

# **AD-410**

## **(Phase 5)**

# **Installation Manual**

**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 death.

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

—**WHAT DO YOU 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 the gas supplier.

**AVERTISSEMENT:** Assurez-vous de bien suivre les instructions données dans cette notice pour réduire au minimum le risque d'incendie ou d'explosion ou pour éviter tout dommage matériel, toute blessure ou la mort.

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

—**QUE FAIRE SI VOUS SENTEZ UNE ODEUR DE GAZ:**

- \* Ne pas tenter d'allumer d'appareil.
- \* Ne touchez à aucun interrupteur. Ne pas vous servir des téléphones se trouvant dans le bâtiment où vous vous trouvez..
- \* Évacuez la pièce, le bâtiment ou la zone.
- \* Appelez immédiatement votre fournisseur de gaz depuis un voisin. Suivez les instructions du fournisseur.
- \* Si vous ne pouvez rejoindre le fournisseur de gaz, appelez le service des incendies.

—L'installation et l'entretien doivent être assurés par un installateur ou un service d'entretien qualifié ou par le fournisseur de gaz.



For replacement parts, contact the distributor from which the dryer was purchased or

**American Dryer Corporation**

88 Currant Road

Fall River MA 02720-4781

Telephone: (508) 678-9000 / Fax: (508) 678-9447

e-mail: techsupport@amdry.com

## **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 tout 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.** \_\_\_\_\_ **AD-410**

**DISTRIBUTOR'S 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) 678-9000. 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.

### **“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.**

“Caution: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper operation.”

«Attention: Lor des opérations d’entretien des commandes étiqueter tous fils avant de les déconnecter. Toute erreur de câblage peut être une source de danger et de panne.»

## **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 DRYERS IN OPERATION.**

## **FOR YOUR SAFETY**

**DO NOT DRY MOP HEADS IN THE DRYER.**

**DO NOT USE DRYER IN THE PRESENCE OF DRY CLEANING FUMES.**

## **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.**

### **WARNING**

**DRYER MUST NEVER BE OPERATED WITHOUT THE LINT FILTER (SCREEN) IN PLACE, EVEN IF AN EXTERNAL LINT COLLECTION SYSTEM IS USED.**

### **IMPORTANT**

**PLEASE OBSERVE ALL SAFETY PRECAUTIONS displayed on the equipment or specified in the installation manual included with the dryer.**

Dryers **must not** be installed or stored in an area where it will be exposed to water or weather.

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

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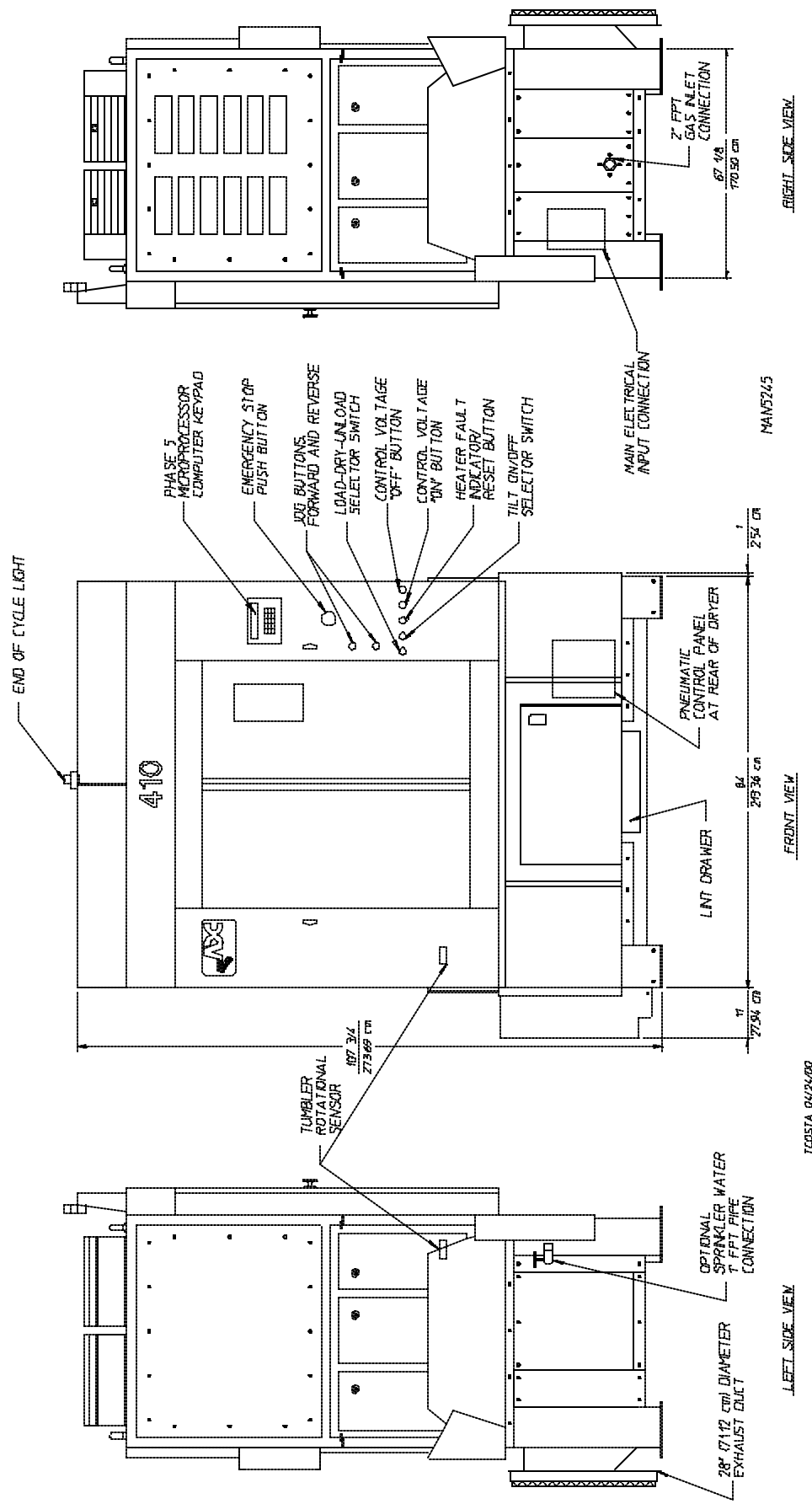
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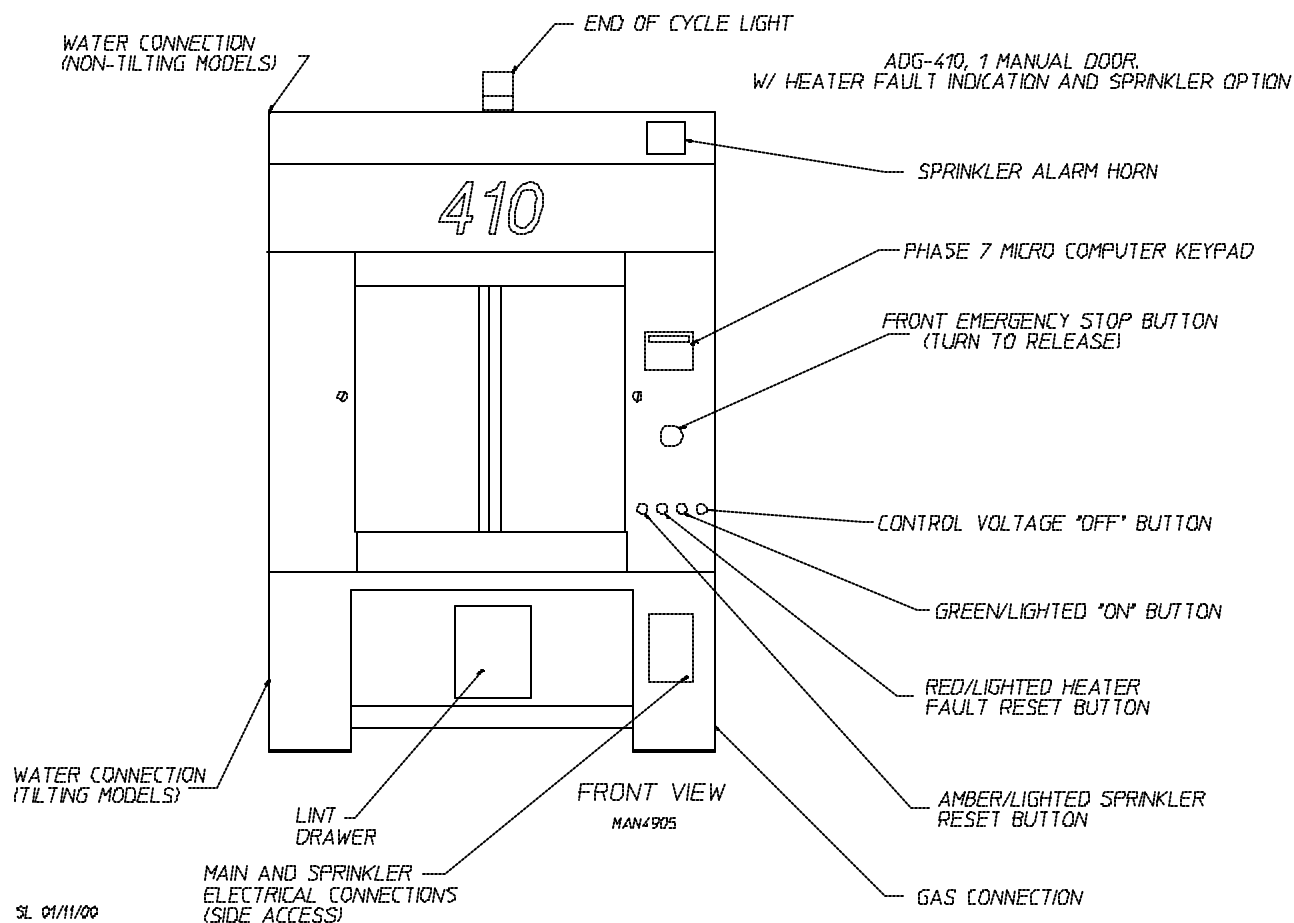
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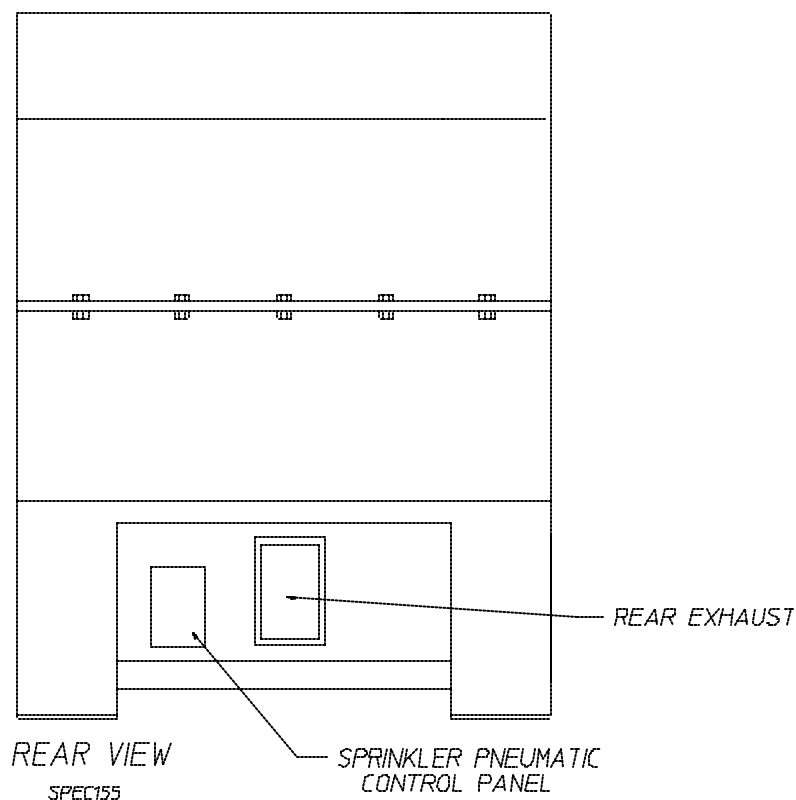
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# AD-410 Reference Guide





ADG-410, 1 MANUAL DOOR.  
W/ HEATER FAULT INDICATION AND SPRINKLER OPTION





# INTRODUCTION

## AD-410 DRYER OPERATIONAL SUMMARY

The model AD-410 incorporates one (1) “EMERGENCY STOP” (E-Stop) BUTTON located centrally on the right front control door. This “red” mushroom push-button is “PUSH TO STOP” the dryer and “TURN TO RELEASE” or “PULL TO RELEASE” type control device. This button **must be** in the released mode to power the dryer. The PHASE 5 MICROPROCESSOR CONTROLLER (computer) display will light when the “EMERGENCY STOP” (E-Stop) BUTTON is in the released mode. To turn “ON” the AD-410’s control voltage, press the “green” “ON” push-button located on the right front control door.

The AD-410 has two (2) electronic controllers:

PHASE 5 MICROPROCESSOR CONTROLLER (Computer) ... for drying material

MICRO-1 PLC (Programmable Logic Controller) ... for loading, unloading auto doors, and burner status monitoring

The PHASE 5 MICROPROCESSOR CONTROLLER (Computer) only response to keyboard (touchpad) commands when the AD-410’s tumbler (basket) section is level with the loading doors and lint drawer/basket door closed. Likewise, the MICRO-1 PLC (Programmable Logic Controller) responses to load or unload selections when the AD-410 is not drying material.

## AD-410 OPERATOR CONTROLS/INDICATORS

The right front control door incorporates the following operator controls/indicators:

“EMERGENCY STOP” (E-Stop) BUTTON (Push To Stop/Turn To Release or Pull To Release)

JOG (Forward/Reverse Push-Buttons)

LOAD/DRY/UNLOAD (Three [3] Position Selector Switch)

TILT (Off - On) (Two [2] Position Selector Switch)

HEATER FAULT (Indicator/Reset Push-Button) *Gas Models Only*

CONTROL POWER (On)

CONTROL POWER (Off)

END OF CYCLE/HEATER FAULT INDICATOR/AIR JET

### “EMERGENCY STOP” (E-Stop) BUTTON (Push To Stop/Turn To Release or Pull To Release)

This “red” mushroom push-button, located in the center of the right front control door almost directly under the Phase 5 microprocessor controller (computer) is a “Push To Stop” and “Turn To Release” type push-button. This button **must be** in the released mode to power the dryer (enable the dryer to run).

### JOG (Forward/Reverse Push-Buttons)

These two (2) push-buttons, located towards the left hand side of the right front control door, are for either loading or unloading the tumbler (basket). “JOG” functions are only enabled when the tumbler (basket) section is in a tilted position.

**NOTE:** There is a PLC (Programmable Logic Controller) controlled “**DWELL TIME**” between forward jog or reverse jog selection to prevent plug starting the tumbler (basket) drive motor.

### LOAD/DRY/UNLOAD (Three [3] Position Selector Switch)

### TILT (Off - On) (Two [2] Position Selector Switch)

The “LOAD/DRY/UNLOAD” and “TILT (Off - On)” selector switches work in conjunction with each other. If the “TILT” selector is in the “OFF” position, an “UNLOAD” or “LOAD” selection will open the front horizontal doors, allowing an operator to load or unload the tumbler (basket) in the level position.

**NOTE:** The AD-410 “JOG” feature will respond in the level position. The lint drawer **must be** closed for the “JOG” feature to operate.

If the “TILT” selector is in the “ON” position, an “UNLOAD” selection will open the front vertical doors and tilt the tumbler (basket) section towards the front (Rear Up). Likewise, a “LOAD” selection will open the front horizontal doors and tilt the tumbler (basket) section towards the rear (Front Up).

The “DRY” selection will bring the tumbler (basket) section to a level position and close the front horizontal doors. Once **ALL** safe conditions are met (i.e., front doors closed, lint drawer closed, dryer level), an operator will be able to select a drying cycle on the Phase 5 microprocessor controller’s (computer’s) keyboard (touchpad), located on the right front control door. Refer to the Phase 5 Operator’s Manual for details.

### HEATER FAULT (Indicator/Reset Button) *Gas Models Only*

During a drying cycle the PLC monitors the status of the Phase 5 microprocessor controller’s (computer’s) “Heat On/Off” signal, the control status of the front and rear gas valves, and the state of both the front and rear burner airflow switches. If a fault is sensed, the “HEATER FAULT” indicator and “END OF CYCLE” indicator will begin to flash at a rate of one (1) per second. Both indicators will flash until the operator presses the “HEATER FAULT” reset button. For more details on “HEATER FAULT” refer to the AD-410 operation section in this manual.

### CONTROL POWER (On)

This “green” lighted operator, located on the right front control door, is for enabling the dryer’s control voltage. This push-button **must be** “ON” for drying or load/unload function to occur.

### CONTROL POWER (Off)

This “red” non-lighted operator, located on the right front control door, is for disabling the dryer’s output control voltage. This push-button is mainly for use as a troubleshooting function.

### END OF CYCLE/HEATER FAULT INDICATOR/AIR JET

This “amber” colored indicator located on the front/top of the AD-410 has two (2) functions:

1. To indicate that a drying cycle has been completed and that the dried material is ready for attention. Once the dryer is attended (i.e., lint drawer is opened or the “UNLOAD - DRY - LOAD” selector is turned to either the “UNLOAD” or “LOAD” position and the vertical doors open) the indicator will go off.
2. To indicate that a “HEATER FAULT” has occurred. Note that during a “HEATER FAULT” this indicator will flash in conjunction with the “HEATER FAULT Indicator/Reset Button” located on the right front control door. Refer to the “HEATER FAULT Indicator/Reset Button” explanation on the previous page (**page 6**), for more information concerning “HEATER FAULTS.”
3. The Air Jet will be activated at the end of the drying cycle when the “END OF CYCLE” light has been energized. The Air Jet will remain active for approximately 30-seconds to remove lint which may have accumulated on the Blower Wheel (squirrel cage).

## AD-410 DRYER OPERATION TROUBLESHOOTING INFORMATION

### END OF CYCLE/HEATER FAULT INDICATOR

The “END OF CYCLE” light located on the top/front of the AD-410, is triggered by the *Air Jet Signal* of the Phase 5 microprocessor controller (computer) to the input of the PLC (Programmable Logic Controller). If this signal is not sensed by the PLC the light will not turn on. The “1-second flashing” is accomplished by a “Flasher Module” located on the main control panel in the right front control cabinet. Refer to the electrical blueprints included with this dryer for detailed signal routing.

The “HEATER FAULT” signal is an output of the PLC to the “END OF CYCLE” light. A “HEATER FAULT” is an indication that a malfunction has occurred in the “Gas Heat Circuit” and needs attention. Refer to the “HEATER FAULT” explanations on **page 10** and **page 11** for more information on this subject.

If this “END OF CYCLE” light fails to display at the end of every cycle:

1. Check the bulb.
2. Check voltage to the bulb (24 VAC).
3. Refer to the ladder diagram and the schematics provided with this dryer for detailed signal information for higher level troubleshooting.

### JOG (Forward/Reverse Push-Button)

*Forward* “JOG” is in the clockwise (CW) direction and *Reverse* “JOG” is in the counterclockwise (CCW) direction.

There is a 7-second dwell (delay) time between a selection of a different rotation direction. This delay is to prevent plug starting the tumbler (basket) drive motor.

If the “JOG” function does not operate in the tilted position:

1. Check that the main doors are fully opened.
2. Check that the overload for the drive motor is in the “Start” position.
3. Check that the overload for the tumbler (basket) motor is in the “Start” position.
4. Check that the lint drawer is closed.
5. Refer to the ladder diagram and the schematics provided with this dryer for detailed signal information for higher level troubleshooting.

### AIR JET

The Air Jet signal is sent from the Phase 5 microprocessor controller (computer) at the end of the drying cycle. If the air valve fails to operate:

1. Check the air supply to the dryer (set to 80 PSI [5.51 bars]).

2. Check to see that the Air Jet L.E.D. (light emitting diode) is on at the end of the drying cycle. If the L.E.D. is not on it may be an indication of a failed Phase 5 microprocessor controller (computer).
3. If Air Jet L.E.D. is on then check the wiring from the Phase 5 microprocessor controller (computer) to the air valve.
4. Faulty air valve.

#### LOAD/DRY/UNLOAD (Selector Switch) and TILT FUNCTION (Off - On Selector Switch)

As mentioned in the dryer summary (refer to **page 5**), the “LOAD/DRY/UNLOAD” selector switch and “TILT Off - On” selector switch work in conjunction with each other.

#### UNLOAD or LOAD LEVEL...opens the vertical doors only

If this selection does not operate:

1. Check that 80 PSI (5.51 bars) of compressed air is supplied to the dryer and that the door solenoid is being actuated. The “Door Open” signal is generated by the PLC (Programmable Logic Controller). Refer to the PLC information included in the ladder diagrams and schematics supplied with the dryer.

#### UNLOAD TILTED

This selection causes the front horizontal doors to open. Once the “Door Open” signal is sensed, the PLC enables the “Rear Up” solenoid to tilt the dryer. Once the tumbler (basket) section releases the tilt switch, the “JOG” functions become enabled for an operator’s selection.

If the tumbler (basket) section does not tilt forward:

1. Verify that a “Door Open” signal is being sensed by the PLC.
2. Check that 80 PSI (5.51 bars) of compressed air is supplied to the dryer and that the “Rear Up” solenoid is being actuated by the PLC.

Refer to the PLC signal information included in the ladder diagrams and schematics supplied with the dryer.

#### LOAD TILTED

This selection causes the front horizontal doors to open. Once the “Door Open” signal is sensed, the PLC enables the “Front Up” solenoid to tilt the dryer. The “JOG” functions then becomes enabled for an operator’s selection.

If the tumbler (basket) section does not tilt towards the rear:

1. Verify that a “Door Open” signal is being sensed by the PLC.

2. Check that 80 PSI (5.51 bars) of compressed air is supplied to the dryer and that the “Front Up” solenoid is being actuated by the PLC (Programmable Logic Controller).

Refer to the PLC signal information included in the ladder diagrams and schematics supplied with the dryer.

## DRY

This selection prepares the dryer for a “Material Drying Command” from the Phase 5 microprocessor controller (computer).

**NOTE:** Before a drying cycle can be selected, the tumbler (basket) section *must be* in the level position and both the front horizontal doors as well as the lint drawer *must be* closed.

The PLC senses that the dryer is level by the two (2) level switches located on the left hand side of the base section. One (1) switch is towards the rear of the dryer and the other switch is towards the front of the dryer.

The PLC senses that the vertical doors are closed by the two (2) proximity switches, located at the top center of the dryer above the doors. These switches are magnetically actuated by magnets located on the doors.

The PLC senses the lint drawer by a push type switch located on the right hand side of the lint drawer door.

**IMPORTANT:** THE LINT DRAWER and LINT DRAWER GUARD *MUST BE* CLOSED BEFORE BRINGING THE DRYER TO A LEVEL POSITION.

If the tumbler (basket) section does not return to a level position:

1. Verify that a “Door Closed” signal is being sensed by the PLC.
2. Check that 80 PSI (5.51 bars) of compressed air is supplied to the dryer and that the “Front Down” or “Rear Down” solenoid is being actuated by the PLC.
3. Verify that the lint drawer and lint drawer guard is in the closed position. This signal can be easily verified since it is a PLC input.

Refer to the PLC signal information included in the ladder diagrams and schematics supplied with the dryer.

## HEATER FAULT (Indicator/Reset Push-Button) *Gas Dryers Only*

“HEATER FAULT” refers to a problem in the gas heating portion of the dryer.

The PLC monitors the Phase 5 microprocessor controller’s (computer’s) Heat Off/On signals to the two (2) individual gas valves that supply the two (2) separate burners.

When a “HEATER FAULT” occurs within the first 25-seconds of the drying cycle, the dryer will go to a “FILL” message on the Phase 5 microprocessor controller’s (computer’s) display and both the “HEATER FAULT” push-button and the “END OF CYCLE” light will flash.

When a “HEATER FAULT” occurs after the first 25-seconds of the drying cycle, a “CLEAR/STOP” will be sent to the Phase 5 microprocessor controller (computer), a “FILL” message will be displayed on the Phase 5 microprocessor controller’s (computer’s) display, and both the “HEATER FAULT” push-button and the “END OF CYCLE” light will flash.

**NOTE:** If the “HEATER FAULT” reset push-button is pressed any time during the PLC (Programmable Logic Controller) controlled cool down cycle, the dryer will come to a stop since the dryer is being attended to by a qualified operator.

“HEATER FAULT” occurs during the following conditions:

Front and/or rear or both airflow switches are in the closed position at the start of a drying cycle.

**IMPORTANT:** At the start of a drying cycle, the tumbler (basket) will begin to turn and a few seconds thereafter, the “FAN” signal will be asserted.

IF BOTH AIRFLOW SWITCHES **ARE NOT** OPEN AT THIS TIME THE BLOWER **WILL NOT** START and A “HEATER FAULT” WILL OCCUR.

Both “HEATER FAULT” indicators will flash and the dryer will come to a complete halt/stop until the “HEATER FAULT” push-button is pressed.

### ONE or BOTH BURNERS **DO NOT** IGNITE

The model ADG-410 dryer has two (2) burner boxes. Each burner box has its own gas valve, Spark Ignitor/Flame-Probe Assembly, and DSI (Direct Spark Ignition) module.

### DSI (Direct Spark Ignition) MODULE

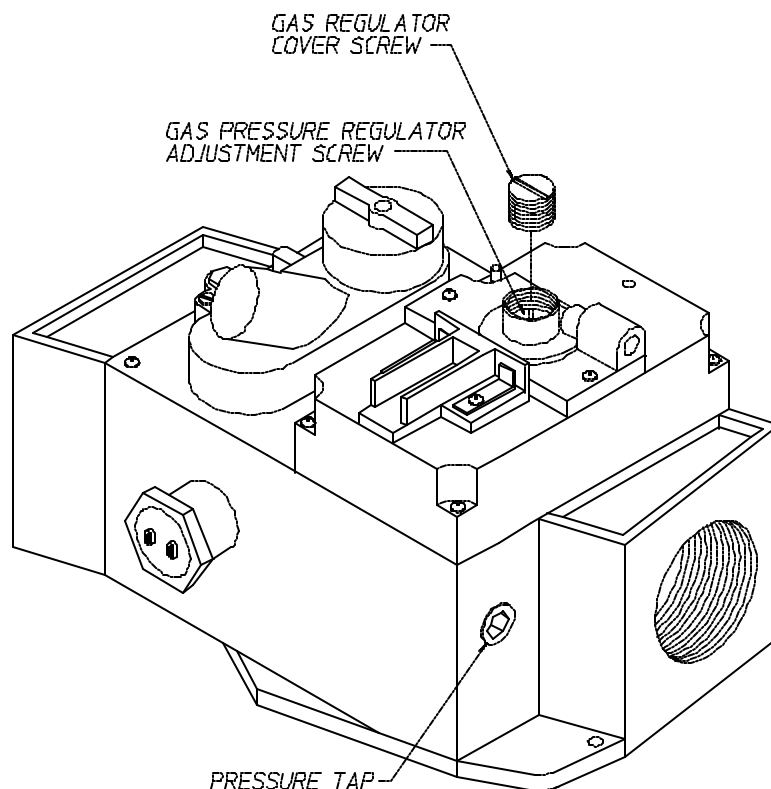
When the dryer calls for heat and **ALL** dryer safety switches are satisfied, a 24 VAC control signal is supplied to both DSI modules. The DSI module L.E.D. (light emitting diode) indicators will light “red” for approximately 1.5-seconds of pre-purge, the L.E.D. indicators will light “green.” Each DSI module will energize its respective gas valve and provide an 8-second spark to its Spark Ignitor/Flame-Probe Assembly. The gas in both burner boxes **should ignite**. If ignition does not occur in one or both burners after 8-seconds, the flame will not be sensed by the Spark Ignitor/Flame-Probe Assembly and the DSI module will go into the “LOCKOUT” mode lighting the L.E.D. indicator(s) “red” continuously. **THERE ARE NO IGNITION RETRIES BY THE DSI MODULE.** Stop the dryer at this point and restart another drying cycle. It may take several restarts to clear the gas supply piping of air.

**NOTE:** “HEATER FAULT” *will occur* during the initial set up of the dryer, indicating that the burners **are not** lighting due to air in the gas line.

### GAS PRESSURE

The natural gas pressure supplied to the dryer **must be** between 6 inches (14.92 mb) and 12 inches of W.C. (water column) - 29.9 mb - pressure. If the supply pressure is above 12 inches water column (29.9 mb) than an external regulator **must be** installed to reduce the gas supply pressure to between 6 inches (14.92 mb) and 12 inches of water column (29.9 mb).

Once the flame has been established in both burner boxes, the natural gas outlet manifold pressure measured at each gas valve pressure tap **must be** 3.5 inches W.C. (water column) - 8.7 mb - pressure. Connect a water tube manometer to the 1/8" F.P.T. gas pressure tap on the downstream side of each gas valve. There is a pressure regulator in both gas valves so the manifold pressure *can be* adjusted to 3.5 inches water column (8.7 mb). Unscrew the slotted regulator cover which is located on the top of each gas valve, and turn the regulator adjustment screw located underneath the cover (clockwise [CW] to increase manifold pressure and counterclockwise [CCW] to decrease manifold pressure).



MAN2633

The L.P. (liquid propane) gas pressure measured at each gas valve pressure tap **must be** 11 inches water column (27.4 mb) pressure, when the flame is established in both burner boxes. There is no means to adjust this pressure supplied with the dryer so the downstream L.P. pressure regulator **must be** adjusted to provide the 11 inch water column (27.4 mb) outlet manifold pressure. Connect a water tube manometer to the 1/8" F.P.T. gas pressure tap on the downstream side of each valve to measure the manifold pressure.

## **IMPORTANT INFORMATION**

**Once the blower motor starts, both the FRONT AIRFLOW SWITCH and the REAR AIRFLOW SWITCH must pull in to indicate that there is sufficient airflow through the dryer for safe ignition of both the front burner and the rear burner.**

Refer to the system ladder diagram for "HEAT" signal information. **There are several safety devices that *must be* satisfied prior to ignition. Any one of these safety devices can cause NO IGNITION, therefore a "HEAT FAULT" ...i.e.,**

**FRONT AIRFLOW SWITCH  
REAR AIRFLOW SWITCH  
EXHAUST HI-LIMIT SWITCH  
FRONT BURNER INTAKE HI-LIMIT SWITCH  
REAR BURNER INTAKE HI-LIMIT SWITCH  
DEFECTIVE ELECTRICAL HEAT CIRCUIT**



## ONE BURNER **WILL NOT** IGNITE AT THE BEGINNING OF A CYCLE

This condition can be caused by the following:

- DEFECTIVE DSI (Direct Spark Ignition) MODULE
- DEFECTIVE SPARK IGNITOR/FLAME-PROBE ASSEMBLY
- DEFECTIVE GAS VALVE
- INSUFFICIENT GAS PRESSURE
- DEFECTIVE ELECTRICAL HEAT CIRCUIT

Refer to the ladder diagram and the schematics provided with this dryer for reference to the above listed information.

## ONE BURNER **WILL NOT** IGNITE DURING A DRYING CYCLE

This condition can be caused by the following:

- DEFECTIVE DSI (Direct Spark Ignition) MODULE
- DEFECTIVE SPARK IGNITOR/FLAME-PROBE ASSEMBLY
- DEFECTIVE GAS VALVE
- DEFECTIVE ELECTRICAL HEAT CIRCUIT
- LOSS OF GAS PRESSURE

Refer to the ladder diagram and the schematics provided with this dryer for reference to the above listed information.

## CONTROL POWER (Indicator/Control Power On Push-Button)

This “green” lighted push-button is for enabling the 24 VAC control voltage to the control circuits of the dryer. This push-button indicator **must be** “ON” for the system to load or dry material.

Refer to the ladder diagram included with this AD-410 for the function of this push-button in the 24 VAC control voltage latching control circuit.

## CONTROL POWER (Off Push-Button)

This “red” non-lighted push-button is for disabling the 24 VAC control voltage to the control circuits of the dryer.

Refer to the ladder diagram included with this AD-410 for the function of this push-button in the 24 VAC control voltage latching control circuit.

## SYSTEM LADDER DIAGRAM

The SYSTEM LADDER DIAGRAM is an overview on the electrical connections of the AD-410. This diagram is for signal flow information and is a tool to direct an individual in the correct direction for troubleshooting this dryer.

The AD-410 system is divided into a number of “electrical” sections which are as follows:

1. Right Front Control Panel

The RIGHT FRONT CONTROL PANEL is located in the right front control cabinet of the AD-410. This panel is the heart of the drying system, where **ALL** control signals interface to or from this panel. The signals that interface to this panel are too many to list here, however, they are **ALL** identified on TB1 of its schematic diagram.

2. Right Base Electrical Enclosure

The RIGHT BASE ELECTRICAL ENCLOSURE is located towards the front of the right base section. An industrial multi-pin connector is used to connect the base section control signals to the tumbler (basket) section’s main control panel. This electrical enclosure is labeled **CAUTION, HIGH VOLTAGE IS PRESENT IN THIS ENCLOSURE** and incorporates the following electrical devices:

The MAIN ELECTRICAL POWER to the dryer

The ELECTRICAL CONNECTION for the “OPTIONAL” SPRINKLER CIRCUIT POWER

The THERMAL/MAGNETIC OVERLOAD and REVERSING CONTACTOR for the TUMBLER (BASKET) MOTOR

The THERMAL/MAGNETIC OVERLOAD and REVERSING CONTACTOR for the BLOWER MOTOR

3. Right Base Interface Junction Box

The RIGHT BASE INTERFACE JUNCTION BOX is located towards the rear of the right base section and is used as a central location to interface the base section electrical components to the TILTING tumbler (basket) section. An industrial multi-pin connector is used to connect the base section control signals to the tumbler (basket) section’s main control panel. The control signals incorporated in the right base interface junction box are:

SOLENOID CONTROL

Front Up/Front Down

Rear Up/Rear Down

Open Front Door

Supply Air Enable

Air Jet

LINT DRAWER/GUARD STATUS

TUMBLER (BASKET) TEMPERATURE and HI-LIMIT INFORMATION

TUMBLER (BASKET) LEVEL SENSE

Front Level Switch

Rear Level Switch

OPTIONAL SPRINKLER CONTROL SIGNALS

#### 4. Optional Sprinkler Circuit

The OPTIONAL SPRINKLER CIRCUIT main control panel will be located in the left front electrical enclosure. If a SPRINKLER OPTION is included with this AD-410, this panel will include an “AUTOMATIC ‘EMERGENCY STOP’ (E-Stop)” feature. *This feature requires the Sprinkler Circuit be functional for the dryer to be powered.*

**NOTE:** There will be a dedicated electrical connection in the right electrical junction box for the sprinkler circuit.

# SECTION I

## IMPORTANT INFORMATION

### A. RECEIVING and HANDLING

The dryer is shipped in a protective stretch wrap cover with protective cardboard corners and top cover (or optional box) as a means of preventing damage in transit. Upon delivery, the dryer and/or packaging, and wooden skid **should be** visually inspected for shipping damage. If any damage whatsoever is noticed, inspect further before delivering carrier leaves.

Dryers damaged in shipment:

1. **ALL** dryers **should be** inspected upon receipt and before they are signed for.
2. If there is suspected damage or actual damage, the trucker's receipt **should be** so noted.
3. If the dryer is damaged beyond repair, it **should be** refused. Those dryers which were not damaged in a damaged shipment **should be** accepted, but the number received and the number refused **must be** noted on the receipt.
4. If you determine that the dryer was damaged after the trucker has left your location, you should call the delivering carrier's freight terminal immediately and file a claim. The freight company considers this concealed damage. This type of freight claim is very difficult to get paid and becomes extremely difficult when more than a day or two passes after the freight was delivered. It is your responsibility to file freight claims. Dryer/parts damaged in transit **cannot** be claimed under warranty.
5. Freight claims are the responsibility of the consignee, and **ALL** claims **must be** filed at the receiving end. **ADC** assumes no responsibility for freight claims or damages.
6. If you need assistance in handling the situation, please contact the **ADC** Traffic Manager at (508) 678-9000.

<b>IMPORTANT:</b> The dryer <i>must be</i> transported and handled in an upright position at <b><u>ALL</u></b> times.
---

## B. 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.

**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.**

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. WHAT TO DO IF YOU SMELL GAS...
  - a. **DO NOT** try to light any appliance.
  - b. **DO NOT** touch any electrical switch.
  - c. **DO NOT** use any phone in your building.
  - d. Clear the room, building, or area of **ALL** occupants.
  - e. Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
  - f. If you **cannot** reach your gas supplier, call the fire department.
4. Installation and service **must be** performed by a qualified installer, service agency, or gas supplier.
5. Dryer(s) **must be** exhausted to the outdoors.
6. 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.**

**WARNING:** **DO NOT** dry rags or articles coated or contaminated with gasoline, kerosene, oil, paint, or wax.  
**EXPLOSION COULD RESULT.**

**WARNING:** **DO NOT** dry mop heads. 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 (basket) may damage plastics or rubber and also may be a fire hazard.

7. A program **should be** established for the inspection and cleaning of lint in the burner area, exhaust duct work, 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 duct work can create a potential fire hazard.

8. 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 do so will VOID THE WARRANTY.

9. **UNDER NO CIRCUMSTANCES** should the dryer door switches, lint drawer switch, heat safety circuit, or tilt switches ever be disabled.

**WARNING: PERSONAL INJURY or FIRE COULD RESULT.**

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

11. 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.

12. **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 DRYER TO ALLOW ACCESS FOR CLEANING, ADJUSTING, INSTALLATION, or TESTING OF ANY EQUIPMENT per OSHA (Occupational Safety and Health Administration) STANDARDS.**

# SECTION II

## SPECIFICATIONS and DIMENSIONS

### A. SPECIFICATIONS (Gas and Steam Models)

Maximum Capacity (Dry Weight)		410 lbs.	<b>185.97 kg</b>
Minimum Capacity (Dry Weight)		250 lbs.	<b>113.40 kg</b>
Tumbler (Basket) Diameter		68-3/4"	<b>174.6 cm</b>
Tumbler (Basket) Depth		66-3/8"	<b>168.6 cm</b>
Tumbler (Basket) Volume		143 cu. ft.	<b>4.05 cu.m.</b>
Drive Motor		7-1/2 HP	<b>5.59 kw</b>
Blower Motor (Gas/Steam)		25 HP	<b>18.64 kw</b>
Door Opening		40" Wide x 50" High	<b>101.6 cm x 127 cm</b>
Door Still Height - Level		39-3/4"	<b>100.97 cm</b>
Compressed Air		80 PSI	<b>5.51 bars</b>
Compressed Air Connection		3/8" F.P.T.	---
<b>Gas*</b>	Voltage Available		208-460v 3ø 3, 4w 50/60 Hz
	Heat Input		1,600,000 btu/hr <b>403,200 kcal/hr</b>
	Approx. Weight (Uncrated)		7,500 lbs. <b>3,401.94 kg</b>
	Airflow		9,200 cfm <b>260.52 cmm</b>
	Inlet Pipe Size		2" F.P.T. ---
<b>Steam*</b>	Voltage Available		208-460v 3ø 3, 4w 50/60 Hz
	Approx. Weight (Uncrated)		8,000 lbs. <b>3,628.74 kg</b>
	Airflow		12,000 cfm <b>339.80 cmm</b>
	Steam Consumption		Boiler HP Normal Load
	1,815 lbs/hr	<b>823.27 kg/hr</b>	55
	Operating Steam Pressure		Steam Supply      Steam Return
	125 PSI max	<b>8.79 kg/sq cm</b>	2" <b>5.08 cm</b> 1-1/4" <b>3.18 cm</b>

*Shaded areas are stated in metric equivalents*

- \* Dryers **must be** provided with a clean, dry, regulated 80 PSI +/- 10 PSI (5.51 bars +/- 0.68 bars) air supply (equivalent volume = 9 cfh [0.26 cmh]).

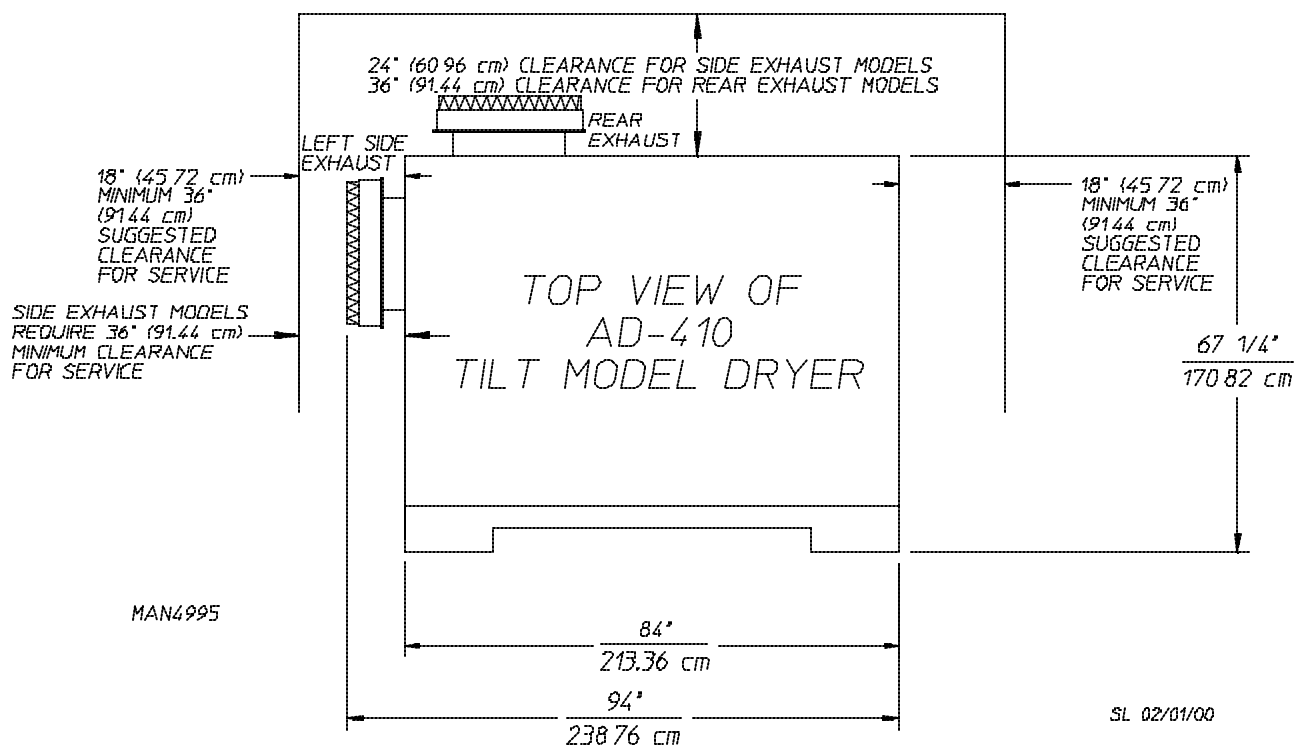
**NOTE:** ADC reserves the right to make changes in specifications at any time, without notice or obligation.

## B. DIMENSIONS

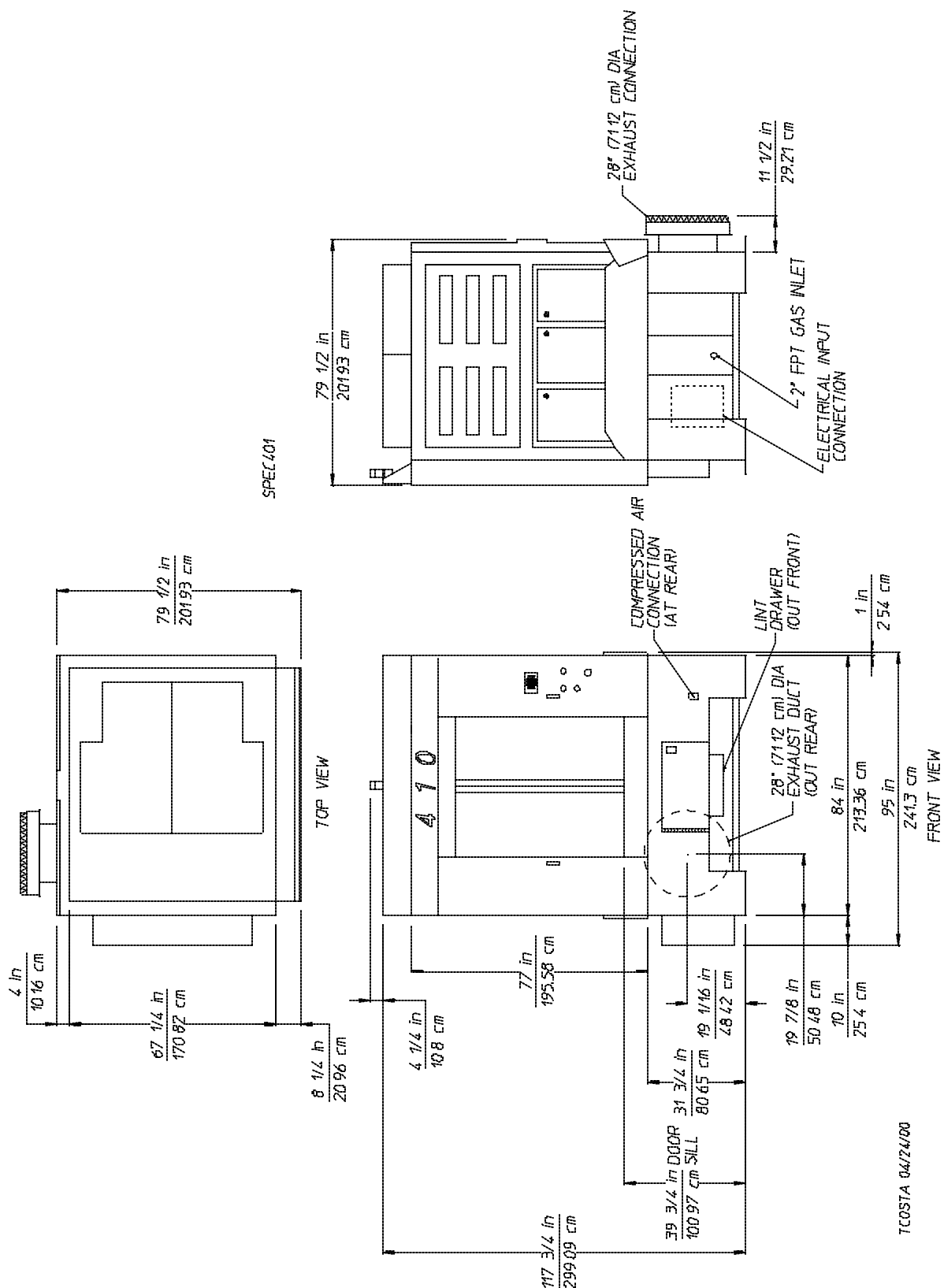
<b>AD-410 TILTING CLEARANCE ALLOWANCES</b>			
<b>ADG-410</b>	1 DOOR/FORWARD TILT	130-1/4"	<b>330.84 cm</b>
	1 DOOR/2-WAY TILT	137-1/4"	<b>348.62 cm</b>
	2 DOOR/REAR TILT	137-1/4"	<b>348.62 cm</b>
<b>ADS-410</b>	1 DOOR/FORWARD TILT	138-15/16"	<b>352.90 cm</b>
	1 DOOR/2-WAY TILT	138-15/16"	<b>352.90 cm</b>
	2 DOOR/2-WAY TILT	138-15/16"	<b>352.90 cm</b>

*Shaded areas are stated in metric equivalents*

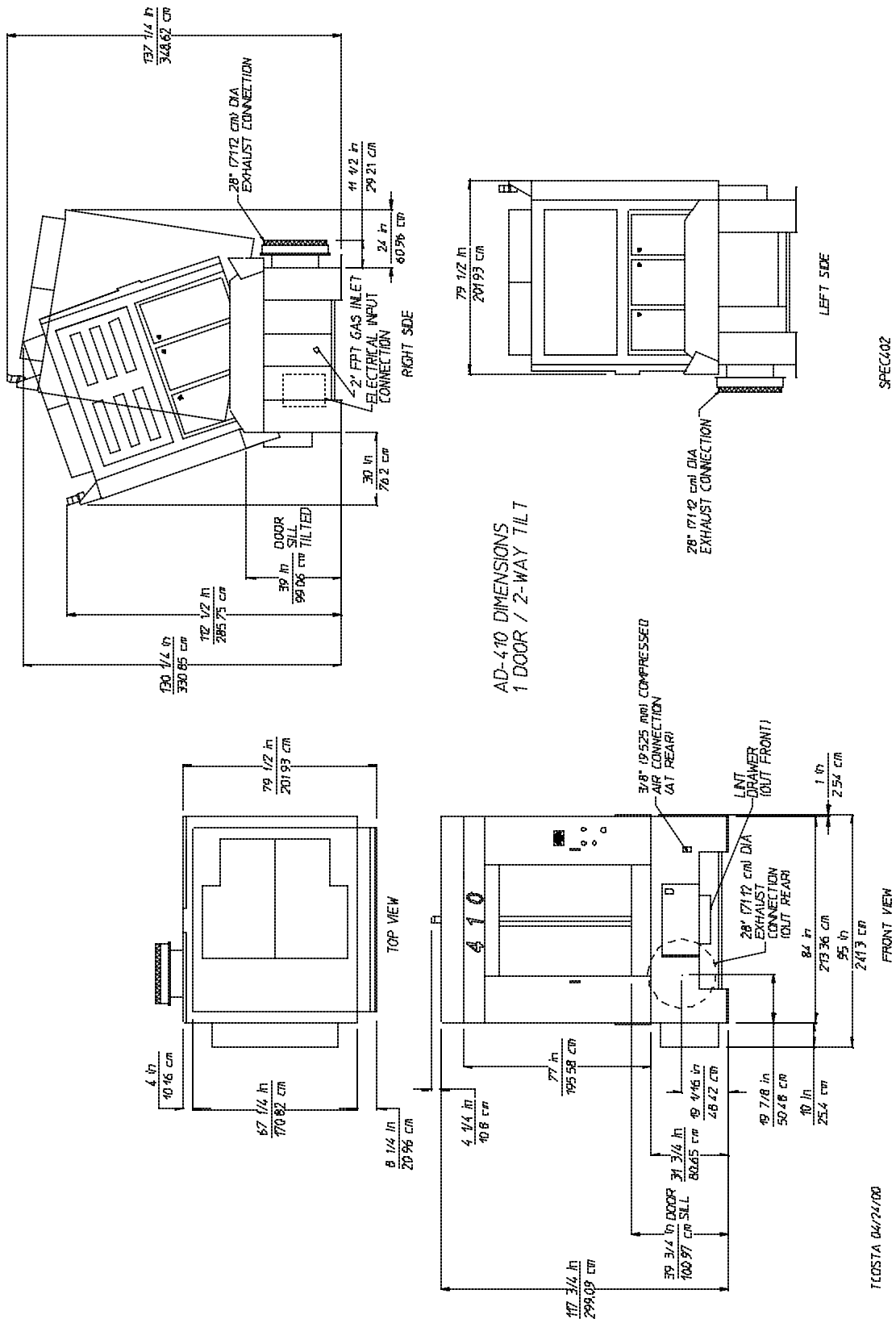
**WARNING:** Dryer *should be* located where a minimum length of exhaust duct will be necessary.



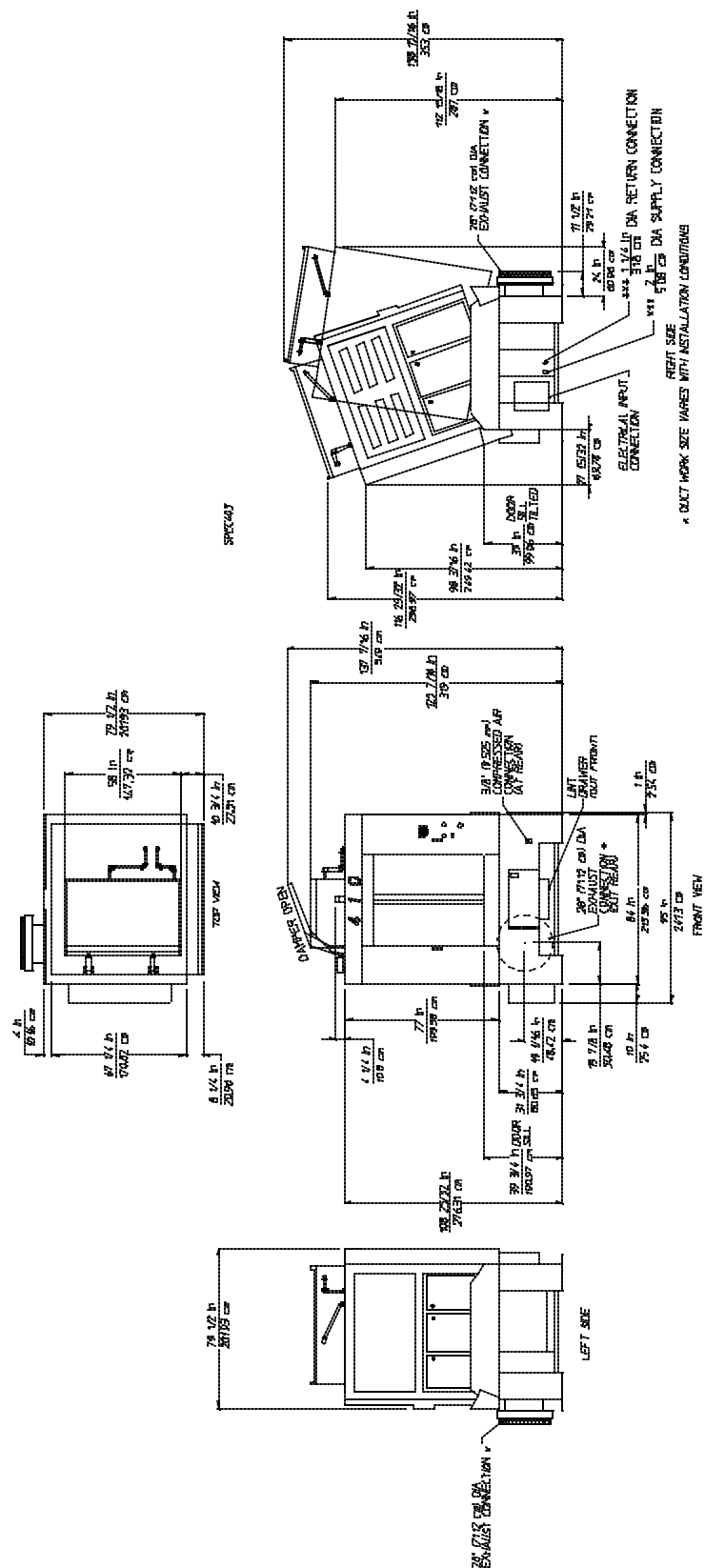




# AD-410 1 Door/2-Way Tilt

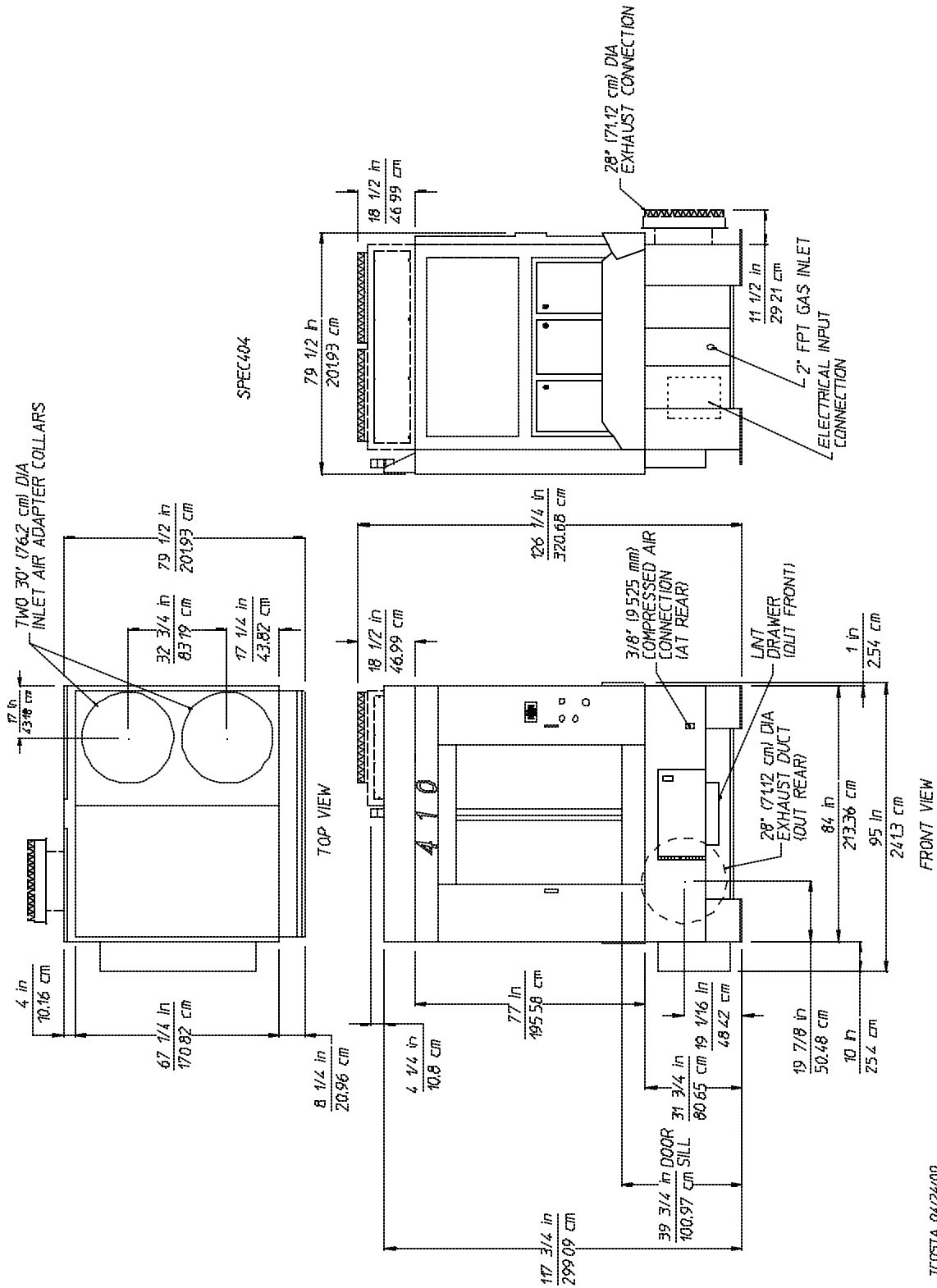


**NOTE:** ADC reserves the right to make changes in specifications at any time, without notice or obligation.



**NOTE:** ADC reserves the right to make changes in specifications at any time, without notice or obligation.

## AD-410 1 Door/2-Way Tilt with Inlet Air Adapter



**NOTE:** ADC reserves the right to make changes in specifications at any time, without notice or obligation.

# SECTION III

## INSTALLATION PROCEDURES

Installation in a proper location **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: National Fuel Gas Code ANSI.Z223.1-LATEST EDITION and/or 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.

Before installing the dryer, be sure the location conforms to local codes and ordinances.

The dryer **must be** installed on a sound level floor capable of supporting its weight. Carpeting **must be** removed from the floor area that the dryer is to rest on.

**IMPORTANT:** “The dryer *must be* installed on noncombustible floors only.”

**IMPORTANT:** Dryer *should be* located where a minimum amount of exhaust duct **will be** necessary.

### A. REASSEMBLY OF DRYER

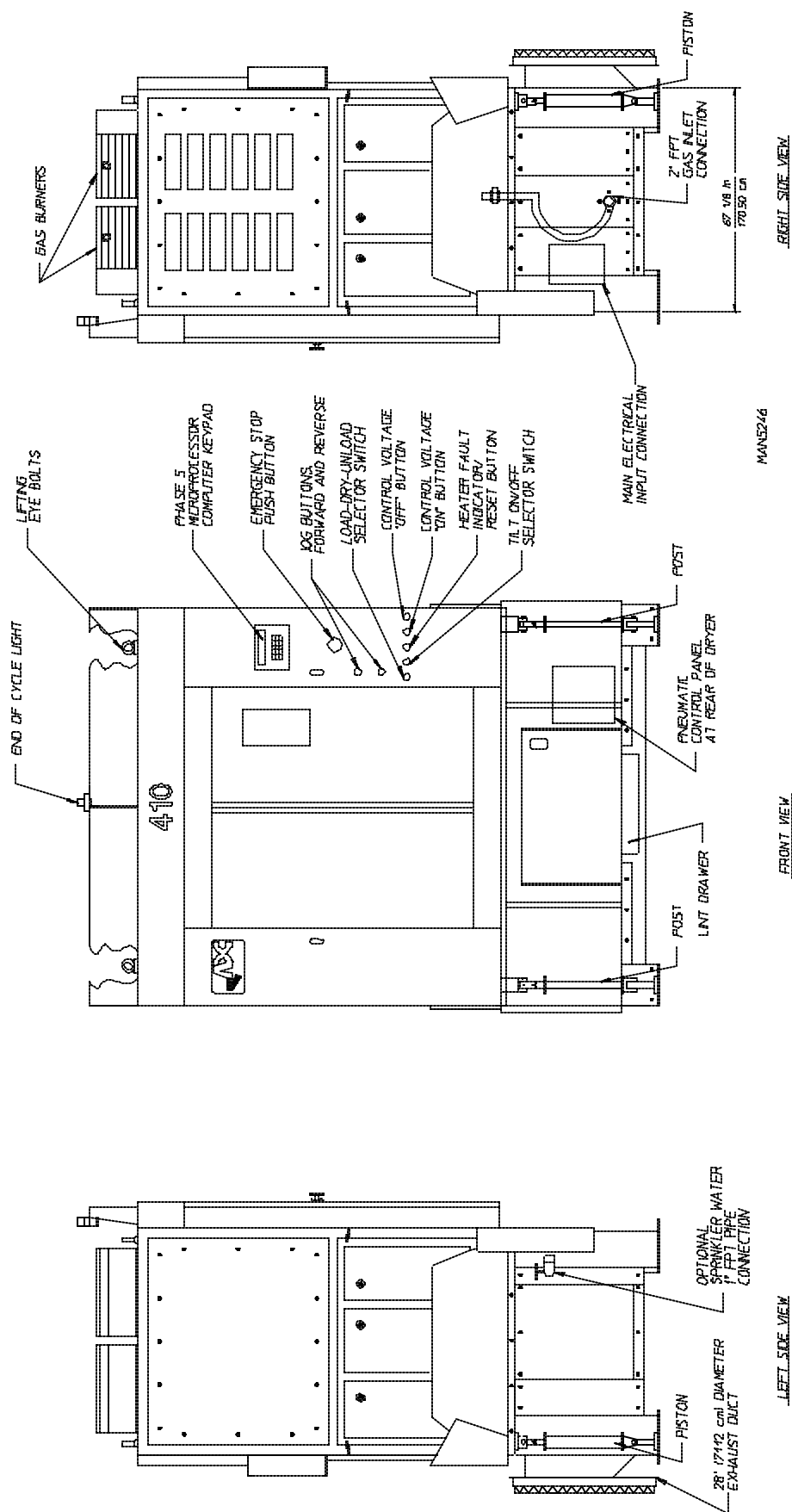
**IMPORTANT:** Always keep the tumbler (basket) section in an upright position when moving and/or transporting.

The AD-410 dryer is shipped in two (2) pieces with the tumbler (basket) section separate from the base section. The tumbler (basket) section will have to be lifted/hoisted onto the base section. Use cables through the eye bolts on top of the tumbler (basket) section, or use a forklift for the lifting process.

The AD-410 tilting dryer is made with many loading and unloading options. Please refer to the reassembly instructions on the following pages for your particular style of dryer.

If a steam dryer is shipped in two (2) pieces, the steam coil may have been removed from the top of the tumbler (basket) section and shipped with the base section. If this is the case, carefully lift the steam coil on to the top of the tumbler (basket) section with the steam pipe connections facing towards the right hand side of the dryer and bolt the coil to the top of the dryer with the 1/4” (6.35 mm) hardware supplied. There are three (3) panels that cover the front, right hand side, and rear of the steam coil. Fasten these into position also. Reconnect the steam pipe and condensate pipe unions to the coil. These pipes run down to the flex hoses in the base section.

# ADG-410 1 Door/Forward Tilt with Sprinkler



1. Reassembly for the ADG-410 1 Door/Forward Tilt with Sprinkler Gas Model Dryer ...

Lift the tumbler (basket) section onto the base ...

- a. Forward tilting dryers have two (2) tilting pistons located in the rear corners of the dryer base and two (2) piston posts located in the front corners of the dryer base. On the top of the tilting pistons and tilting posts are clevis blocks. Use the eight (8) 1/2 x 1-1/4" hex head bolts and lock washers (supplied with the dryer) to secure each clevis block to the bottom of the tumbler (basket) section.

Refer to **Tilting Piston Reconnection View** on page 28.

Refer to **Tilting Post Reconnection View** on page 28.

- b. The gas line is disconnected at the union when the dryer is shipped in two (2) pieces. This gas line union is located in the right hand side of the dryer base. Insert the gas line union half way through the hole on the bottom of the tumbler (basket) section. Connect the two (2) union halves and retighten.

**IMPORTANT: THE FLEX HOSE *MUST NOT BE* KINKED.**

Refer to **Gas Flex Hose Union Reconnection View** on page 28.

- c. There are five (5) electrical reconnections ...
  - 1) Four (4) of these electrical connections are located in the right hand side of the dryer base. The four (4) mating sockets are located in the right hand side of the tumbler (basket) section and **must be** reconnected with the four (4) mating sockets in the dryer base.
  - 2) The remaining electrical connection is made at the drive motor located in the right hand side of the tumbler (basket) section.

**IMPORTANT: THE RECONNECTED ELECTRICAL CABLES *MUST HAVE* ENOUGH SLACK IN THEM TO ALLOW THE DRYER TO TILT *FREELY* IN BOTH DIRECTIONS.**

d. Reattach The Tilt Guard Panel ...

- 1) Use the 1/4-20 x 3/8" hex head bolts and lock washers (supplied with the dryer) to secure the top of the front tilt guard into the bottom of the front of the tumbler (basket) section.
- 2) Use the 1/4-20 x 3/8" hex head bolts and lock washers (supplied with the dryer) to secure the top of the rear tilt guard into the bottom of the rear of the tumbler (basket) section.
- 3) Use the 1/4-20 self-tapping screws (supplied with the dryer) to secure the right hand side tilt guards and left hand side tilt guards.
- 4) Reconnect the spring and claw assembly which connects the rear tilt guard to each side tilt guard.
- 5) Reconnect both chains to the back panel...the spring keeps the rear guard close to the dryer's back as the dryer is tilted forward or backwards. (Refer to **Tilt Guard Reconnection View** on page 28.)

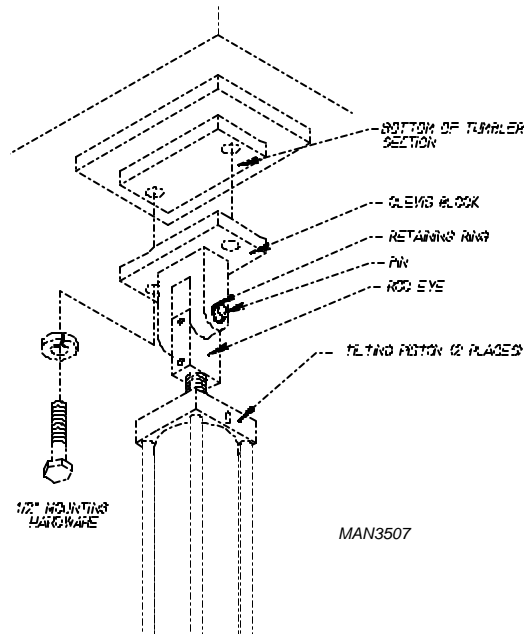
- e. Secure the 28-inch (71.12 cm) diameter exhaust duct transition piece to the dryer's rectangular exhaust duct with the 1/4-20 self-tapping screws (supplied with the dryer).

The exhaust duct exits from the rear of the base.

- f. On dryers equipped with automatic (piston operated) load doors, reconnect the two (2) poly-flo air lines that run from the dryer base up to the door pistons.
- g. On dryers equipped with a sprinkler option, a separate power supply **must be** connected to the sprinkler circuit located in the right base electrical box.
- 1) The optional sprinkler water connection is located in the left hand side of the dryer base. A 1-inch M.P.T. water supply line will be connected to the 1-inch F.P.T. pipe connection of the dryer.

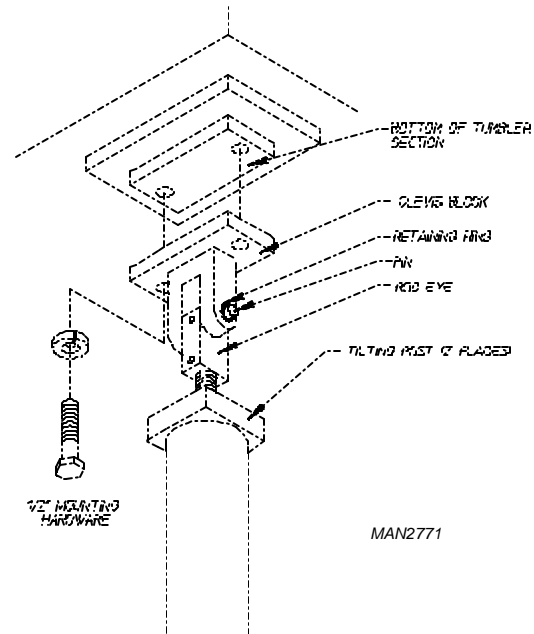
## ADG-410 1 Door/Forward Tilt with Sprinkler

*TILTING PISTON RECONNECTION VIEW*



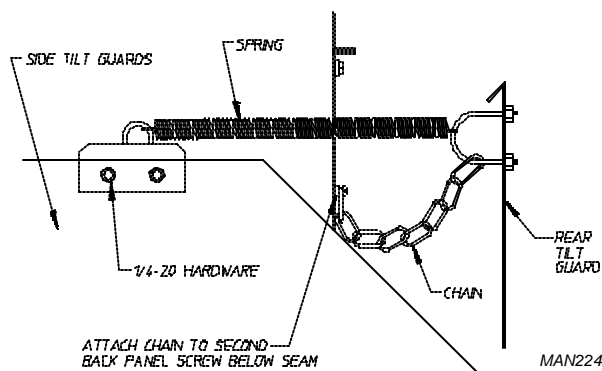
MAN3507

*TILTING POST RECONNECTION VIEW*



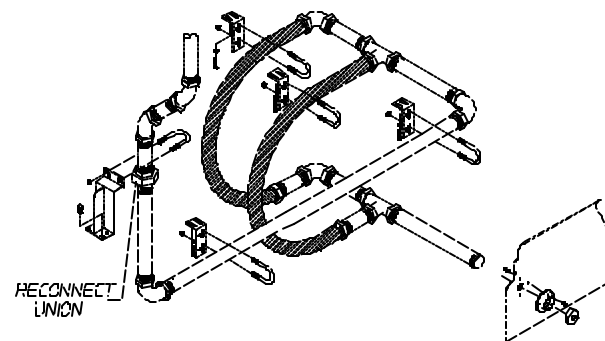
MAN2771

*TILT GUARD RECONNECTION VIEW*



MAN2247

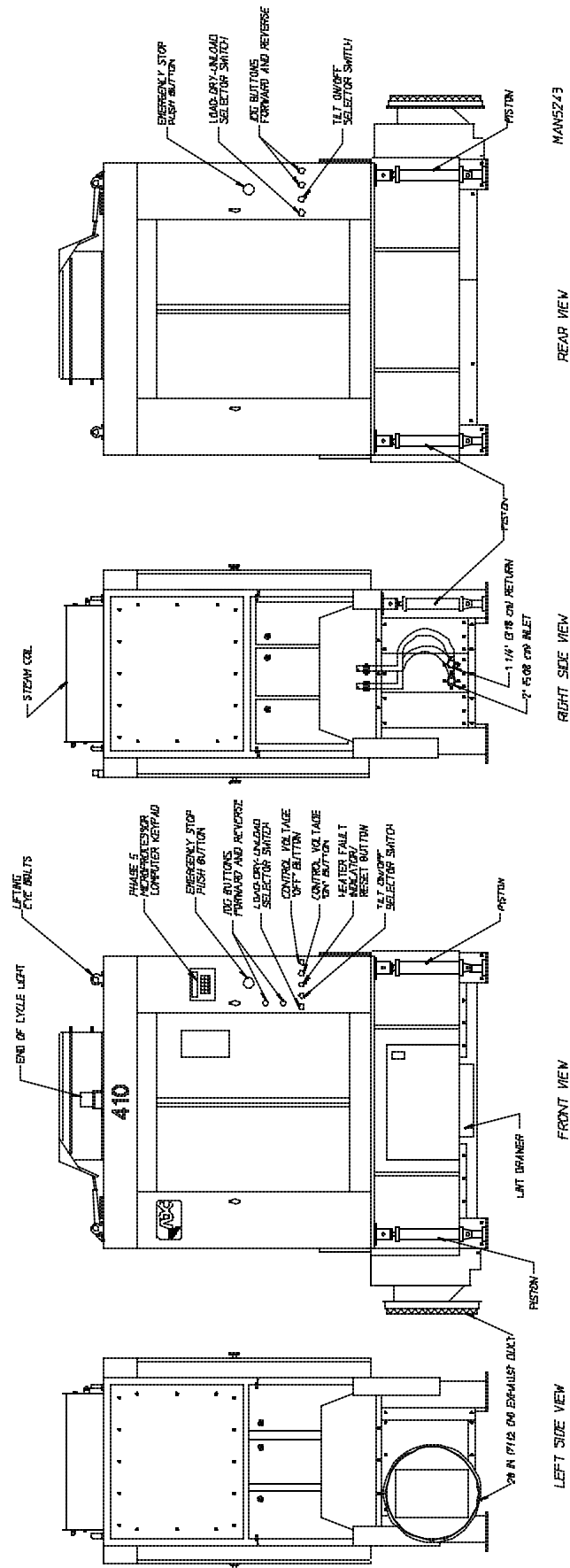
*GAS FLEX HOSE UNION RECONNECTION VIEW*



MAN3506



# ADS-410 2 Door/2-Way Tilt



1. Reassembly for the ADS-410 2 Door/2-Way Tilt Steam Model Dryer ...

Lift the tumbler (basket) section onto the base ...

- a. 2-way tilting dryers have four (4) tilting pistons, one (1) located in each corner of the dryer base. On the top of each tilting piston is a clevis block. Use the four (4) 1/2 x 1-1/4" hex head bolts and lock washers (supplied with the dryer) to secure each clevis block to the bottom of the tumbler (basket) section.

Refer to **Tilting Piston Reconnection View** on page 31.

- b. Both the 2-inch (5.08 cm) steam supply line and the 1-1/4" (3.18 cm) condensate return line unions are disconnected when the dryer is shipped in two (2) pieces. The steam supply lines are located in the right hand side of the dryer base. Insert both union halves up through the holes in the bottom of the tumbler (basket) section. Connect the two (2) union halves and retighten.

**IMPORTANT: THE FLEX HOSE *MUST NOT BE* KINKED.**

Refer to **Steam Flex Hose Union Reconnection View** on page 31.

- c. The air lines are disconnected when the dryer is shipped in two (2) pieces. The air lines are located in the right hand side of the dryer base. Insert the air lines through the hole on the bottom of the tumbler (basket) section. Reconnect the 1/4" (6.35 mm) brass poly connector.
- d. There are four (4) electrical reconnections ...
  - 1) The plug and cable connections are located in the right hand side of the dryer base. These **must be** lifted up and reconnected into the mating sockets located at the bottom right hand side of the tumbler (basket) section.
  - 2) The drive motor power cable **must be** lifted up and reconnected into the drive motor in the right hand side of the tumbler (basket) section.

**IMPORTANT: THE RECONNECTED ELECTRICAL CABLES *MUST HAVE* ENOUGH SLACK IN THEM TO ALLOW THE DRYER TO TILT *FREELY* IN BOTH DIRECTIONS.**

e. Reattach The Tilt Guard Panel ...

- 1) Use the 1/4-20 x 3/8" hex head bolts and lock washers (supplied with the dryer) to secure the top of the front tilt guard into the bottom of the front of the tumbler (basket) section.
- 2) Use the 1/4-20 x 3/8" hex head bolts and lock washers (supplied with the dryer) to secure the top of the rear tilt guard into the bottom of the rear of the tumbler (basket) section.
- 3) Use the 1/4-20 self-tapping screws (supplied with the dryer) to secure the right hand side tilt guards and left hand side tilt guards.

Refer to **Tilting Guard Panel Reconnection View** on page 31.

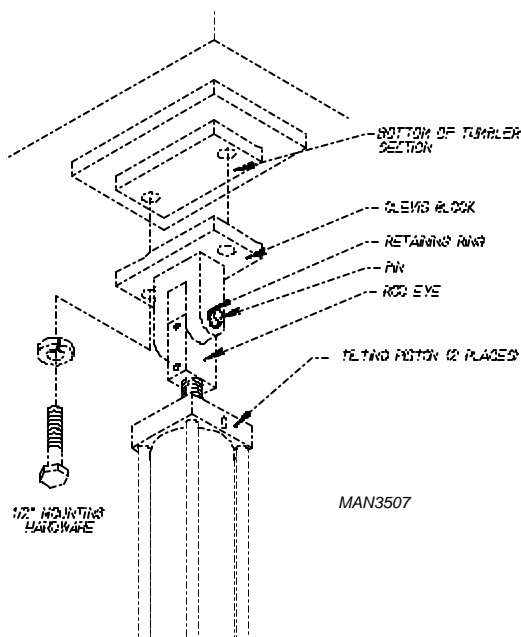
- f. Secure the 28-inch (71.12 cm) diameter exhaust duct transition piece to the dryer's rectangular exhaust duct with the 1/4-20 self-tapping screws (supplied with the dryer).

The exhaust duct exits from the rear of the base.

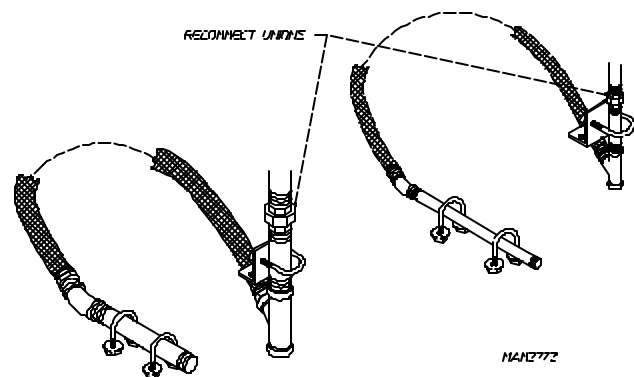
- g. On dryers equipped with automatic (piston operated) load doors, reconnect the four (4) poly-flo air lines that run from the dryer base up to the door pistons in the front and the rear of the dryer.
- h. Reconnect the 1/4" (6.35 mm) poly-flo air lines which run from the dryer base up to the steam damper solenoid valve (located on top of the dryer).

## ADS-410 2 Door/2-Way Tilt

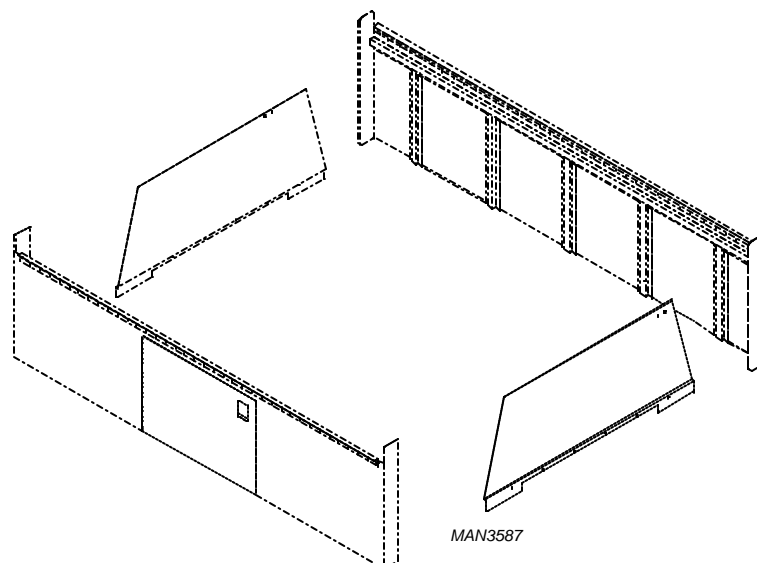
**TILTING PISTON RECONNECTION VIEW**



**STEAM FLEX HOSE UNION RECONNECTION VIEW**



**TILTING GUARD PANEL RECONNECTION VIEW**



## **B. FRESH AIR SUPPLY REQUIREMENTS**

When the dryer is operating, it draws in room air, heats it, passes this air through the tumbler (basket) 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 efficiency will be adversely affected. Ignition problems and sail switch “fluttering” problems may result, as well as premature motor failure from overheating.

Air supply (make-up air) **must be** given careful consideration to assure proper performance of each dryer. An unrestricted source of air is necessary for each dryer. An airflow of 9,200 cfm (cubic feet per minute) - 260.52 cmm (cubic meters per minute) - **must be** supplied to each gas dryer and 12,000 cfm (339.80 cmm) **must be** supplied to each steam dryer. As a general rule, an unrestricted air entrance from the outdoors (atmosphere) of a minimum of 12 square feet (1.11 square meters) is required for each gas dryer and a minimum of 14 square feet (1.30 square meters) is required for each steam dryer.

To compensate for the use of registers or louvers used over the openings, this make-up air area **must be** increased by approximately thirty-three percent (33%). Make-up air openings **should not be** located in an area directly near where exhaust vents exit the building.

It is not necessary to have a separate make-up air opening for each dryer. Common make-up air openings are acceptable. However, they **must be** set up in such a manner that the make-up air is distributed equally to **ALL** the dryers.

Allowances **must be** made for remote or constricting passageways or where dryers are located at excessive altitudes or predominantly low pressure areas.

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

**NOTE:** Component failure due to dry cleaning solvent fumes will VOID THE WARRANTY.

### 1. Optional Inlet Air Adapter

The ADG-410 dryer may be built with the inlet air adapter option. This option allows **ALL** of the dryer’s inlet air to be ducted from the outdoors directly to the dryer.

This option consists of a sheet metal box located on top of the dryer with two (2) 30-inch (76.2 cm) diameter duct collars on top. (Refer to the **illustration** on **page 24** for the location and dimensions of the inlet air adapter.)

Use two (2) 30-inch (76.2 cm) diameter flexible hoses to connect the 30-inch (76.2 cm) collars to the outdoors. Allow enough slack in the flexible hoses so that the dryer can tilt, without restriction.

## C. EXHAUST REQUIREMENTS

**NOTE:** For 1 door AD-410 dryer models, the 28-inch (71.12 cm) diameter exhaust duct exits from the rear of the base. For 2 door AD-410 dryer models, the 28-inch (71.12 cm) diameter exhaust duct exits from the left hand side of the base.

**NOTE:** For 1 door/2-way tilt AD-410 dryer models, keep the exhaust ducting at least 36-inches (91.44 cm) away from the back of the dryer so that the dryer **will not** hit the ducting when the dryer tilts to the rear.

### 1. General Exhaust Duct Work Information

#### a. Gas Models

Exhaust duct work **should be** designed and installed by a qualified professional. Improperly sized duct work will create excessive back pressure which results in slow drying, increased use of energy, overheating of the dryer, and shut down of the burner by the airflow (sail) switches, burner hi-limits, or tumbler (basket) hi-heat thermostats.

**CAUTION:** DRYER ***MUST BE*** EXHAUSTED TO THE OUTDOORS.

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

**NOTE:** When a dryer is exhausted separately, **it is recommended** that a back draft damper be installed.

#### 1) Horizontal Venting

The duct work **should be** laid out in such a way that the duct work travels as directly as possible to the outdoors with as few turns as possible. Single or independent dryer venting is recommended.

The shape of the duct work **is not** critical so long as the minimum cross-sectional area is provided. It is suggested that the use of 90° turns in ducting **be avoided**; use 30° and/or 45° angles instead. The radius of the elbows should preferably be 1-1/2 times the diameter of the duct.

The dryer comes with a 28-inch (71.12 cm) diameter exhaust duct connection. The plant's exhaust duct **must be** at least 28-inches (71.12 cm) in diameter or for a rectangular duct have a cross-sectional area of 616 square inches (3,974 square centimeters). The duct work from the dryer to the outside exhaust outlet **should not exceed** 20 feet (6.09 meters). The shape of the duct work **is not** critical so long as the minimum cross-sectional area is provided. It is suggested that the use of 90° turns **be avoided**; use 45° angles instead. The radius of the elbows should preferably be 1-1/2 times the width or diameter of the duct. Excluding tumbler (basket)/dryer elbow connections or elbows used for outside protection from the weather, no more than one (1) elbow **should be** used in the exhaust duct run. If more than one (1) elbow is used, the cross-sectional area of the duct work **must be** increased.

**IMPORTANT:** Minimum duct size for a horizontal run ***must be*** 28-inches (71.12 cm) for a round or 25" x 26" (63.5 cm x 66.04 cm) for a square duct. Duct size ***must not be*** reduced anywhere downstream of the dryer.

## 2) Vertical Venting

**IMPORTANT:** Minimum duct size for a vertical run **must be** 32-inches (81.28 cm) for a round or 30" x 28" (76.2 cm x 71.12 cm) for a square duct. Duct size **must not be** reduced anywhere downstream of the dryer.

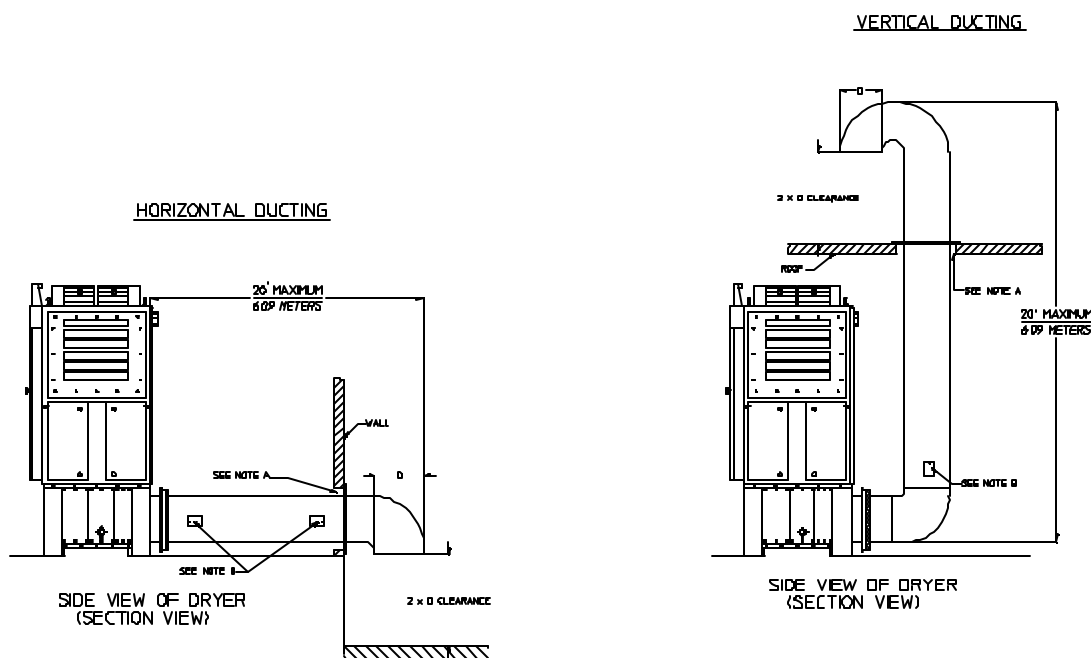
**THE AD-410 MUST BE INDEPENDENTLY EXHAUSTED. COMMON DUCT WORK IS NOT ACCEPTABLE.** The exhaust duct **should be** laid out in such a way that the duct work travels as directly as possible to the outdoors with as few turns as possible. It is suggested that the use of 90° turns in ducting be avoided; use 30° and/or 45° angles instead. The shape of the exhaust duct work is not critical so long as the minimum cross section area is provided.

**IMPORTANT:** Minimum duct size for a vertical run **must be** 32-inches (81.28 cm) for a round or 30" x 28" (76.2 cm x 71.12 cm) for a square duct. Duct size **must not be** reduced anywhere downstream of the dryer.

**IMPORTANT:** Exhaust back pressure measured by a manometer at each tumbler (basket) exhaust duct area **should not exceed** 0.3 inches of water column (0.74 mb).

It is suggested that the duct work from each dryer not exceed 20 feet (6.09 meters) with no more than two (2) elbows (excluding dryer connections and outside exhaust outlets). If the duct work exceeds 20 feet (6.09 meters) or has numerous elbows, the cross section area of the duct work **must be** increased in proportion to the length and number of elbows in it. In calculating duct size, the cross section area of a square or rectangular duct **must be** increased by twenty percent (20%) for each additional 20 feet (6.09 meters). The diameter of a round exhaust duct **should be** increased ten percent (10%) for each additional 15 feet (4.57 meters). Each 90° elbow is equivalent to an additional 80 feet (24.38 meters), and each 45° elbow is equivalent to an additional 40 feet (12.19 meters).

### SINGLE DRYER VENTING



NOTE "A"- OPENING MUST BE 2-INCHES (50.8 cm) LARGER THAN THE DUCT ALL THE WAY AROUND; THE DUCT MUST BE CENTERED WITHIN THIS OPENING.  
 "B"- INSPECTION DOORS SHOULD BE INSTALLED AT STRATEGIC POINTS FOR PERIODIC INSPECTION AND CLEANING

b. Steam Models

1) Horizontal Venting

**THE AD-410 *MUST BE* INDEPENDENTLY EXHAUSTED. COMMON DUCT WORK IS NOT ACCEPTABLE.** The exhaust duct **should be** laid out in such a way that the duct work travels as directly as possible to the outdoors with as few turns as possible. It is suggested that the use of 90° turns in ducting be avoided; use 30° and/or 45° angles instead. The shape of the exhaust duct work is not critical so long as the minimum cross section area is provided.

**IMPORTANT:** Minimum duct size for the dryer is 28-inches (71.12 cm) for a round duct or 25" x 26" (63.5 cm x 66.04 cm) for a square duct. Duct size ***must not be*** reduced anywhere downstream of the dryer.

**IMPORTANT:** Exhaust back pressure measured by a manometer at each tumbler (basket) exhaust duct area ***should not exceed*** 0.3 inches of water column (0.74 mb).

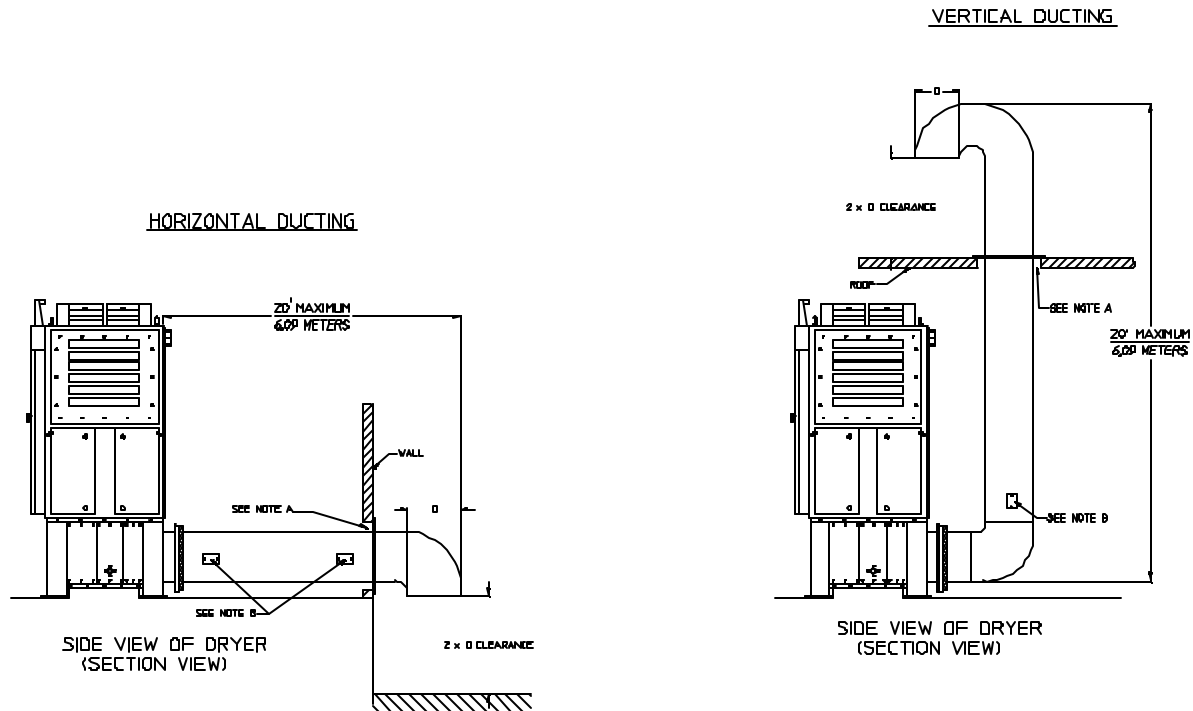
It is suggested that the duct work from each dryer not exceed 20 feet (6.09 meters) with no more than one (1) elbow (excluding dryer connections and outside exhaust outlets). If the duct work exceeds 20 feet (6.09 meters) or has numerous elbows, the cross section area of the duct work **must be** increased in proportion to the length and number of elbows in it. In calculating duct size, the cross section area of a square or rectangular duct **must be** increased by twenty percent (20%) for each additional 20 feet (6.09 meters). The diameter of a round exhaust duct **should be** increased ten percent (10%) for each additional 15 feet (4.57 meters). Each 90° elbow is equivalent to an additional 68 feet (20.73 meters), and each 45° elbow is equivalent to an additional 34 feet (10.36 meters).

2) Vertical Venting

**IMPORTANT:** Minimum duct size for the dryer is 36-inches (91.44 cm) for a round duct or 34" x 32" (86.36 cm x 81.28 cm) for a square duct. Duct size ***must not be*** reduced anywhere downstream of the dryer.

It is suggested that the duct work from each dryer not exceed 20 feet (6.09 meters) with no more than two (2) elbows (excluding dryer connections and outside exhaust outlets). If the duct work exceeds 20 feet (6.09 meters) or has numerous elbows, the cross section area of the duct work **must be** increased in proportion to the length and number of elbows in it. In calculating duct size, the cross section area of a square or rectangular duct **must be** increased by twenty percent (20%) for each additional 20 feet (6.09 meters). The diameter of a round exhaust duct **should be** increased ten percent (10%) for each additional 15 feet (4.57 meters). Each 90° elbow is equivalent to an additional 93 feet (28.35 meters), and each 45° elbow is equivalent to an additional 46-1/2 feet (14.17 meters).

## SINGLE DRYER VENTING



NOTE: "A"- OPENING MUST BE 2-INCHES (5.08 cm) LARGER THAN THE DUCT (ALL THE WAY AROUND) THE DUCT MUST BE CENTERED WITHIN THIS OPENING.

"B"- INSPECTION DOORS SHOULD BE INSTALLED AT STRATEGIC POINTS FOR PERIODIC INSPECTION AND CLEANING

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**ALL** duct work **should be** smooth inside with no projections from sheet metal screws or other obstructions which will collect lint. When adding ducts, the duct to be added should overlap the duct to which it is to be connected. **ALL** duct work joints **must be** taped to prevent moisture and lint from escaping into the building. Inspection doors **should be** installed at strategic points in the exhaust duct work for periodic inspection and clean-out of lint from the duct work.

**IMPORTANT:** Exhaust back pressure measured by a Magnehelic in the exhaust duct **should not exceed** 0.3 inches of water column (0.74 mb).

**NOTE:** When the exhaust duct work passes through a wall, ceiling, or roof made of combustible materials, the opening **must be** 2-inches (5.08 cm) larger than the duct (**ALL** the way around). The duct **must be** centered within this opening.

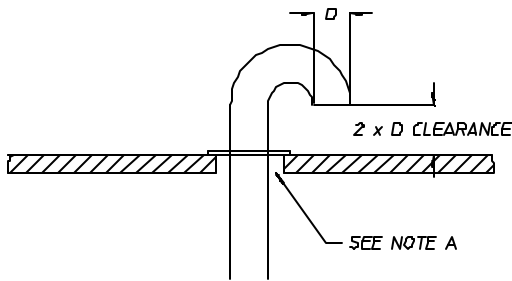
### a) Outside Duct Work Protection

- (1) To protect the outside end of horizontal duct work from the weather, a 90° elbow turned downward **should be** installed where the exhaust exits the building. If the duct work travels vertically up through the roof, it **should be** protected from the weather by using a 180° turn to point the opening downward. In either case, allow at least twice the diameter of the duct between the duct opening and the nearest obstruction.

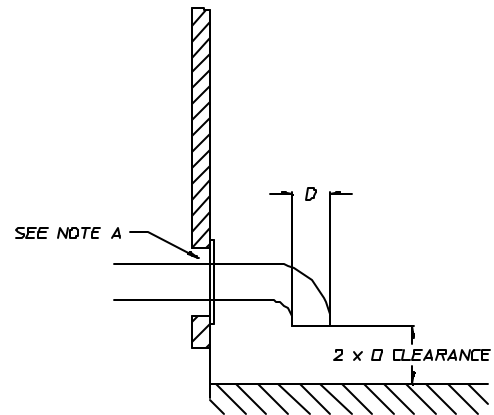
**IMPORTANT:** **DO NOT** use screens or caps on the outside opening of the exhaust duct work.



### VERTICAL DUCTING



### HORIZONTAL DUCTING



NOTE "A" OPENING MUST BE TWO (2) INCHES (50.8 CM) LARGER THAN DUCT (ALL THE WAY AROUND) THE DUCT MUST BE CENTERED WITHIN THIS OPENING.

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## D. COMPRESSED AIR SUPPLY SYSTEM

The compressed air system of the AD-410 tilting dryer consists of a number of pneumatic pistons located throughout the dryer. The pneumatics 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 the Load and Unload Doors (for AD-410 dryer models equipped with Automatic Doors)
- Operate the Steam Coil Damper (for ADS-410 Steam Heated Models ONLY)
- Air Jet is used to clean lint from the blower fan (impellor)

### 1. Filter/Regulator Assembly

The compressed air supply to the dryer is connected into the 3/8" F.P.T. fitting of the filter/regulator assembly which is located at the bottom rear of the right hand side of the base.

The filter/regulator assembly performs two (2) essential functions. The filter removes most solids and liquid particles from the compressed air stream and traps them in its bowl where this waste can be readily removed through the drain valve at the bottom of the bowl.

The filter bowl **should be** cleaned monthly.

The regulator will maintain a nearly constant outlet air pressure so that the dryer's pneumatics will function normally despite upstream air pressure variations. After the compressed air is connected into the filter/regulator assembly, adjust the regulator knob so that the gauge needle reads 80 PSI (5.51 bars).

### 2. Tilting-Piston Solenoid Valves

A 2-way tilt dryer has two (2) pairs of these 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) pair of solenoid valves.

Each valve has five (5) 3/8" F.P.T. ports and two (2) electric solenoid operators, one (1) on each side of the valve.

To tilt the dryer forward, a 24 volt signal is applied to the rear pistons solenoid connector "12" and no voltage is applied to the solenoid connector "14." The internal spool in the valve will move and 80 PSI (5.51 bars) of air will enter the bottom port of the rear tilting pistons, extending the rear tilting piston rods and tilting the dryer forward for unloading. The top piston ports are bled to the atmosphere.

To level the dryer, the voltage signals are reversed. No voltage is applied to the "12" solenoid, and 24 volts is applied to the "14" solenoid. The valve spool will now move so that 80 PSI (5.51 bars) of air is applied at the top piston ports, while the bottom piston ports are bled to the atmosphere. The piston rod will now retract leveling the dryer. On rear tilt dryers, the front tilting piston solenoid valve acts in the same manner.

The tilting piston valves are 4-way/5 port/3 position valves. If no voltage is applied to both the "12" and "14" solenoids, **ALL** five (5) valve ports are blocked. This means that 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 tilting pistons 3/8" flow control valves which are located on the pneumatic control panel.

The tilting piston valves and flow control valves are located on the pneumatic plate in the rear of the dryer's base.

### 3. Internal/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 "12" side of the front tilting piston solenoid valve coil, the round internal spool in the core of the solenoid will move, allowing 80 PSI (5.51 bars) air to flow into the bottom ports of the front tilting pistons, while the top ports are bled to the atmosphere. In addition to this 24 volt electrical signal, the spool also requires a 30 PSI (2.06 bars) supply of compressed air to change its position. This pilot air can either be supplied internally, tapped off the 80 PSI (5.51 bars) 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" 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.

This can be used to prevent both sets of tilting pistons from extending their rods at the same time. When the front tilting piston rods are extended, 80 PSI (5.51 bars) air is connected to the bottom piston ports, while the top piston ports are bled to the atmosphere. So, by tapping the external pilot air supply to the rear tilting piston solenoid valve off the air line to the front tilting piston top port, whenever the front tilting piston rods are extended, then there is no pilot pressure available to the rear tilting piston solenoid valve so that its spool **cannot** move and the rear tilting piston rods **cannot** extend even if a 24 volt signal is sent to its "12" side solenoid valve coil.

The external pilot air supply to the front tilting piston is tapped off the rear tilting piston top port air line so that whenever the rear piston rods are extended, there is no pilot air supplied to the front tilting piston solenoid valve and the front tilting piston rods **cannot** extend. On the solenoid valve supplied on the dryer, the "12" side valve is externally piloted, while the "14" side valve is internally piloted.

A valve can easily be checked for internal pilot or external pilot by removing the two (2) screws which hold the solenoid operator onto the valve. For an internal pilot, the "O" ring **should be** positioned over the internal pilot supply port. This allows internal pilot air to be supplied to the valve spool. For external pilot, the solid sealing disc **must be** positioned on top of the internal port.

4. **OPTIONAL Automatic (Piston Operated) Load/Unload Doors**

If the dryer is equipped with the AUTOMATIC DOOR OPTION, then the loading doors are operated by two (2) pneumatic pistons located above the load doors. On two (2) door models, the unloading doors on the back of the dryer will also be controlled by two (2) pistons, located above the unload doors.

The 24 volt solenoid valve operators controlling the door pistons are located on the pneumatic plate in the rear of the dryer's base. These solenoid valves are configured so that if power to the dryer is shut off, the door piston's ports are bled to the atmosphere so that the doors can be opened and closed by hand.

5. **OPTIONAL Sprinkler Valve**

The sprinkler water flow is controlled by a pneumatically operated water valve, which is located in the left hand side of the base. This water valve is controlled by a 3 port/2 position, 24 volt - double solenoid valve which is located at the top of the dryer's pneumatic plate. If no voltage is applied to both solenoids then **ALL** three (3) ports are blocked. This means that if the sprinkler is activated and power to the dryer is then shut off, the sprinkler will stay on, until the manual water valve is closed or until the dryer's internal temperature drops below the sprinkler set point temperature and the sprinkler reset button is physically pushed.

## E. ELECTRICAL INFORMATION

### 1. Electrical 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 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.

**NOTE:** Component failure due to improper installation will VOID THE WARRANTY.

It is required that a separate circuit serving each tumbler (basket) be provided. The dryer **must be** connected with copper wire **ONLY**. ***DO NOT use aluminum wire which could cause a fire hazard.***

**NOTE:** The use of aluminum wire will VOID THE WARRANTY.

## 2. Electrical Service Specifications

# ADG-410 (Gas) ADS-410 (Steam)

25 HP (ADC Part No. 181006) Blower Motor  
7-1/2 HP (ADC Part No. 181017) Drive Motor

## ELECTRICAL SERVICE SPECIFICATIONS (PER POCKET)

**IMPORTANT:** 208 VAC AND 230 VAC ARE NOT THE SAME. When ordering, *specify exact voltage*.

**NOTE:** A. Fuse ratings are dual element, time delay, current limiting, class RK1 or RK5 **ONLY**.  
B. Circuit breakers are thermal magnetic (industrial) type **ONLY**. For others, calculate/verify correct breaker size according to appliance amp draw rating and type of breaker used.  
C. Circuit breakers for 3Ø dryers **must be** 3-pole type.

SERVICE VOLTAGE	PHASE	WIRE SERVICE	APPROX. AMP DRAW	MINIMUM WIRE SIZE	FUSING Dual Element Time Delay	CIRCUIT BREAKER
208	3Ø	3/4	81	#3	100	110
230	3Ø	3	78	#3	100	110
380	3Ø	3/4	49	#6	60	90
416	3Ø	3/4	44	#6	60	90
460/480	3Ø	3/4	40	#8	60	80

**IMPORTANT: THE DRYER *MUST BE* CONNECTED TO THE ELECTRICAL SUPPLY SHOWN ON THE DATA LABEL THAT IS AFFIXED TO THE REAR OF THE RIGHT HAND ELECTRICAL ENCLOSURE.**

**WARNING: 208 VAC and 230 VAC ARE NOT THE SAME.** Any damage done to the dryer components due to improper voltage connections will automatically VOID THE WARRANTY.

**NOTE: ADC reserves the right to make changes in specifications at any time, without notice or obligation.**

### 3. Electrical Connections

**NOTE:** A wiring diagram is included with each dryer and is located in the blueprint pocket inside the left hand side control cabinet.

The main electrical input connections to the dryer are the 3-phase (3 $\phi$ ) power leads (L1, L2, and L3), GROUND, *and in the case of 4 wire service, the Neutral*. These electrical connections are made at the power distribution block located in the base front electrical enclosure.

If the dryer has an optional sprinkler circuit then a separate single-phase (1 $\phi$ ) source **must be** supplied to the sprinkler circuit at the name plate voltage. These connections are made at the power distribution block located in the base front electrical enclosure.

The main electrical 3-phase (3 $\phi$ ) connections (L1, L2, and L3) and the optional single-phase (1 $\phi$ ) connection **must be** provided and installed in accordance with state and local codes. In the absence of these codes, grounding **must conform** to applicable requirements of the National Electrical Code ANSI/NFPA NO. 70-LATEST EDITION, or in Canada, the installation **must conform** to applicable Canadian Standards: Canadian Electrical Codes Parts 1 & 2 CSA C22.1-1990 or LATEST EDITION. In ALL cases, a strain relief **must be** used where the wire(s) enter the dryer electrical service (relay) box.

**NOTE: A CIRCUIT SERVING EACH DRYER *MUST BE* PROVIDED.**

### 4. Main Grounding

Grounding (earth) connections **must be** provided and installed in accordance with state and local codes. In the absence of these codes, grounding **must conform** to applicable requirements of the National Electrical Code ANSI/NFPA NO. 70-LATEST EDITION, or in Canada, the installation **must conform** to applicable Canada Standards: Canadian Electrical Codes Parts 1 & 2 CSA C22.1-1990 or LATEST EDITION. The ground connection may be to a proven earth ground at the location service panel.

**NOTE:** A grounding connection (terminal lug) is provided in the dryer in the Base Electrical Junction Box.

For added personal safety, when possible, it is suggested that a separate ground wire (sized per local codes) be connected from the ground connection of the dryer to a cold water pipe. ***DO NOT ground to a gas or hot water pipe.*** The grounded cold water pipe **must have** metal to metal connections ALL the way to electrical ground. If there are any nonmetallic interruptions, such as a meter, pump, plastic, rubber, or other insulating connectors, they **must be** jumped out with no. 4 copper wire and securely clamped to bare metal at both ends.

**IMPORTANT:** For personal safety and proper operation, the dryer ***must be*** grounded. For proper operation of the microprocessor (computer), an earth (zero) ground is required.

**NOTE:** Grounding via metallic electrical conduit (pipe) **is not recommended**.

## F. GAS INFORMATION

It is your responsibility to have **ALL** plumbing connections made by a qualified professional to assure that the gas plumbing installation is adequate and conforms with local and state regulations or codes. In the absence of such codes, **ALL** plumbing connections, materials, and workmanship **must conform** to the applicable requirements of the National Fuel Code ANSI Z223.1-LATEST EDITION or in Canada, CAN/CGA-B149.1-M91 (Natural Gas) or CAN/CGA-B149.2-M91 (L.P. Gas) or LATEST EDITION (for General Installation and Gas Plumbing), as well as local codes and ordinances and **must be** done by a qualified professional.

**IMPORTANT:** Failure to comply with these codes or ordinances, and/or the requirements stipulated in this manual, can result in personal injury and improper operation of the dryer.

The dryer and its individual shut-off valves **must be** disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 psig (3.5 kPa). The dryer **must be** isolated from the gas supply piping system by closing its individual manual shut-off valve during any pressure test of the gas supply system at test pressures equal to or less than 1/2 psig (3.5 kPa).

**IMPORTANT:** Failure to isolate or disconnect the dryer from the gas supply as noted can cause irreparable damage to the gas valve which will VOID THE WARRANTY.

**WARNING: FIRE or EXPLOSION COULD RESULT.**

### 1. Gas Supply

The gas dryer installation **must meet** the American National Standard...National Fuel Gas Code ANSI Z223.1-LATEST EDITION, or in Canada, CAN/CGA-B149.1-M91 (Natural Gas) or CAN/CGA-B149.2-M91 (L.P. Gas) or LATEST EDITION (for General Installation and Gas Plumbing), as well as local codes and ordinances and **must be** done by a qualified professional.

**NOTE:** Undersized gas piping will result in ignition problems, slow drying, increased use of energy, and can create a safety hazard.

The dryer **must be** connected to the type of heat/gas indicated on the dryer label affixed behind the right control box door. **If this information does not agree with the type of gas available, DO NOT operate the dryer.** Contact the distributor who sold the dryer or the ADC factory.

**IMPORTANT:** Any burner changes or conversions **must be** made by a qualified professional.

The 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 or conversion of dryers in the field for elevations over 2,000 feet (609.6 meters) are made by changing each burner orifice. If this conversion is necessary, contact the distributor who sold the dryer or contact the ADC factory.

## 2. Technical Gas Data

### a. Gas Specifications

	TYPE OF GAS			
	Natural		Liquid Propane	
Manifold Pressure*	3.5 inches W.C.	8.7 mb	10.5 inches W.C.	26.1 mb
Inline Pressure	6.0 - 12.0 inches W.C.	14.92 - 29.9 mb	10.5 inches W.C.	26.1 mb

*Shaded areas are stated in metric equivalents*

\* Measured at the gas valve pressure tap when the gas valve is on.

Refer to the **illustration** on **page 12**.

### b. Gas Connections

Run a 2-inch (5.08 cm) gas pipe from the main gas header to the dryer. There is a 2-inch (5.08 cm) gas pipe connection at the bottom of the dryer base.

Inlet Connection --- one (1) 2-inch F.P.T.

Btu/hr input ----- 1,600,000 (403,200 kcal/hr)

#### 1) Natural Gas

Pressure regulation is controlled by both gas valve's internal regulators. Incoming supply pressure **must be** consistently between a minimum of 6.0 inches water column (W.C.) - 14.92 mb - and a maximum of 12.0 inches water column (W.C.) - 29.9 mb.

#### 2) Liquid Propane (L.P.) Gas

Dryers made for use with liquid propane (L.P.) gas have both of their gas valve's internal pressure regulators open so that the gas pressure **must be** regulated upstream of the dryer. The pressure is measured at each gas valve pressure tap and **must be** a consistent 10.5 inches water column (W.C.) - 26.1 mb. There is no regulator or regulation provided in an L.P. gas dryer. The water column **must be** regulated at the source (L.P. tank) or external regulator/regulation **must be** added to each dryer.



### 3. Piping /Connections

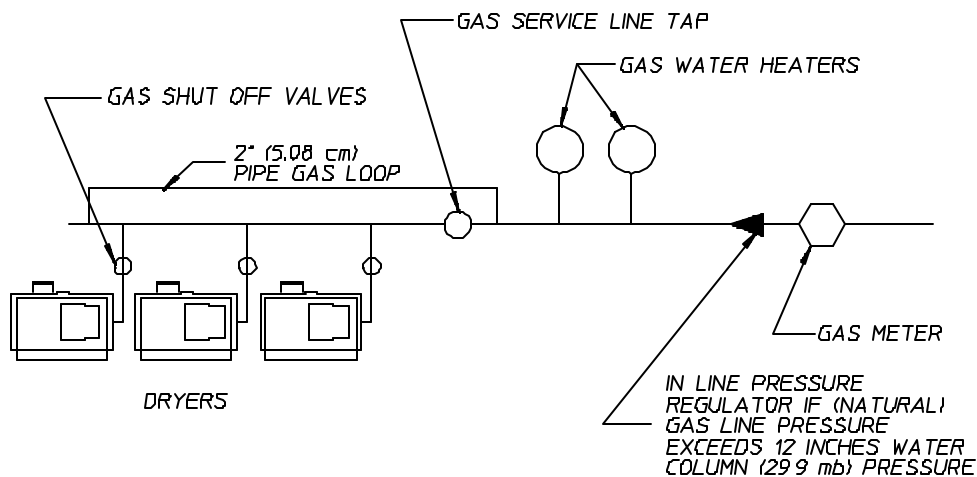
**ALL** components/materials **must conform** to National Fuel Gas Code Specifications ANSI Z223.1-LATEST EDITION, or in Canada, CAN/CGA-B149.1-M91 (Natural Gas) or CAN/CGA-B149.2-M91 (L.P. Gas) or LATEST EDITION (for General Installation and Gas Plumbing), as well as local codes and ordinances and **must be** done by a qualified professional. It is important that gas pressure regulators meet applicable pressure requirements, and that gas meters be rated for the total amount of **ALL** the appliance BTUs being supplied.

The dryer is provided with a 2-inch N.P.T. inlet pipe connection located at the right hand side of the base of the dryer. For ease of servicing, the gas supply line of each dryer **must have** its own shut-off valve.

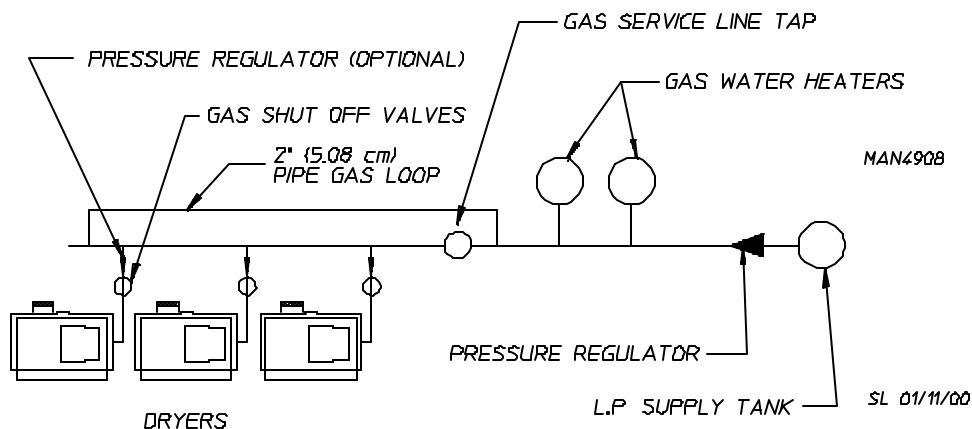
The size of the main gas supply line (header) will vary depending on the distance this line travels from the gas meter or, in the case of L.P. (liquid propane) gas, the supply tank, other gas operated appliances on the same line, etc. Specific information regarding supply line size **should be** determined by the gas supplier.

**NOTE:** Undersized gas supply piping can create a low or inconsistent pressure which will result in erratic operation of the burner ignition system.

TYPICAL NATURAL GAS INSTALLATION



TYPICAL L.P. GAS INSTALLATION



Consistent gas pressure is essential at **ALL** gas connections. It is recommended that a 2-inch (5.08 cm) pipe gas loop be installed in the supply line serving a bank of dryers. An in-line pressure regulator **must be** installed in the gas supply line (header) if the (natural) gas pressure exceeds 12.0 inches of water column (29.9 mb) pressure.

**NOTE:** A water column test pressure of 3.5 inches (8.7 mb) for natural gas and 10.5 inches (26.1 mb) for L.P. (liquid propane) dryers is required at the gas valve pressure tap of each dryer for proper and safe operation.

A 1/8" N.P.T. plugged tap, accessible for a test gauge connection, **must be** installed in the main gas supply line immediately upstream of each dryer.

**IMPORTANT:** Pipe joint compounds that resist the action of natural gas and L.P. gas **must be** used.

**IMPORTANT:** Test **ALL** connections for leaks by brushing on a soapy water solution (liquid detergent works well).

**WARNING: NEVER TEST FOR LEAKS WITH A FLAME!!!**

**ALL** components/materials **must conform** to National Fuel Gas Code Specifications ANSI Z223.1-LATEST EDITION, or in Canada, CAN/CGA-B149.1-M91 (Natural Gas) or CAN/CGA-B149.2-M91 (L.P. Gas) or LATEST EDITION (for General Installation and Gas Plumbing), as well as local codes and ordinances and **must be** done by a qualified professional. It is important that gas pressure regulators meet applicable pressure requirements, and that gas meters be rated for the total amount of **ALL** the appliance BTUs being supplied.

**IMPORTANT:** The dryer and its individual shut-off valve **must be** disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 psig (3.5 kPa).

**NOTE:** The dryer **must be** isolated from the gas supply piping system by closing its individual manual shut-off valve during any pressure test of the gas supply system at test pressures equal to or less than 1/2 psig (3.5 kPa).

## G. STEAM INFORMATION

It is your responsibility to have **ALL** plumbing connections made by a qualified professional to assure that the steam plumbing installation is adequate and conforms with local and state regulations or codes.

**IMPORTANT:** Failure to comply with the requirements stipulated in this manual can result in component failure which will VOID THE WARRANTY.

**NOTE:** The ADS-410 is manufactured with a pneumatic (piston) damper system which requires an external supply of air (80 PSI +/- 10 PSI [5.51 bars +/- 0.61 bars]).

<b>Operating Steam Pressure - High Pressure</b>		
Maximum	125 psig	<b>8.79 kg/sq cm</b>
Minimum	100 psig	<b>7.03 kg/sq cm</b>
Heat Input (Normal Load)	55 Bhp	
Consumption (Approximate)	1,815 lbs/hr	<b>823.27 kg/hr</b>

*Shaded areas are stated in metric equivalents*

### 1. 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.

### 2. Steam Requirements - High Pressure

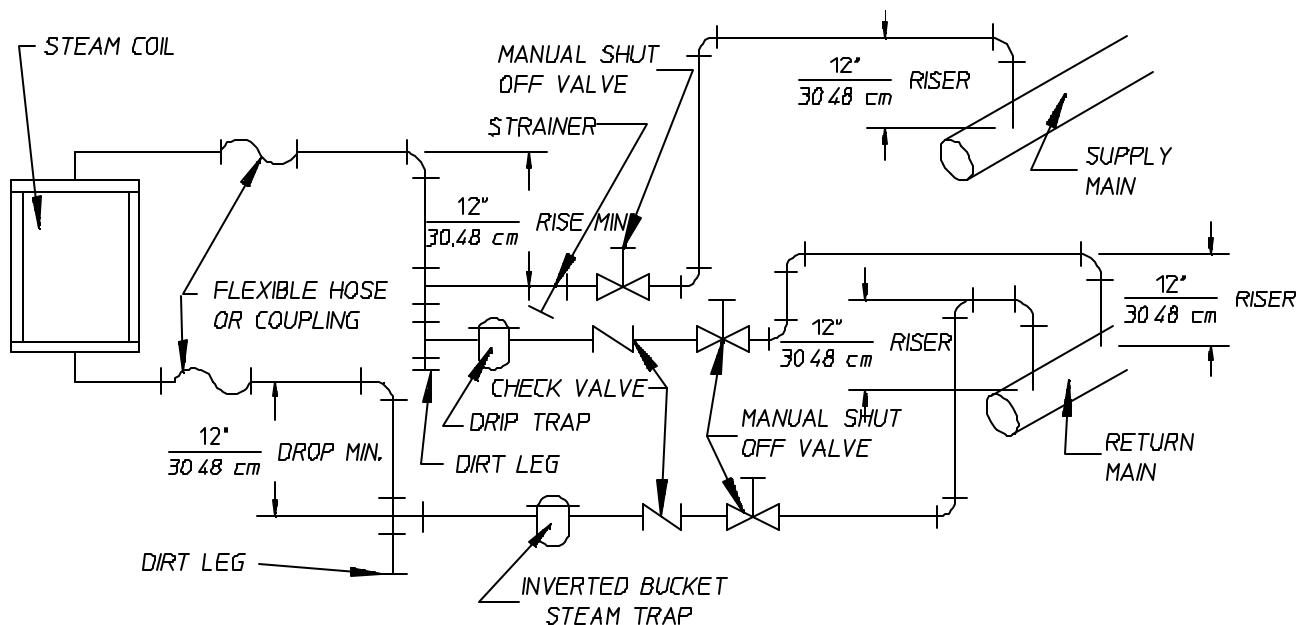
Inlet -----2" (5.08 cm) supply line connection  
Return ---- 1-1/4" (3.18 cm) return line connection

### 3. Installation Instructions

To insure an adequate supply of steam is provided, be sure that the steam lines and steam return lines are sized and laid out as stipulated in this manual. Inadequate steam lines and steam return lines or improper steam plumbing will result in poor performance and can cause component failure. Clean, dry steam **must be** provided to the dryer.

**IMPORTANT:** Steam coil failure due to water hammer by wet steam will VOID THE WARRANTY.

- a. The presence of condensate in the steam supply will cause water hammer and subsequent heat exchanger (steam coil failure). The steam supply connection into the main supply line **must be** made with a minimum 10-inch (25.4 cm) riser. This will prevent any condensate from draining towards the dryer.
- b. The steam supply piping to the dryer **must include** a 12-inch (30.48 cm) rise along with a drip trap and check valve. This will prevent any condensate from entering the steam coil.
- c. Flexible hoses or couplings **must be** used. The dryer vibrates slightly when it runs and this will cause the steam coil connections to crack if they are hard piped to the supply and return mains.
- d. Shut-off valves for each dryer **should be** installed in the supply line, return line, and drip trap return line. This will allow the dryer to be isolated from the supply main and the return main if the dryer needs maintenance work.
- e. Install an inverted bucket steam trap which will pass 2,700 lbs/hr (1224.69 kg/hr) at 125 PSI (8.62 bars) and a check valve at least 12-inches (30.48 cm) below the steam coil as close to the coil as possible.
- f. The supply line and the return line **should be** insulated. This will save energy and provide for the safety of the operator and maintenance personnel.
- g. Water pockets in the supply line, caused by low points, will provide wet steam to the coil possibly causing steam coil damage. **ALL** horizontal runs of steam supply piping **should be** pitched 1/4-inch (6.35 mm) for every 1 foot (0.30 meters) back towards the steam supply header causing the condensate in the line to drain the header. Install a bypass trap in any low point to eliminate wet steam.



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## STEAM DAMPER SYSTEM

#### 4. Steam Damper Air System Connections

The ADS-410 is manufactured with a pneumatic (piston) damper system which requires an external supply of compressed air. The connection is made at the left hand side on top of the dryer.

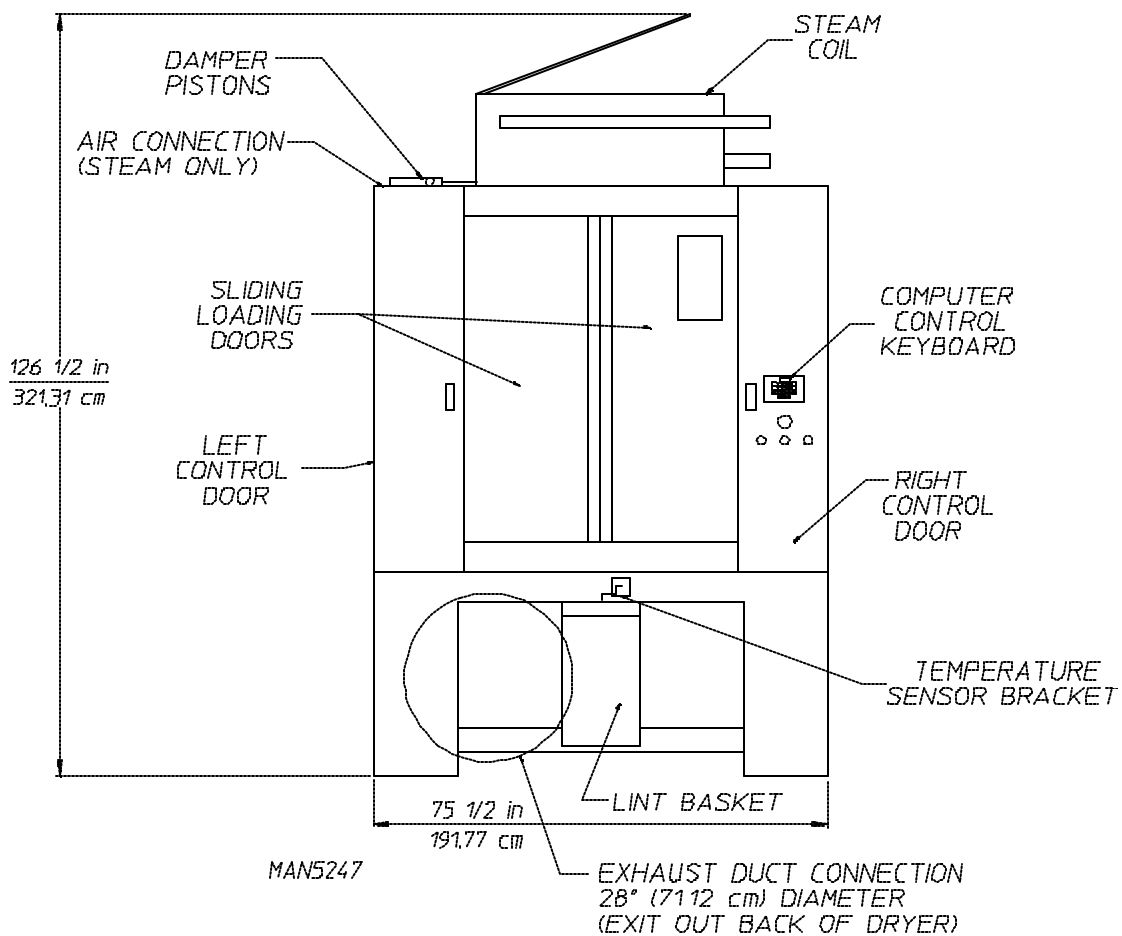
##### a. Air Requirements

Compressed Air Supply	Air Pressure	
Normal	80 PSI	<b>5.51 bars</b>
Minimum Supply	70 PSI	<b>4.82 bars</b>
Maximum Supply	90 PSI	<b>6.20 bars</b>

*Shaded areas are stated in metric equivalents*

##### b. Air Connections

Air connection to system --- 1/8" N.P.T.



- c. No air regulation is provided with a standard AD-410 dryer. External regulation of 80 PSI (5.51 bars) **must be** provided. It is suggested that a filter/regulator assembly (with gauge) be added to the compressed air line just before the dryer connection. This is necessary to insure that correct and clean air pressure is achieved. The filter/regulator assembly (with gauge) is provided on dryers with the AUTOMATIC DOOR OPTION or THE SPRINKLER CIRCUIT OPTION.

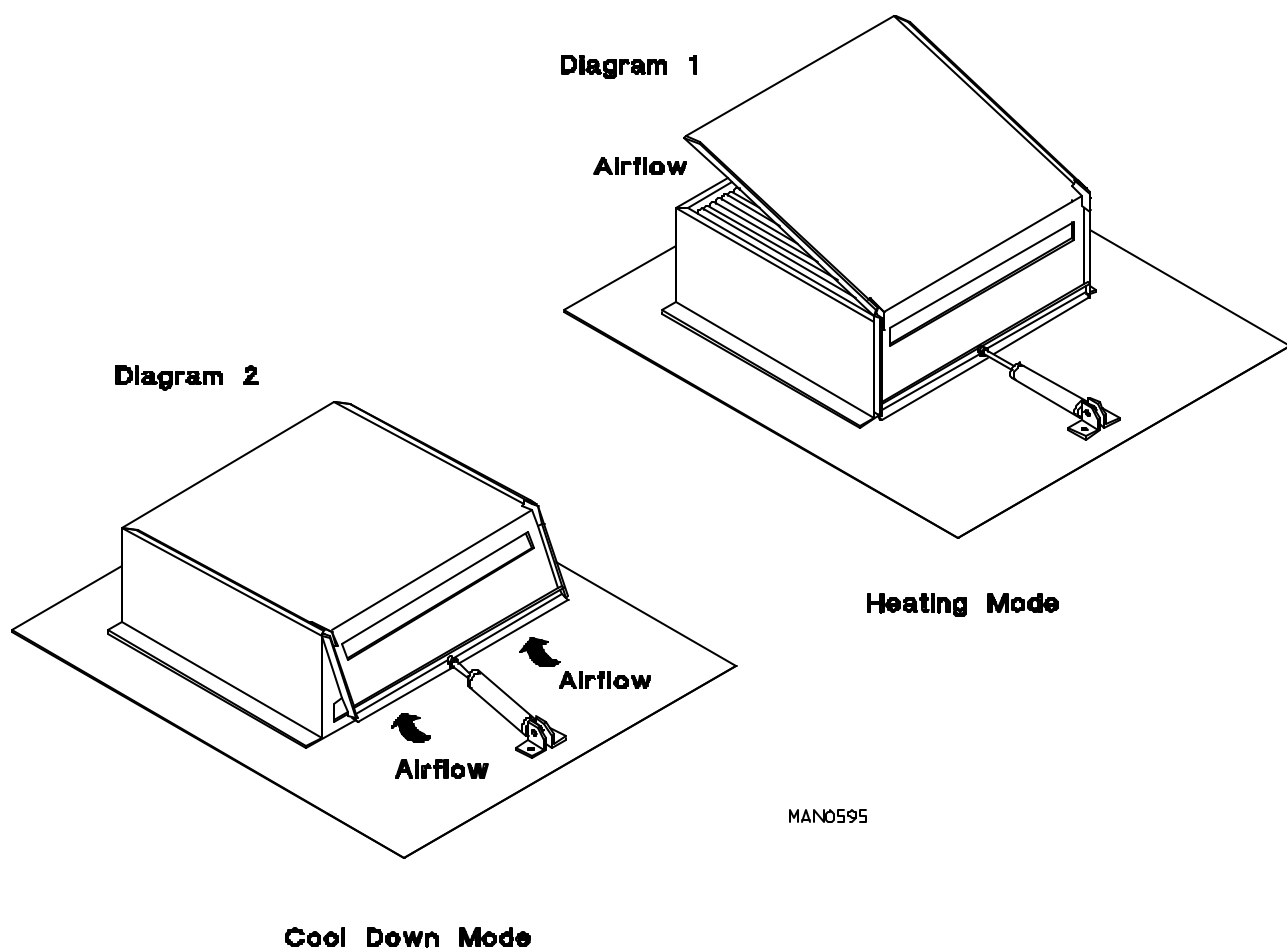
## 5. Steam Damper System Operation

The ADS-410 steam damper system shown in the illustration below, allows the coil to stay constantly charged eliminating repeated expansion and contraction. When the damper is opened, the air immediately passes through the already hot coil, providing instant heat to start the drying process. When the damper is closed, ambient air is drawn directly into the tumbler (basket), allowing a rapid cool down.

**Diagram 1** shows the damper in the heating (open) mode, allowing heat into the tumbler (basket/drum).

**Diagram 2** shows the damper in the cool down (closed) mode, pulling ambient air directly into the tumbler (basket/drum) without passing through the coils.

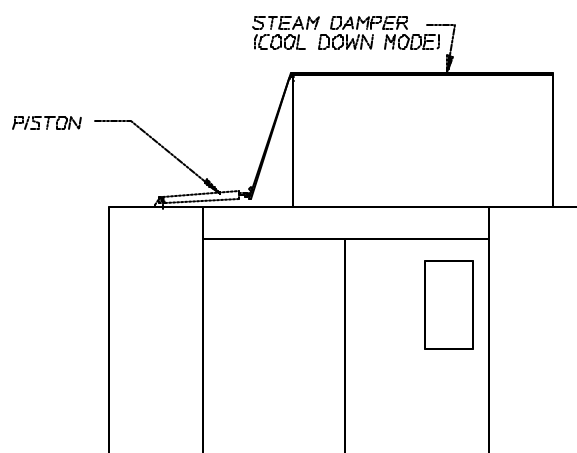
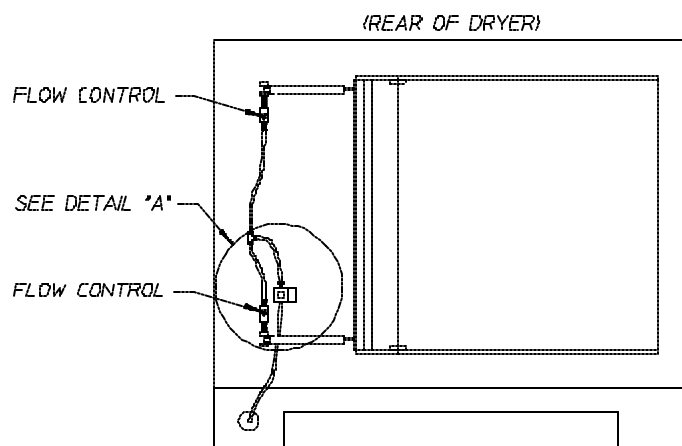
**NOTE:** With the dryer off or with no air supply, the steam damper is in the cool down mode as shown in **Diagram 2**



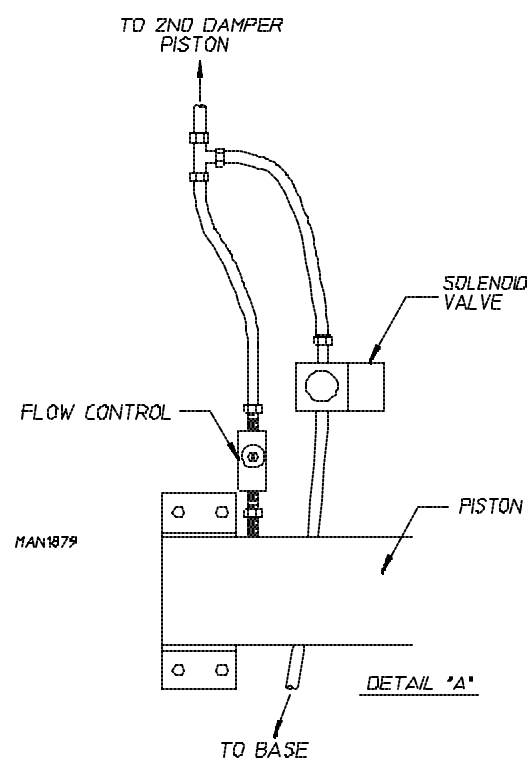
## 6. Steam Damper Air Piston (Flow Control) Operation Adjustment

Steam damper operation was tested and adjusted prior to shipping at 80 PSI (5.51 bars). If steam damper adjustment is necessary, locate the flow control valve and make the necessary adjustments as noted below.

**NOTE:** Adjust both flow control valves equally, so that both pistons operate at the same time.



NOTE:  
TURNING KNOB ON FLOW  
CONTROL CLOCKWISE WILL  
RESTRICT AIR FLOW. TURNING  
KNOB COUNTER-CLOCKWISE WILL  
ALLOW HIGHER AIR FLOW



## H. WATER SUPPLY CONNECTION FOR OPTIONAL SPRINKLER SYSTEM

If the dryer is equipped with the SPRINKLER SYSTEM OPTION, a water supply of approximately 40 PSI (2.75 bars) **must be** connected into the 1" N.P.T. sprinkler shut-off valve located on the left hand side of the dryer base.

## I. PREOPERATIONAL TESTS

**ALL** dryers are thoroughly tested and inspected before leaving the factory. However, a preoperational test **should be** performed before the dryer is publicly used. It is possible that adjustments have changed in transit or due to marginal location (installation) conditions.

1. Turn on electric power to the dryer.
2. Make sure the loading doors are closed and the lint drawer is closed.
3. Microprocessor controller (computer) system operational test -- to start the dryer:
  - a. L.E.D. (light emitting diode) display will read "FILL."
  - b. Press "E" (preprogrammed) cycle key on the touchpad of the keyboard.
  - c. L.E.D. display will quickly read ... "Ld30," "Lc04," and "F180" (unless special programs requested). These codes mean that the dryer is in the timed mode, will operate with heat at 180° F (Fahrenheit) - 82° C (Celsius) - for 30 minutes drying time, and have a 4 minute cool down period.
  - d. The dryer will now start, and the L.E.D. display will read "Dr30" (dry mode for 30 minutes) and count downwards in minutes.

**NOTE:** The dryer can be stopped at any time by opening the main door or by pressing the "CLEAR/STOP" key. To restart the dryer, press the "ENTER/START" key or a preprogrammed cycle key (i.e., "E").

**NOTE:** Pressing keyboard (touchpad) key "A," "B," "C," "D," and "F" will also start the dryer. The six (6) preprogrammed drying cycles ("A" through "F") have been stored in the microprocessor controller (computer) memory. Refer to the Programming Manual supplied with the dryer for these preprogrammed cycles.

4. Check to insure that the tumbler (basket) starts in the clockwise (CW) direction. Additionally, check the direction of the blower motor to insure that it rotates in the counterclockwise (CCW) direction as viewed from the left hand side of the dryer. If it does, the phasing is correct. If the phasing is incorrect, reverse two (2) of the leads at L1, L2, or L3 of the power supply connections made to the dryer.

**IMPORTANT:** The dryer blower motor and impellor/fan shaft as viewed from the left hand side of the dryer **must turn** in the counterclockwise (CCW) direction, otherwise the dryer efficiency **will be** drastically reduced, and premature component failure can result.

5. Heat Circuit Operational Test

- a. Gas Models

- 1) When the dryer is first started (during initial start-up), the burners have a tendency not to ignite on the first attempt. This is because the gas supply piping is filled with air, so the dryer might have to be stopped and restarted several times for this air to be purged from the lines.



- 2) The dryer has two (2) burner boxes and each burner has its own Direct Spark Ignition (DSI) Module and Spark Ignition/Flame-Probe Assembly. If ignition is not established after the first attempt, or if one (1) burner lights and the other does not, then the system will shut both burners off and the “HEATER FAULT” light will come on. To reset the heater circuit, press in the “HEATER FAULT” button.

**NOTE:** During the purging period, verify that **ALL** gas shut-off valves are open.

- 3) Once ignition is established, a gas pressure test **should be** taken at each gas valve pressure tap of the dryer to assure that the water column pressure is correct and consistent.

**NOTE:** Water column pressure requirements measured at both gas valve pressure taps...

NATURAL GAS --- 3.5 Inches Water Column (W.C.) - 8.7 mb.

L.P. GAS ----- 10.5 Inches Water Column (W.C.) - 26.1 mb.

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

b. Steam Models

- 1) Check to insure that the steam damper is functioning properly.
6. Make a complete operational check of **ALL** safety-related circuits (i.e., lint drawer switch and sail switches on gas models).
7. **A reversing tumbler (basket) should never be operated with less than a 250 lbs (113.40 kg) load (dry weight).** The size of the load will affect the coast-down and dwell (stop) times. ***The tumbler (basket) must come to a complete stop before starting in the opposite direction.*** For automatic (mode) cycle only, the spin and stop times are not adjustable and have been preprogrammed into the microprocessor controller (computer) for a 2 minute spin time and a 7-second dwell (stop) time.

### BASKET COATING

The tumbler (basket) is treated with a protective coating. We suggest dampening old garments or cloth material with a solution of water and nonflammable mild detergent and tumbling them in the tumbler (basket) to remove this coating.

8. Each dryer **should be** operated through one (1) complete cycle to assure that no further adjustments are necessary and that **ALL** components are functioning properly.
9. Microprocessor controller (computer) programs/selections:
  - a. Each microprocessor controller (computer) has been preprogrammed by the factory with the most commonly used program (parameter) selections. If computer programming changes are required, refer to the Computer Programming Manual which was shipped with the dryer.

## J. PREPARATION FOR OPERATION/START-UP

The following items **should be** checked before attempting to operate the dryer:

1. Read **ALL** “**CAUTION,**” “**WARNING,**” and “**DIRECTION**” labels attached to the dryer.
2. Check incoming supply voltage to be sure that it is the same as indicated on the dryer data label affixed behind the right control box door. In the case of 208 VAC or 230 VAC for dryers with sprinkler option, verify single-phase (1 $\phi$ ) voltage is correct. ***THE SUPPLY VOLTAGE MUST MATCH THE ELECTRICAL SERVICE EXACTLY.***
3. **GAS MODELS** - Check to assure that the dryer is connected to the type of heat/gas indicated on the dryer data label.
4. **GAS MODELS** - the sail switch damper assembly was installed and adjusted at the factory prior to shipping. However, each sail switch adjustment **must be** checked to assure that this important safety control is functioning.
5. **GAS MODELS** - be sure that **ALL** gas shut-off valves are in the open position.
6. Be sure **ALL** side and base panels are on the dryer.
7. Check **ALL** service doors to assure that they are closed and secure.
8. Be sure the lint drawer is securely in place.

<p><b>NOTE:</b> Lint drawer <b><i>must be</i></b> <b><u>ALL</u></b> the way in place to activate the safety switch otherwise the dryer <b><u>will not</u></b> start.</p>
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9. Rotate the tumbler (basket/drum) by hand to be sure it moves freely.
10. Check bolts, nuts, screws, terminals, and fittings for security.
11. Check to insure air supply (80 PSI [5.51 bars]) is connected to the dryer.
12. **STEAM MODELS** - check to insure **ALL** steam shut-off valves are open.

## **K. SHUT DOWN INSTRUCTIONS**

If the dryer is to be shut down (taken out of service) for a period of time, the following **must be** performed:

1. Discontinue power to the dryer either at the external disconnect switch or the circuit breaker.
2. Discontinue the heat supply:
  - a. ***GAS MODELS* ... discontinue the gas supply ...**
    - 1) **SHUT OFF external gas supply shut-off valve.**
    - 2) **SHUT OFF internal gas supply shut-off valves located in the gas valve burner area.**
  - b. ***STEAM MODELS* ... discontinue the steam supply ...**
    - 1) **SHUT OFF external (location furnished) shut-off valve.**
    - 2) **SHUT OFF internal steam valves located in the supply lines and the return lines.**

## SECTION IV

### SERVICE/PARTS INFORMATION

#### A. SERVICE

1. Service **must be** performed by a qualified trained technician, service agency, or gas supplier. If service is required, contact the distributor from whom the **ADC** equipment was purchased. If the distributor **cannot** be contacted or is unknown, contact the **ADC** Service Department for a distributor in your area.

**NOTE:** When contacting the **ADC** Service Department, be sure to give them the correct **model number** and **serial number** so that your inquiry is handled in an expeditious manner.

#### B. PARTS

1. Replacement parts **should be** purchased from the distributor from whom the **ADC** equipment was purchased. If the distributor **cannot** be contacted or is unknown, contact the **ADC** Parts Department for a distributor in your area. Parts may also be purchased directly from the factory by calling the **ADC** Parts Department at (508) 678-9000 or you may FAX in your order at (508) 678-9447.

**NOTE:** When ordering replacement parts from the **ADC** dealer or the **ADC** factory be sure to give them the correct **model number** and **serial number** so that your parts order can be processed in an expeditious manner.

# SECTION V

## WARRANTY INFORMATION

### A. RETURNING WARRANTY CARD(S)

1. Before any dryer leaves the **ADC** factory test area, a warranty card is placed in a plastic bag behind the right control door. These warranty cards are intended to serve the customer, where we record the individual installation date and warranty information to better serve you should you file a warranty claim.
  - a. If a warranty card did not come with your dryer, contact the **ADC** Warranty Department or **ADC** Service Department at (508) 678-9000.

### B. WARRANTY

For a copy of the **ADC** commercial warranty covering your particular dryer(s), contact the **ADC** distributor from whom you purchased the equipment and request a dryer warranty form. If the distributor **cannot** be contacted or is unknown, warranty information can be obtained from the factory by contacting the **ADC** Warranty Department at (508) 678-9000.

**NOTE:** Whenever contacting the **ADC** factory for warranty or warranty information, be sure to have the dryer's **model number** and **serial number** available so that your inquiry can be handled in an expeditious manner.

### C. RETURNING WARRANTY PART(S)

**ALL** dryer or parts warranty claims or inquiries **should be** addressed to the **ADC** Warranty Parts Department. To expedite processing, the following procedures **must be** followed:

1. No parts are to be returned to **ADC** without prior written authorization ("Return Material Authorization") from the factory.

**NOTE:** A "Return Material Authorization" (R.M.A.) is valid for only sixty (60) days from date of issue.

- a. The R.M.A. issued by the factory, as well as any other correspondence pertaining to the returned part(s), **must be** included inside the package with the failed merchandise.

2. Each part **must be** tagged with the following information:
  - a. **Model number** and **serial number** of the dryer from which the part was removed.
  - b. Nature of failure (be specific).
  - c. Date of dryer installation.
  - d. Date of part failure.
  - e. Specify whether the part(s) being returned is for a replacement, a credit, or a refund.

**NOTE:** If a part is marked for a credit or a refund, the invoice number covering the purchase of the replacement part ***must be*** provided.

**NOTE:** Warranty tags (ADC Part No. 450064) are available at “no charge” from ADC upon request.

3. The company returning the part(s) must clearly note the complete company name and address on the outside of the package.
4. **ALL** returns **must be** properly packaged to insure that they are not damaged in transit. *Damage claims are the responsibility of the shipper.*

**IMPORTANT:** No replacements, credits, or refunds **will be** issued for merchandise damaged in transit.

5. **ALL** returns **should be** shipped to the ADC factory in such a manner that they are insured and a proof of delivery can be obtained by the sender.
6. **Shipping charges are not the responsibility of ADC. ALL returns *should be* “prepaid” to the factory. Any “C.O.D.” or “COLLECT” returns will not be accepted.**

**IMPORTANT:** No replacements, credits, or refunds **will be** issued if the claim **cannot** be processed due to insufficient information. The party filing the claim **will be** notified in writing, either by “FAX” or “CERTIFIED MAIL - Return Receipt Requested,” as to the information necessary to process claim. If reply **is not** received by the ADC Warranty Department within thirty (30) days from the FAX/letter date, then no replacement, credit, or refund **will be** issued, and the merchandise **will be discarded.**

# SECTION VI

## 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.**

**WARNING: 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 IN THE DRYER (*cleaning the lint drawers is the only exception*).**

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

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

#### ***WEEKLY***

Open the hinged panels on each side of the tumbler (basket) section and remove any lint accumulation from the tumbler (basket) drive motor, drive shafts, speed reducing idler shaft, drive chains, drive wheels, and drive shaft bearings.

Slide the lint basket **ALL** the way out of the dryer and clean any lint accumulation off of the temperature sensor bracket, which is located above the lint basket.

**WARNING: TO AVOID THE HAZARD OF ELECTRICAL SHOCK, DISCONTINUE ELECTRICAL SUPPLY TO THE DRYER.**

***MONTHLY***

Empty the compressed air filter bowl.

Add oil to the compressed air lubricator bowl. Use a petroleum-based non-detergent lightweight oil (SAE 10/150 SSU), which will readily break up into a mist, such as Mobil DTE Light Oil or its equivalent. **DO NOT** use synthetic oils.

Retighten set screws in the collars of the four (4) 2-inch (5.08 cm) diameter tumbler (basket) drive shaft bearings.

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

**NOTE:** To prevent damage, avoid cleaning and/or touching the ignitor/flame-probe assembly.

Check the fan (impellor) and drive motor belts for tightness and wear. Retighten and/or replace if required.

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 duct work system and from the dryer's internal exhaust ducting.

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

**NOTE: *DO NOT* OBSTRUCT THE FLOW OF COMBUSTION and VENTILATION AIR. CHECK CUSTOMER FURNISHED BACK DRAFT DAMPERS IN THE EXHAUST DUCT WORK. INSPECT and REMOVE ANY LINT ACCUMULATION WHICH CAN CAUSE THE DAMPER TO BIND or STICK.**

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



## B. ADJUSTMENTS

### ***7 DAYS AFTER INSTALLATION and EVERY 6 MONTHS THEREAFTER***

Inspect bolts, nuts, screws (bearing set screws), nonpermanent gas connections (i.e., unions, shut-off valves, orifices), and grounding connections. Fan (impellor) V-belts, along with the motor and drive chains **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 (i.e., door switches, lint drawer switch, sail switch, burner, and hi-limit thermostats).

### ***30 DAYS AFTER INSTALLATION***

**SHUT OFF ALL POWER TO THE DRYER.** Verify that the electrical connections to the motor contactors and overloads are tight. This is done to accommodate the compression of the wires over time.

## C. 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 an 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 an NLGI Grade 2 multipurpose industrial grease with a lithium thickener and mineral base oil.

# SECTION VII

## COMPONENT SYSTEM DESCRIPTIONS

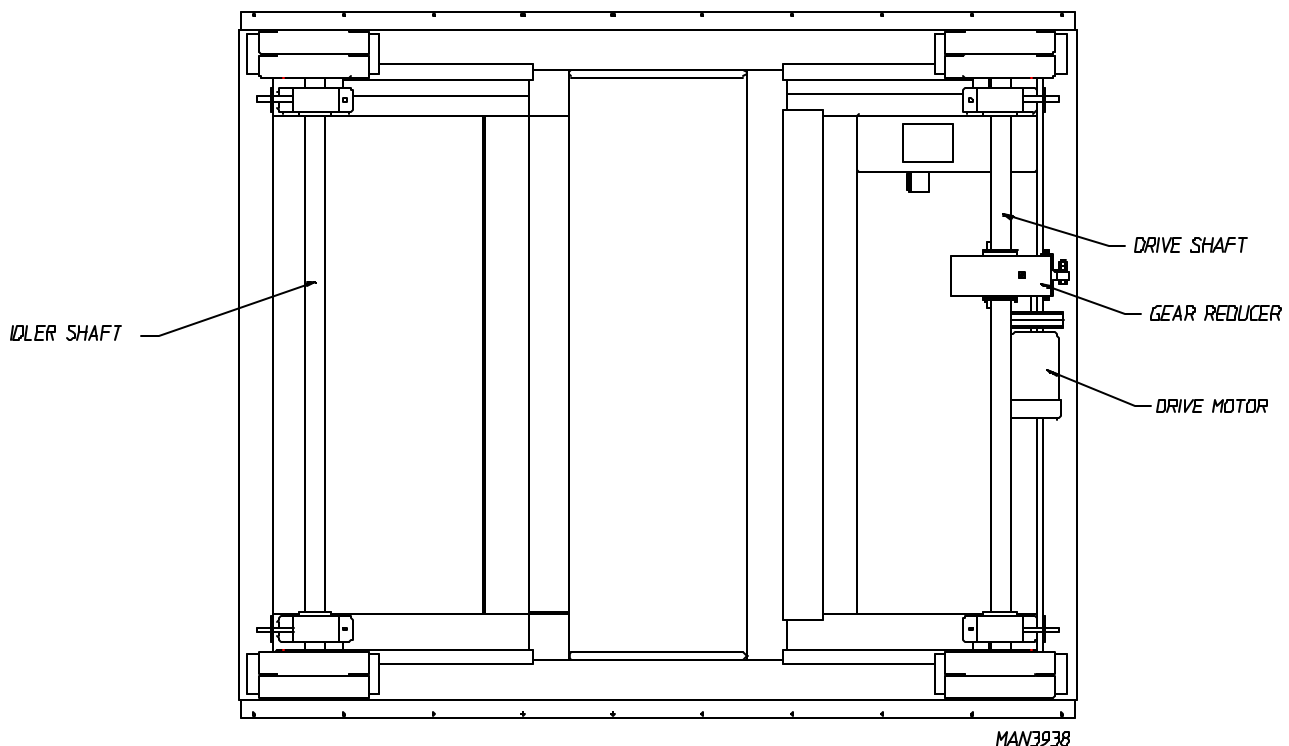
### A. TUMBLER (BASKET) DRIVE SYSTEM

The tumbler (basket) is supported and driven by four (4) 11-inch (27.94 cm) diameter drive wheels assemblies. Two (2) of these wheels are attached to a 2-inch (5.08 cm) diameter idler shaft, while the other two (2) are attached to a 2-inch (5.08 cm) diameter drive shaft. Each of the wheels is fastened to the shafts by a wheel taper lock bushing.

The idler shaft and drive shaft are each supported by two (2) 2-inch (5.08 cm) diameter pillow block bearings. These bearings sit on slotted support channels and can be moved inward or outward by the adjustment bolts to raise or lower the tumbler (basket).

The drive system consists of a 7-1/2 HP (5.59 kw) drive motor which is connected to the drive shaft by two (2) "A" section V-belts, driving a shaft-mounted (5.6 to 1 ratio) gear reducer. This produces a tumbler (basket) speed of approximately 31.5 r.p.m. Proper tension is maintained on the V-belts by tightening the gear reducer turnbuckle support. The oil in the gear reducer **must be** replaced every six (6) months by 1.4 liters of I.S.O. viscosity grade 460 gear oil.

AD - 410 TUMBLER DRIVE SYSTEM



## B. TUMBLER (BASKET)

The tumbler (basket) is made of 14-gauge stainless steel perforated panels, five (5) stainless steel ribs, and two (2) outer tumbler rings made of rolled steel angle iron that has been turned on a lathe for smoothness. The tumbler (basket) is a completely welded assembly so the perforated panels are not removable.

## C. AIR BLOWER DRIVE SYSTEM

The impellor (fan) used in the AD-410 dryer is a 22-1/4" (56.52 cm) diameter squirrel cage impellor (fan) wheel. It spins in a counterclockwise (CCW) direction looking at the back of the blower housing.

The impellor (fan) shaft is mounted in two (2) pillow block bearings, and the shaft is driven by two (2) B-section V-belts connected to the 25 HP (18.64 kw) blower motor.

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

## D. AIR JET SYSTEM

The Air Jet System is activated at the end of a drying cycle to clean lint accumulation off of the blower (impellor/fan).

## E. SAFETY DEVICES

### 1. Load/Unload Door Switches

There are two (2) of these switches located above the main loading doors. These switches ensure that the doors are closed before the dryer can start and ensures that the doors are fully open before the dryer will tilt. If the dryer is started when the loading doors are open, the microprocessor controller (computer) L.E.D. (light emitting diode) display will show "door."

### 2. Lint Basket Switch

This switch ensures that the lint basket is closed before the dryer can start. This switch is located at the front of the dryer at the right hand side of the lint basket. If the lint basket is open when the dryer is started, the microprocessor controller (computer) L.E.D. display will show "door."

### 3. Tumbler (Basket) Hi-Limit Safety Thermostat

This disc temperature switch has a setting of 225° F (107° C). It is located below the tumbler (basket) on the temperature sensor bracket, along side the computer (microprocessor) sensor, and is an automatic reset type switch. Access to this switch is gained by sliding/pulling the lint basket completely out of the dryer.

This switch backs up the computer (microprocessor) sensor and in case of a computer (microprocessor) malfunction will prevent the tumbler's (basket's) temperature from becoming excessive. If this switch trips, the gas flow to the burner boxes will be shut down; however, the tumbler (basket) will still rotate.

4. Burner Box Hi-Limit Safety Thermostats *(for Gas Models Only)*

These disc temperature switches have a setting of 330° F (165° C). They are located on the right hand side of each burner box, and they are an automatic reset type of switch. These switches ensure that there is proper airflow through the burner box. Upon a low airflow condition, which may be caused by a clogged lint screen, excessively long or blocked exhaust duct, or improper make-up air, the temperature in the burner boxes will increase tripping these switches. This will shut off the gas flow to the burner boxes, however, the tumbler (basket) will still rotate.

5. Sail Switches *(for Gas Dryers Only)*

These sail switches are located in the front and back of the burner boxes. 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 burners. This creates a negative pressure inside the burner boxes. This negative pressure pulls in the round dampers and activates the sail switches. If there is an improper (low) airflow through the dryer, the sail switch dampers will not pull in, preventing the heat from coming on.

Low airflow through the dryer will be caused by overly long or block exhaust ducting, lack of make-up air, or a clogged lint screen.

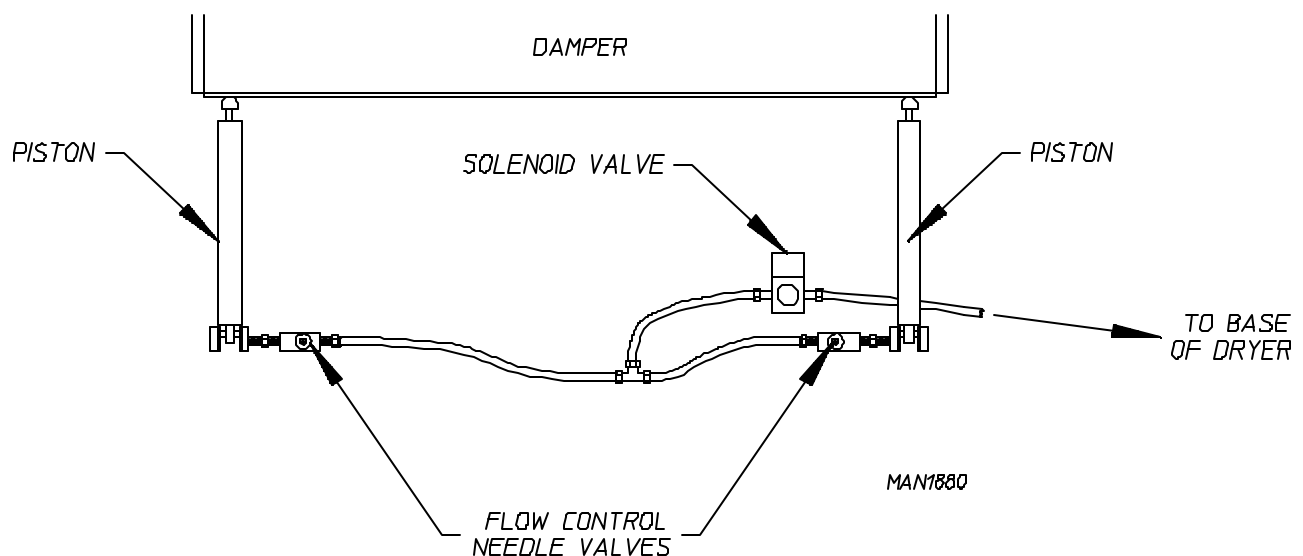
## F. STEAM DAMPER ACTUATOR SYSTEM

The system consists of a hinged damper plate, two (2) pneumatic pistons (each with its own airflow needle valve) to control the speed of both pistons actuation, and a 24 volt solenoid valve.

On a call for heat, a 24 volt signal is applied to the 3-way/2 position solenoid valve. This signal switches the valve so that compressed air is sent to the pistons. The piston rods extend, pushing the hinged steam damper plate to the open position. This allows room air to be drawn through the hot steam coil and then through the tumbler (basket).

When the temperature set point has been reached, the 24 volt signal is removed from the solenoid valve, so that the solenoid valve blocks the air supply to the pistons, and the air in the pistons is bled to the atmosphere. The springs in the pistons now retract the piston rods, closing the steam damper. The steam damper plate now covers the steam coil and allows room air to bypass the coil before entering the tumbler (basket) for a rapid cool down.

The steam damper plate should open and close slowly and smoothly. The speed can be modulated by adjusting both needle valve knobs. Turning the knob clockwise (CW) restricts the compressed airflow and slows down the steam damper movement. Counterclockwise (CCW) adjustment speeds up the steam damper motion. Upon completion of adjustment, tighten the needle valve's locking nut.



**NOTE:** Turning the knob on the **FLOW CONTROL VALVE** clockwise (CW) will restrict airflow. Turning the knob on the **FLOW CONTROL VALVE** counterclockwise (CCW) will allow higher airflow.

# SECTION VIII

## OPTIONAL SPRINKLER SYSTEM COMPONENTS

### OPTIONAL SPRINKLER CIRCUIT COMPONENTS

#### AUTO “EMERGENCY STOP” (E-Stop) RELAY

This device, located in the Front Right Electrical Enclosure, supplies the main control voltage to the dryer.

The AD-410's Sprinkler Circuit supplies or removes 120 VAC to the coil of this relay for the “EMERGENCY STOP” (E-Stop) power disconnect control.

#### TEMPERATURE CONTROLLER

This device is located in the Front Left Electrical Enclosure and monitors the Sprinkler Circuit temperature. Its operating functions are preset at the factory and **should not** require any adjustment.

#### RTD (Resistive Temperature Device) TEMPERATURE PROBE

This device is a high temperature 100 Ohm (100  $\Omega$ ) RTD (Resistive Temperature Device) Probe and is located on the upper left hand side of the tumbler (basket).

#### PNEUMATIC VALVE

This is a Dual Pneumatic 110 VAC Control Valve and is located in the lower rear base section of the dryer. Power to turn “ON” the Pneumatic Valve is supplied from the Sprinkler Control Circuit. Power to turn “OFF” the sprinkler is supplied from a manual reset button located on the right front control door.

#### SPRINKLER VALVE

This valve controls the flow of the sprinkler water. It is air actuated and requires air pressure to turn “ON” or “OFF.”

NOTE THAT THERE IS A “RED” INDICATING PISTON AT THE REAR OF THIS SPRINKLER VALVE.

The piston indicates the current state of the valve; when the piston is “IN” the valve is “CLOSED,” when the piston is “OUT” the valve is “OPEN.”

#### ALARM HORN

This component is an audible device to indicate that the Sprinkler System has tripped and that water is flowing into the tumbler (basket). The Alarm Horn will reset when the Sprinkler System is reset.

## SPRINKLER RESET BUTTON

This amber colored push button is located on the right hand control door and illuminates when the Sprinkler System is activated. Attempting to reset the Sprinkler System with this button can be tried, however, if the sprinkler circuit continues to be in the active mode the reset function will not latch.

## SPRINKLER and MAIN POWER CONNECTIONS

There are two (2) individual power connections to an AD-410 that includes the Sprinkler System Option.

1. Main Dryer Power (3-phase [3Ø]).
2. Dedicated Sprinkler System Circuit Power (single-phase [1Ø]).

Both of these connections are at the voltage rating of the dryer and can be installed in the front right base electrical enclosure. The larger connection is for main electrical power and the smaller connections, located to the right of the larger connection is for the dedicated Sprinkler System Circuit power.

Refer to the dryer nameplate for voltage rating information.

## SPRINKLER THEORY OF OPERATION

1. Power Sprinkler System Circuit.
2. “TURN TO RELEASE” **ALL** “EMERGENCY STOP” (E-Stop) buttons.
3. Run dryer.

If the temperature of the tumbler (basket) should rise above the sprinkler controller’s preset value the Sprinkler System will activate and the following will occur:

- An “AUTOMATIC ‘EMERGENCY STOP’ ” (E-Stop) will stop the dryer.
- The Alarm Horn will sound.
- The amber Sprinkler System reset button will light.
- The Sprinkler System will spray water into the tumbler (basket).
- The water will flow and the Alarm Horn will sound until:

The temperature of the tumbler (basket) falls below sprinkler controller’s preset value and the Sprinkler System reset button is pressed.

<b>NOTE: THE SPRINKLER SYSTEM <u>DOES NOT</u> AUTOMATICALLY RESET.</b>
--

## AD-410 SPRINKLER OPTION TEMPERATURE CONTROLLER SETTINGS

**NOTE:** Refer to Controller's User's Manual for further information on controller options.

Message Display	Message Description	Settings
SP	TEMPERATURE SET POINT	575° F or 301.6° C
ALHi	ALARM HI	575° F or 301.6° C (NOTE: ADJUST SAME AS SP)
InP	INPUT DEVICE	P 385 = RTD INPUT
F-C	° F or ° C	SELECT TYPE REQUIRED (FAHRENHEIT OR CELSIUS)
dpt	DECIMAL POINT	0, NO DECIMAL POINT
InPt	INPUT FAULT TIMER	0.2
SPL	SET POINT LOW	500 (SETTING <i>CAN NOT BE</i> LOWER)
SPH	SET POINT HIGH	700 (SETTING <i>CAN NOT BE</i> HIGHER)
SPSt	SET POINT STATE	rE (REVERSE ACTION)
SPOL	SET POINT OUTPUT LOW LIMIT	0% (NOT USED)
SPOH	SET POINT OUTPUT HIGH LIMIT	100% (NOT USED)
SPLP	SET POINT LAMP	0 OFF (LAMP OFF WHEN OUTPUT IS ON)
AL	HIGH ALARM ONLY	Hi
ALt	ALARM TYPE	Abs (ABSOLUTE ALARM)
ALrE	ALARM RESET	OnOf (AUTOMATIC RESET)
ALPi	ALARM POWER INTERRUPT	OFF (ALARM INHIBIT IS OFF)
ALiH	ALARM INHIBIT	OFF (ALARM INHIBIT IS OFF)
ALSt	ALARM OUTPUT STATE	CLOS (CLOSES CONTACTS AT ALARM SET POINT)
ALLp	ALARM LAMP	0 ON (ALARM LAMP IS ON WHEN ALARM CONTACT IS CLOSED)
SECr	SECURITY CODE	FULL SECURITY - SET TO 110 (DISPLAYED AS 1) "VIEW ONLY" NO SECURITY - SET TO 111 (DISPLAYED AS 4) "ALL FEATURES UNLOCKED"



# SECTION IX

## TROUBLESHOOTING

**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 DRYER 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 component(s) 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 suspected 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.**

**WARNING: WHILE MAKING REPAIRS, OBSERVE ALL SAFETY PRECAUTIONS DISPLAYED ON THE DRYER or SPECIFIED IN THIS MANUAL.**

### **A. No Display...**

1. “EMERGENCY STOP” (E-Stop) button pushed in.
2. Service panel fuses blown or tripped breaker.
3. Blown F1 (fuse 1) or F2 (fuse 2) on right base main electrical enclosure.
4. Blown F4 (fuse 4) or F5 (fuse 5) on right hand control panel.
5. Failed microprocessor controller (computer).
6. Optional sprinkler circuit emergency relay is not engaged ...
  - a. Service panel fuse blown or tripped breaker.
  - b. Sprinkler circuit is activated.

**NOTE: SPRINKLER *MUST HAVE* POWER FOR THE DRYER TO OPERATE.**

**B. Drive motor is not operating (does not start)...**

\* **Microprocessor controller (computer) relay output indicator (either forward “FWD” or reverse “REV”) is on.**

1. Blown drive motor contactor fuse(s)/overload(s).
2. Failed drive motor contactor.
3. Failed drive motor.

\* **Microprocessor controller (computer) relay output indicator (neither forward “FWD” or reverse “REV”) is on.**

1. Failed microprocessor controller (computer).

**C. Drive motor operates in one direction only...stops and restarts in the same direction...**

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

1. Failed reversing contactor (relay).

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

1. Failed microprocessor controller (computer).

**D. 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) L.E.D. (light emitting diode) display will read “door.”

1. Motor is overheating ...
  - a. Motor air vents clogged with lint.
  - b. Low voltage to motor.
  - c. Failed motor.
  - d. Tumbler (basket) is binding...check for an obstruction.
  - e. Tumbler (basket) bearings are binding.
  - f. Drive chains are too tight.
  - g. Dryer has an oversized load.
2. Failed overload protector.

**E. Impellor (fan) motor is not operating (does not start)...**

**\* Microprocessor controller (computer) “MTR” relay output indicator is on.**

1. Failed blower (impellor/fan) motor fuse(s)/overload(s).
2. Failed blower (impellor/fan) motor contactor (relay).
3. Failed blower (impellor/fan) motor.
4. Sail switch engaged prior to start of dry cycle.

**\* Microprocessor controller (computer) “MTR” relay output indicator is off.**

1. Failed microprocessor controller (computer).

**F. Blower (impellor/fan) 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) L.E.D. (light emitting diode) display will read “door.”

1. Motor is overheating ...
  - a. Motor air vents clogged with lint.
  - b. Low voltage to motor.
  - c. Failed motor.
  - d. Tumbler (basket) is binding...check for an obstruction.
  - e. Tumbler (basket) bearings are binding.
  - f. V-belts are too tight.
2. Failed overload protector.

**G. Both drive motor and blower (impellor/fan) motor are not operating...microprocessor controller (computer) L.E.D. motor indicator dots and the “MTR” relay output and forward “FWD” or reverse “REV” L.E.D. indicators are on.**

1. Blown drive motor and blower (impellor/fan) motor fuse(s)/overload(s).
2. Failed motors (both blower [impellor/fan] motor and drive motor).

**H. Both drive motor and blower (impellor/fan) motor are not operating...microprocessor controller (computer) L.E.D. (light emitting diode) motor indicator dots and the “door” L.E.D. indicator are on but the relay output L.E.D. indicators are off (microprocessor controller [computer] L.E.D. display does not read “door”).**

1. Failed microprocessor controller (computer).

**I Microprocessor controller (computer) L.E.D. display reads “dSFL” continuously and the buzzer (tone) sounds every 30-seconds...**

1. Fault in microprocessor heating sensing circuit ...
  - a. Failed microprocessor temperature sensor.
  - b. Blown “dSFL” 1/8-amp fuse on the microprocessor controller (computer).
  - c. Failed microprocessor controller (computer).
  - d. Broken wire or connection between the microprocessor controller (computer) and the microprocessor temperature sensor.

**J. Microprocessor controller (computer) L.E.D. display reads “door” and the microprocessor controller (computer) “DOOR” L.E.D. indicator is off...**

1. Fault (open circuit) in main door/lint drawer switch circuit ...
  - a. Lint drawer is not closed **ALL** the way.
  - b. Lint drawer switch is out of proper adjustment.
  - c. Failed lint drawer switch.
  - d. One (1) of the main door switches has failed.
  - e. One (1) of the main door switch contact magnets is either missing or is broken.
  - f. Failed door switch relay.
  - g. Broken wire/connection in main door or lint drawer switch circuit.
  - h. Drive motor and/or blower (impellor/fan) motor thermal overload reset has tripped.
2. Failed 24 VAC step down transformer.
3. Master control relay (MCR) is not engaged.
4. Blown 24 VAC control circuit fuse (fuse 3 [F3]).

**K. Microprocessor controller (computer) L.E.D. (light emitting diode) display reads “door” and the microprocessor controller (computer) “DOOR” L.E.D. indicator is on...**

1. Failed microprocessor controller (computer).

**L. Microprocessor controller (computer) will not accept any keyboard (touchpad) entries, (i.e., L.E.D. display reads “FILL” and when keyboard [touchpad] entries are selected, the L.E.D. display continues to read “FILL”)...**

1. Dryer is not in level position.
2. Broken connection between level switches.
3. Level switches need to be adjusted.
4. Failed keyboard (touchpad) label assembly.
5. Failed microprocessor controller (computer).
6. Dryer has a “Heater Fault.”
7. Selector switch is not in “Dry” position.

**M. Microprocessor controller (computer) will only accept certain keyboard (touchpad) entries...**

1. Failed keyboard (touchpad) label assembly.
2. Failed microprocessor controller (computer).

**N. Microprocessor controller (computer) locks up and L.E.D. display reads erroneous message(s) or only partial segments...**

1. Transient power voltage spikes...disconnect the electrical power to the dryer, wait one (1) minute and reestablish power to the dryer. If problem is evident ...
  - a. Failed microprocessor controller (computer).
  - b. Failed keyboard (touchpad) label assembly.

**O. Dryer stops during a cycle, microprocessor controller (computer) buzzer (tone) sounds for 5-seconds, L.E.D. display reads “dSFL” for approximately 30-seconds and then returns to “FILL”...**

1. Loose connection somewhere between the microprocessor controller (computer) and the microprocessor temperature sensor.

**P. Dryer stops during a cycle, microprocessor controller (computer) buzzer (tone) sounds for a few seconds, and then microprocessor controller (computer) L.E.D. (light emitting diode) returns to “FILL”...**

1. Loose connection somewhere in the main power circuit to the microprocessor controller (computer).

**Q. Microprocessor controller (computer) L.E.D. display reads “SEFL”...**

1. Rotational sensor circuit failure...fault somewhere in the tumbler (basket) rotation or circuit ...
  - a. Tumbler (basket) is not rotating ...
    - 1) Broken tumbler (basket) drive chains.
    - 2) Failure in drive motor circuit...refer to **Section B, Section C, and Section D** on page 63.
  - b. Faulty rotation sensor.
  - c. Broken wire or connection between rotation sensor and microprocessor controller (computer).
  - d. Magnet missing or gap too large.

**R. Microprocessor controller (computer) L.E.D. reads “Hot”...**

1. Possible overheating condition...microprocessor controller (computer) has sensed a temperature which has exceeded 220° F (104° C).

“Hot” display will not clear until temperature sensed has dropped to 220° F (104° C) or lower and the microprocessor controller (computer) is manually reset by pressing the “CLEAR/STOP” key.

**S. No heat (*for Steam Models ONLY*)...both microprocessor controller (computer) L.E.D. heat indicator dot and the “HEAT” relay output L.E.D. are on...**

1. Fault in 225° F (107° C) hi-heat (limit) switch circuit or thermostat.
2. No (external) compressed air to steam damper...80 PSI (5.51 bars) required.
3. Failed steam damper 24 VAC pneumatic solenoid valve.
4. Failed steam damper pistons.
5. Steam damper stuck closed.

**T. Dryer operates but is taking too long to dry...**

1. Exhaust duct work run is too long or is undersized...back pressure cannot exceed 0.3 inches water column (W.C.) - 0.74 mb.
2. Restriction in duct work...check duct from the dryer ALL the way to the outdoors.

3. Low and/or inconsistent gas pressure (*for Gas Models Only*).
4. Insufficient make-up air.
5. Poor air/gas mixture at burner - yellow or poor flame pattern...adjust gas burner air adjustment shutters (*for Gas Models Only*).
6. Lint drawer/screen is not being cleaned on a regular basis or often enough.
7. Extractors (washer) is not performing properly.
8. Sail switch is fluttering...restriction in exhaust (*for Gas Models Only*).
9. Failed microprocessor controller (computer)...temperature calibration is inaccurate.
10. Failed microprocessor temperature sensor...calibration is inaccurate.
11. Failed burner hi-limit (*for Gas Models Only*).
12. Failed 225° F (107° C) hi-limit (thermostat).
13. Steam damper system is not functioning properly (*for Steam Dryer Only*) ...
  - a. Steam damper sticking closed.
  - b. Leak in pneumatic system.
14. Undersized load, dryer requires a minimum load size of approximately 250 lbs (113.40 kg) for maximum drying efficiency.

**U. Dryer stops during cycle, microprocessor controller (computer) displays “FILL” and keyboard (touchpad) is locked out with “HEATER FAULT” reset button flashing...**

1. Dryer is in “HEATER FAULT” ...
  - a. Only one of the burners are igniting ...
    - 1) Defective gas valve
    - 2) Faulty Direct Spark Ignition (DSI) module.
  - b. Gas valve status relays have a broken connection between relays and gas valves or relays and Programmable Logic Controller (PLC).
  - c. Broken connection between Programmable Logic Controller (PLC) to heat or status relay.

**V. Excessive noise and vibration...**

1. Dryer is not leveled properly.
2. Impellor (fan/blower) out of balance ...

- a. Excessive lint buildup on impellor (fan/blower)...check air jet.
- b. Failed impellor (fan/blower).
- 3. Loose motor mount.
- 4. Failed idler bearings and/or tumbler (basket) bearings.
- 5. V-belt(s) either too tight or too loose.
- 6. Tumbler (basket) drive wheels are worn or are loose.
- 7. Set screws of tumbler (basket) drive shaft bearings are loose.
- 8. Failed motor bearing.
- 9. Drive wheel taper lock bushing loose.

**W. Dryer will not tilt...**

- 1. No (external) compressed air to pneumatic switches...80 PSI (5.51 bars) required (11 cf/hr [0.31 cm/hr]) ...
  - a. Tilting to unload -- 1 door ...
    - 1) Dryer will not tilt unless the front doors are completely open ...
      - a) No door open signal.
      - b) Defective proximity switch.
  - b. Tilting to unload -- 2 doors ...
    - 1) Dryer will not tilt to unload unless the front doors are closed.
- 2. Lint drawer is open.

**X. Dryer will not level from a tilt position to a load position...**

- 1. Lint drawer is open.
- 2. Defective lint drawer switch.
- 3. Broken connection between the lint drawer switch and the lint drawer closed relay.

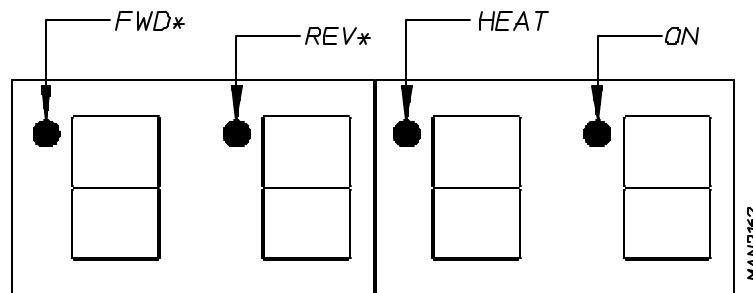


# SECTION X

## PROCEDURE FOR FUNCTIONAL CHECK OF REPLACEMENT COMPONENTS

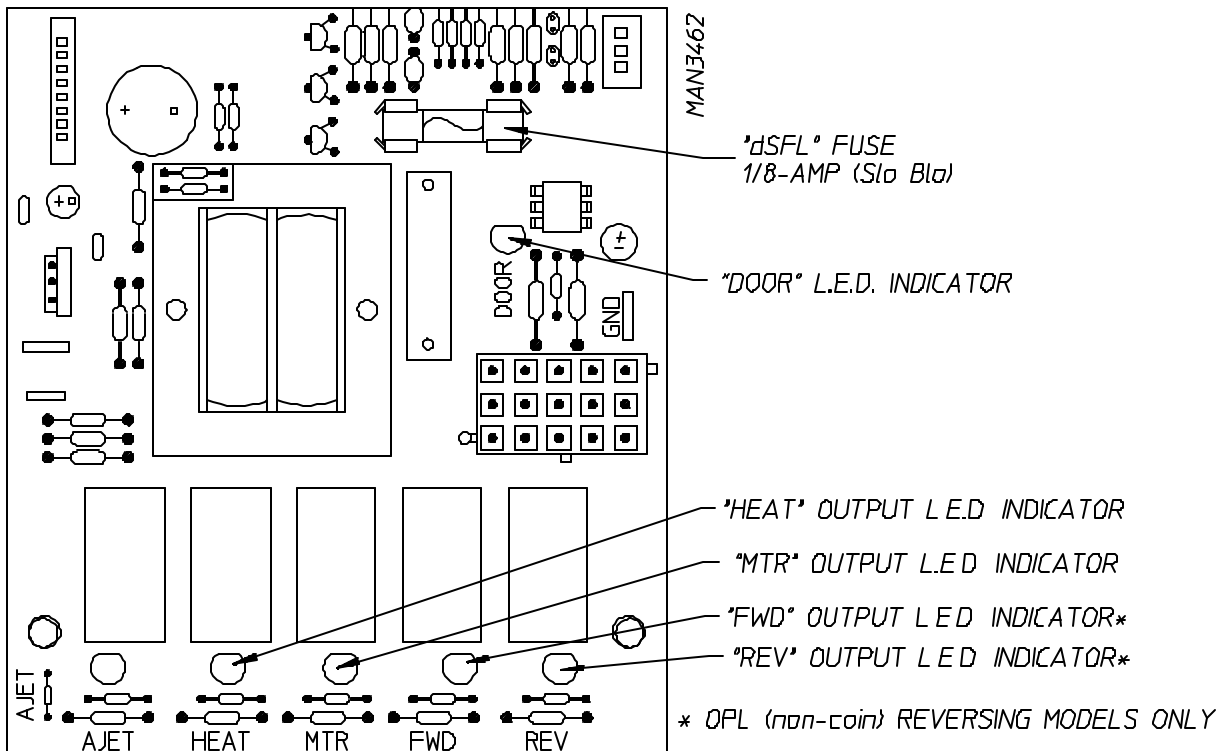
### 1. Microprocessor (computer) Board

- a. Upon completing installation of the replacement microprocessor (computer) board, reestablish power to the dryer.
- b. Start the drying cycle.
- c. Verify that the motor(s) and the heat indicator dots, in the microprocessor (computer) L.E.D. (light emitting diode) display are on. (Refer to the **illustration** below.)



\*OPL (NON-COIN) REVERSING MODELS ONLY.

- d. Verify that the motor(s) heat, and door indicator lights on the back side of the microprocessor (computer) board are lit. (Refer to the **illustration** below.)



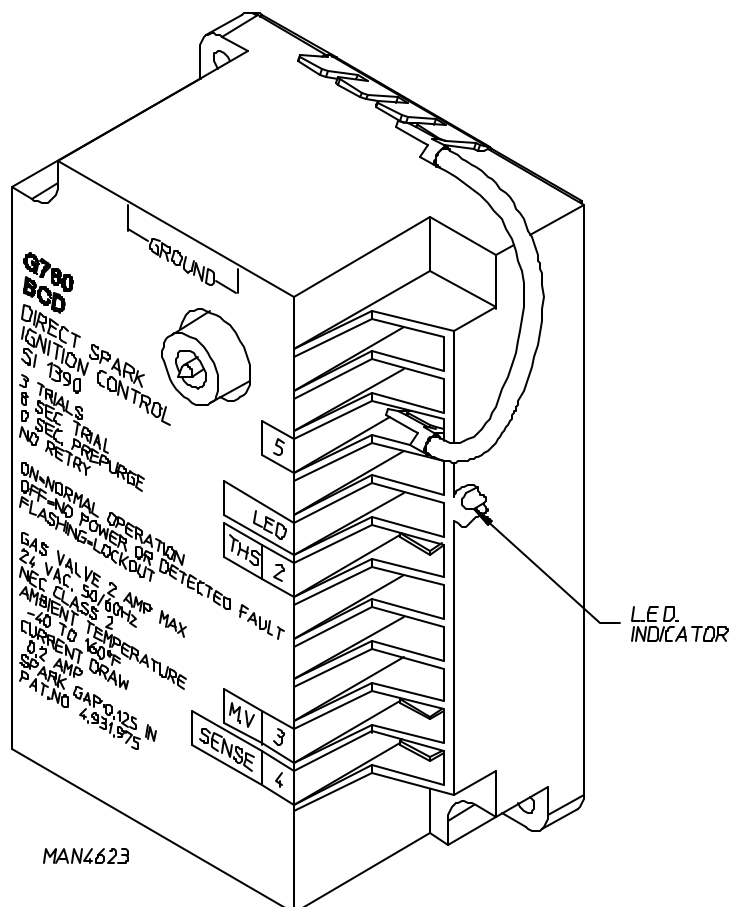
- e. Open main door. The dryer **must stop** and **ALL** indicator lights on the back side of the microprocessor (computer) board **must go out**. (Refer to the **illustration** on previous page [page 77].)
  - f. Try to restart the dryer with the main door open.
  - g. The microprocessor (computer) board's L.E.D. (light emitting diode) display **must read "DOOR."**
  - h. Close the main door and restart the dryer.
  - i. Functional check of microprocessor (computer) board is complete.
2. For Models With Johnson Controls DSI (Direct Spark Ignition) Module (G760)

#### 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 Direct Spark Ignition (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" (L.E.D. [light emitting diode] flashes).

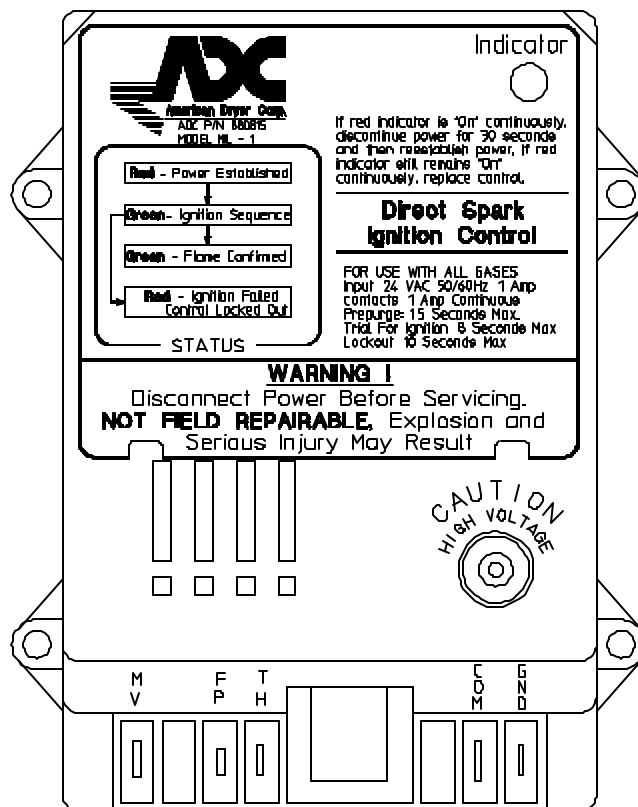
A steady L.E.D. indicator indicates normal operation.

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



3. For Direct Spark Ignition (DSI) System Models Manufactured With ADC Module Part No. 880815

- a. Upon completing installation of the replacement Direct Spark Ignition (DSI) module, reestablish power to the dryer.
- b. Start the drying cycle.
- c. The ignition (DSI) module's L.E.D. (light emitting diode) indicator will be "off" for up to approximately 1.5-seconds (prepurge time).
- d. The module's indicator light will then turn "green." The gas valve will be energized and the ignitor probe will spark for approximately 8-seconds. The burner flame **should now be** established. If the L.E.D. on the module lights "green" continuously, then the system is functioning properly. A flashing "green" L.E.D. (lockout mode) indicates that ignition flame has not been confirmed.



- e. With the burner flame on, remove the flame sensor wire from the sense terminal of the DSI module.
- f. The burner flame **must shut off** and the ignition module **must lockout** with the DSI module's indicator light flashing "green."
- g. Stop the drying cycle, with the flame sensor wire still removed, restart the drying cycle.
- h. The ignition module **must proceed** through the prepurge, with the indicator light "off," the ignition trial time of approximately 8-seconds, with the indicator light "green," and then proceed to lockout with the indicator light flashing "green."
- i. Functional check of the Direct Spark Ignition (DSI) module is complete.
  - 1) Replace the flame sensor wire from the FS terminal to the DSI module.

# SECTION XI

## BURNER and LINT (TUMBLER) CHAMBER MANUAL RESET HI-LIMIT INSTRUCTIONS

### **IMPORTANT**

#### **MANUAL RESET HI-LIMIT INSTRUCTIONS**

##### FOR GAS MODELS WITH PHASE 5 WITH HEATER FAULT

This dryer was manufactured with a burner manual reset hi-limit and tumbler/lint chamber hi-limit thermostat which is monitored by the Phase 5 computer. If either manual reset thermostat is open prior to start of the drying cycle, the dryer will start momentarily and then shut down displaying a “heater fault” condition.

If either manual reset hi-limit thermostat opens during a drying cycle, the dryer will display a “heater fault” condition and will continue to run (with no heat applied) for three (3) minutes or until the drum temperature has fallen below 100° F (38° C). The heater fault button **must be** pressed to clear this fault condition. The open manual reset hi-limit thermostat **must be** reset “manually” prior to the start of the next cycle.

This hi-temperature condition may be caused due to a restricted exhaust, poor airflow, or improper burner oven operation.

The location of the manual reset hi-limit is on the right hand side of the burner box and the tumbler hi-limit is located in the lint chamber area.

**WARNING:** Discontinue power to the dryer before attempting to reset hi-limit.

### **IMPORTANT**

This dryer is equipped with a burner hi-limit and tumbler/lint chamber hi-limit thermostat which must be reset manually.

**WARNING:** Discontinue power to dryer before attempting to reset hi-limit.

ADC P/N: 114093

# **IMPORTANT**

## **MANUAL RESET HI-LIMIT INSTRUCTIONS**

### STEAM MODELS WITH PHASE 5

This dryer was manufactured with a manual reset tumbler/lint chamber hi-limit thermostat. If the manual reset thermostat is open prior to the start of the drying cycle, or during the cycle, the dryer will not recognize the open state of the hi-limit thermostat and will start or continue through the drying cycle with no heat. Manual reset hi-limit must be reset manually.

This hi-temperature condition may be caused due to a restricted exhaust, poor airflow, or improper heating unit operation.

The location of the manual reset hi-limit switch is in the lint chamber area.

**WARNING:** Discontinue power to the dryer before attempting to reset hi-limit.

## **IMPORTANT**

This dryer is equipped with a lint chamber hi-limit thermostat which must be reset manually.

**WARNING:** Discontinue power to dryer before attempting to reset hi-limit.

ADC P/N: 114501

ADC 112249 1 - 09/26/97-30 2 \* 05/07/98-30 3 - 12/23/98-50  
4 - 06/02/99-25 5 \* 06/14/00-15

