RER 133
Bus Connection Module

Technical Description

ABB

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This document includes caution and information icons that point out safety-related conditions or other important information. The corresponding icons should be interpreted as follows:

The caution icon indicates important information or warning related to the concept discussed in the text. It might indicate the presence of a hazard which could result in corruption of software or damage to equipment or property.

The information icon alerts the reader to relevant facts and conditions.

Although caution hazards are associated with equipment or property damage, it should be understood that operation of damaged equipment could, under certain operational conditions, result in degraded process performance leading to personal injury or death. Therefore, comply fully with all caution notices.

2. Safety information

⚠	Dangerous voltages can occur on the connectors, even though the auxiliary voltage has been disconnected.
	National and local electrical safety regulations must always be followed.
	The device contains components which are sensitive to electrostatic discharge. Unnecessary touching of electronic components must therefore be avoided.
STOP	Only a competent electrician is allowed to carry out the electrical installation.
	Non-observance can result in death, personal injury or substantial property damage.
	Breaking the sealing tape of the device will result in loss of warranty and proper operation will no longer be guaranteed.

3. General

The RER 133 Bus Connection Module acts as an interfacing unit between an RE_54_ host device and a SPA, Modbus or DNP 3.0 system. The RER 133 module converts RS-232 signals to RS-485 signals. RS-485 can be connected by using 2- or 4-wire mode.

The RER 133 module is connected by a cable to the RS-232 D-type connector marked X3.2 on the rear panel of the RE_ 54_ host device. RER 133 is not a stand alone device. An RE_ 54_ host device is always required to power the module. No external power supply is supported.

RER 133 supports communication speeds from 300 to 19200 bits/s. Collision detection and collision avoidance is supported for communication speeds 4800, 9600 and 19200 bits/s.

A RER 133 delivery includes the RER 133 Bus Connection Module, a connection cable (1MRS120542) and this manual.

4. Principle of operation

The RER 133 Bus Connection Module is designed to work with RE_ 54_ products. The module utilizes the RS-232 communication port located on the rear panel of the RE_ 54_. The module is not designed to be connected to any other ABB product, nor to any third party products.

REF 542 and REF 542plus are not supported by RER 133.

The signal levels and the functionality of the RER 133 module are defined in the RS-485 standard. RER 133 module is a regular type of RS-485 interface, meaning that a maximum of 32 nodes can be connected in a daisy chain type of bus configuration.

Collision detection on the RS-485 bus is supported when a maximum of 32 nodes are connected to the same daisy chain. In order for collision detection to operate, the communication speed has to be set to 4800, 9600 or 19200 bits/s. These speeds are set by using the DIP switches on the front of the module. For an example on how to set these DIP switches, please see section “Module configuration” on page 9. When collision detection is not used, the communication speed does not have to be set.

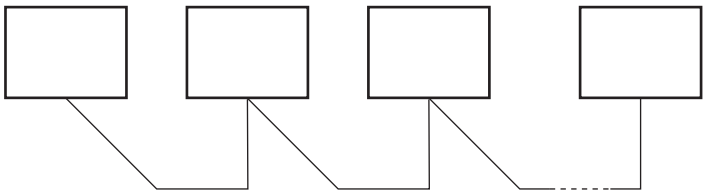

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Fig. 4.-1 Daisy chain

5. Construction and installation

The RER 133 module is mounted on the side of the RE_ 54_ host device and is connected by the supplied cable to the 9-pin female type D-connector (X3.2) of the RE_ 54_ host device.

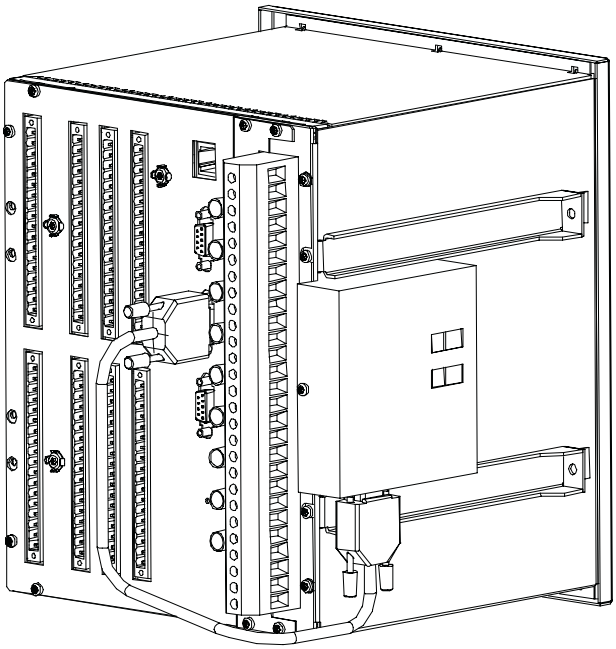

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Fig. 5.-1 RER 133 mounted on a REF 54_ host device

Only the cable supplied with the RER 133 may be used to connect the RER 133 module to the RE_ 54_.

The RER 133 module consists of a printed circuit board and is housed in a metal case. Because shielded cables and an RS-485 interface is used, special attention must be paid to the grounding.

The dimensions of the case are: 95 mm x 101 mm x 30 mm (95 mm x 105 mm x 38 mm with mounting bracket).

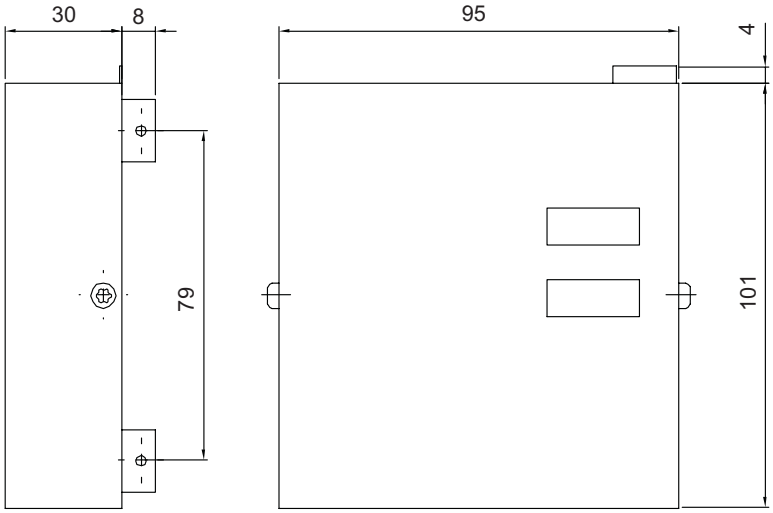

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Fig. 5.-2 Dimensions of the RER 133 Bus Connection Module

5.1. Module configuration

The attributes for the RER 133 can be set through the two DIP switches on the front of the module. The DIP switches are labeled S1 and S2.

Switch S1	Usage
1	2-wire enable
2	4-wire enable
3	Set communication speed to 19200 bits/s
4	Set communication speed to 9600 bits/s
5	Set communication speed to 4800 bits/s
6	Not connected
7	Not connected
8	Not connected

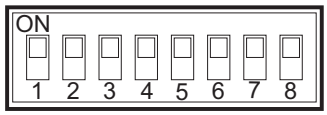

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Fig. 5.1.-1 Settings for the S1 DIP switch

Switch S2	Usage
1	4-wire pull-down enable
2	4-wire termination enable
3	4-wire pull-up enable
4	2-wire pull-down enable
5	2-wire termination enable
6	2-wire pull-up enable
7	Not connected
8	Not connected

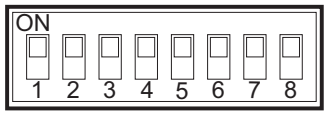

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Fig. 5.1.-2 Settings for the S2 DIP switch

4 wire mode requires both the 2- and 4- wire switches for pull-down/termination/pull-up to be set.

5.2. Configuration examples

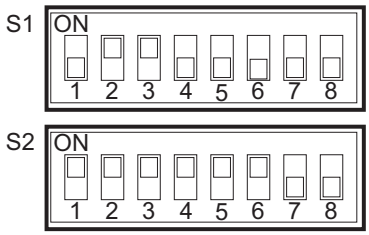

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Fig. 5.2.-1 4-wire, terminated, 19200 bits/s, pull-up and pull-down active

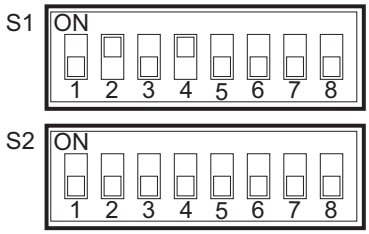

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Fig. 5.2.-2 4-wire, no termination, 9600 bits/s

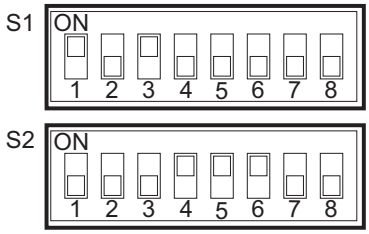

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Fig. 5.2.-3 2-wire, terminated, 19200 bits/s, pull-up and pull-down active

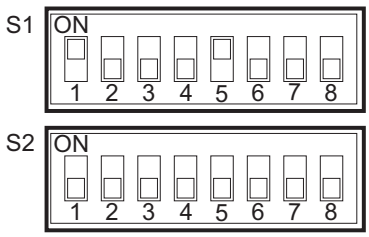

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Fig. 5.2.-4 2-wire, no termination, 4800 bits/s

6. Interfaces

The RS-485 bus used by SPA, Modbus and DNP 3.0 requires a daisy chain topology.

A daisy chain topology means a node-to-node connection, where nodes are chained using cables of minimal length. The cables must be point to point, no stars, rings or other topologies are allowed. The bus must be terminated at both ends using 120Ω resistors. The RER 133 includes as an option the use of internal termination resistors. These resistors are enabled through DIP switch S2.

Pull-up and pull-down resistors must be used in one of the nodes, in order for the receivers to be able to determine the state of the bus when it is idle. These resistors can be enabled through DIP switch S2.

Please see sections “Module configuration” on page 9 and “Configuration examples” on page 10 for the correct settings.

The RS-232 interface (X1) of the RER 133 module is shown in Fig. 6.-1.

Pin	Usage
1	Not connected
2	TX
3	RX
4	+15 V DC, power supply for the RER 133 module
5	GND, signal ground for power supply
6	DSR (CD/CS)
7	RTS
8	Not connected
9	Not connected

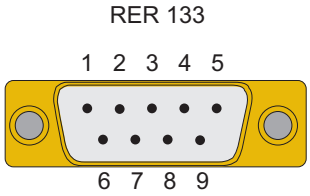

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Fig. 6.-1 Pin usage table for the 9-pin D-type connector (X1)

The RS-485 interface of the RER 133 module is shown in Fig. 6.-2. The connector (X2) is an 8-pin Weidmüller terminal block. If GND (pin 5) is used, then it is required for all other nodes to be isolated as well.

Pin	Signal	Functionality
1	Shield GND	Can be used for cable shield grounding
2	Shield GND C	Can be used for cable shield grounding via a capacitator
3	NC	Not connected
4	AGND	Can be used for potential balancing between RS-485 nodes
5	B-	Differential signal B (-) 1)
6	A+	Differential signal A (+) 1)
7	B-	4-wire differential signal B (-) 2)
8	A+	4-wire differential signal A (+) 2)

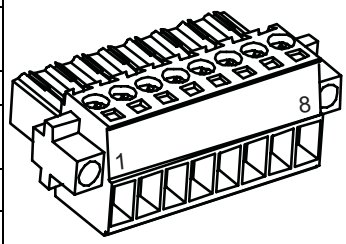

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Fig. 6.-2 Pin usage table for the Weidmüller terminal block (X2)

1) used for Tx in 4-wire connection
2) used for Rx in 4-wire connection

The EIA RS-485 Specification labels the data wires "A" and "B", but many manufacturers label their wires "+" and "-". In our experience, the "+" wire should be connected to the "A" line, and the "-" wire to the "B" line.

When wiring RS-485 , use a shielded twisted pair cable with an internal impedance of 100-120Ω. Examples of recommended cables are CAT 5, Belden RS-485 (9841-9844) and Alpha Wire (Alpha 6222-6230).

The shield of the cables must be directly connected to ground in one of the nodes. In the other nodes the connection should be made via a capacitor, i.e. if the shield of the cable is connected to pin 1 in node 1, all the other nodes must be grounded using pin 2.

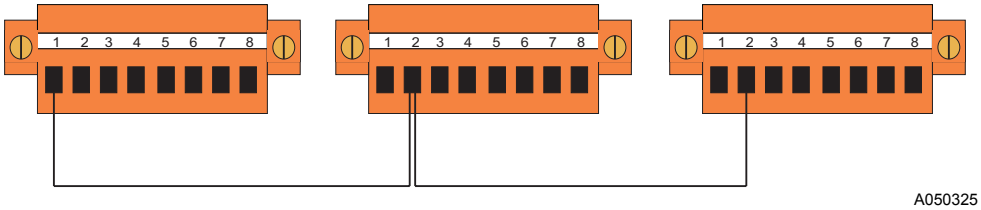

Fig. 6.-3 Example on a cable shield connection

7. Type designation and technical data

Type designation	RER 133
Ordering number	RER133
Auxiliary power supply	Powered from host device (+15 V DC)
Burden	~ 1 W, Peak value ~1,8 W
Communication speed	300...19200 bits/s
Mechanical dimensions	Width: 95 mm Height: 101 mm (105 mm with mounting bracket) Depth: 30 mm (38 mm with mounting bracket)
Operating temperature range	-10...55°C
Storage temperature range	-40...70°C

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