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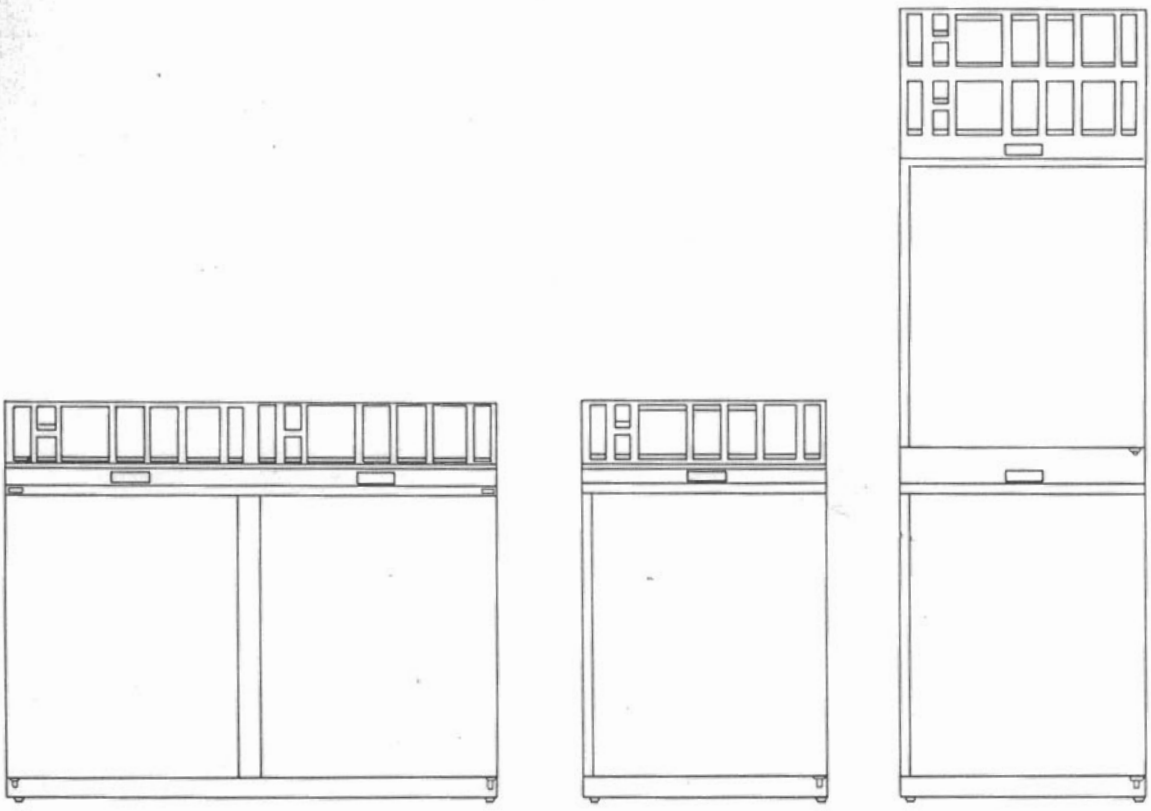
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OPERATION & MAINTENANCE MANUAL

MODELS NU-1000, 1100, 1200



CO_2 WATER-JACKETED INCUBATORS

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WATER-JACKETED

GP AUTOFLOW INCUBATOR

MODELS NU-1000, 1100, 1200
NU-1000E,1100E,1200E

OPERATION AND MAINTENANCE MANUAL

REVISED
JULY, 1993

CSA LISTED

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WATER-JACKETED, GP AUTOFLOW INCUBATOR
OPERATION AND MAINTENANCE MANUAL

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WATER-JACKETED, GP AUTOFLOW INCUBATOR
MODELS NU-1000, 1100, 1200
NU-1000E,1100E,1200E
OPERATION AND MAINTENANCE MANUAL

1.0 GENERAL DESCRIPTION

The NuAire GP Autoflow water-jacketed incubator has been designed to provide a reliable controlled environment for optimum product growth. Four parameters contribute to optimum growth conditions. These are:

1. Humidity
2. Precise temperature control
3. Sterility
4. Reliability

Like all NuAire equipment, the GP Autoflow has been designed to provide the highest quality standards of performance with matching microprocessor technology and precise temperature control. Combining state-of-the-art technology with years of design, quality and manufacturing experience.

In order to accomplish the foregoing objectives, the GP Autoflow features the following:

1.1 Extra large (16-gallon) Water Jacket - Each Chamber

The outer stainless steel wall is lined with a space-age insulation providing an R5.0 rating, minimizing heat loss. The large (16-gallon) water jacket utilizes water, one of nature's best "sinks" of heat. Its high capacity to hold heat makes it the ideal medium to surround a chamber in order to obtain temperature uniformity. In fact, the ability of materials to hold heat, called the specific heat, uses water as the comparative standard. The large water jacket surrounding the chamber permits the water to circulate within the jacket, producing a temperature uniformity of $\pm$ 0.2°C. The larger the mass, the less susceptibility within the chamber to environmental fluctuations outside. It also establishes cabinet stability for the growth of vibration sensitive cells.

1.2 NuAire Incubator Control Electronics

The NuAire Incubator Control Electronics is a state-of-the-art microprocessor based control system specifically designed to service the precise control requirements of the chambers environment, providing optimum programmable conditions for culture growth. The functions include a main water-jacket monitor.

The main temperature control is proportional, which means that the energy supplied to the water is directly proportional to the difference between the water-jacket temperature and the setpoint. This prevents/minimizes temperature overshoot within the chamber and provides transient-free temperature control.

Over-temperature differential setpoint is preset at 1°C over main temperature setpoint. The rest of the functions (located on the board) provide a small integrated package that is easily replaced for minimum down time in the field.

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1.3 All Stainless Steel Construction

The GP Autoflow's exterior is constructed of 16 gauge, type 304 stainless steel with the interior being 16 gauge, type 304 polished stainless steel using crevice free construction. This provides an easily cleanable (for decontamination) inert surface that does not in itself promote biological growth. In addition, all shelves, shelf supports, and guide rails are easily removable and can be autoclaved to remove contamination. Remember: the chamber is not selective. The growth environment is applied to all micro-organisms within the interior, equally.

1.4 Humidity

Humidification of the chamber is achieved through the process of water evaporation from a water reservoir placed within the incubator. In addition, water condensation (which actually lowers the relative humidity within the chamber) is prevented by having all interior surfaces exposed to the constant temperature water jacket, or heated separately via an integrated control that regulates door heat to maintain a condensation-free glass door. Without condensation and with an easily cleanable stainless steel interior, the probability of contamination is minimized.

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2.0 PERFORMANCE PARAMETERS

2.1 The Autoflow's exterior is constructed of 16 gauge, type 304 stainless steel with the interior being 16 gauge, type 304 polished stainless steel, using crevice free construction. All exposed edges are deburred to insure that there are no sharp edges. The exterior is finished in a textured polyurethane finish, which is resistant to chemicals and easily cleaned using mild household detergents.

2.2 Each chamber's water-jacket holds 16 gallons (60.56 liters) of water, that in conjunction with the microprocessor control system provides an interior chamber temperature uniformity of $\pm 0.2^{\circ}C$ at $37.0^{\circ}C$.

2.3 The GP Autoflow's microprocessor temperature control system has two temperature sensors with their location being: one in the water-jacket and one in the chamber. The chamber temperature sensor compares the values to the setpoint and executes a time proportional control algorithm that energizes a solid-state switch, supplying power to the heater.

2.4 The outer door includes a radiant heater in order to minimize condensation on the inner glass door. A magnetic outer door gasket helps to insure a tight seal against the cabinet.

2.5 The inner glass door is 3/16" tempered with smooth-ground edges and seals air tight against a U-grooved silicone rubber gasket. The door latch is cam action. An all solid-state magnetic switch monitors door motion.

2.6 All electronic controls are modular plug in/plug out, easily removed through the front Service Control Center.

2.7 All control electronics are protected with circuit breaker that may trip at 110% of load rating, but will trip at 145% of load rating in less than 2 seconds. Should the circuit breaker open (pop-out button will appear), merely depress to reset.

2.8 A water fill access port is provided on the front of the GP Autoflow. A 1/4 inch NPT plated brass fill plug is removed and a 1/4-inch NPT to 3/8-inch hose adapter is provided.

2.9 The GP Autoflow has heavy-duty adjustable leveling legs to compensate for uneven laboratory surfaces.

2.10 The entire interior shelving assembly is easily removable for decontamination. The shelves are constructed from 18 gauge, type 304 polished stainless steel.

2.11 A through-wall access port is provided for operating electrical appliances such as roller apparatus, rockers, etc.

2.12 A water level sensor switch is provided to monitor the level of water within the jacket.

2.13 A water jacket drain is provided on the bottom of the unit for ease of maintenance.

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3.0 MODELS AND FEATURES

NuAire offers three configurations of the basic Model NU-1000/1000E water-jacketed GP Autoflow incubators. These are (1) Model NU-1000/1000E the basic single chamber unit, (2) Model NU-1100/1100E, a side-by-side unit and (3) Model NU-1200/1200E, two single chamber units vertically stacked over/under.

3.1 Dimensions

See also specification Drawings BCD-03295, BCD-03296 and BCD-03297.

Overall Dimensions Inches (mm):	Model NU-1000/1000E Single Unit	Model NU-1100/1100E Side-by-Side Unit	Model NU-1200/1200E Vertical Unit
Width	25.5 (647.7)	52 (1320.8)	25.5 (647.7)
Height	41.5 (1054.1)	41.5 (1054.1)	75.5 (1917.7)
Depth	27 (685.8)	27 (685.8)	27 (685.8)

* The side-by-side incubator is two independent chambers with individual controls. The doors open from the center.

3.2 Standard Features

- 100% Stainless Steel Construction
- Large Capacity Water-Jacket (16-Gallon) (60.56 Liters)
- Chamber Temperature Uniformity: 0.2°C at 37°C
- Temperature Sensitivity: ± 0.1°C

3.3 Standard Items Packed with Unit (per chamber*)

- (4) Stainless Steel Shelves*
- (8) Stainless Steel Shelf Brackets*
- (4) Stainless Steel Shelf Bracket Supports*
- (1) Full Size Water Pan with Supports*
- (1) Fill Port Fitting
- (1) Fill Port Plug*
- (1) 6 Feet (2m), Fill Tube
- (1) Electrical Cord 8 Foot (2.5m)
- (1) Operation and Maintenance Manual

3.4 Optional Features

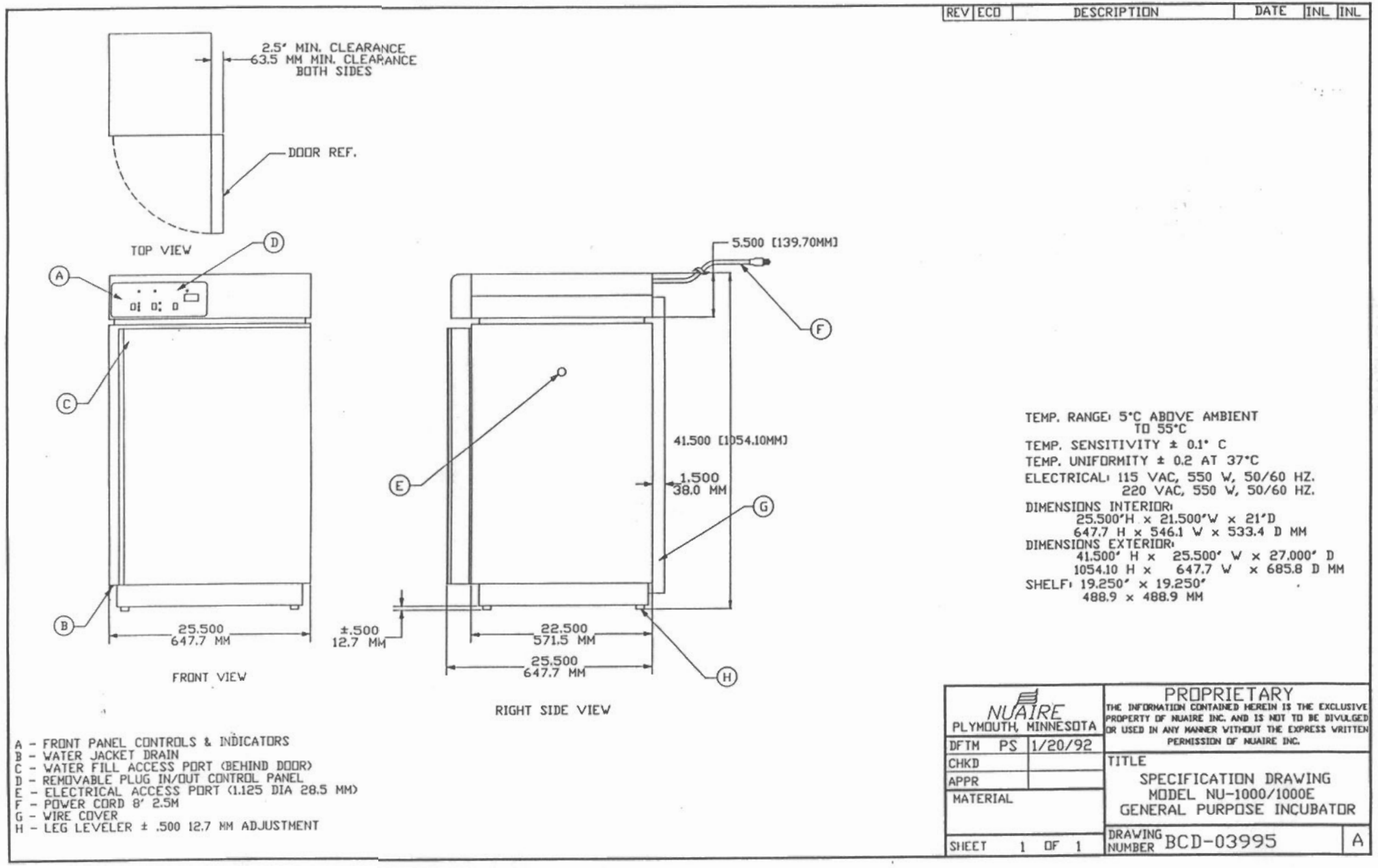
Part No.

Model No. I10 Left Hand Door Hinge
Model No. I11 Internal Coil for Chilled Water

3.5 Accessories

Part Number	
NU-1553	Stacking Rack (single unit)
NU-1554	Stacking Rack (dual unit, side/side)
NU-1555	Additional Stainless Steel Water Pan
NU-1557	Additional Shelves
NU-1566	Platform
NU-1571	Platform w/Casters
NU-1575	Moisture Proof Duplex Outlet (115 VAC)
NU-2568	Surge Protector (115 VAC)

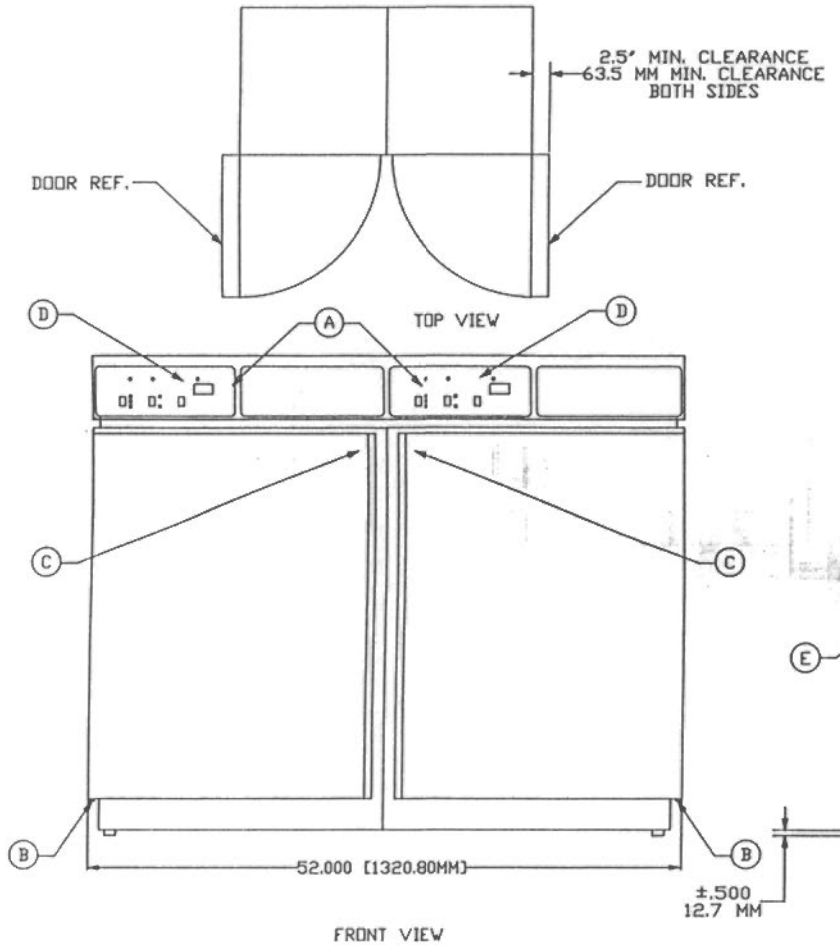
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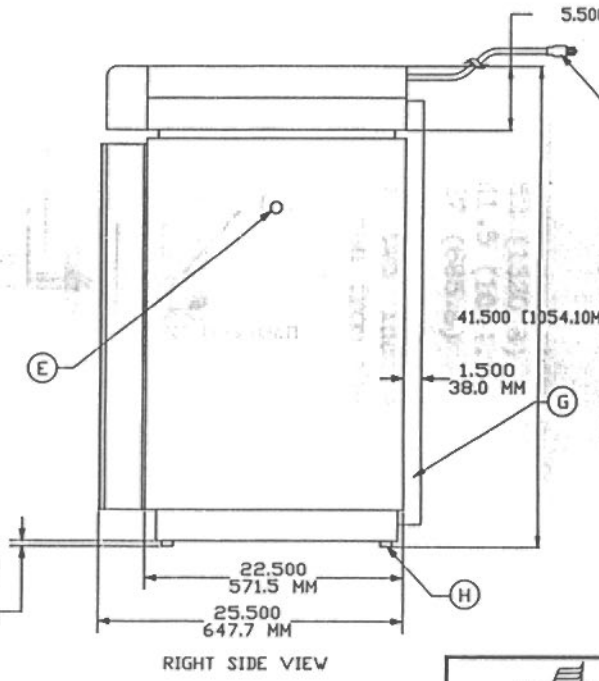


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REV	ECO	DESCRIPTION	DATE	INL	INL





±.500
12.7 MM

TEMP. RANGE: 5°C ABOVE AMBIENT TO 55°C
TEMP. SENSITIVITY ± 0.1° C
TEMP. UNIFORMITY ± 0.2 AT 37°C
ELECTRICAL: 115 VAC, 1100 W, 50/60 HZ.
220 VAC, 1100 W, 50/60 HZ.
DIMENSIONS INTERIOR: (EACH CHAMBER)
25.500"H x 21.500"W x 21"D
647.7 H x 546.1 W x 533.4 D MM
DIMENSIONS EXTERIOR:
41.500" H x 52.000" W x 27.000 D
1054.10 H x 1320.8 W x 685.8 D MM
SHELF: 19.250" x 19.250"
488.9 x 488.9 MM

A - FRONT PANEL CONTROLS & INDICATORS
B - WATER JACKET DRAIN
C - WATER FILL ACCESS PORT (BEHIND DOOR)
D - REMOVABLE PLUG IN/OUT CONTROL PANEL
E - ELECTRICAL ACCESS PORT (1.125 DIA. 28.5 MM)
F - POWER CORD 8' 2.5 M
G - WIRE COVER
H - LEG LEVELER ± .500 12.7 MM ADJUSTMENT

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SHEET 1 OF 1		

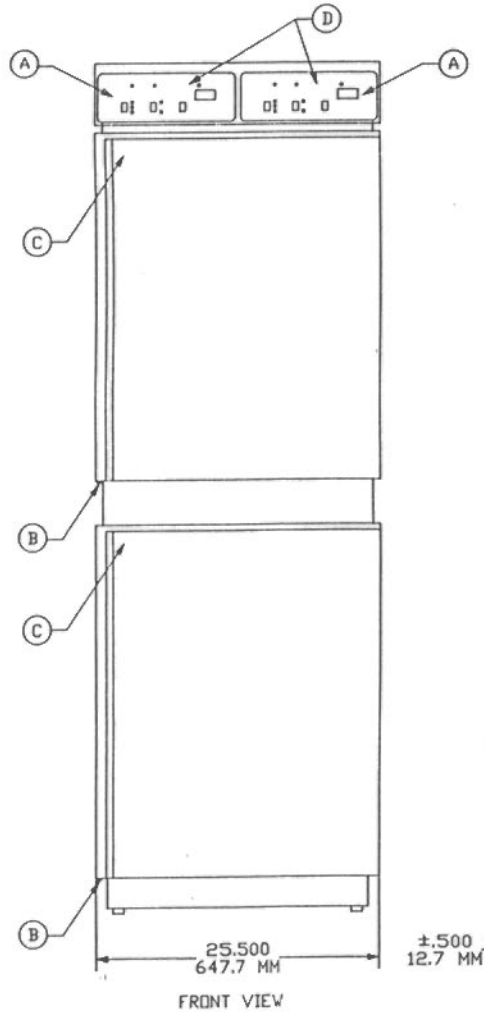
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TITLE
SPECIFICATION DRAWING
MODEL NU-1100/1100E
GENERAL PURPOSE INCUBATOR

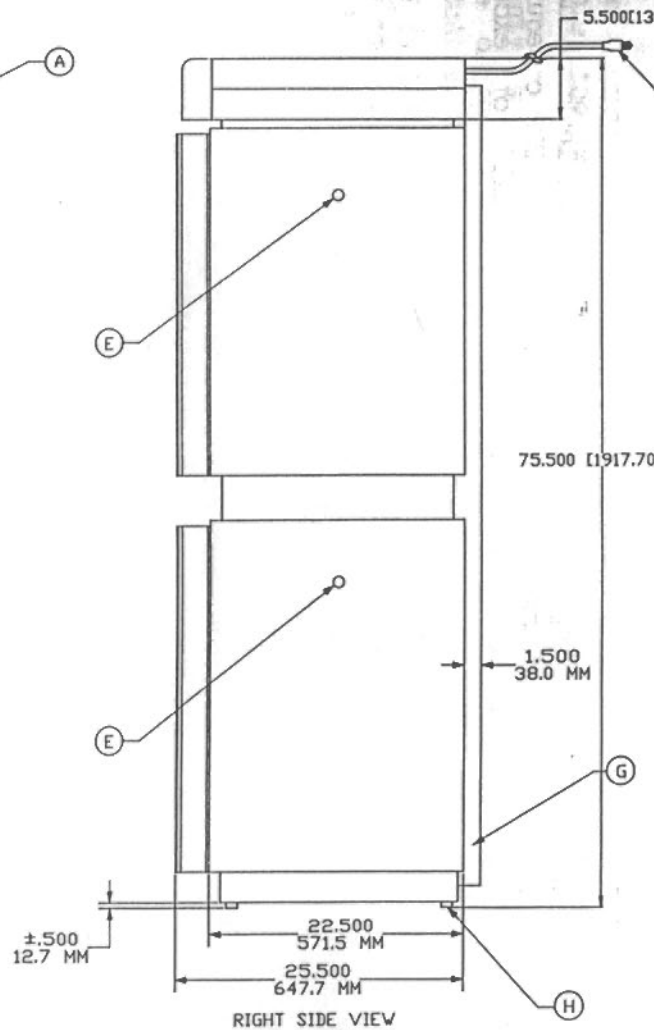
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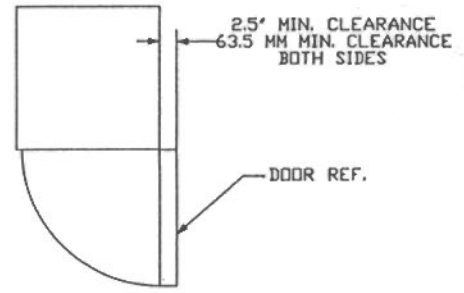
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FRONT VIEW



RIGHT SIDE VIEW



TOP VIEW

A - FRONT PANEL CONTROLS & INDICATORS
B - WATER JACKET DRAIN
C - WATER FILL ACCESS PORT (BEHIND DOOR)
D - REMOVABLE PLUG IN/OUT CONTROL PANEL
E - ELECTRICAL ACCESS PORT (1.125 DIA. 28.5 MM)
F - POWER CORD 8' 2.5 M
G - WIRE COVER
H - LEG LEVELER ± .500 12.7 MM ADJUSTMENT

TEMP. RANGE: 5°C ABOVE AMBIENT TO 55°C
TEMP. SENSITIVITY ± 0.1° C
TEMP. UNIFORMITY ± 0.2 AT 37°C
ELECTRICAL: 115 VAC, 1100 W, 50/60 HZ.
220 VAC, 1100 W, 50/60 HZ.
DIMENSIONS INTERIOR: (EACH CHAMBER)
25.500"H x 21.500"W x 21"D
647.7 H x 546.1 W x 533.4 D MM
DIMENSIONS EXTERIOR:
75.500" H x 25.500" W x 27.000" D
1917.7 H x 647.7 W x 685.8 D MM
SHELF: 19.250" x 19.250"
488.9 x 488.9 MM

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TITLE
SPECIFICATION DRAWING
MODEL NU-1200/1200E
GENERAL PURPOSE INCUBATOR

DRAWING NUMBER BCD-03997 A

4.0 TEST PERFORMANCE AND PROCEDURES

All equipment is thoroughly inspected at the NuAire factory at the time of shipment. Quality control is maintained by constant surveillance over the product, beginning at the receipt of purchased material and concluding with a final inspection which certifies the incubator's performance to the specifications. In all instances where product quality cannot be easily assessed on the end item, (i.e. water jacket leak tightness), the product is inspected during sub-assembly fabrication. The following test procedures are conducted on each cabinet and a copy of the test report is included with each unit.

4.1 Visual Inspection

4.1.1 Each incubator is visually inspected to insure that the interior is clean and free from scratches, nicks and burrs and that all welds both interior and exterior are ground and polished smooth.

4.1.2 Painted surfaces are inspected to be free of scratches, nicks, insufficient covering and runs.

4.1.3 The door opens/closes freely without binding of the hinges. The vinyl gasket seals the inner glass door tightly. The glass door is free of scratches.

4.2 Electrical Tests

4.2.1 Electrical Leakage Test 115 VAC electrical leakage shall not exceed 500 microamperes using a Simpson Model 229 or equivalent testor. 220 VAC electrical leakage shall not exceed 750 microamperes.

4.2.2 Dielectric Voltage - Withstand 1250 volts is applied between dead metal parts and the hot/neutral power source lead with no electrical breakdown using a Slaughter Model 101-2.5. 1500 volts is applied for 220 VAC units.

4.3 Functional Tests

The following tests are performed on every unit at the end of a continuous 48 hour burn in period.

4.3.1 Control Systems All diagnostic functions are exercised to insure proper operation of control systems, components and alarms.

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5.0 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 18 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. 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.

NuAire, Inc. warrants the water jacket and will repair or replace (FOB its factory or furnish without charge FOB its factory) the water jacket within five years after the date of sale, if proved to the satisfaction of the company to have been defective at the time it was sold.

This warranty shall not apply to any NuAire product or part thereof which has been subject to misuse, abuse, filling the water jacket improperly, using additives in water jacket, 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, Inc. 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.

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6.0 SHIPMENTS

NuAire takes every reasonable precaution to assure that your incubator 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 incubator to be sure that if damage has occurred, the proper claims and actions are taken immediately.

6.1 Damaged Shipments

6.1.1 Terms are factory, unless stated otherwise. Therefore, it is important to check each shipment before acceptance.

6.1.2 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.

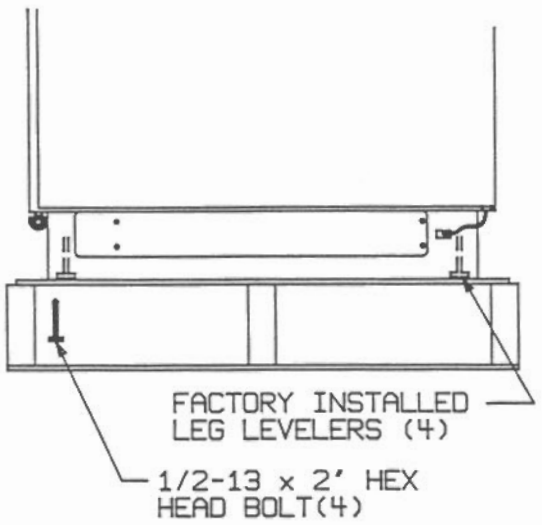
6.1.3 If concealed damage is found, it is absolutely necessary to NOTIFY THE FREIGHT AGENT AT ONCE, and request an inspection. Without this inspection, the transportation company may not accept a claim for loss or damage.

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.

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7.0 INSTALLATION

The GP Autoflow is fastened to a base skid and it is usually the best procedure to leave the skid attached until the autoflow is located in its approximate position, to facilitate ease in handling. The base skid can then be removed by removing the four bolts holding the cabinet to the skid. Examine the GP Autoflow carefully. Inspect both the exterior and the interior of the GP Autoflow for any transit damage before discarding the shipping crate, (see Section 6.1.3).

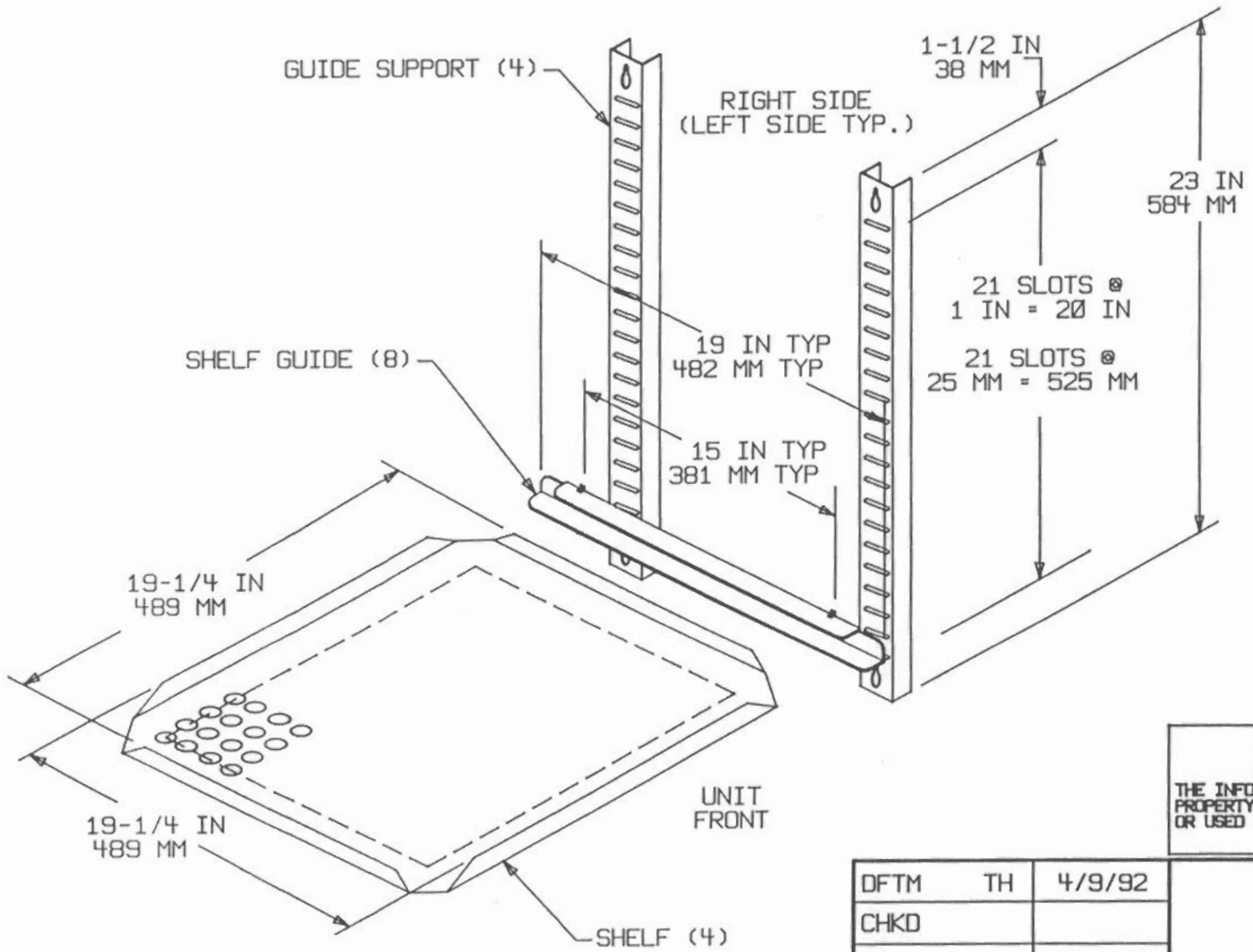


7.1 Location In locating the GP Autoflow, consider all possible conditions that might affect its performance as well as laboratory procedures for its intended purpose. Do not locate near heating or cooling ducts, or next to equipment that generates heat (steam radiators, stoves, ovens, autoclaves, etc.). Avoid direct sun rays and rapidly moving air currents. The GP Autoflow needs even heat loss on all surfaces in order to maintain an internal temperature variation of less than 0.2 degrees C. As a result, a minimum of 2 inches must be allowed between the rear and sides of the GP Autoflow and any walls, partitions or obstructions to facilitate adequate convection of air around the GP Autoflow's water jacket. For maintenance/service purposes the top cover containing the electronics should remain accessible.

7.2 Leveling The GP Autoflow should be leveled prior to filling with water, and should rest firmly on the bench or floor. Uneven water levels may cause false ADD WATER indications on the front panel as well as to affect the water circulation paths within the water jacket, which could cause condensation on the walls of the chamber. Leveling feet are provided for this purpose, factory installed into the base of the GP Autoflow. Turning the adjustable leveling feet counterclockwise raises the GP Autoflow. The leveling feet height should be approximately 1/4 inch below the GP Autoflow base.

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FOUR SQUARE STAINLESS STEEL SHELVES WITH REMOVABLE INTERIOR SHELF ASSEMBLY GREATLY SIMPLIFIES DECONTAMINATION PROCEDURES.

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NUAIRE
PLYMOUTH, MINNESOTA

MATERIAL

TITLE
SHELF INSTALLATION

APPLICABLE SERIES

DRAWING NUMBER ACD-04119

SCALE

SHEET 1 OF 1

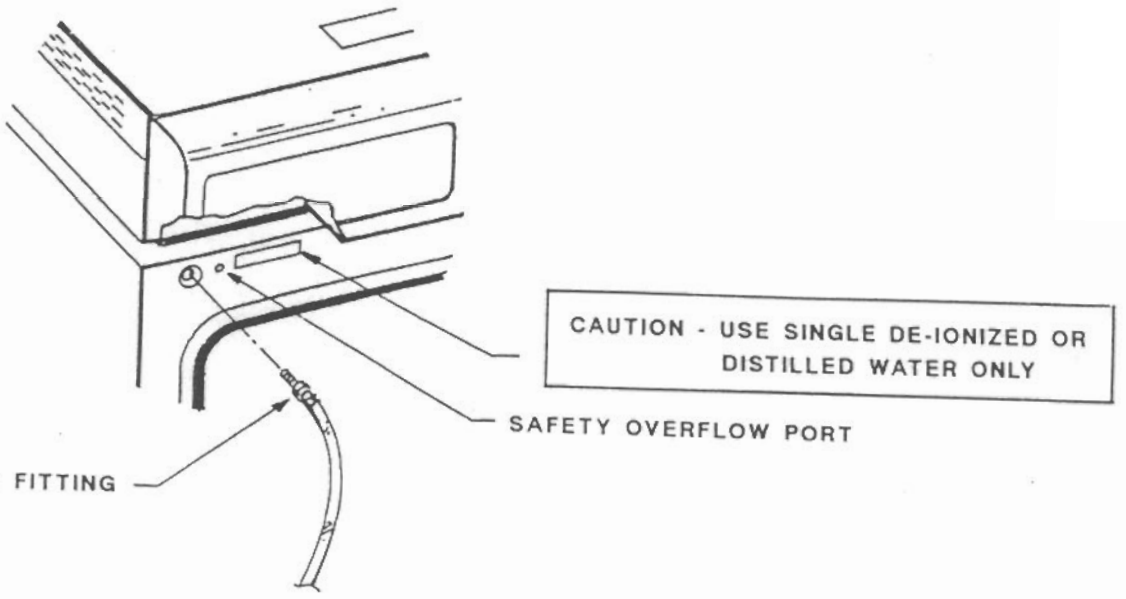
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7.3 Decontamination and Shelf Installation Before installation of the shelves, NuAire recommends decontamination of all surfaces within the interior chamber, glass door and outer door with gasket. The can be wiped down with a disinfectant of 70 percent alcohol or similar noncorrosive antimicrobial agent. Provided with each autoflow are four shelves. The shelves are easily installed per Drawing ACD-02177 by attaching the guide supports to the stainless steel pins in the interior of the chamber. Additional shelves and shelf guides are available.

7.4 Electrical The electrical supply circuit to the incubator must conform to all national and local electrical codes. Consult the incubator's serial-data plate for voltage, cycle, phase and ampere requirements before making connection. Plug the power cord securely into grounded outlet. VOLTAGE SHOULD NOT VARY MORE THAN 5% FROM SERIAL PLATE RATINGS. A separate branch circuit is recommended to prevent possible loss of product due to overloading or failure of other equipment on the same circuit. A SURGE PROTECTOR IS STRONGLY RECOMMENDED TO AVOID POWER RELATED FAULTS.

7.5 Precaution for GP Autoflow Filling To prepare the GP Autoflow for filling, turn on main power switch located on backpanel and set mode switch to PROGRAM. The digital indicator should light up as well as the ADD WATER light.

7.6 Filling and Draining the Water-Jacket The fill port plug is located on the front top left side behind the exterior door. Install the fill port fitting. Place the tubing over the adaptor and connect the other end to either a funnel or serrated tap. USE SINGLE DISTILLED OR DEMINERALIZED WATER to fill the water jacket. NO PURER THAN 5 MEGOHM WATER SHOULD BE USED. While the unit is on, fill the water jacket until the ADD WATER light turns off. Add an additional 1 to 2 liters of water, remove the tube adaptor and replace the fill port plug.



CAUTION
BE SURE TO POSITION AND LEVEL THE INCUBATOR GP AUTOFLOW
DO NOT OVERFILL

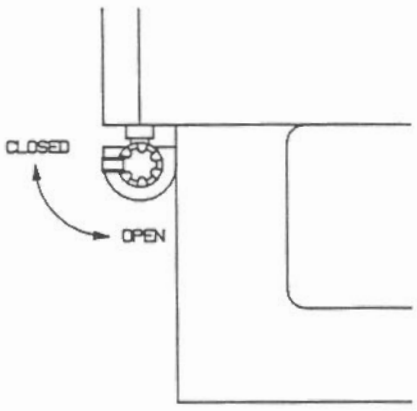
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The water jacket requires no anti-bacterial agents. The GP Autoflow already incorporates a copper tube producing copper sulfate which eliminates bacterial growth within the water jacket. ABSOLUTELY NO CHLORINATED OR HALOGEN MATERIALS ARE TO BE USED IN THE WATER JACKET.

A safety over-fill port is located next to the fill port plug so if overfill does occur, the water will be relieved through the port.

The water jacket can be drained from the drain plug located on the bottom left side. The drain uses a ball valve to control the drain water. If the valve stem is horizontal the drain is closed, and if it is vertical the drain is open. A safety plug must be removed prior to draining, located on the bottom of the ball valve. It also insures no leakage will occur.



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8.0 GP AUTOFLOW OPERATION

The GP Autoflow is designed to provide a sterile, constant temperature and high humidity controlled atmosphere for optimum product growth. To operate the GP Autoflow properly, the following parameters must be reviewed, carefully set and/or prepared.

8.1 Sterility The environment provided by the GP Autoflow is not selective. As a result, any contamination within the chamber is subjected to the same environment as the specimens. Therefore, before placing any cultures in the GP Autoflow, the shelves and shelf brackets should be sterilized. The interior side walls, (top, bottom, door, as well as the gasket) should be wiped clean with a 70% solution of isopropyl alcohol or other disinfectant to remove any contamination. Use mild detergent to clean exterior of GP Autoflow.

8.2 Humidity Humidification of the GP Autoflow is achieved through the process of water evaporation (vapor water pressure) from the stainless steel water pan placed on the bottom of the GP autoflow shelf rack. Materials of different thermal resistance (i.e., glass, plastic) do not offer sufficient thermal recovery and are not recommended for use. Although some metals offer better thermal coefficients than stainless steel, dissimilar metals cause electrolysis in the acid atmosphere (carbonic acid) and should NEVER be used or placed within the GP Autoflow's chamber.

Use only distilled or mineral-free water in the stainless steel pan. The water should be changed at least once a week, preferably more often. Flooding the bottom of the autoflow IS NOT RECOMMENDED, since it is difficult to change the water weekly and almost necessitates the use of chemicals which are not recommended and may damage the stainless steel. Also it promotes condensation on the GP Autoflow's inner walls because it steals the natural convection heat flow through the inner chamber and condensation points occur. ABSOLUTELY NO CHLORINATED OR HALOGEN MATERIALS ARE TO BE USED IN THE CHAMBER.

Humidity recovery will be back to 95% within 15-20 minutes after a 30-second door opening, with a water reservoir area of 361 square inches, (i.e., a NU-1555 full-sized pan). Contamination in the water pan may be avoided by adding a small amount of copper sulfate to the water pan after every decontamination of the chamber.

Condensation on the walls, top or bottom of the chamber, indicates an incorrect balance of door heat which should be calibrated to allow the main temperature control to heat the chamber, not the door heater.

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8.3 System Introduction

The NuAire Incubator Control Electronics system is designed to service the control requirements of the GP Autoflow incubator chamber. Temperature is controlled to provide optimum conditions for culture growth within a chamber. Operator input is coordinated through the control panel and status displays. Figure 1 shows the various inputs and outputs of the system.

The NuAire Incubator Control Electronics is a state-of-the-art microprocessor based system that provides:

8.3.1 Single chamber control in a single electronic package

8.3.2 Enhanced information presentation of the following:

* Chamber Temperature (setpoint and actual)
* Door Heater (percentage time on)
* Water-Jacket Heater Status
* Water Jacket Low Water Status

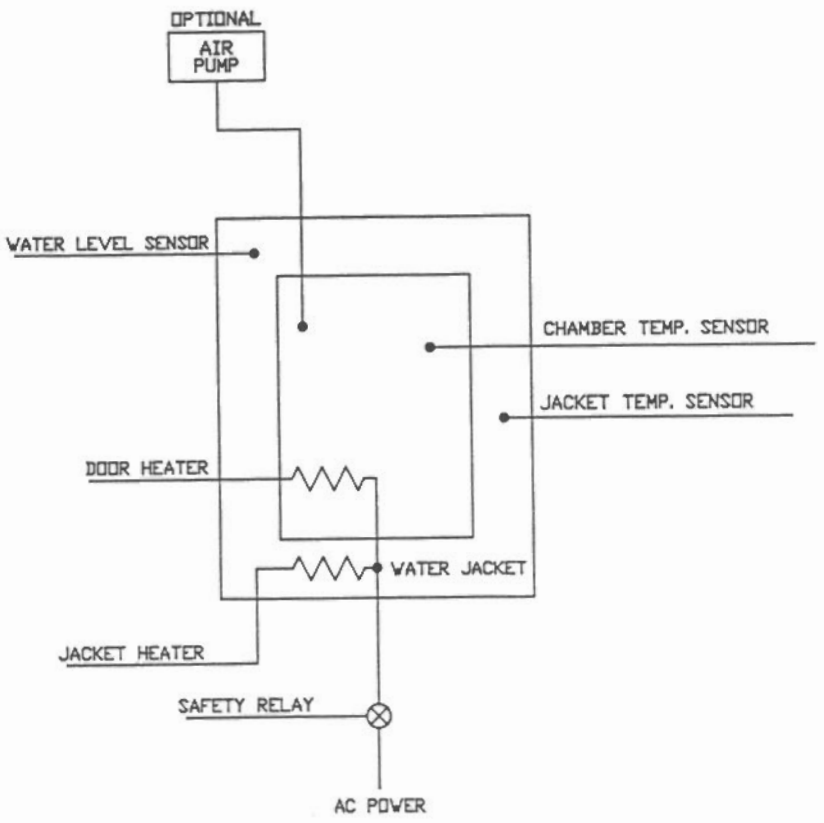
8.3.3 Simplified operator controls. The control panel is operated using three rocker switches as follows:

* Mode Switch - Run - run with alarm
  Program- Standby
  Silence - Run without alarm

* Chamber Environment Display - Temperature Display
  Door Temp

* Chamber Environment Control - Up
  Down

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GP AUTOFLOW CONTROL INPUT AND OUTPUTS

8.3.6 Automatic modification of abnormal situations. The red or yellow LEDs on the control panel will light to indicate a fault within the system. Such faults include:

* Control Failure (i.e., temperature exceeds setpoint tolerance)

8.3.7 Diagnostic and calibration assists. By adding an electrical jumper wire (supplied) on the PWB, the diagnostic mode is entered, which permits (should only be performed by a qualified technician):

* Individual analog inputs may be displayed to assist calibration.
* Individual outputs may be forced to an ON or OFF condition.
* Individual digital inputs may be displayed.
* Front panel lamps may be tested.
* Memory and internal processor diagnostics may be selected.
* All options may be individually tested.

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8.4 Front Panel Controls and Indicators

The GP Autoflow front panel contains the following functions described in detail (see Drawing BCD-03298).

8.4.1 Heat Jacket Status LED The heat jacket green LED indicates when the chamber heater is turned on.

8.4.2 LOW WATER STATUS LED The low water yellow LED indicates when the water-jacket requires additional water. If the low water light is lit, the water-jacket should be filled as soon as possible to avoid uneven heating of the chamber.

8.4.3 Mode Switch The mode switch indicates the running mode of the incubator "RUN" mode indicates a fully functional condition. If an alarm condition occurs (i.e. over temperature) an audible noise alarm will sound and control the condition. "PROGRAM" mode indicates all functions are turned off and ready to input setpoints for temperature and door temperature. "SILENCE" mode indicates a fully functional condition; if an alarm condition occurs, no audible noise alarm will sound, but the condition will be controlled.

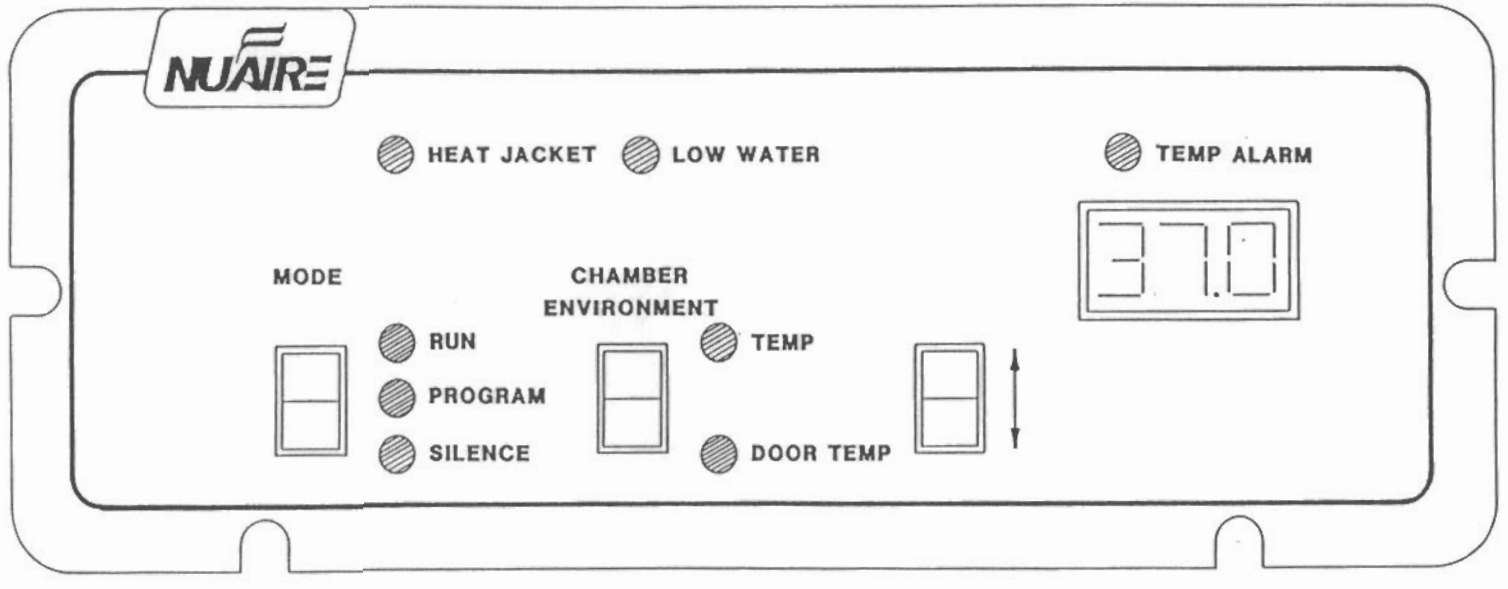
8.4.4 Chamber Environment Switch The chamber environment switch indicates what the digital display is showing. Temperature or door temp are the two variables.

8.4.5 Adjustment Switch The adjustment switch changes the set-points of both temperature and recovery time in program mode.

8.4.6 Temp Alarm Indicating Light The temp alarm red LED indicates when the temperature exceeds 1°C above setpoint and the safety relay interrupts power to the chamber heater.

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REV	ECO	DESCRIPTION	DATE	INL



DFTM : TH	5/23/90	NUAIRE PLYMOUTH, MINNESOTA
CHKD		
APPR		
MATERIAL		TITLE: LABEL, NU-1000 INCUBATOR GENERAL PURPOSE
APPLICABLE SERIES		DRAWING NUMBER: BCD-03298
		SCALE / SHEET 1 OF 1

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8.5 Rear Panel Arrangement

The GP Autoflow rear control panel contains the following functions described in detail (see drawing BCD-03299).

8.5.1 Power Cord The power cord is 8 ft. (2 m) in length, Type "SVT" molded plug, allowing for long life and easy cleanability.

8.5.2 Circuit Breaker All control electronics are protected with a circuit breaker that may trip at 110% of load rating, but will trip at 145% of load rating in less than 2 seconds. Should the circuit breaker open (pop-out button will appear), merely depress to reset.

8.5.3 Power Switch The power switch, located at the right of the rear panel, controls all power to the incubator.

8.5.4 Air Inlet The air inlet is available for specific applications requiring a continuous supply of oxygen. The air inlet would be connected to an external air pump to provide the necessary continuous air supply.

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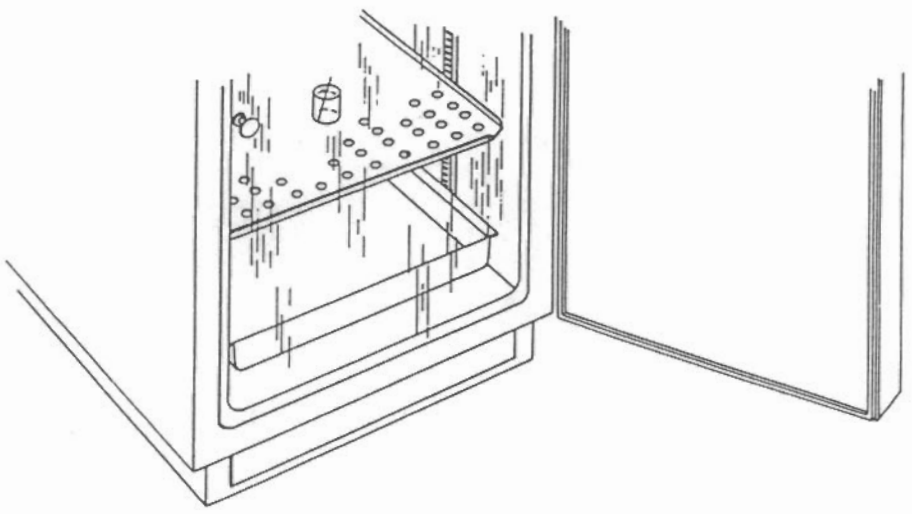
9.0 Calibration

The calibration of the GP Autoflow is accomplished in two steps which are chamber temperature and door temperature. Below, each calibration procedure is described in detail. For the best results, follow the procedure carefully, and if the desired result is not achieved, try procedure again from the start.

9.1 Chamber Temperature Calibration

The GP Autoflow's TEMPERATURE CALIBRATION MUST BE PERFORMED WITHIN 1°C OF THE PLANNED OPERATING TEMPERATURE. Normally, 37.0°C is the most common setpoint. To initiate the procedure, turn on the GP Autoflow via the power switch on the backpanel. Set mode switch to PROGRAM to check the temperature setpoint parameter for your planned operating temperature and if necessary, alter with the adjustment switch. Set mode switch back to RUN and let stabilize for 8 to 12 hours.

In the beginning of this procedure, set a mercury glass thermometer in a glass beaker filled with water resting on a shelf in the middle of the incubator chamber. Do not place the glass beaker on the bottom of the chamber because it will result in a slightly higher temperture due to the heater pan being located just below the chamber bottom.



When the unit has stabilized at the operating temperature, perform the following calibration procedure.

STEP 1: Set mode switch to SILENCE position.
STEP 2: Set chamber environment switch to TEMP position.
STEP 3: Press adjustment switch either up or down for a minimum of 10 seconds until the display starts to move.
STEP 4: The display will go up or down. Adjust temperature to agree with mercury thermometer in chamber as per above description.
STEP 5: Set mode switch to PROGRAM and back to RUN position to enter the calibrated temperature.

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The over-temperature setpoint is preset at 1°C. above main temperature setpoint. If the main temperature rises to the over-temperature setpoint, a safety relay will interrupt power to the chamber heater and remain interrupted until the temperature falls below over-temperature setpoint. At this point, the TEMP ALARM indicating light will be lit and the incubator will control to 1°C. above main temperature setpoint until service can be performed.

9.2 Door Heater Adjustment The door heater is controlled by the main control board on a percentage time basis. The door heater adjustment sets the time the heater is on or off. For example, if the heater is set at 50, the heater will be on 30 seconds in one minute.

STEP 1: Set mode switch to PROGRAM position.

STEP 2: Set chamber environment switch to DOOR TEMP position.

STEP 3: The display will move up or down. Adjust door heater percentage up for more heat, or down for less. Typically, 50-60 percent is normal.

STEP 4: Set mode switch to RUN position to enter the door heater percentage.

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10.0 MAINTAINING YOUR GP AUTOFLOW

GP AUTOFLOW CHAMBER

The chamber maintenance is only required as to the extent of cleanliness and sterility. The shelves and bracket supports are all removable and autoclavable. The interior should be wiped down with an appropriate disinfectant such as 70% ISOPROPYL or equivalent. **DO NOT USE ANY CHLORINATED OR HALOGEN MATERIALS IN THE CHAMBER.** The humidity pan should also be sterilized and the water changed regularly to assure sterility. A small amount of copper sulfate may be added to the humidity pan to inhibit bacterial growth.

GP AUTOFLOW WATER-JACKET

The water-jacket requires no anti-bacterial agents. The GP Autoflow already incorporates a copper tube producing copper sulfate which eliminates bacterial growth within the water-jacket. **DO NOT USE ANY CHLORINATED OR HALOGEN MATERIALS IN THE WATER-JACKET.**

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11.0 ERROR INDICATORS AND TROUBLESHOOTING

Step 1: NOTE ALL ERROR INDICATORS. When the incubator is running, any and all red or yellow LED's indicate an error.

Step 2: CLEAR ERROR INDICATORS. Error indicators can be cleared by switching the mode switch to program and back to run.

Step 3: MONITOR REOCCURRENCE OF ERROR INDICATORS. If reoccurance of the error indicator is immediate or daily, use the guide below to correct the situation.

Error Indicator Troubleshooting Guide

CHAMBER TEMPERATURE	
ALARM	Indicator: (2) Temperature sensors are calibrated.
	Correction: Perform chamber temperature calibration (see section 9.1).
	Indicator: Chamber over temperature.
	Correction: Perform chamber temperature calibration (see section 9.1). If not calibration, temp sensor or main control board fault.
Incubator Does Not Heat	Correction: Check fuse inside control center. If not fuse, check connections (T1) on main control board or main control board itself for fault.
RH PERCENT	
Chamber Wall Condensation	Correction: Adjust door heater to lower percentage (see section 9.2).
Inner Glass Door Condensation	Correction: Adjust door heater to higher percentage (see section (9.2).
Low RH Percent	Correction: Add water in pan.
GENERAL INDICATORS	
LOW WATER	Indicator: Low water in jacket.
	Correction: Add water to jacket via fill port.

For further assistance: Call NuAire Customer Service at 1-800-328-3352 or 612-553-1270 USA.

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12.0 REPLACEMENT PARTS LIST

12.1 115 VAC PARTS LIST

The following is a list of replacement parts. Please consult NuAire for parts not listed. To order, specify model number, serial number and part number.

PART NUMBER	DESCRIPTION	QUANTITY NU-1000	QUANTITY NU-1100,1200
B-990235	LABEL, FRONT	1	2
A-1000-420	MAIN CONTROL CIRCUIT BOARD	1	2
A-999309	EMI FILTER	1	1
A-999134-06	CIRCUIT BREAKER (8 AMP)	1	-
A-999134-07	CIRCUIT BREAKER (15 AMP)	-	1
A-999676	MAIN POWER SWITCH STDP	1	1
A-1500-010	MAGNETIC DOOR GASKET	1	2
F-1500-629	DOOR PANEL HEATER ASSY (115V)	1	2
A-1500-051	GLASS DOOR	1	2
F-1500-124	HEATER PAN ASSEMBLY	1	2
A-1500-065	SHELF BRACKETS	AR	AR
A-980444	LEG LEVELERS	AR	AR
A-999550	ELECTRICAL CORD 3 COND. 8 FT.	1	1
A-999314-02	FUSE (MAIN CTRL BD, 5 AMP 250 VOLT)	1	2
A-980758	DRAIN VALVE	1	2
A-999741	FLOAT SWITCH	1	2
A-999605-06	SENSOR, CHAMBER	1	2
A-999605-06	SENSOR, WATER JACKET	2	2
A-999645	MOV SUPPRESSOR (115V)	1	1
X-980324	1/4" NPT HOSE ADAPTOR	AR	AR

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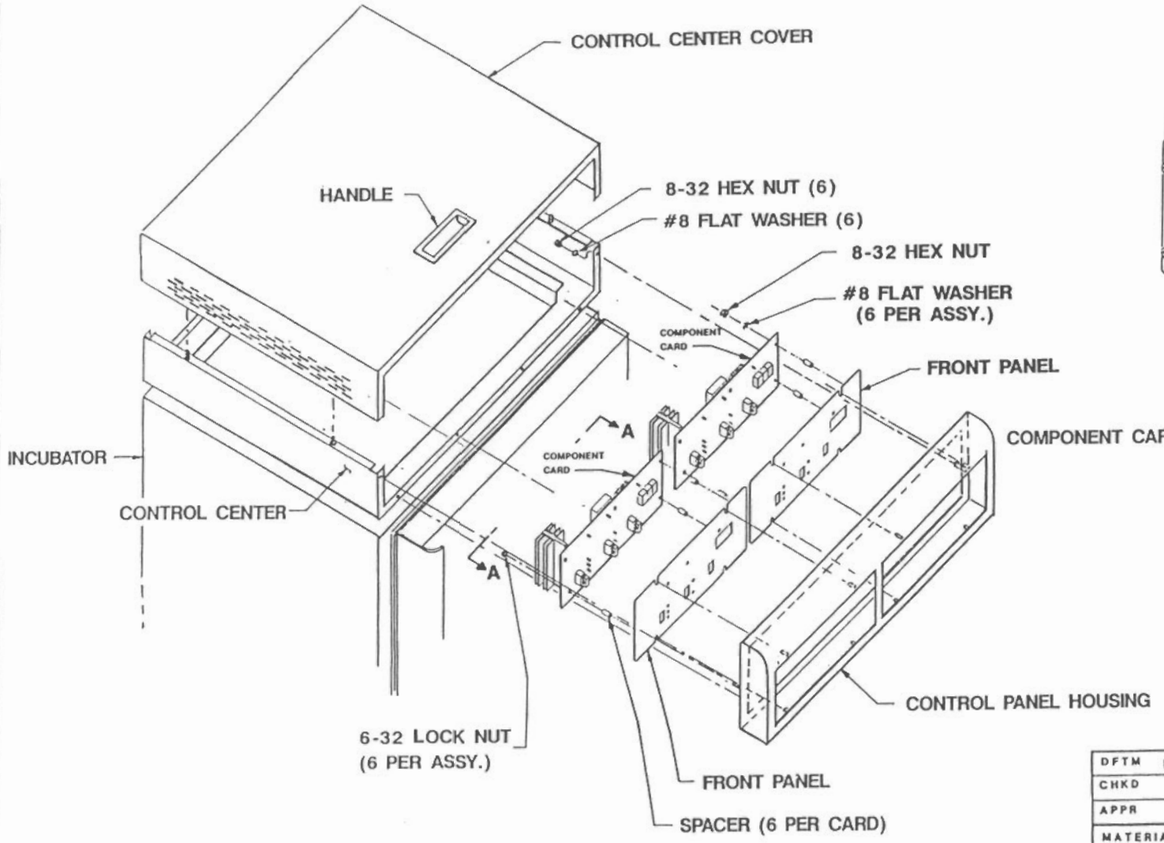
12.2 220 VAC PARTS LIST

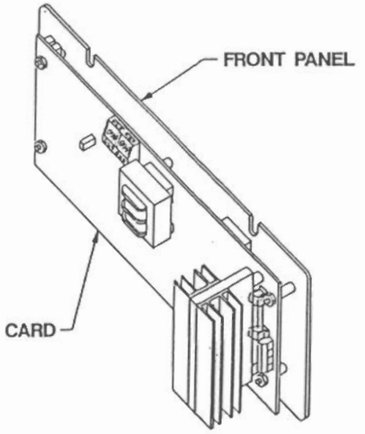
The following is a list of replacement parts. Please consult NuAire for parts not listed. To order, specify model number, serial number and part number.

PART NUMBER	DESCRIPTION	QUANTITY NU-1000E	QUANTITY NU-1100E/1200E
B-990235	LABEL, FRONT	1	2
A-1000-444	MAIN CONTROL CIRCUIT BOARD	1	2
A-999309	EMI FILTER	1	1
A-999134-01	CIRCUIT BREAKER (5 AMP)	1	-
A-999134-02	CIRCUIT BREAKER (10 AMP)	-	1
A-999676	MAIN POWER SWITCH	1	1
A-1500-010	MAGNETIC DOOR GASKET	1	2
F-1500-630	DOOR PANEL HEATER ASSY (220V)	1	2
A-1500-051	GLASS DOOR	1	2
F-1500-302	HEATER PAN ASSEMBLY (220V)	1	2
A-1500-065	SHELF BRACKETS	AR	AR
A-980444	LEG LEVELERS	AR	AR
A-999582	ELECTRICAL CORD 3 COND. (2.5 M)	1	1
A-999314-03	FUSE (MAIN CTRL BD, 3 AMP 250 VOLT)	1	2
A-980758	DRAIN VALVE	1	2
A-999741	FLOAT SWITCH ASSEMBLY	1	2
A-999605-06	SENSOR, CHAMBER	1	2
A-999605-06	SENSOR, WATER JACKET	2	2
A-999644	MOV SUPPRESSOR (220V)	1	1
X-980324	1/4" NPT HOSE ADAPTOR	AR	AR

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REV	ECO	DESCRIPTION	DATE	INL





VIEW A-A

DFTM	BJS	7-6-93
CHKD		
APPR		

NUMRE
PLYMOUTH, MINNESOTA

MATERIAL

APPLICABLE SERIES

TITLE
FRONT/TOP PANEL ASSEMBLY

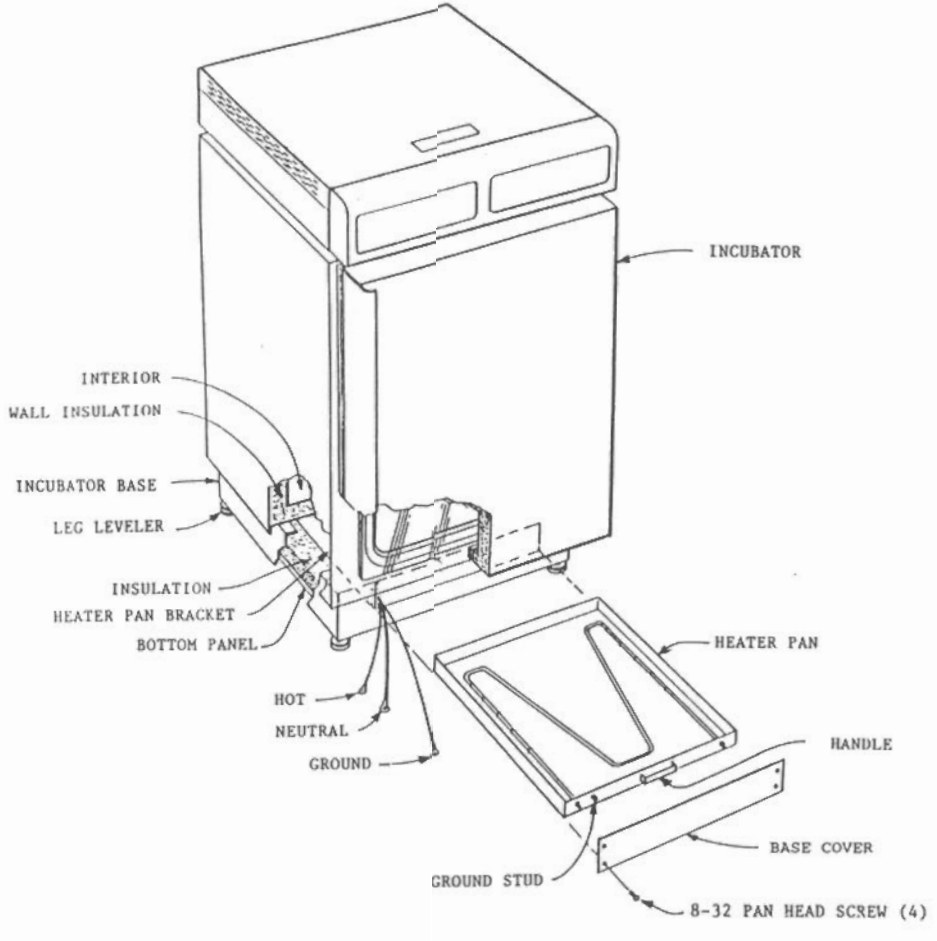
DRAWING NUMBER
BCD-04563

SCALE

SHEET 1 OF 1

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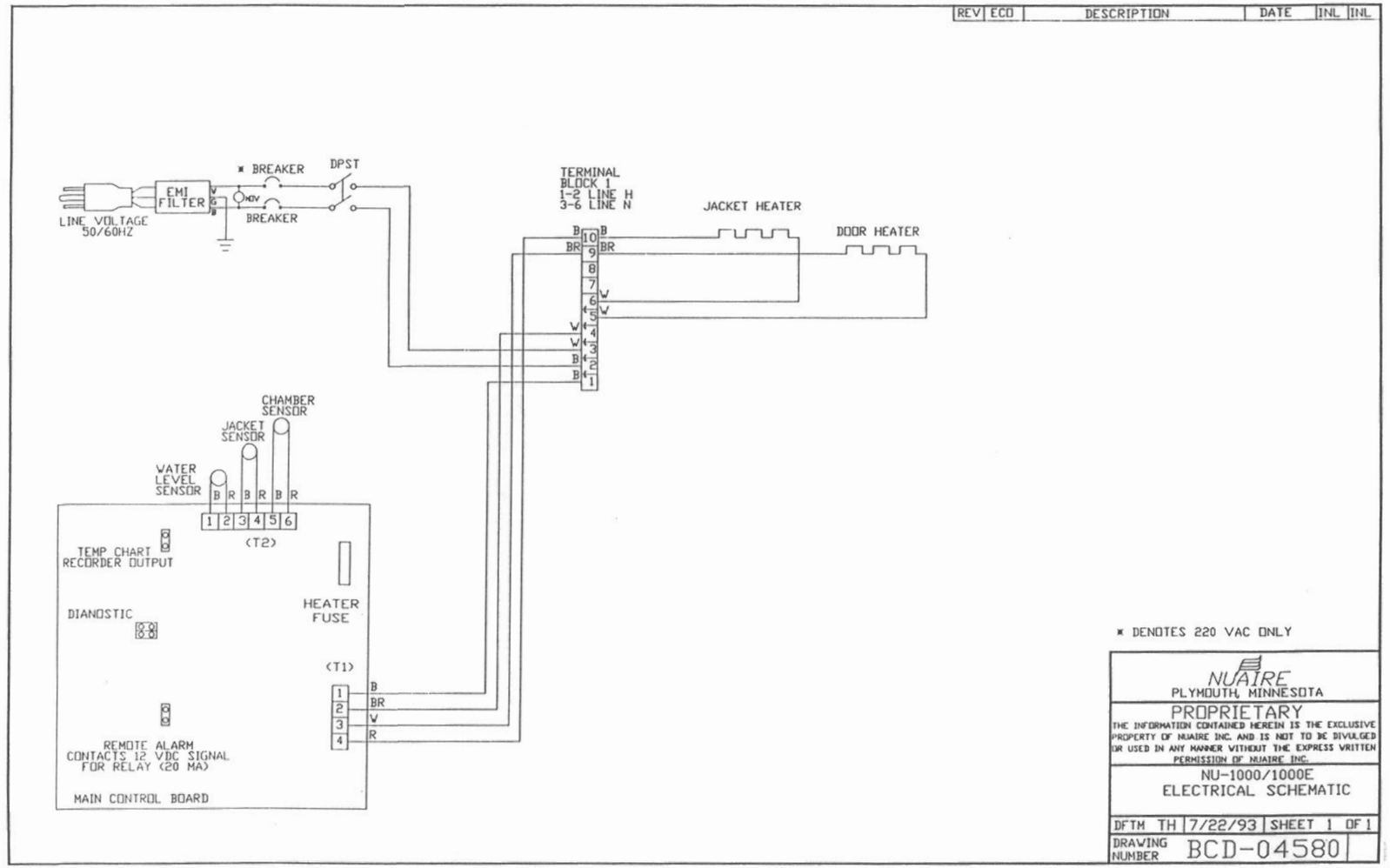
REV	ECO	DESCRIPTION	DATE	INL



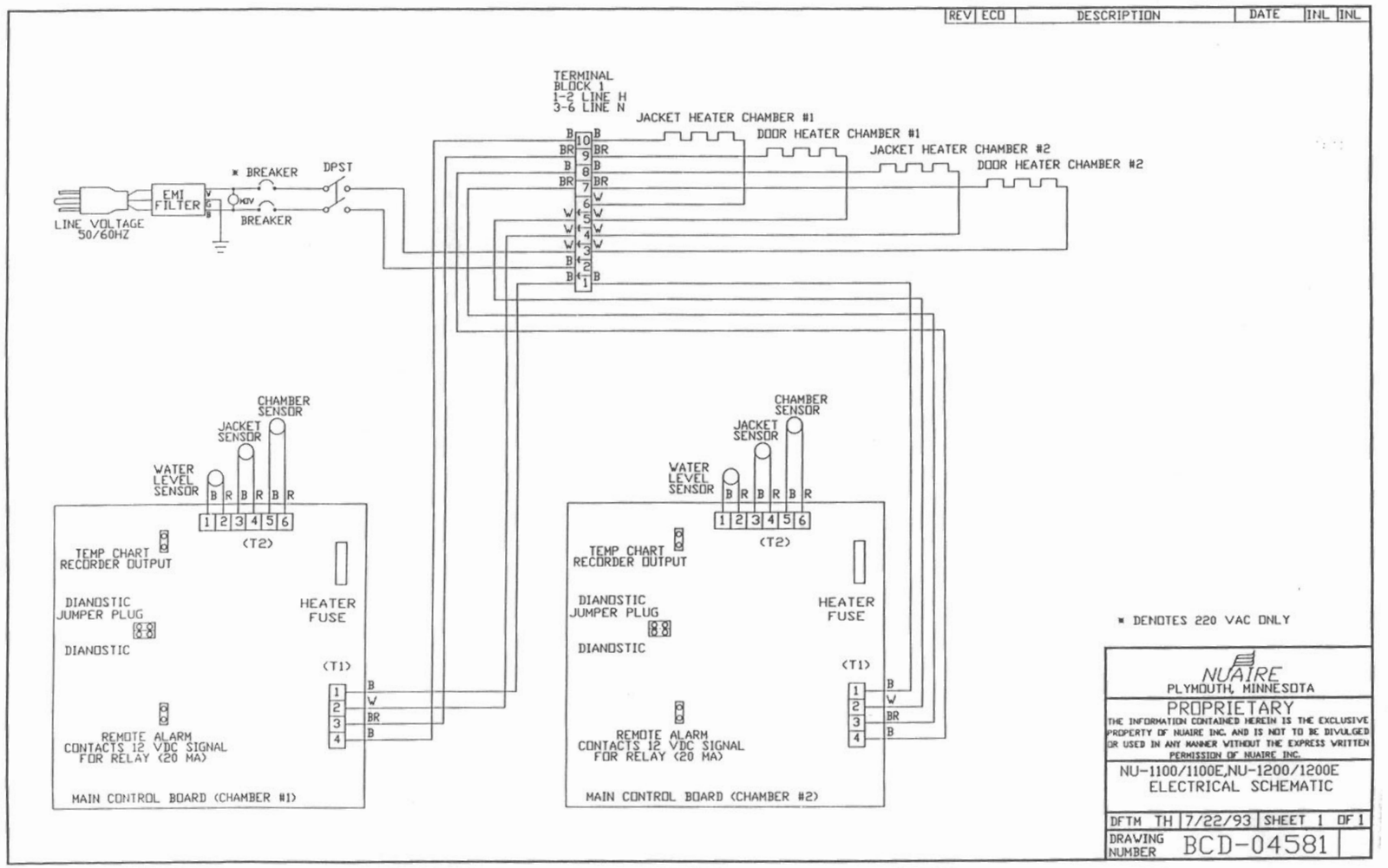
PROCEDURE:
1. DISCONNECT ALL ELECTRICAL POWER.
2. REMOVE (4) SCREWS AND BASE COVER.
3. REMOVE WIRE TERMINATIONS WITH 3/8" OPEN END WRENCH (HOT, NEUTRAL, AND GROUND).
4. TO REMOVE HEATER PAN, SLOWLY PULL HANDLE OUTWARD.

DFTM BJS	4/9/92	NUAIRE PLYMOUTH, MINNESOTA
CHKD		
APPR		TITLE: HEATER PAN ASSEMBLY
MATERIAL		DRAWING NUMBER: BCD-04120
APPLICABLE SERIES		SCALE ~ SHEET OF

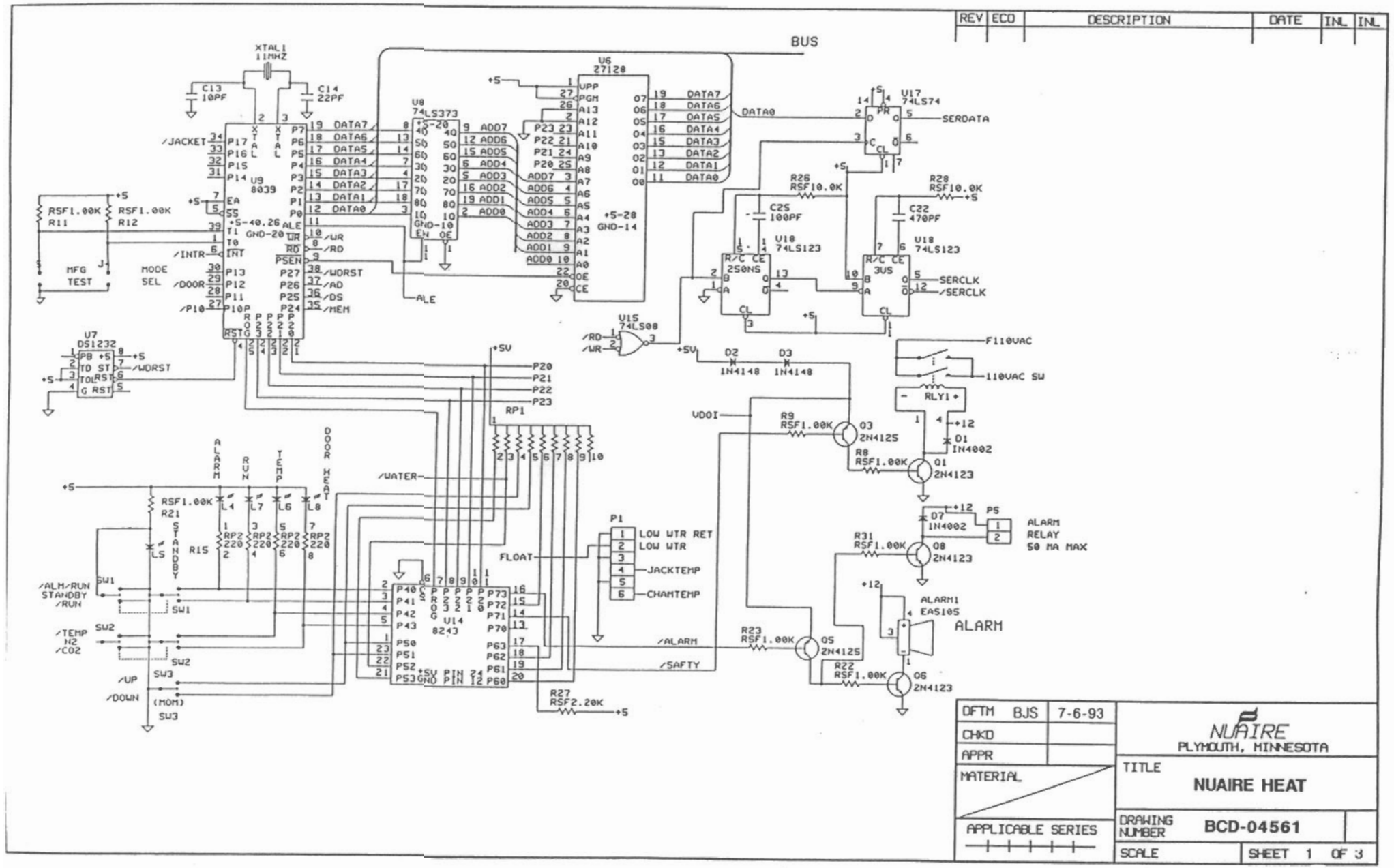
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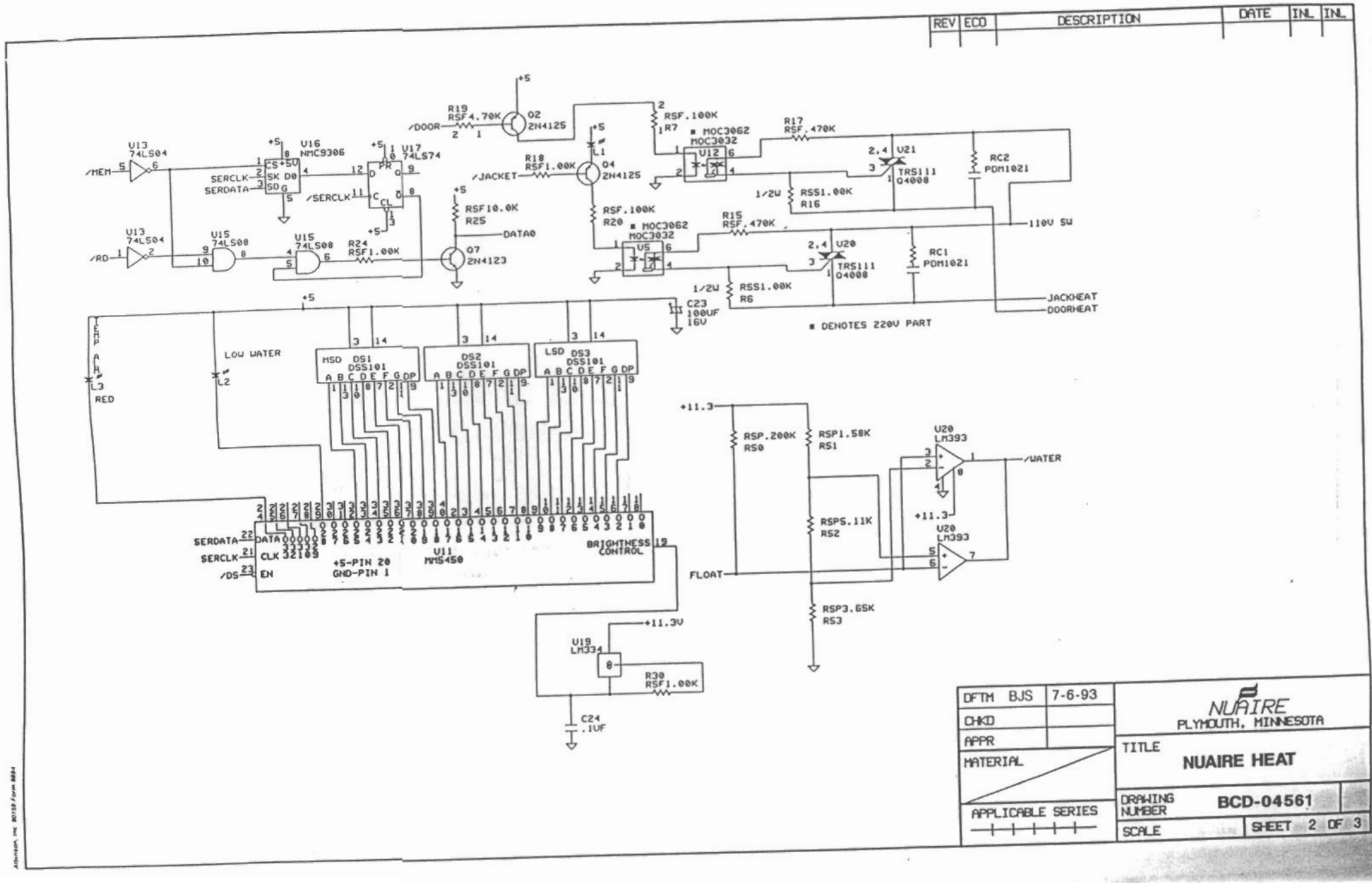
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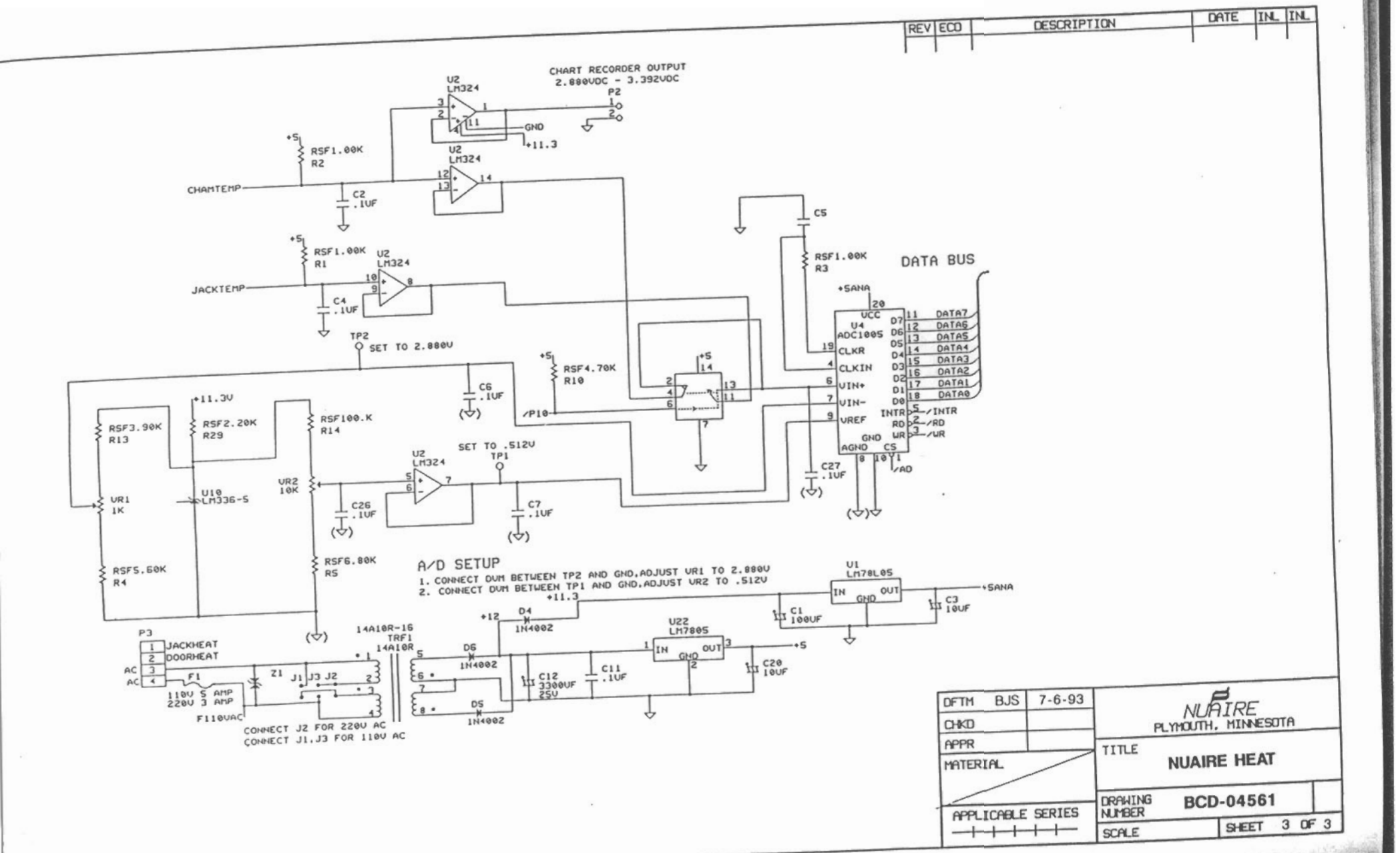
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