

FLEXtra twinRepeater

700-972-2AA02

Instruction Manual

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Note:

We have checked the content of this manual for conformity with the hardware and software described. Nevertheless, because deviations cannot be ruled out, we cannot accept any liability for complete conformity. The information in this manual is regularly updated. When using purchased products, please heed the latest version of the manual, which can be viewed in the Internet at www.helmholz.de, from where it can also be downloaded.

Our customers are important to us. We are always glad to receive suggestions for improvement and ideas.

Changes in this document:

Status	Date	Changes
1	29. 06. 2009	First edition
1a	30. 09. 2009	Minor changes

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1 Safety Information


The safety information indicates possible hazards and provides information about how you can avoid hazardous situations. Therefore please observe the safety information given for your own and other people's safety.


1.1 General


FLEXtra twinRepeater is only used as part of a complete system.

 *The operator of a machine system is responsible for observing all safety and accident prevention regulations applicable to the application in question.*

 *During configuration, safety and accident prevention rules specific to the application must be observed.*

 *Emergency OFF facilities according to EN 60204 / IEC 204 must remain active in all modes of the machine system. The system must not enter an undefined restart.*

 *Faults occurring in the machine system that can cause damage to property or injury to persons must be prevented by additional external equipment. Such equipment must also ensure entry into a safe state in the event of a fault. Such equipment includes electromechanical safety buttons, mechanical interlocks, etc. (see EN 954-1, risk estimation).*

 *Never execute or initiate safety-related functions using the operator terminal.*

1.2 Restriction of access



Only authorized persons must have access to the FLEXtra twinRepeaters!

FLEXtra twinRepeater is an open item of equipment and must only be installed in electrical equipment rooms, cabinets or housings. Access to the electrical equipment rooms, barriers, or housings must only be possible using a tool or key and only permitted to personnel having received instruction or authorization. See also Chapter 2.

1.3 Target group for these instructions

These instructions are addressed to project planners and installers of FLEXtra twinRepeater.

It is intended as a reference work for project planners. It provides the installing technician with all the necessary data.

FLEXtra twinRepeater is intended for use in a PROFIBUS network only. For that reason, the configuring engineer, user, and installing technician must observe the standards, safety and accident prevention rules applicable in the particular application. The operator of the automation system is responsible for observing these rules.

1.4 Use as intended

FLEXtra twinRepeater must only ever be used as described in these instructions.

1.5 Avoiding use not as intended!

Safety-related functions must not be controlled using FLEXtra twinRepeater alone.

1.6 Symbols used

The following symbols are used in this manual.



Caution, indicates hazards and sources of error



Hazard, general or specific



*Danger of **electric shock***



Gives information

2 Installation and Mounting

FLEXtra twinRepeater must be installed according to VDE 0100 IEC 364. FLEXtra twinRepeater has degree of protection IP20.

Ambient temperature: 0 °C – 60 °C.



Before you start installation work, all system components must be disconnected from their power source. Danger of electric shock!



During installation, the safety and accident prevention rules that apply to the specific application must be followed (e.g. protection against static discharges).

FLEXtra twinRepeater is supposed to be installed on a top-hat-rail.

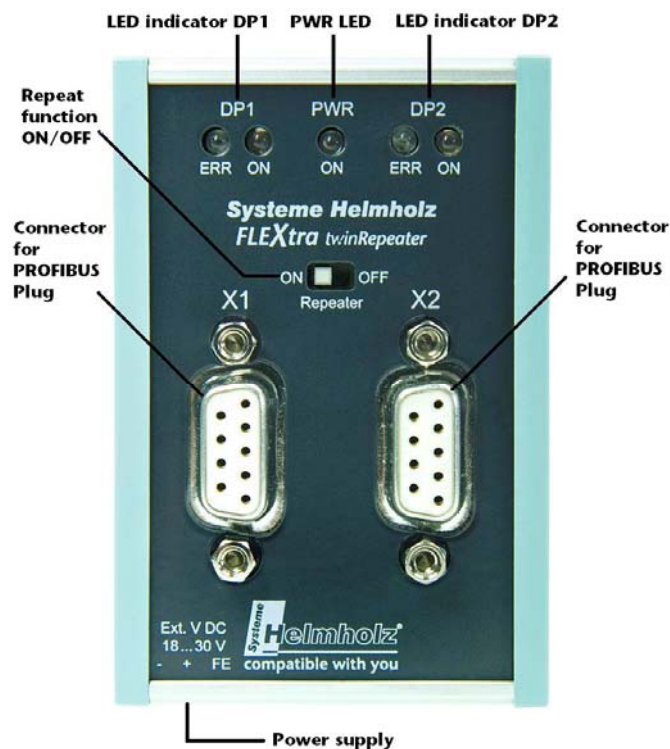


Fig. 2-1:
System function
overview

FLEXtra twinRepeater is supposed to be used with PROFIBUS plugs.

The Sub-D female connectors are arranged in a way that the cables of PROFIBUS are routed downward out of the repeater housing. Here needs to be room for PROFIBUS cables.

If FLEXtra twinRepeater is at the end or beginning of a segment, the termination at PROFIBUS plug must be ON.

3 Short Description of FLEXtra twinRepeater

3.1 Application and function description

FLEXtra twinRepeater is a normal PROFIBUS Repeater despite its small dimensions. It regenerates the electrical signal arriving on the bus line and retransmits it. The level, edge steepness, and mark-to-space ratio of the signals are reproduced exactly. At the same time, it electrically isolates the receive lines from the transmit lines. There is a switch on the front of FLEXtra twinRepeater to switch off the repeating function.

These functions can be used

1.) to add a further segment to an existing PROFIBUS. This increases the possible number of stations on PROFIBUS by another 31.

2.) to cover long cable distances without any reduction in data transmission rate.

FLEXtra twinRepeater is looped into PROFIBUS in place of a normal PROFIBUS connector. This permits the extension, segmentation or branching of PROFIBUS without extensive installation. FLEXtra twinRepeater needs to be run by an external power supply.

FLEXtra twinRepeater permits transmission rates of 9.6 Kbps to 12 Mbps.

3.2 The LED displays/switches and their meaning

On the front of the housing of FLEXtra twinRepeater you will find the LED displays that show you the operating status of FLEXtra twinRepeater and the connected PROFIBUS segments 1 and 2.

Meanings:

LED	Luminous period	Meaning
DP1/2 ERR (Red)	Flashing	Erroneous telegrams are received
	OFF	No errors at BUS
DP1/2 ON (Yellow)	Flashing / continuous	Shows that data is being received
PWR ON (Green)	Flashing	Baudrate is searched
	continuous	Baudrate has been detected → Repeater is in use
	OFF	No power supply, or device is defective

Switch	Position	Meaning
	ON	Repeating function is enabled; therefore, modules connected to DP2 are accessible via DP1.
	OFF	Repeating function is disabled; therefore, modules connected to DP2 are separated from DP1.

3.3 Connections

PROFIBUS is connected to FLEXtra twinRepeater via the SUB-D female connector. 2 PROFIBUS plugs are necessary to do so, see Fig. 3-1. Because the Repeater can be embedded via PROFIBUS plug, PROFIBUS plugs with PG socket can be used as well. Therefore, it is possible to connect e.g. a PROFIBUS Analyzer to both nets (DP1 and DP2).



Fig. 3-1:
FLEXtra twinRepeater
with PROFIBUS
connectors

Power supply via power supply connectors at the lower part of the repeater.

Segment 1	DP1/X1
Segment 2	DP2/X2 (repeated net)

Pin assignment

Pin	PROFIBUS / SUB D connector 9-way X1/X2
1	-
2	M 24 V
3	DATA B
4	-
5	GND
6	+5V
7	+24 V
8	DATA A
9	-

3.4 Examples of circuits

The combinations that are possible to derive bus structures can be derived from the simplified diagram, see Fig. 3-2:

!
The bus cables are always connected as stub lines. Do not connect Ax/Bx and Ax'/Bx' by cable!

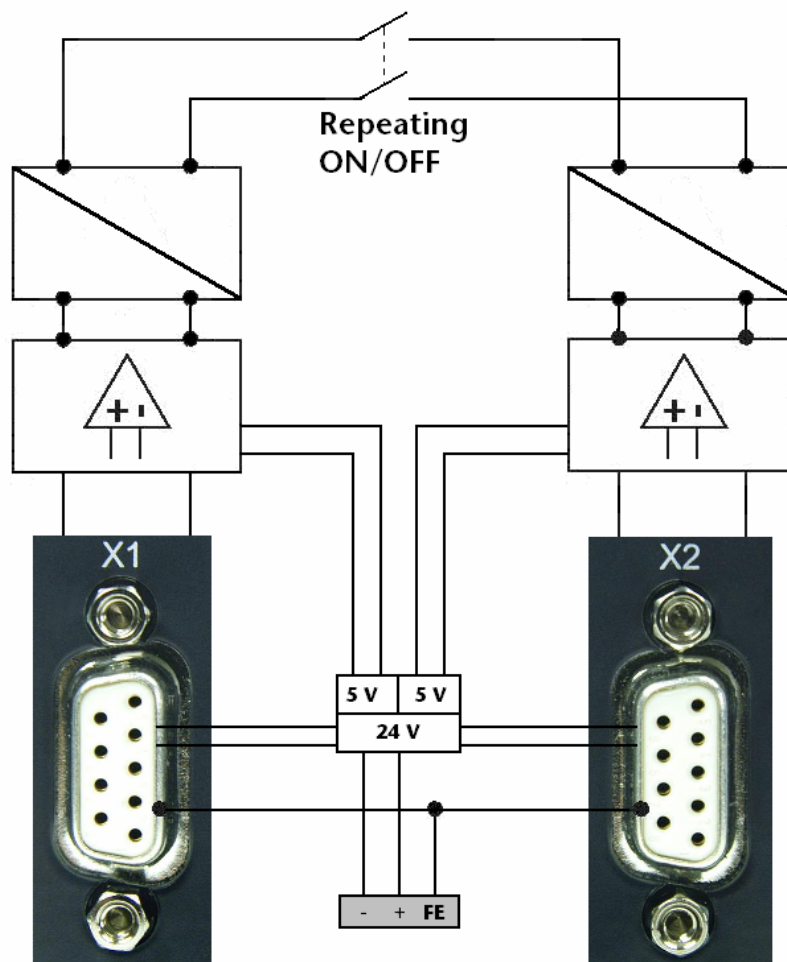


Fig. 3-2:
 Block diagram of the
 repeater

For long bus lines, repeaters can be connected in series (up to three repeaters):

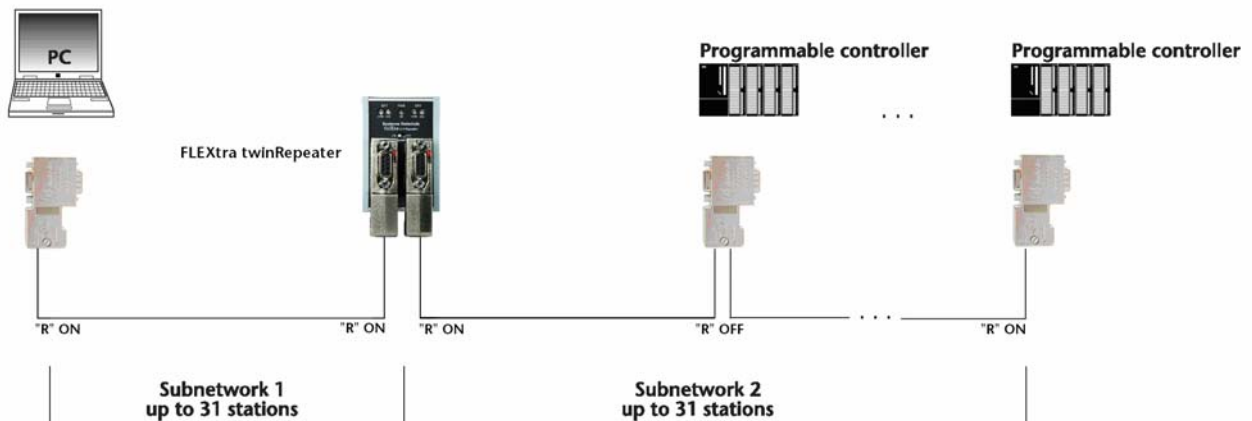


Fig. 3-3:
Application example of
a long bus line

For complex bus structures, the bus can be constructed with hierarchical or star topology using repeaters.

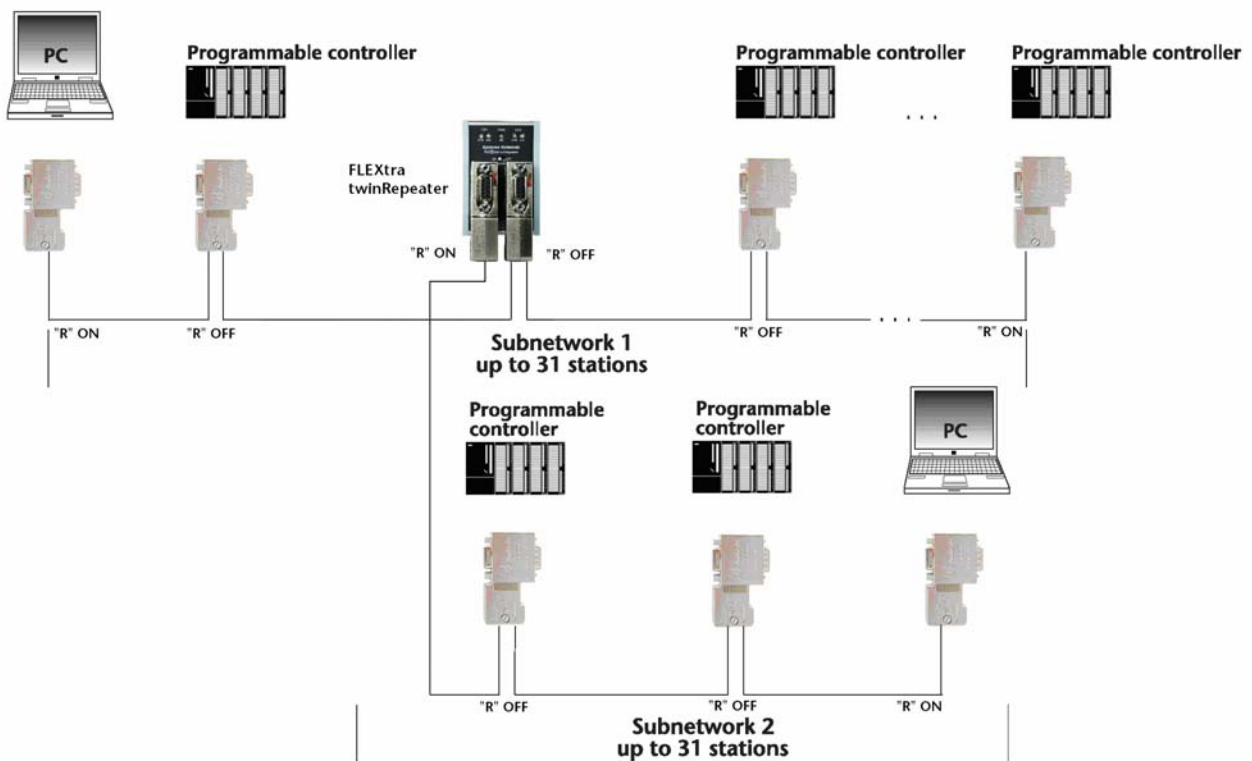


Fig. 3-4:
Application example of
more than 32 stations

Up to 31 stations can be connected to one repeater in a subnetwork. The number of stations can be increased still further by interposing further repeaters.

4 Technical Data

4.1 Operating conditions

Dimensions in mm (LxWxH)	72 x 51 x 35 mm
Weight	approx. 110 g
Housing	Protective class IP 20

Power supply

Voltage	+18 - 24 VDC
Output voltage	5 V
Potential separation	500 V
Current consumption	typically 60 mA

Permissible ambient conditions

• Ambient temperature during operation	0 °C ... +60 °C
• Temperature during transportation and storage	-25 °C ... +90 °C

PROFIBUS interface

Transmission rate	9.6 Kbps to 12 Mbps, automatic detection
Protocol PROFIBUS DP	per EN 61 158 - 2
Connector	SUB D 9-way

Special features

Quality assurance per ISO 9001:2008

4.2 Transmission rates

The transmission rates on the bus segment are automatically detected by FLEXtra twinRepeater.

Transmission rate	Max. segment length
9.6 Kbps	1000 m
19.2 Kbps	1000 m
45.45 Kbps	1000 m
93.75 Kbps	1000 m
187.5 Kbps	1000 m
500 Kbps	400 m
1.5 Mbps	200 m
3 Mbps	100 m
6 Mbps	100 m
12 Mbps	100 m

4.3 Accessories

Manual, German/English	900-972-2AA02/de 900-972-2AA02/en
Power supply adapter with plug	700-751-SNT01
Input: 100-240 V AC / 47-63 Hz / 400 mA	
Output: 24 V DC / 625 mA	
EasyConnect® PROFIBUS connector without PG	700-972-0BA50
EasyConnect® PROFIBUS connection with PG	700-972-0BB50
EasyConnect® PROFIBUS connector for flexible cables, without PG	700-972-0FA50
EasyConnect® PROFIBUS connector for flexible cables, with PG	700-972-0FB50
EasyConnect® PROFIBUS connector axial for solid cable	700-972-0CA50
EasyConnect® PROFIBUS connector axial for flexible cable	700-972-0CF50
EasyConnect® PROFIBUS connector with diagnostic LED without PG	700-972-7BA50
EasyConnect® PROFIBUS connector with diagnostic LED with PG	
Bus connector for PROFIBUS 90° without PG	700-972-0BA12
Bus connector for PROFIBUS 90° with PG	700-972-0BB12
Bus connector for PROFIBUS 35° without PG	700-972-0BA41
Bus connector for PROFIBUS 35° with PG	700-972-0BB41
Bus connector for PROFIBUS axial	700-972-0CA12
Bus connector for PROFIBUS with Atex approval, without PG, Ex-Zone 2	700-973-0BA12
Bus connector for PROFIBUS with Atex approval, with PG, Ex-Zone 2	700-973-0BB12
PROFIBUS connector diagnostics without PG	700-972-7BA12
PROFIBUS connector diagnostics with PG	700-972-7BB12
PROFIBUS Compact Repeater	700-972-0RB12
Insulation stripping tool for PROFIBUS	700-972-6AA00

5 Further Documentation

Internet: www.helmholz.de, www.profibus.de

Siemens Manuals: "Installing and Wiring the S7-300/S7-400", "S7-300 Module Data"

"Profibus DP/DPV1", Manfred Popp, Hüthig Verlag

"Profibus-Handbuch", Max Felser, Berner Fachhochschule, CH-3400 Burgdorf,
<http://www.profibus.felser.ch/planung/installation/PROFIBUSInstallation%20D11.pdf> (in German)

Notes