DATAMARS

TEXTILE ID

R-IN1300 MID

HF – multi read

USER MANUAL

Version 3.1

DATAMARS

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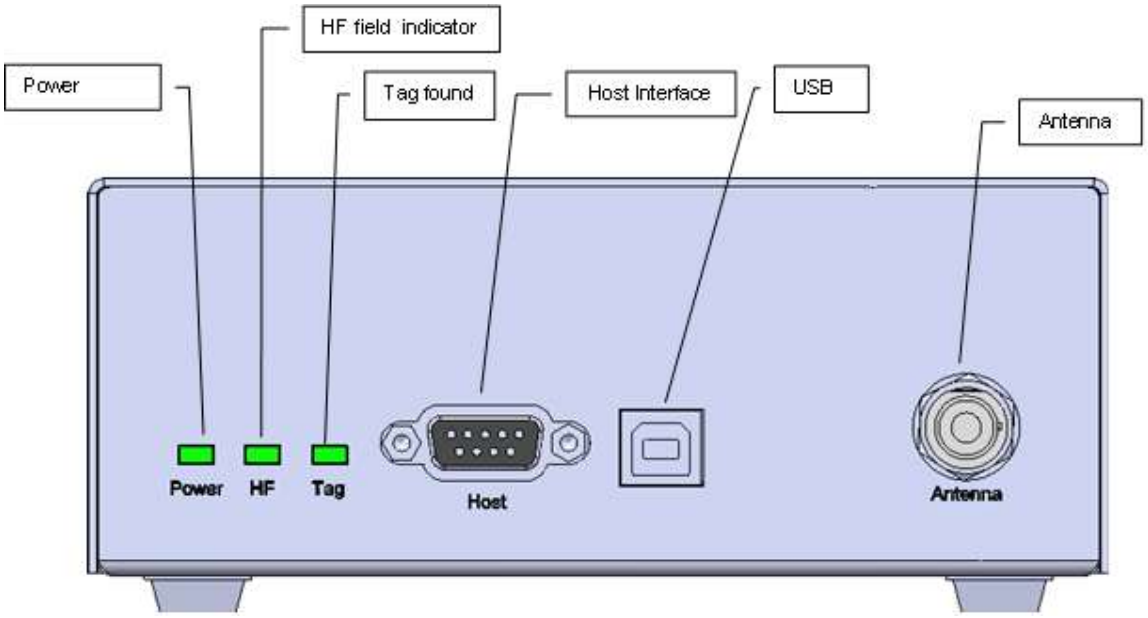
1 INTRODUCTION

The Datamars R-IN1300 MID High Frequency (HF) RFID-reader, designed to work in industrial environments, is resistant to vibrations, electromagnetic interference and able to detect the following transponder technologies:

- T-BT 1320, T-BT1315, T-BT1311 (ISO 15693), HF

The reader is able to find simultaneously more than one High Frequency (HF - multi read) transponder[1].



LEDs

Power	Light on when the reader is switched on
Tag	Light on when one or more transponder are detected
HF	High Frequency reading is ON (Led blinks during software update)

Antenna

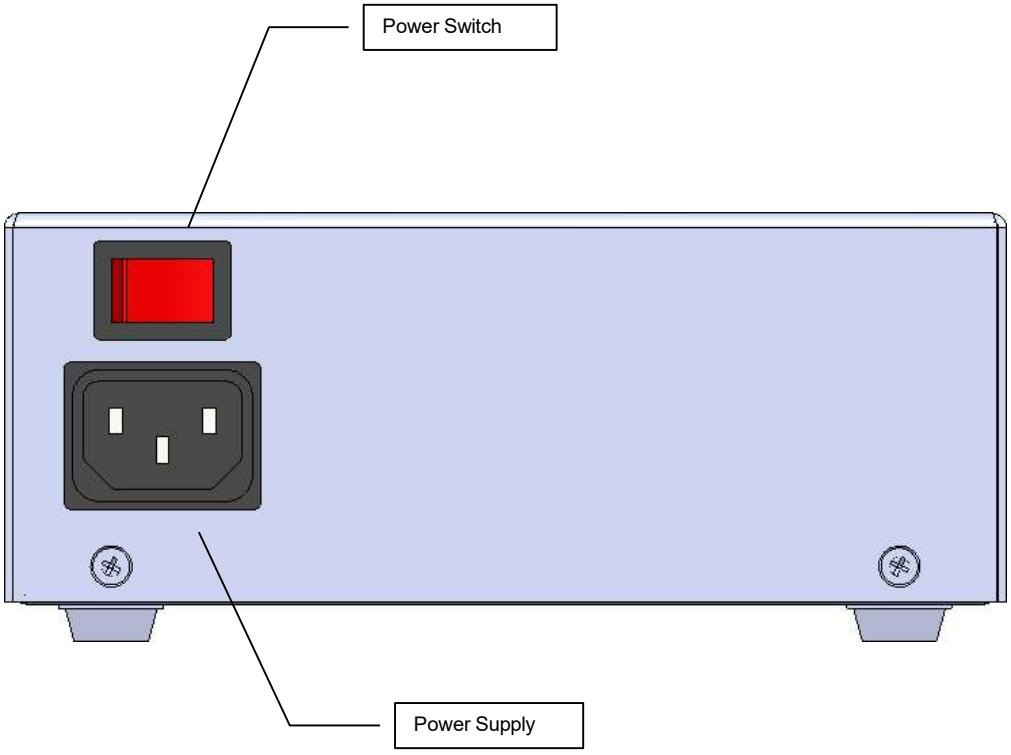
Antenna	TX/RX antenna: for example A-ST1330TT / TTL

Interfaces

Host	Connect to any serial port (COM) on your PC with RS-232 cable or to any other RS232 Terminal.
USB	USB device port

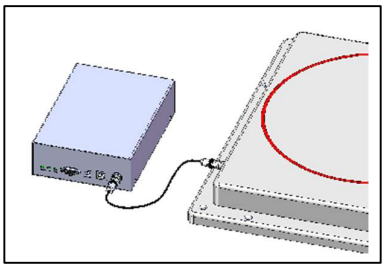
[1] the quantity of transponders detected and the accuracy can change depending on the used transponder, the environment, the size of the antenna, etc.

Power Switch	Turn ON and OFF the reader.
Power Supply	Connect the power supply cable (100-240VAC, 50-60 Hz).



2 HARDWARE CONNECTIONS

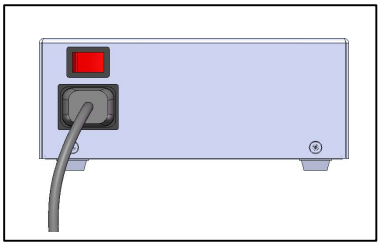
1. **Antenna**:
   Connect the black coaxial cable from the antenna to the connector marked as “Antenna”.



You can not use cable other than the 3.5m coaxial 50Ω cable supplied by Datamars. Additional extension cables at disposal.

2. **PC/Terminal**
   Connect the serial white cable from the connector marked “Host” to any serial port (COM) on your PC

3. **Power**
   Connect the power cable 110 – 240 V AC and be sure that it is well fixed.



4. Set the Power Switch to ON and check if the green LED (Power) is on.
5. Wait until light “Tag” stop flashing (~20 seconds).

IMPORTANT:

- **Please place the antenna as far as possible from metal surfaces to avoid possible reading interferences and avoid mounting it in places where regular ventilation is not granted.**
- **After the reader is turned on for some time the temperature might increase.**

Do not plug/unplug any connectors while the reader is turned ON.

Although R-IN1300 MID is protected against ESD, to avoid reader malfunction make sure that no direct electrostatic discharge will happen into the reader case, antennas or even on metallic parts directly in contact with the reader enclosure or antennas structure.

3 OPERATION WITH TERMINAL

For operation with terminal use any kind of terminal, e.g. *Windows HyperTerminal* with the following settings:

- Bits per second 115200
- Data bits 8
- Parity None
- Stop bits 1
- Flow control None

3.1 LIST OF THE COMMANDS OF THE READER

All commands must be followed by a carriage return (ENTER).

General Commands	Explanation
*d	Detect: returns the UID-list of all the HF transponders in the field
*i	Interrupts any continuous mode operation (does not disable the continuous mode)
*x	List of the commands and settings
*v	Firmware Version
*se	Settings: Displays the current settings (Notice that the settings are maintained after power off)
*st	Store UIDs **Usage:** with the command **"*st"** switch from the state "Store UIDs off" to the state "Store UIDs on". Then start reading with the command **"*d"**. The detected tags are not sent to the output devices but are cumulated internally. Using now the command **"*dw"** the reading process is stopped and the cumulated detected UIDs are sent to the output devices all at once.
*dw	Download UIDs (this command is coupled with *st – see above)

3.2 GENERIC SETTINGS

General settings	Explanation
*rd	Restore default settings Any previously user defined settings will be deleted and re-placed by factory defaults. Confirmation: "Default settings restored"
*co[_]	Continuous mode: *co0 continuous mode off *co1 continuous mode on (default)
*in[_]	Number of inventories (for non continuous mode only) *in[1 .. 9] (default 1 [inventory], example *in5)

*id[_]	Delay (ms) between two inventories (for non continuous mode only) *id[0 .. 1000] (default 0 [ms], example *id530)
*rh[_]	Remove headers: *rh0 does not remove the headers *rh1 removes the headers (default)
*ec[_]	Echo: *ec0 echo disabled (default) *ec1 echo enabled “echo” makes it possible to view the characters sent to the reader.
*sa[_]	Stand alone mode: *sa0 stand alone mode disabled (default) *sa1 stand alone mode enabled (detect) When stand alone mode is enabled, the device will start reading as soon as it is turned on.
*bu[_]	Buzzer Box (beeper). *bu0: buzzer disabled *bu1: buzzer activated on tags-detection *bu2: buzzer activated on antenna-transmission
*nl[_]	New Line character(s) selection: *nl0 line feed and carriage return (0x0D 0x0A) (default) *nl1 line feed (0x0A) *nl2 carriage return (0x0D) *nl3 carriage return and line feed(0x0A 0x0D)
*pw[_]	Output power: *pw[0 .. 4000] range of power from 0 to 4000 mW (default 2000 mW) - Example *pw2000 ⚠ The selected output power is an approximate value.
*dt[_]	Time between UIDs: This parameter inserts a time delay between the transmission of codes. *dt[0..200] range of time between UIDs from 0 to 200 units (default 0), 1 unit = 10 ms (example: *dt10 >> 100ms)
*lc[_]	Lock code: *lc0 lock code disabled (default) *lc1 lock code 1 enabled *lc2 lock code 2 enabled *lc3 lock code 3 enabled
Details for *lc1: Any transponder is read just once. To read a transponder again, another one must be read first. The transponder is first detected only once without regard to the time spent in the field. Details for *lc2: A chip can be read again only if it was outside the reading area for more than *ti[_] seconds. Details for *lc3: A chip can be read again only if it was outside the reading area for more than *cn[_] chips.	
*ti[_]	Time out: *ti[0..180] time parameter for lock code 2 from 2 [s] to 180 [s] (default 10 [s], example *ti10)
*cn[_]	Number of detections to loose a lock: *cn[1 .. 9] counter parameter for lock code 3 from 1 [chip] to 9 [chips] (default 2 [chips], example *cn7)

*sk[_]	Skip time slot on no response: *sk0 skip on no response off *sk1 skip on no response on (default)
*ct[_]	Collision threshold parameter: *ct[0 .. 100] parameter from 0 to 100 (default 33, example *ct33)
*et [_]	Communication selection : *et1 RS232 *et2 RS232(default)
*br[_]	baud rate: *br0 baud rate 9600 *br1 baud rate 19200 *br2 baud rate 38400 *br3 baud rate 57600 *br4 baud rate 115200 (default)
*cl[_]	Code length: See Appendix A for more details. *cl0 16 characters UIDs (standard, default) *cl1 15 characters UIDs (Partial code) *cl2 14 characters UIDs (Partial code) *cl3 13 characters UIDs (Partial code) *cl4 12 characters UIDs (Partial code) *cl5 12 characters UIDs (First character special) *cl6 11 characters UIDs (Partial code) *cl7 10 characters UIDs (Partial code) *cl8 9 characters UIDs (Partial code) *cl9 8 characters UIDs (Partial code) Attention: code maybe not unique with the selected code length
*tt[_]	Tag technology: *tt1 tag technology ISO 15693(T-BT1320 T-BT1315) (default) *tt2 tag technology Philips I-Code I (not available). Example: *tt1: only ISO *tt2: only I-Code I *tt12: both ISO and I-Code I
*rg[_]	Receiver gain (in case of doubt, do not modify): Amplification of the received signal.

	*rg0, *rg1, *rg2, *rg3 (default): allowed amplification steps
*re[_]	Reverse order *re0 Uid not reversed (default) *re1 Uid reversed
*lo[_]	Location: The place where the reader has been put or the name of the reading point (e.g. Clean Scan 1) Valid values: sequences of characters (max. length = 40)

3.3 ISO 15693 SETTINGS

ISO 15693 settings	Explanation
*rm[_]	Reader request rate: *rm0 Reader Request Rate: SLOW (1 out of 256) *rm1 Reader Request Rate: FAST (default) (1out of4)
*mt[_]	Modulation type: *mt0 modulation type ASK *mt1 modulation type FSK (default)
*tm[_]	Tag response rate: *tm0 Tag Response Rate: SLOW *tm1 Tag Response Rate: FAST (default)
*mi[_]	Modulation index: *mi0 modulation index 20% (default) *mi1 modulation index 100%
*ts[_]	Time slots ISO-15693: *ts0 single time slots *ts1 16 times slots (default)
*qm[_]	Quiet mode: When this mode is enabled the transponder will answer just once while in the antenna field. *qm0 quiet mode off (default) *qm1 quiet mode on
*aw[_]	Anti-collision window correction: Range: *aw[0..32] (default: 0) - Example *aw14 **NB: Customers are not allowed to modify the value of this setting (DM-Customer-Support only)**
*rw[_]	Response window correction: Range: *rw[-64..64] (default: 0) - Examples: *rw-14 (for negative values use '-') *rw14 (for positve values do not use '+') **NB: Customers are not allowed to modify the value of this setting (DM-Customer-Support only)**
*pp[_]	Positive pulse width correction: Range: *pp[-30..30] (default: 0) - Examples: *pp-25 (for negative values use '-') *pp25 (for positve values do not use '+') **NB: Customers are not allowed to modify the value of this setting (Datamars Customer-Support only)**
*pn[_]	Negative pulse width correction: Range: *pn[-30..30] (default: 0) - Examples:

	*pn-25 (for negative values: use '-') *pn25 (for positive values do not use '+') **NB: Customers are not allowed to modify the value of this setting (Datamars-Customer-Support only)**

3.4 I-CODE I SETTINGS

*nt[_]	Time slots I-Code I: **0 single time slot** **1 4 time slots** **2 8 time slots** **3 16 time slots (default)** **4 32 time slots** **5 64 time slots** **6 128 time slots** **7 256 time slots**

3.5 USB SETTINGS

The USB-device can be used to emulate a serial-connection or a mass storage. Using the USB-device like a "mass storage emulator", it is possible to write the detected UIDs into a formatted file (journal-file). The file-format per default is CSV so that the journal-file can be opened with "Microsoft Excel".
The generic format of journal-file looks like this:

```
UID0  <line-separator>
UID1  <line-separator>
UID2  <line-separator>
UID3  <line-separator>
        …
```

The customer can configure the "line-separator" and the extension of the journal-file.
Note: Refer to chapter 5.2 to get information on how to retrieve and handle the journal-file.

*us[_]	USB usage: *us0 USB disabled *us1 USB serial emulation *us2 USB mass storage emulation (MID Plus only)
*jf[_]	Journal-file format: *jf0 csv-format (default) *jf1 customized format
*fs[_]	Field-separator: Valid values: sequences of characters (max. length = 10) To specify "Carriage-Return", type "\r" To specify "New-Line", type "\n" To specify "Horizontal-Tab", type "\t"
*ls[_]	Line-separator: Valid values: sequences of characters (max. length = 10)

	To specify “Carriage-Return”, type “\r” To specify “New-Line”, type “\n” To specify “Horizontal-Tab”, type “\t”
*fe[_]	Journal-file extension: Valid values: sequences of characters (max. length = 5)

3.6 OPERATING WITH THE SERIAL PORT (RS-232)

The reader “R-IN 1300 MID” can be connected to a PC with a serial connection and operated through the Datamars Reader Configuration

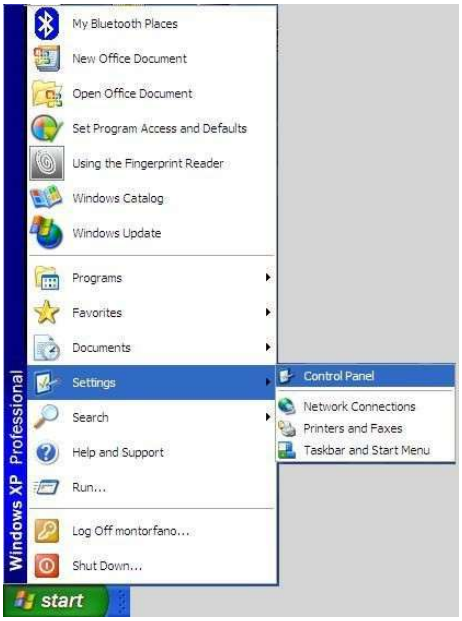
The Datamars Reader Configuration is a Java application which makes use of the command line interface through the RS-232 interface.

3.6.1 FURTHER USAGE

For further usage there is no need to install the USB Serial Drivers. Just specify that you intend to use the USB-Serial-Emulation and plug the USB-cable in

3.6.2 HOW TO DISCOVER WHICH COM-PORT CORRESPONDS TO THE USB-SERIAL-EMULATION

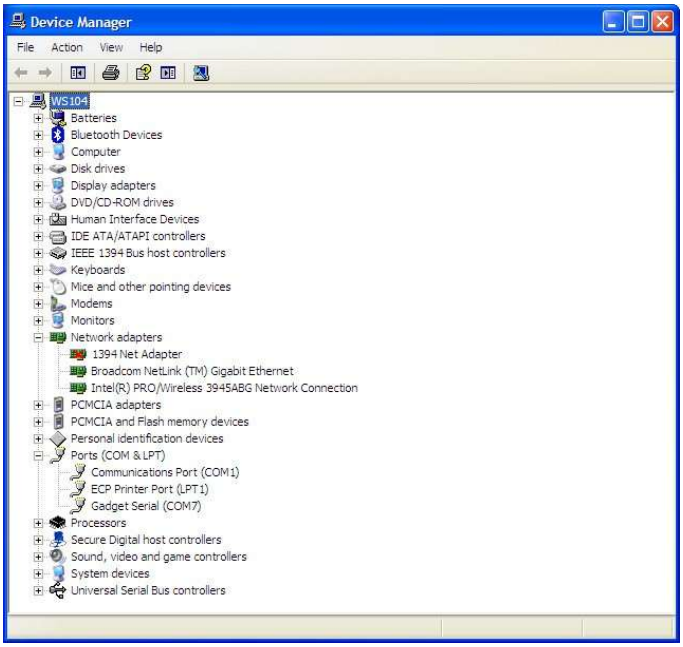
Open the “control panel”.



Select “System”

Select “Hardware” and “Device Manager”:

Select “Ports” to see which COM corresponds to the “USB-Gadget Serial”(ie: COM7). Now you can open a terminal on “Gadget Serial” (ie: COM 7) without need to specify baud rate, data-bits, parity-bit, stop-bit and flow-control.



NB: If the USB-Cable is unplugged, the USB-Serial-Communication stops. If now you plug the USB-Cable in, the USB-Serial-Communication will NOT start! After unplugging, you have to close the terminal, plug the USB-Cable again and open a new terminal.

4 TECHNICAL SPECIFICATIONS FOR R-IN1300 MID

4.1 OPERATIONAL CHARACTERISTICS

The DATAMARS SA RFID reader R-IN1300 MID is an integrated analog system for RFID-Applications (RFID=radio frequency identification) which works at 13.56MHz. It allows reading data stored into ISO-RFID transponders or ISO-Labels at 13.56 MHz. Single- and Multi-read operation are supported. The communication between the reader and the transponder is based on the ISO 15693 (Part 1-3) protocol.

All transponders (contact less memories) are powered by a transmitted carrier radio wave at 13.56MHz and are compliant with the ISO 14443-B recommendation for the transfer of power and signals via radio transmission. For this purpose the reader R-IN1300 MID amplitude, modulates the data on the carrier using amplitude shift keying (ASK) and the tag replies by load modulating the data on the carrier.

Once the reader is connected to an appropriate client-network (via dedicated computer) it works based on the installed software like a server providing the received data from the transponders to the final client-application.

The service software helps to control and update the reader in user-friendly way.

R-IN1300 MID supports different antennas as well as multiple configurations.

4.2 ELECTRICAL CHARACTERISTICS

Electrical characteristics (without antenna)

POWER SUPPLY	AC 100-240V 1A 50-60 Hz
POWER CONSUMPTION	35 W
ANTENNA OUTPUT POWER	4 W

Technical characteristics

OPERATING FREQUENCY	13.56 MHz
OPERATING TEMPERATURE	0°C - 40°C / 32°F - 104°F
DIMENSIONS	222 x 152 x 59 (mm) / 8.7 x 6.0 x 2.3 (inches)
WEIGHT	1.5 kg
TRANSPONDER TYPE	ISO15693 (T-BT 1320, T-BT1315 or T-BT1311)
ANTI COLLISION	Yes
COMMUNICATION PROTOCOL	RS-232, USB (upon request)
AUTO TUNING	No
READING SPEED	Depend on number of transponder and technology (up to 40/s)

READ/WRITE	Read / Write
EMC	High attenuation characteristics (~30÷60 dB)
IP PROTECTION DEGREE	IP30
MAX. READABLE TRANSPONDERS	1000 pieces

Hot
With high power transmission the housing might become hot!

4.3 REGULATIONS

4.3.1 EQUIPMENT MODIFICATION

Equipment modifications not expressly approved by Datamars SA, CH-6930 Bedano, the party responsible for FCC compliance, are forbidden. Such modifications could void the user's warranty and authority to operate the equipment and cause hazardous conditions.

4.3.2 EN 300330-1/-2 (EUROPE)

The R-IN1300 MID system is a sending and receiving equipment and is in accordance with the R & TTE directive **EN 300 330-1/-2.**

The R-IN1300 MID system fulfils the requirements of this regulation.

4.3.3 FCC (USA)

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.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
-- Reorient or relocate the receiving antenna.
-- Increase the separation between the equipment and receiver.
-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-- Consult the dealer or an experienced radio/TV technician for help.

4.3.4 IC (CANADA)

This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

The device has been designed to operate with the antennas listed below, and having a maximum gain of 2 dB. Antennas not included in this list or having a gain greater than 2 dB are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

List of antennas: Datamars antenna A-ST1330 TT
Please ask for more antennas which are not listed above.

In order to reduce potential radio interferences to other users, select the antenna type and gain as follows:
equivalent isotropically radiated power (e.i.r.p.) not higher than the permitted one for a successful communication.

Operation is subject to the following two conditions:
(1) this device may not cause interference, and
(2) this device must accept any interference, including interference that may cause undesired operation of the device.

4.3.5 CE CERTIFICATION

The system R-IN1300 MID is in accordance with the requirements of protection, which are defined in the regulation concerning the electromagnetic tolerability EN301 489-1, -3, emitted by the council for the harmonisation of regulations in the member countries. The European Community regulation for Low Frequency, EN 60950, is respected.

The R-IN1300 MID system fulfils the requirements of this regulation.

4.3.6 WARRANTY

If the reader is opened by not certified personnel by mistake the warranty is voided and we cannot guarantee the fulfillments of the above-mentioned regulations.

APPENDIX A - CODE LENGTH

In terminal mode you can configure the reader to return the UID code in 4 different formats:

1. ***cl0:**
Standard 16 characters UID

2. ***cl1 to *cl9:**
The reader returns only the right most digits of the original 16 digit UID.

With this format it is not possible to guaranty the uniqueness of the codes !

3. ***cl5:**
The reader returns 12 digits code in the fashion of “cl2”, but in this case the first (left) chapter ranges from “G” to “Z” instead of from “0” to “F”.

With this format it is not possible to guaranty the uniqueness of the codes !

APPENDIX B - TROUBLESHOOTING

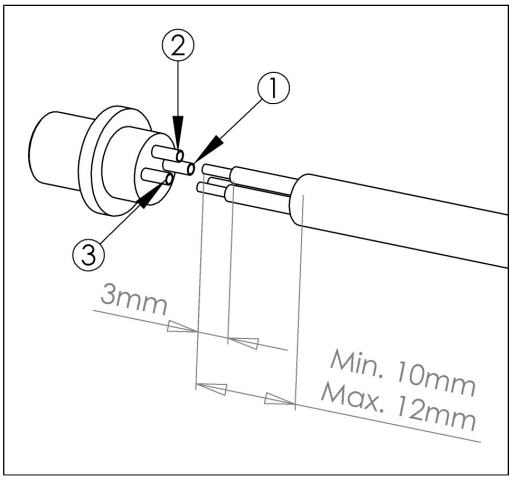
If you run into any problem using your reader, use the following table to troubleshoot the problem. If the problem persists, contact support at support@datamars.com or +41 91 935 73 80.

SYMPTOM	CAUSE AND/OR CORRECTIVE ACTIONS
There are transponders on the antenna but the software displays no UID.	• Is the antenna cable connected to the reader? • Are the transponders you want to read specified in the options? • Is the HF led on? ➔ If the three previous points didn't solve the problem turn the reader off, wait 10 seconds before turning the reader on again
Bad reading or low reading distance	• Is the antenna near metallic objects or noise source like electric motors? ➔ Try to move the antenna and the reader away from these objects.
The reader reads transponder (Tag LED lights on) but the software displays no UID	• Is the RS-232 cable well connected to the Host Interface? • Is the software set 115200 bps – 8 – N – 1 – N? ➔ Verify the connection

ADDENDUM – 24V DC VERSION OF MID-RANGE READER

1. DC INPUT CONNECTOR

1.1. DC PLUG PINOUT AND WIRE PREPARATION

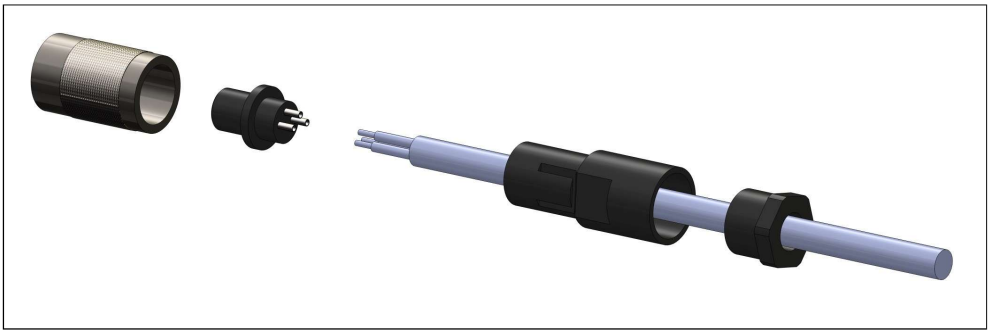


Pin number	Description
1	DC Positive terminal
2	Earth (must be connected)
3	DC Negative terminal (GND)

Wire section	Cable Outer diameter
0.25-0.34 mm2	3.5-5 mm

1.2 DC PLUG TO WIRE CONNECTION

The following picture shows how to assemble the connector on the 3 wire cable.



The 3 wire terminals must be soldered on the connector terminals as described in chapter 1.1.

2. INSTALLATION INSTRUCTION

The following figure shows how to connect the RIN1300MID to a 24VDC power supply.

Note: for optimum performance the earth must be connected.