

Annex 1 to the EU type examination certificate no. N-17/4545 Rev 0, dated 30.06.2020

1 Design of instrument

1.1 Hardware

1.1.1 Description of the main hardware

Hardware type: Cargoscan 800S laser scanner with embedded processor

1.1.1.1 Construction

The TLD870 is an electronic multi-dimensional measuring instrument for measuring the length (L), width (W) and height (H) of a stationary object placed on the platform underneath the instrument. The reported dimensions represent the length, width and height of the smallest hexahedron that can fully contain the object as the object rests on the measuring platform. The instrument is used to measure goods/parcels in combination with systems for determining shipping and storage charges for the objects, based on their dimensions.

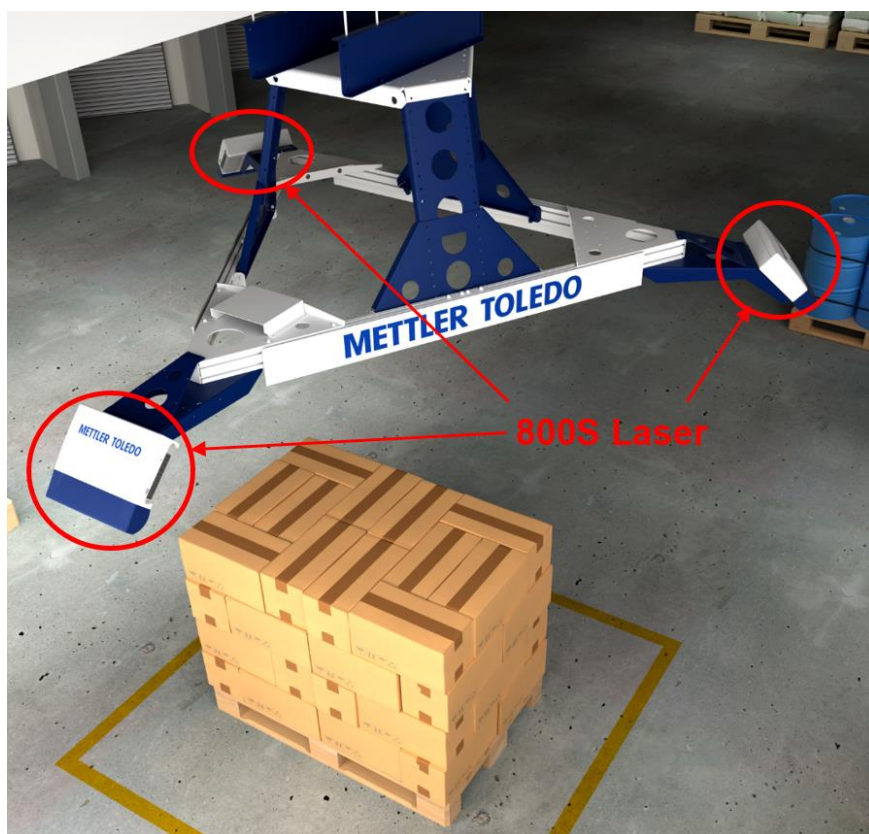


Figure 1 TLD870 instrument with 3 x 800S laser scanners

The TLD870 Pallet comprises three 800S dimensioning heads, mounted in a triangular configuration above the measuring platform (See Figure 1). One of the three heads is configured as the Master and the two others as Slaves. The mounting configuration ensures that the three scanners together get a full view of the top and all sides of the objects without any shadowing effects. The instrument can measure objects of any shape. Each 800S dimensioning head consists

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of a laser Rangefinder, a scanning polygon, a sweep mirror and a CPU. (see Figure 9 and Figure 10).

The laser diode sends a narrow beam of light to the spinning polygon mirror, which generates a fan-shaped laser beam in the horizontal direction. This fan-shaped beam hit a stepper motor controlled sweep mirror that sweeps the laser beam fan across the object to be measured. The light reflected from the object goes back up to the photo-detector in the rangefinder.

The rangefinder measures the light travel time from the laser diode down to the objects and back to the optical receiver.

The CPU converts the light ray travel time information into a grey level image and a 3D point cloud image of the object. These images are analysed by the CPU in the Master in order to determine the dimensions of the objects on the measuring platform.

The dimensions and additional data for each object are output from the instrument.

1.1.1.2 Measurand sensor

The measurand sensor is a laser transmitter/receiver with electronics that measures the travelling time of the laser light between the sensor and the object to be measured. The measuring principle is based on matched filtering.

1.1.1.3 Indication device

The instrument shall be equipped with one of the following indicating devices to be used as the instrument primary indicator. The indicator shall display the following information (permanently, or on demand)

- Product Name
- EU type examination certificate number
- SW identifier
- Event Counter
- Measurement results, i.e. length (L), width (W), height (H), unit of measurement
- Status code of the measurement (OK or Error code)
- Tare value (if applicable)

Option 1: USB display (Cargoscan CS220 Display)

This is a simple graphics display connected to one of the USB ports on one of the 800S scanners. System information and sealing status is shown in "Ready" mode. The dimensions are shown after each measurement. The display goes back to "Ready" mode automatically after a time-out period. See Figure 2.

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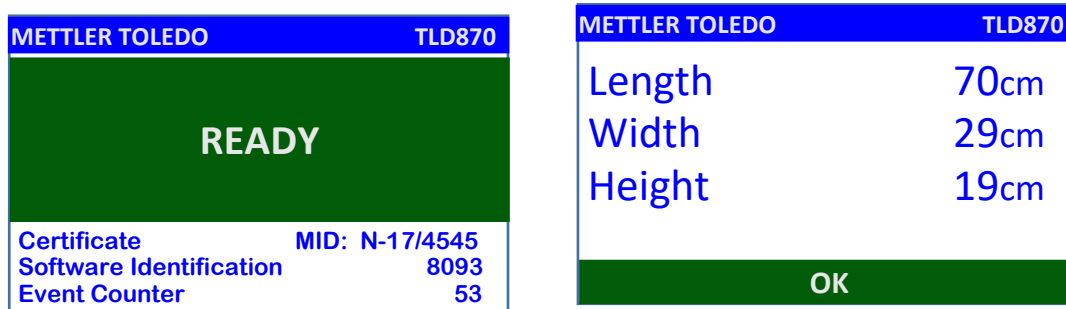


Figure 2: Cargoscan CS220 Display (USB display).

Left of figure: Ready Mode

Right of figure: Measuring results.

Option 2: OctoCSM display/indicator

The Cargoscan OctoCSM display software in combination with a standard graphics display (VGA or equivalent). This software may be installed on the internal computer of the instrument or run on an external computer connected to the **TLD870** instrument via Ethernet. The measurement results and status codes are shown in the upper blue field on the screen. Clicking on the Octo logo in the upper right corner brings up a new page with System and status information. See also the certificate of the display/indicator (TC7413 issued by NMI).



Figure 3 OctoCSM display/indicator (Upper blue field). Click on Octo logo will bring up a new page with system and seal status information.

Option 3: Display or printout of alibi memory storage

In applications where the customer is not present during the measurement process, a printout or display from an alibi memory storage can be used for documenting the measuring results. An operator terminal with OctoAMS - Alibi Memory Software (with parts certificate TC7512 from NMI) can be used. This software has its own viewer for displaying the measurement results. The Alibi

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software runs on the instrument computer where it uses the USB memory for storage. The Alibi software may also be ran on an external computer, but the instrument USB is also then used for storing the result.

Alibi Memory Viewer:

- Click on Menu button in lower left corner (or press F2) (see Figure 3)
This opens a new page, see Figure 4.

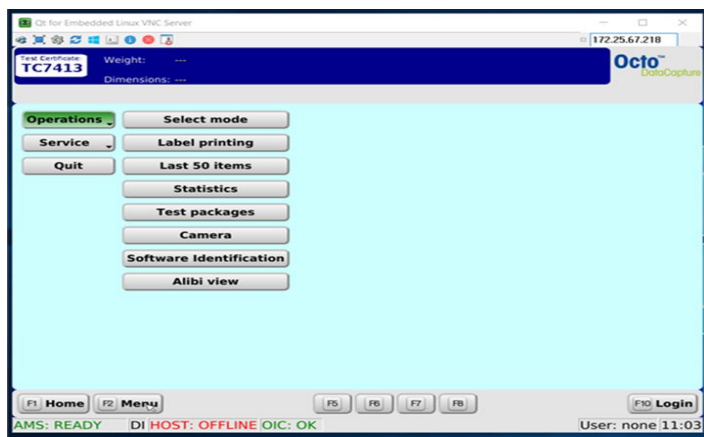


Figure 4 Page with Alibi view

- Click on “Alibi View” and this brings up the Alibi search page with current date/time filled as default, see Figure 5.

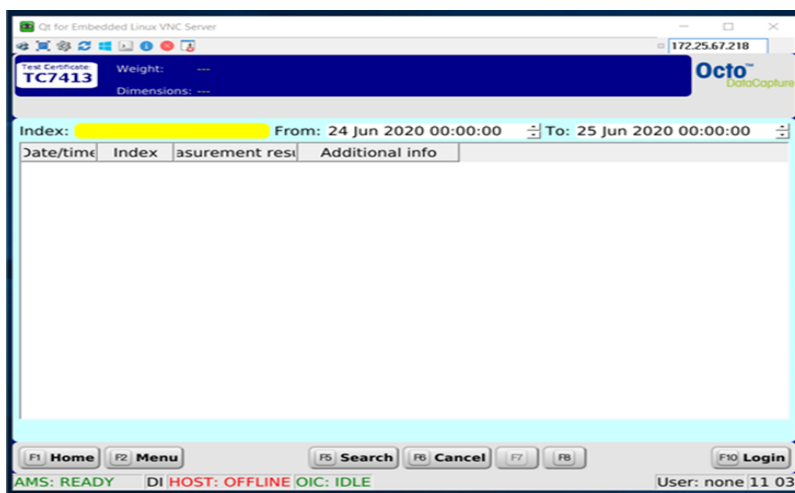
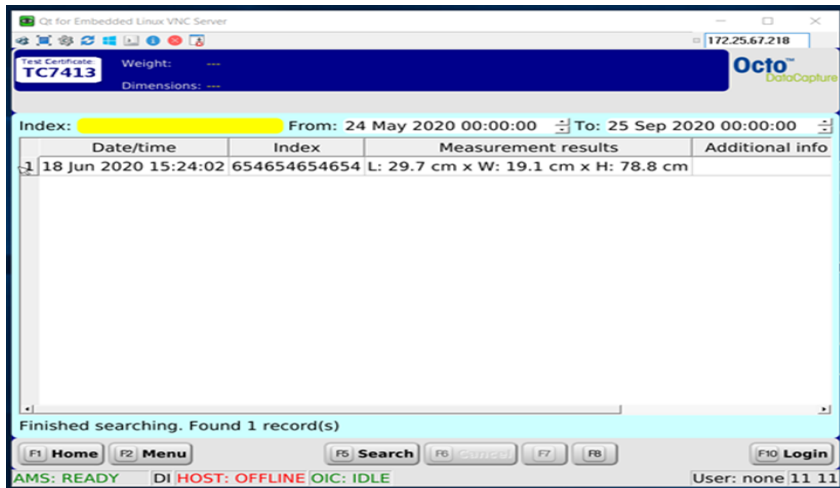


Figure 5 Search page date/time interval

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- Select the “ from Date/Time” and to Date/Time” and click search and all measurements stored in this time interval are displayed. See example in Figure 6.

**Figure 6.** measurement results in a chosen date/time interval**1.1.1.4 Applied harmonised standards or normative documents and other public documents**

- OIML R129 (Edition 2000): Multi-dimensional measuring instruments
- WELMEC Guide 7.2 :2018 Software Guide (Measuring Instruments Directive 2014/32/EU)

1.1.2 Description of optional hardware and integrated equipment not subject to the MID**Optional hardware:**

Bar Code Reader, keyboard, mouse and/or graphics display may be connected to the instrument. These devices are used for input/output of data to non-legally relevant software.

1.1.3 Description of peripherals, and information whether or not these additional devices when providing metrological results comply with the provisions of the Directive on legal metrological control

USB display: see section 1.1.1.3

OctoCSM display/indicator: See section 1.1.1.3

Alibi Memory storage: see section 1.1.1.3

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1.2 Software

1.2.1 Legally relevant software, including the protective software interface

Software: Cargoscan Dimensioning software
Legal software package identifier: **8093**

1.2.2 Allowed functions subject to the MID.

- **Zeroing:** Requires special test pattern. Shall be done by trained personnel only.
- **Software download:** Requires special software tools. All downloads are logged **and can be viewed** (see Figure 8)
- **Tare Function:** Tare function is a function that is used when the object to be measured is placed on an elevated platform such as a pallet, and this platform shall not be included in the measurement. The Tare function raises the reference plane to the top level of this platform/pallet such that only the object resting on this surface is included in the measurement. The tare function is activated by giving a non-zero tare value with the measurement command. The Tare value is the height (in cm) of the platform/pallet above the reference plane (floor/pallet scale). The TLD870 reports the net dimensions of the object and the tare value used with the measurement. The tare function is active for one measurement at a time. The operator must determine the correct tare value to be used by measuring the height of the pallet/platform with appropriate means.
- **Alibi memory for long time storage:** Alibi memory software for long time storage of measurement data may be installed on the instrument computer, or on an external computer connected to the instrument. See the manufacturer document "conformity assessment record" if alibi is installed (also shown on system information page).

1.2.3 Allowed functions not subject to the MID.

Cargoscan Octo software for collecting weight and bar code data for the measured object and merging these data with the object dimensions may be installed on the instrument computer. This application has a graphical user interface for the operator, and a data communication interface for transmitting measurement data to remote systems.

2 DESCRIPTION OF THE SEALING PROVISIONS

TLD870 is fitted with an Electronic sealing mechanism for protection of the legal relevant properties of the instrument. Any changes to the legal relevant setup will increment an Event Counter which can be viewed on the indicating device.

The following changes are considered Legal relevant and will break the electronic sealing:

- Change to legal relevant configuration parameters
- Download of software

Download of bug fixes and other non-legal relevant updates to approved software is possible without breaking the electronic sealing.

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2.1 Hardware Sealing

No hardware sealing is required

2.2 Electronic Sealing function

This function can be turned ON or OFF. When ON legal relevant parameters cannot be changed. The purpose of this function is to protect the legal relevant setup from unintentional changes.

When OFF, legal relevant parameters may be changed, but any such change will be recorded in the Audit Trail and the Event Counter will be incremented.

2.2.1 Event counter

This is a 4 digit counter that is incremented every time a legal relevant change has taken place.

The Event Counter and Audit Trail are activated automatically when the Electronic Sealing Function is turned ON for the first time. After that, it is not possible to deactivate the Event Counter and/or the Audit Trail.

After sealing, the value of the Event Counter is recorded in the conformity assessment record. This record shall be retained in the archives of the body performing the verification and sealing. A copy of the record shall be given to the own/user of the instrument. If required by local regulation, the Event Counter value shall be printed on the product label or another label affixed to the instrument.

The Event Counter is shown on the USB display (Figure 2) and on the System info page (Figure 8). Check that the displayed value is the same as recorded in the conformity assessment record.

2.2.2 Audit Trail

This is a text file stored inside the flash memory of the instrument in which any change to a legal relevant parameter is recorded.

No users have access to this file for deleting or editing. How to view Audit trail, see Figure 8

2.2.3 Sealing Status

System/sealing information is found on the display. See section 1.1.1.3.

The instrument shall be regarded as legally correct sealed if the Event Counter has the same value as the value in Conformity Assessment Record and if the other displayed information is in accordance with this EC type examination certificate.

2.3 Alibi memory system

The OctoAMS alibi memory software is approved for use with TLD870. This software has its own parts certificate (TC7512 from NMI).

If installed, a reference to this is found on the display (see Figure 8).

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3 TECHNICAL DATA

3.1 Conditions for validity of the certificate

3.1.1 Information in respect of the conditions of use

3.1.1.1 Requirements of the object

The TLD870 Pallet measures objects of any shape, colour and surface texture. However, the following restrictions applies:

- Maximum and minimum measurement sizes of object;
- Only one object at a time can be measured;
- A stable positioning of the object is essential for a correct measurement. Therefore, the measuring platform must be stable and free from vibration.
- Transparent objects and objects packed in thick, transparent wrapping material (e.g. "bubble" plastic) are not suited for this type of measuring.
- Mirror type surfaces (e.g. chrome and high gloss metal surfaces) are not suited for this type of measuring. However, the instrument can measure objects covered with shiny sealing tape and glossy plastic wrapping.
- The entire object has to be within the scan area. If any part of the object is outside the measuring area, an error message is reported.

An error code will appear if measuring fails, indicating a reason for the failure.

3.1.1.2 Requirements to measuring platform

The quality and installation of the measuring platform may have significant influence on the measurement accuracy. Therefore, the following recommendations for the platform and its surroundings applies:

- The platform must be stable and undisturbed during the measurement.
- The stand/mounting structure of the frame with the three 800S must be stable and undisturbed during measurement.
- Dull (non-glossy) surface on the measuring platform is recommended, but not mandatory.
- Flat and/or corrugated surface is allowed.
- Rollers, balls and caster deck surface is allowed on the measuring platform.

3.1.2 Instructions for correct operation

3.1.2.1 Start up

- At power-on the TLD870 starts a self-test automatically.
- After successful completion of the self-test, the instrument goes into Ready mode automatically.

3.1.2.2 Measurement

- Place the object to be measured on the platform.

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- Ensure that no other items than the object to be measured are in the area of measurement (The operator must also be outside the measuring area).
- Start a measurement (from the display, Work station or via the host interface)
- The results of the measurement are shown on the display and output on the host port.
- If an alibi memory is installed, the measurement values are stored automatically in the alibi memory storage
- If Tare is used, the correct Tare value shall be found by measuring the height of the pallet/platform with a tape measure or equivalent with an accuracy of $\leq 2\text{mm}$. The instrument accepts Tare values with up to two decimals (0.01 cm).

3.1.2.3 Error messages

If the measurement is not successful, an error message will be shown instead of, or in addition to the measurement result.

3.1.3 Information to ensure consistent production.

The instrument shall be produced according to this certificate.

3.2 Metrological characteristics of the measuring instrument

Accuracy Class	MPE = 1d for H, W and L
Scale Interval, Height	$d_H \geq 10 \text{ mm}$
Scale Interval Length, Width	$d_{LW} \geq 10 \text{ mm}$
Minimum object size	$H_{\text{Min}} = 10d$, $L_{\text{Min}} = W_{\text{Min}} \geq 20\text{cm}$
Maximum object size	$H_{\text{Max}} = 260\text{cm}$, $L_{\text{Max}} = W_{\text{Max}} = 250\text{cm}$
Climatic	-10 to +40 °C non-condensing
Mechanical class	M2
EMC	E2

3.2.1 Multi interval

The instrument can be configured for multi-interval resolution. The resolution in Height may be set different than for Length and Width. Length and Width are always set together. The multi-interval changeover point is set during configuration and locked by the electronic sealing. At the changeover point, the dimensions may be displayed with the lower or the higher resolution.

Example: If the changeover point for Length/Width is set at $L=200\text{cm}$.

For an object with a true length of 200.0cm , the following displayed values are valid (i.e. within $\pm d$): 199cm , 200cm , and 202cm (201cm is not allowed since $d=2\text{cm}$ for $L/W > 200\text{cm}$)

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3.3 Information on the operation

3.3.1 Rated operating conditions

Voltage	: 24Vdc
Laser type	: Visible red: Class 2: (not eye safe for continuous viewing).
Principle of measurement	: Optical (Visible Laser Rangefinder)
Control system	: Linux
Database	: Proprietary

3.3.2 Environments / influence quantities

See chapter 3.2

3.3.3 Adjustments

The 800S scanners are calibrated at the factory and requires no re-calibration on site during installation.

The complete TLD870 instrument must be assembled, configured and zeroed according to the manufacturer's specifications before verification testing and sealing. After being sealed, any calibration or adjustment cannot be performed without breaking the seals.

Zeroing, in order to re-adjust the zero level in all three dimensions, is allowed on a sealed instrument.

3.3.4 Equipment and documents for the control of the instrument

Check of the instrument shall be carried out using appropriate test objects of various sizes and of stable dimensions as described in OIML R129 11.1.4.2 and 11.2

The following manual shall always be available:

"TLD870_site_Verify_and_seal_Procedure".

Operator Guide and Sealing Procedure TLD870 Pallet, version 1.1.1 or newer.

4 INTERFACES AND COMPATIBILITY CONDITIONS

- Display port – USB display
 - o Output: System information and Measurement data in digital format.
 - o Input: None
 - o Physical connector: USB connector. The TLD870 detects the presence of the USB display at power-on and configures the port for communication with the USB display. Works with proprietary displays only.
- Host port
 - o Output: Output of measurement data in digital format
 - o Input: Closed shell input of commands
 - o Physical connectors: NET1 or NET2

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- HDMI port
 - o Output: of video graphics in HDMI format
 - o Input: None
 - o Physical connector: VGA
- Keyboard & Mouse
 - o Output: None
 - o Input: Keyboard and Mouse signals
 - o Physical connectors: Any USB connector. Operating system detects the presence of the device and establish communication accordingly.
- Console Port
 - o Non-privileged access to operating system of embedded computer. For viewing of setup and for changing of non-legally relevant setup parameters
 - o Physical connectors: Net 1 or Net 2
- Web Server Interface
 - o Access to embedded web server for instrument setup and calibration. Limited functions available (closed shell). After sealing of the instrument, all changes are recorded in the audit trail, and the internal, non-resettable event counter is incremented by 1 for each change.
 - o Physical connectors: Net 1, Net 2. Requires a PC with standard web browser.

5 MARKINGS

A product marking plate, in conformance to Directive 2014/32/EU, shall be fixed to the enclosure of the instrument

The Conformity marking shall be according to Article 20, 21 and 22

Information to be borne by and to accompany the instrument shall be according to Directive 2014/32/EU Annex I, §9

- Number of the EC-type examination certificate
- Manufacturer
- Make and model
- Serial number
- Date manufactured
- CE marking and the supplementary metrology marking

TLD870 shall be accompanied by information on its operation in conformance to Directive 2014/32/EU Annex I, §9.3

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TLD870		c N _{us} CE M 20 1259	
MID approval: N-17/4545		SW Ident: 8093	Event Counter:
Operating temperature:		-10°C / +50°C	
Mechanical / Electro-magnetic enviroment:		M2 / E2	
Max Object Size:	Height 260cm	Length/Width 250cm	
Min Objecct Size:	10d	≥ 20cm	
Scale Interval:			
d=1cm	<.....cm	<.....cm	
d=2cm	>.....cm	<.....cm	
Ser.no:	sau0:.....	sau1:.....	sau2:.....
METTLER-TOLEDO CARGOSCAN			
Ulvenveien 92B, N-0581 Oslo, Norway - www.mt.com			
			Label no: 28xxxx

Figure 7. Example of marking

The following information shall be available for the operator (i.e. on a plate mounted to or nearby the instrument or in an operating manual:

WARNING:

1. TLD870 cannot measure the following objects/cargo:

- √ Objects wrapped in transparent “bubble” plastic
- √ Objects with mirror type metal surfaces

2. The object must not move during measurement.

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6 PICTURES AND DRAWINGS

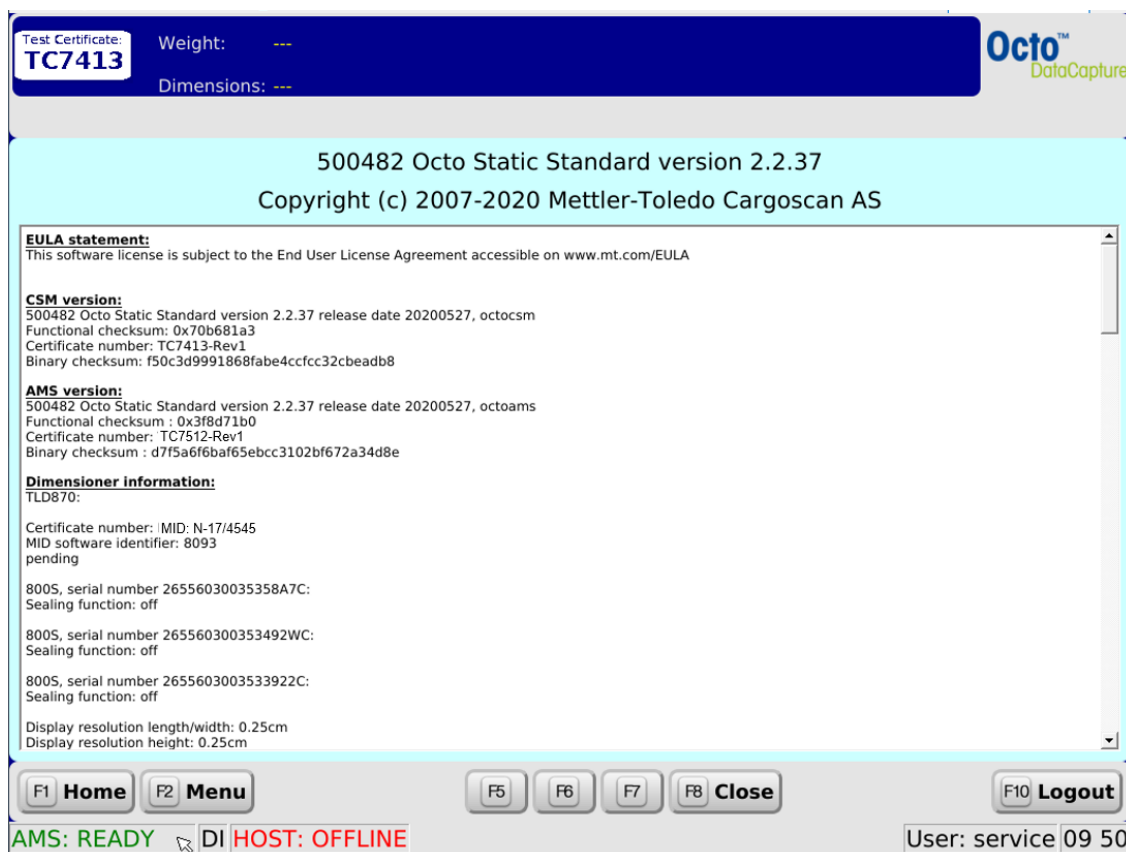


Figure 8 System status page (shown after clicking on the Octo logo in the upper, right corner of Octo display. Display of Software identifiers and Sealing status. Scroll down to see download log and audit trail

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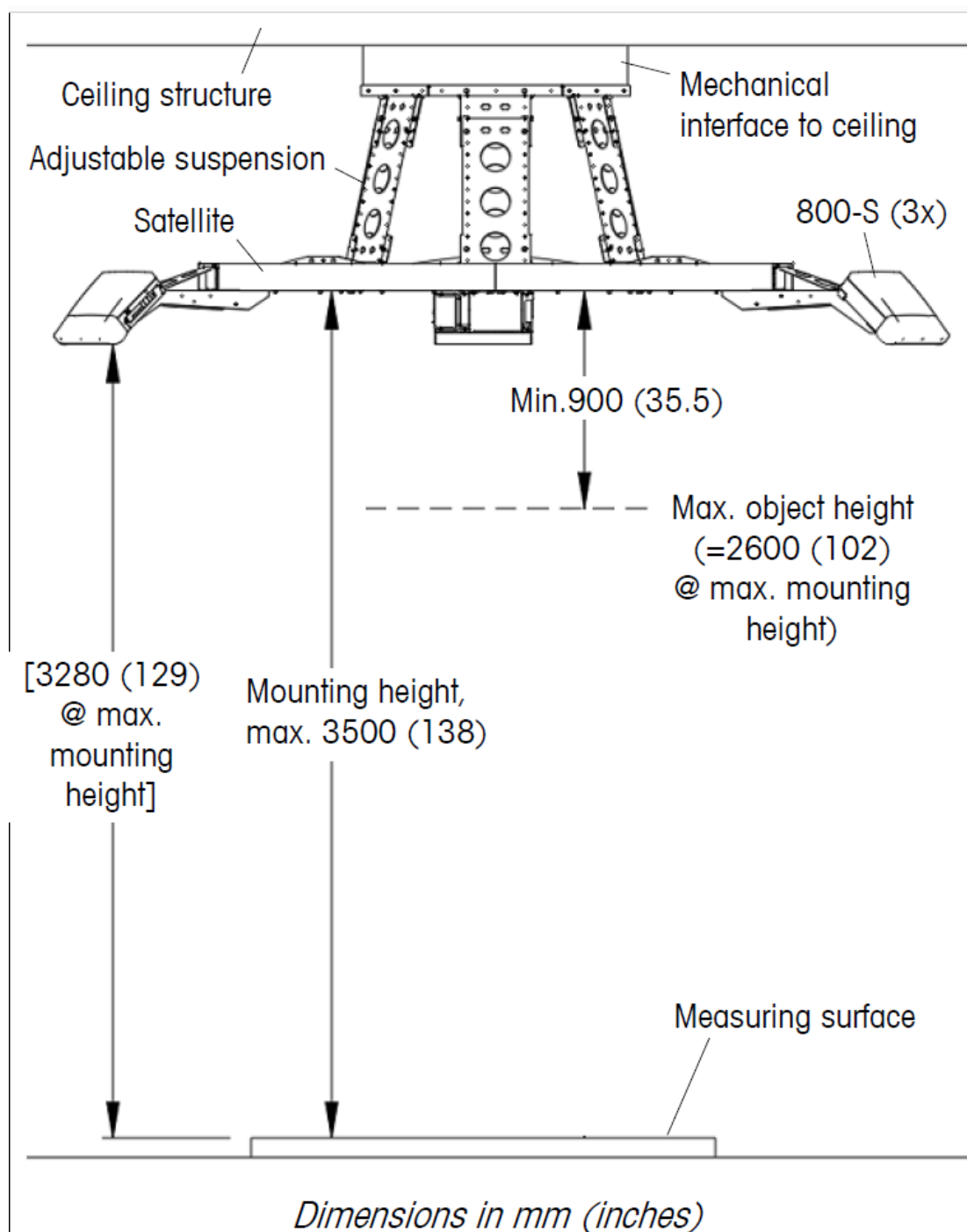


Figure 9: Drawing showing the dimensions of TLD870: Mechanical Layout of system (side view). Dimensions in mm. Mounting height is 600mm higher than tallest object to be measured. Illustrated system can measure objects of height 2600mm

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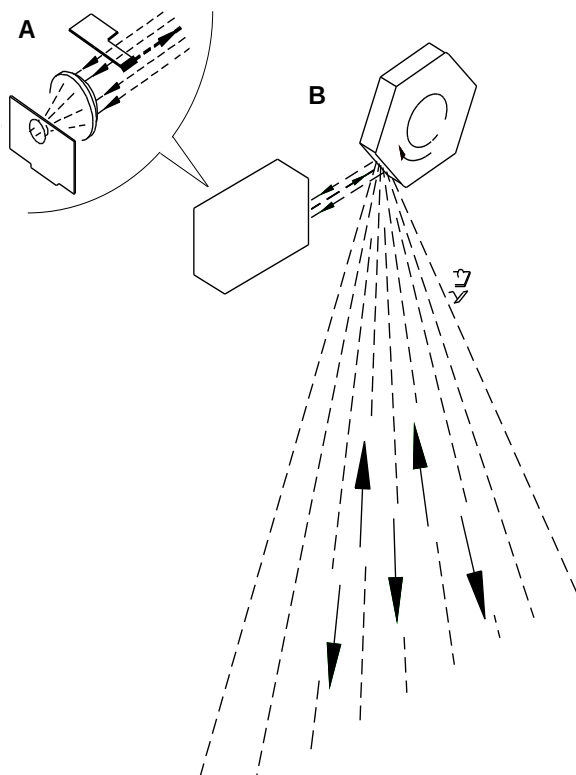


Figure 10 Laser beam fan of the TLD870

7 CERTIFICATE HISTORY

Issued no	Date	Reference no	Description
N-17/4545	30.06.2020	17/4545	Certificate first issued