

Printing Concept for the Cubis® MCA Balance

This description provides an overview of the printing concept for the Sartorius Cubis® MCA laboratory balance. It contains an explanation of the basics, how own reports can be created with different output formats, and the ways in which they may later be printed or electronically saved.



Executive Summary

The Sartorius Cubis® MCA laboratory balance offers a modern and future-oriented documentation concept that fulfills all requirements regarding data integrity and electronic documentation according to 21 CFR Part 11 and EudraLex, Volume 4, Annex 11. The reports can be adapted to customer requirements and printed in several ways or electronically saved, for example as PDF files, by using the integrated network connection. The Cubis® supports all common IT standards for seamless integration into your network, so that no additional manufacturer software is required.

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1 Printing Concept

Printing of weighing results and calculated values can be individually adjusted according to the requirements for each task. Values are accepted for printing only when they are stable; in the case of fluctuating values, the system waits for a steady reading.

The values taken over may include a marker for batch or sample identification. The scope of the printer output can be set, for example with date/time and memory identifier. The printout can also be provided with a GLP header and footer, which can be configured.

The values may be accepted by a printer memory. The accepted display value may also be forwarded directly to an interface.

The output of the values accepted may take the form of a paper printout and/or a file. Output on paper may be in strip, label, or A4 format. Printout on a USB printer, network printer, or wireless printer is also possible. PDF or CSV format can be selected for output files. This output is provided via a connector, e.g. onto a USB drive or a network server.

In addition to printing, there is also the option of outputting display values independently of the task by means of interface protocols and their commands.

2 Printing from a Task

Printing from a task is defined by print profiles. The print profiles determine the type and content of the printed output. Up to two different print profiles can be chosen for each task.

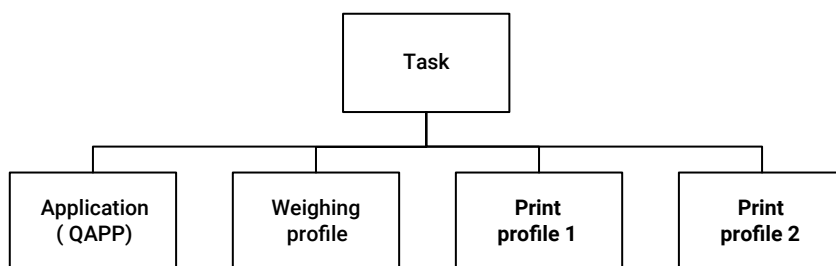


Figure 1: Components of a task

There are two types of printed output, printing of the accepted values to a printer memory and printing all values at the end of the task or from time to time, as well as printing of the accepted display value with direct output to the interfaces.

The print output can be made on a USB printer (YDP30) or network printer as well as in files in various formats on USB drives or network servers. Print output requires appropriate configuration of the connectors and interfaces.

2.1 Printing to the Printer Memory

Each value taken over in a task is temporarily stored in a print memory. The memory can be viewed in a print preview while the task is being used. Depending on the application, individual values can also be marked as invalid there. Before you end the Task, you can output the print memory to the target device (printer or file system) via the set print profiles. Print jobs are saved and can be output several times as long as the application has not been exited. If the Task is exited, the print memory is also deleted.

Printing on paper strips or label paper can be configured for the YDP30 printer. Printing of the file with separate print profiles for PDF format or CSV format can be arranged through connectors to the USB drive, YDP30-NET, or network printer.

In addition, the print memory can be sent to a web server via a data connector HTTP / HTTPS. Many ELNs or LIMS have implemented such web servers and can receive data in structured form. A corresponding adapter may also need to be installed on this side to interpret the data.

2.2 Printing with Direct Output

In contrast to the print memory, it is also possible to print each weight value directly after it has been stored. This setting must be configured in the print profile. Both the YDP30 and SBI-Direct and PC-Direct support the output. For SBI-Direct, the display values are output via the built-in RS232 or via virtual COM ports, such as USB-B or Ethernet. PC-Direct transfers the set values directly to the current application on the PC.

3 Print Profiles

Various print profiles have been factory set for the balance. These print profiles can be adjusted, deleted, or newly created. Once print profiles have been set up, they can be used for various tasks.

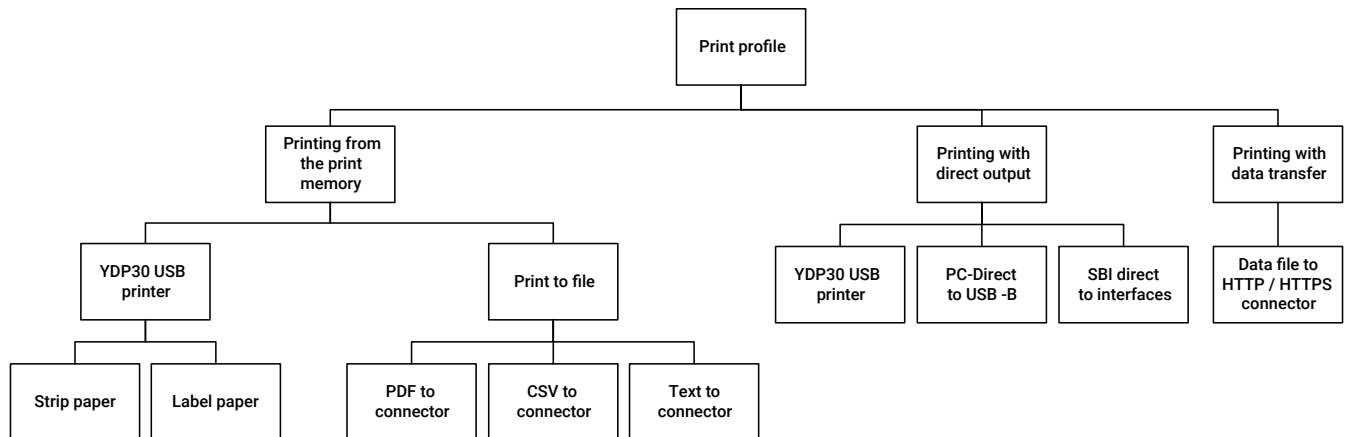


Figure 2: Differentiation of print profiles

3.1 YDP30 Print Profile

Print profiles with different output scopes for the YDP30 printer have been provided by the factory. New print profiles can be created according to the task requirements. The printout can be provided with a GLP header and footer, and the scope of the output values can be configured.

The standard setting of the print mode is print preview, so that the values accepted can be checked and marked as invalid as required. It is also possible to print the accepted values immediately and without a preview.

The print job will not be lost when the printer is not ready for the print job. It is saved and can be automatically or manually retrieved at a later stage.

Output on the YDP30 printer can be made on strip or label paper. You will find application examples for this in the chapter: Weighing with Individual GLP Print Using the YDP30 Printer on a Paper Strip or Printing of Labels Using the YDP30 printer.

Please note: The YDP30 printer advances the paper in a forward direction, so that the output on a paper strip appears upside down. In print mode with print preview, the printout is generated by a print job and can then be torn off from the printer and reviewed. When printing without print preview, the output is immediately provided on the printer. The paper is slightly advanced after output, so that it can be read, and is again pulled in so that the next printout follows without a big gap, reducing paper consumption. The output is only turned for output on label paper, so that the printout is directly legible.

3.2 PDF Print Profile

The PDF file format is a platform-independent data format for documents. Print output in this format can be viewed on each computer. For each PDF output file, a matching test file containing the checksum (MD5 hash value) of the PDF data is created. When the file is transferred, this checksum is saved in the audit trail. Using an appropriate tool, this PDF file can be compared with the check file to ensure the integrity of the PDF data.

A print profile for output in PDF format has already been provided by the factory. New PDF print profiles can be created according to the task requirements. The printout can be provided with a GLP header and footer, and the

scope of the output values can be configured. Connectors can be set up for the output, so that the output can be directed to mass storage or to a network printer.

The values accepted are collected in a printer memory. The print job can be viewed, and individual accepted values can be marked as invalid, as required. The print job can be sent to the connector at the end of the application, or from time to time. If the print job cannot be sent, it is not lost and is automatically repeated.

Application examples for this in chapter: Printing in A4 Format Using a Network Printer or Output of Print Jobs on an FTPS server.

3.2.1 Electronic Signature

This function facilitates signing of an electronic report or printout with an electronic signature. It complies with Directive 21 CFR Part 11 and is included in the work flow of the tasks by entering a user password directly before compiling a report. Each signature process is documented in the audit trail, as well as in an electronic report or printout. The description of this QAPP extension contains more relevant information.

This functional extension must be activated through the QAPP Center under [Pharma]. It can be used free of charge for 30 days before a license has to be acquired.

Note: The electronic signature is available only to users who register with a password.

3.3 CSV Print Profile

The CSV file format is a text file with special separators for simply structured files that can be read by table processing software.

A print profile for the CSV format is already provided by the factory. New CSV print profiles can be created according to the task requirements. The printout of values can be provided with a GLP header and footer, and the scope of the output values can be configured. Connectors can be set up for the output so that the output of the CSV files can be directed to mass storage or to a network printer.

The values accepted are collected in a printer memory. The print job can be viewed, and individual accepted values can be marked as invalid, as required. The print job can be sent to the connector as a CSV file at the end of the application, or from time to time. If the print job cannot be sent, the data are not lost and the output of the file is automatically repeated.

An application example can be found in chapter: Output to Windows File Server.

3.4 PC Direct Print Profile

PC direct facilitates direct insertion of the print output into a PC application, e.g. table processing. Special transfer software (Middle Ware, Wedge) on the PC is therefore no longer required.

PC direct simulates a PC input keyboard through the USB-B connection of the balance. The [Num-Lock] key on the PC must be pressed to ensure that the characters are correctly transmitted. The correct decimal point or comma must be set for the respective country.

The scope of the print output can be set according to requirements. The data fields Title, Abbreviation (Header), Value, and Unit can be selected for each output value. A 'TAB', 'Blank', or line break may be chosen as a separator between the data fields. For the output of the elements you can choose whether they should be 'single line' the elements next to each other or 'multi-line' the elements one below the other. The printout of the weight values is as on the balance display with plus and minus signs. As some applications cannot handle a leading plus sign, the option to select the leading sign is offered.

You can find an application example in the chapter: PC Direct Output.

3.5 SBI Direct Print Profile

SBI direct is the printout on all or a selection of interfaces that are set to the SBI protocol.

All interfaces are used for the print output if [Common SBI Protocol settings] has been selected as [SBI Output formatting]. Also the protocol of the desired interface must be set to SBI. For the printing process, the SBI formatting instructions selected in the menu [Connections] -> [SBI protocol] are used.

Only the interfaces selected in the print profile are used for print output if [Costumized] has been selected as [SBI Output formatting]. Also the protocol of the selected interfaces must be set to SBI. For the printing process, the SBI formatting instructions selected in the print profile are used.

A print profile for the SBI print is already provided by the factory. New special SBI print profiles can be created

according to the task requirements. The printout can be provided with a GLP header and footer, and the scope of the output values can be configured.

3.6 Web service report print profile

The Web service Report print profile is used if you want to establish a connection with the Ingenix® software. Completed tasks and their data remain on the device until they are retrieved by the software.

The print profile saves all the data provided, regardless of the configured print elements.

3.7 Print profile Text file

The text file can be used to write print outputs to a file in human-readable form. The file can then be passed on for other applications.

A print profile for the text file is not installed ex works. Further special text print profiles can be created according to the requirements from the tasks. Values can be printed with GLP header and footer, the scope of the output values is adjustable.

3.8 Print profile Data file

The "Data file" print profile outputs the report data in JSON format, a structured and human-readable data format. This format is intended for sending the report data to a web server via an HTTP or HTTPS connector. You can also save the JSON data structure as a file.

The scope of the print output can be set according to requirements. It is recommended to enable GLP output in this format in order to include device metadata in the data structure. Graphical elements such as blank lines or horizontal lines are ignored in this format, although they can be selected. The print profile is not preset ex works.

4 Connectors

A connector is used to output print data from print profiles via the connector to a mass storage device or a network printer.

Mass storage in the form of a drive can be directly attached to the balance via USB-A or USB-C, or can be located on a network server. Storage on a network server requires a QAPP extension, such as the Windows File Server, FTP/FTPS, or STARLIMS.

The YDP30-NET network printer can be connected by WLAN or as a general network printer with an independent Wi-Fi network or corporate network using DHCP.

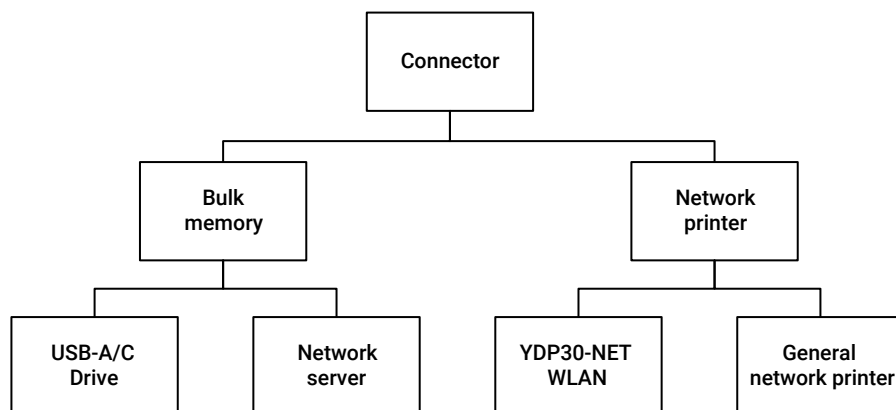


Figure 3: Output connectors

4.1 USB Connector

The USB connector can be used to connect a USB mass storage device, e.g. USB stick to the USB-A or USB-C connector of the balance. A name must be assigned to the connector, and it can be specified as a target folder on a data storage drive.

4.2 Network Server Connector

These connectors require a QAPP extension that defines the network service to be used. The required server must first be authorized in the QAPP Center under Connectivity. Thereafter, the required connector settings can be

entered.

4.2.1 Windows File Server Connector

The Windows File Server connector uses the SMB network protocol. This protocol facilitates access to released network drives of Windows or Linux computers in order to store data files in the target directories selected.

4.2.2 FTP/FTPS Connector

The File Transfer Protocol (FTP) is a standard network protocol for transferring computer files between a client and a server in a computer network. The balance is an FTP client and can transfer its file using the protocol on an FTP server. FTPS encrypts the connection.

4.3 YDP30-NET Connector

This connector is intended for connecting a YDP30-NET printer with a cable (LAN) or a wireless connection (WLAN). A connector requires a connector name, an IP address, or a host name to be entered on the printer, as well as an agreed port number between printer and balance.

4.4 Network Printer Connector

The network printer connector allows, for example, connections to an A4 printer in an independent Wi-Fi network with standard Wi-Fi components, or in a corporate network per DHCP with standard authentication methods. The network printer must support IPP (Internet Printing Protocol). A connector requires a connector name, an IP address, or a host name to be entered on the printer, as well as the transfer protocol.

4.4.1 Transfer Protocols

The [Socket] protocol is recommended for printer access in local networks. Modern network printers support the IPP and HTTP protocols. LDP should be used only when all other methods fail.

All protocols require the IP address or the host name of the network printer to be input. The [Socket] protocol requires an additional port number. The number 9100 is very commonly used, but this depends on the printer.

5 Interfaces and Protocols

Output to the RS232, USB, and Ethernet hardware interfaces that are available on the device require setup according to the requirements and devices connected.

The RS232, USB-B, and USB-A interfaces (with full speed) are located on the rear wall of the balance, or on the E-box. The network connection (Ethernet) and a USB-A, as well as a USB-C interface (with high speed), are located on the MCA display head.

Note: The interface settings all include a [Log communication] option. This option should be switched on only for diagnostic purposes, in the event that problems are identified with the interface.

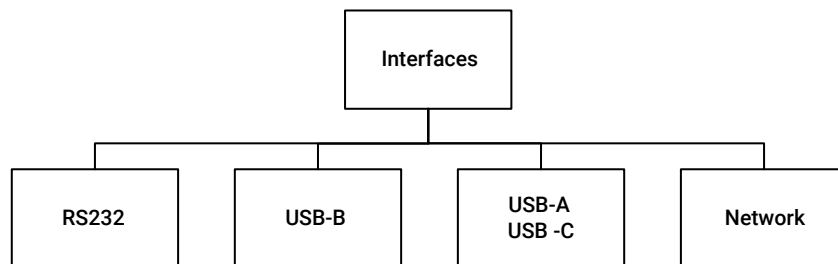


Figure 4: Balance interfaces

The selection of the possible protocol depends on the respective interface. These types of protocols are differentiated. ASCII-readable protocols such as SBI, SICS and miniSICS, binary protocol with xBPI, keyboard simulation with PC direct, and direct output from the task using QAPP.

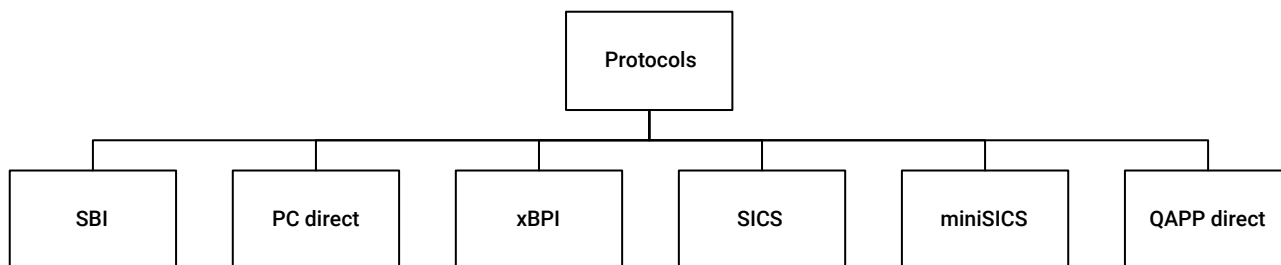


Figure 5: Interface protocols

5.1 Output of Display Values

This form of output is not strictly speaking printing, but is the output of display values independently of the activated task. This does not require settings for the task or the print profile. The settings for this output at the Ethernet, RS232, and USB-B interfaces are generally adjusted in the [Setup] menu under [Connections].

The output of display values can be achieved by requests using interface commands, or automatically with each new weighing result, or after predetermined time intervals. It is possible to select whether the output should be given with or without the standstill of the display value.

5.2 COM-RS232 Interface

The COM-RS232 interface is intended for the connection of a PC or an SPS control unit. It can be adjusted to the SBI, xBPI, SICS, and miniSICS protocols, which can be used independently of the tasks and their applications.

Furthermore, it is possible to operate the interface directly from the task and its QAPP. Communication with the connected device requires both locations to be set to the same baud rate, data bits, stop bits, parity, and handshake.

5.3 USB-B Interface

The USB-B interface is intended to create a connection to a PC via a standard USB cable with USB-A and USB-B plugs. On the PC, this connection is installed and displayed as a virtual COM port (VCP). The driver for this interface is automatically installed on the PC by the operating system, provided that the user has the appropriate rights. The interface can be set to the SBI, xBPI, SICS, and miniSICS serial protocols, which can be operated independently of the task and its application.

Furthermore, it is possible to operate the interface directly from the task and its QAPP.

The PC setting turns the balance into an input device (HID) and is displayed on the PC as a second keyboard. The output data from the balance can thus be written into any active PC application that currently contains the input pointer.

5.4 USB-A/C Interface

The USB-A and USB-C interfaces can be connected to USB slave devices, to a YDP30 USB printer for printed output on paper, or to a USB mass storage device for storing a print file. In addition, these connections may also be used for USB input devices such as barcode readers, PC keyboards, or USB foot pedals.

5.5 Serial Communication via a Network

Furthermore, it is possible to use the serial communication protocols via the network connection.

The SBI, xBPI, SICS, and miniSICS protocols can then be used independently of the active task and its applications.

This client/server connection requires settings for a joint TCP port.

Attention: The TCP is automatically disconnected after approx. 15 minutes of inactivity. The connection must then be re-established.

5.6 SBI Protocol

This simple, ASCII-based protocol can control the basic functions of the balance using ESC commands. The output of display values can be individually requested via an ESC command, or automatically with each new weighing result in the display sequence cycle, or automatically after specific time intervals. It is possible to choose whether the output is provided with a stable display value only, or also without the display value being stable. The output format can be selected with or without identifier (header).

6 Application Examples

The application examples relate to the MCA version from Package 09-03-04.01.xx onwards, along with the adjustment options and functionalities it contains. From this version onwards, the print output for the GLP header and footer, as well as the accepted weighing result, can be individually configured by selecting the items and determining their sequence. All other printer outputs are determined by the application used in the task (QAPP).

Appropriate user rights are required for establishing interfaces, print profiles, and the task.

6.1 Weighing with Individual GLP Print Using the YDP30 Printer on a Paper strip

This example describes the setup and application of a [Weighing] task with output of the accepted value in a GLP compliant manner and with individual settings, i.e. the GLP header should add lines for the name and the department of the company. The output is provided by a YDP30 USB printer on a paper strip.

6.1.1 Setting up

Configuration steps:

1. Configure a print profile, e.g. [My GLP print on YDP30].
 - a. Open the [Settings] menu.
 - b. Navigate to [Weighing and print profiles] -> [YDP30].
 - c. Use the [+] button to activate the creation of a new print profile.
 - d. Set the [GLP print] item to [On].
 - e. Open the selection of print items for the GLP header. The items specified for the GLP header will be displayed. You can delete items you do not need and add others using the [+] button.
Use the [Up]/[Down] buttons to define the position for each item.
 - f. For this example, select the positions [User text 1] and [User text 2] under [Add new items]. These positions are required for the name of the company and department, which you can enter later.
 - g. Open the selection of the print items for each accepted value. Here, the required items can be selected and their output sequence can be determined as previously described for the GLP header.
 - h. Open the selection of print items for the GLP footer.
Once again, you can select the required items and define their position.
 - i. Set the [Connector] item to [YDP30].
 - j. Select the print mode [Report with print preview].
This provides the option to mark the accepted values as invalid when required.
 - k. Select [Continuous] for the paper.
 - l. The [Continue] button activates the input of the user texts 1 and 2 that you designated for entering the name of the company and the department.
 - m. Next, assign a unique name and description to the print profile.
This is important if you wish to use this profile for other applications.
2. Allocate the print profile [My GLP print to YDP30] to your task, e.g. [My weighing with GLP print].
 - a. Open the [Task management] menu.
 - b. Use the [+] button to activate the creation of a new task.
 - c. Select the [Weighing] application.
 - d. Specify the number of descriptors for the lot (batch) and the samples. Up to 5 descriptors can be selected in each case.
 - e. Once the descriptors for the batch have been selected, you can specify an abbreviation and a designation for each of them.
 - f. Each of the sample descriptors may also include an abbreviation and a designation. Furthermore, it is possible to select whether the designation counter should automatically be increased or decreased.
 - g. Select a weighing profile, and then the print profile [My GLP print to YDP30].
 - h. The name and task description are then entered, select the user roles and save task.

6.1.2 Application

User steps:

1. Connect the USB-A connection on the balance with the USB-B connection on the YDP30 printer using a standard USB cable (USB-A to USB-B). The YDP30 printer is automatically recognized and no further interface settings are required.
2. Start the task, e.g. [My weighing with GLP print], which includes the allocated print profile [My GLP print to YDP30].

3. If you selected descriptors for the batch, they must now be entered or scanned. The [Weighing] application then starts.
4. The current weighing result is accepted by pressing the [Save] button. If you have selected descriptors for the samples, they must now be entered or scanned. The values specified by the print profile for each accepted value are written into the printer memory together with the descriptors, and can be viewed at any time using the [Printer memory] button. It is possible to mark the accepted value as invalid, where required.
5. The printer memory is automatically displayed after pressing the [Quit] button.
6. The [Print] button generates the print job and sends it to the connected YDP30 printer.
An output example can be found here: YDP30 printer with paper strip.

Note: If the print job cannot be completed, it will not be lost; see Troubleshooting.

6.1.3 Troubleshooting

No printout:

1. Ensure that all the configuration steps described above have been followed, especially the allocation of the print profile to the task, e.g. [My GLP print to YDP30].
2. Check that the balance is correctly connected to the YDP30 printer using a USB-A to B cable, and that the printer is switched on.
3. Ensure that the printer is supplied with a sufficient amount of [endless paper].
4. Repeat the output of the print job.
5. If this results in a [Transfer failure] message, you can retry the print job now, retry it later, redirect it, or delete it.
 - a. Retry: The print job will be resent to the YDP30 printer.
 - b. Retry later: The output of the print job will be automatically repeated. Outstanding transfers are displayed in the [Status center] under [Messages].
 - c. Redirect: You can redirect the print job to another connected printer.
 - d. Delete: The print job is canceled and deleted.

6.2 Printing of Labels Using the YDP30 printer

This example describes the adjustment and application of a [Weighing] task that involves output of the accepted values with date/time and a sample designation on a label via the YDP30 USB printer.

6.2.1 Setting up

Configuration steps:

1. Configure a print profile, e.g. [My label print on YDP30].
 - a. Open the [Settings] menu.
 - b. Navigate to [Weighing and print profiles] -> [YDP30].
 - c. Use the [+] button to activate the creation of a new print profile.
 - d. Set the [GLP print] item to [Off].
 - e. Open the selection of print items for each stored value. Predefined items are displayed with the output of each weighing result. You can delete items you do not need and add others using the [+] button. Use the [Up]/[Down] buttons to define the position for each item.
 - f. For this example, select the positions [Date/time] under add new items. Next, determine the printing sequence.
 - g. Set the [Connector] item to [YDP30].
 - h. Select the print mode [Immediate output without preview]. The label is thus printed on the YDP30 printer immediately after the weighing result is accepted.
 - i. Select [Label] for the paper. This output format is thus communicated to the printer.
 - j. Next, assign a unique name and description to the print profile.
This is important if you wish to use this profile for other applications.
2. Allocate the print profile [My label print to YDP30] to your task, e.g. [My weighing with label print].
 - a. Open the [Task management] menu.
 - b. Use the [+] button to activate the creation of a new task.
 - c. Select the [Weighing] application.
 - d. Specify the number of descriptors for the lot (batch) and the samples. In this example, only one descriptor is defined for the samples.
 - e. An abbreviation and a designation can be used as the descriptor for the sample. In addition, it is also possible to determine whether the designation counter should be automatically increased or decreased.
 - f. Select a weighing profile, then the print profile [My labels print to YDP30].

- g. The name and task description are then entered, followed by the selection and storage of user roles (wrong separation).

6.2.2 Application

User steps:

1. Connect the USB-A connection on the balance with the USB-B connection on the YDP30 printer using a standard USB cable (USB-A to USB-B). The YDP30 printer is automatically recognized, no further interface settings are required.
2. Start the task, e.g. [My weighing with label printing] with the assigned print profile: [My label print to YDP30].
3. The current weighing result is accepted by pressing the [Save] button. If you have selected a descriptor for the samples, it must now be entered or scanned. The values specified in the print profile for each accepted value are then printed immediately with the descriptor on a label via the YDP30 printer.
An output example can be found here: YDP30 Printer with Label Paper.

Note: In this configuration, the print job is sent immediately, so the [Printer memory] or [Quit] button do not offer a print preview.

6.2.3 Troubleshooting

No printout:

1. Ensure that all the configuration steps described above have been followed, especially the allocation of the print profile to the task, e.g. [My label print to YDP30].
2. Check that the balance is correctly connected to the YDP30 printer using a USB-A to B cable, and that the printer is switched on.
3. Ensure that the printer is supplied with a sufficient amount of [label paper].
4. Repeat the output of the print job.
5. If this results in a [Transfer failure] message, you can retry the print job now, retry it later, redirect it, or delete it.
 - a. Retry: The print job will be resent to the YDP30 printer.
 - b. Retry later: The print job will be automatically repeated. Outstanding transfers are displayed in the [Status center] under [Messages].
 - c. Redirect: You can redirect the print job to another connected printer.
 - d. Delete: The print job is canceled and deleted.

6.3 Printing in A4 Format Using a Network Printer

This example describes the setup and application of a [Backweighing] task with output of the accepted values for weighing and backweighing in GLP-compliant form in PDF format using a network printer with DIN A4 paper.

The [Backweighing] application is a QAPP from the [Advanced] package: it can be used free of charge for 30 days, after which a license must be purchased.

6.3.1 Setting up

Configuration steps:

1. Activate the [Backweighing] QAPP, if this has not yet been done.
 - a. Open the [Task management] menu, followed by the [QAPP Center].
 - b. Select the [Advanced] QAPP package and then the [Backweighing] QAPP. The description and version of the QAPP will be displayed.
 - c. Use the [License] button to activate this QAPP; the order and license information will be displayed.
 - d. If this QAPP was not ordered as [factory licensed], start the test version or enter the license code that you have purchased for this QAPP.
2. Establish a connector for a network printer, e.g. [My A4 network printer].
 - a. Open the [Settings] menu.
 - b. Navigate to [Connections] -> [Connectors] -> [Network printer].
 - c. Use the [+] button to activate the creation of a new connector.
 - d. Assign a unique name to this connector.
 - e. Enter the IP address of the network printer or the host name. Pay attention to the way in which the IP address and the host name are written.
More information is provided in chapter: Transfer Protocol.
 - f. Select the protocol that is understood by the network printer for the connection.
In our example, you select the [IPP] protocol and confirm the settings.

3. Configure a print profile, e.g. [My GLP print to A4 network printer].
 - a. Open the [Settings] menu.
 - b. Navigate to [Weighing and print profiles] -> [PDF].
 - c. Use the [+] button to activate the creation of a new print profile.
 - d. Set the [GLP print] item to [On].
 - e. Open the selection of print items for the GLP header. The items specified for the GLP header will be displayed. You can delete items you do not need and add others using the [+] button. Use the [Up]/[Down] buttons to define the position for each item.
 - f. There is no need to select print items for each added value. The output of the value is defined by the QAPP.
 - g. Open the selection of print items for the GLP footer. Once again, you can select the required items and define their position.
 - h. Set the [Connector] item to [My A4 network printer].
 - i. Next, assign a unique name and description to the print profile. This is important if you wish to use this profile for other applications.
4. Allocate the print profile [My GLP print to A4 network printer] to your task, e.g. [My backweighing with GLP print to DIN A4].
 - a. Open the [Task management] menu.
 - b. Use the [+] button to activate the creation of a new task.
 - c. Choose the [Backweighing] application.
 - d. Adjust the specified settings for backweighing to your requirements, e.g. the maximum number of batches, maximum number of samples per batch, sample labeling using an automatic increment or decrement, etc.
 - e. Choose a weighing profile, followed by the [My GLP print on A4 network printer] print profile.
 - f. The name and task description are then entered, select the user roles and save task.

6.3.2 Application

User steps:

1. Start the task, e.g. [My backweighing with GLP print on DIN A4] with the assigned print profile: [My GLP print to A4 network printer].
2. The specified values for the backweighing application are displayed in an overview.
3. Use the [+] button to activate the creation of a new batch and enter a unique designation for your batch (measurement, test).
4. Start your batch by weighing your sample, and enter a designation for sample 1.
5. Follow the instructions and symbols to guide you through the sample weighing process. Repeat these steps until all samples have been weighed.
6. Treat your samples in accordance with your requirements. In the meantime, the balance can be used for other batches or applications.
7. Start your batch by backweighing your samples and select the sample for backweighing.
8. Follow the instructions and symbols to guide you through the backweighing process. Once accepted, the backweighing results will be displayed. Repeat these steps until all the samples have been backweighed.
9. You have the option to change to the print preview of the accepted values and their results. You can generate the print output on the network printer from here. You can find an output example here: Network Printer with A4 Paper.

Note: If the print job cannot be completed, it will not be lost; see Troubleshooting.

6.3.3 Troubleshooting

No printout on the network printer:

1. Ensure that all the configuration steps described above have been followed, especially the allocation of the print profile, e.g. [My GLP print to A4 network printer] and the [My A4 network printer] connector.
2. Check the IP address and host name in the connector, as well as the protocol selected for your network printer.
3. Check that the balance is connected to the network via an Ethernet cable. The IP address of the balance in the network must be displayed in the [Status center] under [Device information].
4. Check that the printer is part of the network, and that a file can be saved there from your PC.
5. Repeat the output of the print job.
6. If this results in a [Transfer failure] message, you can retry the print job now, retry it later, redirect it, or delete it.
 - a. Retry: The print job will be sent to the network printer again.
 - b. Retry later: The print job will be automatically repeated. Outstanding transfers are displayed in the [Status

- center] under [Messages].
- c. Redirect: You can redirect the print job to another connected printer.
- d. Delete: The print job is canceled and deleted.

6.4 Output of Print Jobs on an FTPS server

This example describes the setup and application of a [Flexible formulation] task. The output of the stored formulation values should be in GLP-compliant form as a PDF file, sent to an FTPS server.

The [Flexible formulation] application is a QAPP from the [Advanced] package, it can be used free of charge for 30 days, after which a license must be purchased.

An [FTP/FTPS connection] QAPP extension from the [Connectivity] package is required for the transfer of files to a network server. The extension can be used free of charge for 30 days, after which it must also be licensed.

An appropriately set up FTPS server in your network is a requirement for this application.

6.4.1 Setting up

Configuration steps:

1. Activate the [Flexible formulation] QAPP, if this has not yet been done.
 - a. Open the [Task management] menu, followed by the [QAPP Center].
 - b. Select the [Advanced] software package and then the [Flexible formulation] QAPP. The description and version of the QAPP will be displayed.
 - c. Use the [License] button to activate this QAPP; the order and license information will be displayed.
 - d. If this QAPP was not ordered as [factory licensed], start the test version or enter the license code that you have purchased for this QAPP.
2. Activate the [Connection to FTP/FTPS] QAPP extension, if this has not yet been done.
 - a. Open the [Task management] menu, followed by the [QAPP Center].
 - b. Select the [Connectivity] software package, and within it the [Connection to FTP/FTPS] QAPP. The description and version of the QAPP will be displayed.
 - c. Use the [License] button to activate this QAPP; the order and license information will be displayed.
 - d. If this QAPP was not ordered as [factory licensed], start the test version or enter the license code that you have purchased for this QAPP.
3. Set up a connector to an FTPS server, e.g. [My FTPS server].
 - a. Open the [Settings] menu.
 - b. Navigate to [Connections] -> [Connectors] -> [FTPS].
 - c. Use the [+] button to activate the creation of a new connector.
 - d. Assign a unique name to this connector.
 - e. Enter the IP address of the network server (ensure correct spelling)
 - f. A port number is required for the connection: the number 21 has been assigned. If required, you can enter a different port number.
 - g. Enter the name of a sub-directory on the server, in which to save the files.
 - h. Enter username and password for access to the FTPS server.
4. Configure a print profile, e.g. [My PDF print on FTPS server].
 - a. Open the [Settings] menu.
 - b. Navigate to [Weighing and print profiles] -> [PDF].
 - c. Use the [+] button to activate the creation of a new print profile.
 - d. Set the [GLP print] item to [On].
 - e. Open the selection of print items for the GLP header. The items specified for the GLP header will be displayed. You can delete items you do not need and add others using the [+] button. Use the [Up]/[Down] buttons to define the position for each item.
 - f. There is no need to select print items for each added value. The output of the value is defined by the QAPP.
 - g. Open the selection of print items for the GLP footer. Once again, you can select the required items and define their position.
 - h. Set the [Connector] item to [My FTPS server].
 - i. Next, assign a unique name and description to the print profile.
This is important if you wish to use this profile for other applications.
5. Assign the [My PDF print on SMB server] print profile to your task, e.g. [My flexible formulation with PDF print on FTPS server].

- a. Open the [Task management] menu.
- b. Use the [+] button to activate the creation of a new task.
- c. Choose the [Flexible formulation] application.
- d. Adapt the specified settings for the formulation to your requirements, e.g. automatic takeover, number of components, number of lot and sample indicators, etc.
- e. Choose a weighing profile, followed by the [My PDF print on FTPS server] print profile.
- f. The name and task description are then entered, select the user roles and save task.

6.4.2 Application

User steps:

1. Start the task, e.g. [My flexible formulation with PDF print on FTPS server] with the assigned print profile: [My PDF print on FTPS server].
2. The specified values for the [Flexible formulation] application are displayed in an overview. Where necessary, change the number of components.
3. Follow the instructions and symbols to guide you through the takeover of components.
You can give each component an individual designation (ID). Repeat these steps for the specified number of components.
4. You have the option to change to the print preview of the specified values at any time; this also takes place automatically once the specified number of components have been taken over.
5. You can generate the print output as a PDF file on the FTPS server from the print preview.
See here for an output example: PDF Output to file on FTPS.

Note: If the print job cannot be completed, it will not be lost; see Troubleshooting.

6.4.3 Troubleshooting

No PDF file on the FTPS server:

1. Ensure that all the configuration steps described above have been followed, especially the allocation of the print profile, e.g. [My PDF print to FTPS server] and the [My FTPS server] connector.
2. Check the IP address and port number of the FTPS server, as well as the username and password for access rights to the server in the connector.
3. Verify that the balance is connected to the network via an Ethernet cable. The IP address of the balance in the network must be displayed in the [Status center] under [Device information].
4. Check that the FTPS server is part of the network and that a file can be saved there from your PC.
5. Repeat the output of the print job.
6. If this results in a [Transfer failure] message, you can retry the print job now, retry it later, redirect it, or delete it.
 - a. Retry: The print job will again be sent to the FTPS server.
 - b. Retry later: The print job will be automatically repeated. Outstanding transfers are displayed in the [Status center] under [Messages].
 - c. Redirect: You can redirect the print job to another medium.
 - d. Delete: The print job is canceled and deleted.

6.5 Output to Windows File Server

This example describes the setup and application of a [Flexible formulation] task with the output of the formulation values taken over in GLP-compliant form as a CSV file for the transfer to a network drive via SMB protocol.

The [Flexible formulation] application is a QAPP from the [Advanced] package: it can be used free of charge for 30 days, after which a license must be purchased.

A QAPP extension from the [Connectivity] package is required for the transfer of files to a Windows File Server using the SMB protocol. The extension can be used free of charge for 30 days, after which it must also be licensed.

An authorized drive with SMB protocol in your network is a requirement for this application.

6.5.1 Setting up

Configuration steps:

1. Activate the [Flexible formulation] QAPP, if this has not yet been done.
 - a. Open the [Task management] menu, followed by the [QAPP Center].
 - b. Select the [Advanced] software package and then the [Flexible formulation] QAPP. The description and version of the QAPP will be displayed.

- c. Use the [License] button to activate this QAPP; the order and license information will be displayed.
 - d. If this QAPP was not ordered as [factory licensed], start the test version or enter the license code that you have purchased for this QAPP.
2. Activate the [Connection to Windows File Server] QAPP extension, if this has not yet been done.
 - a. Open the [Task management] menu, followed by the [QAPP Center].
 - b. Choose the [Connectivity] software package, and within it the [Connection to Windows File Server] QAPP. The description and version of the QAPP will be displayed.
 - c. Use the [License] button to activate this QAPP; the order and license information will be displayed.
 - d. If this QAPP was not ordered as [factory licensed], start the test version or enter the license code that you have purchased for this QAPP.
3. Set up a connector to a Windows File Server, e.g. [My SMB server].
 - a. Open the [Settings] menu.
 - b. Navigate to [Connections] -> [Connectors] -> [SMB].
 - c. Use the [+] button to activate the creation of a new connector.
 - d. Assign a unique name to this connector.
 - e. Enter the network path for Host and Share, making sure that you use the correct spelling //Host Name/Share Name.
 - f. Enter the name of a sub-directory on the server, in which to save the files.
 - g. Enter the username and password for access to the authorized drive in your network.
4. Configure a print profile, e.g. [My CSV print on SMB server].
 - a. Open the [Settings] menu.
 - b. Navigate to [Weighing and print profiles] -> [CSV].
 - c. Use the [+] button to activate the creation of a new print profile.
 - d. Set the [GLP print] item to [On].
 - e. Open the selection of print items for the GLP header. The items specified for the GLP header will be displayed. You can delete items you do not need and add others using the [+] button. Use the [Up]/[Down] buttons to define the position for each item.
 - f. There is no need to select print items for each added value. The output of the value is defined by the QAPP.
 - g. Open the selection of print items for the GLP footer. Once again, you can select the required items and define their position.
 - h. Set the [Connector] item to [My SMB server].
 - i. Next, assign a unique name and description to the print profile.
This is important if you wish to use this profile for other applications.
5. Assign the [My CSV print on SMB server] print profile to your task, e.g. [My flexible formulation with CSV print on SMB server].
 - a. Open the [Task management] menu.
 - b. Use the [+] button to activate the creation of a new task.
 - c. Choose the [Flexible formulation] application.
 - d. Adapt the specified settings for the formulation to your requirements, e.g. automatic takeover, number of components, number of lot and sample indicators, etc.
 - e. Choose a weighing profile, followed by the [My CSV print on SMB server] print profile.
 - f. The name and task description are then entered, select the user roles and save task.

6.5.2 Application

User steps:

1. Start the task, e.g. [My flexible formulation with CSV print on SMB server] with the assigned print profile: [My CSV print on SMB server].
2. The specified values for the [Flexible formulation] application are displayed in an overview. Where necessary, change the number of components.
3. Follow the instructions and symbols to guide you through the takeover of components. You can give each component an individual designation (ID). Repeat these steps for the specified number of components.
4. You have the option to change to the print preview of the specified values at any time; this also takes place automatically once the specified number of components have been taken over.
5. You can generate the print output as a CSV file on the SMB server from the print preview.
See here for an output example: CSV output to file on SMB.

Note: If the print job cannot be completed, it will not be lost; see Troubleshooting.

6.5.3 Troubleshooting

No CSV file on the SMB file server:

1. Ensure that all the configuration steps described above have been followed, especially the allocation of the print profile, e.g. [My CSV print to SMB server] and the [My SMB server] connector.
2. Check the network path in the connector and the correct spelling of Host and Share, as well as the username and password for access rights to the SMB file server.
3. Check that the balance is connected to the network via an Ethernet cable. The IP address of the balance in the network must be displayed in the [Status center] under [Device information].
4. Check that the SMB file server is part of the network and that a file can be saved there from your PC.
5. Repeat the output of the print job.
6. If this results in a [Transfer failure] message, you can retry the print job now, retry it later, redirect it, or delete it.
 - a. Retry: The print job will again be sent to the SMB file server.
 - b. Retry later: The print job will be automatically repeated. Outstanding transfers are displayed in the [Status center] under [Duplicate messages].
 - c. Redirect: You can redirect the print job to another medium.
 - d. Delete: The print job is canceled and deleted.

6.6 PC Direct Output

This example describes the configuration of a Cubis® MCA balance to transfer weight readings to an application (e.g. table processing) on the PC using the PC direct function.

6.6.1 Setting up

Configuration steps:

1. Set the USB-B interface to [PC direct].
 - a. Open the [Settings] menu.
 - b. Navigate to [Connections] -> [Interfaces] -> [USB-B interface].
 - c. Process parameter, set [Protocol] to [PC direct], and activate.
2. Configure a print profile, e.g. [My PC direct].
 - a. Open the [Settings] menu.
 - b. Navigate to [Weighing and print profiles] -> [PC direct].
 - c. Create a new print profile, select output values according to your requirements.
 - d. Select data fields: one data field corresponds to a cell or column allocation for each output value in the table processing software.
 - e. Select the decimal points according to the regional settings for the operating system or the table processing software.
 - f. The column separator defines the separator between the columns (data fields).
 - g. Select the output of elements, 'one line' next to one another or 'multiple lines' one below the other.
 - h. Enter the profile name and description, where necessary, then save the profile.
3. Assign the [My PC direct] print profile to your task, e.g. [My weighing with PC direct].
 - a. Open the [Task management] menu.
 - b. Create a new task, select an application, e.g. [Weighing].
 - c. Select the number of descriptors.
 - d. Select a weighing profile, followed by the [My PC direct] print profile.
 - e. Enter the name and task description, select the user roles and save task.

6.6.2 Application

User steps:

1. Connect the USB-B connection on the balance with the USB-A connection on the PC using a standard USB cable (USB-A to USB-B).
2. Ensure that the [Num] key on your PC keyboard has been activated.
3. Start the task, e.g. [My weighing with PC direct] and its allocated [My PC direct] print profile.
4. The [Save] button is used to store the current weight, along with the output variables selected in the print profile, to the PC as a simulated keyboard entry and to transfer it to the cells and columns for table processing in accordance with the selected data fields.

See here for an output example: PC Direct in Table Processing.

Note: When the GLP/GMP printout has been activated, the GLP header is transferred as part of the first output. The GLP footer appears when you complete the printout via the print preview

6.6.3 Troubleshooting

No data transfer:

1. Ensure that all the configuration steps described above have been followed, especially the allocation of the [PC direct] print profile to the task.
2. Check that the balance is recognized as a keyboard by the operating system (Devices and printers). If the balance is not recognized as a keyboard by the operating system:
 - a. Ensure that the Cubis® MSA USB-B interface is set to [PC direct].
 - b. Ensure that you have the right to add new hardware to the operating system. (No special driver is required.)

Data fields are wrongly distributed or formatted in the table processing software:

1. Ensure that the [Num] key on your keyboard has been activated.
2. Ensure that the configured decimal points are in accordance with the regional settings of the operating system and the table processing software.

6.7 SBI Direct Output

This example describes the configuration of a Cubis® MCA balance to transfer weight readings by using the SBI print profile and the USB-B interface.

6.7.1 Setting up

Configuration steps:

1. Set the USB-B interface to [SBI direct].
 - a. Open the [Settings] menu.
 - b. Navigate to [Connections] -> [Interfaces] -> [USB-B interface].
 - c. Process parameter, set [Protocol] to [SBI], and activate.
2. Configure a print profile, e.g. [My SBI direct].
 - a. Open the [Settings] menu.
 - b. Navigate to [Weighing and print profiles] -> [SBI direct].
 - c. Create a new print profile, select output values according to your requirements.
 - d. Select [Common SBI Protocol]: For the printing process, the SBI formatting instructions selected in the menu [Connections] -> [SBI protocol] and all interfaces with SBI as selected protocol are used.
 - e. Select [Customized]: For the printing process, the SBI formatting instructions and interfaces selected below are used. In this case, please select the desired interfaces, format and formatting output values.
 - f. Enter the profile name and description, where necessary, then save the profile.
3. Assign the [My SBI direct] print profile to your task, e.g. [My weighing with SBI direct].
 - a. Open the [Task management] menu.
 - b. Create a new task, select an application, e.g. [Weighing].
 - c. Select the number of descriptors.
 - d. Select a weighing profile, followed by the [My SBI direct] print profile.
 - e. Enter the name and task description, select the user roles and save task.

6.7.2 Application

User steps:

1. Connect your device to the USB-B interface of the balance with e.g. the USB-A connection on the PC using a standard USB cable (USB-A to USB-B).
2. Start the task, e.g. [My weighing with SBI direct] and its allocated [My SBI direct] print profile.
3. The [Save] button is used to store the current weight, along with the output variables selected in the print profile. The stored data is then transferred via the USB-B interface to the PC.
See here for an output example: SBI Direct in Terminal Program.

Note: When the GLP/GMP printout has been activated, the GLP header is transferred as part of the first output. The GLP footer appears when you complete the printout via the print preview

6.7.3 Troubleshooting

No data transfer:

1. Ensure that all the configuration steps described above have been followed, especially the allocation of the [SBI direct] print profile to the task.
2. Check that the balance is recognized in the device manager of the operating system. If the balance is not recognized by the operating system:
 - a. Ensure that the Cubis® MSA USB-B interface is set to [SBI].
 - b. Ensure that you have the right to add new hardware to the operating system. (No special driver is required.)

7 Output Examples

These figures show examples of the output of stored weights via the various media.

7.1 YDP30 Printer with Paper Strip

```

Manuf.    Sartorius
Model     MCA524S
Ser. no.  1234567890
Package   09-03-03.01.16
          CN:76B3
Task      Weighing GLP
          YDP30
ID 1      My inventar number
My company name
My department name

Initial:
L ID1     My Lot ID
S ID1     My Sample 1
G         +49.99947 g
S ID1     My Sample 2
G         +99.99957 g
S ID1     My Sample 3
G         +199.99924 g

2020-03-03      14:04:00
Signat.:
  
```

[Weighing] sample application with GLP header and footer.

- Device ID for inventory number, for example.
- Additional lines for company name and department, for example.
- L ID for lot designation.
- S ID for designation of sample(s).

7.2 YDP30 Printer with Label Paper

```

S ID1     My Sample 2
2020-03-03      14:50:00
G         +99.99977 g

S ID1     My Sample 1
2020-03-03      14:49:34
G         +49.99978 g
  
```

[Weighing] sample application with label printing.

- S ID for sample designation.
- Date/time of takeover.

7.3 Network Printer with A4 Paper

SARTORIUS

Backweighing with Network Printer
Differential weighing with up to 10 lots (alphanumeric).

Manufacturer	Manuf.	Sartorius		
Model number	Model	M-623S		
Serial number	Ser. no.	0000108111		
Package version	Package	09-03-04.01.47 CN:76B3		
QAPP version	QAPP	2.1.9		
Task name	Task	Backweighing with Network Printer		
Lot ID	Lot	My Lot 1		
Sample number	n	1		
Sample ID	SID	My Sample 1		
Initial weight				
User	User	Administrator		
Net	N		+49.8001	g
Backweight 1				
User	User	Administrator		
Gross	G		+77.1009	g
Residue in g	Resi_g		26.9016	g
Residue in %	Resi_%		54.02	%
Loss in g	Loss_g		22.8985	g
Loss in %	Loss_%		45.98	%
Sample number	n	2		
Sample ID	SID	My Sample 2		
Initial weight				
User	User	Administrator		
Net	N		+49.8014	g
Backweight 1				
User	User	Administrator		
Gross	G		+78.0925	g
Residue in g	Resi_g		27.8956	g
Residue in %	Resi_%		56.01	%
Loss in g	Loss_g		21.9058	g
Loss in %	Loss_%		43.99	%
Date/time of report end	2020-09-01	08:42:52		
Signat.:				

CUBIS_0000108111_2020-09-01_06-42-52.pdf

1/1

7.4 PDF Output to file on FTPS



Flexible formulation with PDF to FTPS
This application is used to weigh in recipes.

Manufacturer	Manuf.	Sartorius
Model number	Model	MCA524S
Serial number	Ser. no.	1234567890
Package version	Package	09-03-03.01.16 CN:76B3
QAPP version	QAPP	2.1.2
Task name	Task	Flexible formulation with PDF to FTPS
Initial:		
Lot identifier 1	L ID1	My Lot ID
Components:		
Sample number	n	1
Component ID	CompID	My Component 1
Net	N	+49.99923 g
Sample number	n	2
Component ID	CompID	My Component 2
Net	N	+100.00000 g
Sample number	n	3
Component ID	CompID	My Component 3
Net	N	+24.81131 g
Result:		
Defined number of items	nDef	3
Sum	Sum	174.81054 g
2020-03-04	10:14:39	
Signat.:		

7.5 CSV output to file on SMB

```

Manuf. Sartorius
Model MCA524S
Ser. no. 1234567890
Package 09-03-03.01.16 CN:76B3
QAPP 2.1.2
Task Flexible Formulation with CSV to SMB

```

Output divided by separator into header, variable, and unit.

```

Initial:
L ID1 My Lot ID
Components:
n 1
CompID Component 1
N +99.90225 g
n 2
CompID Component 2
N +24.90796 g
n 3
CompID Component 3
N +31.12542 g
Result:
nDef 3
Sum 155.93563 g

```

```

2020-03-04 10:52:09
Signat.

```

7.6 PC Direct in Table Processing

	A	B	C
1	G	0,501604	g
2	G	1,100081	g
3	G	2,025426	g
4	G	5,068323	g
5			

Output divided into columns, e.g. header, weight, and unit.

7.7 SBI Direct in Terminal Program

```

G + 49.99945 g
G + 99.99984 g
G +199.99928 g
N + 49.99883 g
N + 99.99931 g
N +199.99941 g

```

Output of gross or net values, for example.

8. Abbreviations

ASCII	American Standard Code for Information Interchange	The American standard code for information exchange is a 7-bit character encoding system.
CSV	Comma separated values	Configuration of a text file to save or exchange data with a simple structure
DHCP	Dynamic Host Configuration Protocol	A communication protocol in computer technology. It allows for the allocation of the network configuration to clients by a server.
FTP	File Transfer Protocol	A standard network protocol for the transfer of files between a client and a server within a network.
FTPS	FTP over TLS	A method for encrypting the File Transfer Protocol (FTP).
GLP	Good Laboratory Practice	Good laboratory practice.
HID	Human Interface Device	An input device using the USB standards for computers.
HTTP	Hypertext Transfer Protocol	A protocol for the transfer of data via a computer network.
IPP	Internet Printing Protocol	Provides print services via a network.
MD5	Message-Digest Algorithm 5	A hash function that creates a checksum out of any text or file (or from a character string).
PDF	Portable Document Format	A platform-independent file format.
RS232	Recommended Standard 232	A standard for a serial interface.
SBI	Sartorius Balance Interface	A simple, ASCII-based protocol that can be used to control the basic functions of the balance with ESC commands.
SICS	Standard Interface Common Set	An interface protocol that allows the balance to be operated and controlled.
SMB	Server Message Block	A network protocol for file, print, and other server services in computer networks.
VCP	Virtual Com Port	Virtual communication port.
WLAN (WiFi)	Wireless Local Area Network	A wireless local network.
xBPI	Extended Balance Process Interface	Binary protocol with extended command volume. It can be used to control numerous balance functions.