PROCENTEC



Compact IP66 Repeater D1+D

Transparent PROFIBUS DP single channel repeater

Safety Guidelines

This manual contains notices which you should observe to ensure your own personal safety, as well as to protect the product and connected equipment. These notices are highlighted in the manual by a warning sign and are marked as followed according to the level of danger:



Draws your attention to important information on handling the product, a particular part of the documentation or the correct functioning of the product.

Warning

This device and its components may only be used for the applications described in this manual and only in connection with devices or components that comply with PROFIBUS and RS 485 interface. This product can only function correctly and safely if it is transported, stored, set up, installed, operated and maintained as recommended. The D1 Repeater is a CE class A product. In a domestic environment it may cause radio interference in which case the user may be required to take adequate measures.

Warranty

Warranty is void if you open the D1 Repeater.

Qualified Technicians

Only qualified technicians should be allowed to install and work with this equipment. Qualified technicians are defined as persons who are authorized to commission, to ground, to tag circuits and systems in accordance with established safety practices and standards. It is recommended that the technicians carry a Certified PROFIBUS Installer or Certified PROFIBUS Engineer certificate.

Disclaimer of Liability

We have checked the contents of this manual as much as possible. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the content in this manual is reviewed regularly and necessary corrections will be included in subsequent editions. Suggestions for improvements are welcome.

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Important information

Purpose of the manual

This user manual provides information how to work with the compact IP66 Repeater D1.

Recycling and Disposal

The parts of the compact IP66 Repeater D1 can be recycled. For further information about environmentfriendly recycling and the procedure for disposing your old equipment, please contact:

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Document Updates

You can obtain constantly updated information on PROCENTEC products on the Internet at www.procentec.com

You can also contact PROCENTEC Customer Support:

- by phone at +31-(0)174-671800
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- by email at support@procentec.com

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1 Introduction

The compact PROFIBUS DP Repeater D1 offers an economic alternative and tackles the technological limitations of existing repeaters. This first-class network component fulfils the electrical, mechanical and diagnostic requirements of the demanding modern industry.

The advanced 12 Mbps core of the D1 is identical to the other members of the ProfiHub+ family; it can be cascaded unlimitedly and is equipped with the latest isolated RS 485 interface. The data is constantly monitored for glitches which are digitally filtered out. Every channel has on-board switchable termination and can drive 31 devices.

The robust M12 connectors of the PROFIBUS interface provide flexible wiring; a channel can be terminated or daisy-chained to a neighbouring component. An extra M12 connector is featured on the outgoing channel (channel 2) for ProfiTrace or other maintenance/engineering tools.

The D1+D comes with a built-in Diagnostics Device. The Diagnostics Device is a very versatile statistics/diagnostics logger. It can be used to keep track of the overall PROFIBUS network health and inform the PLC or DCS of any network failure such as repeats or illegals, missing ProfiHub termination, live list changes, or power supply problems.

2 Installation instructions

Location

The D1 can be installed everywhere in a non-hazardous area that complies with IP 66 (DIN 40 050) and the specified ambient temperature range of -25° to $+70^{\circ}$ Celsius.

Position

The D1 can be installed in every position. When installing the D1 on a vertical surface, it is recommended to install it with Channel 2 pointing down. In this position it is easier to read the front plate.

Mounting and dismounting

The D1 has to be mounted on a flat surface, by using the four screw holes in the corners of the D1. The M4 mounting screws need to cover at least 3 mm.

3 PROFIBUS



Connectors

Each channel has 2 connectors (IN and OUT). They are both linked 1-on-1, even when the termination is ON.

When a channel of the repeater is NOT the last device on the segment, it does not matter which connector (IN or OUT) is utilized.

PROFIBUS Pin layout

Pin 1: + 5 V DC Pin 2: A or green wire Pin 3: DGND Pin 4: B or red wire Pin 5: not used Thread: Shield

Termination

Each channel has its own termination which can be switched ON/OFF. If one of the channels is not used, turn on the termination. Press and hold the 'TERM' button for 3 seconds. The yellow TERM LED will illuminate. After power down/up the D1 will remember the termination state.

Monitoring connector

The busmonitor connector is connected 1-on-1 with channel 2.

Not used connectors

Verify that the unused connectors have the protective cap screwed on tightly to avoid water or dirt entering the connector.

Robust Repeating mode

The D1 has two repeating modes: normal (default) and Robust Repeating. In normal mode the bits are transferred directly on the other channel with a minimal delay (see delay times on the next page). In Robust mode, the first byte is checked to verify if the following bits are a real PROFIBUS message. If the byte is illegal, the message will not be transferred to the other channel. This helps network stability in EMC sensitive environments.

To enable or disable the Robust Repeating mode, proceed as follows:

- 1. Enter the 'Settings menu' by pressing and holding both TERM buttons simultaneously for 5 seconds. You will see the Power LED flashing every second, to indicate that settings can be changed.
- 2. Press and hold the TERM2 button for 1 second. The green RX LED of Channel 2 will switch ON to indicate that Robust Repeating has been enabled.
- 3. To switch OFF Robust Repeating, Press the TERM2 button for 1 second again. The RED Error LED of Channel 2 will turn ON and the green LED goes OFF.
- 4. To exit the 'Settings menu', press and hold both TERM1 and TERM2 simultaneously for 5 seconds. The Power LED will stop flashing every second.

The 'Settings menu' will be exited automatically when no key has been pressed for 20 seconds.

After power down/up the D1 will remember the settings.

In Robust Repeating mode the data delay time of the unit increases; see the table in Technical Data.

LED	OFF	Blinking	ON
READY	Power is not switched on or an internal failure.	8 Trying to detect the transmission speed, but has not locked it yet.	The transmission speed has been detected.
RX	No communication detected (this Channel).	I or more devices communicating (this Channel).	8 Internal error
ERR	No problem has been detected.	Communication problem (this Channel).	😢 Baud rate not found
TERM1/2	() internal termination is switched off.	😕 Internal error	() internal termination is switched on.

Diagnostic LEDs

4 Diagnostics Device

The D1+D comes with a built-in Diagnostics Device. The Diagnostics Device is a very versatile statistics/diagnostics logger. It can be used to keep track of the overall PROFIBUS network health and inform the PLC or DCS of any network failure such as repeats or illegals, missing ProfiHub termination, live list changes, or power supply problems.

You can use a ComBricks to display the most important diagnostics of every channel. The information of this ProfiHub Diagnostics slave is displayed as follows:



Fig. 1 - Information window of the Diagnostic slave

It displays the following information:

- Address and Tag-name of the Diagnostic slave
- Type and serial number of the Diagnostic slave
- Firmware version of the Diagnostic slave
- Connection to the Network, Module and Channel number of the ComBricks
- Power status of the ProfiHub
- Alarm status (of the relay)
- Termination status of all channels
- Illegal count for all channels
- A live list of all channels

For more information see the ComBricks manual, paragraph 'Diagnostic Slave info'.

To enable or disable the Diagnostic Device mode, proceed as follows:

- Enter the 'Settings menu' by pressing and holding both TERM buttons simultaneously for 5 seconds. You will see the Power LED flashing every second, to indicate that settings can be changed.
- 2. Press and hold the TERM1 button for 1 second. The green RX LED of Channel 1 will switch ON to indicate that the Diagnostic slave has been enabled. The default address of the slave is 126.
- 3. To switch OFF Diagnostic slave, Press the TERM1 button for 1 second again. The RED Error LED of Channel1 will turn ON and the green LED goes OFF.
- 4. To exit the 'Settings menu', press and hold both TERM1 and TERM2 simultaneously for 5 seconds. The Power LED will stop flashing every second.

The 'Settings menu' will be exited automatically when no key has been pressed for 20 seconds.

After power down/up the D1 will remember the settings.

4.1.1 Changing the default PROFIBUS address

By default the address of the Diagnostic Device is set to 126. To change the address, use a configuration tool which supports the 'Set Slave Address' command. Most configuration tools support this feature.

Class 2 commands dialog						
Set/Change Slave Address Diagnostics Input	s & Outputs Get Configuration Network scan					
Set Slave Address Current Address 126	Station address change successful!					
New Address 20						
C Lock Address						
Change Address						

Fig. 2 - ProfiCaptain changes the address from 126 to 20

4.1.2 GSD file

Locate and download the appropriate GSD file for the Diagnostics Device on www.procentec.com/downloads . The correct GSD file for the ProfiHub D1+D is: **PROC6974.gsd**. The zip file also contains the corresponding .bmp (Bitmap) files. Import the GSD file into your configuration tool and insert the device in the PLC hardware configuration.

4.2 Configuring the Diagnostic Device

The Diagnostic Device has many configuration options. It can be configured modularly. This paragraph describes all the available options per module in list order.

4.2.1 Info data (mandatory module)

There is only one mandatory module, which is the first module in the list ("INFO DATA MANDATORY ON 1st SLOT"). It has 4 input bytes with the following meaning:

Byte 1: Input Identifier byte (always 0xDE) Byte 2: Device type byte (0xD1 is ProfiHub D1+D) Byte 3: Version byte: 0x01 Byte 4: Data format byte (0x00 is Little Endian, 0x01 is Big Endian)

4.2.2 Baudrate Status

Input Identifier byte: 0x11

The next input byte is to indicate the baudrate lock status.

Dec	Meaning	
1	No baudrate detected	
2 9.6 Kbit		
3	19.2 Kbit	
4	45.45 Kbit	
5	93.75 Kbit	
6	187.5 Kbit	
7	500 Kbit	
8	1.5 Mbit	
9	3 Mbit	
10	6 Mbit	
11	12 Mbit	

4.2.3 Termination Status

Input Identifier byte: 0x14

The next input byte is to indicate the status of the termination switches on the ProfiHub channels.

Bit	Meaning
0	Channel 1 termination ON
1	Channel 2 termination ON

Examples: 0x03 = Channel 1 and 2 terminations are ON 0x02 = Only Channel 2 termination is ON

4.2.4 Channel Status

Input Identifier byte: 0x15

The next input byte is to indicate the communication status of the individual channels.

Bit	Meaning
0	Communication on Channel 1
1	Communication on Channel 2

Example: 0x03 = Communication on Channels 1 and 2

4.2.5 Livelist Status

Input Identifier byte: 0x20

The next input byte is to indicate which Channel is selected to display the Livelist status.

Hex	Meaning
80 Livelist of Channel 1	
81 Livelist of Channel 2	
86	Livelist of this ProfiHub
FF	Livelist of all channels (entire network)

The next 32 input bytes are used for the actual Livelist data. Each address uses two bits. So the first two bits of the first byte are for address 0, the next two bits of the first byte are for address 1 and so on. The bits are used to indicate if the station is a slave device, master device or both.

Device:	Bit 1:	Bit 0:
None	0	0
Slave Device	0	1
Controller	1	0
Both	1	1

Example: If there is a master device on address 2, and a slave device on address 3, then the first byte will be 0x60, because it will look like this:

Bit	7	6	5	4	3	2		1	0	
Value	0	1	1	0	0	0		0	0	
	Addres	s 3	Address 2		Addres	ss 1 🖉	(Addre	ess 0	

This module also has 2 Output bytes. The first Output byte is used to select the Livelist of a specific Channel. This selection can be read-back in the Input byte described above.

Hex	Meaning
80 Livelist of Channel 1	
81	Livelist of Channel 2
86	Livelist of this ProfiHub
FF	Livelist of all channels (entire network)

The next Output byte can be used to reset the Livelist. Write 0x01 to this Output byte to reset the Livelist.

4.2.6 Statistics (Short Format, Long Format)

Input Identifier byte: 0x30 (short format) or 0x31 (Long Format)

The next byte is used to display the current selection of statistics that it sends.

Hex	Meaning
007E Statistics for device 0126	
7F Statistics for undefined devices	
80 Statistics of Channel 1	
81 Statistics of Channel 2	
86	Statistics of this ProfiHub
FF	Statistics of all channels (entire network)

The next 16 bytes (Short Format) or 32 bytes (Long Format) are used to transfer the statistics of the selected address, selected Channel or all Channels of the ProfiHub. Each statistic uses 2 bytes (Short Format, so a maximum of 65535 decimal per statistic) or 4 bytes (Long Format) and is sent in the following order:

- 1. Lost count
- 2. Sync count
- 3. Repeats total count
- 4. Repeats max per cycle count
- 5. Illegals count
- 6. Int. diagnostics count
- 7. Ext. diagnostics count
- 8. Diagnostics while in Data Exchange count

This module also has 2 output bytes. The first byte is used to configure the ProfiHub Statistics; you can choose which stations or Channels will display statistics. Configure it by sending the following output value:

Hex	Meaning
007E	Statistics for device 0126
7F Statistics for undefined devices	
80	Statistics of Channel 1
81 Statistics of Channel 2	
86	Statistics of this ProfiHub
FF	Statistics of all channels (entire network)

The next output byte can be used for clearing the statistics. Please note that the selected statistics of ALL node addresses and/or ProfiHub channels are cleared, not only for the displayed address or channel.

Bit	Meaning
0	Clear LOST statistics
1	Clear SYNC statistics
2	Clear REPEATS TOTAL statistics
3	Clear REPEATS MAX statistics
4	Clear ILLEGALS statistics
5	Clear INT. DIAG statistics
6	Clear EXT. DIAG statistics
7	Clear DIAG WHILE IN DX statistics

Example: To clear all LOST and ILLEGALS statistics, send 0x11 To clear all statistics, send 0xFF

4.3 Parameterizing the Diagnostic Device

The Diagnostic Device has many user-definable parameters that can be changed, to alter the behaviour and options of the ProfiHub Diagnostics Device.

4.3.1 Diagnostics

The Diagnostics Device sends a diagnostic message on PROFIBUS whenever certain conditions are changed. These changes can be any of the following:

- Livelist change (a station added or removed)
- Bitrate error
- Alarm relay active
- Power status changed (one of the two power sources added or removed)
- Redundancy status change (one of the redundant cables added or removed)
- Termination status change (a termination switch on the ProfiHub has been changed)
- Channel status change (communication stopped or started on a channel)
- Statistics change (any statistic has changed)

In your configuration tool you can toggle the diagnostics for each item.

ffset	Datatype	Reference Name	Value	Meaning	A	Min. Va	alue	0	
	BitO	Diag. on LiveList change	1	Enabled		Max. V	alue	1	
	Bit1	Diag. on Baudrate status	1	Enabled		Defaul	Value:	1	
	Bit2	Diag. on Relay status	1	Enabled		NewV	alue:	1	
	Bit3	Diag. on Power status	1	Enabled		14000 0	anao.	P	
	Bit4	Diag. on Redundancy status	1	Enabled			App	oly value	
	Bit5	Diag. on Termination status	1	Enabled	_				
	Bit6	Diag. on Channel status	1	Enabled			Reset	To Default	
	BitO	STATISTIC, LOST CHANGED	1	Enabled		Allerine	d Values.		
	Bit1	STATISTIC: SYNC CHANGED	0	Disabled		Allower	I values:		
	Bit2	STATISTIC: REPEATS TOTAL CHAN	1	Enabled		Value	Mea	ning	
	Bit3	STATISTIC: REPEATS MAX. CHANGI	1	Enabled		U	Disa	bled	_
	Bit4	STATISTIC: ILLEGALS CHANGED	1	Enabled			Enat	bled	
	Bit5	Statistic: Int. Diag changed	0	Disabled					
	Bit6	Statistic: Ext. Diag changed	0	Disabled					
	Bit7	Statistic: Diag in DX changed	0	Disabled					
					•				
w par	ameter info	in Hex							
00	01 02 0 00 00 7 00 00 0	3 04 05 06 07 08 09 0A 0B 0 F 1D 00 00 3E 00 0A 05 01 0 0 00 00 00 00	C OD OE	E OF 0 00					

Fig. 3 - Screenshot of ProfiCaptain - User Parameter window

The 8th byte of a diagnostic message from the Diagnostic Device indicates which options have been enabled or disabled.

4.3.2 Statistics

You can choose which Statistics can trigger a diagnostic message, because not all statistics are interesting in all networks. For example, Syncs have been disabled by default because this is not a statistic that is suitable for PROFIBUS health monitoring.

ſ	GSD C	onfiguratio	on dialog (c) 2003-2012 PROCENTEC	C V1.3.6				
	Module Se	election U	ser Parameters Module Parameters !	Standard k	eywords			
	User Defi	inable Parar	neters					
	Offset	Datatype	Reference Name	Value	Meaning	*	Min. Value 0	
	3	Bit4	Diag. on Redundancy status	1	Enabled		Max. Value 1	
	3	Bit5	Diag. on Termination status	1	Enabled		Default Value: 1	
	3	Bit6	Diag. on Channel status	1	Enabled		Nou (oluo: 1	
K	4	BitO	STATISTIC: LOST CHANGED	1	Enabled			
	4	Bit1	STATISTIC: SYNC CHANGED	0	Disabled		Apply value	
	4	Bit2	STATISTIC: REPEATS TOTAL CHAN	1	Enabled			
	4	Bit3	STATISTIC: REPEATS MAX. CHANGE	1	Enabled		Reset To Default	
	4	Bit4	STATISTIC: ILLEGALS CHANGED	1	Enabled		Allowed Yalves:	
	4	Bit5	Statistic: Int. Diag changed	0	Disabled		Allowed values.	
	4	Bit6	Statistic: Ext. Diag changed	0	Disabled		Value Meaning	
Y	4	Bit7	Statistic: Diag in DX changed	0	Disabled		U Disabled	
	5	BitO	ExtDiag. on LiveList change	0	Disabled		I Enabled	
	5	Bit1	ExtDiag. on Baudrate error	0	Disabled			
	5	Bit2	ExtDiag. on Power error	U	Disabled			
	5	Bit3	ExtDiag. on Redundancy error	U	Disabled	Ŧ		
	◀ 🔚				+			
	Raw para	ameter info i	n Hex					
	00 00 00 00	01 02 03 00 00 7F 00 00 00	04 05 06 07 08 09 0A 08 0 10 00 00 3E 00 0A 05 01 00 00 <td>C OD OE 0 00 00</td> <td>0F 00</td> <td></td> <td></td> <td></td>	C OD OE 0 00 00	0F 00			
-			Ok		Cancel			

Fig. 4 – You can choose which statistics trigger a diagnostic message

The following Statistics can trigger a diagnostic message of the Diagnostic Device:

- Lost changed
- Sync changed
- Repeats (total) changed
- Repeats (max) changed
- Illegals changed
- Internal Diagnostics changed
- External Diagnostics changed
- Diagnostics in Data Exchange changed

4.3.3 Extended Diagnostics on Events change

For more critical applications you can choose to enable the 'Extended Diagnostics' option for each of the previously mentioned events. In the case of such an event, the Diagnostics Device will send out a diagnostics message with the 'Extended Diagnostic' bit on. In a Busmonitor tool such as ProfiTrace the extended diagnostics bit will appear as a red blinking square.

40	41
ProfiHub-85+ Diagnostics	51
60	61

All Events described in paragraph 3.3.1 can trigger the Extended Diagnostic bit of the Diagnostic Device. By default, the Extended Diagnostic option is disabled. Each item can be enabled individually.

	🖻 GSD C	Configuratio	on dialog (c) 2003-2012 PROCENTI	EC V1.3.6							×
ſ	Module S	election U	ser Parameters Module Parameters	Standard	keywords						
	User Def	inable Para	meters								
	Offset	Datatype	Reference Name	Value	Meaning		*	Min. Value	э	0	
	4	Bit5	Statistic: Int. Diag changed	0	Disabled			Max. Valu	e	1	
	4	Bit6	Statistic: Ext. Diag changed	0	Disabled			Default Va	alue:	0	
	4	Bit7	Statistic: Diag in DX changed	0	Disabled			N		-	
T	5	BitO	ExtDiag, on LiveList change	0	Disabled			inew valu	e:	lo.	
	5	Bit1	ExtDiag. on Baudrate error	0	Disabled				App	ly value	
	5	Bit2	ExtDiag. on Power error	0	Disabled						
	5	Bit3	ExtDiag. on Redundancy error	0	Disabled				Reset 7	To Default	
	5	Bit4	ExtDiag. on Termination change	0	Disabled						
	5	Bit5	ExtDiag. on Channel change	0	Disabled			Allowed V	alues:		_
	6	Bit0	ExtDiagStat: Lost changed	0	Disabled			Value	Mean	ning	
	6	Bit1	ExtDiagStat: Sync changed	0	Disabled			0	Disab	oled	
	6	Bit2	ExtDiagStat: Reps. total changed	0	Disabled			1	Enab	led	
	6	Bit3	ExtDiagStat: Reps. max. changed	0	Disabled						
	6	Bit4	ExtDiagStat: Illegals changed	0	Disabled						
	6	Bit5	ExtDiagStat: Int. Diag changed	0	Disabled		÷				
	•					P.					
	Raw par	ameter info i	in Hex								
		01 02 02									
			TD 00 00 3E 00 0A 05 01		- 0						
	10,00										
								,			
			Ok	1	Cancel						
						_	_				

4.3.4 Extended Diagnostics on Statistics change

The Extended Diagnostic option can also be enabled for each individual available statistic. This works the same way as the Events described in paragraph 3.3.3.

	🖻 GSD C	Configurati	on dialog (c) 2003-2012 PROCENTE	C V1.3.6				
ſ	Module S	election U	ser Parameters Module Parameters	Standard	keywords			
	User Def	inable Para	meters					
	Offset	Datatype	Reference Name	Value	Meaning		Min. Value 0	
	5	Bit3	ExtDiag. on Redundancy error	0	Disabled	-	Max. Value 1	
	5	Bit4	ExtDiag. on Termination change	0	Disabled		Default Value: 0	
	5	Bit5	ExtDiag. on Channel change	0	Disabled		New Velue	
K	6	Bit0	ExtDiagStat: Lost changed	0	Disabled		New Value: U	
	6	Bit1	ExtDiagStat: Sync changed	0	Disabled		Apply value	
	6	Bit2	ExtDiagStat: Reps. total changed	0	Disabled			
	6	Bit3	ExtDiagStat: Reps. max. changed	0	Disabled		Reset To Defa	ault
	6	Bit4	ExtDiagStat: Illegals changed	0	Disabled	_		
	6	Bit5	ExtDiagStat: Int. Diag changed	0	Disabled		Allowed Values:	
	6	Bit6	ExtDiagStat: Ext. Diag changed	0	Disabled		Value Meaning	
	6	Bit7	ExtDiagStat: Diag in DX changed	0	Disabled		0 Disabled	
	7	Bit0	Relay on LiveList Change	0	Disabled		1 Enabled	
	7	Bit1	Relay on Baudrate change	1	Enabled			
	7	Bit2	Relay on Power error	1	Enabled			
	7	Bit3	Relay on Redundancy error	1	Enabled	Ŧ		
	•				•			
	Raw par	ameter info i	in Hex					
	00	01 02 03	3 04 05 06 07 08 09 0A 0B 0		ELOF			
	00 00	00 00 7	- 1D 00 00 3E 00 0A 05 01 0	0 00 00	0 00			
	10 00	00 00 0	0 00 00 00 00					
	I							
_								
			Ok		Cancel			

4.3.5 Alarm Relay on Events change

The Alarm Relay on the ProfiHub can be switched on each Event described in paragraph 4.3.1. When such an Event occurs, the Relay will be switched immediately without delay. The only Event that can delay the switching of the Alarm Relay is the Lost event.

ſ	🔄 GSD C	onfigurati	on dialog (c) 2003-2012 PROCENTE	C V1.3.6				
	Module S	election U	Iser Parameters Module Parameters	Standard	keywords			
ĺ	User Del	inable Para	meters					
	Offset	Datatype	Reference Name	Value	Meaning		Min. Value 0	
	6	Bit5	ExtDiagStat: Int. Diag changed	0	Disabled		Max. Value 1	
	6	Bit6	ExtDiagStat: Ext. Diag changed	0	Disabled		Default Value: 0	
	6	Bit7	ExtDiagStat: Diag in DX changed	0	Disabled		New Yolen	
1	7	Bit0	Relay on LiveList Change	0	Disabled		New Value: U	
	7	Bit1	Relay on Baudrate change	1	Enabled		Apply value	
	7	Bit2	Relay on Power error	1	Enabled			
	7	Bit3	Relay on Redundancy error	1	Enabled		Reset To Default	
	7	Bit4	Relay on Termination change	1	Enabled		All 152.1	
L	7	Bit5	Relay on Channel lost	1	Enabled		Allowed Values:	
Γ	8	BitU	RelayUnStat: Lost changed	U	Disabled		Value Meaning	
	8	Bit1	RelayOnStat: Sync changed	0	Disabled		U Disabled	
	8	Bit2	RelayOnStat: Reps. total changed	0	Disabled		1 Enabled	
	8	Bit3	RelayOnStat: Reps. max. changed	0	Disabled			
	8	Bit4	RelayOnStat: Illegals changed	0	Disabled			
	8	Bit5	RelayOnStat: Int. Diag changed	0	Disabled	Ŧ		
	•				•			
	Raw par	ameter info i	in Hex					
	00	lot lot lot	3 104 105 106 107 108 109 104 108 10	IC LOD LOP	I DE L			
	00 00		F 1D 00 00 3E 00 0A 05 01 0	00 00 00) 00			
	10 00	00 00 0						
	I							
						_		
			Ok		Cancel			

4.3.6 Alarm relay on Statistics change

The Alarm Relay on the ProfiHub can be switched (closed) on each change in Statistics, described in paragraph 3.3.2. When such an (enabled) Statistic change occurs, the Relay will be switched immediately without delay. The only Statistic that can delay the closing of the Alarm Relay is the Lost event.

l	GSD C	onfigurati	on dialog (c) 2003-2012 PROCENTE	C V1.3.6					• 🗙
	Module S	election U	Iser Parameters Module Parameters	Standard k	keywords				
	User Del	inable Para	meters						
	Offset	Datatype	Reference Name	Value	Meaning		Min. Value	. 0	
	7	Bit2	Relay on Power error	1	Enabled		Max. Value	e 1	
	7	Bit3	Relay on Redundancy error	1	Enabled		Default Va	lue: 0	
	7	Bit4	Relay on Termination change	1	Enabled		Nam Value		
	7	Bit5	Relay on Channel lost	1	Enabled		New value	s. [0	
K	8	BitO	RelayOnStat: Lost changed	0	Disabled			Apply value	
	8	Bit1	RelayOnStat: Sync changed	0	Disabled				
	8	Bit2	RelayOnStat: Reps. total changed	0	Disabled			Reset To Default	
	8	Bit3	RelayOnStat: Reps. max. changed	0	Disabled				
	8	Bit4	RelayOnStat: Illegals changed	0	Disabled		Allowed Va	alues:	
	8	Bit5	RelayOnStat: Int. Diag changed	0	Disabled		Value	Meaning	
	8	Bit6	RelayOnStat: Ext. Diag changed	0	Disabled		0	Disabled	
V	8	Bit7	RelayOnStat: Diag in DX changed	0	Disabled		1	Enabled	
	9	Uint8	Diag change timeout (x 100msec)	10					
	10	Uint8	Device lost timeout (x 1sec)	5					
	11	Bit0	Data format of 16/32 bits values	1	Motorola, high-low-byte	-			
	•				+				
	Raw par	ameter info i	in Hex						
	00 00 00 10 00	01 02 0 00 00 7 00 00 0	3 04 05 06 07 08 09 0A 08 0 5 1D 00 00 3E 00 0A 05 01 0 5 00 00 00 00	IC OD OE	0F 00				
_			Ok		Cancel				

4.3.7 Changing the Diagnostics duration/timeout

You can change the duration of the Extended Diagnostics warning in steps of 100 milliseconds. The default value is 10, so 1 second. The maximum value is 255.

Offset	Datatupe	Beference Name	Value	Meaning		Min. Value	0		
7	Bit2	Relay on Power error	1	Enabled	_	Max Value	255		
7	Bit3	Relay on Redundancy error	1	Enabled		Default) (alue:	10		
7	Bit4	Relay on Termination change	1	Enabled		Derault value.	10		
7	Bit5	Relay on Channel lost	1	Enabled		New Value:	10		
3	BitO	RelayOnStat: Lost changed	0	Disabled	_	Apr	lu valua	1	
3	Bit1	RelayOnStat: Sync changed	0	Disabled	_	Abt	ny value		
3	Bit2	RelayOnStat: Reps. total changed	0	Disabled		Beset	To Default		
3	Bit3	RelayOnStat: Reps. max. changed	0	Disabled					
3	Bit4	RelayOnStat: Illegals changed	0	Disabled		Allowed Values:			
3	Bit5	RelayOnStat: Int. Diag changed	0	Disabled		Value Mear	ning		
3	Bit6	RelayOnStat: Ext. Diag changed	0	Disabled					
2	B⊮7	BelayOnStat: Diag in DX changed	0	Disabled					
3	Uint8	Diag change timeout (x 100msec)	10						
10	Uint8	Device lost timeout (x 1 sec)	5						
11	Bit0	Data format of 16/32 bits values	1	Motorola, high-low-byte	+				
•					F.				
law par	ameter info	in Hex							
00	01 02 0	3 04 05 06 07 08 09 04 08 0	יון מין אי	FIDE					
00.00		F 1D 00 00 3F 00 04 05 01							
10 00									

4.3.8 Changing the Device Lost timeout

The Diagnostics Device waits for a certain time before it considers a slave to be lost. This works in a similar way as the ProfiTrace Live List, where the background turns yellow when a slave stops communicating. This timeout can be changed in steps of 1 second. Default value is 5, and maximum value is 255.

I	🔄 GSD C	Configurati	on dialog (c) 2003-2012 PROCENTE	C V1.3.6				
	Module S	election	Iser Parameters Module Parameters	Standard	keywords)			
	Lloor Do	finable Para	meters					
	Official	Datatura	Reference Marro	l) (alua	Manning		Min Value 0	
	7	Bir2	Relau on Power error	1	Enabled	-	Mari Value	
	7	Bir3	Belau on Bedundancu error	1	Enabled		Max. Value 23	10
	7	BiM	Belau on Termination change	1	Enabled		Default Value: 5	
	7	Bit5	Belau on Channel lost	1	Enabled		New Value: 5	
	8	BitO	BelayOnStat: Lost changed	0	Disabled		A	tur.
	8	Birt	BelayOnStat: Sunc changed	0	Disabled		Apply va	liue
	8	Bit2	BelauOnStat: Bens, total changed	0	Disabled		Poost To D	lof-sult
	8	Bit3	BelavOnStat: Bens max changed	0	Disabled		11636(100	crauk
	8	Bit4	BelavOnStat: Illegals changed	0	Disabled		Allowed Values:	
	8	Bit5	BelavOnStat: Int. Diag.changed	0	Disabled		Value Meaning	
	8	Bit6	BelavOnStat: Ext. Diag.changed	0	Disabled			
	8	Bit7	BelavOnStat: Diag in DX changed	0	Disabled			
	9	Llint8	Diag change timeout (x 100msec)	10				
	10	Uint8	Device lost timeout (x 1sec)	5				
İ.	11	BitO	Data format of 16/32 bits values	i	Motoroia, high-low-byte	Ŧ		
	•				4			
	Raw par	rameter info i	in Hex					
		101 102 10	3 104 105 106 107 108 109 106 108 1	ne lon los				
	00100	00 00 7	E 1D 00 00 3E 00 0A 05 01		- 00			
	10 00							
	10100							
			01	1	Const			
1			Uk		Lancel			

4.3.9 Changing the data format

The data format can be changed if needed. Default is Motorola, high-low-byte format. You can change it to Intel, low-high-byte format.

lser De	finable Para	meters				
Offset	Datatype	Reference Name	Value	Meaning	^	Min. Value 0
7	Bit2	Relay on Power error	1	Enabled	_	Max. Value 1
7	Bit3	Relay on Redundancy error	1	Enabled		Default Value: 1
7	Bit4	Relay on Termination change	1	Enabled		New Value: 1
7	Bit5	Relay on Channel lost	1	Enabled		
8	BitO	RelayOnStat: Lost changed	0	Disabled		Apply value
8	Bit1	RelayOnStat: Sync changed	0	Disabled		
8	Bit2	RelayOnStat: Reps. total changed	0	Disabled		Reset To Default
8	Bit3	RelayOnStat: Reps. max. changed	0	Disabled		
8	Bit4	RelayOnStat: Illegals changed	0	Disabled		Allowed Values:
8	Bit5	RelayOnStat: Int. Diag changed	0	Disabled		Value Meaning
8	Bit6	RelayOnStat: Ext. Diag changed	0	Disabled		0 Intel, low-high-byte
8	Bit7	RelayOnStat: Diag in DX changed	0	Disabled		1 Motorola, high-low-byte
9	Uint8	Diag change timeout (x 100msec)	10			
10	Llint8	Device lost timeout (x 1sec)	5			
11	Bit0	Data format of 16/32 bits values	1	Motorola, high-low-byte	-	
•					F	
law pa	rameter info	in Hex				
100	01 02 0	3 104 105 106 107 108 109 10A 108 1	oc lop lo	ELOF		
00 00	00 00 7	F 1D 00 00 3E 00 0A 05 01	00 00 0	0 00		
10 00						
		- , , - 2 , - ,				
						,

4.4 ProfiTrace plugin for the Diagnostic Device

On the download section of www.procentec.com you can download a useful plugin for the Diagnostic Device. It interprets all messages to and from the Diagnostic Device and displays the data in the Info Panel of ProfiTrace.

4.4.1 Installing the Plugin

Once you have downloaded the file and extracted it to your hard drive, start ProfiTrace and choose 'Settings – Plugins' to bring up the Plugin window.

Click 'Install Plugin' and locate it on your harddrive. Next, click 'Enabled' so that ProfiTrace starts the plugin on startup.

Filename	Enabled	Vendor		Version Desc	ription	
Jugin info & settings ✓ Enabled Capabilities:	e i les	General setup		Description General in Version	No Supported Ident Nrs	
Info Panel		Setup Setup	 Enabled Enabled 	Build : Vendor	0 PROCENTEC RD	

4.4.2 Using the Plugin

When the Plugin is correctly started and you have a ProfiHub with Diagnostics Device running, click 'Start Message Recording' in ProfiTrace, and view the screen with messages (see Fig. 5). If you click on a data exchange message to or from a Diagnostics Device, you will see all the interpreted data bytes in the Info Panel. This is very useful for Troubleshooting activities.

A good example is the Statistics. These statistics are available per individual channel or station address (see paragraph 3.2.10), so it is easy to see the source of the problem.

ProfiTrace for ProfiCore Ultra V2.9.2+SP1 (c) 2004-20	14 PROCENT	TEC ProfiCore Ser.Nr: xxxxx	00029						
File Action Filter Trigger Toolbars View Rep	ort <u>S</u> etting	s <u>H</u> elp							
ProfiTrace Soverview ScopeWare Bar graph Top	logy Networ	k Manager ProfiCaptain							
Load Data Save Data File viewer Setup recor	d trigger S	itart message recording S	top message record	ng Set re	ecord filter	iew filter			
Init ProfiCore Ultra Close ProfiCore Ultra Auto-detect	t baudrate	Set baudrate	▼ Wizard						
System activity: Live list : 🔵 Message recording : 🔀	Record to	file: 🔀 💙							
Info Panel	🔶 🕈 Live li:	st 🗉 Messages 🔽 Me:	sages (with view filt	er applied) 🛛 🤇	Station statistics	s view 🏽 🔎 Data inspecti	on		
Framestructure: SD2 message Source address: 20	Setup Se	arch Search Sea	rch Down 🔲 🗖 Rai	v frames 🕅	Stick To Bottom				
Model_Name: ProfiHub-B2+ Diagnostics	FrameNr	Timestamp At t:	on Frame	Addr	Service	Msg type	Req/Res SAPS	DataLe	an Data
Destination address:	0	11-Jul-2	SD2	1<-20	DL	Data Exchange	Res	64	00 01 01 0
Frametype: Response message	1	11-Jul-2	SD4	1->1	Token pass	Pass token			
	2	11-Jul-2	SD2	1->20	SRD_HIGH	Data Exchange	Req	4	FF 00 FF (
PROFIBUS DP-VO Message:	3	11-Jul-2	SD2	1<-20	DL	Data Exchange	Res	64	00 01 01 (
Data Exchange (Con/Res)	4	11-Jul-2	SD4	1->1	Token pass	Pass token			
	5	11-Jul-2	SD2	1->20	SRD_HIGH	Data Exchange	Reg	4	FF 00 FF (
Diagnostic device plugin info:	6	11-Jul-2	SD2	1<-20	DL	Data Exchang	Res	64	00 01 01 (
Device type: B2+	7	11-Jul-2	SD1	1->22	FDL Status		Req		
Version: 0x01	8	11-Jul-2	SD4	1->1	Token pass	Pass token			
Data format: Motorola, high-low-byte	9	11-Jul-2	SD2	1->20	SRD_HIGH	Data Exchange	eq	4	FF 00 FF (
	10	11-Jul-2	SD2	1<-20	DL	Data Exchange	Res	64	00 01 01 (
Status cable redundancy: Redundancy not used	11	11-Jul-2	SD4	1->1	Token pass	Pass token			
Refer status, Refer (s. s.	12	11-Jul-2	SD2	1->20	SRD_HIGH	Data Exchange	Req	4	FF 00 FF (
Relay status: Relay 15 on	13	11-Jul-2	SD2	1<-20	DL	Data Exchange	Res	64	00 01 01 (
Paran status:	14	11-Jul-2	SD4	1->1	Token pass	Pass token			
Power status.	15	11-Jul-2	SD2	1->20	SRD_HIGH	Data Exchange	Req	4	FF 00 FF (
Pending alarm: Power 2 not active	16	11-Jul-2	SD2	1<-20	DL	Data Exchange	Res	64	00 01 01 (
rendring didin. Fower 2 not dotte	17	11-Jul-2	SD4	1->1	Token pass	Pass token	-		
Termination:	18	11-Jul-2	SD2	1->20	SRD_HIGH	Data Exchange	Req	4	EE OO EE C
Main channel termination	19	11-Jul-2	SD2	1<-20	DL	Data Exchange	Kes	64	00 01 01 0
Channel 1 termination	20	11-Jul-2	504	1-21	con utcu	Pass token	D		
	21	11-301-2	502	1-920	SKD_HIGH	Data Exchange	Req	4	22 00 22 0
Live list information:	22	11-Jul-2	502	1-51	Tokon paga	Data Axchange	Kes	0.4	00 01 01 (
Current Selection:	2.5	11-301-2	504	1-520	CDD UTCU	Data Evolution	Dec	4	FF 00 FF (
Complete device	25	11-Jul-2	502	1<-20	DL.	Data Exchange	Dee	64	00 01 01 0
Masters: 1;	26	11-Jul-2	SD4	1->1	Token nass	Page token	100	04	00 01 01 0
Slaves: 20;50;	27	11-Jul-2	SD2	1->20	SPD HIGH	Data Exchange	Peg	4	FF 00 FF (
	28	11-Jul-2	SD2	1<-20	DI.	Data Exchange	Res	64	00 01 01 0
Statistics data:	29	11-Jul-2	SD4	1->1	Token pass	Pass token			
Current Selection: Complete device	30	11-Ju1-2	SD2	1->20	SRD HIGH	Data Exchange	Reg	4	FF 00 FF (
Lost count: 1	31	11-Jul-2	SD2	1<-20	DL	Data Exchange	Res	64	00 01 01 (
Sync count: 25	32	11-Jul-2	SD4	1->1	Token pass	Pass token			
Total repeat count: 2	33	11-Jul-2	SD2	1->20	SRD HIGH	Data Exchange	Reg	4	FF 00 FF (
Max repeat count: 1	•						-		
Illegal count: 217	1								
Internal diagnose count: 4									
External diagnose count: 22	00: 00 01	01 01 10 01 12 01 13	21 14 03 20 FF 0	8 00 00 00	0 00 01 00 00 00	00 00 00 10 00 00 0	00 00 00		
Diagnose while in data exchange count: 22	20: 00 00	0 00 00 00 00 00 00 00	00 00 00 00 00 3	0 FF 00 0	1 00 19 00 02 00	0 01 00 09 00 04 00 1	6 00 16		

Fig. 5 - Info Panel with ProfiHub Diagnostics information

5 Technical Specifications

Technical Data ProfiHub D1	
Dimensions and weight	
Dimensions L x W x H (mm)	169 x 79 x 42 mm (excluding DIN-rail and plug-able screw connectors)
Weight	490 g (excluding plug-able screw connectors and packing material).
Mounting holes L x W	155 × 65 mm M4
Ambient conditions	-25 to +70° Celsius
Operating temperature	-13 to +158° Fahrenheit
Isolation class	IP 66 (IEC/EN 60529, DIN 40050)
Protocol and Timing specifications	
Supported Protocols	DP-V0, DP- V1, DP-V2, FDL, MPI, FMS, PROFIsafe, PROFIdrive and any other FDL based protocol.
Transmission speed	9.6 kbps to 12 Mbps (including 45.45 kbps)
Transmission speed detection	Auto detect
Transmission speed detection time	< 10 s detection and 50 s baudrate switchover time.
Data delay time unit	At baudrateNormal modeRobust mode9.6 - 500 kbps3.0 Tbit14 Tbit1.5 Mbps4.0 Tbit15 Tbit3 Mbps4.5 Tbit15 Tbit6 Mbps5.0 Tbit16 Tbit12 Mbps7.0 Tbit18 Tbit
Jitter per message frame	0.0625 Tbit at 9.6 Kbps - 3 Mbps 0.125 Tbit at 6 Mbps 0.25 Tbit at 12 Mbps
Deviation	2 bit times (over the complete message) for received messages is allowed and is corrected to nominal speed when transmitted.

PROFIBUS Diagnostics Device Specifications			
Supported protocol	DP-V0		
ldent Number	6974		
GSD filename	PROC6974.gsd		
Bus address	0-126 (software address only, set by software, default 126)		
Transmission speed	9.6 kbps to 12 Mbps (including 45.45 kbps)		
Transmission speed detection	Auto Detect		
Maximum transferrable data	85 bytes input and 5 bytes output		

PROFIBUS cable specifications			
Cable lengths	1200 m at 9.6	kbps to 93.75 kbps	
	1000 m at 187	7.5 kbps	
	400 m at 500	kbps	
	200 m at 1.5 M	Vbps	
	100 m at 3 MI	ons to 12 Mbps	
	100 11 01 01 11		
Mine diamates	< 2.5 mm ²		
Wire diameter	Stranded or S	olid core	
whe type			
Number of devices	Max. 31 per C	hannel (including ProfiH	ubs, OLMs,
	Laptops/PCs,	etc.)	
Termination	Integrated an	d switchable, default on	(to toggle termination
	ON/OFF hold	'TERM' button for 3 seco	onds).
	Powered acco	ording to IEC 61158 (390,	/220/390 Ohms)
Cascading depth	No limits (only	y limited by busparamet	ers of the master)
	With standard	busparameters:	
	At baudrate	Normal mode[units]	Robust mode[units]
	9.6 kbps	6	1
	19.2 kbps	6	1
	45.45 kbps	39	8
	93.75 kbps	6	1
	187.5 kbps	6	1
	500 kbps	16	3
	1.5 Mbps	20	5
	3 Mbps	17	5
	6 Mbps	13	4
	12 Mbps	13	5
	Formula to ca	Iculate number of casca	ding units with adjusted
	Tslot :		
	Number casca	ading units = (Tslot - max	:Tsdr) / (2 ×
	Data delay ti	me unit)	
	* Data delay	time unit: Normal or Re	obust mode see table
Power supply specifications			
Power supply operating voltage range	12 to 24 VDC		
Power supply absolute max. rated voltage	9 to 31 VDC		
Redundant power supply	No		
Current consumption	Max. 125 mA		
Power dissipation	Max. 1.8 W		
Reverse polarity protection	Yes		

Connector lay-out	
Power supply M8 Male	Pin 1 : 12 to 24 VDC
	Pin 2 : 12 to 24 VDC
	Pin 3 : 0 V
	Pin 4 : 0 V
	Thread : Shield
PROFIBUS M12 Male CH1 and CH2	Pin 1: +5V
	Pin 2: PROFIBUS A (green wire)
	Pin 3: DGND
	Pin 4: PROFIBUS B (red wire)
	Pin 5: not used
	Thread : Shield
PROFIBUS M12 Female CH1, CH2 and	Pin 1: +5V
MONITOR	Pin 2: PROFIBUS A (green wire)
	Pin 3: DGND
	Pin 4: PROFIBUS B (red wire)
	Pin 5: not used
	Thread : Shield
Standards and approvals	
CE	EMC Directive 2014/30/EU, class B Digital Device
	RoHs Directive 2011/65/EU
FCC	47 CFR 15, Unintentional Radiator, class B Digital Device.
UL	Report reference: E365044-A1-UL
	Standards for safety: UI 60950-1 Information Technology
	Equipment - Safety - Part 1 General Requirements
	CAN/CSA C22.2 No. 60950-1-07, Information Technology
	Equipment - Safety - Part 1: General Requirements
PROFIBUS connector specifications	





Certificate

PROFIBUS Nutzerorganisation e.V. grants to

PROCENTEC Klopperman 16, 2292 JD Wateringen, The Netherlands

the Certificate No: Z02190 for the PROFIBUS device:

Model Name:	D1+D Repeater Diagnostics
Revision:	1.0; SW/FW: 2.0; HW: 1.3
GSD:	PROC6974.GSD File Version: 2.0

This certificate confirms that the product has successfully passed the certification tests with the following scope:

DP-V0	MS0, Sync, Freeze, Auto_Baud, Set_Slave_Add
Physical Layer	RS485

Test Report Number: Authorized Test Laboratory: PCN210-DPS-01 PROCENTEC, Wateringen, The Netherlands

The tests were executed in accordance with the following documents: "Test Specifications for PROFIBUS DP Slaves, Version 3.09 from September 2008". This certificate is granted according to the document:

"Framework for testing and certification of PROFIBUS and PROFINET products". For all products that are placed in circulation by **January 02, 2022** the certificate is valid for life.

Karlsruhe, January 29, 2019

(Official in Charge)



Board of PROFIBUS Nutzerorganisation e. V.

(Karsten Schneider)

tah i

(Dr. Jörg Hähniche)

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7 About PROCENTEC

PROCENTEC is a specialist in PROFIBUS and PROFINET technology and develops products to optimize the production processes of end users. Our innovative solutions ensure that our customers successfully operate in the world of industrial automation and enjoy maximum results from their process.

PROCENTEC globally supplies all the components required to install a measurable and steerable network. We develop and produce all products in the Netherlands and they are exported through our worldwide distribution network. At PROCENTEC, we have a professional team of qualified support engineers who provide technical support on-site and online. Our professionals have more than 20 years of experience with PROFIBUS and PROFINET technology. They provide the necessary support to end users during implementation procedures, certification processes, audits and malfunctions. PROCENTEC also is the international accredited Competence and Training centre for PROFIBUS and PROFINET. We provide training courses that help employees using those techniques optimally for their business objectives.

Products

- ProfiTrace
- ComBricks
- ProfiHub
- PROFINET tools
- Cables and connectors
 - Competence centre

Services

- On-site & Online Support
- Network Audit
- Network Certfication
- Consultancy
- Testlab & Democenter

Training courses

- PROFIBUS training courses
- PROFINET training courses
- Product training courses



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