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Siemens PROFIBUS Diagnostic Repeater Termination Guide

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1. Introduction

This document provides an overview of the Siemens SIMATIC Diagnostic Repeater for PROFIBUS Decentralised Peripheral (DP) network and guidance on its correct wiring and termination. It covers the four possible wiring configurations and related termination and DP3 rotary switch settings.

This document is intended for persons working in the fields of configuring, commissioning, and servicing automation systems. General knowledge of automation technology is required to understand the manual.

2. Overview

The Siemens Diagnostic Repeater monitors a segment of an RS-485 PROFIBUS subnet (copper wire) during running operation and to signal line faults via diagnostic messages to the DP master. Using step 7, COM PROFIBUS, and operator interface systems (SIMATIC Human Machine Interface (HMI)) the location and cause of the fault can be displayed in plain text.

Through its line diagnostics during operation, the diagnostic repeater allows line faults to be rapidly detected, localised, and visualised. In this way, problems in plants can be detected at a suitable time and system standstills minimised.

The diagnostic repeater fulfils the following tasks:

- Diagnostic function for two PROFIBUS segments (DP2 and DP3): The diagnostic function supplies the fault location and the fault cause of line faults, such as a wire break or missing matching resistors. The fault location is specified relative to the existing nodes, for example, "Short-circuit in the signal line A against shield between Nodes 12 and 13".
- Repeater function for three PROFIBUS segments (DP1, DP2 and DP3): The diagnostic repeater amplifies data signals on bus lines and links individual RS-485 segments.
- The programming device is isolated galvanically or electrically from the other bus segments. When the programming-device line is withdrawn/plugged, no fault is caused at the other segments of the PROFIBUS-DP, even at high baud rates.
- The diagnostic repeater is a DP slave with an IP (Ingression Protection) 20 degrees of protection.

A Siemens Diagnostic Repeater is required in the following situations:

- When there are more than 32 devices (including Repeaters, OLMs (optical link modules), Couplers) connected to the PROFIBUS DP segments.
- When the maximum cable length of a segment (baud rate dependent) is exceeded.

Transmission rate	Max. cable length of a bus segment (in m)
9.6 to 187.5 kbps	1000
500 kbps	400
1.5 Mbps	200
3 to 12 Mbps	100

Figure 1: Allowed maximum cable length, depending on baud rate

- When electrically isolated PROFIBUS DP segments are required for example some segments underground, different potential earths, different floors in a building, branching to electrically noisy equipment (e.g., VSDs (Variable Speed Drives), large motors, arc furnaces, etc).
- When segmentation is required (up to 3 segments DP1, DP2, DP3).
- When branching is required (up to 2 segments DP2 & DP3) assuming DP1 is daisy-chained.
- The signals are to be regenerated in amplitude and time.

Refer to the Siemens SIMATIC Diagnostic Repeater for PROFIBUS DP User Manual for more information.

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3. Technical Specifications for the Siemens Diagnostics Repeater

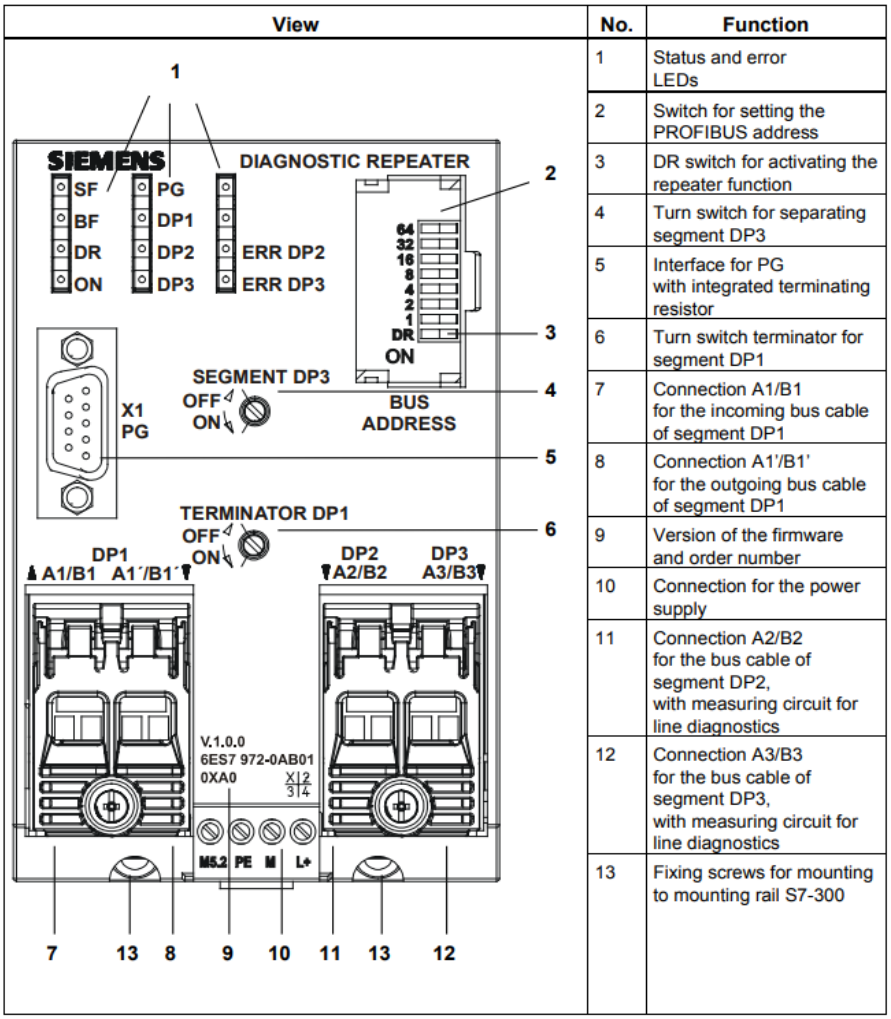
Below are the technical specifications for the Siemens Diagnostic Repeater:

Technical specifications	Values
Attenuation	
At 16 MHz	< 42 dB/km
At 4 MHz	< 22 dB/km
At 38.4 kHz	< 4 dB/km
At 9.6 kHz	< 2.5 dB/km
Characteristic impedance	
At 3 to 20 MHz	150 ± 15 Ω
At 38.4 kHz	185 ± 18.5 Ω
At 9.6 kHz	270 ± 27 Ω
Rated value	150 Ω
Loop resistance	≤ 110 Ω/km
Shield resistance	≤ 9.5 Ω/km
Working capacity	Approx. 28.5 nF/km

Figure 2: Siemens diagnostic repeater technical specifications

4. View and Operating Elements of the Siemens Diagnostic Repeater

Below is the frontal view and operating elements of the Siemens Diagnostic Repeater:



No.	Function
1	Status and error LEDs
2	Switch for setting the PROFIBUS address
3	DR switch for activating the repeater function
4	Turn switch for separating segment DP3
5	Interface for PG with integrated terminating resistor
6	Turn switch terminator for segment DP1
7	Connection A1/B1 for the incoming bus cable of segment DP1
8	Connection A1'/B1' for the outgoing bus cable of segment DP1
9	Version of the firmware and order number
10	Connection for the power supply
11	Connection A2/B2 for the bus cable of segment DP2, with measuring circuit for line diagnostics
12	Connection A3/B3 for the bus cable of segment DP3, with measuring circuit for line diagnostics
13	Fixing screws for mounting to mounting rail S7-300

Figure 3: Siemens diagnostic repeater operating elements

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5. Switches and Their Function

Below is a table explaining the various switches on the Siemens Diagnostic Repeater:

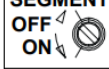
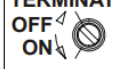
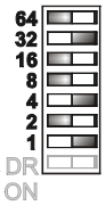
Switch	Setting	Description
	ON	Segment DP3 is activated and can be diagnosed.
	OFF	Segment DP3 is de-activated. Select this switch setting if no bus line is connected to segment DP3 or if the bus line for this segment is to be disconnected.
	ON	The terminating resistor is connected at DP1. Segment DP1 is interrupted. The right-hand part of the connector is passivated. Select this switch position if no outgoing bus line is connected at A1'/B1' to segment DP1.
	OFF	The terminator is not connected at segment DP1. Select this switch position if no outgoing bus line is connected at A1'/B1' to segment DP1.
	ON (switch on left depressed)	Switch contributes to the formation of the PROFIBUS address. The address results from the addition of the numbers which are assigned to the switches. The addresses 1 to 125 are permitted. In the example the address 64 + 16 + 8 + 2 = 90 results.
	OFF (switch on right depressed)	Switch does not contribute to the formation of the PROFIBUS address.
	ON (switch on left depressed, state on delivery)	The repeater function is activated. • It is activated if the diagnostic repeater has found the baud rate. • It is de-activated if the diagnostic repeater has lost the baud rate.
	OFF (switch on right depressed)	The repeater function is not activated (for commissioning and service purposes): • The repeater function is not activated. The DR LED is off. • Segments DP1, DP2 and DP3 of the diagnostic repeater are separated from each other. • The diagnostic repeater can only be addressed via the programming-device interface. • The diagnostic repeater carries out an active line check at segments DP2 and DP3.

Figure 4: Siemens diagnostic repeater switch functions

Activating the repeater function (DR switch = ON):

- The repeater function supports all three PROFIBUS segments of the diagnostic repeater: DP1, DP2, and DP3.

Deactivating the repeater function (DR switch = OFF):

- The repeater function can be deactivated for commissioning and service purposes.

The repeater function is not activated. The DR LED is off:

- Segments DP1, DP2 and DP3 of the diagnostic repeater are separated from each other.
- The diagnostic repeater can only be addressed via the programming-device interface.
- The diagnostic repeater carries out an active line check on segments DP2 and DP3 if there are no active nodes in these segments.

6. Fundamentals

The diagnostic repeater can connect individual segments via the repeater function. It allows the connection of 31 devices, with an RS-485 interface, per each segment namely DP1, DP2 & DP3 or 93 in total. It also means that up to 62 devices, with an RS-485 interface, can be connected behind each diagnostic repeater, up to 31 nodes on segment DP2 and DP3 respectively as a DP slave the diagnostic repeater also counts itself as a device with an RS-485 interface on each segment.

The diagnostic repeater starts with the automatic search for the baud rate. The repeater function is activated as soon as a valid baud rate is found, and the DR switch is positioned to ON. The DR LED then lights up green.

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6.1. Behaviour in the Event of an Error

If the diagnostic repeater does not receive any correct messages at one of the three segments DP1, DP2 and DP3 or at the programming-device interface (no signal level or signal level unstable), the corresponding segment will switch off.

Faults can thus not have any effect on the other segments. The SF, ERR DP2 or ERR DP3 LEDs light up red. The diagnostic signals that the respective segment is switched off. The repeater function is reactivated as soon as the fault has been eliminated.

6.2. Line Diagnostics is Possible for Nodes that are Connected to DP2 and DP3

The line diagnostic is carried out in two steps:

1. **Determining the topology**
   The diagnostic repeater determines the PROFIBUS addresses and the distance of the nodes and draws up a topology table.
2. **Determining the fault point**
   The diagnostic repeater checks the lines during bus operation. It determines the distance of the fault point, determines the cause of the fault, and emits a diagnostic message with the relative specification of the fault location.

The topology is determined by measuring the reflection. The diagnostic repeater (DR) enters the PROFIBUS addresses and the absolute distance of the nodes from itself in a topology table.

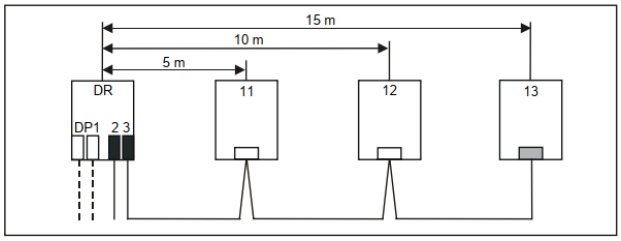


Figure 6: Topology determination

PROFIBUS address	Distance from the diagnostic repeater
11	5 m
12	10 m
13	15 m

Figure 5: Topology table

6.3. Carrying out the Determination of the Topology

After setting up a plant and after making any changes to it, the user carries out topology determination on the selected DP master system:

- Using the programming device/PC with STEP 7: **PLC > PROFIBUS > Prepare Line Diagnostics**
- Using the programming device/PC with COM PROFIBUS: **Service > Prepare Line Diagnostic**
- Using SFC 103 "DP_TOPOL" in the user program of an S7 CPU (Central Processing Unit)

The topology table is kept retentively in the diagnostic repeater, even if the supply voltage fails until topology determination is restarted.

6.4. Determining the Fault Location

While the operation is running, the diagnostic repeater analyses and evaluates the signals at segments DP2 and DP3 and determines the distance and the type of the fault points. The fault location is specified relative to the existing nodes based on the topology table (for example, "Short-circuit in signal line A to shield between nodes 12 and 13").

The bus operation is not influenced by additional messages. If bus operation does not take place, the diagnostic repeater carries out an active check of the line at specific intervals. Faults on segments DP2 and DP3 are detected by the diagnostic repeater and can be read out via the programming device interface.

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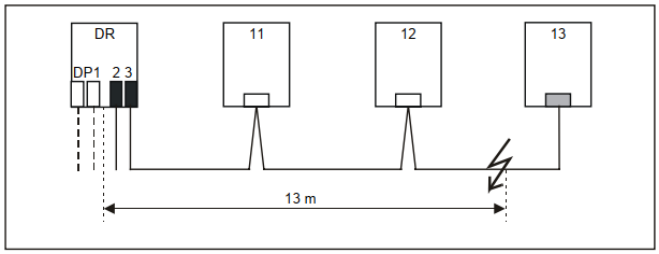


Figure 7: Fault location determination

6.5. Distance Specifications

All distance specifications have a tolerance of ±1 m. The error can therefore also have occurred at neighbouring nodes which lie within the tolerance to the specified node.

6.6. Setting a PROFIBUS Address

The PROFIBUS address results from the addition of the numbers which are assigned to the switches.

1. Swivel open the window at the diagnostic repeater.
2. Use the switches to set the desired PROFIBUS address. Do not include the bottom switch (DR ON) in the calculations/assignment. However, ensure DR ON is changed to ON for operational use of the Diagnostic Repeater.
3. Close the window.

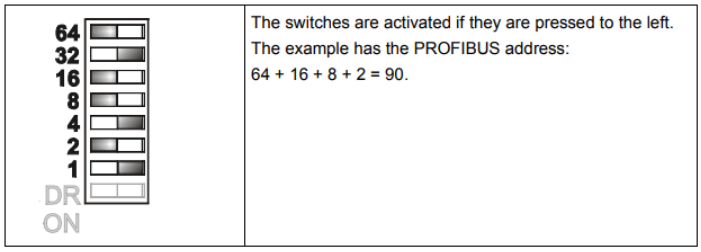


Figure 8: Setting a PROFIBUS address with a switch

6.7. Status and Error LEDs

LED	Color	Description
SF	Red	Group error
BF	Red	Bus fault
DR	Green	Repeater function
ON	Green	Voltage
PG	Yellow	Bus activity at the programming-device interface
DP1	Yellow	Bus activity at segment DP1
DP2	Yellow	Bus activity at segment DP2
DP3	Yellow	Bus activity at segment DP3
ERR DP2	Red	Line fault at segment DP2
ERR DP3	Red	Line fault at segment DP3

Figure 9: Interpreting LEDs on Siemens diagnostic repeater

6.8. Termination

DP1 can be terminated or unterminated using the TERMINATOR DP1 rotatory switch depending on if the DP1 segment ends at the Diagnostic Repeater (TERMINATOR DP1 = ON) or daisy chains through the Diagnostic Repeater (TERMINATOR DP1 = OFF).

Both DP2 and DP3 are automatically terminated and begin of their respective segments DP2 and DP3. If only DP2 is connected, then the SEGMENT DP3 rotatory switch should be set to OFF if both DP2 and DP3 are used then the SEGMENT DP3 rotatory switch should be set to ON.

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6.9. Activating/deactivating TERMINATOR DP1

If no outgoing bus cable is connected to the outgoing connection of segment DP1 (A1'/B1'▼), the rotatory switch TERMINATOR DP1 should be set to ON. If an outgoing cable is connected, then the rotatory switch should be set to OFF.

6.10. Activating/deactivating SEGMENT DP3

If no bus cable is connected to segment DP3 (A3/B3▼), the rotatory switch SEGMENT DP3 should be set to OFF. If an outgoing cable is connected, then the rotatory switch should be set to ON.

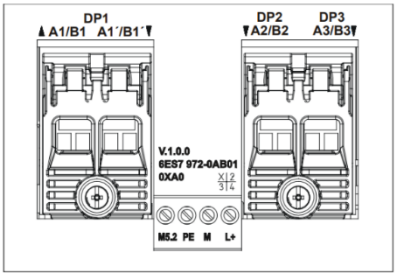


Figure 10: Activating termination and segments using rotary switch

6.11. Maximum Monitorable Line Length DP2 and DP3

If you are using standard cables, at baud rates of 9.6 kbps to 12 Mbps the diagnostic repeater can monitor a maximum of **100m** of cable per diagnostic-capable segment namely DP2 and DP3. The monitorable line length of some cable types is limited.

The length of cable for the non-diagnostic-capable segment namely DP1 is per the PROFIBUS standard based on the baud rate.

Transmission rate	Max. cable length of a bus segment (in m)
9.6 to 187.5 kbps	1000
500 kbps	400
1.5 Mbps	200
3 to 12 Mbps	100

Figure 11: Transmission length in relation to cable length

The table below shows the SIMATIC NET PROFIBUS cables that can be used in conjunction with the diagnostic repeater or are not permissible as well as the permissible line lengths in segments DP2 and DP3.

Designation	Order number	Maximal permissible line length
FC Standard Cable	6XV1 830-0EH10	100 m
FC FRNC Cable	6XV1 830-0LH10	100 m
FC Food Cable	6XV1 830-0GH10	100 m
FC Robust Cable	6XV1 830-0JH10	100 m
FC Underground Cable [1]	6XV1 830-3FH10	100 m
FC Trailing Cable	6XV1 830-3EH10	80 m
Festoon Cable [2]	6XV1 830 -3GH10	80 m
Flexible Cable [2]	6XV1830-0PH10	80 m
SIENOPYRFR shipboard cable[3]	6XV1830-0MH10	80 m
FC Process Cable for IEC 61158-2	6XV1 830-5EH10 6XV1 830-5FH10	Not permissible
Cable for festoon attachment	6XV1 830-3CH10	Not permissible

[1] Outside diameter > 8 mm, connection to the diagnostic repeater only possible after removal of the outer sheath.

[2] Direction connection possible to the diagnostic repeater.

[3] Convert to a FastConnect cable.

Figure 12: Maximum permissible cable lengths

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6.12. Cascading Depth

Up to nine diagnostic repeaters can be connected in series. A diagnostic message is produced if more than nine diagnostic repeaters are connected in series.

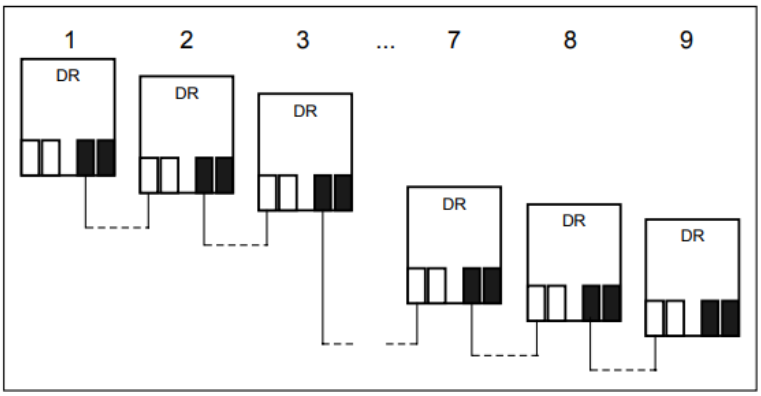


Figure 13: Siemens diagnostic repeater cascade depth

6.13. Network Design with an Optical Link Module (OLM)

If you use an Optical Link Module (OLM) with integrated section monitoring in your plant, you must de-activate the determination of the topology for segment (DP2) of the diagnostic repeater (DR 4 in the example below) to which the OLM is connected.

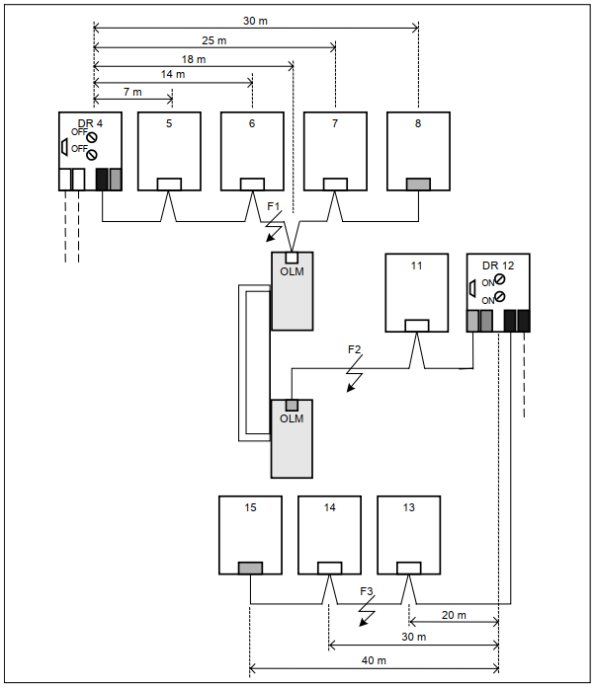


Figure 14: Network layout using an OLM with a deactivated topology determination in integrated section monitoring

6.14. Spur Lines

Spur lines, including those within devices, are not permissible within segments DP2 or DP3. The party line of the S7-300, for example, corresponds to an internal device spur line with a length of up to 0.6m and is not permitted within segments DP2 or DP3 only on DP1.

Spur lines are not allowed within segments DP2 or DP3 of diagnostic repeaters since they prevent correct determination of the topology and fault points.

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6.15. Avoiding Spur Lines

Spur lines arise, for example, when programming devices or nodes are connected as a branch or when PROFIBUS connectors are stacked over each other.

Methods of avoiding spur lines:

- Connect the programming devices directly to the programming device interface of the diagnostic repeater or
- To connect programming devices, use only the SIMATIC S5/S7 spur line for 12 Mbps ("active cable").
- The RS-485 bus terminal may not be used.

6.16. Arrangement of the Nodes without Spur Lines

The following example shows an illegal arrangement since Node 14 is connected via a spur line, for example by stacking two connectors over each other.

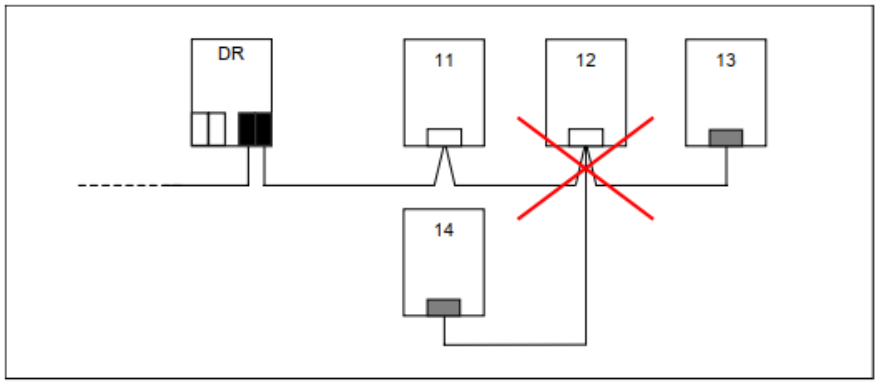


Figure 15: Example of a spur line connection

6.17. Only One Measuring Circuit at a Segment

Diagnostic Repeaters must be circuited so that a segment has a maximum of one measuring circuit. The diagnostic repeater has two interfaces with measuring circuits (DP2 and DP3) as well as one interface without a measuring circuit (DP1). A diagnostic repeater may only be connected to segment DP2 or DP3 with the interface DP1.

6.18. Valid Arrangements

The following examples show valid interconnections between two diagnostic repeaters. Up to 30 devices with RS-485 interfaces can be positioned between the Diagnostic Repeaters.

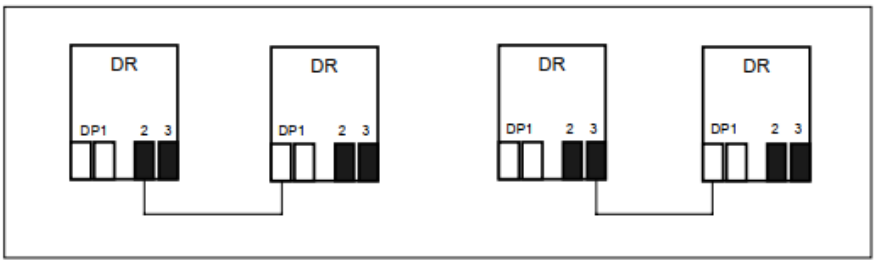


Figure 16: Valid arrangements in interconnected diagnostic repeaters

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6.19. Invalid Arrangements

A diagnostic message is issued if two or more measuring circuits exist at one segment. The following examples show invalid interconnections between two Diagnostic Repeaters:

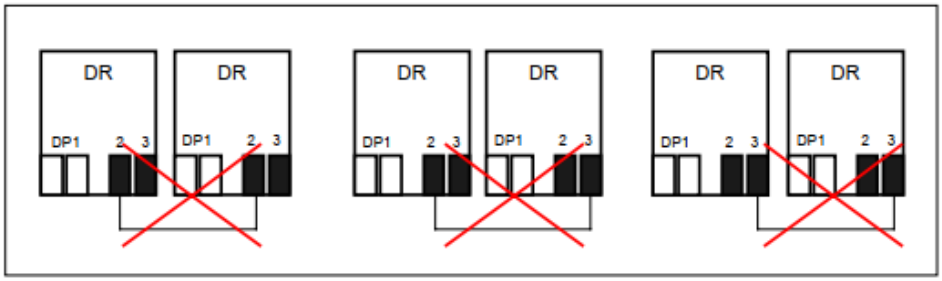


Figure 17: Invalid arrangement in interconnected diagnostic repeater

7. Four Wiring Configurations for a Siemens Diagnostic Repeater

There are four possible configurations in terms of wiring a Siemens Diagnostic Repeater namely:

1) DP1 Terminated at the Diagnostic Repeater and only DP2 used
2) DP1 Terminated at the Diagnostic Repeater and both DP2 & DP3 used
3) DP1 Connected through the Diagnostic Repeater and only DP2 used
4) DP1 Connected through the Diagnostic Repeater and both DP2 & DP3 used

Both DP1 and DP2 must be used as a minimum to be correctly wired. DP1 must be wired on the incoming connection (A1/B1▲). The use of the outgoing connection for DP1 (A1'/B1'▼) is optional as is the use of DP3.

Below is the legend related to the diagrams to follow for the four possible configurations.

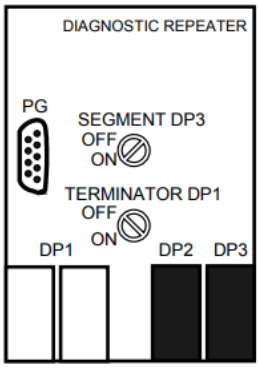
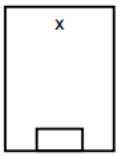
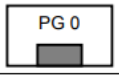
Figure	Description	
	PG	Interface for PG with integrated terminating resistor
	SEGMENT DP3	Activate/deactivate segment DP3 ON = activate segment DP3 OFF = deactivate segment DP3
	TERMINATOR DP1 P3	Terminating resistor for segment DP1 ON = terminating resistor connected OFF = terminating resistor not connected (if both connections to DP1 are used)
	DP1	Connections for segment DP1
		Connection A1'/B1' of segment DP1 de-activated
	DP2	Connections for segment DP2, with measuring circuit for line diagnostics
	DP3	Connection for segment DP3, with measuring circuit for line diagnostics
		Segment DP3 de-activated
		Terminator at Node x not connected
		Terminator connected Grey = manually set Black = automatically set
	PG	PG, terminator connected

Figure 18: Diagnostic repeater legend related to diagrams in section 7

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7.1. DP1 Terminated at the Diagnostic Repeater and Only DP2 Used

In this scenario, the DP1 segment terminates at the Siemens Diagnostic Repeater (DR 3) and only DP2 is used. As a result, TERMINATOR DP1 is set to ON and SEGMENT DP3 is set to OFF.

- Segment DP1 starts at the DP-Master (2) and ends at Diagnostic Repeater. The Segment DP1 is terminated at both the DP-Master (2) and Diagnostic Repeater using TERMINATOR DP1.
- Segment DP2 starts at the Diagnostic Repeater and ends at Device 10. The segment is terminated at both the Diagnostic Repeater, automatically, and Device 10.
- Segment DP3 is not used.

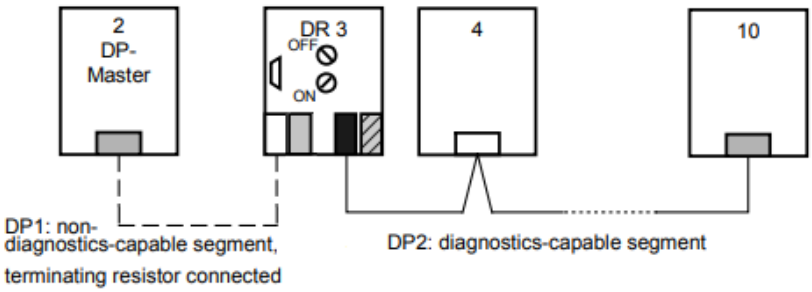


Figure 19: DP1 Terminated at the Diagnostic Repeater and only DP2 used

- Note: If only one diagnosable segment is to be used, segment DP2 of the Diagnostic Repeater must be used and not segment DP3.
- As no bus cable is connected to the outgoing connection of segment DP1 (A1'/B1▼), the TERMINATOR DP1 rotary switch must be switched to ON. This activates the terminator for segment DP1 and de-activates the connection A1'/B1'▼.
- As there is no bus cable connected to segment DP3, the SEGMENT DP3 rotary switch must be switched to OFF.
- A maximum of 31 devices with RS-485 interfaces can be placed on the segment DP2 after the Diagnostic Repeater.
- The maximum total cable length of the DP2 segment is 100m.

7.2. DP1 Terminated at the Diagnostic Repeater and Both DP2 & DP3 Used

In this scenario, the DP1 segment terminates at the Siemens Diagnostic Repeater (DR 3) and both DP2 and DP3 are used. As a result, TERMINATOR DP1 is set to ON and SEGMENT DP3 is set to ON.

- Segment DP1 starts at the DP-Master (2) and ends at Diagnostic Repeater. The Segment DP1 is terminated at both the DP-Master (2) and Diagnostic Repeater using TERMINATOR DP1.
- Segment DP2 starts at the Diagnostic Repeater and ends at Device 20. The segment is terminated at both the Diagnostic Repeater, automatically, and Device 20.
- Segment DP3 starts at the Diagnostic Repeater and ends at Device 10. The segment is terminated at both the Diagnostic Repeater, automatically, and Device 10.

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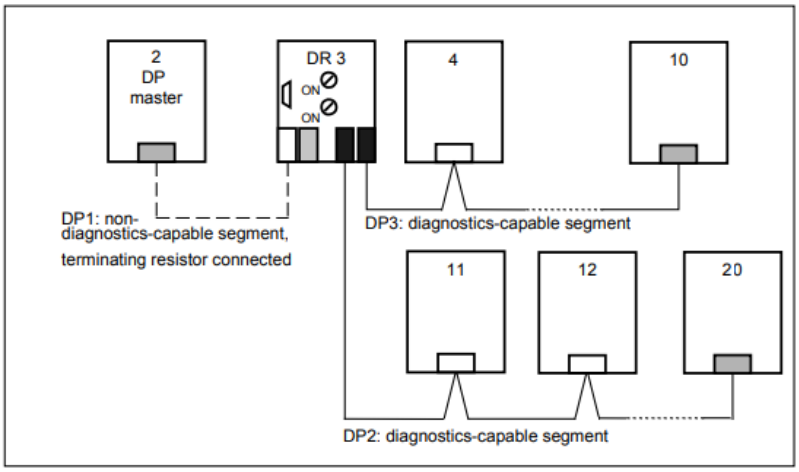


Figure 20: DP1 Terminated at the Diagnostic Repeater and both DP2 & DP3 used

- As a bus line is connected to segment DP3, the SEGMENT DP3 rotary switch must be set to ON. As no bus cable is connected to the outgoing connection of segment DP1 (A1'/B1▼), the TERMINATOR DP1 rotary switch must be switched to ON. This activates the terminator for segment DP1 and de-activates the connection A1'/B1'▼.
- As there is a bus cable connected to segment DP3, the SEGMENT DP3 rotary switch must be switched to ON.
- A maximum of 31 devices with RS-485 interfaces can be placed on DP2 and DP3 respectively after the Diagnostic Repeater.
- The maximum total cable length of the DP2 and DP3 segments is 100m in both cases.

7.3. DP1 Daisy Chained Through the Diagnostic Repeater and Only DP2 Used

In this scenario, the DP1 segment connects through the Siemens Diagnostic Repeater (DR 3) and only DP2 is used. As a result, TERMINATOR DP1 is set to OFF and SEGMENT DP3 is set to OFF.

- Segment DP1 starts at the DP-Master (2), daisy chains through the Diagnostic Repeater and ends at Device X (Not shown) which is at the end of Segment DP1. The Segment DP1 is terminated at both the DP-Master (2) and Device X.
- Segment DP2 starts at the Diagnostic Repeater and ends at Device 10. The segment is terminated at both the Diagnostic Repeater, automatically, and Device 10.
- Segment DP3 is not used.

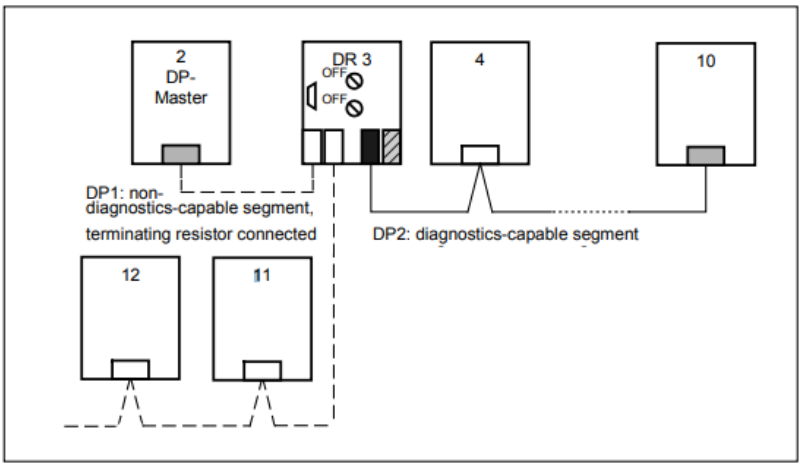


Figure 21: DP1 Daisy Chained through the Diagnostic Repeater and only DP2 used

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- Again note: If only one diagnosable segment is to be used, segment DP2 of the Diagnostic Repeater must be used and not segment DP3.
- As a bus cable is connected to the outgoing connection of segment DP1 (A1'/B1▼), the TERMINATOR DP1 rotary switch must be switched to OFF. This deactivates the terminator for segment DP1 and activates the connection A1'/B1'▼.
- As there is no bus cable connected to segment DP3, the SEGMENT DP3 rotary switch must be switched to OFF.
- A maximum of 31 devices with RS-485 interfaces can be placed on the segment DP2 after the Diagnostic Repeater.
- The maximum total cable length of the DP2 segment is 100m.

7.4. DP1 Connected Through the Diagnostic Repeater and Both DP2 & DP3 Used

In this scenario, the DP1 segment connects through the Siemens Diagnostic Repeater and both DP2 and DP3 are used. As a result, TERMINATOR DP1 is set to OFF and SEGMENT DP3 is set to ON.

- Segment DP1 starts at the DP-Master (2), daisy chains through the Diagnostic Repeater and ends at Device X (Not shown) which is at the end of Segment DP1. The Segment DP1 is terminated at both the DP-Master (2) and Device X.
- Segment DP2 starts at the Diagnostic Repeater and ends at Device X (Not shown) which is at the end of Segment DP2. The segment is terminated at both the Diagnostic Repeater, automatically, and Device X.
- Segment DP2 starts at the Diagnostic Repeater and ends at Device 30. The segment is terminated at both the Diagnostic Repeater, automatically, and Device 30.
- Segment DP3 starts at the Diagnostic Repeater and ends at Device 10. The segment is terminated at both the Diagnostic Repeater, automatically, and Device 10.

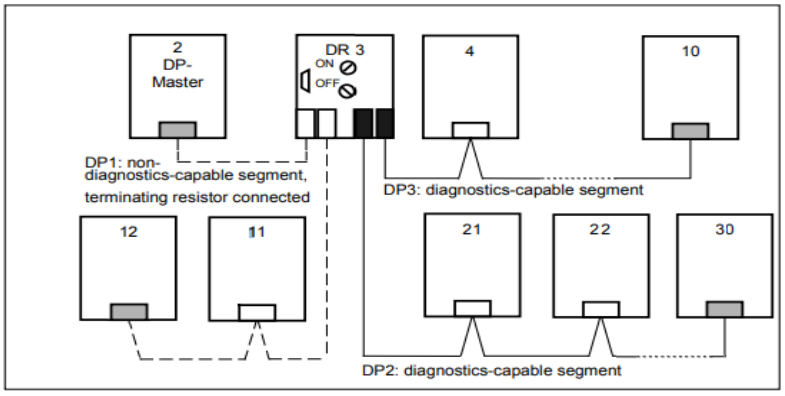


Figure 22: DP1 Connected Through the Diagnostic Repeater and both DP2 & DP3 used

- As a bus cable is connected to the outgoing connection of segment DP1 (A1'/B1▼), the TERMINATOR DP1 rotary switch must be switched to OFF. This deactivates the terminator for segment DP1 and activates the connection A1'/B1'▼.
- As there is a bus cable connected to segment DP3, the SEGMENT DP3 rotary switch must be switched to ON.
- A maximum of 31 devices with RS-485 interfaces can be placed on DP2 and DP3 respectively after the Diagnostic Repeater.
- The maximum total cable length of the DP2 and DP3 segments is 100m in both cases.

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8. Connecting the PROFIBUS Cable

Connect the PROFIBUS LAN cable to the PROFIBUS Standard Repeater, as follows:

1. Cut the PROFIBUS cable to the required length.
2. Strip the insulation from the PROFIBUS cable as shown in Figure 5-10. The braided shield must be folded back onto the cable. Only then can the shield clamp serve as strain relief and as the shield contact.

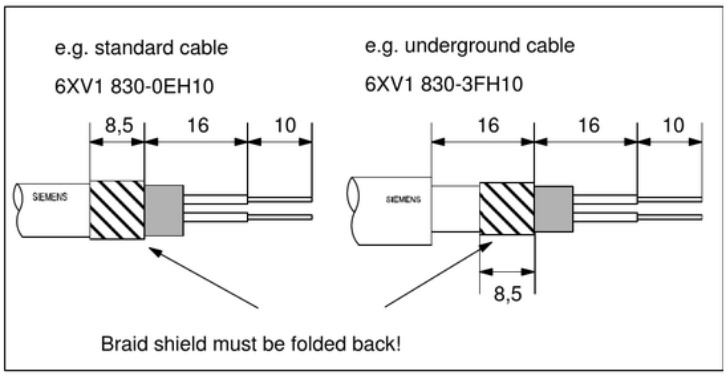


Figure 23: Stripping the Cable to Connect it to the RS-485 Repeater

3. Connect the PROFIBUS LAN cable to the PROFIBUS Standard Repeater:
   Connect the same wires (green/red for the PROFIBUS LAN cable) to the same terminal A or B (in other words always connect terminal A with a green wire and terminal B with a red wire or vice versa).
4. Tighten the shield clamps so that the shield makes good contact with the clamp.

About Industrial Data Xchange:

Industrial Data Xchange (IDX) provides industrial ICT products, services, solutions and training that connect plant infrastructure and transform complex data into actionable insights, supporting smarter decisions and operational excellence.

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