RS-422/485

REPEATER

Operating instructions

GB

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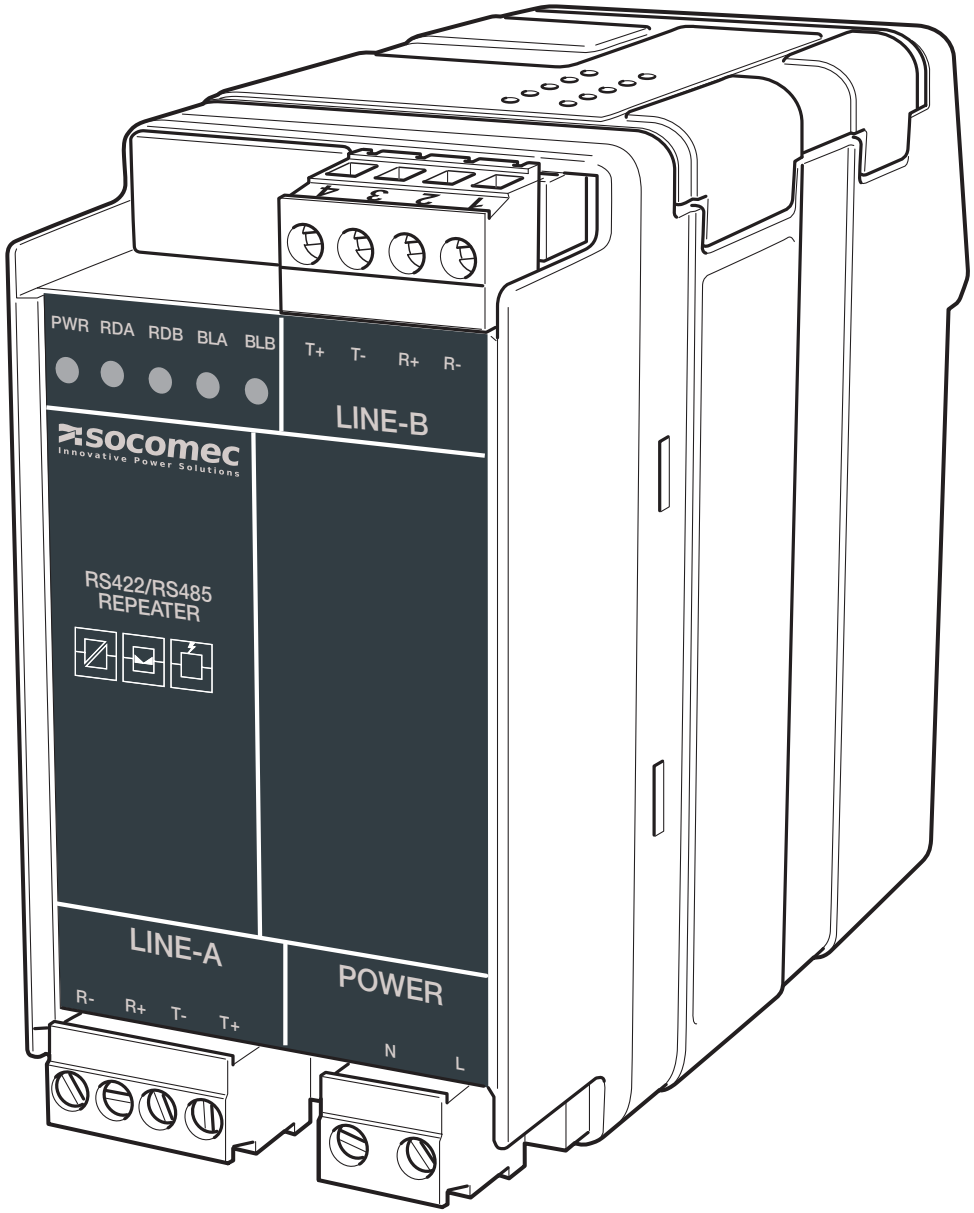

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GENERAL INFORMATION

Safety

IMPORTANT NOTE TO BE READ BEFORE INSTALLATION

Read the manual carefully and ensure you have fully understood its contents before operating this equipment for the first time.

Check that your application meets the equipment's technical specifications for operation.

Dangerously high voltage levels can be produced when this equipment is connected to the power supply or TNV circuits.

To prevent electric shocks, the equipment must be disconnected from the power supply and all other electrical connections.

You are recommended to ground yourself to avoid electrostatic discharge (ESD) damage to internal components (e.g.: wear electrostatic bracelets.

BEFORE INSTALLATION

This equipment must only be installed by qualified technicians.

This equipment is designed for industrial use. It must be installed in an equipment room where access is strictly restricted to authorised personnel.

The power supply must have adequate electrical protection and it must be possible to disconnect the equipment manually.

Ensure that the installation complies with current national regulations.

This equipment uses convection cooling. Ensure to leave sufficient space around the equipment to enable proper airflow (refer to the chapter on installation).

Maintenance

No maintenance is required provided that the equipment is used under the conditions specified.

Introduction

This product is an industrial repeater for RS-422/485 buses, it can also be used as a converter between 2- and 4-wire systems or as an isolator to protect for example a PLC from transients or overvoltage.

The standard RS-422/485 bus supports 32 nodes at a distance of 1200 meters. This repeater gives you another 31 nodes and further max.1200 meters. It is designed to be mounted on a standard 35 mm DIN-rail.

APPROVALS AND CONFORMITY

Conformity with the Directive 73/23/EEC (Low Voltage Directive) has been assessed by application of the standard EN 60 950.

Conformity with the Directive 89/339/EEC (Electromagnetic compatibility) has been assessed by application of standards EN 61000-6-2 (industrial immunity) and EN 61000-6-3 (residential emission).

APPROVALS AND CONFORMITY

Declaration of Conformity

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ATTESTATION OF CONFORMITY CE No AC 9851 PRO

Following specifications :
Manufacturer's specifications

TESTED MATERIAL

Designation :	System ensuring the control, management and protection of electrical networks
Type :	RS-422/485 repeater
Reference :	4899 0120
Manufacturer :	SOCOMEC S.A. 67230 BENFELD FRANCE

Rated characteristics :

The above-mentioned materials,

-subject to installation, maintenance and use according to its intended purpose, to its regulations, to the standards in force and to the manufacturer's instructions and rules-

Satisfy to the European Low voltage directive n° **73/23/CEE dated 19/02/73** modified by the directive n° **93/68/CEE dated 22/07/93,**

and to the European EMC directive n° **89/336/CEE dated 03/05/89** modified by the directive n° **92/31/CEE dated 28/04/92** modified by the directive n° **93/68/CEE dated 22/07/93**

and to the EN 61000-6-2(2001) ; EN 61000-6-4(2001) ; EN 60950(2000)

Year of the CE mark apposition : **2003**

Date : October 17th , 2006

The Writer

Nadine METZ

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SPECIFICATIONS

Power

Rated voltage	95–240 VAC 110–250 VDC
Operating voltage	85.5–264 VAC 88–300 VDC
Rated current	30 mA
Rated frequency	48–62 Hz
Polarity	Polarity independent
Connection	3-position screw terminal
Connector size	0.2 – 2.5 mm^2 (AWG 24-12)
Fuse	To be externally fused

RS-422/485 – LINES A AND B

Electrical specification	RS-422/485
Data rate	300 bit/s – 1.5 Mbit/s
Connection	4-position screw terminal
Connector size	0.2 – 2.5 mm^2 (AWG 24-12)
Circuit type	TNV-1

Insulation between interfaces

Power to all other	3.0 kV RMS @ 50Hz and 60 s duration
Line A to Line B	1.5 kV RMS @ 50Hz and 60 s duration

Climatic environment

Temperature, operating	5 to 55°C
Temperature, storage and transportation	–40 to 70°C
Relative humidity, operating	5 to 95% (non-condensing)
Relative humidity, storage and transportation	5 to 95% (condensation allowed outside packaging)

Mechanics

Dimension (W x H x D)	55 x 100 x 128 mm
Weight	0.3 kg
Mounting	Snap on mounting to 35 mm DIN-rail
Degree of protection	IP 20 (IEC 529)

Mounting / Removal

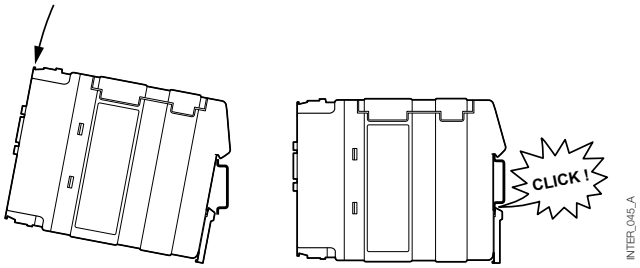
BEFORE MOUNTING OR REMOVING THE UNIT

Prevent damage to internal electronics from electrostatic discharges (ESD) by discharging your body to a grounding point (e.g. use of wrist strap).

Prevent access to hazardous voltages by disconnecting the unit from DC/AC mains supply and all other electrical connections.

MOUNTING

This unit should be mounted on 35 mm DIN-rail which is horizontally mounted on a wall or cabinet backplate. This unit use convention cooling.To avoid obstructions to the airflow around the unit, use the following spacing rules:
- recommended spacing 25 mm (1.0 inch)
- above/below and 10 mm (0.4 inches)
- left/right the unit.
- Snap on mounting (see figure).



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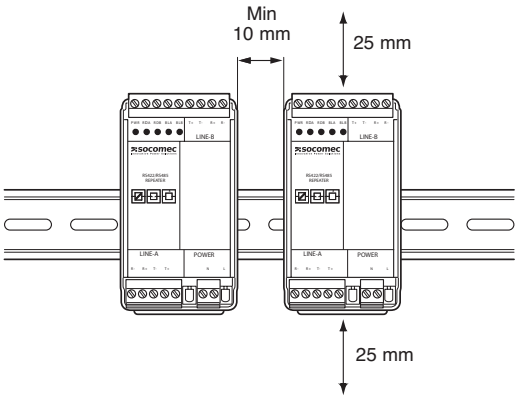

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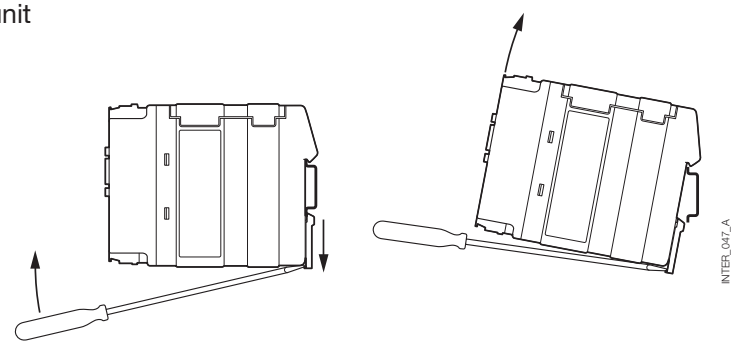
REMOVAL

Press down the black support at the back of the unit using a screwdriver (see figure).



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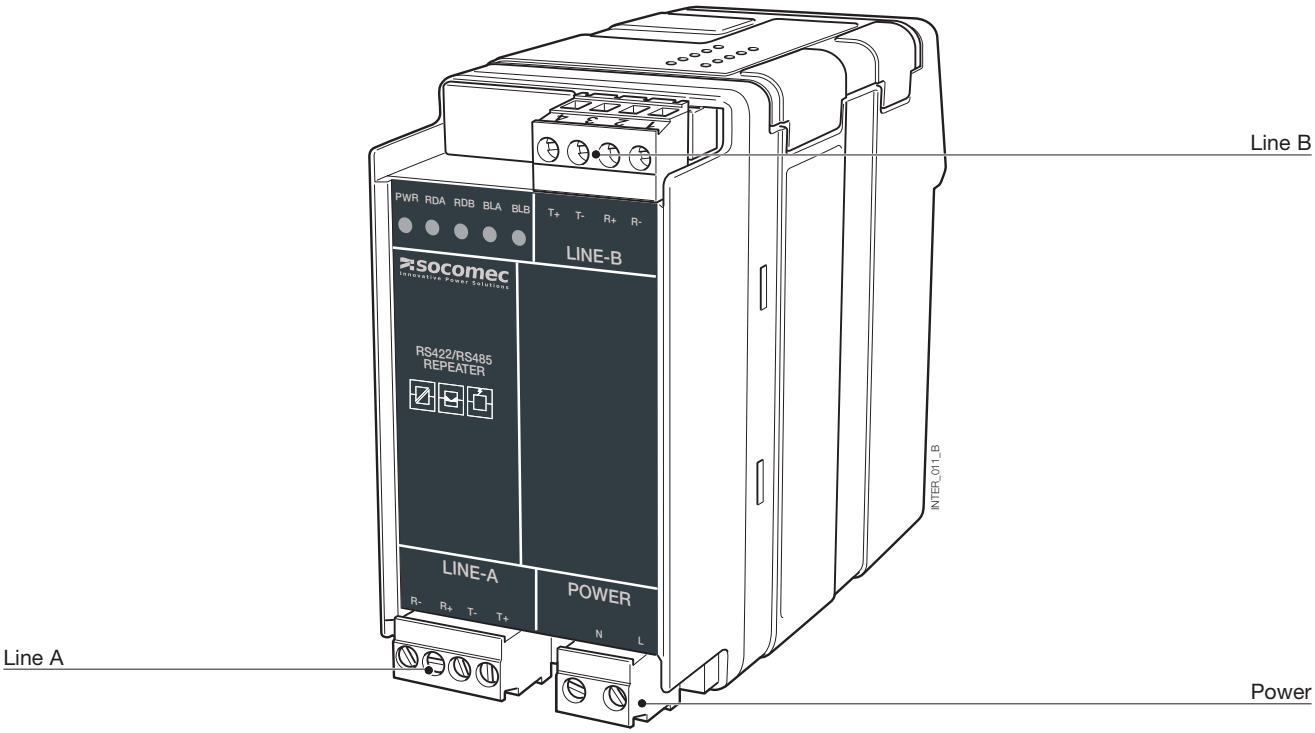
Connections



Power

3-pos screw terminal	Description
L	Power AC line / Power DC
N	Power AC neutral / Power DC
⏚	Power AC protective earth

Line A - RS-422/485

4-pos screw terminal	Direction	Description
N° 1	In	R- RS422 receiver
N° 2	In	R+ RS422 receiver
N° 3	In/Out	T- RS-422/485 transmitter/receiver
N° 4	In/Out	T+ RS-422/485 transmitter/receiver

Line B - RS-422/485

4-pos screw terminal	Direction	Description
N° 1	In	R- RS422 receiver
N° 2	In	R+ RS422 receiver
N° 3	In/Out	T- RS-422/485 transmitter/receiver
N° 4	In/Out	T+ RS-422/485 transmitter/receiver

Indicators

PWR	LED ON LED OFF	Internal power correct No internal power
RDA	LED ON LED OFF	Received data line A No data line A
RDB	LED ON LED OFF	Received data line B No data line B
BLA	LED ON LED OFF	Blocking line A No blocking line A
BLB	LED ON LED OFF	Blocking line B No blocking line B

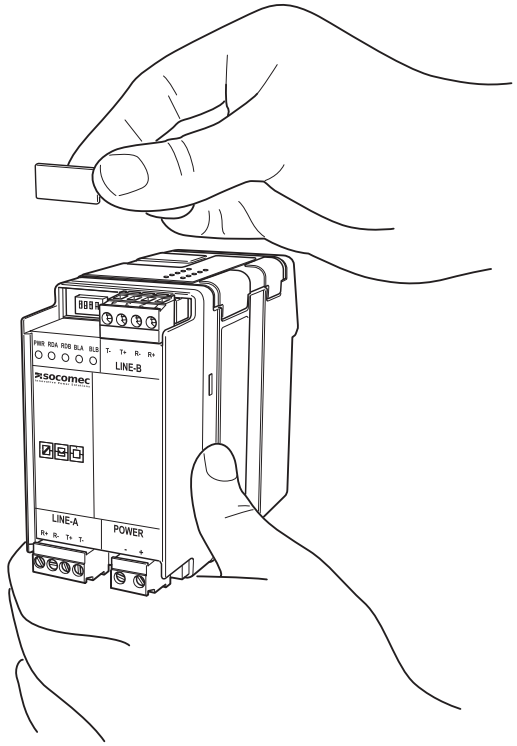
DIP switch settings

DIP-switches are assessable under the lid on top/front of the unit. DIP-switches are used to configure the modem.

Prevent damage to internal electronics from electrostatic discharges (ESD) by discharging your body to a grounding point (e.g. use of wrist strap), before the lid on top of the modem is removed.

> Do not open connected equipment

Prevent access to hazardous voltages by disconnecting the unit from DC/AC mains supply and all other electrical connections.



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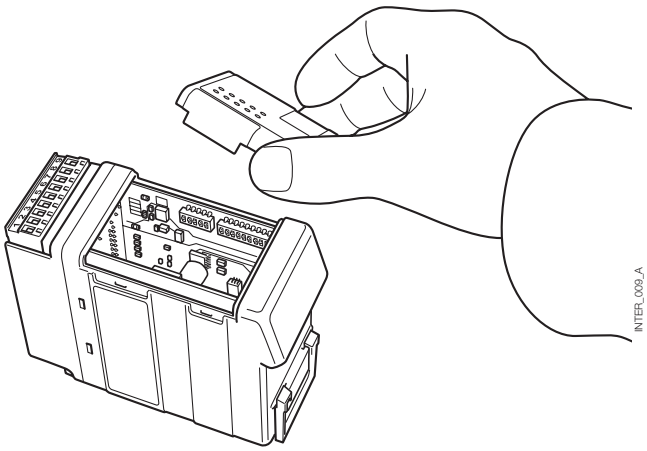

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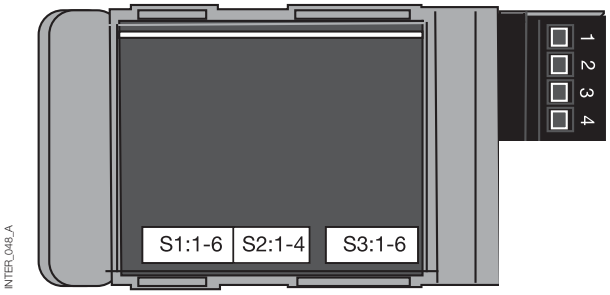
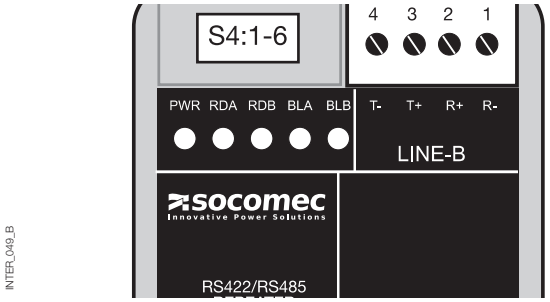
DIP switch settings





DIP SWITCH 1

> S1

Data rate

- 300 bit/s
- 1 200 bit/s
- 2 400 bit/s
- 4 800 bit/s
- 9 600 bit/s
- 19 200 bit/s
- 38 400 bit/s
- 57 600 bit/s
- 93 750 bit/s
- 115,2 kbit/s
- 187,5 kbit/s
- 375 kbit/s
- 500 kbit/s
- 1 500 kbit/s

Format settings

- 9 bits format
- 10 bits format
- 11 bits format
- Synchronous format

1–2 bits turning time at all speed and format settings

DIP SWITCH 2

> S2

Operating mode

- Retiming inactive
- Retiming active
- Anti-blocking inactive
- Anti-blocking active

Line A

- 4-wire
- 2-wire

Line B

- 4-wire
- 2-wire

DIP switch settings

DIP SWITCH 3

> S3

Line A

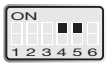

Inactive fail-safe 4-wire


Active fail-safe 4-wire


No termination 4-wire


Termination 4-wire


Inactive fail-safe 2-wire


Active fail-safe 2-wire


No termination 2-wire


Termination 2-wire

DIP SWITCH 4

> S4

Line B


Inactive fail-safe 4-wire

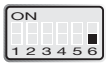

Active fail-safe 4-wire


No termination 4-wire


Termination 4-wire


Inactive fail-safe 2-wire


Active fail-safe 2-wire


No termination 2-wire

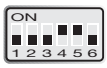

Termination 2-wire

FACTORY SETTINGS

S1  9 600 bit/s,
10 bit format

S2  Anti blocking active + 2 wires transmission
Retiming inactive

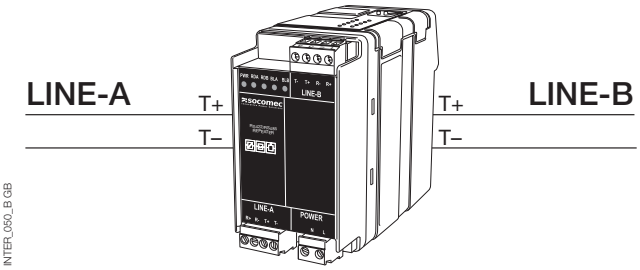
S3  No termination (Line A),
inactive fail-safe

S4  No termination (Line B),
inactive fail-safe

Operating modes

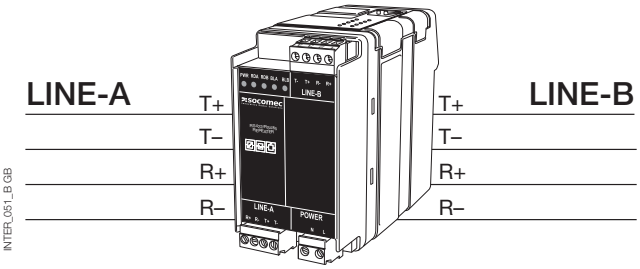
RS485 REPEATER

This operating mode is used to extend / increase number of loads on a 2-wire (RS485) bus.



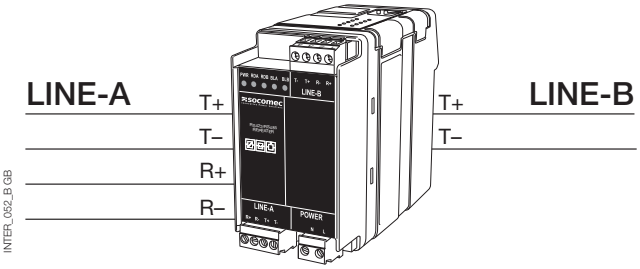
RS422 REPEATER

This operating mode is used to extend / increase number of loads on a 4-wire (RS422) bus.



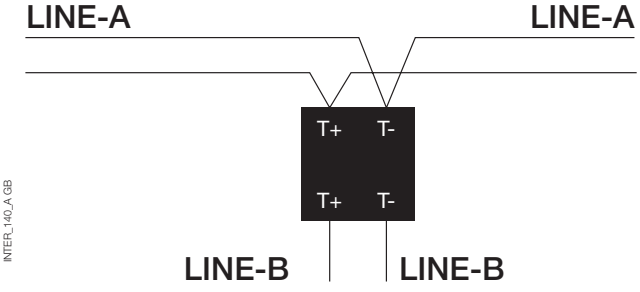
RS-422/485 CONVERTER

This operating mode is used to convert between 2- (RS485) and 4-wire (RS422) communication.



REPEATER : RS485 SPLITTER FUNCTION

This mode allows to realize a star network.



Selection of data rate / format

The selection of the data rate and format settings is used to decide the turning time on the RS-422/485 bus. For optimum performance the data rate and format settings need to be set up according to the used protocol.

The data rate switches select the operating speed on both line-A and line-B. Observe that the repeater is a transparent unit and the data rate needs to be the same on both sides of the unit.

The format switches selects the data format on both line-A and line-B. 9,10 or 11-bit format is used for asynchronous protocols. Synchronous mode activates the transmitter for 11 bits after a detected edge in data.This mode is used for synchronous protocols.

Setting of retiming

Retiming is possible on higher data rates (187.5 kbit/s and higher) and recreates the data bits to exact bit length set up by the speed selection.The use of retiming makes it possible to connect an increased number of repeater units on a line.

Setting of anti-blocking

The anti blocking function secures transmission on each side of the repeater.

If the line is constant active (blocked) for more than 50 ms the anti blocking function will disconnect this side of the repeater.This makes it possible to communicate between units on the other side of the repeater.When the line is cleared the repeater will automatically reconnect the disconnected side.

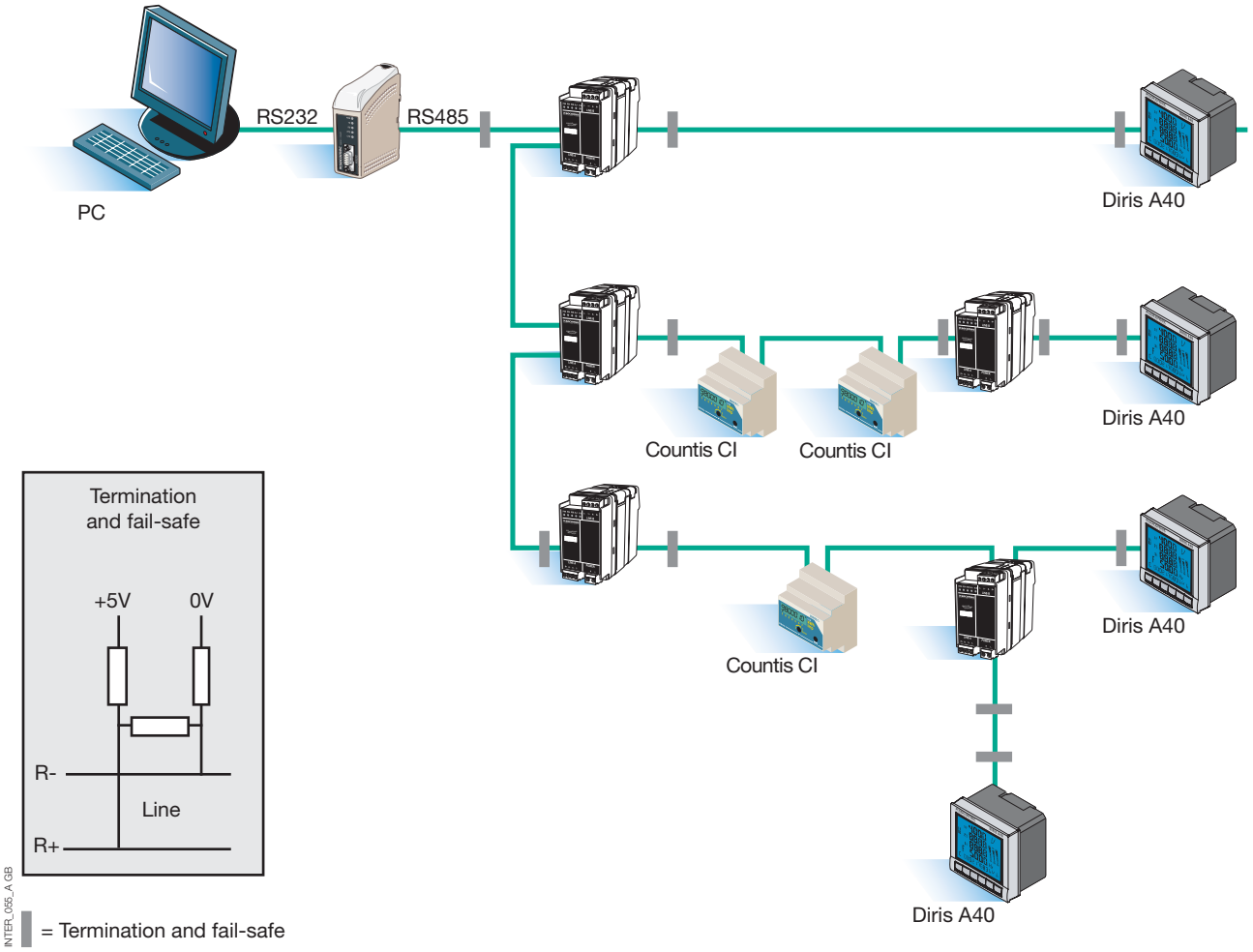
Selection of RS-422/485 setting

When an RS-422/485 system is installed it should always form a bus structure. Using the repeater, it is possible to produce a star network of several busses. It is important to terminate RS-422/485 equipment correctly. In standard networks the fail-safe function should also be connected which is provided to push the unit to a defined state when the RS-422/485 line becomes undefined.The repeater relies on this for operation.

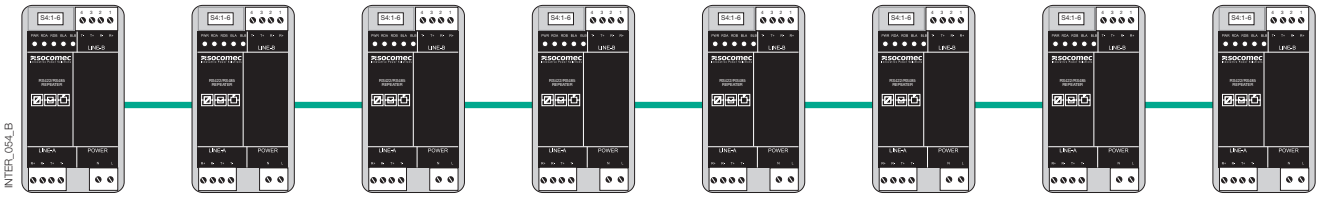
We recommend connection of termination and fail-safe as shown in the application note.

APPLICATION EXAMPLE

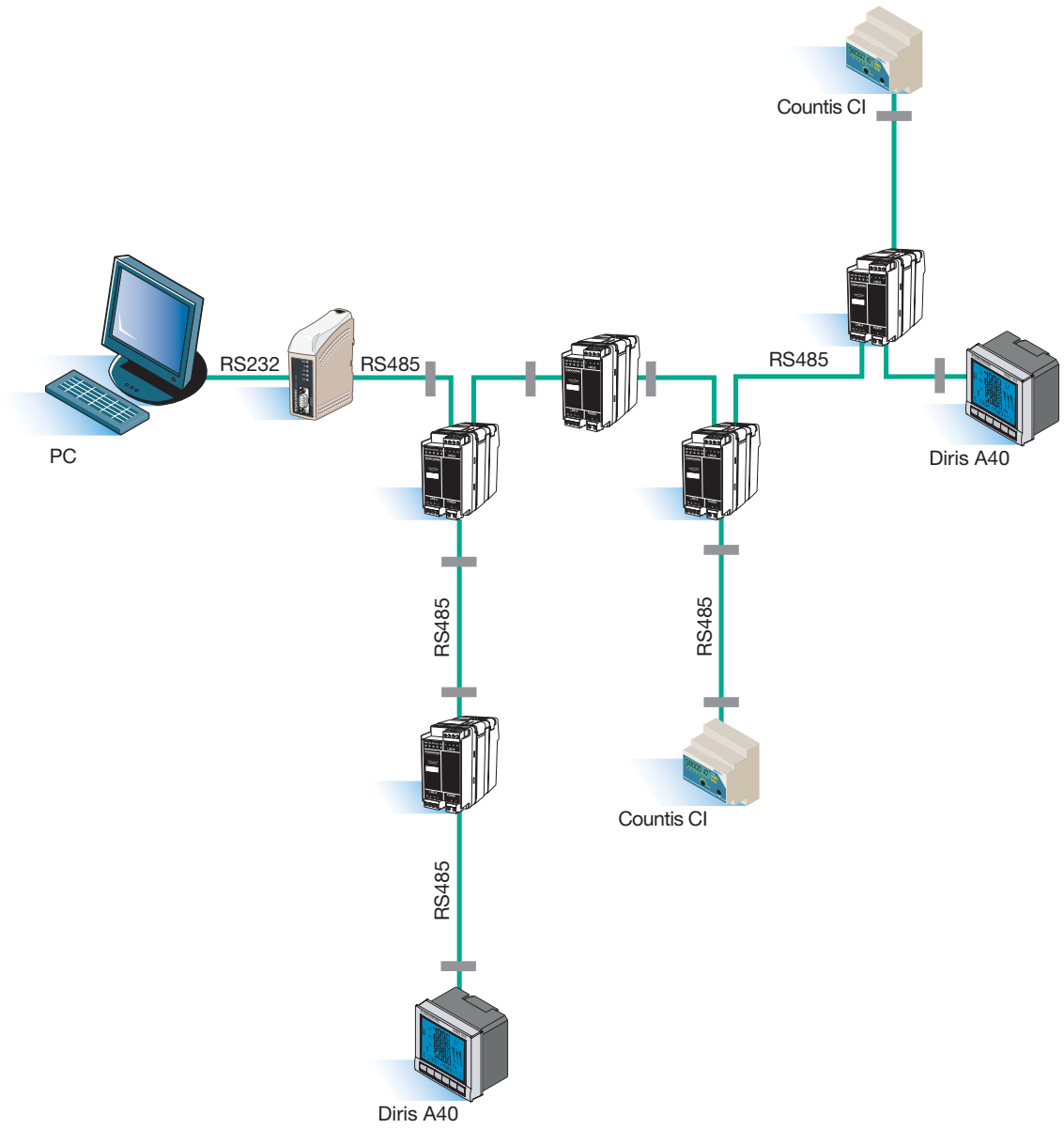
Normally star networks is not allowed in RS485 applications. Using the repeater makes it possible to create branches up to 1200 m. Observe that the product should be connected a maximum of 30 cm from the bus. Observe setting of termination and fail-safe.



Note: It is not possible to have more than 8 repeaters in serial connection.



APPLICATION EXAMPLE



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