

RDL150 RS485 RS232 Wiring & Installation Instructions

V17/08/05

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August 2005 PF/HM/BF

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1 Basic information

1.1 Introduction

The interface options enable this stationary reader with integrated controller to be connected directly to a PC, processor or controller.

1.2 Applications

The reader was especially designed for applications where it is necessary to read and write several transponders at the same time from different distances.

- Control of incoming goods and dispatch
- Event ticketing
- Operating data collection
- Lending processes
- Paperless operations such as electronic delivery papers, invoices, receipts

2 Technical Data

Dimensions:	298 x 298 x 33,5 mm
Material:	ASA plastic, black
Protection type:	IP 65 (IEC 529)
Operating temperature:	-20 °C...+70 °C
Storage temperature:	-40 °C...+70 °C
Supply voltage:	+8...30 V/DC
Power consumption:	approx. 2 Watt
Electrical protection:	Reverse polarity diode protection on supply power lines. High speed transient suppressor diode protection on data lines, trigger input and switching output
Electrical connection:	1 m shielded cable open wire, shield is not internally connected
Operating frequency:	13.56 MHz
Read/write distance:	up to 400 mm (depending on transponder type and the local environment)
Data transmission speed:	ca. 26 kBit/s
Reading/writing speed:	< 50 ms per block
Transponder types:	ISO 15693, I•CODE
Trigger input:	+8...36 V/DC
Switched output:	+6...32 V/DC; I < 500 mA +32...48 V/DC; I < 300 mA
Interface:	RS 232, opt. RS 485 data rate: 9600 baud, 19200 baud, 38400 baud
Anti-collision:	recognition up to 30 transponders in the reading field

3 Connection RDL150 with RS485

Color of cable	Signal	Function
White	V_IN	Power Supply +8...30 VDC
Brown	GND_IN	Power Supply 0 VDC
Red	VDD_SA	External power supply for galvanically isolated Output (+6...48 VDC)
Purple	SA	Galvanically isolated Output
Black	GND_SA	External power supply for galvanically isolated Output (0 VDC)
Pink	VDD_SE	Galvanically isolated Input (+5...36 VDC)
Blue	GND_SE	Galvanically isolated Input (0 VDC)
Grey	RS485_A	Noninverting Receiver Input and Driver Output
Green	RS485_B	Inverting Receiver Input and Driver Output
Yellow	GND	(internal connected with GND_IN)

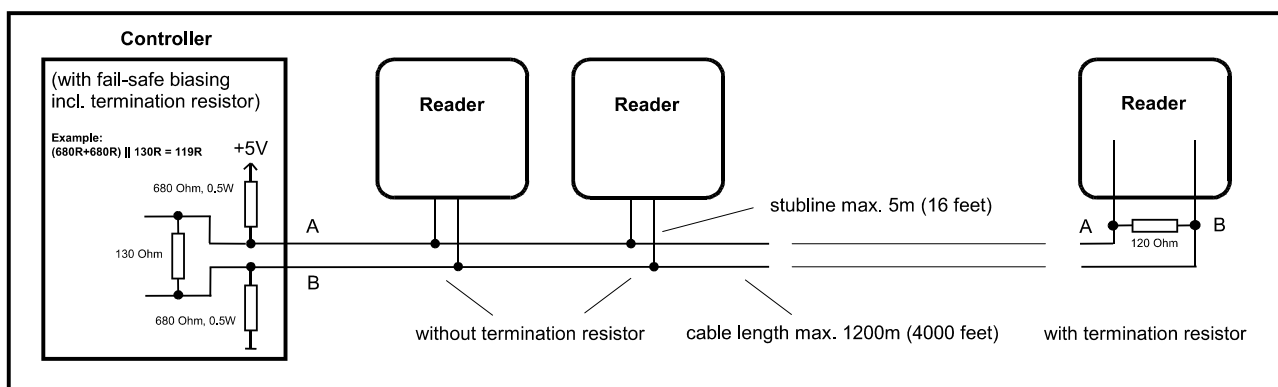
3.1 Connection RDL150 with RS232

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Blue	GND_SE	Galvanically isolated Input (0 VDC)
Grey	RS232_RXD	RS232 Reader Receiving Signal
Green	RS232_TXD	RS232 Reader Transmitting Signal
Yellow	RS232_GND	RS232 GND (internal connected with GND_IN)

4. RS485 Interface

Most RS485-buses require termination resistors across the conductor pair. The need for termination has to be proofed for each installation. Especially for fast transitions, high data rates or long cables the resistors are absolutely necessary. Only both ends of the main cable require termination resistors, additional resistors excessively loads the driver. The resistor value matches the cable's differential-mode characteristic impedance (100-120 Ohm).

At the RS485-bus you need a controller with fail-safe biasing, meaning a pull-up and a pull-down resistor on the cable. The fail-safe biasing provides a known state in which there is no active driver on the bus and therefore it is essential, independent from data rates and length of the cable.



(Bus with RS485 interface)

Technical data (for baud rates up to 100 kHz):

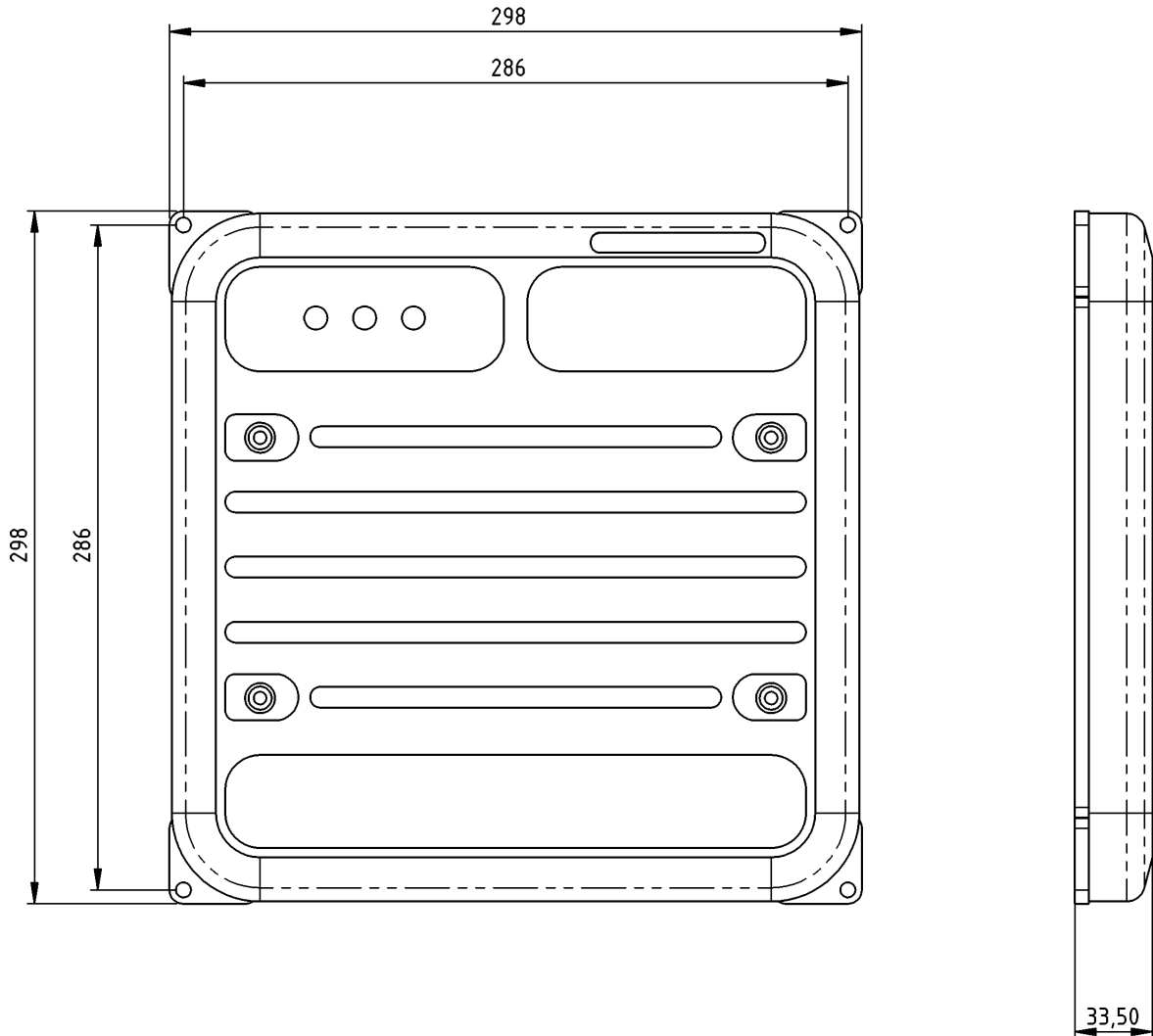
Max. cable length: 1200m (4000 feet)

Max. stub length: because of reflections stubs should be as short as possible
 Exceptions allow a length up to 5 m (16 feet)

Recommendation for the cable: twisted pair, cable-cross-section at least 0,22mm² (AWG 24)
 differential-mode characteristic impedance 100-120 Ohm

5 Mechanical Dimensions

All dimensions in mm



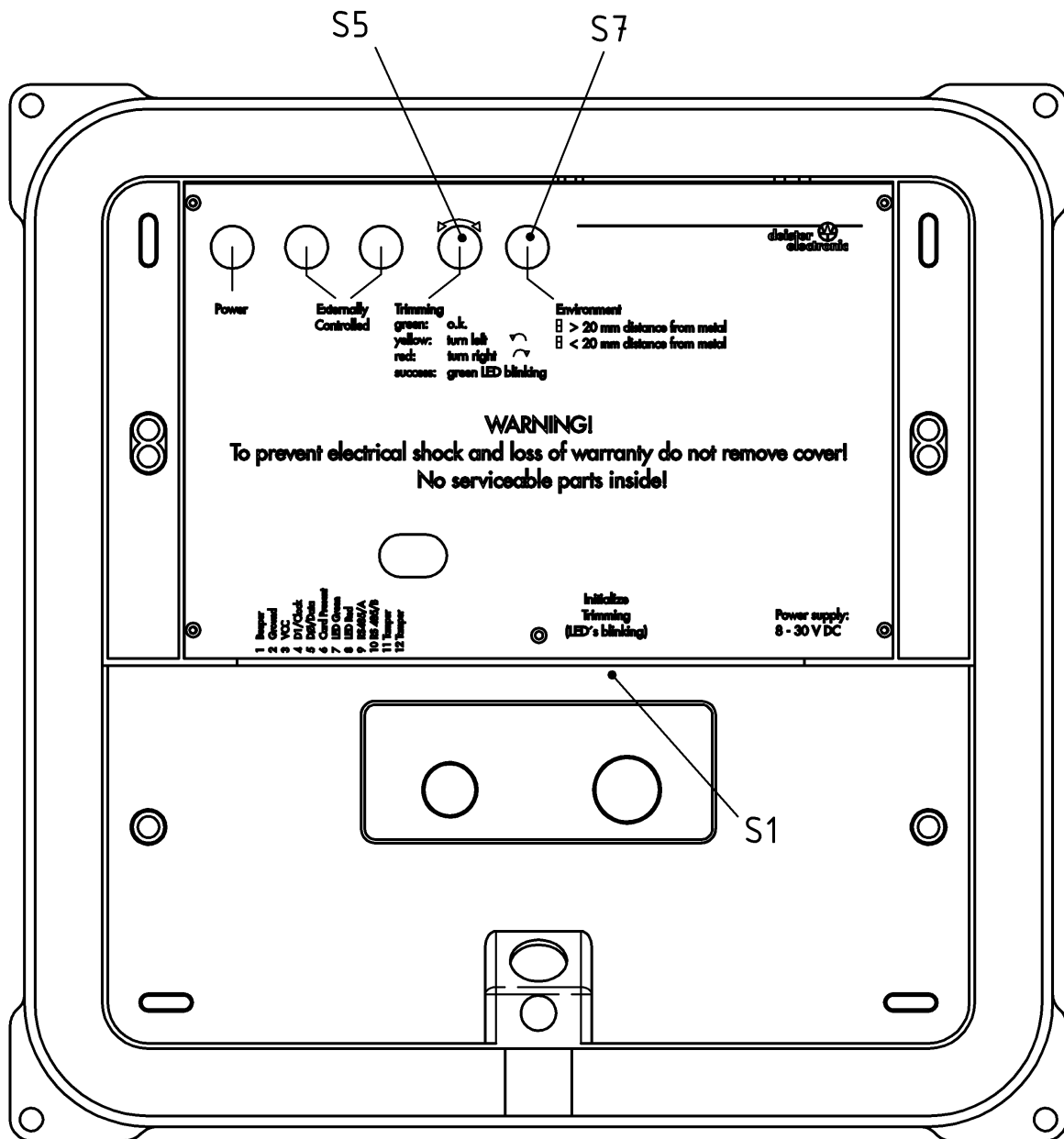
Status: red LED, displays errors and error telegrams or valid data

Read: green LED, displays succesful reading of a transponder

Power: yellow LED, always lighting if power supply is connected

Further explanation on page 10.

5.1 Rear view (opened Housing)



The switches **S1**, **S5** and **S7** will be explained in chapter 4.3

5.2 LED Explanation

1) Yellow LED: Line voltage indicator

After connecting the power supply, the device shows it is ready to operate by permanently activating the yellow LED. If a transponder is read, the yellow LED turns off for a moment.

2) Green LED: Read indicator

If a transponder data was read, the answer telegram is sent and the reader activates the green LED for about 50 ms. No visual activity of LED during write instructions.

3) Red LED: Status indicator

Displays error telegrams. The LED activates for about 200ms on the following events:

- Communication error telegrams
- Non executable commands
- If the reader is set to polling mode (see Rdemo description, chapter xx) and a transponder is identified, the red LED lights up while the "valid data" is not polled by the host system.

4) General status indicator:

The green LED and the red LED are activated while the yellow LED is deactivated. This occurs during:

- The start up phase after switch on the reader
- While updating the firmware
The description for upgrading the firmware will be found in chapter 6
- Undervoltage operation of the reader (e.g. $U < 8 \text{ V/DC}$)

5.3 Easy Trim Function (ETF)

This function allows adjusting the reader to its environmental conditions.

The ETF is a semiautomatic function for trimming the reader to its best performance.

The ETF starts if switch **S1** is pressed.

In this mode only one of the three LEDs is blinking. The individual meaning of each LED is:

Red LED:	The rotatable switch (S5) must be turned to the right
Yellow LED:	The rotatable switch (S5) must be turned to the left
Green LED:	The setting of the rotatable switch (S5) matched the best performance.

It could be possible that there are two settings of the switch that match the best performance. If there are two possible positions of the rotatable switch (**S5**), it is better to choose the position before the yellow LED is blinking.

The ETF ends after switch **S1** is pressed again. It also ends after 6 minutes.

If the reader should be mounted directly on metal ground (distance to metal is lower than 2 cm) the switch **S7** must be actuated before the rotatable switch is turned.

6 Installation Instructions

6.1 Possible Interference Sources

**Warning:**

It is possible that external interference sources will influence the read range, e.g. monitors, switching power supplies, power cables parallel to data cables, mounting on metal etc.

LCD monitors have a minimal influence on the read range. In particular the reader should be mounted on non-metallic material, such as plastic or wood. Metal screws (M6 - ISO 1207, 4762 or 7045) for mounting the reader have an insignificant influence on the read range.

**Note:**

With growing distance between reader and interference source the influence decreases.

Use only regulated power supplies. deister electronic GmbH offers suitable power supplies. To reduce the influence of external electrical interference, connect the cable shield to ground (GND) of the power supply.

6.2 Mounting Considerations

The following problems may occur when mounting multiple RDL150 readers in close proximity.

- The signal energy from one reader may interfere with the read/write range of the other.
- Overlapping read/write fields can cause a single transponder to be read/write simultaneously by two or more readers.

To ensure proper operation and optimal read/write range, take the following precautions:

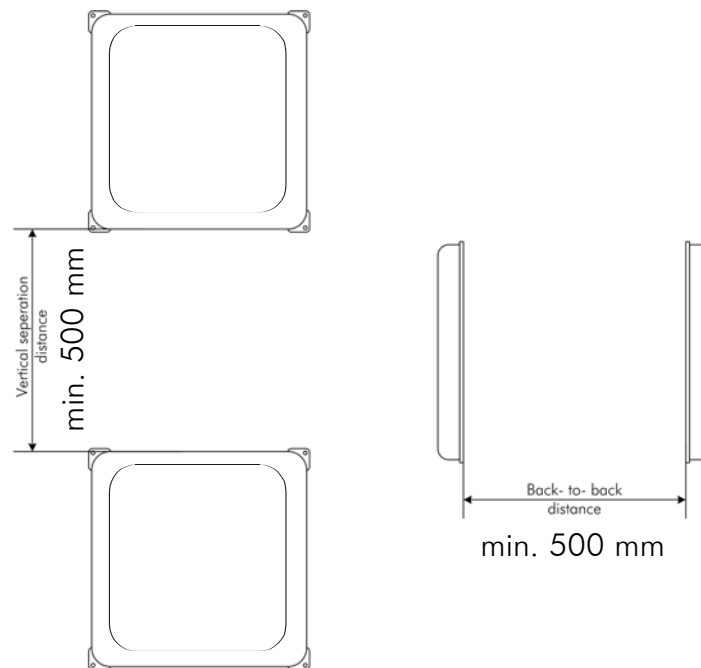


Figure: Visualization of separation distances (vertical and back-to-back)

1. Mount all readers before tuning any of the readers
2. Ensure that the back-to-back distance is at least one meter
 - **Note 1:** If a metal plate is installed between the two readers, the back to back distance may be ignored. However, read/write range will be reduced to approx. 240 mm.
 - **Note 2:** Reduced transponder read/write range and the simultaneous read/write of a transponder by both readers may result if the readers are installed less than 500 mm.
3. Ensure that the vertical separation distance is at least 500 mm. A more narrow vertical separation gap may be used if the simultaneous read/write of a transponder by two readers is acceptable.

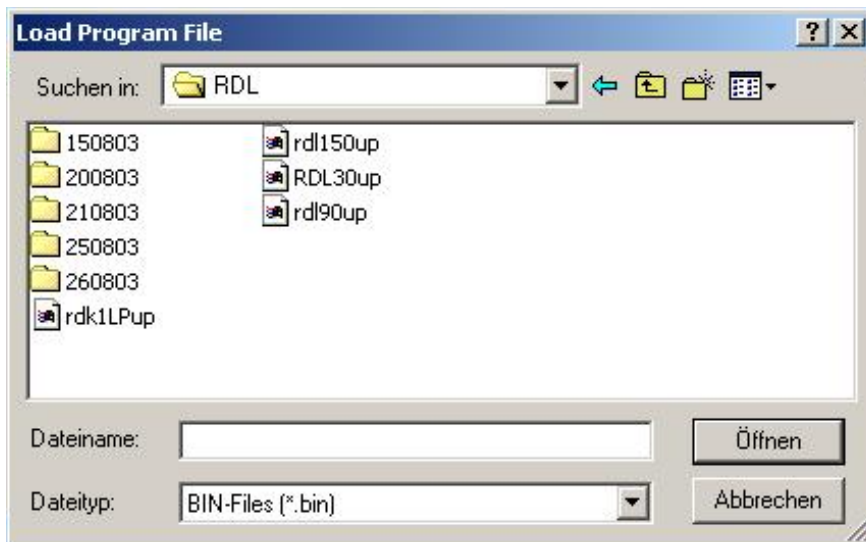
7 Upgrading Firmware

To perform a firmware update with **deFlash** please follow the steps below:

- Connect reader serial interface with PC, then plug in power supply.
- Start **deFlash.exe**
- Select the COM-Port the reader is connected with.



- Click 'Load File' and open the update file (xxxxx.bin) related to the device.

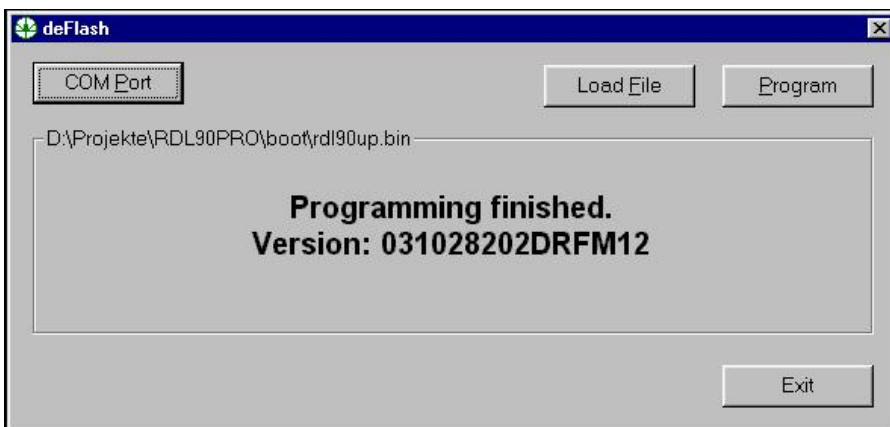


RDL150 RS485/RS232

- Start programming procedure by clicking 'Program'.
- Program displays "Flash Loader Programming" while the green LED and the red LED are switched on and the yellow LED is deactivated.



- Wait until display shows, "Programming finished Version XXXXXX".
- 'Exit' program.



- If programming fails, repeat procedure as described above.
- If repetition fails again, please disconnect power supply of reader, restart program **deFlash.exe** and plug in power supply of reader within 5 seconds. Programming process should run properly now.
- If this update variation also fails, please contact your service partner or sales representative at deister electronic GmbH.

8 Regulatory Notices / Zulassungen

8.1 Europe / Europa

Hereby, deister electronic GmbH, declares that this equipment, if used according to the instructions, is in compliance with the essential requirements and other relevant provisions of the RTTE Directive 1999/5/EC.

Hiermit erklärt die deister electronic GmbH, dass sich diese Funkanlage bei bestimmungsgemäßer Verwendung in Übereinstimmung mit den grundlegenden Anforderungen und den anderen relevanten Vorschriften der R&TTE Richtlinie 1999/5/EG befindet.



**Approved for use in all European countries.
Zugelassen in allen europäischen Ländern.**

8.2 FCC Digital Device Limitations

Radio and Television Interference

This equipment has been tested and found to comply with the limits for a digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio and television reception.

Caution! Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment

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