



LF-134-SER

Low Frequency RFID Reader

User Manual

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1 General Information

This manual provides complete information about safety, operation and display elements, as well as operation modes and technical data Serial RFID-Reader LF-134-SER.

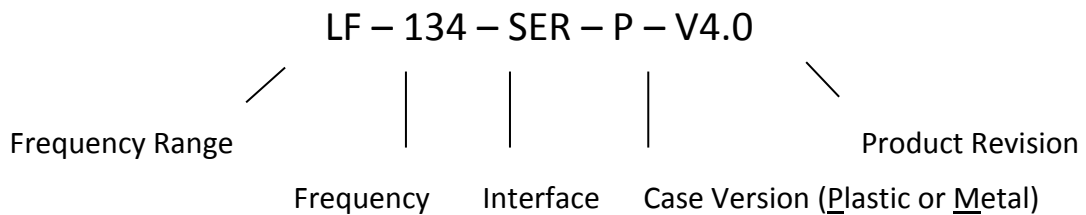
Keep the manual in a handy place so it is accessible at any time for getting necessary information.

Read the instructions carefully. The instructions must be understood and observed in all respects by those persons, who are responsible for the installation, operation and maintenance of this equipment.

2 Product Revisions

Product Code	Product Revision	Hardware Version	Available Communication Protocols
LF-134-SER-M-V4.0	4.0 (without Test button)	3.0	- ASCII-L (Fabmatics Light)
LF-134-SER-P-V4.0	4.0 (with Test button)		- ASCII-H (Hermos) - ASCII-A (Asyst) - SECS (SEMI E99)

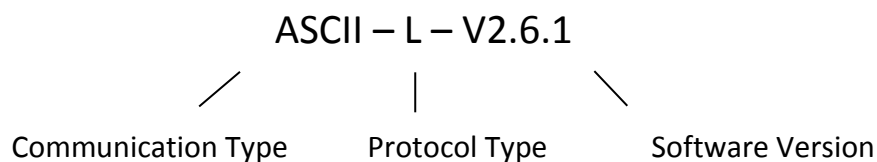
The product code consists of following information:



Available software versions are:

Version	Description
ASCII-L-V3.0.0	Fabmatics developed short command set. Test button implemented, sending error messages to host.
ASCII-H-V2.0.0	Command set compatible to Hermos protocol. Test button not implemented.
ASCII-A-V2.0.0	Command set compatible to Asyst ASCII CIDRW Version S protocol. Test button implemented without sending any messages to host.
SECS-V2.0.0	SECS communication by SEMI E99. Test button not implemented.

The software code consists of following information:



NOTE: Product revisions are identified by revision numbers. Each revision number corresponds to versions of three components of the product: hardware, software and manual. Each product revision number is distinctive. The product revision number is assigned accordingly to distinctive versions of the three components. Version alteration of one of the components (hardware, software, manual) may alter accordingly the product revision number.

3 Safety Instructions

Please recognize the safety regulations. Nevertheless, there are dangers associated with the use of the equipment even for its intended purpose. Therefore you should read the following safety information carefully and keep it in mind. Install and operate this equipment only if it is in perfect condition and with reference to this manual. Do not use the equipment if it is damaged!

3.1 General

Read and understand all safety and operating instructions before installing and operating the device.

This instruction is designed for specially trained personnel. This device is NOT intended for use by the “general population” in an uncontrolled environment. Installation, operation and error handling the device shall be carried out by specially trained personnel only.

Keep these instructions. Store this manual in a place that can be accessed at any time by all persons involved in installing, operating and error handling the device.

Heed all warnings. Follow all warnings on and inside the device and operating instructions.

Install in accordance with the manufacturer's instructions only.

Only use attachments, accessories and connecting cables supplied by the manufacturer.

All error handling except the error handling listed in this manual must be carried out by the manufacturer.

People with hearing aids should remember that radio signals transmitted by the device might cause a very unpleasant buzzing noise in their hearing aids.

Do not connect the device to any kind of power supply such as a standard household power supply. The device should be connected to a power supply of the type described in these instructions only.






When you disconnect a cable, pull on its conductor and not on the cable itself. Keep the connector evenly aligned to avoid bending any connector pins. When you connect a cable, ensure that the connector pins are positioned correctly.



Never over bend the antenna cable or expose it to mechanical loads.





When replacement parts are required, use the replacement parts specified by the manufacturer only. Unauthorized substitutions may result in fire, electric shock, or other hazards.

3.2 Symbol and Tags

Special tags are used in this document to alert technicians to personal and equipment safety hazards. Before using this document, a thorough understanding of specific safety issues detailed in the Manual must be understood. The following types of safety tags appear in this document. Note that the following are only examples; they do not indicate a specific hazard associated with the product.

WARNING!	
	<p>Flammable Material Flames – Risk of fire</p>
DANGER!	
	<p>Electricity; Electrical Hazard Lightning bolt – Dangerous voltage</p>
DANGER!	
	<p>Explosive Material; Explosion Hazard Object exploding – Risk of explosion</p>
WARNING!	
	<p>Non-Ionizing Radiation; Radio Frequency Abstract radiation transmitter – indicates electromagnetic radiation</p>
CAUTION!	
	<p>General Warning Important instructions</p>

	All antenna resonant circuit components carry high voltage!
	The installer is responsible for installing the device to comply with FCC requirements of human exposure to radio frequency.

	To prevent fire, shock hazard, or annoying interference, use recommended accessories only.
	When removing the housing lid, note that the housing lid is connected to the case with a cable. Remove the lid carefully to prevent damage – do not pull it! Do not operate the device when the housing lid is removed!
	Do NOT operate this device without a proper antenna attached. Proper antennas are antennas supplied by the manufacturer and listed in section „Antennas“.
	Never locate the antenna so that it is very close to or touching parts of the body while transmitting.

3.3 ESD Instructions

Static electricity can harm electronic components inside the device. All persons who install or maintain the device must be trained in ESD protection. ESD protection measures must be observed when opening the device.

Before removing or inserting components, disconnect the power supply.

To prevent electrostatic damage, static electricity must be discharged from the body and tools before touching components inside the device.

Touch electro sensitive components carefully at their edges only.

3.4 Proper Use

This product was developed for reading and writing the TIRIS® transponder only. Any other use of this device would constitute abuse. All antenna resonant circuit components carry high voltage! To prevent fire, shock hazard, or annoying interference, use recommended accessories only. Do not operate the device when the housing is removed! Proper antennas are antennas supplied by the manufacturer“. Never locate the antenna so that it is very close to or touching parts of the body while transmitting. This product is designed to be mounted and operated in an industrial environment as a built-in-device only. It is not designed to be used as a stand-alone or a portable device in a non-industrial environment, such as a household, automotive or open-air environment.







3.5 Qualified Personnel





This manual is designed for specially trained personnel only. This device must be installed and maintained by the manufacturer or its specially trained representatives. Intervention or error handling not expressly approved in this manual must be carried out by the manufacturer's personnel only. If you are unsure about the qualifications that are actually required, contact the manufacturer.



Unqualified interventions may result in personal injury or damage to the device!

3.6 General Installation Notes

	This device is designed for use in an indoor industrial environment only. Installation is only permitted in an environmental indoor climate with a constant temperature of between 0°C and +50°C / 32°F and 122°F, humidity between 25% and 80%, and a maximum temperature of +50°C / 122°F.
	Do not install or use this device in or near water. Never spill liquids of any kind onto the device. Should spillage occur, unplug the device and let it check from a technician.
	Do not install near heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat. Do not install the device in a flammable environment.
	Never expose the device to intense changes in temperature, otherwise condensation can develop inside the device and cause damages.
	Do not locate the device near overhead power lines or other electric lights, or power circuits or where it can encounter such circuits. When installing the device, take extreme care not to encounter such circuits as they can cause serious injury or death.
	The device should not be used in the immediate vicinity of electrical units (such as medical units, monitors, telephones, televisions and energy-saver lamps), magnetic data carriers, or metallic objects. This could result in reduced reading/writing ranges.

	Never use the device in potentially explosive areas (such as paint shops).
	Do not position the device in a location where it can suffer from vibration or shock.
	When the device is installed, the installation location must be adequately illuminated.
	Do not install the device during periods of lightning.

4 Application

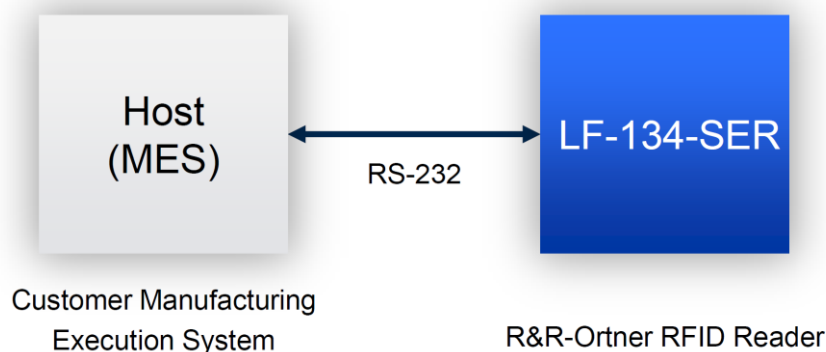
RFID provides simple and fast radio identification via a short range.

The Low frequency reader LF-134-SER is a 134.2 kHz Low-frequency RFID solution. It is specialized for applications in production and logistics. It is less sensitive to interference than HF solutions and designed for rugged applications.



Ideal application environments are production facilities featuring only one or very few identification goods (i.e. Load port). The module supports 134.2 kHz half duplex transponders, reading of “Read-only” as well as “Read-Write” transponder types.

Host communication is realized by a Serial RS-232 interface with data rates up to 57.600 Kbit/s.



Supported communication protocols to a superordinate host system are:

- ASCII-L (Fabmatics ASCII light protocol)
- ASCII-H (Hermos compatible)
- ASCII-A (Asyst CIDRW compatible)
- SECS (SEMI E99 compatible)

5 Construction Design

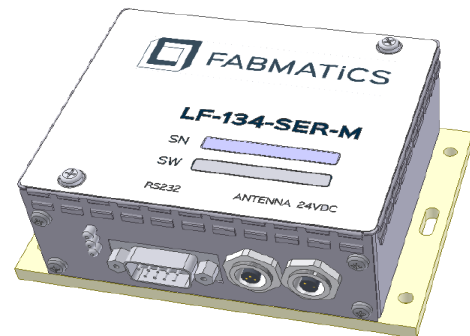
5.1 Design

The LF-134-SER ID-Reader is available in two case versions:



Plastic Case

contains vapour metallized shielding inside



Metal Case

usage of thin plate metal for efficient shielding

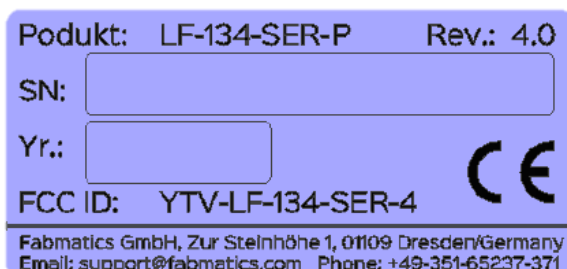
5.2 Product Information Label

The product information label contains the product name (Model), product revision, serial number and year of production. The dimension of label is 21,5mm x 46 mm. Furthermore the FCC number YTV-LF-134-SER-4 is listed and the CE-mark.

For the location of product information label for LF-134-SER-P-V4.0 please see engineer drawing in chapter 5.3

For the location of product information label for LF-134-SER-M-V4.0 please see engineer drawing in chapter 5.4

The serial label is seen in the following figures.



6 Hardware Design

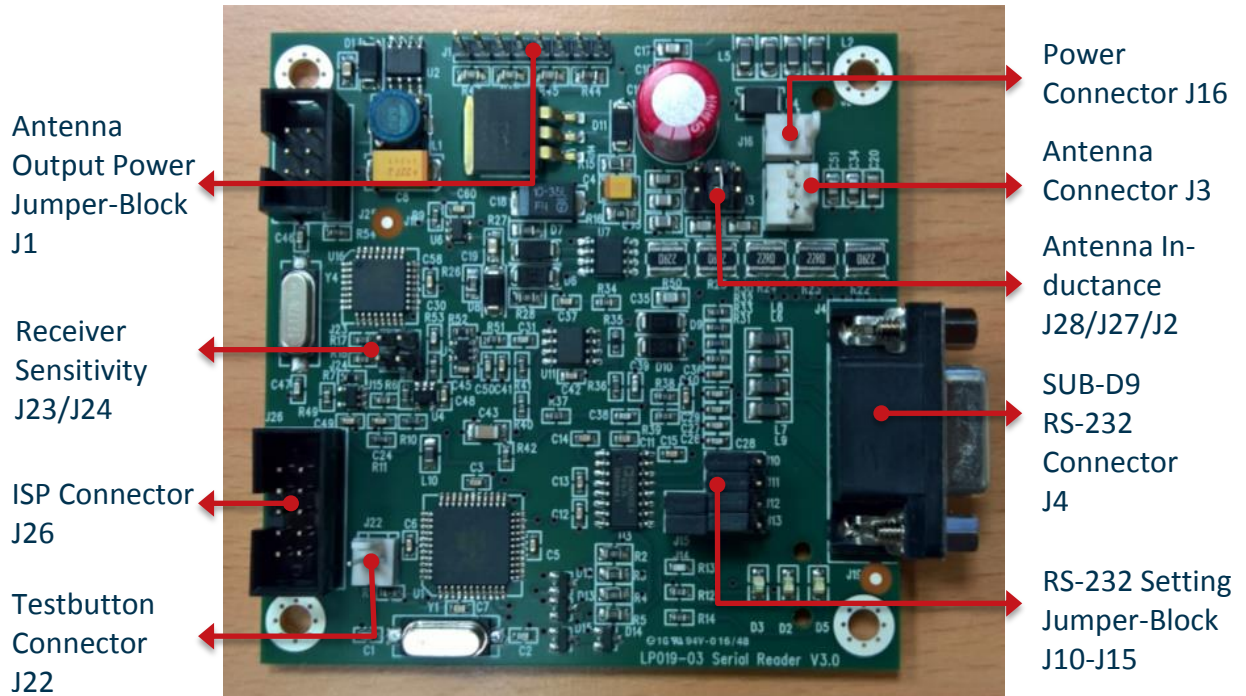
6.1 Technical Data

Version	LF-134-SER-P (Plastic)	LF-134-SER-M (Metal)
Application	Suitable for environments with low electromagnetic interference.	Particularly suitable for production environments with high electromagnetic interference.
Dimensions (w-h-d)	120 x 50 x 90mm	117 x 44 x 90mm 97 x 39 x 90mm (w/o Base plate)
Weight	235g	255g
Case Material	ABS	Case: tinfoil Base plate: POM
Voltage supply	24 V/DC \pm 3% Plug Power Supply 000278 or parent System Power Supply ¹	
Fuse	Use of Plug Power Supply 105124: integrated Use of parent System Power Supply: 0,5A slow-blow ²	
Power consumption	Idle mode: 0,6W (25mA) Read mode: 3,2W (132mA)	
Antenna specification	Designed for use with 48 μ H \pm 3% and 110 μ H \pm 3%, Ferrite or Air-coil Antenna (available in different versions)	
RFID Frequency	134.2kHz	
RFID Chip Type	TIRIS compatible chip 134.2kHz HDX/FSK	
Supported Transponder Types	HDX/FSK, MPT, SAMPT, RW, RO (e.g. RI-TRP-DR2B)	
Max. reading range	For specific information, please refer to the respective antenna data sheets.	
Reading time one page	110msec Average	
Permanent reading	maximum 1 cycle/s	
Connectors	<ul style="list-style-type: none"> - 24 V/DC Power (Binder plug socket, Series 712-2p) - Antenna (Binder plug socket, Series 712-3p) - Serial RS-232 (DSUB-9 female) 	
MCBF MTBF	\geq 1,000,000 reading cycles \geq 40,000h	
Operating temperature	0°C to +50°C (duty cycle: <50%)	
Storage temperature	-25°C to +50°C	

¹ Specification for external low power source (LPS) has to match according section 2.5 of EN 60950-1:2006 standard.

² Make sure that the LF-134-SER Reader is supplied from a separately fused busbar!

6.2 Mainboard Layout



6.3 Antenna Power / Range Settings

Jumper-Block J1 can be used to decrease the RF output power level for the transmitting amplifier, which will result in a decreased reading range also. This can be necessary if several Antennas needs to be placed very closely to each other or if an high read frequency up to 14 cycles/s needs to be performed.

All values are calculated values and might differ a bit.

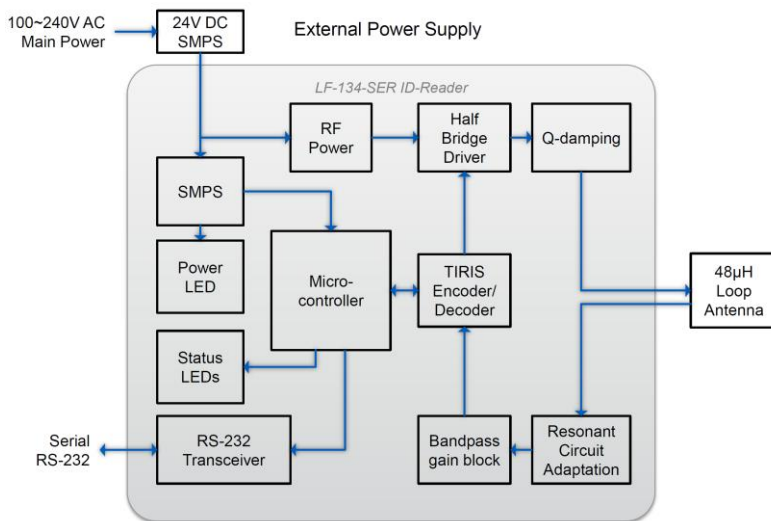


Jumper Block J1				RF supply Voltage (approx.)	Read distance (approx.)
J1.1	J1.2	J1.3	J1.4		
-	-	-	-	23,75 V	100%
-	-	-	On	14,75 V	85%
On	-	-	-	12,50 V	81%
On	-	-	On	9,70 V	74%
On	On	-	-	8,75 V	71%
On	On	-	On	7,40 V	67%
On	On	On	-	6,87 V	66%
On	On	On	On	6,07 V	63%

NOTE: With full output power (no jumper) it is not recommended to read faster than ones per second! For performing high speed cycles up to 14 times per second permanently, the output power must be reduced to 85% by setting jumper J1.4 (above R44).

By default no jumper is set (100% output power).

6.4 Circuit Block Diagram



6.5 Serial Interface Specification





The setting of the serial interface depends on the applied software protocol.

Protocol	Bit rate (bit/sec)	Data bits	Stop bits	Parity
ASCII-L	9600	8	1	none
ASCII-H	4800, 9600, 19200, 28800, 57600	8	1	even
ASCII-A	4800, 9600, 19200, 28800, 57600	8	1	none
SECS	9600	8	1	none

6.6 Serial Interface Settings

The Serial RS-232 communication interface supports different operation modes. To change these modes, the jumper J10 – J15 need to be modified as shown below.

The default mode is Standard RS-232 with Handshake.

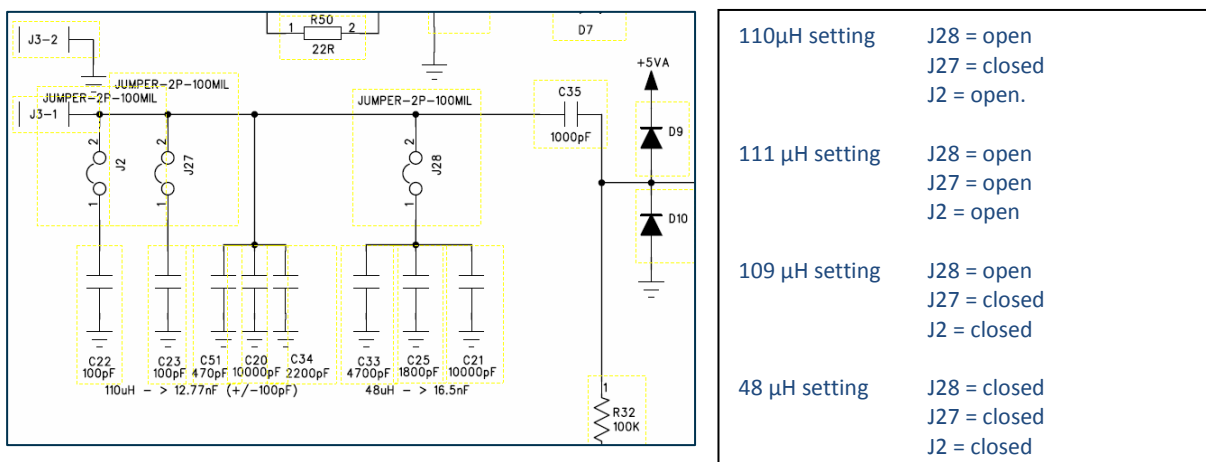
RS-232 Mode	Handshake On	Handshake Off
Standard	 <p>J10 - J15 (default)</p>	 <p>J10 J11 J14 J15</p>
TTL Level	 <p>J10 – J13</p>	 <p>J10 J11</p>

6.7 Antenna Inductance Settings

It is possible to connect antennas with different inductance values to the reader. Therefore it is necessary to adjust the resonant circuit.

For possible setting see the following picture.

Jumper setting for J27 /J28 and J2



6.8 Receiver Sensitivity Settings

Jumper Block J23/24		Sensitivity
J23	J24	
-	-	40dB gain => 100x
On	-	29dB gain => 30x
-	On	29dB gain => 30x
On	On	23dB gain => 15x

6.9 Connector Pin Assignments

6.9.1 Power Connector

In table below the Electrical specification is given for connector J16.

Pin	Name	Description
1	Vcc	24 V/DC \pm 3%
2	GND	Ground

6.9.2 Antenna Connector

In table below the Electrical specification is given for connector J3.

Pin	Name	Description
1	RF -	Antenna (-)
2	GND	Ground (used for wire shield)
3	RF+	Antenna (+)

6.9.3 Serial Interface

The Serial Host-Interface J4 uses the RS-232 standard with female DSUB-9 connector.

Pin	Name	Description
1 4 6 9	-	not connected
2	RxD	Receive Data
3	TxD	Transmit Data
5 10 11	GND	Ground

7	RTS	Request to Send
8	CTS	Clear to Send

7 Operation

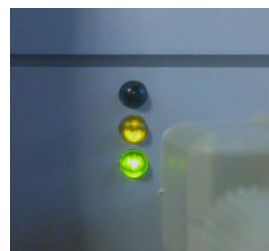
7.1 Test Button

The plastic version LF-134-SER-P is equipped with a Read Test Button for perform quick Antenna alignment, range or transponder tests manually.

The button starts a single page read (page 0, same as command 'R') with an interval of approximately 250msec as long as the button is pressed. Depending on protocol version, the read result is send to the serial interface and shown by the Status LEDs.



ID read OK



ID read Fail



The functioning of the Test-Button depends on protocol version:

Protocol Version	Test button function
ASCII-L	Trigger ID read, status is indicating by device LEDs. Data and failure messages will be send to host!
ASCII-H	not implemented
ASCII-A	Trigger local ID read, status is indicating by device LEDs. No messages will be send to host.
SECS	not implemented

7.2 LED Light-Status Description

In the table below the meaning of all signal LEDs is described.

Status LEDs	Description
Green active	Power OK / Idle mode
Yellow active	Reading in progress (Read success in test mode)
Red active	Reading error

7.3 Reading and Writing Ranges

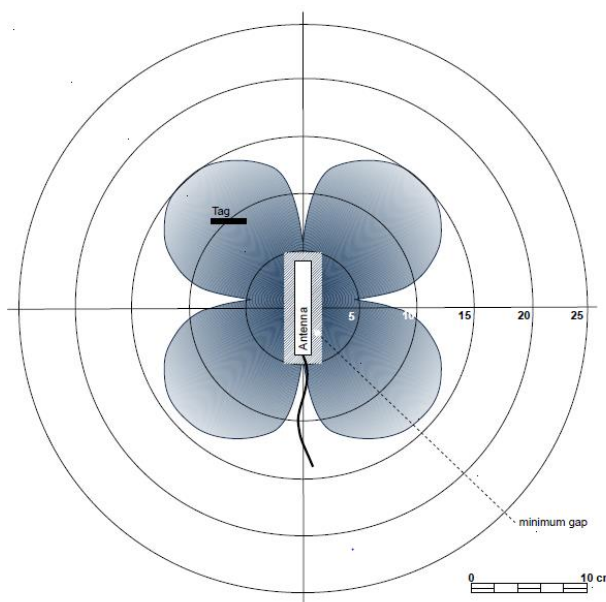
The provided reading ranges shown here and in their respective Antenna datasheets are measured with best conditions. In real environment the ranges can be differ due to disturbing material like metal or any kind of electro-magnetically fields near to the Antenna location. Please thorough improve the conditions before make final decisions about the Antenna location.

Writing ranges in general are approximately 60% of the reading ranges.

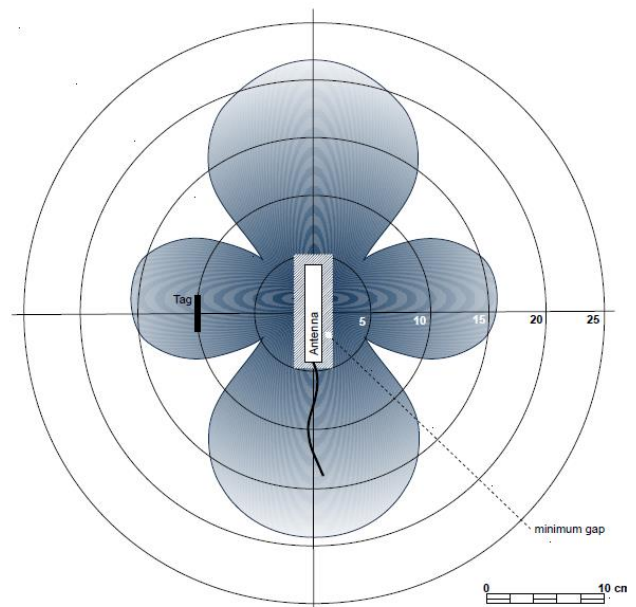
Be aware that tag reading and writing very close to the antenna will not be possible. As a guide value keep the distance above 10mm !

For detailed information about individual range characteristics of available Antenna-Types please refer to the corresponding data sheets like **ANT-04-35E** / **ANT-08-65E** / **ANT-10-100E**.

Example range measures with Antenna ANT-08-65E:

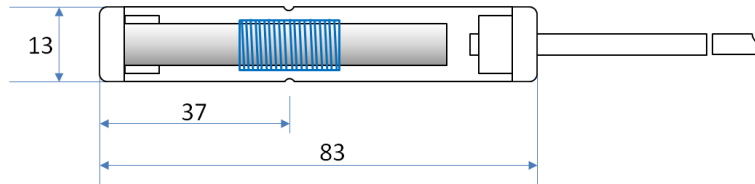


Antenna aligned orthogonal to the ID Tag,
 reading range up to 150mm



Antenna aligned parallel to the ID Tag,
 reading range up to 220mm

Technical Antenna data of ANT-08-65E:



Operating Frequency: 134.2 KHz
 Inductance: 48 μ H \pm 3%



7.4 Installation guide for RFID ferrite core antennas

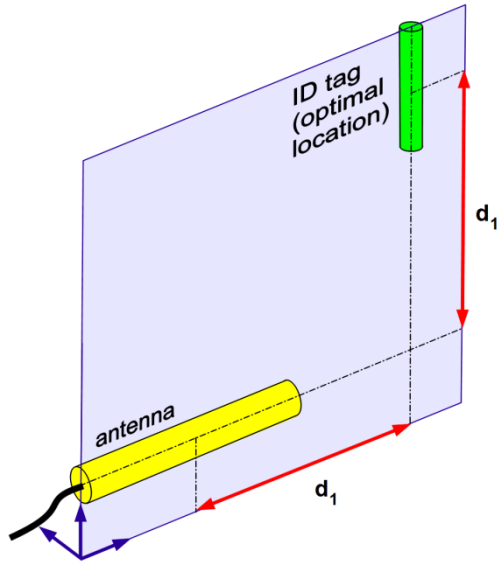
This guide shall show you the best way to install RFID antennas to your devices to achieve safe reading results. It considers two possible orientations between antenna and ID tag:

1. Antenna is aligned orthogonal to the ID tag, in one layer
2. Antenna is aligned parallel to the ID tag, in one layer

General information:

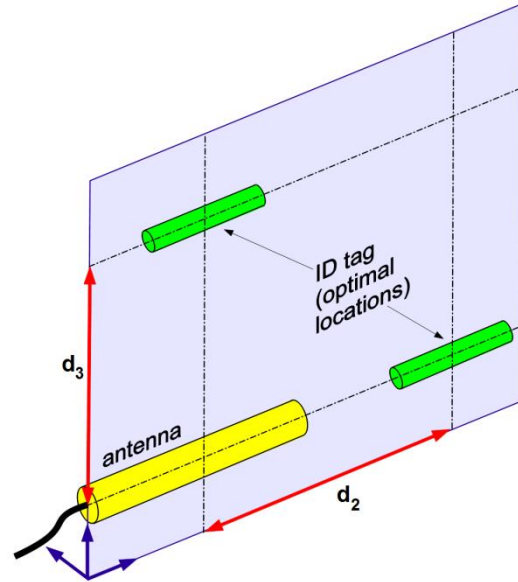
- Don't attach RFID antennas directly to metal surfaces and avoid ferromagnetic materials! Leave a gap of at least 5mm and use plastic mountings and screws for fixing the antenna.
- Don't install antennas, cables or reading devices close to electromagnetic radiating devices such as switched-mode power supplies!
- Only use shielded cables and try not to loop the remains!
- Try to align antenna and ID tag in one layer. (see case explanations)
- **Maximum distances are given for best surrounding conditions. In reality the maximum distances may be lower due to other electromagnetic interferences! So, try to keep the distance between antenna and ID tag as low as possible.**

Case 1: Antenna orthogonal to ID tag



Antenna type ANT08-65E
 $d_{1\ min} = 10\ \text{mm}$ $d_{1\ max} = 120\ \text{mm}$

Case 2: Antenna parallel to ID tag



Antenna type ANT08-65E
 $d_{2\ min} = 10\ \text{mm}$ $d_{2\ max} = 200\ \text{mm}$
 $d_{3\ min} = 10\ \text{mm}$ $d_{3\ max} = 140\ \text{mm}$

Considering the suggested alignment between antenna and ID tag should perform best results.

If you still encounter problems or for further information please contact our Customer Support.

8 Communication Protocol Details

The implementation of all available protocol versions is based on the ASCII communication protocol for RFID Reader – Type TIRIS® by Texas Instruments.

NOTE: For detailed descriptions of each Communication Protocol, please refer to the respective Software-Manuals listed below.

Protocol	Description	User Manual
ASCII-L	Fabmatics developed short command set	<u>UME_LF-134-SER_SW-ASCII-L</u>
ASCII-A	Command set compatible to Asyst ASCII CIDRW Version S protocol	<u>UME_LF-134-SER_SW-ASCII-A</u>
ASCII-H	Command set compatible to Hermos protocol	<u>UME_LF-134-SER_SW-ASCII-H</u>
SECS	SECS communication by SEMI E99	<u>UME_LF-134-SER_SW-SECS</u>

8.1 Supported ASCII-L Communication Commands

Command	Description
R	Read RO, RW and MPT(Only page 0) transponders
W	Write RW transponders
V	Version and Serial number
M	Read MPT and SAMPT (Only page 0) transponders
U	Write MPT transponders
N	Read SAMPT transponders
I	Write SAMPT transponders
L	Lock MPT transponders
K	Lock SAMPT transponders
E	Returns details for last Error

8.2 Supported ASCII-A Communication Commands

Command	Description
R	Are you there
RAR	Read attribute request
WAR	Write attribute request
RR	Read request

WDR	Write data request
RMID	Read material ID
WMID	Write material ID
SCR	Subsystem command request

8.3 Supported ASCII-H Communication Commands

8.3.1 Commands Terminal to Reader

Command	Description
'X'	start an externally triggered read
'W'	write tag
'G'	request parameter
'P'	change parameter
'H'	start heartbeat
'N'	start software reset
'M'	set/read TransponderMode (single/mpt)
'L'	lock one page
'I'	version & serial number query
'S'	write serial number (require password)
'V'	version query

8.3.2 Commands Reader to Terminal

Command	Description
'x'	data from a page (externally triggered read)
'w'	response after write to tag
'p'	response during parameter setting
'g'	response to read parameters
'h'	response after heartbeat
'n'	response after software or hardware reset
'e'	failure message
'm'	response/ack after TransponderMode-Settings
'l'	feedback at locking of one page
'I'	response to version & serial number query
'v'	response to version query

8.4 Supported SECS Commands

8.4.1 Equipment Messages

Message	Description	Direction	W-bit
Sx, F0	Abort transaction	E → H	
S1, F2	Are you there	E → H	Reply
S1, F16	Request offline	E → H	Reply
S1, F18	Request online	E → H	Reply
S2, F20	Reset send	E → H	Reply
S9, F1	Unrecognized device ID	E → H	
S9, F3	Unrecognized stream type	E → H	
S9, F5	Unrecognized function type	E → H	
S9, F7	Illegal data	E → H	
S9, F9	Transaction timer timeout	E → H	
S18, F2	Read attribute request	E → H	Reply
S18, F6	Read request	E → H	Reply
S18, F8	Write request	E → H	Reply
S18, F10	Read ID request	E → H	Reply
S18, F12	Write ID request	E → H	Reply
S18, F14	Subsystem Command Request	E → H	Reply

8.4.2 Host Messages

Message	Description	Direction	W-bit
Sx, F0	Abort transaction	E ← H	
S1, F1	Are you there	E ← H	x
S1, F15	Request offline	E ← H	x
S1, F17	Request online	E ← H	x
S2, F19	Reset send	E ← H	x
S18, F1	Read attribute request	E ← H	x
S18, F5	Read request	E ← H	x
S18, F7	Write request	E ← H	x
S18, F9	Read ID request	E ← H	x
S18, F11	Write ID request	E ← H	x
S18, F13	Subsystem Command Request	E ← H	x

9 Service Information

9.1 Contact

To buy RFID components or spare parts, please contact our sales team:

Phone: +49 351 65237-0 (only daytime CET)

Fax: +49 351 65237-900

Mail: sales@fabmatics.com

9.2 Support

For all purchased RFID components Fabmatics will provide free phone or email support. This includes support for the operation of the components and also support for the integration/installation of components into other equipment. The phone support will be available at normal working times (8:00 a.m. to 5:00 p.m. CET, outside this timeframe a voice mail box will be available).

To get support, please contact our team:

Phone: +49 351 65237-0 (only daytime CET)

Fax: +49 351 65237-900

Mail: support@fabmatics.com

9.3 Return Material Authorization (RMA)

Before returning a defective device to Fabmatics, it is necessary to request a RMA number. This process ensures the proper return of the product and enables a faster classification and repair/replacement of the defective device.

1. Please contact us by phone or mail to get the RMA-Form and RMA-Number:

Phone: +49 351 65237-00 (only daytime CET)

Mail: support@fabmatics.com

Fabmatics generates a RMA number

Using the RMA number, the customer completes the RMA form

2. Ship the defective unit with the RMA-Report to:

Fabmatics GmbH
(vormals Roth & Rau - Ortner)
R M A [Number]
Zur Steinhöhe 1
011109 Dresden
GERMANY

IMPORTANT! Please prominently display the RMA number on the packaging, to allow us to serve you faster.

Acknowledgment of receipt and processing of the RMA request by Fabmatics

3. Returning the repaired/replaced device

9.4 Spare parts

The components in our current array of products are available as spare parts to our customers. In case of spare part requests for products which are already removed from our actual array of products, Fabmatics GmbH requires the type information. All components have an expected product lifetime of 10 years. For this time period we are able to provide spare parts.

9.5 Warranty

The warranty period is 24 months and begins with the moment of delivery of the device as proved by an invoice or other documents. The warranty includes the repair of all damages to the device that occurs within the warranty period and which is evidently caused by faults of the material or production defects.

The warranty does not include damages caused by incorrect connection, inappropriate handling and non-observance of the technical reports.

9.6 Error Case

In case of serious system disorders please contact the Fabmatics Support:


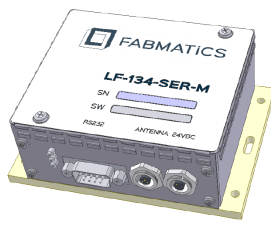



Phone: +49 351 65237-0
Fax: +49 351 65237-900
Email: support@fabamtics.com

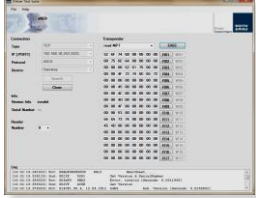



9.7 Disposal


Within the European Union Fabmatics will take back any delivered equipment for disposal. For further information on the return, please contact the Fabmatics Support.

For disposal the equipment by your own, make sure to observe all applicable laws.

9.8 Accessories

Component	Description	Order Codes
LF-134-CAN-P 	134.2 KHz low frequency RFID-reader with serial RS-232 host interface. Available with different Communication Protocols. Case material: plastic (ABS)	
	LF-134-SER-P-4.0 ASCII-A (Asyst)	105125
	LF-134-SER-P-4.0 ASCII-L (Fabmatics ASCII light)	105126
	LF-134-SER-P-4.0 ASCII-H (Hermos)	105127
	LF-134-SER-P-4.0 SECS (SEMI E99)	105128
LF-134-CAN-M 	134.2 KHz low frequency RFID-reader with serial RS-232 host interface. Available with different Communication Protocols. Case material: tinplate metal	
	LF-134-SER-M-4.0 ASCII-A (Asyst)	105129
	LF-134-SER-M-4.0 ASCII-L (Fabmatics ASCII light)	105130
	LF-134-SER-M-4.0 ASCII-H (Hermos)	105131
	LF-134-SER-M-4.0 SECS (SEMI E99)	105132
OEM-POW-OPEN 	Power cable for all versions of LF-134-SER LF-ID-readers and CAN2Web Advanced MINI gateway devices. Open ends for clamp or screw mounting and Binder connector 712–2p.	
	OEM-POW-OPEN-(X)	cable length max. 2m 105122
OEM-POW-M 	Power cable for all versions of LF-134-SER LF-ID-readers and CAN2Web Advanced MINI gateway devices. Molex connector 5557-02R and Binder connector 712–2p.	
	OEM-POW-M-500	cable length 0.5m 105123
Plug Power Supply 	Wide range plug power supply 100-240 V/AC, 50/60 Hz. Output 24 V/DC, 24 W (1A), with Binder connector 712–2p.	
	cable length 1.5m	105124

<p>Fabmatics Test Suite</p> 	<p>Comprehensive software tool for testing all Fabmatics CAN/Serial LF and HF ID-readers in conjunction with a CAN2Web gateway.</p> <p>For further information please contact our support: support@fabmatics.com</p>																														
<p>ANT-04-35EM B</p> 	<p>External LF Ferrite Antenna</p> <ul style="list-style-type: none"> – core dimensions (diameter, length): 4 × 35 mm – inductance: 47 µH – connector type: Binder 712-3p – available cable lengths: up to 2m <table border="1" data-bbox="547 797 1422 1025"> <tr> <td>ANT-04-35EM B-500</td> <td>cable length 0.5m</td> <td colspan="2">105133</td> </tr> <tr> <td>ANT-04-35EM B-8000</td> <td>cable length 0.8m</td> <td colspan="2">105134</td> </tr> <tr> <td>ANT-04-35EM B-1000</td> <td>cable length 1.0m</td> <td colspan="2">105135</td> </tr> <tr> <td>ANT-04-35EM B-1500</td> <td>cable length 1.5m</td> <td colspan="2">105136</td> </tr> <tr> <td>ANT-04-35EM B-2000</td> <td>cable length 2.0m</td> <td colspan="2">105137</td> </tr> </table>			ANT-04-35EM B-500	cable length 0.5m	105133		ANT-04-35EM B-8000	cable length 0.8m	105134		ANT-04-35EM B-1000	cable length 1.0m	105135		ANT-04-35EM B-1500	cable length 1.5m	105136		ANT-04-35EM B-2000	cable length 2.0m	105137									
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ANT-04-35EM B-2000	cable length 2.0m	105137																													
<p>ANT-08-65EM B</p> 	<p>External LF Ferrite Antenna</p> <ul style="list-style-type: none"> – core dimensions (diameter, length): 8 × 65 mm – inductance: 47 µH – connector type: Binder 712-3p – available cable lengths: up to 2m – available with high flex cable <table border="1" data-bbox="547 1267 1422 1585"> <thead> <tr> <th colspan="2"></th> <th>normal</th> <th>high flex</th> </tr> </thead> <tbody> <tr> <td>ANT-08-65EM B/BF-500</td> <td>cable length 0.5m</td> <td>105138</td> <td>105148</td> </tr> <tr> <td>ANT-08-65EM B/BF-800</td> <td>cable length 0.8m</td> <td>105139</td> <td>105149</td> </tr> <tr> <td>ANT-08-65EM B/BF-1000</td> <td>cable length 1.0m</td> <td>105140</td> <td>105150</td> </tr> <tr> <td>ANT-08-65EM B/BF-1300</td> <td>cable length 1.3m</td> <td>105141</td> <td>-</td> </tr> <tr> <td>ANT-08-65EM B/BF-1500</td> <td>cable length 1.5m</td> <td>105153</td> <td>105154</td> </tr> <tr> <td>ANT-08-65EM B/BF-2000</td> <td>cable length 2.0m</td> <td>105142</td> <td>105155</td> </tr> </tbody> </table>					normal	high flex	ANT-08-65EM B/BF-500	cable length 0.5m	105138	105148	ANT-08-65EM B/BF-800	cable length 0.8m	105139	105149	ANT-08-65EM B/BF-1000	cable length 1.0m	105140	105150	ANT-08-65EM B/BF-1300	cable length 1.3m	105141	-	ANT-08-65EM B/BF-1500	cable length 1.5m	105153	105154	ANT-08-65EM B/BF-2000	cable length 2.0m	105142	105155
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<p>ANT-10-100EM B</p> 	<p>External LF Ferrite Antenna</p> <ul style="list-style-type: none"> – core dimensions (diameter, length): 10 × 100 mm – inductance: 47 µH – connector type: Binder 712-3p – available cable lengths: up to 2m <table border="1" data-bbox="547 1792 1422 2056"> <thead> <tr> <th colspan="2"></th> <th>normal</th> <th>high flex</th> </tr> </thead> <tbody> <tr> <td>ANT-10-100EM B/BF-500</td> <td>cable length 0.5m</td> <td>105143</td> <td>105156</td> </tr> <tr> <td>ANT-10-100EM B/BF-800</td> <td>cable length 0.8m</td> <td>105144</td> <td>105157</td> </tr> <tr> <td>ANT-10-100EM B/BF-1000</td> <td>cable length 1.0 m</td> <td>105145</td> <td>105158</td> </tr> <tr> <td>ANT-10-100EM B/BF-1500</td> <td>cable length 1.5m</td> <td>105146</td> <td>105151</td> </tr> <tr> <td>ANT-10-100EM B/BF-2000</td> <td>cable length 2.0m</td> <td>105147</td> <td>105152</td> </tr> </tbody> </table>					normal	high flex	ANT-10-100EM B/BF-500	cable length 0.5m	105143	105156	ANT-10-100EM B/BF-800	cable length 0.8m	105144	105157	ANT-10-100EM B/BF-1000	cable length 1.0 m	105145	105158	ANT-10-100EM B/BF-1500	cable length 1.5m	105146	105151	ANT-10-100EM B/BF-2000	cable length 2.0m	105147	105152				
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ANT-10-100E B 	External LF Ferrite Antenna <ul style="list-style-type: none"> - core dimensions (diameter, length): 10 × 100 mm - inductance: 47 µH - connector type: Binder 712-3p - available cable lengths: up to 2m - available with high flex cable 			
			normal	high flex
	ANT-10-100E B/BF 800	cable length 0.8m	-	105159

10 Maintenance, repairs, troubleshooting

10.1 Maintenance

Cleaning of the surfaces is possible with Isopropanol (IPA).

The plant operator is responsible for the maintenance.

Before start working on the system, always check for mechanical damage and pay attention to any unusual noises!

10.2 Trouble Shooting

In case of any problems check the following list point to point.

1. Power LED is off?
> check power supply (try to replace it) or power cable

In case of frequent read fails, try to use the Read Test Button (only LF-134-SER-P >V3.1) or use the Fabmatics Test Suit (OTS) Software. If the red LED is flashing equably fast during read operation, the reader indicates a persistent Read-Error. Proceed with step 2.

2. RFID Tag is out of range?
> decrease distance between Antenna and Tag and check Transponder- (Tag) alignment - recheck read operation
3. RFID Tag is damaged?
> replace Tag and recheck read operation
4. Antenna, Antenna-cable or Antenna-plug is damaged?
> replace Antenna and recheck read operation
5. Power supply has malfunction (under voltage)?
> replace power supply and recheck read operation
6. Reader Hardware is damaged?
> replace the ID-Reader and recheck read operation

11 Attachment

11.1 Glossary

ASCII	American Standard Code of Information Inter-exchange
CAN	Controller Area Network
RF	Radio Frequency
RFID	Radio Frequency IDentification
LF / HF	Low / High Frequency
HDX	Half Duplex
ISP	In-Circuit Programmer
FSK	Frequency Shift Keying
MPT / SPT	Multi / Single Page Transponder
RO / RW	Read Only / Read and Write
SAMPT	Selective Addressable Multi Page Transponder
ABS	Acrylonitrile Butadiene Styrene (plastic material)
POM	Polyoxymethylen (plastic material)
SMPS	Switched Mode Power Supply
MES	Manufacturing Execution System
SEMI	Semiconductor Equipment and Materials International
SECS	SEMI Equipment Communication Standard
MTBF	Mean Time Between Failures
MCBF	Mean Cycles Between Failures
TIRIS	Texas Instruments Registration and Identification System (RFID Standard)

11.2 EC-Declaration of Conformity

	<h3>EG-Konformitätserklärung</h3> <p><i>EC-Declaration of Conformity</i></p>
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gemäß dem Gesetz über Funkanlagen und Telekommunikationsendeinrichtungen (FTEG) und der Richtlinie 2014/53/EU (RED)
in accordance with the Radio and Telecommunications Terminal Equipment Act (FTEG) And Directive 2014/53/EU (RED Directive)

Hiermit erklären wir, dass nachstehend bezeichnetes Produkt in seiner Konzeption und Bauart sowie in der von uns in Verkehr gebrachten Ausführung den grundlegenden Sicherheits- und Gesundheitsanforderungen der **EU-Richtlinie 2014/53/EU** entspricht. Bei einer mit uns nicht abgestimmten Änderung des Produkts verliert diese Erklärung ihre Gültigkeit.

We hereby declare that, to our best knowledge, the following described product in its design and construction of us in the circulated version is in accordance with all the relevant essential health and safety requirements of the EU directive 2014/53/EU as amended and the national laws and regulations adopting this directive. This declaration is no longer valid if the product is modified without our consent.

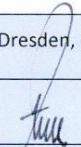
Firma <i>Company</i>	Fabmatics GmbH (vormals Roth & Rau - Ortner) Zur Steinhöhe 1 011099 Dresden / Germany
Produktbezeichnung <i>Designation of product</i>	LF-134-SER-P-4.0 LF-134-SER-M-4.0

Außerdem wird die Übereinstimmung mit folgenden weiteren Richtlinien erklärt:
Furthermore we declare the compliance with other applicable directives:

- **Niederspannungsrichtlinie 2014/35/EU (low voltage directive 2014/35/EU)**

Folgende Normen wurden angewandt:
The following standards were applied:

- EN 60950-1:2006 + A11:2009 + A1:2010
- DIN EN 61000-6-2:2006-03
- DIN EN 61000-6-4:2011-09

Ort, Datum <i>Place and date of issue</i>	Dresden, den 27.01.2017
Unterschriften <i>Signatures</i>	
Name / Funktion <i>Name and function</i>	Heinz Martin Esser Geschäftsführer / <i>Managing Directors</i>

11.3 USA Federal Communications Commission (FCC)

LF-134-SER is a Part 15 Low Power Communication Device Transmitter (DXX) and a Part 15 Class B Computing Device Peripheral (JBP). It is a device that is marketed for use in industrial or business environment, exclusive of a device which is marketed for use by the general public or is intended to be used in the home.

11.3.1 Compliance

The product complies with FCC Subpart C – Intentional Radiators § 15.207 and § 15.209 and the product complies with Subpart B – Unintentional Radiators § 15.107 and § 15.109, when used for its intended purpose. 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/her own expense.

11.3.2 Antenna Requirements

The antenna is removable and does not employ a unique connector; however, the device is professionally installed and maintained. Therefore, the described reader LF-134-SER complies with FCC Subpart C – Intentional Radiators § 15.203.

11.3.3 Labeling Requirements

The described reader LF-134-SER is not large enough to accommodate a label with the standard FCC compliance statement. It is therefore provided here as follows:

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.

For further labelling information please see chapter 0.



11.4 Related documents

- UMA_LF-134-SER_SW-SECS_Eng_Rev02
- UMA_LF-134-SER_SW-ASCII-L_Eng_Rev01
- UMA_LF-134-SER_SW-ASCII-H_Eng_Rev01
- UMA_LF-134-SER_SW-ASCII-A_Eng_Rev01
- DAS_ANT-08-65EM_Eng_Rev05
- DAS_ANT-04-35EM_Eng_Rev03
- DAS_ANT-10-100EM_Eng_Rev05

The documents apply in their respective current version.

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