

LM

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User Manual

LM Dental Tracking System™ Reader



This manual is valid starting from:

LM Dental Tracking System™'s Reader 2.14.3

This manual is connected to LM Dental Tracking System™'s Server and it is recommended to read also *Manual for LM Dental Tracking System™'s Server*.

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CONTENT

1. Introduction	4
2. Safety instructions.....	5
2.1 Safety notices	5
2.2 General safety instructions for the reader.....	5
2.3 EMC Guidance and manufacturer's declaration	7
3. Contents of the delivery	10
3.1 Contents	10
3.2 Reader	11
3.3 User interface of the reader	12
3.4 Reader UI icons.....	13
3.5 Activity icons	14
3.6 System glossary.....	15
4. Taking the Reader into use.....	18
4.1 Installation	18
4.2 Reader activation	18
4.3 Normal use – only one configured activity.....	18
4.4 Normal use	18
4.5 Logging in with an RFID card.....	18
5. Using the Reader.....	19
5.1 Startup and shutdown.....	19
5.2 Information search.....	19
5.3 Reading articles with an auxiliary device connected to the reader.....	19
5.4 Reader settings	19
5.5 Registering new instrument	19
5.6 Reader HID mode use and registering new instruments through the server	20
6. Error/alert situations	21
6.1 Error/alert description and resolution	21
6.2 Warnings.....	22
7. Cleaning and maintenance.....	22
7.1 Recommended cleaning procedures.....	22
7.2 Maintenance	22
8. Troubleshooting.....	23
8.1 Network failure	23
9. Technical data	23
10. Warranty	24

1. INTRODUCTION

Foreword

This is the user manual for LM Dental Tracking System™ Reader. Later referred as to “DTS Reader”. Read and understand this manual before you use the product. If there are any questions regarding the contents of this manual, please contact LM-Instruments Oy. Ensure this User Manual is easily available for all users.

Intended and prohibited uses of the product

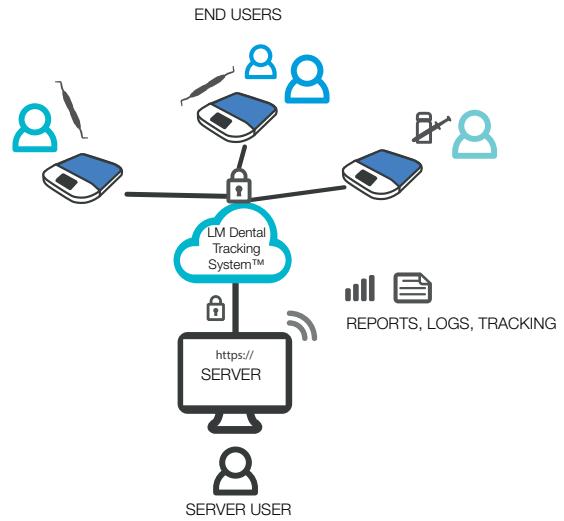
LM Dental Tracking System™ is used to record and track (chosen) activities made to articles registered in the system. Articles can be e.g. different kinds of tools like dental hand instruments or materials like dental filling materials.

Do not use DTS Reader where it is not intended to be used. If you are unsure about your operation, please contact your local dealer or place of purchase.

Description of the LM Dental Tracking System™

LM Dental Tracking System™ (later referred to as “DTS”) consists of a server and several readers connected to it. The communication is encrypted (HTTPS) between the readers and the server. Readers record activities to the server and get configuration from the server.

Users can be given access to the server to access web-based UI to e.g. view logs and configure the system. The communication between the server user and the server is encrypted (HTTPS).



General Requirements

Special precautions are necessary to this product regarding EMC (Electro Magnetic Compatibility). It is necessary to install the product and put it into service as described in the EMC data in Section 2.4, “EMC Guidance and manufacturer’s declaration”, on page 7.

Portable and mobile RF (Radio Frequency) communications equipment can have an unwanted effect on the product.

Connect the product to electricity and network supply which meets the requirements in the Technical data.

Service

Only approved service persons are permitted to do servicing to this product. The maintenance procedures which are introduced in this manual are for the user. Users must obey the maintenance measures to keep safe and efficient operation of the product.

2. SAFETY INSTRUCTIONS

2.1 Safety notices

The safety notices shown on this page are used to identify safety messages in these instructions:



WARNING indicates a dangerous situation that, if not prevented, could cause death or injury.



CAUTION indicates a dangerous situation that, if not prevented, could cause minor or moderate injury.



NOTICE indicates a situation that, if not prevented, could result in material damage.

2.2 General safety instructions for the reader



Metal surfaces may affect reader performance.



No modification of this equipment is allowed.



Do not open the cover plate of the reader.



Use only approved power source, the technical data in section 9.



Do not step on the reader.



Do not sit on the reader. Max load 5 pounds or 2 kilograms.



If the reader has been in the cold, allow it to warm up at room temperature for at least 6 hours before switching on, in order to allow condensation formed to evaporate.



Always check that the DTS Reader, cables and connectors are in operational use. If the DTS Reader or cables has been damaged, DO NOT USE the DTS Reader.



The reader is intended for indoor use only.



System is not used for medical treatment decisions.



Basic recommendation is that the reader is on all the time. However the user has to turn it off before transportation.



Device is not intended for use in conjunction with flammable agents or anaesthetics.



A warning that the DTS Reader should not be used adjacent to or stacked with other equipment and that if adjacent or stacked use is necessary, the DTS Reader should be observed to verify normal operation in the configuration in which it will be used.

Note

The manufacturer of the DTS Reader may provide a description or list of equipment with which the DTS Reader has been tested in a stacked or adjacent configuration and with which stacked or adjacent use is permitted.

2.3 EMC Guidance and manufacturer's declaration

Guidance and manufacturer's declaration - electromagnetic emissions		
The DTS Reader is intended for use in the electromagnetic environment specified below. The customer or the user of the DTS Reader should ensure that it is used in such an environment.		
Emission test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR 11	Group 1	The DTS Reader is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
RF emissions CISPR 11	Class B	The DTS Reader uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/flicker emissions IEC 61000-3-3	Complies	

Guidance and manufacturer's declaration - electromagnetic immunity			
The DTS Reader is intended for use in the electromagnetic environment specified below. The customer or the user of the DTS Reader should ensure that it is used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 percent.
Electrical fast transient/ burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV line(s) to line(s) ±2 kV line(s) to earth	±1 kV line to line	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5 % U_T (>95 % dip in U_T) for 0.5 cycle 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles <5 % U_T (>95 % dip in U_T) for 5 sec	<5 % U_T (>95 % dip in U_T) for 0.5 cycle 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles <5 % U_T (>95 % dip in U_T) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the DTS Reader requires continued operation during power mains interruption, it is recommended that the DTS Reader be powered from an uninterruptible power supply or battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE U_T is the AC mains voltage prior to application of the test level.			

Guidance and manufacturer's declaration - electromagnetic immunity

The DTS Reader is intended for use in the electromagnetic environment specified below. The customer or the user of the DTS Reader should ensure that it is used in such an environment.

Use of accessories and cables other than those specified may result in decreased immunity of the DTS Reader.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	<p>Portable and mobile RF communications equipment should be used no closer to any part of the DTS Reader including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.</p> <p>Recommended separation distance: $d = 1,2\sqrt{P}$</p>
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2,5 GHz	3 V/m	<p>$d = 1,2\sqrt{P}$ 80 MHz to 800 MHz $d = 2,3\sqrt{P}$ 800 MHz to 2,5 GHz</p> <p>where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m).</p> <p>Field strengths from fixed RF transmitters as determined by an electromagnetic site survey, ^a should be less than the compliance level in each frequency range. ^b</p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 
<p>NOTE1 At 80 MHz and 800 MHz, the higher frequency range applies.</p> <p>NOTE2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</p>			
<p>a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the DTS is used exceeds the applicable RF compliance level above, the DTS should be observed to verify normal operation. If abnormal performance is observed additional measures may be necessary, such as reorienting or relocating the DTS.</p> <p>b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.</p>			

Important Note

To comply with the FCC RF exposure compliance requirements, no change to the antenna or the device is permitted. Any change to the antenna or the device could result in the device exceeding the RF exposure requirements and void user's authority to operate the device.

Recommended separation distances between portable and mobile RF communications equipment and the DTS Reader.

The DTS Reader is intended for use in the electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the DTS Reader can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the DTS Reader as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150 kHz to 80 MHz $d = 1,2/\sqrt{P}$	80 MHz to 800 MHz $d = 1,2/\sqrt{P}$	800 MHz to 2,5 GHz $d = 2,3/\sqrt{P}$
0,01	0,12	0,12	0,23
0,1	0,38	0,38	0,73
1	1,2	1,2	2,3
10	3,8	3,8	7,3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

Caution

Exposure to Radio Frequency Radiation. To comply with FCC/IC RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons. This device must not be co-located or operating in conjunction with any other antenna or transmitter.

Note

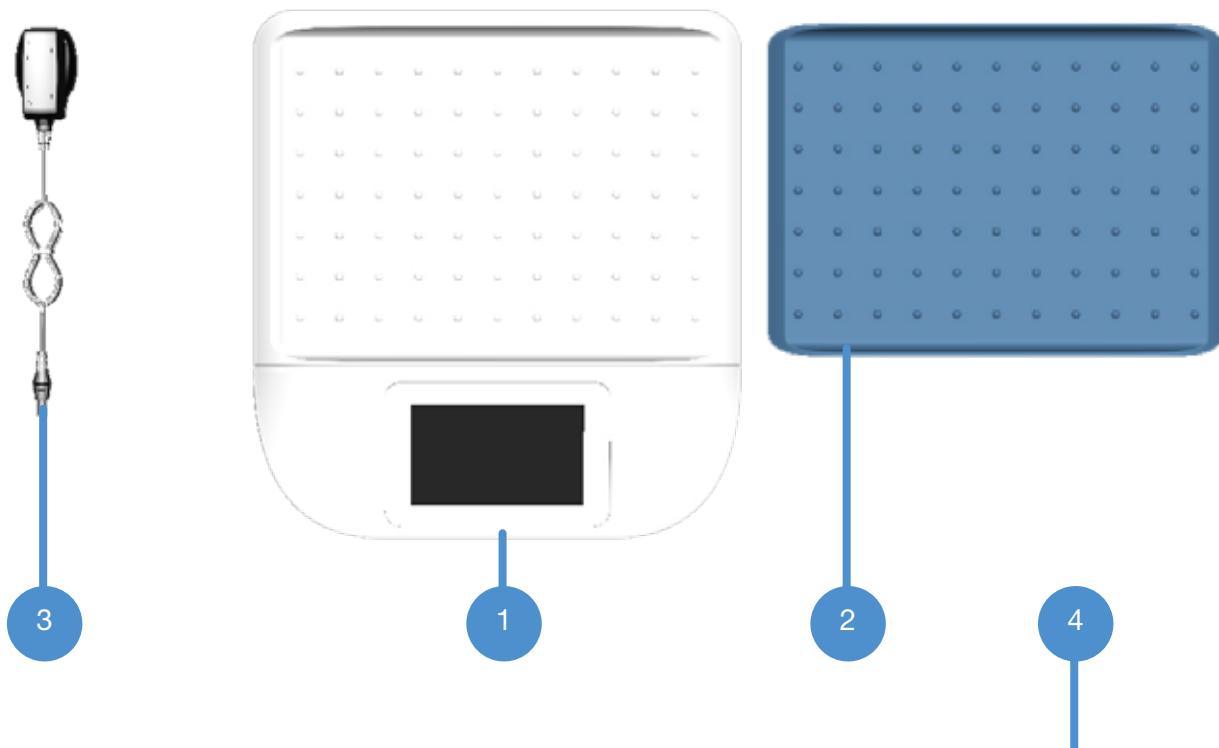
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate 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.

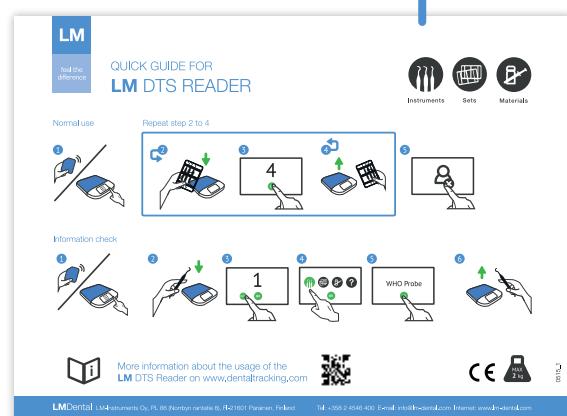
3. CONTENTS OF THE DELIVERY

3.1 Contents

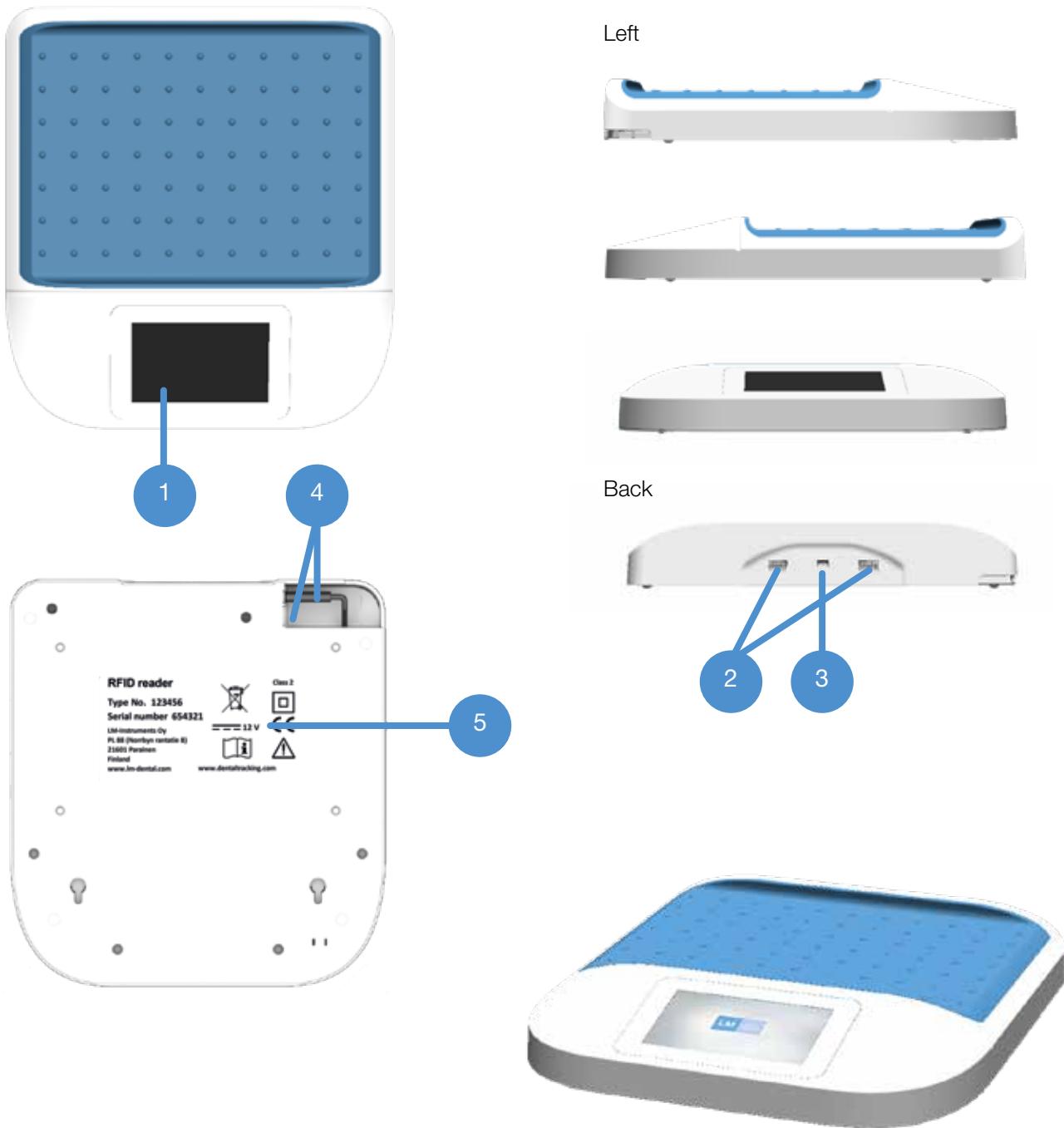
Here are the contents of the DTS Reader package.



1. Reader
2. Silicone mat
3. Power supply (FSP015-RCMM, 1,5 meter)
4. Quick guide



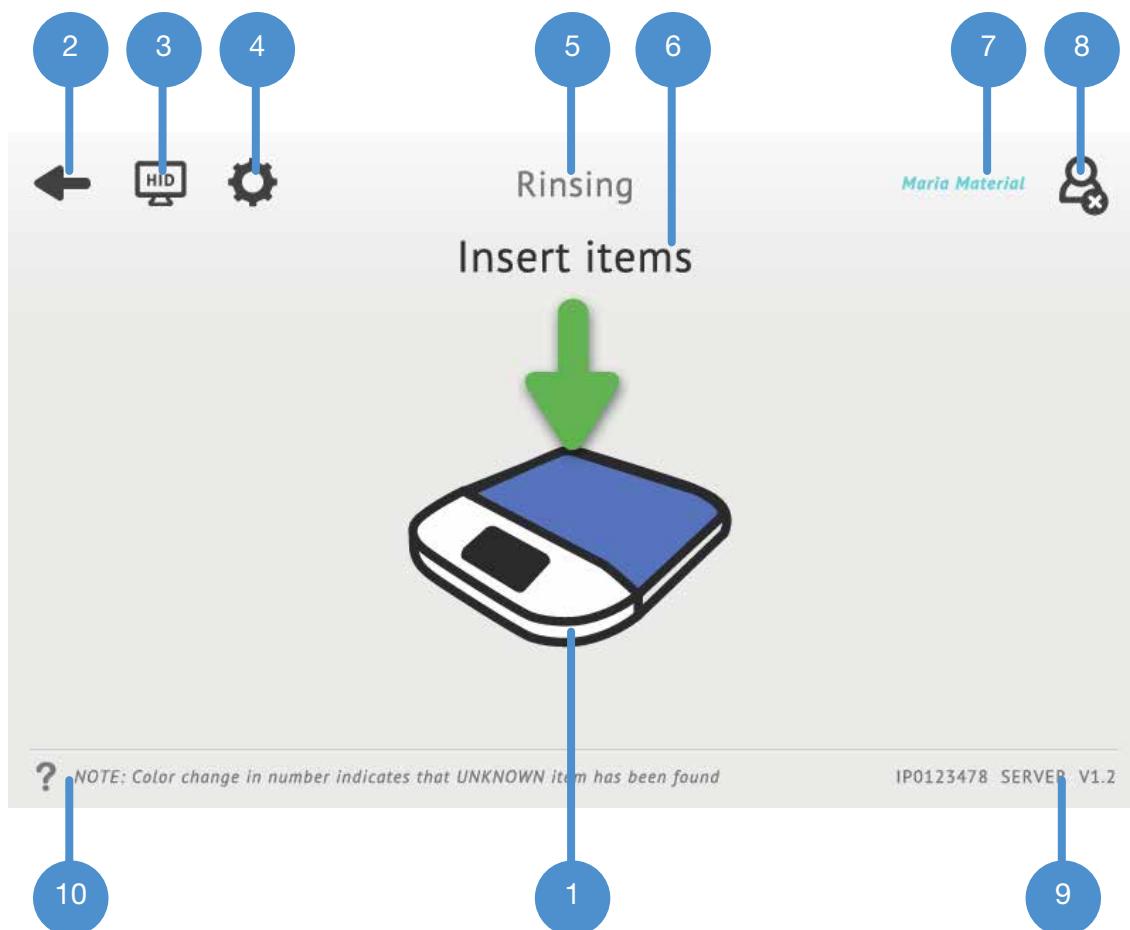
3.2 Reader



1. Touch screen
2. USB Host port type A (only high-speed USB 2.0 cable may be used)
3. HID port Mini-B (only high-speed USB 2.0 cable may be used)
4. Power source and ethernet cable (e.g. UTP CAT5 cable)
5. Type label at the bottom of the device

3.3 User interface of the reader

User interface definitions:



1. Main content area
2. Back
3. HID mode
4. Settings
5. Info area
6. Guidance area
7. User name
8. Log out
9. System information
10. Note and guidance

3.4 Reader UI icons

Icons used in the DTS Reader UI:



Log out



Back



Green Back



Settings



HID - mode



Information



Note/Help



Connection



Card User



Successful



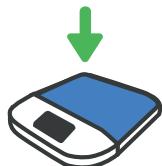
Warning



Error



Reader



Animation
Insert articles



Animation
Remove articles



Refresh



Instruments



Sets



Materials



Unknown

3.5 Activity icons

Examples of activities used with icons.



Rinse



Washing machine



Autoclaving



Maintenance



Clinical use



Ultrasonic



Check-in



Check-out



End of life



Registering



Sharpening



Packing



Storage in



Storage out



Transport



Overlay exit



Example of
exit overlay

3.6 System glossary

Activity (SERVER)

An activity can be performed on individual articles or article sets. Activities are usually part of one or more activity processes, but they can also be configured without a process. Such an activity can be performed on any article, and cannot be part of a process.

An activity can be configured as a “full set activity”. This means that not all articles from a set need to be detected; the system will apply activities to all articles in the set of the detected article. This type of activity is recommended only for sets that are somehow sealed, to avoid applying activities to articles that actually are missing from a set.

Article

An article is a taggable instrument or material. A tag is an identifier, which can be e.g. RFID, barcode or some other unique identifier.

Article group (SERVER)

Articles can belong to only one article group. Groups are used to separate different types of articles, e.g. diagnostic and restoration instruments. Groups themselves do not have attributes.

Process (SERVER)

A process can be set for each article group. A process is an ordered list of activities which need to be executed for an article. Activities can be configured to be executed only once and marked as required or optional. Activities not part of a process are thus not allowed for articles belonging to the group, except in activities without a process.

A maintenance reminder can be set for a process. When a maintenance reminder is set for an activity, skipping that activity a set number of times will result in a user warning.

A sterile expiration can be set for a process. When it is set for an activity (usually Autoclaving) in a process, performing any other activities in the process after the time limit will result in an error/alert message.

Editor (SERVER)

Users with sufficient user rights may add or edit information on the server. Clicking the Add or Edit buttons will open an editor box on which users may add or edit information.

Error/Alert

If a process is set for a group and an activity is performed in violation of the process rules, errors/alerts will be displayed on the reader. Some of the errors/alerts can be forced, i.e. at least a supervisor-level user will be required to override.

The errors/alerts which can be forced are:

- Invalid activity sequence
- Repeating of an activity is not allowed
- Incomplete set
- Article expired
- Sterile expiration

If an error/alert occurs in reading, the whole activity is discarded for all articles.

List of all error/alert codes:

- Forbidden activity
- Invalid sequence (process)
- Incomplete set content
- Invalid user
- Invalid activity
- Unknown item (not registered)
- Repeating of activity not allowed
- Current user is not allowed to force activity
- Article disabled
- Article already registered.
- Article is not registered.
- Incomplete template set content
- Article expired
- Sterile expiration

HID mode

When the reader is in HID (Hardware Interface Device) mode, it is connected to a computer. In HID mode, unknown instruments, such as those from a manufacturer other than LM Instruments, may be added to the system.

Instrument

An instrument is the most typical type of article.

Instrument set (SERVER)

An instrument set contains individual (tagged) instruments. Once set for an instrument, all activities must contain all instruments from a set. A process can disable the set enforcement for some (optional) activities. Example: A set can contain cutting and non-cutting instruments. The process for the cutting instruments includes a sharpening activity, which is not applicable to the non-cutting instruments. In this case, the set enforcement can be disabled for the sharpening activity, as it cannot be performed on all of the instruments in the set.

The container (cassette) of a set can be tagged, in which case the cassette must also remain the same. This is optional.

Material

A material has the same attributes as an instrument, with quantity and expiry date as additional properties. Materials cannot be part of sets. Typical activities for Materials are check in/out, which would be without a process.

Reader

A reader is an UHF (Ultra High Frequency) RFID (Radio Frequency Identification) (Gen2) reader device which communicates with a server. A reader needs to be configured for allowed activities which can be performed on it.

Table and unit readers are available. A table reader is meant for multireading, while a unit reader is meant for reading one article at a time.

Reading transaction

Reading transactions are stored centrally on a server. A reading transaction contains the following information:

- Date and time of the reading
- Activity
- List of articles
- Instrument set, is available
- Information if the reading was forced by supervisor user
- Reader
- User
- Force reasons (if reading was forced)
- Warnings (if occurred in reading)

Server

Communicates with readers. Logs activities and e.g. verifies activity processes. All communication is initiated by the reader, i.e. the server can only send information to the readers as responses to messages from the readers.

Template set (SERVER)

Defines a set of instruments, identified by the instrument code and quantity. A template set can be thought of as a “loose” set. Set enforcement disabling applies to template sets the same way as normal sets.

A tagged container should be defined for a template set. Alternatively, the user can define one template set without tag. This means that then each reading must match the content of the defined set without a tag.

Users

Local user management is supported.

User groups

User

Reader: Can perform normal activities.

Server: Can view information. Users view: Can only edit own information, cannot change user group.

Supervisor

Reader: Can force certain process error/alert codes.

Server: Can edit information. Users view: Can only edit own information, cannot change user group.

Administrator

Reader: Can force certain process error/alert codes.

Server: Can edit and remove information.

Warning

There can also be warnings related to process activities. Warnings do not prevent the performing of an activity.

View (SERVER)

Server content is divided into different views that can be selected from the panel at the top of the display. The main views are Reports, Logs, Readers, Instruments, Materials and Settings. Extra menu displays additional views, which are Users, Instruments sets, Template sets, Article groups, Activities and Processes.

4. TAKING THE READER INTO USE

4.1 Installation

Reader software is pre-installed. Software updates are delivered by LM-Instruments Oy when needed.

Place the reader on a flat surface away from metal surfaces, because metal surfaces may affect reader performance.

4.2 Reader activation

Connect the reader to the network by an Ethernet cable (wired network). Connect the power connector to the reader and then to the power source.

The device starts and establishes a connection with the network automatically. The reader is ready to use when the login page opens.

Establishing a wireless connection may require configuration of a wireless network.

4.3 Normal use – only one configured activity

Log in using a PIN code or an RFID card, depending on the selected login policy.

When the reader is configured for only one activity, its name will appear at the top of the display.

Place the articles to be read on the reader. The reader will read the articles and state their amount. If the amount is correct, press the Send button. Remove the articles from the reader when it prompts you to do so. Once this is done, log out.

4.4 Normal use

Log in using a PIN code or an RFID card, depending on the selected login policy.

The available activities will appear on the reader display. Select your desired activity and place the articles to be read on the reader. The reader will read the articles and state their amount. If the amount is correct, press the Send button. Remove the articles from the reader when it prompts you to do so. Once this is done, log out.

4.5 Logging in with an RFID card

If RFID is selected as the only login policy, you will only be able to log in using a card.

Log in to the system by placing the card on the reader.

5. USING THE READER

5.1 Startup and shutdown

The device is started by connecting the power cable. Before connecting, check that the cable and power source are intact. The device is designed to always be on, but if it needs to be powered off, it is recommended to shut it down by pressing the Halt button in the settings menu. While the device shuts down, the color of the display varies. This is normal. When the display is off, the device can safely be disconnected.

5.2 Information search

You can use the reader to find information on a set or instruments in the following manner:

If there is multiple activities, first select an activity on the reader, otherwise place the set on the reader. Press the *i* button. The instrument information will appear on the display. You can access more detailed information on each instrument by pressing on its name.

5.3 Reading articles with an auxiliary device connected to the reader

The system can also be used to track articles which do not have UHF RFID tags. An auxiliary device must be connected to the reader for this purpose.

The auxiliary device may be a barcode reader/data matrix reader or an RFID reader using a different frequency. A USB keyboard may also be used as an auxiliary device for manually entering IDs.

In order for the auxiliary device to be used as an external reader, it must be USB HID compatible.

5.4 Reader settings

In the **Settings** menu, you can configure a wireless network. External adapter needed.

An external keyboard can be connected to the device to fill in the necessary fields if the WLAN has not been preconfigured.

Press the **Info** button to open the **Device info** box, which displays additional information on the device. This includes the device name, which comes from the server, and the HW ID, which is the device's individual ID. You can also check the **Device info** box to confirm whether the device's UHF region is correct.

5.5 Registering new instrument

A new instrument with LM instrument information may be registered with the reader by performing an activity permitted for it. This kind of activity is usually Maintenance or Autoclaving in.

When a new instrument is read by the reader for the first time, the counter will turn red. After completing the first activity, the instrument will be registered and follow processes.

You can check to see whether the instrument has been successfully registered by re-reading the instrument after completing the first activity. Press the **i** button to ensure that the instrument is no longer unknown. Once this is done, the counter will no longer turn red.

Normally, the reader does not issue error/alert notifications. It may, however, issue an error/alert notification if the first activity is a 'Clinical use' type, as this kind of activity requires sterilised instruments.

5.6 Reader HID mode use and registering new instruments through the server

When the reader is in HID mode, it is connected to a computer. In HID mode, unknown instruments, such as those from a manufacturer other than LM-Instruments Oy, may be added to the system through the server in the following manner:

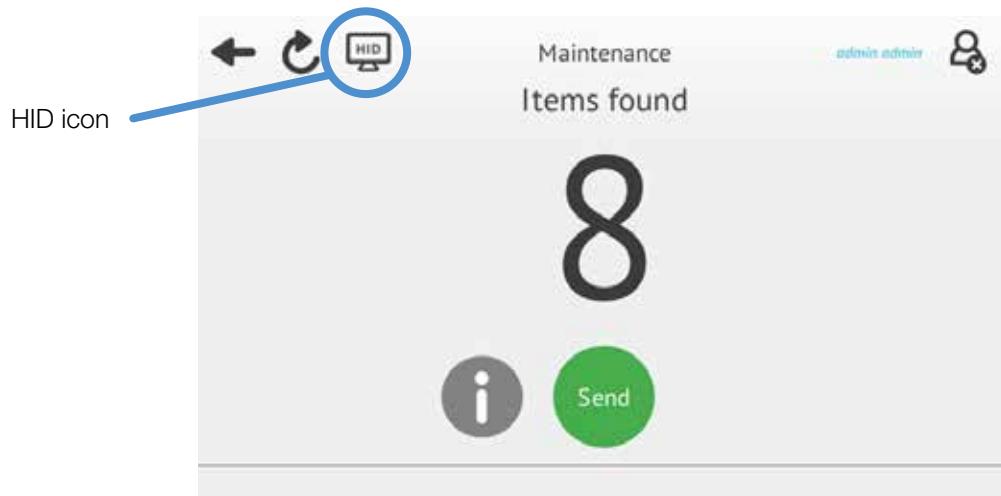
Select HID mode by pressing the HID icon found in the upper left-hand corner of the reader display. Also, ensure that the reader is connected to the computer.

Log in to the server and go to the Instruments view. Click on the Add button. This will open the Edit instruments box. Activate the Tag ID field by clicking on it.

Place the desired instrument(s) on the reader. The reader will display the number of instruments it recognises and the Tag IDs will appear in the Edit server box in the Tag ID field. Enter the required information in the other Edit box fields and then click on the Save button. This will close the Edit box and the server will return to the Instruments view. The added instruments will now appear in the instrument table.

Once this is done, you can take the reader out of HID mode, log in to the reader and then select and perform activities in the normal manner.

The USB HID device should be configured in such way that it sends a line break character after each read line.



6. ERROR/ALERT SITUATIONS

6.1 Error/alert description and resolution

Activity error/alert

When the reader issues an activity error/alert notification, you will see which instrument the error/alert concerns in the reader Info view.

If you have administrator or supervisor level user rights, you can ignore minor errors/alerts by using forced reading. However, more serious errors/alerts cannot be ignored.

Activity order error/alert

If there is an error/alert in the activity order, the reader will issue an error/alert notification.

If you have administrator or supervisor level user rights, you can ignore the error/alert notification by pressing the Force button.

Article disabled

Item is disabled: no further readings possible. Enable instrument again (if feasible).

Article expired

Article expired (for materials only currently).

Article is not registered

Not registered. Register manually; not recognized by the system (non-LM instrument).

Current user is not allowed to force activity

User with at least supervisor privileges needed to force.

Invalid activity

Invalid activity for the article.

Invalid sequence (process)

Previous activity does not allow this activity. Perform activity next in process.

Invalid user

Usually does not happen, can happen if e.g. a user is removed before being synced with the reader.

Incomplete set content

Read the full set.

Incomplete template set content

Read the correct template set.

Repeating of activity not allowed

Do not repeat.

Sterile expiration

Instrument sterile period has expired. Perform sterile activity.

Unknown item (not registered)

Register article.

6.2 Warnings

The reader may issue warning messages during activities.

Warning messages appear on the display in a yellow-bordered box stating the reason for the error/alert warning.

7. CLEANING AND MAINTENANCE

7.1 Recommended cleaning procedures

Reader:

Turn off the reader and remove all cables before cleaning.

Clean with a soft cloth and if needed, use an ethanol-based surface disinfectant suitable for hard plastics.

Silicone mat:

All cleaning and maintenance procedures meant for LM hand instruments can be used with the silicone mat as well. For instructions for maintenance please visit www.lm-dental.com.

Do not use disinfectants including amines!

Before use:

If needed, clean the reader and the silicone mat with above mentioned methods.

Avoid using detergents near connectors, ok to clean the display.

7.2 Maintenance

For maintenance related issues please contact LM-Instruments Oy.

Please note if the seal is broken the warranty is no longer valid.

8. TROUBLESHOOTING

8.1 Network failure

If the network connection is lost, the reader will notify you of the error. If this happens, record the content of the error notification and the error code and then contact the administrator. The administrator may ask for information on the error notification, as this information can be helpful in pinpointing the error.

On the server, the reader status will be listed as being **disconnected**. This information will appear under **Status**. The error will be displayed on the server after no more than a two-minute delay.

9. TECHNICAL DATA

Power consumption: max 12 W

Dimensions: 310 x 340 x 55 mm (W x D x H)

Weight: 2.1 kg (with power supply and silicone mat)

Mains input voltage: 90-264 VAC

Mains input frequency: 47-63Hz

Mains input current: 0.25 A @ 120 VAC; 0.15 A @ 240 VAC

Storage temperature range: 0 °C to +50 °C

Operating temperature range: +10 °C to +30 °C

Relative humidity range: 10-85%

Display size: 5"

Display resolution: 800 x 480 pixels

Touch screen: Capacitive touch screen with Gorilla® Glass

RFID technology: EPC Gen2 UHF multi-tag reading

RFID capability: ServoMAX tray (DIN13999 184 x 285 mm)

Frequency: 865.6 - 867.6 MHz (ETSI), 902 - 928 MHz (FCC)

Power output: max 0.5 W (EIRP)

Modulation: PR-ASK

In compliance with IEC standards for medical device

Power supply safety: IEC 60601-1

EMC emission/immunity: IEC 60601-1-2

Protection against electric shock: Class II equipment

Classification of applied parts: No applied parts

Ingress protection: IP22; except back panel: IP20

This device complies with Industry Canada's licence-exempt RSSs (RSS-247).

10. WARRANTY

The following warranty terms apply to the sale of LM-Instrument Oy's products (hereinafter "Products") to a purchasing company or individual by LM-Instruments Oy (hereinafter "LM").

LM hereby warrants that the Products will be free from defects arising from faulty materials or workmanship for a period of twenty four (24) months from the date of purchase by a customer from LM's authorized dealer (hereinafter "Authorized Dealer"). The warranty period is exceptionally three (3) months for products with a life inherently shorter than 24 months due to normal wear and tear (for example tips of hand instruments, tips of ultrasonic scalers, tips of endodontic files, front surface mirrors and grinding stones of sharpening devices) and for RFID tags to dental instruments manufactured by third party manufacturer (hereinafter "Third Party").

This warranty shall not apply to Products or parts thereof;

- a) which have been subject to abuse, misuse, negligence or accident or are not connected to proper power supply;
- b) to which any modification, alteration or attachment has been made without written consent of LM;
- c) which are installed or operated violating instructions for installation, use and maintenance; or
- d) which are normally consumed in operation (for example working tips of LM-MultiHolder and strips for LM-Cello).

End-user is entitled to install RFID tags to dental instruments manufactured by Third Party. When installing RFID tags to the dental instruments manufactured by Third Party (hereinafter "Instruments"), end-user is liable to check warranty terms and product information of the Instruments to ensure that instalment does not have adverse effect to Instruments or to the terms and conditions applied between end-user and its suppliers. End-user shall install RFID tags to Instruments or get those installed by LM or other party at its own risk. LM shall not be liable for any damages accrued due to the instalment of RFID tags to Instruments. This limitation of liability does not apply in respect of damage caused by

- a) negligence of LM when installing the RFID tags to Instruments, or
- b) RFID tags defective at the time of delivery to end-user

to personal private property, or personal injury or death.

The sole and exclusive remedy under this warranty shall be limited to correct or circumvent the errors or to repair or replacement of defective parts of Products, EXW LM's factory, providing that a written claim of the defect is sent to LM within the warranty period and the original part is returned to LM's factory by the Authorized Dealer, and LM's inspection establishes the existence of such a defect.

The end customer must contact the Authorized Dealer from whom the Products were purchased to request repair or replacement under this warranty and a written claim of the defects and send the original Product to the Authorized Dealer. This warranty is void if service or repair is performed by persons not authorized by LM.

Any products not manufactured by LM, carries only such warranty, if any, as given by any manufacturer thereof.

This warranty is the LM's only warranty in respect of the Products and LM disclaims all other warranties, whether of merchantability, fitness for particular purpose or otherwise, guarantees and liabilities, express or implied, arising by law or otherwise. In no event shall LM be liable for any general, consequential or incidental damages, loss of use or loss of profits by reason of LM's negligence or otherwise in connection with the sale, delivery, installation, repair or use of the Products.

LM shall have no liability whatsoever to the Authorized Dealer or end customer or any other person for or on account of any injury, loss or damage of any kind or nature, sustained by, or any damages assessed or asserted against, or any other liability incurred by or imposed upon the handling, use, operation, maintenance or repairs of Products by anyone other than LM. This exclusion of liability does not apply pursuant to the laws on product liability in case of personal injury and property damage to privately used objects resulting from the Products.

LM Dental

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