



Scan-Measurement-System
SpectroDrive
Software
ExPresso 5



Manual

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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 SpectroDrive, the software ExPresso 5 and SpectroConnect.

The manual is divided into four chapters:

CHAPTER 1: General description of the measurement system

CHAPTER 2: Installation of SpectroDrive and the software ExPresso 5

CHAPTER 3: How to use SpectroDrive and the software ExPresso 5

You will be fascinated how easy the system is to use. You will know how to work with SpectroDrive after having read this manual for only a few minutes. The second chapter describes the assembly of SpectroDrive and the installation of the software ExPresso 5. The third chapter describes the operation of SpectroDrive and gives detailed information about the measurement functions.

Please get the device registered by using the registration card, which you will find in the appendix of this manual. That way we can keep you updated about product news.

Please visit us as well on the internet at 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

High quality and productivity

The new generation of the proven Scan-Measurement System SpectroDrive combines decisive advantages: Precise measurements thanks to an ISO-compliant measuring head, technical reliability and high measurement speed. It can be fully integrated into the printing process. The result: a productivity and quality boost for your printing press.

The system consists of two components: The motorized measurement device scans the complete color bar on a printed sheet within seconds and simultaneously sends the spectral measurement data wirelessly to the PC. Here all relevant information for controlling the printing press is clearly displayed by the TECHKON ExPresso 5 software.

Increase profitability

Due to the trend of smaller print jobs and shorter press runs the time from starting a press to getting it “in color” and running with consistent quality is cost critical. SpectroDrive reduces this “non-productive” and therefore expensive set-up time dramatically. You will increase profitability thanks to substantially reducing paper and ink waste and getting more precious time out of your printing press. The system makes your printing jobs predictable and calculable. In addition, the complaint rate will go down significantly and your customers will appreciate the sensible gain and reliability of the print quality. ISO-compliant printing becomes easier than ever before.

The high rate of return of investment is amazing. The relative low – and only one time – investment will show in recurring profits almost immediately. Also older printing presses get a productivity boost thanks to SpectroDrive.

Ease of use and high speed measurement

Setting up a printing press can be compared with starting a jet plane. It is a time critical process, where the press operator – like a pilot – must observe

and perform a multitude of important tasks at the same time. Hence, during the development of SpectroDrive great care was taken in delivering a system that is easy to use and fast, to make working with SpectroDrive even more intuitive and convenient.

For example, a laser beam can be activated to support the exact positioning of the print control strip. Furthermore the measurement device has only one button to start the measurement process. Installation is simple as well. After a few minutes the system is operable and ready to take measurements.

Due to its aluminum unibody case the new SpectroDrive is particularly robust and reliable. Of course SpectroDrive is able to handle variable scan lengths and fits to any printing press format. The battery charging is inductive, fast and sustainable.

Two measurement systems in one

This statement relates not only to the technical fact that the spectral measurements allow displaying densitometric and colorimetric data. It also points out that SpectroDrive can be used as a scanning device as well as a hand-held instrument for single measurements. Just take the device from the horizontal track and position it wherever you want to take a color measurement. SpectroDrive now also features an integrated display that shows the measurement values of spot measurements directly at the device.

Software ExPresso

The Windows software TECHKON ExPresso 5 has a self-explanatory user interface which can be operated via touch-screen. The software offers a comprehensive tool set comprising measurement of spot colors, support of up to 16 print units, front-side and reverse printing, display of color density, dot gain, gray balance, CIE $L^*a^*b^*$ -values and recommendations on how to adjust the ink on the press. This is only an extract of the complete functionality.

Thanks to its modularity TECHKON ExPresso 5 is expandable and versatile. The measurement data can be exported into other software applications that connect real-time to printing presses to enable a “closed loop” turn-key solution. In addition, the ExPresso software can export measured data to standard applications such as Microsoft Excel™.

All advantages at a glance

Easy to handle

- Fast, motorized scanning by pressing the green measurement button on the touch-screen or on the device itself
- Automatic white calibration
- Windows-software TECHKON ExPresso 5 can be operated with or without the touch-screen
- The device can easily be used as hand-held device for spot measurements as well

Modular and compact

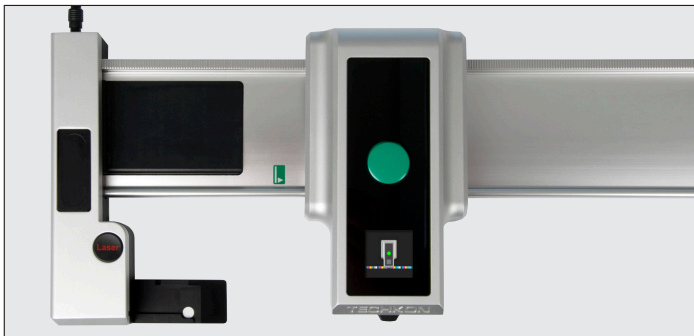
- Works with any sheet or press format
Horizontal track can be shipped in any length up to 206 cm
- Space-saving measurement device fits on any mounting table
- The mounting table can be inclined up to 45°
- Delivery contains all components supplied

Easy to install

- Installation is made within five minutes without any major assembly effort
- Complete system is maintenance free
- Measurement system can be flipped 180°, if the color bar is on the opposite side of the printed sheet
- Wireless, fast data transmission per WLAN
- No vacuum air suction is necessary to hold down the printed sheet

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 in paper thickness
- Automatic polarizing filter function for densitometric and colorimetric measurements



Accurate

- Precise spectral engine with automatically insertable polarizing filter
- Patented measurement head for easy positioning conforming to ISO 13655
- Solid aluminium unibody case for reliable function in a harsh industrial environment



Fast

- High resolution spectral measurement of a complete color bar within seconds (e.g. 500 mm sheet length in about 3 seconds!)
- Wireless data transmission to the PC during scan in real-time
- Information overview displays all relevant parameters for quality control

Using SpectroDrive as a hand-held unit is simple. Just position the compact measurement head above the sample and press the green measurement button. The measurement value is transmitted instantly to the PC.



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

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

Formats

52: for printed sheet 00 (B3+, 370 x 520 mm)

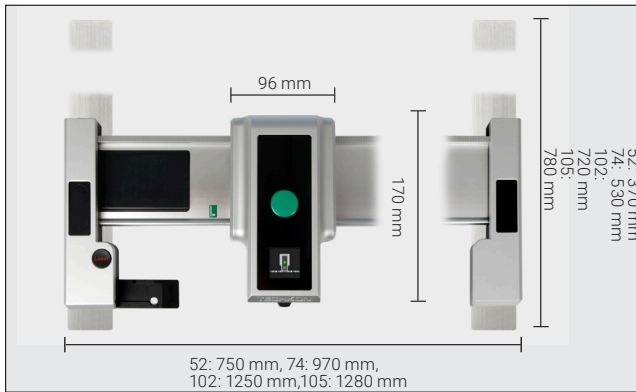
74: for printed sheet 0B (B2+, 520 x 740 mm)

102: for printed sheet 3B (B1+, 720 x 1020 mm)

105: for printed sheet 3B+ (B1+, 780 x 1050 mm)

Special formats (up to 2100 mm system length/ 2060 mm scan length) on request

Dimensions



Performance packages

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

SpectroDrive + ExPresso Basic

consists of the spectral measuring device SpectroDrive and the Microsoft Windows software ExPresso Basic with the following functions:

- Ink zone specific density display
- Color density for CMYK and spot colors (spectral density)
- Densitometric gray balance
- Dot gain, dot area, printing contrast
- Slur/doubling value
- Target values, tolerances, OK-sheet
- Front- and reverse-printing
- Works with any color bar length
- Display of single measurements when used as a hand-held device
- Measurement data export (e.g. JDF-format)
- Statistical analysis, report generator
- Supports up to 6 printing units

SpectroDrive + ExPresso Pro

contains the same functions as the Basic package and additionally:

- Ink zone specific colorimetric CIE $L^*a^*b^*$ and $\Delta E^*a^*b^*$ display $\Delta L^*a^*b^*$, CIE $L^*C^*h^*$, $\Delta L^*C^*h^*$
- InkCheck: recommendation for ink key setting
- Display and evaluation according to ISO 12647 (PSO)
- G7™-IDEAlliance (neutral density display)
- OBA-Check
- 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



Measurement device SpectroDrive and the supplied system components

Contents of delivery

- Measurement device SpectroDrive
- Left holder incorporating charging console with white standard and AC adapter with universal plugs
- Horizontal track, right holder, two vertical bars
- WLAN-module for wireless data transmission, USB cable
- Manual with ISO 9000 compliant certificate (pdf on data media),
- Manufacturer certificate
- Screwdriver, 4 screws
- Optional: Data media with Windows software TECHKON ExPresso 5, USB-dongle (software protection key)

System requirements: for TECHKON software:

Microsoft Windows 10 or higher; 64-bit, minimum: IBM-compatible PC with Intel i5 or comparable processor, 8 GB better 16 GB RAM, SSD Harddisk, 2 USB ports; screen resolution for TECHKON ExPresso 5: minimum 1.400 x 900 pixel

Optional accessories

- Color reference SpectroCheck NG for checking the measuring accuracy
- Print control strips TECHKON TCS, available as EPS- and pdf-files on CD (can be downloaded free of charge at www.techkon.com)
- Software-upgrades from ExPresso Basic to ExPresso Pro

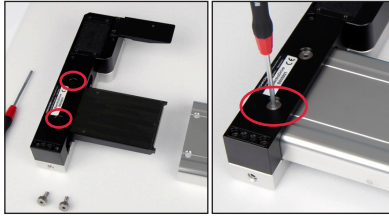
Replacement parts

- Left holder with charging console and white standard
- Horizontal track
- AC adapter
- Rechargeable battery
- WLAN-module

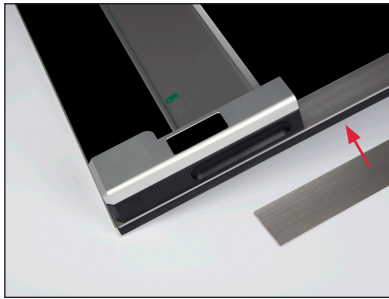
Chapter 2

Installation of SpectroDrive and the software ExPresso 5

2.1 Assembly of SpectroDrive



- Connect the horizontal track with the left and right holder as shown on the images. Before placing the holders upside down, put a soft material underneath to avoid scratches. Before tightening the first screw, insert the second screw and assure that the holder is correctly aligned.



- The two vertical bars are attached vertically at the right and left side on a flat table. Before adhering them, it is important to check that they are parallel and have the right distance to each other. We advise to mark the position with a pencil first. Now attach the two vertical bars, which have self-adhesive tape on the backside to the table or console. Assure, that the vertical bars are parallel and well aligned in order to hold the left and right holder which will attach magnetically to the vertical bars. Preferably the table will have a lay-on edge for positioning the printed sheet.



- Connect the plug of the AC adapter with the charging console. The AC adapter can be used universally for 100 – 240 V. Depending on the country of shipment the local plug is content of the delivery. If the change of the adapter plug should be necessary, just unlock the lock, pull the plug off the AC adapter and push in the new one. Make sure it is connected firmly.



- Connect the mains plug to the power socket. The socket must be located near the facility and must be easily accessible. Do not use the power plug if the power cord is damaged. Always use the original TECHKON SpectroDrive AC adapter. The use of other power sources is hazardous and may damage the device.

2.2 Installation of the software ExPresso 5



System requirements

- Microsoft Windows 10 or higher; 64-bit, minimum: IBM-compatible PC with Intel i5 or comparable processor, 8 GB better 16 GB RAM, SSD Harddisk, 2 USB ports; screen resolution for TECHKON ExPresso 5: minimum 1.400 x 900 pixel

The software is optimized to be operated with a touch sensitive screen.

However, working without a touch-screen by using a conventional mouse / trackpad and keyboard is also possible.

Recommended color bar:

Print control strip TECHKON TCS Digital (included in delivery).

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. Plug the TECHKON data media into the USB port of the running computer. Make sure that the USB-dongle (software protection key) and the module for wireless data transmission are **not** connected to the PC.

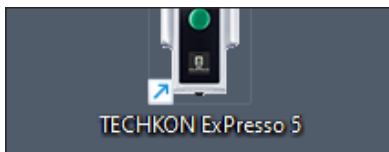
2. Select **starter.exe** and choose **Install TECHKON ExPresso**. The installation routine will start automatically. Follow the steps of the installation, until it is completed.

3. After the installation is finished successfully you can connect the module for wireless data transmission with the USB cable and the USB-dongle to the PC.

4. TECHKON ExPresso 5 can now be launched.



WLAN-module for wireless data transmission



Chapter 3

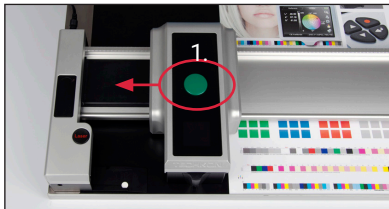
How to use SpectroDrive and the software ExPresso 5

3.1 Operation of SpectroDrive

Automatic measurements



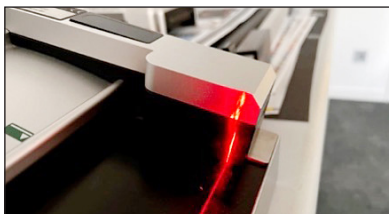
- Place the measurement device on the horizontal track.
- The module for the wireless data transmission has to be positioned as close as possible to the measurement device with the front pointing to the measurement system as shown on the image. Please connect it to the PC via the USB cable **AFTER** the installation of the software.



- By pressing the green measurement button the device will move into the charging station at the left, where it is automatically charged, which is indicated by an animated battery symbol in the device display.



- You can align the measurement system in vertical direction. By keeping the black buttons on the left and right holder pressed you reduce the magnetic adhesion of the holders.



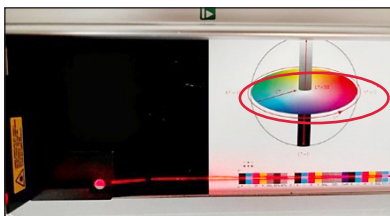
- The laser helps you to align the measurement head correctly on the print control strip. To do this, remove the device from the track and switch on the laser using the button on the left-hand holder. The laser remains switched on for approximately 10 seconds. Use the white line marking on the right-hand holder to check that the laser is set correctly.



Caution: To protect your eyes, do not look directly into the laser beam.

- During initial installation, the laser can be aligned with the white line on the right-hand side holder using the adjusting screw on the front of the left-hand holder.

The appropriate Torx screwdriver is included in the scope of delivery and has already been used to install the two side holders.



- Now position the two holders on the tracks so that the red laser line is exactly in the middle of the print control strip. This ensures that the measurement head is positioned on the measurement patches during the measurement. Place the device back on the track and the system is ready for the scan measurement.



- Finally, check that the measurement head is positioned over the measuring patches during the entire scanning process.
- If the measurement device is in the parking position (charging station) and the software has been set up, you can now start the measurement using the green measurement button or directly from the software.

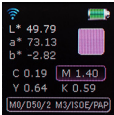
Spot measurements



- To carry out a spot measurement just remove the measurement device from the horizontal track, position it with the measurement head on a single measurement patch and press the green measurement button shortly.

The measurement data are shown in the device display as well as in the window **Spot measurement** of the Ex-Presso software.

Display modes of the device display



Results of a spot measurement; densities CMYK and CIE-Lab values; display of the measurement conditions



Absolute white calibration is performed



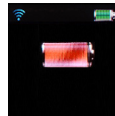
Warning: the unit has been blocked while driving



After a few minutes of inactivity on the charging station the device goes into the stand-by mode



Scan is in progress



The battery is discharged. Please place the device on the charging station and check the charging process and battery condition.



Paper white calibration is performed



The charging procedure has stopped!

How to measure

Please ensure that the sample is located on a solid and flat surface. 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 on top of a non-printed area of the sheet.

When SpectroDrive is on the track, the paper white calibration is performed by software command (see p. 42).

Charging

Completely charging an empty battery will take approximately four hours.

SpectroDrive has a regulated charging management. This means it will power-charge an empty battery, so the device can be used again after a few minutes. The temperature control of the charging process guarantee, there is no over-charging of full batteries.

Disposal instructions: Please dispose of the battery only in a designated recycling center.

Automatic turn off

When the device is not located at the left holder in the charging position and is not in use, it will switch off automatically after three minutes. It can be reactivated by pressing the green button on the device.

Device information and safety instructions

The use of this device in a different way than recommended by TECHKON GmbH can endanger the device safety.

WARNING: This device may not be used in potentially explosive atmospheres. Please protect your eyes and do not look directly into the optics when the device is switched on.

Operating conditions: Ambient temperature: 10 to 35 °C, max. 30 to 85% rel. humidity (non-condensing); storage temperature: -20 to 50 °C.

3.2 Care and maintenance / Cleaning

SpectroDrive 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.

The measurement head with the optical system is sealed against dust and dirt. Nevertheless 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 which is integrated in the charging console. A soft cloth made of micro-fibers is especially well suited for cleaning the white ceramic tile. If the white standard should be defective, it has to be replaced completely. 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.

Error handling

- Should SpectroDrive 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, the module for wireless data transmission and the USB-dongle communicate correctly with the PC.

- It can be helpful to plug-off and re-connect the module for the wireless data transmission from the USB connection when problems occur.
- Restarting the software ExPresso is also recommended to solve software problems.
- Check that the right measurement device is selected in the software settings. If **SpectroDrive Simulator** is selected, no real measurements will be carried out.
- Check if the AC adapter is connected correctly to the mains plug and the charging station. Check if SpectroDrive is charged in the home position (The battery symbol is animated during charging).
- If the device does not communicate with the software and does not work by pressing a button, but the device display is on, move it manually from the charging position. Now, wait until it switches off automatically after three minutes. Then, turn it on again by pressing the green button.

Warranty and service

The warranty for TECHKON products is 24 months starting with the date of purchase. Consumable and wearing parts are excluded from this. 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 SpectroDrive is to a large extend maintenance free. Nevertheless 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.

Appendix

Specifications

Measurement geometry	0° : 45° optics according to ISO 5-4
Spectral range	400 to 700 nm in 10 nm steps, spectral resolution 10 nm, pixel distance sensor < 3 nm
Measurement aperture	1.5 mm, appropriate for measuring patches with at least 3 x 3 mm (h x w)
Light source	LED, provides measurement conditions M0, M1, M2, M3 according to ISO 13655
Polarization filter	Twice linear crossed, switched on and off per software command
Measurement time	Approx. 160 mm/s for 4 mm patches (equals approx. 3 seconds for 520 mm sheet length), single measurement approx. 1 second (if SpectroDrive is used as hand-held device)
White reference	Absolute and relative; absolute white standard integrated in charging console
Illumination types	A, C, D50, D65, F 2/7/11
Standard observer	2°, 10°
Density filter	ISO/ANSI T, ISO/ANSI I, ISO E; spectral density Dmax
Density measurement range	0.00 – 2.50 D
Formats	52 (20") for sheet format 00 (B3+, 370 x 520 mm); 74 (28") for sheet format 0B (B2+, 520 x 740 mm); 102 (40") for sheet format 3B (B1+, 720 x 1020 mm); 105 (42") for sheet format 3B+ (B1+, 780 x 1050 mm); special formats (up to 2060 mm) on request
Repeatability	0.01 D; 0.03 CIE $\Delta E^*a^*b^*$
Inter-instrument agreement	0.01 D; 0.3 CIE $\Delta E^*a^*b^*$
Display single measurement	Color-OLED, 128 x 128 pixel
Data transmission	WLAN-module for wireless data transmission with PC-sided USB connection
Power supply	LiFePO4 battery, regulated recharge via charging console with AC adapter, 100 – 240 V, 47 – 63 Hz
Weight	Measurement device: 925 grams
Dimensions	59 x 96 x 170 mm (approx. 2.3 x 3.8 x 6.7 inches)

System requirements for TECHKON software:

Microsoft Windows 10 or higher; 64-bit, minimum: IBM-compatible PC with Intel i5 or comparable processor, 8 GB better 16 GB RAM, SSD Harddisk, 2 USB ports; screen resolution for TECHKON ExPresso: minimum 1.400 x 900 pixel

Manufacturer certificate

applicable for ISO 9000 documentation

Device: Scan-Spectrometer TECHKON SpectroDrive

Serial Number:

Manufacturer: TECHKON GmbH • Wiesbadener Str. 27 • D-61462 Königstein
Telephone: +49 (0)6174 9244 50 • Telefax: +49 (0)6174 9244 99
info@techkon.com • www.techkon.com

Certification: The device is compliant with 2014/53/EU concerning the electromagnetic compatibility EMC and is provided with the CE label. The device is RoHS compliant (class 9). Japanese Radio Law. This device is granted pursuant to the Japanese Radio Law (電波法). This device should not be modified (otherwise the granted designation number will become invalid).

- ETSI EN 300 328
- ETSI EN 301 489-1
- ETSI EN 301 489-17
- EN IEC 62311

This device complies with

- FCC Part 15.247 and FCC Part 15 B
- FCC ID: VYLSDR3 ▪ RSS-247 and ICES-003
- IC: 7548A-SDR3 ▪ Japan Test for wireless LAN, (2004-03) Art. 2 Paragraph 19

▪ Japan Radio Law module approval::   201-190234

Notice: Changes or modifications made to this equipment not expressly approved by TECHKON GmbH may void the FCC authorization to operate this equipment.

ISED Canada Compliance Statement / Déclaration de Conformité d'ISDE Canada:

This device contains licence-exempt transmitter(s)/

receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- (1) L'appareil ne doit pas produire de brouillage;
- (2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

The supplied AC adapter complies with UL 60950-1, IEC 60950-1, EN 60950-1 and IP40. The device must only be used with the original TECHKONSpectroDrive AC adapter.

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 ElektroG 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 of the white standard are derived from a ceramic white standard, which is referenced to measurements taken and certified by the National Institute of Standards and Technology (NIST).

Standards: The calculation of colorimetric values is accord. to the formulas and tables of ISO 13655:2017 and publications of CIE. The calculation of densitometric values is according to the formulas and tables of ISO 5-3.
ETSI EN301-489-1 EMC standard for radio equipment and services V2.1.1 (2017-02) ETSI EN301-489-17 EMC standard for radio equipment: specific conditions for broadband data transmission systems V3.1.1 (2017-02) ETSI EN 300 328 RF spectrum use V2.1.1/2016-11

Place

Date

Signature

D-61462 Königstein

EU-Konformitätserklärung
EC-Declaration of Conformity
Déclaration de Conformité de la CE
Dichiarazione di conformità CE

Hersteller: TECHKON GmbH
Manufacturer / constructeur / costruttore

Adresse: Wiesbadener Str. 27
Address / adresse / indirizzo D-61462 Königstein

erklärt, dass das Produkt:
Declares that the product / déclare, que l
e produit / si dichiara che il prodotto

Typ: SpectroDrive (WLAN Version)
Type / tipo

Verwendungszweck: Farbmessungen
Intended use / utilisation prévue / Color measurements / mesure de la
uso previsto couleur / misurazione del colore

bei bestimmungsgemäßer Verwendung den grundlegenden Anforderungen gemäß Artikel 3 der Funkanlagenrichtlinie 2014/53/EU entspricht und dass die folgenden harmonisierten Normen angewandt wurden:
complies with the essential requirements of Article 3 of the Radio Equipment Directive 2014/53/EU when used for its intended purpose and that the following harmonised standards have been applied: répond aux exigences essentielles de l'article 3 de la directive 2014/53/UE relative aux équipements radioélectriques lorsqu'il est utilisé conformément à sa destination et que les normes harmonisées suivantes ont été appliquées : soddisfa i requisiti essenziali dell'articolo 3 della Direttiva 2014/53/UE sulle apparecchiature radio quando utilizzato per l'uso previsto e che le seguenti norme armonizzate sono state applicate:

1. Gesundheit (Artikel 3.1.a der RED-Richtlinie 2014/53/EU)
Health / santé / salute

angewendete Norm: EN IEC 62311:2020
applied standard / standard appliqué /
norma applicata / édition pubblicato

2. Sicherheit (Artikel 3.1.a der RED-Richtlinie 2014/53/EU)

Safety / sécurité électrique / sicurezza elettrica

angewendete Normen: IEC 62368-1:2018

applied standards / standards appliqués /

norme applicate / édition pubblicato

EN IEC 62368-1: 2020 +

A11:2020

3. Elektromagnetische Verträglichkeit (Artikel 3.1.b der RED-Richtlinie 2014/53/EU)

Electromagnetic compatibility / compatibilité électromagnétique / compatibilità elettromagnetica

angewendete Normen: ETSI EN 301 489-1 V2.2.3 (2019-11)

applied standards / standards appliqués /

norme applicate / édition pubblicato

ETSI EN 301 489-17 V3.3.1

(2024-09)

4. Effiziente Nutzung des Funkfrequenzspektrums (Artikel 3.2 der RED-Richtlinie 2014/53/EU)

Efficient use of the radio frequency spectrum / efficacité du spectre radio / effettivo uso dello spettro radio

angewendete Norm: ETSI EN 300 328 V2.2.2 (2019-07)

applied standard / standard appliqué /

norma applicata / édition pubblicato

ETSI EN 301 489-1 EMC standard for radio equipment and services
V2.2.3 (2019-11)

ETSI EN 301 489-17 EMC standard for radio equipment: specific
conditions for broadband data transmission
systems V3.3.1 (2024-09)

ETSI EN 300 328 RF spectrum use V2.2.2 (2019-07)



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