TECHKON

SpectroJet

Manual

Scan-Measurement-Device
SpectroJet

Software
ExPresso 3

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Welcome

We welcome you among the worldwide community of users of TECHKON products. We are happy that you have selected this high-quality measurement instrument. It will be a valuable tool for your day-to-day quality control tasks. With this manual we invite you to learn how to use SpectroJet and the software ExPresso 3.

The manual is divided into three chapters:

Chapter 1: General description of the measurement system

Chapter 2: Installation of SpectroJet and ExPresso 3

Chapter 3: How to use SpectroJet and the software ExPresso 3

You will be fascinated how easy the system is to use. You will know how to work with SpectroJet after only a few minutes. The third chapter will show you detailed insight into the measurement functions.

Please get the device registered by using the detachable registration card, which is the last page of this manual. That way we can keep you updated about product news.

Please visit us as well on the internet at http://www.techkon.com.
You will find useful information about the complete product range and new software versions.

Do you have any suggestions for improvements or do you require information that goes beyond the contents of this manual? We will be glad to hear from you. Your suggestions or questions make an important contribution to the continuous optimization of our documentation and products.

Your TECHKON Team

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Chapter 1

General description of the measurement system

1.1 Product description

Accurate, fast and easy to use

SpectroJet revolutionizes automatic measurements of print quality on print control bars, color wedges and test charts.

Color measurement made easy: The compact measurement device is quickly guided by hand along the color bar. Tracking wheels on the bottom of the device ensure a secure and straight run. At longer distances the device can be slid along a guiding track. The measurement data is transferred simultaneously to a PC in order to control the color quality of the printing press.

All-purpose device

Thanks to the modular concept of SpectroJet it can be used for any printing process and quality standard. ISO 12647, PSO, Fogra media wedge, Gracol G7™ or any other standardization method can be applied: SpectroJet will always deliver all relevant measurement data necessary for evaluating high quality prints.

The supplied software TECHKON SpectroConnect displays clearly all measurement values on the computer screen, which are transferred by SpectroJet via an USB connection. All measurement values can be exported as well into other applications, such as Microsoft Excel™ for example. The additionally available software TECHKON ExPresso is especially suited for the evaluation and documentation of the print quality according to various quality control methods, e. g. ISO 12647 or Gracol G7™.

ISO compliant measurements

By software command a physical polarizing filter can be inserted which is the precondition for conforming to the print standards. Multiple functions – color densities, colorimetry, printing contrast, gray balance, dot gain or ink setting recommendations – SpectroJet is a versatile and valuable tool for achieving highest print quality and boosting the productivity of a printing press.

All advantages at a glance:

Easy to handle

- for automatic measurements of colorimetric values, densities, dot gain, printing contrast and gray balance
- TECHKON ExPresso PC-software can be operated with or without the touchscreen

Easy to install

- installation is made within seconds
- measurement device is maintenance free
- robust design for reliable function in a harsh industrial environment

Modular and compact

- works with any sheet or press format
- space-saving measurement device fits on any table
- also on inclined tables perfectly to handle
- delivery contains all components supplied in a practical carrying case

Complete measurement information

- any color bar can be measured (patch size has to match aperture size)
- color bar can be at any location on the printed sheet
- no limitation on paper thickness
- universally designed for ISO 12647 (PSO), Gracol G7™ or any other quality standard
- ideal for reading Fogra media wedge and similar color control targets

Accurate

- precise spectral engine in patented measurement head with automatically insertable polarizing filter for easy positioning conforming to ISO and DIN standards (e. g. CIE L*a*b*- and ΔE-measurements)
- UV cut filter option available

Fast

- high resolution spectral measurement of a complete color bar within seconds (e.g. 500 mm in only 3 seconds!)
- information overview displays relevant parameters for quality control in real-time

The perfect tool for spot- and scan-measurements.

The guiding track SpectroJet Track, which is optionally available, supports the accurate scanning of long color bars.

TECHKON SpectroJet is delivered as a complete turn-key system. Within a few minutes the system is up and running.

One unique feature of SpectroJet is its flexibility to be used with any press type or format.

TECHKON SpectroJet is the ideal extension to TECHKON's renown hand held instruments: **SpectroPlate** is the perfect tool for accurately reading printing plates and **SpectroDens** is the mobile, multi-purpose spectro-densitometer, which can be used at any location.

Dimensions

Two different performance packages

The scan-measurement device SpectroJet and the MS-Windows software ExPresso form a complete quality control system for increasing productivity and quality of a printing press.
There are two different versions available:

SpectroJet + ExPresso Basic
consists of the spectral measuring device SpectroJet and the MS-Windows software ExPresso Basic with the following functions:

- ink zone specific density display
- color density for CMYK and spot colors (spectral density)
- measurement data export
- densitometric gray balance
- dot area, dot gain and printing contrast
- slur / doubling value
- target values, references, tolerances, OK sheet
- face- and reverse printing
- works with any color bar length
- display of single measurements when used as a hand held device
- statistical analysis and report
- supports up to 6 printing units

SpectroJet + ExPresso Pro
contains the same functions as the "Basic" package and additionally:

- gray balance display (densitometric)
- ink zone specific colorimetric $\Delta E^*a^*b^*$ display, CIE $L^*a^*b^*$, $\Delta L^*a^*b^*$, $L^*C^*h^*$, $\Delta L^*C^*h^*$
- "InkCheck" recommendation for ink key setting
- display and evaluation according to ISO 12647, Gracol G7™ generator
- supports up to 16 printing units

A post-purchase software-upgrade from the Basic- to the Pro-version can be done easily.

1.2 Packing list

The carrying case protects SpectroJet and parts

Contents of delivery:

- measurement device SpectroJet
- white standard, AC adapter with universal plugs, USB cable, carrying case
- CD with software SpectroConnect
- print control strip TECHKON TCS Digital
- manual with ISO 9000 certificate

System requirements for TECHKON software:
MS-Windows XP, Vista.

Optional accessories:

- SpectroJet Track: horizontal track in different lengths with two vertical bars
- software TECHKON ExPresso delivered on CD with software protection key (USB-dongle)
- print control strips TECHKON TCS, available as EPS- and pdf-files on CD (can be downloaded free of charge at http://www.techkon.com)
- software-upgrades from ExPresso Basic to ExPresso Pro

Chapter 2

Installation of SpectroJet and ExPresso 3

2.1 Assembly of SpectroJet

SpectroJet is a solidly designed measurement device which is very functional and easy to use. It is compact in size; the buttons can be reached with the right index finger when the device is held with the right hand. The LED row is always visible.

A great advantage of SpectroJet is the fact, that it can be easily positioned on the measurement sample.

The device incorporates a high-resolution spectral sensor which analyzes the color spectrum of the measured sample. The spectral data is the base information for calculating densitometric and colorimetric data which is displayed. Densitometric values can be solid density, dot area, dot gain or trapping values. Colorimetric values are typically CIE L*a*b*- or ΔE-color information.

The USB-connector is for linking with a PC. The self-locking push-pull-connector fits into the socket at the back of the device.

2.2 Installation of the software ExPresso 3

System requirements:

- PC with MS-Windows XP or Vista
- 2 USB ports
- Screen resolution: 1024 x 768 or higher

The software is optimized to be operated with a touch sensitive screen (for example: Elotouch 1715L 17"). However, working without a touchscreen by using a conventional mouse / trackpad and keyboard is also possible.

Recommended color bar:

Print control strip TECHKON TCS Digital (included with ExPresso 3 software).

Installation:

It is important to carry out the following steps in the right order, to make sure that the USB device drivers will be installed properly.

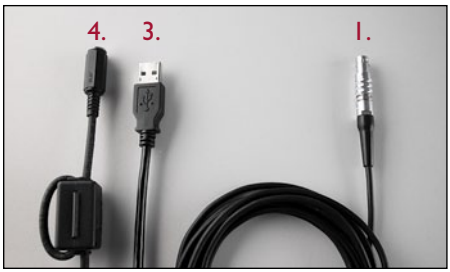
1. Make sure that SpectroJet and the USB-dongle (software protection key) are NOT connected to the PC. Insert the TECHKON CD into the CD drive of the computer. (You will find the CD at the back of the manual).
2. Select "ExPresso Installation" from the menu. The installation routine will start automatically. Follow the steps of the installation, until it is completed.
3. Now, after the installation was finished successfully you can connect SpectroJet with the USB cable and the USB-dongle to the PC.
4. TECHKON ExPresso can now be launched.

Chapter 3

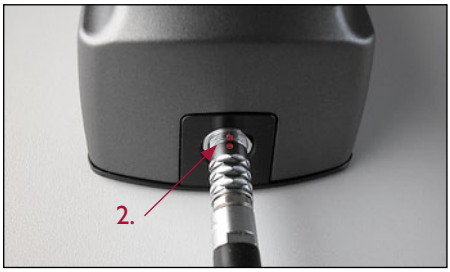
How to use SpectroJet and the software ExPresso 3

3.1 Operation of SpectroJet

Installation of SpectroJet



Data cable



Push-pull-connection of SpectroJet

AC adapter with universal plugs

• Connect the push-pull-connector (1.) of the included data cable with the socket at the back of the device. Please make sure that you connect the cable properly. The red dots (2.) on the connector and the socket will guide you. The connector has to snap in audibly.

Tip: Disconnect the connector from the device, by grasping the fluted area at the front of the connector. Thus the movable part of the connector will shift back when pulled and the adjustment of the connector in the socket will be released.

• Connect the USB-connector (3.) at the other end of the cable with the PC and the second branch of the cable, which ends in a phone socket (4.), with the phone jack of the AC adapter cable. Now connect the AC adapter to the grid.

When the green LED in the middle of the LED row is flashing, SpectroJet is ready for use.

To switch off the device, you just have to disconnect the AC adapter from the grid.

The AC adapter can be used universally for 100 – 240 V and a frequency of 47 – 63 Hz. There are three adapter plugs for different countries. For changing, just pull the plug and push in the new one. Make sure that the plug adapter has a tight fit and use only the original TECHKON SpectroJet AC adapter.

Guiding track SpectroJet Track (Accessory)

Guiding track SpectroJet Track

TECHKON offers optionally the guiding track SpectroJet Track in different lengths, which matches to the most current printing sheet formats.
For the installation you need the holder, the guiding track and the two metal bars.

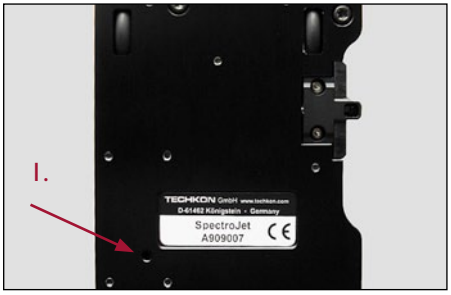
• First take the included screw driver and attach the holder to the stop rail at the back of the SpectroJet device.

• Now the two vertical metal bars, having self-adhesive tape on the backside, are attached to the table or console. The distance of the metal bars from each other is given by the length of the guiding track. The vertical bars should at one side preferably flush with the lay-on edge of the table.

• Make sure, that the vertical bars are parallel and well aligned in order to hold the left and right end of the guiding track, which will attach magnetically to the vertical bars.

• Finally mount SpectroJet with the fixed holder onto the guiding track.

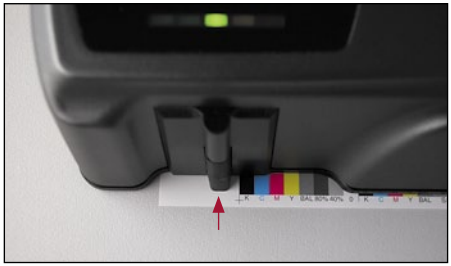
Adjustment of the tracking wheels



The resistance of the tracking wheels at the bottom of the device can be adjusted.

• Insert an Allen key (1,5) into the little hole (1.) which is located near the device label with the serial number at the bottom of SpectroJet. When you turn the screw key clockwise you will decrease the resistance. Turning the screw key anticlockwise will result in a higher resistance.
Thus you can customize the movement characteristics of SpectoJet to your preferred way of working when using the device in scanning mode.

Scan measurements



• Place SpectroJet on the color bar with the measurement aperture just ahead of the first section, you want to measure. Press the green measurement button. After an acoustic signal an the illumination of the whole LED row, start to scan the color bar at constant speed. After the first measurement run you have completed the densitometric measurement an you will hear, that the polarization filter is switched off for the colorimetric measurement.

• Now move the device in a constant speed back to the point where you started the measurement.

If densitometric measurements without polarization filter are carried out, only one measurement run is necessary (which is the standard practice in the USA).

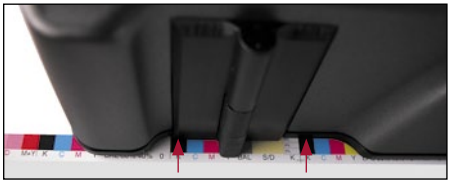
The faster you move the measurement device along the color bar, the more of the green LEDs will light up in the LED row. When the orange LED flashes up, the limit range is reached.

If the speed was too high and SpectroJet was not able to read all measurement patches, the red LED at the end of the row lights up together with three acoustic signals and the software displays that the measurement procedure has been aborted. In that case repeat the measurement at lower speed.

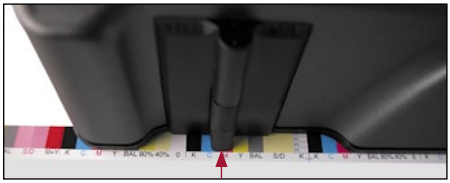
If the measurement was carried out successfully a short double signal can be heard and the measurement data are captured by the software.

Make sure that the measurement head is aligned exactly with the color bar.

Here the optional available guiding track SpectroJet Track is a helpful tool.



• When using color bars with a patch height smaller than 4,5 mm, the edge of the measurement head of the device has to be placed exactly at the upper edge of the color bar, to ensure that the measurement head is positioned correctly on the patches.



When using color bars with a patch height higher than 4,5 mm, the measurement head has to be placed with the measurement aperture at the bottom edge of the color bar.

Spot measurements

• To carry out a spot measurements just position the device with the measurement head on a single measurement patch and press the green measurement button shortly.
During the measurement process all LEDs flash up simultaneously. A double sound confirms, that the measurement is completed and the measurement data are displayed by the ExPresso software in the window „Spot measurement“.

How to measure

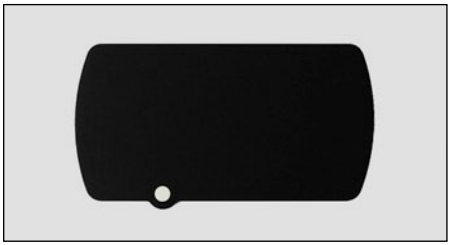
Please ensure that the device always has a firm stand on a solid and flat surface. The rubber wheels prevent the device from slipping in the vertical direction. There must not be a distance between the measurement head and the sample where light could pass through, because this can influence the measurement. The color of the background material underneath the measurement sample can have an influence on the measurement result. Different technical standards describe which backing material to use. In the printing industry the following procedure is widely used: White backing for single printed papers and black backing for double printed sheets in order to avoid that the back printed side might shine through the paper and influence the measurement.

Paper white calibration

A paper white calibration can be carried out by keeping the green button pressed for a few seconds. The measurement aperture has to be positioned on a non-printed area of the sheet.

Absolute white calibration

The absolute white calibration is carried out on the absolute white standard which is included. SpectroJet must be placed on the standard, with the measurement aperture on the ceramic tile. Make sure that the ceramic white standard is clean and not defective.



Absolute white standard of SpectroJet

• Choose in the ExPresso Software under „Settings → Measuring conditions → Measurement devices" the button „Settings" and press then in the „Measurement settings" window the button „Absolute white calibration". SpectroJet will confirm the calibration with an acoustic signal and the ExPresso software displays that the calibration was carried out successfully.

3.2 Care and maintenance

SpectroJet is a highly-precise optical instrument. It is designed to work in harsh, industrial environments. However, it should be handled with care. Avoid mechanical shocks, heat, dusty or humid environments.

Cleaning

Although the measurement head with the optical system is sealed against dust and dirt, take care that the visible, open measurement aperture is always free of dust. You can clean the measurement aperture with oil-free, clean compressed air and a brush used for cleaning photographic equipment.

Clean the device casing only with a soft cloth and a non-aggressive plastic cleaner. Never use alcohol or chemically aggressive solvent-based cleaners which can destroy the surfaces.

The same procedure is valid for the white standard. A soft cloth made of microfibers is especially well suited for cleaning the white ceramic tile. If the white standard should be defective, it has to be replaced completely.

Clean the rubber of the tracking wheels regularly with a cloth. Do not use aggressive cleaners for this procedure.

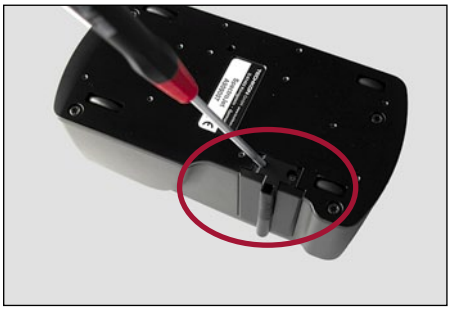
Please do not stick any labels at the bottom of the device. This could lead to faulty measurements, because the defined distance – which is important for the correct optical field of depth – might not be maintained.

Exchanging apertures

The measurement aperture can be replaced for cleaning purposes. A special screw-driver type TORX T6 is required and which is included into delivery.

• For the disassembly and assenbly of the aperture turn the instrument upside down. Use a soft cloth as protective layer to avoid any scratches of the case-surface.

• After each cleaning of the aperture a new white calibration has to be carried out.



1. Release the two screws completely so they can be taken out. Now the aperture can be lifted from the measurement head.

2. When disassembling or assembling an aperture take care that no dust enters the optical elements. Do not press the screws too tight in order to avoid damaging the threads.

Error handling

• Should SpectroJet do not work properly, first check, if the ExPresso software is running correctly. The status bar in the lower right corner will display if the device communicates correctly with the PC.
Restarting the software ExPresso is also recommended when a problem occured.

• Check that the right measurement device is selected in the software settings.

• Check if the AC adapter is connected correctly to the mains plug and the device. When connected properly, SpectroJet shows a flashing green LED in the middle of the LED row.

Warranty

The warranty for TECHKON products is 24 months starting with the date of purchase. The invoice is the certificate of warranty. The warranty is invalid if the damage is caused by inadequate use of the device.

Should a TECHKON product do not work according to the specification, please contact us before sending us the device. In most cases we can solve the problem over the phone or via E-mail.

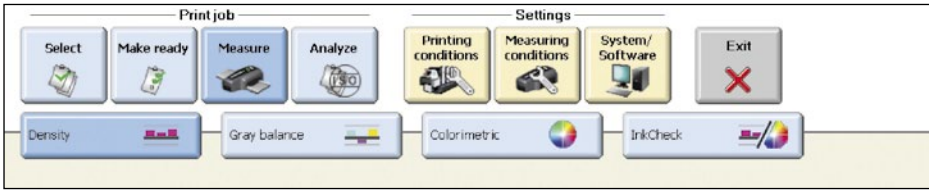
Inspection intervals

TECHKON SpectroJet is maintenance free. **We recommend to validate the complete functionality of the devices in a 24 months time interval in the TECHKON service center.** We offer a complete device check as a service package. Please contact us for details.

For a flat fee the device will be cleaned, checked and recalibrated. In case a repair or exchange of components should be necessary we will inform you. Please send the device always securely in the carrying case with complete accessories.

3.3 Software overwiew

The software ExPresso is clearly structured. The menu bar comprises the three sections “Print job” (blue buttons), “Settings” (yellow buttons) and “Exit” (gray button). The appropriate submenu layers follow this color system persistently.



Select:

Select
P. 40

Make ready
P. 41

- Print job info — P. 41
- Press / Inks — P. 42
- Sheet / Color bar — P. 43
- Target values / Tolerances — P. 45

Measure
P. 47

- Density — P. 47
- Gray balance — P. 50 (GrayGuide P. 51)
- Colorimetric — P. 52*
- InkCheck — P. 53*

Analyze
P. 56

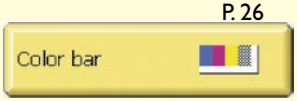
- ISO-report single measurement — P. 56*
- ISO job report — P. 57*
- Single measurement report — P. 59
- Job report — P. 60

* ExPresso Pro only

Settings:

P. 26

P. 26



P. 29

P. 27

P. 31

P. 31

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P. 33

P. 37

P. 38

P. 38

Exit:

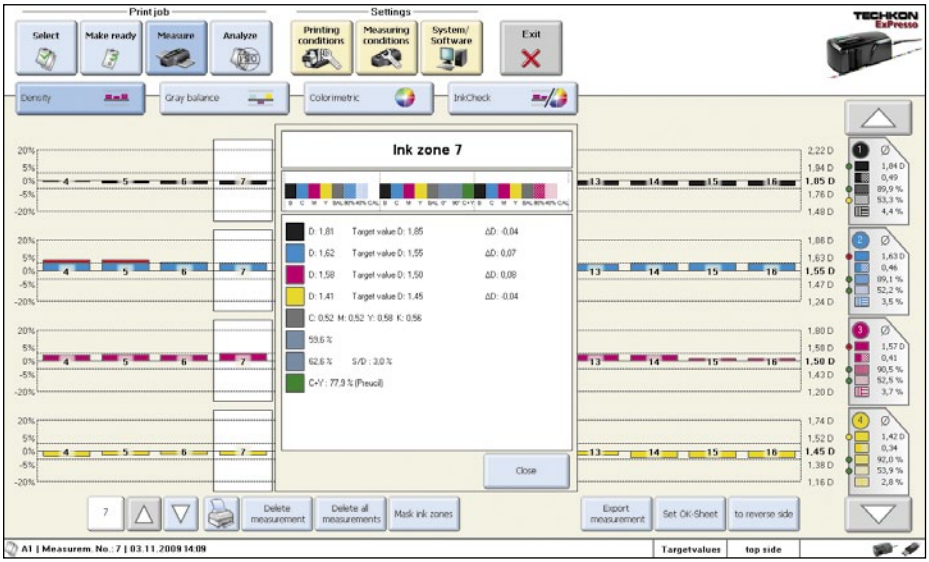
P. 61

By clicking on the device icon in the right section of the **menu bar** (1.), one gets a direct access to important device settings. A window is displayed with the submenus "Measurement device / Update", "Measurement settings" and "Export to other applications" (see p. 33 – 35).

Below the menu bar the **program window** (2.) is displayed which is activated by the appropriate menu item.

The following example shows the program window "Density" after a measurement was carried out. In this program window a click on the bar graph opens a second window displaying detailed measurement data of the ink zones.

The **command line** (3.) of the active program window is located at the bottom of the program window.



The bottom area of the screen is a **status line** (4.), showing the connection status of the measurement device (SpectroDrive, SpectroDrive Simulator or SpectroJet) and of the USB-dongle at the right side. When moving the mouse pointer on the icons of one of these components, you get additional information, e. g. the density- and colorimetric-settings of the device or the software version.

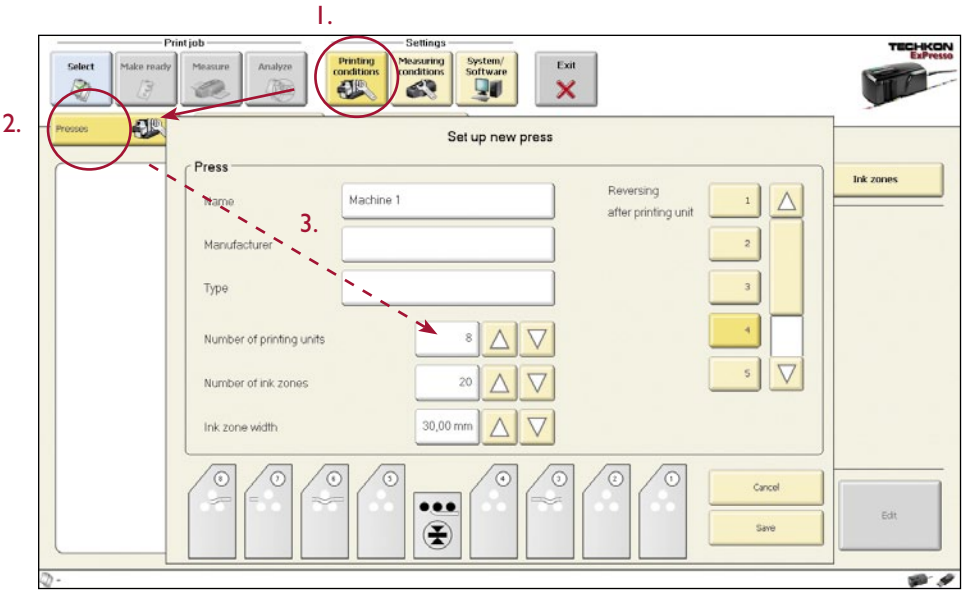
3.4 Software settings

When the software is started by a double click on the TECHKON ExPresso icon, the software routine checks first, while displaying the intro icon, whether a measurement device and a dongle are connected.

If the software does not detect any measurement device, an information window requests you to connect the measurement device to the PC or to select another measurement device out of the settings menu. In the menu item "Settings → Measuring conditions → Measurement devices" there is also the option "SpectroDrive Simulator" to your disposal. Please keep in mind, that the simulator provides only virtual measuring data for test- and demo purposes.

If you have not defined any printing machine in the menu section "Settings → Printing conditions → Presses" up to now, you will see the following info window:

You can set up a printing machine which fits to your print job, by clicking on the "New" button in the menu item "Presses". When it has been installed and saved, the new printing machine appears in a listing in the right section of the menu, where it is at hand if you wish to change the press settings later.



Certain settings are done only once, after the software is installed or have to be changed only occasionally when fundamental parameters have altered. For example the menu language, the selection of the measurement device or the definition of a new printing press will be set once and do not have to be set for each and every print job to be carried out later.

This kind of **settings** is made by pushing one of the **yellow** "Settings" buttons (1.) and then selecting one button from the sublayer (2. see p. 24). The referring window opens (3.) and can be edited.

All settings which were made, can later be recalled when defining a **"Print job"**, where the screen will appear in **blue** color.

When you start ExPresso, the sublayers "Make ready", "Measure" and "Analyze" in the section "Print job" are shaded an can not be activated until you have set up all necessary informations concerning your printing- and measurement-conditions in the "Settings". Finally you have to click on the "Select" button in the "Print job" section to define or select a print job. Now all menu items in the "Print job" section can be used.

The following settings can be made in the "Printing conditions" section:

Printing conditions – Presses

- Name: text box to define a name of the printing press
- Manufacturer: text box (not mandatory)
- Type: text box (not mandatory)
- Number of printing units: 1 – 6 for ExPresso Basic, 1 – 16 for ExPresso Pro
- Number of ink zones: max. 100
- Ink zone width: in mm, max. 100 mm
- Reversing after printing unit: if the printing press has a reversing unit, the location can be set

You can set up new printing presses (see p. 24) and edit or delete the ones which are already defined and listed in the right section of the "Presses" window.

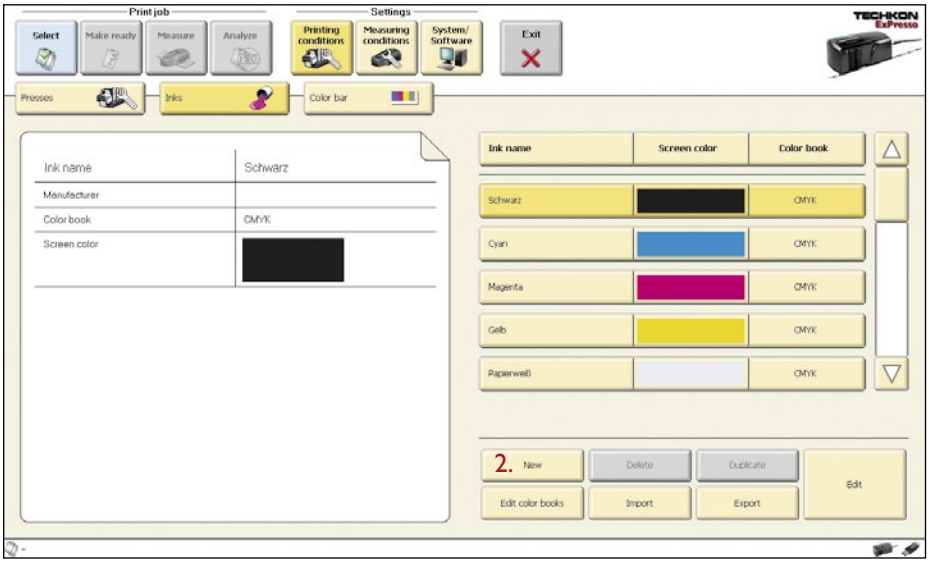
Tip: By double clicking on one of the printing presses which are listed in the right section of the main window you switch directly into the appropriate "Edit" window. You find this possibility of quick editing in all of the "Print job"- and "Settings"-windows which contain such listings. The order of the listed elements can be changed by clicking in the header of the register.

Settings – Inks

The list of inks included in the database is displayed. The four process colors C, M ,Y and K (1.) are pre-installed. They are stored in the color book CMYK and are already marked by a screen color. The four process colors can not be deleted or duplicated.

But it is possible to edit further inks and to import, duplicate and export them.

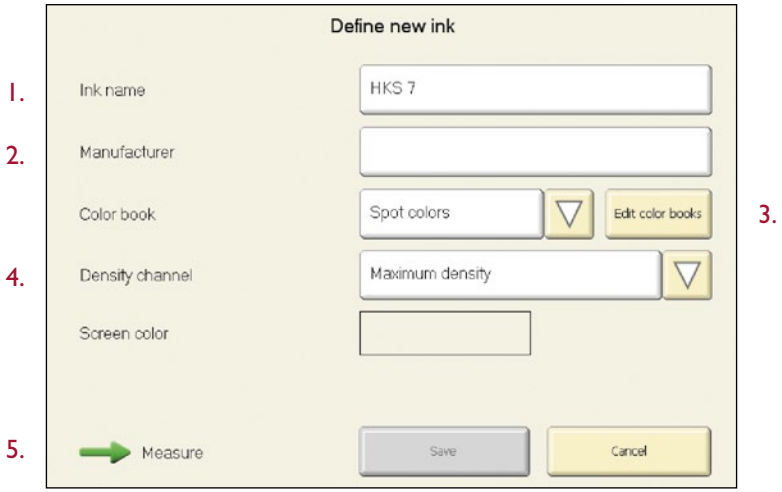
By using the "Export" function you can hand over individually edited inks and color books easily to another printing machine.



1.

The definition of new inks makes it possible to edit and measure customary spot colors, for example the colors of a HKS color book.

- First click on the "New" button" (2.), to open the window "Define new ink".



• Now enter an ink name (1.) for the spot color. Additionally the manufacturer can be defined.

• You can choose an already existing color book for the new ink or a generate new one. You edit a new color book by clicking on the button "Edit color books" (3.). In the window which opens now you choose "New", enter a name for the new color book and confirm the process with "OK".

• Choose "Maximum density" (4.) for density channel for spot colors.

• Now click on the green arrow to activate the "Measure" function (5.), after you have placed the measurement head of the device on the color patch you wish to measure. The procedure will be carried out and the software adds a screen color to the new ink.

• Complete the definition of the spot color by pressing the "Save" button. The new ink appears now in the ink list in the right section of the "Inks" menu.

Thus any customary spot colors or individual colors can be measured and added to the ink listing.

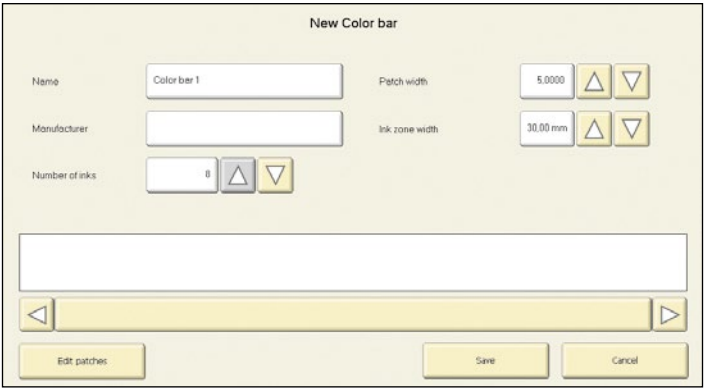
Printing conditions – Color bar

In this menu section the list color bars included in the database is displayed. We recommend the use of the TECHKON TCS print control strips, because their design is based on ink zones and covers all relevant measurement patches. Other definitions can be loaded by using the "Import" function.

But not only already existing color bars can be used and edited. You can also generate your own printing definitions in ExPresso.

Please note that the used colors are only placeholders for the printed colors in the print job.

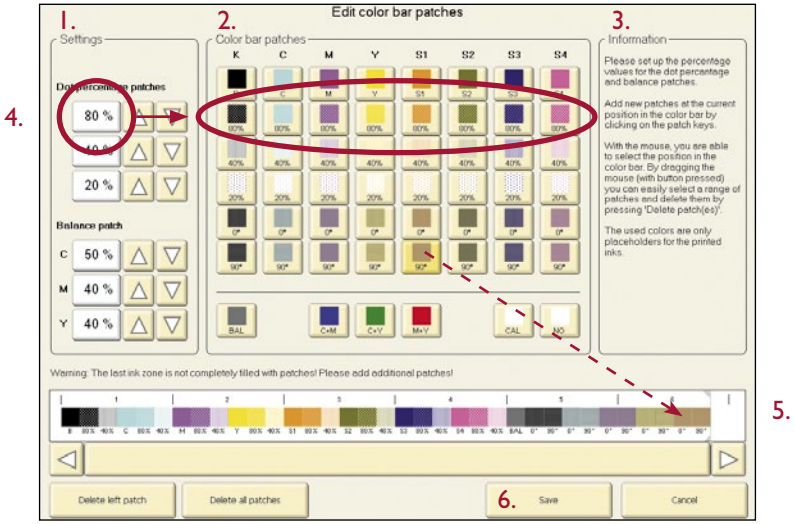
When you click the "New" button in the "Color bar" menu, the window "New color bar" opens.



1.

• Edit the text boxes "Name", "Manufacturer", "Number of inks", "Patch width" and "Ink zone width". Then click on the "Edit patches" button (1.).

The window "Edit color bar patches" opens, which is divided into the three sections "Settings" (1.), "Color bar patches" (2.) and "Information" (3.).



• First define three percentage values for the dot percentage patches and three for the balance patch (4.), which both are listed in "Color bar patches".

• In the section "Color bar patches" now successively compile your individual color bar by clicking on the color bar patches. The color bar which you are creating is displayed in the lower part of the window (5.).

• If you edited 8 in "Number of inks" in the previous "New color bar" window, now you have the four process colors C, M, Y, K as well as 4 spot colors at your disposal. Each of these colors is given as solid ink, dot percentage value and slur / doubling patches. The bottom line offers a balance patch (BAL), the trapping patches (C+M, C+Y and M+Y), a calibration patch (CAL) and an empty patch (NO).

• Accidentally set color bar patches can be marked directly in the color bar (by sliding over them with the mouse button pressed) and then deleted by clicking on the "Delete selected patches" button. To add patches later, you can set with a mouse click a marker in the color bar. To the left of this marker the new patches will be filled in.

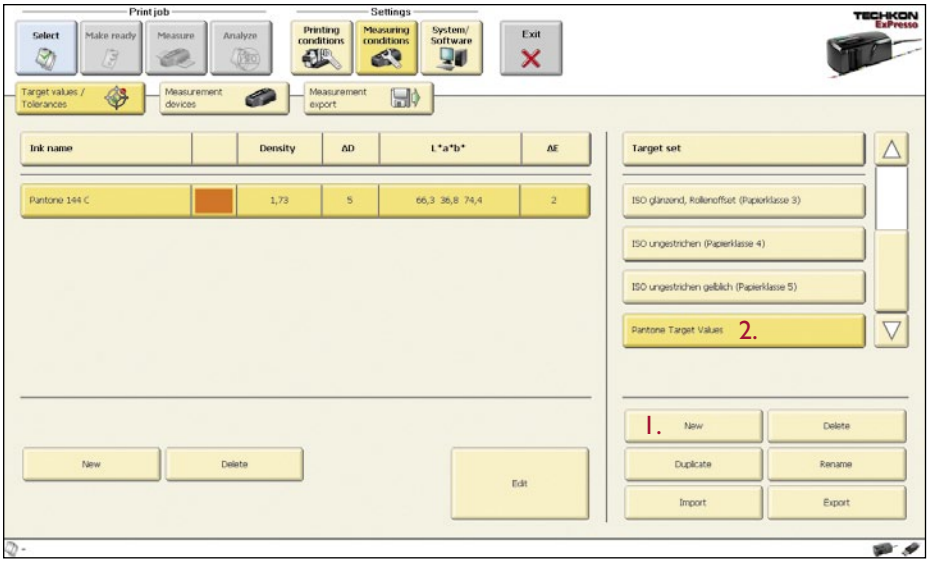
• Finally the "Save"-button will save the currently generated color bar (6.) and it will be listed automatically in the first place of the already existing color bars

The following settings can be made in the "Measuring conditions" section:

Measuring conditions – Target values / Tolerances

A list of data sets for target values and tolerances will be displayed. It is based on ISO 12467 color values for CMYK. Individual target and tolerance settings can be made as well – also for spot colors.

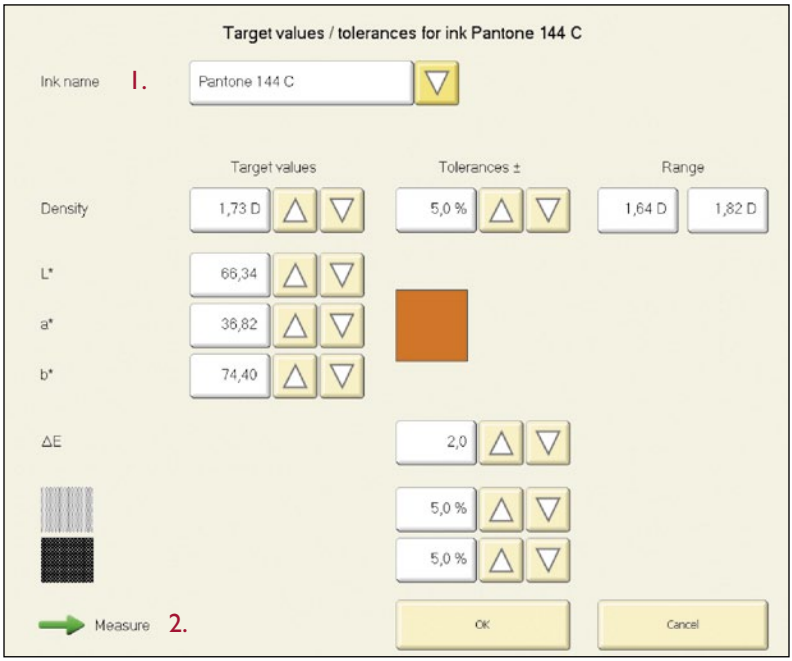
• Click on the "New" button (1.) in the right menu section below the already listed target values. A new window opens where you can enter the name of the new target set you want to generate. Confirm the process with "OK". The new target set will appear in the list of the already defined target sets in the menu window (2.), but it does not yet contain colors.



• Now click on the "New" button, which you find on the lower left side of the menu window. The window "Target values / tolerances for ink" appears.

• Choose from the pull-down-menu the "Ink name" (1.) of a color, which you have already defined in "Settings" → Printing conditions → Inks" (see p. 27).

• Additionally you can change the target values and tolerances of this color manually by editing the text boxes or take the measurement data of SpectroJet by pressing the "Measure" button (2.).



• Confirm the color and eventually set changes with "OK". Now the color appears in the left section of the menu window and is added to the new target set.

• Thus proceed with all the colors which you want to add to a target set.

• Already existing target sets can be duplicated, renamed, imported an exported by using the buttons in the lower right section of the "Target values / Tolerances" window (see picture on p. 31). The target sets of the five paper classes can not be deleted.

Measuring conditions – Measurement devices

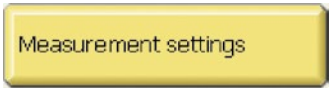
The types of measurement devices which can be connected to the ExPresso software are shown. When you have chosen the type of device you wish to connect, an information window is displayed at the left side of the window. Here you get further information about the actual device and the connection status.

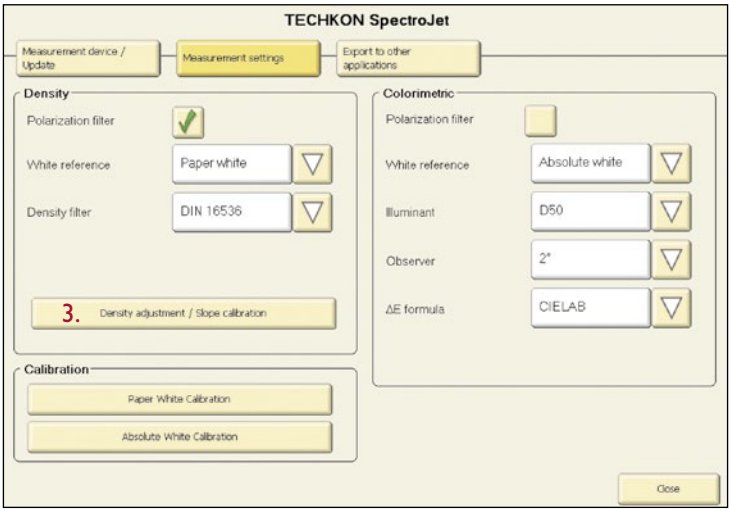
By clicking on the "Settings" button in the right lower corner, of the "Measurement devices" menu, the window "TECHKON SpectroJet" opens, which is divided into three sections and which offers basic settings options.

The "Measurement device / Update" window shows all relevant information concerning the connected device (1.).

The button "Start device update" (2.) establishes the connection to the hard disk level of the PC and enables the choice of the directory, in which the update file is located.

You can download the latest firmware for you device free of charge in the internet: www.techkon.com → Service → Software → Folder: SpectroJet / TECHKON ExPresso → TECHKON SpectroJet Firmware.
The firmware version of the connected SpectroJet can be seen in the information window "Measurement device / Update".





In "Measurement settings" the fundamental settings for density- (1.) and colorimetric-measurements (2.) are displayed.

The standard pre-settings for density measurement are
• for Europe: polarization filter on, white reference is paper white, density filter is DIN 16536
• for the USA: no polarization filter, white reference is absolute white, density filter is status T.

You can use the "Density adjustment / Slope calibration" (3.) function, to adjust the measurement device to the density measurement data of other devices.

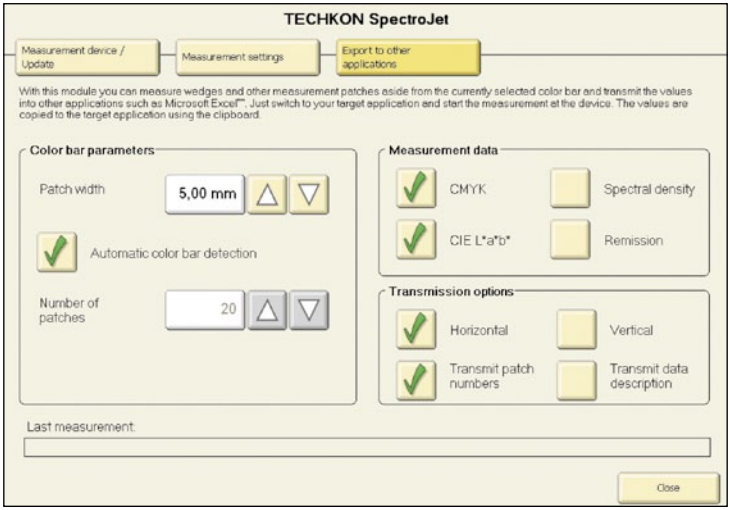
• Select the window "Density adjustment / Slope calibration" and follow the instructions. First you have to carry out a paper white calibration on the paper patch of the calibration chart.

Then the reference values of the calibration chart have to be entered into the text boxes of the process colors. Now the color patches (CMYK) of the calibration chart have to be measured. A green checkmark confirms that the measurement was carried out successfully. The new density adjustment is saved with "OK". If the procedure is cancelled or the "Reset slope values" function activated, the device will be reset into its factory-made state.

The pre-settings for colorimetric measurements are: polarization filter off, white reference is absolute white, illuminant is D50, observer is 2° and ΔE formula is CIELAB.

One can choose other standards by clicking on the pull-down-menu if required.

The buttons "Paper white calibration" and "Absolute white calibration" (4.) start the corresponding calibration. After the calibration has been carried out properly, it will be confirmed by the information window.



With this module you can measure wedges and other measurement patches aside from the currently selected color bar and transmit the values into other applications such as Microsoft Excel™. Just switch to your target application and start the measurement at the device. The values are copied to the target application using the clipboard.

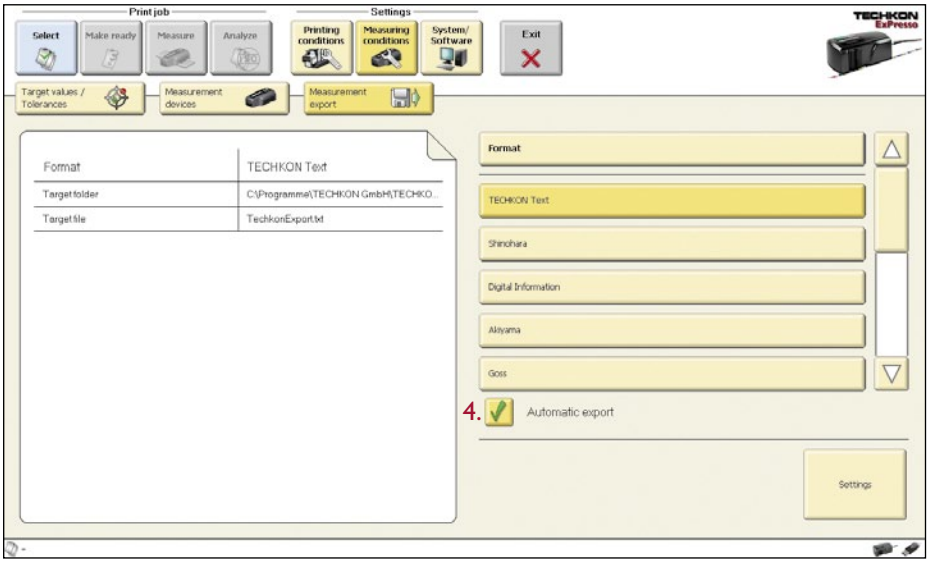
Measuring conditions – Measurement export

After each measurement, the values can be exported to other applications. The most popular export formats e. g. CSV (Microsoft Excel™) are already pre-installed (1.).

In the left section of the window further information about the target file and the target folder are displayed (2.).

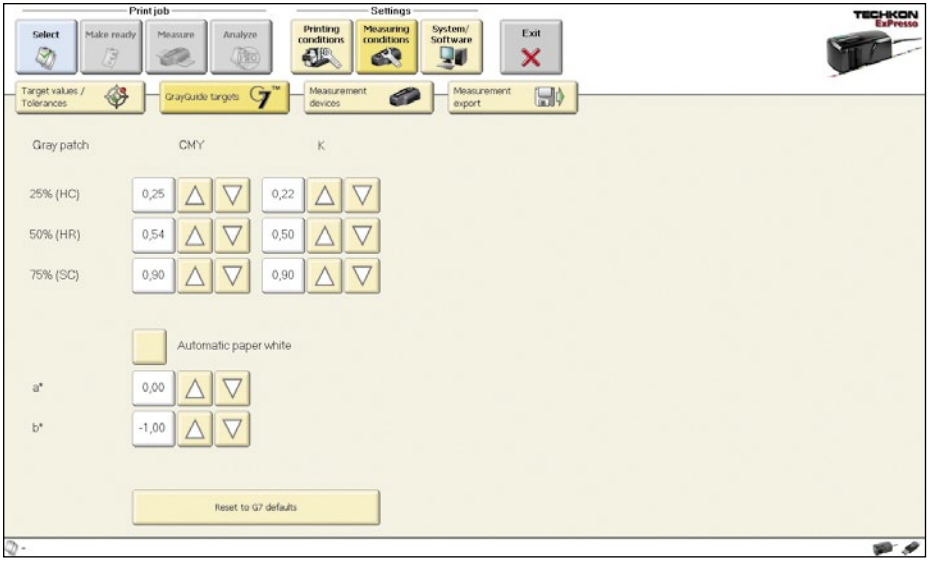
The button "Settings" (3.) opens a window headed by the name of the selected export format. Here you can edit format specific settings. For example in "Digital Information Export" you can choose between text- and the JDF format.

For all export formats the option "Automatic export" (4.) can be activated.



GrayGuide targets

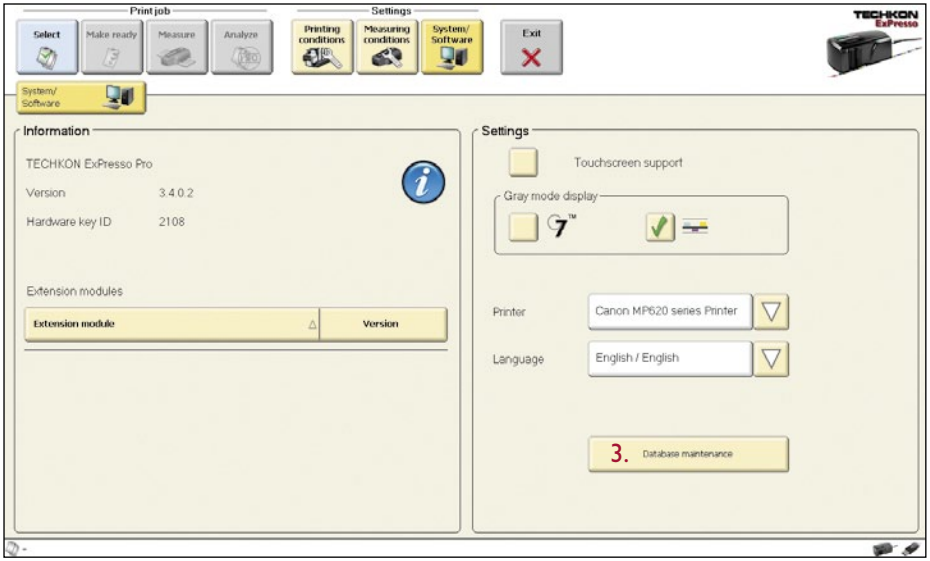
If in "Settings → System / Software" the option Gracol G7™ was selected to be the preferred Gray mode display (see picture p. 38), "Settings → Measuring conditions → GrayGuide targets" opens now a menu window, which allows to adjust the target values manually.
Gray patches as well as the automatic paper white can be edited. If required all values can be reset to the G7™ defaults.



Tip: There is no access to the settings windows described on page 33 – 35, when in "Settings→ Measuring conditions → Measurement devices" SpectroDrive Simulator is selected. The simulator is a virtual measurement device which can be used for tests and demonstrations when no real hardware device is connected. The "SpectroDrive Simulator" will also be used when no software protection key (dongle) is connected and the software runs in demo mode.

The following settings can be made in the "System / Software" section:

The menu item is divided into the two sections "Information" (1.) and "Settings" (2.).



1.

2.

Information:
Displays the type of software (ExPresso Basic or Pro), the software version, the dongle-ID and if extension modules are installed.

Settings:

- Touchscreen support: Must be active, when a touch-sensitive screen is connected, to provide a virtual keyboard for the text input.

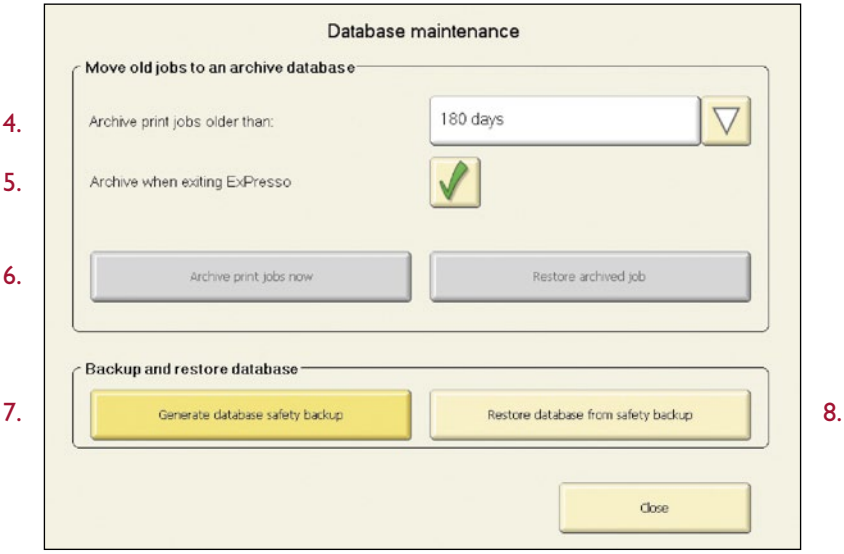
- Gray mode display: This selection defines, whether the analysis of the gray balance shall be carried out densitometrically or according to Gracol G7™.
- Printer: Defines the connected printer for printing the report.
- Language: Sets the language.

The button "Database maintenance" (3. in picture p. 38) opens a new window, where one can decide, after which period of time the print jobs will be archived (4.).

The option "Archive when exiting ExPresso" can also be selected (5.).

Furthermore older print jobs can be archived instantly by a push of a button and in the same way already archived print jobs can be restored (6.).

The database is located on the hard disk of the PC in the ExPresso directory. When "Generate database safety backup" (7.) is selected, the existing database will be saved under a given name.
If required the stored database can be restored using the included restore tool (8.). You have to quit ExPresso for this procedure and start it again after the database has been restored. Restoring of the database leads to an overwriting of the recently saved data in ExPresso.



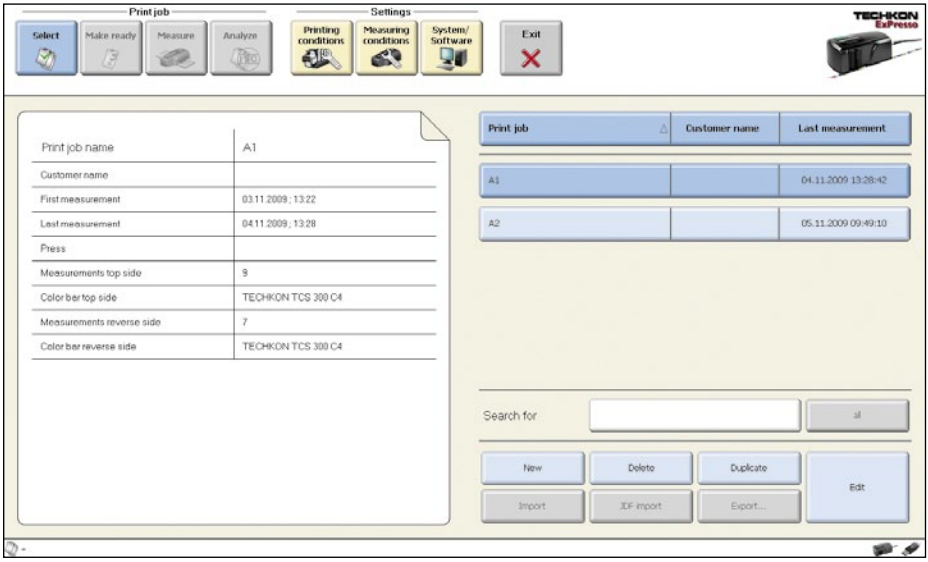
3.5 Defining and running a print job

Before running a print job, certain selections have to be made. Everything related with a "Print job" is indicated by the blue screen color.

ExPresso has an "autosave" function. Every "Print job" will be saved automatically. This applies also for "Print jobs" which are not completed and will be resumed later.

Print job – Select

The list (1.) contains "Print jobs" which have been already made. A "Print job" can be stopped at any time and resumed later.
An information box (2.) on the left side of the menu window shows at a glance the most relevant informations: customer name, date and time stamp of the first and last measurement, press, number of the measurements and the selected color bars (for the top side as well as for the reverse side).



The “Search for” function supports the fast research for already existing “Print jobs”.

Clicking in the “Settings” button (3. in picture p. 40) provides a direct access to the submenu “Print job → Make ready → Print job info”.

Tip: New print jobs similar to old print jobs, can be set up by duplicating. Thus time is saved, because settings can be taken over.

By using the duplication function also OK-sheets can be taken over for repeated print jobs.

Print job – Make ready

Certain selections have to be made, before the measurements can be started.

Make ready – Print job info

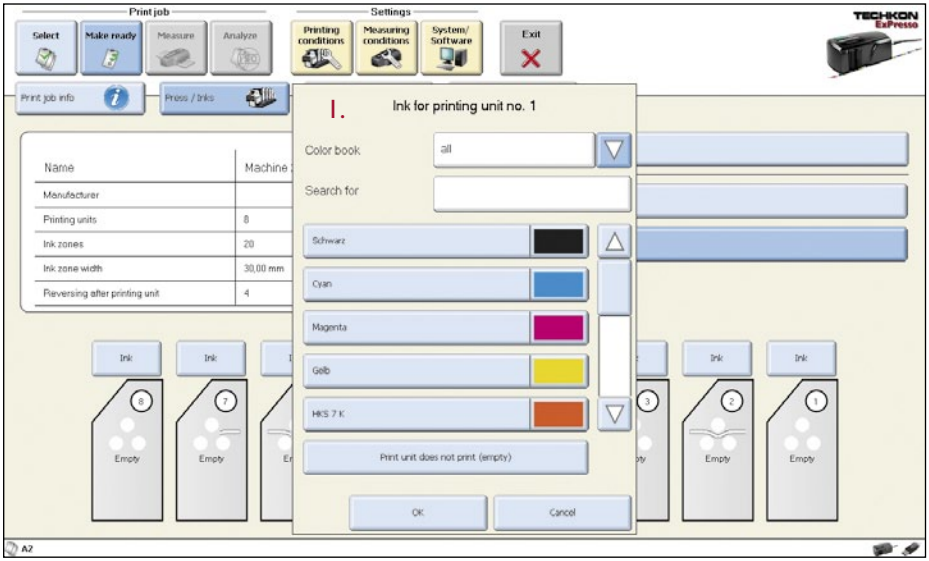
Textual information about the print job can be edited in “Print job info”.

The text entered in “Print job name” will be the title of the data set, which will be automatically saved by ExPresso. It can be selected from the “Print job → Select” menu. During measurements it will be shown in the lower left section of the status bar.

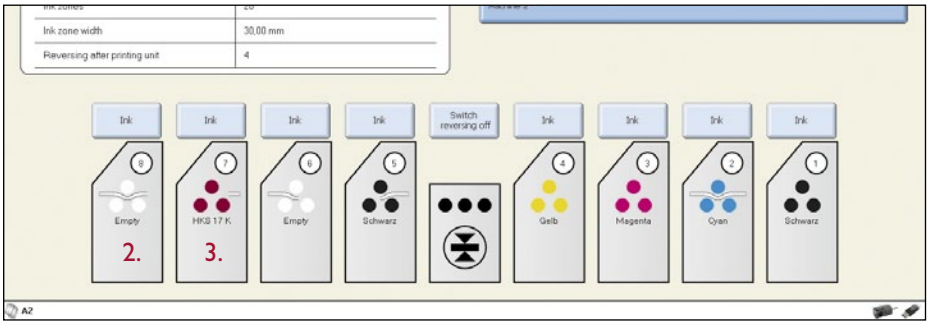
The section “Customer name” and a text box for detailed “Remarks” concerning the print job can be used optionally.

Make ready – Press / Inks

Select a press, which you have already defined in "Settings → Measuring conditions → Presses" (see p. 24 and 26) and fill the printing units virtually with ink (1.).



An inking unit can be kept empty as well (2.).
For example if a 6-color press is used only for CMYK-print, the last two printing units can remain empty.

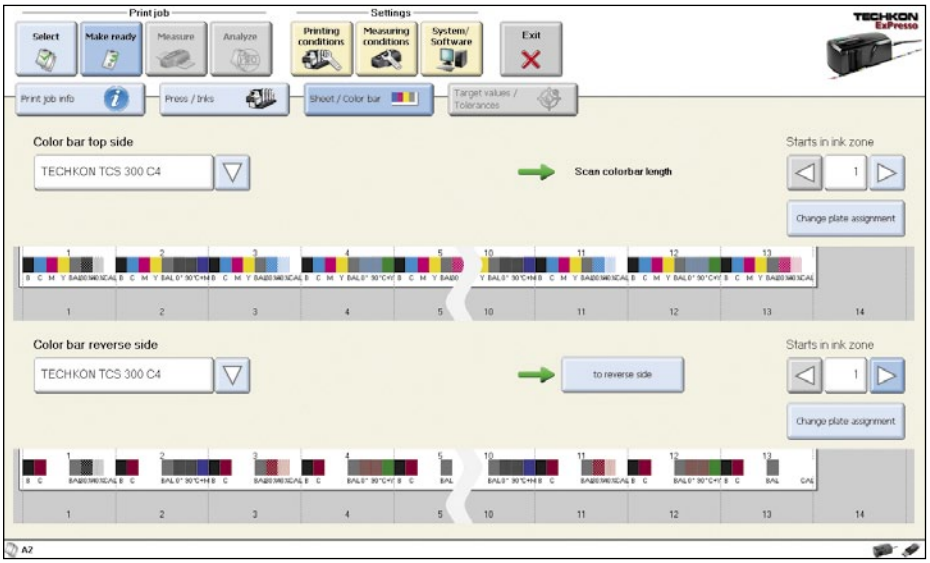


The picture on page 42 shows an 8-color press, with two empty printing units. Printing unit no. 7 contains the spot color HKS 17 K (3.), what can be seen at a glance by the screen color and the color name on the printing unit.

Tip: The virtual filling of the press with ink is not necessary, when an already existing print job with the same press configuration is selected in "Print job → Select" and duplicated.

Make ready – Sheet / color bar

As soon as the press is filled with ink choosing "Print job → Make ready → Press / Inks", the menu item "Sheet / Color" is unlocked and selectable.



1.

1. On the left side of the window a "Color bar" can be selected, after having been defined or pre-installed in "Settings → Printing conditions → Color bar" (see p. 29 f.).

If a color bar is selected, whose ink zone width differs from the ink zone width of the selected press, a warning is displayed.

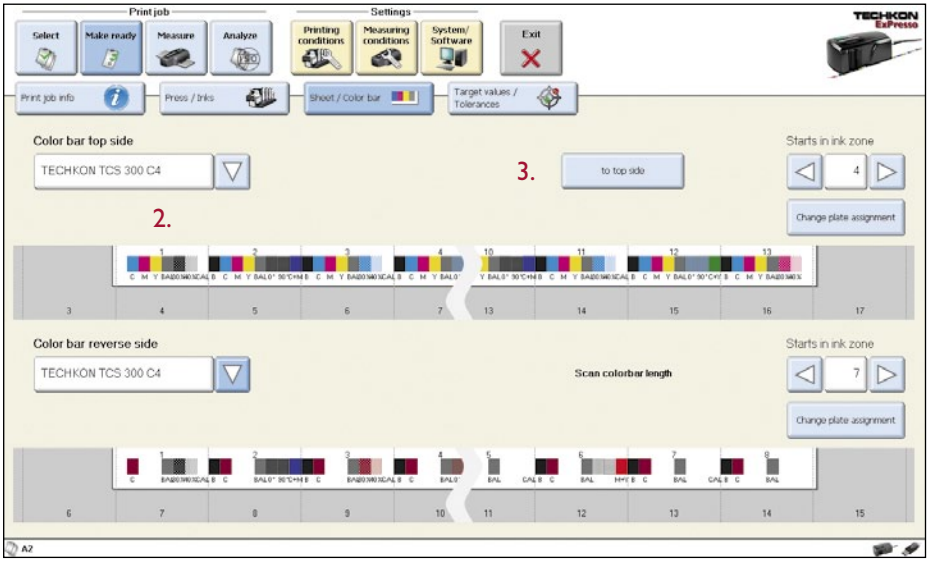
If the selected color bar does not contain a paper white patch, a paper white calibration has to be carried out manually, before the function "Scan color bar length" can be used.

The green arrow located left from "Scan color bar length" indicates that the color bar has to be measured. Now scan the color bar using SpectroJet. As a default, the color bar will be centrally aligned.

Additionally the ink zone for the first measurement can be defined. Use the arrow buttons of the "Starts in ink zone" function to define which ink zone of the press will correspond with the first zone of the color bar(1.).
The selected connection between the color bar and the ink zones of the printing press is also shown graphically (2.).

Using the buttons "to top side" and "to reverse side" (3.) you can switch between the measurement of the color bar length for top- and reverse-printing. This requires that a press with a reversing unit has been defined.

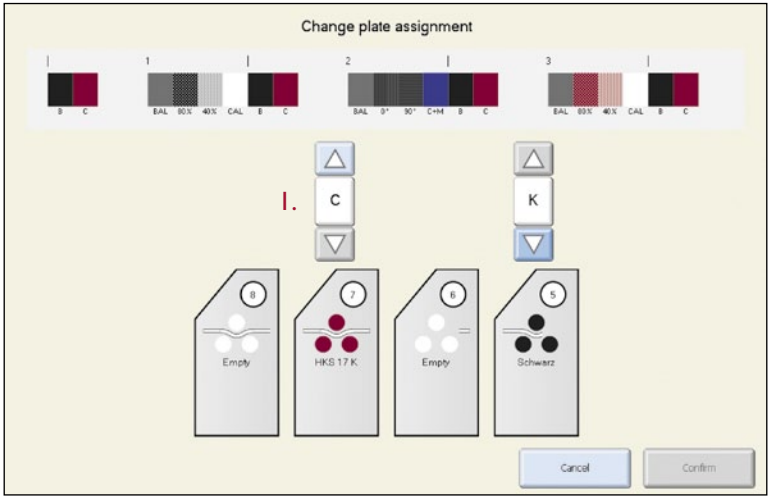
The green arrow disappears, if a color bar length has been scanned and captured successfully,



The button “Change plate assignment” (4.) opens a new window, where the assignment of a printing plate in regard to a printing unit can be defined individually.

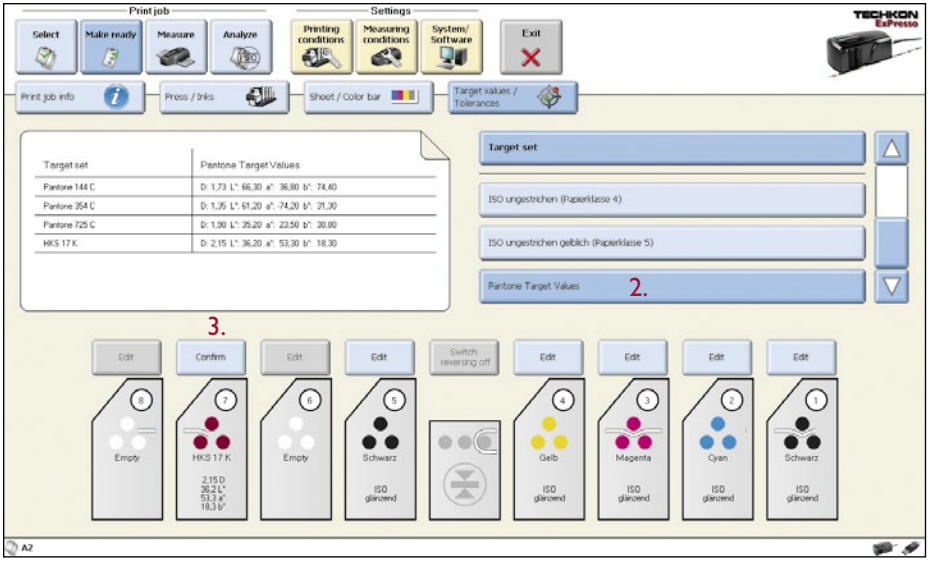
A change of the plate assignment is always necessary, when the order of the inks has been changed or if spot colors are used.

In the following example it has been necessary to assign the ink Magenta (1.) to the spot color HKS 17 K in printing unit no. 7. Thus the color bar will feature a measurement patch at the right position, which guarantees a proper measurement and analyze of the color bar.



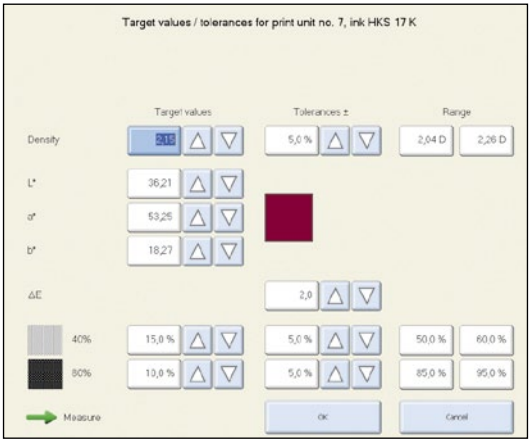
Make ready – Target values / Tolerances

As the printing units have been filled with ink, now they are assigned with target and tolerance values; preferably tolerance sets according to the printing standard ISO 12647 for the paper classes 1 – 5, which are already pre-installed.



Besides the already pre-installed target sets for the five paper classes (1.), the list can also contain individual target sets (2.), which have been already edited using "Settings → Measuring conditions → Target values / Tolerances" (see p. 31 f.). The information box on the left side of the menu window shows all colors which belong to a target set and their target values.

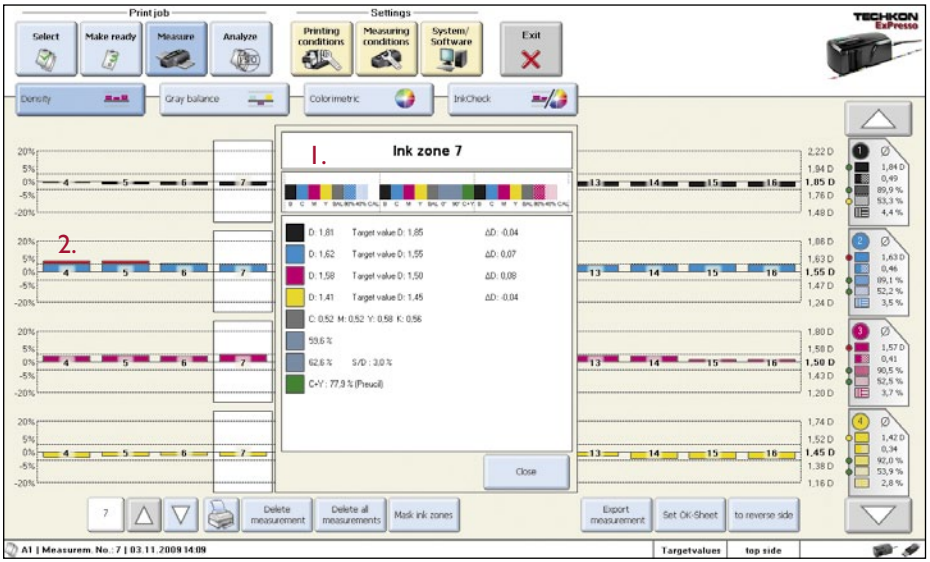
Individual target values and admissible tolerances can be edited and measured for each printing unit. When a target set has been confirmed, just click on the button above the printing unit (3.). It changes into an "Edit" button, which opens the following window:



Measurement of a print job

Measure – Density

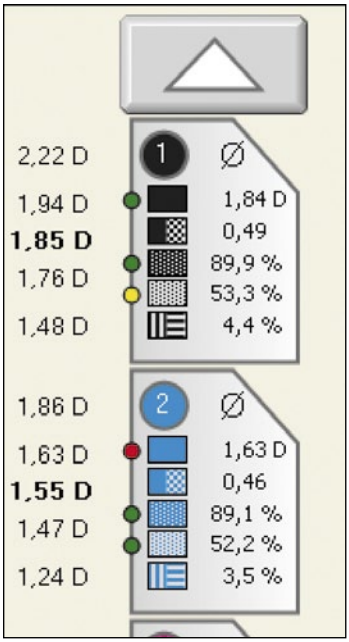
This screen will display all relevant information after a scan measurement. The scan measurement can be started by pressing the green measurement button on the device.



1. Detailed information for every ink zone by pointing on the bar graph.

2. Measurement values out of tolerance will be marked with red top.

3. This section displays in detail the average values of the measurement parameters of the single printing units.



1.
2.
3.
4.
5.

The info section of the menu item density measurement shows in detail the following parameters:

1. Solid density
2. Printing contrast
3. Dot area 80 %
4. Dot area 40 %
5. Slur / doubling factor

In the measurement menus "Colorimetric" and "InkCheck" the relevant parameters for these measurements are displayed.

Red, yellow and green dots, located ahead of the average values, show fundamental problems. Green dots indicate values within the tolerance. Red dots show values out of tolerance. Values close to the tolerance limit (75 %) are marked by yellow dots.

Structure of the command line

1. 2. 3. 4. 5. 6. 7.

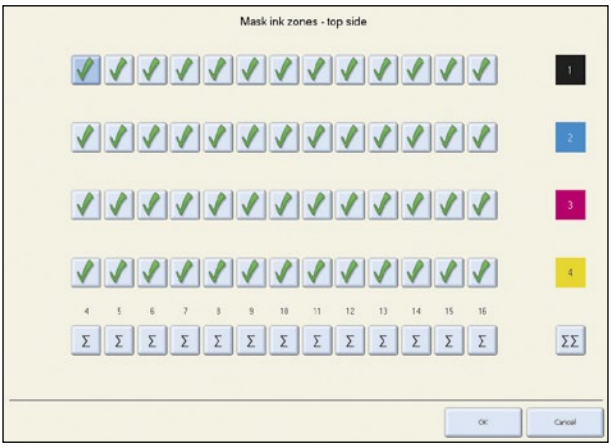
On the basis of the command line of the menu section "Print job→ Measure → Density" all command options will be explained. The order and the availability of the particular command options can vary in the different measurement menus, but they have always the same effect.

1. The white patch shows after each measurement which was carried out, the number of this measurement automatically. Using the arrow buttons one can navigate through the already made measurements of a print job.

2. Clicking on the button with the printer icon opens the connection to the printer, which has been already defined in "Settings → System / Software". The printer option allows to print out the displayed window.

3. These buttons can optionally delete the current measurement or all measurements of a print job.

4. The button "Mask ink zones" opens a window, where optionally single inks within the ink zones or complete ink zones can be masked. Please note that the masked ink zones will not be taken into account for the calculation of the report statistics.



5. "Export measurement" starts the export into another application (see p. 36).

6. "Set OK-sheet", defines the OK-sheet, which is set instead of the target set.
When setting the OK-sheet, it will be numbered to the corresponding measurement and will be displayed in the lower status line. Now the button switches to "Delete OK-Sheet" and serves for this function.

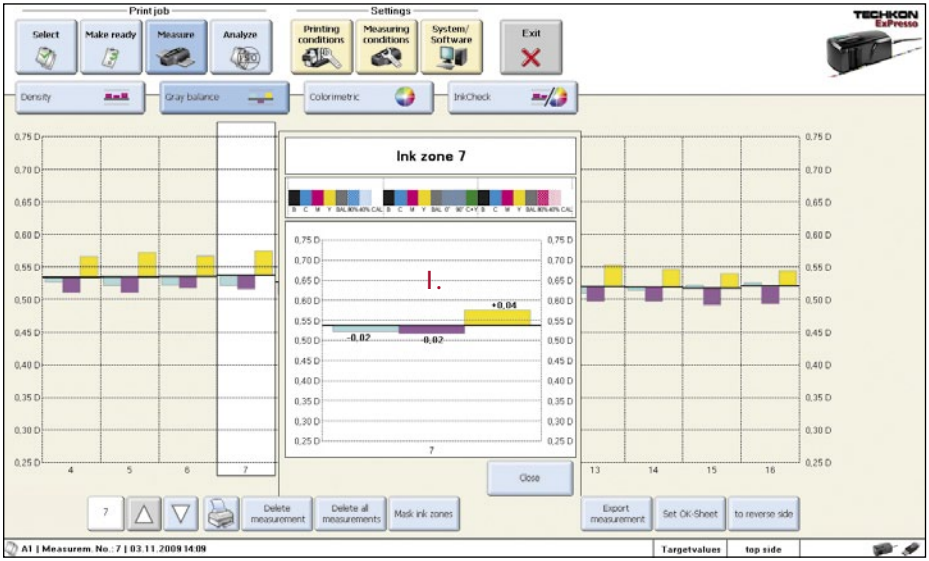
7. "To top side" respectively "to reverse side" switches between top- and reverse-printing, if a press with a reversing after a printing unit has been selected.

Measure – Gray balance (densitometric)

When making a measurement on a gray balance patch, the referring density values for the process colors (without K) are shown in a bar graph. The values for Cyan, Magenta and Yellow should be in close range to each other to ensure a neutral gray balance without a color hue.
It is important that the gray balance patch, on which the measurement is taken, comprises the right %-values to achieve a neutral gray when printed correctly. The process standard ISO 12647 for offset print defines the values as:
C = 50 %, M = 40 % and Y = 40 %.

The color bars TECHKON TCS Digital include a gray balance patch compliant with ISO 12647 in every ink zone. The gray balance display will show densitometric gray balance values for CMY in a bar graph.

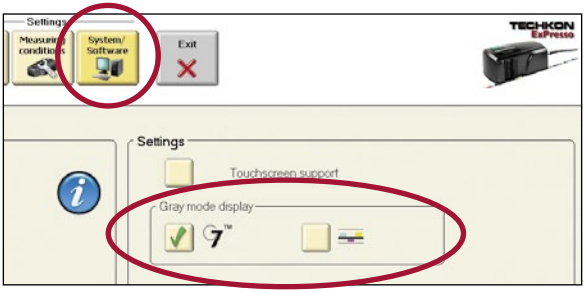
At a glance there can be diagnosed, if the overprint of CMY is a neutral gray or if it has a color cast (1.).



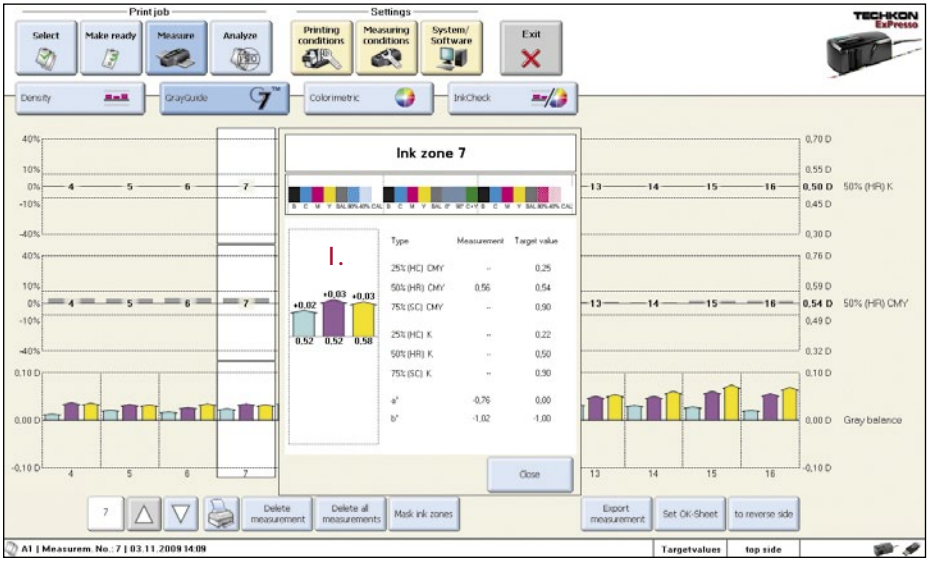
Measure – GrayGuide (according to Gracol G7™)

The GrayGuide function is a very useful feature when controlling a printing press according to the Gracol G7™ method, which is especially common in the USA.
It requires the use of an appropriate color bar.

1. In "Gray mode display" G7™ has to be selected in "Settings → System / Software", to make the GrayGuide function available in the menu bar.



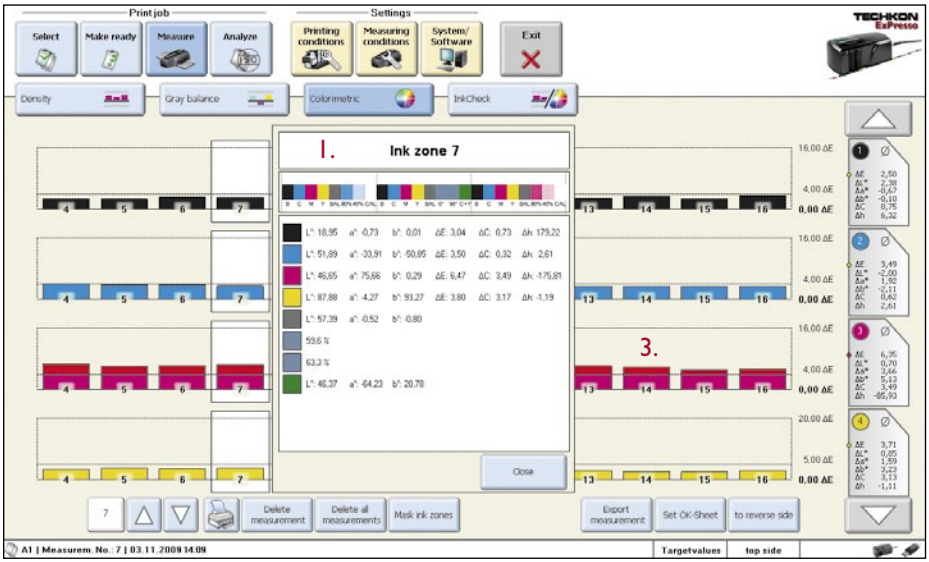
In the following example the adjustment recommendation (1.) shows, that all of the three inks CMY have to be increased to match the Gracol targets.



Measure – Colorimetric (ExPresso Pro)

Thanks to the spectral performance of SpectroJet it is possible to calculate and display colorimetric values as well. Measurements in colorimetry modes have the advantage of an absolute description of color based on characteristic values. So it is possible to measure spot colors as well.

Colorimetric measurements refer in most cases to the most popular color system in the printing industry: the CIE L*a*b* color space. The color distance ΔE describes how close two colors match. A value of 0 means that two colors are identical.
It can be defined in the "Measurement settings" (see p. 34) according to which ΔE formula the color distance is calculated by ExPresso.



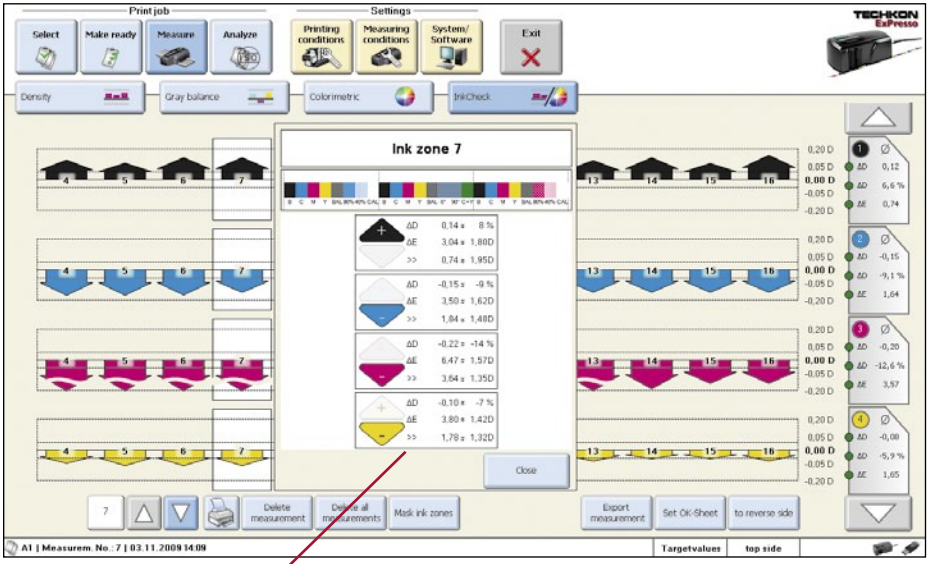
1. Detailed information for every ink zone by pointing on the bar graph.

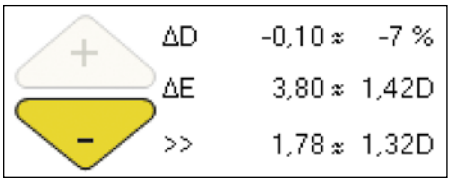
2. Average values for all ink zones.

3. Measurement values out of tolerance will be marked with red top.

Measure – InkCheck (ExPresso Pro)

Densitometric values are a direct measure for the ink applied on the paper. They are very process-related, although they are relative values only. Colorimetric values as recommended in print standard ISO 12647 are absolute values, but they are not suited to use them for handling the printing process. Thanks to the spectral measurement technology of SpectroJet, the very useful "InkCheck" function combines the best of both worlds: Spectrally based recommendations how to set the ink keys as used from density in order to meet colorimetric targets required for printing within ISO standards.



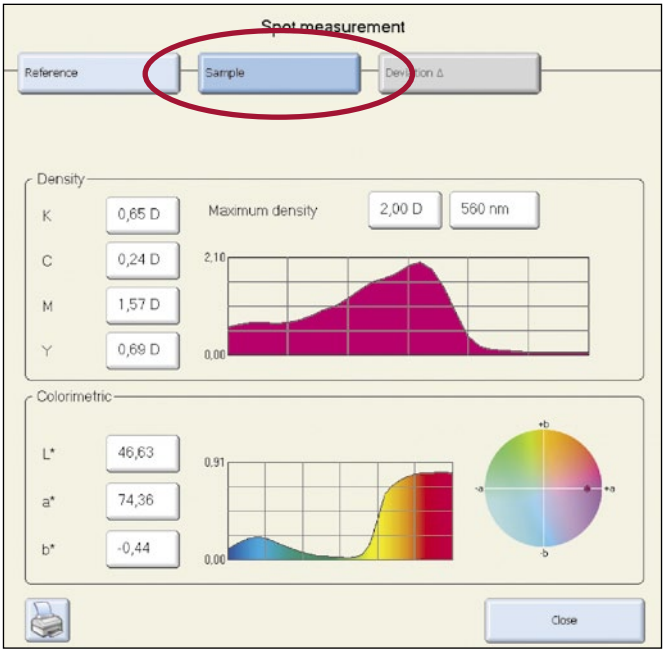


In this case there is too much yellow ink applied in ink zone 7. In order to achieve a lower ΔE, the density has to be reduced by 0,10 from D=1,42 to D=1,32. That reduces ΔE from 3,8 to 1,78.

Spot measurement

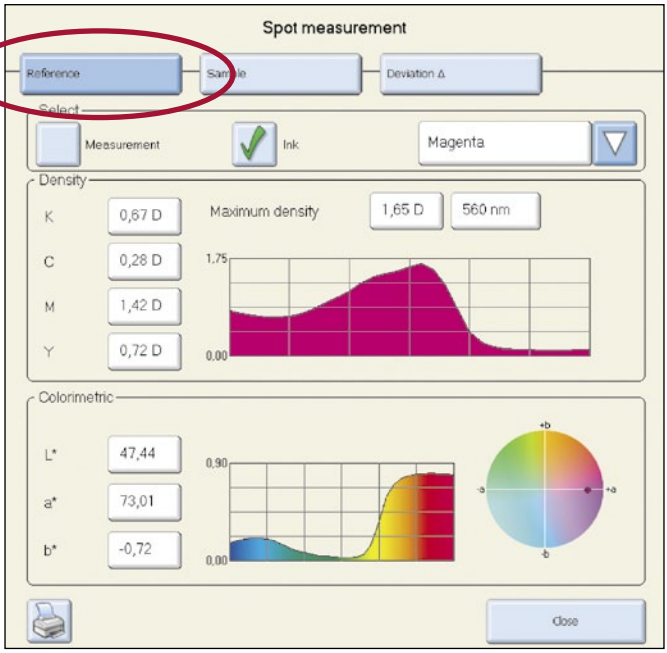
To carry out a spot measurements just position the device with the measurement head on a single measurement patch and press the green measurement button shortly. During the measurement process all LEDs flash up simultaneously. A double sound confirms, that the measurement is completed and the measurement data are displayed by the ExPresso software in the window "Spot measurement" in the sub-menu "Sample".

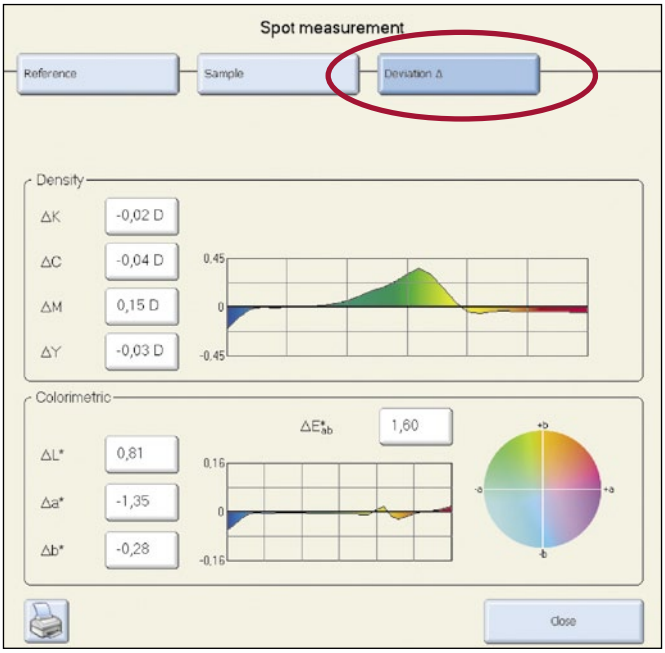
All relevant density- and colorimetric-values are shown here very cleary and can therefore be interpreted at a glance. The maximum density according to the wave length is displayed as well.



In the menu "Spot measurement → Reference" (see p. 55) a reference can be selected for the measured color. This can be a second measurement or an already defined ink (see p. 27).

The window "Spot measurement → Deviation Δ" (see p. 55) displays the deviation of the measurement values of the sample to the selected reference. The densitometric and colorimetric numerical values are supplemented by a graph.

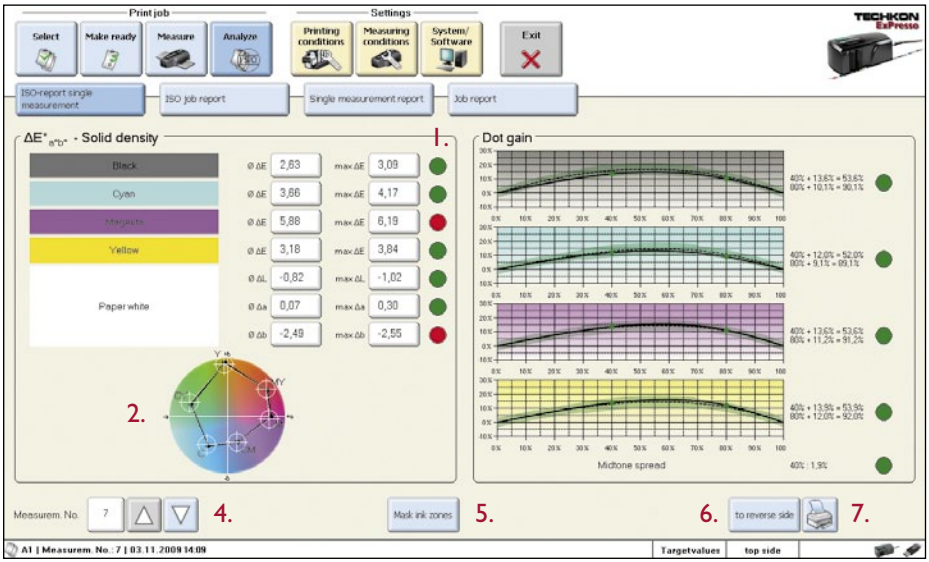

Spot measurement
Reference
Sample
Deviation Δ
Select
Measurement
Ink
Magenta
Density
K
0,67 D
Maximum density
1,65 D
560 nm
C
0,28 D
M
1,42 D
Y
0,72 D
1.75
0.00
Colorimetric
L*
47,44
a*
73,01
b*
-0,72
0.90
0.00
+b
-a
+a
-b
Close


Spot measurement
Reference
Sample
Deviation Δ
Density
ΔK
-0,02 D
ΔC
-0,04 D
ΔM
0,15 D
ΔY
-0,03 D
0.45
0
-0.45
Colorimetric
ΔE*ab
1,60
ΔL*
0,81
Δa*
-1,35
Δb*
-0,28
0.16
0
-0.16
+b
-a
+a
-b
Close

Analyze

The functions in the "Analyze" menu serve to analyze single measurements or complete series of measurements (print jobs).
"Single measurement report" and "Job report" are used in regard to individually defined target sets and tolerances. "ISO-report single measurement" and "ISO job report" include additionally the compliance with target sets and tolerances according to the international standard for the printing process control ISO 12647.
The resulting evaluations of the different analyses can also be printed out in so called reports.

ISO-report single measurement (ExPresso Pro)

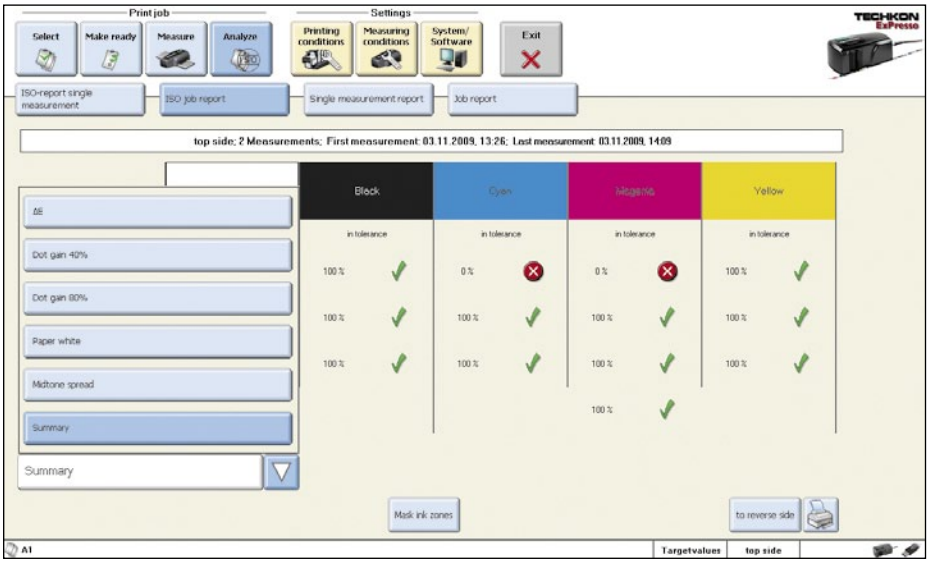


"ISO-report single measurement" includes two sections:
ΔE*a*b*-solid density and dot gain. The dot gain is documented for 40 % and 80 % and the midtone spread is visualized graphically.

1. Green dots indicate that the values are within tolerance
2. Display of the color gamut
3. Tonal % curves
4. Selection of measurement to be analyzed
5. Function "Mask ink zone" (see p. 49)
6. Switch between top side and reverse side (if available)
7. Prints reports

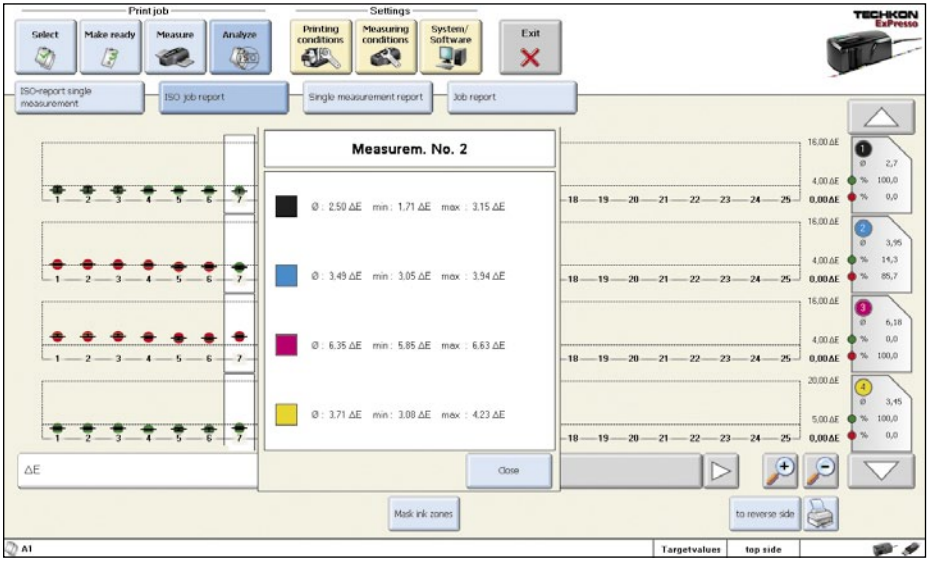
ISO job report (ExPresso Pro)

The job report according to the ISO standard allows the documentation of the whole printing process during the entire print job. You can choose between a summary (1.) and the display of detailed reports of single parameters, which you can select from the pull-down-window in the lower left corner of the menu window.

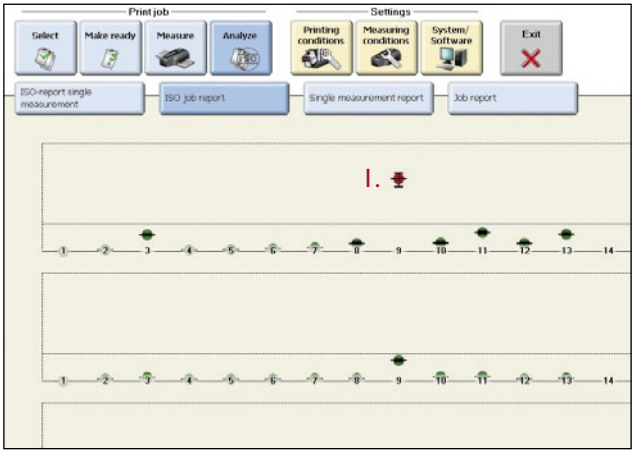


1.

Window: with detailed information “ISO job report” for ΔE and selected measurement no. 7:



A green dot indicates, that the measurement value meets the tolerance.



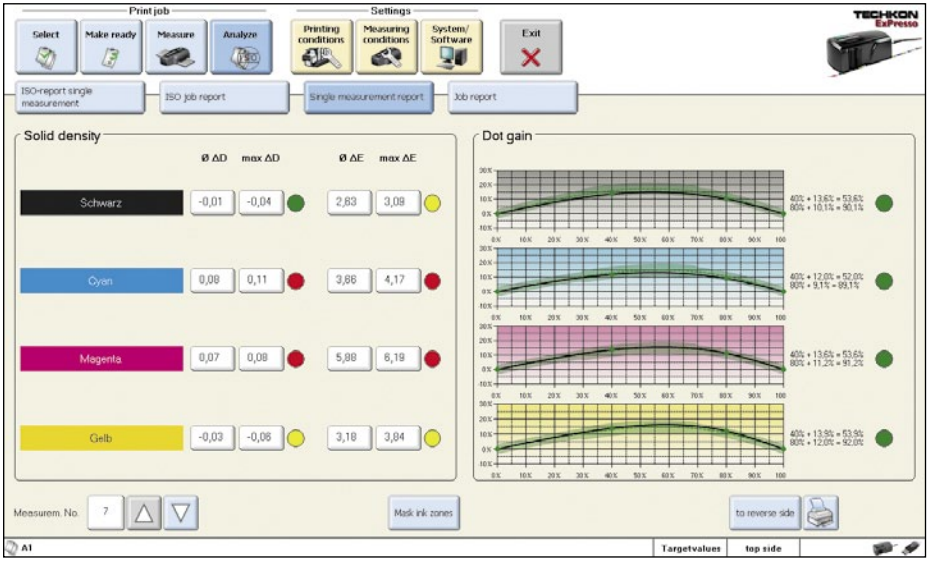
The example shows a red dot in the measurement series no. 9 (1.), which signalizes a measurement value which is out of tolerance. This is also indicated by the fact that the position of the dot is far above the base line.

The variation within a sheet is described by a vertical line within the dot. The heavier the variation, the longer the vertical line.

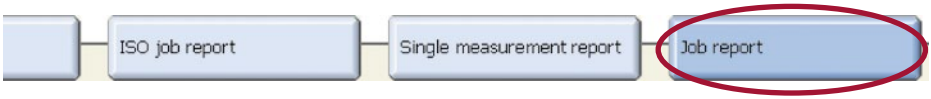
Using the button “Mask ink zones” in the lower part of the menu window (see p. 57) you will switch to the “Mask ink zones” function. Here you can define which OK-sheet will be the starting point for the evaluation of the print job. Optionally a measurement can be selected to serve as starting point. This function is available for the top side as well as for the reverse side.

Single report measurement

“Single measurement report” can be compared with “ISO-report single measurement”, but the evaluation it does not refer to the ISO standard. Therefore the information sections “Solid density” and “Dot gain” refer only to individually defined target sets and tolerances.
Up to eight color can be displayed, e. g. CMYK and four spot colors.

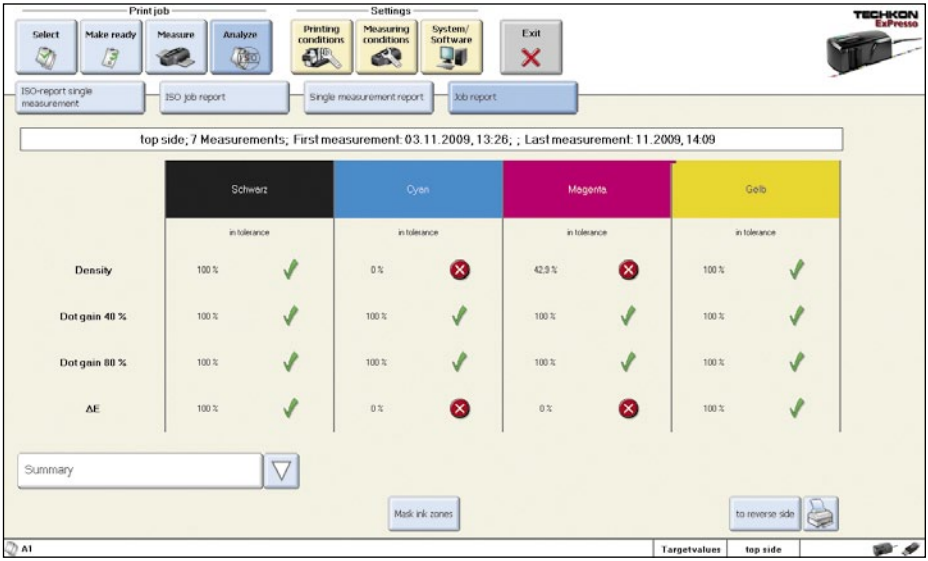


Job report



"Job report" is an evaluation of the whole print job in regard to the target values and tolerances according to customer standards.

You can choose between a summary (see the picture below) and the display of single parameters e. g. dot gain 40 %, dot gain 80 %, slur/doubling, contrast and ΔE (ExPresso Pro only), which you select by clicking in the pull-down-menu in the lower left corner of the menu window (1.) (see page 58 for further information).



1.

Exit

Just press the "Exit" button to quit the ExPresso application.

A window for confirmation will appear:

There is no need to actively save a "Print job" or settings made. Since ExPresso has an "autosave" functionality, all data is securely stored already.

TECHKON

SPECTRO JET

Measurement technology
Spectral remission measurement and color density determination to ISO 5-3/4

Measurement geometry
0/45° optics to DIN 5033

Spectral range
400 to 700 nm in 10 nm steps

Measurement aperture
1,5 mm, appropriate for measuring patches with at least 3 mm height and 3 mm width. UV cut filter optional

Light source
Gas-filled lamp, type A illumination

Polarization filter
Twice linear crossed, switched on and off per software command

Measurement time
Approximately 160 mm/s for 4 mm patches (equals approximately 3 seconds for 520 mm sheet length), approximately 400 mm/s for 8 mm patches;
single measurement approx. 1 second

Scanlength
max. 2000 mm

White reference
Absolute and relative

Illumination types / Standard Observer
A, C, D50, D65, F 2/7/11 / 2°, 10°

Density filter
DIN 16536, DIN 16536 NB, ISO/ANSI T, ISO/ANSI I, ISO E, spectral density Dmax

Density measurement range
0,00 D – 2,50 D

Repeatability
0,01 D
0,03 CIE ΔE*a*b*

Production spread
0,01 D
0,3 CIE ΔE*a*b*

Data transmission
USB-connection

Power supply
AC adapter, 100 – 240 V, 47 – 63 Hz

Weight
Measurement device: 360 grams

Dimensions:
see page 8

Contents of delivery:
see page 9

Software TECHKON ExPresso
Delivery on CD with software protection key (USB-dongle) and CD with print control strip TECHKON TCS Digital
System requirements: Windows XP, Vista
Recomm. touchscreen: Elotouch 1727L 17"

Manufacturer certificate

applicable for ISO 9000 documentation

Device: Scan-Measurement device TECHKON SpectroJet

Serial Number:

Manufacturer: TECHKON GmbH • Wiesbadener Str. 27 • D-61462 Königstein
Telephone: +49 (0)6174 92 44 50 • Telefax: +49 (0)6174 92 44 99
E-mail: info@techkon.com • http://www.techkon.com

Certification: The device is compliant with R&TTE directive 1999/5/EC concerning the electromagnetic compatibility EMC and is provided with the CE label. The device is RoHS compliant (class 9).

Standards:

- German Standard (DIN EN):
  DIN EN 61000-4-6:2008-04
- European Standard:
  EN 61000-4-6:2007 + Corrigendum August 2007
- IEC/CISPR-Standard:
  IEC 61000-4-6 + A1:2004 + A2:2006
- EN61000-4-2 and 4-4
- EN 55022:2006 + A1:2007 2008-05
- EN 55024:1998+ A1:2001 + A2:2003 in parts 2003-01
- 47CFR15 2008-07
- ICES-003, Issue 4 2004-02

The supplied AC adapter is according to regulations UL, IP 40, IEC 950 and VDE EN-EC10. The device ist to be used only with original TECHKON SpectroJet AC Adapter, 7,5 V DC,
Part no.: FRIWO FW 75550/08.

Maintenance: The device is maintenance free. The measurement aperture has to be kept clean from dust. It can be cleaned with clean, compressed air and an optics brush.

We recommend a functionality check-up every 24 months at the TECHKON service center, which includes the issue of a new Manufacturer certificate.

Warranty: The warranty for TECHKON products is 24 months starting with the date of purchase. The warranty is invalid if the damage is caused by improper use of the device. Only original TECHKON spare parts and accessories are to be used.

Recycling: The device is according to §14 ElektoG registered under the EAP no.: DE 98280049. Devices for disposal can be sent directly to the manufacturer.

Calibration: The integrated spectral sensor is calibrated by a white calibration. After performing a white calibration with the supplied absolute white standard integrated in the charging console, the device is long term stable. We recommend to make a white calibration before every measurement series, to ensure the device is calibrated correctly.

The remission values documented on back of the charging console are derived from a ceramic white standard, which is referenced to measurements taken and certified by the German Institute for Material Testing (Bundesanstalt für Materialprüfung, BAM).

Standards: The measurement device is manufactured according to the recommendations of the technical standards DIN 5033 part1-9, CIE, DIN ISO 16 536 part 1+2 and ISO 5-3.

The accuracy of the device is checked during the manufacturing by spectral measurements on color samples which were measured and certified by the German Institute for Material Testing (Bundesanstalt für Materialprüfung, BAM).

The calculation of colorimetric values is according to the formulas and tables of DIN 6174, DIN 5033 part 1-9 and CIE.

The calculation of densitometric values is according to the formulas and tables of DIN 16527 part 3, ISO 5-3 and the handbook of standardization of the German Printing and Media Industries Federation (Bundesverband Druck und Medien e.V.) and fogra (Forschungsgemeinschaft Druck e.V.).

D-61462 Königstein

Place	Date	Signature

Please send this registration card by mail or via telefax to us. This way we can keep you informed in future about product news.
You can send your registration information by E-mail as well.
TECHKON GmbH • Wiesbadener Str. 27 • D-61462 Königstein • Telefax: +49 (0) 6174 92 44 99 • E-mail: info@techkon.com

TECHKON Registration card

☐ Please send me information about the entire TECHKON product range

☐ Please put my E-mail address on the mailing list for the TECHKON-Newsletter

TECHKON GmbH
Wiesbadener Straße 27

D-61462 Königstein / Germany

via Telefax to: +49 (0)6174 92 44 99

Name: _____

Company: _____

Department / Job title: _____

Address: _____

City / ZIP-Code: _____

Country: _____

Telephone: _____

Telefax: _____

E-mail: _____

Your TECHKON-Dealer: _____

Device Serial number: _____
(label on the bottom of the device)