PointMaster 200

Multipoint Recorder

10/41-2.10 EN

- **6 Measuring channels**
- **Last dot visible from the front**
- **With text printout**
- **Measuring channels electrically isolated and ungrounded**
- **Connection of process signals, thermocouples and resistance thermometers**
- **Format 144 mm x 144 mm; installed depth 250 mm**
- **Combined chart unit for roll chart (32 m) or folded chart paper (16 m)**
- **Interface RS 485 for configuration and measuring data readout/write**
- **2 alarm values per measuring channel**
- **Report function**
- **4 event markers**

The PointMaster 200 is a microcontroller-based multipoint recorder which is available in three different versions:
– Scale version with 1 to 6 graduations
– LC display version
– LED display version.

The recorder can be connected to transmitters and/or attached directly to thermocouples or resistance thermometers.

The recorder is tailored to the given measuring task by means of software using an internal key pad or a PC with PARAPOINT 200 parameterization program connected via the RS 485 interface.

Additional functions such as the text printout function, the balance sheet function and the use of event markings enhance the information value of the logged process variables. Alarm signalling and remote control features contribute to make the PointMaster 200 a highly versatile instrument. The standby function supports triggered recording.

Technical data

Measuring section

Deviation
Class 0.5 acc. to IEC 484, referred to nominal range

Additionally, if location of start and/or end of measurement changes:

$$\pm (0.1\% \times \frac{\text{nominal range}}{\text{scale span}} - 0.1)$$

Dead zone
0.25 % of scale span

Response time
1 s

Print cycle time for all channels
3...360 s, variable

Measuring value damping
using first-order-low-pass filter; time constant 0...60 s per measuring channel, can be parameterized

Measured variable / nominal measuring ranges

Direct current
0...20 mA, 4...20 mA; R_i approx. 50 Ω
± 2.5 mA; R_i = 50 Ω
± 5 mA; R_i = 50 Ω
± 20 mA; R_i = 50 Ω

Direct voltage
0... 25 mV; ± 25 mV, $R_i \geq 2$ MΩ
0...100 mV; ± 100 mV, $R_i \geq 2$ MΩ
0...500 mV; ± 500 mV, $R_i \geq 2$ MΩ
0...2.5 V; ± 2.5 V, $R_i \geq 200$ kΩ
0...5 V; ± 5 V, $R_i \geq 200$ kΩ
± 10 V, $R_i \geq 200$ kΩ
± 20 V, $R_i \geq 200$ kΩ

Thermocouples, $R_i \geq 2$ MΩ
Type B, E, J, K, L. N, R, S, T, U
The nominal measuring range corresponds to the definition ranges of the selected types.
Reference junction parameters can be entered internally or externally.
Sensor break monitoring can be activated.

Resistance thermometer
Pt 100 in 2- or 3-wire circuit
-50...+150 °C; -50...+500 °C; -200...850 °C
Max. line resistance of
2-wire circuit: 40 Ω
3-wire circuit: 80 Ω

Measuring ranges

Start of measuring range
can be parameterized over 0...80 % of the given nominal range

End of measuring range
can be parameterized over 20...100 % of the given nominal range

Square-root function
can be parameterized for direct current and direct voltage nominal ranges

User linerization
can be parameterized for direct current and direct voltage nominal ranges

Effects

Temperature

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

± 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 0.5 mT
0.5 % of measuring span

With shoc and vibration
± 0.5 % of measuring span during and after the effect

Recording section / measured value display

Scale design

Scale
1 to 6 graduations
Character size for specific number of graduations:

Graduations	1	2	3	4	5	6
Character size (mm)	4	4	4	2	2	2

Channel display
by vertical row of LEDs on left-hand side of scale

Scale/channel assignment
by vertical row of LEDs on right-hand side of scale

Operator and display panel
(behind the chart unit)

Display (for entering parameters only)
5-digit, 7-segment display
Numeral size 4 x 7 mm

Operation
with a function key on the rear of the scale plate and 3 keys behind the chart unit

Display versions

The displays are used in the operation mode to display tag number (single-digit), measured value (5-digit), dimensional unit (7-digit), alarm status.

Parameters and parameter values are displayed in the parameter definition mode.

LC display (illuminated)

Display
16-digit; character size 3.1 x 5.5 mm

Operation
with one function key on the display and 3 keys behind the chart unit

LED display

Display
16-digit; character size 3 x 5 mm

Operation
with 6 keys on the display

Technical data

Recording

Colours
violet, red, black, green, blue, brown
Colour sequence acc. to DIN 43 838
Channel 1 violet
Channel 2 red
Channel 3 black
Channel 4 green
Channel 5 blue
Channel 6 brown
alternatively, can be freely assigned to the channels

Last dot visible from the front
Ink supply ≥ 1 x $10^{6)}$ dots per colour

Recording trends

The measured values are recorded as a dottet line
with equidistant dot spacing

Operating modes
Cyclical mode – process all channels

Recording
all channels are updated during the cycle time

Measured value display
Either one measuring channel continuously or channel stepping from cycle to cycle

External control

Recording
The channels selected externally by DI1...DI6 are recorded, start of recording can be delayed 0...60 s

Measured value display
Channel stepping from cycle to cycle
Option ‘‘Alarm monitoring and binary inputs‘‘ required

Cyclical mode – external signalling

Recording and measured value display
The displayed channel is updated during the cycle time. DO1...DO6 signals that the measuring channel has been through-connected.
Option ‘‘Alarm monitoring and binary inputs‘‘ required.

Event recorder for 10 events

Recording
The start, duration and end of event are recorded as an open square

Display (in the case of display version)
Last event displayed as clear text message
I/O converter required

Cycle time

can be varied between 3...360 s

Text output

only possible with chart speeds ≤ 240 mm/h

Character size
approx. 1.5 x 2 mm

Scope of text output
1. Ten lines of text, each containing either
   max. 32 characters
   max. 30 characters and time
   max. 24 characters and time / date
   Triggered at preset cyclic intervals or in response to events by internal (alarm values) / external initiation (binary inputs)
2. Printout of chart speed, date and time
   Triggered when recorder is switched on and when chart speed is changed
3. Printout of current measured values
   Triggered at preset cyclic intervals or in response to events by internal / external initiation
4. Printout of triple lines assigned to measuring points
   Line 1: scale line with channel designation and printout of measuring unit
   Line 2: text specific to measuring points, max. 54 characters
   Line 3: alarm pointers
5. Printout of balance sheet table comprising:
   Message line
   Start and end times of balance sheet interval
   Min./max. values during the balance sheet interval
   Average and cumulative values or over balance sheet interval
   Triggering: cyclical and external
6. Lists of all active parameters
   Triggered manually in parameter mode

Chart speed

Various speeds can be defined
0/2.5/5/10/20/30/40/60/120/240/300/600/1200 mm/h
Optional: external speed switching and shutdown
Option ‘‘Alarm monitoring and binary inputs / outputs‘‘ required

Chart paper
32 m roll paper or 16 m fanfold

Visible chart length
60 mm

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

Chart feed-in (roll paper)
The start of the paper engages automatically in the take-up reel
(charts torn off daily or 32 m can be wound up)

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: approx. 20 W / 25 VA fully equipped

Technical data

RS 485 interface

a) for entering parameters

b) link to higher-level systems for bidirectional data transfer. The data protocol is based on the PROFIBUS standard.

‘‘Alarm monitoring and binary input‘‘ options

External chart speed switching
Control voltage: 24 V DC / 6 mA external

Standby control voltage: 24 V DC / 6 mA external

Alarm monitoring
2 alarm values per channel for absolute value monitoring
6 internal relays can be freely assigned to alarm values
Output: normally open contact
(The roots of the contacts are interconnected)

Contact loading: 30 V / 100 mA
14 additional relaas available via external I/O converter

Event marking
4 markings are possible
Recording at approx. 2 %, 5 %, 95 % and 98 % recording width
Control voltage: 24 V DC / 6 mA external

Externally controlled recording
Recording of channels selected externally
Control voltage: 24 V DC / 6 mA external

10 event markings
can be used (without measured value recording) via external I/O converter

Balance sheet function
The balance sheet function can be selected for each measuring channel. External control of the balance sheet interval is via a selectable binary input.
Control voltage: 24 V DC / 6 mA external

End-of-paper signal
Chart speeds ≥ 120 mm/h, 2 hours before paper ends
Chart 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 (instrument in use)
≤ 75 % annual average, max. 85 %
Avoid condensation. Observe DIN 16 234 for effect of humidity on chart paper.

Mechanical features

Tested acc. to DIN IEC 68-2-27 and DIN IEC 68-2-6
Transportation: Shoc 30 g/18 ms
Vibrations 2 g/5...150 Hz
In use
Vibrations 0.5 g / ± 0.04 mm / 5...150 Hz / 3 x 2 cycles

Electromagnetic compatibility

The protection objectives of EMC guideline 89/336/EWG as regards radio interference suppression acc. to EN 55 011 and immunity to interference acc. to EN 50 082-2 are met.

Radio interference suppression acc. to EN 55 011
Threshold class B
German Post Office Degree 243/92

Immunity to interference
Test acc. to IEC 801 / EN 60 801

Type of test	Test intensity	Effect	Severity
Burst (5/50 ns) on			
mains line	2 kV	≤ 1 %	3
measuring line	1 kV	≤ 1 %	3
Surge (1,2/50 µs) on 230 V mains line			
common	2 kV	≤ 1 %	3
differential	1 kV	≤ 1 %	2
24 V mains line			
common	1 kV		
differential	0.5 kV		
HF field			
radiated			
80 MHz...1 GHz	10 V/m	≤ 1 %	3
conducted			
0.15...80 MHz	10 V	≤ 1 %	3
1 MHz pulse on			
mains line common	2 kV	≤ 1 %	3
differential	1 kV	≤ 1%	3
ESD (1/30 ns)	6 kV	≤ 1 %	3

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

Permissible parasitic voltages

	Permissible parasitic voltage
Serial parasitic voltage Peak to peak	< 0.3 x measuring span max. 3 V
Normal mode rejection	75 dB
Common mode parasitic voltage	60 V DC / 250 V AC
Common mode suppression	83 dB for DC 96 dB for AC

Technical data

Electrical protection

Tested acc. to DIN EN 61 010-1 (classification VDE 0411)
or IEC 1010-1

Class of protection
I

Overvoltage category
III at mains input
II for inputs and outputs

Degree of pollution
2 in the instrument and at the terminals

Test voltage
3.75 kV measuring channels to power supply
2.20 kV earthing conductor to power supply

Functional extra-low voltage with safe isolation (PELV)
between mains input – measuring channels, control and interface lines
acc. 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, case and mounting

Electrical connections
Degree of protection IP 20
Screw / plug-in terminals for measuring inputs, control inputs and alarm value relay outputs.
Max. wire cross-section 2 x 1 mm^2
Screw terminals for mains connection
Max. wire cross-section 1 x 4 mm^2 oder 2 x 1.5 mm^2
RS 485 interface via 9-pole subminiature connector

Case
Moulded plastic for panel and rack mounting
(see diagram for dimensions)

Type of protection acc. to IEC 529

Front (incl. door)	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 (for either panel or rack mounting)
for max. rack rod width 40 mm, centering brackets required for rack installation, 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

Default settings

Scale with one graduation 0...100
will be supplied automatically if no scale graduation is specified when ordering the recorder

Basic parameters
If no particular parameter definition is given when ordering the recorder, the PointMaster 200 will be 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 to end positions (0 and 20 mA)
Measured value damping and zoom, printer and alarm functions are off
No password defined
These parameter defaults can be initialised at any time when the recorder is 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		Degree of protection
IEC 801	DIN VDE 0843	Immunity to electro-
EN 60 801		magnetic interference
IEC 721-3-3	DIN IEC 721-3-3	Environmental capabilities
IEC 742	DIN EN 60 742	VDE 0551 classification, safety transformer

B) US standards

UL 3111-1	Process Control Equipment

C) Canadian standards

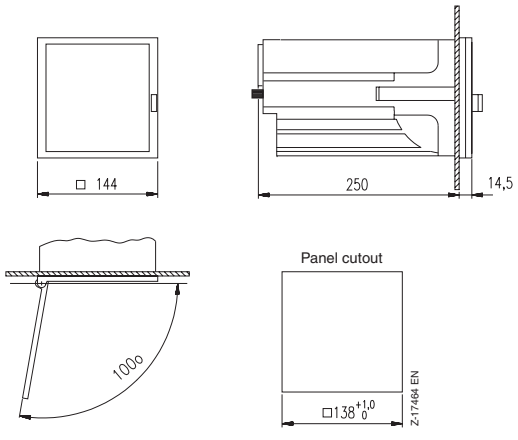
CAN/CSA C22.2 No.1010.1	Safety Requirements for Electrical Equipment

D) German standards

DIN 16 230	Recording chart paper
DIN 43 802	Scales
DIN 43 831	Cases

Initial equipment (part of delivery scope)
1 Operating Manual; 2 Fasteners
1 Rolled or folded chart paper in the device; 1 Ink head
Options, depending on order:
Centering brackets for rack mounting; ruler(s)

Dimensional diagram (dimensions in mm)



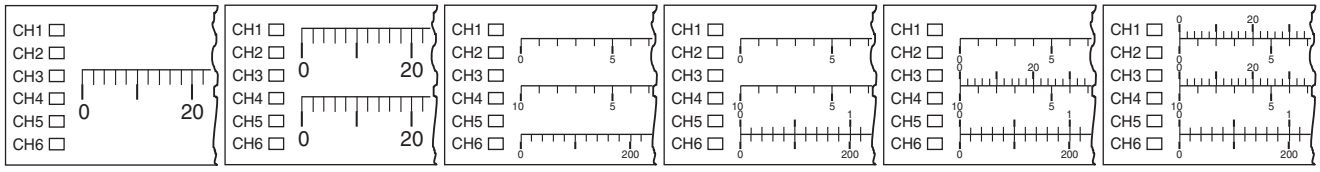
Ordering information

	Catalog No							Code				
Multipoint Recorder PointMaster 200 Standard colour RAL 7032 (pebble grey)	**V41411A-**											
Version												
PointMaster 200 S scale version		1										
PointMaster 200 D1 with LC display		2										
PointMaster 200 D2 with LED display		3										
Measuring range												
Universal version for:												
process signals, thermocouples, resistance thermometers			9									
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							
Case[1]												
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						
Large case format [2] (W x H) 192 mm x 288 mm Front bezel in RAL 9005 (black)						9						
Parameter definition												
Standard							1					
as specified							2					
Alarm monitoring and binary inputs												
without								0				
with								1				
Create the required Code No. for each channel												
Scale												
Character height for 1 and 2 graduations: 5 mm												
Character height for 3, 4, 5 and 6 graduations: 2 mm												
1st graduation (above)								3	1			
2nd graduation								3	2			
3rd graduation								3	3			
4th graduation								3	4			
5th graduation								3	5			
6th graduation (below)								3	6			
without										0		
0...100										1		
as specified (Klartext)										3		
Ruler												
Graduation as scale graduation (scale version)										8		
Graduation as specified (LC/LED display) and scale version when difference										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] Large case format only with roll paper. No design modifications possible.



The scale will appear as one of the figures shown above depending on the number of graduations defined.

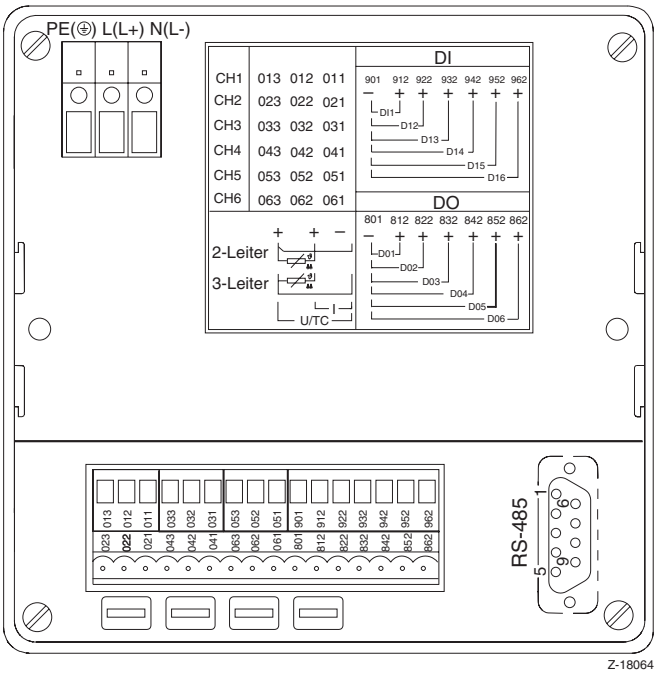
Additional Ordering information						
		Code				
Labelling of the tag name plate						
Character height 3 mm (max. 31 characters per tag)						
for channel 1	(clear text)	5	7	2		
for channel 2	(clear text)	5	7	5		
for channel 3	(clear text)	5	7	8		
for channel 4	(clear text)	5	8	1		
for channel 5	(clear text)	5	8	4		
for channel 6	(clear text)	5	8	7		
Case colour						
RAL 7037 (pebble grey)		6	1	1		
RAL 9005 (black)		6	1	2		
Design						
with compact connector for main and measuring lines		6	2	0		
Accessories						
4 centering brackets (for rack mounting)		6	0	5		
Surface mounting console for wall mounting		6	0	1		
Case version						
Portable version:						
Degree of protection IP 54		6	2	4		
Degree of protection IP 20 (with 2 m connection cable for power supply)		6	2	5		
with lithium battery for time backup						
neutal version		6	9	5		
Operating Manual[1)]						
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		

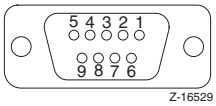
*) The three-digit Code Numbers should be appended to the Catalog Number - separated by a slash

[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 specifiy number required)

Consumables			
	Bestellnummer		
Print head	41481-0319659		
Roll chart paper (only supplied in packs of 10)			
with hourly time imprint for 20 mm/h	40920-3000505		
without time imprint; with baselines	40920-3000150		
Folded chart paper (only supplied in packs of 10)			
with hourly time imprint for 20 mm/h	40926-3000502		
without time imprint; with baselines	40926-3000103		

Connection diagrams



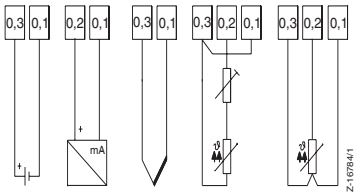


RS 485 interface
Pin 1: Shielding
Pin 3: RXD (+)
Pin 4: I/O converter (+)
Pin 5: Gnd (reference potential)
Pin 6: + 5 V
Pin 8: RXD (–)
Pin 9: I/O converter (–)

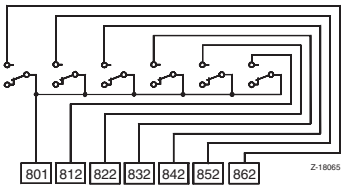
For bus operation:
The + 5 V voltage on Pin 6 is required when the PointMaster 200 is used as a bus terminal unit.

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

Signal inputs



Limit alarm values



Binary inputs
Depending on the parameters for chart speed switching – event marking – releasing text output

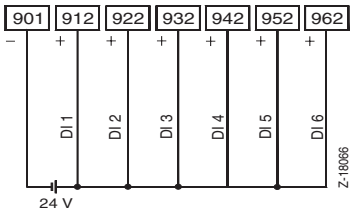


ABB Automation Products GmbH
Höseler Platz 2
D-42579 Heiligenhaus
Phone +49(0)20 56 - 12 51 81
Fax +49(0)20 56 - 12 50 81
http://www.abb.com/automation

Subject to technical changes.
Printed in the Fed. Rep. of Germany
10/41-2.10 EN 01.2000