N50, N100, N200, N300, N400 SERIES NON EVAPORABLE GETTERS (NEG)

USER GUIDE

PN 900030, Rev B

ISO 9001:2008 Certified

Part of the Atlas Copco Group

GENERAL INFORMATION

Purpose:

The purpose of this guide is to provide instruction to the user of Gamma Vacuum's N50, N100, N200, N300 and N400 series NEGs.

Scope:

The scope of this document is to provide the information necessary to successfully employ the Gamma Vacuum NEG into a vacuum environment.

WARNING: Do not use unauthorized parts. Such parts may compromise safety. Contact Gamma Vacuum with any questions.

WARNINGS

WARNING:
GAMMA VACUUM CONTROL UNITS DESIGNED FOR ION-PUMP OPERATION ARE CAPABLE OF DELIVERING 7000 VDC UNDER OPEN CIRCUIT OR LOW PRESSURE OPERATING CONDITIONS. FOR SAFE OPERATION, THE CONTROL UNIT AND ION PUMP SHOULD HAVE A COMMON CHASSIS CONNECTOR WHICH IS TIED TO THE POWER SYSTEM GROUND.

ALERTE:
LES UNITES DE CONTROLE DE GAMMA VACUUM POUR L'OPERATION DES POMPES IONIQUES SONT CAPABLES DE FOURNIR 7000 VOLTS CONTINUS DANS UN CIRCUIT OUVERT OU EN TRAVAILLANT SOUS BASSE PRESSION . POUR OPERER EN TOUTE SECURITE, L'UNITE DE CONTROLE ET LA POMPE IONIQUE DOIVENT AVOIR UN CONNECTEUR DE CHASSIS EN COMMUN QUI EST LIE A LA TERRE DU SYSTEME D'ALIMENTATION.

警告：
イオンポンプ用ガンマ製真空制御装置は通電、もしくは低圧の状態で運転した場合直流7000V 供給可能です。安全運転のため、制御装置とイオンポンプはアースに接続された共通の等級配線を使用する必要があります。

安全警告:
伽玛真空 (公司) 为离子泵运行所设计的控制单元在开路或低压运行条件下可输送7000伏直流电压。为确保安全运行, 控制单元与离子泵应有一个共同的底盘连接器, 和电源接地相连。

ADVERTENCIA:
LAS UNIDADE DE CONTROL DE VACÍO GAMMA DISEÑADAS PARA LA OPERACIÓN DE BOMBAS TIPO IÓNICAS, SON CAPACES DE ALCANZAR 7,000 VDC BAJO OPERACION DE CIRCUITO ABIERTO O EN CONDICIONES DE OPERACIÓN A BAJA PRESIÓN. PARA UNA OPERACIÓN FUERA DE RIESGO Y PELIGRO, LA UNIDAD DE CONTROL Y LA BOMBA IÓNICA, DEBEN TENER UN CONECTOR COMÚN A UN CHASÍS EL CUÁL ESTARÁ A SU VEZ, ENLAZADO A LA TIERRA DE LA FUENTE DE PODER.

ACHTUNG:
GAMMA VACUUM STEUERGERÄTE FÜR IONENGETTER-PUMPEN KÖNNEN HOCHSPANNUNGEN BIS ZU 7000 VOLT GLEICHSPANNUNG ERZEUGEN BEIM HOCHVAKUUM-BETRIEB ODER OFFEN LIEGENDEN ANSCHLÜSSEN. FÜR DEN SICHEREN BETRIEB MUSS EIN GEMEINSAMER SCHUTZLEITER DIE GEHÄUSE VON PUMPE UND STEUERGERÄT MIT DEM SCHUTZLEITER DES NETZANSCHLUSSES VERBINDEN.

WARNING:
READ AND UNDERSTAND OPERATOR'S MANUAL BEFORE USING THIS MACHINE. FAILURE TO FOLLOW OPERATING INSTRUCTIONS COULD RESULT IN INJURY OR DAMAGE TO EQUIPMENT.

ALERTE:
LIRE ET COMPRENDRE LE MANUEL D'OPERATION AVANT D'UTILISER CETTE MACHINE . NE PAS SUIVRE LES INSTRUCTIONS D'OPERATION PEUT CAUSER DES BLESSURES OU DES DEGATS A L'EQUIPEMENT.

警告：
この装置を使用される前に必ず取扱説明書を熟読し理解した上でご使用ください。取扱説明書の通り操作をしなかった場合、装置が損傷、破損することがあります。

安全警告:
在使用这台机器前, 请务必阅读并理解 "操作员手册 (指南)"。如果未能遵循操作步骤说明, 将可能导致设备的损坏。

ADVERTENCIA:
LEA, ESTUDIE, Y ENTIENDA BIEN EL MANUAL DE OPERACION, ANTES DE USAR ESTA MAQUINARIA. UNA FALLA POR NO SEGUIR LAS INSTRUCCIONES OPERATIVAS, PUDIERA RESULTAR EN DAÑO O PERJUICO DEL EQUIPO.

ACHTUNG:
LESEN UND VERSTEHEN SIE DIE BEDIENUNGSANLEITUNG BEVOR SIE DAS GERÄT IN BETRIEB NEHMEN. FEHLBEDIENUNGEN KÖNNEN ZU VERLETZUNGEN FÜHREN ODER DIE AUSRÜSTUNG BESCHÄDIGEN.

TERMS:

Conditioning:

The act of heating the NEG getter material to 160° C for one hour to drive off any water that has formed on the NEG surface as a result of the NEG being brought up to air. This step is accomplished prior to activation **any time the NEG has been brought up to air.**

Activation or Regeneration:

The act of heating the NEG to above 400° C for a period of time to remove diffused hydrogen from NEG materials and diffuse reacted compounds (mainly oxides and nitrides) on the NEG surface into the bulk of the NEG material.

RECEIVING YOUR NEG:

The Gamma Vacuum NEG will be shipped in a vacuum sealed, cleanroom compatible package. Upon removal of the NEG from its packaging, Gamma Vacuum recommends using dry nitrogen to blow off potential particulate that may have resulted during transit.

CAUTION: Do not remove the NEG from packaging until you are ready to install it into your vacuum system. The NEG's performance is degraded through long-term exposure to atmospheric conditions. Opening the NEG to a nitrogen environment is preferred but not required.

NOTE: Ultra High Vacuum (UHV) compatible gloves should be used if touching any portion of the NEG that will be placed in the vacuum environment.

INSTALLING THE NEG INTO A VACUUM SYSTEM:

Ideally the NEG will be installed into the vacuum chamber with as little shrouding as possible. Any shrouding will limit conductance which will reduce the Gettering rate of the NEG.

CAUTION: The NEG material is fragile and care must be taken not to bump the NEG material against the side of the vacuum port when placing the NEG into the vacuum chamber.

CONDITIONING THE NEG:

Using a Gamma Vacuum TSP Controller for conditioning the NEG, set the voltage using the following table values:

Table 1.

NEG	Setting	Time
N50	2 Amperes	1 Hour
N100	2 Amperes	1 Hour
N200	2.2 Amperes	1 Hour
N300	2.3 Amperes	1 Hour
N400	2.3 Amperes	1 Hour

Using an off the shelf DC power supply, set the voltage using the following table values. The power supply should have a DC output of 30-40 volts with minimum amperage of 7 amperes.

Table 2.

NEG	Settings	Time
N50	2 Amperes	1 Hour
N100	2 Amperes	1 Hour
N200	2.2 Amperes	1 Hour
N300	2.3 Amperes	1 Hour
N400	2.3 Amperes	1 Hour

CAUTION: The conditioning step will initially release large amounts of water vapor into the vacuum chamber. The pressure needs to be monitored during the NEG conditioning. If the pressure during the conditioning **exceeds 1 E-4 Torr the NEG could be damaged resulting in a degradation of performance.**

NEG ACTIVATION:

Using a Gamma Vacuum TSP Controller or off the shelf DC power supply for conditioning the NEG, set the voltage using the following table values:

Table 3.

NEG	Settings	Time
N50	6 Amperes	1 Hour
N100	6 Amperes	1 Hour
N200	6.5 Amperes	1 Hour
N300*	-	-
N400*	-	-

* The Gamma Vacuum TSP controller is not designed to operate NEGs above the N200, and should not be used to operate the N300 and N400.

Using an off the shelf DC power supply, set the voltage using the following table values. The power supply should have a DC output of 30-40 Volts with Minimum Amperage of 7 Amperes.

Table 4.

NEG	Settings	Time	Time
N50	6 Amperes	35 Watts	1 Hour
N100	6 Amperes	65 Watts	1 Hour
N200	6.5 Amperes	120 Watts	1 Hour
N300	7.0 Amperes	170 Watts	1 Hour
N400	7.0 Amperes	220 Watts	1 Hour

CAUTION: The activation step will release large amounts of hydrogen gas into the vacuum chamber. The pressure should be monitored during the NEG activation. If the vapor pressure exceeds 1 E-5 Torr the NEG material could be damaged, resulting in a degradation of performance. Ideally the pressure should be kept below 1 E-06 Torr during the activation process. This will maximize the efficiency of the NEG.

NEG REGENERATION:

The time interval between NEG activations is dependent on the amount of gas the NEG is exposed to (Torr Liters). The following intervals are based on the maximum amount of nitrogen the NEG can effectively pump at the stated pressures.

Table 5.

Vacuum	Time
1 E-06 Torr	6 Hours
1 E-07 Torr	60 Hours
1 E -08 Torr	600 Hours
1 E-09 Torr	250 Days
1 E-10 Torr	7 Years

RETURN MATERIAL AUTHORIZATION FORM

Thank you for taking the time to complete this form. Please complete this form and return to Gamma Vacuum in electronic format (Adobe PDF format [.pdf] preferred), or via fax. Digital signatures are acceptable.

Assigned RMA: _____

Your Reference: _____

CONTACT INFORMATION

Name: _____

E-mail Address: _____

Phone: _____

Fax: _____

Website: _____

COMPANY INFORMATION

Company Name: _____

Date: _____

Address: _____

RETURN INFORMATION

Type of Product: Ion Pump / Ion Pump Controller / Other

Contaminant Status*: Has Not Been Exposed / Has Been Exposed

Claim Status: Warranty Claim / Service Request / Shipping Error / Evaluation / Other

Reason for Return: _____

Part Number: _____

Description: _____

Serial Number: _____

Original Purchase Order: _____

Your Reference: _____

Additional Information: _____

Signature of Certifying Official: _____

Name and Title of Certifying Official: _____

* Contaminants to vacuum systems are defined as: any substance that, because of its properties, is not compatible with ultra-high vacuum (UHV) operation. Some of these are: silicon (in the form of silicones), sulfur, cadmium, fluorine and chlorine. Contaminants have been determined by vapor pressure curves and/or properties that are detrimental to the operation of UHV products.

** *Hazardous substance* means a chemical or substance, or mixture of chemicals or substances, which:

- is regulated by the Federal Occupational Safety and Health Administration under Code of Federal Regulations, title 29, part 1910, subpart Z;
- is either toxic or highly toxic, an irritant, corrosive, a strong oxidizer, a strong sensitizer, combustible, either flammable or extremely flammable, dangerously reactive, pyrophoric, a carcinogen, a teratogen, a mutagen, a reproductive toxic agent, or that otherwise, according to generally accepted documented medical or scientific evidence, may cause substantial acute or chronic personal injury or illness during or as a direct result of any customary or reasonably foreseeable accidental or intentional exposure to the chemical or substance. (Common examples: arsenic, cadmium, gallium, cesium, mercury, radiation, etc.)

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