



**Operator Manual**  
CIND Dimensioner In-Motion MID2

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## 1 Background and purpose

This document contains instructions on how to use the Cind product Dimensioner In-Motion. The intent of this document is to be used by a notified body to review how the product is constructed and how to operate it, in order to evaluate CIND Dimensioner In-Motion for legal for trade certification, for example the MID 2014/32/EU directive.

## 2 User interface

### 2.1 Overview

The user interface consists of two parts. A stoplight that shows the operational state of CIND Dimensioner In-Motion and a display with three output fields. Two that show legally relevant information and one that shows non-legally relevant information.

### 2.2 Stoplight

The stoplight shows the operational state of the system as described below:

Light color	Meaning
Green	System ready/available
Yellow	System occupied/unavailable/calculating
Red	System disabled/error, check display for more information

### 2.3 Display

The display is split into three fields that shows different information as described below:

Display Layout	Additional information (Legally non-relevant)	Display Layout	Additional information (Legally non-relevant)
F: 30 L: 120 W: 80 H: 60 WGT: 100.0 F: 60 Forklift speed too high F: 0 Unregistered forklift  Installation: YYYY-MM-DD System status: Ok  Versions: Cargospect: 1.0.0 API: 1.0.0  [hostname_00:00:00:ff:ff:ff]	Id: b3c0e23e-b471-4102-99a5-90fa5cc81f25 Date: YYYY-MM-DD HH:MM:SS Measurement result: Forklift id: 30 Length: 120 Width: 80 Height: 60  Min Speed: 2.9 [km/h] Max Speed: 4.0 [km/h]	F: 30 L: 120 W: 80 H: 60 WGT: 100.0 F: 60 Forklift speed too high F: 0 Unregistered forklift  Installation: YYYY-MM-DD System status: Ok  Versions: Cargospect: 2.0.0 API: 1.0.0  [hostname_00:00:00:ff:ff:ff]	Id: 4e1adc0c-cde8-4f49-a5a4-9bd9dd7a3a92 Date: YYYY-MM-DD HH:MM:SS  Fault(s) code: 12288 - Not driving in straight line - Speed too varied
Version numbers (Legally relevant)	Measurement data (Legally relevant)	Version numbers (Legally relevant)	Measurement data (Legally relevant)

**The version field** shows software identifiers and system status. This field allows for verification that the system is running certified software. This field also shows error information if the system is disabled. The color of this field will always be the current stoplight color.

**The measurement field** shows the results of the latest recorded passage. The results contain length, width, height, forklift id and if available, barcode. When the results appears here it is an indication it has also been saved in the measurement database.

The **additional information field** shows text received from an external source or information from the system that is legally non-relevant. For example a list of the latest passages or error messages explaining why a measurement failed.

The display uses color to show the state of the system and operations during a passage. The colors of each field are described below:

Version field	
Color	Meaning
Red	System disabled/error
Yellow	Occupied/calculating
Green	Available/ready

Measurement field	
Color	Meaning
Green	Measurement successful
Red	Measurement failed
Black	System idle

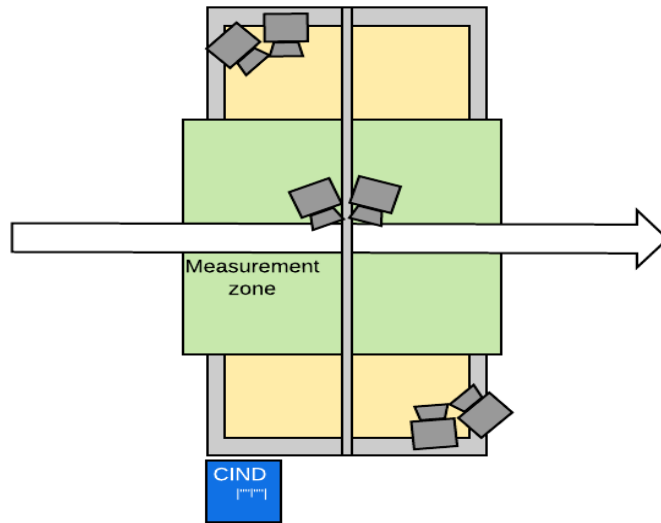
Additional information field	
Color	Meaning
Any	Color set by external connection per message. Default color: Black.

## 2.4 Requirements

Cargo needs to be loaded on a pallet and moved by a registered forklift, pallet jack or other pallet mover to deliver a valid measurement. Measuring cargo not loaded on a pallet or using other means of moving through the system (ex. conveyor belts, package carts, unregistered pallet movers, objects being carried etc) is not supported.

CIND Dimensioner In-Motion is only able to track and measure cargo moving from entry to exit and it only supports measuring one entity at a time. Ensure that only the pallet mover with cargo is inside the measurement zone during measuring. Stopping, placing objects or standing in the measurement zone will not generate measurements but it will prevent the system from being used. Measuring will be unavailable until the measurement zone has been fully cleared again.

Driving the reverse way through CIND Dimensioner In-Motion will not create any measurement data. Note that doing so will disrupt any current measurement being calculated resulting in a failed measurement.



## 2.5 System disabled

A red stoplight indicates that CIND Dimensioner In-Motion is disabled, undergoing maintenance or has encountered an error. For more information about ongoing errors check the display. While the system is disabled it does not track, measure or record anything passing through the system.

### Display Layout

Additional information  
(Legally non-relevant)

<p>F: 30 L: 120 W: 80 H: 60 WGT: 100.0          F: 60 Forklift speed too high          F: 0 Unregistered forklift</p>	
<p>Installation: YYYY-MM-DD          System status: Not Active / Failed</p> <p>Versions:          Cargospect: 2.0.0          API: 1.0.0</p> <p>[hostname_00:00:00:ff:ff:ff]</p>	<p>Measurement data (Legally relevant)</p>

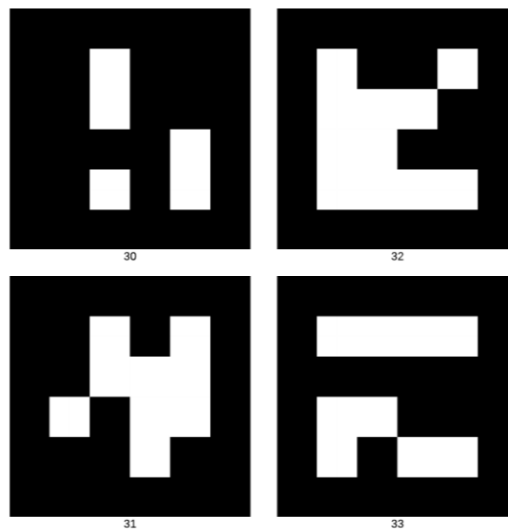
Version numbers (Legally relevant)

Measurement data (Legally relevant)

## 3 Forklift registration

### 3.1 Overview

Pallet movers need to be registered before they can be used in CIND Dimensioner In-Motion. Registration requires driving through the portal with ArUco markers on the pallet mover and the registration board on the forks. ArUco markers are synthetic square markers containing id numbers that are designed to be easily detected and interpreted by computer vision. They consist of a white outer and black inner border around a binary matrix of white squares on a black background. Below is an example of how these markers can look like:



#### Notice

To use a forklift in multiple CIND Dimensioner In-Motion systems it needs to be registered in each system it will operate in.

Each forklift is assigned a numerical identifier during registration, determined by the lowest ID among the ArUco markers used. As a result, the forklift will retain the same identifier across all CIND Dimensioner In-Motion systems where it is registered, provided the markers remain unchanged.

The ArUco markers placed on the forklift need to be in ascending order, a forklift assigned id 100 needs ArUco markers 100, 101, 102 and 103. Forklift identification numbers are increased in increments of five to avoid accidentally overlapping ArUco marker id, this means that a forklift id is always a multiple of 5.

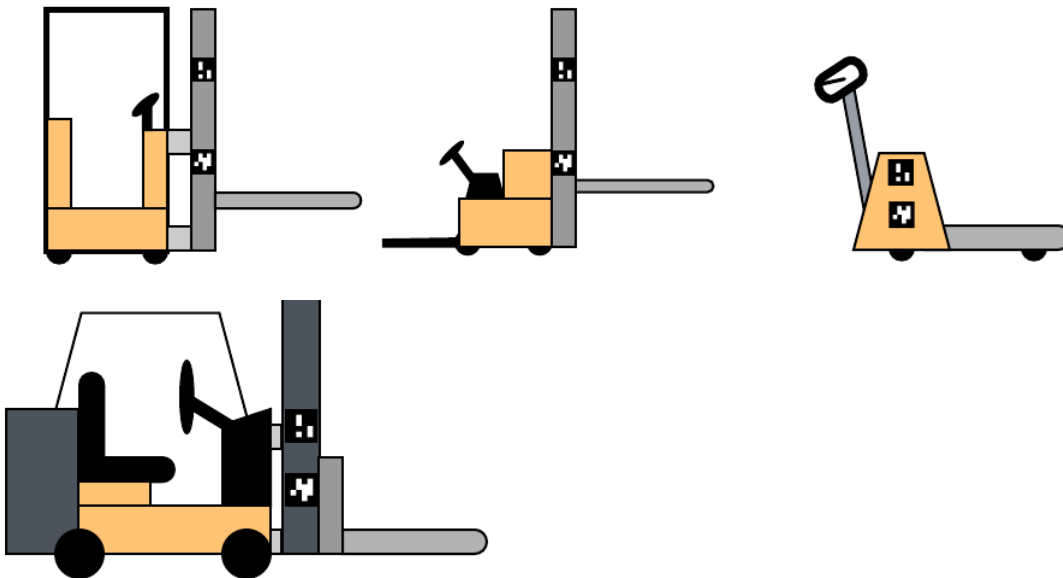
#### Notice

Each CIND Dimensioner In-Motion uses forklift id to keep track of registered forklifts. It is highly recommended to use unique identifiers for each forklift. If multiple forklifts should

use the same id, only the latest forklift registered to that id within a CIND Dimensioner In-Motion will provide accurate measurements.

### 3.2 ArUco marker placement

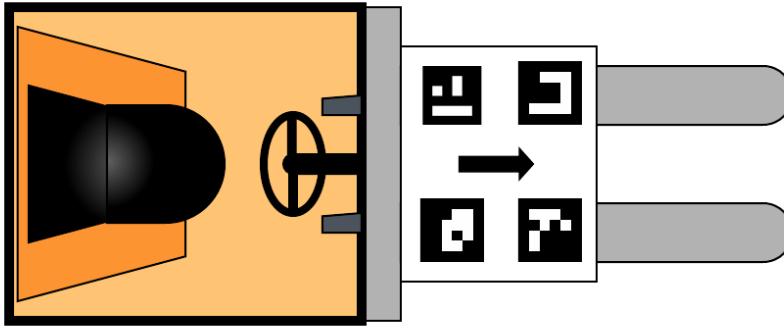
CIND Dimensioner In-Motion requires ArUco markers on the pallet mover to function. The markers are used to detect tilt in the forks. Therefore they must be placed on the parts, if any, of the forklift that tilts. If the forks are incapable of tilting the markers can be placed where they are most easily seen by the CIND Dimensioner In-Motion cameras. See example of ArUco marker placement below:



### 3.3 Registration board

The registration board contains a pattern of four ArUco markers. The board is used to calibrate the location of the forks in reference to the markers placed on the pallet mover.

Place the registration board on the forks of the forklift with the ArUco side facing up and the arrow pointing towards the ends of the forks, this means the arrow does not always point in the driving direction of the pallet mover. The board must be placed touching the base or carriage plate at the back of the forks. See figure below:



### 3.4 Registration

With ArUco markers attached and registration board in place, raise forks about 20 cm above ground. When the stoplight is green drive slowly through the system. The measurement field

Display Layout	Additional information (Legally non-relevant)
F: 30 L: 120 W: 80 H: 60 WGT: 100.0 F: 60 Forklift speed too high F: 0 Unregistered forklift	
Installation: YYYY-MM-DD System status: Ok  Versions: Cargospect: 2.0.0 API: 1.0.0  [hostname_00:00:00:ff:ff:ff]	Measurement result: Forklift id: 40  Forklift registered
Version numbers (Legally relevant)	Measurement data (Legally relevant)

on the display shows if the forklift was registered successfully by turning green and showing the newly registered forklift id along with calibration values for each camera set in the rig. See below for example:

If the measurement field turns red the registration failed. Check the display for more information. Correct any errors concerning ArUco markers, such as numbering, visibility or damage, check the registration board and drive through again.

### 3.5 Replacing damaged markers

If one or more ArUco markers are damaged or unreadable they need to be replaced. It is important that the new marker-id is the same as the old one.

Replace the damaged marker on the forklift and repeat steps 3.2 and 3.3 to update the forklift registration with the new position of the markers. Even minor changes to marker positioning can effect measurement values so always re-register a forklift after replacing ArUco markers.

**Notice**

Remember to update the registration in all CIND Dimensioner In-Motion systems the forklift is registered and used in.

## 4 Measuring

Before you measure your cargo it must be loaded on a pallet. Pick up the pallet loaded cargo on the forks of the pallet mover. Position the pallet all the way back on the forks, or with a 10 cm or greater gap between the back end of the forks and the back end of the cargo/pallet whichever extends the furthest.

When the stoplight is green drive through the portal at about 5 km/h. Drive in a straight line without stopping until you have exited the portal. The stoplight will turn yellow during the passage, to indicate that the system is in use.

Remember:

**- Keep your speed consistent and drive in a straight line through the portal.**

**- Stopping inside the measuring zone, turning or serpentine driving will result in a failed measurement.**

After driving through the portal verify the measurement was successful by checking the display. See chapter 2.3 for more information on the display layout.

If the measurement is successful the measurement data is shown on the display in the measurement window. The measurement data is also available for retrieval via api for up to three months.

Once the measurement is complete the stoplight will turn green to show the portal is ready for another measurement.