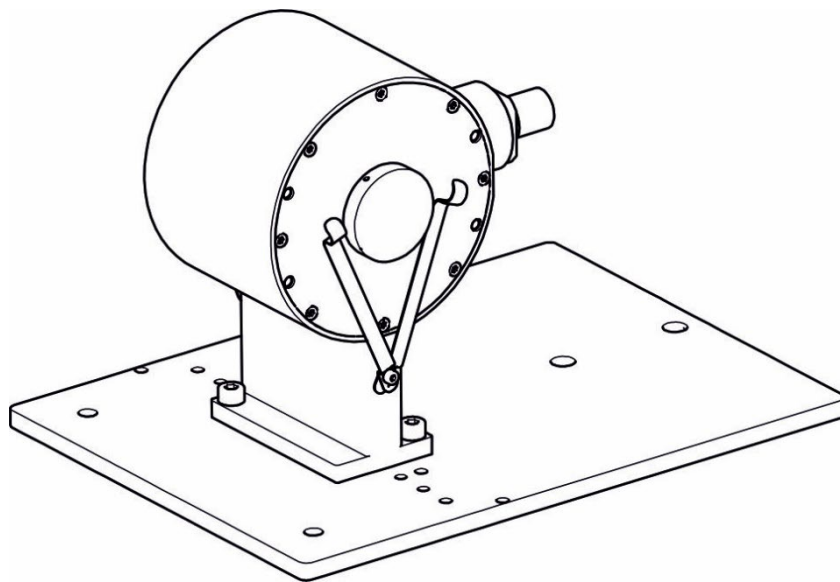

Cary 60 integrating sphere

Instruction



(images similar)

Version 1.0.1

Opsytec Dr. Gröbel GmbH
Am Hardtwald 6-8
D-76275 Ettlingen

Telefon: +49(0)7243 / 9 47 83-50
info@opsytec.de

1 Table of Contents

1	Table of Contents	2
2	Preface	3
3	Identification	4
3.1	Manufacturer.....	4
3.2	Change History	4
3.3	Copyright	4
3.4	Purpose.....	5
3.5	Foreseeable misuse	5
3.6	Verifying safe state	6
3.7	Legal information	6
3.7.1	Limitation of liability	6
3.7.2	Declaration of Conformity.....	6
4	General	7
4.1	Information about this manual	7
4.2	Information about the symbols	7
4.2.1	Safety instructions	7
4.2.2	Optional function	8
5	Description of the system and function overview	9
5.1	Product Description:	10
6	Unpacking and Installation	11
7	Measurement Geometries, accessories and sample holder	12
7.1	How to install the sample holders and accessories.....	14
8	Cleaning and maintenance, further service, spare parts and troubleshooting	16
8.1	Spare parts	16
8.2	Troubleshooting	18
9	Technical data	19
10	CE Compliance	20
11	Electromagnetic Compatibility	21
11.1	EU WEEE Directive compliance.....	22

2 Preface

Dear Customer!

Thank you for choosing a product manufactured by us!

Please take your time to read this manual carefully. Please pay special attention to the safety instructions.

This is the condition for safe handling and safe operation of the system and its components.

If you have any questions that you do not find answered in this manual, please call us and we will be pleased to assist you. In addition, we always welcome any suggestions or proposals for improvement.

Our products undergo constant advanced development; therefore there may be minor differences between your system and the illustrations given in this Operating Manual.

THIS MANUAL CONTAINS IMPORTANT SAFETY INSTRUCTIONS.
KEEP THIS MANUAL.

© 2025

Opsytec Dr. Gröbel GmbH

At Hardtwald 6-8

D - 76275 Ettlingen

Phone: +49(0)7243 / 9 47 83-50

info@opsytec.de

All rights reserved. Reprinting, including excerpts, is only permitted with the written consent of Opsytec Dr. Gröbel GmbH.

This is a translation of the original operating manual.

3 Identification

3.1 Manufacturer

Opsytec Dr. Gröbel GmbH
Am Hardtwald 6-8
D - 76275 Ettlingen
Phone: +49(0)7243 / 9 47 83-50
info@opsytec.de
www.opsytec.de

3.2 Change History



We reserve the right to make changes in content. Opsytec Dr. Gröbel GmbH is not liable for any errors in this documentation. No liability shall be accepted for indirect damages arising from the delivery or use of this documentation, in as far as this is legally permissible.

Version	Changed by	Date	Change
1.0.0	Paravia	04.02.2023	release
1.0.1	Paravia	16.04.2025	Editorial changes

3.3 Copyright



Opsytec Dr. Gröbel GmbH shall retain the copyright for this operating manual. The operating manual is intended for the owner/operator and his personnel.

Copyright in accordance with DIN ISO 16016:

Reproduction and copying of this document, use and disclosure of the contents herein are strictly prohibited unless expressly authorized. Failure to comply may result in a claim for damages. All rights in the case of a patent application, utility model or design are reserved. Infringements may be subject to prosecution.

3.4 Purpose

- The system is intended for industrial and laboratory use only.
- Installation, commissioning, operation, maintenance and service work may only be carried out by trained and qualified personnel who comply with all safety guidelines and standards.
- The device is intended for use indoors in clean, dry rooms.
- Responsibility: Damage resulting from unintentional or unauthorized tampering terminates any right to assert warranty or liability claims against the manufacturer.
- Warranty Disclaimer: The use of any non-original parts will void the warranty.
- Environmental protection: Defective parts and packaging parts containing environmentally harmful substances must be disposed of accordingly.
- Operation is only permitted in a dry environment. The installation is horizontal.
- Wear gloves when servicing, cleaning, and operating the integrating sphere.
- Do not clean the system when it is in operation.
- Any use other than that mentioned above will result in damage to the product. Furthermore, this is related to dangers such as short circuits, fire and electric shock. The entire device must not be changed and/or modified! The safety instructions must be observed at all times.
- If the accessory is used in any manner not specified by Opsytec, this protection may be impaired. It is good practice to develop safe working habits. It is essential that no cover is bypassed, damaged or removed.



Please take some time to read this manual carefully. Please pay special attention to the safety instructions. This is the condition for safe handling and operation of the system and its components.

3.5 Foreseeable misuse

The following is deemed to be foreseeable misuse:

- Operation of the device without safety devices and safety equipment.
- Activities of untrained personnel on the device.
- Failure to follow the owner/operator's operating instructions.
- Ignoring the operating manual.
- Any use outside the specified purpose.

3.6 Verifying safe state

The following general safety precautions must be observed during all phases of operation and maintenance. All service procedures for this accessory must be done by a trained service provider qualified by Agilent to work on this product.

To ensure continued safety of the accessory after maintenance or service procedures verify the accessory is returned to a safe state for the user. This includes running system checks to verify the accessory's safety systems are functioning correctly. Check the general condition of the accessory during operation for wear or signs of corrosion that are likely to inhibit function or safety.

Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the accessory. Agilent Technologies assumes no liability for the customer's failure to comply with these requirements

3.7 Legal information

3.7.1 Limitation of liability

All information in this manual has been compiled taking into account the currently applicable standards and regulations, the technical standard and our many years of knowledge and experience.

The manufacturer is not liable for damages in the event that:

- This manual was ignored,
- the device has been used improperly,
- untrained personnel were used,
- untrained personnel used the integrating sphere incorrectly,
- unauthorized modifications have been made,
- technical changes have been made
- unauthorized spare parts have been used.

We are not liable for common faults of the device caused by a power failure or a failure of the control system.

The actual scope of delivery may differ from the explanations and pictures in this manual in the case of special versions, when additional options are ordered, or due to the latest technical changes.

The obligations agreed upon in the delivery contract as well as the delivery conditions of the manufacturer and the legal regulations valid at the time of the conclusion of the contract shall apply.

3.7.2 Declaration of Conformity

The declaration of conformity is shipped with the product and can also be requested from the manufacturer / distributor.

4 General

4.1 Information about this manual

This manual is intended to make the handling of this system and its components safe and efficient. This manual is part of the system and must be kept in its immediate environment where it is accessible to personnel at all times.

This documentation contains the necessary information for the intended use of the system described. It is intended for technically qualified personnel who have been specially trained for operation, quality assurance, laboratory, maintenance and repair.

The personnel must have read this manual carefully and understood its contents before starting any work. The basic condition for safe working is the observance of all mentioned safety instructions and operating instructions in this manual.

Knowledge and technically correct implementation of the instructions, safety requirements and warnings are a condition for safety during operation, maintenance and repair.

Illustrations in this manual are for general understanding; they may differ from the actual version.

Apart from this manual, the instructions for the installed components contained in the appendix apply.

This operating manual cannot cover every possible maintenance case. If you require further information or if special problems arise that are not covered comprehensively enough in this manual, please request the necessary information from the manufacturer.



For ease of description, the above components are collectively referred to as a system.



4.2 Information about the symbols


4.2.1 Safety instructions


In this manual, safety information is indicated by means of symbols. Safety information is preceded by signal words that indicate the scope of risk.

To avoid accidents and damage to persons or property, always follow the information and act prudently.

Throughout the text, you will find the following pictograms with the following meanings:

	 DANGER
	<p>Imminent danger Possible consequences: death or most serious injuries.</p> <ul style="list-style-type: none"> • Prevention

	⚠ WARNING
	Dangerous Situation Possible consequences: death or most serious injuries. <ul style="list-style-type: none">• Prevention

	⚠ CAUTION
	Possible Situation Possible consequences: slight or minor injuries. Sometimes also used for warning of material damage. <ul style="list-style-type: none">• Prevention

**Note**

Information for use or useful important information

4.2.2 Optional function

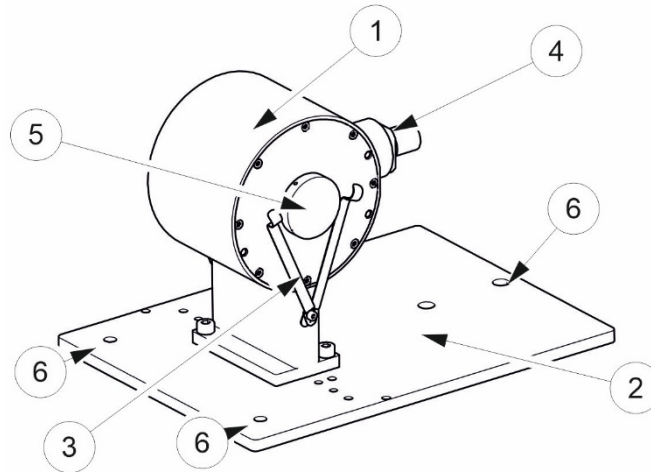
* Optional function, not available for every system

5 Description of the system and function overview

This integrating sphere consists of a reflecting hollow sphere whose inner surface is PTFE and reflects diffusely. Depending on the geometry, the radiation is coupled from the outside or centrally and measured at the detector port.

The integrating sphere is a measuring instrument designed exclusively for measuring photometric quantities / radiation quantities or for generating such quantities. Any other use is considered improper.

The integrating sphere is shown below as an example of a PTFE integrating sphere:



(Illustration exemplary)

Pos.	Designation	Pos.	Designation
1	Integrating sphere	2	Mounting plate
3	Sample holder (springs)	4	Si detector
5	Port Cover / adapter	6	Mounting holes

5.1 Product Description:

The integrating sphere is built in the following specification:

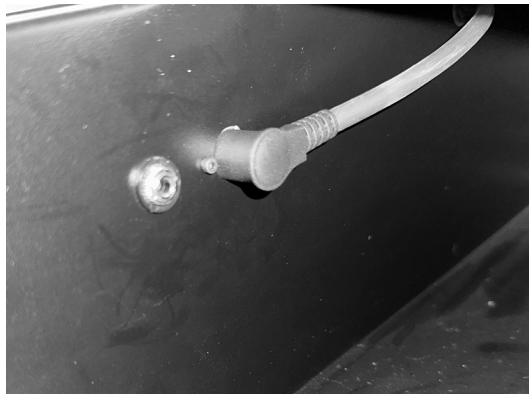
- Coating: PTFE
- Diameter: 50 mm
- Sensor port for built in Si photodetector
- Entrance port
- Exit port
- Port reducer*
- 8° sample holder*




For ease of description, the above components are collectively referred to as a system.

6 Unpacking and Installation

- Unpack all components and remove packing materials. Keep the bags the accessories come in to store them when not in use.
- Remove all packaging.
- Check for completeness and whether any damage has been caused to the device during transport.
- Switch off Agilent Cary 60
- Open sample compartment, remove sample holder
- Disconnect the internal detector cable
- Install integrating sphere with accessories (see chapter 7)
- Connect integrating sphere photodiode



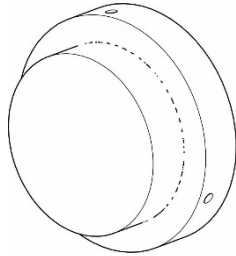
- Switch on Agilent Cary 60
- The integrating sphere is now ready for operation.

⚠ CAUTION	
	<p>Possible damage</p> <p>Avoid touching the sensitive optical coating with bare hands, tools or other objects. If the optical coating is damaged or soiled, the measuring accuracy may be impaired.</p> <ul style="list-style-type: none"> • Wear gloves. • Do not touch the sensitive optical coating. • Hold components such as port lids only at the edge at the non-coated areas. • Hold parts such as port covers, etc. when loosening so that they do not fall into the integrating sphere. • Keep parts such as port covers clean and protected at all times.

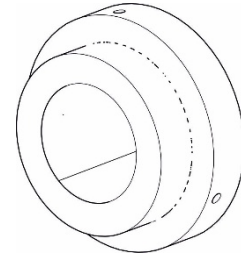
Confirming the installation. See Instructions in the Cary WinUV Help on how to test the installation with a Baseline noise test.

7 Measurement Geometries, accessories and sample holder

The integrating sphere can be used with an accessory pack to measure diffuse reflection, transmission in 0° and 8° configuration. In addition, a port reducer is available.



Port Cover

 8° adapter

Port reducer

To fix the samples the two springs on each side of the sphere can be used.

We recommend the following settings to measure your sample:

	Direction	Entrance Port	Exit Port
Diffuse Transmission	0°	sample	Port Cover
Diffuse Transmission	8°	8° adapter + sample	Port Cover
Diffuse Reflection	0°	open	sample
Diffuse Reflection	8°	open	8° adapter + sample

For fluids, thin films and powders optional equipment is available:

Item	Description	View
G9855-67000	Cary 60 UV-Vis DRA Accessory Spare	
Opsytec 850311 Agilent G9855-67001	Pulverhalter Ø28 Powder holder Ø28	
Opsytec 850312 Agilent G9855-67002	Küvettenhalter 10 x 10/ Cary 60 DRA cell holder 10 x 10	
Opsytec 850305-3 Agilent G9855-67003	Filterhalter/ Cary 60 DRA filter holder	
Opsytec 850305-6 Agilent G9855-67006	Reflektionsstandard opt. PTFE/ Cary 60 DRA Reflection standard opt. PTFE*	
Opsytec 850305-7 Agilent G9855-67007	Filterhalter/ Cary 60 DRA Filter holder	
Opsytec 850305-11 Agilent G9855-67010	Folienhalter/ Cary 60 DRA Thin film (foil) holder	

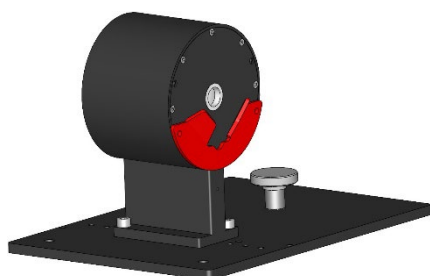
7.1 How to install the sample holders and accessories

Direct and diffuse transmission

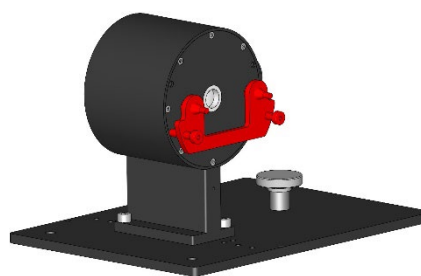
Direct transmission typically occurs when the optical sample is homogeneous and transparent. This means that the sample has no significant scattering, absorption or haze.

Diffuse transmission occurs in samples that are not completely transparent or homogeneous. These samples may contain scattering, haze or particles that deflect the light inside the sample and scatter it in different directions.

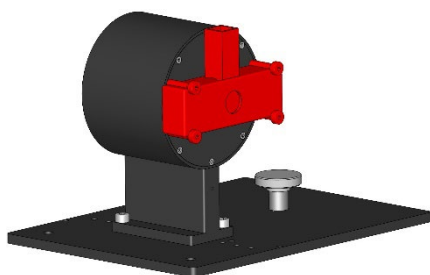
Install the equipment like depicted:



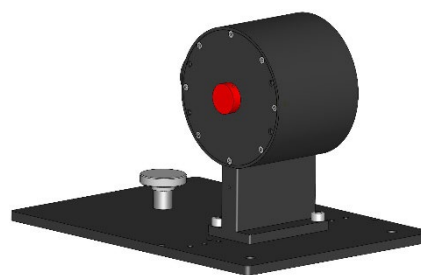
Fixed samples



Thin Film



Liquid samples / cells



Back closed with port lid

(images similar)

Confirming the installation. See Instructions in the Cary WinUV Help on how to test the installation with a Baseline noise test.

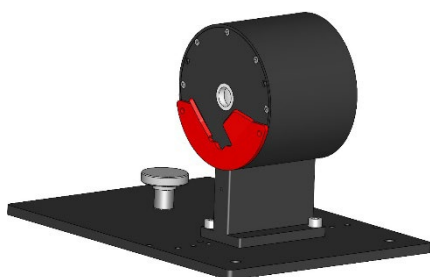
Direct and diffuse reflection

The „direct reflection“ and „diffuse reflection“ indicate the way in which light is reflected from a surface. Similar to transmission, they describe different types of light reflection, depending on the properties of the surface and the incident light. Accordingly, direct reflection typically occurs on smooth and flat surfaces, such as a mirror or a polished metal surface.

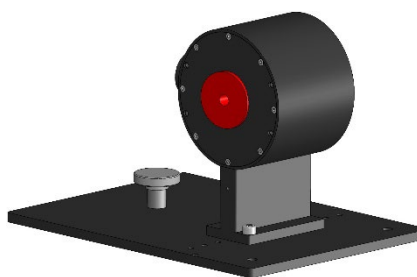
Diffuse reflection occurs on rough, uneven or matt surfaces that scatter light in different directions due to unevenness or microstructures.

Measure the diffuse reflection as follows:

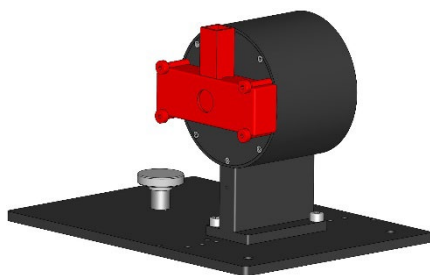
Install the equipment like depicted:



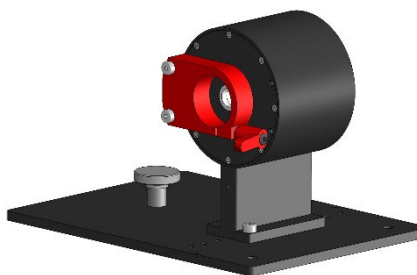
Solid samples (scattering)



Fixed specimens, specular, with 8° adapter



Liquid samples / cuvettes



Powdered samples

(images similar)

Confirming the installation. See Instructions in the Cary WinUV Help on how to test the installation with a Baseline noise test.

8 Cleaning and maintenance, further service, spare parts and troubleshooting

Dirt on the PTFE should only be carefully blown away with dry cleaned air. Cleaning should only be carried out as required. If possible, avoid air blowing inside the sphere.

In case of spills, wipe immediately and make new baseline measurements.



Contact for replacement orders and service needs:

Use only Agilent or Opsytec supplied parts.

For purchases from Agilent Technologies:

Contact your local Agilent service representative for service and repairs or go to the Contact Us page on www.agilent.com.

For purchases from Opsytec Dr. Gröbel GmbH:

Am Hardtwald 6-8

76275 Ettlingen

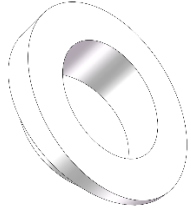
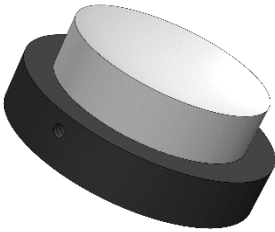
Germany

Fax +49 - 7243 - 94 783 - 65

Visit us on the Internet: www.opsytec.de

8.1 Spare parts

For additional optional parts, see Page 13.

Item	Description	View
Opsytec 850309 Agilent G9855-67004	Portdeckel 8° Verkippung + Portreduzierung Ø6mm/ Cary 60 DRA port cover 8° tilt + port reducer Ø6mm	
Opsytec 850305-5 Agilent G9855-67005	Sphärischer Portdeckel Ø10/ Cary 60 DRA spherical port cover Ø10	

<p>Opsytec 850310 Agilent G9855-67008</p>	<p>Portreduzierung/ Cary 60 DRA Port reduction</p>	
<p>Opsytec 850305-9 Agilent 110745590</p>	<p>Agilent Si-Detektor/ Agilent Si detector</p>	
<p>Opsytec 850305-10 Agilent G9855-67009</p>	<p>Adapterplatte CARY60/ Adapter plate CARY 60</p>	
<p>Opsytec 850305-12 Agilent G9855-67011</p>	<p>U-Kugel Stativ/ Cary 60 DRA U-ball (sphere) stand</p>	
<p>Opsytec 850305-13 Agilent G9855-67012</p>	<p>U-Kugel Gehäuse/ Cary 60 DRA U-ball housing</p>	
<p>Opsytec 850305-14 Agilent G9855-67013</p>	<p>U-Kugel Abdeckungen/ Cary 60 DRA U-ball housing covers</p>	
<p>Opsytec 921004 Agilent G9855-67013</p>	<p>Transportkoffer für CARY Ulbrichtkugel / Cary 60 DRA transport case</p>	

8.2 Troubleshooting

If the instrument is not communicating with the PC, check to see if the instrument is online. If it is offline, check that all cabling is connected and is plugged in.

9 Technical data

General data	
Diameter	Ø 50 mm
Port diameter	Ø 10 mm
Number of Ports	2
Number of detectors	1
Number of sample springs	4
Cooling	none
Ambient temperature	+5 to 35 °C
Storage temperature, approx.	-10 to +60 °C
Supply voltage	12 V, DC
Humidity	20% to 80% rel. humidity
Noise emission	L _{pa} < 70 dB at the workplace in normal operation according to DIN 45635 T. 19 L _{pa} < 70 dB am Arbeitsplatz im normalen Betrieb nach DIN 45635 T. 19

Connections	
Si Photodiode	Cary 60 specific connector located inside sample compartment

Detector	
Detectortype	100 mm ² Hamamatsu SI photodiode

Dimensions and weight	
Dimensions	180 x 130 x 120 mm
Weight unpacked	1 kg
Weight packed	Approximately 2 kg including the case

Refer to Cary 60 manual for Altitude, Overvoltage Category and Pollution Degree.

10 CE Compliance

Your Opsytec accessory has been designed to comply with the requirements of the applicable directives of the European Union, such as Electromagnetic Compatibility (EMC) Directive, Low Voltage Directive (LVD), Machinery Directive (MD), RoHS Directive, etc.

Opsytec has confirmed that each product complies with the relevant Directives by testing samples against the harmonized EN (European Norm) standards published on the Official Journal of the European Union (OJEU).

Proof that a product complies with these directives is indicated by:

- the CE Marking appearing on the rear of the product, and
- the documentation package that accompanies the product containing a copy of the Declaration of Conformity. The Declaration of Conformity is the legal declaration by Agilent that the product complies with the relevant directives listed above, and shows the EN standards to which the product was tested to demonstrate compliance.

11 Electromagnetic Compatibility

This product conforms to the following regulations on Electromagnetic Compatibility (EMC) and Radio Frequency Interference (RFI):

- CISPR 11/EN 55011: Group 1, Class A
- IEC/EN 61326-1
- Canada ICES-001 (This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme à la norme NMB-001 du Canada).

Group 1 ISM equipment: group 1 contains all Industrial, Scientific and Medical (ISM) equipment in which there is intentionally generated and/or used conductively coupled radio- frequency energy which is necessary for the internal functioning of the equipment itself.

Class A equipment is equipment suitable for use in all establishments other than domestic and those directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.

This device complies with the requirements of CISPR11, Group 1, Class A as radiation professional equipment. Therefore, there may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted as well as radiated disturbances.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try one or more of the following measures:

1. Relocate the radio or antenna.
2. Move the device away from the radio or television.
3. Plug the device into a different electrical outlet, so that the device and the radio or television are on separate electrical circuits.
4. Make sure that all peripheral devices are also certified.
5. Make sure that appropriate cables are used to connect the device to peripheral equipment.
6. Consult your equipment dealer, Agilent Technologies or Opsytec, or an experienced technician for assistance.

Changes or modifications not expressly approved by Agilent Technologies and Opsytec could void the user's authority to operate the equipment.

Class B equipment is equipment suitable for use in domestic establishments and in establishments directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.

11.1 EU WEEE Directive compliance

This product complies with the European WEEE Directive marking requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste.



Do not dispose of in domestic household waste.

To return unwanted products, refer to Page 16 for contact information.