



AD-170 Service Manual

Phase 5 Microprocessor Controls and Timer Controls

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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 properly licensed technicians should service this equipment.

OBSERVE ALL SAFETY PRECAUTIONS displayed on the equipment or specified in the installation/operator's manual included with the dryer.

WARNING: UNDER NO CIRCUMSTANCES should the door switch or the heat circuit devices ever be disabled.

WARNING: The dryer *must never* be operated with any of the back guards, outer tops, or service panels removed. PERSONAL INJURY or FIRE COULD RESULT.

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. **AD-170**

DISTRIBUTORS NAME _____

Serial Number(s) _____

Replacement parts can be obtained from your distributor 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 orders directly to the ADC Parts Department at (508) 678-9010. 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 of the various dryer models. Be sure to check the descriptions of the parts thoroughly before ordering.

INSTRUCTIONS TO BE FOLLOWED IN THE EVENT THE USER SMELLS GAS MUST BE POSTED IN A PROMINENT LOCATION. THE INSTRUCTIONS TO BE POSTED SHALL BE OBTAINED FROM THE LOCAL GAS SUPPLIER.

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.

CAUTION

LABEL ALL WIRES PRIOR TO DISCONNECTION WHEN SERVICING CONTROLS. WIRING ERRORS CAN CAUSE IMPROPER AND DANGEROUS OPERATION.

VERIFY PROPER OPERATION AFTER SERVICING.

CAUTION

DRYER(S) SHOULD NEVER BE LEFT UNATTENDED WHILE IN OPERATION.

WARNING

CHILDREN SHOULD NOT BE ALLOWED TO PLAY ON OR NEAR THE DRYER(S).

CHILDREN SHOULD BE SUPERVISED IF NEAR DRYER(S) IN OPERATION.

WARNING

The dryer must never be operated with any of the back guards, outer tops, or service panels removed. PERSONAL INJURY or FIRE COULD RESULT.

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.

IMPORTANT

PLEASE OBSERVE ALL SAFETY PRECAUTIONS displayed on the equipment and/or specified in the installation/operator's manual included with the dryer.

Dryer(s) **must not** be installed or stored in an area where it will be exposed to water and/or weather.

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

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SECTION I

Important Information

A. Safety Precautions

1. **DO NOT** store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
2. 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.
3. Dryer **must be** exhausted to the outdoors.
4. Although ADC's dryer is a very versatile machine, 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" cleaners. Fire or explosion could result.

WARNING: **DO NOT** dry rags or articles coated with gasoline, kerosene, paint, or wax. Fire or explosion could result.

WARNING: **DO NOT** dry mopheads. Contamination by wax or flammable solvents will create a fire hazard.

WARNING: **DO NOT** use heat for drying articles that contain plastic, foam, sponge rubber, or similarly textured rubberlike materials. Drying in a heated tumbler may damage plastic or rubber and also may be a fire hazard.

5. A program **should be** established for the inspection and cleaning of lint in the burner area and exhaust duct work. The frequency of cleaning can best be determined from experience at each location.

WARNING: The collection of lint in the burner area and exhaust duct work can create a potential fire hazard.

6. For personal safety, the dryer **must be** electrically grounded in accordance with local codes and/or the National Electric Code ANSI/NFPA No. 70-LATEST EDITION.
7. Under no circumstances should the dryer door or lint drawer switch(es) or heat safety devices ever be disabled.
8. Read and follow **ALL** caution and direction labels attached to dryer.

WARNING: CHILDREN **SHOULD NOT BE** ALLOWED TO PLAY ON OR IN THE DRYER(S). CHILDREN **SHOULD BE** SUPERVISED IF NEAR DRYER(S) IN OPERATION.

SECTION II

Routine Maintenance

A. Cleaning

A program and/or schedule **should be** established for periodic inspection, cleaning, and removal of lint from various areas of the dryer, as well as throughout the duct work 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.

SUGGESTED INTERVAL

FUNCTION

DAILY	Clean Lint screen. Inspect lint screen and replace if torn.
90 DAYS	Remove lint accumulation from lint chamber thermostats and sensors.

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

90 DAYS	Remove lint from the motor air vents and surrounding area.
90 DAYS	Inspect and tighten ALL set screws (i.e.; pulleys, idler bearings, tumbler bearings).

IMPORTANT: Lint accumulation will restrict internal motor air flow, causing overheating and irreparable damage. Motor failure due to lint accumulation will *VOID THE MANUFACTURER'S WARRANTY*.

120 DAYS	On gas and electric models remove lint from gas burner area with a dusting brush or vacuum cleaner attachment. On steam dryers, clean the coil. Proper cleaning of steam coils is necessary to prevent lint build-up between the fins. When cleaning the coil, be extremely careful not to bend the aluminum fins, which will also reduce airflow. If the fins are bent, straighten them by using a comb. Fin combs are available from local air conditioning supply houses. Regular cleaning will prevent lint build-up and blockage of the coil.
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6 MONTHS

Inspect and remove lint accumulation in customer-furnished exhaust duct work system. Inspect exhaust back draft dampers to insure they are not binding. Inspect and remove ALL lint accumulation from in and around control box area, including coin acceptors. Clean lint accumulation from around tumbler wrapper area.

WARNING: THE ACCUMULATION OF LINT IN THE EXHAUST DUCT WORK CAN CREATE A POTENTIAL FIRE HAZARD.

AS REQUIRED

In cleaning and care of the cabinet, avoid using harsh abrasives. A product intended for the cleaning of appliances is recommended.

B. Adjustments

SUGGESTED INTERVAL

FUNCTION

6 MONTHS

Motor and drive belts **should be** examined. Cracked or seriously frayed belts **should be** replaced. Tighten loose belts when necessary, and check belt alignment.

6 MONTHS

Complete operational check of controls and valves.

6 MONTHS

Complete operational check of **ALL** safety devices (door switches, sail switch, burner and lint chamber thermostats.)

12 MONTHS

Inspect bolts, nuts, screws, non-permanent gas connections, (unions, orifices, etc.) electrical terminals, and grounding connections.

C. Lubrication

Lubrication is necessary on the fan bearings (2) 50 & 60Hz steam models, and 50Hz gas models ONLY. This should be performed every 90 days.

SECTION III

Installation Requirements

Installation **should be** performed by competent technicians in accordance with local and state codes. In the absence of these codes, installation must conform to applicable AMERICAN NATIONAL STANDARDS:

National Fuel Gas Code ANSI Z223.1-LATEST EDITION
and/or
National Electric Code ANSI/NFPA No. 70-LATEST EDITION

A. Enclosure, Air Supply, and Exhaust Requirements

NOTE: The following information is very brief and general. For detailed description, refer to the Installation Manual supplied with 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 appropriate 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 insure 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 motors and other dryer components.

Exhaust duct work **should be** designed and installed by a competent technician. Improperly sized duct work 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 appropriate Installation Manual for more detail.)

CAUTION: IMPROPERLY SIZED OR INSTALLED EXHAUST DUCT WORK CAN CREATE A POTENTIAL FIRE HAZARD.

B. Electrical and Gas Requirements

It is your responsibility to have **ALL** electrical connections made by a properly licensed and competent electrician to assure that the electrical installation is adequate and conforms with local and state regulations or codes. In the absence of such codes, **ALL** electrical connections, material, and workmanship must conform to the applicable requirements of the National Electric Code ANSI/NFPA No. 70-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, 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 L.P.) indicated on the dryer data label. If this information does not agree with the type of gas available, contact the distributor 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, unless elevation requirements of over 2,000 feet 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 are made by changing the burner orifices. If this adjustment is necessary, contact the distributor who sold the dryer or contact the factory.

NOTE: Any burner changes **must be** made by a qualified technician.

C. Operational Service Check Procedure

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

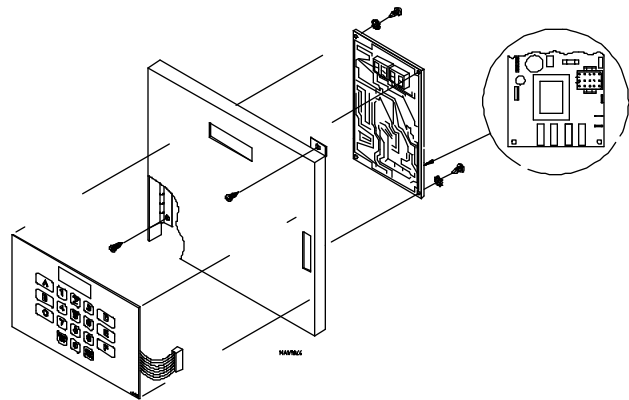
1. Make a complete operational check of **ALL** the operating controls to insure that the timing is correct, temperature selection switches are functioning properly.
2. Make a complete operational check of **ALL** safety related circuits, door switch(es), hi-limit thermostat, sail switch, cycling thermostats, etc.

SECTION IV

Description of Parts

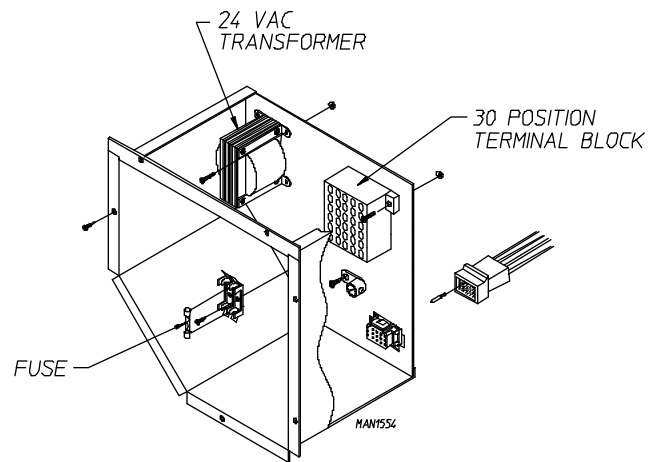
A. Computer Panel Assembly

The computer panel assembly on the AD-170 consists of a phase 5 computer board a keypad label. The keypad inputs your selections into the computer and the computer board directs all the functions of the dryer.



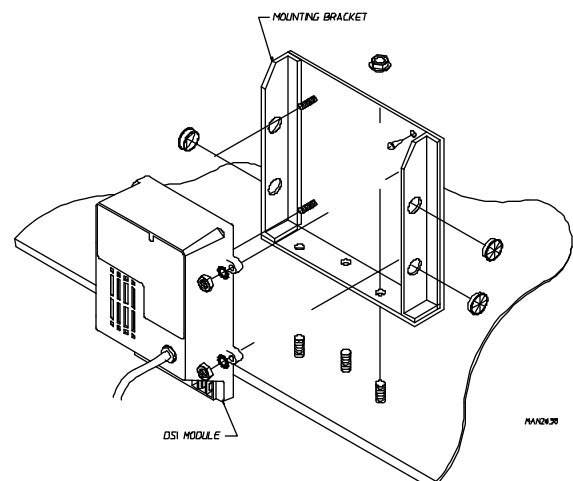
B. Control Box

Lifting the control door and opening the computer panel will reveal the control box. Inside the control box are **ALL** the electronic control components. Located on the back of the control box are the 30-position block, fuse block, and transformer.



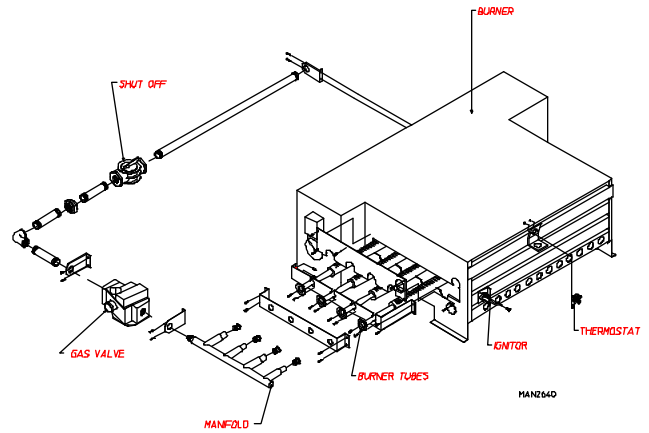
C. DSI Module (Gas Models Only)

The (DSI) Direct Spark Ignition system consists of a microprocessor-based control module, along with an ignitor/flame-probe assembly. This control utilizes a high voltage synchronous spark ignitor and a rectified flame sensor/probe signal to locally control **ALL** basic functions in the gas burner.



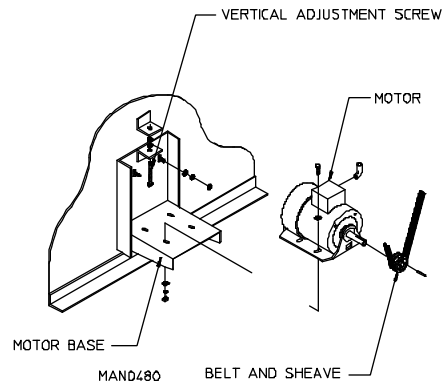
D. Gas Burner Assembly

Gas-heated dryers are equipped with a gas burner assembly consisting of four (4) burner tubes, gas valve, spark ignition probe assembly, sail switch, and hi-limit thermostat. The inlet piping enters through the rear of the dryer on the left-hand side (viewing from the front) and runs to the front of the dryer where the gas valve is located.



E. Drive Motor

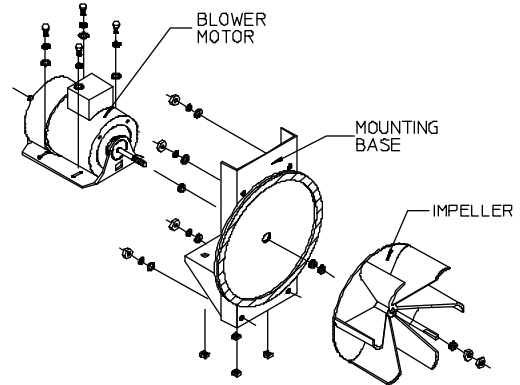
The T.E.F.C. (totally enclosed, fan-cooled) drive motor is located approximately lower center of the dryer. It sits on an adjustable base so that the motor can be easily adjusted to the left or right, up or down, forward or backward. The drive motor is a 3/4 HP motor and operates on 208 to 408 volts, 3Ø, 50/60 Hz.



F. Blower Motor and Impellor

(60 Hz Gas Models Only)

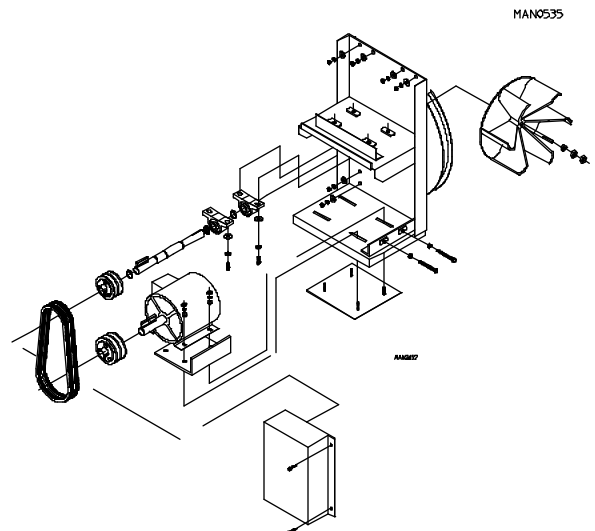
The blower motor is located on the back of the dryer at the lower right-hand corner. The impellor is a backward curved paddle wheel which is directly connected to the shaft of the blower motor. The blower motor is a 3 HP motor and operates on 208 to 460 volts, 3Ø, 50/60 Hz.



G. Blower Motor and Impellor

(50Hz, 60Hz Steam & 50Hz Gas)

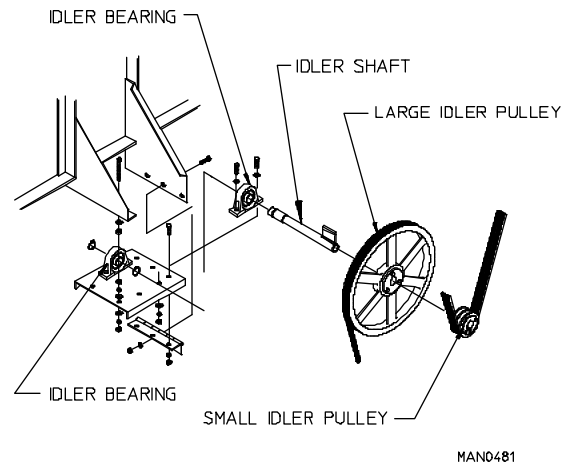
The impellor on this design is shaft driven. The blower motor drives the shaft on which the impellor is mounted. This enables the impellor to run at a higher RPM, thereby producing a higher air flow (CFM).



NOTE: The bearing on this type of blower assembly **should be** greased according to the maintenance section of this manual.

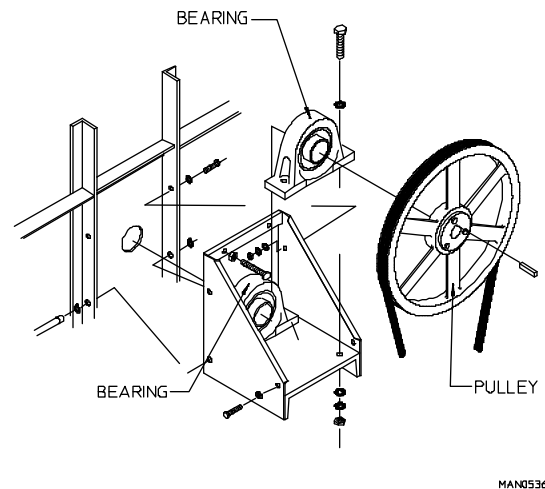
H. Idler Assembly

(Viewing from the rear of the dryer) the idler assembly is located approximately on the lower center of the dryer. The idler assembly consists of two (2) idler pulleys, the small and large pulleys. The idler's main purpose is to reduce the speed and increase torque provided to the tumbler bearing. Also, at the idler assembly, belt tension can be adjusted.



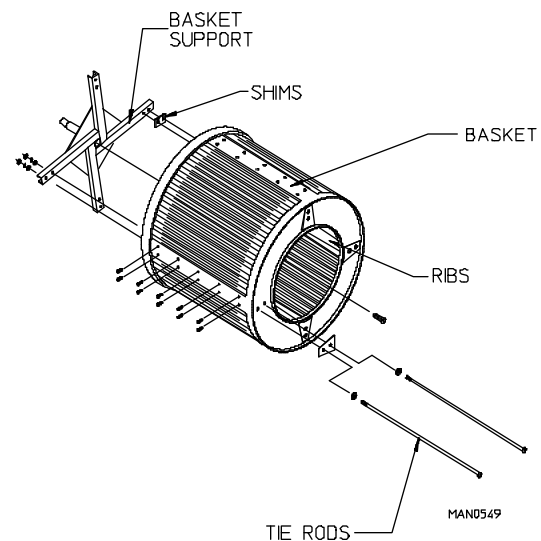
I. Tumbler Bearing and Pulley Arrangement

The tumbler bearing and pulley arrangement is located (viewing from the rear of the dryer) approximately at the upper center of the dryer. The arrangement consists of a pulley and two (2) bearings which serve to drive, adjust, and support the basket.



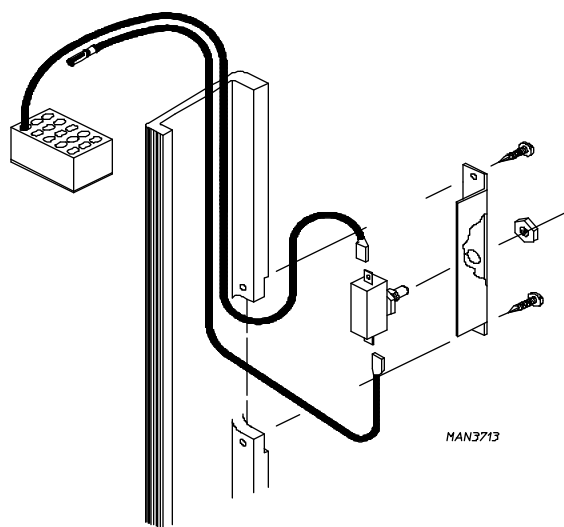
J. Basket (Tumbler)

The basket consists of four (4) ribs and four (4) perforated panels, along with front and back, which are screwed together as an assembly. The basket also consists of tie rods, which support the basket from front to back. The basket support is used to mate the basket to the drive system in the rear.



K. Main Door Switch

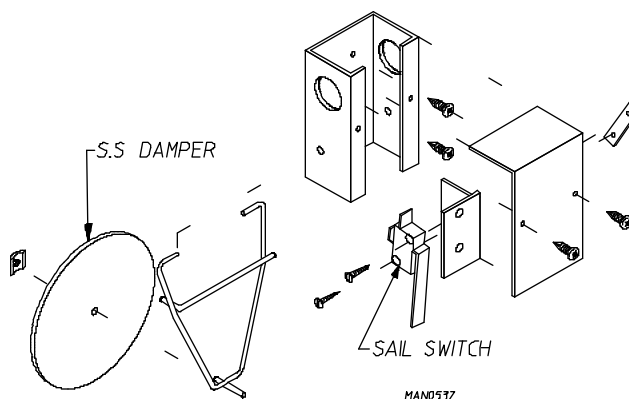
The main door switch is located in the main door hinge block. When the main door opens, the switch will also open, preventing the dryer from operating. The main door switch is a safety device and should never be disabled.



L. Sail Switch (Gas Models ONLY)

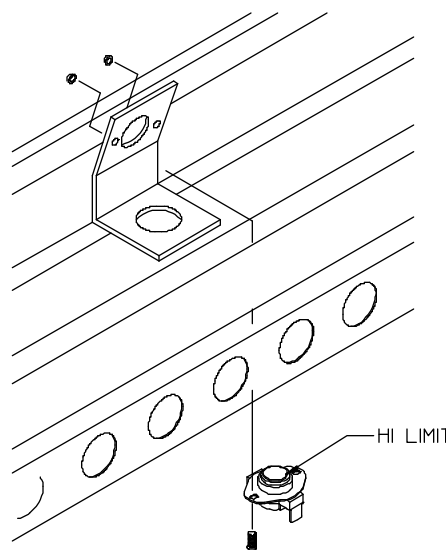
The sail switch is located on the front of the burner box. A sail switch consists of a round damper plate on a lever arm which is in contact with an electric switch. When the air blower comes on, it draws air through the gas burner. This creates a negative pressure inside the burner box, and this negative pressure pulls in the round damper and activates the sail switch. If there is improper airflow, the damper will not pull in, preventing the burner from starting.

Improper airflow can be caused by improperly designed exhaust ducting where the duct run is too long or has too many sharp bends in it. It can also be caused by a lack of make-up air.



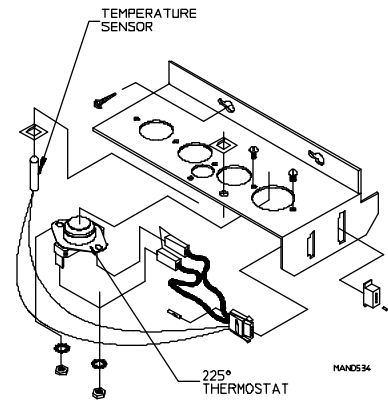
M. Hi-Limit (Gas Models Only)

A hi-limit thermostat is located at the burner. This is an automatic reset disc-type thermostat set at 330° F for gas dryers. If the flame in the burner should get too hot, this thermostat will shut off the burner. This is generally caused by low airflow in the dryer.



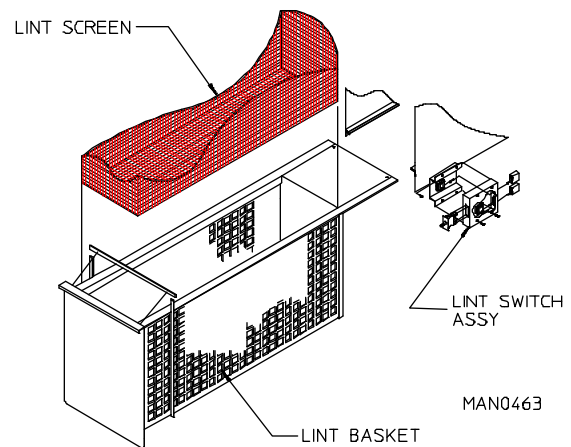
N. Automatic Reset Thermostat

This is located inside the dryer in the lint compartment above the lint drawer. This thermostat senses the heated air after it has passed through the basket. If the air temperature gets too hot, the thermostat will shut off the burner. The dryer will not heat up until the air temperature cools down. At this time, the thermostat will reset. Basket and blower will run, but dryer will not heat.



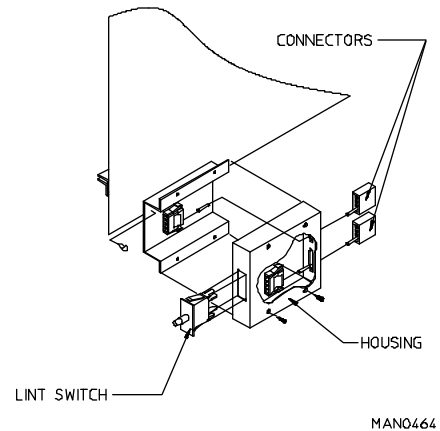
O. Lint Drawer

The lint drawer is a pullout type and is located at the bottom of the dryer in the lint compartment. Simply grab the lint drawer handle, slide out the drawer, brush off the lint, and slide the drawer back in. The lint screen **must be** kept clean in order for the dryer to operate properly and efficiently.



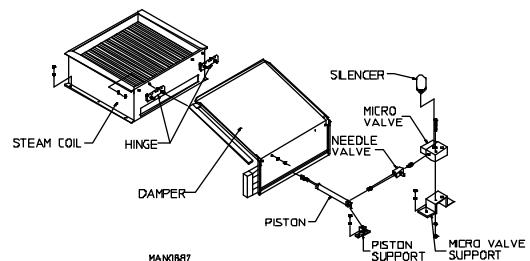
P. Lint Drawer Switch

The lint drawer switch is located in the lint compartment and attached to the side of the lint drawer track. The lint drawer switch insures that the dryer will operate only when the lint drawer is completely closed. This is a safety device and **should never be** disabled.



Q. Steam Damper System

The newest type system is called the steam damper. It is shown to the right and it uses a piston with compressed air to open and close the steam damper which in turn allows the air to flow either through the coil for heat, or under the coil for cool down. Air supply is 80 PSI (+/- 10 PSI).



SECTION V

Servicing

Introduction

ALL electrical/mechanical service or repairs **should be** made with the electrical power to the dryer disconnected (power off).

WARNING: PERSONAL INJURY COULD RESULT

The information provided in this section **should not be** misconstrued as a device for use by an untrained person making repairs. Service work **should be** performed by competent technicians in accordance with local, state, and federal codes.

When contacting the factory for assistance, always have the dryer model and serial numbers available.

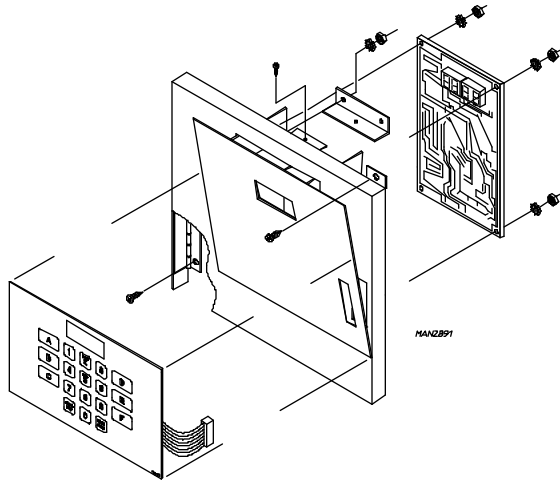
CAUTION: Observe **ALL** safety precautions displayed on the dryer or specified in this manual before and while making repairs.

Before considering replacement, make sure that **ALL** connectors are in place and making proper contact.

A. Computer Controls

To Replace Computer

1. Disconnect power to the dryer.
2. Disconnect main power harness from rear of computer by squeezing locking tab and pulling connector straight back.
3. Disconnect the green ground wire from the computer.
4. Disconnect keyboard ribbon from the computer.
5. Remove the two hex nuts securing the computer to the sheet metal control panel. Remove the board by pulling the other two corners off the clinch studs.
6. Install new computer by reversing this procedure.
7. When replacing the computer, the "A" and "B" factors **must be** reprogrammed. (see "Computer Operator's Manual" for details)



NOTE: The "A" and "B" factors are printed on a label located on the rear of the control panel (see illustration)

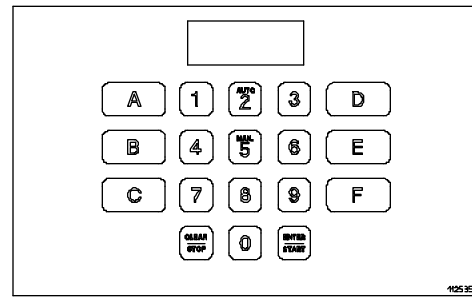
8. Reestablish power to dryer.

To Replace Keyboard Label Assembly

1. Discontinue power to dryer.
2. Unplug keyboard ribbon from rear of computer.
3. Slowly peel off and remove keyboard label assembly from control panel.

4. Peel paper backing off new keyboard label assembly.

5. Holding the new keyboard label assembly close to the panel, insert the keyboard ribbon through the rectangular slot in the control panel. Align label assembly into position by matching the red viewing window on the label to the rectangular cutout in the panel and gently press into place.



6. Connect keyboard ribbon to the computer.

7. Reestablish power to dryer.

MAN0550

To Replace Microprocessor Temperature Sensor Probe

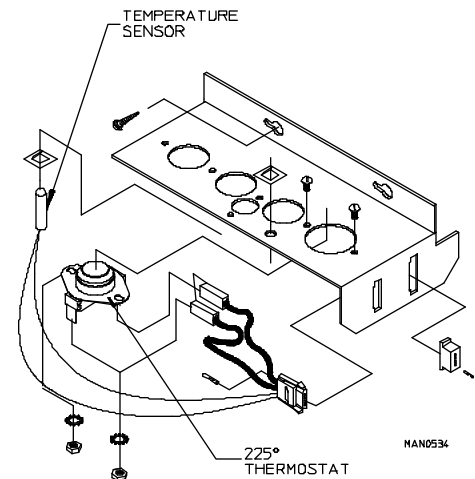
1. Discontinue power to dryer.

2. Remove lint drawer. Remove two (2) screws securing lint door and remove lint door.

3. Remove microprocessor sensor bracket assembly from dryer.

a. Disconnect sensor bracket harness connector.

b. Loosen the two (2) Phillips head screws securing bracket assembly to dryer and remove bracket from dryer.



NOTE: DO NOT remove screws.

4. Disassemble sensor probe from bracket assembly by removing the top push-on fastener securing the probe from bracket. Use a small screwdriver to slowly pry the fastener off.

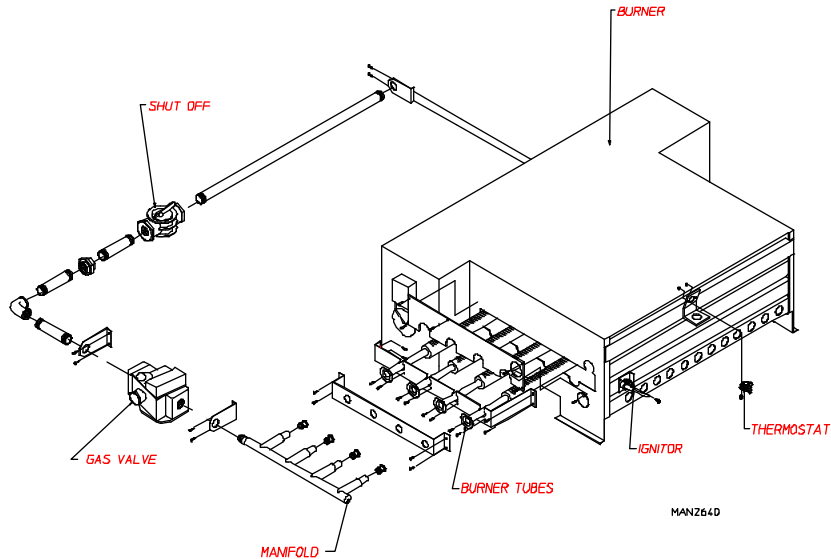
5. Disconnect the two (2) orange wires from the high heat (225 degree) thermostat, and remove modular bracket connector, wires, and probe from bracket assembly.

6. Install new sensor probe assembly (ADC P/N 880251) by reversing procedure.

7. Reestablish power to the dryer.

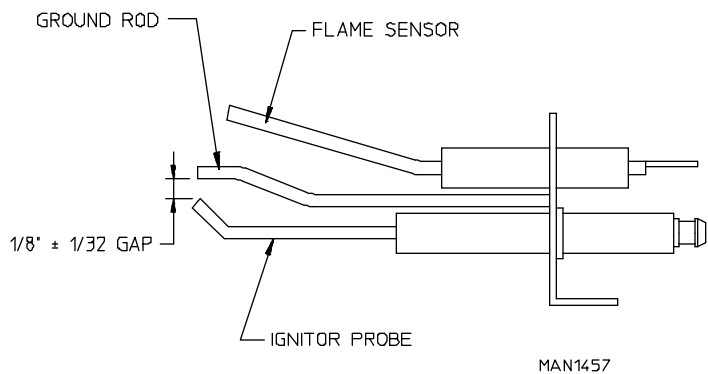
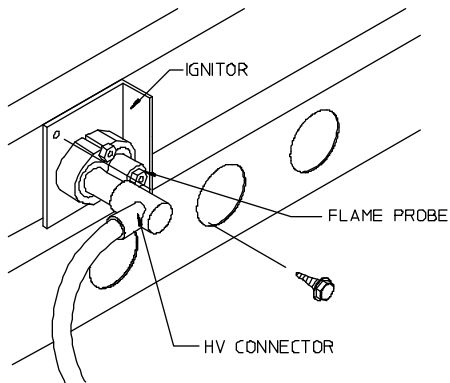
NOTE: If, when power is reestablished, the computer display reads "dSFL", check for a loose connection in the wiring.

B. Ignition Controls



To Remove Spark Ignitor (see above burner illustration)

1. Discontinue power to dryer.
2. Disconnect HV connector and flame probe connection from ignitor.
3. Disassemble ignitor from burner by removing the two (2) self-tapping screws.
4. Reverse procedure for installing new ignitor/flame-probe.



NOTE: Before reestablishing power to dryer, visually check the following (see illustration):

- A. The flame electrode, ignitor electrode, and ground rod are all on the same line axis.
- B. There **should be** a 1/8" gap (+/- 1/32") between the ignitor electrode and ground rod.
- C. Do not wrap the red HV wire and the flame electrode wire together. Improper operation may result. They may run alongside each other.

To Replace Gas Valve (see burner illustration on page 16)

1. Discontinue power to dryer.
2. Close shut-off valve(s) in gas supply line.
3. Disconnect gas valve wiring.

NOTE: Identify location of each wire for correct reinstallation.

4. Break union connection before gas valve.
5. Loosen and remove screws (4) securing pipe brackets to burner.
6. Remove gas valve/manifold assembly from dryer.
7. Remove valve mounting bracket, manifold, and piping from gas valve.
8. Reverse procedure for installing new gas valve.

WARNING: Test **ALL** connections for leaks by brushing on a soapy water solution.
NEVER TEST FOR LEAKS WITH A FLAME.

To Replace Main Burner Orifices

1. Refer to "To Replace Gas Valve" and follow steps 1 through 6.
2. Unscrew main burner orifices and replace.

NOTE: Use extreme care when removing and replacing orifices. These orifices are made of brass and are easily damaged.

3. Reversing the removal procedure for reinstalling.

NOTE: Test **ALL** connections for leaks by brushing on a soapy water solution.
NEVER TEST FOR LEAKS WITH A FLAME.

To Test and Adjust Gas (Water Column) Pressure

There are two (2) types of devices commonly used to measure water column pressure. They are spring/mechanical-type gauges and manometers. The spring/mechanical-type gauge is not recommended, because it is easily damaged and not always accurate. A manometer is simply a glass or transparent plastic tube with a scale in inches. When filled with water and pressure applied, the water in the tube rises showing the exact water column pressure.

NOTE: Manometers are available from the factory by ordering **ADC P/N 122804**

1. To Test Gas Water Column (W.C.) Pressure:

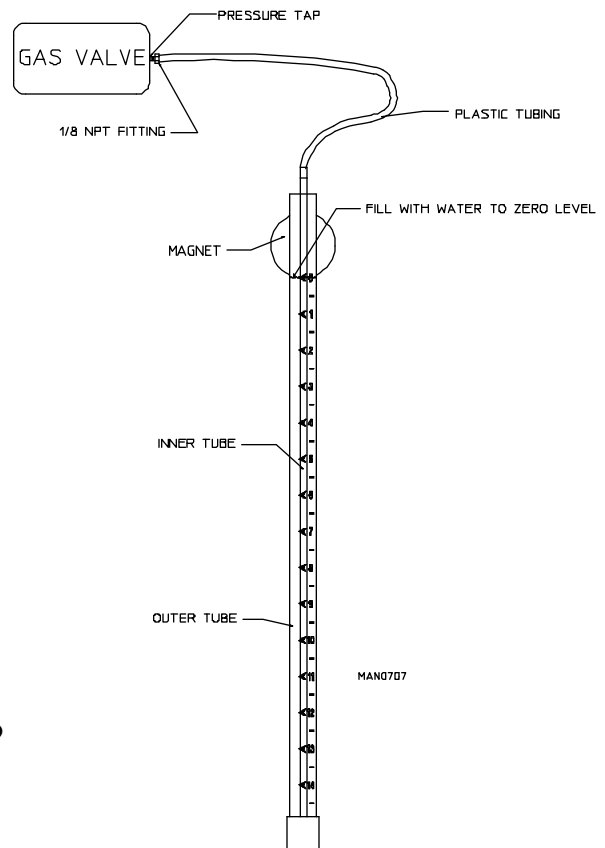
- a. Connect water column test gauge connection to gas valve pressure tap (1/8" NPT). This pressure tap is located on the outlet (manifold) side of the valve.
- b. Start dryer. With burner on, the correct water column reading in inches would be:

Natural Gas – 3.5 to 4 Inches Water Column

L.P. Gas – 10.5 to 11 Inches Water Column

2. To Adjust Water Column Pressure (natural gas only, L.P. gas must be regulated at source):

- a. Remove the slotted vent cap on the top of the valve.
- b. Turn the slotted adjustment screw located on the top of the valve next to the terminals. Turn clockwise to increase manifold pressure and counterclockwise to decrease.



NOTE: If correct W.C. pressure *cannot be* achieved, problem may be due to an undersized gas supply line, a faulty or underrated gas meter, etc.

To Convert from Natural Gas to L.P. Gas

NOTE: *ALL* dryers are sold as natural gas, unless otherwise specified at the time the dryer order was placed. For L.P. gas the dryer *must be* converted as follows.

1. Refer to "Replace Gas Valve" and follow steps 1 through 6.
 - a. For models with 1" Robertshaw valve.
2. Remove the four (4) screw which secure the top cap assembly. This assembly contains the regulator adjustment screw and the terminal connections.
3. Replace the top cap assembly with the L.P. version.
4. Unscrew main burner orifices and replace with L.P. orifices.

NOTE: Use extreme care when removing and replacing orifices. These orifices are made of brass and are easily damaged.

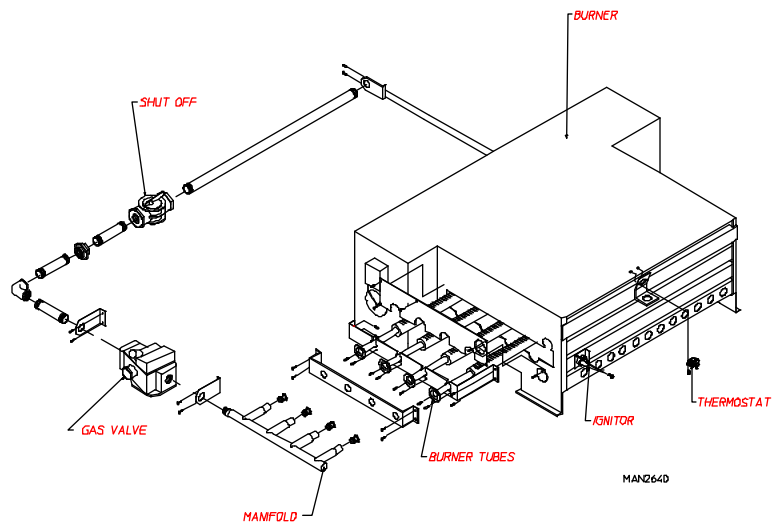
5. Reverse the procedure for reinstalling valve assembly to the dryer.

WARNING: Test *ALL* connections for leaks by brushing on a soapy water solution.
NEVER TEST FOR LEAKS WITH A FLAME.

NOTE: There is no regulator provided in an L.P. dryer. The column pressure *must be* regulated at the source (L.P. tank) or an external regulator *must be* added to each dryer.

To Replace Burner Tubes

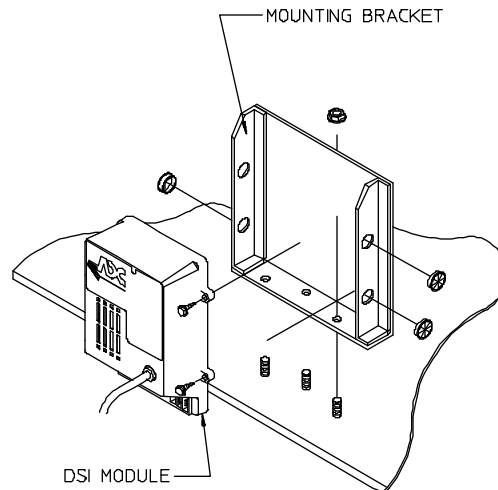
1. Refer to "Replace Gas Valve" and follow steps 1 through 6.
2. Remove four (4) screws securing manifold rest and remove rest.
3. Remove the screws securing the front flanges of the burner tubes to the burner tube rest.
4. Remove the screws securing the burner tube rest to the oven and remove this rest.
5. Remove screws securing the sight hole disk and burner box cover plate to the oven and remove both of these pieces.
6. Remove burner tubes by sliding them out.
7. Replace by reversing procedure.



WARNING: Test ALL connections for leaks by brushing on a soapy water solution.
NEVER TEST FOR LEAKS WITH A FLAME.

To Replace DSI Module

1. Discontinue power to the dryer.
2. Remove the wires connected to the terminal strip at the bottom of the module.
3. Remove the four (4) screws securing the module to the mounting bracket.
4. Replace module by reversing procedure.
5. Reestablish power to dryer.



C. Thermostats

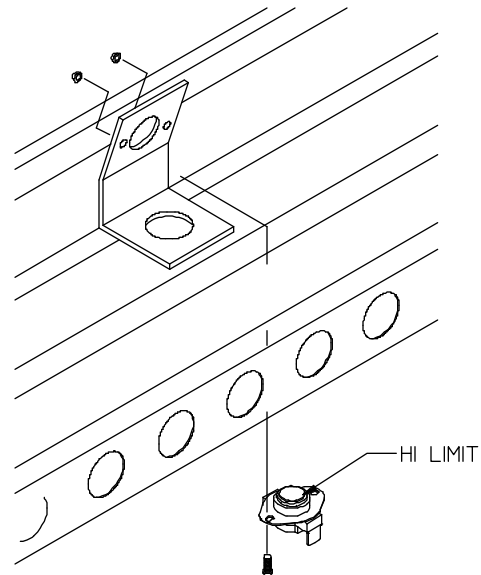
MAN0460

To Replace Burner Hi-Limit Thermostat (Gas Models Only)

This thermostat is an important safety device serving as an added protection against failure of the air flow (sail switch) to open in the event of motor failure or reduced airflow condition.

IMPORTANT: Under no circumstances should heat circuit safety devices ever be disabled.

1. Discontinue power to dryer.
2. Disconnect wires from hi-limit thermostat.
3. Remove screw, washer, and nut securing thermostat to the bracket. Remove thermostat.
4. Reverse procedure for installing new thermostat.
5. Reestablish power to dryer.



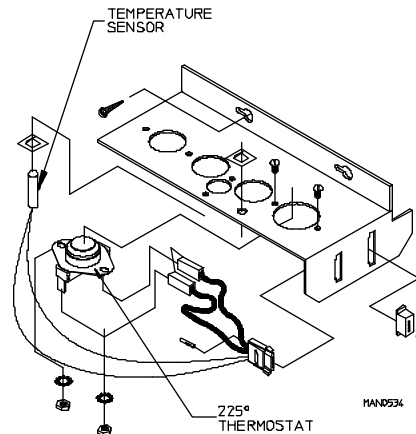
MAN0539

To Replace Lint Compartment Hi-Heat Protector (225 Degree) Thermostat

This thermostat is part of the "sensor bracket assembly" and is secured to the underside of the basket wrapper in the lint compartment. As a safety device, this thermostat will open (shut off) the heating unit circuit if an excessive temperature occurs. The dryer motors will remain on, even if the thermostat is open.

IMPORTANT: Under no circumstances should heat safety devices be disabled.

1. Discontinue power to dryer.
2. Remove lint drawer. Remove two (2) screws securing lint door and remove lint door.
3. Locate sensor bracket assembly and loosen the two (2) Phillips head screws securing bracket assembly to the tumbler wrapper.



NOTE: DO NOT remove the screws.

4. Remove bracket assembly by slightly sliding bracket towards the rear of the dryer and to the left.
5. Disconnect sensor bracket harness connector and remove bracket assembly from dryer.
6. Disconnect the two (2) orange wires from the thermostat.
7. Disassemble thermostat from bracket assembly by removing the two (2) mounting screws, washers, and nuts.
8. Reverse this procedure for installing a hi-heat protector thermostat.
9. Reestablish power to the dryer.

D. Sail Switch Assembly (Gas Models Only)

The sail switch is a heat circuit safety device which controls the burner circuit only. When the dryer is operating and there is proper airflow, the sail switch damper pulls in and closes the sail switch. Providing all the other heat-related circuits are functioning properly, ignition should now be established. If an improper airflow occurs, the sail switch damper will release, and the circuit will open.

To Replace Sail Switch

1. Disconnect power to dryer.
2. Remove the two (2) screws which hold sail switch box cover to sail switch box.
3. Disconnect the two (2) wires from the switch.
4. Disassemble sail switch from mounting bracket by removing the two (2) screws securing switch in place.
5. Reverse this procedure for installing new sail switch. Adjust sail switch as described in the next section.

To Adjust Sail Switch

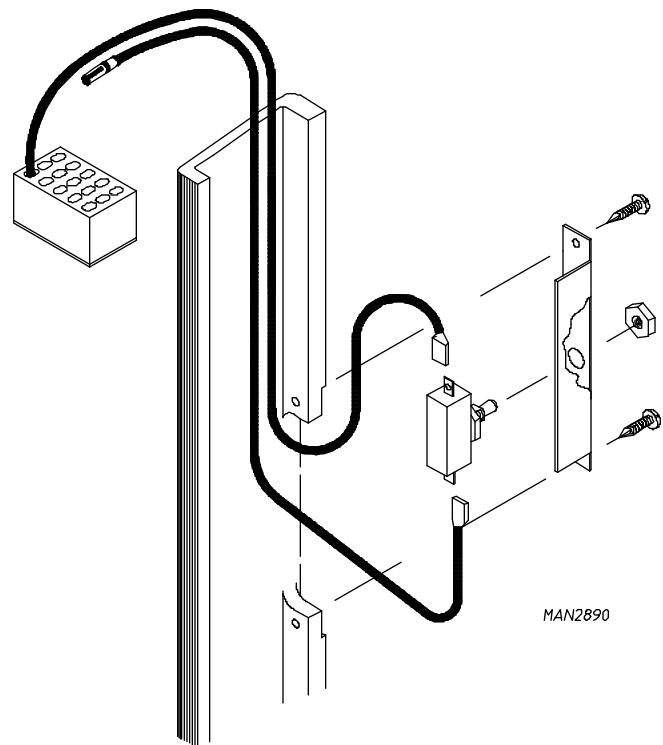
With the dryer operating at a high temperature setting, pull the sail switch away from the burner. The sail switch should open and extinguish the burner. Let the sail switch damper return to the burner wall. The sail switch should close to restart the burner ignition cycle. If the sail switch circuit does not operate as described, bend the actuator arm of the sail switch accordingly until proper operation is achieved. To check proper "open" position of sail switch, open main door, manually depress main door switch, and start dryer. With the main door open and the dryer operating, the sail switch should be open, and the burner should not come on.

CAUTION: DO NOT abort this switch by taping or screwing sail switch damper to burner.
PERSONAL INJURY OR FIRE COULD RESULT.

E. Front Panel and Main Door Assemblies

To Replace Main Door Switch

1. Discontinue power to dryer.
2. Open main door.
3. Remove the two (2) Phillips head screws holding the main door switch bracket assembly in place.
4. Remove door switch bracket from hinge block and disconnect wiring from switch.
5. Disassemble door switch bracket by removing locking adjustment nut. Remove second locking nut and assemble onto new door switch.
6. Reverse this procedure for installing new door switch.
7. Reestablish power to dryer.



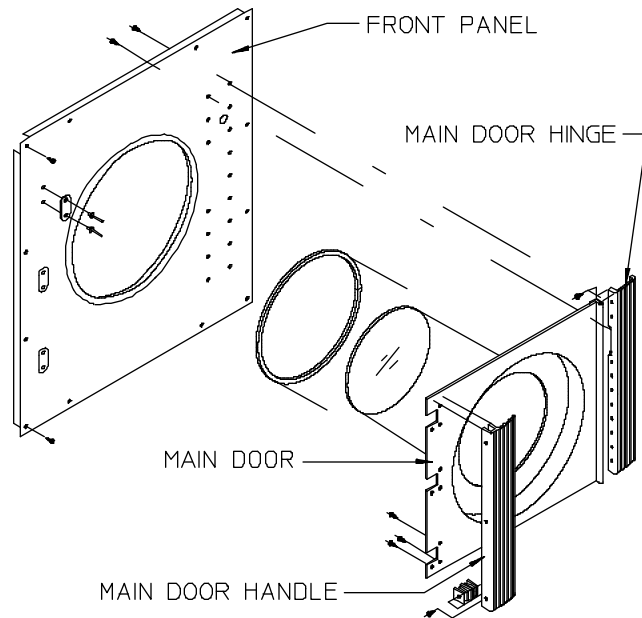
IMPORTANT: Under no circumstances should the door switch be disabled.

To Replace Main Door Assembly

1. Remove screws holding main door to main door hinge pad.
2. Reverse this procedure for reinstalling new main door assembly.

To Install New Main Door Glass

1. Remove main door assembly from dryer (follow main door removal procedure).
2. Lay main door on flat surface with front of door face down.
3. Remove glass and clean all old sealant off main door. This area must be completely cleaned for correct bonding.



MAN0548

4. Apply a narrow bead of silicone (**ADC P/N 170730**) all around main door area where glass will rest.
5. Install glass onto door/adhesive and slightly press glass in place.

IMPORTANT: DO NOT press hard or silicone thickness between the glass and door *will be* reduced, resulting in poor bonding.

6. The door assembly should now be put in an area where it will not be disturbed for at least 24 hours. Depending on the conditions, the curing time of this adhesive is 24 to 36 hours.
7. After 24-hour curing period, install main door on dryer by reversing step 1.

To Replace Front Panel

1. Discontinue power to dryer.
2. Remove main door switch and bracket assembly.
3. Follow procedure for removal of main door assembly.
4. Open control (service) door.
5. Remove lint drawer and open lint door by removing two (2) screws.
6. Remove the twelve (12) Phillips head screws securing front panel to dryer.
7. Pull wires up through front panel door switch wire channel and gently remove front panel assembly.
8. Reverse this procedure for installing new front panel.
9. Reestablish power to dryer.

To Replace Main Door Hinge Pad

1. Discontinue power to dryer.
2. Follow procedure for removal of main door assembly.
3. Follow procedure for removal of front panel assembly.
4. Disassemble hinge pad from front panel by removing the Phillips head screws located on the back side of the front panel.

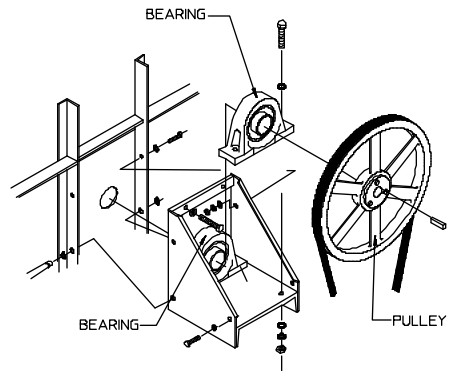
IMPORTANT: When removing hinge pad assembly from front panel, be careful not to damage main door switch wires.

5. Reassemble by reversing removal procedure.
6. Reestablish power to dryer.

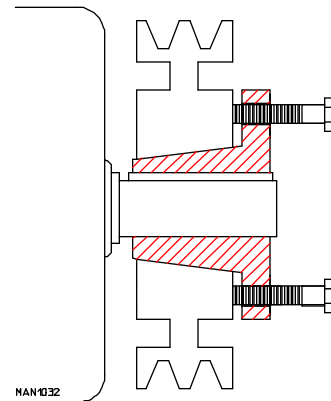
F. Pulleys

To Replace Tumbler Pulley

1. Loosen V-belts. Rotate pulley and roll V-belts out of grooves.
2. Remove cap screws from the bushings.
3. Insert cap screws in tapped removal holes and tighten evenly until bushing becomes loose on shaft. See figure "A".
4. Remove bushing, pulley, and key.
5. Assemble bushing and sheave as shown in figure "B". When cap screws are loosely inserted, bushing remains fully expanded to provide a sliding fit on the shaft.
6. Insert key on the shaft, then slide sheave to desired position with cap screw heads to the outside.
7. Tighten cap screws progressively. There should remain a gap between the sheave hub and the flange of the bushing.



A

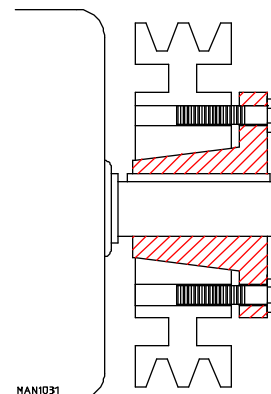


IMPORTANT: Tighten screws evenly and progressively. Never allow the sheave to be drawn in contact with the flange of the bushing. This gap should measure from 1/8" to 1/4". Proper cap screw torque is 30ft-lbs. If greater tightening forces are applied, excess pressures *will be* created in the hub of the mounted sheave which may cause it to crack.

To Replace Small Idler Pulley

1. Loosen V-belts. Rotate pulley and roll V-belts out of grooves.
2. Remove cap screws from the bushings.
3. Insert cap screws in tapped removal holes and tighten evenly until bushing becomes loose on shaft. See figure "A".
4. Remove bushing, pulley, and key.
5. Assemble bushing and sheave as shown in figure "B". When cap screws are loosely inserted, bushing remains fully expanded to provide a sliding fit on the shaft.
6. Insert key on the shaft, then slide sheave to desired position with cap screw heads to the outside.

B

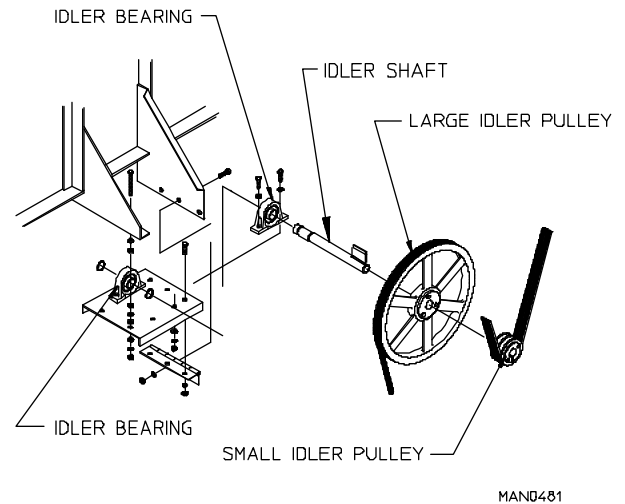


- Tighten cap screws progressively. There should remain a gap between the sheave hub and the flange of the bushing.

IMPORTANT: Tighten screws evenly and progressively. Never allow the sheave to be drawn in contact with the flange of the bushing. This gap should measure from 1/8" to 1/4". Proper cap screw torque is 6 ft-lbs., if greater tightening forces are applied, excess pressures *will be* created in the hub of the mounted sheave which may cause it to crack.

To Replace Large Idler Pulley

- Loosen V-belts. Then, rotate pulley and roll V-belts out of grooves.
- Remove cap screws.
- Insert cap screws in tapped removal holes and tighten evenly until bushing becomes loose on shaft. See Figure "A" on previous page.
- Remove bushing, pulley, and key.
- Assemble bushing and sheave as shown in figure "B" on previous page. When cap screws are loosely inserted, bushing remains fully expanded to provide a sliding fit on the shaft.

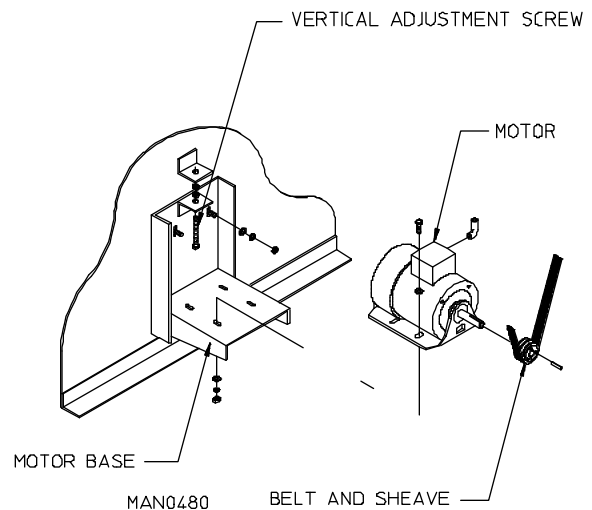


- Insert key on the shaft, then slide sheave to desired position with cap screw heads to the outside.
- Tighten cap screws progressively. There should remain a gap between the sheave hub and the flange of the bushing.

IMPORTANT: Tighten screws evenly and progressively. Never allow the sheave to be drawn in contact with the flange of the bushing. This gap should measure from 1/8" to 1/4". Proper cap screw torque is 6 ft-lbs. If greater tightening forces are applied, excess pressures *will be* created in the hub of the mounted sheave which may cause it to crack.

To Replace Motor Pulley

- Loosen V-belts. Rotate pulley and roll V-belts out of grooves.
- Remove cap screws from bushing.
- Insert cap screws in tapped removal holes and tighten evenly until bushing becomes loose on shaft. See figure "A" on previous page.



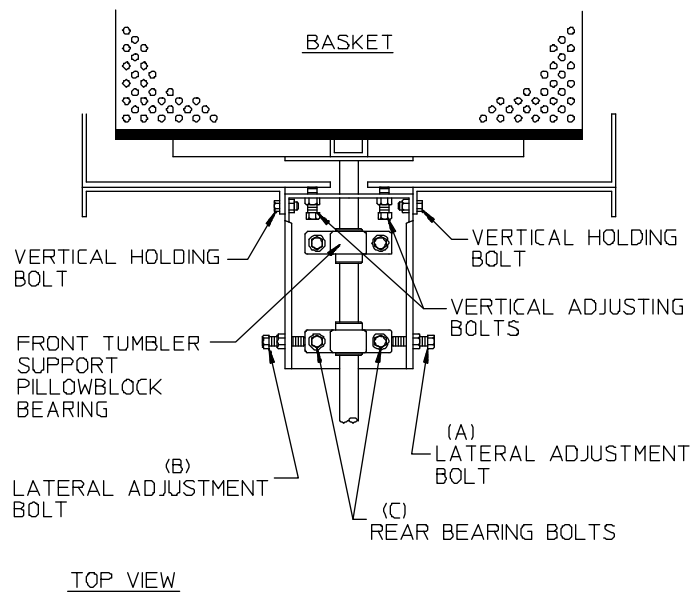
4. Remove bushing, pulley, and key.
5. Assemble bushing and sheave as shown in figure "B". When cap screws are loosely inserted, bushing remains fully expanded to provide a sliding fit on the shaft.
6. Insert key on the shaft, then slide sheave to desired position with cap screw heads to the outside.
7. Tighten cap screws progressively. There should remain a gap between the sheave hub and the flange of the bushing.

IMPORTANT: Tighten screws evenly and progressively. Never allow the sheave to be drawn in contact with the flange of the bushing. This gap should measure from 1/8" to 1/4". Proper cap screw torque is 6 ft-lbs., if greater tightening forces are applied, excess pressures *will be* created in the hub of the mounted sheave which may cause it to crack.

G. Basket Assembly

Basket Alignment (Vertical) (Up and Down Adjustment)

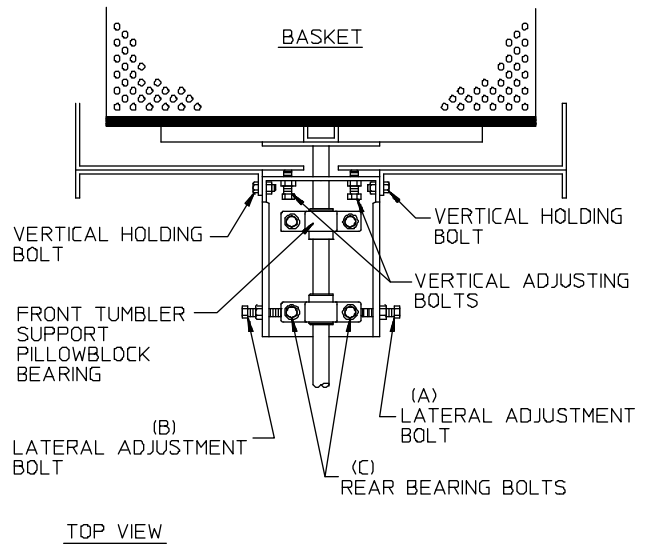
1. Discontinue power to dryer.
2. Remove background.
3. Loosen the two (2) vertical holding bolts on the side at the top of the bearing box (1 on each side).
4. Back off jam nuts on vertical adjustment bolts.
5. Turn these bolts clockwise evenly to raise basket or counterclockwise evenly to lower basket.
6. Rotate basket from front and check alignment with front door opening.
7. Leave a larger gap from the inside ring on the top of the front panel opening to the basket and a smaller gap on the bottom to compensate for the weight of the clothes when wet.
8. Retighten the two (2) vertical holding bolts on the sides, at the top of the bearing box, and the jam nuts on the two (2) vertical adjustment bolts.
9. Check basket drive belt for proper tension. Adjust if necessary. (Refer to Section I, page 7)
10. Replace backguard.
11. Reestablish power to dryer.



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Basket Alignment (Lateral) (Side to Side Adjustment)

1. Discontinue power to dryer.
2. Remove backguard.
3. Loosen rear pillow block bearing bolts (C).
4. Back off jam nuts on the two (2) lateral adjustment bolts (A) and (B).
5. Simultaneously loosen one bolt and tighten the other. This will move the rear pillow block bearing. Center the basket in the wrapper cavity.
6. Tighten and secure both lateral adjustments bolts (A) and (B) and jam nuts.

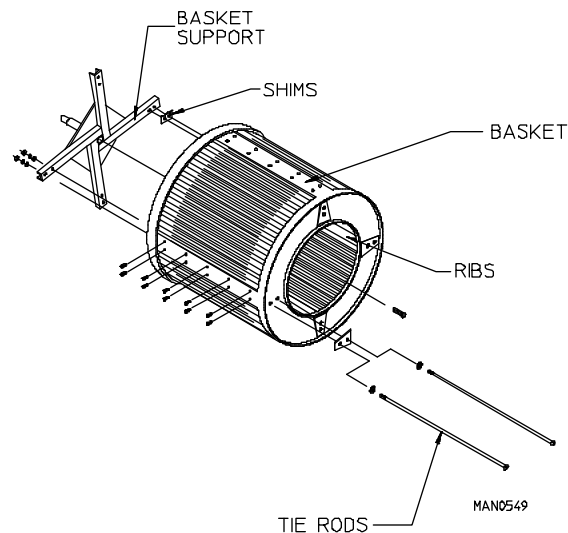


MAN0551

7. Tighten pillow block bearings bolts (C) loosened in step 3.
8. Replace backguard.
9. Reestablish power to dryer.

To Replace Tumbler (Basket) or Tumbler (Basket) Support

1. Discontinue power to dryer.
2. Follow procedure for removal of main door assembly.
3. Follow procedure for removal of front panel assembly.
4. Remove backguard.
5. Remove tumbler belts.
6. Remove basket pulley.
7. Remove basket assembly and support.



- a. Loosen the two (2) set screws on both the pillow block bearing collars.
- b. Remove the retaining rings from the grooves of the tumbler shaft.
- c. Remove the basket and support assembly from the front of the dryer. If the basket cannot be removed freely, clean the shaft area and spray WD-40 or similar lubricant. With a block of wood against the shaft end, strike the block wood with a hammer or mallet to move the shaft past any burrs made by the set screws.

IMPORTANT: Never strike the shaft directly with a hammer.

8. Remove basket from basket support.

- a. Remove the bolt in the center of the basket back wall.
- b. Loosen and remove the eight (8) sets of nuts and washers from basket tie rods. Remove the eight (8) tie rods.
- c. Replace either basket or basket support by reversing procedure.

NOTE: Shims might be needed between tumbler and tumbler support to insure proper balancing of basket.

9. Reassemble components onto dryer by reversing steps 2 through 8.

10. Check basket vertical/lateral alignment and adjust if necessary.

11. Replace backguard.

12. Reestablish power to dryer.

H. Bearings (Refer to illustrations in section F "Pulleys")

To Replace Rear Tumbler (Basket) Support Pillow Block Bearing

1. Discontinue power to dryer.

2. Remove backguard.

3. Remove basket pulley.

4. Loosen lateral adjustment jam nuts and bolts. (Refer to illustration in section G "Basket Alignment")

5. Loosen set screws (2) from rear pillow block bearing collar.

6. Remove the rear bearing bolts, securing bearing to bearing mount. Remove bearing.

7. Replace by reversing steps 3 through 6.

8. Adjust both lateral and vertical basket alignment.

9. Replace backguard.

10. Reestablish power to dryer.

To Replace Front Basket Support Pillow Block Bearing

1. Discontinue power to dryer.
2. Remove backguard.
3. Follow steps 3 through 6 from "Replacement of Rear Basket Support Pillow Block Bearing".
4. Remove the two (2) retaining rings from the tumbler shaft.
5. Remove the two (2) bolts holding the front basket support pillow block bearing to the dryer.
6. Loosen bearing collar set screws (2) and as the end of the basket shaft is lifted up slightly, slide the bearing off the shaft.
7. Prop a block of wood between the basket shaft and the bearing to the dryer.
8. Replace by reversing steps 2 through 6.

NOTE: Before replacing back guard, check basket lateral/vertical adjustment, as well as, belt adjustment and readjust if necessary.

9. Reestablish power to dryer.

To Replace Front Idler Shaft Pillow Block Bearing

(Bearing nearest the back of the dryer)

1. Discontinue power to dryer.
2. Remove V-belts from idler pulleys.
3. Remove bolts holding each idler pillow block bearing to mount.
4. Remove idler shaft (with both bearings and idler pulleys still attached) from dryer.
5. Remove end retaining ring and loosen the two (2) set screws in the bearing race collar.

NOTE: Replacement idler shaft is now manufactured with a hump on the shaft therefore no retainings are needed.

6. Slide bearing off the shaft.
7. Replace bearing by reversing procedure.
8. Align idler pulley with basket pulley before tightening bolts.
9. Reestablish power to dryer.

To Replace Rear Idler Shaft Pillow Block Bearing

1. Follow steps 1 through 3 from "To Replace Front Idler Shaft Bearing".
2. Remove retaining rings on each side of forward idler shaft pillow block bearing.
3. Loosen the two (2) set screws on each bearing collar.
4. Slide both bearings off the shaft.
5. Replace by reversing procedure.

NOTE: Replacement idler shaft is now manufactured with a hump on the shaft therefore no retainings are needed.

6. Reestablish power to dryer.

I. V-Belts (See illustrations in section F "Pulleys")

V-belts should have proper tension. If too loose, they will slip, excessive wear on the bearings will result. If the pulleys are not properly aligned, excessive belt wear will result. Proper belt tension will allow 1/2" displacement under normal thumb pressure at mid span of belt.

NOTE: Belts *must always be* replaced in pairs (matched sets).

V-Belt Tension Adjustment (Basket to Idler)

1. Discontinue power to dryer.
2. Back off jam nuts on idler adjustment belts.
3. Tighten belts by turning both bolts evenly clockwise. (Turn clockwise to loosen belts.)
4. Check vertical plane of idler pulley for parallel alignment with basket pulley.
5. If realignment is required, loosen basket pulley and bushing, and move basket pulley to proper position.
6. Retighten jam nuts.
7. Reestablish power to dryer.

V-Belt Tension Adjustment (Motor to Idler)

1. Discontinue power to dryer.
2. Loosen the nuts on the four (4) studs holding the drive motor mount to the back of the dryer.
3. Loosen the jam nuts on the adjustment screw on the top of the motor mount.
4. Turn the adjustment screw to lower the motor mount (to tighten the belts) or raise the motor mount (to loosen the belts).
5. Check the vertical plane of the motor pulley and idler pulley for parallel alignment.
6. If realignment is required, loosen motor pulley and bushing and move motor pulley to proper position.
7. Retighten motor mount bolts and jam nuts.
8. Reestablish power to dryer.

To Replace V-Belts

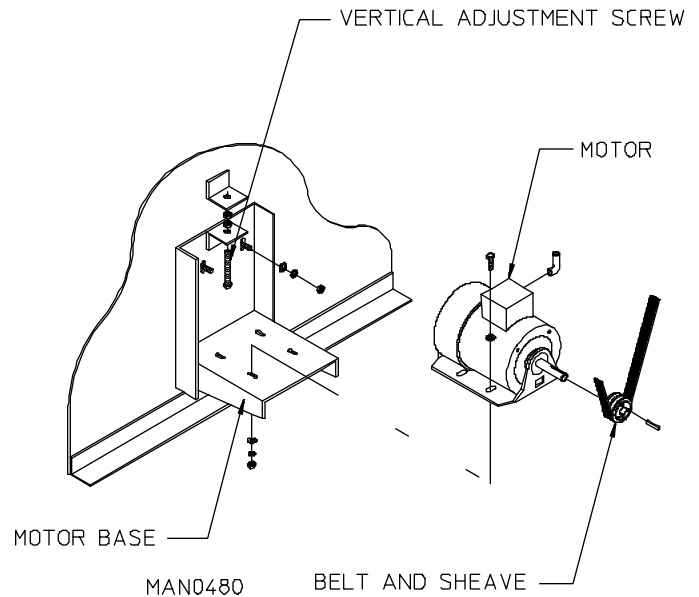
1. Loosen tension on V-belts so that they can easily be rolled off pulleys.
2. Replace V-belts.
3. Retighten V-belts and adjust tension and alignment per previous instructions.

NOTE: Always replace V-belts in pairs.

J. Motors

To Replace Drive Motor

1. Discontinue power to dryer.
2. Remove drive belts.
3. Disconnect wiring harness from motor.
4. Remove bolts holding motor to mount and replace with new motor. Do not tighten bolts.
5. Remove pulley from old motor and install on new motor.

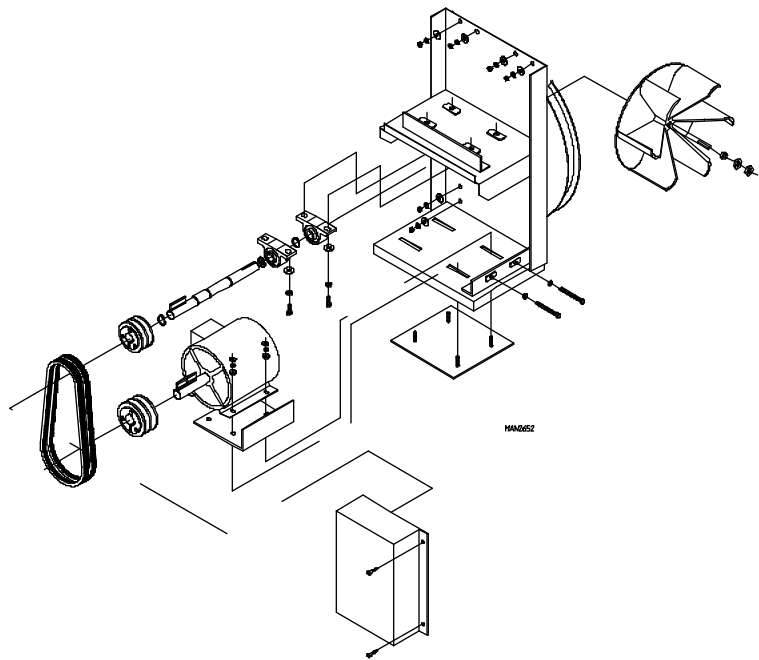


6. Align motor pulley with idler pulley and align motor shaft with idler shaft and tighten bolts.
7. Replace belts and adjust belt tension.
8. Retighten bolts.
9. Reestablish power to dryer.

To Replace Impellor Motor

(Fan Shaft Drive - Steam Models 50 & 60 Hz and 50 Hz Gas Models ONLY)

1. Discontinue power to dryer.
2. Remove drive belts.
3. Disconnect wiring harness from motor.
4. Remove bolts holding motor to mount and replace with new motor.
Do not tighten bolts.
5. Remove pulley from old motor and install on new motor.
6. Align motor pulley with fan shaft pulley and tighten bolts.
7. Replace belts and adjust belt tension.
8. Retighten bolts.
9. Reestablish power to dryer.



K. Impellor

1. Discontinue power to the dryer.
2. Remove the left side panel to access the fan shaft mount assembly.
3. Remove the two (2) left handed jam nuts that hold the impellor to the fan shaft.
4. Remove the impellor and the washers and the key.
5. Replace the impellor, key, washers, left handed jam nuts, and the side panel.
6. Re-establish power to the dryer.

L. Lint Drawer Assembly

To Replace Lint Screen

1. Pull out lint drawer.
2. Remove lint screen from lint drawer.
3. Drop new lint screen in place.
4. Slide lint drawer back into dryer.

To Replace Lint Drawer Switch

1. Disconnect power to dryer.
2. Remove lint drawer and lint door.
3. Disconnect both 4-pin connectors at the rear of the lint switch cover.
4. Remove the four (4) screws holding the lint switch cover on.
5. Remove lint switch cover and disconnect the two (2) terminals of the switch.
6. Remove switch by pressing tabs together and push switch out.
7. Install new switch by reversing procedure.

SECTION VI

Troubleshooting

The information provided will help isolate the most probable component(s) associated with the difficulty described. The experienced technician realizes, however, that a loose connection or broken or 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.

The information provided should not be misconstrued as a device for use by an untrained person in making repairs. Only properly licensed technicians should service the equipment.

OBSERVE ALL SAFETY PRECAUTIONS DISPLAYED ON THE EQUIPMENT OR SPECIFIED IN THIS MANUAL WHILE MAKING REPAIRS.

Refer to section "Electrical Troubleshooting" for a detailed troubleshooting procedure for electrical components.

1. No display on computer.

- A. Open circuit breaker switch or blown fuse
- B. Tripped overload on the blower MTR.
- C. Bad wiring connection
- D. Faulty microprocessor (computer controller)

2. Computer will not accept key pad entries.

- A. Key pad ribbon is not plugged into computer securely
- B. Keypad is defective
- C. Faulty microprocessor (computer controller)

3. Dryer will not start, but computer display indicators are on.

- A. Failed contactors
- B. Failed arc suppressor (A.S.) board
- C. Failed microprocessor (computer)
- D. Failed motors

4. Drive motor runs, burner is on, but basket will not turn.

- A. Broken, damaged or loose V-belt
- B. Belts are contaminated (oil, grease, etc.)
- C. Loose or broken pulley

5. Drive motor and blower start, computer display heat indicator is on, but there is no heat.

- A. Lint coop automatic safety thermostat (225 degree) has failed
- B. Sail switch is out of adjustment, has failed, or sail switch damper is not closing due to back pressure created by a restriction in the exhaust system
- C. Failed burner hi-limit (330° for gas models, 290° for electric models) safety thermostat
- D. Failed ignitor/flame-probe assembly or probe is misadjusted
- E. Failed ignition DSI module
- F. Failed gas valve
- G. Failed microprocessor (computer) controller

6. Dryer operates, probe sparks, but gas does not flow.

- A. Dryer gas shut-off valve is closed
- B. Failed gas valve (open coil in valve)
- C. Loose wiring connection from DSI module to gas valve (Check voltage at gas valve)
- D. Failed DSI module

7. Dryer operates, probe sparks but there is no ignition even though gas is evident.

- A. Gas pressure is too low...Check manifold pressure and take necessary corrective action
- B. Failed gas valve
- C. Ignitor probe is out of adjustment (readjust within gas flow)
- D. Lint accumulation in burner tubes

8. Dryer operates but is taking too long to dry.

- A. An inadequate exhaust duct work system
- B. Restriction in exhaust system
- C. Insufficient make-up air
- D. Poor housekeeping...Dirty or clogged lint screen
- E. Washing machine extractors are not performing properly
- F. An exceptionally cold/humid or low barometric pressure atmosphere
- G. The supply gas may have a low heating value, check with local gas supplier
- H. Failed temperature sensor (temperature calibration is incorrect)
- I. Failed microprocessor (computer) controller

9. Thermal overload for drive motor is tripping.

- A. Either an exceptionally low or high voltage supply
- B. Motor bearing failure
- C. Bearing failure in drive system
- D. Motor vents are blocked with lint
- E. Failed motor
- F. Insufficient make-up air

10. Overload for impellor (fan) motor is tripping.

- A. Either an exceptionally low or high voltage supply
- B. Motor bearing failure
- C. Motor vents are blocked with lint
- D. Failed motor
- E. Failed overload
- F. Out of balance impellor (fan)
- G. Insufficient make-up air

11. Dryer is cycling on burner hi-limit safety thermostat.

- A. Insufficient exhaust duct work...size or restriction in exhaust system
- B. Insufficient make-up air
- C. Lint screen needs cleaning
- D. Damaged impellor (fan)

12. Display reads "dSFL". Dryer Sensor Circuit Failure.

- A. Check 1/8 amp fuse on computer
- B. Faulty microprocessor temperature sensor probe
- C. Open circuit in either one of two (2) wires leading from the sensor probe to the computer
 - 1) Connection at sensor bracket assembly connector
 - 2) Connection at computer harness connector
- D. Faulty microprocessor (computer) controller

13. Dryer does not start. Display reads "door".

- A. Main door is open
- B. Lint drawer is open
- C. Faulty main door or lint door switch
- D. Open circuit in either main door or lint drawer switch harnesses
- E. Faulty 24 V transformer

14. There is excessive vibration coming from the basket.

- A. Basket is out of adjustment
- B. Loose or broken tie rod
- C. Failed tumbler support

SECTION VII

Electrical Trouble Shooting

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 or 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.

The information provided should not be misconstrued as a device for use by an untrained person in making repairs. Only properly licensed technicians should service the equipment.

OBSERVE ALL SAFETY PRECAUTIONS DISPLAYED ON THE EQUIPMENT OR SPECIFIED IN THIS MANUAL WHILE MAKING REPAIRS.

A. Phase 5 OPL System Diagnostics

All major circuits, including door, microprocessor temperature sensor, heat and motor circuits are monitored. The Phase 5 OPL microprocessor controller will inform the user, via the LED display, of certain failure codes, along with indicators both in the LED display and the outputs of each relay, (and door switch circuit) to easily identify failures.

Diagnostic (LED Display) Failure Codes

1. "**door**" - indicates door switch circuit is open.
 - a. Keyboard entry was made while main door or lint drawer is open, or
 - b. There is a fault in the door switch circuit (external of the Phase 5 OPL microprocessor controller)
2. "**dSFL**" - indicates a fault in the microprocessor temperature circuit.

If fault is detected in the microprocessor heat sensor circuit, the display will read "dSFL", and the tone (buzzer) will sound for approximately 5 seconds every 30 seconds until...

- a. The problem is corrected, or
- b. Power to the dryer is discontinued and the problem is then corrected

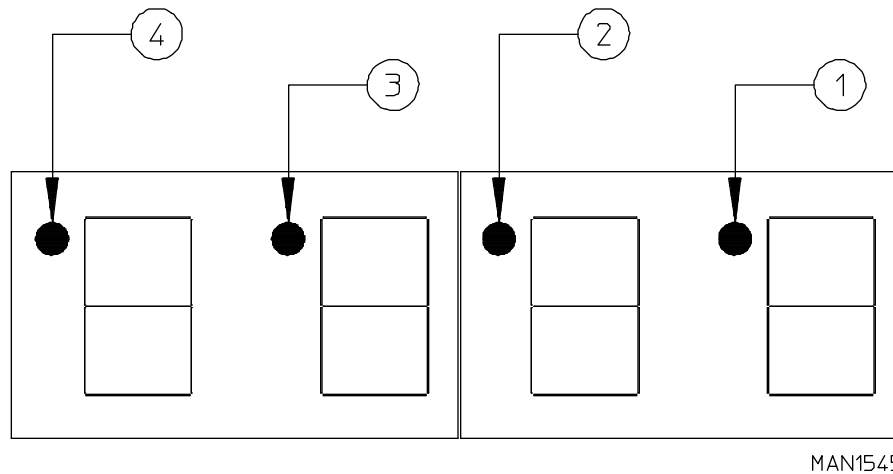
IMPORTANT: The Phase 5 OPL microprocessor controller has its own internal heat sensing circuit fuse protection located on the back side of the Phase 5 OPL computer. If a "dSFL" condition occurs, check to see if this fuse has blown. If it has, **DO NOT** replace the entire Phase 5 OPL microprocessor controller, replace the fuse and do so with a 1/8 amp (Slo-Blo) fuse **ONLY**.

NOTE: Once the Phase 5 OPL microprocessor controller detects a problem in the heat circuit, it updates every 30 seconds. If the problem was a loose connection in this circuit which corrected itself, the "dSFL" condition would automatically be cancelled.

3. "**SEFL**" - indicates rotational sensor circuit failure meaning that there is a fault somewhere in the basket (tumbler) rotation detection circuit, or the Phase 5 OPL microprocessor controller program related to this circuit (Program Location 2) is set incorrectly in the active mode (**SEn**) where the dryer is not equipped with the optional rotational sensor and should be set in the non-active mode (**nSEn**).
4. "**Hot**" - indicates a possible overheating condition. The Phase 5 OPL microprocessor controller monitors the temperature in the dryer at all times. If the microprocessor controller detects that the temperature in the dryer has exceeded 220° F (104°C), it will disable all outputs (shut the dryer down), the tone (**bUZ**) will sound for approximately 5 seconds, and the LED display will read "Hot" until the temperature has dropped to 220° F or lower and the Phase 5 OPL microprocessor controller is manually reset by pressing the "Clear/Stop" key.

B. LED Display Indicators

The LED indicator dots located at the top portion of the LED display (as shown in the illustration below) indicate the Phase 5 OPL microprocessor controller output functions while a cycle is in progress. These indicator dots do not necessarily mean that the outputs are functioning. They are only indicating that the function (output) should be active (on).



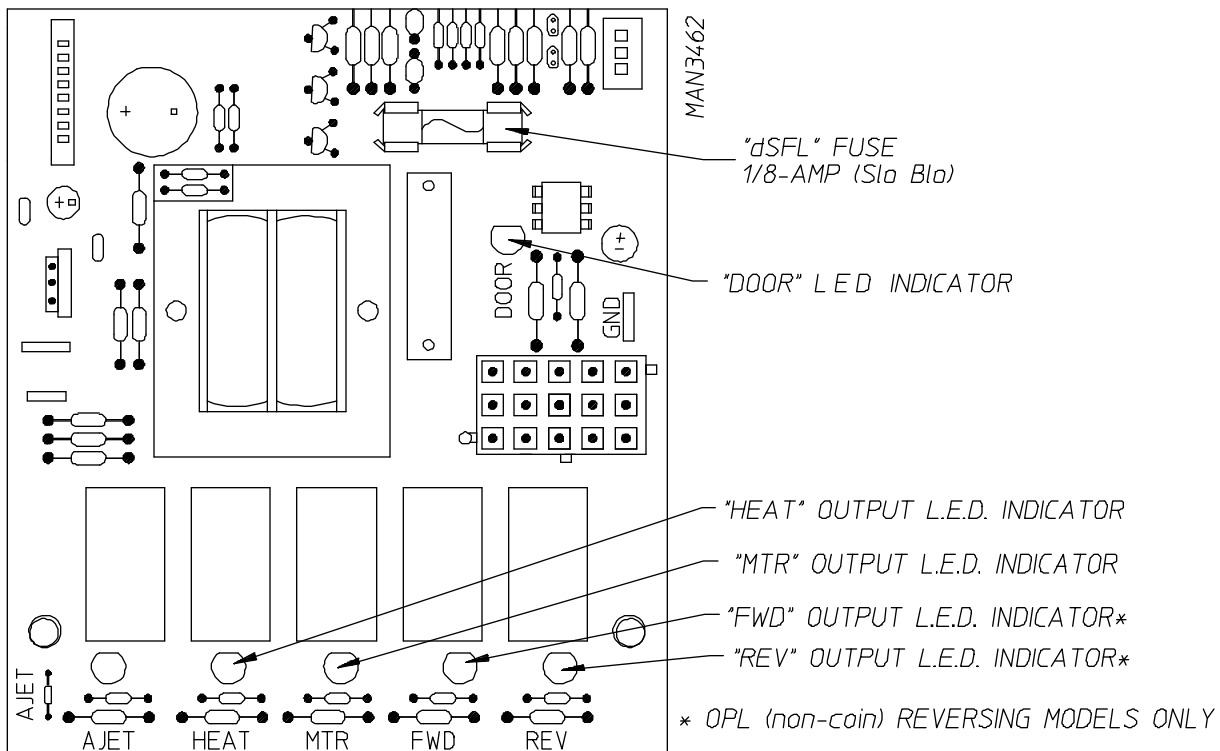
1. Blower Motor Circuit Indicator - indicator dot is on whenever a cycle is in progress.
2. Heat Controller Indicator - indicator dot is on whenever the Phase 5 OPL microprocessor controller is calling for the heating circuit to be active (on).
3. Reversing Indicator - indicator dot is on when the drive basket (tumbler) motor is operating in the reverse mode (counterclockwise direction).
4. Reversing Indicator - indicator dot is on when the drive basket (tumbler) motor is operating in the forward mode (clockwise direction).

Phase 5 OPL Microprocessor Controller Relay Output LED Indicators

There are five (5) LED indicators (red lights) located at the lower backside area of the Phase 5 OPL microprocessor controller. They are identified/labeled (from left to right as shown in the illustration on this page) as "HEAT", "MTR" (blower motor), "FWD" (forward), "REV" (reversing), and "DOOR". These LEDs indicate that the outputs of the Phase 5 OPL microprocessor controller or, in the case of the door switch, are functioning.

1. "HEAT" Output LED Indicator -

If the dryer is started and there is no heat, yet the microprocessor controller display heat circuit indicator dot is on, but the heat output LED indicator is off, then the fault is in Phase 5 OPL microprocessor controller itself. If both display heat indicator dot and the heat output LED indicator are on, then the problem is elsewhere (i.e., external of the microprocessor controller).



2. "MTR" Output LED Indicator -

If the dryer is started and the motor is not operating, yet both the microprocessor controller display motor indicator dot and the "dOOR" input LED indicator are on, but the motor output LED indicator is off, then the fault is in the Phase 5 OPL microprocessor controller itself. If the motor is not operating and the "MOTOR" output indicator is on, then the problem is elsewhere (i.e., external of the microprocessor controller).

3. "FWD" Output LED Indicator -

- a. If the dryer is started and the blower motor is operating but the drive basket (tumbler) motor is not, yet the Phase 5 OPL microprocessor controller display "Forward" indicator dot is on, but the "FWD" (forward) motor output LED is off; the fault is the Phase 5 OPL microprocessor controller itself.
- b. If the drive basket (tumbler) motor is not operating and the "FWD" indicator is on, then the problem (fault) is elsewhere (i.e., external of the Phase 5 OPL microprocessor controller).

4. "REV" Output LED Indicator -

If the dryer is started and the blower motor is operating but the drive tumbler (basket) motor is not, yet the Phase 5 OPL microprocessor controller's display "REVERSE" indicator dot is on, but the "REV" (reverse) motor output LED is off, the fault is the Phase 5 OPL microprocessor controller itself. If the drive tumbler (basket) motor is not operating and the "REV" (reverse) indicator is on, then the problem (fault) is elsewhere (i.e., external of the Phase 5 OPL microprocessor controller).

5. "DOOR" LED Indicator -

The indicator should be on all the time (even if the dryer is not returning) unless the main door or lint drawer is open or there is a problem (open circuit in the main door or lint drawer circuit).

NOTE: If the dryer is started (LED display indicator dots are on) and there are no outputs (heat and/or motor output LEDs are off) and the "dOOr" input LED is on, the fault is in the Phase 5 OPL microprocessor controller itself. If the failure was elsewhere (i.e., dryer's door switch circuit) the LED display would read "dOOr" if a keyboard entry was attempted. If the LED display indicators are on the door LED input and motor/heat output LED's are on and the motor and/or heat is not active (on), then the problem is not the door switch circuit or the Phase 5 OPL microprocessor controller and is elsewhere in the dryer.

C. LED Display/Codes

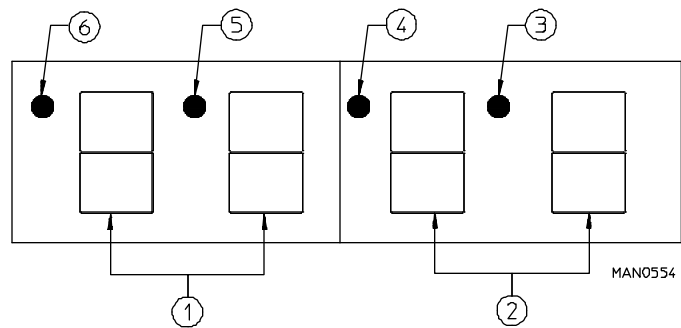
The LED display informs the user of cycle status and program verification and displays important diagnostic and fault codes.

1. Display Operating Status

- a. Cycle in Progress - While the dryer is operating, the display will read which cycle is in progress. For example, in the drying cycle (mode), the display will read "dr", and in the cool down cycle (mode), the display will read "CL".
- b. Cycle Status - While a cycle is in progress, the display will show the progress of the cycle (load) that is being processed.
 - 1) Automatic Drying Cycle - The cycle status portion of the display will show the percentage of extraction.
 - 2) Timed (Manual) Drying Cycle - The cycle status portion of the display will show the drying or cool down time and will count downward until the programmed time has expired.
- c. Alternate Display Programs - Programming allows for the display to read just the cycle in progress or just the basket temperature or to flash back and forth from cycle in progress to basket temperature while the dryer cycle is in progress.
- d. Indicator Dots - Located at the top of the display is a series of dots which indicate the various microprocessor controller output functions while a cycle is in progress.

Illus. No. 3 -BLOWER MOTOR INDICATOR - This indicator dot is on whenever a cycle is in progress. In addition, when the anti-wrinkle program is active, this indicator will be on whenever the microprocessor controller is in the guard on time program.

Illus No. 4 - HEAT INDICATOR - This indicator dot is on whenever the microprocessor controller is calling for the heating unit to be active (on).



1. CYCLE IN PROGRESS
 - a. dr -- DRYING CYCLE
 - b. CL -- COOL DOWN CYCLE
2. CYCLE STATUS
 - a. AUTOMATIC MODE DISPLAYS % OF EXTRACTION
 - b. MANUAL MODE DISPLAYS DRYING TIME OR COOL DOWN TIME
3. ON INDICATOR, DRYER IS IN OPERATING MODE
4. HEAT ON INDICATOR
5. BASKET IN REVERSE MODE (C.C.W.) INDICATOR
6. BASKET IN FORWARD MODE (C.W.) INDICATOR

Illus. No 5 - REVERSE INDICATOR - This indicator is functional for models with the reversing action option only. This indicator will be on when the basket is in the reverse (counterclockwise direction).

Illus. No. 6 - FORWARD INDICATOR - This indicator dot is functional only for models with the reversing action option only. This indicator will be on when the basket is in the forward (clockwise) direction. In addition, when the anti-wrinkle program is active, this indicator dot will be on whenever the microprocessor controller is in the guard on time program.

LED Display Codes

A	Slope Factor
AUtO	Automatic Mode (Patent No. 4,827,627)
ArEv	Always Reverse
b	Heat Loss (offset) Factor
bUZ	Buzzer (tone)
bUZ-tinE	Buz Time
° CEL	Degree in Celsius
CL	Cool Down Cycle in Progress
COOL-tinE	Cool Down Time
COOL-tEnP	Cool Down Temperature
CY A	Preprogrammed Cycle A
CY b	Preprogrammed Cycle B
CY C	Preprogrammed Cycle C
CY d	Preprogrammed Cycle D
CY E	Preprogrammed Cycle E
CY F	Preprogrammed Cycle F
CYCL-tinE	Cycle Display Time
d	Dryness Level (percentage of extraction) (Numerical Value)

donE	Drying or Cooling Cycles Complete or Dryer is in Anti-Wrinkle Program
door	Door Circuit is Open or Fault in Door Switch Circuit
dr	Drying Cycle in Progress
drY-LEuL	Dryness Level (percentage of extraction)
drY-tEnP	Drying Temperature
dSFL	Dryer Sensor Circuit Failure
F	Fabric (temperature)
° FAr	Degree in Fahrenheit
FILL	No Cycle in Progress
FLS	Flash Display Active
GdLY	Anti-Wrinkle Delay Time
G on-tInE	Anti-Wrinkle On Time
Grd	Anti-Wrinkle Program Active
Hot	Overheating Condition
MAnU	Manual Mode
MGrd	Maximum Guard Time
nbUZ	No Buzzer (tone)
nFLS	No Flash Display
nGrd	Anti-Wrinkle Program is Not Active
nrEu	No Reverse
ProG	Program Mode
rEu	Reverse
SC	Special Cool Down

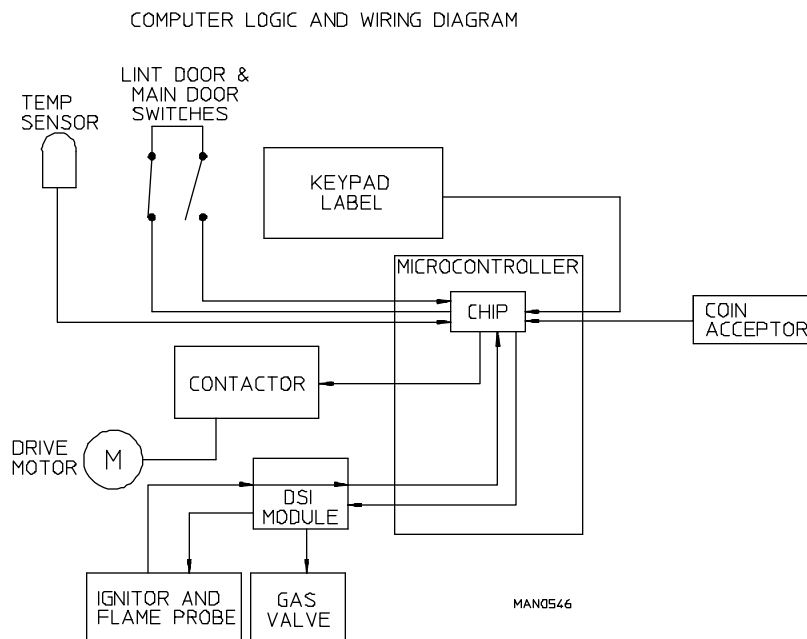
SEFL	Rotational Sensor Circuit Failure
SEn	Rotational Sensor Selected
SPIn-tInE	Spin Time
Sr	Select Reverse
Stop-tInE	Stop Time
tEnP-tInE	Temperature Display Time
tinE	Time

Fault Codes

1. **door** - Keyboard entry was made while the main door or lint drawer was open or fault in the circuit
2. **dSFL** - Fault in microprocessor temperature sensor circuit.
3. **SEFL** - Fault in rotation of basket (tumbler).
4. **Hot** - Indicates that the dryer has experienced an overheating condition. To cancel the "Hot" default code, press the "Clear/Stop" key.

D. Computer Logic and Wiring Diagram

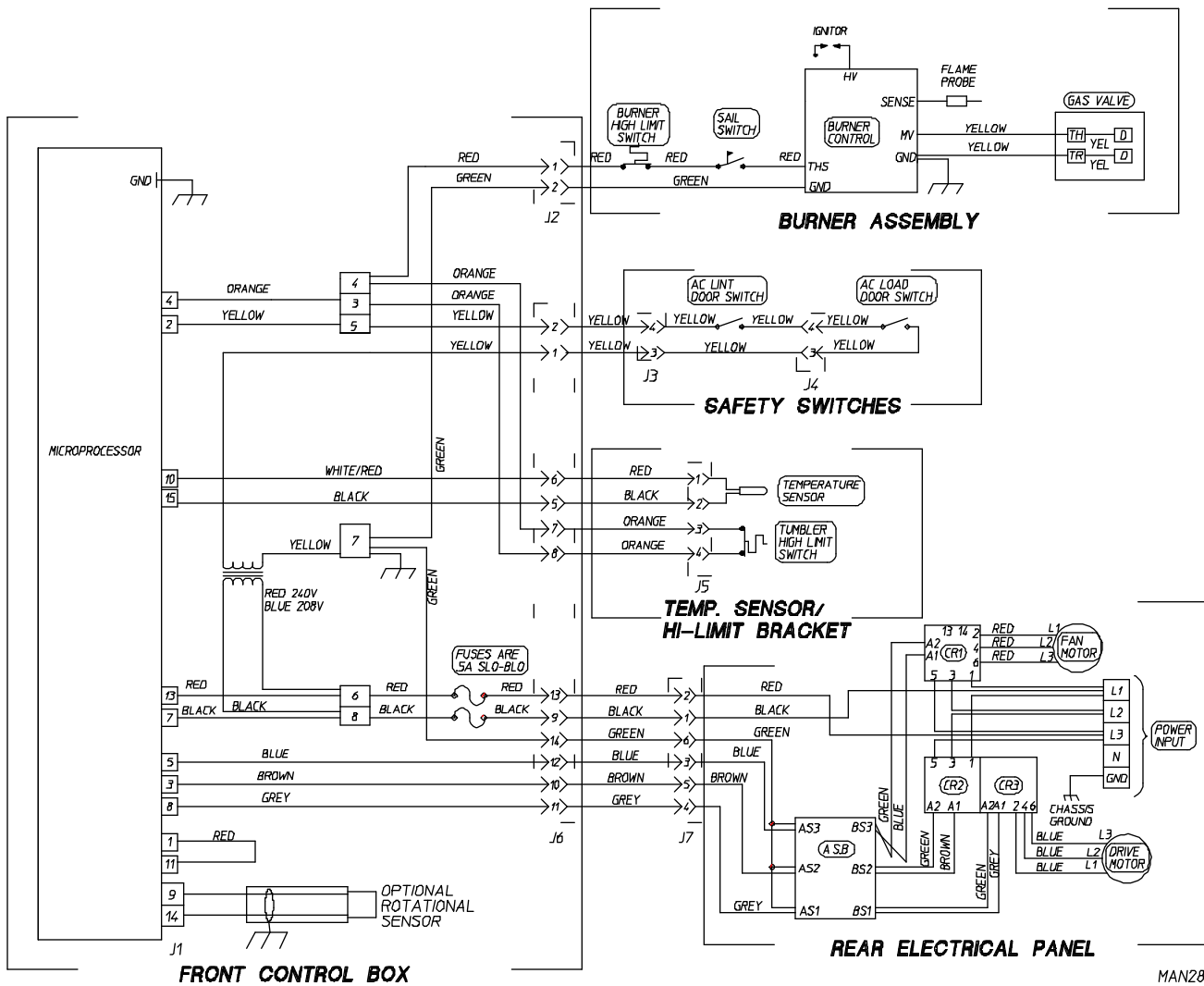
1. Operator enters desired selection(s).



2. Information entered is sent to the microcontroller via the keyboard.
3. The input information is sorted/processed and executed by the microcomputer chip.
4. The microcomputer output signal activates the contactors and DSI module which control machine functions.

NOTE: When contacting **ADC** with electrical questions, please have on hand the correct wiring diagram number for your particular machine. This number is located on the top right-hand corner of the diagram. It is a six (6) digit number followed by a letter to distinguish the revision dates (see illustration).

The wiring diagrams used in Troubleshooting are specifically for dryers manufactured at the time of publishing. Your particular model may vary slightly depending on the date of manufacturing and options available. The correct wiring diagram and number is either taped to the rear of the control door on each dryer, or placed in the control box. If your particular diagram is lost or unreadable, call **ADC** with the serial number of the dryer. **ADC** will be more than happy to send you a diagram by fax or mail.



1. No Display Condition

- A. Check main fuses or circuit breaker
- B. Check blower motor overload...If tripped, reset
- C. Check fuse 1 or fuse 2 and if either are blown, replace
- D. Across terminal block nos. 6 and 8 you should be getting your 208 V or 240 V.

If no voltage is present at 6 and 8, double check steps A and B and also check wires and terminations at these points.

- E. Take voltage reading across the microprocessor 15 pin connector nos. 7 and 13.

If there is voltage, replace the computer.

If there is no voltage, there is a bad wire(s) or termination(s) between terminal block nos. 6 and 8 and microprocessor 15 pin connector nos. 7 and 13.

NOTE: In this next section *ALL* voltage checks *must be* done in the operating mode with the appropriate microprocessor dot on!! Also appropriate LED output light on!!

NOTE: In this next section when checking for voltage you are looking for 24 AC volts unless otherwise specified.

2. Drive motor reverses but does not go forward, blower motor runs.

- A. If computer dot (First one on left) does not come on, replace computer.
- B. Check for voltage across the coil of the reversing contactor located in the rear panel box. The contactor according to your diagram is marked CR2, also, the markings on the coil are A1 and A2.

If there is voltage, replace the coil or complete contactor.

If there is no voltage, check for voltage across the two BS2 terminals on the arc suppressor board.

If there is voltage across the two BS2 terminals and no voltage across the coil of the reversing contactor (A1 and A2), the problem is bad wire(s) or termination(s) between BS2 and the connector coil.

- C. If there is no voltage between BS2 terminals on the arc suppressor board, check for voltage across the two AS2 terminals on the board.

If there is voltage across the two AS2 terminals and no voltage across the two BS2 terminals, replace the arc suppressor board.

If there is no voltage across the two AS2 terminals, the problem is bad wire(s) or termination(s) between the arc suppressor board and the computer 15 pin connector no. 3 or a faulty computer.

3. Drive motor works in forward mode but does not reverse, blower motor runs.

- A. If computer dot (second one from left) does not come on, check program to see if set for reverse.
- B. If set for reverse, replace computer.
- C. Check for voltage across the coil of the reversing contactor located in the rear panel box. The contactor according to your diagram is CR3, also the markings on the coil are A1 and A2.

If there is voltage replace the coil or the complete contactor.

If there is no voltage, check for voltage across the two BS1 terminals on the arc suppressor board.

If there is voltage across the two BS1 terminals and no voltage across the coil of the reversing contactor (A1 and A2), the problem is bad wire(s) or termination(s) between BS1 and the contactor coil.

- D. If there is no voltage between the two BS1 terminals on the arc suppressor board, check for voltage across the two AS1 terminals on the board.

If there is voltage across the two AS1 terminals and no voltage across the two BS1 terminals, replace the arc suppressor board.

If there is no voltage across the two AS1 terminals, the problem is bad wire(s) or termination(s) between the arc suppressor board and the computer 15 pin connector no. 8, or a faulty computer.

4. Blower motor does not operate, drive motor runs.

- A. Check for voltage across terminals A1 and A2 of the impellor contactor. This is the single contactor in the rear control box.

If voltage is present check for voltage across the blow motor. If there is voltage at the blower motor replace the motor.

If there is no voltage at the blower motor, problem is bad wire(s) or termination(s) between the contactor and the motor or a bad impellor contactor.

- B. If there is no voltage present at A1 and A2 of the contactor, check for voltage across the two BS3 terminals of the arc suppressor board.

If there is voltage present at the two BS3 terminals, problem is bad wire(s) or termination(s) between the two BS3 terminals and the coil (A1 and A2) terminals.

If there is no voltage across the two BS3 terminals, check for voltage across the two AS3 terminals.

If there is voltage across the two AS3 terminals and there is no voltage between the two BS3 terminals, replace the arc suppressor board.

- C. If there is no voltage across the two AS3 terminals, problem is bad wire(s) or termination(s) between the two AS3 terminals and the computer board 15 pin connector no. 5, or faulty computer.

5. "No Heat" drive & blower motors run, display reads normal (Gas Models).

- A. Check for voltage across terminal block nos. 3 and 7.

If no voltage is present, problem is bad wire or broken terminal from terminal block no. 3 to MP harness connector pin 4.

- B. If voltage is present, check for voltage across terminal block nos. 4 and 7.

If no voltage is present, problem is bad wire or broken terminal from terminal block 3 to tumbler hi-limit switch and back to terminal block no. 4, or faulty tumbler hi-limit switch.

- C. If voltage is present, check for voltage across DSI module "TH" and "GND".

If no voltage is present, check voltage through the sail switch and burner hi-limit harness against ground. Also check for voltage at the terminals of both components. If voltage is not passing through any one of the two components, replace that component.

- D. If voltage is present, refer to DSI technical manual (P/N 450119), or if equipped with ADC style DSI module refer to technical manual (P/N 450142).

6. "No Heat" drive and blower motors run, display reads normal (Steam Models).

A. Check for voltage across terminal block nos 3 and 7.

If no voltage is present, problem is bad wire(s) or termination(s) between terminal block 3 to MP harness connector pin 4.

B. If voltage is present, check for voltage across terminal block nos. 4 and 7.

If no voltage is present, problem is bad wire(s) or termination(s) from terminal block 3 to tumbler hi-limit switch and back to terminal block 4, or faulty tumbler hi-limit switch.

C. If voltage is present across terminal block nos 4 and 7, check for voltage across the Pneumatic Steam Damper Solenoid (red & green wires).

If no voltage is present, problem is bad wire(s) or termination(s) between terminal block nos. 4 and 7 and the Damper Solenoid.

If voltage is present, problem is faulty Damper Solenoid.

7. "Door" condition

NOTE: Make sure main door and lint drawer are closed. Also, if checking either switch, the plunger *must be* depressed.

Check LED input light "door" on component side of the computer. If light is on, replace computer.

A. Check voltage (24 VAC) across terminal block nos. 5 and 7.

If voltage is present, problem is bad wire(s) or termination(s) between terminal block 5 and computer 15 pin connector 2, or faulty computer.

If no voltage is present, check for voltage across the 15 pin modular connector nos. 1 and 2 against ground.

If voltage is evident at both points, problem is bad wire(s) or termination(s) between terminal block 5 and pin 2 of the 15 pin modular connector or pin 1 of that same connector to the in-line connector on the output of the 24 volt XFMR located in the computer box area.

- B. If voltage is not evident at both points (nos. 1 & 2 of the 15 pin modular connector located in computer box area) with respect to ground.

If no voltage at either two points...Problem is faulty 24 V XFMR (P/N 141403)

If voltage at one point, trace the voltage through the lint drawer switch and the main door switch and their connectors (J3 and J4), to the 15 pin modular connector 2.

If voltage stops at any one of the switches, replace the switch.

If voltage stops at a connector, check the termination or wire back to the prior connector.

8. Microprocessor reads "DSFL"

NOTE: Before continuing with this section check the .125 MA fuse on the computer board.

- A. Replace the temperature sensor underneath the basket on a bracket (the bullet shaped device).
- B. If it still reads "DSFL", unplug the 4 pin connector from the temperature sensor bracket. Also, unplug the microprocessor 15 pin connector from the computer board. Where the white/red striped wire is going into the connector, take a continuity reading across the wire and that same wire from the 4 pin connector that you unplugged earlier in this paragraph.

If there is no continuity, check for break in wire, a short to the ground, loose termination(s), or even replace the wire.

If there is continuity, do the same thing to the black wire right next to the white/red striped wire in the 15 pin connector.

If there is no continuity, check for break in wire, a short to ground, loose termination(s), or even replace the wire.

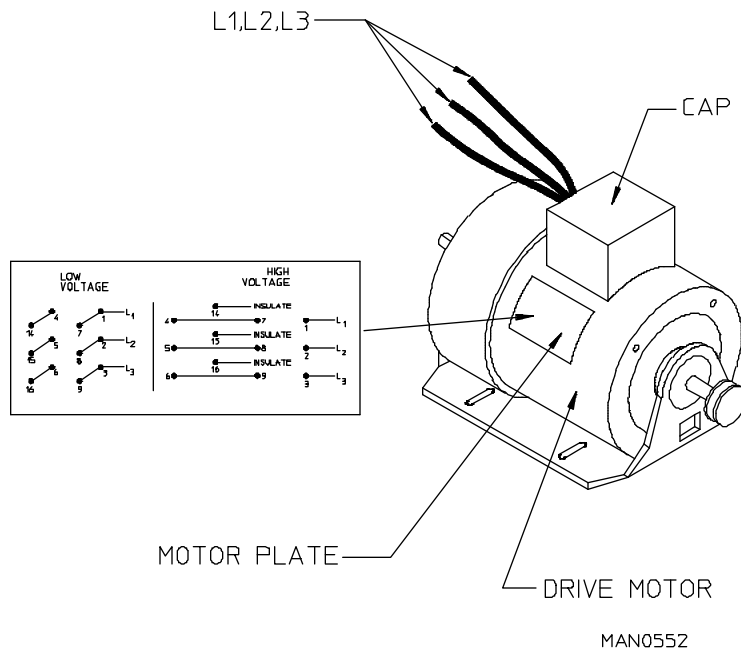
If there is continuity, computer board is faulty.

SECTION VIII

Technical Information

The following section contains various technical information important to the service person in servicing and maintaining the dryer.

A. Motor Plate (High and Low Voltage)



The motor plate is located on the side of the drive motor (see illustration) and contains a graphical representation of the motor wiring for both low voltage rating and high voltage rating.

Removing the cap reveals the wiring to the motor. On each wire there is a number which corresponds to the numbers on the motor plate. Depending on whether the dryer is operating on low voltage or high voltage, the wiring should match the motor plate as follows:

The dots and lines represent connections (see illustration). **For example:**

On Low Voltage - wire #14 is connected to wire #4

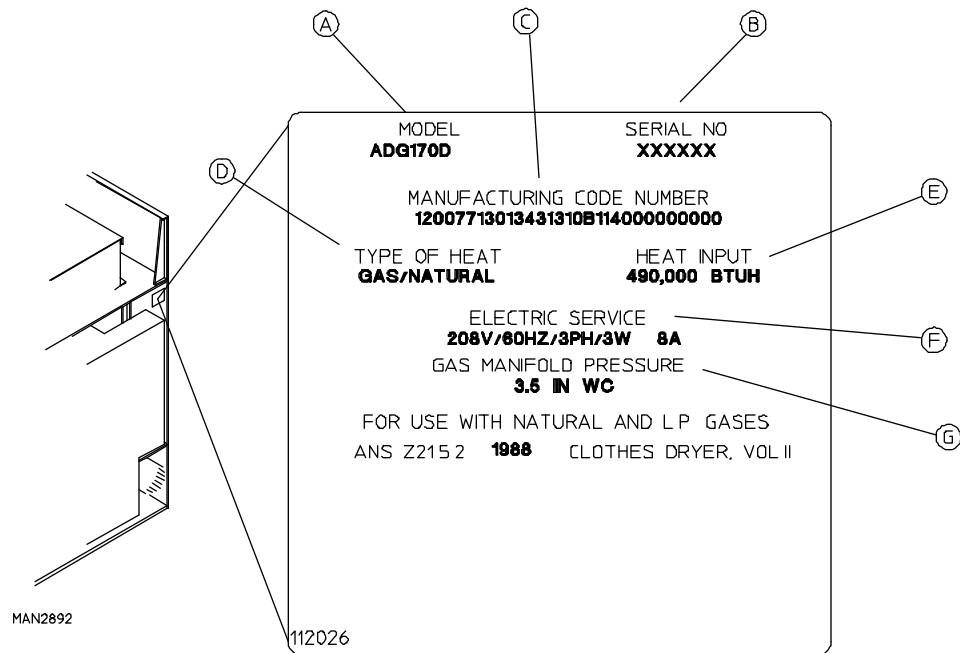
- wire #1 is connected to wire #7, which in turn are both connected to L1

On High Voltage - wire #14 is insulated or capped

- wire #4 is connected to wire #7

- wire #1 is connected to L1

B. Data Label



Contacting American Dryer Corporation (ADC)

When contacting **ADC**, certain information is required to insure proper service/parts information. This information is on the data label, located on the top right corner of the dryer, viewed from the rear (see illustration). When contacting **ADC**, please have the model number and serial number readily accessible.

Information on the Data Label

- A. Model number — The model number is an **ADC** number which describes the size of the dryer and the type of heat (gas or steam).
- B. Serial number — The serial number allows **ADC** to gather information on your particular dryer.
- C. Manufacturing code number— The manufacturing code number is a number issued by **ADC** which describes all possible options on your particular model.
- D. Type of heat— Describes the type of heat; gas (natural or L.P.), steam or electric.
- E. Heat input— (For gas dryers) describes the heat input in British Thermal Units.
- F. Electric service— Describes the electric service for your particular models.
- G. Gas manifold pressure— Describe the manifold pressure as taken at the gas valve pressure tap (see "Using a Manometer").

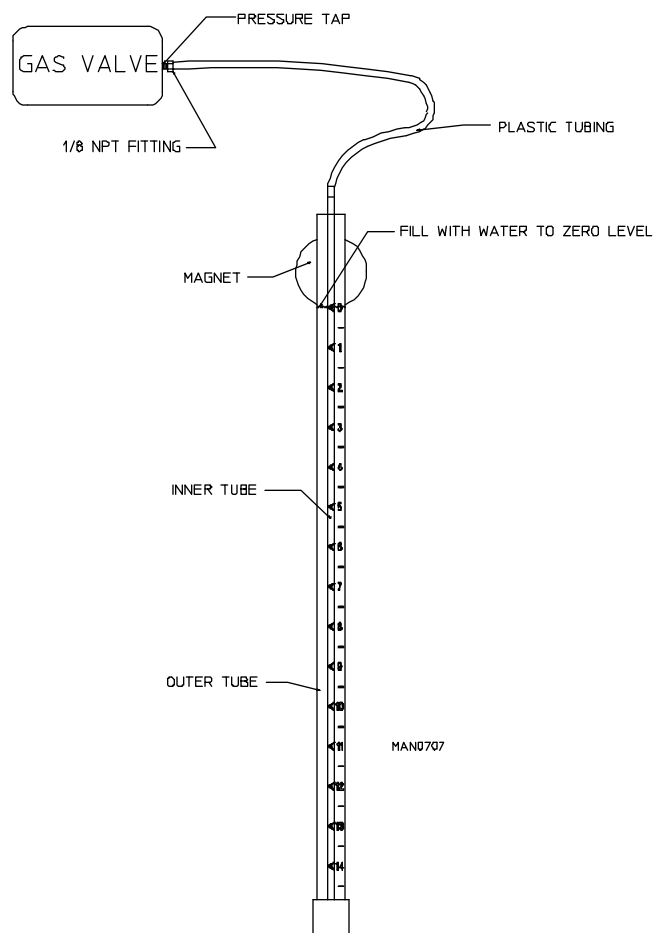
C. Using a Manometer

HOW TO USE A MANOMETER

1. With dryer in non-operating mode, remove plug on the gas valve pressure tap.
2. Attach plastic tubing to pressure tap. Fitting is supplied with manometer (see illustration).
3. Attach manometer to dryer using magnet.

NOTE: Place manometer in a position so that readings can be taken at eye level.

4. Fill manometer with water, as shown in illustration, to the zero level.
5. Start dryer. With burner on, take a reading.
 - A. Read water level at the inner tube. Readings should be taken at eye level.
 - B. Correct readings should be:
NATURAL GAS: 3.5 - 4.0 inches W.C.
L.P. GAS: 11 - 10.5 inches W.C.
6. If water column pressure is incorrect refer to "TO ADJUST GAS PRESSURE"
7. Reverse procedure for removing manometer.



D. AD-170SE Tool List

Straight Head Screwdriver

Phillips Head Screwdriver

Sensor Pin and Socket Tool (P/N 122801)

Pliers

1/4" Nut Driver

3/8" Open End Wrench

5/8" Open End Wrench

5/8" Deep Socket Wrench

3/8" Socket Wrench

1/2" Socket or Open End Wrench

1/4" Open End Wrench

5/16" Socket or Open End Wrench

1/2" Socket Wrench

7/16" Socket or Open End Wrench

5/16" Nut Driver

12" Pipe Wrench (2)

1/8" "T" Shaped or "L" Shaped Allen Wrench

3/16" "T" Shaped or "L" Shaped Allen Wrench

Wire Cutters

1/2" Allen Wrench

3/8" Allen Wrench

Channel Locks

Manometer (**ADC** P/N 122804)

MP Pin Extraction Tool (**ADC** P/N 122800)

