

OPERATION AND MAINTENANCE MANUAL



PQ OVENS

1. Sales and Service Contact Information

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Please read and follow these instructions carefully. The safety of your employees and your shop, as well as the success of this process depend absolutely on the operator observing all precautions outlined in this manual, and any other common sense measures of safety that may be indicated.

Do not allow anyone to operate this equipment until this person understands fully how it works and what it is supposed to do. The manufacturer assumes no responsibility for uncontrollable fires, damages to the premises, to the oven, its contents, or to individuals.

2. Safety Precautions

We, like most American manufacturers, go to great lengths to make our products as safe as possible. For continued protection from injury, the operator must:

1. Know how to operate the oven properly
2. Follow proper operating and safety procedures
3. Be careful and attentive
4. Never try to “take a short cut”
5. Supply good maintenance

CAUTION:
The following instructions are imperative!

On installing any oven it is of the utmost importance that the installer follows NFPA 91 Code Book (*Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids*), NEC Standards, and local codes for safe and proper installation and operation.

2.1 Local Codes

Ovens are equipped to comply with most local building codes, but sometimes there will be requirements which the factory has no way of knowing unless told before shipment. If such requirements become known after receipt of the oven, please contact the manufacturer before authorizing any work to change anything, so that we may fully explain to local authorities the details of your unit, and also for us to understand their requirements. If the manufacturer was not notified in advance of any special requirements, then any changes will be at the expense of the customer.

2.2 Standard Safety Precautions for the Oven

1. **NEVER** put products with volatile vapors into an oven that is not equipped with a proper size powered exhaust fan and safeties. (If such a condition exists, consult with the factory immediately for proper safety recommendations prior to using.)

***Note:** See label for quantity of solvent the oven is equipped for.*

2. **NEVER** reduce or block off the exhaust port or outlet of powered exhauster.
3. **NEVER** operate oven without proper guards secured in place.
4. **NEVER** overload oven to the point of blocking off air flow.
5. **NEVER** tamper with electrical connections or wiring, unless power is turned off and you are a qualified electrician.
6. **NEVER** attempt to adjust the exhaust damper with your bare hands with the oven at temperature. The hot sheet metal may cause severe burns.
7. **ALWAYS** turn oven off and correct any malfunction immediately. Refer to the troubleshooting section of this manual or contact the factory.
8. **ALWAYS** upon shut-down, turn off heat source and allow the fans to run for proper cooling period to avoid damage to oven.

CAUTION:
Do not leave oven unattended when in operation!

3. Installation and Set-Up

3.1 Determining Proper Oven Location

CAUTION:

When selecting the location for an oven, consideration must be given to the possibility of fire, building damage and personal injury

1. Ovens which have a fuel hazard and/or may contain flammable solvents or combustible materials in processing should be located at or above floor level unless special consideration has been given to ventilation and explosion relief.
2. Class “A” Oven—Per NFPA 86 Guidelines; 10.1.1.4 On completion of an oven installation, airflow test shall be conducted on the ventilation systems under the oven operating conditions, with air flow control devices at their minimum setting. 10.1.1.5 The air flow tests required by 10.1.1.4 shall be repeated when the flammable or combustible vapor loadings are increased or when modifications are made to the ventilation system.
3. Locate oven so building structural members are not adversely affected by maximum anticipated temperature.
4. Locate oven to minimize exposure to people from possible injury from fire, explosion, asphyxiation, toxic materials and so as not to obstruct building exits.
5. Give consideration to adjacent stock areas, power stations, sprinkler systems, flammable liquids and gases. Follow NFPA code requirements, NFPA/NEC 70 and 86.
6. Place oven on noncombustible floor or on structure approved by use over combustible floors. Follow NFPA code requirements, NFPA/NEC 70 and 86.
7. Locate oven so there is unrestricted air circulation around the blower motor and fresh air inlets.
8. Do not place oven up against a wall. A minimum air space of three feet must be provided on all sides to allow for air circulation—with additional space provided for ovens operating over 450° F to assure adjacent structures and materials are not subjected to excessive temperatures. See stack instructions for recommended exhaust stack installation.

FLOOR LOAD CALCULATION

When calculating the floor load in an area in which the oven is to be located, consider the total weight of the oven and the product or process material used inside the oven including all trucks, carts or fixtures used to hold the product.

3.2 Installing the Oven

REMOVAL FROM SKID

Leave the oven fastened to the base skid until it is moved to its final location. Then remove lag screws holding it to the skid. Elevate the oven uniformly, lifting from the corners, just high enough to remove the skid. This can be done with an overhead crane, forklift or jacks, whichever is available and will do the job safely considering the size of the oven.

LEVELING AND ANCHORING

All ovens must be leveled to assure proper door seal and oven operation. Locate the oven on a solid nonflammable surface using shims, if necessary, to level from side to side and front to back where mounting holes are provided. Anchor securely after leveling. Once the oven is leveled properly, the top center of the doors will be even. (See Fig. 6)



Fig. 6

BOTTOM DOOR CART TRACK CLOSE-OFFS (FOR WALK-IN AND TRUCK OVENS)

Ovens supplied with insulated floor and cart guide tracks only require fastening the Z-bracket close-offs to the bottom front of the doors. For ovens supplied with no floor, but where cart wheel openings are required, anchor the center of the bottom door close-off angle to the floor. Using a saw or torch, cut out two 4" (100mm) to 6" (150mm) wide openings in the angle, as required for the cart wheels to clear. Fasten the Z-bracket close-offs (See Fig. 7) to the bottom front of the door so that they cover the openings cut in the angle for the cart wheels.

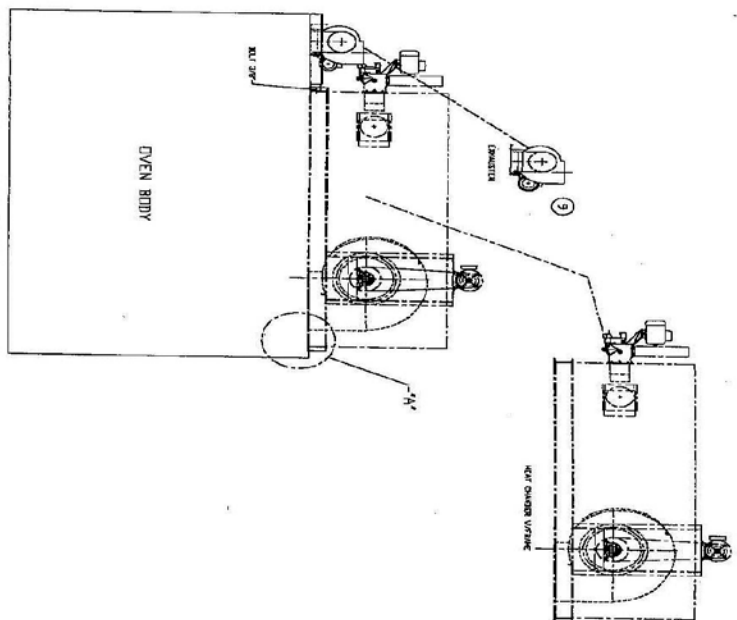
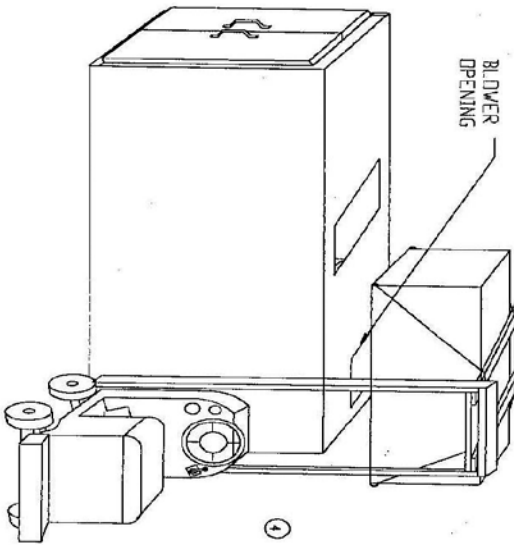


Fig. 7

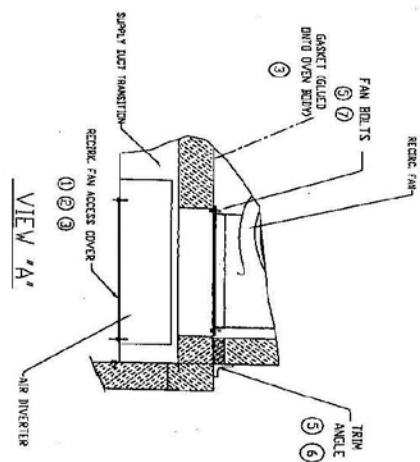
Note: *It is recommended that any oven which is loaded by means of a cart or truck should have some form of guide tracks and end stops to avoid damage to the oven interior.*

3.3 Mounting of Heater Box to Oven

MOUNTING OF HEATER BOX TO OVEN



SIDE VIEW



1. LOCATE RECIRCULATION SUPPLY TRANSITION ON WORK CHAMBER CEILING. THE 'RECIRC. FAN ACCESS COVER' IS A RECTANGULAR PLATE SCREWED TO THE MIDDLE OF THE SUPPLY TRANSITION.
2. REMOVE RECIRC. FAN ACCESS COVER TO ALLOW EASY ALIGNMENT OF THE HEAT CHAMBER. BEFORE LIFTING THE HEAT CHAMBER TO TOP OF OVEN MAKE SURE THE GASKETING FURNISHED IS IN PLACE.
3. (1/4"X2" FOR FAN SEAL, 1/4"X2" = 2-3 STRIPS FOR HEATER BOX SEAL BOTH GLUED TO OVEN TOP.)
4. USING A FORK LIFT (OF PROPER CAPACITY) HOOK UP LIFTING EYES PROVIDED TO RAISE HEATER BOX TO THE TOP OF THE OVEN.
5. AFTER THE HEATER BOX HAS BEEN SET DOWN ON TOP OF THE OVEN ALIGN IT WITH THE PRE DRILLED HOLES.
6. BOLT HEAT CHAMBER TO OVEN TOP.
7. BOLT RECIRC. FAN TO TOP OF OVEN FROM UNDERSIDE.
8. BOLT THE RECIRC. FAN ACCESS COVER BACK IN PLACE.
9. REMOUNT EXHAUST FAN (IF SUPPLIED).

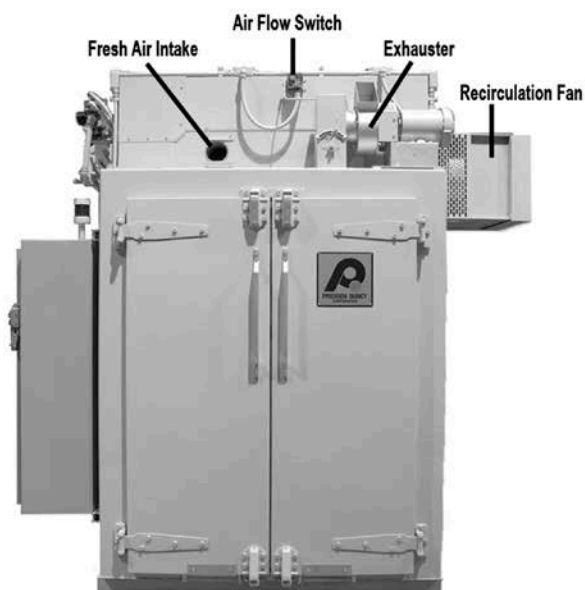


PRECISION QUINCY CORP.

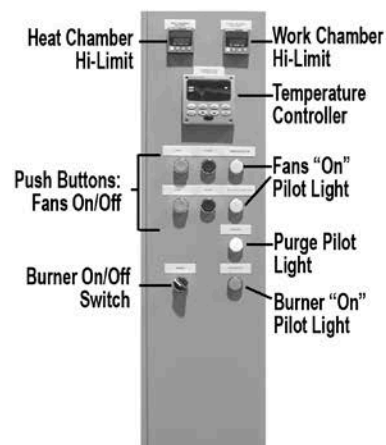
1625 W. LAKE SHORE DR., WOODSTOCK, IL 60098
PHONE: 815 338-2675, FAX: 815 338-2950

4. Gas Oven Information

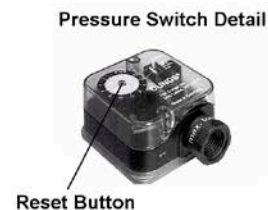
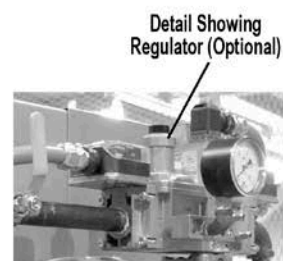
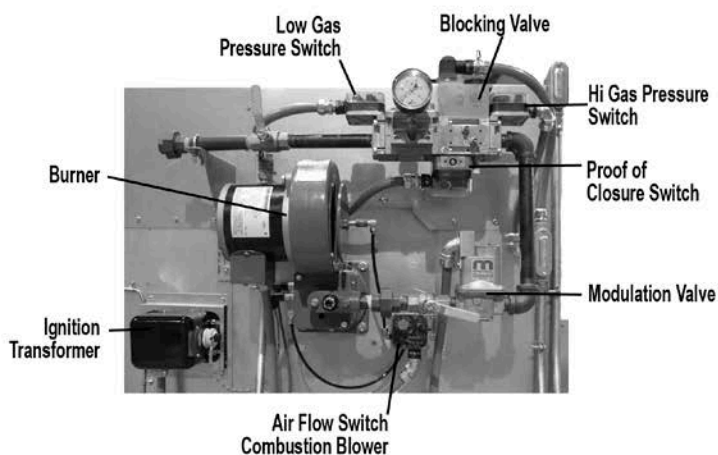
4.1 Gas Oven Nomenclature



Control Panel



Gas Train Components



CAUTION:

Do not exceed maximum permissible solvent load stated on Control panel door label

4.2 Gas Service Installation

Reference Picture on Page 7

Gas Service

All gas fired equipment requires a gas pressure regulator whenever the plant supply pressure exceeds that required for proper burner operation, or whenever the plant supply pressure is subject to excessive fluctuations. All gas piping must be large enough to handle and deliver the proper pressure and volume of gas to the burner. A tag attached to the oven wall near the gas train inlet piping lists the gas pressure and the oven nameplate lists the burner capacity.

Gas pressure regulators and, when furnished, the vent valve on gas fired equipment, must be piped outdoors or to a safe location according to NFPA Code 86A and/or local codes. This also includes the vent lines on the high/low gas pressure switch and the modulating valve.

HI-LOW GAS PRESSURE SWITCHES

These devices are used to sense an abnormally high or low gas pressure condition which would affect the operation and safety of the equipment. If the gas pressure goes above or below a preset level, the control circuit to the burner is automatically turned off.

VENT VALVE - *(To be used with block valve)*

The vent valve is used as part of a system to safely vent any leaking gas through the valve circuit to a safe location. See installation instructions above and NFPA Code 86.

BLOCK VALVE

This is used in conjunction with the vent valve and safety valve (*safety valve is standard on all gas trains*). This forms a barrier down-stream from the vent valve so that any gas leaking through the safety valve will discharge safely through the vent valve to a safe location. See NFPA Code 86.

VENT VALVE LEAK TEST DEVICE

This test device is used as part of an inspection program to insure that the valves are sealing properly when de-energized.

GAS PRESSURE GAUGE

The gas pressure gauge is required to properly set up and check the burner for optimum operation. The gauge indicates incoming gas pressure.

POWERED EXHAUSTER (Class A Oven)

As a safety device, the powered exhauster must be used to remove a definite volume of air when flammable solvents, vapors, gasses or products of combustion are present in the oven atmosphere. This must be properly sized for safe operation. This must be determined from the quantity of vapors in the atmosphere and the operating temperature of the oven, in accordance with NFPA Standards, NFPA Code 86. See nameplate on the oven control panel for maximum solvent load and Exhaust Fan CFM.

PURGE TIMER

The purge timer is used in conjunction with powered exhaust, when it is necessary to purge the oven of flammable solvents, vapors or gasses before initiating the heat. The timer starts automatically after the fans are started and safeties on the oven are made to allow for proper purge period.

AIR FLOW SWITCH

This device is used on an exhaust blower and on a recirculating blower and/or burner combustion blower to indicate that these fans are moving air. When failure of the air supply is critical or dangerous, this device is necessary. It will shut-off the heating system when there is a failure of air movement.

MANUAL RESET EXCESS TEMPERATURE CONTROLLER (HI-LIMIT)

This device, upon a failure which would cause the oven temperature to exceed a preset level, disconnects the control circuit to the heating element contactors if electric, or shuts off the burner on gas fired units. To restore operation, push the "manual reset" button after determining and correcting the cause of the failure. Electric heated units are furnished with one Hi-Limit, with the thermocouple mounted to monitor the oven work area. It is set slightly above maximum oven temperature.

Note: Gas fired ovens are furnished with a second excess temperature control with the thermocouple mounted in the heat chamber.

CAUTION:

All electrical work should be done by a qualified electrician

ELECTRICAL INSTALLATION OF GAS OVEN

All electrical connections must be made in accordance with the appropriate local and national codes.

If any items were removed for shipping, rewire to the appropriate terminals. All wires and terminals are numbered and/or color coded.

A disconnect switch, if not already furnished, must be provided between fused power supply and the oven. Use the information provided on the oven's nameplate to determine the capacity.

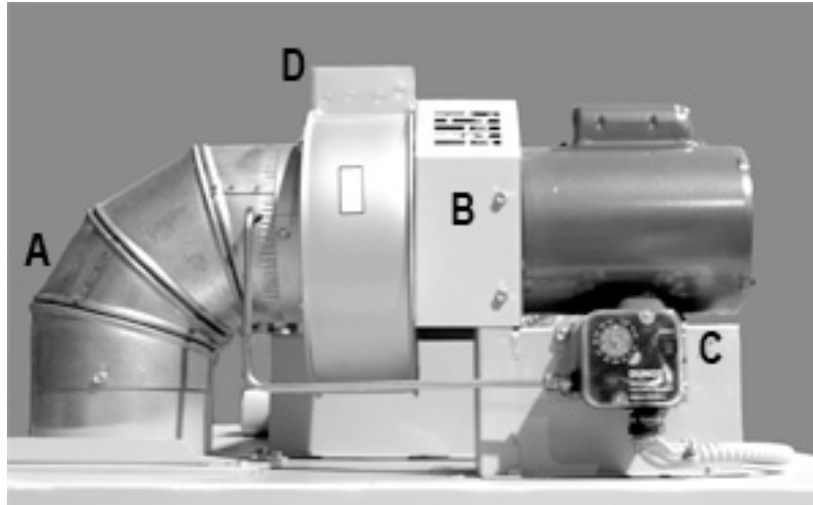
The oven must be adequately grounded.

When the equipment is placed in operation, check all fans for proper rotation. Rotation directional arrows are located near each fan. Three phase motors may be reversed by interchanging any two of the three wires which supply power to the oven. Single phase motors are correctly set at the factory.

CAUTION:

Disconnect all power to unit and tighten all terminals, especially on power connections, to minimize terminal and component failure due to poor contact

4.3 Exhaust System



A. EXHAUST DAMPER:

All ovens are equipped with an adjustable damper that is to be adjusted for the amount of exhaust required for the product being put into the oven. The damper is not a 100 percent close-off unit.

CAUTION:

DO NOT modify the slide for complete close-off of all exhaust!
Some air must always be exhausted from the oven

B. POWERED EXHAUSTER:

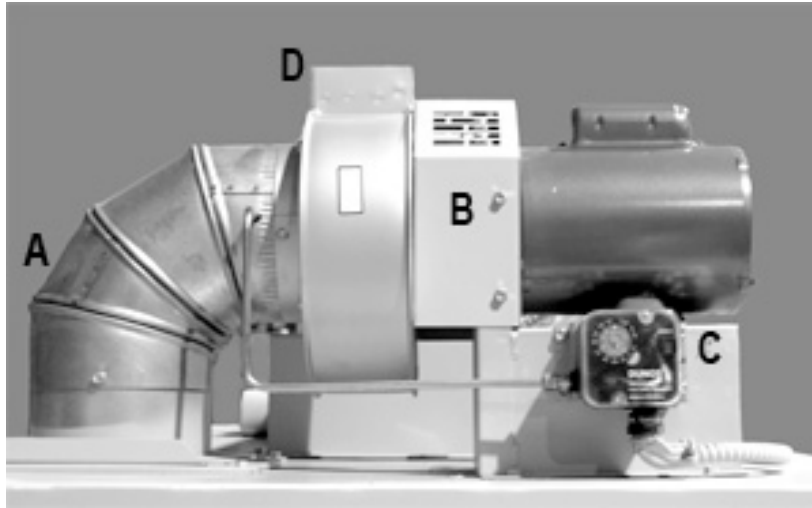
In some cases, the powered exhauster must be removed for shipping. If so, the nuts, bolts, and/or screws required for remounting to pre-drilled and tapped holes, are placed in a shipping bag.

C. AIR FLOW SWITCH:

If the air flow switch is removed for shipping reasons, remount and rewire to the pre-drilled holes.

Note: *1/4" tube must be placed so that the end of tube is pointed to the inlet of the exhaust fan to sense vacuum.*

4.3.1 Exhaust System Stacking



D. EXHAUST STACK: *(See stack recommendation sheets provided on CD)*

Note: *The following are recommendations only. Local, State, and Federal building codes **must** be followed.*

1. The top of the stack must be at least six feet above any projection (walls, roof, peaks, etc.) within 50 feet measured horizontally from stack to prevent down-drafts.
2. Keep stack as far as possible from combustible building materials. Stacks passing through combustible walls must be insulated or sufficient clearance allowed to keep area adjacent to stack below 140° F.
3. Stacks must be made out of sheet metal, stove pipe or other materials approved for maximum stack temperatures. Use the shortest and most direct path for all stacks. Do not use 90° elbows in exhaust stacks. All stack joints must be tight with laps in the direction of air flow. Do not run stack through fire walls. Do not install dampers or restrictions that can impede exhaust flow.
4. All stacks within seven feet of the factory floor must be insulated or guarded to protect personnel. All stacks must be supported sufficiently so as not to place a load on the connecting equipment. On ovens without a powered exhauster, if the total length of the straight stack is ten feet or less, use the same stack size as the oven connection. If the length of the straight stack is over ten feet or has elbows, use one size larger pipe for each additional ten feet and/or elbow. For ovens with powered exhauster, the stack should be sized for the most efficient operation. Varying stack velocities are required for different exhausted materials. (See NFPA Code 91).

4.4 Gas Fired Oven Control Sequence

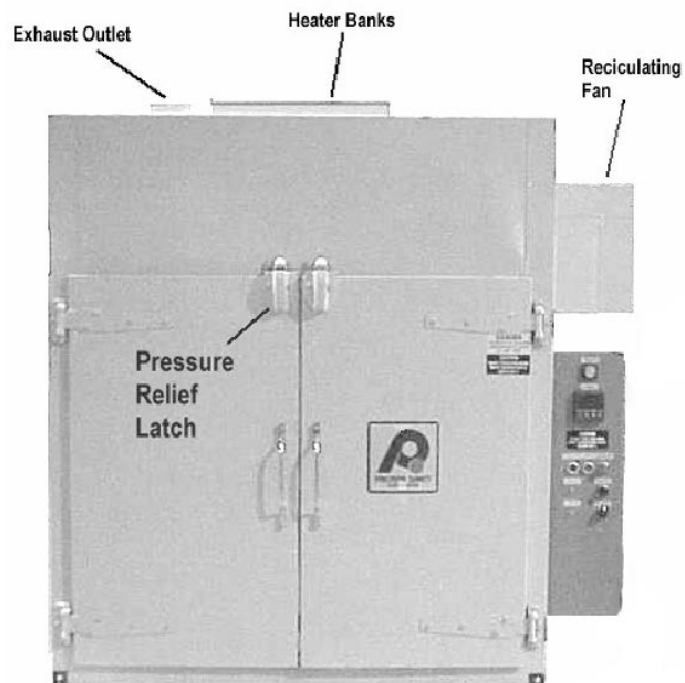
1. Close main power switch.
2. Set temperature controller to desired operating temperature.
3. Reset Hi-Limit controllers.
4. Reset Hi-Low gas pressure switch, as well as proof of closure switch (if applicable).
5. Push Exhaust fan “start” button. The fan motor contactor coil (MC1) will energize, closing normally open contacts in main power line, starting the motor and closing auxiliary contacts which forms a holding circuit to the fan motor contactor coil and motor on (amber) pilot lights. Once the fan is running, the amber fan running light will illuminate and power is supplied to Step 6 start-stop station.
6. Push recirculation fan “start” button.
7. The sequence from the previous steps will supply power through the safeties to the flame safety for the burner.
8. The burner can now be turned on using the burner on/off switch. With the switch in the “on” position the flame safety will start its sequence of operation. The flame safety will verify that all of the safeties are ok. Once this is proven the flame safety will start the combustion fan and begin its purge sequence. This will be indicated by a white “oven purging” pilot light. Upon completion of the purge sequence the safety will open up the gas blocking valve and fire the ignition transformer for spark. Once a flame is established the flame safety will close a relay and turn off the oven purging light and close the connection for the control signal to the modulating valve.
9. The oven will now operate at the desired set temperature by controlling the modulating valve using a proportional signal.
10. To shut-off the oven, switch the burner switch to the “off” position. After the oven temperature has dropped below 250° F, to avoid fan shaft warpage, push the exhaust fan “stop” button and throw the main power switch to the “off” position.

CAUTION:

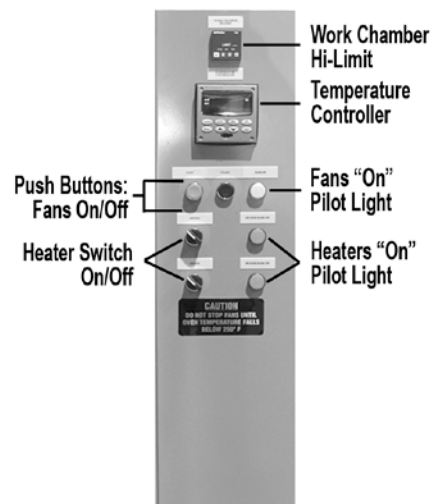
Opening doors when the oven is operating at temperatures over 500° F or stopping fans when operating temperatures over 350° F (250° F on ovens less than 450° F) can cause excessive oven sheet metal warping, fan and shaft imbalance and bearing failure respectively. Any damage caused as a result of these actions will not be covered under our warranty.

5. Electric Oven Information

5.1 Electric Oven Nomenclature



Control Panel



CAUTION:

Do not exceed maximum permissible solvent load stated on Control panel door label

5.2 Electric Oven Installation

CAUTION:

All electrical work should be done by a qualified electrician

All electrical connections must be made in accordance with the appropriate local and national codes.

If any items were removed for shipping, rewire to the appropriate terminals. All wires and terminals are numbered and/or color coded.

A disconnect switch, if not already furnished, must be provided between fused power supply and the oven. Use information provided on the oven's nameplate to determine the capacity.

The oven must be adequately grounded.

When the equipment is placed in operation, check all fans for proper rotation. Rotation directional arrows are located near each fan. Three phase motors may be reversed by interchanging any two of the three wires which supply power to the oven. Single phase motors are correctly set at the factory.

CAUTION:

Disconnect all power to unit and tighten all terminals, especially on power connections, to minimize terminal and component failure due to poor contact

When a Silicon Controller Relay (SCR) type power controller is used on an oven, it may be necessary to properly phase the unit. If no output can be obtained from the SCR, interchange any two of the three wires which supply power to the SCR power controller. Be careful to change the input (*fused*) connections and not the output connections.

POWERED EXHAUSTER (Class A Oven)

As a safety device, the powered exhauster must be used to remove a definite volume of air when flammable solvents, vapors, gasses or products of combustion are present in the oven atmosphere. This must be properly sized for safe operation. This must be determined from the quantity of vapors in the atmosphere and the operating temperature of the oven, in accordance with NFPA Standards, NFPA Code 86. See nameplate on oven control panel for maximum solvent load.

PURGE TIMER

The purge timer is used in conjunction with powered exhaust, when it is necessary to purge the oven of flammable solvents, vapors or gasses before initiating the heat. The timer starts automatically after the fans are started and safeties on the oven are made to allow for proper purge period.

AIR FLOW SWITCH

This device is used on an exhaust blower and on a recirculating blower and/or burner combustion blower to indicate that these fans are moving air. When failure of the air supply is critical or dangerous, this device is necessary. It will shut-off the heating system when there is a failure of air movement.

MANUAL RESET EXCESS TEMPERATURE CONTROLLER (HI-LIMIT)

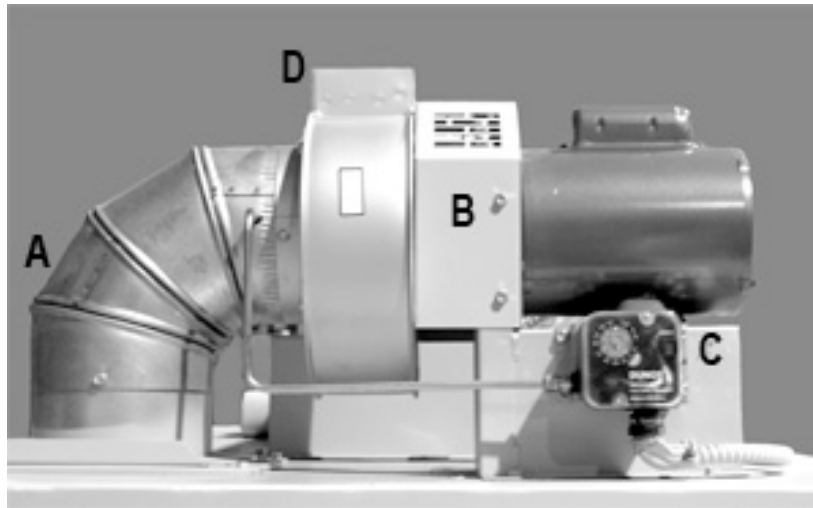
This device, upon a failure which would cause the oven temperature to exceed a preset level, disconnects the control circuit to the heating element contactors if electric, or shuts off the burner on gas fired units. To restore operation, push the manual reset button after determining and correcting the cause of the failure. Electric heated units are furnished with one High-Limit, with the thermocouple mounted to monitor the oven work area. It is set slightly above maximum oven temperature.

Note: Gas fired ovens are furnished with a second excess temperature control with the thermocouple mounted in the heat chamber.

BACK-UP CONTACTORS

This contactor is connected in series with the main control contactor to disconnect the heater power circuit at the same time an oven safety is lost. This provides additional protection which cannot be obtained with the safety circuit alone.

5.3 Exhaust System



A. EXHAUST DAMPER:

All ovens are equipped with an adjustable damper that is to be adjusted for the amount of exhaust required for the product being put into the oven. The damper is not a 100 percent close-off unit.

CAUTION:

DO NOT modify the slide for complete close-off of all exhaust!
Some air must always be exhausted from the oven

B. POWERED EXHAUSTER:

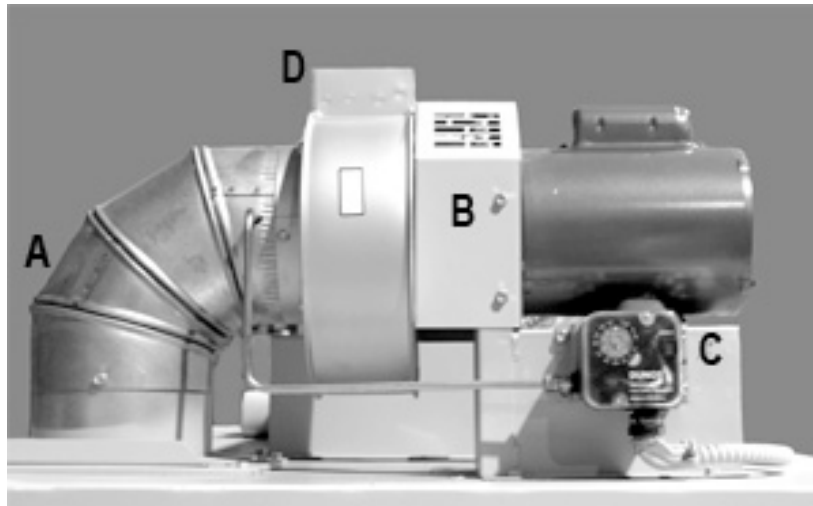
In some cases, the powered exhauster must be removed for shipping. If so, the nuts, bolts, and/or screws required for remounting to pre-drilled and tapped holes, are placed in a shipping bag.

C. AIR FLOW SWITCH:

If the air flow switch is removed for shipping reasons, remount and rewire to the pre-drilled holes.

Note: 1/4" tube must be placed so that the end of tube is pointed to the inlet of the exhaust fan to sense vacuum.

5.3.1 Exhaust System Stacking



D. EXHAUST STACK: *(See stack recommendation sheets provided on CD)*

Note: *The following are recommendations only. Local, State, and Federal building codes **must** be followed.*

1. The top of the stack must be at least six feet above any projection (walls, roof, peaks, etc.) within 50 feet measured horizontally from stack to prevent down-drafts.
2. Keep stack as far as possible from combustible building materials. Stacks passing through combustible walls must be insulated or sufficient clearance allowed to keep area adjacent to stack below 140° F.
3. Stacks must be made out of sheet metal, stove pipe or other materials approved for maximum stack temperatures. Use the shortest and most direct path for all stacks. Do not use 90° elbows in exhaust stacks. All stack joints must be tight with laps in the direction of air flow. Do not run stack through fire walls. Do not install dampers or restrictions that can impede exhaust flow.
4. All stacks within seven feet of the factory floor must be insulated or guarded to protect personnel. All stacks must be supported sufficiently so as not to place a load on the connecting equipment. On ovens without a powered exhaust, if the total length of the straight stack is ten feet or less, use the same stack size as the oven connection. If the length of the straight stack is over ten feet or has elbows, use one size larger pipe for each additional ten feet and/or elbow. For ovens with powered exhaust, the stack should be sized for the most efficient operation. Varying stack velocities are required for different exhausted materials. *(See NFPA Code 91).*

5.4 Electrically Heated Oven Control Sequence

1. Close main power switch.
2. Set temperature controller to desired operating temperature.
3. Reset High-Limit controllers.
4. Push recirculation fan “start” button. (If oven is a Class A oven then the exhaust fan button will need to be hit first.) The fan motor contactor coil (MC1) will energize, closing normally open contacts in main power line, starting the motor and closing auxiliary contacts which forms a holding circuit to the fan motor contactor coil and motor on (amber) pilot lights. Once the fan is running, the amber fan running light will illuminate and power is supplied to the safety sequence.
5. With all fan equipment operating, the electric heater banks may be put into operation by turning “on” the switch on the front of the cabinet labeled “Heat Switch”. Depending on the oven model number there may be more than one heater bank that will need to be turned on. Any one of these banks will operate independently or together in any combination and still maintain a balanced electrical load. Each individual heater bank has its own red pilot light which indicates when that particular heater bank is energized.
6. When temperature is reached, the controller will cycle those heater banks switched to the “on” position, off and on, as required to maintain set temperature.
7. All ovens are wired (through the control circuit) so as not to allow the operation of any safety equipment, accessory equipment or heater elements until all fan equipment is electrically operating.

CAUTION:

Opening doors when oven is operating at temperatures over 500° F or stopping fans when operating temperatures over 350° F (250° F on ovens less than 450° F) can cause excessive oven sheet metal warping, fan and shaft imbalance and bearing failure respectively. Any damage caused as a result of these actions will not be covered under our warranty

6. Operations

6.1 Loading the Oven

Air circulation is very important to proper oven operation. When loading, leave space between articles on each shelf to allow air to move between the parts. Stagger parts from one shelf to another to permit air to pass between the shelves. If problems arise, consult factory.

6.2 Proper Use of the Oven

While our ovens are extremely versatile, they are usually ordered with a specific application in mind. If your process has changed significantly, or if you should have reason to doubt the application for which you wish to use the oven, consult the factory for proper use of the equipment. Heat processing equipment must always be used with caution and proper supervision.

7. Inspection and Maintenance

7.1 Inspection

To ensure continued protection against anticipated hazards, both real and potential, perform regularly scheduled inspection and maintenance of the oven and all its components as required. It shall be the sole responsibility of the user to establish, schedule, and enforce the frequency and the extent of the inspection/maintenance program, and to take any necessary corrective action, since only the user can know what the actual field conditions of operation are. Failure to do this may result not only in short equipment life, personnel injury, accidental shutdowns and loss of production; but also in some cases it can contribute to the possibility of fire or explosion. Following is a list of recommended maintenance and inspection items.

CLEANING

Clean the oven interior and exterior; including the ducts, fans, air inlets, exhaust outlets, control enclosures, motors, safety switches, door latches, hinges, etc. This must be done at regular intervals if they are subject to a buildup of flammable lint or dust. The rate at which depositions build varies considerably with different ovens and processes. Therefore, no specific schedule can cover all ovens. Your new oven should be inspected and/or cleaned on a weekly basis until sufficient experience is obtained to establish the necessary cleaning frequency.

DO NOT ALLOW COMBUSTIBLE DEPOSITS TO ACCUMULATE

LUBRICATION

1. Motors

No lubrication need be added before start-up, as the bearings have been lubricated at the factory. If the motor is equipped with grease fittings, clean tip of each fitting and lubricate with grease gun. Use one or two full strokes on NEMA 215 frame and smaller once every two years and two to three full strokes on NEMA 254 thru 365 frame once every year. Use high quality ball bearing grease, and always lubricate motors at standstill.

2. Blower shaft bearings

Lubricate every 100 hours of operation with good multi-purpose bearing grease. The proper amount of lubricant in the bearing is important. Both excessive and inadequate lubrication may cause failure. The bearings should be relubricated while they are rotating. Pump grease in slowly until a slight bead forms around the seals. This bead, in addition to acting as an indicator of adequate lubrication, provides additional protection against the entry of foreign matter.

3. Latches and hinges

Clean and lubricate with a couple of drops of light machine oil once every three months or sooner if required.

4. Air lift door (*option*)

The door rollers require a couple of drops of heavy machine oil once a month.

5. Cart or truck wheels

All oven cart or truck wheels are pre-lubricated at the factory with 1000° F graphite grease. Re-lubrication is required every three months under regular use, or every six months under intermittent use with comparable grease.

CAUTION:

When lubricating with graphite grease, do not over grease. Follow grease manufacturer's recommendations.

BEARING BOLTS, SET SCREWS, SHEAVES AND BELTS

Check once a month for proper alignment and tightness. Loose drive components can cause excessive wear and premature failure. See next paragraph for belt tension adjustment procedure.

ADJUSTING V-BELT DRIVE TENSION

Without exception, the most important factor in the successful operation of a V-belt drive is proper belt tension. To achieve the long, trouble-free service associated with V-belt drives, belt tension must be sufficient to overcome slipping under maximum peak load. This could be either at start or during the work cycle. The amount of peak load will vary depending upon the character of the driven machine or drive system. To increase total tension, merely increase the center distance between the motor and the shaft. Before attempting to tension any drive it is imperative that the sheaves be properly installed and aligned. If a V-belt slips, it is too loose. Add to the tension by increasing the center distance between the motor and shaft. Never apply belt dressing as this will damage the belt and cause early failure. The general method for adjusting V-belt drive tension should satisfy most drive requirements.

Step 1: Reduce the center distance so that the belts may be placed over the sheaves and in the grooves without forcing them over the sides of the grooves. Arrange the belts so that both the top and bottom spans have about the same sag. Apply tension to the belts by increasing the center distance until the belts are snug.

Step 2: Operate the drive a few minutes to seat the belts in the sheave grooves. Observe the operation of the drive under its highest load condition (*usually starting*). A slight bowing of the slack side of the drive indicates proper tension. If the slack side remains taut during the peak load, the belt is too tight. Excessive bowing or slippage indicates insufficient tension. If the belts squeal as the motor comes on or at some subsequent peak load, they are not tight enough to deliver to torque demanded by the drive machine. Stop the drive and tighten the belts.

Step 3: Check the tension of a new drive frequently during the first day by observing the slack side span. After a few days of operation the belts will seat themselves in the sheave grooves, and it may become necessary to readjust so that the drive again shows a slight bow in the slack side.

OVEN INTERIOR

Touch-up whenever scratches occur to prevent rusting. If the interior of the oven is not built of aluminized steel or stainless steel, it should be maintained with a good grade of hi-temp aluminum paint.

OVEN DOORS

Inspect every six months to make sure that the latches are holding the door firmly and uniformly against the oven providing a good sealing force. The pressure release latches are equipped with adjusting screws for this purpose. Also inspect the door gaskets for damage which would allow excessive leakage of hot air. If worn or damaged to the point where an adequate seal cannot be maintained, replace this gasket material.

NOTICE:

Before attempting any door adjustments, be sure the oven is level. If the oven is not on a solid level base it could twist out of square, resulting in a poor seal. This cannot be corrected by hinge or latch adjustment.

MOTOR STARTERS, RELAYS, CONTACTORS, ETC.

Every 1000 hours or six months, whichever occurs first, inspect contacts for signs of wear or sticking. Clean contacts with approved electrical contact cleaner and tighten all terminals, especially on power connections to motor starters and contactors to minimize terminal and component failure due to poor contact.

HEATING ELEMENTS

On new electric heated ovens, after two weeks of operation, check the heater element terminals for tightness. See oven assembly print for location of heater elements on your oven. Thereafter check and clean every 12 months.

CAUTION:

Do not over tighten terminals as this may result in breakage

7.2 Maintenance Chart Inspection Schedule

The following inspection schedule is a guide for developing a suitable schedule for your specific oven. Details and intervals could vary according to your operation, type of oven and accessories furnished. See the enclosed CD for individual component part literature sheets to establish a maintenance schedule for your own operation.

Check Weekly	Check Monthly	Check Every 6 Months
1. Cleanliness of oven and surrounding area	1. Fan bearings, sheaves and belt tightness	1. Igniter and burner components. See gas piping diagram supplied with oven
2. Motor bearings, fan bearings, hinges and latches for proper lubrication	2. Fan and air-flow interlocks	2. Combustion air supply adjustment
3. Flame safety monitoring system (gas fired ovens)	3. Purge timer operation and setting	3. Piping, wiring, interlock connection and shut-off valve (gas fired ovens)
4. Igniter and burner operation	4. Excess temperature limit switches	4. Calibration of indications and recording instruments
	5. Pressure release latches	5. Operating sequence tests, all components. Located on CD
	6. Fuel safety shut-off valve(s) for leakage (gas fired ovens)	6. Door alignment and latches. Check for leakage of hot air and readjust or replace gasket as necessary
		7. Heater element terminals for proper tightness

8. Troubleshooting

8.1 Tripped Out (Hi-Limit) Temperature Controller

On ovens so equipped, the Hi-Limit control may require manual resetting. Depending upon the specific devices used, they may be tripped by an excessively high oven temperature, an unusually low ambient temperature or a sensing failure. If the Hi-Limit has been tripped, press “reset” push button.

SAFETY WARNING!!!

Before placing the equipment back into operation determine what caused the safety device to actuate and correct the condition.

CAUTION:

If the oven is equipped for use with flammable solvents or vapors, the excess temperature control is factory set at the maximum temperature and must not be exceeded

8.2 Tripped out Hi and Low Gas Pressure Switches

Gas Ovens

In order for the burner to ignite, both the Hi and Low pressure switches must have the amber light lit along with the proof of closure switch light lit (located under blocking valve). To reset any one of these switches, push the “red” button located on the top of each switch. When switch has been “reset” the light will then stay lit.

Burned Out Fuse

In addition to any fuses in your fused disconnect switch, check all fuses located inside the control panel as shown on the wiring diagram. Depending upon the particular oven involved, it is possible for a fuse to open without affecting the pilot lights or other visible signs and still affect the heat circuit.

Improper Line Voltage

Check oven nameplate voltage to assure it matches incoming voltage. Measure the incoming voltage on oven control panel to determine if excessive line drop is causing a reduction in power input. This could be caused by too many devices connected to the same circuit, or by undersized wiring between the oven and line power source.

Motor Does Not Run

The magnetic motor starter “Motor On” light will not remain “on” if the overload has tripped. Disconnect power to the control cabinet before opening. Then push the “reset” button, located on the motor overload relay. In high ambient temperature conditions, nuisance tripping may occur.

Note: *If high ambient temperature conditions exist, adjusting the overload to a higher setting may be needed.*

Incorrect Blower Rotation

This results in reduced air flow and inefficient heat transfer from the heat source to the work area. (See installation instructions)

Reduced Blower Speed

Loose or worn drive belts could prevent the recirculating fan from attaining its designed speed. This results in reduced air flow and inefficient heat transfer from the heat source to the work area.

Tripped Out Flame Safety Relay

A safe-start timer is built into the safety relay which will shut the system down if pilot ignition is not proved in approximately ten seconds. Wait about one minute, then turn the burner on to try to re-ignite. If the burner does not ignite, follow the troubleshooting guide for gas ovens within this manual.

Defective or Improperly Calibrated Temperature Controller

See the temperature control manufacture’s instructions at the back of this manual for the proper operation and adjustment for the specific control used.

COMBUSTION AIR AND EFFECT OF NEGATIVE AIR PRESSURE IN THE BUILDING

Every burner must take in a minimum of ten times as much air as fuel for proper combustion. Therefore an adequate supply of combustion air must be assured. Many buildings in which this oven will be installed will be large enough to have enough “cracks” and leakage of air to the inside. However, many buildings now have exhaust fans, spray paint booths, cleaning booths, sand-blast booths, etc., where air is drawn out much faster than it comes in. This creates a negative pressure inside the building which is enough to overcome the natural draft created in the oven, and the oven will not work properly.

The effect of the negative pressure is compounded when dock doors, walk ways, and windows are closed. This is particularly true in the winter time. In such situations, the squirrel cage fans of the oven gas burners cannot compete for air with these types of devices. Thus, the burners may become starved for air.

The lower air flow to the burners may cause the following undesirable conditions:

1. Lower air flow causes uneven temperatures in the oven and causes the combustion temperature of the burner to rise. The hotter combustion gases emitted from the burner to heat the oven may damage the combustion chamber.
2. Very high building negative pressures may overcome the oven natural negative pressure and draw heat, smoke, and/or odor out of the oven.

Where the building negative pressure is fairly small the oven will work just fine as shipped from the factory or the burners can be “re-tuned.” Contact the factory should “re-tuning” of the burners be required.

In situations where tuning the burners will not correct the problems with excess building negative pressure, outside air ducting will probably be required.

When the oven is installed close to an outside wall, rigid duct may be run from the burner intakes straight through the wall. It is recommended that the duct is less than ten feet long, and as straight as possible.

Outside air ducting is also desirable or beneficial in work areas or installations that have unusually high amounts of dust or particle concentrations that can inhibit the blower’s ability to draw in air for proper operation, or solvent fumes that can corrode the oven. “Dirty blower wheels” are the primary maintenance problems with these ovens.

Blowers should be checked and cleaned frequently, sometimes daily, even if outside air is used.

CAUTION:

If the oven is installed in an area with a high negative pressure, the oven will not work properly unless outside air is ducted to the burners. Consult the factory if you suspect the installation location may be subject to excessive negative pressures

In some cases, if the negative pressure in the building is extremely high, while ducting outside air to the burners will allow for proper operation of the burners and control system, at times smoke may be drawn out of the oven around the door gaskets and around the openings.

In situations such as this, the oven should either be relocated to an area of the building with less negative air pressure, or make-up air must be added to the building in the area where the oven is located in order to reduce the negative pressure in this area of the building.

8.3 Uneven Temperature Uniformity

Air circulation is very important to proper oven operation. Improper air circulation could result from:

Overload Oven

Leave space between articles on each shelf to allow air to move between parts. Stagger parts from one shelf to another to prevent dead spots in the air pattern.

Cold Spots at Front of Oven

Ensure the exhaustor and intake damper is open enough to prevent fouling of the work. Where significant amounts of solvent or moisture are being driven off in the oven, it is necessary to exhaust enough air to remove this material. When the exhaust is increased, the fresh air intake must also be increased. Failure to do this will result in cold spots within the oven, particularly around the doors, since air will be drawn in past the gaskets. When the fresh air intake damper is properly adjusted there will be a slight leakage of hot air out of the door gaskets. Maximum rating is with exhaust dampers full open.

Hot or Cold Spots within Oven

Ovens are equipped with louvered ductwork. The louvers are factory adjusted for the best temperature uniformity, but may be adjusted to give the best performance for your particular process. These louvers are not designed for frequent adjustment and should be changed only when load requirements make it necessary. Louvers should be opened where the work space is cold and closed where it is hot.

8.4 Failure to Reach Set Temperature (Gas Oven)

Contact your local gas company service engineers, you will find them helpful. Have them check all installations as they are aware of the many variables which can affect your operations.

9. Warranty

We guarantee all equipment manufactured by our company to be free of defects in workmanship and materials for a period of ONE (1) YEAR from date of shipment. Component parts such as controls, motors, heating elements, gas burners, etc., which are incorporated into the design of our equipment, are purchased from reputable manufacturers and carry their respective guarantees.

Failure of any components purchased by PQ Ovens and installed into our products will be replaced free of charge for defective parts. *The customer will bear the responsibility for all labor and shipping costs to replace the defective part.*

We assume the responsibility of incorporating these various items in the fabrication of our equipment and warrant that this will be done in a suitable and workable manner. We further guarantee that our product bulletins accurately describe our equipment. If it is necessary to change the design or substitute various control or operating equipment, equal or superior equipment will be used.

Any modifications or changes to the equipment not pre-approved by the factory in writing may void the warranty and will be at the customer's expense.

NOTE:

ALL DEFECTIVE PARTS WILL BE INVOICED AT THE TIME OF SHIPMENT. ALL PARTS MUST BE RETURNED TO PQ OVENS AND DETERMINED TO BE DEFECTIVE BEFORE A CREDIT WILL BE ISSUED. A RETURNED GOODS AUTHORIZATION (RGA#) WILL BE SENT WITH THE REPLACEMENT PART(S) AND MUST BE SENT BACK WITH THE DEFECTIVE PART(S) FOR PROPER TRACKING. THANK YOU FOR YOUR COOPERATION.