INSTALLATION, USE AND MAINTENANCE MANUAL

Electro-optic Interferometer GEMINI

NIREOS S.r.l.

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Section 1

Conformity Declaration
Manufacturer's Data
Information on Documentation
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Declaration of Conformity

The undersigned Fabrizio Preda	
As legal representative of the company NIREOS S.r.l.	
Based in: Via Giovanni Durando, 39 20158 Milano (Italy)	
VAT number: 10359960969	
Declares	
that the device: electro-optic interferometer	
Model and Code: GEMINI – GEMINI-(HP).xxx.x.x (all options)	
Manufacturing Date: June 2021	Serial Number: 202106012
Has been designed and realized following directives:	

- Directive 2014/35/UE “Low-voltage Directive”
- Directive 2014/30/UE "Electromagnetic Compatibility Directive"
- Directive 2011/65/CE “RoHS”
- Directive 2012/19/UE “RAEE”
- Directive 2001/95/CE “General safety of products”
- IEC 61882:2016 risk analysis method HAZOP
- EN61000-6-3:2011
- EN55011:2011
- EN61000-6-1:2007
- EN61010-1:2001

And thus it is compliant with the current regulations and directives.	
The present declaration of conformity is released under the exclusive responsibility of the manufacturer.	
Date: 14 June 2021 Place: Milan (Italy)	Signature: Fabrizio Preda

C.&C. consulenza sicurezza qualità
MarcaturaCE.net
Conoscerla per applicarla, rispettarla e pretenderla.

Via Lauro, 95 Cadoneghe Padova Italy
Consulenti e Periti per: **Guardia di Finanza, Tributaria, Autorità Doganali, Carabinieri, Polizia di Stato, Unioncamere, Tribunali.**

The correct constitution of the technical dossier, as well as the documents prepared by C & C s.a.s., have been verified by Eng. Renato Carraro.

DECLARATION OF CONFORMITY

The device **GEMINI** described in the documentation is shipped together with the declaration of conformity, which is compliant with the European laws and regulations.

NOTE

BEFORE USING THE DEVICE, CHECK THE PRESENCE OF THE DECLARATION OF CONFORMITY.

NOTE

IF THE DEVICE IS GIVEN TO A THIRD PARTY, THE ENTIRE DOCUMENTATION MUST BE CONSIGNED TOGETHER WITH IT.

MANUFACTURER'S DATA

Name	NIREOS S.r.l.
Address	Via Giovanni Durando, 39 20158 Milano
VAT	10359960969
Phone	+39 3493777627
E_mail	info@nireos.com
Website	www.nireos.com

AUTHORIZED ASSISTANCE

Authorized assistance on the product is provided directly by NIREOS SRL.

INTRODUCTION TO THE MANUAL

NOTE

READ CAREFULLY THE PRESENT MANUAL BEFORE OPERATING THE DEVICE.

The present manual contains the instructions for the installation, configuration, use and maintenance of the **GEMINI** interferometer. The manual is divided into different sections; each section deals with a series of topics, divided into chapters and paragraphs.

The general index lists all the topics of the entire manual. The numeration of the pages is progressive, and each page reports the corresponding number. This manual is intended to be read by the user responsible for the configuration, use and maintenance of the **GEMINI** and it is relative to its entire working period after its production and sale.

In the case the device is given to a third party for any reason, it must be consigned together with the entire documentation.

Before starting any operation, it is necessary to have carefully read the entire manual with attention to the topic relative to the operations to be effectuated.

This manual contains reserved information and cannot be given to a third party for any use or in any form, without a written consent by NIREOS SRL.

NIREOS SRL declares that the information contained in this manual agrees with all the technical and safety specifications of the **GEMINI** device.

A copy of this manual is registered in the technical file stored at the headquarters of NIREOS SRL.

NIREOS SRL does not recognize any other documentation which has not been produced, released or distributed by itself or authorized personnel.

The present manual, as the entire technical file, will be preserved by the manufacturer for the entire period required by law (10 years).

During this period, a copy of the documentation can be required at the moment of sale.

The entire technical file is available for the aforementioned period exclusively for the control authority that can request a copy.

After this period, it will be obligation of who manages the device to assure that both the device and the documentation respect the current law at the moment of the control.

Conventions

For a more immediate comprehension of the topics, in the present manual the following graphic and typographic conventions have been adopted.

Warning Conventional Graphics

NOTE

NOTES CONTAIN IMPORTANT INFORMATION, HIGHLIGHTED OUTSIDE THE TEXT THEY REFER TO.

ATTENTION

ATTENTION INDICATIONS INDICATE THOSE PROCEDURES WHOSE PARTIAL OR ENTIRE INOBSERVANCE CAN CAUSE DAMAGES TO THE DEVICE, TO ITS COMPONENTS AND CAN POTENTIALLY EXPOSE PERSONS TO DANGERS.

DANGER

DANGER INDICATIONS INDICATE THOSE PROCEDURES WHOSE PARTIAL OR ENTIRE INOBSERVANCE CAN CAUSE DAMAGES OR INJURIES TO THE HEALTH OF PERSONS AND SERIOUS DAMAGE TO THE DEVICE.

Pictograms

In the device the following pictograms are present:

Dangers

High Voltage
Danger

ATTENTION!
warning labels and safety pictograms must not be removed, covered or damaged.

ANNEXED DOCUMENTATIONS

NOTE

BEFORE STARTING ANY OPERATION, VERIFY THE PRESENCE OF ALL THE ANNEXED DOCUMENTATIONS.

NOTE

IF THE DEVICE IS GIVEN TO A THIRD PARTY, ALL THE DOCUMENTATION OF THE DEVICE MUST BE CONSIGNED TOGETHER WITH IT.

- USER TECHNICAL MANUAL

Section 2

Warranty
General safety rules
Technical specifications
Intended and non-intended use
Residual risks

WARRANTY

The warranty rules, described in the General Terms and Conditions document, are valid only if the device is used in agreement with the intended conditions of use.

Excluding the operations described in the **Section Maintenance** and executed following the indicated procedures, any reparation or modification made to the device from the user or from an unauthorized firm determines the expiration of the warranty.

Warranty does not apply to damages caused by unskillfulness or negligence in the use of the device, or by bad or omitted maintenance.

Our Products Are Covered By Warranty With The Following Conditions:	
1	The warranty is valid for 12 or 24 months, depending on the kind of buyer (private or legal)
2	The manufacturer replaces at its discretion malfunctioning or defective components, only after an accurate control of bad assembly.
3	Customer is responsible for shipping cost in the case of wrong use of warranty terms.
4	During warranty period, replaced products becomes property of the manufacturer.
5	Only the original customer that has respected the indications of normal maintenance described in the manual can benefit from this warranty. Our liability expires in the moment in which: the original owner relinquishes the property of the product, or modifications are made to it.
6	Warranty does not comprise damages deriving from an excessive stress, for example the use of the device after the ascertainment of anomaly, the use of non-adequate operational methods or the inobservance of the use and maintenance instructions.
7	The manufacturer is not liable for possible difficulties arising from the re-sale or re-use of the device or in other countries, due to provisions in force in those countries.
8	Defective components or defective products must be shipped from the customer to the manufacturer for replacement and the customer is responsible for shipping cost. Replacement will not occur without a proof of purchase (invoice, copy of payment); on the contrary, the replaced component will be charged to the customer.

Notice: if you consider using warranty, please indicate the following information:

1	Code of the device
2	Date of purchase (and document of purchase)
3	Detailed description of the problem

NOTE

WARRANTY IS VOID IF THE MODES OF OPERATION AND USE OF THE DEVICE DESCRIBED IN THIS MANUAL ARE NOT RESPECTED.

General Safety Rules

Warning

Please verify that in the packaging of the product all the documents listed in the chapter “documents annexed” are present. If not, please report immediately to the manufacturer the lack or even partial illegibility of the documents. If a part of the documentation is lacking or illegible, please contact NIREOS SRL before executing any further operation on the device.

In this chapter, general safety rules are described. They must be observed during any operation executed with the device. Operation procedures, described in the following chapters, must be executed respecting both the modalities of operation indicated, and the general safety rules described in this chapter.

safety rules and installation, configuration, use and maintenance operations indicated in this document represent also a complement to the general occupational safety regulations that must be respected.

Different countries may have different regulations relative to safety. It is specified that in all those cases in which the regulations of the documentations were in conflict or reductive with respect to the regulations of the country in which the **GEMINI** is used, the regulations of the country have priority value on those written in the documentation.

NOTE

THE MANUFACTURER IS NOT LIABLE IN ANY CASE OF ACCIDENTS OR DAMAGES RESULTING FROM AN INAPPROPRIATE USE OF THE DEVICE, OR FROM THE INOBSERVANCE (EVEN PARTIAL) OF THE SAFETY RULES AND OPERATIONAL PROCEDURES DESCRIBED IN THE DOCUMENTATION.

The non-observance of the operational rules regarding the use, installation, configuration and maintenance of the GEMINI described in the present manual determines the annulment of the warranty conditions.

Safety rules

During the configuration and the following use of the device, situations of incorrect operation and not expected from this documentation may occur. These anomalous situations can be caused to environmental conditions or fortuitous failures unexpected from the manufacturer.

The manual must be kept by the user or the personnel that oversees the management, maintenance and operation of the device.

In case of deterioration or loss, the customer can request to the manufacturer a copy of this documentation. We suggest keeping a safety copy in a safe place.

ATTENTION

SINCE IT WOULD BE IMPOSSIBLE TO DESCRIBE ALL THE OPERATIONS THAT CAN NOT OR MUST NOT BE EXECUTED, PLEASE NOTE THAT ALL THE OPERATIONS (THAT DIFFER FROM THE NORMAL USE) WHICH ARE NOT EXPLICITLY DESCRIBED IN THE PRESENT MANUAL ARE TO BE CONSIDERED NOT FEASIBLE.

DESCRIPTION

The GEMINI is an ultra-stable interferometer, capable of generating two delayed and phase-locked replicas of the input light. The relative delay τ between these two replicas can be controlled by the user via software with extremely high reproducibility and phase stability (<1 attosecond, corresponding to <λ/1000 in the visible spectral region). This delay is introduced by mechanically moving an optical element with a motorized positioner, whose position can be controlled via software. Its exceptional stability is made possible thanks to the employed common-path geometry, that makes the device completely insensitive to external noise and vibrations.

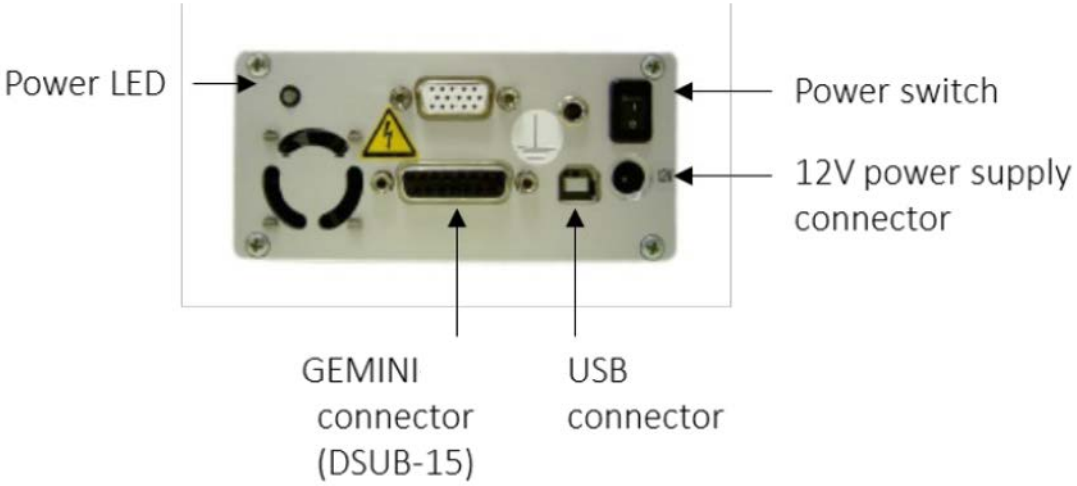
TECHNICAL DATA

Power Supply

Input voltage and current	100 ÷ 240 V A.C. ± 15% - 50/60 Hz - 1,5 A
Output Voltage and current (from the adaptor)	12 V D.C. - 5 A
Power	60 W

Mechanical specifications

Dimensions (L X P X H)	(100 x 110 x 65) mm
Weight	0.4 kg
Mounting	Horizontal



All the technical data relative to the device are indicated in detail in the annexed document “User Technical Manual”.

INTENDED USE

- Use the interferometer in laboratories or adequate environments, following the instructions described in the document “User Technical Manual”.
- Use exclusively cables, connectors, power supply and adaptors provided by NIREOS SRL.

NON-INTENDED USE

No other use of the device which is different from the ones described in the paragraph DESCRIPTION AND INTENDED USE is foreseen. It is absolutely forbidden:

- To operate the device with inadequate supply line.
- To operate the device for applications that differ from the ones indicated.
- To modify the device (hardware or firmware).

- It is absolutely forbidden to open the device, unless otherwise indicated in writing from NIREOS S.R.L.

The reuse of the device after the end of its service is out of the responsibility of the manufacturer company.

NOTE

THE MANUFACTURER COMPANY IS NOT LIABLE FOR INJURIES OR DAMAGES RESULTING FROM NON-INTENDED USES OF THE DEVICE, ANY OTHER NON-INTENDED USE RESULTS, MOREOVER, IN THE EXPIRATION OF THE WARRANTY.

Residual Risks

During the design phase, NIREOS SRL has effectuated a detailed risk analysis on the device GEMINI. From this analysis, it is evident that there are risks that cannot be eliminated by their nature. Those risks have been examined in detail in this manual and indications on how to avoid them are described. It is thus important that any user assigned to the installation, configuration, operation and maintenance of the device has read the present manual preventively.

NOTE

THE MANUFACTURER COMPANY IS NOT LIABLE FOR INJURIES OR DAMAGES RESULTING FROM NON-INTENDED USES OF THE DEVICE, DUE TO THE CARELESSNESS OF THE USER.

In particular:

- It is absolutely forbidden to modify in any way the device. The manufacturer is not liable for any injury to persons, animals or things resulting from the use of an inappropriately modified device by an unauthorized user.
- Please keep with care the present manual, which is necessary for a correct and safe use of the **GEMINI** Interferometer. Please check periodically the condition of the label installed on the product and restore it in the case it is damaged (in this case please contact the authorized assistance).
- In the case the external structure of the case shows sharp edges resulting from accidental impacts that make it dangerous, it is necessary to contact the authorized assistance and follow their instructions.

Important:

- Do not wet with water or other liquids the electrical connections of the device **GEMINI.**
- It is necessary to perform maintenance as described in the manual.
- Maintenance must be performed following the instructions described in the manual.

OPERATIONS THAT PRESENT RISKS FOR THE USER:

in the commissioning operations, follow the general accident prevention regulations.
In particular:

- If you work on electrical parts, please make sure that they are not live.

In the design phase, solutions have been adopted to make the device safe in all the conditions of operation: shipment, mounting, configuration, use and maintenance. Nevertheless, not all the possible risks for the user and the environment have been eliminated, both for technological reasons (reliability of the devices) and management (excessive elimination difficulties). Consequently, the residual risks are reported.

Section 3

Site
Handling
Installation and Configuration
Operation

INSTRUCTIONS FOR UNPACKING

- The device is provided inside a plastic case inside a packing carton. Inside you will find:
  - GEMINI Interferometer
  - Controller Module MCS
  - AC adapter
  - Electric connection cables
  - USB cables
  - Installation, Use and Maintenance Manual
  - User Technical Manual

SITE

It is important to consider some aspects before proceeding with the handling, installation and operation of the device. It is necessary to verify some factors:

- The operation and storage area must be chosen so that it cannot be hit by steam jets and corrosive acids.
- The operation and storage area must be chosen so that it cannot be hit by water and other liquids.
- Indoor use only.
- Altitude up to 2000 m.
- Temperature range from 5 °C up to 40 °C.
- Maximum relative humidity 80 % up to 31 °C, decreasing linearly to 50 % humidity at 40 °C.
- Degree of pollution: 2.

HANDLING

ATTENTION

In the handling procedures of the device it is necessary to provide for the use of personal protective equipment (PPE) such as:

- **Gloves**:

operating with potentially dangerous mechanical components it is necessary to use CE marked gloves as PPE that prevents injuries to hands.

The weight of the device is written in the present manual and in the label stuck to it. Given its size and weight, it can be moved manually by a single user.

INSTALLATION AND CONFIGURATION

Warning

The installation of the GEMINI must be executed by specialized personnel, who must preventively verify that the electrical system is compliant with the legal standard, with grounding system and life-saving equipment.

All the products are tested and optimized by the manufacturer before shipment to the customer.

The product has been designed, realized and tested to satisfy all the specific regulations (please see the declaration of conformity), if installed and configured in the proper manner.

If the installation, configuration, operation and/or maintenance are not executed in the proper manner, anomalies may occur during the operation. Moreover, safety problems may occur. Not appropriated installation, configuration and maintenance result in the expiration of the warranty terms.

ATTENTION

THE DEVICE CAN BE OPERATED ONLY AFTER IT HAS BEEN INSTALLED AND CONFIGURED CORRECTLY.

Before the installation, configuration and operation of the device, please remove any protective or packaging material.

Preliminary Checks

Check for possible damages

Inspect the products for signs of damage and only use equipment that shows no signs of damage. In case of any damage, contact NIREOS for replacement. Please safe all packing materials in case you would like to transport or ship the product again.

Please check:

- That there are no signs of damage or dent indicative of impact during transport;
- That the electrical connections are not damaged;
- That the cables are not damaged and do not present cuts;

The illumination system (natural or artificial) of the area of installation and configuration must assure the following minimum values of illuminance: 200 lux.

DAMAGE REPORTING PROCEDURE

In case of damage, please stop any procedure in progress and report the noticed damages to the manufacturer company.

Installation

ATTENTION

In the installation procedures it is necessary to provide for the use of personal protective equipment (PPE) such as:

- **Clothing**:
  which must comply with the essential safety requirements in force.
- **Gloves**:
  during operations with parts that can reach high temperatures, potentially dangerous mechanical components and high voltage parts, it is necessary to wear CE marked gloved as PPE that protects against the described risks.

Goggles:
to prevent unwanted material from being projected into an operator's eyes

NOTE

THE MANUFACTURER COMPANY IS NOT LIABLE IN ANY CASE OF INJURIES OR DAMAGES RESULTING FROM THE INSTALLATION AND OPERATION OF THE PRODUCT IN AN ELECTRICAL SUPPLY SYSTEM WHICH IS NOT COMPLIANT WITH LEGAL REQUIREMENTS.

DANGER

BEFORE EXECUTING THE PROCEDURES DESCRIBED IN THE FOLLOWING, PLEASE MAKE SURE THAT THE DEVICE IS NOT CONNECTED TO THE ELECTRICITY GRID AND/OR UNDER HIGH VOLTAGE.

For properly install and configure the device, please read carefully the document “User technical manual” annexed to the present manual.

Configuration

The correct configuration procedures are indicated in the annexed document “User Technical Manual”.

NOTE

THE MANUFACTURER COMPANY IS NOT LIABLE IN ANY CASE OF INJURIES OR DAMAGES RESULTING FROM THE OPERATION OF THE PRODUCT IN AN ELECTRICAL SUPPLY SYSTEM WHICH IS NOT COMPLIANT WITH LEGAL REQUIREMENTS.

OPERATION

Problems

In case of occurrence of unexpected and dangerous anomalies during the power on or operation procedures of the **GEMINI**, please follow these instructions:

- Switch off the device;
- Immediately contact technical assistance.

In case of occurrence of unexpected electromagnetic anomalies after the power on procedure of the device, such as for example the impossibility to communicate with telephones or smartphones, please follow these instructions:

- Switch off the device;
- Verify to have installed and configured it correctly;
- In case no anomalies deriving from the installation and configuration are found, please contact immediately the technical assistance.

User Interface

The user interface is described in the annexed document “User Technical Manual”.

Operational Modes

For more details regarding the operation procedures, user interfaces, software installation and optical alignment, please read carefully the annexed document “User technical manual”.

Section 4

Maintenance
Disposal

MAINTENANCE

Safety

ATTENTION

In the maintenance procedures it is necessary to provide for the use of personal protective equipment (PPE) such as:

- **Clothing**:
  which must comply with the essential safety requirements in force.
- **Gloves**:
  during operations with parts that can reach high temperatures, potentially dangerous mechanical components and high voltage parts, it is necessary to wear CE marked gloved as PPE that protects against the described risks.
- **Goggles:**
  to prevent unwanted material from being projected into an operator's eyes.

Maintenance procedures must be executed by personnel who has preventively read this manual.
Any kind of operation of maintenance must be always executed with the device switched off and the power plug disconnected. During these procedures, please follow scrupulously the instructions described in the present manual.

DANGER

DISCONNECT THE DEVICE FROM THE POWER SUPPLY BEFORE EXECUTING ANY OPERATION OF CLEANING OR MAINTENANCE.

The illumination system (natural or artificial) of the area of maintenance must assure the following minimum values of illuminance: 200 lux.

For any kind of operation of cleaning and maintenance, in addition to the instructions provided in this manual, general safety rules must be respected and possibly the general occupational safety regulations in force in the place where these operations are carried out.

Periodic Maintenance

Periodically it is necessary to clean the device from an accumulation of dust that can possibly enter the device and cause problems during the operation. Please use compressed air to blow off the dust. It is possible also to use a wet cloth without alcohol or aggressive solvents. Do not use abrasive sponges, chemical solvents or detergents. During the cleaning procedures, please prevent water from touching electrical parts or entering the device.

Periodically it can be necessary to calibrate the device. For a detailed description of the calibration procedures, please read carefully the annexed documentation or contact NIREOS SRL.

Extraordinary Maintenance

Extraordinary maintenance procedures are requested in case of failure or damages due to unexpected accidents or to an inappropriate use of the device.
All the possible situations that can happen are totally unpredictable, therefore it is not possible to describe appropriate intervention procedures.
In case of need, please contact the technical service of the manufacturer company to receive adequate instructions.

All the intervention procedures (mechanical or electrical, ordinary or extraordinary) must be executed by specialized personnel, authorized by our assistance service

SET OUT OF SERVICE

Deactivation of the device

The device is realized following criteria of robustness, durability and flexibility that allow to use it for many years. Once the end of its technical and operating life has been reached, it must be put out of service in conditions that can no longer be used for the purpose for which it was designed and built, however, making it possible to reuse the raw materials that constitute it. The same procedures of deactivation must be followed in all these cases:

- Set out of service of the device and storage in the warehouse.
- Definitive dismantling and subsequent disposal.

NOTE

THE MANUFACTURER COMPANY IS NOT LIABLE IN ANY CASE OF INJURIES OR DAMAGES TO PERSONS, ANIMALS OR THINGS RESULTING FROM THE USE OF SINGLE PARTS OF THE DEVICE WITH FUNCTIONS OR CONFIGURATIONS DIFFERENT FROM THE ORIGINAL ONES. THE MANUFACTURER DECLINES ANY ACKNOWLEDGMENT, IMPLICIT OR EXPLICIT, OF SUITABILITY FOR SPECIFIC PURPOSES OF PARTS OF THE DEVICE REUSED AFTER THE FINAL DEACTIVATION IN VIEW OF ITS DISPOSAL.

Disposal

The possibility of reusing some parts of the device is subject to the user's total responsibility.
In the label it is indicated the symbol that refers to the Legislative Decree No. 49 of March 14, 2014 which incorporates the 2012/19 / EU directive, which indicates the need to dispose of the product in differentiated waste, specifically in the electrical and electronic waste.

NOTE

THE MANUFACTURER COMPANY IS NOT LIABLE FOR INJURIES OR DAMAGES CAUSED BY THE DEVICE IF IT IS NOT USED IN ITS INTEGRAL VERSION, AND FOR THE OPERATIONS, USES AND APPLICATIONS SPECIFIED IN THE PRESENT MANUAL.

THE MANUFACTURER COMPANY IS NOT LIABLE FOR INJURIES OR DAMAGES TO PERSONS, ANIMALS OR THINGS DERIVING FROM THE RECOVERY OF PARTS OF THE DEVICE USED AFTER ITS DISPOSAL.

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