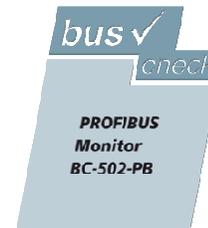


# PROFIBUS Monitor BC-502-PB

Customer Information  
Version 05/02/2013



Softing Industrial Automation GmbH

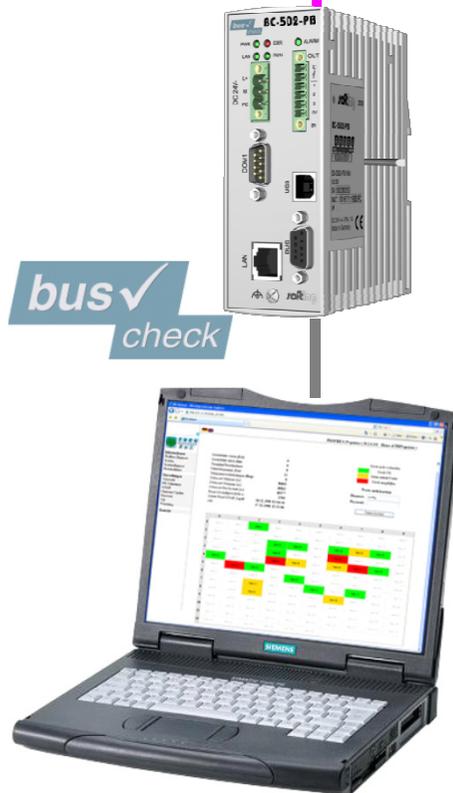
## Overview: permanent monitoring of PROFIBUS DP

- By continuously monitoring all traffic on the bus, the Monitor reliably detects (even slow, initially uncritical) deteriorations in the bus communication that could cause unplanned system downtime.
- If maintenance action is required, the tool automatically alerts the operational staff.
- Based on protocol analyses, the BC-502-PB determines the bus cycle times and monitors the following critical events (quality parameters):
  - Error frames
  - Retries
  - Drop-outs / restarts
  - Device errors (internal/external diagnostics)
- Supports PROFIBUS Protocols DP, DPV1, FMS, MPI
- Baud rates: 9,6 kBit/s – 12 MBit/s

# PROFIBUS Monitor BC-502-PB

## Overview: alerting via PLC/process controller

### PROFIBUS DP

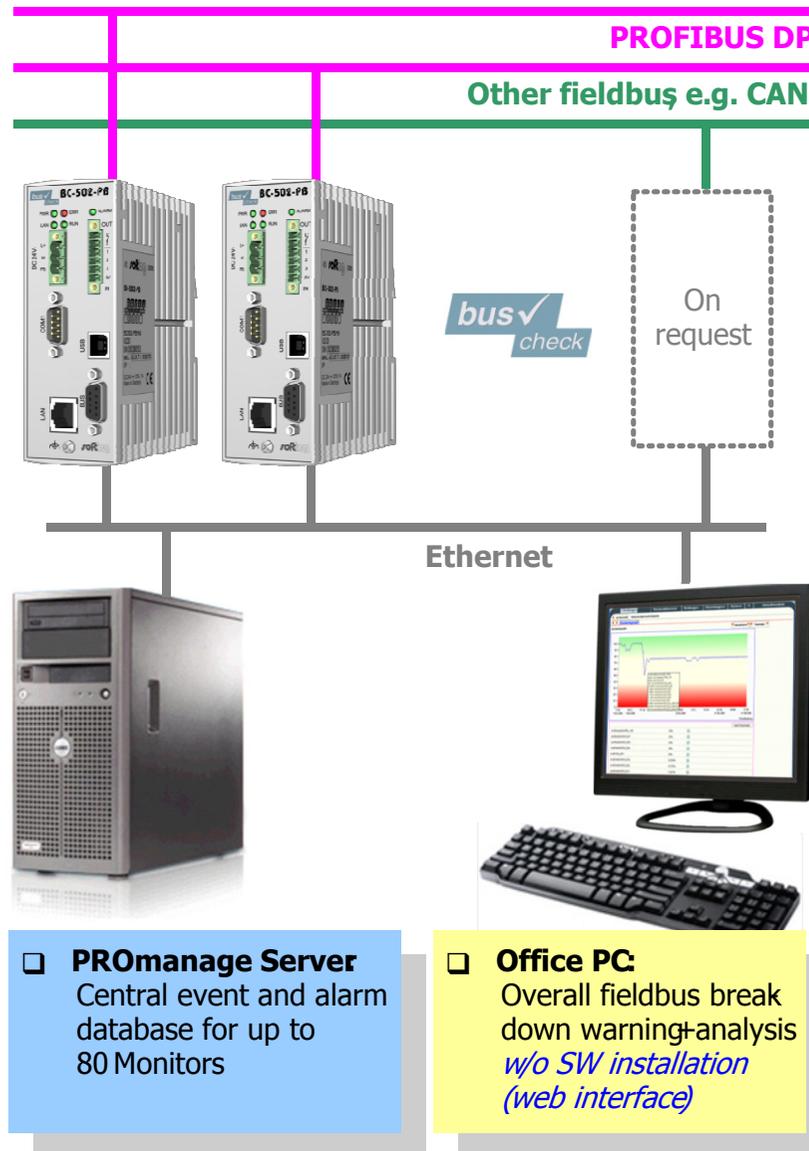


- Alerting:**  
by relay contact
- Control inputs (usage optionally):**  
start/stop trigger  
alarm acknowledgement,  
event counter reset

- Parameterization**
- At alarms:** Diagnosis  
*w/o SW installation*  
*(web interface)*

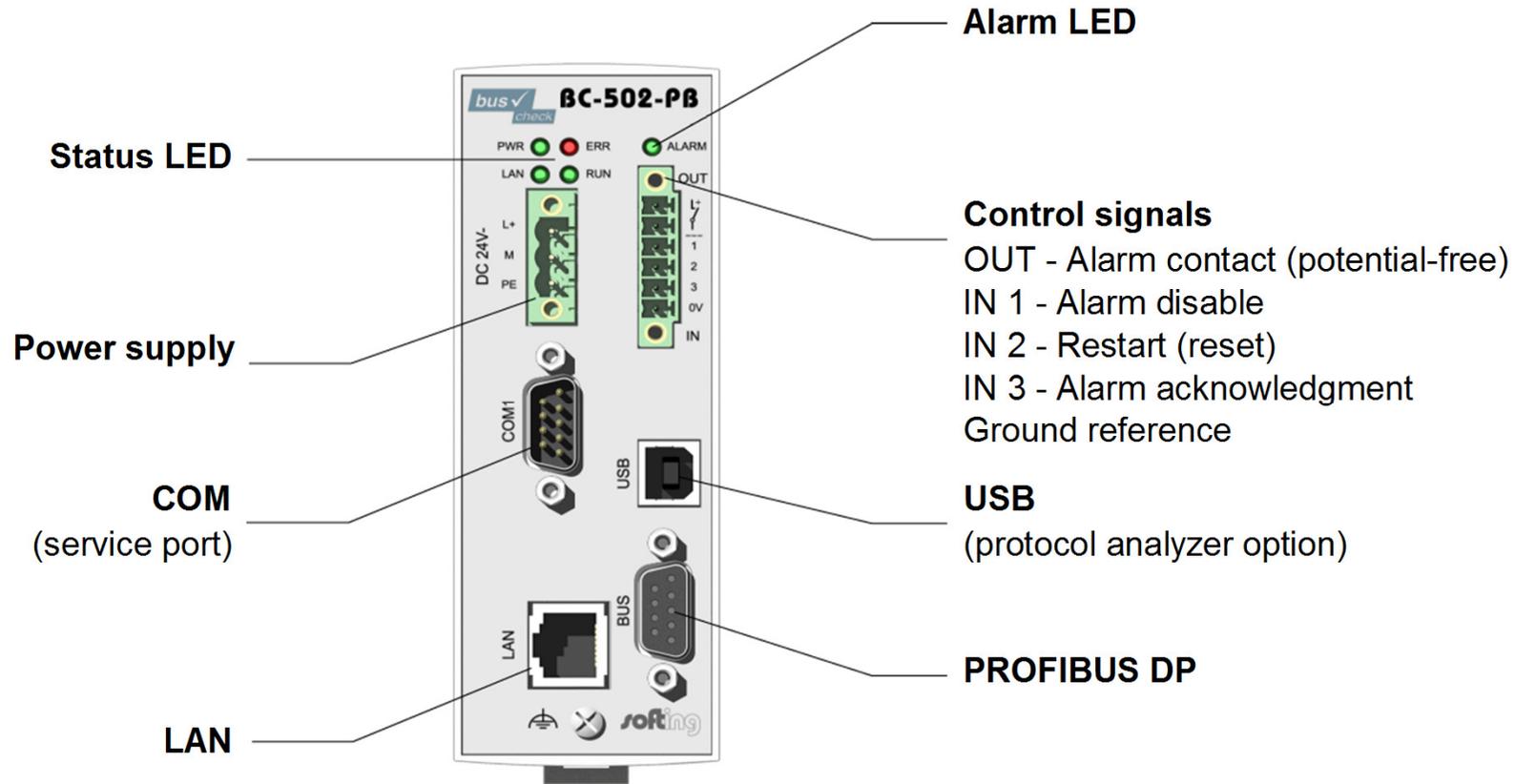
# PROFIBUS Monitor BC-502-PB

## Overview: central data and analysis server



# PROFIBUS Monitor BC-502-PB

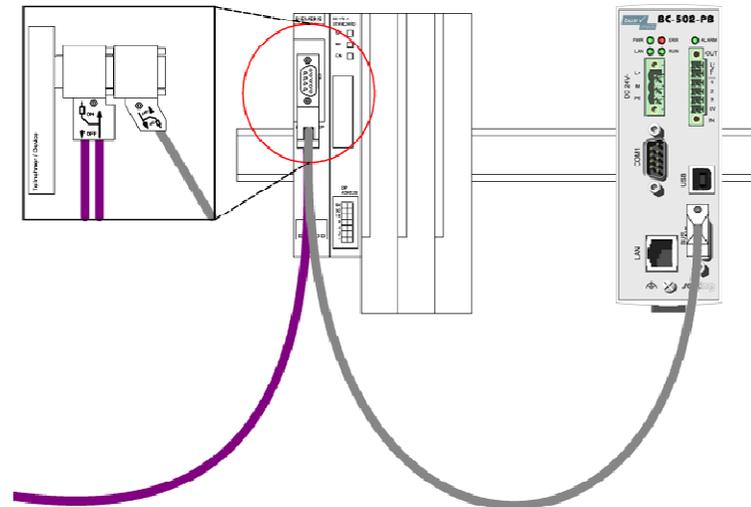
## Connectors and status displays



# PROFIBUS Monitor BC-502-PB

## Connection variants to PROFIBUS DP

### 1. With Active Cable BC-131-PB



### 2. At the bus end

### 3. Loop-in

### Measuring Location:

- ① The PROFIBUS Monitor can basically be connected anywhere on a PROFIBUS DP network. The ideal measuring location is directly at the master or PLC. At this location, the tool can continue to analyze the bus communication even if lines are interrupted.

# PROFIBUS Monitor BC-502-PB

## Commissioning

1. Hat rail mounting (U-rail)
  2. Connect to PROFIBUS DP
  3. Connect to external power supply 24 VDC
- The Monitor initializes, detects baud rate of a connected bus segment automatically and starts measuring operation mode (start-up takes approx. 1 min.)
- At 1st commissioning now the network (LAN) needs to be configured at Monitor and PC - one-time only

**Ready yet!**

# PROFIBUS Monitor BC-502-PB

## Measuring procedure – first steps

- The alerting, alarm contact and snapshot functions are enabled by default, the quality parameter thresholds are set to maximum sensibility.
- If no errors are detected with these settings over a prolonged period of time, you can say with some certainty that the tested bus segment is error-free.
- ① However, to determine segment health with absolute certainty you need to carry out a complete baseline measurement first. You can run this measurement using the PROFIBUS Tester 3 and the BC-400-PB Protocol Analyzer, which also provide you with a comprehensive test report on bus physics and bus communication.
- At error indication:
  - The ERR LED turns red.
  - The potential-free contact closes, the relay clicks audibly.
  - Visualisation via the integrated web interface.

# PROFIBUS Monitor BC-502-PB

## Web interface - start-up and overview page



Measuring Location: Demo DP+PA #1



**BC-502-PB**  
PROFIBUS Monitor®

**Events**



Event / Time Period	Last Minute	Last Period 24h	History 2min
Restart	0	6	6
Internal Diagnostics	0	1	1
External Diagnostics	0	13	13
Error Frames	0	0	0
Max. Retries per Bus Cycle	0	2	2
Total Retries	0	3	3
Condition in %	100	0	0
Bus Cycle Time Min/Mean/Max [ms]	1.43/1.58/1.68	1.29/1.58/1.7	1.29/1.58/1.7
Last SNMP Request	-		

8 Alarms ->>

Baud Rate  
1.5 MBit/s

Device Temperature  
33 °C

Time  
2/25/2013 13:17:18

**PROFIBUS Devices (Most Critical State is Displayed)**

Time Period:

Events:

	0	1	2	3	4	5	6	7	8	9																																				
0	Device 0 4Control Location 0	Device 1 Location 1	MP 310C-RDP Location 2	Device 3 Location 3	Device 4 Location 4	Device 5 Location 5	Device 6 Location 6	Device 7 Location 7	Device 8 ET200 Location 8	Device 9 Location 9																																				
1	Diagn.-Repeater Location 10	Wago 750-333 Location 11	ET200M-SM374 Location 12	Wago 750-333 Location 13	Wago 750-333 Location 14	DP-PA Link Location 15	MPI: PA-Status Location 16	Device 17 Location 17	Device 18 Location 18	Device 19 Location 19																																				
2	BK 3100 Location 20	Device 21 Location 21	Device 22 Location 22	Device 23 Location 23	Address 13 - Wago 750-333 - Location 13			Device 27 Location 27	Device 28 Location 28	Device 29 Location 29																																				
3	Device 30 Location 30	Device 31 Location 31	Device 32 Location 32	Device 33 Location 33	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Event / Time Period</th> <th>Minute</th> <th>Period</th> <th>History</th> </tr> </thead> <tbody> <tr> <td>State</td> <td style="background-color: green;">OK</td> <td style="background-color: red;">Error</td> <td style="background-color: red;">Error</td> </tr> <tr> <td>Drop-out</td> <td>0</td> <td>4</td> <td>4</td> </tr> <tr> <td>Internal Diagnostics</td> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>External Diagnostics</td> <td>0</td> <td>2</td> <td>2</td> </tr> <tr> <td>Error Frames</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Max. Retries per Bus Cycle</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Total Retries</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Condition in %</td> <td>100</td> <td>0</td> <td>0</td> </tr> </tbody> </table>			Event / Time Period	Minute	Period	History	State	OK	Error	Error	Drop-out	0	4	4	Internal Diagnostics	0	1	1	External Diagnostics	0	2	2	Error Frames	0	0	0	Max. Retries per Bus Cycle	0	0	0	Total Retries	0	0	0	Condition in %	100	0	0	Device 37 Location 37	Device 38 Location 38	Device 39 Location 39
Event / Time Period	Minute	Period	History																																											
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Max. Retries per Bus Cycle	0	0	0																																											
Total Retries	0	0	0																																											
Condition in %	100	0	0																																											
4	Device 40 Location 40	Device 41 Location 41	Device 42 Location 42	Device 43 Location 43	Device 44 Location 44	Device 45 Location 45	Device 46 Location 46	Device 47 Location 47	Device 48 Location 48	Device 49 Location 49																																				
5	Device 50 Location 50	Device 51 Location 51	Device 52 Location 52	Device 53 Location 53	Device 54 Location 54	Device 55 Location 55	Device 56 Location 56	Device 57 Location 57	Device 58 Location 58	Device 59 Location 59																																				
6	Device 60 Location 60	Device 61 Location 61	Device 62 Location 62	Device 63 Location 63	Device 64 Location 64	Device 65 Location 65	Device 66 Location 66	Device 67 Location 67	Device 68 Location 68	Device 69 Location 69																																				
7	Device 70 Location 70	Device 71 Location 71	Device 72 Location 72	Device 73 Location 73	Device 74 Location 74	Device 75 Location 75	Device 76 Location 76	Device 77 Location 77	Device 78 Location 78	Device 79 Location 79																																				
8	Device 80 Location 80	Device 81 Location 81	Device 82 Location 82	Device 83 Location 83	Device 84 Location 84	Device 85 Location 85	Device 86 Location 86	Device 87 Location 87	Device 88 Location 88	Device 89 Location 89																																				
9	Device 90 Location 90	Device 91 Location 91	Device 92 Location 92	Device 93 Location 93	Device 94 Location 94	Device 95 Location 95	Device 96 Location 96	Device 97 Location 97	Device 98 Location 98	Device 99 Location 99																																				
10	Device 100 Location 100	Device 101 Location 101	Device 102 Location 102	Device 103 Location 103	Device 104 Location 104	Device 105 Location 105	Device 106 Location 106	Device 107 Location 107	Device 108 Location 108	Device 109 Location 109																																				
11	Device 110 Location 110	Device 111 Location 111	Device 112 Location 112	Device 113 Location 113	Device 114 Location 114	Device 115 Location 115	Device 116 Location 116	Device 117 Location 117	Device 118 Location 118	Device 119 Location 119																																				
12	Device 120 Location 120	Device 121 Location 121	Device 122 Location 122	Device 123 Location 123	Device 124 Location 124	Device 125 Location 125	Device 126 Location 126																																							

Overview

Alarm List

Snapshots

System Information

Settings

Alarms/Snapshots

Time Period

Designations

Drop-Out Detection

State Calculation

System

Support

GPL Information






your connection to excellence

# PROFIBUS Monitor BC-502-PB

## Web interface – highlights I

- Settings for thresholds, alerts and snapshots in one go or separately for each device

**Thresholds, Alerts and Snapshot Settings**

Alerting On/Off	Device	Threshold				Action	
		Per 5 Seconds			Per Bus Cycle	Alarm LED, Switch, SNMP Trap	Snapshot
		Drop-Out	Internal Diagnostics	External Diagnostics	Error Frames		
<input checked="" type="checkbox"/>	All	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Frames before event:	<input type="text" value="250"/>
Frames after event:	<input type="text" value="250"/>

# PROFIBUS Monitor BC-502-PB

## Web interface – highlights II

- Alarm list of the last 100 critical events
- Snapshots with 500 telegrams around the last 8 critical events
  - downloadable from web interface to PC for analysis with protocol analyzer SW (incl. in scope of supply)

No.	Time Stamp	Address	Prot	Primitive	Service	Data
2639	11:00:30.759498	2 -> 2	FDL	Request	TOKEN	
2640	11:00:30.759644	2 -> 10	DP	Request	DATA EXCHANGE	01
2641	11:00:30.759890	2 <- 10	FDL	Response	SC	
2642	11:00:30.759990	2.62 -> 11.60	DP	Request	DIAGNOSIS	
2643	11:00:30.760644	2.62 -> 12.62	DP	Request	CHECK CONFIG	20 10
2644	11:00:30.760955	2.62 <- 12.62	FDL	Response	SC	
2645	11:00:30.761056	2.62 -> 13.60	DP	Request	DIAGNOSIS	
2646	11:00:30.761710	2.62 -> 14.60	DP	Request	DIAGNOSIS	
2647	11:00:30.762366	2 -> 93	FDL	Request	FDL STATUS	
2648	11:00:30.762910	2 -> 2	FDL	Request	TOKEN	

The screenshot displays the PROFIBUS Monitor web interface. On the left, the 'Live List' window shows a tree view of the bus segment configuration. The segment is set to 500.00 kBit/s. It contains 2 Master stations and 14 Slave stations. The slave stations are: (10) DRepeater SIEMENS (S), (11) DP/PA-Link (SIEMENS), (12) WAGO 750-343 (WAGO), (13) ET 200M (SIEMENS), and (14) Slave. On the right, the 'Station Statistics' window is open, showing the following data:

Category	Value
<b>Bus Devices</b>	
Total number of Masters	1
Total number of DP Slaves	5
- thereof not answering	1
- thereof with diagnostic messages	2
Total number of non-DP devices	0
<b>Bus-Data</b>	
Baud Rate	500,00 kBit/s
Bus cycle Min./Avg./Max.	2,16/3,86/7,39 ms
<b>Total Number of Events</b>	
Retries	0
Diagnostic messages	79
Restarts	77

# PROFIBUS Monitor BC-502-PB

## Advantages

- One Monitor per bus line is all that is needed - no matter how many physical segments are to be monitored.
- The tool can be used on the live PROFIBUS without interfering with its operation.
- Using the BC-131-PB active PROFIBUS connection cable (optional accessory, not included in scope of delivery), the Monitor can be integrated into the fieldbus anytime, without undesirable side effects, also temporarily
- No bus address or changes to the PLC program are required for setup and commissioning.
- In addition, the tool's open functionality allows use across all controller and bus device types.

# PROFIBUS Monitor BC-502-PB

## Benefits

- Permanent monitoring of the „health“ of the PROFIBUS.
- At increasing “illnesses” the operational staff will be alarmed.
- Bug fixing will be enabled IN ADVANCE of unplanned breakdowns.
- Plant availability increases.
- best use of the often scarce maintenance resources as it reduces operator intervention to when it is needed.
- It helps and minimize downtimes by permitting.
- Network shut downs can be utilized better as maintenance action can be scheduled in advance

# PROFIBUS Monitor BC-502-PB BC-502-PB-START – starter package

- Complete accessories for quick commissioning.
- Everything included to start measuring at running systems immediately



## Diapositive 14

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**N1** Fotos manipulieren, sobald die neue Grafik (Frontlabel Koffer) verfügbar ist.  
NH; 27/02/2013

# PROFIBUS Monitor BC-502-PB

## Order No.

- BC-502-PB** PROFIBUS Monitor for continuous bus monitoring and condition-based maintenance of DP/DPV1/FMS/MPI, rail-mounted, ext. 24 VDC required, signaling contact, ethernet 10/100BASE-TX (RJ45) incl. internal web server and manual
- BC-131-PB** Optional active connection cable fitting PROFIBUS protocol analyzers BC-4x0-PB or Monitor BC-502-PB for hassle-free integration into existing or running installations without changing cabling, spur cable length 3 m, internal repeater bus powered
- BC-502-PB/CL** PROFIBUS Monitor software option „Comfort Line“, enables full featured protocol analyzer via USB, incl. additional PC SW on CD-ROM and printed manual English/German (available 07/2009)
- BC-502-PB-Start** PROFIBUS Monitor start package consisting of BC-502-PB, BC-131-PB incl. power supply, patch and crossover cable, carrying case
- BC-502-PB-PMxx** Central diagnosis management and data analysis for up to 80 Monitors comprising “Premium Line” and PROmanage® server license for x=5/10/20/40/80 Monitors, SW installation and commissioning at site and possibly network data server, cables, cabling etc. as to be agreed

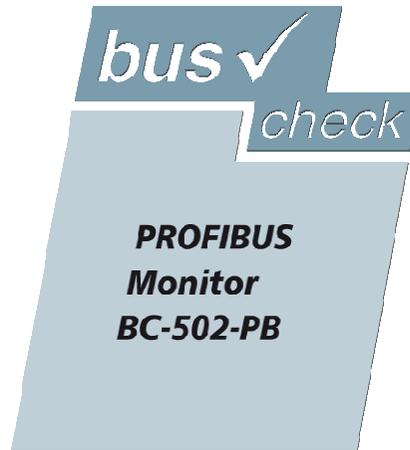
# PROFIBUS Monitor BC-502-PB

## Further informationen

- Softing web page:
  - Product Information
  - Manual
  - Technical article: „Early-warning system for PROFIBUS“  
(incl. fieldbus maintenance strategy approaches)

# PROFIBUS Monitor® BC-502-PB

## The proper decision



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