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OMICRON LAB

Bode 100

Quick Start Guide

+ Multilingual Safety Instructions

Smart Measurement Solutions®

Version: ENU1006 03 05 — Year: 2023

Contents

1 About this Quick Start Guide

This Quick Start Guide was written for professional specialists in electronics and electrical engineering. Its purpose is to familiarize you with the *Bode 100* vector network analyzer and its various application fields. It contains helpful instructions on how to use *Bode 100* safely, properly, and efficiently.

This *Bode 100* Quick Start Guide provides you short information on how to install the *Bode Analyzer Suite* and how to connect the *Bode 100* to your PC. It is intended as an aid for you to take the *Bode 100* into operation quickly and easily. Thus, this Quick Start Guide only provides a small subset of information available for *Bode 100*. When using accessories in combination with the *Bode 100*, read the corresponding documentation.
Therefore, we recommend to read the *Bode 100* User Manual, which is available in PDF format on the DVD delivered with *Bode 100*.

Furthermore, the *Bode 100* User Manual can be viewed by clicking the icon at the top right corner of the *Bode Analyzer Suite* screen.
In addition, the latest version of this Quick Start Guide and the *Bode 100* User Manual can be downloaded from www.omicron-lab.com.

Safety symbols used in this document:

DANGER

Death or severe injury will occur if the appropriate safety instructions are not observed.

WARNING

Death or severe injury can occur if the appropriate safety instructions are not observed.

CAUTION

Minor or moderate injury may occur if the appropriate safety instructions are not observed.

NOTICE

Equipment damage or loss of data possible

2 Safety instructions

Before operating *Bode 100* and its accessories, read the following safety instructions carefully. If you do not fully understand any safety instruction or any part thereof, contact OMICRON Lab before proceeding. When working with *Bode 100*, observe all safety instructions in this document. You are responsible for every application that makes use of an OMICRON or OMICRON Lab product. Any miss-operation can result in damage to property or persons. Maintenance and repair of *Bode 100* and its accessories is only permitted by qualified experts either at OMICRON Lab or at certified repair centers.

Following these instructions will help you to prevent danger, repair costs and possible down time due to incorrect operation. Furthermore, it ensures the reliability and life-cycle of *Bode 100*.

Use *Bode 100* in observance of all existing safety requirements from national standards for accident prevention and environmental protection.

Reading the *Bode 100* manual alone does not release you from the duty of complying with all national and international safety regulations relevant for working with *Bode 100*.

2.1 Operator qualifications

- Testing with *Bode 100* must only be carried out by qualified, skilled and authorized personnel.
- Personnel receiving training, instructions, directions, or education on *Bode 100* must be under constant supervision of an experienced operator while working with the equipment.
- Testing with *Bode 100* must comply with the on-site safety instructions as well as additional relevant documents.

2.2 Rules for use

- *Bode 100* is exclusively intended for the application area specified in this document. The manufacturer/distributors are not liable for damage resulting from a use other than the specified operation. The user alone assumes all responsibility and risk.
- Use *Bode 100* only when it is in a technically sound condition.
- Do not open *Bode 100* or remove any of its housing components.
- The *Bode 100* does not contain any serviceable parts. Do not open the *Bode 100* or carry out any modifications, extensions, or adaptations.
- Use *Bode 100* in observance of all existing safety requirements from national and international standards for accident prevention and environmental protection.
- Always keep the manual either printed or as PDF file at the site where *Bode 100* is used. The manual must be read by all people working with *Bode 100*. In addition to the manual and the applicable regulations for accident prevention in the country and at the site of operation, heed the accepted technical procedures for safe and competent work.

2.3 Designated use

Bode 100 and its accessories are especially designed for swept frequency measurements of electronic circuits in laboratory and manufacturing environments.
Typical applications are:

- Measurement of the complex transfer function of amplifiers, filters and attenuators
- S-Parameter measurement in the 50 Ω domain
- Stability assessment of control loops
- Determination of resonance frequencies of piezo elements and quartz crystals
- Impedance measurement of inductors, capacitors and resistors

Disclaimer

The advisory procedures and information contained within this document have been compiled as a guide to the safe and effective operation of *Bode 100*. It has been prepared in conjunction with application engineers and the collective experience of the manufacturer. The in-service conditions for the use of *Bode 100* may vary between customers and end-users.
Consequently, this document is offered as a guide only. It shall be used in conjunction with the customers own safety procedures, maintenance program, engineering judgment, and training qualifications.
Using *Bode 100* or its accessories in a manner not specified by the manufacturer may result in damage to property or persons.

2.4 Cleaning

Use a cloth dampened with isopropanol alcohol to clean *Bode 100* and its accessories.

3 Compliance statements and recycling

3.1 Compliance statement

Declaration of conformity (EU)

The equipment adheres to the guidelines of the council of the European Community for meeting the requirements of the member states regarding the electromagnetic compatibility (EMC) directive and the RoHS directive.

Declaration of conformity (UK)

The equipment adheres to the regulations of the UK government for meeting the requirements regarding the Electromagnetic Compatibility (EMC) Regulation and the Regulation for Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment.

FCC compliance (USA)

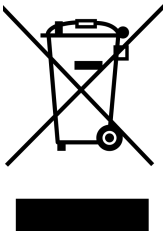
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Declaration of compliance (Canada)

This Class A digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

The use of the delivered mains adapter is required to comply with FCC and ICES rules as well as the EMC directive.

3.2 Information for disposal and recycling



Bode 100 and all of its accessories are not intended for household use. At the end of its service life, do not dispose of the test set with household waste!

For customers in EU countries (incl. European Economic Area)

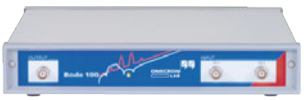
OMICRON test sets are subject to the EU Waste Electrical and Electronic Equipment Directive (WEEE directive). As part of our legal obligations under this legislation, OMICRON offers to take back the test set and to ensure that it is disposed of by an authorized recycling facility.

For customers outside the European Economic Area

Please contact the authorities in charge for the relevant environmental regulations in your country and dispose *Bode 100* and all of its accessories only in accordance with your local legal requirements.

4 Bode 100 and accessories

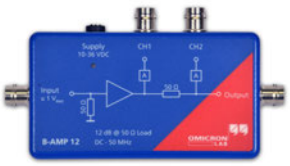
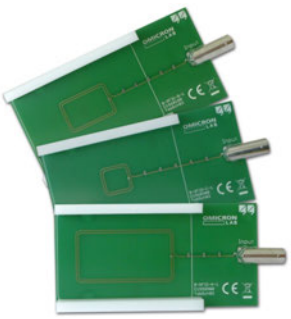
4.1 Delivered items

 *Bode 100* multi functional test set	 *Bode Analyzer Suite* on DVD	 Wide-range AC power supply including mains input plugs for different national standards
 Test objects (Quartz filter and IF filter) on PCB	 USB Cable	 4 pc. BNC 50 Ω cables with 500 mm length (m-m)
 BNC adapters (straight, T, Short, Load 50 Ω)	 *Bode 100* Quick Start Guide	

The delivered items may vary a bit from the look shown above. Please refer to the packing list received with the *Bode 100* for further information

We strongly recommend to use the original wide-range AC power supply delivered with *Bode 100*.

4.2 Optional accessories

	**B-WIT 100 Wideband Injection Transformer & B-LFT 100 Low-Frequency Injection Transformer** The B-WIT 100 and B-LFT 100 are used to inject signals into control loops. Its main application are the stability analysis of switched mode power supplies and linear voltage regulators. B-WIT 100 order number: OL000151 B-LFT 100 order number: OL000169
	**PML-111O 10:1 Passive Probe** PML-111O is a passive 10:1 probe designed for the input stage of Bode 100. It is manufactured by PMK in Germany and fits perfectly to the Bode 100. Order number: OL000110
	**B-WIC & B-SMC Impedance test fixtures** B-WIC and B-SMC extend the impedance measurement range of *Bode 100*. They enable you to easily measure THT or SMD components such as inductors and capacitors. B-WIC order number: OL000152 B-SMC order numer: OL000153
	**B-AMP 12 Amplifier** 12 dB amplifier to boost the output signal of *Bode 100* for applications where more than 13 dBm are needed. Order number: OL000168
	**B-LCM Common Mode Choke** A low-frequency common mode choke to reduce ground-loop errors in e.g. Shunt-Thru measurements. Order number: OL000175
	**B-RFID Measurement Adapters** The B-RFID adapters allow standard compliant measurement of the resonance frequency and Q-factor of RFID antennas. Order numbers: OL000170-OL000173

For more information on the above mentioned *Bode 100* accessories and recommended accessories manufactured by partner companies visit www.omicron-lab.com.

5 Technical data

In this section you can find the most important technical data valid for the *Bode 100 Revision 2* device. You can download a detailed technical data sheet for *Bode 100 Revision 1* as well as *Bode 100 Revision 2* from the OMICRON Lab website www.omicron-lab.com → Bode 100 → Technical Data.

NOTICE

Risk of permanent damage of the device.

Exceeding the absolute maximum ratings might result in equipment damage.

► Do not exceed the absolute maximum ratings listed below.

5.1 Absolute maximum ratings

Table 5-1: Absolute maximum ratings

Characteristic	Absolute Maximum Rating
DC Power Input	
Max. DC supply voltage	+28 V
Max. DC supply reverse voltage	-28 V
INPUT CH 1, INPUT CH 2 connectors (1 MΩ input impedance selected)	
Maximum DC input signal	50 V
Maximum AC input signal	1 Hz...1 MHz: 50 Vrms 1 MHz...2 MHz: 30 Vrms 2 MHz...5 MHz: 15 Vrms 5 MHz...10 MHz: 10 Vrms 10 MHz ... 50 MHz: 7 Vrms
INPUT CH 1, INPUT CH 2 connectors (50 Ω input impedance selected)	
Maximum input power	1 W
Maximum input voltage	7 Vrms
OUTPUT connector	
Maximum reverse power	0.5 W
Maximum reverse voltage	5 Vrms (≤ 3.3 Vdc recommended)

5.2 Bode 100 specifications

Table 5-2: *Bode 100 Revision 2* specifications:

Characteristic	Rating
Frequency range	1 Hz to 50 MHz
OUTPUT	
Waveform	Sinusoidal
Signal level range	-30 dBm...13 dBm 7 mVrms...1 Vrms (50 Ω load) 14 mVrms...2 Vrms (no load)
Source level accuracy	±0.3 dB (1 Hz to 1 MHz) ±0.6 dB (1 MHz to 50 MHz)
Source level frequency response (flatness)	±0.3 dB (typical, referring to 10 MHz)
Frequency accuracy after adjustment	± 2 ppm ± 0.5 stepsize
Frequency resolution (step size)	0.00605 Hz (1 Hz to 100 Hz) 0.03632 Hz (100 Hz to 50 MHz)
Source impedance	50 Ω
Return loss (1 Hz to 50 MHz)	>30 dB, >35 dB (typical)
Spurious signals & harmonics	<-55 dBc (typical)
Maximum reverse signal / power	0.5 W = 5 Vrms (≤ 3.3 Vdc recommended)
INPUT CH 1, INPUT CH 2	
Input impedance (software switchable)	**High**: 1 MΩ (AC-coupled) **Low**: 50 Ω (DC-coupled)
1 MΩ input impedance	1 MΩ ±2% || 40...55 pF
50 Ω input impedance return loss	> 28 dB, >35 dB typical (1 Hz to 50 MHz)
Receiver bandwidth (RBW) software selectable	1 Hz, 3 Hz, 10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz , 5 kHz
Input attenuators (software selectable)	0 dB, 10 dB, 20 dB, 30 dB, 40 dB
Full-scale AC input signal	100 mVrms @ 0 dB input attenuator 316 mVrms @ 10 dB input attenuator 1 Vrms @ 20 dB input attenuator 3.16 Vrms @ 30 dB input attenuator 10 Vrms @ 40 dB input attenuator
Input channel sensitivity (typical)	1 µVrms (0 dB attenuator, 10 Hz RBW)
Maximum DC voltage (1 MΩ input impedance)	1 MΩ input impedance: 50 V 50 Ω input impedance: 7 V
Input channels dynamic Range	> 100 dB (10 Hz RBW)
Noise floor (S21 measurement) RBW = 10 Hz, PSOURCE = 13 dBm, Attenuator CH1: 20 dB, CH2: 0 dB	1 Hz to 10 kHz: -115 dB (typical) 10 kHz to 10 MHz: -125 dB (typical) 10 MHz to 50 MHz: -105 dB (typical)
Gain Error	< 0.1 dB (User-Range calibrated)
Phase Error	< 0.5° (User-Range calibrated)
OUTPUT, CH1, CH2 connector type	BNC

Characteristic	Rating
USB interface connector	USB type B socket
Bode 100 power requirements	
Supply voltage range	+9 VDC to +24 VDC
Power demand	< 10 W
Connector type	Coaxial power socket (2.5 mm / 5.5mm) Inner conductor is positive

5.3 System requirements

Table 5-3: System requirements

Characteristic	Minimum PC Configuration
Processor	Intel Core-i Dual-Core (or similar)
Memory (RAM)	2 GB, 4 GB recommended
Graphics resolution	Super VGA (1024x768) higher resolution recommended
Graphics card	DirectX 11 with Direct2D support
USB interface	USB 2.0 or higher
Operating System	Microsoft Windows 10
Software	Bode 100 Revision 2 requires Bode Analyzer Suite 3.00 or newer.

5.4 Environmental requirements

Table 5-4: Environmental requirements

Characteristic	Condition	Rating
Temperature	Storage	-35 ... +60 °C / -31...+140 °F
	Operating	+5 ... +40 °C / -41...+104 °F
	For specification	23 °C ±5 °C / 73 °F ±18 °F
Relative humidity	Storage	20 ... 90 %, non-condensing
	Operating	20 ... 80 %, non-condensing

5.5 Mechanical data

Table 5-5: Mechanical data

Characteristic	Rating
Dimensions (w x h x d) without connectors	26 cm x 5 cm x 26.5 cm / 10.25 " x 2 " x 10.5 "
Weight	< 2 kg / 4.4 lbs

6 Device overview

Bode 100 is a USB controlled vector network analyzer. The system consists of the *Bode 100* hardware and the *Bode Analyzer Suite* software. In the following the *Bode 100* hardware is described in detail. To learn more about the *Bode Analyzer Suite*, please check out 7.4 Performing your first measurement on page 18 ff.

6.1 Connectors

Bode 100 provides the following three connectors at the front panel:

- OUTPUT: signal output (BNC socket)
- CH 1: channel 1 signal input (BNC socket)
- CH 2: channel 2 signal input (BNC socket)

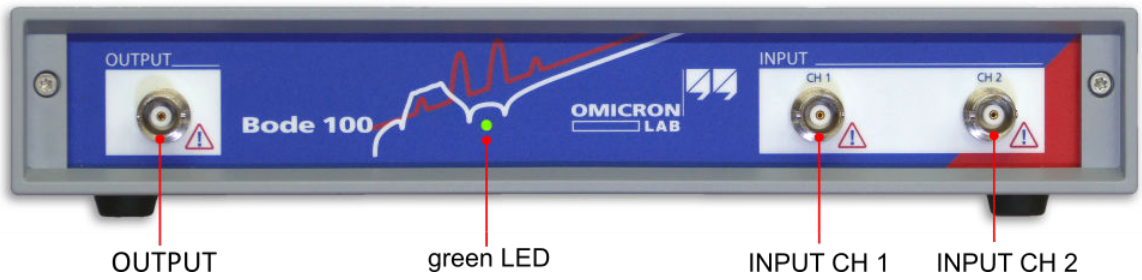


Figure 6-1: *Bode 100* front view

WARNING

Death or severe injury can occur if hazardous voltages are connected to the Bode 100.

Bode 100 is a SELV device (SELV = Safety Extra Low Voltage according to IEC 60950-1).

- ► Do not apply voltage levels >50 VDC or >25 VAC to the inputs of *Bode 100*.
- ► Be aware that no indication on *Bode 100* shows that the output is active. This could be especially critical if amplifiers are connected to *Bode 100*.

Bode 100 provides the following three connectors at the rear panel:

- Supply power input for DC voltages from 9 V to 24 V (5.5 mm coaxial plug with 2.5 mm pin)
- USB: data interface (USB type B port)
- ⏚: Ground connector for external ground connection (4 mm banana-socket)

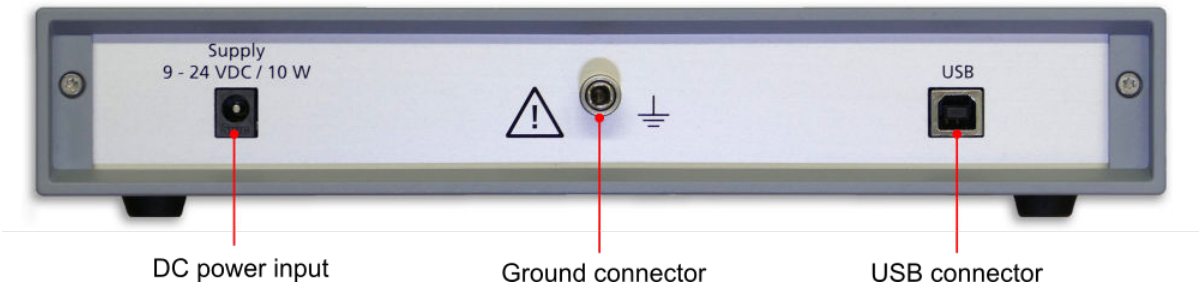


Figure 6-2: *Bode 100* rear view

NOTICE

Risk of permanent damage of the device.

Exceeding the absolute maximum ratings might result in equipment damage.

► The AC-coupled inputs represent a high impedance for DC signal. Before using passive probes, check out 7.5 Using external probes on page 21.

7 Getting started

This section explains how to connect *Bode 100*, put it into operation and how to perform the first measurement with it.

7.1 Installing the *Bode Analyzer Suite*

To install the *Bode Analyzer Suite* insert the DVD delivered with the *Bode 100* and follow the instructions on the screen. In case that you have deactivated the auto run function of your computer's operating system navigate to the root directory of the DVD and start the setup manually.
If you have no DVD drive on your computer you can download the latest version of the *Bode Analyzer Suite* from www.omicron-lab.com.

It is recommended to disconnect the USB connection between the *Bode 100* and your PC during the installation of the *Bode Analyzer Suite*.

7.2 Powering the *Bode 100*

NOTICE

Equipment damage possible.

Make sure the voltage and polarity of the power supply match the ratings of the device.

► Use the power adapter delivered with the *Bode 100*.

The *Bode 100* is powered with an external wide-range AC power adapter. Before powering *Bode 100*, select the adapter's mains input plug fitting your power outlet. Plug the adapter's DC output connector into the *Bode 100* DC power input on the rear panel and the mains input plug into the power outlet.

7.3 Connecting *Bode 100* to a computer

The *Bode 100* communicates with the computer via USB. Connect the *Bode 100*'s USB connector on the rear panel to the USB connector of your computer using the USB cable delivered with your *Bode 100*.

Some USB Hubs can cause problems with the data transfer between the *Bode 100* and your computer. In case you are experiencing problems with the USB connection, try to connect your *Bode 100* directly to a USB port of your computer. The same applies to some USB isolators.

7.4 Performing your first measurement

Follow the steps described below to perform your first measurement:
Connect the test object "IF Filter" to the *Bode 100* using two BNC cables as shown in the figure below.

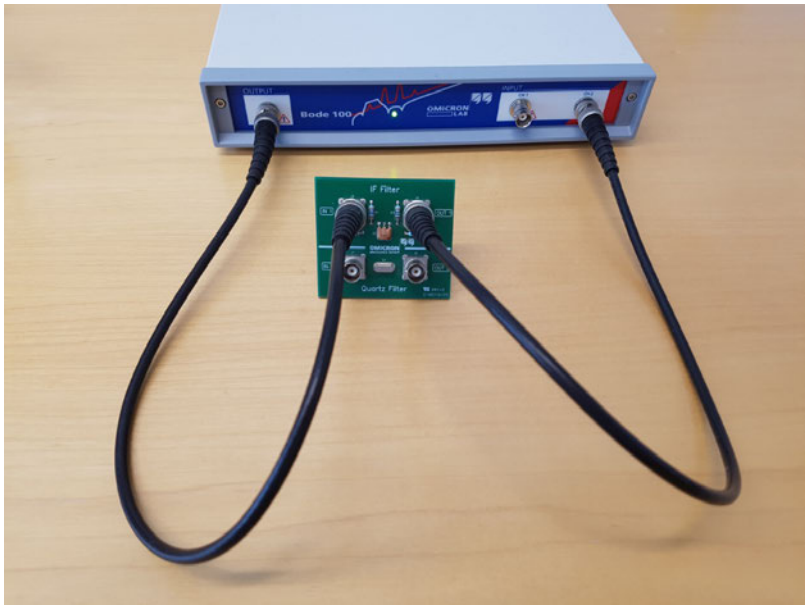
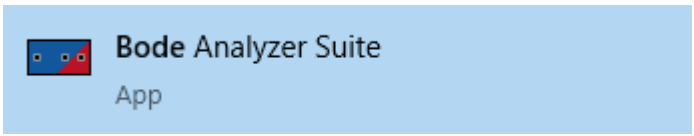


Figure 7-1: Connecting the test object IF Filter to the *Bode 100*

Now start the *Bode Analyzer Suite*:

- either by clicking its desktop icon: 

- or by using the Microsoft Windows start menu: 

After the *Bode Analyzer Suite* has started, you will see a start screen as shown below:

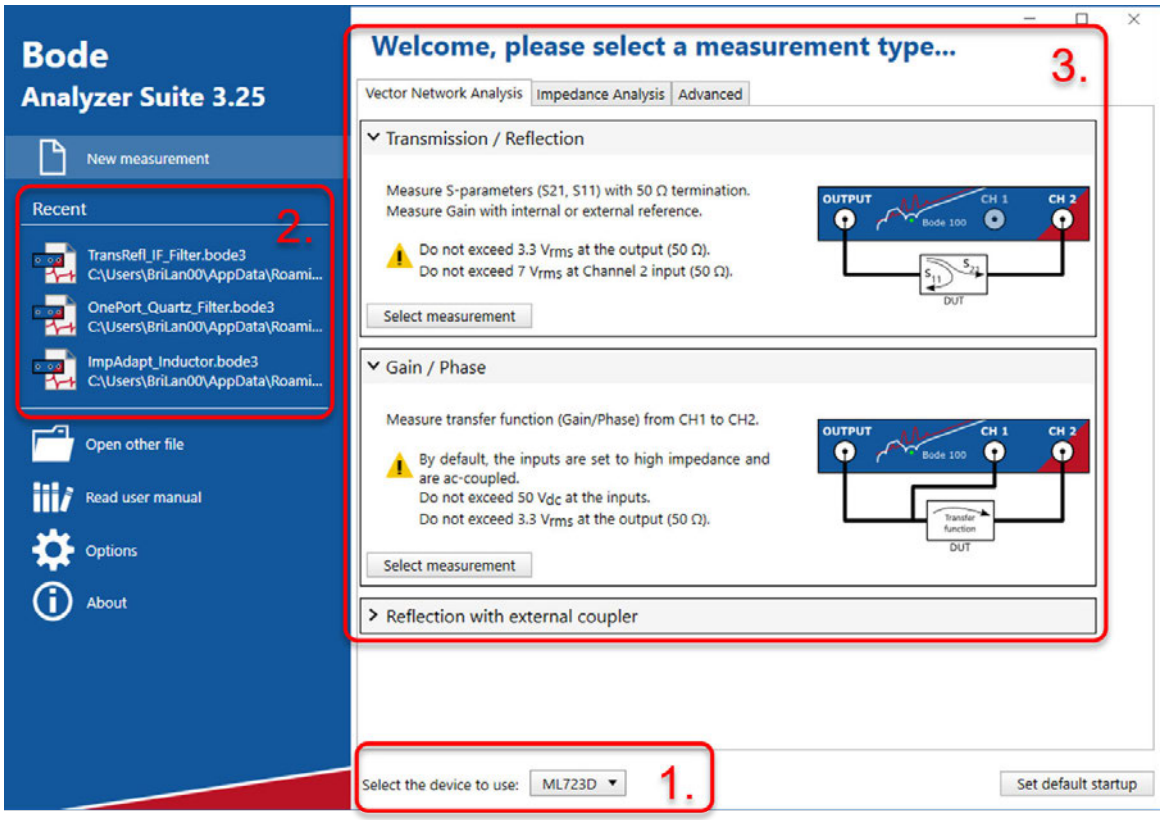


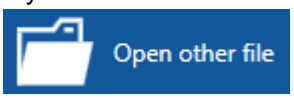
Figure 7-2: *Bode Analyzer Suite* start screen

The Start screen allows the following user interactions:

- Choose the device to use (**1.**). This field is only visible if you have a *Bode 100* device connected to your PC. To find out if your *Bode 100* is recognized by the *Bode Analyzer Suite*, check if the serial number of your *Bode 100* is displayed like shown in the figure above (see **1.**). If no serial number is displayed, refer to the section Troubleshooting for further information.
- Open a recent file or other file (**2.**). On your first start-up the demo-files are listed here.
- Or select one of the available measurement modes (**3.**) and start a measurement.

To start your first measurement click for example the file name **TransRefl_IF-filter.bode3** in recent list (see **2.**)

If you cannot see the file **TransRefl_IF-filter.bode3** in Recent, use the



function and enter *"%APPDATA%\OMICRON Lab\Bode Analyzer Suite\Demo Files\"* to navigate to the demo files.

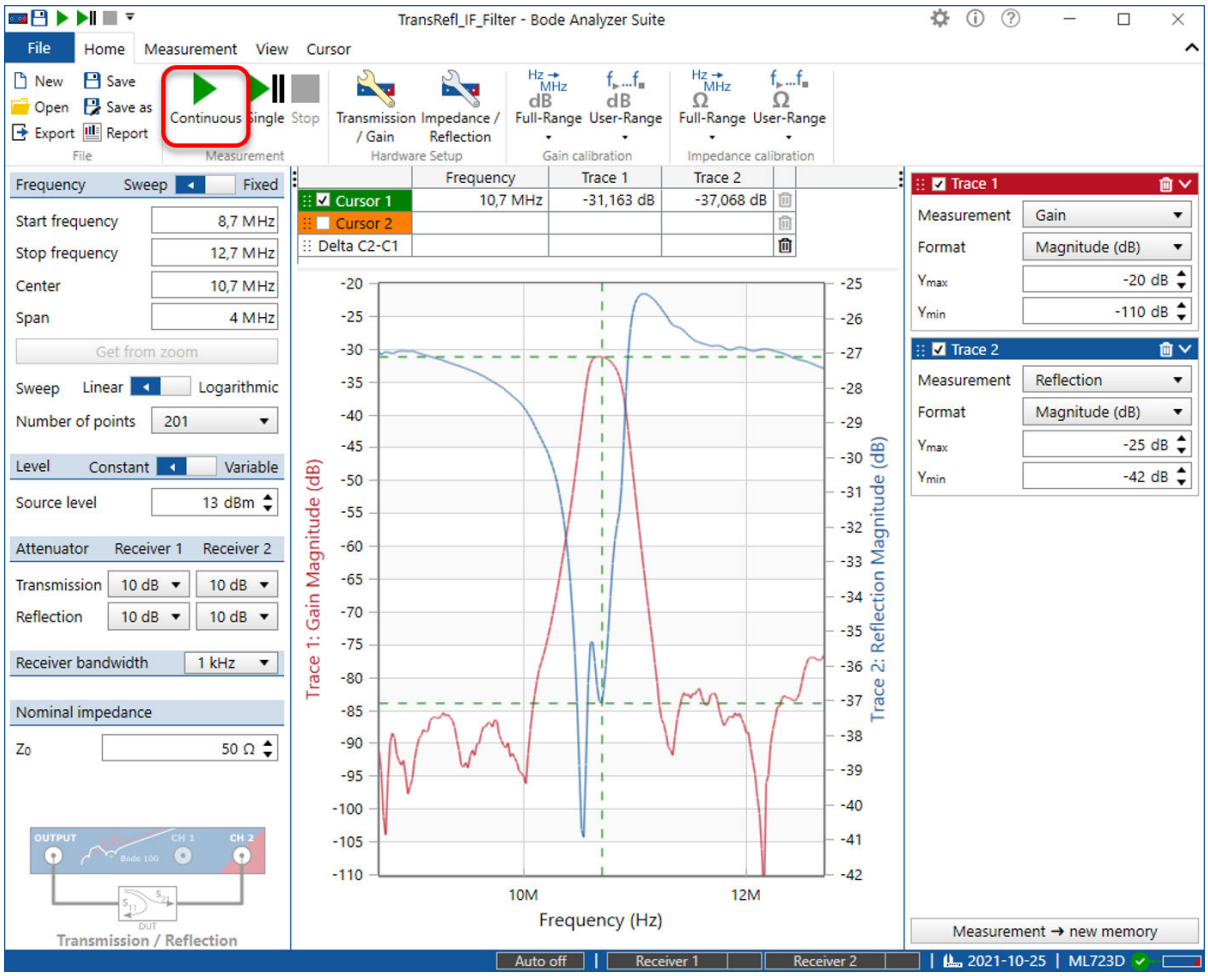


Figure 7-3: Your First Measurement

To start your first measurement, simply press the button marked with a red frame in the figure above.

Congratulations! You have just performed your first measurement using the *Bode 100*.

The red curve shows the transmission characteristic (S21) of the IF filter, while the blue curve shows the reflection (S11) of the IF filter.

Please refer to the *Bode 100* User Manual for more information on the *Bode 100* and its measurement capabilities. You can view the user manual by clicking **Read user manual** in the start screen or by clicking the help icon that is available at the top right corner of the *Bode Analyzer Suite* window.

7.5 Using external probes

You can use any probe with *Bode 100* that offers a standard BNC connector. The use of probes can have the following advantages:

- Reduction of the capacitive loading added by connecting *Bode 100* to your circuit.
- Easier probing possibilities when no BNC connectors are available on the DUT.
- Protection of *Bode 100* from hazardous voltages if **isolating probes** are used.

1 MΩ 10:1 probes are recommended. 1 MΩ probes feature a divider in the probe that lowers DC voltage as well. Furthermore 1 MΩ probes provide a lower impedance path that reduces channel-channel crosstalk and noise. OMICRON Lab recommends using the PML-111O probe from PMK for the use with *Bode 100*.

For more information on how to configure probes correctly, how to perform calibration and how to set up the Bode Analyzer Suite, please refer to the User Manual.

WARNING

Death or severe injury due to hazardous voltage levels possible.

Bode 100 is a SELV device and the housing is not connected to safety ground via the power supply.

- ► Ensure that voltage and current probes used with *Bode 100* are properly grounded in accordance with their manufacturer's guidelines.
- ► When working with voltage or current probes, always connect the *Bode 100*'s ground terminal (available for HW Rev. 2 or higher) with a solid connection of at least 3.6 mm² cross-section and not longer than 10 m to the ground terminal in the laboratory.

NOTICE

Risk of permanent damage of the device.

The inputs of *Bode 100* inputs are AC coupled with a maximum allowed DC voltage of 50 VDC. A standard, passive, 10:1 probe with 9 MΩ tip-resistor will not divide the DC voltage.

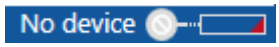
- ► Use suitable probes when measuring on DC levels above 50 V
- ► Do not use standard 10:1 oscilloscope probes with the *Bode 100*

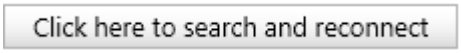
8 Troubleshooting

In case you are not able to start a measurement using *Bode 100*, please perform the following steps:

1. Check if the green power LED at the front panel is on.
   In case that the LED is not lit, execute the following steps:
   a. Check if the Wide-range AC power supply is plugged correctly into the mains socket.
   b. Check if the DC connector of the power supply is properly plugged in.
   c. Check the output voltage of the DC connector using a volt-meter.

2. Check if the communication between the *Bode Analyzer Suite* and the *Bode 100* has been successfully established. To do so, check if the serial number of your *Bode 100* is displayed in the start screen (see 7-2 on page 19, or in the right bottom corner of the measurement screen 

(see 7-3 on page 20).
   a. Check if the USB cable is properly plugged into the computer and the *Bode 100*.
   b. Try disconnecting and re-connecting the USB cable.
   c. If this does not help, avoid USB hubs and plug *Bode 100* directly into an USB port of your computer.
   d. Try to connect *Bode 100* to a different USB port or a different computer. Some USB 3 ports cause issues with *Bode 100* Revision 1 devices. Especially with AMD Ryzen processors, the older Bode 100 Revision 1 devices don't work. If you face this issue, please contact the OMICRON Lab Support
   e. Move the mouse over the icon 

in the bottom right corner of the status bar and then click 

.
3. Try re-starting your PC.

In case you are still experiencing problems do not hesitate to contact us. We are looking forward to support you. Check out the section Support for further information on how to contact us.

9 Multilingual Safety Instructions

Български – Указания за безопасност, предназначение и квалификации на оператора

Указания за безопасност:

- Bode 100 е SELV (безопасно свръхнисковолтово според стандарта за безопасност IEC 60950-1) устройство.
- Не прилагайте опасни нива на напрежение >50 VDC или >25 VAC към входовете наBode 100.
- Уверете се, че измервателните клещи за напрежение и ток, които използвате с Bode 100, са правилно заземени, в съответствие с инструкциите на производителя.
- Когато работите с измервателни клещи за напрежение или ток, винаги свързвайте изхода за заземяване на Bode 100 (наличен за HW Rev. 2 или по-нова версия) към изхода за заземяване в лабораторията посредством твърда връзка с напречно сечение най-малко 3,6 mm² и не по-дълга от 10 m.
- Внимавайте индикаторът на Bode 100 да не показва, че изходът е активен. Това е от особено значение, ако към Bode 100 са свързани усилватели.

Предназначение:

- Bode 100 и аксесоарите му са специално създадени за измерване на амплитуда/фаза, S-параметър и импеданс на електрически вериги в лабораторни и производствени условия.

Квалификация на оператора:

- Изпитванията с Bode 100 трябва да се извършват само от упълномощен и квалифициран персонал.
- Служителите, които се обучават или инструктират за работата с Bode 100, трябва да бъдат под постоянния надзор на опитен оператор, докато работят с апаратурата. При извършване на изпитвания с Bode 100 трябва да се спазват вътрешните указания за безопасност и допълнителни приложими документи.

Čeština – Bezpečnostní pokyny, určené použití a kvalifi kace operátora

Bezpečnostní pokyny:

- Bode 100 je zařízení SELV (Safety Extra Low Voltage = Bezpečné malé napětí podle IEC 60950-1).
- Na vstupy Bode 100 nepoužívejte nebezpečné úrovně napětí >50 VDC či >25 VAC.
- Ujistěte se, že jsou napěťové a proudové sondy používané se zařízením Bode 100 řádně uzemněny v souladu s pokyny jejich výrobců.
- Při práci s napěťovými a proudovými sondami vždy připojujte uzemňovací svorku zařízení Bode 100(k dispozici pro HW Rev. 2 nebo vyšší) s pevným připojením o průřezu alespoň 3,6 mm² a ne delší než 10 m k uzemňovací svorce v laboratoři.

- Nezapomeňte, že zařízení Bode 100 nijak nehlásí, že je výstup aktivní. To by mohlo být obzvláště kritické, pokud jsou k zařízení Bode 100 připojeny zesilovače.

Určené použití:

- Zařízení Bode 100 a jeho příslušenství je navrženo obzvláště pro měření zisku/fáze, S-parametru a impedance elektronických obvodů v laboratoři a výrobních prostředích.

Kvalifi kace operátora:

- Testování se zařízením Bode 100 smí provádět pouze kvalifi kovaná, odborně vyškolená a pověřená osoba.
- Osoby, které jsou školeny, poučovány a trénovány v použití zařízení Bode 100, musí být při práci se zařízením pod neustálým dohledem zkušeného operátora. Testování se zařízením Bode 100 musí vyhovovat interním bezpečnostním pokynům a dalším dokumentům týkajícím se bezpečnosti.

Dansk – Sikkerhedsanvisninger, tilsigtet brug og operatørkvalifi kationer

Sikkerhedsanvisninger:

- Bode 100 er en SELV-enhed (Safety Extra Low Voltage iht. IEC 60950-1).
- Tilslut ikke risikable spændingsniveauer >50 VDC eller >25 VAC til Bode 100s indgange.
- Det skal sikres, at de spændings- og strømsensorer, der anvendes sammen med Bode 100, har en ordentlig jordforbindelse i henhold til producentens retningslinjer.
- Når man arbejder med spændings- eller strømsensorer, skal Bode 100s jordforbindelse (fås til HW Rev. 2 eller højere) altid forbindes med en solid forbindelse på mindst 3,6 mm² i tværsnit og ikke længere end 10 m til jordforbindelsen i laboratoriet.
- Vær opmærksom på, at Bode 100 ikke viser, om der er en aktiv eff ekt. Det kan især være kritisk, hvis der er forstærkere forbundet til Bode 100.

Tilsigtet brug:

- Bode 100 inkl. tilbehør er specialdesignet til gain/phase, s-parameter og impedansmålinger af elektroniske kredsløb i laboratorie- og produktionsmiljøer.

Operatørkvalifi kationer:

- Tests med Bode 100 skal altid udføres af autoriseret og kvalifi ceret personale.
- Personale, der modtager oplæring, anvisninger, instruktioner eller er under uddannelse til at arbejde ved Bode 100, skal være under konstant opsyn af en erfaren operatør, når de arbejder med udstyret. Test med Bode 100 skal være i overensstemmelse med de interne sikkerhedsanvisninger samt supplerende relevante dokumenter.

Deutsch – Sicherheitshinweise, bestimmungsgemäße Verwendung und Qualifikation des Bedienpersonals

Sicherheitshinweise:

- Bode 100 ist ein SELV-Gerät (Sicherheitskleinspannung) gemäß IEC 60950-1.
- Legen Sie an die Eingänge des Bode 100 keine Spannungen über 50 VDC oder 25 VAC an.

- Stellen Sie sicher, dass bei Verwendung von Tastköpfen und Stromzangen mit dem Bode 100 diese gemäß den Richtlinien des jeweiligen Herstellers korrekt geerdet sind.
- Verbinden Sie bei Verwendung von Tastköpfen und Stromzangen immer den Erdungsanschluss des Bode 100 mittels einer Erdungsleitung von mindestens 3,6 mm² Querschnitt und einer maximalen Länge von 10 m mit dem Erdungsanschluss des Labors (der Erdungsanschluss ist nur an Bode 100-Geräten der Hardware-Revision 2 oder neuer vorhanden).
- Beachten Sie, dass keine Anzeige am Bode 100 darauf hinweist, ob der Ausgang aktiv ist. Dies kann besonders kritisch sein, wenn Verstärker an das Bode 100 angeschlossen sind.

Bestimmungsgemäße Verwendung:

- Das Bode 100 und dessen Zubehör sind speziell für die Messung der Verstärkung und des Phasenverhaltens von elektronischen Schaltungen sowie von S-Parametern und Impedanzen konzipiert. Das Gerät ist ausschließlich für die Verwendung in Labor- und Produktionsumgebungen vorgesehen.

Qualifikation des Bedienpersonals:

- Prüfungen mit dem Bode 100 dürfen nur durch autorisierte, qualifizierte und dafür ausgebildete Personen durchgeführt werden.
- Zu schulendes, anzulernendes, einzuweisendes oder im Rahmen einer Ausbildung befindliches Personal darf nur unter ständiger Aufsicht einer erfahrenen Person mit dem Bode 100 arbeiten. Prüfungen mit dem Bode 100 müssen immer unter Beachtung aller anzuwendenden Sicherheitsbestimmungen und sonstigen relevanten Dokumente erfolgen.

Ελληνικά – Οδηγίες ασφαλείας, προβλεπόμενη χρήση και προσόντα χειριστών

Οδηγίες ασφαλείας:

- Το Bode 100 είναι μια συσκευή SELV (Συσκευή ασφαλείας εξαιρετικά χαμηλής τάσης σύμφωνα με το πρότυπο IEC 60950-1).
- Μην εφαρμόζετε επικίνδυνα επίπεδα τάσης >50 VDC ή >25 VAC στις εισόδους του Bode 100.
- Βεβαιωθείτε ότι οι ανιχνευτές τάσης και έντασης που χρησιμοποιούνται με το Bode 100 είναι σωστά γειωμένοι σύμφωνα με τις οδηγίες του κατασκευαστή.
- Όταν εργάζεστε με τους ανιχνευτές τάσης ή έντασης, πρέπει πάντα να συνδέετε τον ακροδέκτη γείωσης του Bode 100 (διαθέσιμο για τον εξοπλισμό έκδοσης 2 ή νεότερης) μέσω σταθερού αγωγού σύνδεσης διατομής 3,6 mm² και μήκους όχι μεγαλύτερου από 10 m με τον ακροδέκτη γείωσης στο εργαστήριο.
- Θυμηθείτε ότι όταν είναι ενεργή η έξοδος, δεν υπάρχει καμία σχετική ένδειξη στο Bode 100. Αυτό μπορεί να έχει ιδιαίτερα κρίσιμη σημασία εάν συνδεθούν ενισχυτές στο Bode 100.

Προβλεπόμενη χρήση:

- Το Bode 100 και τα παρελκόμενά του είναι σχεδιασμένα ειδικά για μετρήσεις της απολαβής/φάσης, της παραμέτρου S (σκέδασης) και της σύνθετης αντίστασης ηλεκτρονικών κυκλωμάτων σε εργαστηριακά και βιομηχανικά περιβάλλοντα παραγωγής.

Προσόντα χειριστών:

- Οι δοκιμές με το Bode 100 πρέπει να εκτελούνται μόνο από πιστοποιημένο, ειδικευμένο και εξουσιοδοτημένο προσωπικό.

- Το προσωπικό που εκτελεί πρακτική εξάσκηση ή λαμβάνει εντολές, οδηγίες ή εκπαίδευση σχετικά με το Bode 100 πρέπει να βρίσκεται υπό τη συνεχή επίβλεψη ενός έμπειρου χειριστή όταν εργάζεται με τον εξοπλισμό. Η εκτέλεση δοκιμών με το Bode 100 πρέπει να συμμορφώνεται με τις εσωτερικές οδηγίες ασφαλείας και με οποιαδήποτε επιπρόσθετα σχετικά έγγραφα.

Español – Instrucciones de seguridad, aplicación prevista y cualifi cación del operador

Instrucciones de seguridad:

- El instrumento Bode 100 es un dispositivo SELV (Safety Extra Low Voltage, tensión de seguridad extrabaja según la norma IEC 60950-1).
- No aplique niveles de tensión peligrosos >50 VCC o >25 VCA a las entradas del Bode 100.
- Asegúrese de que las sondas de tensión y corriente utilizadas con el Bode 100 están correctamente conectadas a tierra de acuer- do con las directrices de su fabricante.
- Al trabajar con sondas de tensión o corriente conecte siempre el terminal de tierra delBode 100 (disponible para la revisión 2, o superior, del hardware) con una conexión segura con una sección de al menos 3,6 mm² y una longitud no superior a 10 m para el terminal de tierra en el laboratorio.
- Tenga en cuenta que el Bode 100 no tiene indicación alguna de que la salida esté activa. Esto podría ser especialmente crítico si los amplifi cadores están conectados al Bode 100.

Aplicación prevista:

- El instrumento Bode 100 y sus accesorios están diseñados especialmente para mediciones de ganancia/fase, parámetro S e impedancia de circuitos electrónicos en entornos de laboratorio y de fábrica.

Cualifi caciones de los operadores:

- Solo el personal cualifi cado, experimentado y autorizado debe realizar pruebas con Bode 100.
- El personal no experimentado en el manejo del instrumento Bode 100 debe estar en todo momento bajo la supervisión de un operador experimentado mientras trabaja con el equipo. Al realizar pruebas con el instrumento Bode 100 se deben cumplir todas las instrucciones de seguridad internas, así como las instrucciones proporcionadas en cualquier otro documento que resulte pertinente.

Eesti keel – Ohutusjuhised, kasutusotstarve ja kasutaja kvalifi katsioon

Ohutusjuhised:

- Bode 100 on maandamata kaitseväikepingega (Safety Extra Low Voltage, SELV) seade (kooskõlas standardi IEC 60950-1 nõuetega).
- Ärge kasutage seadme Bode 100 sisendis ohtlikku pinget > 50 V alalisvoolu või > 25 V vahelduvvoolu.
- Veenduge, et seadmega Bode 100 kasutatavad elektripinge ja -voolu andurid oleks õigesti maandatud kooskõlas andurite maaletootja(te) juhistega.
- Kui töötate elektripinge ja -voolu anduritega, ühendage seadme Bode 100 maandusklemm (saadaval HW Rev. 2 või uuema jaoks) täistraadist juhtmega, mis on vähemalt 3,6 mm2 ristlõikega ja mitte pikem kui 10 m, labori maandusklemmiga.

- Pange tähele, et seadmel Bode 100 ei ole näitu, mis osutaks sellele, et väljund oleks aktiivne. Seda on äärmiselt oluline jälgida, kui seade Bode 100 on ühendatud võimenditega.

Kasutusotstarve:

- seade Bode 100 ja selle lisatarvikud on peamiselt arendatud selleks, et mõõta võimendust/faasi, s-parameetrit ja takistust elektriahelates labori- ja tööstuskeskkonnas.

Kasutaja kvalifi katsioon:

- seadmega Bode 100 testimist võivad läbi viia üksnes vastavate volitustega kogenud ja väljaõppega töötajad.
- Töötajad, kes läbivad seadme Bode 100 kasutamise väljaõpet või koolitust või keda juhendatakse selles valdkonnas, peavad seadmega töötamise ajal olema kogenud kasutaja pideva järelevalve all. Seadmega Bode 100 testimine peab toimuma ettevõtte sisemiste ohutusnõuete ja ohutusega seotud lisadokumentide kohaselt.

Suomalainen – Turvallisuusohjeet, käyttötarkoitus ja käyttäjän pätevyys

Turvallisuusohjeet:

- Bode 100 on SELV-laite (Safety Extra Low Voltage, suojaava pienoisjännite standardin IEC 60950-1 mukaan).
- Älä käytä vaarallisia jännitetasoja > 50 V DC tai > 25 V AC Bode 100 -syöttöliitännöissä.
- Varmista, että Bode 100 -laitteen jännite- ja virta-anturit on maadoitettu valmistajan ohjeiden mukaan.
- Jännite- ja virta-antureita käytettäessä täytyy Bode 100 -laitteen maadoitusliitin (saatavissa laiteversiolle 2 tai sitä uudemmalle laiteversiolle) yhdistää laboratorion maadoitusliittimeen kiinteällä johtimella, jonka poikkipinta-ala on ainakin 3,6 mm² ja jonka pituus on enintään 10 m.
- Ota huomioon, ettei Bode 100 -laitteesta näe, että sen lähtö on aktiivinen. Tämä voi olla kriittistä erityisesti silloin, kun Bode 100 -laitteeseen on kiinnitetty vahvistimia.

Käyttötarkoitus:

- Bode 100 ja sen lisävarusteet on suunniteltu nimenomaisesti elektroniikkapiirien vahvistus/vaihe-, S-parametri- ja impedanssimittaukseen laboratorioissa ja tuotantoympäristöissä.

Käyttäjän pätevyys:

- Bode 100 -laitteen testaukseen osallistuvilla henkilöillä tulee olla asianmukainen pätevyys, ammattitaito ja valtuutus.
- Henkilöiden, joille annetaan Bode 100 -laitetta koskevaa koulutusta, ohjeistusta, opastusta tai valmennusta, tulee olla kokeneen käyttäjän jatkuvan valvonnan alaisina käsitellessään laitteistoa. Bode 100 -laitteella suoritettavan testauksen täytyy noudattaa sisäisiä turvallisuusohjeita sekä muita asianmukaisia asiakirjoja.

Français – Consignes de sécurité, utilisation prévue et qualifi cations des opérateurs

Consignes de sécurité:

- Le Bode 100 est un dispositif TBTS (Très Basse Tension de Sécurité, au sens de la norme CEI 60950-1).
- N'appliquez pas aux entrées du Bode 100 des tensions dangereuses supérieures à 50 V en courant continu ou à 25 V en courant alternatif.
- Veillez à ce que les sondes de tension et de courant utilisées avec le Bode 100 soient convenablement mises à la terre conformément aux consignes de leur fabricant.
- Lorsque vous travaillez avec les sondes de tension ou de courant, raccordez toujours la borne de terre du Bode 100 (disponible sur le matériel de version 2 ou supérieure) à l'aide d'une connexion pleine de section minimale 3,6 mm² et d'une longueur ne dépassant pas 10 m, à la borne de terre en laboratoire.
- Soyez conscient qu'aucune indication ne signale sur le Bode 100 que la sortie est active. Redoublez particulièrement de vigilance dans le cas où des amplifi cateurs sont raccordés au Bode 100.

Utilisation prévue:

- Le Bode 100 et ses accessoires sont particulièrement destinés aux mesures de gain/phase, des paramètres S et de l'impédance des circuits électroniques dans les laboratoires et les usines.

Qualifi cations des opérateurs:

- Les essais eff ectués à l'aide du Bode 100 doivent être exclusivement réalisés par du personnel qualifi é, compétent et agréé.
- Le personnel qui reçoit une formation, des instructions ou des directives quant à l'utilisation du Bode 100 doit rester sous la supervision permanente d'un opérateur expérimenté pendant le travail avec l'équipement. Les essais eff ectués à l'aide du Bode 100 doivent être conformes aux consignes de sécurité internes et à tout autre document pertinent.

Hrvatski – Sigurnosne upute, predviđena namjena i kvalifi kacije rukovatelja

Sigurnosne upute:

- Bode 100 je SELV uređaj, tj. uređaj s odvojenim niskonaponskim strujnim krugom (engl. Safety Extra Low Voltage, prema standardu IEC 60950-1).
- Ne dovodite na ulaze uređaja Bode 100 opasno visok napon, tj. napon > 50 VDC ili > 25 VAC.
- Uvjerite se da su naponske i strujne sonde koje se upotrebljavaju uz Bode 100 ispravno uzemljene u skladu sa smjernicama njihovih proizvođača.
- Kad radite s naponskim ili strujnim sondama, terminal za uzemljenje uređaja Bode 100 (dostupan za HW Rev. 2 ili bolji) uvijek čvrsto povežite s terminalom za uzemljenje u laboratoriju vodičem minimalnog poprečnog presjeka od 3,6 mm² i ne duljim od 10 m.
- Obratite pozornost da na uređaju Bode 100 nema nikakvih indikacija da je izlaz aktivan. Ovo može biti osobito kritično ako su na Bode 100 priključeni pojačivači.

Predviđena namjena:

- Bode 100 i njegova dodatna oprema osmišljeni su izričito za mjerenja parametara pojačanje/faza, parametra S i električne impedancije elektroničkih krugova u laboratorijima i proizvodnim okolinama.

Kvalifi kacije rukovatelja:

- Bode 100 smiju ispitivati samo kvalifi cirani, stručni i ovlašteni zaposlenici.
- Zaposlenici koji prolaze izobrazbu, instrukcije, poduku ili tečaj o uređaju Bode 100 moraju biti pod stalnim nadzorom iskusnog rukovatelja prilikom rada s opremom. Ispitivanje uređajem Bode 100 mora biti u skladu s unutarnjim sigurnosnim uputama i dodatnim relevantnim dokumentima.

Magyar – Biztonsági utasítások, rendeltetésszerű használat és kezelői szakképesítési követelmények

Biztonsági utasítások:

- A Bode 100 egy IEC 60950-1 szabvány szerinti biztonsági törpefeszültségű (SELV) készülék.
- A Bode 100 bemeneteire tilos 50 V (egyenáramú, DC) vagy 25 V (váltakozó áramú, AC) feszültségnél nagyobb, veszélyes jelszintet kapcsolni.
- Gondoskodjon arról, hogy a Bode 100 készülékhez feszültség- és árammérés céljából csatlakoztatott vizsgálandó készülékek a gyártói útmutatások szerint megfelelően földelve legyenek.
- Feszültség- vagy árammérés céljából csatlakoztatott vizsgálandó készülékek esetén a Bode 100 földelőcsatlakozóját (2. hardverrevíziós vagy annál újabb készülék esetén) minden esetben legalább 3,6 mm² keresztmetszetű és legfeljebb 10 m hosszúságú tömör vezetékkel csatlakoztassa a laboratórium földeléséhez.
- Vegye fi gyelembe, hogy a Bode 100 nem jelzi a kimenet aktív állapotát. Ez különösen akkor lehet kritikus fontosságú, ha a Bode 100 kimenetére erősítők csatlakoznak.

Rendeltetésszerű használat:

- A Bode 100 és kiegészítői különösen elektronikai áramkörök erősítésének, fázisának, szórásparaméterének és impedanciájának laboratóriumban és gyártási környezetekben végzett mérésére szolgálnak.

Kezelői szakképesítési követelmények:

- A Bode 100 segítségével végzendő méréseket csak szakképzett, gyakorlattal rendelkező és ezzel megbízott személyek végezhetik.
- A Bode 100 kezelésére vonatkozó betanításban, utasításokban, útmutatásban vagy oktatásban részesülő személyeket a készülék használata során folyamatosan felügyelnie kell egy tapasztalt kezelőnek. A Bode 100 segítségével végzendő vizsgálatok során be kell tartani a belső biztonsági utasításokat és a további vonatkozó dokumentumokban foglaltakat.

Italiano – Istruzioni di sicurezza, utilizzo previsto e qualifi che degli operator

Istruzioni di sicurezza:

- Bode 100 è una periferica SELV (Safety Extra Low Voltage secondo IEC 60950-1).

- Non applicare livelli di tensione pericolosi >50 V CC o >25 V CA agli ingressi di Bode 100.
- Le sonde di tensione e di corrente impiegate con Bode 100 vanno collegate a terra in modo corretto, secondo le istruzioni del rispettivo produttore.
- Quando si utilizzano le sonde di tensione o di corrente, collegare sempre al morsetto di terra del laboratorio il morsetto di terra del Bode 100 (disponibile per HW Rev. 2 o superiore) con un cavo robusto con una sezione incrociata minima di 3,6 mm² e non più lungo di 10 m.
- Attenzione: Bode 100 non segnala in alcun modo l'attivazione dell'uscita. Questo può comportare problemi soprattutto in caso di collegamento di amplifi catori a Bode 100.

Utilizzo previsto:

- Bode 100 e i suoi accessori sono appositamente progettati per le misurazioni di guadagno/fase, parametro-S e impedenza nei circuiti elettronici del laboratorio e degli ambienti di produzione.

Qualifi che degli operatori:

- Le prove con il Bode 100 devono essere condotte solo da personale esperto autorizzato e qualifi cato.
- Quando utilizza l'apparecchiatura, il personale che riceve addestramento, istruzioni o formazione sul Bode 100 deve trovarsi sotto la costante supervisione di un operatore esperto. Le prove eseguite con Bode 100 devono rispettare le istruzioni di sicurezza interne e i documenti aggiuntivi relativi.

Lietuvių – Saugos nurodymai, numatomasis naudojimas ir operatoriaus kvalifi kacija

Saugos nurodymai:

- Bode 100 yra SELV (ypač žemos saugiosios įtampos (angl. „Safety Extra Low Voltage“) pagal IEC 60950-1) prietaisas.
- Prie Bode 100 įėjimų nejunkite pavojingos įtampos (>50 V nuolatinės arba >25 V kintamosios).
- Užtikrinkite, kad su Bode 100 naudojami įtampos ir srovės bandikliai būtų tinkamai įžeminti, kaip nurodyta jų gamintojo parengtose taisyklėse.
- Jei dirbama su įtampos arba srovės bandikliais, Bode 100 įžeminimo gnybtą (įrengtas, jei aparatinės įrangos versija yra 2 arba naujesnė) su laboratorijos įžeminimo gnybtu sujunkite patikimu ne mažesnio kaip 3,6 mm² skerspjūvio ir ne ilgesniu kaip 10 m laidininku.
- Įsitikinkite, kad nė vienas Bode 100 indikatorius nerodo, jog įjungtas prietaiso išėjimas. Šis reikalavimas yra ypač svarbus, jei prie Bode 100 jungiami stiprintuvai.

Numatomasis naudojimas:

- Bode 100 ir jo priedai specialiai skirti laboratorijose ir gamyklose matuoti elektroninių grandinių stiprinimo koefi cientui, fazei, S parametrui ir pilnutinei varžai.

Operatoriaus kvalifi kacija:

- Bandymus su Bode 100 leidžiama atlikti tik kvalifi kuotiems, įgudusiems ir įgaliotiems darbuotojams.
- Darbuotojai, kurie mokomi, instruktuojami, kuriems nurodoma arba pasakojama, kaip dirbti su Bode 100, turi būti nuolat, kol dirbama su įranga, prižiūrimi patyrusio operatoriaus. Bandymai su Bode 100 turi būti atliekami laikantis vidaus saugos instrukcijų ir papildomų aktualių dokumentų.

Latvijas – Drošības instrukcijas, paredzētā izmantošana un operatora kvalifi kācija

Drošības instrukcijas:

- Bode 100 ir SELV (Safety Extra Low Voltage (zemsprieguma drošība) atbilstoši IEC 60950-1) ierīce.
- Nepievadiet Bode 100 ieejām bīstama līmeņa spriegumu, kas pārsniedz >50 V līdzstrāvu vai >25 V maiņstrāvu.
- Pārliecinieties, ka ar Bode 100 izmantotie sprieguma un strāvas devēji ir pareizi iezemēti atbilstoši to ražotāju norādēm.
- Strādājot ar strāvas vai sprieguma devējiem, vienmēr stingri savienojiet Bode 100 zemētājspaili (pieejama, sākot ar 2. vai jaunāku aparatūras versiju) ar laboratorijas zemētājspaili, izmantojot vadu ar vismaz 3,6 mm² šķērsgriezumu, kura garums nepārsniedz 10 m.
- Ņemiet vērā, ka Bode 100 nav izejas aktivizācijas rādījuma. Tas ir īpaši svarīgi gadījumā, kad Bode 100 ir pievienoti pastiprinātāji.

Paredzētā izmantošana:

- Bode 100 un tā piederumi ir īpaši paredzēti pastiprinājuma/fāzu, S parametra un pilnās pretestības mērījumiem laboratorijas un ražošanas vides elektroniskajās shēmās.

Operatora kvalifi kācija:

- Testēšanu ar Bode 100 atļauts veikt tikai atbilstoši pilnvarotiem un kvalifi cētiem darbiniekiem ar nepieciešamajām prasmēm.
- Strādājot ar aprīkojumu, darbinieki, kas piedalās apmācībās, saņem instrukcijas, norādījumus vai izglītojošu informāciju par Bode 100, pastāvīgi jāuzrauga pieredzējušam operatoram. Testēšanai ar Bode 100 jāatbilst iekšējām drošības instrukcijām un attiecīgajiem papildu dokumentiem.

Nederlands – Veiligheidsinstructies, beoogd gebruik en kwalifi caties van de bediener

Veiligheidsinstructies:

- De Bode 100 is een SELV-apparaat (Safety Extra Low Voltage, veiligheidsapparaat met extra lage spanning, overeenkomstig IEC 60950-1).
- Plaats geen gevaarlijke spanningsniveaus (>50 VDC of >25 VAC) op de invoeraansluitingen van de Bode 100.
- Zorg ervoor dat de spannings- en stroomtestkabels die met de Bode 100 worden gebruikt, correct zijn geaard, in overeenstemming met de richtlijnen van de fabrikant.
- Zorg er tijdens het werken met spannings- of stroomtestkabels altijd voor dat de aardeaansluiting van de Bode 100 (beschikbaar voor HW-revisie 2 of later) op de aardeaansluiting van het laboratorium is aangesloten via een kabel met een harde kern, met een diameter van minstens 3,6 mm² en een lengte van maximaal 10 m.
- Houd er rekening mee dat op de Bode 100 niet wordt aangegeven wanneer de uitvoer actief is. Dit kan vooral van belang zijn indien er versterkers op de Bode 100 zijn aangesloten.

Beoogd gebruik:

- De Bode 100 en de bijbehorende accessoires zijn speciaal ontwikkeld voor het uitvoeren van metingen van amplitude- versterking/faseverschuiving, S-parameters en impedantie van elektronische circuits in laboratorium- en productieomgevingen.

Kwalifi caties van de bediener:

- Tests met de Bode 100 mogen alleen worden uitgevoerd door ervaren, gekwalifi ceerd en hiertoe bevoegd personeel.
- Personen die via een training, een cursus, instructies of aanwijzingen bekend worden gemaakt met het gebruik van de Bode 100, moeten continu onder toezicht van een ervaren bediener staan wanneer ze met de apparatuur werken. Het testen met de Bode 100 moet aan de interne veiligheidsinstructies en aanvullende veiligheidsrelevante documenten voldoen.

Polski – Instrukcje bezpieczeństwa, przeznaczenie i kwalifi kacje operatora

Instrukcje bezpieczeństwa:

- Bode 100 to zabezpieczone urządzenie niskonapięciowe (ang. Safety Extra Low Voltage — SELV) zgodne z normą IEC 60950-1.
- Do wejść urządzenia Bode 100 nie wolno przykładać niebezpiecznych napięć powyżej 50 V DC lub 25 V AC.
- Sprawdź, czy cęgi napięciowe i prądowe używane z urządzeniem Bode 100 są prawidłowo uziemione zgodnie z wytycznymi ich producenta.
- Korzystając z cęgów napięciowych lub prądowych, zawsze łącz styk uziemiający urządzenia Bode 100 (dostępny w wersji sprzętu 2 lub wyższej) ze stykiem uziemiającym w laboratorium, używając stabilnego przewodu o przekroju co najmniej 3,6 mm² i długości nieprzekraczającej 10 m.
- Pamiętaj, że na urządzeniu Bode 100 nie ma wskaźników sygnalizujących, że wyjście jest aktywne. Jest to szczególnie istotne, gdy do urządzenia Bode 100 podłączone są wzmacniacze.

Przeznaczenie:

- Urządzenie Bode 100 wraz z osprzętem służy do pomiarów wzmocnienia/fazy, parametru S i impedancji obwodów elektronicznych w warunkach laboratoryjnych i produkcyjnych.

Kwalifi kacje operatora:

- Testy za pomocą urządzenia Bode 100 mogą być wykonywane wyłącznie przez wykwalifi kowany i autoryzowany personel mający odpowiednie umiejętności.
- Podczas pracy ze sprzętem przeszkolony personel zapoznany z instrukcjami, wytycznymi i obsługą urządzenia Bode 100 musi znajdować się pod stałym nadzorem doświadczonej osoby. Testy przeprowadzane przy użyciu urządzenia Bode 100 muszą być zgodne z wewnętrznymi instrukcjami bezpieczeństwa oraz dodatkowymi obowiązującymi dokumentami.

Portugues do Brasil – Instruções de segurança, uso designado e qualifi cações do operador

Instruções de segurança:

- O Bode 100 é um dispositivo SELV (Extra Baixa Tensão de Segurança conforme a IEC (Comissão Eletrotécnica Internacional) 60950-1).

- Não aplique níveis de tensão perigosos >50 VDC ou >25 VAC às entradas do Bode 100.
- Certifi que-se de que as sondas de tensão e de corrente utilizadas com o Bode 100 estejam devidamente aterradas de acordo com as diretrizes do fabricante.
- Ao trabalhar com sondas de tensão ou corrente, sempre conecte o terminal de aterramento do Bode 100 (disponível para HW Rev. 2 ou superior) com uma conexão sólida de pelo menos 3,6 mm² de seção transversal e não mais longa do que 10 m ao terminal de aterramento no laboratório.
- Fique atento para que nenhuma indicação no Bode 100 mostre que a saída está ativa. Isto pode ser especialmente crítico se os amplifi cadores estiverem conectados ao Bode 100.

Uso designado:

- O Bode 100 e acessórios são especialmente projetados para medições de ganho/fase, parâmetro de dispersão e de impedância de circuitos eletrônicos em ambientes laboratoriais e de fabricação.

Qualifi cações do operador:

- Testes com o Bode 100 devem ser realizados apenas por pessoal autorizado, capacitado e qualifi cado.
- Pessoal em fase de treinamento, instrução, orientação ou aprendizado sobre o Bode 100 deve permanecer sob a constante supervisão de um operador experiente ao trabalhar com o equipamento. O teste com o Bode 100 deve estar em conformidade com as instruções de segurança internas, além de com os documentos relevantes adicionais.

Română – Instrucțiuni de siguranță, destinația de utilizare și califi cările operatorului

Instrucțiuni de siguranță:

- Produsul Bode 100 este un dispozitiv SELV (tensiune foarte joasă de siguranță conform IEC 60950-1).
- A nu se aplica niveluri periculoase ale tensiunii >50 V CC sau >25 V CA pe intrările produsului Bode 100.
- Asigurați-vă că sondele de tensiune și intensitate utilizate cu produsul Bode 100 sunt împământate corect conform instrucțiunilor producătorului.
- Când se lucrează cu sonde de tensiune sau intensitate, conectați întotdeauna borna de împământare a produsului Bode 100 (disponibilă pentru versiunea HW Rev. 2 sau versiuni superioare) cu un cablu robust cu secțiunea transversală de cel puțin 3,6 mm² și nu mai lung de 10 m la borna de împământare din laborator.
- De reținut că produsul Bode 100 nu indică dacă ieșirea este activă. Acest aspect poate avea importanță critică dacă sunt conectate amplifi catoare la produsul Bode 100.

Destinația de utilizare:

- Produsul Bode 100 și accesoriile sale sunt proiectate special pentru măsurători de amplifi care/fază, parametri de dispersie și impedanță al circuitelor electronice în medii de laborator sau de producție.

Califi cările operatorului:

- Testarea cu produsul Bode 100 trebuie efectuată doar de personal califi cat, instruit și autorizat.

- Personalul în curs de instruire, dirijare și educare privind produsul Bode 100 trebuie să se afl e sub supravegherea permanentă a unui operator experimentat când efectuează lucrări cu echipamentul. Testarea cu Bode 100 trebuie să se conformeze instrucțiunilor de siguranță internă, precum și documentației suplimentare relevante.

Slovenský – Bezpečnostné pokyny, určené použitie a kvalifi kácia obsluhy

Bezpečnostné pokyny:

- Bode 100 je zariadenie typu SELV (s bezpečným veľmi nízkym napätím podľa STN EN 60950-1).
- Na vstupy zariadenia Bode 100 neaplikujte nebezpečné úrovne napätia >50 V jednosmerného prúdu alebo >25 V striedavého prúdu.
- Uistite sa, že sú napäťové a prúdové snímače používané so zariadením Bode 100 riadne uzemnené podľa pokynov výrobcu.
- Pri práci s napäťovými alebo prúdovými snímačmi vždy pripojte uzemňovaciu svorku zariadenia Bode 100 (dostupná pre HW Rev. 2 alebo vyššie) pevným pripojením s prierezom aspoň 3,6 mm² a nie dlhším ako 10 m k uzemňovacej svorke v laboratóriu.
- Majte na pamäti, že na zariadení Bode 100 nie je žiadna indikácia, ktorá by ukazovala, že výstup je aktívny. Táto skutočnosť by mohla byť zvlášť kritická pri pripojení zosilňovačov k zariadeniu Bode 100.

Určené použitie:

- Zariadenie Bode 100 a jeho príslušenstvo sú špeciálne navrhnuté na merania Zisku/fázy, S-parametra a Impedancie elektronických obvodov v laboratóriách a výrobných prostrediach.

Kvalifi kácia obsluhy:

- Testovanie pomocou zariadenia Bode 100 môže vykonávať len vyškolený, skúsený a oprávnený personál.
- Na pracovníkov, ktorí momentálne absolvujú školenie, zaúčajú sa alebo sa vzdelávajú v súvislosti so zariadením Bode 100, musí pri práci so zariadením vždy dohliadať skúsený operátor. Testovanie pomocou zariadenia Bode 100 sa musí vykonávať v zhode s internými bezpečnostnými pokynmi, ako aj ďalšou príslušnou dokumentáciou.

Slovenščina – Varnostna navodila, predvidena uporaba in kvalifi kacije upravljavca

Varnostna navodila:

- Bode 100 je naprava z napetostjo SELV (varna zelo nizka napetost v skladu s standardom IEC 60950-1).
- Na vhodih naprave Bode 100 ne uporabljajte nevarne napetosti – >50 VDC ali >25 VAC.
- Prepričajte se, da so sonde za napetost in tok, ki se uporabljajo z napravo Bode 100, pravilno ozemljene v skladu z navodili proizvajalca.
- Kadar uporabljate sonde za napetost ali tok, vedno priključite ozemljitveni priključek naprave Bode 100 (na voljo za HW Rev. 2 ali novejše) na ozemljitveni priključek v laboratoriju s čvrstim vodnikom prereza vsaj 3,6 mm² in dolžine največ 10 m.

- Upoštevajte, da nobena oznaka na napravi Bode 100 ne prikazuje, da je izhod aktiven. To je še posebej pomembno, če so na napravo Bode 100 priključeni ojačevalniki.

Predvidena uporaba:

- Naprava Bode 100 in njena dodatna oprema so izdelane posebej za merjenje ojačevalnega/faznega razločka, parametra razpršenosti in impedance elektronskih vezij v laboratoriju in proizvodnih okoljih.

Kvalifi kacije upravljavca:

- Preizkušanje z napravo Bode 100 lahko izvaja samo kvalifi cirano, usposobljeno in pooblaščeno osebje.
- Osebje, ki se usposablja, prejema navodila ali se izobražuje o napravi Bode 100, mora biti med delom z opremo pod stalnim nadzorom izkušenega upravljavca. Preizkušanje z napravo Bode 100 mora biti v skladu z notranjimi varnostnimi navodili in dodatnimi ustreznimi dokumenti.

Svenska – Säkerhetsinstruktioner, avsedd användning och användarkvalifi kationer

Säkerhetsinstruktioner:

- Bode 100 är en SELV-enhet (Safety Extra Low Voltage enligt IEC 60950-1).
- Anslut inte farliga spänningsnivåer >50 V DC eller >25 V AC till ingångarna på Bode 100.
- Kontrollera att spännings- och strömsonder som används med Bode 100 har jordats ordentligt i enlighet med deras tillverkares anvisningar.
- Vid arbete med spännings- eller strömsonder ska Bode 100:s jordterminal (tillgänglig för maskinvarurev. 2 eller senare) alltid anslutas med en solid anslutning som har minst 3,6 mm² area och inte längre än 10 m till jordterminalen i laboratoriet.
- Tänk på att ingen indikator på Bode 100 visar att utgången är aktiv. Detta kan vara särskilt kritiskt om det har anslutits förstärkare till Bode 100.

Avsedd användning:

- Bode 100 och dess tillbehör har tagits fram specifi kt för förstärkning/fas-, S-parameter- och impedansmätningar på elektroniska kretsar i laboratorie- och tillverkningsmiljöer.

Användarkvalifi kationer:

- Test med Bode 100 ska endast utföras av kvalifi cerad, kunnig och auktoriserad personal.
- Personal som får utbildning, instruktioner, anvisningar eller undervisning om Bode 100 måste vara under ständig övervakning av en erfaren operatör medan de arbetar med utrustningen. Test med Bode 100 måste följa interna säkerhetsinstruktioner, samt ytterligare relaterade dokument.

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Bode 100 Quick Start Guide English

Version 5.0

ENU 1006 03 05