APACHE
Volume Scanning Systems

system manual

System software apaconv800

APACHE Conveyor contour 2100-AKL

APA436

AKL-tec

Boehlstraße 7 · 57518 Alsdorf / Germany

Tel. +49 (0) 27 41 / 93 77-0
Fax +49 (0) 27 41 / 93 77-29

info@akl-tec.de
www.akl-tec.de

Acknowledgements

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AKL-tec GmbH
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This documentation has been created with great care in order to ensure that the information contained in this manual is complete. Readers who wish to make comments, change requests or suggestions for improvement are invited to provide us with appropriate information.

The content of this documentation is subject to change without notice.

Safety Regulations

The APACHE (**A**utomatic **PA**llet **CH**aracteristics m**E**asurement) measuring system complies with the prevailing safety regulations according to IEC and VDE for industrial machines (EN 60204-1).

The following harmonized standards apply:

DIN EN ISO 12100	Safety of machines.
DIN EN 60204.1	Electrically equipping industrial machines.

The APACHE System is equipped with a safety-rated AC mains power cord and may only be connected to an earthed power socket. Permanently installed devices must be permanently connected to the operator's power mains by terminals. The operator's mains voltage range must be consistent with the local country's mains voltage.

The power cable plug or the red-and-yellow turn switch must be easily accessible so as to allow complete disconnection from the power mains. For the device to be truly disconnected from the mains power, the power to the device must be severed by unplugging the mains power plug or by turning the switch.

So that other devices can continue to be powered when the APACHE system is switched off (red-and-yellow switch turned to **OFF**), individual consumers must be tapped off before the main switch (e.g. charger for barcode scanner and weighing platform display).

When installing, the environmental conditions must be taken into consideration. Never connect or disconnect data transmission lines during an electrical storm.

The power supply may only be opened by qualified personnel. Repairs beyond the maintenance work described in Chapter **4 Care and Maintenance** may only be performed by qualified personnel. Improperly performed repairs can present a serious danger to users.

Laser Safety Note

The laser measurement systems (LMS1 and LMS2) are class 1 laser products according to EN 60825-1, IEC 60825-1 and 21 CRF 1040.10.

Operating Environment

Do not install the APACHE measuring system where it could be exposed to moisture or heat (e.g. direct sunlight).

Operating temperature:	0˚ C to +40˚ C (+32˚ F to +104˚ F)
Humidity:	maximum 85%, non-condensing.

The operating housing has openings at the top and sides where the fans are located, so that generated heat can escape. Do not cover these openings.

Safety Information

When working on the portal frame, the APACHE are switched off and disconnect from the power supply.

During the operation, no further work in the area of the APACHE be performed on climbing aids.

On the APCHE only trained staff are working.

There are to observe the general and the local safety regulations

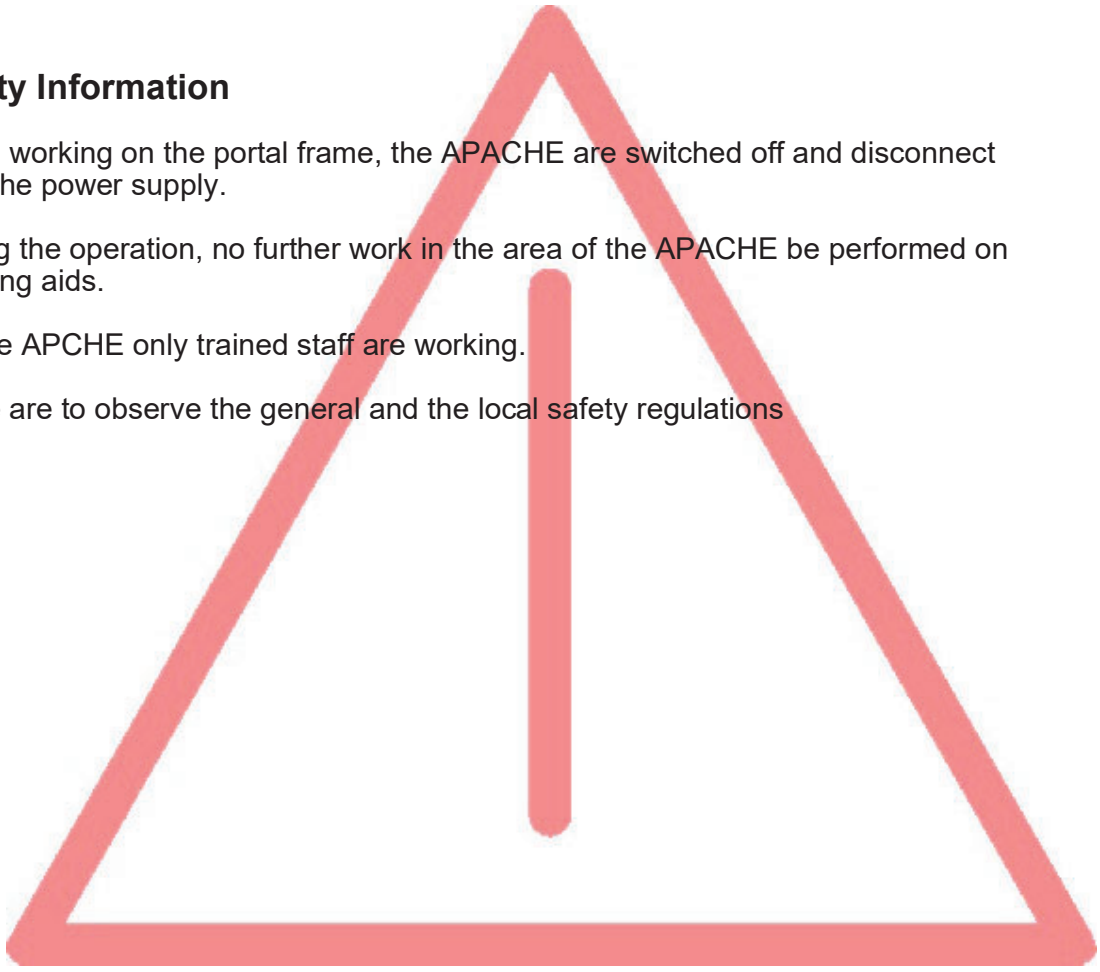


Table of Contents

Foreword

This manual is organized into the following chapters:

1. **Introduction**
   This chapter describes the quantities measured, the measurement procedure, obligation of standardization and legality for trade.

2. **APACHE portal Measuring System Layout**
   This chapter gives an overview of the mechanical, electrical and software components.

3. **Operating the System Software**
   This chapter describes what options authorized users have for controlling and adapting the system software. It also explains safety aspects, as well as calling up the logbook and alibi memory.

4. **Care and Maintenance**
   This is where the care and maintenance of the APACHE system are described.

5. **Error Messages**
   In this chapter, you will find notes on troubleshooting and fixing simple problems.

6. **Technical Data**
   All technical details and data are presented in this chapter.

7. **Description of the Interfaces**
   For a better understanding of the system, this chapter describes the flow of information between the interfaces.

A. **Appendix A Calibration and Parameterization**
   Overview of possible settings for all parameters in the system software initialization file.

Formatting used in this documentation

The following formatting is used for clarity:

Bold Titles and important information

Note: Special suggestions for easier use

Caution: Important information to avoid personal injury or damage to the APACHE system.

[Length] All touch-sensitive areas, buttons or keys are indicated in square brackets.

1 Introduction

1.1 Description of the APACHE conveyor contour 2100-AKL system

Multidimensional measuring devices are instruments used for determining the external dimensions of an object. The dimensions measured are length, width and height. These dimensions are used, among other things, for calculating performance-related transport or storing expenses, packaging planning and storage space optimization.

Naturally, one field that commonly makes use of multidimensional measuring devices is logistics. Often, it is essential to know not only the dimensions of an object (in this case the transported goods), but also the weight (mass) of the object. Multidimensional measuring devices are then combined with weighing systems. The APACHE conveyor contour 2100-AKL system is such a multidimensional measuring system that can be connected to an electronic weighing platform. The system accommodates large volume applications in particular, and is often used for measuring bulk goods packed onto pallets and similar consignments.

Measuring a large-volume freight object with APACHE conveyor contour 2100-AKL starts with gapless scanning of the measured object using a 3D measuring device. The scanning device based on laser scanners is equipped with a measuring arm that records a two-dimensional cross section through the measured object. By repeating this process while moving the scanner, the two-dimensional cross sections are merged into a three-dimensional image from which the dimensions of the object and other factors can be determined.

The three-dimensional image is processed, and the relevant object dimensions thereby calculated, on an analytical computer based on an industry-standard personal computer. The system software layout is described in Chapter **3 Operating the System Software**.

1.2 Measured Quantities

In this manual, we use the term freight object to refer to transported goods. In the simplest case, a freight object could be a square box, which anyone can describe in terms of its outer dimensions and weight. Especially when transporting large freight objects, which can be colloquially dubbed as bulk goods, the description can be complemented by additional dimensional properties.
Cuboid volume refers to the product of length, width and height that describes the cubic capacity of a cuboid object (parallelepiped).

1.2.1 Smallest Enclosing Cuboid

The smallest enclosing cuboid around an object arbitrary shape is described by the external dimensions of the smallest possible cuboid outer box (smallest possible cuboid figure that completely encloses the object). For a cuboid object, this would be the external dimensions – length, width and height – of the object itself. For other objects of arbitrary shape, all possible outer boxes are tested and the variant chosen that minimizes the cuboid volume.

1.2.1.1 Gross Cuboid Dimensions

The gross cuboid dimensions are the external dimensions of the smallest enclosing cuboid (length, width and height). Gross values are those that concern the entire freight object, including any existing object carrier (pallet).

1.2.1.2 Object Carrier (Pallet)

Large freight objects in particular, consisting of individual boxes, parcels or irregularly shaped pieces such as machine parts, are frequently transported and stored on transport means or pallets. For transporting, a distinction is made between transport means inseparably incorporated with the freight object and removable transport means. Various institutions involved in the logistics chain or in transport simply add a pallet in order to simplify their own internal processes.
For example, it is necessary to place a pallet underneath heavy, cuboid objects in order to be able to transport the freight using forklifts and other ground conveyors. As a result, the freight object appears in the multidimensional measuring system with its carrier additionally underneath it. In order to measure the dimensions of the freight object without the object carrier (pallet), the object carrier must be excluded.

An object carrier is specified by two quantities. In addition to its mass (weight), its height is defined. Under the general assumption that the object presented on the pallet is dimensionally stable, and that no part of the object lies beneath the top surface of the object carrier, the APACHE system can exclude an object carrier of such description. The isolated freight object (without pallet) thereby appears as if the surface of the floor, or the surface of any scales installed beneath the measuring frame, was closer to the scanners by the height of the object carrier. The 3D image of the measured object thus obtained can be investigated and described by the relevant quantities.

1.2.1.3 Net Cuboid Dimensions

When a pallet is excluded, the net cuboid dimensions length, width and height describe the smallest enclosing cuboid around the isolated object. If no object carrier (pallet) is excluded, then the net cuboid dimensions equal the gross dimensions.

2 Layout of the APACHE conveyor contour 2100-AKL Measuring System

2.1 Introduction – Software Layout

This measuring system for measuring the dimensions and overhangs of loaded pallets and large-volume consignments (called APACHE conveyor contour 2100-AKL) comprises the hardware components described below. The system is illustrated in the photograph below, with each of the modules labeled separately.

The system layout can vary in the type of housing and various other features. However, every measuring system of the APACHE conveyor contour 2100-AKL comes with the following standard components:

- Laser scanners LMS1 and LMS2 fastened onto the measuring beam or arm
- emController as analytical system, running the operating system Microsoft Windows 10 IOT
- Electrical control with drive actuator and power supply
- Display in the form of a monitor or touch panel

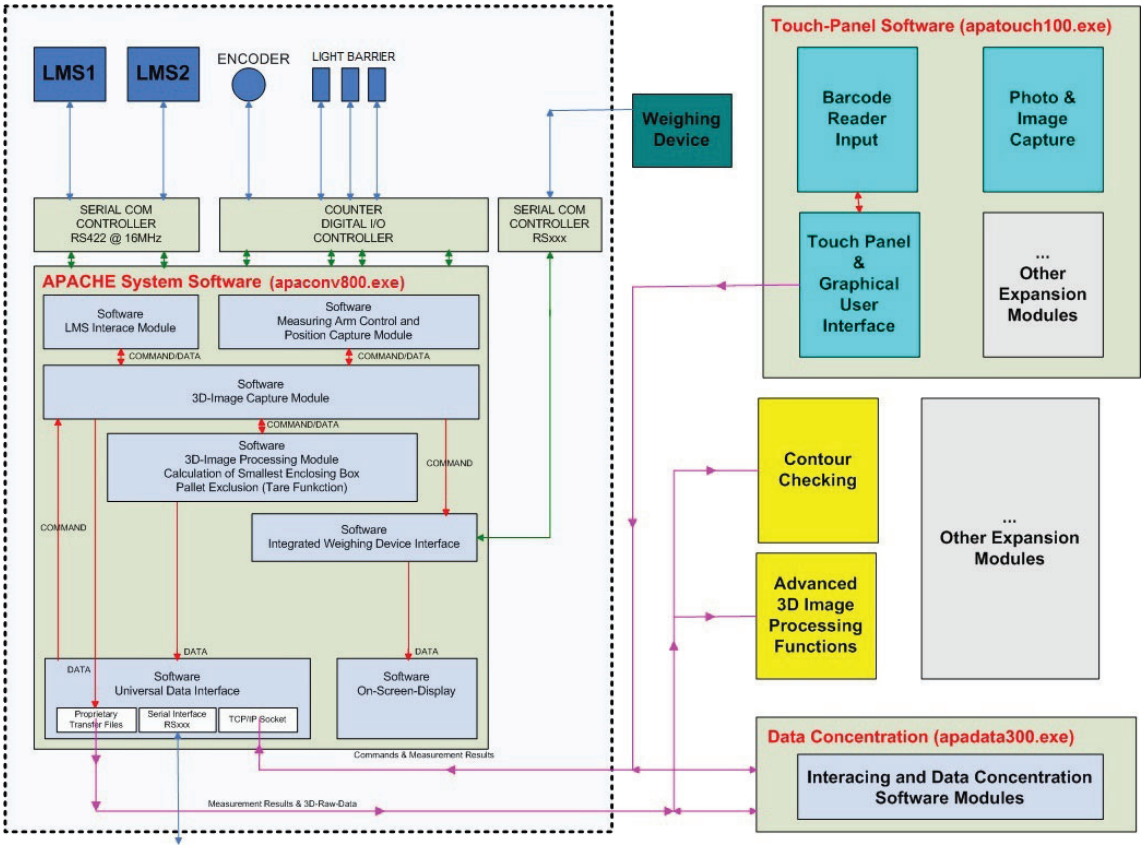
Beyond measuring the dimensions and weight, additional functions can be performed based on the 3D image generated by the measuring device (e.g. checking the contours of air freight etc.). For this reason, the emController is prepared for operation of other applications.

In addition to applications that process 3D measurement data, these are in particular applications for displaying the data interface of processing and non-legal-for-trade IT systems and for outputting illustrated slips that can be used to depict the freight object.

2.2 Block Diagram of the System Software

The following block diagram shows the layout of the system software with associated hardware components.

The dotted box covers the certified and legal-for-trade part of the system software (segregation of software).



2.3 Interfaces

The certified application can only communicate with other applications running on the computer over non-reactive software interfaces that are unidirectional for the respective class.

The measurement is initiated by the following parameters:

- Specification of a package piece ID (e.g. barcode) for storage with the legal-for-trade measurement data in the alibi memory
- Flag “Legal-for-trade measurement (yes/no)”; this information is stored in the alibi memory as an additional field
- Flag “Store 3D image (yes/no)”; If this flag is set, then the 3D image will be stored locally as a file, for interpretation by a contour check
- Specification of the height and weight of loading equipment to be excluded (pallet tare).

Note: A detail description is given in Chapter **8 Interfaces**.

2.3.1 The following communications channels are available

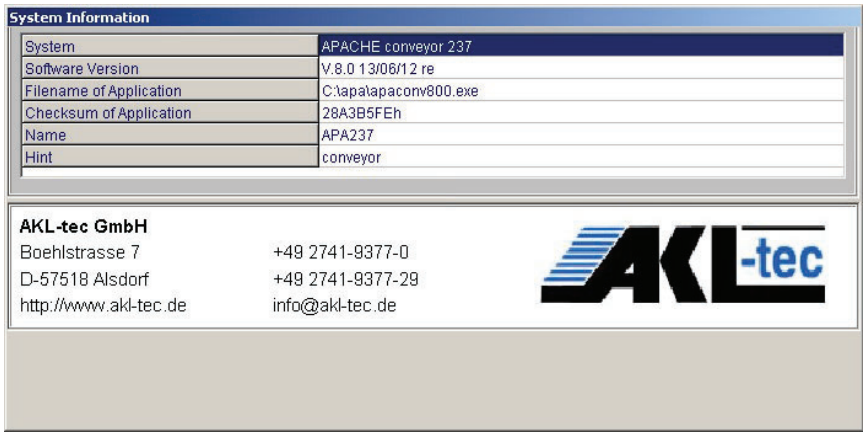
Purpose / Class	Direction (looking from certified application)	Type	Description
Initiation of a measurement	Incoming	Text file	The presence of a specific text file in a special directory on the local hard drive of the system starts the measurement procedure. If more than one file is present, then the youngest file is used. All other files will be deleted. The presence of such a file is also indicated by an event in Windows.
		TCP/IP telegram	The certified application provides a server socket for accepting maximum one TCP/IP client connection.

Purpose / Class	Direction (looking from certified application)	Type	Description
Initiation of a measurement		Serial COM port	The certified application provides a COM port for receiving measured value requests. The transmitting line of the same COM port is used for outputting the measurement data. The telegram structure is the same as the structure of the TCP/IP telegram for initiating the measurement.
Outputting the measurement data	Outgoing	Text file	Once the measurement has been taken, the certified application writes a file (with checksum) that can be read by a processing application. The legal-for-trade data is already stored in the integrated alibi memory of the certified application before output to the file.
		TCP/IP telegram	Once the measurement has been performed, the certified application establishes a TCP/IP socket connection (client; active connection) to a specified TCP/IP server. Once this socket connection has been established, a telegram with all measurement data is sent. The legal-for-trade data is already stored in the integrated alibi memory of the certified application before output to the file.
		Serial COM port	Once the measurement has been performed, a measurement initiated at the COM port is answered by an individual event telegram at this port. The telegram structure is the same as the answer telegram from the TCP/IP connection.
Output of the 3D picture	Outgoing	Text file	Once the measurement has been performed, the measuring system writes a file that describes the complete 3D scene, which will not be further processed, that was previously recorded by the laser measuring system. This file is used for further processing in the non-legal-for-trade area (e.g. contour checking).

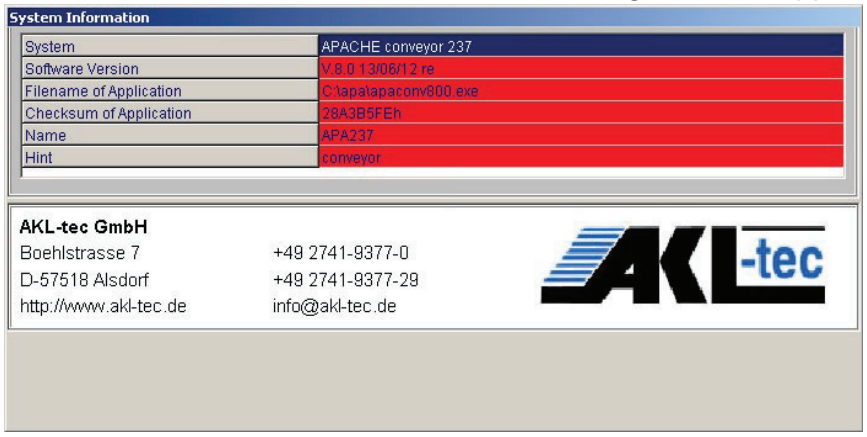
2.4 Security Concept

In order to ensure that only software that has been presented and certified in a type examination is operated, a checksum (**CRC32** with secret generator polynomial) is generated from the certified files to be executed (apa800.exe; apalauncher.exe) and the associated parameter file (paralft7.ini). These checksums can be displayed under the software information of the certified system software application (apa800.exe). The checksums of both applications are stored in tamper-proof form on the dongle when the system is sealed. If the system software detects a mismatch at startup, the software will be suspended.

In addition to the checksum, a **calibration counter** and the time of calibration and checksum (**CRC32** with secret generator polynomial) are stored. This information can also be brought up under the software information. The figure below shows the system software display. The checksum for the software application (.EXE) is determined immediately before the system display is called up.



Note: If the calibration is invalid, then the background will appear in red.



2.5 Security Concept embedded controller

The emController is operated with the operating system Windows 10 IOT.

It is forbidden to install any additional software or to uninstall existing software.

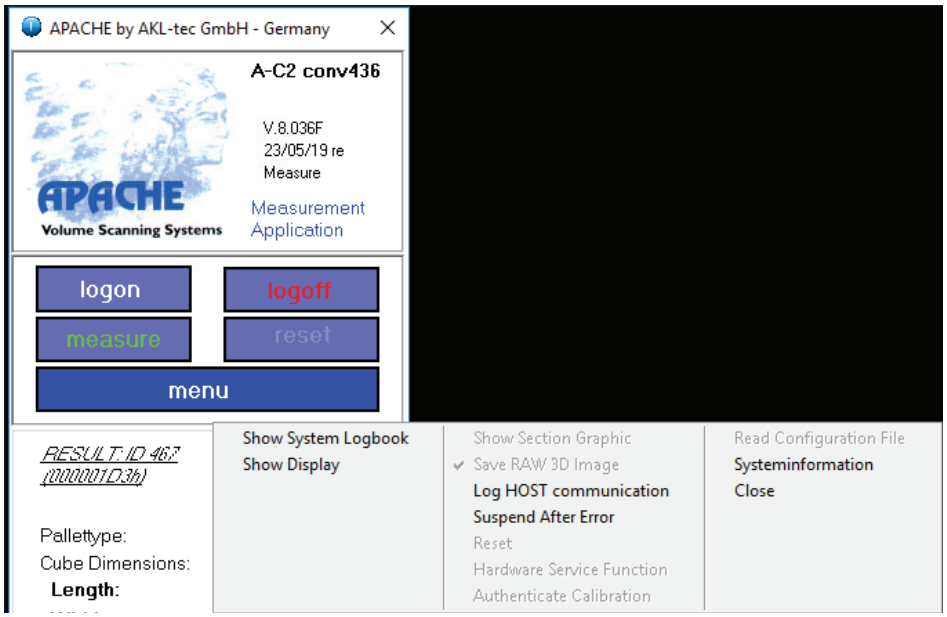
It is important to note that a change to the mode system or adding or removing software, a new calibration has to follow. Are usually also one amendment submitted.

3 Operating the System Software

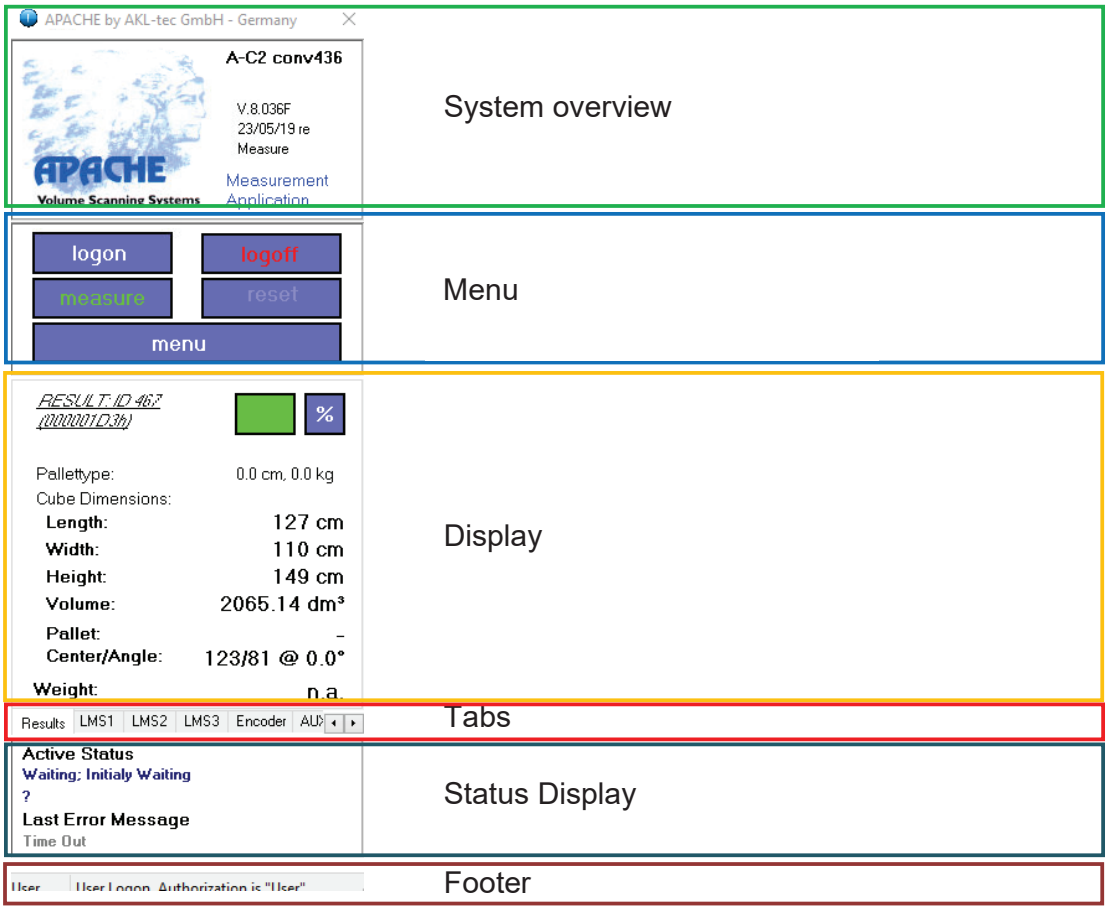
3.1 General Prerequisites

Operation of the system software (certified application) always requires the correct blue dongle belonging to the system to be plugged in
(**see also the note in Caption 7.2).**

Note: A keyboard and mouse are required for operating the system software and for making any changes to the configuration file. The basic functions can also be enabled by touching the buttons on the touch-screen**.**



In the system software, various functions are available to the defined user group. Without first logging on, you can operate the system as described in Chapter 3. However, these functions are limited to delivering information about the current status of the system.
When you touch **[menu]**, the system presents the following options only.
In this case, the system logbook, alibi memory and system information displays can be called up. However, it is not possible to make changes.
Some functions in the system software are only available for certain user groups. The system can be run without log on, but it is not possible to make changes to the system configuration. It is only possible to access system information in this non log on mode.



System overview:

Information about system type, serial number, software version and Date.

Menu:

[logon]: Logon user group

[logoff]: log off user group

[measure]: Start measurement, without popping up of the touch panel mask. User input of mandatory fields is omitted also by clicking this Button. Use only possible if logged on as customer service.

[measure] = system cleared for measurement

[measure] = system prohibited for measurement

[measure] = system in „Fill Fields “-mode.

Measurement process will be started, even if not all mandatory fields are filled. System is on halt after measurement as long as every mandatory field is filled.

[reset]: **system r**eset

[menu]: **Menu of the sytem software**, Seperate description of the menu-subitems in chapter Fehler! Verweisquelle konnte nicht gefunden werden..

Status display:

Display of the tabs.

Tabs:

[Results]:	Display of measurement results
[LMSx]:	Status Display of LMS1, LMS2, LMS3
[Encoder]:	Display of the actually measured speed.
[AUX]:	Display of data received from externally connected devices, such as RFID-reader, barcode scanner, scale etc.
[Interface]:	Status display of the internal interfaces
[I/O]:	Status display of the in**-** and outputs and the service functions
[PLC]	Status Display of PLC

Display:

Active Status: Displays the current status of the APACHE system (processed step in code)

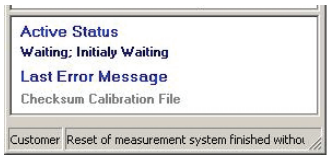
Fehleranzeig zur rechtlich relevanten Softwareüberwachung:

Calibration Parameter valid → **c**alibration parameters are valid.
Calibration Parameter valid → calibration parameters are NOT valid. APACHE System is suspended.

Last Error Massage:

Current error messages (active) are displayed in red colored letters. Active errors have an influence on system state.

The last **error messages (not active) are displayed in grey colored letters**. The display of the last error message is only for information purpose. These errors do not influence System state anymore.



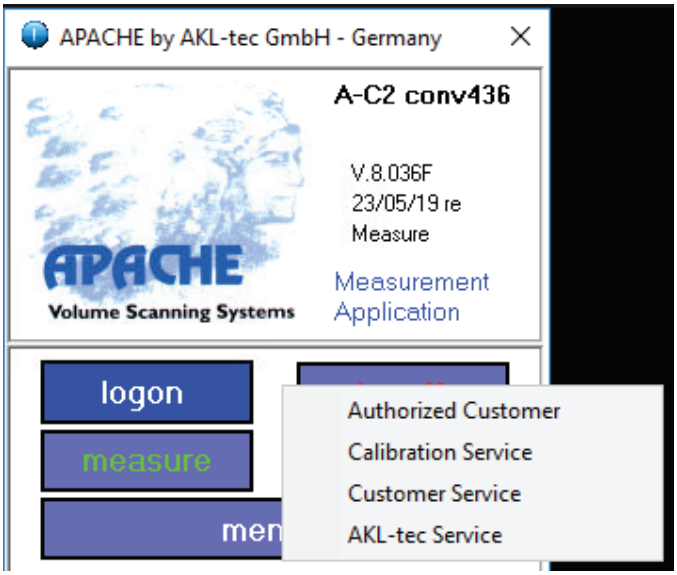
Footer:

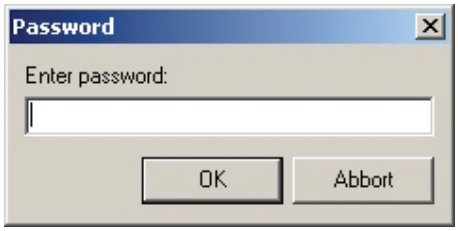
The currently logged on user group is shown in the left column of the footer. On the right-hand side you can get inform about the last performed action.

3.2 Logging on with User Permissions

Touching the [logon] button opens a new window in which you can select the type of user.

Note: The permissions described and assigned here relate only to the enabling of functions in the system software. This logon is not associated with any permission at the operating system level or within other legal and non-legal-for-trade applications. All security mechanisms remain enabled.





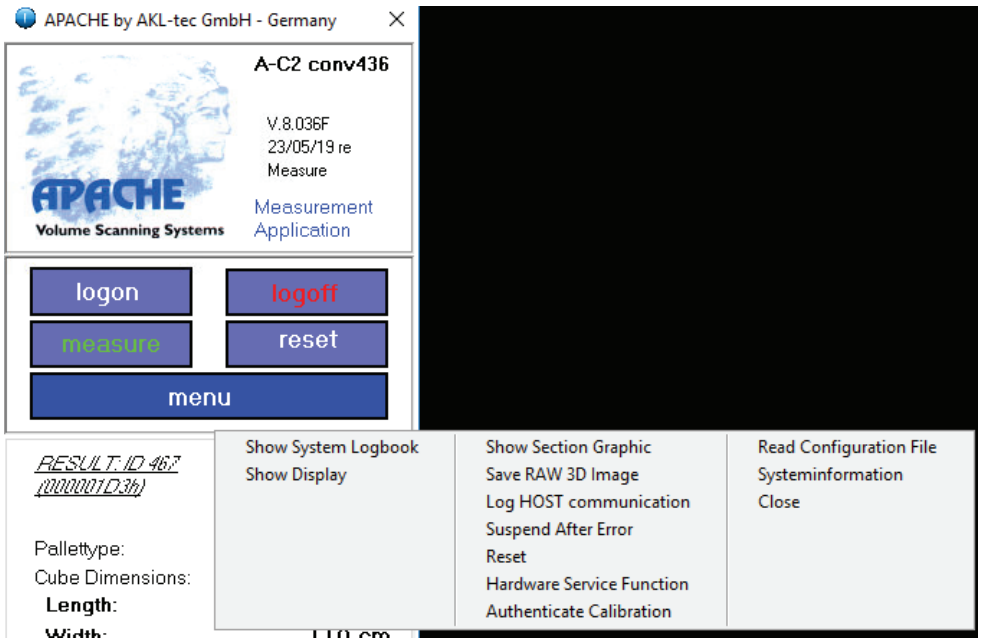
Entering the password with the keyboard.

[Authorized Customer]
You are authorized to perform test functions.

[Calibration Service]
You are granted permission to authenticate the configuration file. This is only possible if the red master key is inserted (double security).

[Customer Service] and **[AKL-tec Service]**
The customer service groups also have permission to authenticate the parameters. Naturally, this group also requires the master key.

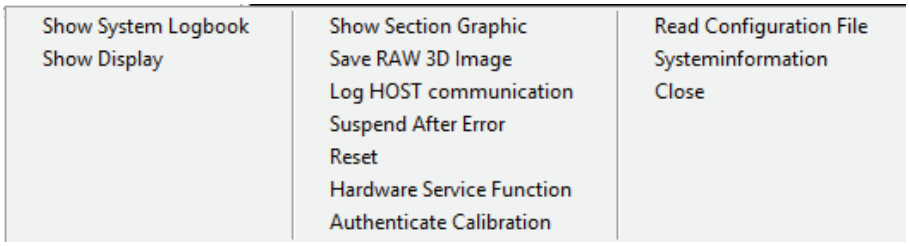
Once successfully logged on with permissions, when you touch **[menu]**, the system presents you with all options.



The blue dongle beside the socket for the master key contains the certification and calibration data. It is labelled with the serial number of the system and must be plugged in for the system software to be operable.

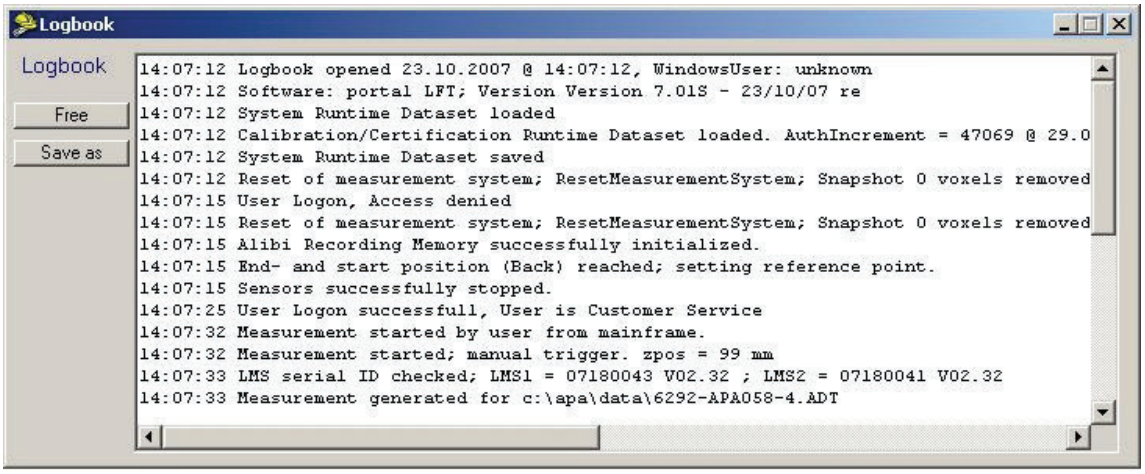
[logoff] All user permissions are disabled in the system software. After logging off, the touch panel software will come back to the foreground **(see Chapter** 3 Operation**).**

3.3 Description of the Enabled Functions



[Show System Logbook]

Opens the logbook for reading.



[Free] Unlocks the logbook, making it free to overwrite.

[Save as] Saves the logbook under a name of choice.

[Show Section Graphic]

Opens the **Show Section Graphic** window. This window is mainly used for the software adjustment of the system. If you are logged on as **Customer Service** you can start measuring by clicking the **[measure]** Button, without the touch panel mask poping up. The display **Show Section Graphic** is NOT updated automatically in this mode. To update this information a user action has to be taken in the window. By clicking the **[calibrate]** button, a panel with certain parameters for the software adjustment will be shown. After making adjustments the changed settings have to be saved manually to „para###.ini“.

[Show Display]

Changes to the user interface.

[Save RAW 3D Image]

This option has a check mark next to it when enabled. The image data are written as raw measurement data to a file with the extension **.C3D**. With this 3D raw data, the image and the alignment can be checked when offline. Files from other applications can also be processed.

[Log Host Communication]

If this option is chosen a check mark is displayed in front. By activating this sub item the communication with the host will be logged in the system log book.

[Suspended After Error]

If activated, the APACHE system is suspended after occurrence of an error. To clear the APACHE system for measuring again, the error has to be acknowledged manually by the operator.

[Reset]

Selecting this initializes the system. Any ongoing measurements will be cancelled.

[Hardware Service Function]

If activating the sub item **Hardware Service Function**, the function of the I/O-tab can be controlled. Activation is shown by a check mark in front of the item.

[Authenticate Calibration]

New or changed parameters must be declared valid using this function. This can only be done when the master key is inserted. If it is not present, then the changes will not be applied, and the following message will appear in the bottom part of the measurement results display.

[Read Configuration File]

After choosing this sub item, parameter files are read again into the system software.

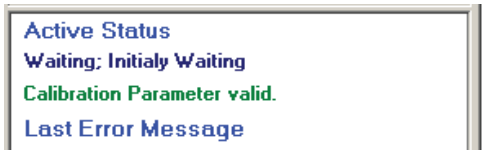
[System information]

Shows information regarding the APACHE system, such as serial number, software version, checksum and the calibration counter. If the software recognizes a checksum mismatch, the system will be suspended.

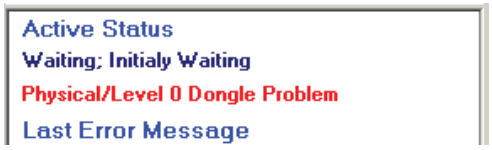
[Close]

Shuts down the system software. If no user group is logged on, the embedded pc is shut down also.

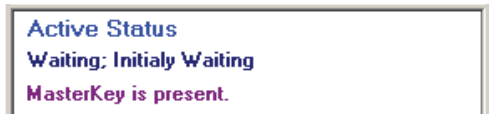
Display “Calibration parameter valid”, measurement is allowed



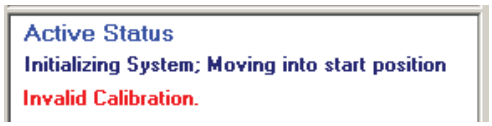
Display “Dongle with calibration data missing”



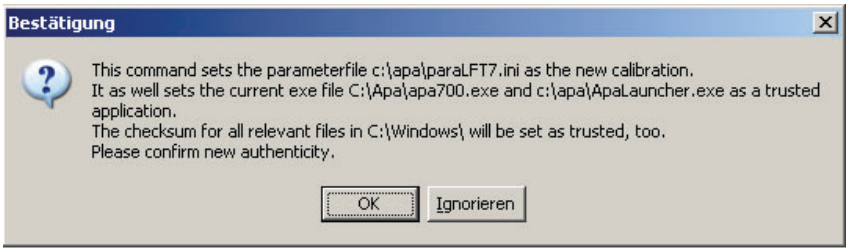
Display “Master key is present”



Display “Invalid calibration”



Upon authentication, you are advised that this action will declare the parameterization as well as the relevant applications and the list of files in %SystemRoot% as trusted.

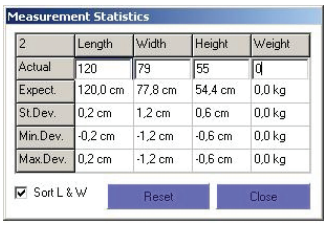


The displayed checksums must be compared with the checksums of the type approval.

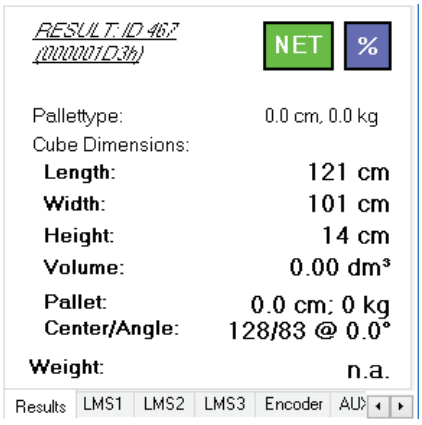
3.4 Status Display

3.4.1 Tab [Results]

Selecting the soft button % opens another window for input of actual values.



Here, you can enter the actual length, width, height and weight into the row **Actual**. The value shown above Actual (in this example "**2**") indicates the number of measurements. The **difference** resulting from the measurements is given in the bottom rows as the minimum and maximum difference (**Min.Dev**/**Max.Dev**), the standard deviation (**St.Dev**) and the expected value (**Expect.**) for the measurement.
This display is helpful for calibrating the measuring system.



With the button NET you can switch between gross and net values. The button is labeled with **NET, if net values are shown**.

All green marked values below Cube Dimensions, values for volume and weight show net values after activating net button.

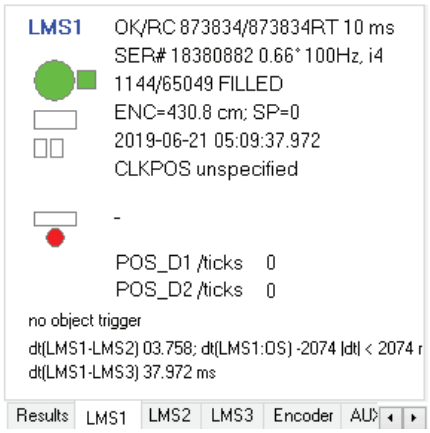
Pallettype: Shows the palette type.

Cube Dimensions:	Shows the volume of the cube volume with space.
Length, Width, Height:	Shows the measured length, width and height
Volume:	Shows the volume of the cube volume with space.
Pallet:	Shows if and what kind of palette was masked
Center/Angle:	Shows the centre and angle of the object

3.4.2 Tab [LMS1]

Status display for LMS1

OK/RC 1232981/1232981: Amount of the valid data packages / amount of the overall received data packages



RT # ms: Time between 2 valid data packages

SER#: Serial number of LMS1

0,66°: Angle resolution of LMS1/2 depending on the operating mode

100Hz: Scan frequency of LMS1

i4: LMS1 operating mode,
i4 = Displayed angle resolution divided by four is the real resolution

1144/65049 FILLED: Scan-ID of every single measurement received from LMS1, followed by FILLED, LOCKED or „empty“:

FILLED:	ring buffer is full
LOCKED:	ring buffer is full at the start of measurement
„empty“:	ring buffer is empty

Measurement data is saved to the ring buffer continuously. At the begin of the measurement process the ring buffer is closed and at its end the data is written at the beginning of the ring buffer.

ENC= 622,3 cm: Encoder value in cm, at start of measurement.

SP=0: speed of the measuring arm, Impulses per second.

2019-06-21 05:09:37.972: Current Date and time, internal system time and date received via TCP/IP of LMS1 YYYY-MM-DD hh:mm:ss.

CLKPOS: Calculated value for the position of the measuring arm in [cm], calculation based on internal time

POS_D1/ticks 0: Measured position of the initiator "Stop back”

POS_D2/ticks 0: Measured position of the initiator "Ref”

dt(LMS1-LMS2): Time difference of the internal clock of LMS1and the internal clock of the LMS2

dt(LMS1-LMS3): Time difference of the internal clock of LMS1and the internal clock of the embedded Controller.

- LMS not available
- Connected to LMS, no data is received.
- Connected to LMS, data is received.
- Connected to LMS, Caution: dirt warning
- Connected to LMS, LMS trigger-field touched => end of measurement

- Status, serial connection to LMS1 failed.
- Status, serial connection to LMS1 is up
- Status Encoder, Encoder not referenced.

- Status Digital input DI1 (Initiator „Stop back“) and DI2 (Initiator „Reference“) of LMS1.
  Input signal DI1 = 0
  Input signal DI2 = 0
- Status Digital input DI1 (Initiator „Stop back“) and DI2 (Initiator „Reference“) of LMS1.
  Input signal DI1 = 1
  Input signal DI2 = 0

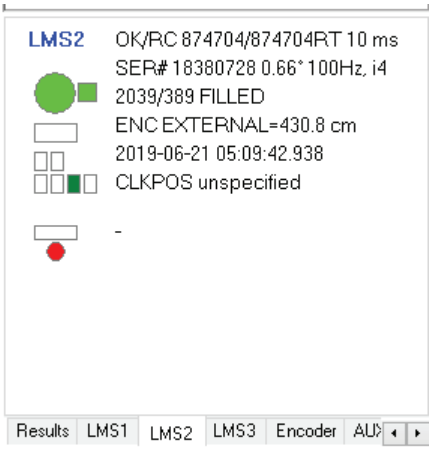
- Status, wait for heartbeat signal from LMS1.
- Status, receiving Heartbeat Signal from LMS1
- Status, heartbeat signal from LMS1 break.

3.4.3 Tab [LMS2]

Status display for LMS2

OK/RC 12484969/1248496: Amount of the valid data packages / amount of the overall received data packages

RT 15 ms: Time between 2 valid data packages



SER#: Serial number of LMS2

0,66°: Angle resolution of LMS1/2 depending on the operating mode

100Hz: Scan frequency of LMS2

i4: LMS1 operating mode,
i4 = Displayed angle resolution divided by four is the real resolution

11211/11154 FILLED:

Scan-ID of every single measurement received from LMS1, followed by FILLED, LOCKED or „empty “:

FILLED:	ring buffer is full
LOCKED:	ring buffer is full at the start of measurement
„empty “:	ring buffer is empty

Measurement data is saved to the ring buffer continuously. At the beginning of the measurement process the ring buffer is closed and at its end the data is written at the beginning of the ring buffer.

ENC= 0,0 cm: Encoder value in cm, at start of measurement.

2019-06-21 05:09:42.938: Current Date and time, internal system time and date received via TCP/IP of LMS2 YYYY-MM-DD hh:mm:ss.

CLKPOS: Calculated value for the position of the measuring arm in [cm], calculation based on internal time

- LMS not available
- Connected to LMS, no data is received.
- Connected to LMS, data is received.
- Connected to LMS, Caution: dirt warning
- Connected to LMS, LMS trigger-field touched => end of measurement


Status rotary encoder, no signals being received from encoder.


Status rotary encoder, signals being received from encoder.


Status rotary encoder, encoder no reference value

.


Status digital input DI1 („Stop front“) und DI2 (free) of LMS2. Input signal DI1 = „Stop front“ = 0 = reached input signal DI2 = free


Status digital input DI1 („Stop front“) und DI2 (frei) of LMS2. Input signal DI1 = „Stop front“ = = 1 = free, input signal DI2 = free


Status digital output DO1, DO2, DO3 und DO4 vom LMS2
digital output DO1 =signal lamp RED = 0
digital output DO2 = signal lamp YELLOW = 0
digital output DO3 = signal lamp GREEN = 0
digital output DO4 = acoustic signal = 0


Status digital output DO1, DO2, DO3 und DO4 vom LMS2
digital output DO1 =signal lamp RED = 1
digital output DO2 = signal lamp YELLOW = 1
digital output DO3 = signal lamp GREEN = 1
digital output DO4 = acoustic signal = 1

Status, serial connection to LMS2 failed.

Status, serial connection to LMS2 is up

Status, wait for heartbeat signal from LMS1.

Status, receiving Heartbeat Signal from LMS1

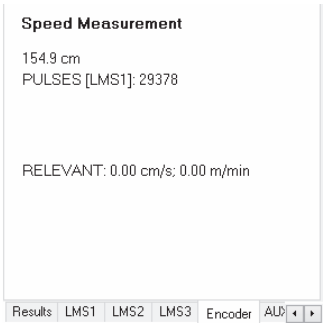
Status, heartbeat signal from LMS1 break.

3.4.4 Tab [LMS3]

Not used

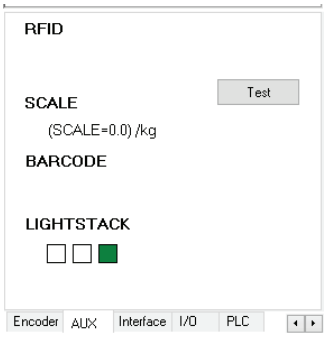
3.4.5 Tab [Encoder]

By clicking on the [encoder] tab the measured speed [cm/second] is shown.



3.4.6 Tab [AUX]

By clicking on the **[AUX]** tab information about the send data by the external devices is shown.



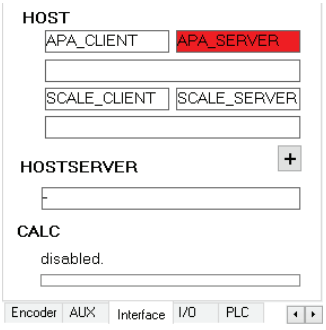
RFID: Shows the latest data sent by the connected RFID- reader.

SCALE: Shows the latest data send by the connected scale.

BARCODE: Not used

LIGHTSTACK: Not used.

3.4.7 Tab [Interface]



Host:
Shows the status of the external interfaces

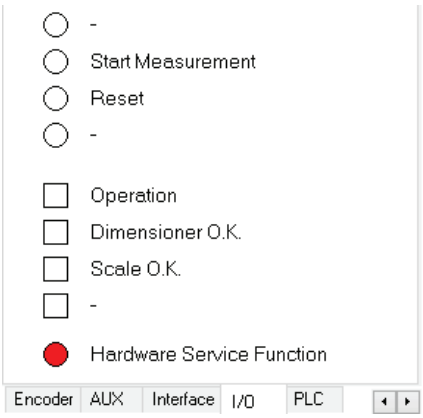
Hostserver:
Shows the status of the host-interface and the port number.

CALC: Not used

3.4.8 Tab [I/O]

Shows the status of the in- and outputs and sub items of the service functions. The [I/O] tab shows the status of some different signals. You have to be logged on a user group to access the control functions. Additionally in the [menu] Hardware Service Function must be checked. Active **Hardware Service Function** is shown in the [menu] with the check mark and with a LED located in the last column on the **[I/O] tab.**

The Hardware Service Function has to be deactivated manually. It will NOT be automatically deactivated if leaving the tab.



Start Measurement:
Status of the external signal for starting measurement
● Signal = high / ○ Signal = low

Reset: Status of the external reset signal
● Signal = high / ○ Signal = low

Operation: Not used

Dimensioner OK: Status of Dimensioner

Scale OK: Status of Scale

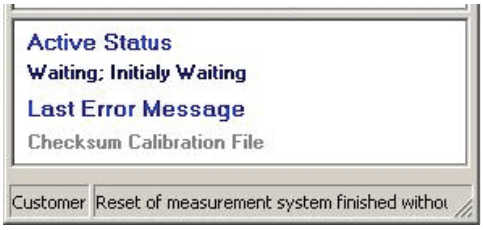
Hardware Service Funktion: Not Used

3.4.9 Status and Error Messages

In the bottom part of the measurement results or status display, the active status and last or current error are shown.

A current error message is shown in red.

A corrected or no longer applicable error appears in grey.

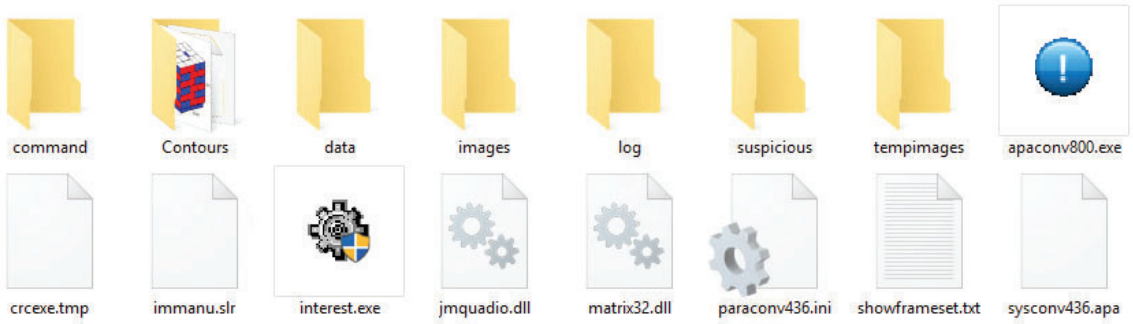


3.5 The APACHE File System

The following chapter describes the files on the embedded controller on the APACHE system. The embedded controller has a SSD media as the drive C:.

3.5.1 APACHE conveyor Drive C:

The following files are in the directory C:\Apa\ on the SSD media.



Application “apaconv800.exe”

This is where the system software of APACHE is located (certified application).

Configuration File „paraconvxxx.ini“

The parameter file of the system software. This file contains the parameters regarding equipment calibration and geometry. Created in the system software checksum for the calibration relates to view this file.

System file “immanu.slr”

Internal system file with the vendor’s logo for displaying in the system software (apaconv800).

Library „matrix32.dll“

The handling function for the technology used dongle.

Folder “Data”

Storage path for measurement data.

Folder “Images”

Path where image files are stored.

Folder “Log”

Path where logbooks are stored.

Folder „TempImages“

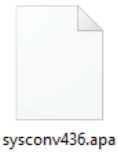
The directory is used to store temporary images (3D images and grayscale images) that are generated by the system software for further processing in the touch panel software. Storage of 3D image files. This function is only effective if **Save 3D-RAW Images** is enabled in the function selection, or if the corresponding flag has been set in the command.

Application “interest.exe”

The diagnostics tool for the serial interfaces and TCP sockets.

System file “sysconvxxx.apa”

The system deposit for storing counters and errors from the system software (apaconv800).



Folder „Contours“

The files for the manual palette selection are stored in this folder. The pictograms for the different palettes are stored as bmp files. The parameter file for the pallet type is saved as an ini file. The names of the two files must be identical.

Pictogram file „*Pallet-Typ XY*“

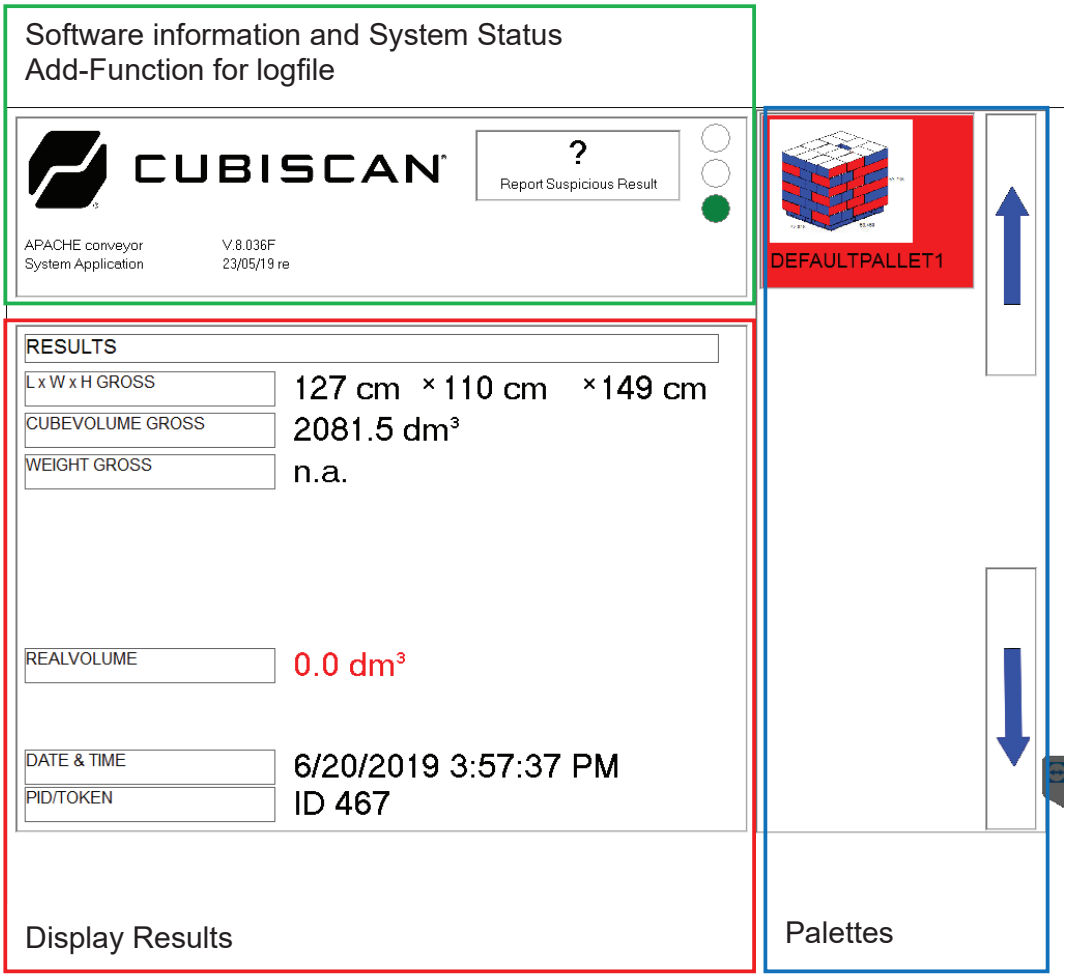
The specified icon is used for the palette type in the user interface.

Parameter file „*Pallet-Typ XY*“

Parameter file for the specified pallet type. The geometry data of the pallet and the maximum protrusions are specified here.

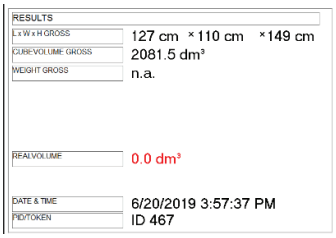
3 Operating the User interface

The palette type must be selected in the user interface. Only then can the system correctly interpret the overhang limits and issue the corresponding messages.



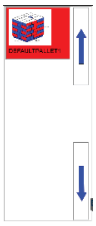
Display Result:

1. Display of measured gross values
2. Display gross Cube volume
3. Gross Weight is not used
4. Real Volume is not used
5. Display of the timestamp for the measurement
6. Display internal ID Number



Pallets:

1. Selection field for the pallet type



System information:

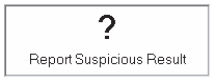
1. Viewing the software version

System Status:

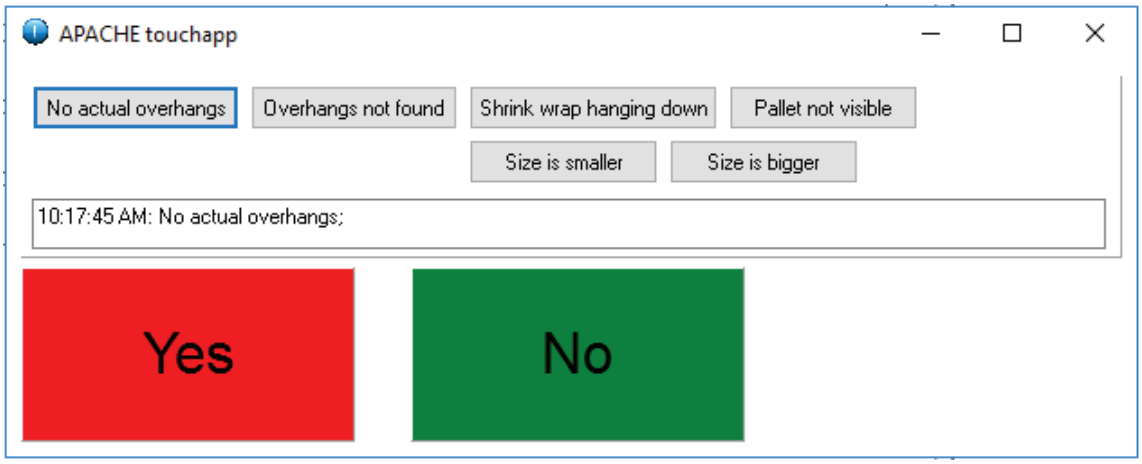
1. Green LED -> System ready, waiting
2. Yellow LED -> System is calculating
3. Red LED -> System in measuring process

Add-Function for logfile:

One klick of the button **[Report Suspicious Result]**
Opened a new window:



Here you can select a comment for the last measurement and save it in the logfile.



4 Care and Maintenance

4.1 Cleaning the Laser Probes

The laser probes can be periodically cleaned by the user, and should be done at **3 month** intervals. If they become contaminated more frequently (e.g. due to the environment), the maintenance intervals should be shorter.

LMS 1 or LMS2

Dirty
probe visor

Recommended materials
The probe visors (LMS1 and LMS2) should be carefully cleaned using a **dry** microfiber cloth.

4.2 Cleaning the mirrors

The mirrors can be periodically cleaned by the user, and should be done at **1 month** intervals. If they become contaminated more frequently (e.g. due to the environment), the maintenance intervals should be shorter.

Recommended materials
The mirrors should be carefully cleaned using a **dry** microfiber cloth.

4.3 Maintaining the Computer System

Note: All of the following maintenance work can only be performed by the supplier. For maintenance purposes once a measuring system is successfully installed, the customer can enter a service agreement with AKL-tec, in which the service and monitoring intervals and arising costs are specified.
In the scope of preventative maintenance, the hard drives and laser diodes of the probes can be exchanged. All components used are standard components with worldwide assurance of short delivery times in the event of system downtime/faults.

Stored data and the operating system must undergo regular system maintenance. A regular checkup of the computer system allows early recognition of possible causes of faults.

5 Error Messages

Every possible error message is described below in decimal or hexadecimal order:

Error text (followed by the decimal and hexadecimal code)
Interpretation of the error text
The *cause of the error* with suggestions for possible solutions

Time Out (1d), (01h)
Runtime exceeded
Cause of error: – Axis is mechanically blocked
– Inverter faulty

Checksum Calibration File (2d), (02h)
Checksum of the parameter file
Cause of error: – Invalid parameterization
Safety mechanism of parameters and calibration

File size Calibration File (3d), (03h)
Wrong size of calibration file
Cause of error: – Calibration file has been modified
Safety mechanism of parameters and calibration

Exception in Volume Processing (4d), (04h)
Unhandled software error while calculating volume
Cause of error: – Software error
– Inform vendor and add to logbook

Angle Resolution LMS1 not at 1/4 deg (5d), (05h)
Incorrect angle resolution on probe LMS1
Cause of error: – LMS1 improperly configured
– Order customer service to configure LMS

Angle Resolution LMS2 not at 1/4 deg (6d), (06h)
Incorrect angle resolution on probe LMS2
Cause of error: – LMS2 improperly configured
– Order customer service to configure LMS

Improper Serial ID LMS1 (7d), (07h)

Serial number of probe LMS1 does not match parameter

Cause of error: – Incorrect parameter Serial ID LMS1
Safety mechanism of parameters and calibration

Improper Serial ID LMS2 (8d), (08h)

Serial number of probe LMS2 does not match parameter

Cause of error: – Incorrect parameter Serial ID LMS2
Safety mechanism of parameters and calibration

Too many empty scans LMS1 (9d), (09h)

Too many empty scans from probe LMS1

Cause of error: – Dirty sensor
– Rotary encoder resolution incorrect

Too many invalid scans LMS1 (10d), (0Ah)

Too many invalid scans from probe LMS1

Cause of error: – Dirty sensor
– Sensor fault
– Glare from outside light source
– Faulty communications line
– Clean probe (see Chapter 4 Care and Maintenance)

Too many empty scans LMS2 (11d), (0Bh)

Too many empty scans from probe LMS2

Cause of error: – Dirty sensor
– Rotary encoder resolution incorrect

Too many invalid scans LMS2 (12d), (0Ch)

Too many invalid scans from probe LMS2

Cause of error: – Dirty sensor
– Sensor fault
– Glare from outside light source
– Faulty communications line
– Clean probe (see Chapter 4 Care and Maintenance)

Head counter value too low LMS1 (13d), (0Dh)

Not enough sections received from LMS1

Cause of error: – Dirty sensor
– Irregular speed of arm drive
– Faulty communications line

Head counter value too low LMS2 (14d), (0Eh)

Not enough sections received from LMS2

Cause of error: – Dirty sensor
– Irregular speed of arm drive
– Faulty communications line

Error in Parameter File (15d), (0Fh)

Error in parameter file

Cause of error: – Syntax error in parameter file
– More detailed information in system logbook

Error in BCC (Block Check Character) (16d), (10h)

Transmission error recognized from check character

Cause of error: – Check character error
– Inform vendor

Scale Module - No plausible data received (17d), (11h)

No valid weight value received from scales

Cause of error: – Scales connected?
– Scales switched on?
– Scales display OK?
– Connection line OK?

Error in Protocol Scale Module, Unexpected Character (18d), (12h)

Unexpected character from connected scales

Cause of error: – Faulty telegram and type setting of scales.
– Check telegram and type setting

Error in Protocol Scale Module, Redundancy Check (19d), (13h)

Telegram check from scales finds error

Cause of error: – Faulty telegram and type setting of scales.
– Check telegram and type setting

TCP/IP connection failed (20d), (14h)

Connection error in TCP socket

Cause of error: – Error in the TCP socket connection
– Check TCP socket connection

TCP/IP: General Unknown Error Message (21d), (15h)

Connection error in TCP socket

Cause of error: – Error in the TCP socket connection
– Check TCP socket connection

TCP/IP: Send Error (22d), (16h)

Send error in TCP socket

Cause of error: – Error in the TCP socket connection;
– Client disconnects too quickly
– Check TCP socket connection

TCP/IP: Receive Error (23d), (17h)

Receive error in TCP socket

Cause of error: – Error in the TCP socket connection
– Client disconnects too quickly
– Check TCP socket connection

TCP/IP: Connect; Error while connecting (24d), (18h)

Connection error in TCP socket

Cause of error: – Error in the TCP socket connection
– Check TCP socket connection

TCP/IP: Disconnect; Error while disconnecting (25d), (16h)

Connection error in TCP socket

Cause of error: – Error in the TCP socket connection
– Check TCP socket connection

TCP/IP: Accept; Error while accepting connection (26d), (1Ah)

Connection error in TCP socket

Cause of error: – Error in the TCP socket connection
– Check TCP socket connection

Error during Comport Initialisation LMS 1 (27d), (1Bh)

COM port for LMS 1 not ready

Cause of error: – Incorrect settings of COM port LMS 1
– Incorrect COM number in configuration file
– Incorrect COM number in device manager

Error during Comport Initialisation LMS 2 (28d), (1Ch)

COM port for LMS 2 not ready

Cause of error: – Incorrect settings of COM port LMS 2
– Incorrect COM number in configuration file
– Incorrect COM number in device manager

Error during Comport Initialisation Scale Portal (29d), (1Dh)

COM port for the scales not ready

Cause of error: – Incorrect settings of COM port on the scales
– Incorrect COM number in configuration file
– Incorrect COM number in device manager

Error during Comport Initialisation Barcode Reader (30d), (1Eh)

COM port for the barcode scanner not ready

Cause of error:
– Incorrect settings of COM port for the barcode scanner
– Incorrect COM number in configuration file
– Incorrect COM number in device manager

Error Init APCI1710 (31d), (1Fh)

Initialization error in counter card

Cause of error:
– Driver not properly installed
– PCI card not properly inserted in slot
– Faulty card

Error Init Pulse Counter on APCI1710 (32d), (20h)

Initialization error in counter card

Cause of error:
– Driver not properly installed
– Modules in FPGA of the counter card badly loaded
– PCI card not properly inserted in slot
– Faulty card

Error Init Reference on APCI1710 (33d), (21h)

Initialization error in counter card

Cause of error:
– Driver not properly installed
– Modules in FPGA of the counter card badly loaded
– PCI card not properly inserted in slot
– Faulty card

Error Init External Strobe on APCI1710 (34d), (22h)

Initialization error in counter card

Cause of error:
– Driver not properly installed
– Modules in FPGA of the counter card badly loaded
– PCI card not properly inserted in slot
– Faulty card

Error Init DIO on APCI1710 (35d), (23h)

Cause of error:
– Initialization error in counter card
– Modules in FPGA of the counter card badly loaded
– Driver not properly installed
– PCI card not properly inserted in slot
– Faulty card

Error closing APCI1710 (36d), (24h)

Error when disconnecting the counter card

Cause of error:
– Driver conflict

Error cyclic requesting hardware (37d), (25h)
Error upon cyclic requests from periphery (counter and digital inputs/outputs)
Cause of error: – Driver conflict

Cyclic Latch Register Request (38d), (26h)
Error reading the latch register
Cause of error: – Driver conflict

Dirty head LMS 1 (39d), (27h)
Probe LMS 1 dirty
Cause of error: – Error due to contamination
– Clean probe (see Chapter 4 Care and Maintenance)

Dirty head LMS 2 (40d), (28h)
Probe LMS 2 dirty
Cause of error: – Error due to contamination
– Clean probe (see Chapter 4 Care and Maintenance)

Interface/Host no response! (41d), (29h)
No response from superior computer or superior software;
Cause of error: – Interfaces for HOST interface wrongly set
– Software not started
– Connection error

Weighing device "Gross indicator" not plausible (42d), (2Ah)
The gross indicator in the telegram from scales is not plausible
Cause of error: – Error in telegram from scales
– Check the settings for analyzing the telegram from the scales

Weighing device "no decimals" (43d), (2Bh)
No decimal separator in telegram from scales
Cause of error: – Decimal separator is missing
– Check the settings for analyzing the telegram from the scales

Weighing device, unit not plausible (44d), (2Ch)
Implausible unit in telegram from scales
Cause of error: – Units not clearly defined
– Check the settings for analyzing the telegram from the scales

Weighing device or indicator not ready (45d), (2Dh)

Scales display not ready

Cause of error: – Check the settings for analyzing the telegram from the scales

Weighing device "implausible Alibi-ID" (46d), (2Eh)

The alibi-ID from the scales display is not plausible or does not exist

Cause of error: – Faulty settings
– Check the settings for analyzing the telegram from the scales

Weighing device "weight value is negative" (47d), (2Fh)

Negative weight value

Cause of error: – Excluded pallet actually weighed by the scales does not weigh as much as the stored value
– Scales not properly tared (zeroed)

Weighing device "confusing decimal separators" (48h), (30d)

Multiple decimal separators stored in a value from the scales

Cause of error: – Faulty settings
– Check the settings for analyzing the telegram from the scales

Weighing device "serial ID not plausible" (49d), (31h)

Serial number of the scales is not plausible

Cause of error: – Wrong serial number
– Check the settings for analyzing the telegram from the scales

Weighing device "serial ID mismatched" (50d), (32h)

Serial number of scales does not match the parameter

Cause of error: – Setting or parameter incorrect
– Check the settings for analyzing the telegram from the scales
– Check parameters for the serial number of the scales

Socket for APCI1710 plugged incorrectly (51d), (33h)

APCI1710 plug improperly plugged

Cause of error: – The 50-pin plug for controlling the measuring arm is improperly plugged
– Check the plug on the PC
– Check the card
– Check for breaks in plug

Error object exceeds border (too large) (59d, (3Bh)

The measured object extends beyond the measurement area

Cause of error: – Error message during operation
– Position measured object correctly

Error object exceeds maximum height (too tall) (60d), (3Ch)

Measured object is too tall

Cause of error: – Measured object is too tall
– Shorten measured object
– Break object up into multiple objects

Error while generating Exe-Checksum (62d), (3Eh)

Error while generating the checksum for the executable file

Cause of error: – The system was denied access to its own executable file for generating the checksum.

6 Technical Data

The technical data specified here relates to the automatic pallet characteristic measurement system APACHE conveyor contour 2100-AKL:

Common technical data:

APACHE conveyor contour 2100-AKL

Dimensions	The dimensions of an APACHE conveyor system depend on the chosen substructure (attached to ceiling / wall, freestanding).
Measuring area	Width x Height: 63 in x 80 in The maximum measuring area is determined by the travel length of the measuring beam.
Measuring length	70 in
Speed of movement	96 ft/min
Method of measurement	Two infrared scanners (fan scanners) are driven on two linear guides over the freight and load carrier to be measured. During the movement, which is detected by a encoder on the drive, is the scanning gapless.
Measurement uncertainty (MPE)	Length, width of the smallest enclosing cuboid (covering box) 1 cm
	Height of the smallest enclosing cuboid 1 cm
Exclusions	Measurement of non-transparent, i.e. opaque, objects only. Measurement of dimensionally stable objects only.
Protrusion	Protrusions on the object smaller than 4 cm in length and width, or 1 cm in height are ignored when measuring the smallest enclosing cuboid.
Controller (IPC)	Processing Unit APACHE conveyor contour 2100-AKL with Windows 10 IOT ®

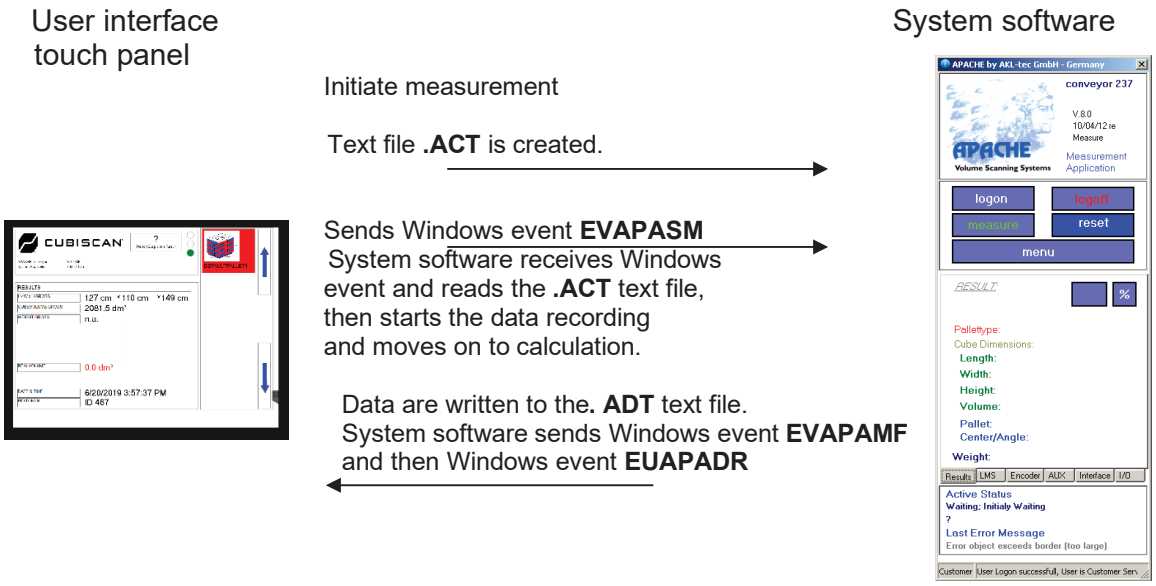
Communication	TCP/IP Ethernet 10/100 over RJ45 plug, RS232 / RS422 over D-SUB plug.
Operating panel	Touch panel as user input interface for secondary data. Visualization of measurement results and images.
Power connection APACHE conveyor	115 VAC, 7A in terminal compartment; access through switch cabinet socket Standard: Over protective circuit interrupter
IT connection	10/100 Mbit/s Standard: 2 x RJ45 sockets on computer Alternative: Patch socket in switch cabinet Alternative: RJ45 socket (CAT.5) in the side wall Alternative: WLAN 802.11a-g
Controller	Intel CoreDuo with 1.66 GHz 1024 MB DDR2 SO-DIMM >80 GB 2.5“ SSD hard disk 24 V_{DC} power supply 2 x 10/100 Mbit/s Ethernet 2 x USB 2.0 2 x USB for KB and Mouse 1 x RS232
Operating conditions	**Operating temperature:** 0˚ C to +40˚ C (+32˚ F to +104˚ F) **Humidity:** maximum 85% non-condensing
MTBF	Mean time between failures of the laser probes is 40,000 h according to the manufacturer’s specifications. The service life of the laser diode has been taken into account in this value
Measuring resistance	As measuring resistance of the system under normal conditions two (2) years will be accepted.
Standards	DIN EN 292 *Sicherheit von Maschinen, Geräten und Anlagen* DIN EN 60204.1 *Elektrische Ausrüstung für Industriemaschinen*

7 Description of the Interfaces

This chapter describes the flow of information between the interfaces during initiation of a measurement and upon output of the measured data.

7.1 Communication Scheme for the Text Files

The following diagram demonstrates the communication between the certified software and the non-legal-for-trade software.



Interpreting EVAPASM, EVAPAMF and EVAPADR:

EV = Event
APA = APACHE
SM = Start Measuring
MF = Measuring Finished
DR = Data Ready

7.1.1 Interpreting the Generated Data

After initialization of a measurement, two text files are generated. The text file with the extension **.ACT** is generated after initialization and contains query information such as time of query, information on the measurement and how to handle a pallet.

The output file has the extension **.ADT** and contains the data from the measurement.

7.1.1.1 Example of an .ACT File (Command)

```
*COMMAND*
[HEADER.GENERAL]
NAME  “c:\apa\command\filename.ACT”          Filename
TIMESTAMP  2013-11-25  12:10:09             Timestamp of query
IDENTIFIER  “12345678901234567890”  }        Information on allocation
REQUESTHANDLE  0

GAUGE LARGE                                  Range LARGE or SMALL
SAVERAW    YES/NO
LEGAL      YES/NO
[HEADER.MASKPALLET]
PALID 0
PAL_TOTALHEIGHT  0.0 cm
PAL_WOODHEIGHT  0.0 cm                       Pallet to be excluded
PAL_WEIGHT  0.0 kg
PAL_NAME
PAL_SHORTNAME
```

7.1.1.2 Example of an .ADT File (Result)

```
*RESULT*
[HEADER.GENERAL]
NAME  "c:\apa\data\filename.ADT"
TIMESTAMP  "2013-11-25  12:10:09"
IDENTIFIER  "12345678901234567890"
REQUESTHANDLE  0
ALIBIID "AP1234"
[HEADER.INFO]
VERSION "MEASURE_APALFT1.0"
SYSTEMNAME "APACHE conveyor"
SOFTWARE "VERSION 8.01s, 08/11/13 re"
LEGAL "YES"
WARNINGPATTERN  "0000"
SCANS  "641/622"
EMPTY  "0/0"
INVAL  "0/0"
ZPOS  "9.9  …  266.3"
MAV;EDGE "0/0"
[HEADER .DIMGROSS]
L_GROSS    79.5 cm
W_GROSS   54.5 cm
H_GROSS    60.3 cm
VOL_CUBE_GROSS  261.26 dm³
ANGLE_GROSS   0.2 °
CENTERX_GROSS   104.0
CENTERZ_GROSS    121.0
VOL_REAL_GROSS    249.20 dm³
WEIGHT_GROSS  n.a.
[HEADER.MASKPALLET]
PALID  0
PAL_TOTALHEIGHT   0.0 cm
PAL_WOODHEIGHT  0.0 cm
PAL_WEIGHT
PAL_NAME
PAL_SHORTNAME
[SECURITY]
CHECKSUM   0123456AF
```

Filename
Timestamp of measurement
Information on allocation of the measurement.
System version
System name
Software version
YES/NO result legal
Additional information *) for the measurement
Measured results *)
n.a. = not applicable; if no scales connected.
Pallet information
Measurement record checksum*)

*) Values shown here are only examples of possible data

7.2 Communication Scheme of the HOST Interface

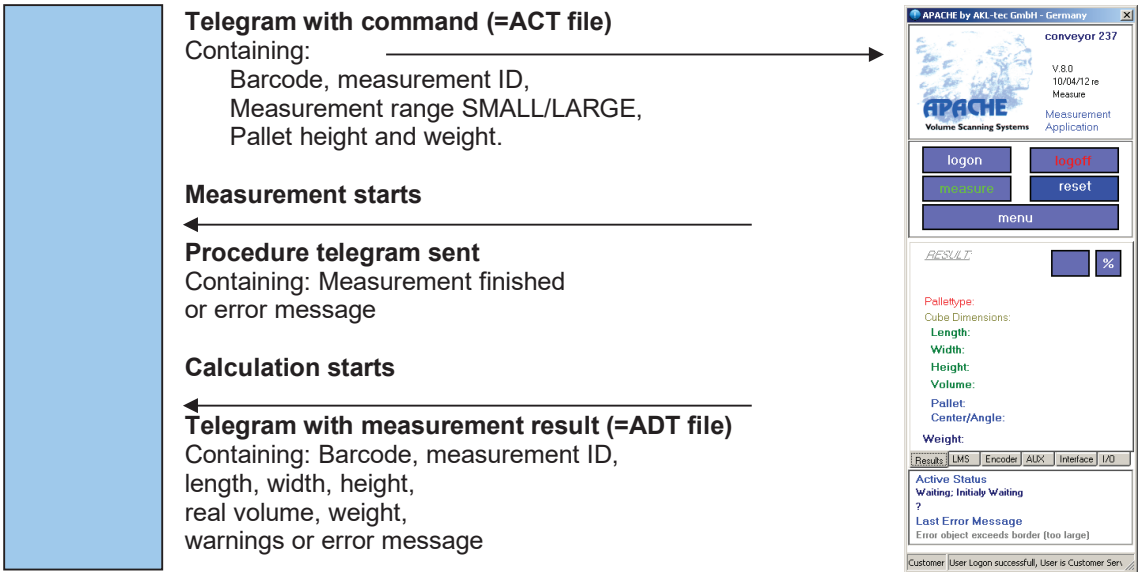
The APACHE system software provides a TCP server socket (passive connection) that accepts connections from clients known by address.
The server socket permanently listens for incoming connections at a definable port.

Alternatively, communication can also be established over a serial interface (serial COM port). The functions and telegrams are still identical in this case.

7.2.1 Communication between Client and Server

TCP Client
(e.g. Touch Panel Software)

TCP Server
(System software)



7.2.2 Telegram Layout

All telegrams basically have the same layout as the command and results files described above. They are transmitted as TCP packets divided into individual lines, separated by CR+LF as separator. Each line contains an identifier and the value that follows it.

The telegrams are used both for communication with higher-level systems (HOST) and for communication of the applications together (system software (Apa##800.exe) with touch panel (apatouch###.exe) and APACHE data (apadata###.exe) .
In the first line of the file or telegram, the purpose is specified. The following purposes are valid:

COMMAND	Command to start a measurement
RESULT	Result of a measurement
3DIMAGE	3D image data from a measurement
STATUS	Status request or status report for the addressed system (usually the system software)
EVENT	Transmission of an event e.g. of the system software on the Touch Panel application or vice versa. Events are e.g. to control signal lights used in the system software.
RESET	Forcing a reset for the receiving software.

The purpose is specified in the first line of the telegram so as to switch the telegram interpreter. Also, information in the telegram can be arranged into paragraphs.

The order of paragraphs and identifiers in the telegram is completely arbitrary. Identifiers and values are separated from one another by spaces. Free character strings are enclosed in quotes ("). Numerical values bearing units (e.g. length or weight) are represented including the units, where a space must be placed between the value and unit.

Outside the legal part of the software, telegrams are complemented with additional values (e.g. secondary data such as stack ability and damage information).

All the interfaces are fully metrological without feedback.

A Appendix A: Parameterization

A.1 Introduction

Parameters are set in a parameter file that is used for creating and storing all of the parameters. This initialization file is named:

PARA + Subfix**.ini** for the System APACHE conveyor

It can be edited with any text editor, the default editor under Windows being Notepad.

Note: The parameters should only be changed by expert users, or by AKL-tec Customer Service or AKL-tec Diagnostics.

It is necessary to log on as **system administrator** to edit the parameter settings.

A.2 Parameters in the System Software

A.2.1 Parameter file Paralftxxx.ini

Types:

INT (Integer)

Whole number value that can have a leading sign. Values without leading sign are interpreted as positive.

FLOAT (floating point)

Decimal number with any number of decimal places. This value must contain a decimal separator, which must be either a point "**.**" (ASCII 2E hex) or a comma "**,**" (ASCII 2D hex). Either point or comma is accepted regardless of the regional settings.
Thousands separators are not permitted.

STRING (character string)

This data type can contain any number of characters. Special characters (ASCII character set $\leq$ 127 decimal) are allowed. If strings contain special characters, in particular control characters, then such a character must be masqueraded using a hash (**#)**.
The two characters following the hash (**#**) specify the ASCII code of the desired character. A hash itself must be specified using its ASCII code (i.e. **#23**).
The control character Carriage Return (**CR**) is thus displayed as **#0D** with **0D** hex = **13** decimal. The letters (A–F) can be written either as capitals or in lower case (a–f).
An empty string is defined by "**–**". If you want a string that contains only a "**–**", then you can specify it with **#2D**.

BOOL (Boolean value)

This type of parameter can only assume one of two statuses. As such, only values such as **ON** for **1** and **OFF** for **0** are permitted. A query is interpreted as **ON**, so all deviating syntax is processed as **OFF**. Parameters of this type are typically used as switches.

Comments

Comments in the parameter file are denoted by a double slash **//** at the beginning of a line. The entire line is interpreted as a comment, and therefore ignored when loading/reading the parameter file.
Comments behind a parameter (on the same line) are **not allowed**.
When generating the checksum from the parameter file, comment lines are ignored. However, since the length of the file is also checked in addition to the checksum, a change to a comment usually leads to a different file length, and thereby failure to authenticate.
The individual parameter lines in the parameter file can appear in any order.
In order to keep the parameters easier to read, they are divided into separate sections. These sections are each headed by a comment line.

Units

Parameters that define a distance, weight or area are specified consistently in metric units. Unless explicitly defined otherwise, distances are given in centimetres (**cm**) and weights in kilograms (**kg**). Angles are given in degrees (°) and can be given with decimal places. Negative values and values >360° are valid degree values.
Units are **not** specified in the parameter. The parameterized value always appears as a pure digit or unit. The unit of a value is inherent from the parameter. In the following text, units will be given in square brackets along with the parameter name.

A.2.2 General Information

STRING SYSTEMNAME

This parameter is used to specify the name of the system. As a rule, this is the **factory number** of the equipment as given by the manufacturer (e.g. APA058-4). The identifier set here must match that on the type plate. Spaces and special characters are allowed in this parameter, but should be avoided.

STRING CUSTOMERNAME

The **name of the operator** can be entered here, which is the name that will appear in the system software. Spaces and special characters are allowed.

STRING SERIALID

or a more precise specification of the location in this parameter, the serial number is registered with sequential numbering (e.g. APA058-4). The value is placed in the system software to the display. Must be congruent with the parameter SYSTEM NAME.

STRING HINT

This parameter serves as a hint for using the measurement system and is also displayed in the software.

A.2.3 Comport Settings (communication settings)

The connected sensors communicate with the system software over serial interfaces that are managed by the Microsoft Windows operating system as COM ports. Also, transmission parameters are defined for the connected communication parameters.

INT IPPORT_LMS1

Port number of the TCP/IP connection to communicate with LMS1.

INT IPPORT_LMS2

Port number of the TCP/IP connection to communicate with LMS2.

INT IPADDRESS_LMS1

Is the IP-Address of LMS1.

INT IPADDRESS_LMS2

Is the IP-Address of LMS2.

STRING LMS1_SERIALID

Serial number of the first measuring head (LMS1). This value is singled before each measurement and displayed in the system software. The system software compares this value with the stored serial number. In case of mismatch the system is set to halt-state.

STRING LMS2_SERIALID

Serial number of the second measuring head (LMS2). This value is singled before each measurement and displayed in the system software. The system software compares this value with the stored serial number. In case of mismatch the system is set to halt-state.

INT LMS_MAXTEMPSCANBUFFER

Is the maximum number of scans which can be written into the circular buffer before data will be overwritten.

A.2.4 Scale (OPTION)

BAUD

Baud rate; transfer speed in bits per second (bps)

PAR

Parity, parity bit or longitudinal redundancy check (LRC).

0 = Even	Even parity
1 = Odd	Odd parity
2 = None	No parity
3 = Mark	Always **1** as parity
4 = Space	Always **0** as parity

DATABITS

Number of data bits in a transmitted byte (as a rule **7** or **8**).

STOP

Number of stop bits at the end of a transmitted byte (as a rule **1** or **2**).

BOOL SCALE_ACTIVE

This parameter switch decides whether a weighing system is connected or not. If this switch is enabled, then the weight will be queried from the connected scales at the end of each measurement.

INT COMNO_SCALE

Number of the serial interface to which the scale is connected.

BOOL COMACT_SCALE

Activates the serial interface of the scale. This parameter is used to disconnect the interface of the scale for testing purposes or for software standalone operation without running the machine.

INT SCALE_BAUD

With this parameter, the transfer rate of the serial interface is configured for connection to the scales.

INT SCALE_PAR

With this parameter, the number of serial interfaces for connecting to the scales is configured.

INT SCALE_DATBITS

With this parameter, the number of data bits in a byte to be transmitted is configured for the serial interface for connecting to the scales.

INT SCALE_STOP

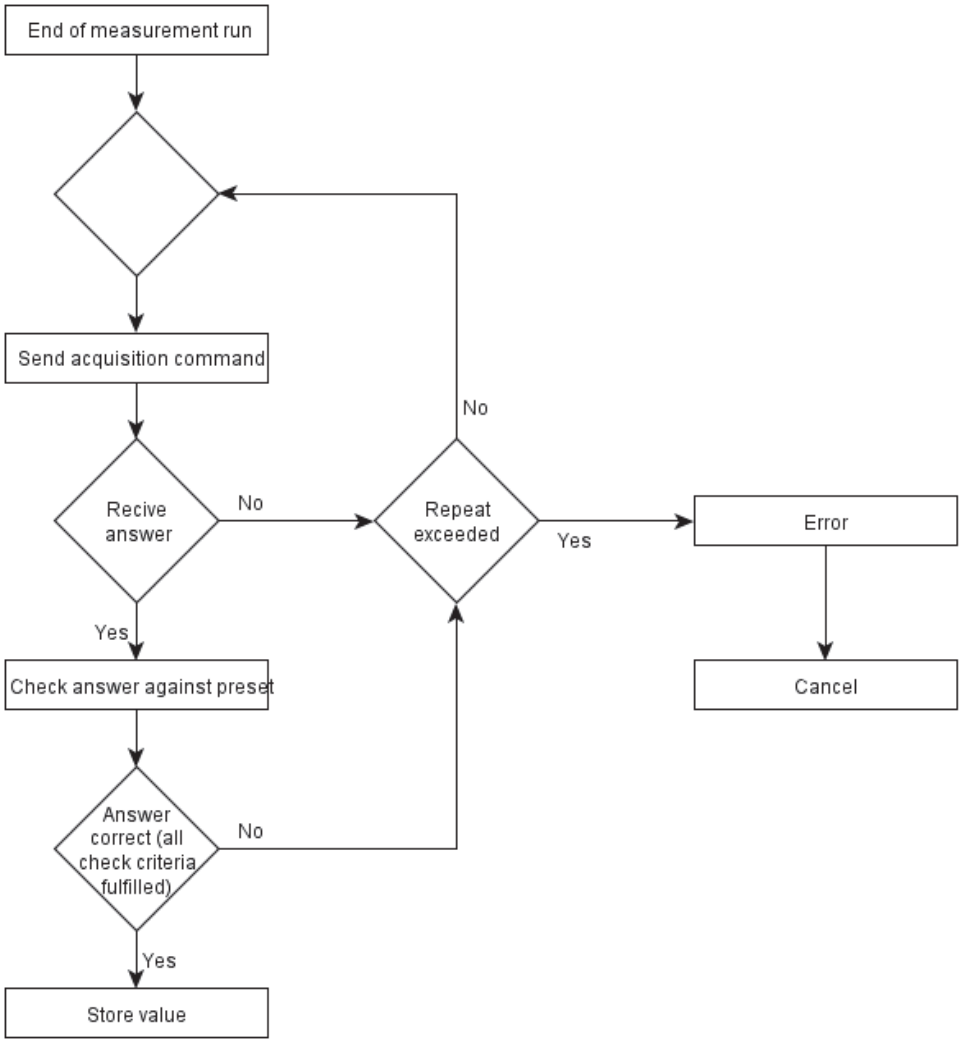
With this parameter, the number of stop bits in a byte to be transmitted is configured for the serial interface for connecting to the scales.

INT SCALE_TYPE

This parameter serves to specify the data delivered from the weighing system. The following table presents the possible values:

Wert für **SCALE_TYPE**	Prüfung auf Messwert-indikator (Brutto)	Prüfung auf Einheit	Alibi-ID im Telegramm	ACK/NAK nach Empfang	Seriennr. im Telegramm
0	Nein	Nein	Nein	Nein	Nein
1	Ja	Nein	Nein	Nein	Nein
2	Nein	Ja	Nein	Nein	Nein
3	Ja	Ja	Nein	Nein	Nein
4	Nein	Nein	Ja	Nein	Nein
5	*Ja*	Nein	Ja	Nein	Nein
6	Nein	Ja	Ja	Nein	Nein
7	Ja	Ja	Ja	Nein	Nein
8	Nein	Nein	Nein	Ja	Nein
9	Ja	Nein	Nein	Ja	Nein
10	Nein	Ja	Nein	Ja	Nein
11	Ja	Ja	Nein	Ja	Nein
12	Nein	Nein	Ja	Ja	Nein
13	Ja	Nein	Ja	Ja	Nein
30	Nein	Ja	Ja	Ja	Ja
31	Ja	Ja	Ja	Ja	Ja

At the end of a measurement, communication always runs according to the same schema, irrespective of the settings in this parameter.



The parameter **SCALE** is a binary coded whole number, the value of which can be used to set the properties of the response telegram to be checked.

The individual check criteria are as follows:

– **Check for measured value indicator**
  At the position to be specified in the response telegram, the system expects an indicator together with the gross measurement value from the weighing system. According to the specifications of DIN/EN... every measured value is identified by a prefixed identifier. For the gross weight value, **G** and **B** are valid. If one of these values is found in the area of the measurement value, then this check criterion is fulfilled.

– **Check for unit**
  If this check criterion is enabled, the unit as parameterized will be expected in the area of the gross measured value. If the unit is found following the digit sequence, then this check criterion is fulfilled.

– **Alibi-ID in the telegram**
  Some weighing units (or their displays) already have an integrated alibi memory. Although the alibi memory of this system software is sufficient for legal operation, the memory of the display device of the weighing system can be used. The position of the **ID** to be assigned by this memory in the response telegram is set. This string is not checked.

– **ACK /NAK**
  Sending an ACK or NAK control character after the receipt of the telegram.
  ACK signal = **ack**nowledgment = confirmation acknowledgment.
  NAK signal = **N**o **A**c**k**nowledgment = negative acknowledgment, negative acknowledgment

– **Serial number in response telegram**
  In order to avoid a different system being connected instead of the intended weighing system, the serial number of the device can be included in the response telegram. If this matches the stored value, then this check criterion is fulfilled.

INT SCALE_TRIGGERLENGTH
In order to be able to respond to the answer telegram from the weighing system, the length of the expected telegram can be set with this parameter. Upon receiving this number of bytes/characters, the buffer of the serial interface will be analyzed as parameterized.

STRING SCALE_ENDTRIGGER

Alternatively to setting the telegram length, an analysis of the data stream from the weighing system can also be triggered by reception of a string specified in this parameter at the end of the telegram.

STRING SCALE_UNIT

The unit from the scales display device in the telegram stream and expected with the measured value is set here. This check is case sensitive.

Example telegram from display device of a measuring system:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
STX	0	0	0	G	␣	1	2	3	.	5	␣	K	G	␣	0
					GROSS										
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	2	3	4	5	␣	B	0	0	1	2	3	4	␣	CR	LF
SERIAL_ID						**ALIBI_ID**									

In this example, this yields:

SCALE_SERIALID	**012345**
SCALE_ENDTRIGGER	**#0D#0A**
SCALE_TYPE	**15**
SCALE_TRIGGERLENGTH	**32**
STARTPOS_GROSS	**5**
STOPPOS_GROSS	**14**
STARTPOS_ALIBI	**23**
STOPPOS_ALIBI	**29**
STARTPOS_SERIAL	**16**
STOPPOS_SERIAL	**21**

STRING SCALE_SERIALID

Expected serial number of the display device to be checked, which is expected at the position in the answer telegram to be set.

INT

STARTPOS_GROSS
STOPPOS_GROSS
STARTPOS_ALIBI
STOPPOS_ALIBI
STARTPOS_SERIAL
STOPPOS_SERIAL

The positions of the individual components in the answer telegram are specified using this parameter. If the respective components are not expected (see parameter **SCALE_TYPE**), then this parameter can be set to **0** or to any number. In the example, all possible components are used.
The specification of a **TRIGGERLRNGTH** is accomplished by setting an **ENDTRIGGER**.
For specifying start and stop for the gross measurement value, it must be ensured that, if expected, the indicator **G** or **B** and the unit are within the range.

STRING SCALE_ACQUIRE_ZPOS

When reaching the specified z-position the measuring result is requested from the scale.

A.2.5 DP-Settings

A connection from the DP-Interface to the SPS can be established optionally.

INT DPBAUDRATE

Specification of the baud-rate of the DP-interface:

0 = 9600 bps	1 = 19200 bps	2 = 93750 bps	3 = 187500 bps
4 = 500000 bps	5 = 1500000 bps	6 = 3000000 bps	7 = 6000000 bps
8 = 12000000 bps	9 = 450450 bps	10 = autodetect	11 = invalid

INT DPADDRESS

Specification of the dp-address which is used for the client

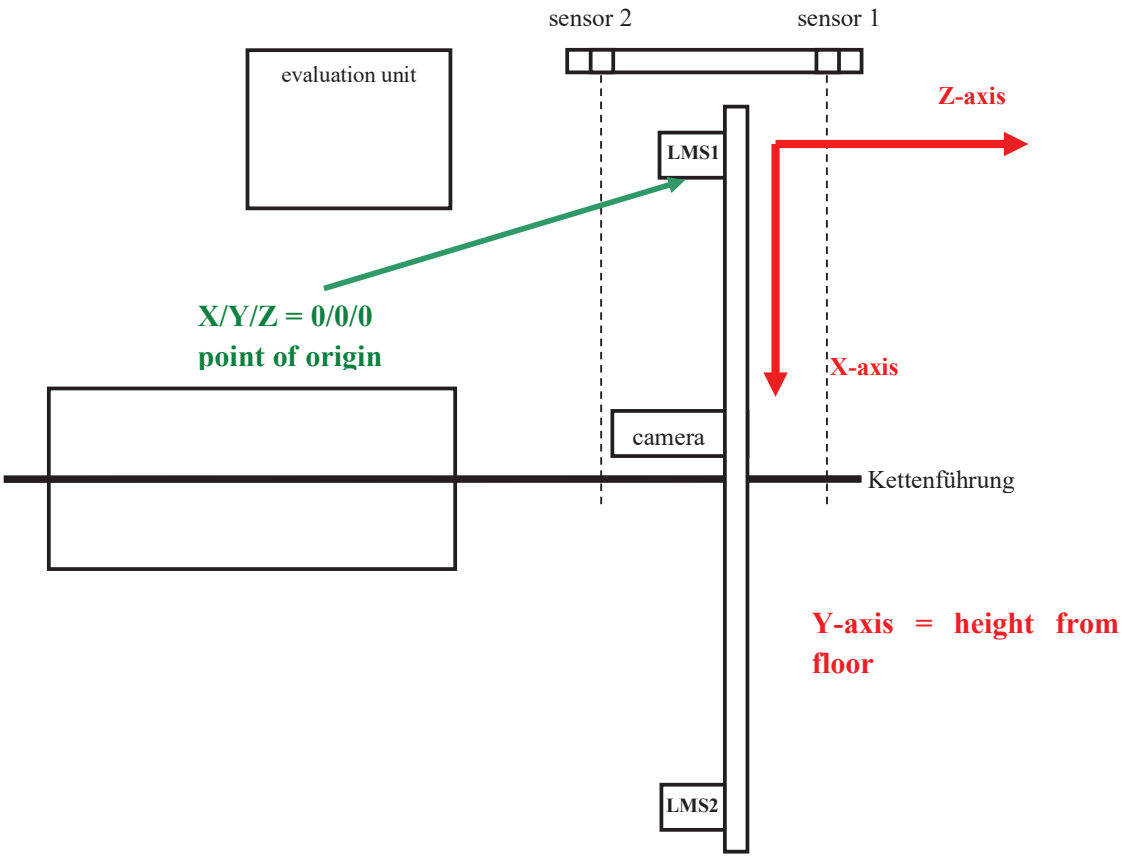
INT DPSLAVEMODE

Setting for slave-mode:

0 = DPS_SM_SIMPLE	1 = DPS_SM_V1_ENABLE
2 = DPS_SM_FREEZE_SUPP	3 = DPS_SM_SYNC_SUPP

A.2.6 Parameters for Scanner Head Geometry

Many of the parameters used refer to the geometric characteristics of the APACHE system. The figure underneath shows the notation and position of the components and co-ordinate system.



X-axis	= Parallel to measuring arm (abscissa)
Y-axis	= Height
Z-axis	= Travel of measuring arm (row)

Origin of coordinates: Below **LMS1** at the level of the top of the scales or floor (when not using scales) at the rear end position of the measuring arm.

A.2.6.1 Parameters for Setting the Geometric Relationships

The following parameters serve to set the geometric ratios on the measuring arm. All parameters must be set during alignment.

FLOAT LMS_BOTTOM [cm]

Distance in **cm** between measuring arm (in particular laser scanner **LMS1**) and the floor, or top level of any platform scales positioned under the scanner. This is set during alignment. Any existing level difference (i.e. difference between the height of the first and second scanner head) is corrected by the setting in **YCORR_LMS2**.

FLOAT LMS_LMS [cm]

Distance in **cm** between the two laser scanners on the measuring arm. The reference scale here is the centre of rotation of the mirror. This is set during adjustment.

FLOAT ZCORR_LMS2 4,7 [cm]

Corrective value for setting the distance of the scan planes from **LMS1** (Z=0) and **LMS2**.
The two scanner heads are fastened on the measuring arm and arranged at 180° rotation. The geometry of the scanner heads gives rise to a nominal distance from the scan planes of 5.0 cm. (Default value of this parameter is **5.0**).
This parameter serves to set the real distance from the scan planes. This is set during alignment. For proper operation, it must be ensured that both scan planes are aligned parallel to each other, and at right angles to the floor (base area of the measuring system).

FLOAT YCORR_LMS2 [cm]

Correction value in cm for setting a possible level difference between the two scanners. A negative value means that the second scanner (LMS2) is arranged by that amount closer to the floor than LMS1. This value is set during alignment.

FLOAT ALPHACORR_LMSx [degrees]

Both scanners are fastened to the measuring arm on consoles. Manufacturing tolerances in the measuring arm, in the consoles and in the laser scanners themselves can result in the angle deviating slightly from the desired value. The angle of the standard console is **45.0°**. In this parameter, appropriate values can be set for both scanners independently of each other.

FLOAT ALPHAMAX

Both laser scanners are mounted on the measuring arm on consoles. Due to manufacturing tolerances in the measurement arm, in the brackets as well as in the laser scanner itself may result in that the angle deviates from the desired value. With this parameter, the maximum angle the y-axis (up), be limited. (e.g. when truck flaps are still recognized)

FLOAT GAMMACORR_LMSx

This parameter should only be changed by AKL-Tec service personnel.
(Default = 0)

FLOAT YMAX_DONTCARE

This parameter indicates the maximum height (Y-axis), to which the Voxels are evaluated. Voxels that are higher are ignored.

FLOAT MAXHEIGHT

This parameter sets the maximum valid height is specified. If an object is measured higher than specified in this parameter, a message is generated (subject to high).
This value must be less than the parameter **YMAX_DONTCARE**.

FLOAT MAXLENGTH

Is the maximum length. If the measured length is greater than this value, the measuring result is declared invalid.

FLOAT MAXWIDTH

Is the maximum width. If the measured width is greater than this value, the measuring result is declared invalid.

FLOAT XWIDTHALARMLEFT

Is the alarm limit of the width. Results excessing this value (positions further to the left) cause an alert.

FLOAT XWIDTHALARMRIGHT

Is the alarm limit of the width. Results excising this value (positions further to the right) cause an alert.

FLOAT YHEIGHTALAME

Is the alarm limit of the height. Results excising this value (positions located higher) cause an alert.

A.2.6.2 Hardware Portal

The following parameters are used to adjust the geometry and motion conditions for the transport system.

INT MAXROW

Maximum measuring length. If this value is achieved, and it is still recorded some measure data of the scanners, the measurement will be declared invalid.

FLOAT ENCODERDIV [Impulse/mm]

The position of the object to be measured is measured by an incremental encoder which is connected to the drive system (conveyor system, underfloor chain, etc.). By changes in the installation position or other technical changes such as the number of pulses of the encoder can cause a change in this parameter.

A.2.6.3 Parameters for Setting the Image Processing for 3D Measurement

INT MINSCANSPERMETER [cm]

Number of minimum required scans per laser scanner (LMS) per meter. For the scanners used, one scan means one revolution of the tilted mirror, which takes **15 ms** time. For centimeter-precise scanning, 2 scans per centimeter, and therefore 200 scans per meter, are required. (**IN LFT MODE CONSTANT = 200**).

FLOAT D_WIDTHLENGTH [cm]

Scale division for specifying the length and width of the smallest enclosing cuboid in **cm**. During normal operation, the values to be output are output as normal whole-number multiples of the scale division (d) set here. The system supports different scale divisions for length, width and height.
(**IN LFT MODE CONSTANT = 2.0**).

FLOAT D_HEIGHT [cm]

Scale division for specifying the height of the smallest enclosing cuboid in **cm**. During normal operation, the height value to be output is output as a whole-number multiple of the scale division set in this parameter.
(**IN LFT MODE CONSTANT = 1.0**).

FLOAT MINIMUM_HEIGHT [cm]

Minimum height in **cm** accounted for on the measurement area. Independent of the value set here, objects less than **10 * D_HEIGHT** high cannot be measured.

FLOAT FLOORMARGIN [cm]

Near the floor level a special filter is used. This value determines up to which value the filter is set active (referring to the origin (scale, floor). This parameter should only be changed by AKL-Tec service staff.

FLOAT PROTURSION [cm]

This parameter specifies the protrusion. This parameter is adjusted up to what length in the XZ projection of the values are not rated.

FLOAT XMAX [cm]

Maximum value in **cm** for measurement values in the direction of the **x-axis**, which were scanned by the two scanners. The range set here serves to prefilter the measurement values and to limit the area of measurement.

FLOAT XMIN [cm]

Minimum value in **cm** for measurement values in the **x-axis** direction in **cm**.

FLOAT SYSERR_CUBX [cm]

Systematic error for the dimensions of the smallest enclosing cuboid calculated by the system from the 3D image. The value set here in **cm** is subtracted from the determined object width in the x-direction under consideration of the object rotation. This parameter can be changed during alignment.

FLOAT SYSERR_CUBZ [cm]

Systematic error for the dimensions determined by the system from the 3D image (cf. **SYSERR_CUBZ**).

FLOAT SYSERR_RELXZ

In addition to an absolute systematic error, a relative systematic error can be set as correction factor for length and width of the smallest enclosing cuboid. The calculated values are multiplied by the factor set here after correction by the absolute error (cf. **SYSERR_CUB**). The correction value is calculated from the geometry of the scanner head alignment and is set during alignment.

FLOAT SYSERR_RELH

The relative systematic error for the height value of the smallest enclosing cuboid is set here (cf. **SYSERR_RELXZ**). This is used similarly to the parameter **SYSERR_RELXZ**.

FLOAT RELREALVOL

It can be set a relative systematic error as a correction factor for the real volume. The calculated value is multiplied by the factor set here. The correction value results from the geometry of the device of the laser scanner and is set in the context of adjustment.

FLOAT IMP_TOLERANCE [cm]

Global tolerance parameter for the image processing processor.

INT MAX_ERROR_SECTION

This parameter is used to set the maximum number of implausible single scans per laser scanner. A single laser scan will be classified as implausible if

- A transmission error has been detected
- Individual measurement values beyond the plausible range have been recorded
- Measurement values of the scans from the scanner head have been indicated as implausible.

If the number parameterized here is exceeded, then the 3D image acquisition, and with it the measurement, will be discarded and have to be repeated.

INT FIELDWIDTH_LOWPASS [cm]

The system has a function for recording existing, freestanding objects in the measuring range. When measuring the dimensions of the smallest enclosing cuboid, the positioning of several freestanding objects naturally does not make sense, since the dimensions would depend not only on the objects themselves but also on the position of the individual objects to one another. In addition, additional objects are often dirt or foreign bodies projecting into the measuring range (e.g. ground conveyors etc.). In order to record the number of objects, the height profile determined from the 3D image is filtered by low pass. The edge length of the cuboid frame used for this is given in this parameter.
See also **BOOL CHECKFORDUST**.

FLOAT ISCUBEEDGERATIO

The system evaluates the shape of the scanned 3D object and decides whether it is a cuboid or an irregularly shaped object (**Irreg**) from the frequency of parallel edges in the optimized image. This parameter predefines the evaluation threshold. It is set during alignment. For standard sizes, there are no changes. A different value can arise for systems with very large dimensions (>5m).

BOOL IMAGEMAKEUP ON

The 3D image recorded by the scanning laser scanners is post processed with appropriate algorithms and filters before it is used to calculate the dimensions. For testing and aligning purposes, it can make sense to switch this post processing off. This is accomplished with this parameter.

INT MAVFILTERWIDTH [cm]

Width of the filter to eliminate outliers (mavericks) in the 3D image.

FLOAT MAVFILTERTOLERANCE_XZ [cm],
FLOAT MAVFILTERTOLERANCE_Y [cm]

These two parameters specify the tolerances for classification of outliers in the xz and y-direction based on the generated 3D image.

FLOAT MAVFILTERTOLERANCE_YSG [cm]

This parameter should only be changed by AKL-Tec service staff.

FLOAT MINSPACEAFTEREMPTY

Number of columns which have to be clear after the end of the measuring object, in order to determine a measurement (cf. MINFREELINES_EOM in APACHE portal).

FLOAT STANDARD_PALLETHEIGHT

Defines the standard height of the palette which is used during palette masking process.

FLOAT STANDARD_PALLETWEIGHT

Defines the standard weight of the palette which is used during palette masking process.

FLOAT CAMA_ACQUIRE_ZPOS

Is the value to specify the position for taking the real pictures.

FLOAT CONVEYOR_ZPOS_CUT

By reaching this z-position [cm] the measurement processed is stopped

FLOAT CONVEYOR_MINPSEED_CMPERS

Is the value of the slowest feed speed to obtain a valid measuring result [cm/sec].

FLOAT CONVEYOR_MAXSPEED_CMPERS

Is the value of the highest feed speed to obtain a valid measuring result [cm / sec].

FLOAT MONTECARLOADJUSTMENT

Is a stochastic filter based on random numbers to reduce the number of points during the vision-pick-up. It is necessary because of the different and often very low measurement speeds that are used. This parameter should only be changed by AKL-Tec service staff. (0 = inactive).

FLOAT CONVEYOR_SYSERRSPEEDREL

Ist he systematic, relative error of the speed determination, especially for the measurement of speed with the APACHE conveyor pallet jack (light beam used with the scale). The measured value of the speed is multiplied with this value. If set to 1,0, there will be no change in detected speed.

FLOAT CONVEYOR_FIXEDSPEED_CMPERS

Fixed speed of the transport system (conveyor) [cm/s]. If it is set to values disparate to 0, there will be no measurement of speed. Setting this value to zero will activate measurement of speed respectively use of the encoder.

FLOAT CONVEYOR_SIGNALFIELD_TOP

To trigger the measurement a trigger-field is defined in the x/y-plane. Measurement is started, if an object is detected in the dined trigger-field. The TOP-value marks the top edge in y-direction (Height from origin)

FLOAT CONVEYOR_SIGNALFIELD_BOTTOM

This parameter marks the bottom edge of the trigger-field. It is recommended to set its value slightly higher than the height of the conveyor respectively the floor. This can prevent a measurement start caused by random noise.

FLOAT CONVEYOR_SIGNALFIELD_LEFT

Is the left-hand edge (x_min) of the trigger-field [cm]. For APACHE conveyor pallet jack systems it is recommended to define the trigger-field in a way, so that measurement is started only in case, if the label of the fork lift is detected in the area. This will avoid starting of measurement caused by people crossing the trigger-field.

FLOAT CONVEYOR_SIGNALFIELD_RIGHT

Is the right-hand edge of the trigger-field [cm]

A.2.7 Parameters for Setting the Directories used by the System Software

STRING SYSTEMDATASETPATH d:\apa

Directory for the dataoutput of the system software (adt-files).

STRING LOGBOOKPATH D:\apa\log

Directory for storing the logbook as long as permanent storage is enabled with the parameter LOGINFILE.

STRING PRGPATH D:\apa

Execution path for the system software. The path set here is compared with the path of the application determined by the operating system. If there is no match, the application will be suspended.

STRING TEMPIMAGEFILEPATH D:\apa\tempimages

The system can store temporary files of the 3D images and individual series of buttons for testing and aligning purposes. This parameter specifies the storage path for these temporary files. During normal operation, no such files are created.

STRING DATAPATH D:\apa\data

Storage path for the results data sets.

STRING COMMANDFILEPATH D:\apa\command

Search path for command files that prompt the system software to perform a measurement.

STRING IMAGESFILEPATH d:\apa\tempimages

Buffer storage path for all images (fotorealistic camera and greyscale images).

BOOL LOGINFILE

Switches on or off the storage of logbook entries of the system software to a file.

INT MAXLOGROWS

For the logbook display integrated into the system software, the maximum number of rows is set here. If the number of rows set here is exceeded, then the oldest entries will be deleted according to the FIFO principle.

A.2.8 Parameters for General System Settings

BOOL LEGALFORTRADE_MODE

In “Legal For Trade” mode, relevant parameters are overridden by parameters with the values to be used for legal operation. If this switch is set to **OFF**, then only the values set in the parameter file apply.

BOOL METRICUNITS

This switch determines whether the measured value display shall appear in metric units (cm, dm³, kg) or in imperial units (inch, cubic inch, lb). When switched to **ON**, the display will be in metric units.

BOOL THROWIFWARNING

The system can create various warnings that point towards faulty measurement results. This switch is used to specify whether a value that has been assigned a warning will be accepted, i.e. whether it will be passed on to the processing application or not.

Possible warnings are:

BORDER	Measuring area is overshot at the border
DUST	Dirt warning; more than one freestanding object
ZERO	Measurement result in length, width, height or weight without expansion (**= 0**).
UNDERSH	Protrusion warning when measuring the estimated quantity **real volume**.

BOOL COMPUTE_REALVOLUME

Switching on this parameter causes the estimated quantity **real volume** to be calculated in addition to the determined dimensions.

BOOL DONETONLY

To minimize computation time the calculation of dimensions can be done without generating the gross dimensions of the measurement object. In this case only net-volume is calculated, which is commonly used by most customers. If no palette is masked out, the gross and net values match.

BOOL USECALCULATOR

For conveyor systems running with high speed, it is necessary to start with the next measurement, before the current results are calculated. In this case the calculation is done by the APACHE calculator while the next measurement is processed.

FLOAT THRESHOLD_UNDERSHOT

For processing the estimated quantity **real volume**, an undershoot warning can be displayed warning the user if overhangs can lead to an inclusion of air into the calculation. This parameter provides a threshold for triggering this warning.

BOOL CHECKFORDUST

For calculating the dimensions of the smallest enclosing cuboid, an additional function can be used to check whether only one single object is present in the measuring area or whether any discontiguous objects could lead to an increase in the determined cuboid dimensions. If more than one freestanding object is found in the measuring area, then the system shows a warning, since additional freestanding objects are generally created by residual detritus in the measuring area (e.g. pallet feet, sheeting etc.). This switch serves to switch this function on or off.

STRING AUTCUSTOMERPASS

This is where the password for the authorized customer is set in plain text. An authorized customer can make configurations on the non-legal-for-trade components of the system software, and execute service and maintenance functions.

INT MAXMEASURETIME

This parameter defines the maximum time for an individual measurement. The maximum time [ms] serves to trigger an error message if no measurement result exists by that time.

INT STORE_CRC_THRESHOLD

Limit for stochastic reduction of the measured values to decrease the amount of data.

INT SCREENSAVE_TIME

Timer for shutting down the screen.

A.2.9 Parameters for Setting the Measurement Results display

BOOL STAYINFRONT

In order to prevent manipulations or faulty displays from other software components running on the computer, the measurements result display is forced by the operating system into the foreground after every measurement for a set duration. This parameter switches this function on or off. If no overlay display (separate measurement results display) is switched on, then the main window of the system software will be brought to the foreground.

BOOL OVERLAYDISPLAY

For systems that operate without their own measurements display, the separate measurements display (overlay display) can be deactivated using this parameter.

INT OVERLAYDISPLAY_LEFT [pixels],
INT OVERLAYDISPLAY_TOP [pixels]

These two parameters specify the position of the overlay display in pixels depending on the current screen resolution. The coordinates are relative to the top left corner of the desktop.

STRING CAPTION_CUBEDIMGROSS
STRING CAPTION_CUBEDIMNET
STRING CAPTION_CUBEVOLGROSS
STRING CAPTION_CUBEVOLNET
STRING CAPTION_WEIGHTGROSS
STRING CAPTION_WEIGHTNET
STRING CAPTION_MASKEDPALLET
STRING CAPTION_REALVOLUME
STRING CAPTION_HEADLINE
STRING CAPTION_PID
STRING CAPTION_TIMESTAMP
STRING HINT_LFT
STRING HINT_NOTLFT

These parameters serve to set the labels on the overlay display. For Internationalization of the system, texts can be entered in different languages or adapted to the customer's local dialect if necessary. The input is checked during standardized calibration of the system, and is therefore important for legality.

INT DISPLAYDURATION [ms]

The display duration for the measurement results display (duration for forcing into the foreground) is specified here in **ms**.

A.2.10 Parameters for Setting Interfaces

BOOL PUBLISH_RAWIMAGE

This switch prompts the system to transmit the raw data image from the respective measurement. The raw data image contains all data recorded by the sensor system, and can be used for further processing or for a contour check.

BOOL PUBLISH_GRAYSCALEIMAGE

The system can generate a grayscale image of the measured object as a top view based on the scanned 3D profile. This parameter controls the generation of this file after each measurement.

INT GRAYSCALE_QUALITY

The compression or quality of the JPEG image for the top view to be generated.

INT ACQUISITIONSOURCE

//0= ONLY MANUAL START (INTEGRATED GUI)
//1= BARCODE SCANNER (SERIAL PORT)
//2= COMMAND FILE IN COMMANDFILEPATH
//4= TELEGRAM (TCP/IP)
//8= TELEGRAM (SERIAL)

This binary coded value defines which interfaces measurement requests and the associated results are accepted.

	//**0** = ONLY MANUAL START *)	//**1** = BARCODE SCANNER	//**2** = COMMAND FILE IN COMMANDFILEPATH	//**4** = TCP/IP	//**8** = SERIAL
0	X				
1	X	X			
2	X		X		
3	X	X	X		
4	X			X	
5	X	X		X	
6	X		X	X	
7	X	X	X	X	
8	X				X
9	X	X			X
10	X		X		X
11	X	X	X		X
12	X			X	X
13	X	X		X	X
14	X		X	X	X
15	X	X	X	X	X

*) //0 = ONLY MANUAL START is always active for every option

A.2.10.1 Parameters for the Host Interface

The following parameters define the settings of the interface to the host (superior computer or process). These parameters therefore relate to the telegram interface (cf. **8.2 Communication Scheme of the Host Interface**).

INT PIDSOURCE

This parameter should only be changed by AKL-Tec service staff.

INT TRIGGERDURATION

A trigger can be set for the connection of a barcode-scanner. This value determines, how long the trigger will be is set to 1. After the measurement process the trigger is set to zero every time.

INT HOSTSERVER_SOCKET

This value determines, if the telegram interface is applied by the system software via a TCP-server-socket.

INT HOSTSERVER_IPPORT

Port number of the connecting client. This IP-address is used to authorize the client. Connections from clients using a different than this specified address will be rejected and the socket connection fails.

A.2.11 Additional Parameters

INT KEEPDATADAYS 60

In this parameter is set how many days the data shall be kept in the alibi memory. Records that are older than the number defined here will be automatically removed from the legal memory.

BOOL ITSME

This parameter should only be changed by AKL-Tec service staff. (Default OFF)

INT CHARSET 856

Character set for displaying the measurement values (see **STRING CAPTION**). This binary coded value specifies the interface at which measurement requests and the associated results will be accepted.
The font used by APACHE for the display on the touch panel is **Arial**.

It must be ensured within the operating system that the installed true-type font contains the character set used. If this is not the case, then the font must be reinstalled.

The “special characters” are masked in the language file of APACHE (lang###.ini) with a # (ASCII 23h). After this masking character come two (exactly two) digits in hexadecimal notation, which point to an entry in the selected character set. In the tables, the hex numbers of each character are specified in the top left corner of the box.

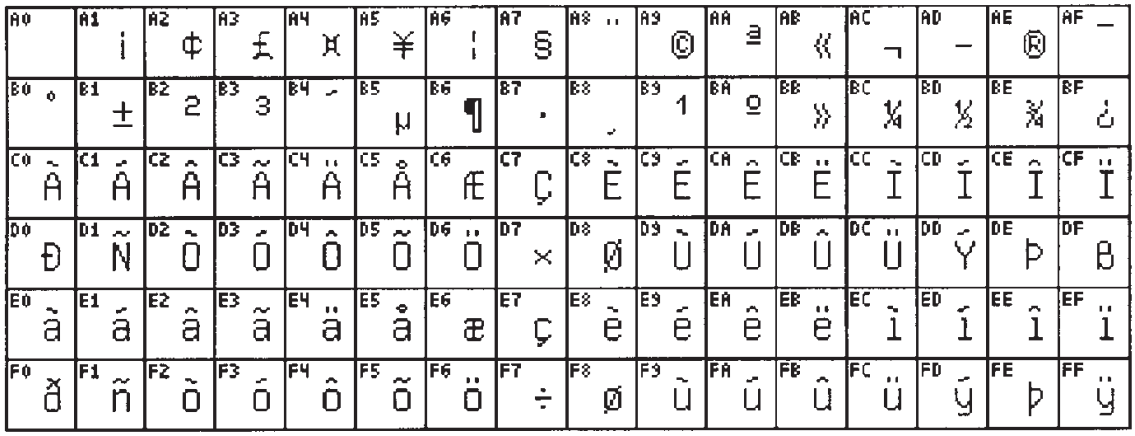
The character set is determined by an additional parameter in the system software parameter file (para###.ini).

The most common character sets available are defined below. Other character sets (such as Cyrillic, Hebrew etc.) are also required. Depending on the scope of the application, however, preference should be given to Unicode.

ISO 8859-1 (LATIN 1)

This character set matches the character set preset on most Western European Windows computers **Windows Codepage 1252** (except for minor differences). For this character set, the ANSI character set is declared in the system.

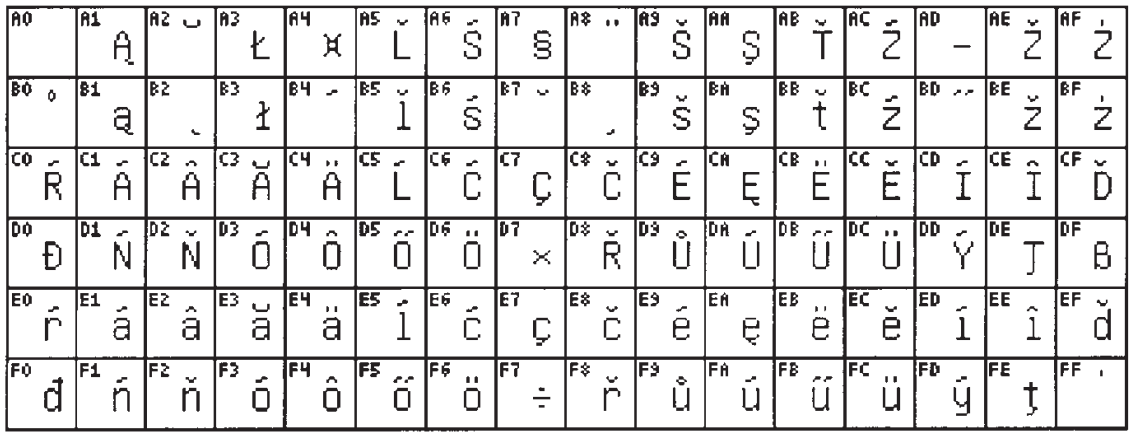
APACHE Charset Parameter: **INT CHARSET 0**



ISO 8859-2 (LATIN 2)

Languages: Croatian, Polish, Romanian, Slovakian, Czech and Hungarian.

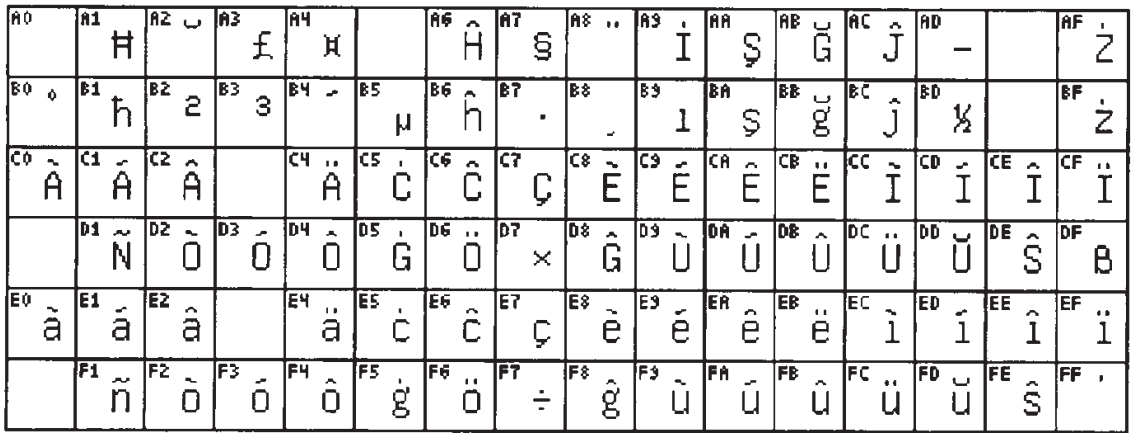
APACHE Charset Parameter: **INT CHARSET 238**



ISO 8859-3 (Latin 3)

Languages: Esperanto, Galician, Maltese and Turkish.

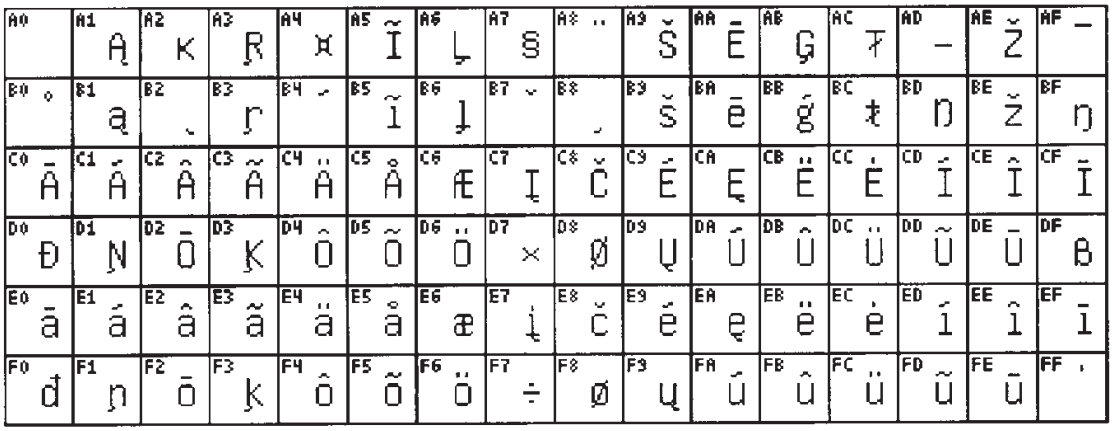
APACHE Charset Parameter: **INT CHARSET 162**



ISO 8859-4 (LATIN 4)

Languages: Estonian, Latvian and Lithuanian.

APACHE Charset Parameter: **INT CHARSET 186**



APACHE Charset Parameter: **INT CHARSET 208** Language: Russian

Ђ 128	Ѓ 129	‚ 130	ѓ 131	„ 132	… 133	† 134	‡ 135	€ 136	‰ 137	Љ 138	‹ 139	Њ 140	Ќ 141	Ћ 142	Џ 143
ђ 144	‘ 145	’ 146	“ 147	” 148	• 149	– 150	— 151	152	™ 153	љ 154	› 155	њ 156	ќ 157	ћ 158	џ 159
nbsp 160	Ў 161	ў 162	J 163	¤ 164	Ґ 165	¦ 166	§ 167	Ё 168	© 169	Є 170	« 171	¬ 172	shy 173	® 174	Ї 175
° 176	± 177	І 178	і 179	ґ 180	µ 181	¶ 182	· 183	ё 184	№ 185	є 186	» 187	j 188	S 189	s 190	ї 191
А 192	Б 193	В 194	Г 195	Д 196	Е 197	Ж 198	З 199	И 200	Й 201	К 202	Л 203	М 204	Н 205	О 206	П 207
Р 208	С 209	Т 210	У 211	Ф 212	Х 213	Ц 214	Ч 215	Ш 216	Щ 217	Ъ 218	Ы 219	Ь 220	Э 221	Ю 222	Я 223
а 224	б 225	в 226	г 227	д 228	е 229	ж 230	з 231	и 232	й 233	к 234	л 235	м 236	н 237	о 238	п 239
р 240	с 241	т 242	у 243	ф 244	х 245	ц 246	ч 247	ш 248	щ 249	ъ 250	ы 251	ь 252	э 253	ю 254	я 255

A.3 Parameters Pallet Contours

The file name is the pallet type and must be the same like by pictogram

NAME
This parameter is used to specify the name of the pallet contour type.

PICTOGRAM_FNAME
Filename and path for the pictogram of the pallet type in the user interface.

MAX_LENGTH
Maximum length of the object including the palette in cm

MAX_WIDTH
Maximum width of the object including the palette in cm

MAX_HEIGHT
Maximum height of the object including the palette in cm

PALLET_LENGTH
Pallet length in cm

PALLET_WIDTH
Pallet width in cm

PALLET_HEIGHT
Pallet height in cm

MAXOVERHANG_ZMIN
Maximum permissible overhang on Zmin site

MAXOVERHANG_ZMAX
Maximum permissible overhang on Zmax site

MAXOVERHANG_XMIN
Maximum permissible overhang on Xmin site

MAXOVERHANG_XMAX
Maximum permissible overhang on Xmax site