



# MetriXFreight

:: smart dimensioning ::

## MetriXFreight – L

Fast and precise freight dimensioning

▶ [User Manual](#)

Software version(s) V.2.0.0 or higher

With MetriXFreight, the length, width and height of freight can be fully captured within milliseconds. This manual describes the overall system and the functionality of the software and offers users a guide to learn how to use MetriXFreight quickly and easily.

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▶ 1. List of Abbreviations

<b>ID</b>	An identification number that is scanned with a barcode and is unique for a measured object
<b>LFT</b>	Legal for trade

## ▶ 2. Introduction

MetriXFreight is a multi-dimensional measurement system. The main components of the system are a PC, a network switch, two sensor heads and a screen. MetriXFreight automatically measures standing cargo within a few milliseconds.

The measurement is not limited to cubic objects, irregular objects can also be measured. It also offers the possibility to automatically save the dimensions length, width, height as well as a Full-HD color image and the weight of the cargo.



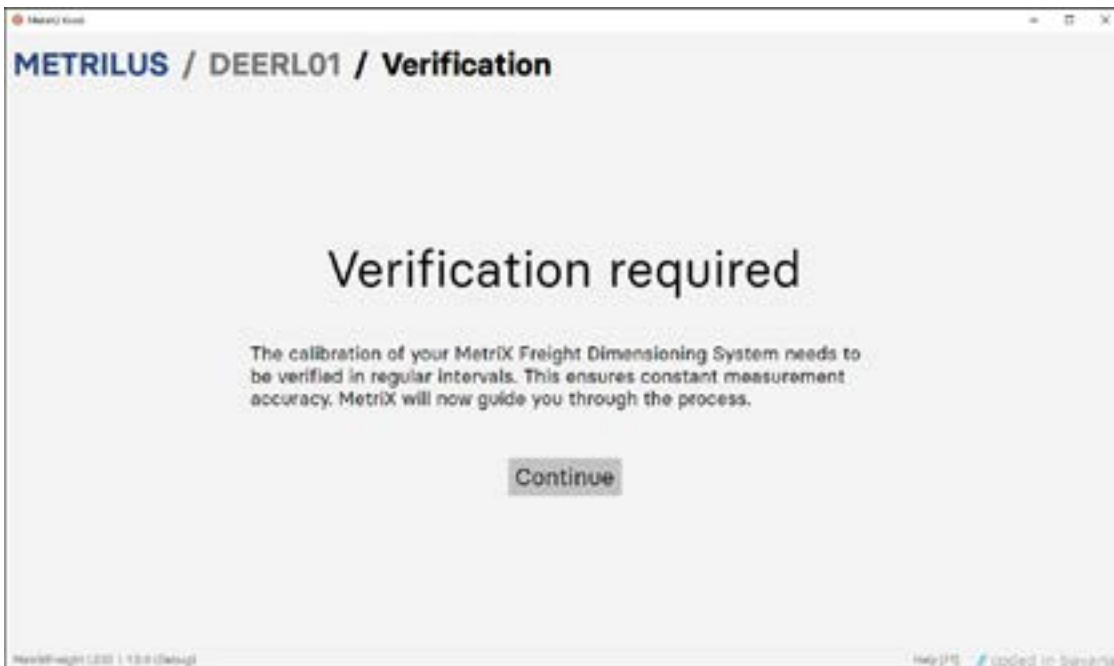
**Figure 1: The MetriXFreight – L system in a ceiling suspended truss mounted set-up (example picture)**

### ▶ 3. Start-up and Verification

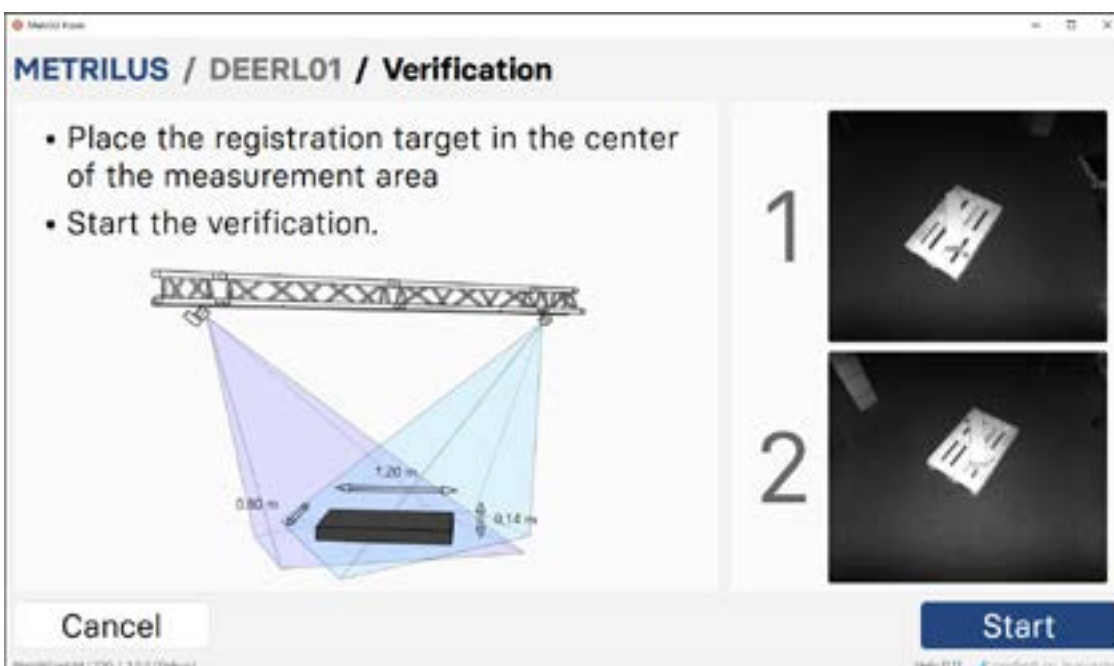
Before the system can be used for the first time and in regular intervals, the system needs to be calibrated or verified. LFT versions also need to be verified at every start-up.

Verifications can also be manually initiated by pressing “**F4**” on the keyboard.

If a verification is initiated automatically, the system displays this message:



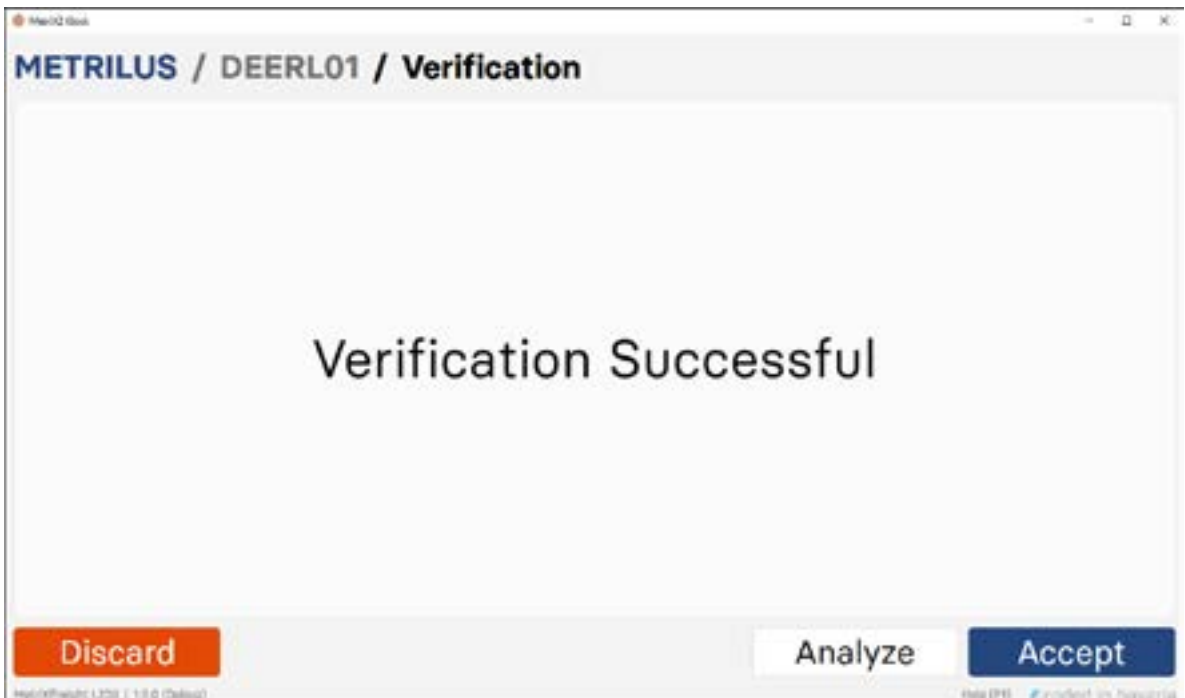
Press “**Continue**” or hit “**Enter**” on the keyboard to continue and follow the instructions on the screen.



Place the calibration object in the center under the system and press “**Start**”. The calibration object may vary depending on your type of system and installation.



The verification might take some time. After it's done, it automatically proceeds to the results screen.



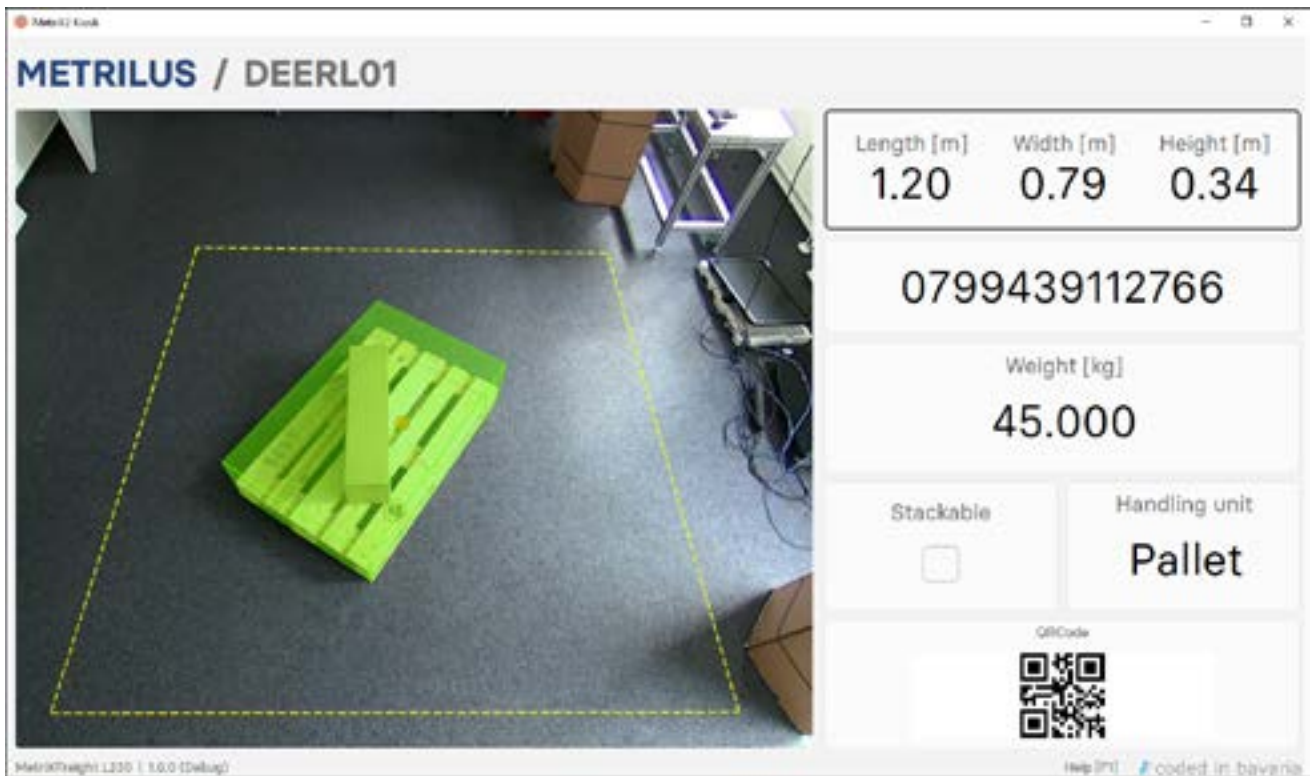
If the verification is successful you can continue with the dimensioning screen, by clicking “**Apply & Save**”.

If the verification fails, the system will display an error message with instructions on how to eliminate the cause of the error and prompt you to retry the verification.

► 4. Dimension Cargo

When the MetriXFreight system has started it enters dimensioning mode. The screen will look like the screenshot depicted in **Figure 2**.

The version number is displayed in the lower left corner. The left part of the screen is henceforth called the **live image view**, whereas the right part is called the **widget area**. Both are described below.



**Figure 2:** Application interface with two areas: (left) Live image view of the dimensioned object; (right) Widget area with measurement data and optional widgets, “ID” and on-screen QR code.

## 4.1 Live Image View

The live image view shows the current color camera image of the main camera. With the help of the **live image view** a simple optical check can be made to see whether MetriXFreight has correctly dimensioned the cargo.

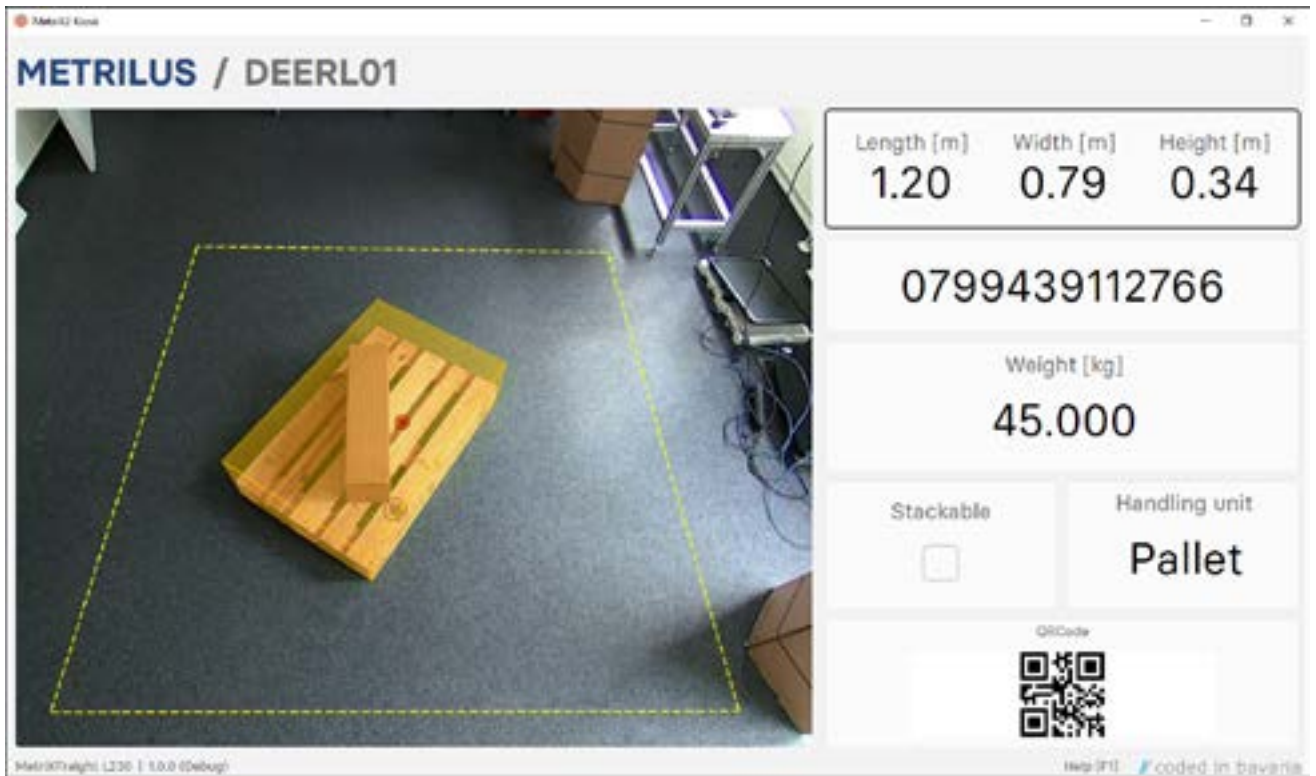
The dashed yellow line indicates the measurement area. All objects that are to be measured need to be fully contained in the area outlined by the dashed line. If an object violates the boundaries of the measurement area, the respective section of the dashed line is drawn in red color and an error message is presented (see **Figure 3**).



**Figure 3:** An object is misplaced and exceeds the measurement area on one side. An error message is shown, and the violated side is colored in red.

If an object is placed within the measurement area it is detected in less than one second and highlighted with an overlaid, colored box. While the measurement is not stable, the overlay is colored orange (see **Figure 4**) and the measured values in the **widget area** are updated. When the measurement is stable, MetriXFreight freezes the measurement values. If no **ID is required** by the configured workflow, measurement data is stored immediately, otherwise it is stored when the ID has been scanned.

**IMPORTANT NOTICE:** Please make sure that the measuring area is perfectly flat and free of any irregularities and that the objects to be measured stand directly on the measuring surface and are not placed on foreign objects or debris.  
If possible, place the objects on their largest side.



**Figure 4: Orange box overlay while the measurement is not stable.**

## 4.2 Widget Area

The **widget area** displays all the measurement data an optional user id (e.g. scanned barcode) field and optional additional fields.

In case of an error (e.g. object violates the measurement area) the measurement values are hidden, and the error message is shown instead (see **Figure 3**).

When a measurement is stored the **widget area** turns green.

### 4.2.1 Dimension Fields

This area shows the measured dimensions width, height and length.

For LFT versions, these and only these are the legally relevant dimensions given in multiples of two centimeters for width and length and one centimeter for height.

### 4.2.2 Optional Fields

Depending on the configuration, the **widget area** may contain additional, non LFT-relevant fields (see also section "Appendix A: Workflow Examples").

If a weighing scale is connected and configured, then a "weight" field is also shown.

The **widget area** may also contain a barcode field where the barcode can encode the measurement data in a configurable format. The barcode is only displayed while the measurement is stable.

Another optional field is "ID". If a barcode scanner is connected to MetriXFreight, any code scanned by it will be filled into the "ID" field. This can be used to store a code identifying the dimensioned object together with the measurement data.

### 4.3 Measurements

A measurement will only be stored when the system is in the stable state (i.e. the dimensioning cube is **green**).

There are different configuration options for additional constraints which must be met:

- no additional constraints – store a measure each time it becomes stable,
- a stable measurement and a scanned ID are available (if a barcode scanner is connected),

### 4.4 Error Messages

MetriXFreight will automatically detect certain conditions which prohibit measuring and present a warning message to the user. Such conditions comprise:

- the measurement area is empty,
- the object violates a boundary of the measurement area – either because it's misplaced, or too large –,
- the object is too high,
- the object is not measurable – because it is too dark –,
- low disk space

► 5. Database View / Alibi Memory (Legal for Trade versions)

Every time a measurement is saved, either by a stable measurement or a save operation triggered by a barcode scan, it is stored in a database.

In case of legal for trade systems, all LFT measurements are stored together with a unique **alibi id**.

In order to oversee previous measurements, the user can open the LFT Database View by pressing the “**F5**” key (configurable). The LFT-Database View contains detailed information about previous measurements such as timestamp, Measurement Id and dimensions of the freight, see **Figure 5**.

On the left side filter options are presented. If one or more filters are set, the application then displays all measurements that meet all filter criteria.

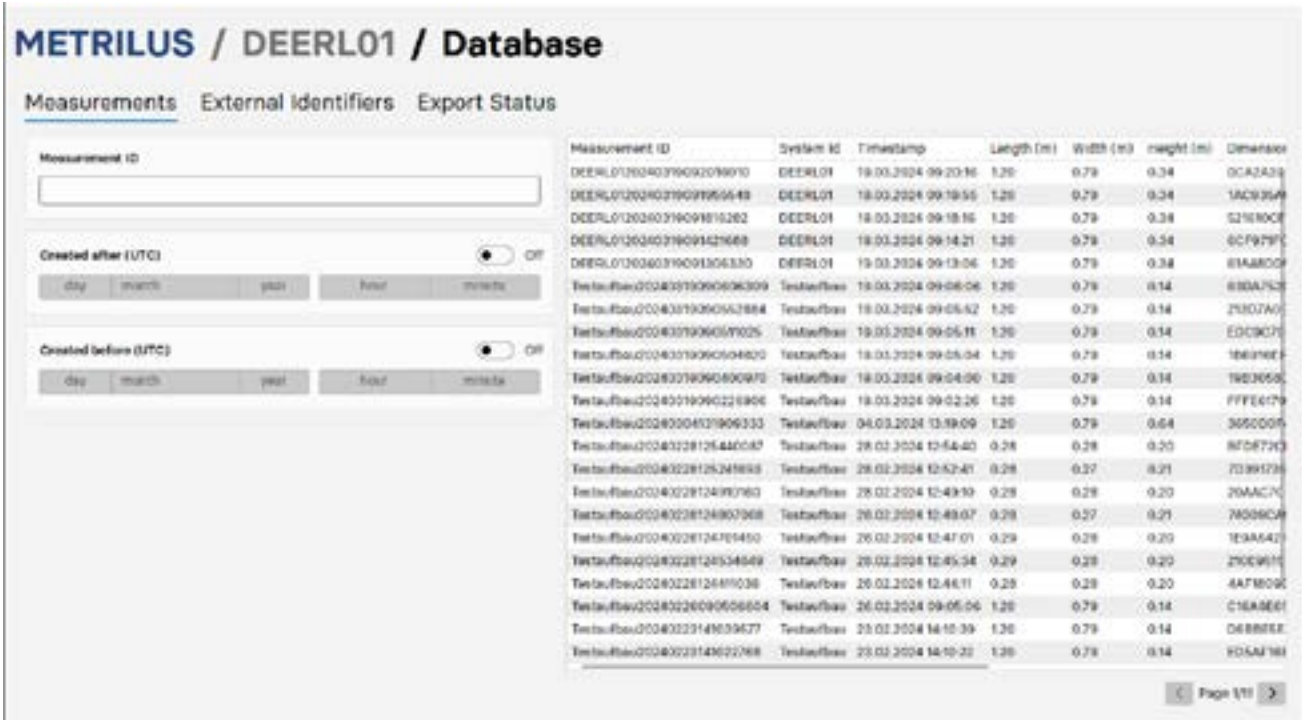


Figure 5: Interface of the LFT Database view.

## ▶ 6. Magic Barcodes

Most hotkeys can also be triggered by scanning a **magic barcode**, see “**Magic Barcodes.pdf**” for a list and the actual barcodes.

## ▶ 7. Restrictions

Several restrictions for measurements apply:

1. Objects or object parts may not move during measurement, if any movement of the object is detected by the system, it will not dimension the object.
2. Objects or object parts that are black or very dark may not be dimensioned accurately.
3. Objects or object parts that are very shiny or reflective may not be dimensioned accurately.
4. Objects or object parts that are (semi-)transparent may not be dimensioned accurately.
5. While any part of the system or the measurement area is exposed to direct sunlight, objects may not be dimensioned accurately.
6. Any protrusions with a thickness of less than 2 cm may not be considered in the measurement.
7. Objects smaller than **20 x 20 x 10 cm (l/w/h)** may not be dimensioned.
8. If an object is larger than the measurement area in any of its dimensions or if an object is too high, the object will not be dimensioned.
9. If the measurement system is physically damaged, bent or significantly moved out of place, it may not measure correctly and needs to be re-calibrated.
10. If multiple objects are placed in the measurement area simultaneously and they are clearly separated, an arbitrary object is measured.
11. If multiple objects are placed in the measurement area simultaneously and their closest parts are closer than 10 cm, they will be treated as a single object and dimensioned together as a single object.
12. Any parts of the object below **10 cm above the measurement plane** are completely ignored by the system and not considered for the measurement.
13. Very high and narrow objects may lead to wrong width and length measurements if placed on uneven surfaces. Try to place objects like this on their largest side.

## ▶ 8. Errors and Solutions

MetriX presents measurement related errors in the widget area on the right hand side of the UI, they can usually easily be solved by changing the position of the cargo according to the instructions on the screen. Hardware related errors are presented as full screen messages and completely block the measurement workflow. They usually require manual interactions with the hardware and / or a reboot or power cycle of the system.

## Typical error messages and solutions

<b>Message</b>	<b>Solution</b>
<b>Measurement is fluctuating</b>	The item or the whole system still moves or something is interfering with the measurement. Wait for the movement to stop or eliminate the source of the interference.
<b>Object is unmeasurable</b>	The object cannot be measured because one or more restrictions listed in section "Restrictions" apply.
<b>Object is undersized</b>	The object is too small to be measured reliably.
<b>Object is not centered</b>	Place the object closer to the center of the measurement area.
<b>Object is not correctly oriented</b>	Rotate the object so that it's oriented roughly diagonally under the system.
<b>Object is oversized</b>	The object is too large to be measured.
<b>Object is not box shaped</b>	Only applies to L1XX systems. This object's shape is not suited to be measured with this system type.
<b>Object violates the Region of Interest</b>	Object exceeds one or more of the measurement area boundaries. Move it fully into the measurement area.
<b>Object is too tall</b>	Object height is above the specifications.
<b>No object or object not detected</b>	The measurement area is empty or the object is invisible to the system (see "Restrictions").
<b>(Full screen hardware error message)</b>	Check the piece of hardware mentioned in the error message. Power cycle it if possible. If applicable, check the cables to the device. Power cycle the whole system. If the error persists, contact the MetriX service.

## ► 9. Appendix A: Workflow Examples

MetriXFreight supports a variety of diverse workflows and can be configured to fulfill different requirements depending on the application scenario. Two of the most commonly deployed workflows are described in detail, below. For consultation on advanced workflows, please contact your MetriXFreight support consultant.

### **Non-interactive measurement workflow**

The user-interface for this workflow displays measured dimensions (length, width, height and, optionally, weight) along with an on-screen barcode. The on-screen barcode encodes the measured values in a user-defined format and the operator will typically scan this barcode using a barcode scanner connected directly to the customer's 3<sup>rd</sup> party line-of-business software.

The operator typically follows the underlying procedure:

1. Scan a barcode identifying the pallet or object to be measured. This barcode is usually an ID which is unique for the object or shipment.
2. The barcode scanner is connected directly to the customer's line-of-business software.
3. Place the pallet or object in the measurement area.
4. Wait for MetriXFreight to display a stable measurement on-screen.
5. Scan the on-screen barcode encoding the measured values. Scanning this barcode enters the values directly into the customer's line-of-business software.

### **Triggered measurement workflow**

An alternative, commonly used workflow is the **triggered** workflow. When this workflow is in use, the user scans the identity barcode of the pallet or object to be measured directly into MetriXFreight itself – this may be done before or after the object is placed in the measurement area.

Immediately upon acquiring a stable measurement, MetriXFreight stores the measured data on disk, using the scanned identity so that the data may be later retrieved by a user, over a network or by 3<sup>rd</sup> party software. The scanned identity is displayed on-screen.

The operator typically follows the underlying procedure:

1. Place the pallet or object in the measurement area.
2. Scan a barcode identifying the pallet or object to be measured. This barcode is usually an ID which is unique for the object or shipment.  
The **barcode scanner is connected directly to MetriXFreight.**
3. Wait for MetriXFreight to confirm that the measurement has been triggered and stored.  
This is indicated by highlighting the screen in bright green.  
At this time, the operator can see the **identity that was scanned and the measurements, on-screen.**

Confirmation and storage of a measurement is triggered as soon as a stable measurement is acquired and an identity barcode has been scanned but the order in which these occur (i.e. steps 1 and 2 in the procedure, above) is not important. For this reason, this workflow is sometimes called the **identity-first** workflow.

▶ 10. Appendix B: Technical Specifications of MetriXFreight L Systems\*

(\*) L130/L135/L230/L235/L630/L635

**Technical Specification**

**Power Connector** 230V AC, EU plug

**Operating Systems** Microsoft Windows 10 IoT Enterprise 2019 LTSC 64Bit  
-- or – Debian Linux

**Network** Free Gigabit Ethernet Port for external connection (data export / service), the other is used to connect sensors. Wireless Network optional (via USB Dongle)

**Display Connection** HDMI or DisplayPort

**USB** 2 x USB 3.1 Gen 1 2 x USB 2.0

**Other Connectivity** RS 232 (optional, for scales)

