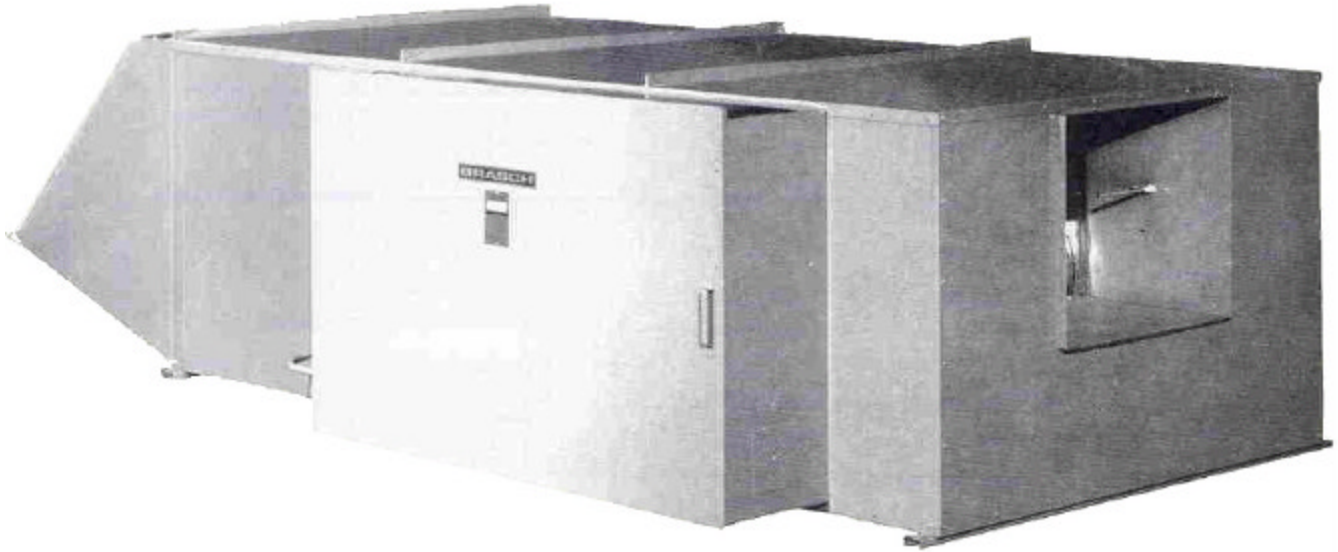


## Description



The nameplate, located on the terminal box door, identifies the model and serial number of the unit. The nameplate also provides information regarding the electrical and airflow ratings and requirements of the equipment. A wiring diagram, located on the inside surface of the terminal box cover, explains the internal and external wiring requirements of the unit. This diagram also details the electrical parameters of the heater and the blower motor. An ETL emblem on the cover establishes listing approval.

The heater section and motor wires are protected by fuses per NEC. The proper fuse size is shown on the wiring diagram. Motor overcurrent protection is provided by automatic or manual reset thermal overloads incorporated in the motor starter.

The heater in the unit employs both primary (automatic reset) and secondary (heat limiters or manual reset) thermal cutouts for protection in the event of an overtemperature condition. The primary thermal cutout is installed in the control circuit and the secondary thermal cutout(s) are in the power lines.

An airflow switch de-energizes the heater section if insufficient airflow exists. A total pressure differential (combined velocity and static pressures) of .05 inches of water column is required for the contacts to close the circuit.

## Pre-Installation

1. Upon receipt, check the shipment with the packing list and the bill of lading.
2. Carefully inspect the unit and any accessories to determine if damage has occurred during shipment. This equipment has been factory operated and inspected before shipment. Any claim for damage or shortage should be reported to the shipping agent immediately.
3. The shipping skid may be used as a lifting platform. If a forklift is used, lift only from the area where the stud offers the greatest support. Do not attach lifting lugs or hooks to the body of the unit as a means of lifting or transporting.
4. If the unit is to be stored prior to installation, the following precautions should be observed:

- Place the unit level at a sturdy location to prevent undue stress. Do not store where the possibility of external vibration exists
- Cover the unit with a waterproof tarpaulin.
- Monthly, rotate the motor and blower assembly in order to redistribute bearing grease and prevent bearing deterioration.
- Support the unit above mud, snow and water. Do not allow the unit to be placed on the ground.

## Installation

**CAUTION: DISCONNECT ALL POWER TO THIS UNIT BEFORE SERVICING OR PERFORMING MAINTENANCE. FAILURE TO DO SO MAY RESULT IN INJURY OR DEATH DUE TO ELECTRIC SHOCK OR FROM THIS UNIT AUTOMATICALLY STARTING.**

### I. GENERAL

1. Extreme care must be observed while handling the crates to avoid equipment damage.
2. Visually inspect the unit exterior for damage and the interior for concealed damage that may have occurred during shipment.
3. This equipment is designed for horizontal use only.
4. Use only trained personnel in the installation, service and maintenance of this equipment.
5. Use the base channel for moving or final positioning of the unit.
6. Allow sufficient room around the perimeter for service and maintenance of this equipment.
7. Do not insulate the heater terminal box exterior.

### II. MOUNTING REQUIREMENT

1. The method used for mounting must be capable of supporting the weight of the unit and accessories. See Table 1 for approximate weights.

Table 1 (weight in pounds)

Model	Basic Unit	Filter Section	Rain Hood	Mixing Box	Roof Curb	Heater & Panel
M-110	300	45	20	70	175	120
M-115	475	65	30	125	200	160
M-118	725	105	45	225	225	200

2. If vibration isolation is required, mount isolators between the unit and its mounting base.
3. This unit must be level for proper operation.
4. The unit must be securely anchored to prevent movement.
5. See instruction package for information regarding specific accessories.

### III. WIRING

1. Disconnect all power at the main disconnect switch before installing or servicing equipment.
2. All wiring must be in accordance with the National Electrical Code and local electric codes.
3. Wire connections are to be made on designated connectors as shown on the wiring diagram (located on the inside cover of the terminal box).
4. Use only the voltage and frequency specified on the nameplate and wiring diagram.
5. Branch circuit wiring connecting this equipment should have a minimum insulation rating of 75° F.
6. This unit must be properly grounded per NEC Article 424.
7. Use NEC Class 1 wiring for the control circuit as described in NEC Article 725.
8. Route conduit away from access covers, panels and doors.
9. If this unit is rated for and used in an outdoor application, use watertight conduit and fittings.

**NOTE: INSPECT AFTER INSTALLATION TO DETERMINE IF DAMAGE TO GASKETS OR CAULKING HAS OCCURRED AND REPAIR OR REPLACE AS NECESSARY.**

## **Start-up Procedure**

1. Check for obstructions. This unit is designed to operate at a specific static pressure (see nameplate).
2. Check for proper input voltage and branch circuit protection (see nameplate or wiring diagram).
3. Review the wiring diagram.
4. Apply power to the unit. (Heating elements may retain a light surface film after manufacture, minor odor may be detected upon initial operation. This is normal and harmless.)
5. Adjust the primary controller to its highest setting. The blower and heating coils should energize (depending on options, a short delay may be experienced). If installed, inlet or discharge thermostats may control stages in excess of the primary controller which may not energize, depending on their settings and ambient conditions.
6. Check the blower for proper rotation. Reverse any two of the three power supply lines to change the direction of the motor and blower. CAUTION: Disconnect power before performing any service.
7. Slowly reduce the setting of the primary controller. The heating stages controlled by this thermostat should deenergize. Stages controlled by other thermostats may not be affected.
8. Adjust the thermostats for the desired heat level. Where applicable, adjust optional control devices.
9. Replace all protective screens, doors, panels and covers.

## **Preventative Maintenance**

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The following checks should be performed monthly, or more frequently under harsh environmental conditions.

1. Check for obstructions at the inlet of the unit.
2. Check the filters. If dirty, replace or clean, as applicable. Do not operate a unit designed for filters without them.
3. Check tightness and alignment of belts and pulleys. Belt adjustment may be necessary. Belts should be sufficiently tight to prevent slipping when starting. Too much tension will cause belts and bearings to wear rapidly and load the motor excessively. "V" belts normally stretch 2% to 4% in length during the first 100 hours of use. Properly adjusted belts should deflect 3/8" to 1/2" when a force of 6 to 7 pounds is applied at the center of the belt span.
4. Check for proper damper operation.
5. Check caulking and gaskets on the unit. If damaged, repair or replace with factory authorized parts.
6. Check voltage for variation from that specified on the nameplate. High voltage increases idle current and low voltage increases load current excessively.
7. Check for unbalanced voltage between phases. A voltage imbalance of 3.5% can result in a current imbalance and subsequent motor temperature increase of 25%.
8. Check for dust accumulation on the concave side of the blower wheel blades. Dirt on the blades can result in severely reduced airflow.

### Miscellaneous Notes:

1. Depending upon the specific unit, the blower and blower motor may contain ball bearings requiring lubrication. Where necessary, use Shell Dolium® Polyurea grease (or equivalent) of medium consistency. Apply grease every other year with a grease gun using one complete stroke.
2. Annually, it is advisable to insure that proper airflow is being maintained by measuring the system static pressure and CFM. See the nameplate for ratings.
3. If the unit has been idle for an extended period, check for obstructions at the inlet before restarting.

4. Use only factory authorized replacement parts. Use of other materials or components will void the ETL listing and could create a hazardous condition.

### **Troubleshooting**

**CAUTION: DISCONNECT ALL POWER TO THIS UNIT BEFORE SERVICING OR PERFORMING MAINTENANCE. FAILURE TO DO SO MAY RESULT IN INJURY OR DEATH DUE TO ELECTRIC SHOCK OR FROM THIS UNIT AUTOMATICALLY STARTING.**

<b>PROBLEM</b>	<b>POSSIBLE SOLUTION</b>
Heater will not operate	<ul style="list-style-type: none"><li>• Make sure the installation and wiring instructions were followed.</li><li>• Check for the correct supply voltage to the unit. Make sure the main disconnect or circuit breaker is in the “ON” position.</li><li>• Check all fusing. If open, determine the cause of failure and correct before replacing the fuse.</li><li>• Check the replaceable thermal cutouts (identified as heat limiters on the wiring diagram) or the manual reset thermal cutouts. These may have opened due to overheating. Determine and correct the cause before replacing or resetting them. Replace only with factory authorized parts.</li><li>• Check the control circuit for proper voltage.</li><li>• Check the airflow switch for continuity. The contacts should close when there is a pressure differential of .05” water column.</li><li>• Check the automatic reset thermal cutouts (ARTCO) for continuity. The ARTCO opens on an overtemperature condition and should reset itself upon cooling. If open, replace with an identical factory authorized part.</li><li>• Check to ensure that the auxiliary end switch in the damper motor is closing when the damper opens.</li></ul>
Insufficient Heat	<ul style="list-style-type: none"><li>• Check for proper airflow. Low airflow can cause cycling of the automatic reset thermal cutout.</li><li>• If the blower motor is also cycling, check the motor overloads. Also check the supply voltage for an unbalanced phase or low voltage.</li><li>• Check for proper thermostat operation. Make sure that field mounted controllers are located in areas unaffected by other heating sources and all controls are adjusted according to manufacturer’s specifications.</li><li>• Check the replaceable or manual reset thermal cutouts. If open, determine and correct the cause before resetting or replacing. Replace only with factory authorized parts.</li><li>• See “No or low airflow” below.</li></ul>
Too much heat	<ul style="list-style-type: none"><li>• Check for a faulty or improperly located thermostat. Check the ambient conditions at the thermostat.</li><li>• Inspect contactors to see if they are energized or sticking when there is not a call for heat.</li></ul>
No or low airflow	<ul style="list-style-type: none"><li>• Visually inspect the blower and motor for a broken or slipping belt, loose pulley or locked bearings.</li><li>• Check the power and phasing to the motor, motor fuses and overloads.</li><li>• Check the voltage to the motor starter coil</li><li>• Check for obstructions.</li><li>• Check for proper damper operation.</li></ul>

Notes:

1. Use only factory authorized replacement parts. Use of other materials or components will void the ETL listing and could create a hazardous condition.
2. Safety devices must be replaced with exact replacement components.
3. If a safety device is removed, it must be repositioned and reconnected (physically and electrically) in the exact location, manner and orientation as it was originally installed. This includes (but is not limited to) all safety devices, motor overload, airflow switch and probe.

IF ANY QUESTION ARISES, CONSULT THE FACTORY BY CALLING 314-291-0440

**Limited Warranty**

Brasch Manufacturing Company, Inc. warrants heater resistance coils against defects in material and workmanship for a period of two years from date of shipment. Other components and accessories are guaranteed for a period of one year from date of shipment against defects in material and workmanship. Should evidence of covered defect occur during the warranty period, Brasch Manufacturing Company, Inc. will repair or replace the product at its sole discretion without charge. Brasch Manufacturing Company, Inc. shall not be held responsible for any charges in connection with the removal or replacement of allegedly defective equipment, nor for incidental or consequential damage.

**Spare Parts**

The following list of parts should be stocked at or near the installation site for purposes of preventative maintenance. These may be obtained from the factory or locally, if available. To ensure compliance with ETL, use these specific products or direct equivalent substitutes only.

Product	Manufacturer	Part Number	Description
Caulk	Permatite	711 Sealant	20 year caulk, -40° F to 250° F Thermoplastic rubber sealant for building and marine applications.
Gasket	Duraco, Inc.	GN 3/4x1/8 GN 3/4x1/4 SC41 material	Closed cell neoprene self-extinguishing Weather and solvent resistant adhesive backed. -20° F to 160° F.
Blower Belt	MBL Corp.	MBL 3 Star Super V Belt	Polyester cord with neoprene cover for heavy load under extreme heat. High tensile strength. Anti-static, oil and heat resistant.
Filters	Replace with the same type of filter as originally installed. A different filter type could result in a different pressure drop, adversely affecting the performance of the unit.		