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Model: 1202

Biological Safety Cabinet
Class II, Type A

Manual No. 7001200 Rev. 1

IMPORTANT!

READ THIS INSTRUCTION MANUAL.

Failure to read, understand and follow the instructions in this manual may result in damage to the freezer, injury to operating personnel and poor freezer performance.

Caution: All internal adjustments and maintenance must be performed by qualified service personnel.






**Refer to the serial tag on the
rear cover of this manual**



The material in this manual is for information purposes only. The contents and the product it describes are subject to change without notice. Forma Scientific Inc. makes no representations or warranties with respect to this manual. In no event shall Forma Scientific Inc. be held liable for any damages, direct or incidental, arising out of or related to the use of this manual.

MANUAL NO. 7001200			
1		5-1-94	Measuring blower motor voltage
0		1-1-94	Revise to new format
REV	ECN	DATE	DESCRIPTION

General Safety Notes Used In This Manual

	<p>This symbol alerts the user to important operating and/or maintenance instructions. It may be used alone or with other safety symbols. Read the accompanying text carefully.</p>
	<p>Potential electrical hazards. Only qualified persons should perform the instructions and procedures associated with this symbol.</p>
	<p>Extreme temperature hazards, hot or cold. Instructions associated with this symbol should only be carried out when using special handling equipment or when wearing special, protective clothing.</p>
	<p>Potential biological hazards. Proper protective equipment and procedures must be used when following instructions associated with this symbol. Reference O.S.H.A. Regulation 1910-1030.</p>
	<p>Potentially hazardous energy. Equipment being maintained or serviced must be turned off and locked off to prevent possible injury. Reference O.S.H.A. Regulation 1910-147.</p>

Remember:

- √ Always use the proper protective equipment (clothing, gloves, goggles etc.).
- √ Always dissipate extreme cold or heat, or wear protective clothing.
- √ Always follow good hygiene practices.
- √ Each individual is responsible for his/her own safety.

Do You Need Information or Assistance on Forma Scientific Products?

If you do, please contact us 8:00 a.m. to 7:00 p.m. (Eastern Time) at:

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Our **Sales Support** staff can provide information on pricing and give you quotations. We can take your order and provide delivery information on major equipment items or make arrangements to have your local sales representative contact you. Our products are listed on the Internet and we can be contacted through our Internet home page.

Our **Service Support** staff can supply technical information about proper setup, operation or troubleshooting of your equipment. We can fill your needs for spare or replacement parts or provide you with on-site service. We can also provide you with a quotation on our Extended Warranty for your Forma products.

Whatever Forma® products you need or use, we will be happy to discuss your applications. If you are experiencing technical problems, working together, we will help you locate the problem and, chances are, correct it yourself...over the telephone without a service call.

When more extensive service is necessary, we will assist you with direct factory trained technicians or a qualified service organization for on-the-spot repair. If your service need is covered by the warranty, we will arrange for the unit to be repaired at our expense and to your satisfaction.

Regardless of your needs, our professional telephone technicians are available to assist you Monday through Friday from 8:00 a.m. to 7:00 p.m. Eastern Time. Please contact us by telephone or fax. If you wish to write, our mailing address is:

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Marietta, OH 45750

International customers please contact your local Forma Scientific distributor.

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SECTION 1 - RECEIVING

1.1 Preliminary Inspection

This item was thoroughly inspected and carefully packed prior to shipment and all necessary precautions were taken to ensure safe arrival of the merchandise at its destination. Immediately upon receipt, before the unit is moved from the receiving area, carefully examine the shipment for loss or damage. Unpack the shipment and inspect both interior and exterior for any in-transit damage.

1.2 Visible Loss or Damage

If any loss or damage is discovered, note any discrepancies on the delivery receipt. Failure to adequately describe such evidence of loss or damage may result in the carrier refusing to honor a damage claim. Immediately call the delivering carrier and request that their representative perform an inspection. Do not discard any of the packing material or move the shipment from the receiving area.

1.3 Responsibility for Shipping Damage

For products shipped F.O.B. Marietta, Ohio, the responsibility of Forma Scientific, Inc. ends when the merchandise is loaded onto the carrier's vehicle.

On F.O.B. Destination shipments, Forma Scientific's and the carrier's responsibility ends when your Receiving Department personnel sign a free and clear delivery receipt.

Whenever possible, Forma Scientific, Inc. will assist in settling claims for loss or in-transit damage.

SECTION 2 - INTRODUCTION

2.1 Description

The Forma Scientific, Inc., Model 1202 Biological Safety Cabinet is listed by NSF International as a Class II Type A Biological Safety Cabinet meeting all of the requirements of NSF Standard 49-1992. The Model 1202 is also approved by CSA. The cabinet provides protection for both personnel and product.

SECTION 3 - INSTALLATION

(Refer to Figure 3-1 and Figure 3-2)

3.1 Location

Locate the cabinet on a level surface in an area of minimum temperature change. The cabinet should be placed away from personnel traffic, air-conditioning or heating ductwork and/or laboratory windows and doors. Proper cabinet location is essential as drafts can disrupt critical air flow characteristics and allow room contaminants to *enter* or *escape* the cabinet work area.

If space permits, fourteen inches should be clear on each side of the cabinet for maintenance and for best cabinet performance. A twelve inch space should also exist from the top of the cabinet to the ceiling.

3.2 Leveling

Place a bubble-type level on the work surface, and check to see if the cabinet is level. Adjust the leveling feet until the cabinet is level and the most comfortable working height is achieved.

3.3 Power Connection

This cabinet is equipped with two power cords: one for the cabinet blower motor and the other for the duplex utility outlets. For efficiency and product safety, it is recommended that the cords be plugged into separate circuits. Refer to the Specification Section of this manual or to the electrical data plate mounted on the unit.

3.4 Plumbing Connection

Petcocks are piped within the cabinet and connected to 3/8"-FPT couplings in the inner side walls. Access to internal couplings is through plugged access holes in the cabinet's side panels.

Caution: It is recommended that flammable gas not be used in the cabinet. If flammable gasses are used, external shut-off valves should be easily accessible. Observe all labels pertaining to restrictions and operating pressures.

3.5 Exhaust Requirements

Filtered air from the cabinet may be exhausted directly into the room or, if safety requires, be vented to the atmosphere through an external exhaust system.

a. Direct Room Exhaust

When directing exhaust air into the room, adequate space must be provided between the cabinet and the ceiling to allow discharged air to flow freely.

1. Remove the cardboard cover plate from the top of the unit.
2. Remove the screws and washers (located on top of unit, installed at factory) that will secure the exhaust filter grille.
3. Install the exhaust filter grille with the downward slope toward the front of the unit. (See Figure 3-2.)

b. External Exhaust System

When an external exhaust is required, the cabinet must be connected to a dedicated exhaust system. The exhaust system should be prepared before moving the cabinet to its location.

Caution: The exhaust system should have safeguards against exhaust failure. It is recommended that a bio safety officer or industrial hygienist review the agents and chemicals utilized within the cabinet to determine if additional filtration treatment is necessary before venting to the atmosphere.

c. Duct Connection

8" Diameter

d. Exhaust Transitions (Optional from Forma Scientific)

Without Damper	Order Number
5' Thimble	191447
5' Airtight	191449
With Damper	Order Number
5' Thimble	191448
5' Airtight	191456

e. Nominal Exhaust Requirements:

Model 1202: 400 CFM

Class II, Type A, biological safety cabinets can be attached to an exhaust system in one of two ways: a canopy connection or a direct, gas-tight connection. Canopy connection with a damper is recommended. The system must have adequate, but not excessive, static pressure for proper and safe operation of the cabinet.

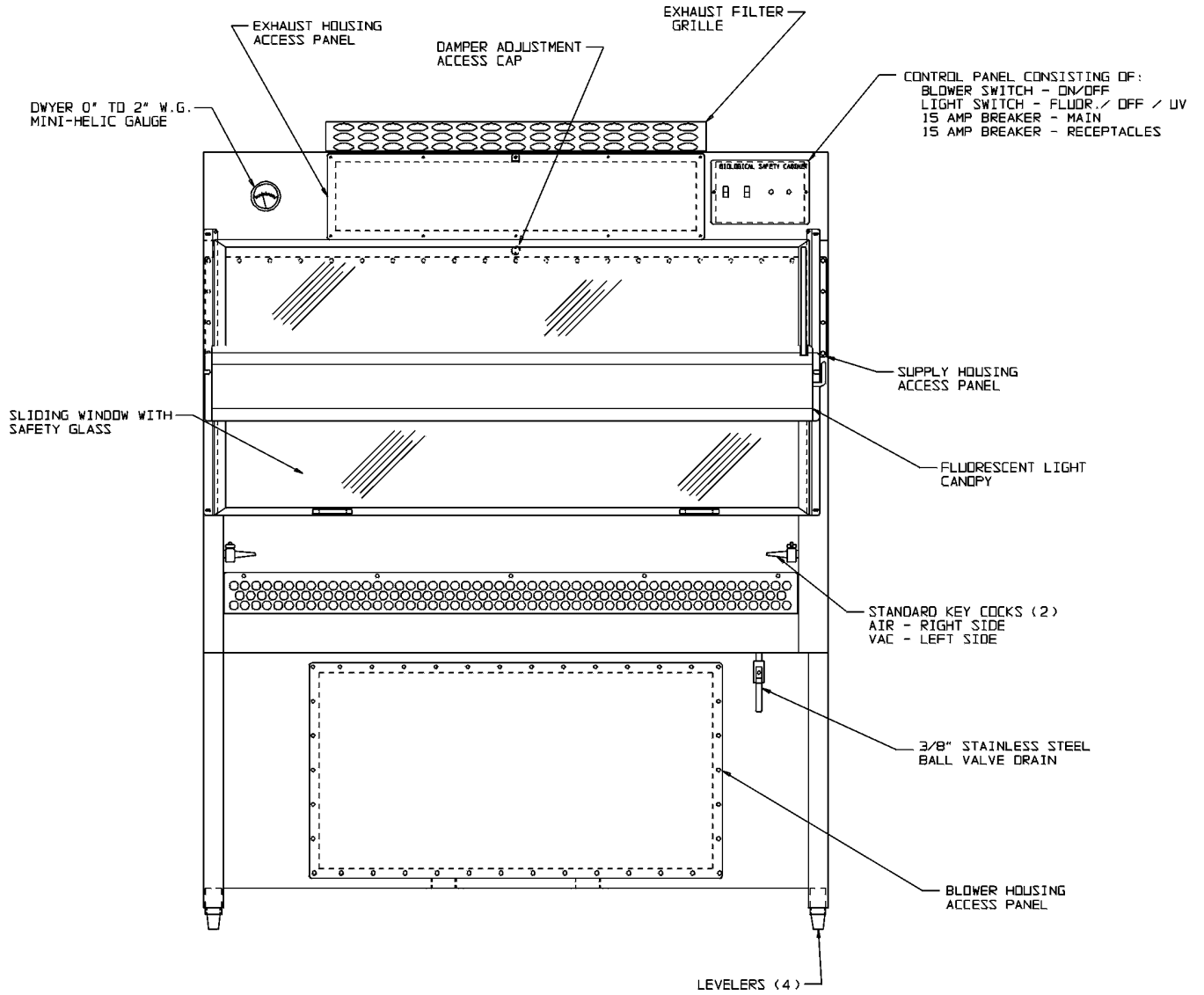
3.6 Exhaust System Connections

a. Canopy Connection

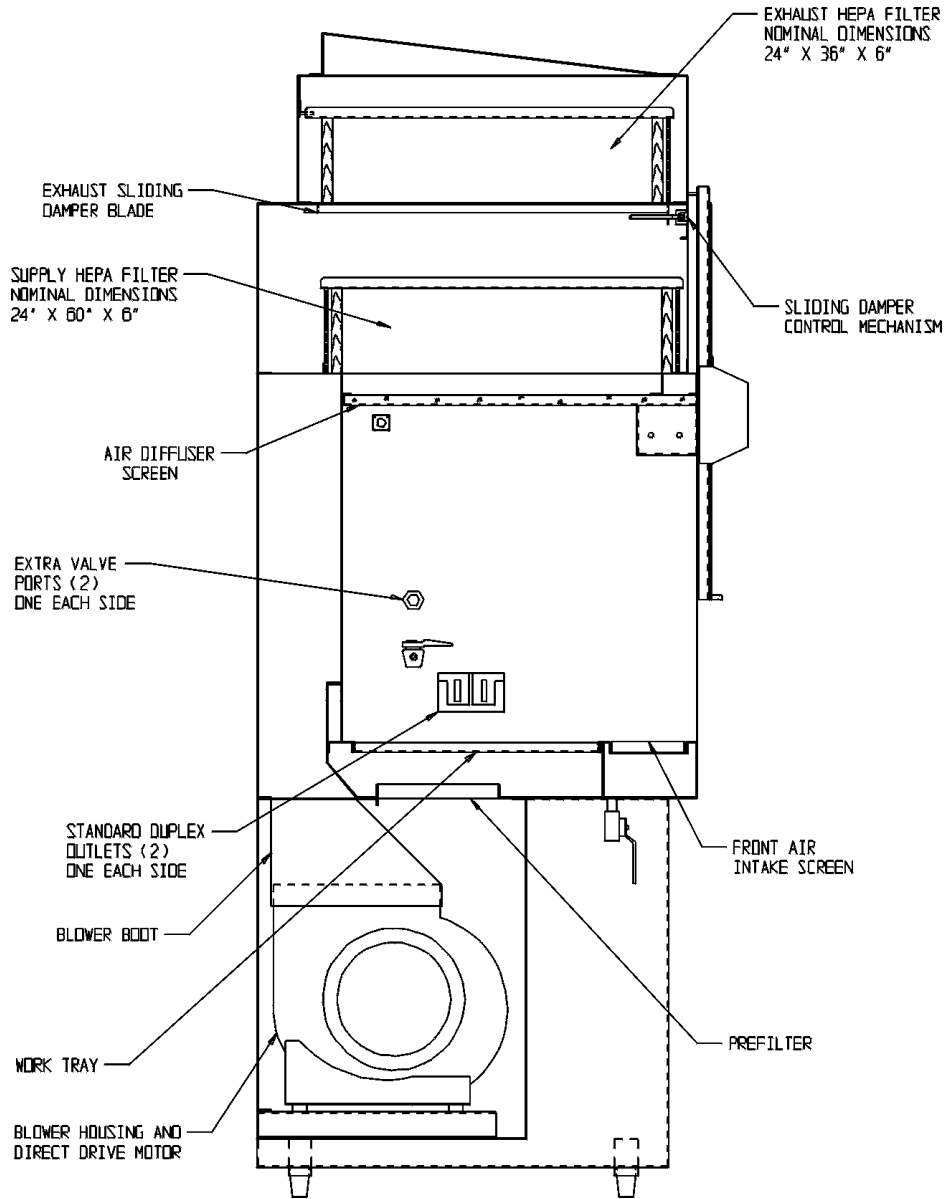
The May 1992 revision of NSF Standard 49* recommends the canopy connection as the hookup of choice. The duct transition canopy piece hangs over the exhaust filter housing, overlapping it by one inch. The benefit of this system is that exhaust fluctuations are buffered by room air and have less effect on the unit's performance.

* NSF Standard 49, Annex E, Section I.b.1

When a canopy is used, the opening at the canopy should be checked with a smoke stick to insure that internal air turbulence does not cause outward air flow. The building exhaust system should be sized to exhaust 30% more air than the cabinet exhausts, the balance to be made up with room air. This will help to insure proper cabinet air balance at the front access opening and thus adequate containment.



**Model 1202 Biological Safety Cabinet
 (Front View)
 Figure 3-1**



**Model 1202 Biological Safety Cabinet
(Side View)
Figure 3-2**

SECTION 4 - CABINET START-UP

4.1 General Recommendations

1. Keep the activity in the room to a minimum when the cabinet is in use.
2. Keep all laboratory doors closed to prevent drafts that will disturb critical air flow characteristics.
3. Pre-plan cabinet use, and place everything required for the complete procedure in the cabinet so that nothing passes through the air barrier (in or out) during the procedure.
4. Segregate clean and dirty materials.
5. Do not place anything on the intake or exhaust grills.
6. It is recommended that the operator wear long sleeves and surgical gloves when working in the cabinet.
7. Practice good aseptic technique to insure safe use of the cabinet.
8. Cover discarded pipettes before removing them from the cabinet.
9. If a spill occurs, clean it up immediately. Decontaminate the work area and all affected equipment. Discard items that cannot be decontaminated such as work pads, swabs, etc.

4.2 Use of Auxiliary Equipment in the Cabinet

The use of auxiliary equipment in the cabinet is acceptable only if the proper precautions are taken. Any appliance used in the work area may cause turbulence and disturb air flow. Use of such equipment should be carefully managed, preferably placed at the rear of the work space where air turbulence will have a minimal effect.

4.3 Cabinet Check

1. Verify that the Drain Valve is closed. If a spill should occur on the work surface it will remain in the plenum tub and not drain onto the floor.
2. Verify that the Service Petcocks are closed.
3. Check the supply and exhaust filters for leaks.

4.4 Start-Up Procedure

1. Turn ON the lights.
2. Check the intake and exhaust grills to ensure that they are not blocked.
3. Turn on the blower to purge the work area of contaminated air.
4. Wash hands and lower arms with germicidal detergent.
5. Disinfect the entire work area.
6. Place everything needed in the cabinet.
 - a. Do not block the intake or exhaust grills.
 - b. Place everything at least 4" (10.2 cm) inside the work area.
 - c. Segregate clean and contaminated items.
7. Position the height of the viewing window at 10".

4.5 Cabinet Shutdown

1. Surface decontaminate with the appropriate disinfectant and enclose all equipment that has been in direct contact with the research agent.
2. Cover trays of discarded pipettes and glassware.
3. Allow the cabinet to run for at least thirty minutes with no activity to allow time for all airborne contaminants to be purged from the work area.
4. Remove all equipment.
5. Clean all interior surfaces with an appropriate disinfectant.
6. If the drain system has been used, thoroughly flush it with a disinfectant solution and rinse with water.

SECTION 5 - OPERATION

5.1 Control and Indicating Devices

Before operating the cabinet it is recommended that the user(s) become familiar with the following items on the cabinet. (Refer to Figure 3-1 and Figure 3-2).

5.2 Blower Switch

Controls the electrical power to the blower.

5.3 Light Switch

Controls electrical power to the fluorescent lamps in the work area or the optional ultra-violet lamp.

5.4 Static Pressure Gauge (In. W.G.)

Located on the control panel, the static pressure gauge measures the air pressure differential across the filters, providing an indication of filter "loading". As the filters become dirty, the resistance to air passage increases and the reading on the static pressure gauge increases.

When the reading increases by 50% (from original measurement), the cabinet airflow should be checked with a thermoanemometer by a qualified service technician. The filters must be replaced if proper airflow cannot be obtained.

The static pressure gauge should not be used as a direct measure of air flow.

5.5 Blower Speed Control

The blower speed control is a variable resistor located on the printed circuit board inside the cabinet behind the blower power switches. (Figure 5-1) The control is used to adjust the air velocity from the blower motor.

Note: The blower speed is set at the factory and should only be changed by a qualified technician.

Adjustment of the blower speed is as follows:

1. Remove the two slot head screws from the blower control section of the control panel.
2. Slide the blower control panel outward a few inches until about half of the printed circuit board is visible. (It is of drawer-type design and will slide easily. Connector wires prevent it from being removed completely.)
3. Locate the blower speed control adjustment pot on the circuit board per the illustration in Figure 5-1.
4. Adjust the speed by rotating the screw on top of the resistor. Turning the screw clockwise increases the air velocity, turning the screw counter-clockwise decreases the air velocity.

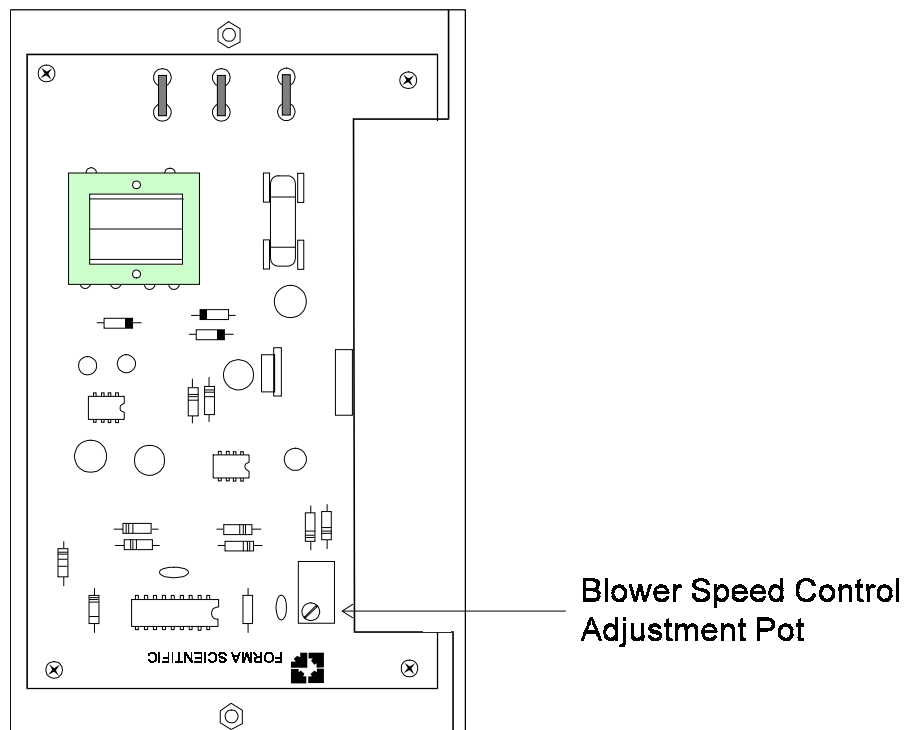
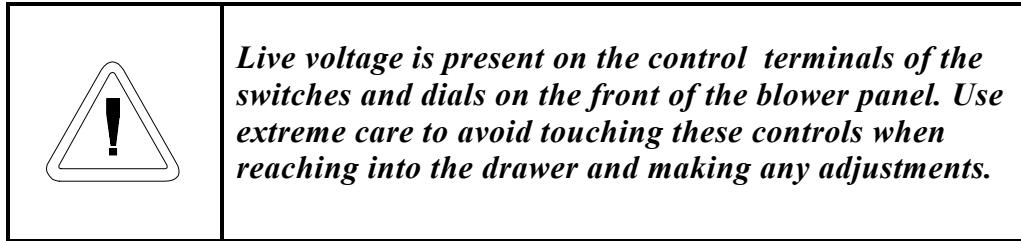
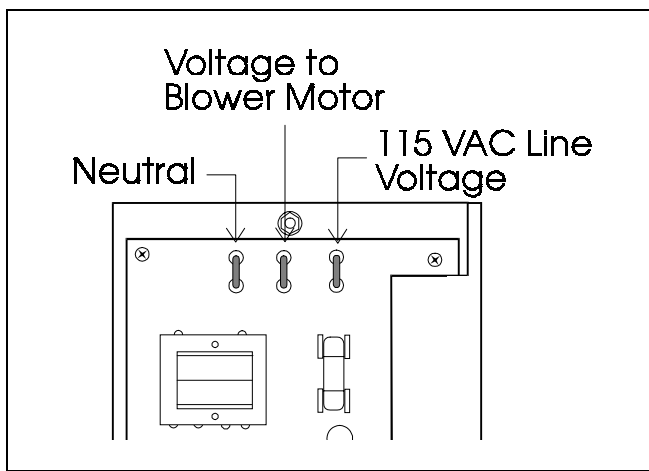


Figure 5-1
Component locations on the printed circuit control board



a. Measuring the Blower Motor Voltage

Both blower motor voltage and line voltage are measured at the three terminal connectors at the top of the circuit board. Refer to Figure 5-2.



**Figure 5-2
Circuit board voltage terminals**

5.6 Reset Button (15 Amp)

The Reset Button is an in-line circuit breaker. If an overload occurs, the circuit breaker will trip and the button will protrude from the panel. When the overload condition has been corrected, pressing the button will reset the circuit breaker.

5.7 Receptacle Reset Button (15 Amp)

The Receptacle Reset Button is an in-line circuit breaker for the electrical receptacles. If an overload occurs, the circuit breaker will trip and the button will protrude from the panel. When the overload has been corrected, pressing the button will reset the circuit breaker.

5.8 Electrical Outlet

A 115 Volt duplex receptacle is located on both side walls of the work station.

5.9 Drain Valve

The drain valve, located on the right front side of the cabinet, has been provided for safe drainage of the drain pan. This valve should always remain closed while work is being performed in the cabinet and should be used only in the event of a major spill.

Caution: If an accidental spill occurs, immediately consult a biological safety officer or other qualified person. To insure proper containment of a spill, connect a hose from the valve to a sealed container.

5.10 Service Petcocks

Two petcock valves are standard with each cabinet. The valves are located on the right and left side of the work station and are coded with the type of service they supply.

5.11 Exhaust Filter Guard

The exhaust filter guard, located on top of the exhaust filter, protects the filter and helps maintain unrestricted air flow. It also prevents the storage of materials on the housing.

5.12 Sliding Window Alarm

The cabinet's sliding window permits auxiliary equipment and research implements to be placed into the work area. When the cabinet is in use, the window must not be raised more than ten inches. If the window is raised higher, the air barrier at the front of the cabinet will be weakened and containment will be impaired. When this occurs, an audible alarm will sound, signaling the unsafe condition.

WARNING! Do not disconnect, disable or silence the audible window alarm. The alarm is intended to draw attention to an unsafe operating condition and is installed for the operator's protection.

Caution: Any blockage of the cabinet's perforated grille disrupts airflow, causes increased turbulence and may promote cross-contamination within the cabinet.

5.13 Ultra-Violet Light (optional)

Cabinets may be equipped with an ultra-violet germicidal light as optional equipment. These lamps lose their effectiveness over a period of time and should be replaced when intensity drops below the optimum level. (For example, these bulbs are only 80% efficient after 1000 hours of use).

Caution: Eyes or skin should not be exposed to ultra-violet light. (Refer to Section 4.24.2 of NSF International Standard, NSF 49-1992.) Recommended usage is only when lab is not in use.

SECTION 6 - CERTIFICATION TESTING PROCEDURES

A list of certification companies is included with this manual.

6.1 Certification of the Cabinet

a. On-Site Certification:

Due to the stress of shipping and handling and the fragile nature of the HEPA filters, the cabinet must be thoroughly tested once it has been placed in its final location. The following tests should be performed*:

1. Tests directly related to containment (personnel and environmental protection) and product protection:
 - a. HEPA Filter Leak Test (DOP Test)
 - b. Downflow Velocity Profile Test -
The downflow velocity grid is defined as: Perimeter points are 6 inches in from the work area sidewalls with successive points spaced 5.81 inches apart side-to-side thereafter; perimeter points are 6 inches in from the work area rear wall with successive points spaced 4.50 inches apart rear-to-front thereafter. This grid provides 4 lateral rows of points, 9 points to a row for a total of 36 points.
 - c. Face Velocity Air Flow Test -
The face velocity may be determined by using a direct reading instrument or by using an alternate thermoanemometer method. The inflow velocity grid used in the alternate thermoanemometer method, 4 inches above the exhaust filter as specified by the manufacturer, is defined as: Perimeter points are 3.83 inches in from the inside edge of the exhaust filter frame with successive points spaced 3.83 inches apart side-to-side thereafter; perimeter points are 3.75 inches in from the inside edge of the exhaust filter frame with successive points spaced 3.75 inches apart rear-to-front thereafter. This grid provides 5 lateral rows of points, 8 points to a row, for a total of 40 points. The exhaust velocity was determined with the cabinet exhausting directly to the room.
 - d. Airflow Smoke Patterns
 - e. Cabinet Leak Test

2. Tests related to worker comfort and safety:
 - a. Electrical Leakage, Ground Circuit Resistance and Polarity Tests
 - b. Lighting Intensity
 - c. Vibration
 - d. Noise Level

*Ref. Annex F, NSF International Standard, NSF 49-1992

These tests must be performed by qualified service specialists who are familiar with the methods and procedures of certifying biological safety cabinets. The certification should be performed upon installation, annually thereafter, after filter changes and after cabinet relocation.

Note: Unless this certification was expressly called for in the specification, quotes and/or purchase order, the cost for on-site testing is to be paid for by the customer.

SECTION 7 - ROUTINE MAINTENANCE

7.1 Checking the Static Pressure Gauge "Zero"

In order to provide an accurate reading, the indicating needle of the static pressure gauge should be precisely at zero when the cabinet is completely shut off. If the cabinet is connected to a central exhaust system, the exhaust system must also be shut off.

Upon initial start-up or after the HEPA filter has been replaced, the static pressure gauge should read (or be set to) zero when the cabinet is not operating. When the cabinet is restarted and proper air flow balance has been achieved, the gauge reading should be recorded. This reading will serve as a base line of subsequent filter loading. If the reading increases by approximately 50%, the air flow balance should be checked again.

7.2 Replacing the Pre-Filter

A pre-filter is used in Forma's Biological Safety Cabinet to help protect the motor/blower and the HEPA filters from foreign particles.

Caution: The pre-filter is under the work tray. This area is contaminated with the agents being used inside the cabinet. Gloves and protective clothing must be worn. Do not turn the cabinet off to replace the pre-filter.

1. Lift the work tray. To facilitate removal and replacement of the pre-filter, it is recommended that one person lift the work tray while another person replaces the filter.
2. Remove the pre-filter, place it in a polyethylene bag and label it for disposal.
3. Install the replacement pre-filter and replace the work tray.

SECTION 8 - SERVICE



Caution: Service to the unit must be performed by qualified personnel. The cabinet should then be recertified.

8.1 Replacing the Exhaust HEPA Filter

Caution: Before filters are replaced the unit must be decontaminated!

Access to the exhaust HEPA filter is through the Exhaust Housing Access Panel on the front of the cabinet, or, if possible, from the top of the exhaust housing. (Refer to Figure 3-1.)

1. Remove the cap nuts that secure the front panel.
2. Remove the front access panel.
3. Loosen and remove the front filter clamps.
4. Loosen the rear filter clamps.
5. Pull the filter out and place it in a heat-sealable polyethylene bag for disposal.
6. With a vacuum cleaner, clean the filter seat, the exhaust filter guard and the flange.
7. Slide the new filter in place and verify that it is properly seated on the flange.
8. Replace the filter clamps, and tighten them alternately a few threads at a time to insure an even seal around the filter. Do not overtighten.
9. After filter replacement the cabinet should be recertified.

8.2 Replacing the Supply HEPA Filter

Caution: *Before service is performed on the cabinet, the unit must be decontaminated!*

Access to the supply HEPA filter is through the Supply Housing Access Panel above the work chamber. (Refer to Figure 3-1.)

1. Remove the cap nuts and washers that secure the supply filter access panel in place and remove the panel.
2. Remove the filter clamps, pull the filter out and place it in a heat-sealable polyethylene bag for disposal.
3. With a vacuum cleaner, vacuum the diffuser plate, the filter seat, all accessible parts above the filter seat and the flange.
4. Slide the replacement filter in place and verify that it is properly seated on the flange.
5. Replace the filter clamps and alternately tighten them to insure an even seal around the gasket. Do not overtighten.
6. After filter replacement, the cabinet should be recertified.

8.3 Adjusting the Damper

Since the HEPA filter resistance may vary considerably from filter to filter (even filters of the same size), a damper has been installed in the cabinet exhaust system for maintaining proper airflow balance. The damper regulates the exhaust air to maintain the proper intake and exhaust velocities. The damper is set at the factory and should not be adjusted unless the proper velocities cannot be attained.

1. The damper adjustment is located in the center of the front of the cabinet.
2. Remove the Damper Adjustment Access Cap with a flat blade screwdriver. (Figure 3-1.)
3. Using the flat blade screwdriver, turn the adjustment counterclockwise to close the damper and decrease the exhaust or turn the adjustment clockwise to open the damper and increase the exhaust.

8.4 Replacing the Blower and/or Motor

Caution: Before service is performed on the cabinet, the unit must be decontaminated! Disconnect the unit from the power source before beginning procedure.

Access to the blower is through the access panel at the bottom of the cabinet under the work area.

1. Remove the cap nuts and washers that secure the Blower Housing Access Panel to the cabinet, and remove the panel. (Refer to Figure 3-1.)
2. Loosen the set bolt on the blower hub from inside the left side of the scroll.
3. Remove the three bolts and washers securing the motor to the scroll on the right side of the blower assembly.
4. Disconnect the wiring, making note of the wiring configuration.
5. Remove the blower motor, and replace it with the new motor. Align the blower wheel, and tighten.
6. Connect the wiring in the same configuration as the old blower motor.
7. Replace the blower housing access panel on the front of the cabinet, and tighten all nuts.
8. After replacement of the blower/motor, the cabinet should be recertified.

8.5 Replacing the Blower Speed Control

Caution: Disconnect the unit from the power source before beginning procedure.

The blower speed control may be replaced without decontaminating the cabinet.

1. Remove the two screws that secure the control panel.
2. Pull out the control panel, and locate the blower speed control on the right side of the control box.
3. Disconnect the wiring to the control, and make note of the wiring configuration.
4. Remove the speed control from the inside of the control box.
5. Install the new blower speed control by reversing the above procedure.

Note: After replacing the blower speed control, the cabinet must be recertified.

SECTION 9 - TROUBLESHOOTING



9.1 Troubleshooting Guide

The following is a guide to troubleshooting the safety cabinet system.

Caution: *Before service is to be performed on the cabinet, the cabinet must first be decontaminated with an appropriate sterilizing gas. Servicing of the unit must be performed by qualified service personnel only.*

Problem: Air flow in the cabinet work area and through the exhaust filter is inadequate.

Possible Causes:

1. Exhaust filter is blocked by laboratory materials or the protective shipping cover.
2. If the biological safety cabinet is connected to an exhaust system, inadequate exhaust may exist. The system must then be rebalanced to handle the correct air volume. Consult with building maintenance engineers.
3. Low electrical voltage to the blower motor.
4. Blower motor or speed control is defective.
5. If the static pressure gauge reading has increased approximately 50% from its initial readings, the filter has likely loaded with dirt and the speed control must be adjusted. If proper airflows cannot be reached by adjusting the speed control, decontaminate the cabinet and replace all HEPA filters.
6. Pre-filter is dirty, causing blockage of air flow. (Located under work tray).

Problem: Ultra violet light malfunction

Possible Causes:

1. Verify that the lamp is properly installed into the fixture.
2. Starter for U/V light defective. Locate starter on far right side of U/V light and remove by twisting counter-clockwise. Replace starter.

Problem: Fluorescent light malfunction

Possible Causes:

1. Verify that the lamp is properly installed into the fixture.

Problem: Non-functioning static pressure gauge

Possible Causes:

1. Verify that the hose is tightly attached to a high pressure port of the gauge and to the cabinet (front top right of the service box). If properly tightened, the static pressure gauge is likely defective and should be replaced.

Problem: Loud screeching noise

Possible Causes:

1. Bad bearings in the motor blower unit.
2. Blower scroll rubbing against housing.

SECTION 10 - SPECIFICATIONS

Model - 1202, 5 - foot

10.1 Construction

Work Surface: Stainless Steel #4 Finish

Cabinet: Cold Rolled Steel

Finish: Bristol Gray with Windsor Blue Trim

Urethane Enamel

Vertical Sliding Window: 1/4" laminated safety glass

10.2 Dimensions

Exterior: 63.50" W x 79.38" H x 34.50" F-B

Work Area: 58.50" W x 25.25" H x 25.00" F-B

Operational Access Opening: 10"

Shipping Weight: 900 lbs

10.3 Electrical

Model 1202: 115 VAC, 1 Phase, 2 Wire, 60 Hz, 11 FLA, requires a 15 amp circuit breaker.

10.4 Filters

(1) Supply HEPA Filter (24" x 60" x 6")

(1) Exhaust HEPA Filter (24" x 36" x 6")

(1) Disposable Pre-Filter (8" x 50" x 1/4")

10.5 Lights

(2) Fluorescent (F42T12/CW/HO)

(1) Optional U/V (G30T8)

10.6 Air Flow

Downflow Velocity:

67 LFPM nominal (Acceptable Range: 62-72 LFPM nominal)

Inflow (Face) Velocity:

92 LFPM nominal (Acceptable Range: 87-97 LFPM nominal)

SECTION 11 - PARTS LIST AND ACCESSORIES

11.1 Parts (Model 1202, 5-foot)

Stock #	Description
105005	Glass, Clear Laminated, Safety
156038	Motor, 1/2 HP
170024	Capacitor, Motor
285812	Plug 15A, 120V Hospital Grade
225250	Ballast, Fluorescent Lamp
500009	Ballast, UV Lamp
500006	Starter, UV Lamp
141024	Lamp, Fluorescent, (F42T12/CW/HO)
141014	Lamp, UV, (G30T8)
100054	Gasket, Rubber
104004	Gauge, Static pressure, 0-2" WR
191242	Actuator, Sliding Window Switch
360106	Switch, Micro-Door Warning
285758	Outlet, Duplex, 3 W, 15A
760168	Supply Filter, HEPA, 24x60x6
760050	Prefilter Approx. 8x50x1/4
760166	Exhaust Filter, HEPA, 24x36x6
249013	Index Button, "AIR", Orange
249014	Index Button, "VAC", Air
249016	Index Button, "GAS", Blue
249017	Index Button, "NITROGEN"
190396	Motor Speed Control

11.2 Accessories (Model 1202, 5-foot)

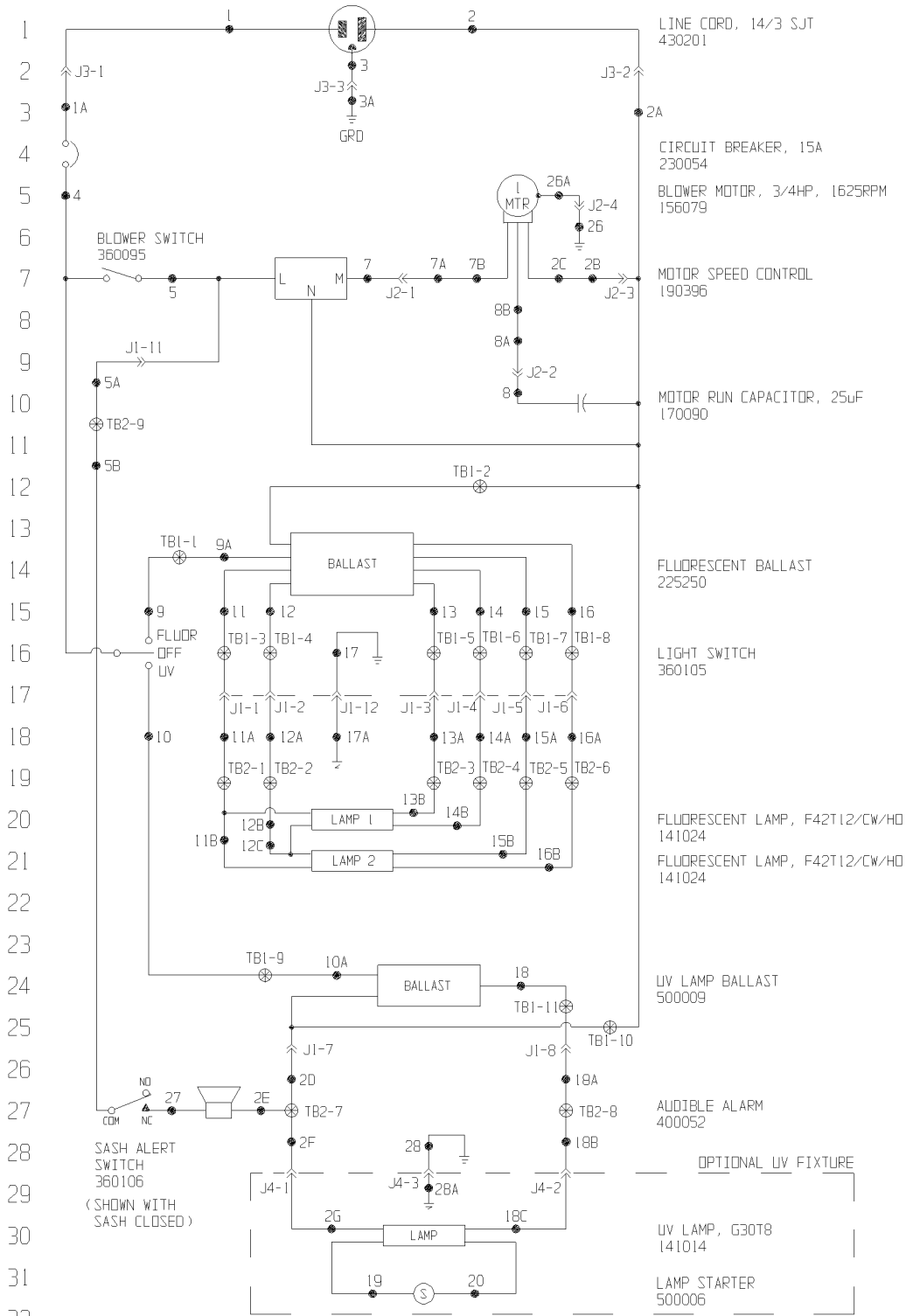
Stock #	Description
191275	Service Valve Kit
191140	Extra Port (Side Wall Mounted)
191419	UV Light, 30 watt
191070	UV Light, 30 watt, Portable
191056	Ground Fault, Duplex Outlet*
191575	IV Rod, 5-foot
191128	Adjustable Foot Rest, 5-foot
191168	Airflow Alarm
760122	Prefilter Replacement Kit
191900	Remote Control for Airflow Alarm

** Factory Installed. Specify when ordering. All other items are customer installed.*

SECTION 12 - SCHEMATICS

POWER CONNECTION

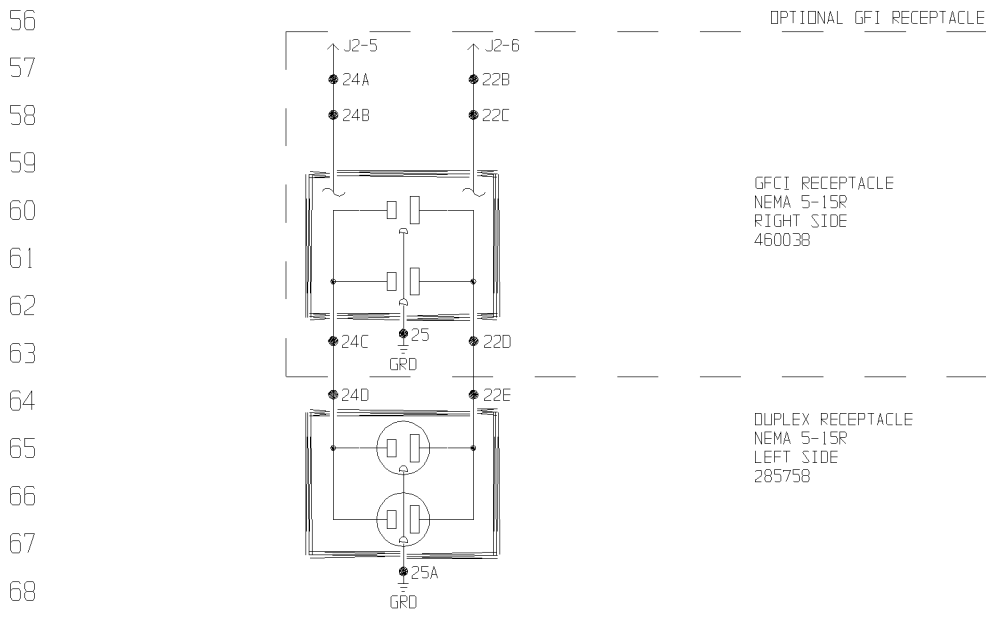
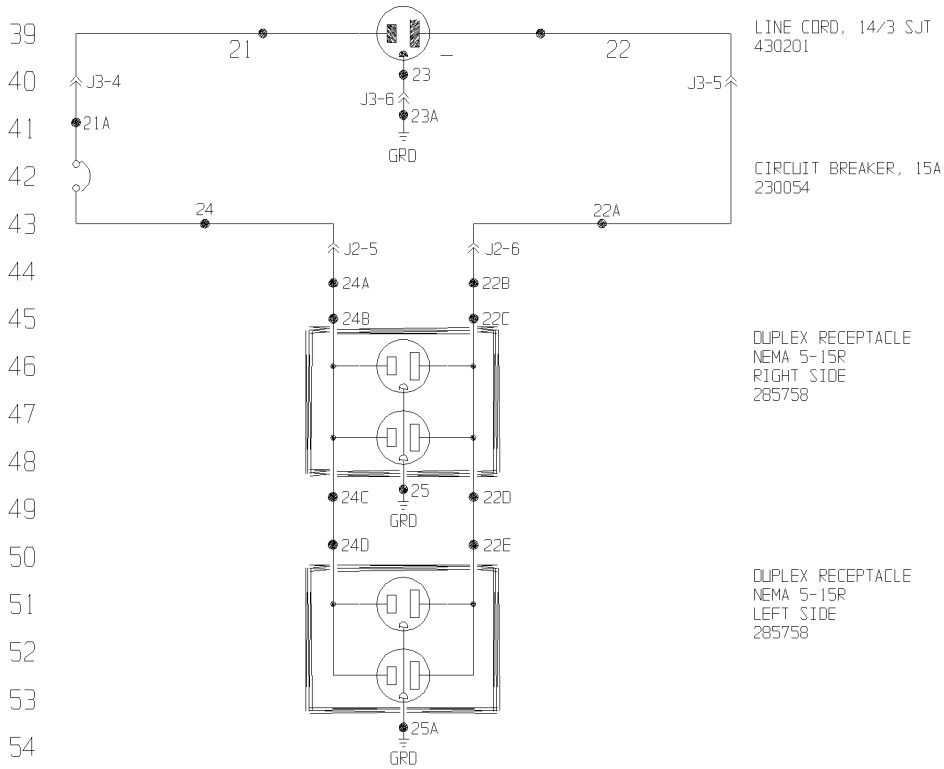
115 VAC, 1PH, 2W, 60HZ, 11FLA



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1202

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POWER CONNECTION - STANDARD DUPLEX RECEPTACLES
 115 VAC NOMINAL, 60HZ, 12FLA MAX.




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WIRE REFERENCE CHART

	WIRE NO.	GAUGE	COLOR
77			
78	1	14	BLACK
	1A	14	BLACK
	2	14	WHITE
79	2A	14	WHITE
	2B	14	WHITE
	2C	16	WHITE
80	2D	18	WHITE
	2E	18	WHITE
	2F	18	WHITE
81	2G	18	WHITE
	3	14	GREEN
82	3A	14	GREEN
	4	14	BROWN
	5	16	BLACK
83	5A	18	BLACK
	5B	18	BLACK
84	6	NOT USED	
	7	16	RED
	7A	14	BLACK
	7B	16	BLACK
85	8	16	RED
	8A	14	RED
86	8B	16	BROWN
	9	18	PURPLE
	9A	18	BLACK
87	10	18	ORANGE
	10A	18	BLACK
88	11	18	YELLOW
	11A	18	ORANGE/BLACK
	11B	18	YELLOW
89	12	18	YELLOW
	12A	18	ORANGE
	12B	18	ORANGE
90	12C	18	YELLOW
	13	18	RED
91	13A	18	RED
	13B	18	RED
	14	18	RED
92	14A	18	RED/BLACK
	14B	18	BROWN
93	15	18	BLUE
	15A	18	BLUE
	15B	18	BLUE
94	16	18	BLUE
	16A	18	BLUE/BLACK
	16B	18	PURPLE
95	17	18	GREEN
	17A	18	GREEN
	18	18	BLUE
96	18A	18	GREEN/BLACK
	18B	18	BLACK
97	18C	18	BLACK
	19	18	BLACK
	20	18	BLACK
98	21	14	BLACK
	21A	14	BLACK
	22	14	WHITE
99	22A	14	WHITE
	22B	14	BLUE
	22C	14	WHITE
100	22D	14	RED
	22E	14	WHITE
101	23	14	GREEN
	23A	14	GREEN
	24	14	ORANGE
102	24A	14	ORANGE
	24B	14	BLACK
	24C	14	ORANGE
103	24D	14	BLACK
	25	14	GREEN
104	25A	14	GREEN
	26	16	GREEN
	26A	14	GREEN
105	27	18	BLACK
	28	18	GREEN
106	28A	18	GREEN
107			

GFI OPTION

22F	14	WHITE
22G	14	WHITE
24E	14	BLACK
24F	14	BLACK

NOTES: ⊕ Denotes Terminal Strip Connection N/A Last Relay Number 18-11 182-9 Last Terminal Number 2B Last Wire Number	Parts List Reference Number <input type="radio"/> Assembly <input type="checkbox"/> Panel <input type="radio"/> Refrigeration <input type="checkbox"/> Wiring	CUSTOMER APPROVAL/REFERENCE APPROVED BY _____ APPROVING FIRM _____ DATE OF APPROVAL _____ THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION AND SUCH INFORMATION IS NOT TO BE DISCLOSED TO OTHERS FOR ANY PURPOSE NOR USED FOR MANUFACTURING PURPOSES WITHOUT WRITTEN PERMISSION FROM FORMA SCIENTIFIC	0 HD-709 12-8-93 JAS JAS REV ECR NO. DATE BY CAD APPD DESCRIPTION OF REVISION DATE 5-11-93 DWN JAS CAD JAS APPD SCALE NTS CUSTOMER JOB TITLE 1202 5FT. BID-SAFETY CABINET DWG TITLE ELECTRICAL SCHEMATIC LOCATION HOODS01 JOB NUMBER DRAWING NUMBER 1202-70-0-D
	 Forma Scientific Bldg 049 MARIETTA, OHIO 45750 TELE: 24-5384 TOLL FREE USA 800-848-3080, OHIO 614-372-4763		

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