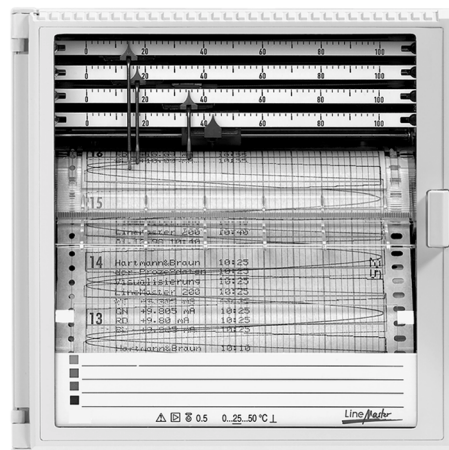


10/43-2.10 EN



- 1 to 4 measuring channels
- With text printout (optionally)
- Format 144 mm x 144 mm; installed depth 250 mm
- Multi-function desk for continuous rollpaper (32 m) or fanfold paper (16 m)
- RS 485 interface for configuration and measuring data readout (H&B-device bus, MODBUS)
- Measuring channels electrically isolated and ungrounded
- 2 limit alarms per channel
- 2 event markers

The LineMaster 200 is a microprocessor-controlled continuous-line recorder. It is supplied in two different versions:

- 1 to 4 measuring channels
- 2 to 4 measuring channels with text printout

For version with text printout, the text is printed out on the violet channel. This measuring channel is excellently suitable for recording gradually changing variables such as temperature, level, etc. Recording is effected as a multipoint line with equidistant spacing (creates a closed curve).

The recorder is connected to a transmitter and/or directly to such primary elements like thermocouples or resistance thermometers.

The recorder is matched to the measuring task by means of the software. The parameter is defined using the key panel or the PC together with the parameter definition program PARALINE 200 via the RS 485 port. An extra matching hardware is required for the version "universal measuring range".

Additional functions like text printout and event markings increase the inflow of information on the logged process variables. Alarm signalling and remote control help to make the LineMaster 200 a versatile device.

Technical data

Measurement component

Error limit acc. to IEC 484, referred to the nominal range
 LineMaster 200 class 0.5
 LineMaster 200P class 0.5 for measuring channel blue, red and green
 class 1 for violet measuring channel
 Where lower-range value and/or upper-range value shifted, additionally
 $\pm (0.1\% \times \frac{\text{nominal range}}{\text{scale span}} - 0.1)$
 Dead zone: 0.25 % of scale span
 Response time: 2 s
 Measured value damping
 with 1st-order low-pass; time constant 0...60 s per measuring channel, parameterizable

Measurement variable / nominal ranges

Standard version

Direct current
 0...20 mA; R_i approx. 50 Ω
 4...20 mA; R_i approx. 50 Ω
 ± 20 mA; R_i approx. 50 Ω
 Direct voltage
 ± 10 V, R_i = 1 MΩ

Universal version

Direct current
 0...20 mA; R_i approx. 50 Ω
 4...20 mA; R_i approx. 50 Ω
 ± 20 mA; R_i approx. 50 Ω
 Direct voltage
 ± 75 mV, R_i ≥ 2 MΩ
 ± 20 V, R_i > 200 kΩ
 Thermocouples, R_i ≥ 2 MΩ
 Type B 100...+1820 °C
 Type E 0...+1000 °C
 Type J 0...+1200 °C
 Type K 0...+1372 °C
 Type L 0...+ 900 °C
 Type N 0...+1300 °C
 Type R 0...+1769 °C
 Type S 0...+1769 °C
 Type T 0...+ 400 °C
 Type U 0...+ 600 °C

Reference junction internally or externally parameterizable, sensor monitoring parameterizable

Resistance thermometers

Pt 100 in 2- or 3-wire circuits
 -50...+500 °C, -50...150 °C
 Line resistance max. in 2-wire circuit: 10 Ω
 3-wire circuit: 40 Ω

Measuring ranges

Lower-range value of 0...80 % of respective nominal range parameterizable
 Span of 20...100 % of respective nominal range parameterizable
 Root-extraction function in direct current and direct voltage nominal ranges parameterizable

Effects

Temperature
 $[\pm 0.2 + (0.05 \times \frac{\text{nominal range}}{\text{scale span}} - 0.05)] \% / 10 \text{ K}$
 ± 1 °C / 10 K for internal reference junction correction
 Reference temperature 25 °C
 Supply voltage
 0.1 % for 24 V, -25 % ... 85 V, +10 % UC
 0.1 % for 95 V, -10 % ...240 V, +10 % UC
 Parasitic voltage
 0.5 % of measuring span
 External magnetic field 1 mT
 0.5 % of measuring span
 Mechanical capability
 during and after effect ± 0.5 % of measuring span

Recording

Scale
 one graduation depending on measuring system
 Scale plate width: 5 mm
 Character size: 2 mm
 Operating and display panel (only for parameter-setting)
 Display
 5-digit 7-segment display
 Character size 4 x 7 mm
 Operation with 3 keys

Recording

Arrangement of measuring elements and colour assignment:

Version without printer channel

LineMaster 200	Number of line channels			
	1	2	3	4
green			x	x
red		x	x	x
blue	x	x	x	x
violet				x

LineMaster 200P

	Number of line channels		
	1	2	3
green			x
red		x	x
blue	x	x	x
violet (text printout)			

Trend recording

Fibre-tip recording pen with reservoir,
 distance between tips of fibre-tip recording pens 2 mm
 capacity approx. 1.4 ml, trace length approx. 1300 m

Printing

In addition to trend recording, the violet measuring channel can be used to printout texts.
 Trace spacing between the green, red and blue channels: 2 mm.
 Trace spacing between the blue and violet channels: 6 mm.
 The measured value of the violet channel is recorded in the form of a multipoint line with equidistant spacing.
 Ink reserve of the print head is 1.5 x 10⁶ dots approx.

Technical data

Text printing for:

1. Eight text lines with 16 characters each.
A time printout is appended to each text line. Initiation, cyclic, at parameterizable intervals or event-dependent by way of internal alarm values or external actuation (binary inputs).
2. Printout, paper feed, date and time
Initiation when recorder is switched on and on paper feed switchover.
3. Printout of time and date
Initiation cyclic, at parameterizable intervals or event-dependent by external actuation.
4. Printout of current measured values.
Initiation cyclic, at parameterizable intervals or event-dependent by internal/external actuation.
5. Printout of double lines allocated to measuring points.
First line: Scaling line with channel identification and printout of unit.
Second line: Measuring point-specific text with max. 32 characters.
6. Listing of all active parameters.
Initiation manual in parameter-setting mode.

Text printing

Only possible at paper feeds ≤ 240 mm/h

Font size

Approx. 1.5 x 2 mm

Chart speed

0/2.5/5/10/20/30/60/120/240/300/600/1200 mm/h
external changeover for optional speed

Charts

32 m roll chart or 16 m fouled chart

Visible chart length

60 mm

Recording width

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

Chart feed-in (with continuous rollpaper)

via automatic take-up reel
(daily chart tear-off or take-up of 32 m possible)

Power supply

Power supply unit

95 V, -10 % ... 240 V, +10 % UC
24 V, -25 % ... 85 V, +10 % UC
Frequency range: 47.5...63 Hz
Power consumption:
at max. complement approx. 20 W / 25 VA

RS 485 interface

- a) for parameter-setting
- b) link to higher-order systems for bidirectional data transmission.
The data protocol is based on the PROFIBUS standard.

Options

Alarm value monitoring

2 alarm values per channel for absolute value monitoring
4 internal relays can be freely assigned to the alarm values

Output

Floating contact (the contacts are interconnected)

Contact load

30 VA/100 mA; $\cos\phi \geq 0.5$ (only permissible for connection of functional extra-low voltage circuits)

Event marking (only version with printer channel)

2 markers possible
Recording at approx. 2 % and 5 % recording width
Control voltage 24 V DC/6 mA external

External speed changeover

Control voltage: 24 V DC/6 mA external

Standby function

Control voltages: 24 V DC/6 mA external

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

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

Mechanical capabilities

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

In operation

Vibrations 0.5 g / ± 0.04 mm / 5...150 Hz / 3 x 2 cycles

Electromagnetic compatibility

The protection objectives of the EMC regulation 89/336/EEC on interference suppression acc. to EN 55 011 and regarding interference immunity acc. to EN 50 082-2 are met.

Radio interference suppression acc. to EN 55 011

Limit value class B

Postal Office Directive 243/92

Technical data

Interference immunity: Tested acc. to IEC 801

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

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

Permissible parasitic voltages

	Standard version	Universal version
Serial parasitic voltage Peak to peak	< 0.3 x span max. 3 V	≤ 3 x span max. 3 V
Normal mode rejection	35 dB	35 dB
Common mode parasitic voltage	60 V DC 250 V AC	60 V DC 250 V AC
Common mode suppression	83 dB for DC 96 dB for AC	83 dB for DC 96 dB for AC

Electrical safety

Tested to DIN EN 61 010-1 (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
- Threaded-head terminals for measuring inputs, control inputs and alarm value relay outputs.
- Max. wire cross-section 2 x 1 mm²

Screw terminals for mains connection

- Max. wire cross-section 1 x 4 mm²
- RS 485 interface via 9-pin SUB-D connector

Housing

- Moulded plastic 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°

Mounting distance

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

Weight: approx. 3.5 kg

Setting basic parameters

If no individual parameter-setting is requested when a recorder is ordered, the LineMaster 200 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
- Speed 3: off
- 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

Basic standards

A) International standards

IEC 484	DIN 43 782	Compensation recorders
IEC 1010-1	DIN EN 61 010-1	Electrical safety (Test voltages)
IEC 664	VDE 0110	Insulation class
IEC 68-2-6	DIN IEC 68-2-6	Mechanical capabilities (Vibrations)
IEC 68-2-27	DIN IEC 68-2-27	Mechanical capabilities (Shoc)
IEC 529	DIN 40 050	Degree of protection
IEC 801	DIN VDE 0843	Immunity to electro-magnetic interference against electromagnetic influences
EN 60 801		
IEC 721-3-3	DIN IEC 721-3-3	Environmental capabilities
IEC 742	DIN EN 60 742	VDE 0551 classification
		Safety transformer

Technical data

B) US standards

UL 3111-1 Process Control Equipment

C) Canadian standards

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

D) German standards

DIN 16 234 Recording paper
 DIN 43 802 Scales
 DIN 43 831 Cases

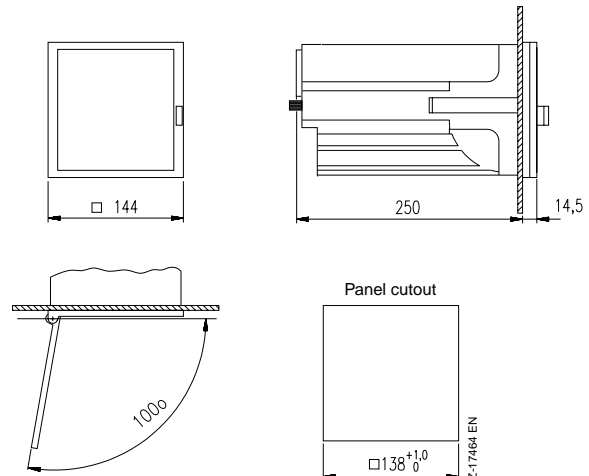
Basic supply (part of delivery scope)

- 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)

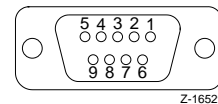
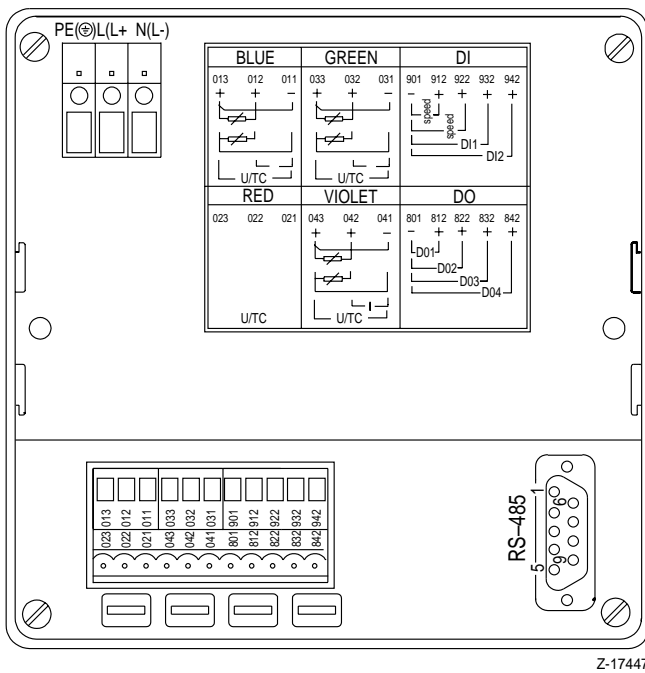
Additionally, according to order:

Centering brackets for mosaic panel field mounting, ruler(s)

Dimensional diagram (dimensions in mm)



Connection diagrams



RS 485 interface

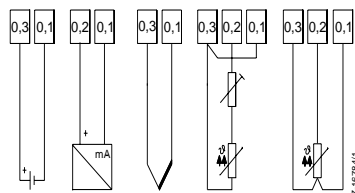
- Pin 1: Shield
- Pin 3: RXD (+)
- Pin 5: Gnd (reference potential)
- Pin 6: + 5 V
- Pin 8: RXD (-)

For bus operation:

The + 5 V voltage on Pin 6 is required when the LineMaster 200 is used as a bus terminal unit.

The shield is located against a blade-type terminal located on the recorder case.

Signal inputs



Limit alarm values

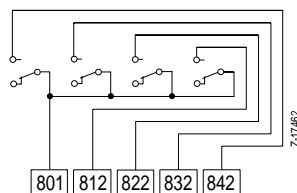
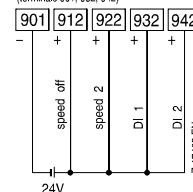


Chart speed changeover (terminals 901, 912, 922)
 Binary inputs =
 Depending on the parameter definition
 for event markers – initiation text printout
 (terminals 931, 932, 942)



Ordering information									
		Catalog No				Code			
Continuous-line Recorder LineMaster 200 Standard colour RAL 7032 (pebble grey)		V43011A-							
Version									
LineMaster 201	1 measuring channel	1							
LineMaster 202	2 measuring channels	2							
LineMaster 203	3 measuring channels	3							
LineMaster 204	4 measuring channels	4							
LineMaster 202P with text printout	2 measuring channels	5							
LineMaster 203P with text printout	3 measuring channels	6							
LineMaster 204P with text printout	4 measuring channels	7							
Measuring range									
Standard: 0...20 mA; 4...20 mA; ± 20 mA and ±10 V for all channels		1							
Universal: Direct current, direct voltage, thermocouples, Pt 100 (2- and 3-wire circuit) for 1 measuring channel		2							
for 2 measuring channels		3							
for 3 measuring channels		4							
for 4 measuring channels		5							
Power supply									
95 V...240 V AC/DC		5							
24 V...85 V AC/DC		6							
Recording									
on rolled chart paper (32 m)		1							
on folded chart paper (16 m)		2							
Case¹⁾									
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							
Parameter definition²⁾									
Standard		1							
as specified		2							
Alarm monitoring and binary inputs									
without		0							
with		1							
Create the required Code No. for each channel									
Line channel									
for measuring channel blue		3							
for measuring channel red		4							
for measuring channel green		5							
for measuring channel violet		6							
Scale graduation (character height 2 mm, Scale height 5 mm)									
without		4	0						
0...100		4	1						
as specified (clear text)		4	2						
acc. to MVO specifications (in connection with Code No. 627) (clear text)		4	4						
Ruler									
as scale graduation		4	9						

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

¹⁾ H&B design with CE-Approval, ABB design with additional UL-Approval

²⁾ If user-specific parameter definition: parameter definition software and adapter set see Data Sheet 41-2.15 EN

Additional Ordering information				
	Code			
Labelling of the tag name plate				
Character height 3 mm (max. 64 characters per tag)				
for channel blue (clear text)	5	7	2	
for channel red (clear text)	5	7	5	
for channel green (clear text)	5	7	8	
for channel violet (clear text)	5	8	1	
Case colour (for H&B design only)				
RAL 7037 (pebble grey)	6	1	1	
RAL 9005 (black)	6	1	2	
Design				
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	
Special versions				
version for heater plants acc. to MVO (German Milk Regulation)	6	2	7	
MVO parameterization 1 (short-term heating)	D	E	1	
MVO parameterization 2 (high temperature heating)	D	E	2	
Accessories				
4 centering brackets (for rack mounting)	6	0	5	
Surface mounting console for wall mounting	6	0	1	
Case version				
Portable version:				
type of protection IP 54	6	2	4	
type of protection IP 20 (with 2 m connection cable for power supply)	6	2	5	
neutral version	6	9	5	
Clock buffering				
lithium battery	6	2	9	
Operating Manual¹⁾				
German (pieces)	Z	2	D	
English (pieces)	Z	2	E	
French (pieces)	Z	2	F	
Certificates				
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	

¹⁾ The three-digit Code Numbers should be appended to the Catalog Number - separated by a slash

¹⁾ 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.			
Fibre-tip insert for LineMaster 200				
violet	43482-0319134			
blue	43482-0319133			
red	43482-0319132			
green	43482-0319131			
Fibre-tip insert for LineMaster 200P				
blue	43482-0319133			
red	43482-0319132			
green	43482-0319131			
Ink head (for printer channel)	43481-0319135			
Roll chart paper (only supplied in packs of 10)				
graduation 0...100, with hourly time imprint for 20 mm/h	V40920-3000505			
graduation 0...100, without time imprint; with baselines	V40920-3000150			
Folded chart paper (only supplied in packs of 10)				
graduation 0...100, with hourly time imprint for 20 mm/h	V40926-3000502			
graduation 0...100, without time imprint; with baselines	V40926-3000103			

Other chart paper see Data Sheet 49-9.10 EN

