AD-464 / ML-460

Phase 7

Service Manual

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031504SCOSTA/gbennett

ADC Part No. 450260

Retain This Manual In A Safe Place For Future Reference

American Dryer Corporation products embody advanced concepts in engineering, design, and safety. If this product is properly maintained, it will provide many years of safe, efficient, and trouble-free operation.

Only qualified technicians should service this equipment.

Observe all safety precautions displayed on the equipment or specified in the installation manual included with the dryer.

The following "FOR YOUR SAFETY" caution must be posted near the dryer in a prominent location.

FOR YOUR SAFETY

Do not store or use gasoline or other flammable vapors or liquids in the vicinity of this or any other appliance.

POUR VOTRE SÉCURITÉ

Ne pas entreposer ni utiliser d'essence ni d'autres vapeurs ou liquides inflammables dans le voisinage de cet appareil ou de yout autre appareil.

We have tried to make this manual as complete as possible and hope you will find it useful. **ADC** reserves the right to make changes from time to time, without notice or obligation, in prices, specifications, colors, and material, and to change or discontinue models.

Important

For your convenience, log the following information:

DATE OF PURCHASE _____ **MODEL NO.** _____

RESELLER'S NAME _____

Serial Number(s) _____

_____

_____

Replacement parts can be obtained from your reseller or the **ADC** factory. When ordering replacement parts from the factory, you can FAX your order to **ADC** at (508) 678-9447 or telephone your order directly to the **ADC** Parts Department at (508) 678-9000. Please specify the dryer model number and serial number in addition to the description and part number, so that your order is processed accurately and promptly.

The illustrations on the following pages may not depict your particular dryer exactly. The illustrations are a composite from the various dryer models. Be sure to check descriptions of the parts thoroughly before ordering.

"IMPORTANT NOTE TO PURCHASER"

Information must be obtained from your local gas supplier on the instructions to be followed if the user smells gas. These instructions must be posted in a prominent location near the dryer.

Important

You must disconnect and lockout the electric supply and the gas supply or the steam supply before any covers or guards are removed from the machine to allow access for cleaning, adjusting, installation, or testing of any equipment per OSHA (Occupational Safety and Health Administration) standards.

Please observe all safety precautions displayed on the equipment and specified in the installation manual included with the dryer.

For Your Safety

Do not store or use gasoline or other flammable vapor and liquids in the vicinity of this or any other appliance.

Do not dry mop heads in the dryer.do not use dryer in the presence of dry cleaning fumes.

Caution

Dryers should never be left unattended while in operation.

Warning

Children should not be allowed to play on or near the dryers.

Children should be supervised if near dryer(s) in operation.

The dryer must never be operated with any of the back guards, outer tops, or service panels removed. Personal injury or fire could result.

Dryer must never be operated without the lint filter or screen in place, even if an external lint collection system is used.

The wiring diagram for the dryer is located in the front electrical control box area.

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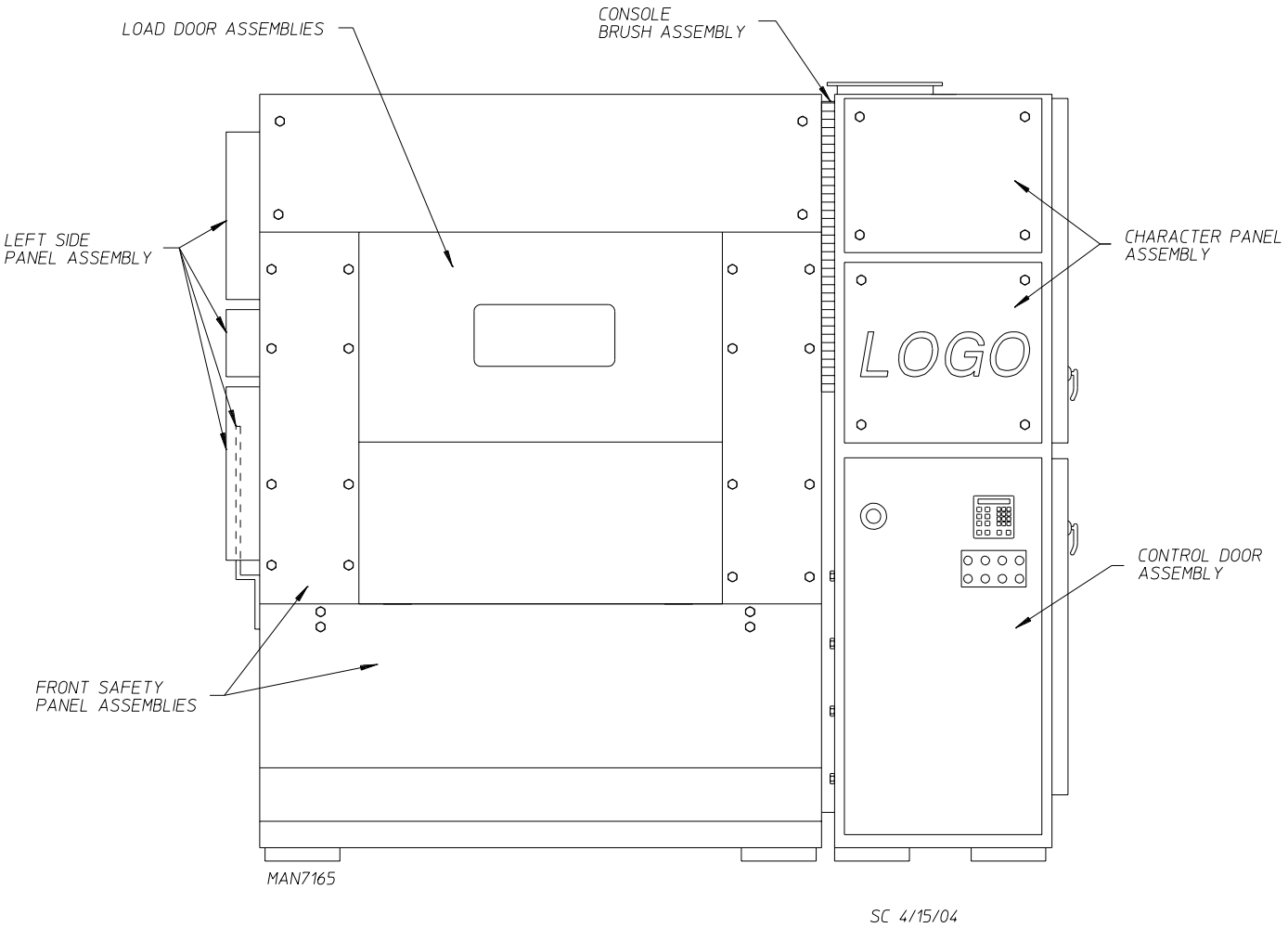
Reference Guide

(Front)

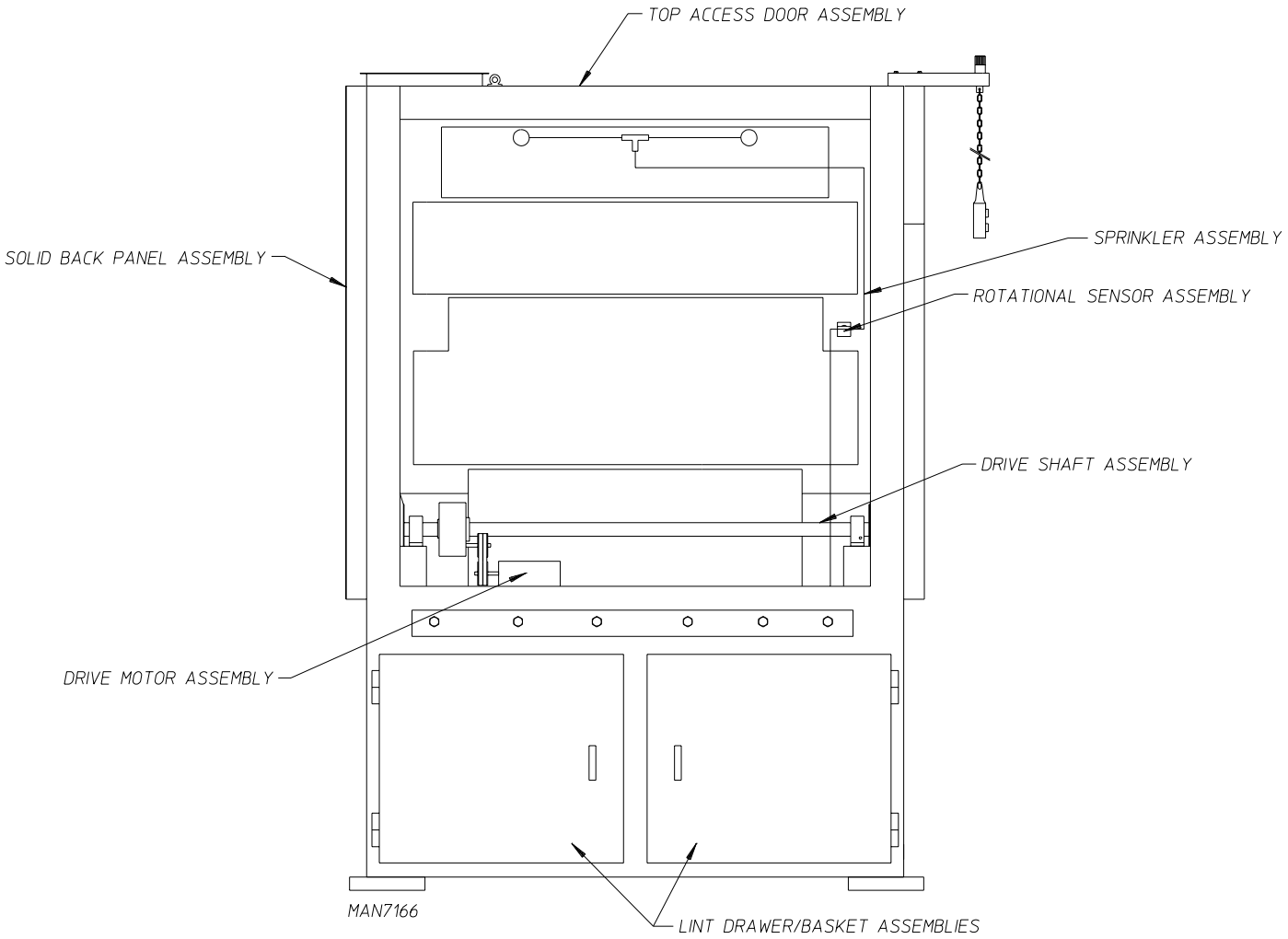
QUICK REFERENCE



Reference Guide

(Left Side)

QUICK REFERENCE



LEFT SIDE

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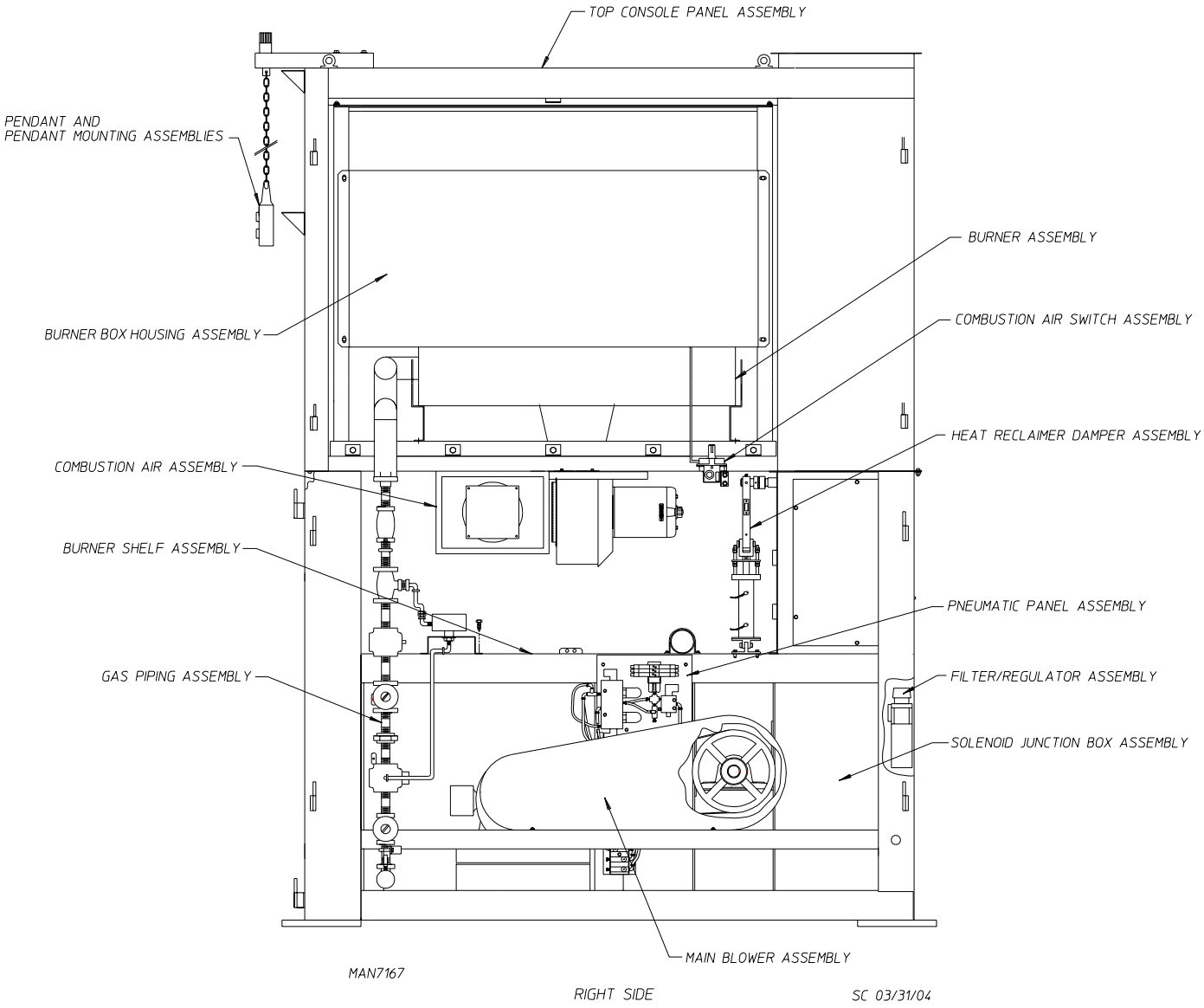
Reference Guide

(Right Side)

QUICK REFERENCE (GAS)



Reference Guide

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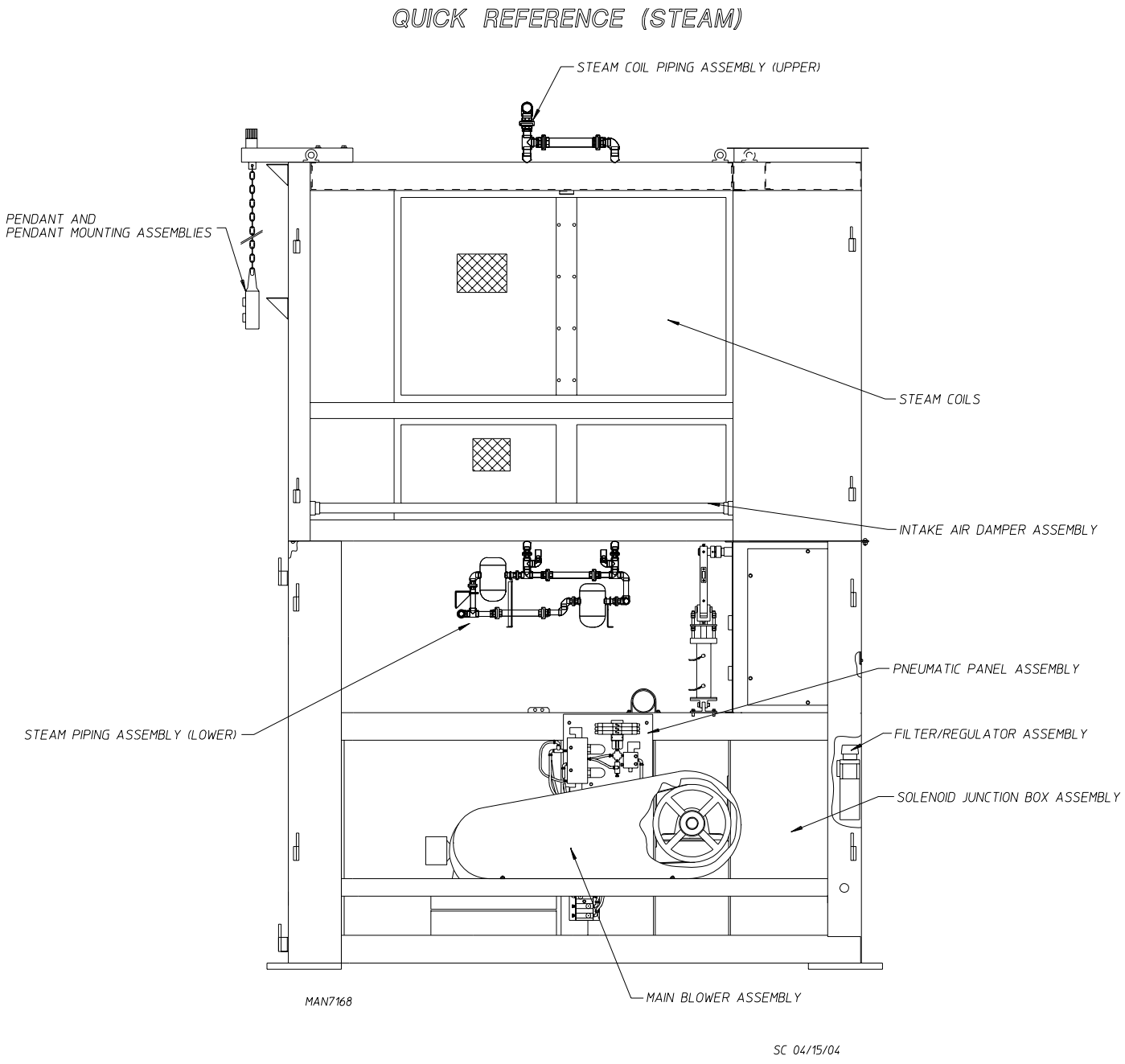


Safety Precautions

Warning

For your safety, the information in this manual must be followed to minimize the risk of fire or explosion or to prevent property damage, personal injury, or loss of life.

The dryer must never be operated with any of the back guards, outer tops, or service panels removed. Personal injury or fire could result.

Caution

The dryer should never be left unattended while in operation.

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

Purchaser/user should consult the local gas supplier for proper instructions to be followed in the event the user smells gas. The instructions should be posted in a prominent location.

What To Do If You Smell Gas

- Do not try to light any appliance.
- Do not touch any electrical switch.
- Do not use any phone in your building.
- Clear the room, building, or area of all occupants.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.
- Installation and service must be performed by a qualified installer, service agency, or gas supplier.
- Dryer(s) must be exhausted to the outdoors.
- Although **ADC** produces a very versatile dryer, there are some articles that, due to fabric composition or cleaning method, should not be dried in it.

Warning

Dry only water washed fabrics. Do not dry articles spotted or washed in dry cleaning solvents, a combustible detergent, or "All Purpose" cleaner. Explosion could result.

Do not dry rags or articles coated or contaminated with gasoline, kerosene, oil, paint, or wax. Explosion could result.

Do not dry mop heads. Contamination by wax or flammable solvents will create a fire hazard.

Do not use heat for drying articles that contain plastic, foam, sponge rubber, or similarly textured rubberlike materials. Drying in a heated basket (tumbler) may damage plastics or rubber and also may be a fire hazard.

A program should be established for the inspection and cleaning of lint in the burner area, exhaust ductwork, and area around the back of the dryer. The frequency of inspection and cleaning can best be determined from experience at each location.

Warning

The collection of lint in the burner area and exhaust ductwork can create a potential fire hazard.

For personal safety, the dryer must be electrically grounded in accordance with local codes and/or the National Electrical Code ANSI/NFPA NO. 70-LATEST EDITION or in Canada, the Canadian Electrical Codes Parts 1 & 2 CSA C22.1-1990 or LATEST EDITION.

Note

Failure to electrically ground the dryer properly will void the warranty.

Under no circumstances should the dryer door switches, lint drawer switch, or heat safety circuit, ever be disabled.

Warning

Personal injury or fire could result should the dryer door switches, lint drawer switch, or heat safety circuit, ever be disabled.

This dryer is not to be used in the presence of dry cleaning solvents or fumes.

Remove articles from the dryer as soon as the drying cycle has been completed.

Warning

Articles left in the dryer after the drying and cooling cycles have been completed can create a fire hazard.

Read and follow all caution and direction labels attached to the dryer.

Warning

YOU MUST DISCONNECT AND LOCKOUT THE ELECTRIC SUPPLY AND THE GAS SUPPLY OR THE STEAM SUPPLY BEFORE ANY COVERS OR GUARDS ARE REMOVED FROM THE MACHINE TO ALLOW ACCESS FOR CLEANING, ADJUSTING, INSTALLATION, OR TESTING OF ANY EQUIPMENT PER OSHA (Occupational Safety and Health Administration) STANDARDS.

Important

Label all wires prior to disconnection when servicing the microprocessor controller (computer) and the ignition module. Wiring errors can cause improper and dangerous operation.

Routine Maintenance

Cleaning

A schedule should be established for periodic inspection, cleaning, and removal of lint from various areas of the dryer, as well as throughout the ductwork system. The frequency of cleaning can best be determined from experience at each location. Maximum operating efficiency is dependent upon proper air circulation. The accumulation of lint can restrict this airflow. If the guidelines in this section are met, an **ADC** dryer will provide many years of efficient, trouble-free, and most importantly safe operation.

Warning

Lint from most fabrics is highly combustible. The accumulation of lint can create a potential fire hazard.

Keep dryer area clear and free from combustible materials, gasoline, and other flammable vapors and liquids.

Note

Remove power from the dryer before performing any maintenance on the dryer.

Suggested time intervals shown are for average usage which is considered six (6) to eight (8) operational (running) hours per day.

Suggested Cleaning Schedule

Every Third or Fourth Load

Clean the lint screen. A clogged lint screen will cause poor dryer performance. The lint screen is located in the lint drawer in the base of the dryer. Pull out the lint drawer, brush the lint off the lint screen, and remove the lint. Inspect the lint screen and replace if torn.

Clean the lint screen from the power burner booster fan located on the right side panel.

Note

The frequency of cleaning the lint screens can best be determined from experience at each location.

Weekly

Remove the panels on each side of the basket (tumbler) section and remove any lint accumulation from the basket (tumbler) drive motor, drive shafts, gear reducer, drive belts, drive wheels, and drive shaft bearings.

Warning

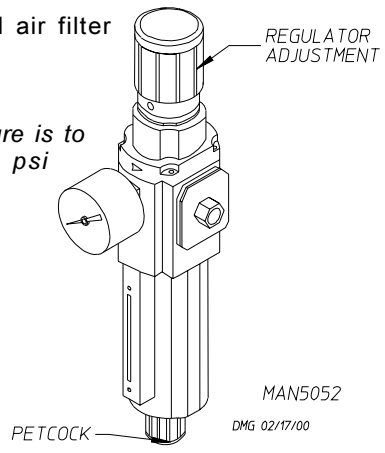
To avoid the hazard of electrical shock, discontinue electrical supply to the dryer.

Monthly

Empty the compressed air filter bowl.

Note

Regulator pressure is to be set at 80 psi (5.51 bar).



Clean any lint accumulation from the gas valve and burner area at the top of the dryer, the fan (impellor) motor, and the fan (impellor) bearings located in the dryer base.

Every 6 Months

Steam Models - Clean the steam coil fins. We suggest using compressed air and a vacuum cleaner with brush attachment.

Note

When cleaning steam coil fins, be careful not to bend the fins. If fins are bent, straighten by using a fin comb, which is available from any local air conditioning supply house.

Inspect and remove any lint accumulation in customer furnished exhaust ductwork system and from the dryer's internal exhaust ducting.

Note

The accumulation of lint in the exhaust ductwork can create a potential fire hazard.

Do not obstruct the flow of combustion and ventilation air. Check customer furnished back draft dampers in the exhaust ductwork. Inspect and remove any lint accumulation, which can cause the damper to bind or stick.

When cleaning the dryer cabinet(s), avoid using harsh abrasives. A product intended for the cleaning of appliances is recommended.

Clean off any lint accumulation on top of the temperature probe and the hi-limit switch located above the lint basket.

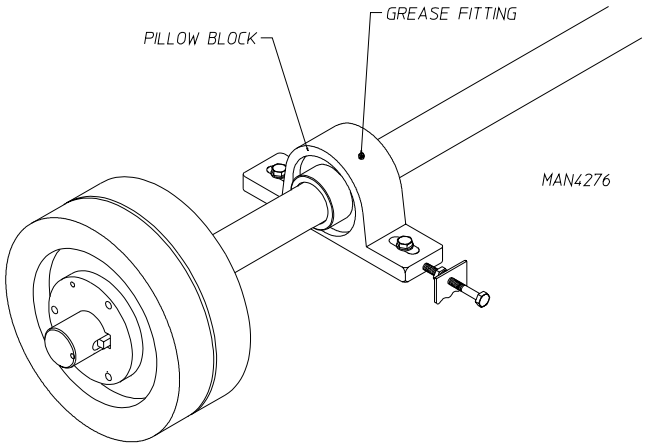
Lubrication

Monthly

The two (2) bearings that support the impellor/fan shaft must be lubricated. Use Shell Alvania #2 grease or its equivalent. Generically, this grease would be described as a NLGI Grade 2 multipurpose industrial grease with a lithium thickener and mineral base oil.

Every 3 Months

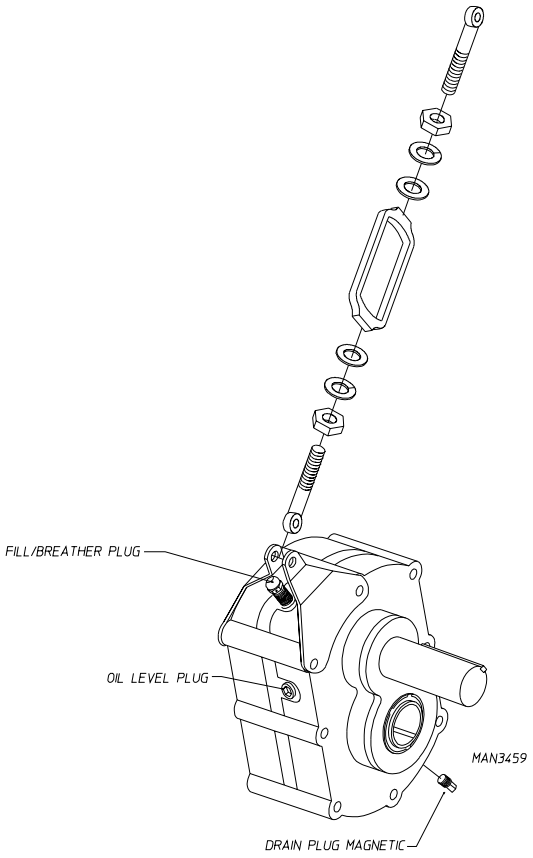
The four (4) bearings that support the drive and idler shafts must be lubricated. Use Shell Alvania #2 grease or its equivalent. Generically, this grease would be described as a NLGI Grade 2 multipurpose industrial grease with a lithium thickener and mineral base oil.



Every 6 Months

Change gear oil in basket (tumbler) shaft gear reducer.

- Remove the drain plug (located at the bottom rear of the reducer).
- After oil is completely drained, replace the drain plug.
- Remove the vent plug and pour in 1.48 quarts (1.4 liters) of Mobil Oil DTE HH5G (I.S.O. viscosity grade 460), SAE 90, or its equivalent.



Adjustments

7 Days After Installation and Every 6 Months Thereafter

Inspect bolts, nuts, screws, setscrews, nonpermanent gas connections (unions, shutoff valves, orifices), and grounding connections. Fan (impellor) V-belts, along with the motor and drive belts should be examined and replaced if necessary. Tighten loose V-belts when necessary. Complete operational check of controls and valves. Complete operational check of all safety devices (door switches, lint drawer switch, sail switch, burner, and hi-limit thermostats).

Installation Requirements

Installation should be performed by competent technicians in accordance with local and state codes. In the absence of these codes, the installation must conform to applicable American National Standards: ANSI Z223.1-LATEST EDITION (National Fuel Gas Code) or ANSI/NFPA NO. 70-LATEST EDITION (National Electrical Code) or in Canada, the installation must conform to applicable Canadian Standards: CAN/CGA-B149.1-M91 (Natural Gas) or CAN/CGA-B149.2-M91 (Liquid Propane [L.P.] Gas) or LATEST EDITION (for General Installation and Gas Plumbing) or Canadian Electrical Codes Parts 1 & 2 CSA C22.1-1990 or LATEST EDITION (for Electrical Connections).

Enclosure/Air Supply/Exhaust Requirements

Note

The following information is very brief and general. For a detailed description, refer to the installation manual included with the dryer.

Bulkheads and partitions around the dryer should be made of noncombustible materials. Allowances should be made for the opening and closing of the control door and lint door. Also, allowances should be made in the rear for ease of maintenance. (Refer to the installation manual for recommended distances and minimum allowances required.)

When the dryer is operating, it draws in room air, heats it, passes this air through the basket (tumbler), and exhausts it out of the building. Therefore, the room air must be continually replenished from the outdoors. If the make-up air is inadequate, drying time and drying efficiency will be adversely affected. Ignition problems and sail switch “fluttering” problems on gas dryers may result, and you also could have premature motor failure from overheating. The air supply must be given careful consideration to ensure proper performance of each dryer.

Important

Make-up air must be provided from a source free of dry cleaning fumes. Make-up air that is contaminated by dry cleaning fumes will result in irreparable damage to the motors and other dryer components.

Exhaust ductwork should be designed and installed by a competent technician. Improperly sized ductwork will create excessive back pressure which will result in slow drying, increased use of energy, and shutdown of the burner by the airflow (sail) switch, burner hi-limit, or lint chamber hi-heat protector thermostat. (Refer to the installation manual for more details.)

Caution

Improperly sized or installed exhaust ductwork can create a potential fire hazard.

Electrical and Gas Requirements

It is your responsibility to have all electrical connections made by a properly licensed and competent electrician to ensure that the electrical installation is adequate and conforms to local and state regulations or codes. In the absence of such codes, all electrical connections, materials, and workmanship must conform to the applicable requirements of the National Electrical Code ANSI/NFPA NO. 70-LATEST EDITION, or in Canada, the Canadian Electrical Codes Parts 1 & 2 CSA C22.1-1990 or LATEST EDITION.

Important

Failure to comply with these codes or ordinances and/or the requirements stipulated in this manual can result in personal injury or component failure.

The dryer installation must meet the American National Standard, National Fuel Gas Code ANSI Z223.1-LATEST EDITION, or in Canada, the Canadian Electrical Codes Parts 1 & 2 CSA C22.1-1990 or LATEST EDITION (for Electrical Connections) as well as, local codes and ordinances, and must be done by a qualified technician.

Note

Undersized gas piping will result in ignition problems and slow drying and can create a safety hazard.

The dryer must be connected to the type of gas (natural or liquid propane [L.P.]) indicated on the dryer data label. If this information does not agree with the type of gas available, contact the reseller who sold the dryer or contact the factory.

The gas input ratings shown on the dryer data label are for elevations up to 2,000 feet (609.6 meters), unless elevation requirements of over 2,000 feet (609.6 meters) were specified at the time the dryer order was placed with the factory. The adjustment for dryers in the field for elevations over 2,000 feet (609.9 meters) is made by changing the burner orifices. If this adjustment is necessary, contact the reseller who sold the dryer or contact the factory.

Note

Any burner changes must be made by a qualified technician.

Operational Service Check Procedure

After performing any service or maintenance function, an operational check should be performed to ensure that all components are performing properly.

Make a complete operational check of all the operating controls to ensure that the timing is correct, temperature selection switches are functioning properly.

Make a complete operational check of all safety related circuits, door switches, hi-limit thermostat, sail switch, cycling thermostats, etc.

Component Description/ Replacement

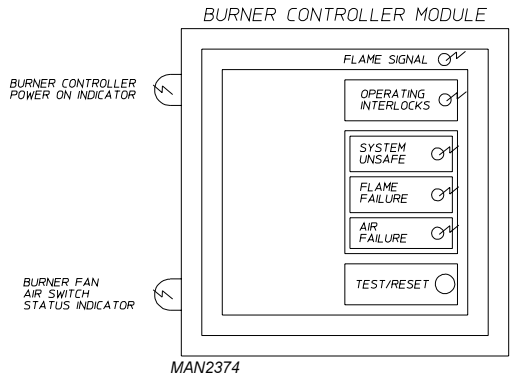
Gas Burner and Ignition System

The dryer's gas burner system operates on an “On” or “Off” gas rate sequences to accurately control the tumbler’s (basket's) drying temperature. Maximum firing rate is 2.8 million Btu/hr.

Upon a call from heat, the dryer computer sends a 120 volt signal to the burner controller module (BCM) which initiates and controls the ignition sequences. The BCM insures that all the safety switches are closed before turning on the combustion air burner fan, then checks to ensure that the burner fan air switch has closed. The pilot gas flame is then established, the flame rod, (which sits in this pilot flame), comes in contact with the flame and signals the BCM. The main motorized gas valves open in sequence, and full operational flame is achieved.

The BCM has five (5) light emitting diodes (L.E.D.) on its cover and two (2) neon’s on the mounting base for ease of troubleshooting, as well as dip switches inside for ease of programming.

The BCM controls all of the gas burner ignition components, except for the motorized gas valve. When the drying set point temperature is reached, the dryer’s computer closes the top motorized gas valve, shutting off full flame.



Major Burner Components

- Burner Controller Module (BCM)

  The BCM provides effective burner flame safeguard control through adjustable purge and trial-for-ignition timing. The BCM insures that all dryer safety switch circuits are closed, delays ignition to allow the combustion chamber to vent, and insures that a healthy pilot flame is established before opening the main gas valves. Five (5) L.E.D.’s on the cover of the BCM allow for easy troubleshooting. Dip switches on the back of the module allow for easy programming.

- Dip Switches Selections

  Loosen the two (2) screws on the burner control module cover and pull the module cover off of its base. The dip switches are on the back of the cover.

  Switch #1 - Recycling Mode

  With this switch in the “ON” position, the burner will recycle the ignition sequence once during each drying cycle after a burner fan air switch or main flame failure, but only if the failure occurs more than 35-seconds after ignition. If this switch is “OFF," the burner will lock out at once.

  Switch #2 - Intermittent Pilot

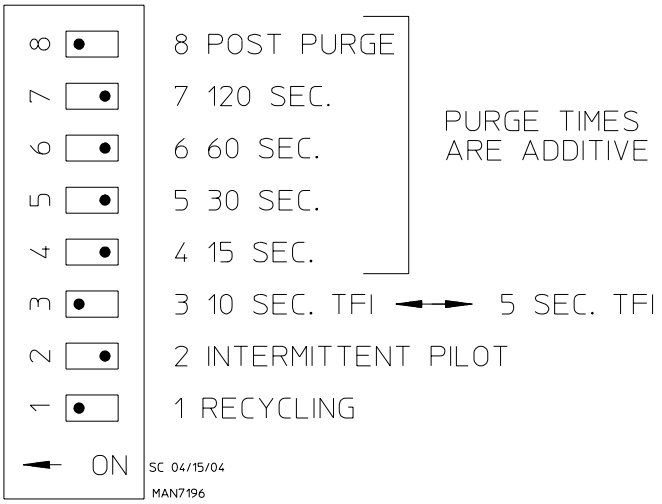
  This switch is “ON” for intermittent pilot or “OFF” for interrupted pilot. The dryer utilizes interupted pilot so that the pilot flame doesn’t stay lit during the entire drying cycle. With interrupted pilot, the pilot flame goes out once the main flame is established.

  Switch #3 - Trial for Ignition (TFI) Time

  When this switch is “ON” a Trial for Ignition (TFI) of ten (10) seconds is set. If it is in the “OFF” position, the TFI is five (5) seconds. The Trial for Ignition Time is the length of time that the pilot is given to light. A ten (10) second TFI is best for the dryer.

  Switch #4, Switch #5, Switch #6, Switch #7- Purge Time

  Switch #8 is for post purge selection. With switch #8 in the "ON" position, the post purge time will be 15-seconds. When switch #4, switch #5, switch #6, and switch #7 are in the “OFF” position, the post purge time will be 0-seconds.



Light Emitting Diode (L.E.D.) and Neon Displays of the BCM (Burner Controller Module)

- Operating Interlock - L.E.D. is lit when:

  All safety interlock switches are closed, applying a 110 VAC signal to terminal #7 of the burner controller module (BCM).

- Operating Interlock - L.E.D. is not lit when:

  One (1) or more safety interlock switches (burner doors, load door, optional unload door, gas pressure, lint pressure, hi-temp alarm contacts, tumbler [basket] stopped, and lint drawer) are open. If any of the safety interlocks switches are open the burner ignition sequence will not be attempted.

- Air Failure - L.E.D. is lit if:

  Burner fan air switch is not closed within 10 seconds of start-up of blower

  Burner fan air switch is open during firing cycle.

- System Unsafe - L.E.D. is lit if:

  A loose connection on the flame rod or spark plug.

  All purge time dip switches are in the off position.

  Flame is detected out of sequence.

  Inductance is detected on sensor wires.

  Wiring fault on terminals #3, #4, and #5.

  An internal controller failure.

  Air switch closed before start-up.

- Flame Signal - L.E.D. is lit when:

  The flame rod is in contact with the pilot flame and the BCM converts a microampere (microamp) current between the flame rod and ground into a three (3) 11 volt DC signal that can be measured on the BCM. Inset one (1) probe of a DC volt Meter into the flame signal port and put the other probe to ground. The meter will read out the three (3) 11 volt DC flame signal. If the flame signal L.E.D. flickers on and off, this is a result of a weak flame signal which can be caused by an intermittent wiring connection between the flame rod and BCM, a faulty ground connection, bad ground of the dryer, weak pilot flame or dirty or defective flame rod.

- Burner Controller Power On Indicator - Neon is lit when:

  Burner Controller has its supply voltage of 120 VAC.

- Burner for Air Switch Status Indicator - Neon is lit when:

  Air switch is closed after start-up of blower (fan) and interlocks are all closed.

- Burner Fan Air Switch Status Indicator - Neon is not lit:

  Air switch is not closed after start-up of burner fan.

  Door interlocks are open.

  A Combustion burner screen is clogged.

  A door on the dryer is open.

- Test/Reset Button

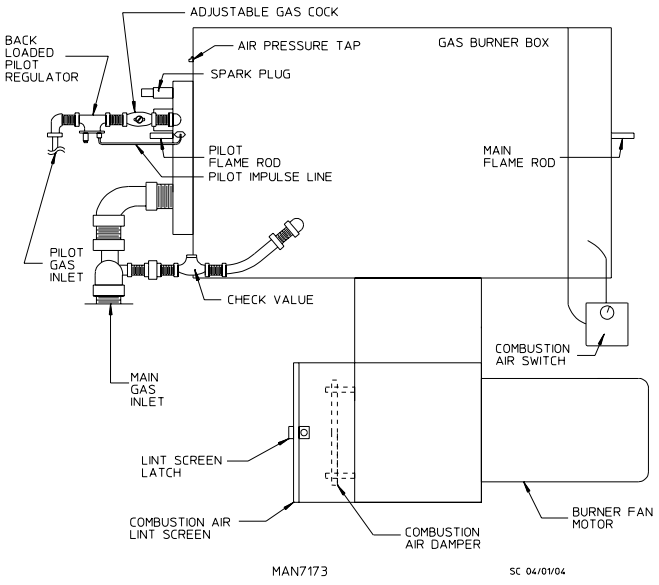
  When this button is pushed in, the BCM will halt the ignition sequence, once the pilot flame is established. This allows the pilot flame to be adjusted.

Flame Rod and Spark Plug

The pilot flame is lit by the spark plug, while flame sensing is done through the flame rod. The spark plug is energized when the pilot solenoid slave opens, igniting the pilot flame. The pilot flame rod sits in the pilot flame and sends a 3 volt DC to 11 volt DC signal to the BCM when it is in contact with the pilot flame. The pilot flame should be about the size of a 3-inch diameter ball and should heat the pilot flame rod so it is red hot. When the main gas valve is turned on the flame sensing will switch to main flame rod to confirm carry over to the end of the burner.

Burner Fan System

The burner fan provides additional combustion air for proper gas combustion. The fan provides approximately 900 cfm of air in this burner box. The airflow is obtained when the air pressure is measured at the air pressure tap on the gas burner box approximately 1.25-inches water (3.1 millibars). The combustion air system is comprised of the components described on page 11 and page 12.



Burner Fan Air Switch

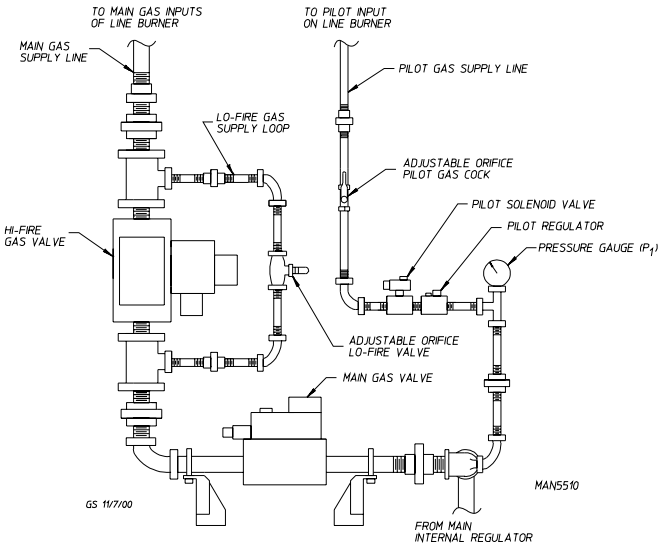
The differential in air pressure is measured by the burner fan air switch, which is located next to the burner fan motor. If the combustion air is inadequate, this switch will prevent ignition. The setting of this switch is adjustable, and it should be set at approximately 0.59-inches (15 mm) of water column (W.C.) because of slight variances in spring tension characteristics, range settings, and markings are nominal.

Burner Fan and Motor

The combustion air is produced by a 6-1/4" squirrel cage fan attached to a 1-1/2 hp, 3,600 rpm motor. The motor must spin counterclockwise (CCW) as viewed from the rear of the motor.

Combustion Air Lint Filter

The combustion air lint filter is made of a fine mesh stainless steel screen which must be cleaned regularly. This screen prevents any lint from entering the burner box.



Combustion Air Damper

To produce the required combustion airflow, this damper can be adjusted. Remove the screen to get access to the damper. Moving the damper closer to the blower inlet opening will reduce the combustion airflow, and moving it away from the blower inlet opening will increase the airflow. To measure the combustion airflow, attached a manometer to the air pressure tap on the burner box. The air pressure should measure 1.25- inches (31.75 mm) to 1.5-inches (38.1 mm) W.C.

Pilot Gas Supply Line

The pilot gas supply line consists of a manual shutoff valve, pressure regulator, electric solenoid valve, back-loaded pressure regulator, and an adjustable gas cock.

The gas pressure in this line should be approximately 3.5-inches (88.9 mm) W.C. for natural gas and 1.5-inches (38.1 mm) W.C. for liquid propane (L.P.) gas. This will provide a bushy pilot flame, which produces a signal through the flame rod that is converted to 3 to 11 volts DC in the burner controller module (BMC).

This flame can be adjusted in two (2) ways

- Pilot Inlet Pressure Regulator

  Remove the cap and turn the slotted adjustment screw clockwise (CW) for more gas and counterclockwise (CCW) for less gas.

- Adjustable Pilot Gas Cock

  Remove the cap and turn the slotted adjustment screw clockwise (CW) for less gas and counterclockwise (CCW) for more gas.

The pilot line contains a back-loaded pressure regulator with an impulse line connected to the gas burner inlet. The regulator will maintain a constant pilot supply pressure in the burner due to an increase in temperature. Do not adjust this regulator.

Main Gas Supply Line

The main gas supply line consists of a pressure regulator, two (2) motorized shutoff valves, HI/LO gas pressure switch, manual shutoff valve.

The gas pressure at the burner should be 2.5-inches (63.5 mm) W.C. for natural gas and 1.25-inches (31.8 mm) water column for L.P. gas. This pressure is measured by a manometer at the manual shutoff valve just top motorized valve.

Motorized Gas Valve

The two (2) 2-inch F.P.T. motorized valve are “ON/OFF” gas flow control valves. The valves motors operate on 120 VAC and are electrically “cascaded” so that upper valve will not open until lower valve has fully opened. A limit switch inside the lower motorized valve provides the signal that the valve is fully opened. These valves will open only when the BCM is receiving a signal from the flame rod proving that the pilot flame is established. The bypass of the second valve allows for the low fire.

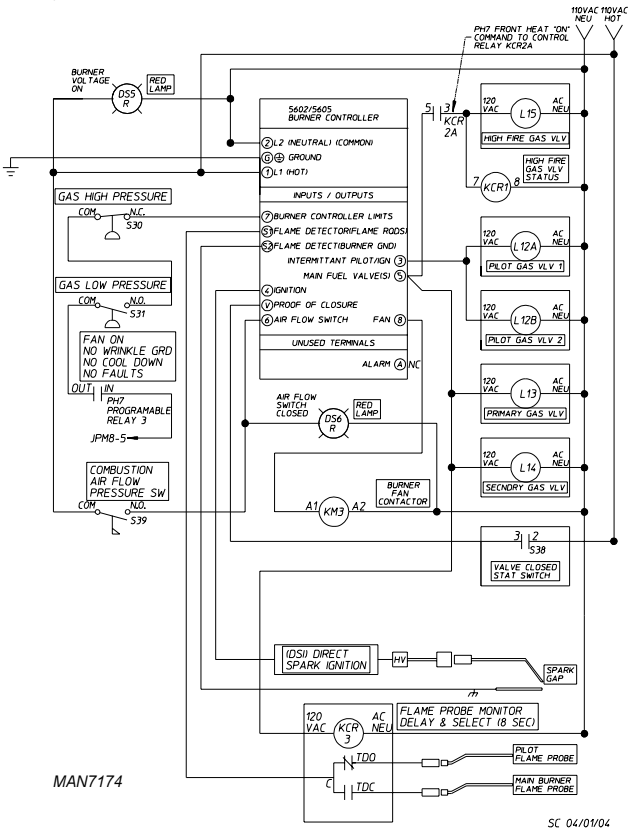
Top Motorized Gas Valve

The valve sets the gas rate of 2,800,000 Btu/hr (705,290 kcal/hr). To achieve this rate, the gas pressure must be set for 2.5-inches (63.5 mm) water column for natural gas and 1.25-inches (31.8 mm) W.C. for L.P. gas. To adjust. loosen the pan head screw located on the front of the top motorized valve, while holding the valve body, turn the flow adjustment clockwise (CW) for less gas and counterclockwise (CCW) for more gas. Retighten the pan head screw when correct gas flow is achieved. There is a switch located on the back of the top gas valve that verifies valve closure. The BCM will go into a system unsafe error and the burner will not begin a burner sequence.

Sequence of Operation

With dryer power on, a 120 volt signal is sent to terminal #1 and terminal #2 of the burner controller module (BCM). A power indicator light has been added to the controller base for troubleshooting.

- Drying cycle is started
- Dryer computer calls for heat.



The BCM checks that all of the dryer's safety circuits are closed (terminal #7 of the BCM). If this is the case, then the green "operating interlocks" light emitting diode (L.E.D.) on the BCM will light. If a safety switch is open, the green L.E.D. will not light, and the red "SYSTEM UNSAFE" L.E.D. will light. The ignition sequence will stop.

If all safety switches are closed, the BCM will start the burner fan motor (BCM terminal #8).

The BCM waits 10-seconds to allow the blower motor to get up to speed, and then checks that the burner fan combustion air switch (BCM terminal #6) circuit is closed. If this circuit is open during the drying cycle, the "Air Failure" L.E.D. will light. The gas valve will close, and a "HEATER FAULT" message will be displayed.

In order to prevent this air switch from being jumped out, the BCM checks to insure that this circuit is open prior to start-up, then "SYSTEM UNSAFE" L.E.D. will light.

If the air flow switch closes after the burner fan is turned on, the pilot solenoid valve (BCM terminal #3) is opened for ten (10) seconds, and a spark is produced (BCM terminal #4) by the burner spark plug, igniting the pilot flame.

The flame rod, which extends into the pilot flame, has 300 VAC on it from the BCM (terminal #S1). The flame lets the current flow from the flame rod to ground, which is then converted to 3 to 11 volts DC by the BCM. The "flame signal" L.E.D. on the BCM lights up. Once the call for heat opens the main valve, the flame rod circuit is switched to the opposite side of the burner to confirm that the flame is across the entire burner.

The spark plug will turn off 1.5-seconds after the pilot flame is detected. If the pilot flame should fail during the 10-seconds period that the pilot solenoid is open. The BCM will reenergize the spark. If the pilot flame is not established at the end of this 10-second period, the system will lock out and the "FLAME FAILURE" L.E.D. will light.

The 10-second period when the pilot solenoid opens and a spark is produced is called the trial-for-ignition (TFI) time. It is selected at either 5-seconds or 10-seconds by a dip switch located on the back cover of the BCM.

The 3 volt DC to 11 volt DC signal from the flame rod to the BCM can be measured by:

- Closing the manual shutoff valve in the main gas line to the burner. Leave the pilot manual valve open.
- Push the Test and Reset button on the cover of the BCM in to the "test" position.
- Start a drying cycle

  The BCM will halt the ignition sequence after the pilot is ignited. The pilot flame should be about the size of a tennis ball and should make the flame cord red hot.
- Insert the positive probe of a DC Volt Meter in to the "flame signal" port on the cover of the BCM. Connect the negative probe to ground.
- If signal is less than 3 volts DC, then the pilot may be too small or too large, there may be a wiring connection between the flame rod and BCM, the flame rod may be dirty, (wash it with soap and water) or defective, or the grounding may be faulty.

Once the flame probe signal is detected by the BCM, it waits 5-seconds to allow the pilot to stabilize and then opens the main motorized gas valves (terminal #5 on the BCM) in sequence.

The lower valve opens first. Upon full opening, its external switch closes, enabling the second motorized valve to open and full flame to be achieved.

At this time an 8-second delay timer is activated. After 8-seconds the flame sensor is switched from the pilot to the main flame sensor on the opposite side of the burner box.

If flame failure occurs within 35-seconds, the system will lock out and the "FLAME FAILURE" pilot will light.

Once main flame is established, the burner will remain in the full fire mode until the drying set point temperature has been reached. At this point, the dryer computer will cycle the top motorized gas valve closed the position. The "OFF" mode will be maintained until the dryer's temperature falls below the drying set point temperature. The motorized valve will then be returned to the full fire position. The ON/OFF motor of the motorized valve, it moves to the full fire position. "OFF" is achieved when no voltage is applied to the motorized valve.

Gas Burner Start-Up

New gas lines are filled with air and must be purged before the burner will light. To do this close the upper manual shutoff valve, but leave the pilot line shutoff open. Push in the test and reset button on the cover of the BCM. This will "freeze" the ignition sequence when the pilot flame ignites. This allows time to examine the pilot flame, and measure the flame rod signal to the BCM.

Connect a pressure gauge or water tube to the pilot gas pressure tap. Start the dryer. Follow the ignition process by referring to the "Sequence of Operation" section of this manual.

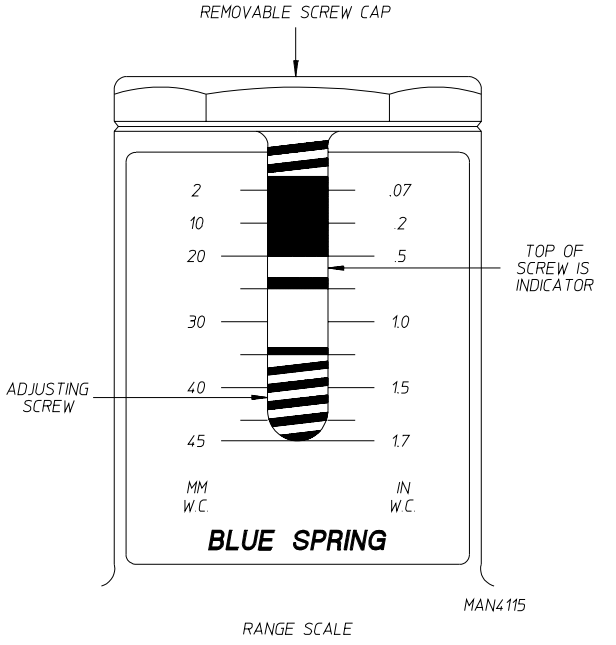
When the pilot flame is ignited, the pilot gas pressure should measure 3.5-inches (38.1 mm) water column (W.C.) for natural gas and 1.5-inches (88.9 mm) W.C. for liquid propane (L.P.) gas. The pilot flame should be about the size of a 3-inch diameter ball.

Once the pilot has been properly set, remove the pressure gauge from the pilot line connect a differential pressure gauge between the main gas pressure tap (HI port) and the air pressure tap (LO port) on the side of the gas burner box. The lines connecting the gauge to these taps must be long enough to allow the gauge to sit outside of the dryer so that the burner section access door can be closed when the dryer runs. Running the dryer with these doors open will give an incorrect air pressure reading.

Once this differential gauge is installed, open the main gas shutoff valve and push the test and reset button on the BCM so that the button springs out. Restart the dryer. The ignition process should now continue to the full gas flow state. The differential gauge should read 2.5-inches (63.5 mm) W.C. for natural gas and 1.25-inches (31.8 mm) W.C. for L.P. gas. If it does not, adjust the top gas valve as described in “Top Motorized Gas Valve” on page 11.

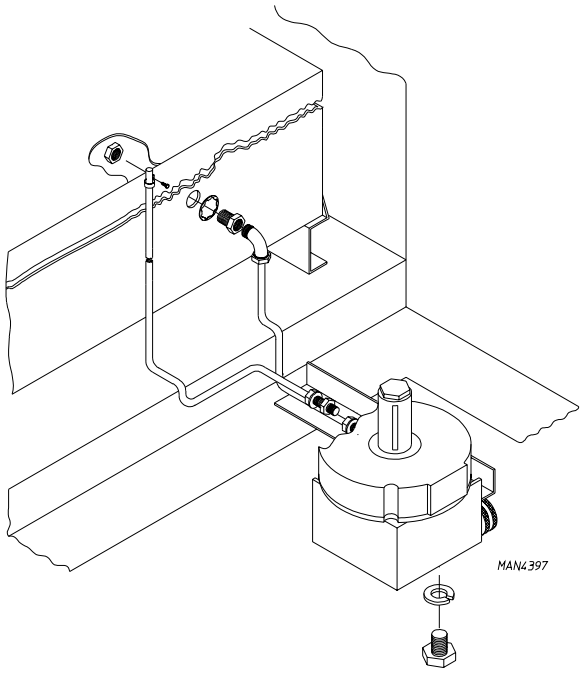
Burner Air Switch

The dryer uses a burner air switch on its burner components. The differential air pressure is measured by this air switch, which is located next to the burner fan motor. If the combustion air is inadequate, this switch will prevent ignition. The setting of this burner air switch is adjustable, and is preset at the factory.



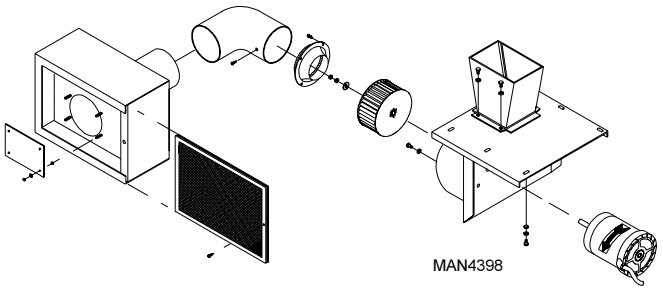
Burner Air Switch Replacement

1. Discontinue electrical service to the dryer.
2. Remove the two (2) 1/4" x 1/8" M.P.T. straight brass connectors from the burner fan air switch.
3. Remove the 5/16-18 x 3/4" tap bolt as well as the 5/16" lock washer.
4. Mark and identify the wires for correct replacement on the new burner air switch.
5. Remove the cord grip from the burner fan air switch.
6. To install new burner air switch, reverse Step #5 through Step #2.
7. Reestablish electrical service to the dryer.



Burner Squirrel Cage Fan Components

The combustion air is produced by a 6-1/4" squirrel cage fan, attached to a 1-1/2 hp, 3,600 rpm motor. This motor must spin counterclockwise (CCW) as viewed from the rear of the motor.



Burner Fan Motor
Burner Fan Motor Replacement

1. Discontinue electrical service to the dryer.
2. Remove the four (4) #8-18 x 7/16" TEK screws which secure the inlet ring to the combustion air blower housing.
3. Remove the two (2) 1/2-20 left hand jam nuts as well as the 1/2-inch flat washer.
4. Remove the 6-1/4" squirrel cage fan.
5. Remove the motor cover plate to reveal the wiring.
6. Mark and identify wiring for correct replacement on to the new motor.
7. Remove the cord grip and wiring harness from the motor.
8. Remove the four (4) 3/8-16 x 3/4" hex head bolts securing the motor to the combustion air blower housing.
9. To install new burner fan motor, reverse steps.
10. Reestablish electrical service to the dryer.

Burner Fan Squirrel Cage
Burner Fan Squirrel Cage Replacement

1. Discontinue electrical service to the dryer.
2. For removal of the 6-1/4" squirrel cage fan, follow Step #2 through Step #4 of the Burner Fan Motor Replacement instructions above.
3. For replacement of new 6-1/4" squirrel cage fan, reverse Step #4 through Step #2 of the Burner Fan Motor Replacement instructions.
4. Reestablish electrical service to the dryer.

Burner Fan Electrical Components
Burner Fan Thermal Magnetic Starter (TMS)

The TMS is used as a safety device to manually disconnect the motor so that it will be protected from damage in the event of a locked rotor condition. The overload has a dial setting on the face of the device. To set the overload, refer to the specific electrical diagram. The overload is specifically designed for motor applications. It has a current curve built into it so the initial high current draw by the motor will not trip the overload. On the face of the overload are two (2) push-buttons; "START" (Black or Tan) and "STOP" (Red - 0). The overload has to be in the "START" mode for the motor to run.

Thermal Magnetic Starter (TMS) Replacement

1. Discontinue electrical service to the dryer.
2. Mark L1, L2, L3, and T1, T2, T3 on the wires to the TMS for correct replacements.
3. Set the amp (amphere) rating on the TMS according to the electrical schematic supplied with the dryer.
4. To remove the TMS, pull the tab on the bottom of the TMS and lift upwards.
5. To install the new TMS, reverse Step #4 through Step #2.
6. Reestablish electrical service to the dryer.

Auxiliary Contact Block
The auxiliary contact block is mounted on the side of the overload. Its function is to sense an overload trip, thereby triggering a safety fault which will disable the drying cycle.

Auxiliary Contact Block Replacement

1. Discontinue electrical service to the dryer.
2. Remove the TMS from the din rail by pulling the tab on the bottom of the auxiliary contact block and lift upwards.
3. Remove the two (2) wires going to the auxiliary contact block and label them for correct reinstallation.
4. There are two (2) types of auxiliary contact blocks: one type has a screw and the other type has a clip. In either type, disassembly and assembly is recommended with the TMS in the stop position.
5. To install the new auxiliary contact block, reverse Step #4 through Step #2.
6. Reestablish electrical service to the dryer.

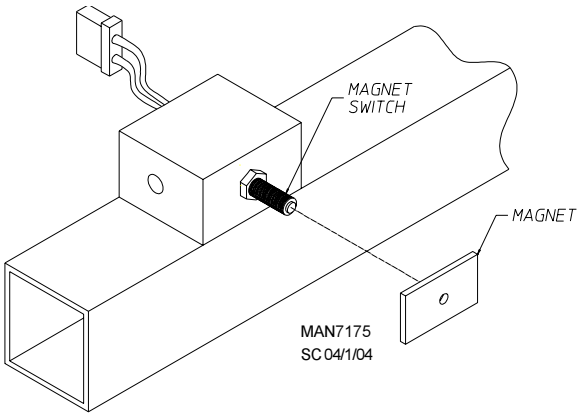
Varistor (Metal Oxide Varistor [MOV])
The metal oxide varistor (MOV) is used to suppress any inductive electrical spikes produced by the energizing and collapsing of coil voltage.

Varistor (Metal Oxide Varistor [MOV]) Replacement

1. Discontinue electrical service to the dryer.
2. Loosen the screws marked A1 and A2 on the contactor.
3. Verify that no additional wires were inadvertently removed.
4. To install the new metal oxide varistor (MOV), reverse Step #3 through Step #1.

Burner Door Switch

The burner door switch is a part of the dryer's safety circuit. If at any time during a drying cycle the burner doors are open, the controller will shut the dryer down and display "FRONT DOOR OPEN." (Verify that the burner door switches are not out of adjustment.)



Burner Door Switch Adjustment

1. With burner doors closed, verify if PLC (Programmable Logic Controller) Input #8 is ON or “FDRC” red light emitting diode (L.E.D.) on control board is on.
2. If indicator shows that the door is open , then adjustment is needed. Remove cover from the switch box.

Note
Adjust one switch at a time.

3. Adjust the switch until the magnet on the door activates the switch.
4. Put the cover back and close the burner doors.

Natural Gas and Liquid Propane (L.P.) Gas Conversion Instructions

Important

Conversion must be performed by competent technicians in accordance with local and state codes.

1. Loosen the screw on the high fire valve cap that doesn't have the paint drop.
2. Turn the cap to the "+" to increase the pressure or to the "-" to decrease the pressure.
3. Take the pressure reading at the outlet of the valve.
4. Tighten the screw to lock the cap once the pressure is set to 1.25 inches of water column (W.C.) for L.P. gas.

Steam Heat System

The steam dryer uses six (6) steam coils to produce a heat input of 60 Bhp (boiler horsepower). The dryer utilizes three (3) separate dampers to direct air in the drying process or cool down process of a cycle.

The first damper is the cool down damper located on the top of the dryer, and is used to bring fresh, room temperature air into the tumbler (basket). When the dryer is in the cool down mode or has reached its set point temperature, the damper will be in the open position further reducing increases in tumbler (basket) temperature. When there is a call for heat, the damper closes, thereby requiring all of the air entering the tumbler (basket) to go through the steam coils.

An inlet air damper is located in the middle of the right hand section of the dryer. During a call for heat, this damper opens, which allows ambient air into the dryer, which then goes through the steam coils, heating the air. During cool down, or if the dryer has reached its set point temperature, the damper closes eliminating air from going through the steam coils.

The heat reclaimer is used to divert a portion of the exhausted air and run it through the steam coil, reheating the air. Depending on the stroke at which the heat reclaimer has been set, the amount of reclaimed air will vary. The heat reclaimer is only opened during a call for heat. Once the dryers' set point temperature is reached or during a cool down mode the heat reclaimer will be closed.

Steam Coil pH Level

The normal pH level for copper type steam coils must be maintained between a value of 8.5 to 9.5. For steel type steam coils the pH level must be maintained between a value of 9.5 to 10.5. These limits are set to limit the acid attack of the steam coils.

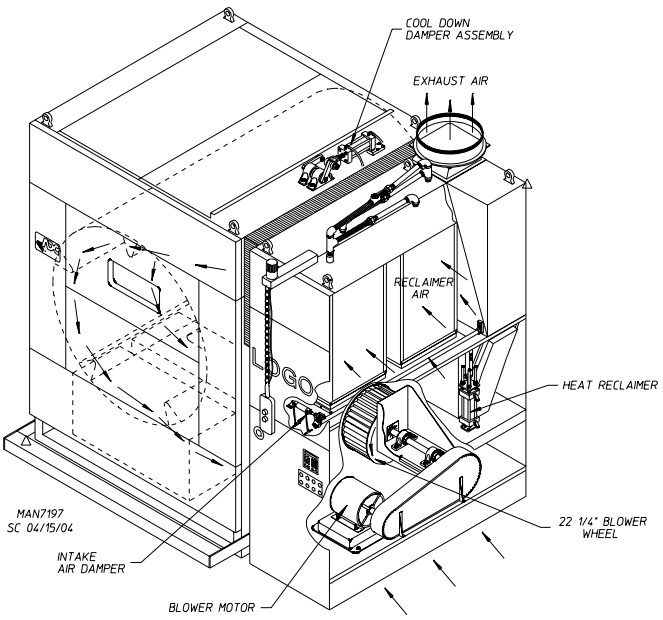
Important

Coil failure due to improper pH level will void the warranty.

Heat Mode Air Flow

During a call for heat, solenoid S10 turns on and air first enters the dryer on the bottom right side of the dryer. The air then passes through the open inlet air damper, then passes through the six (6) steam coils to heat the air. Next, the air enters the tumbler (basket) heating the load inside. The air then goes through the lint screen. Once the air is filtered by the lint screen it is forced out of the exhaust by the blower. A percentage of the air being exhausted gets reheated by the heat reclaimer to be used again. (Refer to the "Drying Cycle" illustration below).

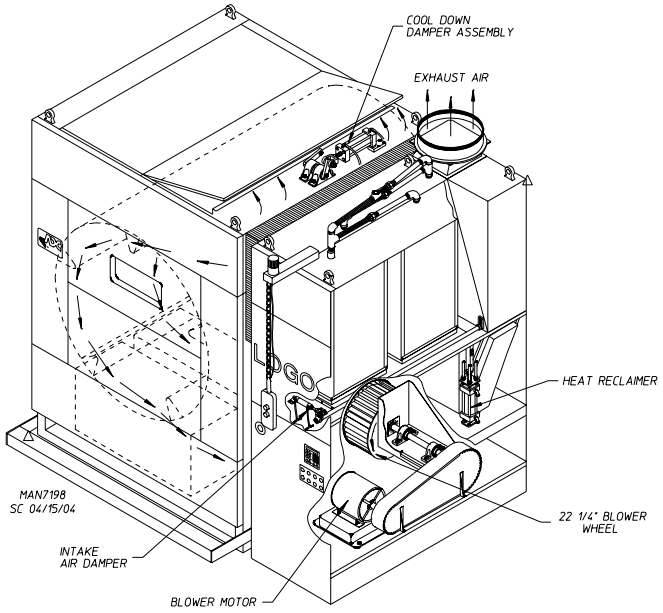
DRYING CYCLE



Temperature Set Point/Cool Down Mode

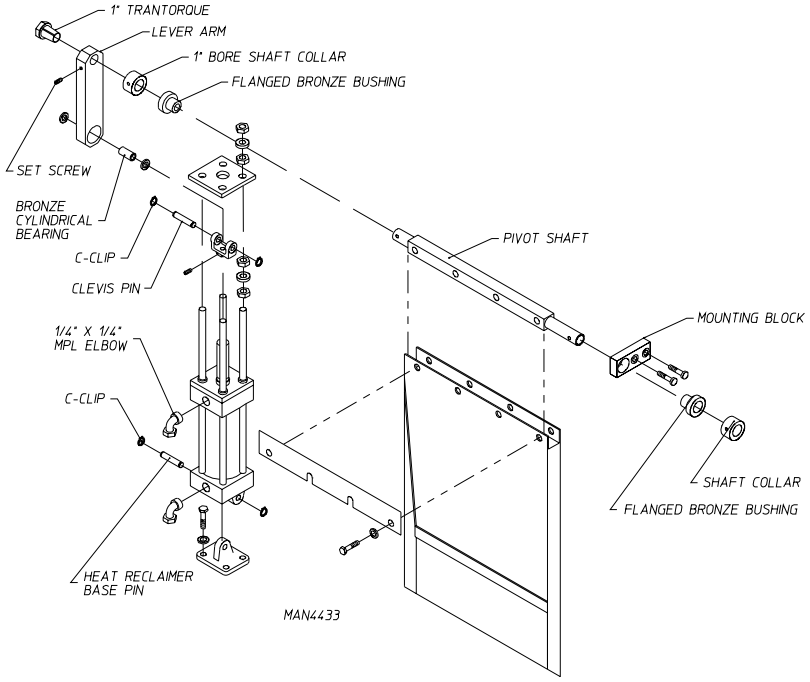
During a cool down mode, solenoid S10 turns off and solenoid S9 turns on. In this mode, the air enters through the cool down damper on top of the dryer and enters the tumbler (basket). The air then passes through the lint basket and gets pushed out of the exhaust by the blower wheel. (Refer to the "Cool Down Cycle" illustration below).

COOL DOWN CYCLE



Heat Reclaimer

The dryer is equipped with a pneumatically operated heat reclaimer, which when open, will recirculate approximately fifteen percent (15%) of the dryers' exhausted air. The heat reclaimer damper is closed until ignition of flame has been established.



Heat Reclaimer Piston Replacement

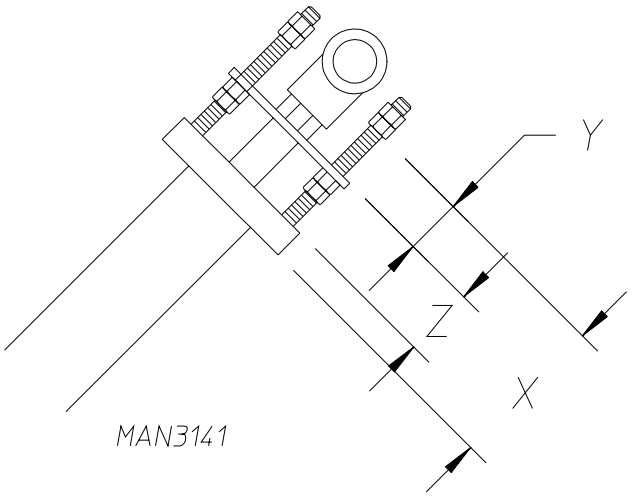
1. Discontinue electrical service to the dryer.
2. Discontinue the air supply to the dryer.
3. Remove the C-clip from one end of the clevis pin.
4. Remove the setscrew from the clevis rod.
5. Remove the clevis rod from the piston.
6. Measure the distance between the adjustment nut and adjustment plate for correct piston stroke.
7. Remove the eight (8) 5/16-18 hex nuts as well as the four (4) 5/16" lock washers from the heat reclaimer adjustment rods.
8. Remove the heat reclaimer adjustment plate.
9. Remove the air lines from the top and bottom of the piston.
10. Remove the 1/4" x 1/4" M.P.T. elbow from the top and bottom of the piston.
11. Remove the C-clip from one side of the heat reclaimer base pin.
12. Remove the heat reclaimer base pin from the heat reclaimer piston.
13. Remove the heat reclaimer piston from the eye bracket.
14. To install new heat reclaimer piston, reverse Step #13 through Step #3.
15. Reestablish the air supply to the dryer.
16. Reestablish electrical service to the dryer.

Heat Reclaimer Adjustment

1. Discontinue electrical service to the dryer.
2. Loosen the heat reclaimer nuts on all four (4) corners of the heat reclaimer piston.
3. Adjust the bottom heat reclaimer nuts down to their desired positions to obtain the proper piston stroke.

Example: If the desired piston stroke is 2-inches (5.1 cm), then the distance "X" in the illustration on the left must be 2-inches (5.1 cm).

4. Tighten the top heat reclaimer nuts down onto the bottom heat reclaimer nuts.



HEAT RECLAIMER SETTINGS			
Z = 1-5/8			
Y+Z=X	**Y**	**%HR**	**Inches Reclaimed**
1-1/8"	1/2"	7.46	1-1/4"
2-5/8"	1"	15.67	2-5/8"
3-1/8"	1-1/2"	25.37	4-1/4"
3-5/8"	2"	34.32	5-3/4"
4-1/8"	2-1/2"	43.28	7-1/4"
4-5/8"	3"	50.74	8-1/2"
5-1/8"	3-1/2"	58.95	9-7/8"
			FULL OPEN 16-3/4"

Intake Air Damper/Cool Down Damper

Steam model dryers require the use of both an intake air damper and a cool down damper. During the heat cycle, the intake air damper is opened to allow fresh air to be drawn across the steam coils. On the cool down cycle, the inlet air damper closes and the cool down damper opens. This draws fresh air into the tumbler (basket) section exhausting all of the 13,000 cfm (368 cmm) airflow, which insures a fast cool down of the load. (Refer to the “Cool Down Cycle” illustration on page 17.)

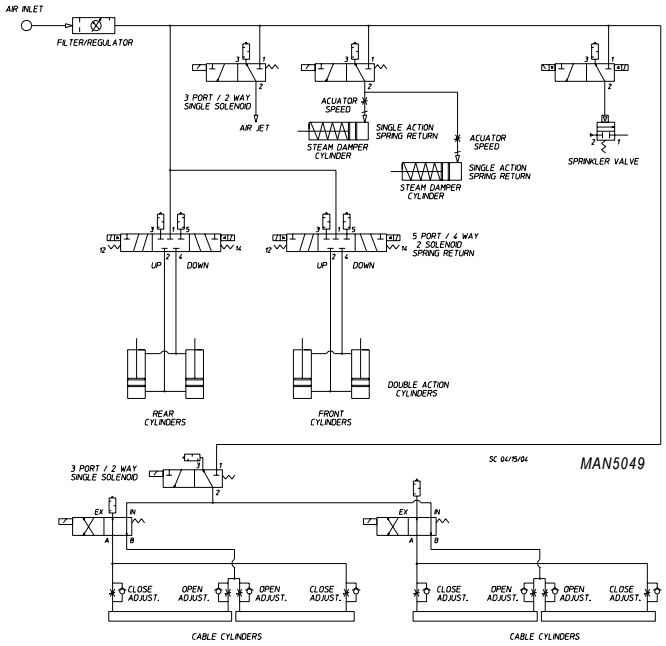
Intake Air Damper Replacement

1. Discontinue electrical service to the dryer.
2. Discontinue the air supply to the dryer.
3. Remove the character panel on the right hand side of the dryer - the 464 perforated panel - to access the pneumatic piston of the air intake damper.
4. Remove the two (2) 1/4" poly x 1/4" M.P.T. connectors from the piston.
5. Remove the C-clip from one end of the 1/2" clevis pin.
6. Remove the 7/16-20 clevis rod from the piston.
7. Remove the piston from the piston support.
8. To install new intake air damper piston, reverse Step #7 through Step #3.
9. Reestablish the air supply to the dryer.
10. Reestablish electrical service to the dryer.

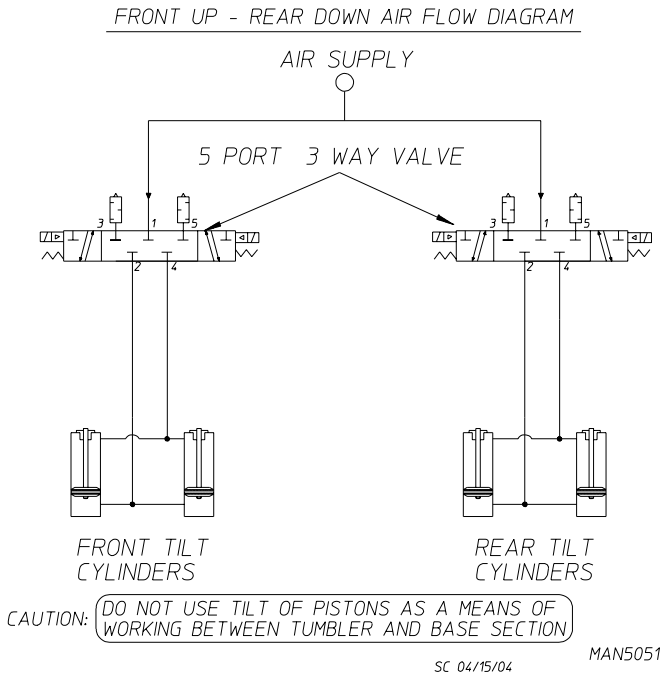
Cool Down Damper Piston Replacement

1. Discontinue electrical service to the dryer.
2. Discontinue the air supply to the dryer.
3. Remove the two (2) 1/4" poly x 1/4" M.P.T. connectors from the piston.
4. Loosen the 1/4-20 x 3/8" setscrew from the clevis and remove the clevis pin.
5. Remove the piston from the damper cylinder mounting plate.
6. To install new cool down damper piston, reverse Step #5 through Step #3.
7. Reestablish the air supply to the dryer.
8. Reestablish electrical service to the dryer.

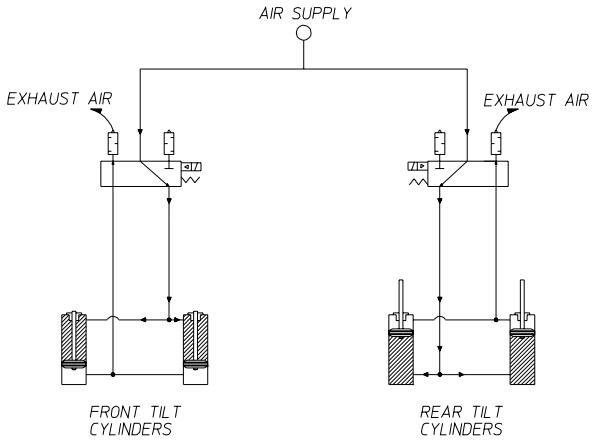
Tilting System Description



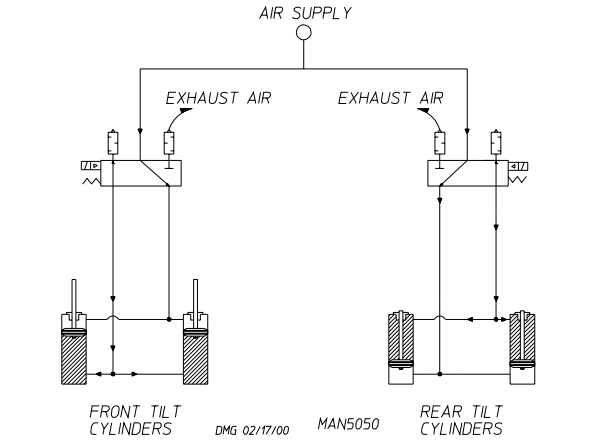
The tilting system in the dryer, whether it is 1-way tilt or 2-way tilt, is controlled by the programmable logic controller (PLC). The PLC will determine if the dryer is safe to tilt based on inputs from several sources. If all conditions are met, the PLC will send a signal to the tilt relays, which energize the appropriate tilt solenoid valve. Compressed air is then allowed to enter the cylinders raising the basket (tumbler).



REAR UP - FRONT DOWN AIR FLOW DIAGRAM



FRONT UP - REAR DOWN AIR FLOW DIAGRAM



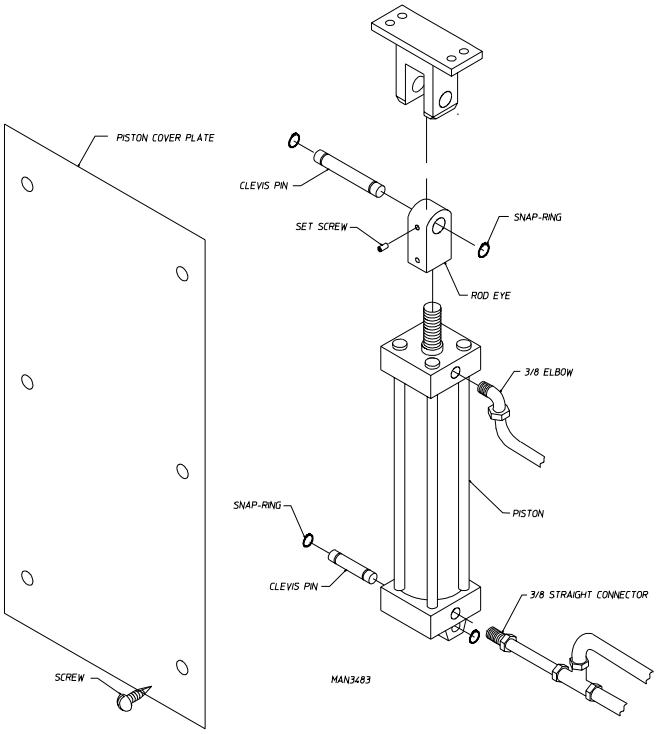
Tilting Solenoid Valve

The dryer uses a 3-position/4-way/5-port, spring centering double solenoid valve. With no power applied to either solenoid, the valve is in a spring centered blocked post state. In this mode, the dryer's tilting pistons will remain in their present state, not being able to exhaust air or receive air. When the left solenoid is energized with 24 VAC, the pilot air pushes the shuttle to the right enabling air to flow into the #2 port and exhausts #4 port. On 2-way tilt models, this is dependent on a supply of external pilot air from the #4 port of the opposite solenoid valve. When the right solenoid of the valve is energized, air flows through the #4 port and the #2 port exhausts the pilot air, the right side of the valve is always internal pilot.

The tilting solenoid valve has two (2) mufflers. The air is exhausted through these mufflers thereby quieting the airflow.

Tilting Pistons

The tilting piston is a double acting cylinder that has a 5-inch (12.7 cm) bore and a 14-inch (35.56 cm) stroke. When air is applied to the bottom port of the cylinder, the piston begins to extend and air is exhausted through the top port. Then, if air is applied to the top port, the bottom port will exhaust the air, which will cause the piston to retract.



Tilting System Component Replacement

Caution

Never service pneumatic components with compressed air connected. Serious injury may result.

Tilting Solenoid Replacement

1. Engage "EMERGENCY STOP" (E-Stop). Discontinue electrical power to the dryer.
2. Remove panel covering the pneumatic controls.
3. Label the solenoid plugs as an aid when reconnecting.
4. Loosen screws from the solenoid plug.
5. Remove the solenoid plug (take notice of the gaskets).
6. Remove the E-clip by gently prying off.
7. Slide tilting solenoid valve up off of the post.
8. To install new tilting solenoid valve, reverse Step #7 through Step #3.

Tilting Solenoid Valve Replacement

1. Disconnect compressed air supply from the dryer.
2. Tilt, then level the dryer to exhaust as much air as possible.
3. Disengage "EMERGENCY STOP" (E-Stop). Discontinue electrical power to the dryer.
4. Label the solenoid plugs and air lines as an aid when reconnecting. Loosen screws from the solenoid plug.
5. Remove the solenoid plug (take notice of the gaskets). Refer to the illustration above.
6. Loosen compression fittings on the air lines. Disconnect the three (3) air lines.

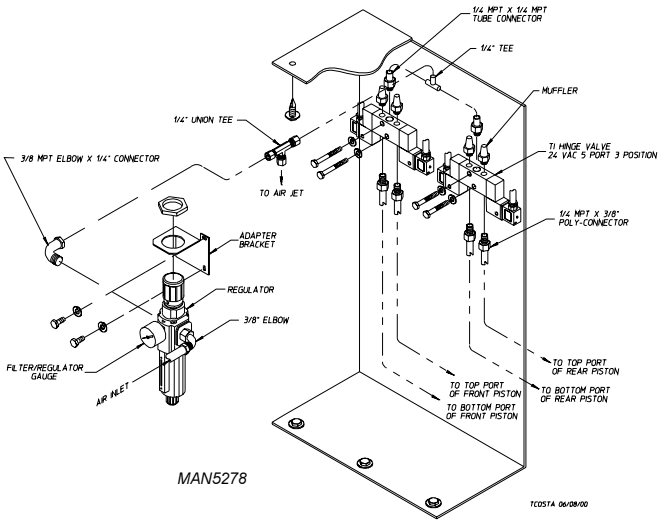
7. Remove the two (2) 1/4-20 hex head bolts that mount the solenoid valve. (Refer to the illustration on the top right of page 18.)
8. Remove the three (3) 3/8" straight connectors. (Refer to the illustration on the top right of page 18.) Reinstall these connectors on the new solenoid valve body.
9. Remove the two (2) 3/8" mufflers. (Refer to the illustration on the top right of page 18.) Reinstall these mufflers on the new solenoid valve body.
10. The left orifice (marked #12 on the tilting solenoid valve) now must be configured for external pilot.

Note
For 1-way tilt models proceed to Step #23.

11. Remove the two (2) Phillips head screws.
12. Carefully remove the end of the valve.

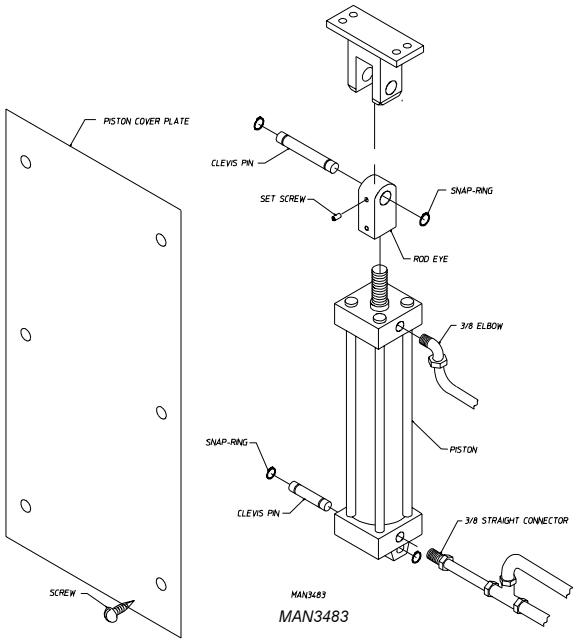
Note
The pieces within the end of the valve are small. Handle carefully to avoid losing parts.

13. Place the solenoid plug over the pilot orifice position of the solenoid valve end.
14. Place the O-Ring (from Step #13) into the top portion of the solenoid valve end.
15. Place end back onto the valve removed in Step #13.
16. Replace the two (2) Phillips head screws removed in Step #12.
17. Remove Allen plug on the left side of the orifice marked #12 on the tilting solenoid valve.
18. Remove the pilot air's 1/4" compression fitting.
19. Remove the pilot air's 1/8" elbow. Reinstall the elbow onto the new solenoid valve body.
20. Reconnect the three (3) air lines removed in Step #7. Tighten/secure compression fittings on the air lines loosened in Step #7.
21. Bolt the solenoid valve in place using the two (2) 1/4-20 hex head bolts removed in Step #8.
22. Reconnect the three (3) air line compression fittings.
23. Reestablish the compressed air supply to the dryer.
24. Check for leaks.
25. Reestablish electrical power to the dryer.
26. Engage "EMERGENCY STOP" (E-Stop) disengaged in Step #3.



Tilting Piston Replacement

1. Disconnect compressed air supply from the dryer.
2. Tilt, then level the dryer to exhaust as much air as possible.
3. Disengage "EMERGENCY STOP" (E-Stop). Discontinue electrical power to the dryer.
4. Remove the six (6) screws holding the piston cover plate.
5. Label the air lines as an aid when reconnecting.
6. Loosen the 3/8" compression fittings.
7. Remove the air lines.
8. Remove the 3/8" straight connector.
9. Remove the 3/8" elbow.
10. Carefully remove the E-clips from the clevis pins.
11. Remove clevis pins.
12. Loosen the bottom setscrew in the piston rod eye.
13. Unscrew the piston rod eye from the tilting piston.
14. To install new tilting piston, reverse above procedure (Step #12 through Step #1).



MAN3483

Tilt Switch Replacement

1. Discontinue electrical service to the dryer.
2. Remove the base panel from the left hand side of the dryer.

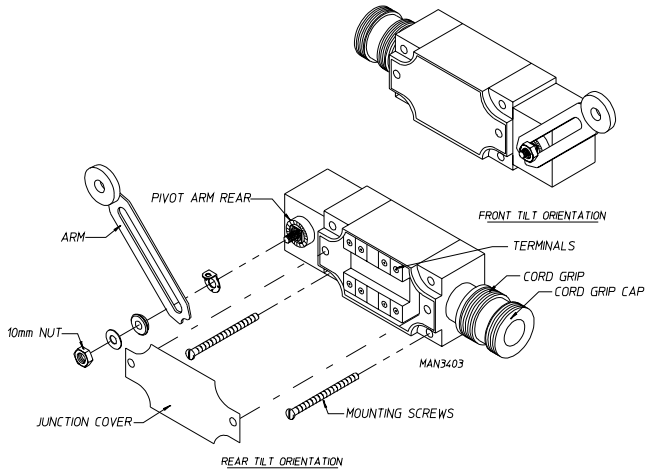
Caution

Do not place hands between the dryer base and the tumbler (basket/drum) section. Serious injury can result.

3. Unscrew tilt switch.
4. Loosen and remove the two (2) screws securing the junction cover.
5. Remove the junction cover.
6. Mark each wire for proper replacement.
7. Remove wires from terminal.
8. Loosen and remove the two (2) mounting screws.
9. Loosen and remove cord grip cap.
10. Remove cord grip.
11. Place pivot arm in the 1 o'clock position for the front tilt switch and in the 11 o'clock position for the rear tilt switch.

Verify that the body orientation and head orientation are correct.
Verify that the tilt switch arm is not in the vertical position or damage will result.

12. Holding the tilt arm, tighten up (snug up) on the nut.
13. Hold pivot point with a screwdriver and tighten the nut.
14. Replace base panel.
15. Reestablish electrical service to the dryer.



Tilt Switch Adjustment

- Discontinue electrical service to the dryer.
- Remove the base panel from the left hand side of the dryer.

Caution

Do not place hands between the dryer base and the tumbler (basket) section. Serious injury can result.

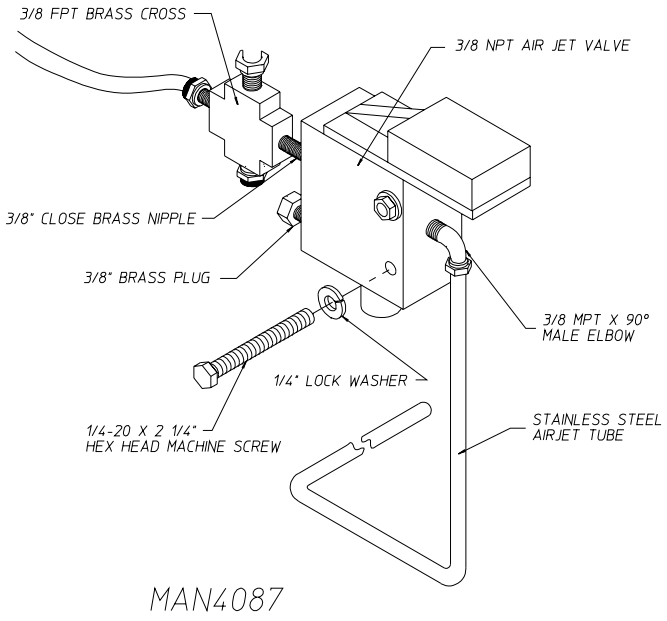
- To adjust the pivot arm; hold the arm and with a #10 metric wrench and loosen the nut.
- Place pivot arm in the one o'clock position for the front tilt switch and in the 11 o'clock position for the rear tilt switch.

Verify that the tilt switch arm is not in the vertical position or damage will result.

- Holding the tilt arm, tighten up (snug up) on the nut.
- Hold pivot point with a screwdriver and tighten the nut.
- Replace base panel.
- Reestablish power to the dryer.

Air Jet System

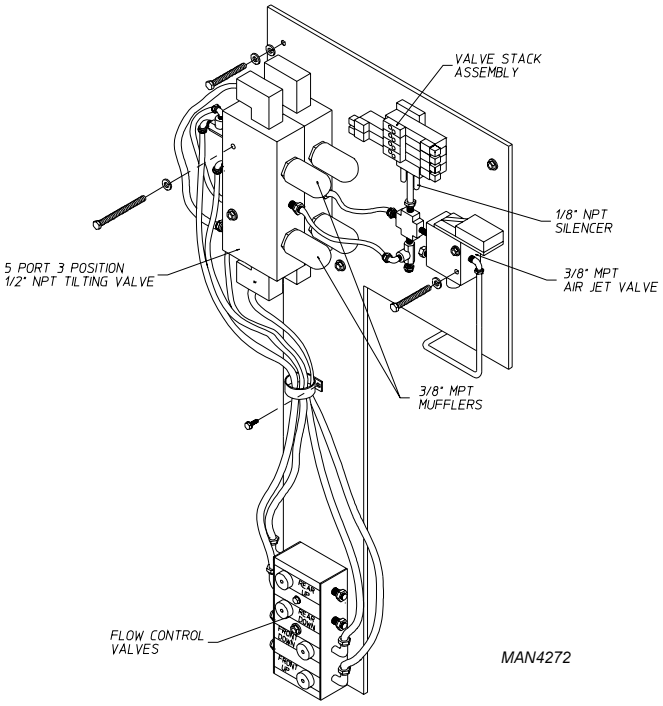
The dryer utilizes an air jet system so that at the end of each drying cycle 80 psi of compressed air is blown across the blower squirrel cage fan for 30-seconds to remove any lint build up that occurred during the drying cycle. This function will not be interrupted if the load doors of lint drawer is opened before the air jet cycle is complete.



Air Jet Valve

Air Jet Valve Replacement

- Discontinue air supply to the dryer.
- Discontinue electrical service to the dryer.
- Remove the poly-flow tubing from the brass tee and the brass cross.
- Remove the stainless steel air jet tubing from the pneumatic solenoid (air jet valve).
- Remove the two (2) 1/4-20 x 2-1/4" hex head machine screws mounting the air jet valve to the pneumatic panel.
- Remove the screw securing the air jet coil harness from the air jet valve.
- To install new air jet valve, reverse Step #6 through Step #3.
- Reestablish electrical survive to the dryer.
- Reestablish air supply to the dryer.



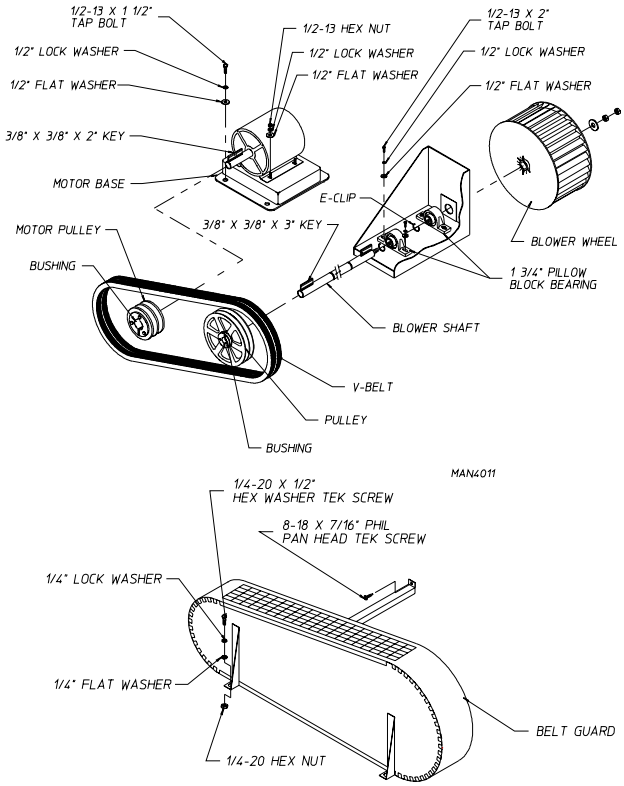
Blower (Squirrel Cage Fan) Motor Assembly

Blower (Squirrel Cage Fan) Motor Description

The dryer uses a 22-1/4 inch diameter blower (squirrel cage fan). It rotates (spins) in a counterclockwise (CCW) direction, when viewed at the blower motor.

The blower shaft is mounted on two (2) 1-3/4 inch diameter pillow block bearings and is driven by two (2) BX type V-belts which are connected to a 25 hp blower motor.

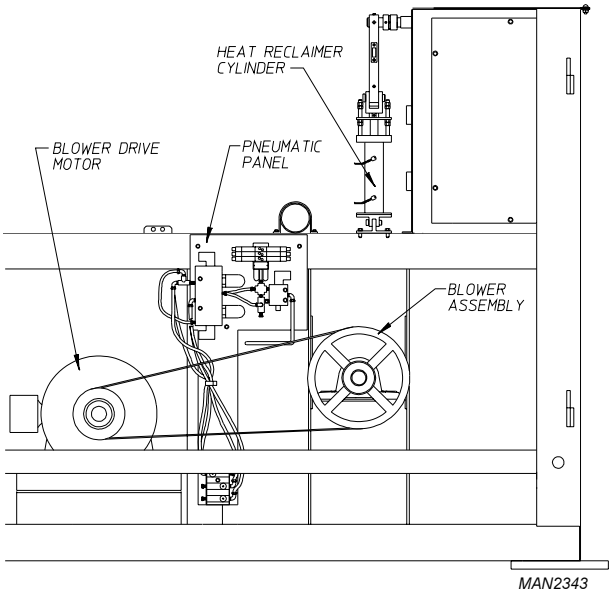
The blower motor is mounted on a adjustable base. The motors position can be easily adjusted so that the proper tension can be maintained on the V-belts.

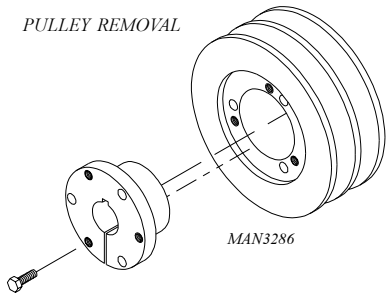


Blower (Squirrel Cage Fan) Motor Component Replacement

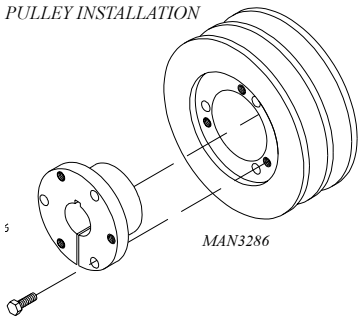
Blower Motor Replacement

1. Discontinue electrical service to the dryer.
2. Remove the belt guard.
3. Mark and identify the wires that will be disconnected for proper reinstallation.
4. Loosen the bolts securing the blower motor to the motor base; slide the blower motor forward. Remove the V-belts. Remove the loosened bolts. Remove the blower motor being replaced from the dryer.
5. Remove the bolts from the bushing.
6. Insert the bolts into the threaded holes.
7. Tighten the bolts evenly for motor pulley removal.
8. Mark the inside of the motor's shaft before removing the bushing.
9. Loosen the setscrews in the bushing.





10. Remove the bushing.
11. Measure the mark on the motor's shaft (from Step #8) to the end of the shaft and mark the new motors' shaft.
12. Install new blower on to the motor base.
13. Slide the motor pulley on to the new blower motors' shaft.
14. Slide the bushing onto the shaft until the inside of the bushing meets the mark (from Step #11) on the new motor's shaft.



15. Tighten/secure the setscrews into the bushing.
16. Insert the bolts into the large holes on the bushing and thread them into the motor pulley.
17. Tighten the bolts evenly for motor pulley installation.
18. Align the pulleys.
19. Tighten (hand tight only) the bolts for the new motor to the motor base. Leave enough movement for V-belt adjustment.
20. Replace the V-belts. Adjust to proper tension by adjusting the position of the new blower motor. Align the V-belts.
21. Tighten/secure the new motor to the motor base.
22. Reconnect the wires onto the new motor that were marked and disconnected in Step #3. A wiring diagram is usually affixed to the side of the motor.
23. Reinstall the belt guard removed in Step #2.
24. Reestablish electrical service to the dryer.

Shrouded Pillow Block Bearing Replacement

1. Discontinue electrical service to the dryer.
2. Remove the belt guard.
3. Loosen the bolts securing the blower motor to the motor base.
4. Remove the V-belts from the motor pulley and the pulley on the blower shaft.

Caution

The blower (squirrel cage) fan is located in the lint compartment properly lock and tag out the electrical service before entering the lint compartment.

5. Remove both lint drawers.
6. Remove the eight (8) 1/4-20 bolts which secure the blower funnel to the blower housing assembly.
7. Remove the blower funnel.
8. Remove the two (2) left hand jam nuts and the washers.
9. Remove the blower (squirrel cage) fan along with the 3/8" x 3/8" x 3" key from the blower shaft.
10. Remove the four (4) bolts securing the shrouded pillow block bearings from the blower shaft mount.
11. Remove the complete blower shaft assembly with the shrouded pillow block bearings from the dryer.
12. To remove the shrouded pillow block bearing from the blower (squirrel cage fan) side. Loosen the setscrews from the shrouded pillow block bearing. Clean the blower shaft prior to removal of the shrouded pillow block bearing.
13. To remove the shrouded pillow block bearing from the pulley side of the blower shaft, the pulley must be removed first. Remove the bolts from the bushing. Insert the bolts into the threaded holes. Mark the inside of the blower motor shaft before removing. Loosen the setscrews on the bushing. Remove the bushing and the pulley.
14. To remove the shrouded pillow block bearing: loosen the setscrew from the shrouded pillow block bearing. Clean the blower shaft prior to the removal of the shrouded pillow block bearing.
15. Replace the shrouded pillow block bearing on the blower shaft: secure the blower shaft to the blower shaft bearing mount. Tighten/secure the setscrews in the shrouded pillow block bearing.

Note

Install the 3/8" x 3/8" x 3" key on to the blower shaft before installing the blower (squirrel cage fan).

16. Reinstall the blower (squirrel cage fan) removed in Step #9.

Important
Make certain that the blower (squirrel cage fan) rotates (spins) freely.

17. Reinstall the blower funnel removed in Step #7.
18. Reinstall the bushing and the pulley removed in Step #13: line up the bushing to the mark on the blower shaft, then secure/tighten the setscrew. Reinstall the bolts into the original holes and tighten evenly for correct pulley installation.
19. Reposition the blower motor to its' original position: tighten (hand tight only) the bolts into the motor and the motor base. Slide the blower motor forward. Align the pulleys before installing the V-belts (use straight edge to confirm alignment).

Important
Do not overtighten v-belts.

20. When the V-belts are properly tensioned, secure/tighten the blower motor to the motor base.
21. Reinstall the belt guard removed in Step #2.
22. Reestablish electrical service to the dryer.

Blower (Squirrel Cage Fan) Replacement

Caution
The blower (squirrel cage fan) is located in the lint compartment. Properly lock and tag out the electrical service before entering the lint compartment.

1. Discontinue electrical service to the dryer.
2. Remove both lint drawers.
3. Remove the eight (8) 1/4-20 bolts which secure the blower funnel to the blower housing assembly.
4. Remove the blower funnel.
5. Remove the two (2) left hand jam nuts and the washers.
6. Remove the blower (squirrel cage fan) along with the 3/8" x 3/8" x 3" key from the blower shaft.

Note
Install the 3/8" x 3/8" x 3" key on to the blower shaft before installing the blower (squirrel cage fan).

7. To install new blower (squirrel cage) fan, reverse Step #6 through Step #1.

V-Belt Replacement

1. Discontinue electrical service to the dryer.
2. Remove the belt guard.
3. Loosen the bolts securing the blower motor to the motor base; ease off on the tension bolt.
4. Slide the blower motor forward.
5. Remove and replace V-belts.

Note
For proper belt replacement, the V-belts should be replaced in matched sets (both belts).

6. Tighten/secure the tension bolt.

Important
Do not overtighten v-belts.

7. Using a straight edge, make certain that the motor pulley and the V-belts are properly aligned.
8. Secure/tighten the bolts from the motor to the motor base.
9. Reinstall the belt guard removed in Step #2.
10. Reestablish electrical service to the dryer.

Blower Shaft Replacement

The procedure to replace the blower shaft is the same procedure used to replace the shrouded pillow block bearing. (Refer to page 22.)

Blower (Squirrel Cage Fan) Electrical Components

Blower (Squirrel Cage Fan) Controls and Overloads

Thermal Magnetic Starter (TMS) Description

The TMS is used as a safety device to manually disconnect the motor, thereby protecting the motor from being damaged in a locked rotor condition. The overload has a dial setting on the face of the device. To set the overload, refer to your specific electrical diagram. The overload is specifically designed for motor applications. It has a current curve built into it so the initial high current draw by the motor will not trip the overload. On the face of the overload there are two (2) push buttons, a "START" and a "STOP" or a dial with “ON” (1) and “OFF” (0). The overload must be in the "START" or “ON” mode for the motor to run.

Thermal Magnetic Starter (TMS) Replacement

1. Discontinue electrical service to the dryer.
2. Mark L1, L2, L3 and T1, T2, T3 on the wires to the TMS for correct reinstallation.
3. Set the amp (amphere) rating on the TMS according to the electrical schematic supplied with your dryer.
4. To remove the thermal magnetic starter, pull the tab on the bottom of the TMS, and lift upward.
5. To install new TMS, reverse Step # 4 through Step #2.
6. Reestablish electrical service to the dryer.

Auxiliary Contact Block Description

The auxiliary contact block is mounted on the side of the overload. Its function is to sense an overload trip, thereby triggering a safety fault which will disable the drying cycle. A motor overload fault message will appear on the display.

Auxiliary Contact Block Replacement

1. Disconnect electrical service to the dryer.
2. Remove the TMS from the din rail by pulling the tab on the bottom of the contact block and lift upward.
3. Remove the two (2) wires going to the auxiliary contact block and label for correct reinstallation.
4. There are two (2) types of auxiliary contact blocks: one style has a screw and the other style has a clip. In both styles, disassembly and assembly is recommended with the TMS in the "STOP" position. To remove the style that has the screw from the TMS, simply remove the screw. To remove the style that has the clip, simply push the clip and twist the auxiliary contact block to remove.
5. To install new auxiliary contact block, reverse above procedure (Step # 4 through Step #2).
6. Reestablish electrical service to the dryer.

Varistor (MOV [Metal Oxide Varistor]) Description

The varistor (MOV) is used to suppress any inductive electrical spikes produced by the energizing and coil voltage.

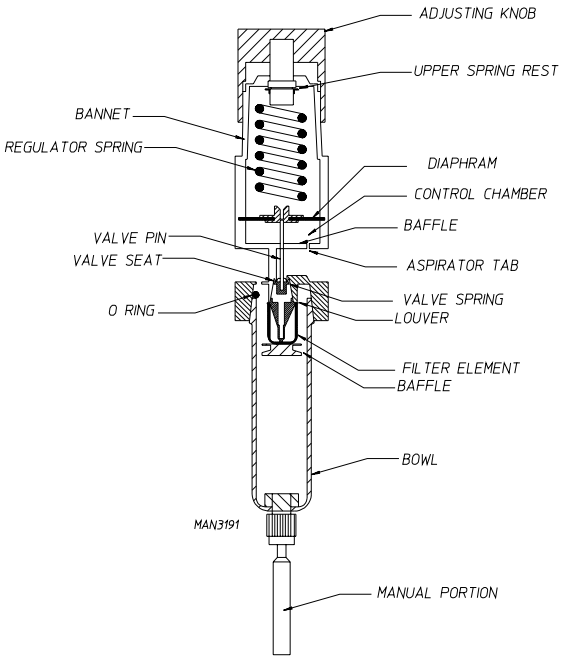
Varistor (MOV) Replacement

1. Discontinue electrical service to the dryer.
2. Loosen the screws marked A1 and A2 on the contactor.
3. Verify that no additional wires were inadvertently removed.
4. Reverse above procedure to install new varistor.

Filter/Regulator Assembly

The purpose of the filter is to remove bulk liquids and solid particles from the compressed air stream. The filter element provides mechanical separation of solids. Centrifugal force inside the filter bowl separates bulk liquids and larger solid particles.

The filter consists of a louver, which causes a centrifugal spinning action to separate contaminants. A filter, which mechanically separates contaminants is also present. The filter bowl collects the contaminants and a baffle prevents turbulence from picking up contaminants at the bottom of the bowl and returning them to the air stream.



FILTER/REGULATOR

Filter Maintenance

To remove filter element: twist the filter bowl 1/8 turn clockwise (CW). Then pull the bowl down to expose the filter element. To remove the filter element, unscrew the baffle (this will allow element removal).

To clean filter element use soap and water.

Note

When replacing the filter element bowl, care must be taken to ensure that the O-Ring does not get pinched.

Regulator Operation

The adjustment knob simply acts upon a spring rest located on the spring and directly compresses the spring as it is adjusted. A non-rising low torque adjustment screw is used on this type of filter and regulator. The upper spring rest is located on top of the regulator spring and transmits force from the adjustment screw to the spring. Regulators use simple wire coil springs for controlling the downstream regulator pressure. The bonnet houses the adjustment spring and is used to help retain the diaphragm. The diaphragm moves up when the downstream pressure reaches its preset pressure level, which in turn closes the valve. A self-relieving regulator is designed to automatically relieve overpressure in the secondary side of the regulator.

Note

This self-relieving feature is not designed to bleed the downstream pressure.

Dryer must be provided with a clean, dry, and regulated 80 psi +/- 10 psi (5.51 bar +/- 0.68 bar) air supply (equivalent volume = 11 cfh [0.31 cmh]).

The regulator should be set at 80 psi +/- 10 psi (5.51 bar +/- 0.68 bar). To set pressure, pull the adjusting knob up and either turn the knob clockwise (CW) to increase the pressure or counterclockwise (CCW) to decrease the pressure.

The dryer is equipped with a pneumatically operated heat reclaimer damper, which when opened, will recirculate approximately fifteen percent (15%) of the dryer's exhaust air.

The heat reclaimer dampener is closed until ignition of flame has been established. Then, the damper piston is actuated, opening the damper and recirculating fifteen percent (15%) of the exhaust air back over the gas burner and into the tumbler. The damper remains open for the rest of the drying cycle. On cool down, the damper closes, exhausting all of the 13,000 cfm which ensures a fast cool down of the load.

Note

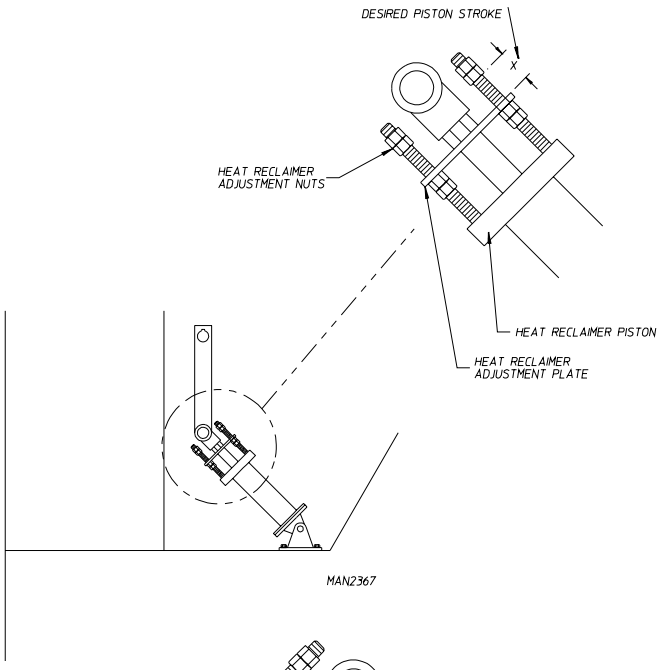
Gas Dryers must have a "Y" dimension of 1-3/16".

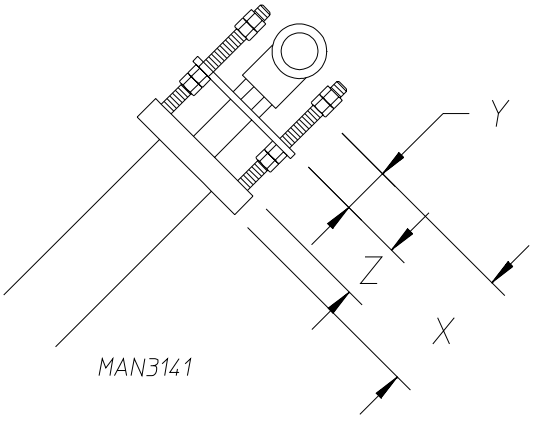
Heat reclaimer adjustment

1. Remove electricity from the unit.
2. Loosen heat reclaimer adjustment nuts on all four (4) corners of the heat reclaimer piston.
3. Adjust the bottom heat reclaimer nuts down to their desired position which will give the proper piston stroke.

Example: If the desired piston stroke is two (2) inches (5.1 cm), then the distance "x" in the illustration must be two (2) inches (5.1 cm).

4. Tighten top heat reclaimer nuts down onto the bottom heat reclaimer nuts.





HEAT RECLAIMER SETTINGS			
Z = 1-5/8			
Y+Z=X	**Y**	**%HR**	**Inches Reclaimed**
1-1/8"	1/2"	7.46	1-1/4"
2-5/8"	1"	15.67	2-5/8"
3-1/8"	1-1/2"	25.37	4-1/4"
3-5/8"	2"	34.32	5-3/4"
4-1/8"	2-1/2"	43.28	7-1/4"
4-5/8"	3"	50.74	8-1/2"
5-1/8"	3-1/2"	58.95	9-7/8"
			FULL OPEN 16-3/4"

Compressed Air System

The compressed air system of the dryer consists of a number of pneumatic pistons located throughout the dryer, a regulator, and pneumatic control panel.

Air Pistons

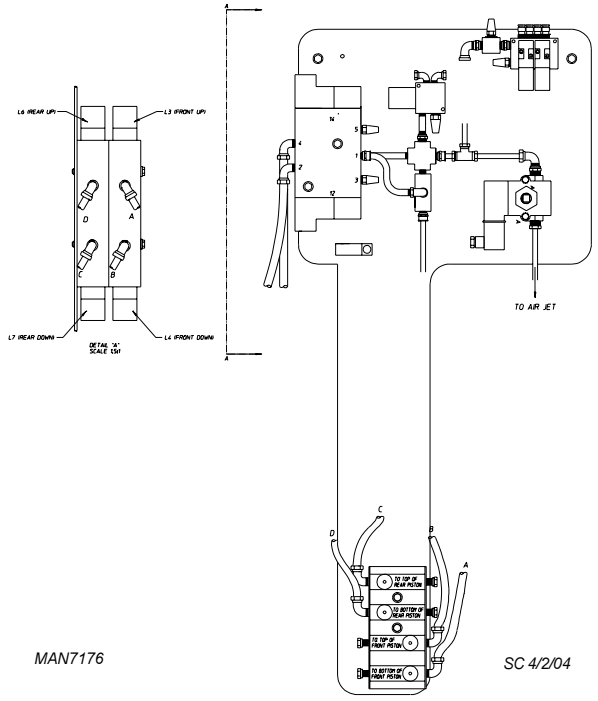
The pistons are actuated by solenoid and flow control valves that are under computer control. The pneumatic pistons are used to:

- Tilt the dryer for loading and unloading.
- Open and close load and unload doors
- Operate heat reclaimer.
- Operate the cool down damper and the intake air damper. (steam only)

Pneumatic Control Panel

The pneumatic control panel of a 2-way tilt dryer has two (2) tilting solenoid valves, one to control the front set of tilting pistons and a second to control the rear set of tilting pistons. A 1-way tilt dryer has only one (1) tilting solenoid valve.

Each valve has five (5) 1/2-inch F.P.T. ports and two (2) electric solenoids, one on each side of the valve.



To tilt the dryer back, a 24 volt signal is applied to the front pistons solenoid connector “L3” connecting air to the bottom of the piston, and no voltage is applied to the solenoid connector “L4” connecting air to the the top of the piston. The internal spool in the valve will move and 80 psi of air will enter the bottom port of the front tilting pistons, extending the front tilting piston rods and tilting the dryer back for loading. The top piston ports are bled to the atmosphere. To level the dryer after loading, the voltage signals are reversed. No voltage is applied to the bottom solenoid, and 24 volts are applied to the top “L4” solenoid. The valve spool will now move so that 80 psi of air is applied at the top piston ports, while the bottom piston ports are bled to the atmosphere. The piston rods will now retract, leveling the dryer. On a 2-way tilt dryer, the rear tilting piston solenoid valve acts in the same manner.

The tilting piston valves are three (3) position valves. This means that, if no voltage is applied to both positions (top “L3” and bottom “L4”) all five (5) valve ports are blocked. If the dryer is tilting or leveling and power to the dryer is shut off, the pistons will lock in position, holding the dryer in a partially tilted position.

The dryer can be made to tilt faster or slower by adjusting the pistons 3/8-inch flow control valves which are located on the pneumatic control panel.

Internal and External Pilot Air Supply

On 2-way tilt dryers, a pneumatic safety circuit is incorporated to prevent both front and rear tilting pistons from extending their rods at the same time. When 24 volts is supplied to the bottom “L3” of the front tilting piston solenoid, the round internal spool in the core of the solenoid will move, allowing 80 psi air to flow into the bottom ports of the front tilting pistons, while the top ports of these pistons are bled to the atmosphere. In addition to this 24 volt electrical signal, the spool also requires a 30 psi supply of compressed air to change its position. This pilot air can either be supplied internally, tapped off the 80 psi air supply connected to port no. 1 through holes in the body of the solenoid valve or it can be supplied externally through the 1/8-inch F.P.T. connection located on either end of the solenoid valve. If no pilot air is supplied to the solenoid valve then the spool cannot move, even with voltage supplied to the solenoid valve coil.

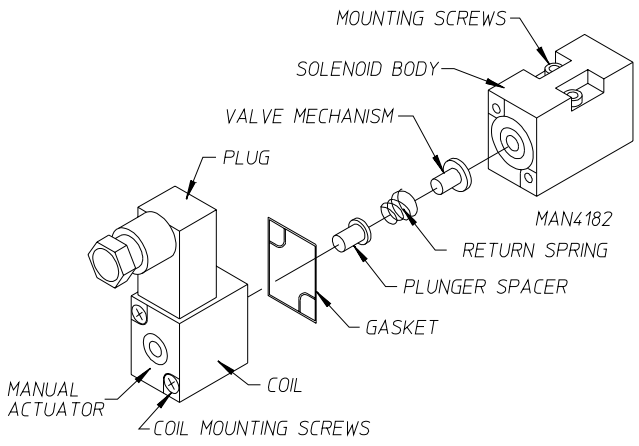
Solenoid Coil

Coil Replacement

1. Discontinue air supply to the dryer.
2. Discontinue electrical service to the dryer.
3. Loosen coil plug screw and remove the plug.
4. Carefully remove the coil mounting screw.

Important
Take notice — small components!!!

5. Note the sequence of the plunger components (i.e., return spring, plunger, etc.).
6. Install new coil making sure that component reinstallation (i.e., return spring, plunger, etc.) is in the correct sequence.
7. Replace coil plug removed in Step #4.
8. Reestablish electrical service to the dryer.
9. Reestablish air supply to the dryer.



Solenoid Valve

Valve Replacement

1. Discontinue air supply to the dryer.
2. Discontinue electrical service to the dryer.
3. Loosen coil plug screw and remove the plug.
4. Carefully remove the two (2) valve mounting screws. Take notice of the gasket.
5. Install new valve body.

Caution
Do not pinch the gasket.

6. Replace coil plug removed in Step #4.
7. Reestablish electrical service to the dryer.
8. Reestablish air supply to the dryer.

Tubing

Tubing Replacement

1. Discontinue air supply to the dryer.
2. Discontinue electrical service to the dryer.
3. Push tubing in and at the same time push black ring on disconnect in, then while holding ring, pull tubing.
4. Install new tubing into the connector.
5. Pull on tubing to verify proper connection.
6. Reestablish electrical service to the dryer.
7. Reestablish air supply to the dryer.

Door Systems

Pneumatic Automatic Door Description/Operation

Description

The dryer uses a piston operated cable assembly to open and close the load doors. The top and bottom sections of the doors have upper and lower, as well as, left and right side clamp plates attached to the doors. The cable is attached to the doors with four (4) cable clamp plates. The cable clamp plate is secured to the clamp plate with a 5/16-18 x 3/4” bolt and 5/16” lock washers. Magnetic switches are used to indicate open and closed door position.

Operation

When the piston is in the retracted position, the doors are closed. When air is applied to the piston, the doors will open.

If the “EMERGENCY STOP” (E-Stop) is engaged, the air is automatically exhausted so that the doors can be opened manually.

In a 2 door application, there are double the components for independent operation of the rear doors.

Door Component Replacement and Removal

Door Piston Replacement

1. Discontinue electrical service to the dryer.
2. Discontinue the air supply to the dryer.
3. Block the bottom load door in the closed position prior to disassembly of any parts.

Important
Failure to block the bottom load door securely in the closed position may result in personal injury.

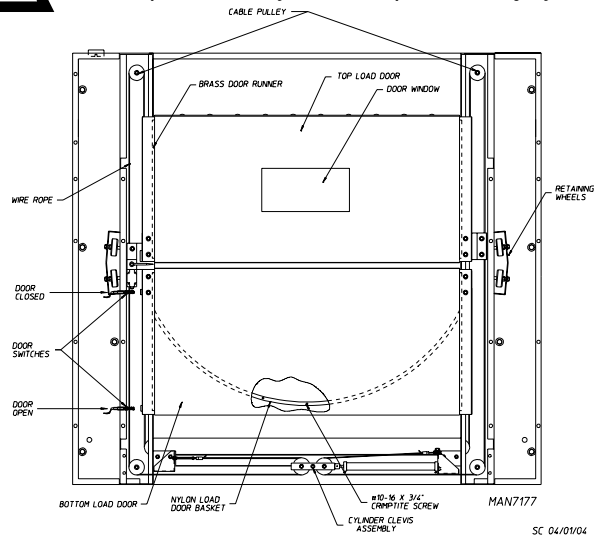
4. Remove the two (2) 1/4" x 1/4" poly connectors from the piston.
5. Loosen the turnbuckle so that the cable becomes slack.
6. Loosen the setscrew securing the cylinder clevis assembly to the piston shaft.
7. Remove the 5/16-24 x 1/4" socket head cap screw and 5/16" lock washer from the piston base.
8. Unscrew the piston shaft from the cylinder clevis assembly.
9. To install new door piston, reverse Step #8 through Step #3.
10. Reestablish the air supply to the dryer.
11. Reestablish electrical service to the dryer.

Cable (Wire Rope) Replacement

1. Discontinue electrical service to the dryer.
2. Discontinue the air supply to the dryer.
3. Block the bottom load door in the closed position prior to disassembly of any parts.

Important

Failure to block the bottom load door securely in the closed position may result in personal injury.



4. Loosen the turnbuckle so that the cable becomes slack.
5. Remove the two (2) cable (wire rope) clamps from the wire rope.
6. Loosen the four (4) cable (wire rope) clamp plates from the wire rope.
7. Remove the cable (wire rope).

Notes

For proper cable (wire rope) routing, starting at the piston;

A. Replace the cable (wire rope) thimble and wire rope clamp to one side of the cable.
B. Secure the cable (wire rope) to the piston mount with the 3/8-16 x 1" bolt, 3/8" fender washer, 3/8" lock washer, and 3/8-16 hex nut.
C. Feed the cable (wire rope) through the cylinder clevis assembly and around the outer lower right cable pulley, to the upper right cable pulley, to the inner lower right cable pulley, to the inner lower left cable pulley, to the outer lower left cable pulley, and to the cylinder clevis assembly.
D. Feed the cable (wire rope) through the wire rope clamp.
E. Feed the cable (wire rope) thimble through the turnbuckle adjustment rod.
F. Feed the cable (wire rope) around the wire rope thimble.
G. Feed the end of the cable (wire rope) through the wire rope clamp and tighten.
H. Adjust the turnbuckle to the proper cable (wire rope) tension.

8. To install new cable (wire rope), reverse Step #7 through Step #3.
9. Reestablish the air supply to the dryer.
10. Reestablish electrical service to the dryer.

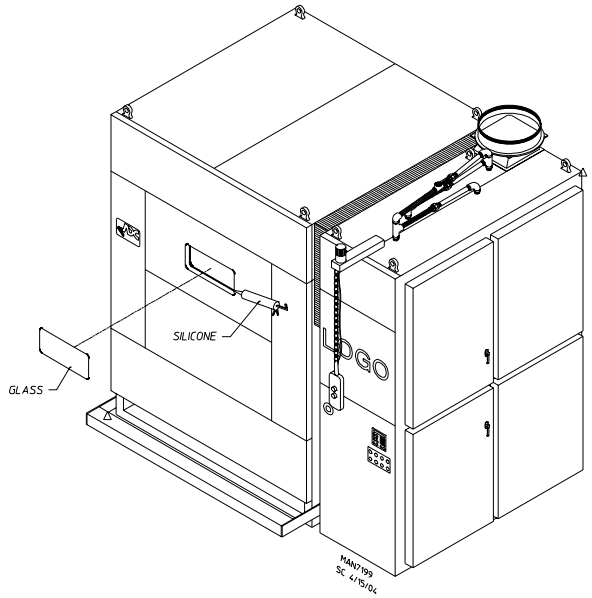
Load Door Glass Window Replacement

1. Remove all of the old silicone from around the door glass.
2. Clean glass door opening (with alcohol) to remove all foreign residue.
3. Carefully clean new door glass with alcohol prior to installation.
4. Apply a bead of silicone (**ADC** P/N 170730) to the outer perimeter of the door glass opening.
5. Carefully insert new door glass within the door glass opening.

Important

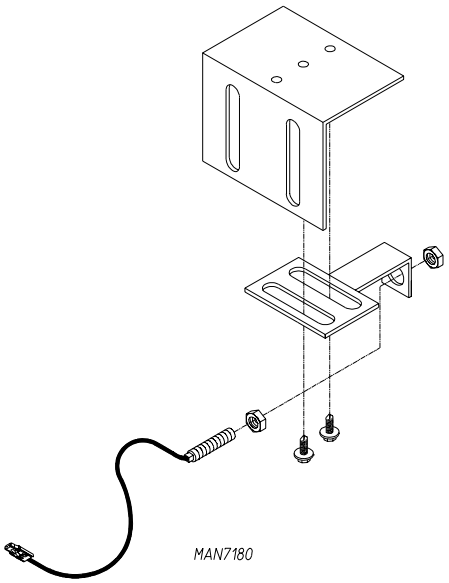
Allow a full 72 hours for the silicone to cure.

6. Carefully trim excess silicone (with a razor blade) after the cure time.



Load Door Open/Closed Switch Replacement

1. Discontinue electrical service to the dryer.
2. Loosen and remove the two (2) screws securing the mounting bracket
3. Remove the switch from the mounting bracket.
4. Depress the tabs on the 2 PIN connector and pull apart from the harness.
5. Install the new switch by connecting the plug to the harness.
6. Place one (1) adjustment nut onto the sensor switch and insert into the mounting bracket.
7. Place the second adjustment nut on the switch but do not tighten.
8. Line up the switch with the magnet on the door with approximately 1/8” space between.
9. Tighten the adjustment nuts.
10. Reestablish electrical power to the dryer.



SC 04/01/04

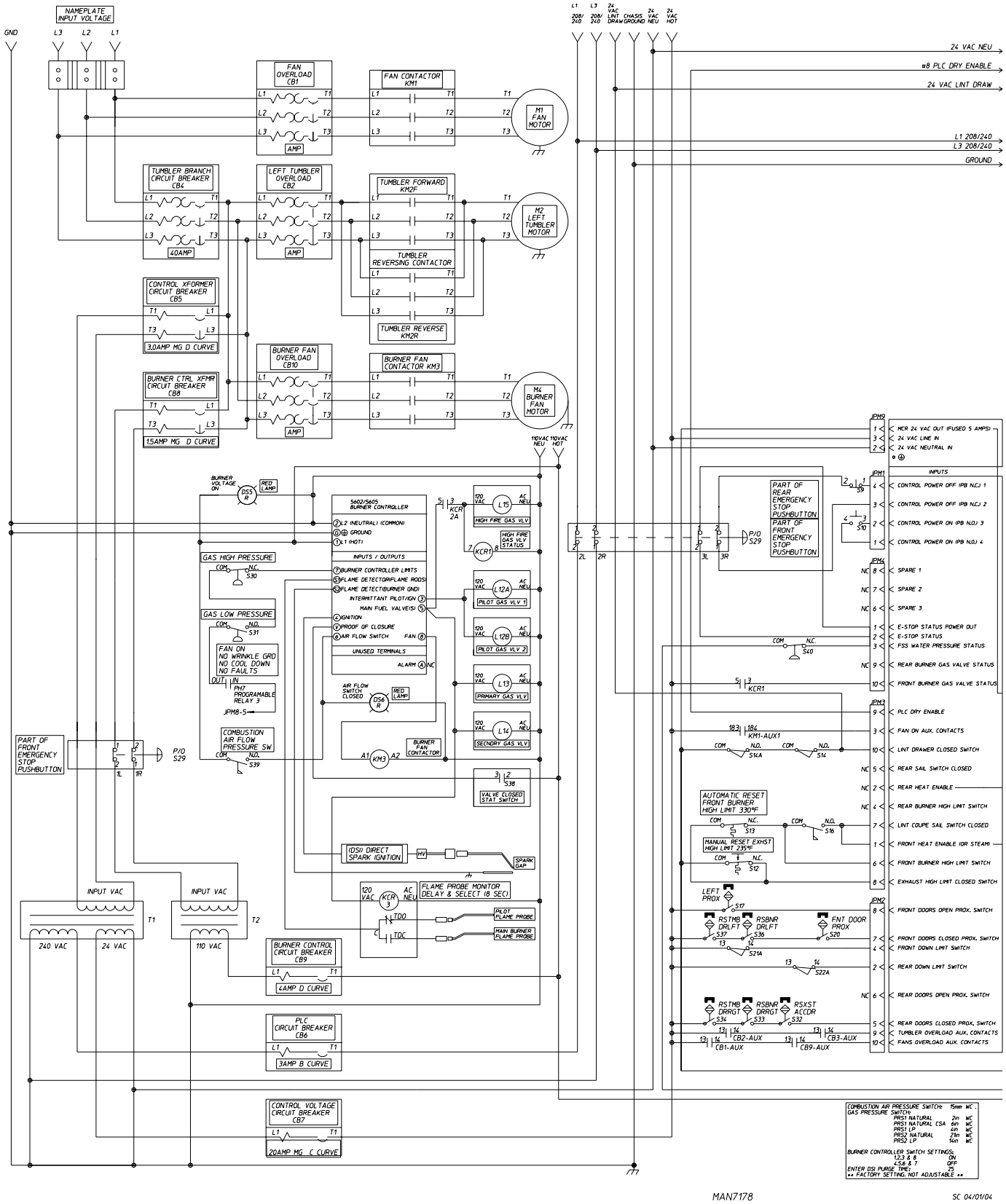
Note

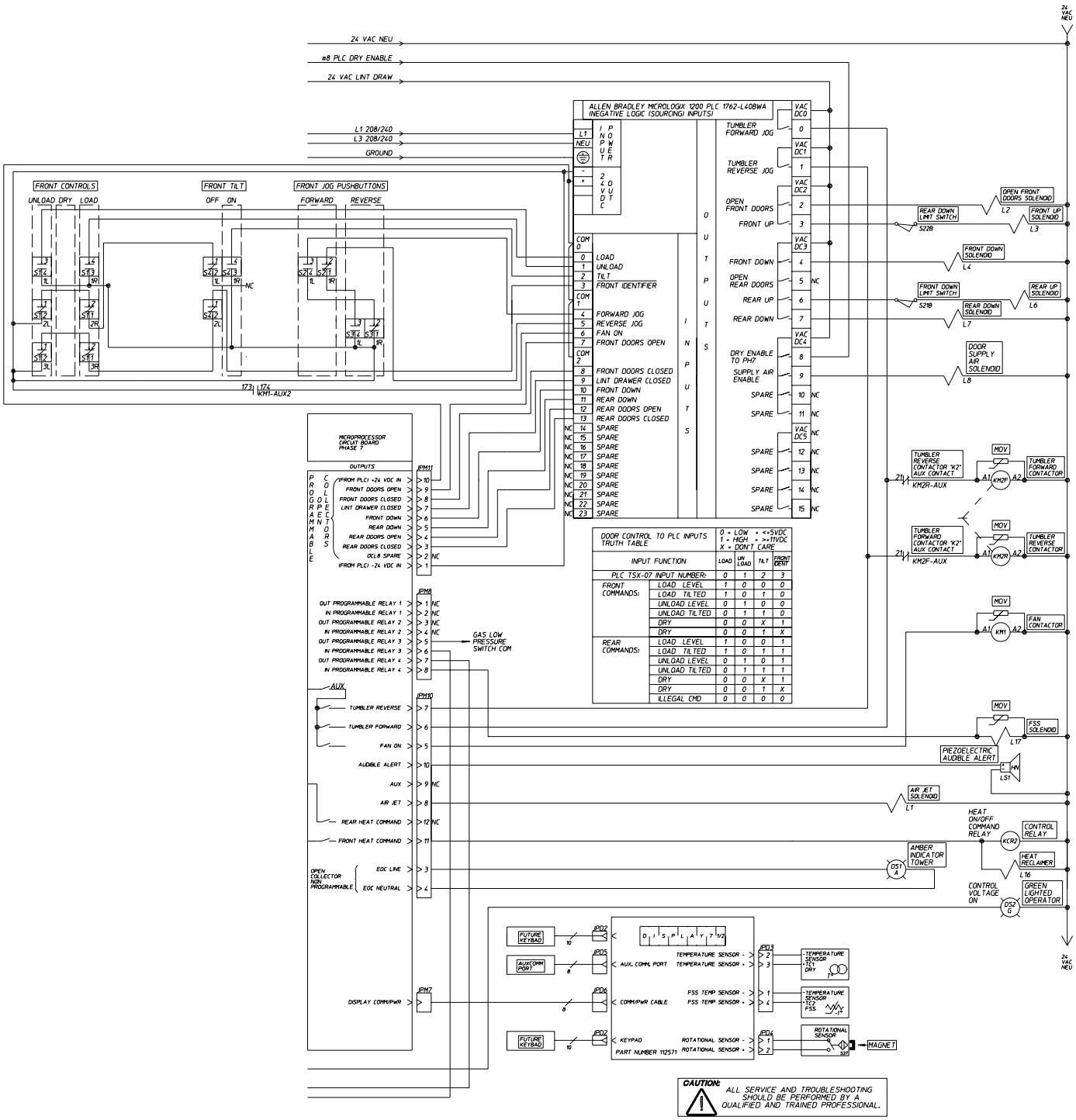
Verify that the proximity switch aligns with the magnet on the door.

Load Door Closed Switch Adjustment

1. Discontinue electrical service to the dryer.
2. Loosen the adjustment nuts and align switch to have about 1/8” between the switch and the magnet.
3. Tighten adjustment nut.
4. Reestablish electrical service to the dryer.

Ladder Diagram




24 VAC NEU
#8 PLC DRY ENABLE
24 VAC LINT DRAW
L1 208/240
L3 208/240
GROUND
ALLEN BRADLEY MICROLOGIX 1200 PLC 1762-L40BWA
(NEGATIVE LOGIC (SOURCING) INPUTS)
FRONT CONTROLS
UNLOAD DRY LOAD
FRONT TILT
OFF ON
FRONT JOG PUSHBUTTONS
FORWARD REVERSE
173 174
KM1-AUX2
MICROPROCESSOR CIRCUIT BOARD PHASE 7
PROGRAMMABLE
COLLECTIONS
OUTPUTS
JPM11
JPM8
JPM10
JPM7
AUX
OPEN COLLECTOR NON PROGRAMMABLE
EOC LINE
EOC NEUTRAL
GAS LOW PRESSURE SWITCH COM
DISPLAY COMM/PWR
FUTURE KEYBAD
AUXCOMM PORT
COMM/PWR CABLE
KEYPAD
PART NUMBER 112571
TEMPERATURE SENSOR
AUX. COMM PORT
FSS TEMP SENSOR
ROTATIONAL SENSOR
MAGNET
TUMBLER FORWARD JOG
TUMBLER REVERSE JOG
OPEN FRONT DOORS
FRONT UP
FRONT DOWN
OPEN REAR DOORS
REAR UP
REAR DOWN
DRY ENABLE TO PH7
SUPPLY AIR ENABLE
OPEN FRONT DOORS SOLENOID
REAR DOWN LMT SWITCH
FRONT UP SOLENOID
FRONT DOWN SOLENOID
FRONT DOWN LMT SWITCH
REAR UP SOLENOID
REAR DOWN SOLENOID
DOOR SUPPLY AIR SOLENOID
TUMBLER REVERSE CONTACTOR "K2" AUX CONTACT
TUMBLER FORWARD CONTACTOR
TUMBLER FORWARD CONTACTOR "K2" AUX CONTACT
TUMBLER REVERSE CONTACTOR
MOV
FAN CONTACTOR
FSS SOLENOID
PIEZOELECTRIC AUDIBLE ALERT
AIR JET SOLENOID
HEAT ON/OFF COMMAND RELAY
CONTROL RELAY
HEAT RECLAIMER
AMBER INDICATOR TOWER
CONTROL VOLTAGE ON
GREEN LIGHTED OPERATOR
DOOR CONTROL TO PLC INPUTS TRUTH TABLE
0 = LOW = <=5VDC
1 = HIGH = >=11VDC
X = DONT CARE
CAUTION:
ALL SERVICE AND TROUBLESHOOTING SHOULD BE PERFORMED BY A QUALIFIED AND TRAINED PROFESSIONAL.
MAN7179
SC 04/01/04

Caution

When servicing the high voltage (HV) section of the dryer, the electrical power must be disabled. The "Emergency Stop" (E-Stop) button does not disable the high voltage to the dryer.

Control/Electrical System Description

3-Phase (3ø) Electrical Power

The 3-phase (3ø) electrical power for the dryer enters the dryer through the power distribution block located in the dryer front right cabinet. It is then distributed to the blower (impellor/fan) motor, drive (basket [tumbler]) motor, and transfer circuits.

Blower (Squirrel Cage Fan) Motor

The blower (squirrel cage fan) motor circuit consists of a blower motor thermal magnetic overload. The overload current is adjustable by a dial located on the face of the overload. (Refer to the electrical specification diagram supplied with the dryer for correct current setting.)

Attached to the thermal magnetic starter (T.M.S.) is an auxiliary contact used to sense an overload trip. This produces a safety error so the dryer service is disabled (the dryer will not start).

In series with the thermal magnetic overload is the blower motor contactor. This device enables the supply voltage to reach the blower (squirrel cage fan) motor. The blower motor contactor is controlled by the Phase 7 microprocessor controller (computer). (Refer to Phase 7 Microprocessor Controller [Computer] on page 34 for information.) When 24 VAC is applied to coil A1-A2, the contactor closes and enables the circuit.

The blower (squirrel cage fan) motor used for gas and steam model dryers is 25 hp (18.64 kW). The motor wiring configuration is dependent on the specific voltage of the dryer. When wiring the motor, refer to the motor nameplate.

Drive (Basket [Tumbler]) Motor

The drive (basket [tumbler]) motor converts the 3-phase (3ø) power source entering the drive motor thermal magnetic overload. The overload current is adjustable by a dial located on the face of the overload. (Refer to the electrical specification diagram supplied with the dryer for correct current setting.) In this circuit, the drive motor contactor follows the thermal magnetic overload.

The drive motor has two (2) separate sets of coils and two (2) separate sets of contacts. One (1) of these sets is for forward basket (tumbler) and drum rotation and the other for reverse basket (tumbler) and drum rotation. The thermal magnetic overloads and the contactors are located in the left hand electrical cabinet. The direction of the drive motor is determined by the phases going into the motor (i.e., in a reverse direction phase, L1 and L2 are switched). When viewing this contactor, the left hand block connections are for the forward rotation direction (clockwise [CW]) when viewed from the front of the dryer.

The drive (basket [tumbler]) motor is a 7-1/2 hp (5.59 kW) motor. Refer to the motor nameplate for specific terminal box wiring.

24 VAC Transformer

The 24 VAC transformer consists of Circuit Breaker (CB5), which is the primary fusing for the transformer. For the proper rating of this circuit breaker refer to the specific electric diagram. The transformer is located in the right hand electrical cabinet.

On dryer models manufactured for 208 volt or 240 volt electrical power, the voltage for the programmable logic controller (PLC) is supplied from the primary side of the 24 VAC transformer. On dryers that are manufactured for 380 volts and higher, there is an additional secondary 240 VAC on the transformer that is used to supply the voltage required to operate PLC through Circuit Breaker (CB6).

24 VAC Control Circuit

The secondary side of the 24 VAC transformer supplies 24 VAC to various control circuits through Circuit Breaker (CB7) circuit breaker amperage (rating) is dependent on the voltage that the dryer was manufactured with.

The first circuit is the control voltage on/off. Control voltage (24 VAC) goes through the "Control Power Off" (normally closed) switch and supplies voltage to the "Control Power On" (normally open) switch. When the "Control Power On" switch is momentarily engaged, the master control relay (MCR) on the Phase 7 board engages. If the power is interrupted or the "Control Power Off" switch is pressed the MCR will disengage.

For dryers manufactured with automatic doors - the purpose of the supply air is to relieve pressure on the automatic door pistons when an "Emergency Stop" (E-Stop) is engaged.

Safety Circuits

The following circuit branches are to verify various safeties, if all conditions are met.

The first two (2) items are the auxiliary contact located on the blower (squirrel cage fan) motor and the basket (tumbler) motor overload. If either of these devices trip, it will open up the safety circuit thereby preventing the dryer from operating.

Front Doors Closed (FDRC) Circuit Branch

There are two (2) magnetic proximity switches used for door position confirmation. The door closed position has a magnet mounted on the side of the doors. When this magnet aligns with the proximity switch, the contacts in the proximity switch close. When both doors are closed, the front doors closed (FDRC) light emitting diode (L.E.D.) is on.

The other magnetic proximity switch is also mounted on the side lined up with a magnet on the door when the doors are in the open position. When this switch is made, the front door open (FDRO) L.E.D. is on.

Dryer Level Switches Circuit Branch

On 1-way tilt models, this switch is in series with the dry enable. It will also be indicated by (FDWN) front down L.E.D. on the Phase 7 board.

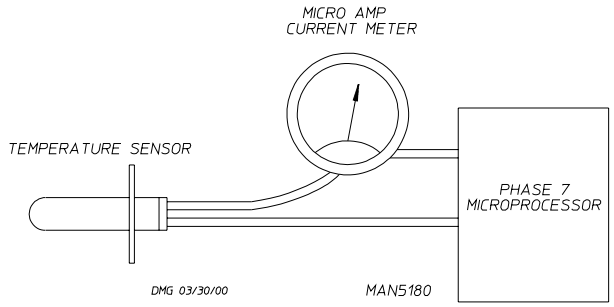
On 2-way tilt models, one (1) pole of each of the two (2) level switches (LS1-A and LS2-A) is in series with the dryer level relay and the other pole is in series with the opposite piston. If the opposite side is not level, the dryer will not tilt. The rear down (RDWN) L.E.D. will also indicate that the rear is down.

Lint Drawer Closed Circuit Branch

The lint drawer closed switch is located in the front of the dryer. When the lint drawer is closed, it closes the switch contacts, powering the PLC outputs with 24 VAC. When the lint drawer is closed, the lint drawer L.E.D. on the Phase 7 board is on.

Phase 7 Microprocessor Controller (Computer)

The temperature sensor probe is a bullet shaped device that is located in the exhaust duct by the heat reclaimer. This temperature sensor probe is used to sense the temperature in the exhaust of the dryer. The temperature sensor is a two (2) terminal monolithic integrated circuit temperature transducer that provides an output current proportional to absolute temperature. The transducer acts as a high impedance temperature dependent current source of 1mA/ºK. The typical accuracy of this probe is +/- 1.5º C (+/- 2.7º F). In a case where the temperature reaches 220º F (104º C), the Phase 7 microprocessor controller (computer) will shut down and the light emitting diode (L.E.D.) will display "Exhaust High Temp Fault." To restart a cycle the "STOP/CLEAR" button must first be pressed.



$$°F = \frac{9}{5}(°C + 32)$$

$$°C = \frac{5}{9}(°F - 32)$$

$$\text{Temperature Sensor Current} = \frac{°C + °K\ (273.15)}{1{,}000{,}000} = \text{microamps}\ (\mu A)$$

To check a temperature sensor you first need a digital multimeter (DMM) with a diode check position. Put the meter on diode check, place the "red" lead of the meter on the "black" lead of the temperature sensor and the "black" lead of the meter on the "white" temperature sensor wire. At this point you should get no response from meter (infinite). If you get a reading the temperature sensor is defective.

Next reverse leads to temperature sensor "black" to "black" and "red" to "white." At that point you measure approximately 1.8-amps, this is the turn on voltage of the device. If you hold the temperature sensor in your hands and warm it the reading will decrease corresponding to a higher current flow (the decrease is very slight tenths of a volt).

The rotational sensor is a magnetic proximity switch that is mounted on the basket (tumbler) wrapper on the left side of the dryer. There is a magnet mounted to the side of the basket (tumbler). After each rotation of the basket (tumbler), the magnet passes by the proximity switch causing the contacts to close and pulse the Phase 7 microprocessor controller (computer). Whenever the magnet is over the proximity switch there should be contact closure.

When a drying cycle is started, the blower (fan and impellor) output switches on putting 24 VAC on the blower (fan and impellor) contactor coil, which in turn pulls in the contactor starting the blower motor turning. The Phase 7 board passes through a "Fan On" signal to the programmable logic controller (PLC) disabling the tilting function. Moments later, the basket (tumbler) and drum begin to rotate because the output turns on thereby pulling in the basket (tumbler) and drum forward contactor. Next, the heat "On/Off" output will turn on if there is a call for heat, supplying 24 VAC to the heat circuit through the safety circuits.

The first safety circuit is the manual reset exhaust hi-limit, which is located on the bracket with the temperature sensor probe in the exhaust duct. On a temperature rise of 235º F (113º C) or higher, the thermal switch opens breaking the heat circuit, this switch must be manually reset.

A second safety circuit is the burner automatic reset hi-limit switch located on the top of the burner. On a temperature rise of 330º F (166º C) or higher, the thermal switch opens breaking the heat circuit.

A third safety circuit is the sail switch, which is located on the side of the lint drawer. This device pulls in when the impellor (fan and blower) is operating correctly and verifies proper airflow.

If all the safeties are properly maintained and a call for heat is present, 120 VAC will enable the Burner Control Module (BCM) via programmable relay 3 on the Phase 7 board through the gas pressure switches.

The heat output from the Phase 7 will enable the gas valves and open the heat reclaimer.

Programmable Logic Controller (PLC)

The PLC can consist of one (1) or two (2) modules; a main module and in some cases an expansion module is used for additional inputs and outputs.

Note

The information listed is generic in nature, refer to blueprints for specific details.

The PLC module has fourteen (14) input relays, which are labeled #0 through #13 and ten (10) output relays labeled #0 through #9.

Input Relays

Input relays #0, #1, #2, and #3 are set up as user inputs to signal what specific function is to be performed (i.e., load, unload, tilt, and front identifier). These input relays are charted as 1 and 0 (1 is logic on and 0 is logic off). When either an input relay or an output relay is on, the appropriate L.E.D. on the PLC will be illuminated.

For input relay #7 to turn on, the top and bottom front doors must be completely open. Once these doors are completely open, the jog forward (input #4) and jog reverse (input #5) can turn on through the PLC, which in turn rotates the basket (tumbler) and drum through either output relay #0 or output relay #1 providing the lint door is closed. This interlock is performed through PLC input #9 (lint door closed), or in some cases the drive or blower overload may interrupt the 24 VAC signal from reaching the drive contactors and the tilting solenoids.

Input relay #6 indicates that the blower fan is ON. This input is used to disable the outputs while the fan is on indicating that the dryer is drying.

Input relay #8 indicates the front doors are closed.

Input relay #10 indicates the front is down.

Input relay #11 indicates the rear is down.

Input relay #12 indicates the rear doors are open.

Input relay #13 indicates the rear doors are closed.

Output Relays

Output relay #0 (drive forward) and output relay #1 (drive reverse) are used to perform jog functions.

Output relay #2 controls the open front door function. When this signal is energized, the pneumatic valve opens allowing air into the two (2) door cable cylinders, which in turn opens the front doors.

Output relay #3 controls the front “UP” solenoid.

Output relay #4 controls the front “DOWN” solenoid.

Output relay #5 controls rear doors open.

Output relay #6 controls the rear “UP” solenoid.

Output relay #7 controls the rear “DOWN” solenoid

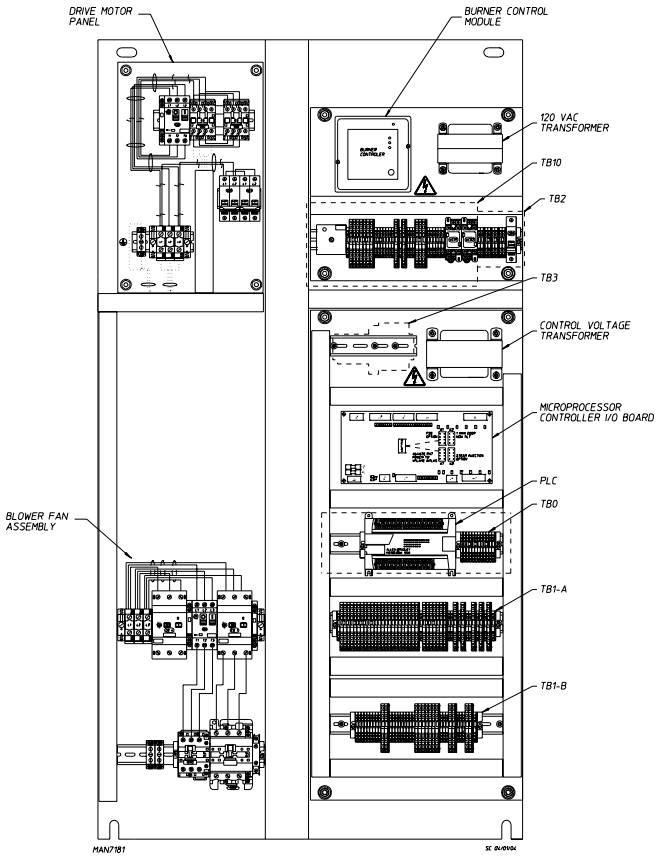
Output relay #8 controls dry enable. This gives control to the Phase 7 board to start the drying process. This signal is present when all the doors are closed and the dryer is level.

Output relay #9 controls supply air. This controls the air valve supplying air to all the dryer.

Electrical Component Replacement

Control Voltage Transformer Replacement

1. Discontinue electrical power to the dryer.
2. Locate the correct schematic for the specific change(s) required and verify the wiring of the transformer using the schematic.
3. Verify the voltage of the new transformer.
4. Loosen and then remove the four (4) wires for a 208-240 VAC dryer or the six (6) wires for a 380 VAC (and higher) dryer from terminal block #3 (TB3).
5. Remove the four (4) screws securing the transformer, then remove the transformer itself.
6. To install new transformer reverse above steps (Step #5 through Step #2).
7. Reestablish electrical power to the dryer.



Programmable Logic Controller (PLC) Replacement

1. Discontinue electrical power to the dryer.
2. Mark and identify the wires that will be removed for proper reinstallation.
3. To remove the PLC from the mounting rail, using a screwdriver, very carefully pull out the mounting clip on the bottom of the PLC and lift the unit out of the rail.
4. To replace the PLC, push in the top of the PLC into the rail and then snap in the bottom of the unit.
5. Replace the wires removed in Step #2.
6. Reestablish electrical power to the dryer.

Note

Allen Bradley Micrologic 1200 terminals can be removed by screws at each end without removing any wires from the terminal strip.

Phase 7 Microprocessor Controller (Computer) Display Board Replacement

1. Discontinue electrical power to the dryer.
2. Carefully unplug JPD3 connector, the JPD4 connector, and the keyboard (touch pad) ribbon cable.
3. Disconnect the common connector power cable (JPD6).
4. Loosen and remove the two (2) screws securing the Phase 7 microprocessor controller (computer) display board and then remove the computer from the door.
5. To install new Phase 7 microprocessor controller (computer) display board, reverse Step #4 through Step #1.

Phase 7 Microprocessor Controller (Computer) Input/Output (I/O) Board Replacement

1. Discontinue electrical power to the dryer.
2. Carefully unplug the connectors from JPM9, JPM7, JPM11, JPM8, JPM10, JPM1, JPM2, JPM3, and JPM4. Stamped on the microprocessor controller (computer) I/O board.
3. Remove the five (5) Phillips head screws securing the I/O board to the control panel.
4. Carefully remove the I/O board from the two (2) standoffs.

Note

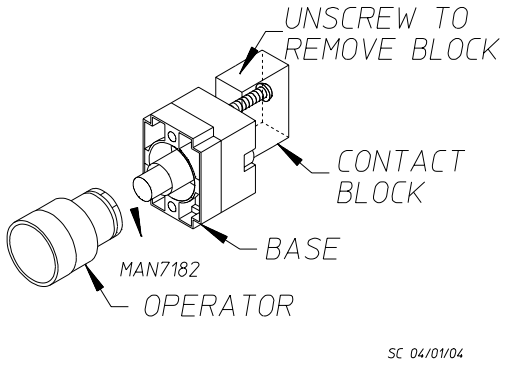
For replacement of the new I/O board it is important to handle with care to avoid any electrical shocks. Damage may occur. Proper static precautions should be taken.

5. To install new microprocessor controller (computer) input/output (I/O) board, reverse Step #4 through Step #1.
6. Reestablish electrical power to the dryer.

Keyboard (touch pad) Replacement

1. Discontinue electrical power to the dryer.
2. Disconnect keyboard (touch pad) ribbon cable from the Phase 7 microprocessor controller (computer) display board.
3. Peel existing keyboard (touch pad) from the door.
4. Remove as much of the remaining adhesive (from the removed keyboard [touch pad]) as possible.
5. Install and adhere new keyboard (touch pad).
6. Reestablish electrical power to the dryer.

Switch Replacement



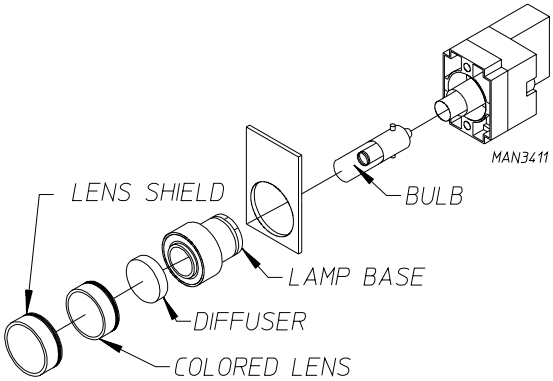
1. Discontinue electrical power to the dryer.
2. Mark and identify the wires that will be removed for proper reinstallation.
3. Remove wires.
4. To remove a contact block, loosen and remove the mounting screw.

Note

Contact block #1 and contact block #2 is normally closed (N.C.) while contact block #3 and contact block #4 is normally open (N.O.).

5. To remove or replace operator, use a small screwdriver to fit in the slot on top of the base body. Then pry the tab away from the center of the switch. This will unlatch the base from the front of the switch.
6. Replace new part by snapping the base and the button together.
7. Reinstall the wires removed in Step #3.
8. Reestablish electrical power to the dryer.

Switch Bulb Replacement



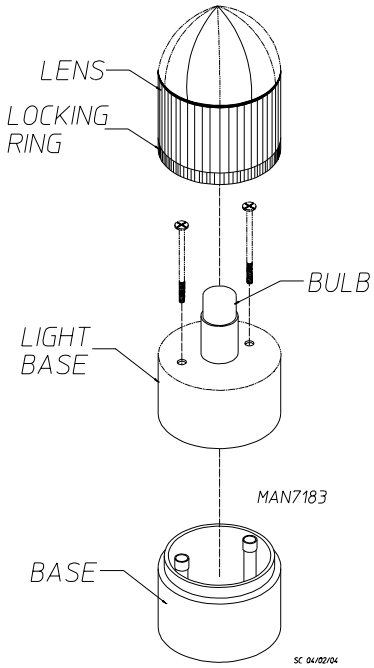
1. Discontinue electrical power to the dryer.
2. Unscrew clear lens shield.
3. Unscrew colored lens.
4. Remove diffuser.
5. With fingertip, gently push and turn the bulb to unlock.

Note

A piece of tubing with an inside diameter the size of the bulb may assist in bulb removal and replacement.

6. To install new bulb, reverse Step #5 through Step #1.

End of Cycle Light Bulb Replacement



1. Discontinue electrical power to the dryer.
2. Twist lock ring counter clockwise (CCW) to remove the cap.
3. Remove the cap.
4. Twist and remove bulb/light.
5. To install new bulb, reverse Step #5 through Step #1.

Basket (Tumbler) System

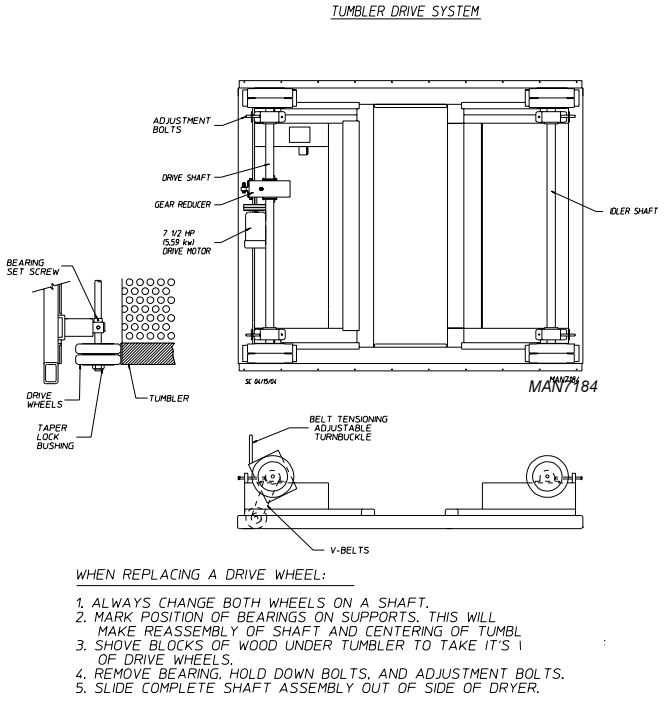
Basket (Tumbler) Drive System

The basket (tumbler) is supported and driven by four (4) 11-inch (27.94 cm) diameter drive wheel assemblies. Two (2) of these wheels are attached to a 2-inch diameter idler shaft, while the other two (2) are attached to a 2-inch diameter drive shaft. Each of the wheels is fastened to the shafts by a taper lock bushing.

The idler shaft and drive shaft are each supported by two (2) 2-inch diameter pillow block bearings. These bearings sit on slotted support channels and can be moved inward or outward by the adjustment bolts. This results in raising or lowering the basket (tumbler).

The drive system consists of a shaft mounted gear reducer, two (2) V-belts, and a 7-1/2 hp (5.59 kW) drive motor. Belt tension can be adjusted by tightening or loosening the gear reducer turnbuckle.

To keep the basket (tumbler) in the middle of the dryer a series of retaining wheels are used in the front and rear of the dryer. The retaining wheels run along the vertical edge of the basket (tumbler) rings. These keep the basket (tumbler) from rubbing on the front and rear panels of the dryer.

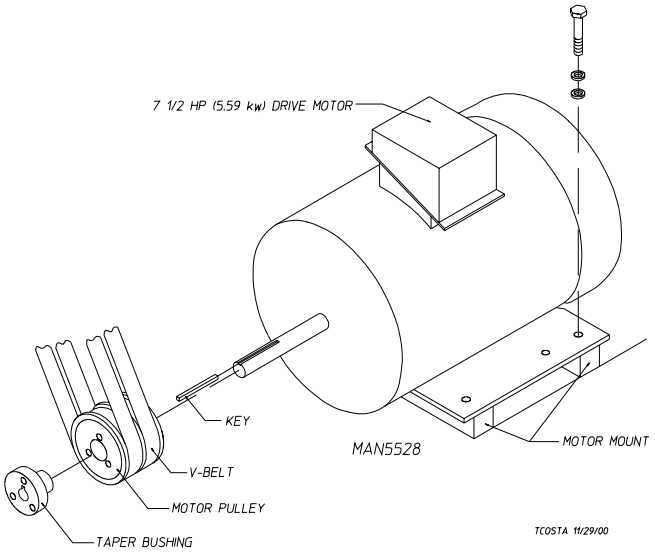


Warning

To ensure that the drive is not unexpectedly started, turn off and lock out and/or tag power source before proceeding. Failure to observe these precautions could result in personal injury.

Drive shaft assembly is heavy. Improper handling can cause personal injury.

Drive Motor Component(s)



Drive Motor Replacement

1. Discontinue electrical power to the dryer.
2. Mark and identify the wires that will be removed for proper reinstallation.
3. Loosen the turnbuckle and remove V-belts.
4. Mark the inside of the shaft before removing the taper lock bushing (for proper reinstallation).
5. Remove the taper lock bushing and motor pulley. Refer to Taper Lock Bushing and Drive Motor Pulley Replacement (Step #3 through Step #6) on the following page.
6. Remove the bolts securing the motor to the motor mount.
7. Install new motor and secure to motor mount.
8. Reinstall motor pulley and taper lock bushing. Refer to Taper Lock Bushing and Drive Motor Pulley Replacement (Step #7 through Step #11) on the following page.
9. Reinstall V-belts then tighten turnbuckle.

Important

Do not overtighten turnbuckle.

10. Rewire the new drive motor in the same order as the wiring from the motor that was removed. Diagram is usually affixed to the side of the motor.
11. Reestablish electrical power to the dryer.
12. Check for proper rotation.

V-belt Replacement

1. Discontinue electrical power to the dryer.
2. Loosen turnbuckle and remove V-belts.
3. Install new V-belts.

Note

Replace V-belts in matched sets (both belts).

4. Tighten turnbuckle.

Important

Do not overtighten turnbuckle.

5. Reestablish electrical power to the dryer.

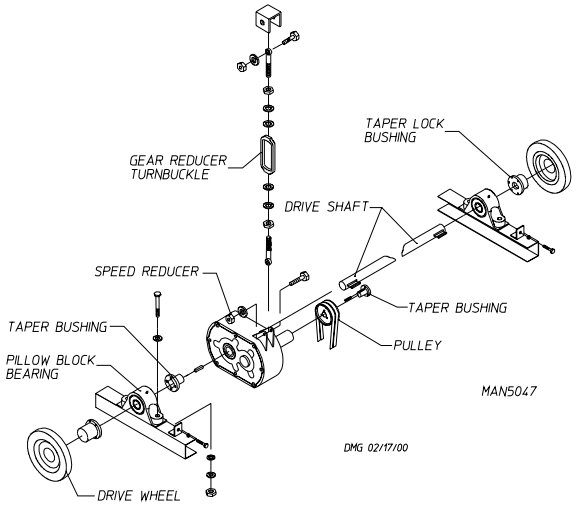
Taper Lock Bushing and Drive Motor Pulley Replacement

1. Discontinue electrical power to the dryer.
2. Loosen turnbuckle and remove V-belts.
3. Mark inside of the drive motor shaft.
4. Remove the bolts securing the taper lock bushing.
5. Insert bolts into the threaded holes on the motor pulley and tighten evenly for pulley removal.
6. Loosen the setscrews on the taper lock bushing and remove the bushing.
7. Measure the mark on the drive motor shaft to the end of the shaft.
8. Install the new drive motor pulley.
9. Align the new taper lock bushing with the mark on the shaft and install by tightening the setscrews.
10. Insert bolts into the holes on the taper lock bushing and thread in to the motor pulley and tighten evenly.
11. Check that the pulley is in proper alignment. Reinstall V-belts and tighten turnbuckle.

Important
Do not overtighten turnbuckle.

12. Reestablish electrical power to the dryer.

Drive Shaft Replacement



1. Discontinue electrical power to the dryer.
2. Remove the side panel and guard from the dryer covering the drive wheels.
3. Mark the position of the pillow block bearing on the mounting pad and loosen the setscrews.
4. Insert blocks of wood under the basket (tumbler) - access through the lint drawer - to take the weight off of the drive wheels.
5. Loosen the turnbuckle and remove the V-belts. Remove bottom turnbuckle mounting bolt.
6. Remove the bolts from the pillow block bearing mounting pads as well as the adjustment bolts.
7. Remove drive motor from the dryer. (Refer to Drive Motor Replacement on page 35.)
8. Remove the taper lock bushings from the gear reducer and side gear reducer to the center of the shaft. (Refer to Taper Lock Bushing and Drive Motor Pulley Replacement.)
9. Remove the taper lock bushings from the drive wheels.
10. Slide the pillow block bearings and taper lock bushing inward towards the gear reducer on the drive shaft.
11. Lift the end of the drive shaft closest to the rear of the dryer and pivot the other end of the shaft on the drive wheel until the shaft can be removed from the dryer.
12. To install new drive shaft, reverse Step #11 through Step #2.
13. Reestablish electrical power to the dryer.

Drive Wheel Replacement

1. Discontinue electrical power to the dryer.
2. Follow Step #2 through Step #11 in the Drive Shaft Replacement instructions in the previous section for the replacement of the drive wheels.

Important
Both drive wheels should be replaced on the drive shaft.

3. To replace the drive wheel assembly into the dryer, reverse Step #11 through Step #2 in the instructions in the previous section.
4. Verify proper position of drive shaft components prior to tightening onto shaft.
5. Reestablish electrical power to the dryer.

Pillow Block Bearing(s) Replacement

1. Discontinue electrical power to the dryer.
2. Follow Step #2 through Step #11 in the instructions in the Drive Shaft Replacement section.
3. Remove both drive wheels and taper lock bushings.
4. Carefully file the score marks on the drive shaft from the setscrews before removing the pillow block bearing(s).
5. To install new pillow block bearing(s), reverse Step #11 through Step #2 in the instructions in the Drive Shaft Replacement section.
6. Reestablish electrical power to the dryer.

Gear (speed) Reducer Replacement

Caution
Replacement gear reducers are shipped without oil. Add proper amount (1.48 quarts [1.4 liters]) of recommended lubricant before operating. Failure to observe these precautions will result in damage to the dryer and will void the warranty.

Too much oil will cause overheating and too little oil will result in gear failure. Check oil level regularly. Failure to observe these precautions could result in damage to the dryer and will void the warranty.

1. Discontinue electrical power to the dryer.
2. Measure the distance of the gear (speed) reducer from the rear of the dryer to assist in positioning the gear reducer on the drive shaft during reinstallation.
3. Follow Step #2 through Step #11 in the instructions in the Drive Shaft Replacement section.
4. Remove the taper lock bushing and pillow block bearing from the drive shaft closest to the rear of the dryer. (Refer to the Taper Lock Bushing and Drive Motor Pulley Replacement section for removal of the taper lock bushing.)
5. Slide the gear (speed) reducer to the center of the drive shaft.

6. Check the position of the drain plug and the breather plug.
7. Check the turnbuckle mount pad on the gear reducer for the correct application.
8. Install the new gear (speed) reducer on the drive shaft along with the taper lock bushing, the pillow block bearing (setscrews in the pillow block bearing face the end of the drive shaft), the taper lock bushing, and the drive wheels.
9. Reinstall the drive shaft into the dryer.
10. Secure the gear reducer to the drive shaft by reinstalling the three (3) bolts into the taper lock bushing and tighten evenly for proper mounting.
11. Repeat Step #12 to reinstall the other taper lock bushing.
12. Reinstall the bolt into the turnbuckle and mounting bracket.
13. Reinstall V-belts and tighten turnbuckle.
14. Prior to operating new gear (speed) reducer, fill with 1.48 quarts (1.4 liters) of SAE 90 gear oil.

Important

Do not overtighten turnbuckle.

15. Mount the pillow block bearings onto the mounting pads (using the bolts that were removed). Do not tighten.
16. Tighten the taper lock bushing into the drive wheels.
17. Tighten the adjustment bolts until the basket (tumbler) is centered.

Important

Remove the wooden blocks that were inserted under the basket (tumbler).

18. Tighten the bolts on the pillow block bearings.

Note

Verify correct mounting position of the gear reducer. Make the necessary corrections and/or adjustments to the gear reducer for proper mounting. Changing the drain plug, breather plug, as well as the turnbuckle mounting pad may be required.

Inspect all of the work performed checking for security of parts and proper alignment.

19. Reestablish electrical power to the dryer.

Retaining Wheel Components

Retaining Wheel Cover Panel Removal

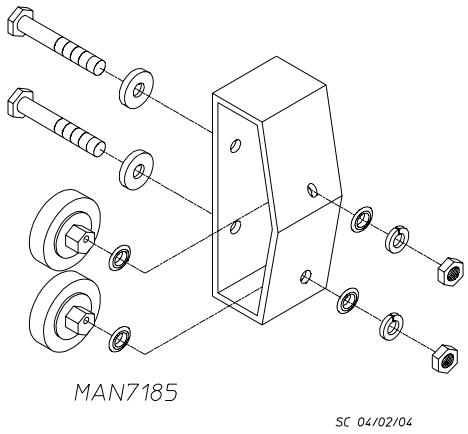
1. Discontinue electrical power to the dryer.
2. Remove the side front panel to access the two (2) front retaining wheels and/or the rear panel to access the two (2) rear retaining wheels.

Note

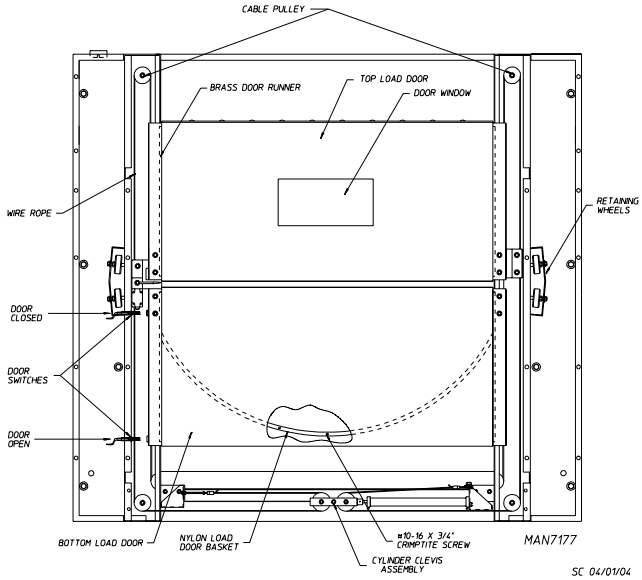
The lower front retaining wheel does not have a cover.

The guard panel must be removed from the dryer to access the rear bottom panel.

3. Remove the bolts from the guard panel to gain access to the rear retaining wheel.



Retaining Wheel(s) Replacement



1. Discontinue electrical power to the dryer.
2. Remove the front side cover.
3. Remove the hardware (i.e., bolt, lock washer, and flat washer) from the hex nut and weld nut on the wheel mount.
4. Install the new retaining wheel. Reinstall the lock washer then the flat washer onto the bolt and insert into lower mount hole through the retaining wheel and through the hex nut, then into the weld nut and snug up the bolt.

Warning

All service and troubleshooting should be performed by a qualified professional or service agency.

While making adjustments, observe all safety precautions displayed on the dryer or specified in this manual.

5. Reinstall cover removed in Step #2.
6. Reestablish electrical power to the dryer.

Retaining Wheel(s) Adjustment

1. With the dryer operating, turn offset hex hub on retaining wheel until wheel is at proper tension.
2. Snug nut against offset hex hub and then tighten.

Caution

Use extreme care when setting retaining wheel tension. Personal injury may result.

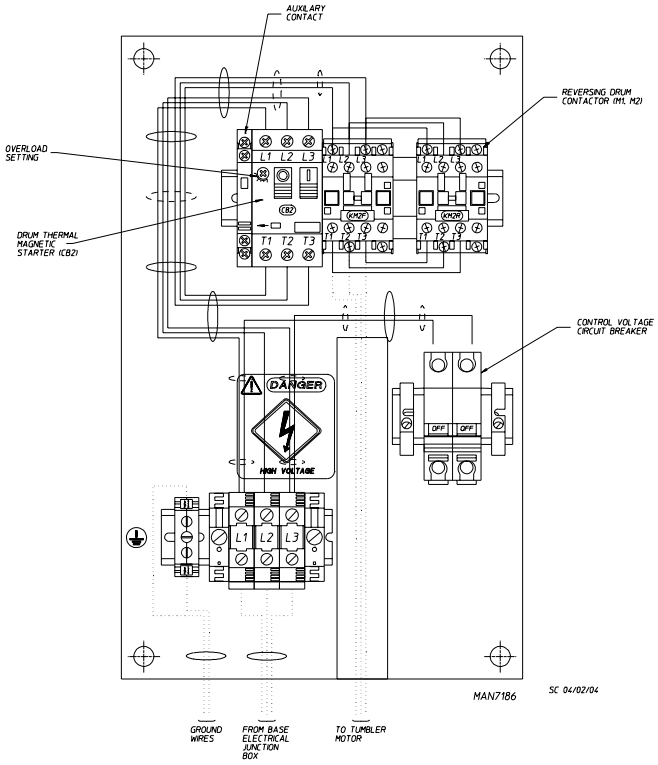
Note

Proper retaining wheel tension has been achieved when the wheel spins and stops when slight pressure is applied (to the retaining wheel itself).

Basket (Tumbler) Electrical Component(s)

Basket (Tumbler) Thermal Magnetic Starter (T.M.S.) and Auxiliary Contact Block Replacement

1. Discontinue electrical power to the dryer.
2. Mark and identify the wires that will be removed for proper reinstallation.
3. Set the control of the T.M.S. to the “stop” position.
4. Press down on the T.M.S. and lift the bottom up and out of the din mounting rail.
5. Remove all associated wires.
6. Separate the T.M.S. from the auxiliary contact block.
7. Install new T.M.S. or auxiliary contact block.
8. Reassemble the T.M.S. to auxiliary contact block.
9. Set overload to required setting.
10. Replace all wires removed in Step #5.
11. Mount the top of the T.M.S. to the top of the din rail and press down and in. Inspect all of the work performed.
12. Set the control of the T.M.S. to the “Start” position.
13. Reestablish electrical power to the dryer.



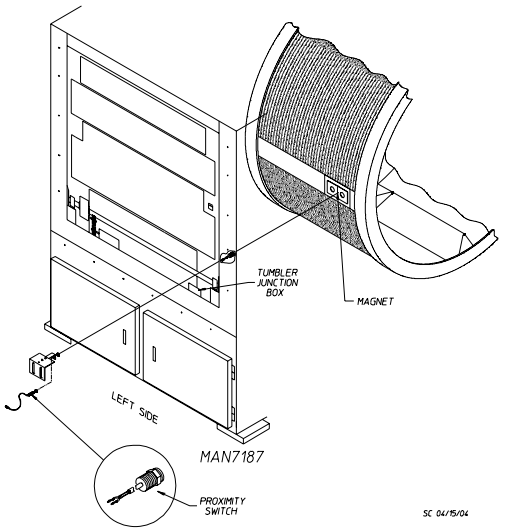
Rotational Sensor Assembly

The Rotational Sensor Assembly is located on the left hand side of the dryer basket (tumbler) section. It consists of a magnetic rotational switch, mounted on the bracket, which is bolted to the basket (tumbler) section. A magnet is riveted to the basket (tumbler) of the dryer.

The magnetic rotational sensor switch senses the rotation of the basket (tumbler). If the gap between the sensor switch and the magnet is greater than a preset amount, then the dryer will shut down on Rotational Sensor Failure.

Rotational Sensor Switch Replacement

1. Discontinue electrical power to the dryer.
2. Remove the two (2) TEK screws securing the rotational sensor bracket to the basket (tumbler) section.
3. Remove the magnetic rotational sensor switch from the mounting bracket, by removing the adjustment nut.
4. Depress the tabs on the rotational sensor harness plug and pull apart, then remove the sensor switch.
5. To install a new sensor switch, connect the plug of the new sensor switch to the sensor harness.
6. Place one (1) adjustment nut onto the sensor switch and insert into the mounting bracket.
7. Place the second adjustment nut on but Do not tighten. The magnets on the basket (tumbler) and the sensor switch must be in a horizontal line to one (1) another.
8. The gap between the magnet and the sensor switch must be 1/8-inch (3.175 mm).
9. Tighten the adjustment nuts installed in Step #7 and Step #6.
10. Reestablish electrical power to the dryer.

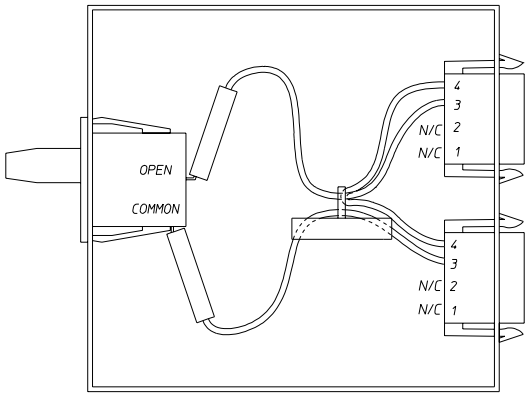


Lint Drawer/Lint Chamber Switches

Lint Drawer Switches

The dryer utilizes two (2) proximity switches (wired in series) to indicate a lint drawer closed status. The proximity switch is a device whereby the contacts within the device close when the lever is pressed in. If either of the proximity switches are opened, the entire circuit will be open.

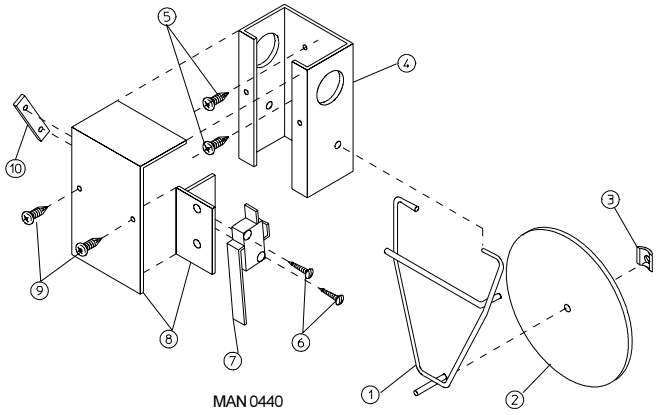
The switch can be checked for failure using an ohm/continuity meter; power down the dryer and place an ohm meter across the two (2) leads that come from the switch. With the switch lever pressed in it should measure a closed circuit. When the switch lever is released the circuit should measure an open circuit.



Proximity Switch Replacement

1. Discontinue electrical service to the dryer.
2. Remove the screws securing the junction box cover.
3. Mark and identify the wires that will be removed for proper reinstallation.
4. Disconnect the two (2) leads of the defective proximity switch.
5. Remove the proximity switch from the cut out.
6. Replace the proximity switch.
7. Reverse Step #4 through Step #2.
8. Reestablish electrical service to the dryer.

Lint Chamber Sail Switch



The lint chamber sail switch utilized in the dryer is used to insure that there is proper air flow through the dryer. If there is a problem with this sail switch a "SAIL SWITCH" error message will be displayed via the L.E.D. (light emitting diode) on the display unit.

Probable Causes for a "SAIL SWITCH" Error Message

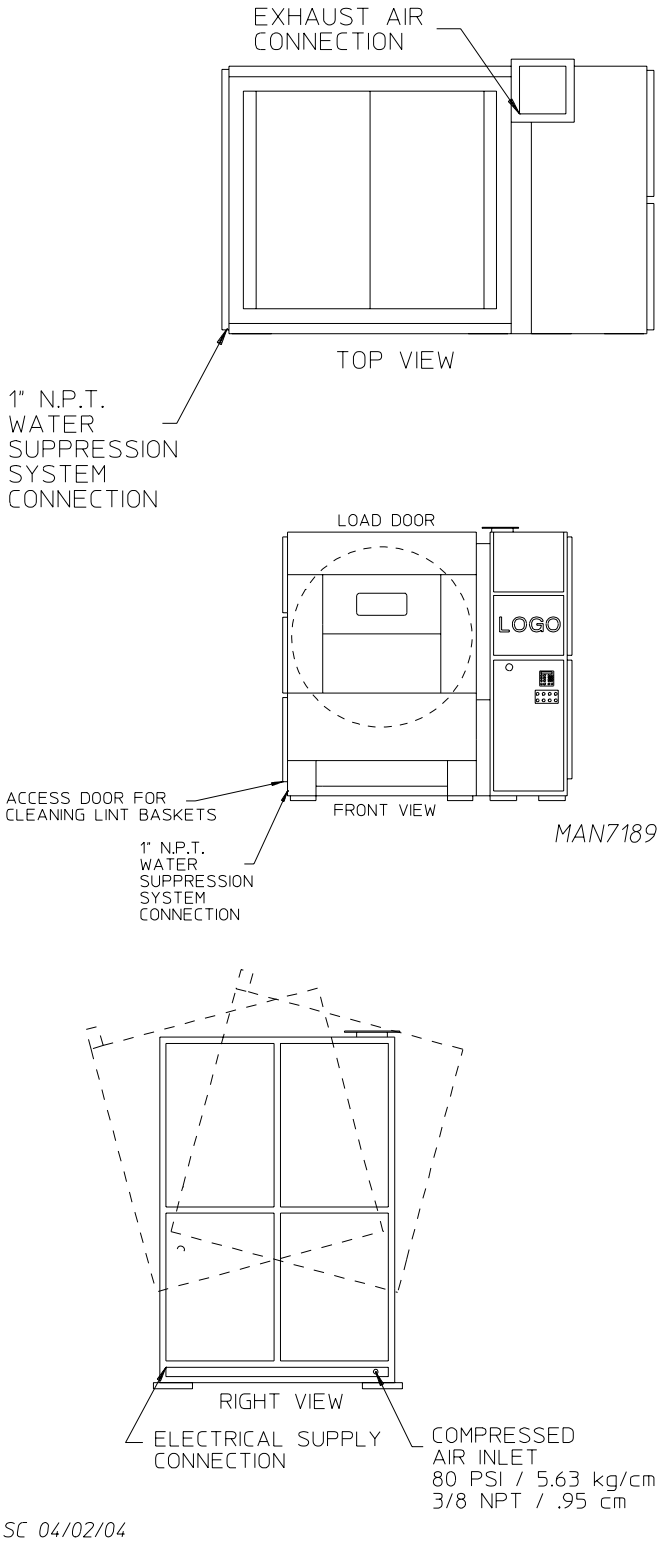
- Clogged lint screen.
- Obstructed exhaust.
- Insufficient make-up air.

Possible Solutions

- Perform preventive maintenance and lint screen cleaning procedures.
- Clean entire exhaust system.

Safety Devices

The dryer is equipped with numerous safety devices to ensure that the dryer operates safely. The chart on the following page lists each device with its location, function, computer display message, and result of tripping.

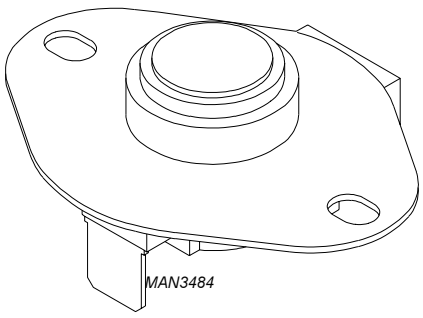


Safety Devices Locations/Functions/Messages _____

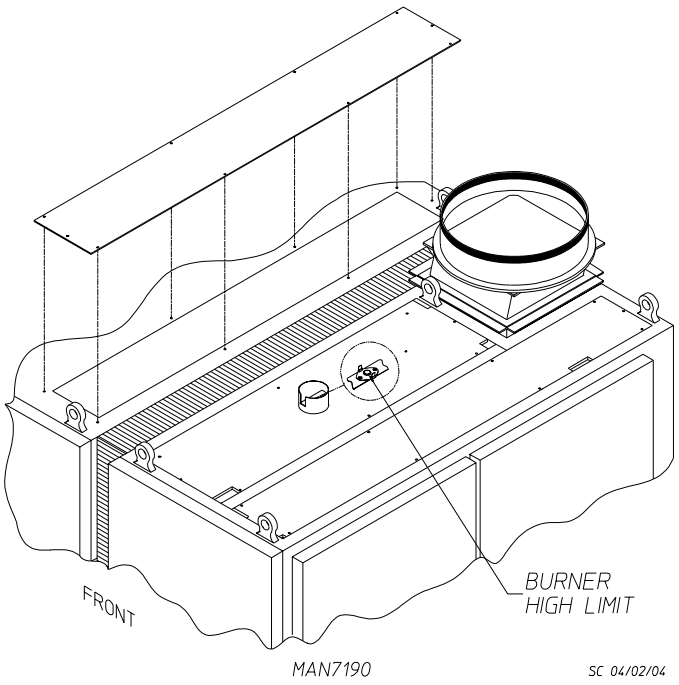
Safety Devices	Location	Function	Computer Display Message	Result of Tripping
Load Door Switch	Left side of Load door	Ensures dryer load doors are closed	"FRONT DOOR OPEN"	Dryer Will Not Run
Unload door switch (Two door unit only)	Right side of unload door	Ensures dryer unload doors are closed	"REAR DOOR OPEN"	Dryer Will Not Run
Tilting Switches	Top left side of base module	Ensures dryer is level	"FRONT NOT DOWN" "REAR NOT DOWN"	Dryer Will Not Run
Drum Rotation Sensor	Left side of tumbler section	Ensures tumbler is rotating	"ROTATION FAULT"	Stops Dryer
Lint Chamber air pressure switch	Rear of base module	Ensures proper air flow through dryer	"SAIL SWITCH FAULT"	Stops Dryer
Burner Fan Air Flow Switch (Gas Dryers Only)	Center of heat console	Ensures proper combustion air flow into the burner box	"BURNER IGNITION CONTROL FAULT"	Stops Dryer
Hi/Lo Gas Pressure Switch (Gas Dryers Only)	Lower left of heat console section	Ensures proper gas supply pressure for adequate ignition	"BURNER IGNITION CONTROL FAULT"	Stops Dryer
Heat Reclaimer Damper Switch	Right side of heat console	Ensures that the heat reclaimer is either opened or closed	"REAR DOOR OPEN"	Dryer Will Not Run
Heat Console Door Access Door Switch	Inside heat console	Ensures that access doors are closed	"DOOR OPEN"	Dryer Will Not Run
Exhaust Air Temp Control Sensor	Inside burner section duct	Monitors tumbler exhaust air temp	"BAD PROBE"	Stops Dryer
Exhaust Air Hi Temp Control Sensor	Inside exhaust duct	Monitors tumbler exhaust and air temp	"HI-TEMP FAULT"	Stops Heat Only
Burner Hi-Limit Safety Sensor	Top of burner section	Monitors air temp above the burner box	"BURNER HIGH LIMIT FAULT"	Stops Heat Only
Lint Drawer Switches	Above lint drawer handles	Disables machine when drawers are open or if drawers have not been cleaned in last five load	"Lint Drawer Open"	Dryer Will Not Run

Top of Tumbler (Basket) _____

The burner auto reset hi-limit switch is a thermostat type switch located in the burner. Its function is to discontinue heat (flame) in the event of an over temperature situation (above 330º F [166º C]).



330º F (166º C) Thermostat



Phase 7 Non-Coin System Diagnostics

Important

YOU MUST DISCONNECT AND LOCK OUT THE ELECTRIC SUPPLY AND THE GAS SUPPLY OR THE STEAM SUPPLY BEFORE ANY COVERS OR GUARDS ARE REMOVED FROM THE MACHINE TO ALLOW ACCESS FOR CLEANING, ADJUSTING, INSTALLATION, OR TESTING OF ANY EQUIPMENT PER OSHA (Occupational Safety and Health Administration) STANDARDS.

All major circuits, including door, microprocessor temperature sensor, heat and motor circuits are monitored. The Phase 7 non-coin microprocessor controller (computer) will inform the user, via the light emitting diode (L.E.D.) display of certain failure messages, along with L.E.D. indicators on the Input/Output (I/O) board on the back panel of the front right control door.

Diagnostic (L.E.D. Display) Fault Messages

CALL FOR SERVICE - Indicates a board communication failure.

FRONT DOOR NOT CLOSED - A front door is open when it should be closed.

REAR DOOR NOT CLOSED - A rear door is open when it should be closed.

CHECK CONTROL POWER - Indicates control power is off.

EXHAUST HIGH TEMP FAULT - Indicates the temperature in the basket (tumbler) is above 220º F (104º C).

LINT DRAWER OPEN - Indicates the lint drawer is open and needs to be closed.

DRY ENABLE FAULT - A signal from the Programmable Logic Controller (PLC) that indicates the dryer is not level and all doors closed. Not ready to start drying.

FRONT NOT DOWN - Dryer is tilted back.

REAR NOT DOWN - Dryer is tilted forward.

TUMBLER OVERLOAD FAULT - Indicates the basket (tumbler) overload has tripped opened.

FAN OVERLOAD FAULT - Indicates the fan overload has tripped opened.

EXHAUST HIGH LIMIT FAULT - Indicates the temperature disk in the exhaust has opened.

FRONT SAIL SWITCH CLOSED FAULT - Front sail switch is closed and should be opened.

FRONT SAIL SWITCH OPEN FAULT - Front sail switch is open and should be closed.

REAR SAIL SWITCH CLOSED FAULT - Rear sail switch is closed and should be opened.

REAR SAIL SWITCH OPEN FAULT - Rear sail switch is open and should be closed.

FAN CONTACTOR FAULT - The fan contactor was not pulled in.

FRONT BURNER HIGH LIMIT FAULT - Indicates the temperature disk in the front burner has opened.

REAR BURNER HIGH LIMIT FAULT - Indicates the temperature disk in the rear burner has opened.

FRONT BURNER VALVE FAULT - Indicates front gas valve is not working or no gas is turned on or flameout.

REAR BURNER VALVE FAULT - Indicates rear gas valve is not working or no gas is turned on or flameout.

FRONT BURNER IGNITION CONTROL FAULT - Front ignition module is not working or failure to ignite.

REAR BURNER IGNITION CONTROL FAULT - Rear ignition module is not working or failure to ignite.

ROTATION FAULT - Indicates the basket (tumbler) is not rotating.

BAD PROBE - Indicates the temperature probe is open or shorted.

LOW VOLTAGE FAULT - Indicates power has dropped below the operating values and will shut down.

FRONT BURNER PURGE FAULT - The front gas valve signal is present during the prepurge time.

REAR BURNER PURGE FAULT - The rear gas valve signal is present during the prepurge time.

MODEL ERROR, ENTER CORRECT MODEL - The wrong model was selected for the dryer.

EE PROM FAULT **###** - Error in memory location. The **###** indicates the location of the fault.

Input/Output (I/O) Board Light Emitting Diode (L.E.D.) Indicators

Inputs: (Red)

1. RDWN - Rear Down
2. FDWN - Front Down
3. RDRC - Rear Door Closed
4. RDRO - Rear Door Open
5. FDRC - Front Door Closed
6. FDRO - Front Door Open
7. TBOL - Basket (Tumbler) Overload
8. FNOL - Fan Overload
9. FAN - Blower Fan On
10. RBHL - Rear Burner High Limit
11. R_SS - Rear Sail Switch
12. FBHL - Front Burner High Limit
13. F_SS - Front Sail Switch
14. EXHL - Exhaust High Limit
15. DRY - Dry Enable Bit
16. LINT - Lint Drawer
17. R_HE - Rear Heat Enable
18. F_HE - Front Heat Enable
19. 24VIN - Control Voltage 24 Volts AC
20. ESTP - Emergency Stop
21. FSWP - Water Pressure Switch
22. SPR3 - Spare Input #3
23. SPR2 - Spare Input #2
24. SPR1 - Spare Input #1
25. RVLV - Rear Gas Valve
26. FVLV - Front Gas Valve
27. 24IN - Board 24 Volt AC
28. +5V - Regulated Voltage
29. Mode - Communication

Outputs: (Green)

1. FSS - Fire Suppression
2. PRG2 - Programmable Output #2
3. R_HEAT - Rear Heat
4. AUDIO ALERT - Horn On
5. FWD - Basket (Tumbler) Forward
6. AIR JET - Air Jet On
7. PRG3 - Programmable Output #3
8. PRG1 - Programmable Output #1
9. F_HEAT - Front Heat
10. FAN - Blower Fan On
11. REV - Basket (Tumbler) Reverse
12. EOC - End Of Cycle Light
13. OCL4 - Open Collector Output #4
14. OCL3 - Open Collector Output #3
15. OCL2 - Open Collector Output #2
16. OCL1 - Open Collector Output #1
17. OCL5 - Open Collector Output #5
18. OCL6 - Open Collector Output #6
19. OCL7 - Open Collector Output #7
20. OCL8 - Open Collector Output #8

Inputs:

1. **RDWN – (RED LIGHT EMITTING DIODE [L.E.D.])**

   This L.E.D. will indicate the status of the rear tilt. If the rear of the dryer is down, then the L.E.D. is ON.
2. **FDWN – (RED L.E.D.)**
   This L.E.D. will indicate the status of the front tilt. If the front of the dryer is down, then the L.E.D. is ON.
3. **RDRC – (RED L.E.D.)**
   This L.E.D. will indicate the status of the rear doors. If the doors are closed, then the L.E.D. is ON.
4. **RDRO – (RED L.E.D.)**
   This L.E.D. will indicate the status of the rear doors. If the doors are open, then the L.E.D. is ON.
5. **FDRC – (RED L.E.D.)**
   This L.E.D. will indicate the status of the front doors. If the doors are closed, then the L.E.D. is ON.
6. **FDRO – (RED L.E.D.)**
   This L.E.D. will indicate the status of the front doors. If the doors are open, then the L.E.D. is ON.
7. **TBOL – (RED L.E.D.)**
   This L.E.D. will indicate the status of the basket (tumbler) overload contact. If the contact is closed, then the L.E.D. is ON. If it faults open, then the L.E.D. is OFF.
8. **FNOL – (RED L.E.D.)**
   This L.E.D. will indicate the status of the fan overload contact. If the contact is closed, then the L.E.D. is ON. If it faults open, then the L.E.D. is OFF.
9. **FAN – (RED L.E.D.)**
   This L.E.D. will indicate the status of the blower fan. If the fan is on, then the L.E.D. is ON.
10. **RBHL – (RED L.E.D.)**
    This L.E.D. will indicate the status of the rear burner high limit disk. If the disk is closed (temperature below 330º F [165º C]), then the L.E.D. is ON.
11. **R_SS – (RED L.E.D.)**
    This L.E.D. will indicate the status of the rear sail switch. If the switch is closed, then the L.E.D. is ON.
12. **FBHL – (RED L.E.D.)**
    This L.E.D. will indicate the status of the front burner high limit disk. If the disk is closed (temperature below 330º F [165º C]), then the L.E.D. is ON.
13. **F_SS – (RED L.E.D.)**
    This L.E.D. will indicate the status of the front sail switch. If the switch is closed, then the L.E.D. is ON.
14. **EXHL – (RED L.E.D.)**
    This L.E.D. will indicate the status of the exhaust high limit disk. If the disk is closed (temperature below 225º F [107º C]), then the L.E.D. is ON.
15. **DRY – (RED L.E.D.)**
    This L.E.D. will indicate the status of the programmable logic controller (PLC). If the mechanical functions of the dryer have been set to the DRY position, the PLC will send a signal to the Phase 7 board. This signal will indicate that all the doors are closed and the dryer is level. When these conditions are met, then the L.E.D. is ON.
16. **LINT – (RED L.E.D.)**
    This L.E.D. will indicate the status of the lint drawer. If the drawer is closed, then the L.E.D. is ON.
17. **R_HE**
    Supply power for rear heat output.
18. **F_HE**
    Supply power for front heat output.
19. **24VIN – (RED L.E.D.)**
    This L.E.D. will indicate the status of the control voltage. If the power on button is pressed (green button light is on), then the L.E.D. is ON.
20. **ESTP – (RED L.E.D.)**
    This L.E.D. will indicate the status of the Emergency Stop button. If the button is pressed in, then the L.E.D. will be OFF.
21. **FSWP – (RED L.E.D.)**
    This L.E.D. will indicate the status of the water pressure switch. If the water is turned off of not connected, providing no pressure, the L.E.D. will be OFF.
22. **SPR3 – (RED L.E.D.)**
    This is for a spare input to be used with programmable outputs.
23. **SPR2 – (RED L.E.D.)**
    This is for a spare input to be used with programmable outputs.
24. **SPR1 – (RED L.E.D.)**
    This is for a spare input to be used with programmable outputs.
25. **RVLV – (RED L.E.D.)**
    This L.E.D. will indicate the status of the rear gas valve. If the rear gas valve is open (ON), then the L.E.D. is ON.
26. **FVLV – (RED L.E.D.)**
    This L.E.D. will indicate the status of the front gas valve. If the front gas valve is open (ON), then the L.E.D. is ON.
27. **24IN – (RED L.E.D.)**
    This L.E.D. will indicate 24 VAC to the board.
28. **+5V**
    The 24 VAC regulated to power components on the board.
29. Mode (blinking) communication between display and input/output (I/O) boards.

Outputs:

1. **FSS – (GREEN LIGHT EMITTING DIODE [L.E.D.])**
   This L.E.D. indicates the activation of the water system. When the system is activated the L.E.D. is ON.
2. **PGR2 – (GREEN L.E.D.)**
   This is for a spare output to be programmed.
3. **R_HEAT – (GREEN L.E.D.)**
   This L.E.D. will indicate the status of the rear heat output. If the request to turn on the rear heater is made, then the L.E.D. is ON.
4. **AUDIO ALERT – (GREEN L.E.D.)**
   This L.E.D. will indicate the status of the horn output. If the request to turn on the horn is made, then the L.E.D. is ON.
5. **FWD – (GREEN L.E.D.)**
   This L.E.D. will indicate the status of the basket (tumbler) forward direction output. If the request to tumble the drum in the forward direction is made, then the L.E.D. is ON.
6. **AIR JET – (GREEN L.E.D.)**
   This L.E.D. will indicate the status of the air jet output. If the request to turn on the air jet is made, then the L.E.D. is ON.
7. **PGR3 – (GREEN L.E.D.)**
   This is for a spare output to be programmed.
8. **PGR1 – (GREEN L.E.D.)**
   This is for a spare output to be programmed.
9. **F_HEAT – (GREEN L.E.D.)**
   This L.E.D. will indicate the status of the front heat output. If the request to turn on the front heater is made, then the L.E.D. is ON.
10. **FAN – (GREEN L.E.D.)**
    This L.E.D. will indicate the status of the fan output. If the request to turn on the fan (blower) is made, then the L.E.D. is ON.
11. **REV – (GREEN L.E.D.)**
    This L.E.D. will indicate the status of the basket (tumbler) reverse direction output. If the request to tumble the drum in the reverse direction is made, then the L.E.D. is ON.
12. **EOC – (GREEN L.E.D.)**
    This L.E.D. will indicate the status of the end of cycle light output. If the request to turn on the end of cycle light is made, then the L.E.D. is ON.
13. **OCL4 – (GREEN L.E.D.)**
    This L.E.D. will indicate the status of the open collector output #4. If the request to turn on the open collector output #4 is made, then the L.E.D. is ON. (Programmable and defaulted to front down).
14. **OCL3 – (GREEN L.E.D.)**
    This L.E.D. will indicate the status of the open collector output #3. If the request to turn on the open collector output #3 is made, then the L.E.D. is ON. (Programmable and defaulted to lint drawer).
15. **OCL2 – (GREEN L.E.D.)**
    This L.E.D. will indicate the status of the open collector output #2. If the request to turn on the open collector output #2 is made, then the L.E.D. is ON. (Programmable and defaulted to front door closed).
16. **OCL1 – (GREEN L.E.D.)**
    This L.E.D. will indicate the status of the open collector output #1. If the request to turn on the open collector output #1 is made, then the L.E.D. is ON. (Programmable and defaulted to front door open).
17. **OCL5 – (GREEN L.E.D.)**
    This L.E.D. will indicate the status of the open collector output #5. If the request to turn on the open collector output #5 is made, then the L.E.D. is On. (Programmable and defaulted to rear down).
18. **OCL6 – (GREEN L.E.D.)**
    This L.E.D. will indicate the status of the open collector output #6. If the request to turn on the open collector output #6 is made, then the L.E.D. is ON. (Programmable and defaulted to rear door open).
19. **OCL7 – (GREEN L.E.D.)**
    This L.E.D. will indicate the status of the open collector output #7. If the request to turn on the open collector output #7 is made, then the L.E.D. is ON. (Programmable and defaulted to rear door closed).
20. **OCL8 – (GREEN L.E.D.)**
    This L.E.D. will indicate the status of the open collector output #8. If the request to turn on the open collector output #8 is made, then the L.E.D. is ON. (Programmable and defaulted to Spare).

Troubleshooting and Replacement

Important

YOU MUST DISCONNECT AND LOCK OUT THE ELECTRIC SUPPLY AND THE GAS SUPPLY OR THE STEAM SUPPLY BEFORE ANY COVERS OR GUARDS ARE REMOVED FROM THE MACHINE TO ALLOW ACCESS FOR CLEANING, ADJUSTING, INSTALLATION, OR TESTING OF ANY EQUIPMENT PER OSHA (Occupational Safety and Health Administration) STANDARDS.

The information provided will help isolate the most probable components associated with the difficulty described. The experienced technician realizes, however, that a loose connection or broken/shorted wire may be at fault where electrical components are concerned, not necessarily the suspect component itself. Electrical parts should always be checked for failure before being returned to the factory.

Important

When replacing blown fuses, the replacement must be of the exact rating as the fuse being replaced. The information provided should not be misconstrued as a handbook for use by an untrained person in making repairs.

Warning

All service and troubleshooting should be performed by a qualified professional or service agency.

While making repairs, observe all safety precautions displayed on the dryer or specified in this manual.

No Display

- "EMERGENCY STOP" (E-Stop) button pushed in.
- Service panel fuses blown or tripped breaker.
- Blown F2 (fuse 2) on microprocessor controller (computer) input/output (I/O) board.
- Blown Circuit Breaker (CB7) on control panel.
- Failed display board.
- Failed communication cable.
- Failed microprocessor controller (computer) I/O board.

Drive Motor is not Operating (Does Not Start)

Microprocessor controller (computer) relay output indicator (either forward "FWD" or reverse "REV") is on.

- Blown drive motor contactor overloads.
- Failed drive motor contactor.
- Failed drive motor.
- No 24 VAC present at drive motor contactor coil.
- Broken belt.

Microprocessor controller (computer) relay output indicator (neither forward "FWD" nor reverse "REV") is on.

- Failed microprocessor controller (computer) I/O board.

Drive Motor Operates in One (1) Direction Only; Stops and Restarts in the Same Direction

Appropriate microprocessor controller (computer) relay output indicator is on.

- Failed reversing contactor (relay).
- Failed electrical reversing contactor interlock.

Appropriate microprocessor controller (computer) relay output indicator is off.

- Failed microprocessor controller (computer) I/O board.

Drive Motor Operates Okay for a Few Minutes and Then Either Repeatedly or Occasionally Trips the Overload Protector

Note

When the overload protector trips, the microprocessor controller (computer) I/O board, red light emitting diode (L.E.D.) "TBOL" will be off and the display will read "Tumbler Overload Fault."

Motor is overheating.

- Motor air vents clogged with lint.
- Failed motor.
- Basket (tumbler) is binding; check for an obstruction.
- V-belts are too tight.
- Dryer has an oversized load.
- Voltage to the dryer is incorrect; check dryer data label for specified voltage.

Failed overload protector.

- Incorrect overload setting.

Impellor (Fan) Motor is not Operating (Does Not Start)

Microprocessor controller (computer) I/O board "FAN" relay output indicator is on.

- Blown blower (fan and impellor) motor overloads.
- Failed blower (fan and impellor) motor contactor (relay).
- Failed blower (fan and impellor) motor.
- No 24 VAC present at fan motor contactor coil.
- Broken belts.

Microprocessor controller (computer) Input/Output (I/O) board "FAN" relay output indicator is off.

- Failed microprocessor controller (computer) I/O board.

Blower (Fan and Impellor) Motor Operates Okay for a Few Minutes and Then Either Repeatedly or Occasionally Trips the Overload Protector

Note

When the overload protector trips, the microprocessor controller (computer) I/O board red light emitting diode (L.E.D.) "FNOL" will be off and the display will read "Fan Overload Fault."

Motor is overheating.

- Motor air vents clogged with lint.
- Failed motor.
- Basket (tumbler) is binding; check for an obstruction.
- V-belts are too tight.
- Motor is running at incorrect voltage.

Failed overload protector.

- Incorrect overload setting.

Failed motor (blower [fan and impellor] motor).

Failed microprocessor controller (computer).

Microprocessor Controller (Computer) Display Board L.E.D. Display Reads "BAD PROBE" Continuously and the Buzzer (tone) Sounds Every 30-seconds

Fault in microprocessor heating sensing circuit.

- Failed microprocessor temperature sensor.
- Failed microprocessor controller (computer) display board.
- Broken wire or connection between the microprocessor controller (computer) and the microprocessor temperature sensor.

Microprocessor Controller (Computer) L.E.D. Display Reads "DRY ENABLE" Fault

- Front or rear doors open.
  - Microprocessor not getting a door closed signal.
- Dryer is not in level position.
- Broken connection between level switches or door switches.
- Level switches or door switches need to be adjusted.
- Input to Programmable Logic Controller (PLC) is not present.
  - PLC does not have supply power.
  - Failed PLC.
- Failed microprocessor controller (computer) I/O board.

Microprocessor Controller (Computer) Board Display Reads "FRONT DOORS NOT CLOSED" or "REAR DOORS NOT CLOSED"

- Fault (open circuit) in front or rear door switch circuit.
- One (1) of the front or rear door switches has failed.
- One (1) of the front or rear door switch contact magnets is either missing or is broken.
- Broken wires or connection in front or rear door.
- Front or rear doors are opened during cycle.
- Failed microprocessor controller (computer) I/O board.

Microprocessor Controller (Computer) L.E.D. Displays "Lint Drawer Open"

- Lint drawer is not closed all the way.
- Lint drawer switch is out of proper adjustment.
- Failed lint drawer switch.
- Failed microprocessor controller (computer) I/O board.
- Broken wire connection from lint switch to microprocessor controller (computer).

Microprocessor Controller (Computer) Will Not Accept Any Keyboard (Touch Pad) Entries, (i.e., L.E.D. Display Reads "READY" and When Keyboard [Touch Pad] Entries are Selected, the L.E.D. Display Continues to Read "READY")

- Failed keyboard (touch pad) label assembly.
- Failed microprocessor controller (computer) display board.

Microprocessor Controller (Computer) Will Only Accept Certain Keyboard (Touch Pad) Entries

- Failed keyboard (touch pad) label assembly.
- Failed microprocessor controller (computer) display board.

Microprocessor Controller (Computer) Locks Up and the Display Reads Erroneous Messages or Only Partial Segments

Transient power voltage spikes: disconnect the electrical power to the dryer, wait 1 minute and reestablish power to the dryer. If problem is still evident:

- Failed microprocessor controller (computer).
- Failed keyboard (touch pad) label assembly.

Microprocessor Controller (Computer) Display Reads "Rotation Fault"

Rotational sensor circuit failure: fault somewhere in the basket (tumbler) rotation or circuit.

- Basket (tumbler) is not rotating.
  - Broken basket (tumbler) drive belts.
  - Failure in drive motor circuit.
- Faulty rotation sensor.
- Broken wire or connection between rotation sensor and microprocessor controller (computer) display board.
- Failure in rotational sensor circuit or magnet missing or gap too large.
- Basket (tumbler) rotation below 12 RPMs.

Microprocessor Controller (Computer) Reads "Exhaust High Temp Fault"

Possible overheating condition; microprocessor controller (computer) display board has sensed a temperature which has exceeded 225º F (107º C).

"Exhaust High Fault Temp" will display until the stop key has been pressed. A cycle cannot be started until the temperature is below 220º F (104º C).

Dryer Operates But Is Taking Too Long To Dry

- Exhaust ductwork run is too long or is undersized (back pressure cannot exceed 0.5 inches water column [W.C.] - 1.24 mb).
- Restriction in ductwork: check duct from the dryer all the way to the outdoors.
- Low or inconsistent gas pressure (for Gas Models only).
- Insufficient make-up air.
- Poor air and gas mixture at burner - yellow or poor flame pattern: adjust gas burner air adjustment shutters (for Gas Models only).
- Lint drawer or screen is not being cleaned on a regular basis or often enough.
- Extractors (washer) is not performing properly. Leaving excessive moisture in the clothes.
- Sail switch is fluttering: restriction in exhaust (for Gas Models only).
- Failed microprocessor controller (computer): temperature calibration is inaccurate.
- Failed microprocessor temperature sensor (probe).
- "B" factor too low (Auto Cycle only).
- Steam damper system is not functioning properly (for Steam Models only).
  - Steam damper sticking closed.
  - Leak in pneumatic system.
- Undersized load, dryer requires a minimum load size of approximately 125 lbs (57 kg) for maximum drying efficiency.

Excessive Noise And Vibration

- Dryer is not leveled properly.
- Impellor (fan/blower) out of balance.
  - Excessive lint buildup on impellor (fan/blower); check air jet.
  - Failed impellor (fan/blower).
- Loose motor mount.
- Failed idler bearings or basket (tumbler) bearings.
- V-belt(s) either too tight or too loose.
- Basket (tumbler) drive wheels are worn or are loose.
- Setscrews of basket (tumbler) drive shaft bearings are loose.
- Failed motor bearing.
- Drive wheel is loose.
- Failed drive wheel.

Dryer Will Not Tilt

Tilt To Load

- Correct door signals are not present.
  - Door open to tilt up.
  - Door closed to tilt level.
- Defective proximity switch.
- No (external) compressed air to pneumatic switches; 80 psi (5.51 bar) required (11 cf/hr [0.31 cm/hr]).
- Lint drawer is open.

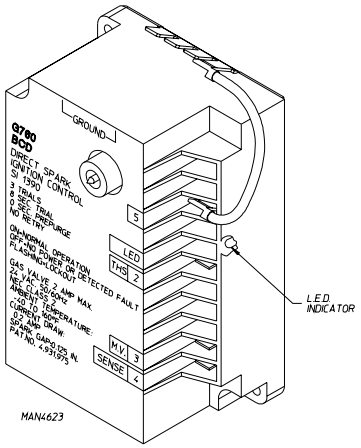
Tilt To Unload

- Correct door signals are not present.
  - Door open to tilt down.
  - Door closed to tilt level.
- Defective proximity switch.
- No (external) compressed air to pneumatic switches, 80 psi (5.51 bar) required (11 cf/hr [0.31 cm/hr]).
- Lint drawer is open.

Procedure for Functional Check of Replacement Components

For Models with Direct Spark Ignition (DSI) Module (Type I)

Theory of Operation:



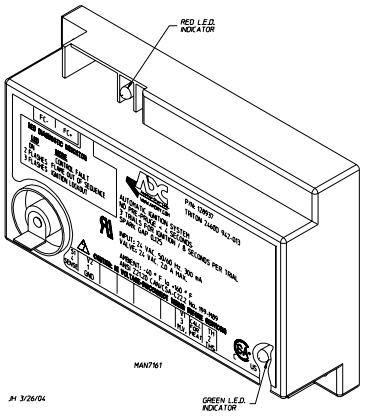
Start the drying cycle. When the gas burner ignites within the chosen trial for ignition time (6-seconds), the flame sensor detects gas burner flame and signals the DSI module to keep the gas valve open as long as there is a call for heat. The DSI module will "LOCKOUT" if the gas burner flame is not sensed at the end of the trial for ignition period. The trial for ignition period will be repeated for a total of three (3) retries/trials (the initial try and two [2] more retries/trials). If the flame is not sensed at the end of the third retry/trial (inter-purge period of 30-seconds) the DSI module will "LOCKOUT" (light emitting diode [L.E.D.] diagnostic indicator flashes).

A steady L.E.D. indicator indicates normal operation.

No L.E.D. indicator indicates a power or an internal failure has occurred.

For Models with DSI Module (Type II)

Theory of Operation:



Start the drying cycle. When the gas burner ignites within the chosen trial for ignition time (8-seconds), the flame sensor detects gas burner flame and signals the DSI module to keep the gas valve open as long as there is a call for heat. The DSI module will "LOCK OUT" if the gas burner flame is not sensed at the end of the trial for ignition period. The trial for ignition period will be repeated for a total of three (3) retries/trials (the initial try and two [2] more retries/trials). If the flame is not sensed at the end of the third retry/trial (inter-purge period of 30-seconds), the DSI module will "LOCK OUT" (a red L.E.D. diagnostic indicator will flash).

An unlit red L.E.D. diagnostic indicator indicates normal operation.

A lit green L.E.D. diagnostic indicator indicates dryer controller is calling for heat and that ALL interlocks have been satisfied.

Sensor Activated Fire Extinguishing (S.A.F.E.) System

The S.A.F.E. system consists of a temperature probe, water pressure switch, and a solenoid valve. Once 40 to 100 psi of water is connected, the system is activated.

20-seconds after the heat turns off, the Phase 7 control monitors the S.A.F.E. system probe located in the top of the basket (tumbler) chamber and records the minimum temperature. If the minimum recorded temperature is no less than 120° F (48° C) and the control detects a 35° rise in temperature, this will be the trip point and the S.A.F.E. system routine will activate.

While a drying cycle is in process and the heat is on, the Phase 7 control monitors the exhaust temperature transducer. If the drying cycle temperature set point is set greater than 160° F (71° C) and the control detects an exhaust temperature rise 25° F (-3.8° C) greater than set point, this will be the trip point and the S.A.F.E. system routine will activate.

Once the S.A.F.E. system routine is activated, water will be injected into the basket (tumbler) chamber. Anytime water is being injected into the basket (tumbler); the basket (tumbler) drive will turn the load for 1-second every 15-seconds. This process will continue for a minimum of 3 minutes. After 3 minutes has elapsed, the control will check if the temperature remained above trip point, if so water will remain on. The control will continue to check if temperature is above trip point every 30-seconds. If the water has been on for a constant 10 minutes, the water will be turned off regardless of the temperature. If the temperature has dropped below trip point, the control will turn off the water prior to 10 minutes.

System Reset

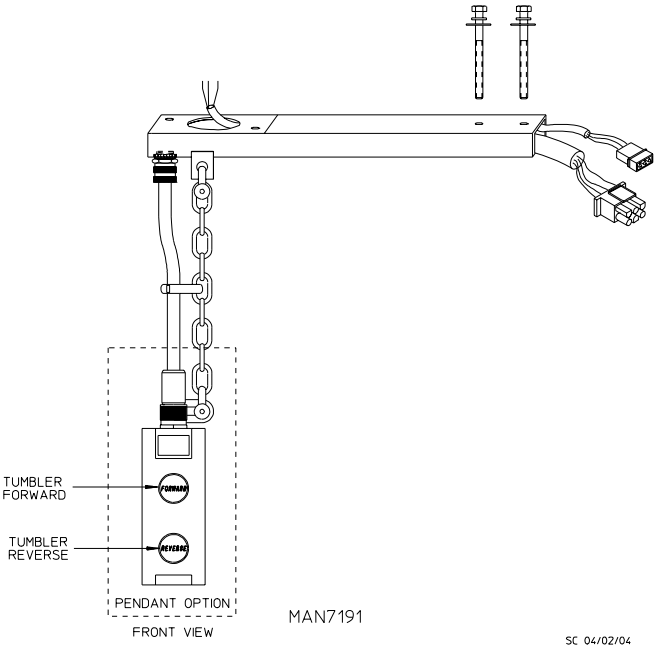
After the microprocessor determines that the situation is under control and shuts the water being injected into the basket (tumbler) off, the microprocessor display will read "FIRE SUPPRESSION SYSTEM ACTIVATED," and the horn/tone will sound until reset manually.

To reset the microprocessor and S.A.F.E. system, press the red key on the keyboard (touch pad).

Pendant Assembly

Pendant Assembly Description

The pendant assembly is used on both the gas and steam model dryer. Within the pendant assembly there is jog forward/ jog reverse push buttons. When depressed individually, these buttons will cause the tumbler (basket) to turn clockwise (CW) for forward and counterclockwise (CCW) for reverse. If both push buttons are depressed together the jog feature is disabled due to the mechanical interlock with the pendant assembly. This feature is used as a safety device to prevent both drive motors from being energized in opposite directions.



Notes

Notes

American Dryer Corp.