resistance for  
 2-wire circuit: 40  $\Omega$ ; 3-wire circuit: 80  $\Omega$

**Measuring ranges**

Parameters can be defined for 0...80 % of the lower-range value of the respective nominal range

Parameters can be defined for 20...100 % of the span of the respective nominal range

Parameters can be defined for the square root function for direct current and direct voltage nominal ranges

Parameters can be defined for linearization of user-specific curves for direct current and direct voltage nominal ranges

**Virtual channels**

4 in number  
 are used for the logical combination of input channels  
 Term length max. 32 characters  
 Based on +, -, \*, /  
 Functions  $x^a$ ,  $a^x$ , log, cos, sign, int.  
 Channels can be freely assigned to recorder

**Pulse inputs**

4 in number  
 Pulse frequency max. 10 Hz  
 Control voltage: 24 V DC / 6 mA external  
 "Binary input/output" option required

**Effects**

Temperature  
 $[\pm 0.2 + (0.05 \times \frac{\text{nominal range}}{\text{scale span}} - 0.05)] \% / 10 \text{ K}$

Reference temperature: 25 °C

Supply voltage  
 $\leq 0.1\%$  for 24 V, -25 % ... 85 V, +10 % UC  
 $\leq 0.1\%$  for 95 V, -10 % ...240 V, +10 % UC

AC interference voltage:  $\leq 0.5\%$  of the measuring span

External magnetic field 1 mT  
 $\leq 0.5\%$  of the measuring span

In case of mechanical stress  
 during and after effect  $\pm 0.5\%$  of the measuring span

**Recording section**

**Measured value display**

**Scale**

one graduation per measuring element	Scale plate width	Character size
LineMaster 34.	5 mm	2 mm
LineMaster 33.	7,5 mm	3 mm
LineMaster 32.	13,4 mm	5 mm

**Operating and display panel**

1. Display  
 16-digit-dot-matrix display, numeral size 3 x 5 mm.  
 Used in operation mode to display the measured values of the channels, to display message texts, alarm value infringements etc. Used in the parameter definition mode to display the entered data

**Technical data**

2. Operation:

- 8 keys with 2-level assignment
- First level: Operation
- Second level: Parameter definition

**Recording**

Arrangement of measuring elements and colour assignments:

Version with 1- to 4-line channels

LineMaster	34.	33.	32.	Number of line channels			
				1	2	3	4
green							x
red						x	x
blue				x	x	x	x
violet							x

Version with 1- to 3-line channels plus printer channel

LineMaster	34.D	33.D	32.D	Number of line channels			printer channel
				1	2	3	
green							x
red						x	x
blue				x	x	x	
violet							

**Trend recording with line channels**

Fibre-tip recording pen with reservoir, capacity approx. 1.4 ml, line length approx. 1300 m, spacing between pen 2 mm

**Trend recording with printer channel**

Instead of the violet line channel, a printer channel is incorporated. The measured value recording follows as a dotted line at equidistant spacings. Ink reservoir in the ink head approx. 1.5 x 10<sup>6</sup> dots. Spacing between blue fibre pen and ink head = 6 mm.

**Text printout**

Only possible for paper speeds of ≤ 300 mm/h

Character size: approx. 1.5 x 2 mm

Volume of text print:

1. Ten text lines: per text line optionally max. 32 characters max. 30 characters and time imprint max. 24 characters, time and date imprint cyclical triggering at time intervals or depending on event through internal (alarm value) / external excitation (binary inputs)
2. Printout of chart speed, date and time Printout triggered on switching on the recorder and on changing the chart speed
3. Printout of current measured values Printout triggered cyclically at parameterizable intervals or depending on event by means of internal/external excitation
4. Printout of double lines assigned to measuring points First line: scaling lines with channel code and printout of dimensions. Second line: measuring point-related text with a maximum of 32 characters

5. Printout of balance sheet consisting of:

- Comment line
- Start and end of the accounting interval
- Min./max. value during the accounting interval
- Average and total value of the accounting interval
- Triggering: cyclical and external

**Chart speed**

Definable parameters:

0/2.5/5/10/20/30/40/60/120/240/300/600/1200/2400/3600/7200 mm/h

Optionally: external chart speed changeover and switch-off "Binary input and output" optionally required

**Chart**

64 m roll chart

**Visible diagram length**

65 mm

**Recording width**

100 mm (chart width 120 mm, DIN 16 230)

**Chart feed-in**

Via automatic take-up reel (daily chart tear-off or take-up of 64 m possible)

**Power supply**

**Mains unit**

95 V, -10 % ... 240 V, +10 % UC  
24 V, -25 % ... 48 V, +10 % UC

**Frequency range for AC operating**

47.5...63 Hz

**Power consumption**

With max. complement approx. 18 W / 25 VA

**RS 485 interface**

- a) to be defined
- b) coupling to higher-level systems for bidirectional data transmission.

**Option "Alarm values and binary inputs"**

**External speed changeover**

Control voltage 24 V DC / 6 mA external

**Standby**

Control voltage 24 V DC / 6 mA external

**Threshold value monitoring**

2 alarm values per channel for monitoring absolute value  
2 alarm values per channel for monitoring gradient  
2 alarm values per channel for monitoring bargraphs  
6 internal relays freely assignable to the alarm values  
Output: floating contact  
Contact interference: U<sub>max</sub> 30 V / 100 mA, cosφ = 1  
14 additional relays can be accessed via the external I/O converter

**Event marking**

4 markings possible  
Recording: for 2 %, 5 %, 95 %, 98 % recording width  
Control voltage: 24 V DC / 6 mA external

**External range changeover**

Control voltage 24 V DC / 6 mA external

<sup>1)</sup> Holding time for mains separation within range 85...120 V DC ≥ 2 ms

**Technical data**

**Accounting**

4 accounting channels can be utilized.  
 The accounting interval is externally controlled through a selectable binary input.  
 Control voltage 24 V DC / 6 mA external

**End-of-paper signal**

For speeds  $\geq 120$  mm/h, 2 hours before paper ends.  
 For speeds  $> 120$  mm/h, at least 8 hours before paper ends.  
 Output: freely selectable relay contact.

**General and safety data**

**Environmental capabilities**

Climatic category 3K3 acc. to DIN IEC 721-3-3

Ambient temperature: 0...25...50 °C

Transport and storage temperature: -40...+70 °C

**Relative humidity**

$\leq 75$  % annual average, max. 85 %  
 Avoid condensation. Pay attention to air humidity on recording paper acc. to DIN 16 234

**Mechanical capability**

Tested acc. to DIN IEC 68-2-27 and DIN IEC 68-2-6

**During transportation**

Shoc 30 g/18 ms; Vibrations 2 g/5...150 Hz

**During operation**

Vibrations 0.5 g /  $\pm 0.04$  mm / 5...150 Hz / 3 x 2 cycles

**Electromagnetic compatibility**

The safety requirements stated in the EMC directive 89/336/EWC are fulfilled in respect of radio interference immunity suppression acc. to EN 55 011 and in respect of interference immunity to drafted prEN 50 082-2

Radio interference suppression acc. to EN 55 011

Limit value class B  
 Postal Office Directive 243/92

**Interference immunity**

Tested acc. to IEC 801 / EN 60 801

Type of test	Test intensity	Effect	Severity
Burst (5/50 ns) on mains line measuring line	2 kV	$\leq 1$ %	3
	1 kV	$\leq 1$ %	3
Surge (1.2/50 $\mu$ s) on mains line common differential	2 kV	$\leq 1$ %	3
	1 kV	$\leq 1$ %	2
HF field radiated 80 MHz...1 GHz conducted 0.15...80 MHz	10 V/m	$\leq 1$ %	3
	10 V	$\leq 1$ %	3
1 MHz pulse on mains line common differential	2 kV	$\leq 1$ %	3
	1 kV	$\leq 1$ %	3
ESD (1/30 ns)	6 kV	$\leq 1$ %	3

The NAMUR industrial standard EMC are met.  
 (Interface lines shielded)

**Permissible parasitic voltages**

	Standard version	Universal version
Serial parasitic voltage Peak to peak	$< 0.3 \times \text{span}$ max. 3 V	$\leq 3 \times \text{span}$ max. 3 V
Normal mode rejection	35 dB	72 dB
Common mode parasitic voltage	60 V DC 42 V AC	60 V DC 42 V AC
Common mode suppression	75 dB	121 dB

**Electrical safety**

Tested to DIN EN 6 010-1 (classification VDE 0411) or IEC 1010-1

Class of protection: I

**Overvoltage category**

III at mains input  
 II at inputs and outputs

Degree of pollution: 2 within the device and at the terminals

**Test voltage**

3.75 kV measuring channels against power supply  
 2.20 kV earthing conductor against power supply

**Functional extra-low voltage (PELV)**

between mains input – measuring channels, control lines, interface lines  
 to VDE 0100 part 410 and VDE 0106 part 101

Tested acc. to UL 3111-1 and CAN/CSA-C.22.2 No.1010.1

**Connection, housing and mounting**

**Electrical connections**

Degree of protection IP 20  
 Screw-plug terminals for signal inputs, control inputs and alarm relay outputs  
 Max. wire cross-section 2 x 1 mm<sup>2</sup>  
 Screw terminals for mains connection  
 Max. wire cross-section 1 x 4 mm<sup>2</sup> or 2 x 1.5 mm<sup>2</sup>  
 RS 485 interface via 9-pin SUB-D connector

**Housing**

Steel plate for panel and mosaic panel field mounting (dimensions see dimensional drawing)

**Degree of case protection acc. to IEC 529**

Front IP 54; Rear IP 20

**Case colour**

Pebble grey to RAL 7032 (H&B design)  
 or grey-white to RAL 9002 (ABB design)

**Case door**

Moulding material  
 Option: metal frame door with glass (H&B design)  
 or metal frame door with plastic window (ABB design)

**Case mounting**

with 2 fasteners (optionally for panel or mosaic panel field mounting) for max. mosaic grid width of 40 mm, centering brackets required for mosaic panel field mounting, see Code-No. 605

**Mounting orientation**

lateral (-30°...0...+30°), inclination towards the back 20°, towards the front 20°

**Technical data**

Mounting distance  
horizontal or vertical 0 mm, case door must open at 100°

Weight  
approx. 5 kg

**Default settings**

**Scale with graduation 0...100 per measuring system**  
will be supplied if no scale is defined on ordering

**Setting basic parameters**

If no individual parameter-setting is requested when a recorder is ordered, the LineMaster 300 is supplied with the following parameter setting:

- All measuring channels with measuring range 0...20 mA
- Speed 1: 20 mm/h
- Speed 2: 120 mm/h
- Alarm values are set at end positions (0 and 20 mA)
- Measured value damping, zoom, printer and alarm value functions are deactivated
- No password assigned

These parameter settings can be initialized at any time with the recorder in service mode

**Relevant standards**

**A) International standards**

- IEC 68-2-6 Mechanical stress capabilities (Vibrations)
- IEC 68-2-27 Mechanical stress capabilities (Shoc)
- IEC 225-4 1 MHz pulse on mains line
- IEC 529 IP types of protection
- IEC 721-3-3 Environmental capabilities
- IEC 742 Safety transformers
- IEC 880 Software development
- IEC 100-4 Electromagnetic immunity (measuring method)
- IEC 1010-1 Safety regulations for process instruments
- IEC 1143-1 Class accuracy
- EN 50 081-1 Electromagnetic parasitic radiation in living quarters
- EN 50 081-2 Electromagnetic parasitic radiation in industrial areas
- EN 50 082-1 Electromagnetic parasitic radiation in living quarters
- EN 50 082-2 Electromagnetic parasitic radiation in industrial areas
- EN 55 011 Interference suppression ISM units
- EN 60 873 Process recorders
- EN 132400 Solid capacitors (Y-capacitors)

**B) US standards**

UL 3111-1 Process Control Equipment

**C) Canadian standards**

CAN/CSA C22.2 Safety Requirements for Electrical Equipment  
No.1010.1

**D) German norms**

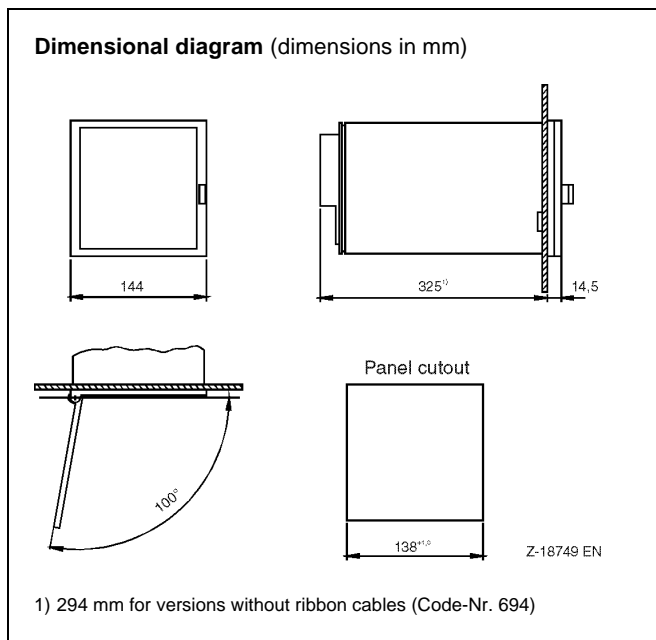
DIN 16 230 Recording chart  
DIN 24 420 Layout of spare part list  
DIN 43 802 Scales  
DIN 43 834 Instrument fastening

DIN VDE 0100-410 Protect. against dangerous shoc currents  
DIN VDE 0106-101 Basic requirements for electrical isolation

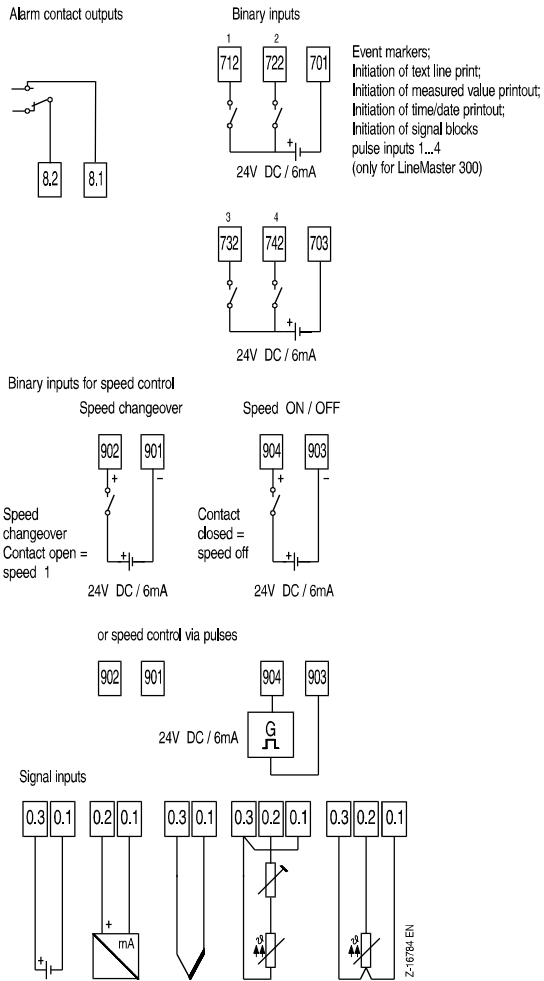
**Basic supply** (part of delivery scope)

- 1 Operating Manual
- 2 Fastening elements
- 1 Roll chart or folded package, already placed in unit
- 1 Fibre-tip recording pen per measuring channel
- 1 Ink head (for recorder version with printer channel)

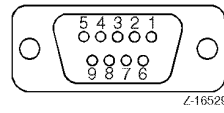
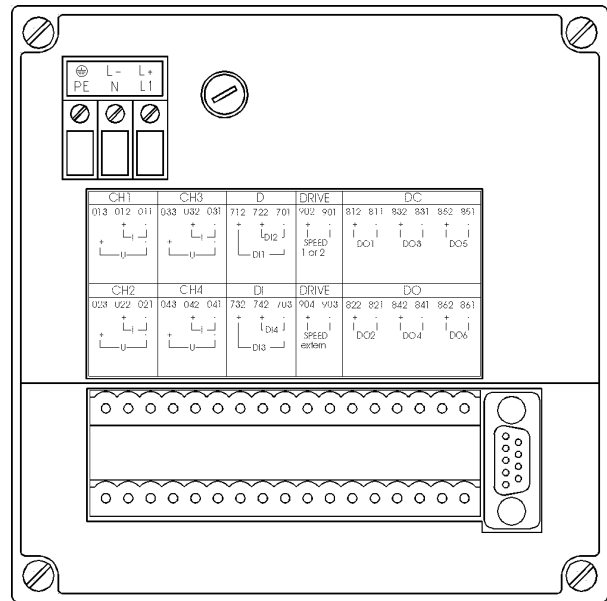
Additionally, according to order:  
Centering brackets for mosaic panel field mounting, ruler(s)



Connection diagrams



Connection diagram LineMaster 300



RS 485 interface

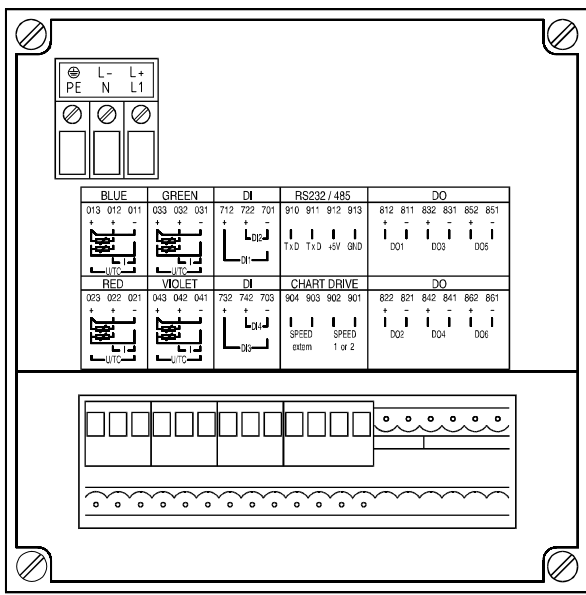
- Pin 1: Shield
- Pin 3: RXD (+)
- Pin 4: I/O converter (+)
- Pin 5: Gnd (reference potential)
- Pin 6: +5 V
- Pin 8: RXD (-)
- Pin 9: I/O converter (-)

For bus operation:

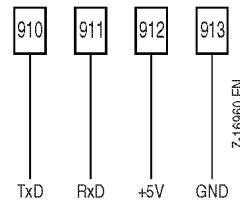
The voltage +5 V on Pin 6 is required if the LineMaster 300 is used as a bus terminal unit.

The shield is mounted on a plug-in terminal on the recorder housing.

Connection diagram LineMaster 300 (Type Minicomp MK) for versions to KTA 3503



Interface RS 232C / 485



Ordering information									
					Catalog No				
<b>Continuous-line Recorder LineMaster 300</b> Standard colour RAL 7032 (pebble grey)					<b>V43422A-</b>				
<b>Version</b>					Sc. height				
LineMaster 341	with 1 line channel	5mm	A						
LineMaster 342	with 2 line channels	5mm	B						
LineMaster 343	with 3 line channels	5mm	C						
LineMaster 344	with 4 line channels	5mm	D						
LineMaster 342 P	with 1 line channel + printer channel	5mm	F						
LineMaster 343 P	with 2 line channels + printer channel	5mm	G						
LineMaster 344 P	with 3 line channels + printer channel	5mm	H						
LineMaster 331	with 1 line channel	7.5 mm	I						
LineMaster 332	with 2 line channels	7.5 mm	J						
LineMaster 333	with 3 line channels	7.5 mm	K						
LineMaster 332 P	with 1 line channel + printer channel	7.5 mm	M						
LineMaster 333 P	with 2 line channels + printer channel	7.5 mm	N						
LineMaster 321	with 1 line channel	13.4 mm	O						
LineMaster 322	with 2 line channels	13.4 mm	P						
LineMaster 322P	with 1 line channel + printer channel	13.4 mm	R						
<b>Measuring range</b>									
Standard: 0/4...20 mA and 0...10 V for all channels					1				
Universal: Direct current, direct voltage, thermocouples, Pt 100 (2- and 3-wire circuit)					2				
LineMaster 341, 331, 321					3				
LineMaster 342, 332, 322, 342P, 332P, 322P					4				
LineMaster 343, 333, 343P, 333P					5				
LineMaster 344, 344P									
<b>Power supply</b>									
24...48 V UC / ...60 V DC					1				
110...230...240 V UC / ...300 V DC					5				
<b>Recording</b>									
on roll chart paper (64 m)					3				
<b>Case<sup>1)</sup></b>									
RAL 7032 with moulded door, H&B design					1				
RAL 7032 with metal frame door (glass window), H&B design					3				
RAL 9002 with metal frame door (plastic window), ABB design					4				
<b>Parameter definition</b>									
Standard					1				
as specified					2				
<b>Alarm value monitoring and binary inputs</b>									
without					0				
with					1				

Continuation next page

<sup>1)</sup> H&B design with CE-Approval, ABB design with additional UL-Approval

Ordering information					
				Code	
Create the required Code No. for each channel					
<b>Line channel</b>					
for measuring channel blue				4	
for measuring channel red				5	
for measuring channel green				6	
for measuring channel violet				3	
<b>Scale graduation</b> (without ruler)					
(character height 2 mm, Scale height 5 mm)					
(character height 3 mm, Scale height 7.5 mm)					
(character height 5 mm, Scale height 13.4 mm)					
Graduation:					
without (start and end marked)					0
0...100					1
as specified (clear text)					2
2 graduations on 1 scale (only possible for scale height 13.4 mm)					
numeral height for 1st graduation 3 mm; for 2nd graduation 2 mm)					
				4	7
<b>Ruler</b>					
as scale graduation					
				4	9
<b>Labelling of the tag name plate</b>					
Character height 3 mm (max. 64 characters per tag)					
for channel blue (clear text)				5	7 5
for channel red (clear text)				5	7 8
for channel green (clear text)				5	8 2
for channel violet (clear text)				5	7 2
<b>Case colour</b>					
RAL 7037 (pebble grey)					
				6	1 1
RAL 9005 (black)					
				6	1 2
<b>Design</b>					
version without flat strip cable (between insert module and power supply)					
				5	9 0
prepared for upgrade to 4 measuring systems, standard version					
				6	1 8
prepared for upgrade to 4 measuring systems, universal version					
				6	1 9
with compact connector for main and measuring lines					
				6	2 0
<b>Accessories</b>					
4 centering brackets (for rack mounting)					
				6	0 5
<b>Case version</b>					
Portable version:					
Degree of protection IP 20 (with 2 m connection cable for power supply) <sup>1)</sup>					
				6	2 4
neutral version					
				6	9 5
<b>Clock buffering</b>					
lithium battery					
				6	2 9
<b>Operating Manual<sup>2)</sup></b>					
German (pieces)					
				Z	2 D
English (pieces)					
				Z	2 E
French (pieces)					
				Z	2 F
<b>Certificates</b>					
Constructor's test certificate M acc. to DIN 55350-18-4.2.2					
and inspection certificate B acc. to EN 10204-3.1B					
				6	9 9

\*) The three-digit Code Numbers should be appended to the Catalog Number - separated by a slash

<sup>1)</sup> Only for version without flat strip cable, Code No. 590

<sup>2)</sup> 1 copy on german included in scope of delivery; No. specific order required; a charge will be made for additional copies of the Operating Manual (please specify number required)



Consumables				
	Catalog No.			
<b>Fibre-tip insert for LineMaster 34.</b> violet blue red green	43482-0319134 43482-0319133 43482-0319132 43482-0319131			
<b>Fibre-tip insert for LineMaster 34.P</b> blue red green	43482-0319133 43482-0319132 43482-0319131			
<b>Fibre-tip insert for LineMaster 33.</b> blue red green	43482-0319165 43482-0319167 43482-0319168			
<b>Fibre-tip insert for LineMaster 33.P</b> blue red	43482-0319195 43482-0319196			
<b>Fibre-tip insert for LineMaster 32.</b> blue red	43482-0319165 43482-0319166			
<b>Fibre-tip insert for LineMaster 32.P</b> blue	43482-0319197			
<b>Ink head</b> (for printer channel) (same for all versions "with printer")	43481-0319135			
<b>Roll chart paper (64 m)</b> (only supplied in packs of 10) graduation 0...100, with hourly time imprint for 20 mm/h graduation 0...100, without time imprint; with baselines	40920-0001530 40920-0001130			

Other chart paper see Data Sheet 49-9.10 EN