Australian Government
Department of Industry, Science and Resources

National Measurement Institute

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval

NMI 13/1/21

VARIANT 3 VALID FOR VERIFICATION PURPOSES UNTIL 1 October 2024

Issued by the Chief Metrologist under Regulation 60
of the
National Measurement Regulations 1999

This is to certify that an approval for use for trade has been granted in respect of the instruments herein described.

AKL-tec Model CS 1200 AKL/AU Dimensional Measuring Instrument

submitted by AKL-tec GmbH
Boehlstrasse 7
ALSDORF 57518 GERMANY

NOTE: This Certificate relates to the suitability of the pattern of the instrument for use for trade only in respect of its metrological characteristics. This Certificate does not constitute or imply any guarantee of compliance by the manufacturer or any other person with any requirements regarding safety.

This approval has been granted with reference to document NMI R 129, *Multi-dimensional Measuring Instruments*, dated July 2004.

This approval is subject to review at the decision of the Chief Metrologist in accordance with the conditions specified in the document NMI P 106.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern approved – interim certificate issued	24/02/12
1	Pattern approved – certificate issued	30/05/12

Document History (cont…)

Rev	Reason/Details	Date
2	Variant 1 provisionally approved – interim certificate issued	21/03/19
3	Pattern reviewed - Variant 1 & 2 approved – certificate issued	09/03/20
4	Variant 3 provisionally approved – interim certificate issued	02/11/23

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with approval number 'NMI 13/1/21' and only by persons authorised by the submittor.

Instruments purporting to comply with this approval and currently marked 'NMI P13/1/21' may be re-marked 'NMI 13/1/21' but only by persons authorised by the submittor.

It is the submittor's responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the National Measurement Institute (NMI) and with the relevant Certificate of Approval and Technical Schedule. Failure to comply with this Condition may attract penalties under Section 19B of the National Measurement Act and may result in cancellation or withdrawal of the approval, in accordance with document NMI P 106.

Auxiliary devices used with this instrument shall comply with the requirements of General Supplementary Certificates No S1/0/A or No S1/0B.

Special:

Instruments are only approved for use for determination of the dimensions of a rectangular box having smooth, flat surfaces with a uniform and non-black colour.

The dimensions determined may also be used for the calculation (by peripheral equipment) of a volume and/or 'dimensional weight' (*) value of the object, also for the purposes of determining freight or postal charges.

(*) A 'dimensional weight' value is a calculated value deemed to be a weight value obtained by applying a conversion factor to the object's volume.

Special Conditions of Approval: (Provisional Approval – Variant 3)

Provisional approval variant 3 is limited to five (5) sites only, the locations of which may be obtained from the National Measurement Institute. The submittor shall advise the **National Measurement Institute – Pattern Approval Unit** at patternapproval@measurement.gov.au of the proposed location or serial number of each instrument prior to it being initially verified.

Instruments purporting to comply with variant 3 of this approval shall be marked with approval number 'NMI P13/1/21' and only by persons authorised by the submittor. (Note: The 'P' in the approval number may be a temporary marking.)

The variation to the approval will remain provisional pending completion of satisfactory testing and evaluation.

In the event of unsatisfactory performance the approval may be cancelled (or altered).

The submittor shall implement such modifications as required by NMI. In the event that such modifications (if any are required by NMI) are not made to the satisfaction of NMI, this approval may be withdrawn.

Signed by a person authorised by the Chief Metrologist to exercise their powers under Regulation 60 of the *National Measurement Regulations 1999*.

Phillip Mitchell
A/g Manager
Policy and Regulatory Services

TECHNICAL SCHEDULE No 13/1/21

1. Description of Pattern approved on 24/02/12

An AKL-tec model CS 1200 AKL/AU dimensional measuring instrument (Figures 1 and 2) which is approved for use for the determination of the linear dimensions of certain stationary objects.

Instruments may be fitted with output sockets (output interfacing capability) for the connection of auxiliary and/or peripheral devices.

Instruments are approved for use over a temperature range of 0 °C to +40 °C and must be so marked.

1.1 Details

The pattern is approved for use for the determination of the linear dimensions of irregular shaped objects having maximum dimensions (i.e. length × width × height) of 350 × 250 × 280 cm and minimum dimensions of 20 × 20 × 10 cm.

The scale interval of measurement (*d*) for length and width dimensions is 2 cm.

The scale interval of measurement (*d*) for height is 1 cm.

The pattern converts the detected characteristics into the linear dimensions of the smallest rectangular box (parallelepiped – #) that would fully contain the object.

The pattern is approved for use in measuring the linear dimensions of opaque objects only; the dimensions determined may also be used for the calculation of volume and/or 'dimensional weight' value (*) of the item (refer to the Special Condition of Approval).

The pattern may include a stationary platform or a conveyor type receptor. Objects are measured statically by being positioned manually on the platform or delivered into the measurement area by the conveyor system. The measurement operation is initiated by a manual button press or automatically when an object is detected in the measurement area using barcode scanners.

(#) A rectangular box (parallelepiped) is a polyhedron having six faces that are parallel in pairs; each face is a parallelogram and adjacent edges are perpendicular.

(*) A **'dimensional weight'** value is a calculated value deemed to be a weight value obtained by applying a conversion factor to the object's volume as calculated from the measured dimensions.

1.2 Laser Scanners (dimensioning heads)

The pattern includes two SICK model LMS200-30106 or LMS500-20000 laser measuring scanners (Figures 1 and 2a) described as LMS1 and LMS2 and mounted on a linear track above the measurement area. The linear track moves both dimensioning heads at a speed of up to 20 m/min.

1.3 Encoder

The instrument uses a Sick model DFS60E-BHCA01024 or model DFS60E-BEEA01024 encoder (*) to measure the length of the object in combination with the laser dimensioning heads. The tachometer is fitted to the linear track and generates pulses based on the displacement of the track while the laser dimensioning head detects the object being measured.

(*) The submittor should be consulted regarding the acceptability of alternative encoders.

1.4 Workstation

An AKL-tec model KD-AKL-84200 industrial personal computer with a model KD-AKL-00015 touchscreen (Figure 2b) is used to initiate measurement operation and display results, as well as collecting additional information about the object being measured via barcode scanners or touchscreen data entry.

The system operates APA700 software v7.11 running on a Microsoft Windows based operating system. The workstation processes the data from the laser scanners and the encoder to determine the dimensions of the object in the measurement area and indicates the results.

1.5 Indications

The pattern is fitted with a local display unit (Figure 2c) however measurement data from the CS 1200 AKL/AU is made available to other systems for indication and/or printing.

Printed and displayed information must be made available for verification and must comply with the requirements set out in document NMI R129, *Multidimensional Measuring Instruments*, in particular as per the extract below.

> 7.9.1 Any printed ticket or displayed indication shall include sufficient information to identify the transaction, for example:
>
> (a) dimensions: length (*L*), width (*W*) and height (*H*);
> (b) volume (vol);
> (c) weight (Wt) if the instrument includes a weighing instrument;
> (d) dimensional weight (Dim Wt ... kg or DW ... kg);
> (e) dimensional tare (DT ... kg);
> (f) conversion factor (F);
> (g) quantity for charging, for example dimensions, vol or DW ... kg;
> (h) price rate and price; and
> (i) date, transaction number or other identification of the object.
>
> *Note 1:* Icons may be used to identify indications.
> *Note 2:* When the customer is not present during the measurement process the above information need not be displayed or printed out at the time but shall be available on request.
> *Note 3:* The price interval and the price rate shall comply with the national regulations applicable for trade.
>
> 7.9.2 A printed ticket shall also contain the following printed or preprinted information:
> (a) that the dimensions and/or volume shown are those of the smallest rectangular box that fully encloses the object; and
> (b) that the dimensional weight is a calculated value deemed to be a weight value obtained by applying a conversion factor to the object's volume or dimensions.

1.6 Sealing Provision

Provision is made for sealing the calibration adjustments in the workstation computer by sealing a metal plate that covers a USB port and by sealing the special USB dongle provided by the manufacturer (Figure 3).

1.7 Verification Provision

Provision is made for the application of a verification mark.

1.8 Descriptive Markings

Instruments carry the following markings (in the vicinity of the indicating device):

Manufacturer's mark, or name written in full	AKL-tec GmbH
Model designation	.....
Serial number of the instrument	.....
Year of manufacture	.....
Pattern approval mark	NMI 13/1/21
Maximum dimensions for each axis	*Max* ..... cm
Minimum dimensions for each axis	*Min* ..... cm
Scale interval for each axis	d = ... cm
Maximum belt speed	..... m/min
Minimum belt speed	..... m/min
Special temperature limits	0 °C to +40 °C

2. Description of Variant 1 **provisionally approved on 21/03/19**
approved on 09/03/20

An AKL-tec model CS 1208 AKL/AU which may also be labelled as APACHE p8 LFT/AU. The instrument is similar to the pattern using LMS500-20000 laser measuring scanners (dimensioning heads).

An AKL-tec emController may comprise either the model as described in **1.4 Workstation** or an AKL-tec model KD-AKL-23120 or AKL-tec model KD-AKL-23122. The emController may also be operated in "two computer concept" mode, in which a second computer may be used to carry out non-legally relevant functions. The emController operates software version apavm800.exe v8.07.

The variant is approved for use for the determination of the linear dimensions of irregular shaped objects having maximum dimensions (i.e. length × width × height) of 720 × 250 × 280 cm and minimum dimensions of 20 × 20 × 10 cm.

The scale interval of measurement (d) for length and width dimensions is 2 cm.

The scale interval of measurement (d) for height is 1 cm.

3. Description of Variant 2 **approved on 09/03/20**

The model CS 2100 AKL/AU is similar to the pattern, except it operates in dynamic mode with the Laser Scanners mounted on a fixed frame above a conveyor type receptor. The tachometer is fitted to a conveyor belt and objects are measured by moving through the measuring area of the laser dimensioning heads.

The conveyor can operate at speeds of up to 0.8 m/s.

4. Description of Variant 3 provisionally approved on 02/11/23

The AKL-tec model APACHE f1 LFT (flying forklift) which is approved for use for the determination of the linear dimensions of certain objects while they are in motion and carried by a forklift truck (Figure 4).

Variant 3 is approved for use over a temperature range of −10 °C to +40 °C.

4.1 Details

The variant is approved for use for the determination of the linear dimensions of irregular shaped objects having maximum dimensions (i.e. length × width × height) of 2100 × 2100 × 2800 mm, minimum dimensions 200 × 200 × 200 mm, with a scale interval of measurement (d) of 20 x 20 x 20 mm.

The variant is approved to measure objects carried by a forklift truck travelling at a minimum speed (V_{min}) of 0.1 m/s and a maximum speed (V_{max}) 0.8 m/s. Objects must be carried with the top surface of the object raised no greater than 3000 mm from the floor.

The variant converts the detected characteristics into the linear dimensions of the smallest rectangular box (parallelepiped – #) that would fully contain the object.

The variant is approved for use in measuring the linear dimensions of opaque objects only; the dimensions determined may also be used for the calculation of volume and/or ‘dimensional weight’ value (*) of the item (refer to the Special Conditions of Approval).

Note: This instrument is NOT suitable for:

- transparent objects and objects packed in thick, transparent wrapping material, e.g. ‘bubble wrap’; or
- Objects with a mirror-like surface, e.g. chrome or other high gloss finish,

however, the instrument can measure objects covered in shiny sealing tape or glossy plastic wrapping, e.g. ‘cling wrap’.

(#) A rectangular box (parallelepiped) is a polyhedron having six faces that are parallel in pairs; each face is a parallelogram and adjacent edges are perpendicular.

(*) A **‘dimensional weight’** value is a calculated value deemed to be a weight value obtained by applying a conversion factor to the object’s volume as calculated from the measured dimensions.

4.2 Dimensioning System

The APACHE f1 LFT comprises three LMS500-20000 laser measuring scanners (dimensioning heads) as shown in Figure 5 and Figure 6. Together with the Camera Sensors, the dimensioning heads supply the raw values for the length, width and height of the smallest cuboid enclosing the object to be measured.

The two laser scanners LMS1 and LMS2 scan the object to be measured from above. A third floor-mounted laser scanner (LMSv1 or LMSv2) provides additional points.

One or two optical cameras are used to detect and record the position of the fork-lift truck as it travels through the measurement area by detecting an active marker on the fork-lift (Figure 5). A single camera is used for measuring fork-lift travelling in a single direction through the measurement area. Two cameras are required for detection of the fork-lift travelling in two directions.

An AKL-tec emController may comprise either the model as described in **1.4 Workstation** or an AKL-tec model KD-AKL-23122 or AKL-tec model KD-AKL-27300. The emController may also be operated in “two computer concept” mode, in which a second computer may be used to carry out non-legally relevant functions. The emController operates flyingForklift software version 2.8.0-C or version 4.5.0.

4.3 Indications

The variant is fitted with a local display unit (Figure 2c) however measurement data from the APACHE f1 LFT is made available to other systems for indication and/or printing.

Printed and displayed information must be made available for verification and must comply with the requirements set out in **1.5 Indications.**

4.4 Sealing Provision

Provision is made for sealing the calibration adjustments in the workstation computer by sealing a metal plate that covers a USB port and by sealing the special USB dongle provided by the manufacturer (Figure 3).

4.5 Verification Provision

Provision is made for the application of a verification mark.

4.6 Descriptive Markings

Instruments carry the following markings (in the vicinity of the indicating device):

Manufacturer’s mark, or name written in full	AKL-tec GmbH
Model designation	.....
Serial number of the instrument	.....
Year of manufacture	.....
Pattern approval mark	NMI P13/1/21
Maximum dimensions for each axis	*Max* ..... cm
Minimum dimensions for each axis	*Min* ..... cm
Scale interval for each axis	d = ... cm

TEST PROCEDURE No 13/1/21

Note: Refer to clause **1.5 Indications** – Printed and displayed information must be made available for verification and must comply with the requirements set out in document NMI R 129, *Multi-dimensional Measuring Instruments*, dated July 2004.

The instrument shall not be adjusted to anything other than as close as practical to zero error, even when these values are within the maximum permissible errors.

Maximum Permissible Error at Verification

The maximum permissible errors are specified in Schedule 1 of the *National Trade Measurement Regulations 2009*.

Ensure that instruments are only being used within the special temperature limits stated elsewhere in this Technical Schedule.

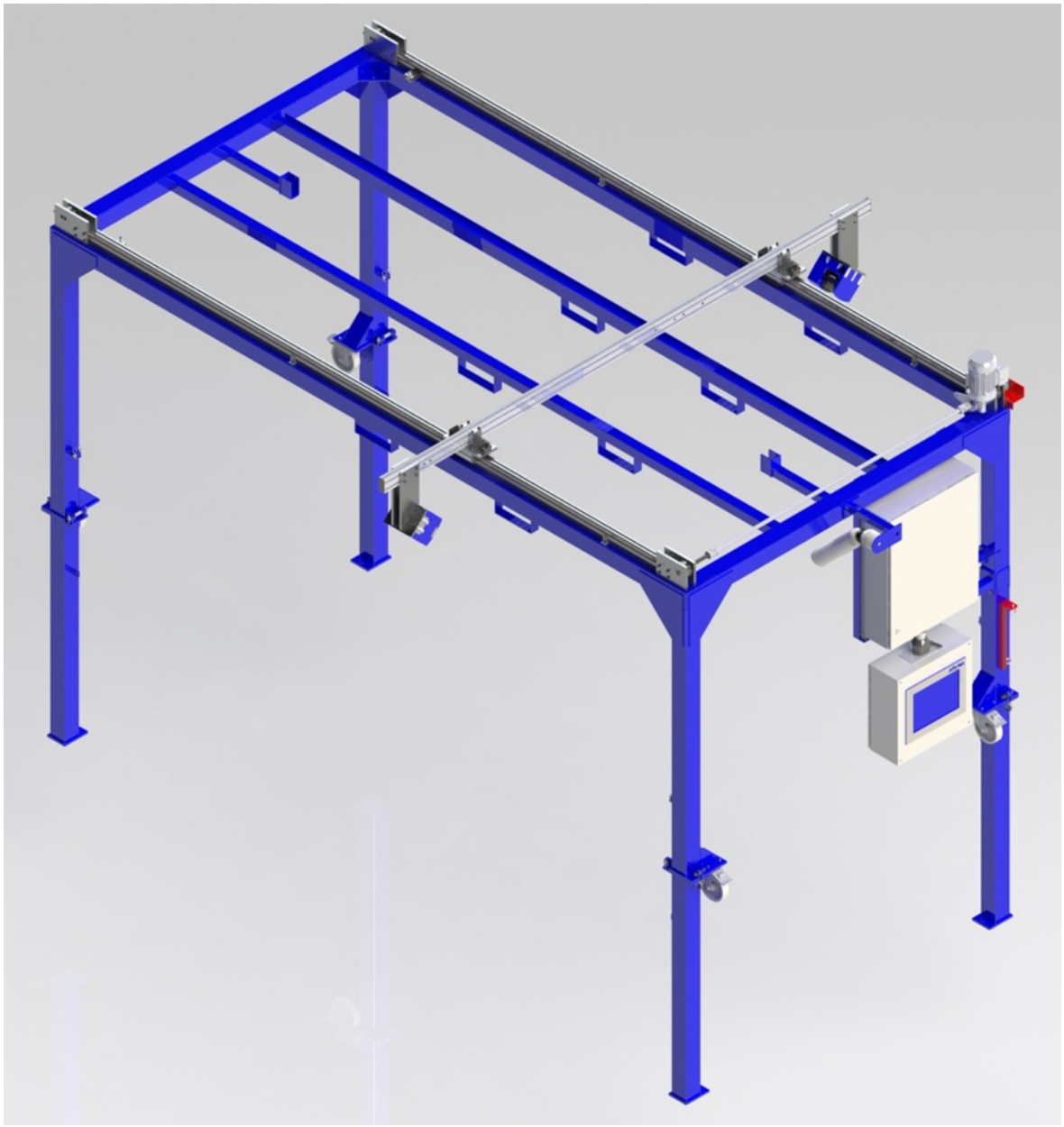
Instruments shall be tested as follows:

(a) Test objects shall be used, in the shape of rectangular boxes with known linear dimensions such that each axis (i.e. length × width × height) is tested for at least five dimensions between and including the minimum and maximum dimensions (approximately) specified on the instrument nameplate. Each test object shall be rigid, with flat faces and well-defined edges. All adjacent faces and edges shall be perpendicular to each other. The dimensions shall be equal to N*d* and the lengths shall be known to an uncertainty equal to or better than ±1/5 of the maximum permissible error, which is equal to the scale interval (*d*). N is a whole number

(b) Carry out at least three test runs for each length, varying position and orientation across the receptor. Each measurement shall be within the maximum permissible error.

(c) Check that instruments are marked and carry one or more notices in accordance with clause **1.8 Descriptive Markings**.

FIGURE 13/1/21 – 1



AKL-tec Model CS 1200 AKL/AU Dimensional Measuring Instrument

FIGURE 13/1/21 – 2

(a) Laser Measuring Scanner

(b) AKL-tec Model “emPC-MCD” Personal Computer

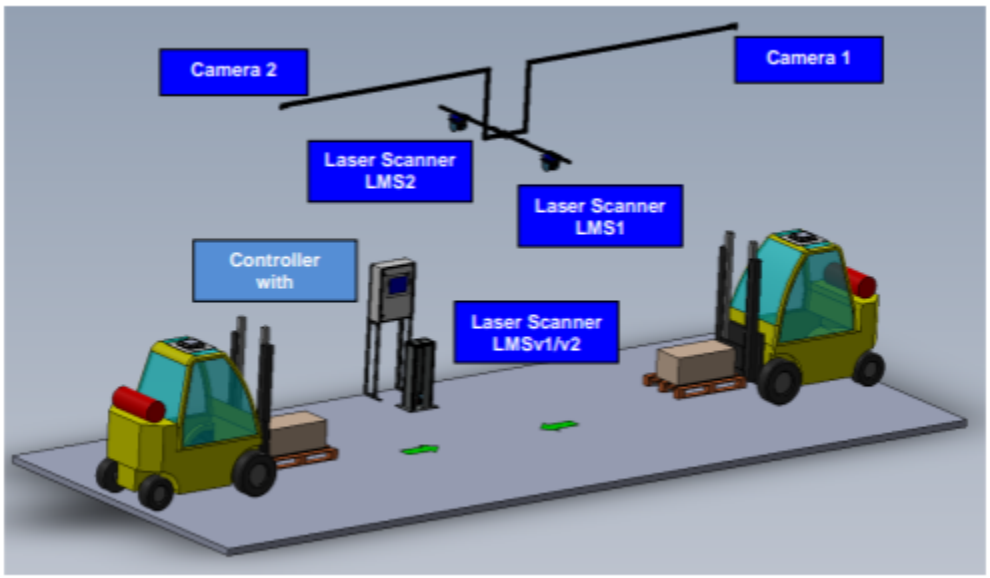
(c) Local Display Unit

Laser Scanner, Personal Computer, and Local Display Unit

FIGURE 13/1/21 – 3

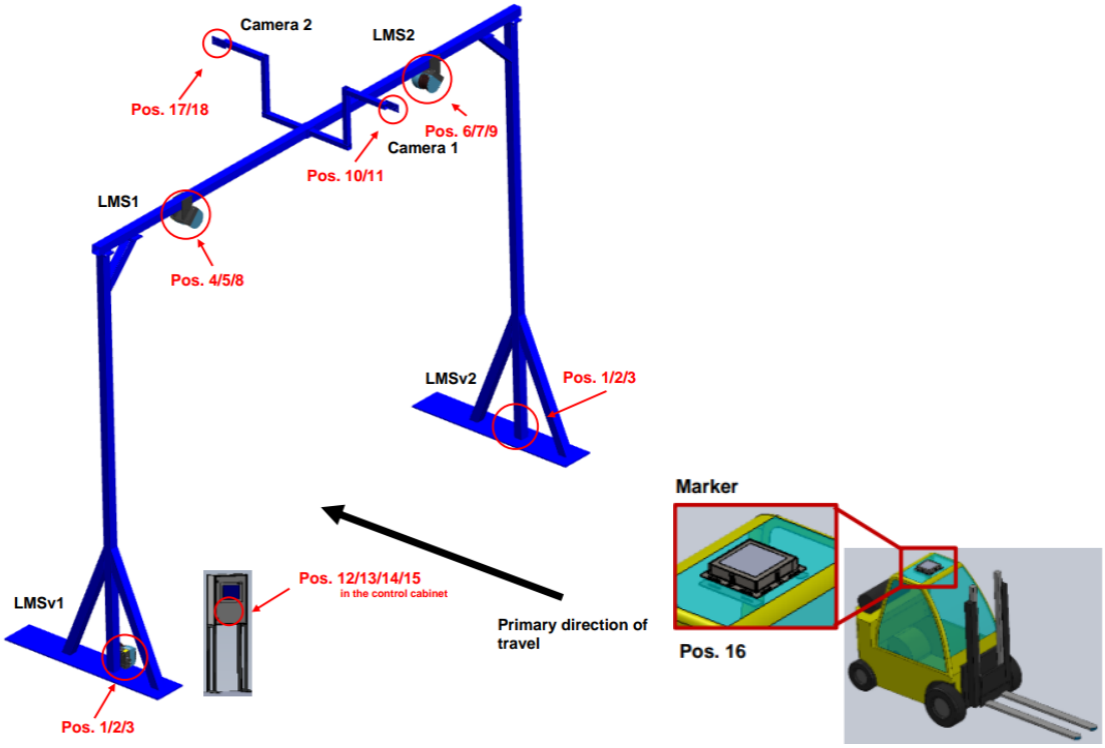
Sealing of USB Port Cover Plate and Checksum Dongle

FIGURE 13/1/21 – 4



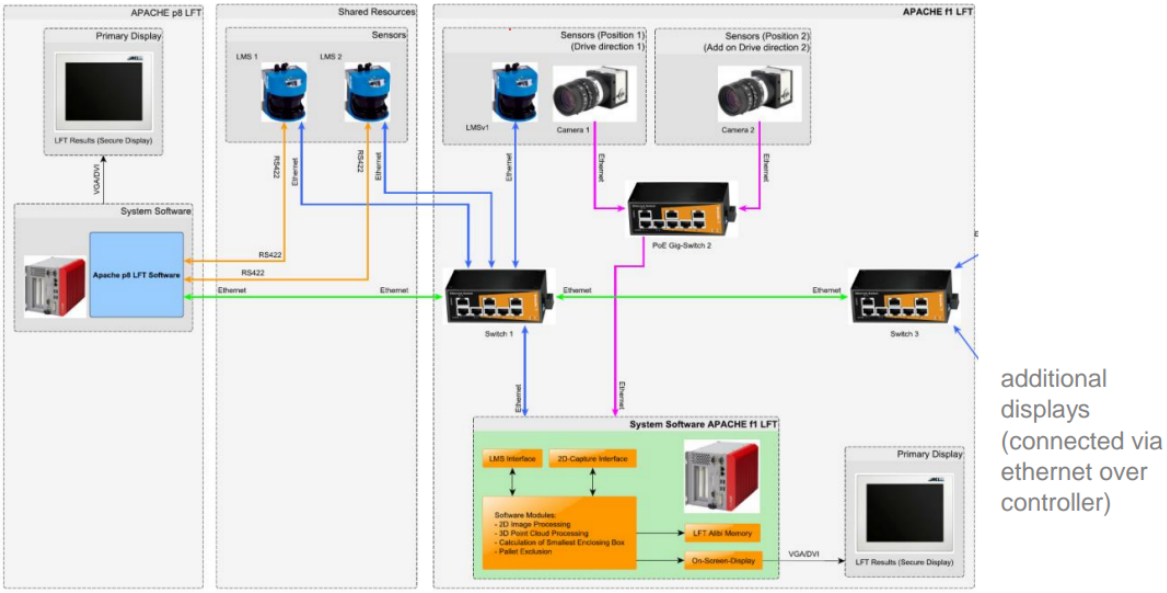
AKL-tec model APACHE f1 LFT flying forklift (variant 3)

FIGURE 13/1/21 – 5



AKL-tec model APACHE f1 LFT flying forklift (variant 3)

FIGURE 13/1/21 – 6



AKL-tec model APACHE f1 LFT flying forklift (variant 3)

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