

**Small Animal Cage  
Changing Station**

**Models  
NU-619-300/400/500**

**Operation & Maintenance Manual**

**August, 2014  
Revision 8**



**Manufactured By:**  
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NU-619-300/400/500  
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**Table of Contents**

Section No. 1 .....General Description  
Section No. 2 .....Models & Features  
Section No. 3 .....Warranty  
Section No. 4 .....Shipments  
Section No. 5 .....Installation Instructions  
Section No. 6 .....Operating the NU-619  
Section No. 7 .....Operating Guidelines  
Section No. 8 .....General Maintenance  
    8.1.....Preventative Maintenance  
    8.2.....Cleaning  
    8.3.....Fluorescent Lamp Bulb Replacement  
    8.4.....HEPA Filter Replacement  
    8.5.....Motor Blower Replacement  
    8.6.....Airflow Calibration  
    8.7.....Filter Integrity Check  
Section No. 9 .....Polycarbonate Material Compatibility  
Section No. 10 .....Error Indicators & Troubleshooting  
Section No. 11 .....Electrical/Environmental Requirements  
Section No. 12 .....Disposal and Recycle  
Section No. 13 .....PM Check List

**Manual Drawings**

BCD-13417 ..... NU-619-300/400/500 Airflow Schematic  
BCD-13418 ..... NU-619-300 Specification Drawing  
BCD-13419 ..... NU-619-400 Specification Drawing  
BCD-13420 ..... NU-619-500 Specification Drawing  
BCD-13421.....NU-619 Front Panel

**Electrical Schematic**

BCD-13533.....NU-619-300/400/500 Electrical Schematic  
BCD-13534.....NU-619-300/400/500 (EC Impeller) Electrical Schematic

# Small Animal Cage Changing Station

Models

NU-619-300/400/500

MANUFACTURED BY:

NuAire, Inc. - Plymouth, Minnesota, USA

## 1.0 General Description

The NuAire Small Animal Cage Changing Station Model NU-619 is a cabinet whose unique configuration offers the benefits of vertical HEPA filtered airflow for product protection on the worksurface. In addition, the NU-619 provides improved allergen personnel protection by incorporating a HEPA filtered down draft vacuum on the worksurface to assure minimal exposure to animal hair/dander as well as cage bedding material. **However, the NuAire Model NU-619 should not be used as a substitute for a Class II, Type A2 Biological Safety Cabinet. The NU-619 is not a containment device for airborne particulate in low to moderate risk-hazard research** as prescribed by the CDC/NIH Biosafety in Microbiological and Biomedical Laboratories.

The NU-619's design and airflow pattern is illustrated on the airflow schematic drawing. The NU-619's design incorporates two impeller/blowers, both a supply and exhaust, each with its own associated HEPA filter providing excellent system function and maximum filter loading capacity. The designed airflow pattern, being a single pass system, also eliminates any heat build up within the workzone. The airflow pattern starts with the supply prefilter located on top of the station. The airflow continues through the supply impeller/blower and forced into the supply HEPA filter providing 99.99% particle removal at 0.3 micron. The airflow continues to move in a uniform vertical downflow pattern providing particulate-free air in the workzone. As the airflow continues to move toward the worktray, some particulate-free downflow is pushed out the top two-thirds of the work access opening.

The worktray configuration provides a unique downdraft airflow pattern that offers improved allergen personnel protection. Downdraft vacuum slots are provided around the worktray perimeter for improved particulate containment of animal hair/dander and bedding materials. Additional downdraft vacuum slots are provided dividing the worktray into quadrants for improved cross-contamination protection from cage to cage during the transfer process. The downdraft HEPA filter provides 99.99% particle removal at 0.3 micron and is located under the worktray in its own impeller/blower/filter cabinet. As the air is pulled from the worktray, through the prefilter and into the blower, the air then passes through the downdraft HEPA filter and is exhausted back to the room providing improved allergen personnel protection.

## 1.1 Safety Instructions

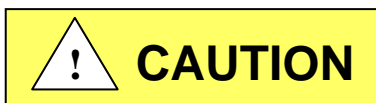
These safety instructions describe the safety features of the Small Animal Cage Changing Station Model NU-619. The station has been manufactured using the latest technological developments and has been thoroughly tested before delivery. **However, the station may present potential hazards if it is not installed and used as instructed for its intended purpose or outside of operating parameters.** Therefore, the following procedures must always be observed:

- The station must be operated only by trained and authorized personnel.
- For any operation of this unit, the operator must prepare clear and concise written instructions for operating and cleaning, utilizing applicable safety data sheets, plant hygiene guidelines, and technical regulations, in particular.
  - Which decontamination measures are to be applied for the station and accessories?
  - Which protective measures apply while specific agents are used?
  - Which measures are to be taken in the case of an accident?
- Repairs to the device must be carried out only by trained and authorized expert personnel.
- Keep these operating instructions close to the station so that safety instructions and important information are always accessible.
- Should you encounter problems that are not detailed adequately in the operating instructions, please contact your NuAire Representative or NuAire technical Services.

## 1.2 Explanation of Symbols



Safety alert symbol indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

### CAUTION:

CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.



Potential electrical hazard, only qualified person to access.



**NOTE:** Used for important information.



Flammable Hazard



Biohazard



Hazardous Gases! Personal Protection Equipment Required.



Ground, Earth

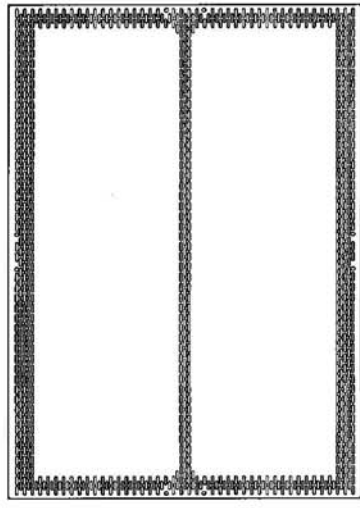
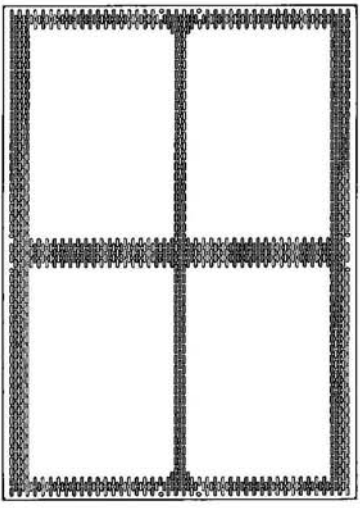
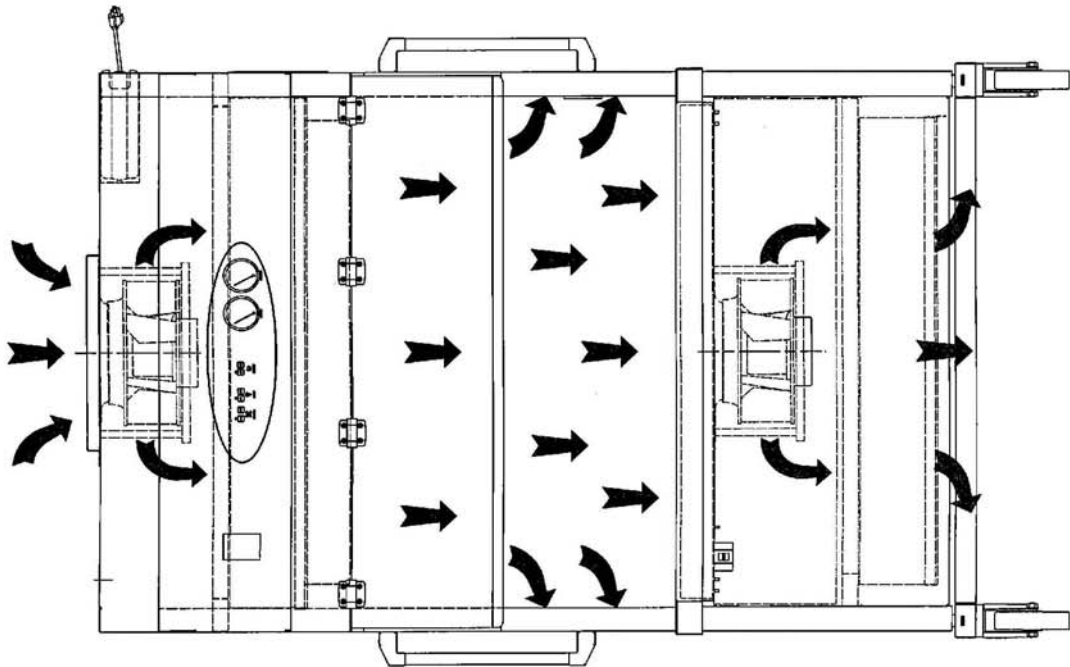


Lead Free



Chemical Hazard

|     |       |                        |           |      |      |
|-----|-------|------------------------|-----------|------|------|
| REV | ECO   | DESCRIPTION            | DATE      | DFTM | CHKD |
| C   | 11507 | CHANGED CASTER ADAPTER | 1/19/2012 | DHH  | MSS  |



WORKSURFACE  
CONFIGURATIONS

**ORIGINAL**

|                |   |
|----------------|---|
|                |   |
| TITLE          | NU-619/E<br>SMALL ANIMAL CAGE CHANGING STATION<br>AIRFLOW SCHEMATIC |
| DFTM           | DATE  |
| PL             | 09/01/2009  |
| CHKD           | MSS   |
| SHEET          | 1 OF 1  |
| DRAWING NUMBER | BCD-13417   |
|                | C   |

## **2.0 Models & Features**

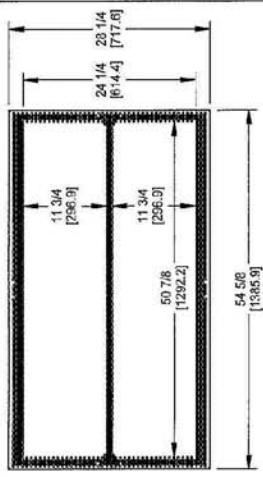
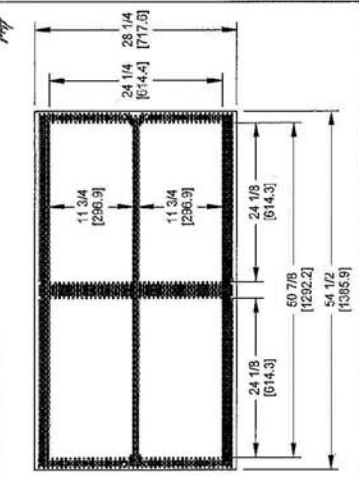
The Model NU-619 Small Animal Cage Changing Station is manufactured in three sizes: 3ft., 4ft. & 5ft.







| REV | ECO   | DESCRIPTION  | DATE      | DFTM | CHKD | MSS |
|-----|-------|--|-----------|------|------|-----|
| F   | 11632 | CHANGED WORKSURFACE STATION HEIGHT SELECTION CHART BY -750 | 6/11/2012 | DHH  |      |     |

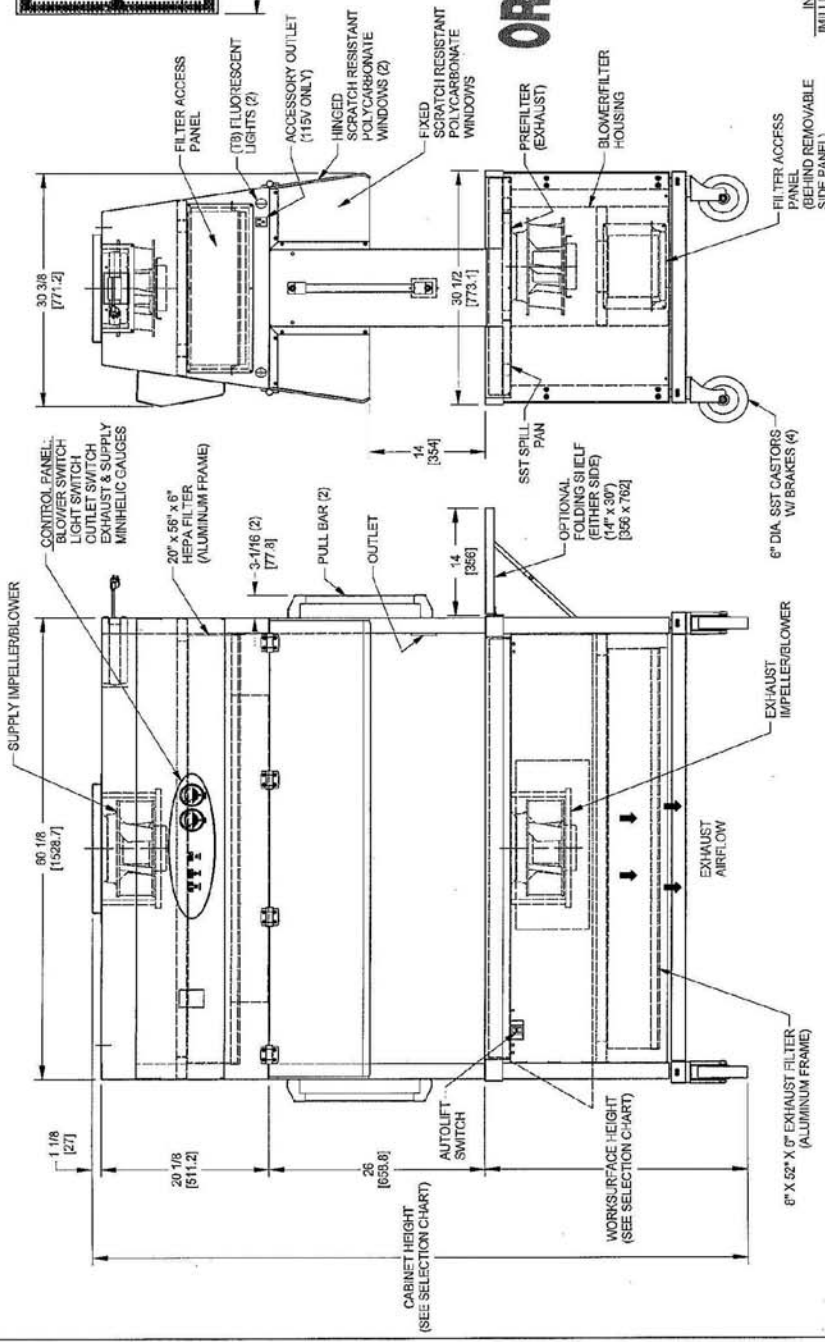
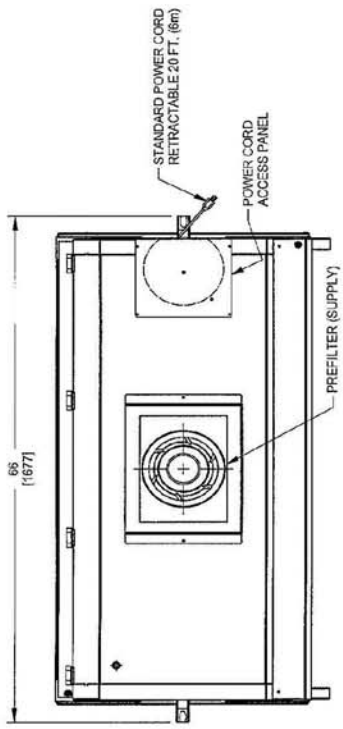


**WORKSURFACE CONFIGURATIONS**

|  |                                       |
|--|---------------------------------------|
| WORKSURFACE / STATION HEIGHT SELECTION CHART |                                       |
| WORKSURFACE HEIGHT                           | CABINET HEIGHT                        |
| 36.34" TO 42.30" [917.1] TO [1068.8]         | 77.78" TO 89.78" [1978.0] TO [2282.8] |

NOTE:  
1. OVERALL DIMENSIONAL TOLERANCE ± 1/4" (6.35)  
ALL OTHER DIMENSIONS ± 1/8" (3.17)

**ORIGINAL**



|                   |            |                  |        |
|-------------------|------------|------------------|--------|
| TITLE             |            | NU-510-500IE     |        |
| SMALL ANIMAL CAGE |            | CHANGING STATION |        |
| DFTM              | DATE       | CHKD             | SHEET  |
| PL                | 09/01/2009 | MSS              | 1 OF 1 |
| DRAWING NUMBER    |            | BCD-13420        |        |
| INCH              |            | MILLIMETER       |        |
|                   |            | F                |        |

### **3.0 Warranty**

NuAire, Inc. warrants that it will repair F.O.B. its factory or furnish without charge F.O.B. its factory a similar part to replace any material in its equipment within 36 months after the date of sale if proved to the satisfaction of the company to have been defective at the time it was sold provided that all parts claimed defective shall be returned, properly identified to the company at its factory, charges prepaid. Factory installed equipment or accessories are warranted only to the extent guaranteed by the original manufacturer, and this warranty shall not apply to any portion of the equipment modified by the user. Claims under this warranty should be directed to NuAire, Inc. setting forth in detail the nature of the defect, the date of the initial installation and the serial and model number of the equipment.

This warranty shall not apply to any NuAire product or part thereof which has been subject to misuse, abuse, accident, shipping damage, improper installation or service, or damage by fire, flood or acts of God. If the serial number of this product is altered, removed or defaced as to be illegible, the Warranty shall be null and void in its entirety.

The warranty is for the sole benefit of the original purchaser and is not assignable or transferable. Prior to returning any item, for any reason, contact NuAire for a Return Authorization Number. This number must accompany all returns. Any product shipped to NuAire without this number will be returned refused shipment or collect freight.

### **4.0 Shipments**

NuAire takes every reasonable precaution to assure that your SMALL ANIMAL CAGE CHANGING STATION arrives without damage. Motor carriers are carefully selected and shipping cartons have been specially designed to insure your purchase. However, damage can occur in any shipment and the following outlines the steps you should take on receipt of a NuAire SMALL ANIMAL CAGE CHANGING STATION to be sure that if damage has occurred, the proper claims and actions are taken immediately.

#### **4.1 Damaged Shipments**

- 4.1.1** Terms are factory, unless stated otherwise.  
Therefore, it is important to check each shipment before acceptance.
- 4.1.2** If there is visible damage, the material can be accepted after the driver makes a notation on the consignee's copy of the freight bill. Then an inspection must be made to verify the claim against the carrier. This inspection is the basis of your filing the claim against the carrier.
- 4.1.3** If concealed damage is found, it is absolutely necessary to NOTIFY THE FREIGHT AGENT AT ONCE, and request an inspection. Without this inspection, the transportation company may not accept a claim for loss or damage. If the carrier will not perform the inspection, an affidavit must be prepared stating that he was contacted on a certain date and that he failed to comply with the request. This along with other papers in the customer's possession will support the claim.

## 5.0 Installation Instructions

### 5.1 Location

The NU-619 Small Animal Cage Changing Station can be located anywhere within the animal facility. However, for maximum product protection, the station should be used away from laboratory personnel traffic lanes, air vents (in or out), doors, and/or any other source of disruptive air currents.

**Do not position the cabinet to prevent access to the power cord.** The power cord plug serves as the disconnect and should remain readily accessible. If the outlet is inaccessible, such as a conduit (hardwired) connection, then an appropriate warning label should be applied near the cabinets on/off switch to indicate the circuit breaker on the power distribution panel to be used.

If drafts or other disruptive air currents exceed the downflow velocity of the station through the access opening, the potential exists for contaminated room air to enter the workzone. Remember: Always use proper laboratory techniques.

### 5.2 Set-Up Instructions

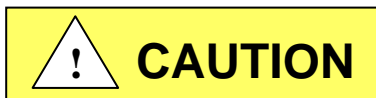
Remove outer shipping protection (carton or crating). The station is fastened to the base skid and it is usually the best procedure to leave the skid in place until the station is located in its approximate position to facilitate ease in handling. It can be disconnected from the skid by removing the brackets, bolts, and screws holding the station to the skid, then remove the screws to disconnect the ends of the skid.

After the cable ties have been removed and the power cable is plugged in for the unit. The NU-619 can be raised onto its lift system and rolled away from the end of the skid. It will take 5-10 seconds of holding the UP button for the lift to begin to move for the first time.

### 5.3 Plumbing Services

Typically, the NU-619 is not provided with plumbing services. In special cases, ground key cocks, needle valve cocks, or customer specified watering system hardware can be added. If ground key cocks are added, the type of service would be specified by the removable button on the handle. The Ground Key cocks are not recommended for pressure over 30 psi (2.0 BAR). Reducing valves should be installed external to the station if necessary. Ground key cocks should never be used for oxygen service. A special needle for oxygen service is required and available upon request.


External connection is to 3/8 inch NPT coupling in the inner sidewalls. Plugged clearance holes in the outer sidewalls are provided for easy access to the inner couplings via a NPT nipple. Connection to plant utilities should be made with proper materials for the individual service and according to national and/or local codes. It is not recommended that flammable gases be used in the station. However, if flammable gas is used, emergency shut-off valves should be located in an accessible area external to the station. Observe all labels pertaining to the type of service and operating pressure.



**THIS UNIT HAS NOT BEEN EVALUATED FOR USE WITH  
FLAMMABLE, TOXIC, OR EXPLOSIVE SUBSTANCES.  
USE AT YOUR OWN RISK.**

#### 5.4 Electrical Services

The NU-619 is provided with an electrical power cord. The station requires 115 VAC, single phase power and is recommended to be on its own branch circuit, protected with a 15 Amp circuit breaker at the distribution panel.

 **Note: THIS UNIT CONTAINS ELECTRONIC BALLASTS FOR THE FLUORESCENT LIGHTING. ELECTRONIC BALLASTS OPERATE WITH HIGH INRUSH CURRENT. IT IS NOT RECOMMENDED TO USE THIS PRODUCT WITH GROUND FAULT INTERRUPTERS (GFCI'S) BECAUSE THE BALLASTS MAY CAUSE THE GFCI TO TRIP.**

#### 5.5 Certification

After installation and prior to use, NuAire recommends that the station be recertified to factory standards. At a minimum, the following tests should be performed (see Section 8.5).

1. HEPA Filter Integrity/Housing & Frame Leak Test
2. Downflow Air Velocity Measurement
3. Exhaust Motor/Blower Setup

It is recommended that these tests be performed by a qualified technician who is familiar with the methods and procedures for certifying Biological Safety Cabinets.

After the initial certification, NuAire recommends that the station be recertified at a minimum on an annual basis and after every filter change or maintenance action or any time the operator feels it is necessary. Note that the station's filters and seals provide premium performance; Quality Control in both design and manufacturing assure superior reliability. However, protection to the work in process can be so vital that certification to the performance requirements should be accomplished as stated to insure safety established by the factory standards.

## **6.0 Operating the NU-619**

The following is a description of the controls and indicators (see Drawing BCD-13421).

### **6.1 Blower Keys**

The blower keys indicate and control on/off power to both supply and exhaust motor/blowers.

### **6.2 Light Keys**

The light keys indicate and control on/off power to the fluorescent lighting system.

### **6.3 Outlet Keys**

The outlets key indicates and controls on/off power to the outlets.

### **6.4 Supply Airflow Control**

The operating supply velocity is controlled by a potentiometer.

The potentiometer is located on the control board under the heat sink.

The potentiometer controls the operating voltage applied to the motor/blower. The potentiometer is adjustable over 270 degrees with a slotted screwdriver, which varies the applied voltage. This adjustment should only be made by a qualified technician employing a thermo anemometer or velometer in order to insure airflows.

### **6.5 Exhaust Airflow Control**

The operating exhaust velocity is controlled by a potentiometer. The potentiometer is located in the control center to the right of the main board.

The potentiometer controls the operating voltage applied to the motor/blower. The potentiometer is adjustable over 270 degrees with a slotted screwdriver, which varies the applied voltage. This adjustment should only be made by a qualified technician.

### **6.6 EC Motor Airflow Control (Optional)**

There are two potentiometers that adjust the DC Control Voltage for the motor/blowers. These are both located on the control board with the supply being in the center and the exhaust being in the corner of the board. These adjustments should only be made by a qualified technician.

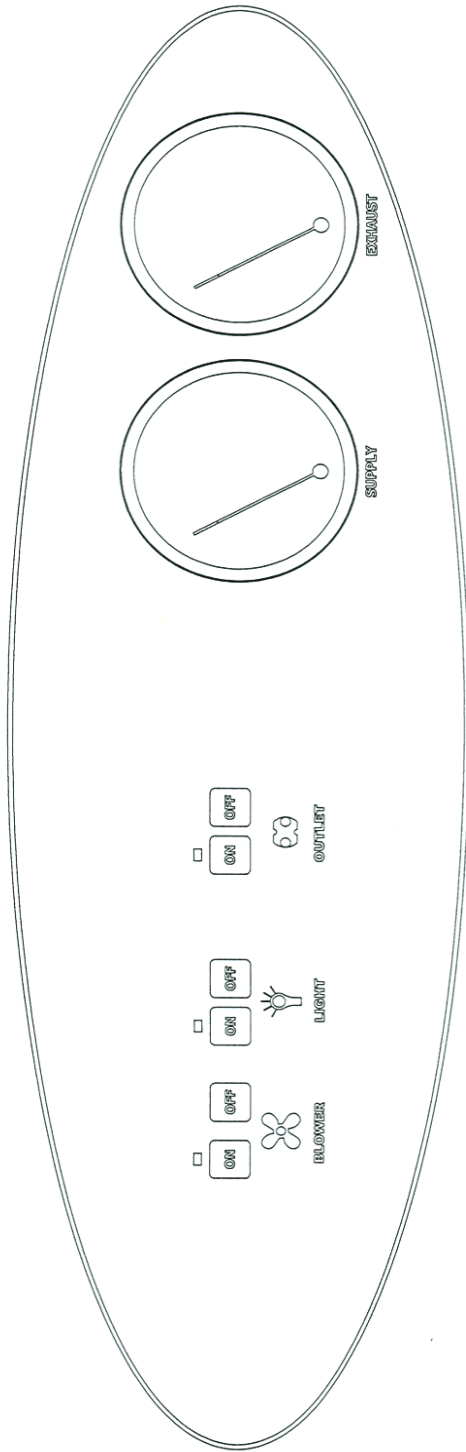
### **6.7 Supply and Exhaust Minihelic Gauges**

The station is equipped with both a supply an exhaust minihelic gauge, which displays the static pressure of the supply and exhaust positive pressure plenums. The gauges are calibrated in inches or mm of water gauge pressure. As the HEPA filters load with particulate matter, the amount of static pressure will increase, an indication of the "health" of the filters.

### **6.8 Digital Light Timer Operation (Optional)**

To operate the digital light timer, first press the ON key for the fluorescent light on the control panel. Then press the button for the light timer once and the light timer will turn on and a timer of 5:00 will appear. Press and hold the button until the desired time is reached and the timer will count down from there. The lights will flash once with one minute remaining. To turn the light off either press the button for the light timer or the OFF key on the control panel.

|     |       |                        |            |      |      |
|-----|-------|------------------------|------------|------|------|
| REV | ECO   | DESCRIPTION            | DATE       | DFTM | CHKD |
| A   | 10549 | RELEASED TO PRODUCTION | 09/01/2009 | PL   | MSS  |



|                                    |            |             |        |
|------------------------------------|------------|-------------|--------|
| TITLE                              |            | NU-619      |        |
| SMALL ANIMAL CAGE CHANGING STATION |            | FRONT PANEL |        |
| DFTM                               | DATE       | CHKD        | SHEET  |
| PL                                 | 09/01/2009 | MSS         | 1 OF 1 |
| DRAWING NUMBER                     |            | BCD-13421   |        |
|                                    |            | A           |        |

## 7.0 Operating Guidelines

It is acceptable and sometimes recommended to operate the station continuously. The station will then remain in its initially clean condition. If for any reason the unit is turned off for some time, daily or weekly, turn the station on and run for 10 minutes before using.

Allow only essential items in the work station. New items introduced into the work area should be placed within one of the worksurface quadrants to minimize cross contamination. All work should be performed with the operator's hand downstream of the critical process points. Unnecessary movement with the work station should be kept to a minimum.

### 7.1 Operating Sequence:

#### Start-Up

Turn on station's blower and lights. Blower speed must only be readjusted by qualified maintenance technicians. Good procedure includes the decontamination or wipe down of station surfaces with chemical disinfectant before work commences.

 **Note: DO NOT USE ANY CHLORINATED OR HALOGEN MATERIALS.**

Allow blower to operate for a minimum of 10 minutes before aseptic manipulations are begun in the station. An additional advantage is obtained from purification (filtration) of the room air circulated through the equipment. Because of the characteristics contributed to the quality of the laboratory environment, some owners leave them in operation beyond the time of actual use.

#### Minimize Room Activity

Activity in the room itself should be held to a minimum. Unnecessary activity may create disruptive air currents as well as interfere with the work of the operator. A person walking past the front of the station can cause draft velocities up to 175fpm (.88 m/s) which are sufficient to disrupt the air balance of the Laminar Flow Unit.

#### Utilize Unidirectional Airflow

The operator must keep two important facts in mind:

1. The air as supplied to the work area through the HEPA filter is contaminant free.
2. Airborne contamination generated in the work area is controlled by the unidirectional vertical flow air stream. A solid object placed in a laminar air stream will disrupt the parallel flow and consequently, the capability of controlling lateral movement of airborne particulates. A cone of turbulence extends behind the object and laminarity of the air stream is not regained until a point is reached downstream, approximately equal to three to six times the diameter of the object. Within the parameters of this cone, particles may be carried laterally by multidirectional eddy currents. The downdraft vacuum source on the worksurface greatly reduces the above effect. However, working with proper technique is always the best method.

#### Terminal Purging & Wipedown

Following completion of the work, allow the station for a 2-3 minute period without personnel activity to purge the unit. The decontamination of the interior surfaces should be repeated after removal of all work materials.

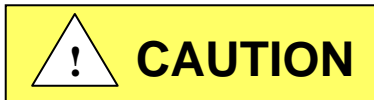
## Prefilters

Located under the work surface is a prefilter area. This area forms the air path to the exhaust motor/blower. If the air flow is blocked by excessive animal dander or bedding materials, the performance of the station could be seriously affected. Therefore, **THE PREFILTERS SHOULD BE CHECKED AND CLEANED NO LESS THAN ON A WEEKLY BASIS.** The prefilters may be vacuumed to remove the materials. The prefilters may also be replaced as necessary (see replacement parts list).

## Shut Down

Turn off blowers and lights. Do not use station as a depository for excess laboratory equipment during periods of non-operation.

## 8.0 General Maintenance

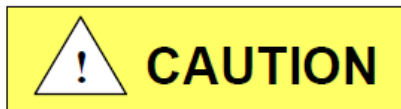


**All maintenance actions on this equipment must be performed by a qualified technician who is familiar with the proper maintenance procedures required for this equipment. This includes both certification as well as repair.**

Normally, no preventative maintenance is required on the interior of the station. The motor is lubricated for life and is thermally protected with automatic reset. The entire lamp assembly is located under the removable supply diffuser. Motor controls and station switches are located in the clean area of the hood.

However, it is recommended to perform routine preventative maintenance. Additionally, it is recommended that the station be certified, per section 8.7 after the station has been installed and annually thereafter, or whenever the operator has reason to believe it necessary.

### 8.1 Preventative Maintenance



In addition to the annual certification process it is recommended that the following preventative maintenance be performed on a regular basis to ensure the station remains in safe working order.

#### 8.1.1 Prefilters

The prefilters should be inspected daily and cleaned on a regular basis as needed or in accordance with established facility guidelines and SOP's. This will ensure that proper airflows will be maintained.

#### 8.1.2 Hydraulic Lift

The hydraulic lift should be inspected annually by running it fully up and down and observing for proper operation.

#### 8.1.3 Caster Adaptor

The adaptors that secure the caster to the stainless steel hydraulic leg should be checked annually for tightness to the hydraulic leg. If they are found to be loose they should be removed and re-installed with blue Loctite to ensure they stay in place.

#### 8.1.4 Casters

The casters should be inspected annually for tightness to the aluminum block. If they are found to be loose they should be removed, inspected, and re-installed with BLUE Loctite. They can be tightened with  $\frac{3}{4}$ " wrench. If the caster stem appears to be bent or damaged replacement may be necessary, please contact NuAire's Technical Support 1-800-328-3352.



### 8.1.5 Push\Pull Bars

The push\pull bars should be inspected annually and tightened as necessary. There are two nuts that secure them to the cabinet. They are under a cover on the black end pieces. They can be tightened with a 7/16" socket or nut driver.

### 8.1.6 Cord Reel

The cord reel and the cord itself should be inspected for wear on an annual basis.

## 8.2 Cleaning

### 8.2.1 Exterior Cleaning

The powder coat urethane and polycarbonate panels are easily cleaned with alcohol followed with any mild household detergent. Use a soft cloth on the panels. Special cleaners/polishers are available for polycarbonate if desired.

The cleaners/polishers are:

- Novus Plastic Polish #1 & #2
- Mirror Glaze Plastic Polish
- Mirror Brite Polish

The use of polycarbonates has some important don'ts:

- **Do Not** use abrasive or high alkaline cleaners.
- **Do Not** scrape with squeegees, razor blades, or other sharp instruments.
- **Do Not** use Benzene, leaded gasoline, Acetone, Toluol, Carbon Tetrachloride or Ketones.

### 8.2.2 Interior Cleaning

The station's interior consists of both powder coat urethane and type 304 stainless steel surfaces. Both surfaces may be surface disinfected using chemical disinfectants. However, **do not use any chlorinated or halogen materials** as they are known to harm stainless steel.

## 8.3 Fluorescent Lamp Bulb Replacement

The fluorescent bulbs are cool white (T8) style and located above the supply diffuser. The life rating of the bulbs is 9000 hours based on three hour burning cycles.

### 8.3.1 To Replace a Bulb:

- 1) Switch the station light off.
- 2) Raise hinged window to access supply diffuser.
- 3) Remove supply diffuser via fasteners.
- 4) The fluorescent bulbs are removed by rotating the bulbs until the bulb pins are free to be gently pulled from the tombstones
- 5) Reverse the above procedures to replace the bulb and reassemble the station.

## 8.4 HEPA Filter Replacement

It is recommended that the station have the integrity of the HEPA filters verified by a qualified technician after the unit has been initially installed. Thereafter, certification per Section 8.5 should be performed on an annual basis or whenever the operator has reason to believe it is necessary. The HEPA filters under normal usage and barring an accident do not need replacement until the efflux velocity cannot be maintained.

### 8.4.1 Supply HEPA Filter

- 1) Disconnect electrical power from station.
- 2) Remove side filter access cover from station's top housing via fasteners.
- 3) Raise hinged window to access supply diffuser.
- 4) Remove supply diffuser via fasteners.
- 5) Loosen filter frame hold down spring clamps under filter.
- 6) Once filter is loose, pull out HEPA filter from side access using handles provided.
- 7) When replacing the filter, **use only filters of the same rated flow, pressure drop, and size.**
- 8) To install new filter, grease the top gasket of the filter with silicon grease and carefully install onto filter frame.
- 9) Tighten filter frame hold down spring clamps evenly, so filter gasket will have equal pressure from all areas.
- 10) Replace diffuser and side access cover once filter is installed.

### 8.4.2 Exhaust HEPA Filter

- 1) Raise station to its highest available work height.
- 2) Disconnect electrical power from station.
- 3) Remove right side access panel.
- 4) Remove side filter access cover from station's base housing via fasteners.
- 5) Remove protective screen under exhaust HEPA filter via fasteners.
- 6) Loosen filter frame hold down spring clamps under filter.
- 7) Once the filter is loose, pull out HEPA filter from side access using handles provided.
- 8) When replacing the filter, **use only filters of the same rated flow, pressure drop, and size.**
- 9) To install new filter, grease the top gasket of the filter with silicone grease and carefully install onto filter frame.
- 10) Tighten filter frame hold down spring clamps evenly, so filter gasket will have equal pressure from all areas.
- 11) Replace protective screen, side access cover, and filter access cover once filter is installed.

## 8.5 Motor/Blower Replacement

The motor/blower assemblies should never need any preventative maintenance, but in case of a malfunction, the following steps should be taken.

- 1) Disconnect electrical power from station.
- 2) To remove the lower (exhaust) motor/blower, lift and remove the work tray and the prefilter screen assembly. Then, remove the nuts that secure the blower plate to the station, lift out the plate and motor/blower, and disconnect the wire harness and ground cable. To remove the upper (supply) motor/blower, remove the prefilter assembly. Then lift the plate with the motor/blower and disconnect the wire harness and ground cable.
- 3) Re-assemble by reversing the above steps.

## 8.6 Airflow Calibration

The NU-619 airflow calibration consists of airflow adjustments within the station.

 **Note: THIS WORK SHOULD BE DONE ONLY BY A QUALIFIED TECHNICIAN WHO CAN MEASURE VOLTAGE AND AIRFLOW FROM THE FILTERS WITH A SUITABLE VELOMETER.**

NuAire provides the following adjustment to calibrate the airflow within the station.

This is: Blower speed adjustment via motor voltage regulators

The station is considered to be certifiable if the following airflow and voltage measurements are present:

- a. Downflow Average: 75 LFPM  $\pm$  5 LFPM (.38 m/s  $\pm$  .025 m/s)
- b. Exhaust Airflow: 450  $\pm$  50 CFM (765  $\pm$  85 CMH), NU-619-300  
475  $\pm$  50 CFM (807  $\pm$  85 CMH), NU-619-400  
500  $\pm$  50 CFM (850  $\pm$  85 CMH), NU-619-500

 **Note: BEFORE STARTING AIRFLOW CALIBRATION PROCEDURE, LET THE STATION RUN FOR AT LEAST 10 MINUTES.**

### 8.6.1 Downflow Calibration

Step 1: Place a velometer in the station workzone in a parallel plane 2 inches from the supply diffuser surface. Spot check several points on the recommended downflow velocity test grid found in Table 10.

Step 2: If necessary, adjust supply airflow control located in the control center, to the above stated airflow requirements.

### 8.6.2 Exhaust Airflow

Procedure: Method #1

After downflow calibration is complete, remove the work surface, stainless steel drip cover, and the mesh screen with the elastic band in the exhaust plenum (leave the black prefilters in place). Then place a direct inflow-measuring device (with the hood removed) upside down over the opening to the exhaust impeller. Seal the opening around the base of the DIM with duct tape. The volume of airflow (in local density mode) should be set at 450  $\pm$  50 CFM for (NU-619-300), 475  $\pm$  50 CFM for (NU-619-400) and 500  $\pm$  50 CFM for (NU-619-500).

Alternate Method:

After downflow calibration is complete, remove the work surface, stainless steel drip cover, and the mesh screen with the elastic band in the exhaust plenum (leave the black prefilters in place). Then place an 18" x 18" x 12" cardboard box (with bottom removed) around opening. Add a hole at the center of the front of the box (6 inches from the bottom, 9 inches from the side). Create a fixture to hold a thermoanemometer probe, and take 11 readings across the opening starting 4 inches from inside of box, reading 1-inch apart, until probe end is 14 inches from inside edge of the box. Average the 11 readings, (compensate for the local air density), multiply the average by the area, (2.25 ft<sup>2</sup>) and then multiply by the conversion factor .68.

The volume of airflow should be set at 450  $\pm$  50 CFM for (NU-619-300), 475  $\pm$  50 CFM for (NU-619-400) and 500  $\pm$  50 CFM for (NU-619-500).

### 8.7 Filter Integrity Check

In order to check filter and seal integrity, the HEPA filter media and seals must be directly accessible. Remove supply diffuser and exhaust protective screen to access the filters. P.A.O. upstream concentration ports are available on both the top and bottom filter housings if needed.

**Table 10**

#### Recommended Measurement Method for Downflow Calibration

##### A. Downflow Airflow Velocity Measurement

- a. Instruments: TSI 8355 Thermoanemometer
- b. Procedure:  
Air velocity readings are taken on a 6 inch (152mm) x 12 inch (305mm) grid, in a parallel plane 2 inches (51mm) from the supply diffuser surface. No reading should be taken closer than 6 inches (152mm) from the edge of the supply diffuser.

- c. Test Data NU-619-300 Inches (mm) measurements taken from the edge of the supply diffuser:

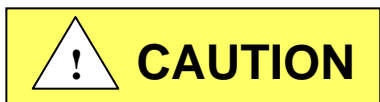
|               | 6.0<br>(152) | 11.000<br>(279) | 16.000<br>(406) | 21.000<br>(533) | 26.000<br>(660) | 31.000<br>(787) | 36.000<br>(914) |
|---------------|--------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 6.0<br>(152)  |              |                 |                 |                 |                 |                 |                 |
| 18.0<br>(457) |              |                 |                 |                 |                 |                 |                 |

Test Data NU-619-400/500 Inches (mm) measurements taken from the edge of the supply diffuser:

|               | 6.0<br>(152) | 11.750<br>(298) | 17.500<br>(445) | 23.250<br>(591) | 29.000<br>(737) | 34.750<br>(883) | 40.500<br>(1029) | 46.250<br>(1175) | 52.000<br>(1321) |
|---------------|--------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|
| 6.0<br>(152)  |              |                 |                 |                 |                 |                 |                  |                  |                  |
| 18.0<br>(457) |              |                 |                 |                 |                 |                 |                  |                  |                  |

|                     |  |
|---------------------|--|
| Number of Readings: | Average Velocity:                      ft./min.(m/s) |
|---------------------|--|

- d. Acceptance Criteria: Average Velocity = **70 to 80 fpm (.36 to .41 m/s)**



**Failure to calibrate airflow to the specified requirements may result in unsafe conditions of performance (i.e. product and/or personnel protection, noise and vibration)**

## 9.0 Polycarbonate Material Compatibility

### 9.1 Polycarbonate sheet is resistant at 70° to these chemicals.

|                        |                         |                        |
|------------------------|-------------------------|------------------------|
| Amyl alcohol           | Heptane                 | Potassium nitrate      |
| Aluminum chloride      | Hydrochloric acid (10%) | Potassium perchlorate  |
| Aluminum sulphate      | Hydrogen peroxide (30%) | Potassium permanganate |
| Ammonium chloride      | Hydrofluoric acid (10%) | Potassium persulphate  |
| Ammonium nitrate       | Isopropyl alcohol (70%) | Potassium sulphate     |
| Ammonium sulphate      | Lactic acid (20%)       | Silicone oil           |
| Antimony trichloride   | Magnesium chloride      | Silver nitrate         |
| Arsenic acid           | Magnesium sulphate      | Sodium bicarbonate     |
| Butyl alcohol          | Maganese sulphate       | Sodium bisulphate      |
| Calcium nitrate        | Mercuric chloride       | Sodium carbonate       |
| Chlorinated Lime Paste | Nickel sulphate         | Sodium chloride        |
| Chrome alum            | Nitric acid (10%)       | Sodium hypochlorite    |
| Chromic acid (20%)     | Nitric acid (20%)       | Sodium sulphate        |
| Citric acid (40%)      | Oleic acid              | Stannous chloride      |
| Copper chloride        | Oxalic acid             | Sulfur                 |
| Copper sulphate        | Pentane                 | Sulfuric acid (>10%)   |
| Formic acid (10%)      | Phosphoric acid (10%)   | Sulfuric acid (50%)    |
| Formalin (30%)         | Potassium bromate       | Tartaric acid (30%)    |
| Glycerine              | Potassium bromide       | Zinc chloride          |
|                        |                         | Zinc sulphate          |

### 9.2 Polycarbonate sheet is not resistant to these chemicals.

|                              |                                  |                              |
|------------------------------|----------------------------------|------------------------------|
| Acetaldehyde                 | Chloroform                       | Methyl alcohol               |
| Acetic acid (conc.)          | Chlorothene                      | Methylene chloride           |
| Acetone                      | Chlorobenzene                    | Nitrobenzene                 |
| Acrylonitrile                | Cresol                           | Nurocellulose lacquer        |
| Ammonia                      | Cutting oils                     | Ozone                        |
| Ammonium fluoride            | Cyclo hexanone                   | Phenol                       |
| Ammonium hydroxide           | Cyclohexene                      | Phosphorous hydroxy chloride |
| Ammonium sulfide             | Dimethyl formamide               | Phosphorous trichloride      |
| Benzene                      | Dioxane                          | Propionic acid               |
| Benzoic acid                 | Ethane tetrachloride             | Pyridine                     |
| Benzyl alcohol               | Ethylamine                       | Sodium sulfide               |
| Brake fluid                  | Ethylene dichloride              | Sodium hydroxide             |
| Bromobenzene                 | Ethyl ether                      | Sodium nitrate               |
| Butylic acid                 | Ethylene chlorohydrin            | Sylfuristic acid (1%)        |
| Carbon tetrachloride         | Formic acid (conc.)              | Tetrahydronaphthalene        |
| Carbon disulfide             | Freon (refrigerant & propellant) | Thiophene                    |
| Carbolic acid                | Gasoline                         | Toluene                      |
| Caustic potash solution (5%) | Lacquer thinner                  | Turpentine                   |
| Caustic soda solution (5%)   |                                  | Xylene                       |

## 10.0 Error Indicators & Troubleshooting

Error indicators occur for a variety of reasons. Whenever an error indicator is presented, minihelic gauge not reading, or light doesn't come on, please perform the following:

Step 1: NOTE ALL ERROR INDICATORS.

When the station is running, note all functions that are in error.

Step 2: VERIFY ERROR INDICATOR.

Error indicators can be verified by turning the errored function on/off.

Step 3: MONITOR RE-OCCURRENCE OF ERROR INDICATORS.

If re-occurrence of the error indicator is immediate or daily, use guide below to correct the situation.

### Error Indicator Troubleshooting Guide

| Error Indicator                              | Indicator                                | Correction   |
|--|--|--|
| Station fluorescent lights won't turn on.    |  | <ul style="list-style-type: none"> <li>Check fuse on front of control board.</li> <li>Check fluorescent lamps.</li> <li>Check voltage to light ballast's.</li> <li>Check ballast.</li> <li>Check light switch.</li> </ul>                            |
| Station blowers won't turn on.               |  | <ul style="list-style-type: none"> <li>Check fuse on control board.</li> <li>Check voltage to blower.</li> <li>At motor voltage regulator.</li> <li>Check wiring to blower.</li> <li>Check blower capacitor.</li> <li>Check blower motor.</li> </ul> |
| Station outlets won't turn on.               | Make sure blower key is turned on.       | <ul style="list-style-type: none"> <li>Check fuse on control board.</li> <li>Check voltage to outlets.</li> </ul>  |
| Blower/Lights/Outlet fuses continue to blow. |  | <ul style="list-style-type: none"> <li>Check for short on main control board.</li> <li>Isolate output of circuit by disconnecting control center connectors, light circuit, AC or DC motor voltage, etc. to isolate the short.</li> </ul>            |
| Minihelic Gauges                             | Minihelic gauge reads "NO" or "LOW FLOW" | <ul style="list-style-type: none"> <li>Check minihelic gauge operation.</li> <li>Check for pinched tubing in control center.</li> <li>Make sure airflow is not too low.</li> </ul>   |
| Hydraulic Lift                               | Lift system does not function properly   | <ul style="list-style-type: none"> <li>Call NuAire Service to resolve. (1-800-328-3352)</li> </ul>   |

## 11.0 Electrical/Environmental Requirements

### 11.1 Electrical: (Supply voltage fluctuations not to exceed +/-10%)

|             |               |       |         |         |
|-------------|---------------|-------|---------|---------|
| *NU-619-300 | 115 ± 10% VAC | 60 Hz | 1 Phase | 10 Amps |
| *NU-619-400 | 115 ± 10% VAC | 60 Hz | 1 Phase | 10 Amps |
| *NU-619-500 | 115 ± 10% VAC | 60 Hz | 1 Phase | 10 Amps |

\*UL Listed

### 11.2 Operational Performance - Indoor Use Only

|                                |                               |
|--------------------------------|-------------------------------|
| Environment Temperature Range: | 60°F - 90°F (15.6°C - 32.2°C) |
| Environment Humidity:          | 20% - 60% Relative Humidity   |
| Environment Altitude:          | (2000 Meters) Maximum         |

### 11.3 Light Exposure

Standard Fluorescent Lighting @ 150 ft. candles (1614 LUX) maximum intensity.

### 11.4 Installation Category: II

Installation category (overvoltage category) defines the level of transient overvoltage which the instrument is designed to withstand safely. It depends on the nature of the electricity supply and its overvoltage protection means. For example, in CAT II, which is the category used for instruments in installations supplied from a supply comparable to public means, such as hospital and research laboratories and most industrial laboratories, the expected transient overvoltage is 2500 V for a 230V supply and 1500 V for a 120 V supply.

### 11.5 Pollution Degree: 2.0

Pollution degree describes the amount of conductive pollution present in the operating environment. Pollution degree 2 assumes that normally only non-conductive pollution such as dust occurs with the exception of occasional conductivity caused by condensation.

### 11.6 Chemical Exposure

Chemical exposure should be limited to antibacterial materials used for cleaning and disinfecting. **CHLORINATED AND HALOGEN MATERIALS ARE NOT RECOMMENDED FOR USE ON STAINLESS STEEL SURFACES.** Chamber decontamination can be accomplished by paraformaldehyde, vapor phased Hydrogen Peroxide or Ethylene Oxide without degradation of cabinet materials.

### 11.7 EMC Performance (classified for light industrial)

Emission: EN61326


Immunity: EN61326



Class A equipment is intended for use in an industrial environment. In the documentation for the user, a statement shall be included drawing attention to the fact that there may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted as well as radiated disturbances.

## 12.0 Disposal and Recycle

Cabinets that are no longer in use and are ready for disposal contain reusable materials. ALL components with the exception of the HEPA filters may be disposed and/or recycled after they are known to be properly disinfected.

 **NOTE:** Follow all local, state and federal guidelines for disposal of HEPA filter solid waste.



**BIOHAZARD**



**Prior to any disassembly for disposal, the cabinet must be decontaminated.**



**RECYCLE**



**LEAD FREE**

| Component               | Material                  |
|-------------------------|---------------------------|
| Main Cabinet            | Painted Steel             |
| Plenum                  | Stainless Steel           |
| Worksurface             | Stainless Steel           |
| View Screen             | Polycarbonate             |
| Window Frame            | HDPE                      |
| Supply Diffuser         | Aluminum                  |
| Exhaust Diffuser        | Aluminum                  |
| HEPA Filter Frames      | Painted Steel             |
| Impeller                | Aluminum                  |
| Motor                   | Various Steel/Copper      |
| Printed Wiring Assembly | Lead Free Electronic      |
| Wire                    | PVC Coated Copper         |
| Ballasts                | Various Steel, Electronic |
| Connectors              | Nylon                     |
| Hardware                | Stainless Steel and Steel |

 **Note:** Material type can be verified with use of a magnet with stainless and aluminum being non-magnetic.



## Cage Changing Station PM Checklist

### Prefilters - Check Daily

- Check supply prefilter
  - Check exhaust mesh prefilter
  - Check exhaust prefilter
- \* Clean (black washable foam) or replace (white disposable) if necessary

### Worksurface - Yearly\As Needed

- Clean the work surface top
  - Clean under the work surface
  - Check for rubber feet on worksurface and prop rods
- \* Replace if missing
- Check tightness of acorn nuts on prop rod supports
- \* Tighten and replace if necessary

### Windows - Yearly\As Needed

- Check acorn nuts holding window hinge
  - Check window clips and make sure they hold the window up
- \* Tighten and replace if necessary
- Clean the View Screen Window, both sides

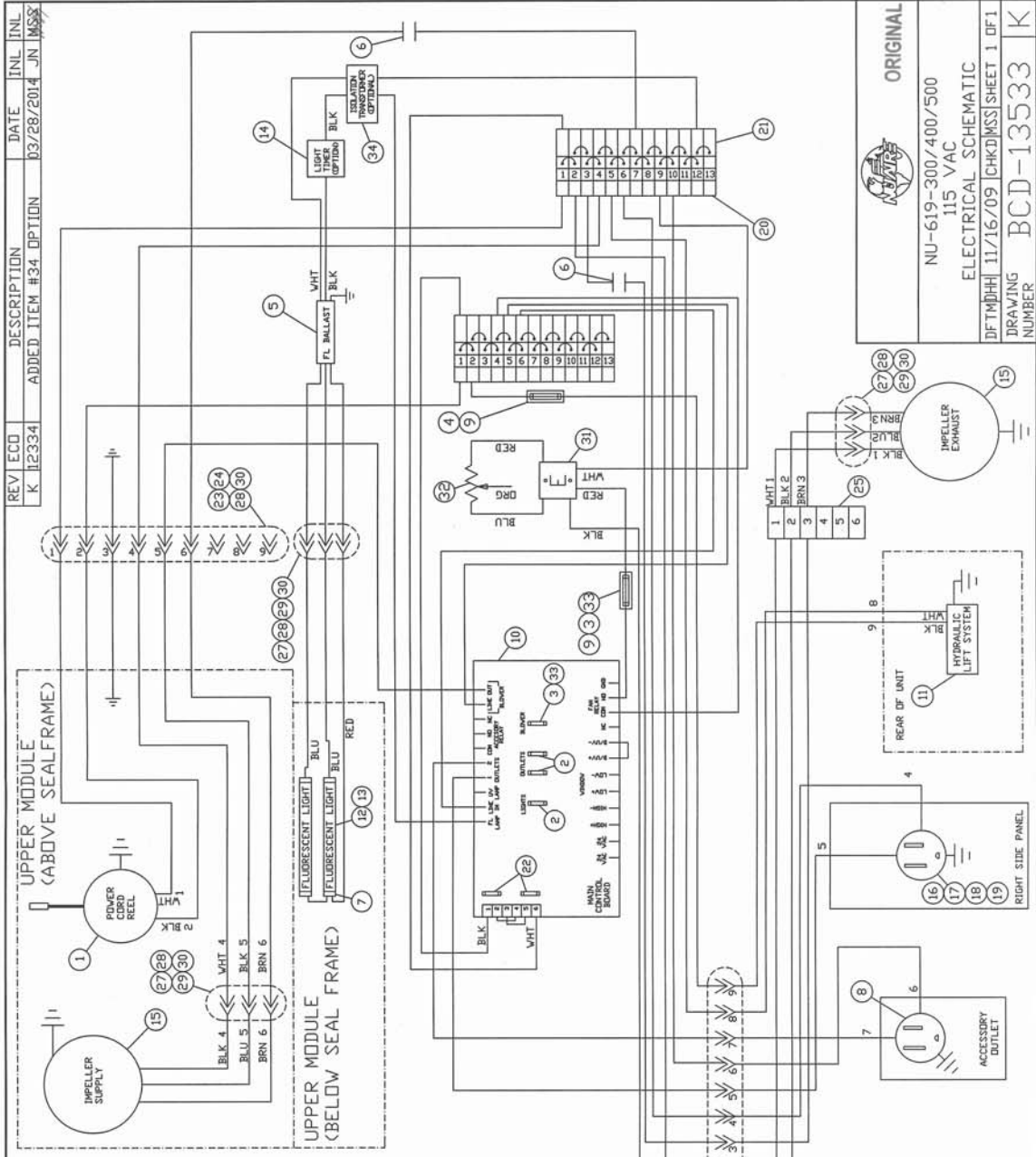
### Diffuser Screen - Yearly\As Needed

- Check thumbscrews
- \* Tighten and replace if necessary

### Other - Yearly\As Needed

- Check castors
- \* Tighten if necessary
- Check cord reel and cord for signs of wear
- \* Replace if necessary
- Check thumbscrews holding feed hopper (Optional)
  - Check tightness of push\pull bars
  - Run the autolift up and down to ensure proper function
  - Check that the fluorescent light bulbs are working correctly
  - Check all the switches and indicators for correct operation

| ITEM ID | DESCRIPTION  | QUANTITY | P/N   |
|---------|--|----------|---|
| 1       | POWER CORD REEL  | 1        | X-985023-04   |
| 2       | FUSE (1 AMP) (5 X 20mm) (LIGHTS)   | 1        | X-999039-13   |
| 3       | FUSE (3 AMP (1/4 X 1-1/4) (BLOWER) (4 & 5 FT))   | 0-2      | X-999311-04   |
| 4       | FUSE (2 AMPS (LIFT))   | 1        | X-999039-14   |
| 5       | BALLAST FLOURESCENT  | 1        | X-999184-05   |
| 6       | CAPACITOR (20MFD)  | 2        | X-999132-22   |
| 7       | LAMPHOLDER FIXED BASE  | 1        | X-999163-02   |
| 8       | ACCESSORY OUTLET   | 1        | X-999512  |
| 9       | FUSE HOLDER  | 2        | X-999316-01   |
| 10      | GENERAL AIRFLOW CONTROL BOARD  | 1        | A-437-8374-G  |
| 11      | HYDRAULIC LIFT (115V)  | 1        | X-980094-17   |
| 12      | 0-2 FL LAMP 36" 25W (4 & 5 FT)   | 0-2      | X-999428-02   |
| 13      | 0-2 DUPLEX FL LAMP 24" 17W (3 FT)  | 0-1      | X-999428-01   |
| 14      | DIGITAL LIGHT TIMER  | 2        | X-999148-13   |
| 15      | ASSY IMPELLER & HARNESS R4E310   | 1        | X-999330  |
| 16      | 0-1 DUPLEX OUTLET GFI  | 0-1      | X-999031-01   |
| 17      | 0-1 DUPLEX COVER GFI   | 0-1      | X-999511  |
| 18      | 0-1 OUTLET COVER   | 0-1      | X-999031-02   |
| 19      | 0-1 JUMPER, TERMINAL BLOCK   | 0-1      | X-999920-01   |
| 20      | TERMINAL BLOCK ASSY CONTAINING:<br>END, NO PLACE, TERMINAL BLOCK<br>END, 4 PLACE, TERMINAL BLOCK<br>TERMINAL BLOCK 2 PLACE NON-END<br>TERMINAL BLOCK 4 PLACE NON-END | 1        | A-425-4099-02<br>X-999921-01<br>X-999921-03<br>X-999919-01<br>X-999919-02 |
| 21      | FUSE, 25 AMP, 5 X 20mm   | 2        | X-999039-01   |
| 22      | 9 PIN CONNECTOR PLUG   | 2        | X-999235-02   |
| 23      | 9 PIN CONNECTOR RECEPTACLE   | 2        | X-999234-02   |
| 24      | BULKHEAD CONNECTOR 6 PIN   | 1        | A-425-3654-01   |
| 25      | 3 PIN CONNECTOR RECEPTACLE   | 18       | X-999236  |
| 26      | 16 PIN CONTACT   | 16       | X-999244-01   |
| 27      | 3 PIN CONNECTOR PLUG   | 3        | X-999237  |
| 28      | SOCKET CONTACT   | 18       | X-999244-02   |
| 29      | MOTOR SPEED CONTROL  | 1        | A-999904-03-B   |
| 30      | POTENTIOMETER 500K DHMS  | 1        | X-999533-03   |
| 31      | 0-2 FUSE 5 AMP (1/4 X 1-1/4) (BLOWER) (3 FT)   | 0-2      | X-999311-01   |
| 32      | ISOLATION TRANSFORMER  | 1        | X-999749-12   |

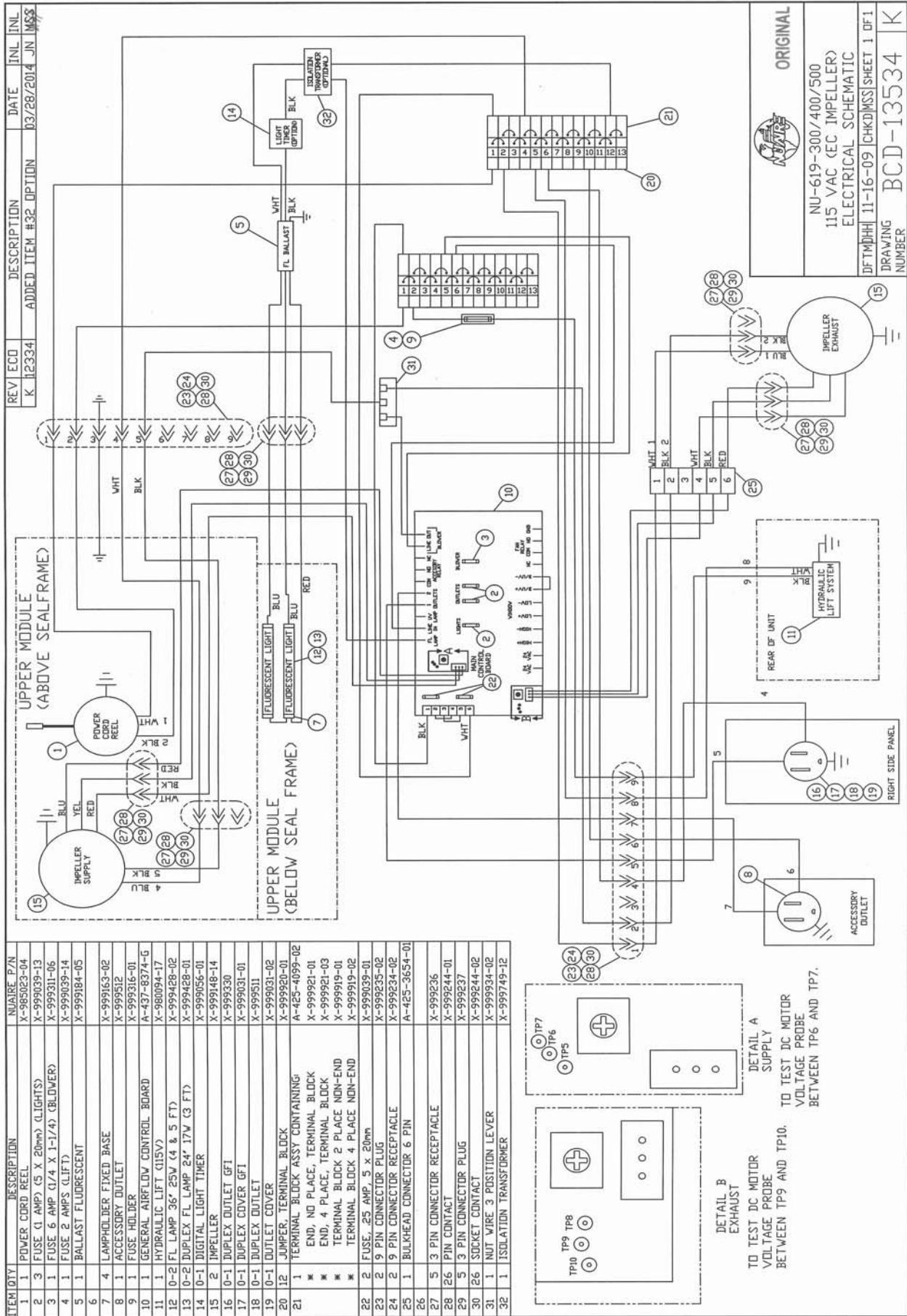


| REV | ECO   | DESCRIPTION           | DATE       | INL | INL |
|-----|-------|-----------------------|------------|-----|-----|
| K   | 12334 | ADDED ITEM #34 OPTION | 03/28/2014 | JN  | MSS |

ORIGINAL

NU-619-300/400/500  
115 VAC  
ELECTRICAL SCHEMATIC

DFTM/DHH 11/16/09 [CHKD/MSS] SHEET 1 OF 1  
DRAWING NUMBER BCD-13533 K



| REV | ECO   | DESCRIPTION           | DATE       | INL | INL |
|-----|-------|-----------------------|------------|-----|-----|
| K   | 12334 | ADDED ITEM #32 OPTION | 03/28/2014 | JN  | MSS |

**ORIGINAL**

NU-619-300/400/500  
115 VAC (EC IMPELLER)  
ELECTRICAL SCHEMATIC

DFTM/DHH 11-16-09 [CHKD/MSS] SHEET 1 OF 1  
DRAWING NUMBER **BCD-13534** K

| ITEMITY | DESCRIPTION  | QUANTITY | P/N  |
|---------|--|----------|--|
| 1       | POWER CORD REEL  | 1        | X-985023-04  |
| 2       | FUSE (1 AMP (5 X 20mm)) (LIGHTS)   | 3        | X-999039-13  |
| 3       | FUSE 6 AMP (1/4 X 1-1/4) (BLOWER)  | 1        | X-999031-06  |
| 4       | FUSE 2 AMPS (LIFT)   | 1        | X-999039-14  |
| 5       | BALLAST FLUORESCENT  | 1        | X-999184-05  |
| 6       | LAMPHOLDER FIXED BASE  | 1        | X-999163-02  |
| 7       | ACCESSORY OUTLET   | 1        | X-999512   |
| 8       | FUSE HOLDER  | 1        | X-999516-01  |
| 9       | GENERAL AIRFLOW CONTROL BOARD  | 1        | A-437-8374-G   |
| 10      | HYDRAULIC LIFT (L15V)  | 1        | X-980094-17  |
| 11      | HYDRAULIC LIFT (L15V)  | 1        | X-999428-02  |
| 12      | 0-2 FL LAMP 36" 25W (4 & 5 FT)   | 2        | X-999428-01  |
| 13      | 0-2 DUPLEX FL LAMP 24" 17W (3 FT)  | 2        | X-999056-01  |
| 14      | 0-1 DIGITAL LIGHT TIMER  | 1        | X-999148-14  |
| 15      | IMPELLER   | 1        | X-999330   |
| 16      | 0-1 DUPLEX OUTLET GF1  | 1        | X-999330   |
| 17      | 0-1 DUPLEX COVER GF1   | 1        | X-999031-01  |
| 18      | 0-1 DUPLEX OUTLET  | 1        | X-999511   |
| 19      | 0-1 OUTLET COVER   | 1        | X-999511   |
| 20      | 12 JUMPER, TERMINAL BLOCK  | 1        | X-999031-02  |
| 21      | TERMINAL BLOCK ASSY CONTAINING:<br>END, NO PLACE, TERMINAL BLOCK<br>END, 4 PLACE, TERMINAL BLOCK<br>TERMINAL BLOCK 2 PLACE NON-END<br>TERMINAL BLOCK 4 PLACE NON-END | 1        | X-999920-01<br>A-425-4099-02<br>X-999921-01<br>X-999921-03<br>X-999919-01<br>X-999919-02 |
| 22      | FUSE, .25 AMP, 5 X 20mm  | 2        | X-999039-01  |
| 23      | 2 9 PIN CONNECTOR PLUG   | 2        | X-999235-02  |
| 24      | 2 9 PIN CONNECTOR RECEPTACLE   | 2        | X-999234-02  |
| 25      | BULKHEAD CONNECTOR 6 PIN   | 1        | A-425-3654-01  |
| 26      | 5 3 PIN CONNECTOR RECEPTACLE   | 5        | X-999236   |
| 27      | 26 PIN CONTACT   | 2        | X-999244-01  |
| 28      | 5 3 PIN CONNECTOR PLUG   | 5        | X-999237   |
| 29      | 5 3 PIN CONNECTOR PLUG   | 5        | X-999237   |
| 30      | SOCKET CONTACT   | 2        | X-999244-02  |
| 31      | 1 NUT WIRE 3 POSITION LEVER  | 1        | X-999934-02  |
| 32      | 1 ISULATION TRANSFORMER  | 1        | X-999749-12  |

