

Model 5060 User's Manual

# *Speed-Dri*

Infrared Dryers

Publication #: 106672-001 Rev. D

**Sept, 2003**

Another quality product from:



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**SPEED DRI  
MODEL 5060-10  
USER'S MANUAL**

**106671-001 REV. D**

**REVISION HISTORY**

<b>REV</b>	<b>ECN NO</b>	<b>DESCRIPTION</b>	<b>DRAFT</b>	<b>CHKR</b>	<b>ENG.</b>	<b>DATE</b>
D	19483	Updated manual for UL/CE	JAR	JAR	JAR	9/16/03

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Dear Valued Customer:

Thank you for purchasing a Model 5060 Speed-Dri infrared dryer. We believe it is the finest heating system of its type and are confident you will think so also.

This instruction manual has been carefully prepared to ensure you will be able to easily install and operate the Model 5060 dryer and to fully realize all its inherent capabilities. We invite your comments as well as any issues you may have regarding this manual or the Model 5060.

**Requirement**

**Appropriate Contact**

Additional information regarding application of the Model 5060 dryer or other Research Inc. products.

Your local sales representative.

Ordering additional Research Inc. products or Manuals.

Your local sales representative or Research, Inc. Customer Service  
(952) 941-3300

Technical assistance and training.

Research Inc. Factory Service  
(952) 941-3300

Once again, let us welcome you to the growing family of Research Inc. customers. We look forward to working with you in the future.

Sincerely,

Bruce Bailey  
Vice President  
Research Inc.

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## Section 1 - Introduction

The Model 5060 *Speed-Dri* Drying System is specifically designed to dry ink-jet printing. On many types of coated stock, the water or solvent base of the ink is not easily absorbed by the material. Instead, it remains on the surface in a liquid state and is easily smeared if touched. The *Speed-Dri* heater module provides the heat and air flow necessary to convert the liquid to vapor, and quickly remove it from the surface of the paper. When used in conjunction with an ink-jet printer, the *Speed-Dri* Drying System can increase printing production by as much as 85 percent.

## Features

### Heater Module

The heater module supplied with the system features four tubular quartz lamps, an aluminum reflector behind the lamps, side reflectors and forced air cooling. The quartz lamps have low mass tungsten filaments allowing them to reach full operating temperature within two- to three seconds after being turned on. The hot air comes out of the holes in the aluminum reflector and passes between the lamps directly on to the material being dried.

The system is available with one to four heater modules which will dry ink-jet printing that is up to 4-inches (102 mm) wide for a single unit and up to 8-inches (204mm) wide for 2 or 4 units. The heater module is available in a 10 inch (254 mm) heated length.

Refer to Appendix A for heater module dimensions.

### Power Control

The power control for the heater module is located in the housing that contains the forced air blower. Heat adjustment is controlled by a potentiometer mounted on the top of the heater body. A switch on top of the housing is provided to turn the system on and off.

An interlock is also provided that enables the heater module to be connected to the transport. This interlock must be satisfied for the heater module to operate.

### Mounting Brackets

The optional extruded aluminum mounting bracket consists of vertical and horizontal supports, brackets for the heater module and all hardware needed for mounting.

## Section 2 – Safety

### General

The Model 5060 *Speed-Dri* Drying System is designed for safe operation. Nevertheless, installation, maintenance and operation of the system can be dangerous for a careless operator or maintenance person. For your safety and the safety of others, please read the instructions in this INSTRUCTION MANUAL and follow these safety practices which will help to prevent accident or injury.

### Infrared Radiation

#### CAUTION!

- Continuous exposure to high intensity infrared radiation at close proximity could be harmful to eyes or skin. Although ultra violet electromagnetic radiation is not being emitted by infrared lamps, harmful burns could still result if an operator is in close contact with lamps being operated at high intensity.
- Because of the brilliant light emitted by infrared lamps at full intensity, it is recommended that the eyes be shielded from the glare if observing the lamps or radiant heat chamber for an extended period of time. Use suitable shaded lenses or dark glasses.

### Electrical Safety

There is danger of electrical shock when servicing the heater module or any item contained in the blower housing. Even when the ON/OFF switch is in the OFF position, there is live HIGH VOLTAGE (up to 240V) present at the power entry of the switch. The power cord is the main disconnect for the heater.

#### WARNING!

- **DANGER OF ELECTRICAL SHOCK.**
- **ALWAYS** disconnect the power cord AND any optional interlock circuits before moving, servicing, installing or replacing lamps.
- **NEVER** operate the heater with the control box cover open or with the heater front cover removed. This panel is designed to protect the operator from electrical shock.
- Even if the Power Switch of the control unit is in the Off position, there is live High Voltage present at the power entry of the Power Switch, AND at the interlock circuit when the conveyor is running.
- A position sensing switch will turn the lamps OFF when the mounting arm is raised, but HIGH VOLTAGE is still present inside the control box.

**Note: All service should be performed by qualified Service personnel.**

## Fire Safety

A fire safety mechanism is built into the System. It allows the operator to tilt the heater module up in the event the transport stops or paper jams up under the lamps. When the heater module is tilted up the lamps will automatically turn off. In the event the transport stops or the paper jams under the heater module:

- LIFT the horizontal support. See Section 4, Operation, for specific details on position adjustment.
- REMOVE any paper from under the heater module.
- REMEMBER that the lamps will remain hot for several minutes.

### CAUTION!

- Jams or stoppages in the transport may cause a FIRE HAZARD.
- NEVER operate the system unless an operator is present at all times.
- NEVER operate the system without a FIRE EXTINGUISHER in the immediate area.
- REMOVE all paper from under heater module IMMEDIATELY if the transport stops or jams. Even though the lamps are turned off, RESIDUAL HEAT may still ignite paper.

## High Temperatures

### WARNING!

- Parts of the heater may exceed 500°F (260°C). Contact with the lamps, aluminum reflectors, or metal parts near the lamps may cause severe BURNS.
- NEVER place hands under the heating elements when it is operating or hot.
- ALWAYS allow heating element to cool at least 15 minutes before touching the lamps or adjacent parts.
- ALWAYS wear soft, clean, oil-free flannel or plastic gloves when handling quartz lamps.

## Labels

### CAUTION – INTERNATIONAL

#### Position

This label is installed on the front side of the housing.



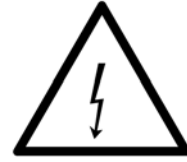
#### Identification

The CAUTION label is a yellow label indicating a potentially hazardous situation that could result in injury. The international “exclamation point” legend is used on the 5060 to indicate that caution is required when operating or servicing the product due to high temperatures and high voltage.

## HIGH VOLTAGE WARNING – INTERNATIONAL

### Position

This label is installed on the removable front panel of the housing. Removing this panel allows access to the power and control circuits within the housing.



### Identification

The HIGH VOLTAGE label is a yellow label indicating a potentially hazardous situation that could result in injury. The international “lighting bolt” symbol is used on the 5060 to indicate that high voltage is present inside the enclosure. All power cords to the product must be disconnected before servicing the product or replacing the lamps. Power is present inside the housing when the unit is tilted up, even when the position sensing circuit shuts off the lamps.

## CAUTION HOT SURFACE – INTERNATIONAL

### Position

This label is installed on the heater side panels near the surface of the lamps and reflector.



### Identification

The HOT SURFACE label is a yellow label indicating a potentially hazardous situation that could result in injury. The international “hot surface” symbol is used on the Model 5060 to indicate that high temperatures are present on the lamps and reflector. Allow a minimum of 15 minutes of cool down time for the lamps and reflector before servicing the unit, replacing lamps, or relocating the unit.



## Section 3 - Installation

### CAUTION!

- Please read the installation instructions carefully. It is important that the Model 5060 is installed correctly or important safety features will not be operational.

### Tools Required

1. Phillips screwdriver set
2. Allen wrench set
3. Drill and drill bits

### Mechanical Installation

#### Mounting the Heater Module using Extruded Aluminum Mounting Brackets

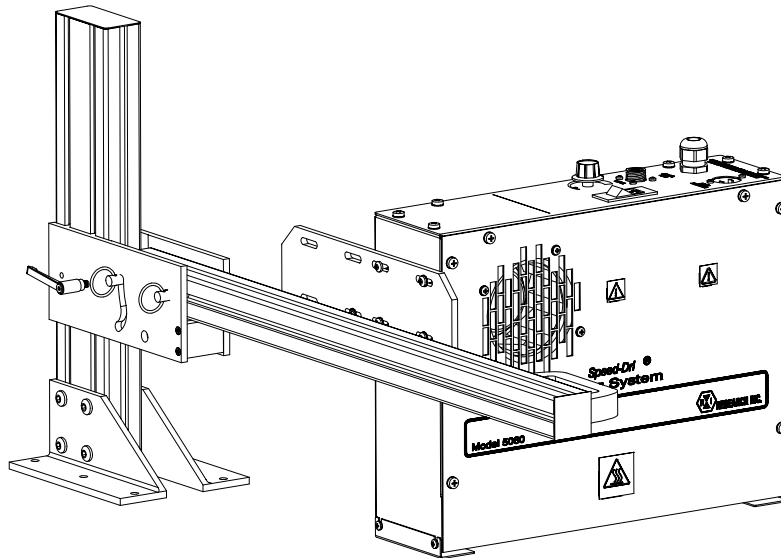


Figure 3-1. Model 5060 Speed-Dri Mounted to Extended Aluminum Mounting Bracket.

*Note: The mounting brackets Research, Inc. supplies are intended to mount on either side of the unit. If not using the Research, Inc. supplied mounting brackets, please mount the unit using all four (4) holes for support safety. Each end of the heater has four (4) holes for mounting purposes.*

Mount the heater module in a location on the transport top that will allow it to be at least 4 inches (102 mm) from the print head while maintaining a short distance from any rollers. The heater module should be mounted so it is level with the transport and can be spaced from 0.25- to 1.00-inches (6 to 26 mm) above the printed surface.

### CAUTION!

- **When mounting the Model 5060 to the transport, please use appropriate caution to avoid drilling into existing wiring or circuitry.**

To install the heater module using the extruded aluminum mounting brackets:

1. The base mounting bracket should be placed as far back as possible on the transport. Normally, the front four mounting holes are used for most installations. This provides the greatest clearance for wide materials.
2. Mark the location of the mounting holes. Drill four 9/32-inch (7.0 mm) diameter holes in the transport top (Figure 3-2).
3. Attach the base mounting bracket using the 1/4-20 screws and kepnuts provided (Fig. 3-3).

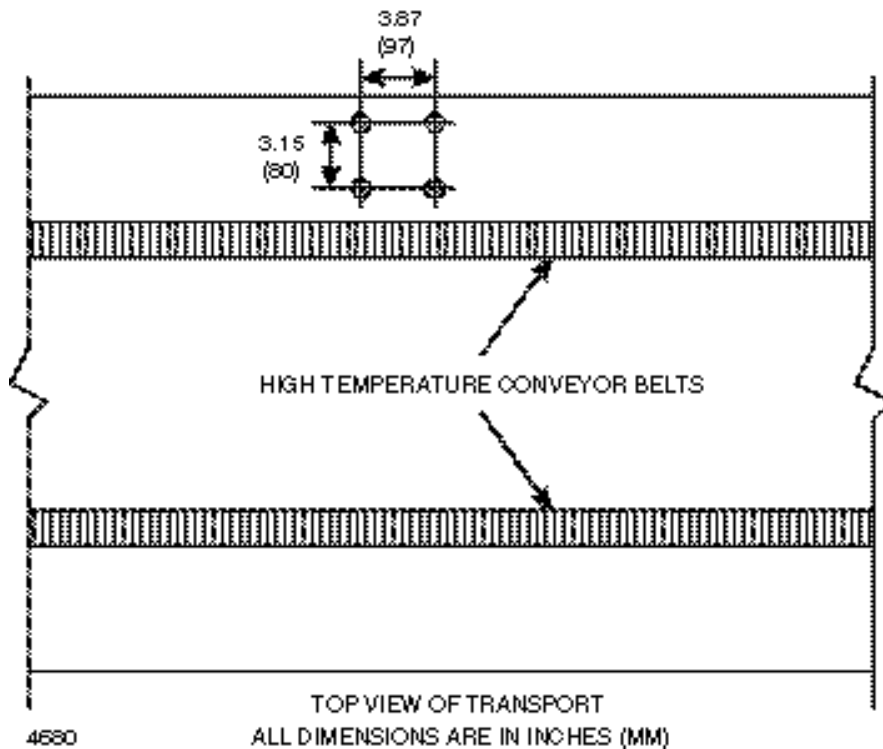
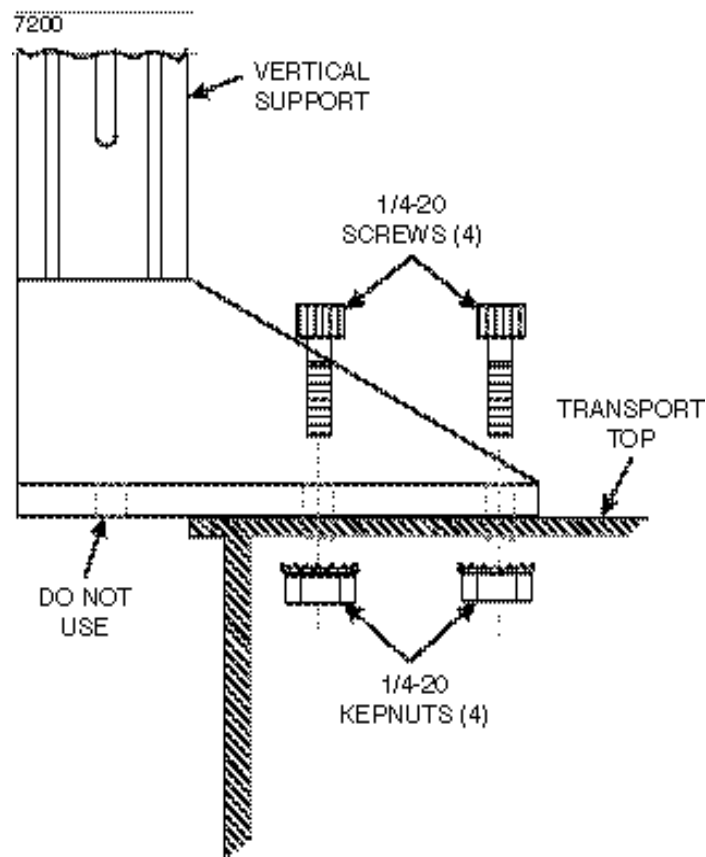


Figure 3-2. Top View of Transport Illustrating Drill Hole Dimensions.



**Figure 3-3. Mounting the Vertical Support to the Transport.**

4. Remove the self-locking pin and T-handle clevis pin from the heater mounting bar.
5. Insert the heater mounting bar into the channel of the vertical support.
6. Reinstall the self-locking pin and T-handle clevis pin.
7. Attach the heater mounting bracket to the heater module using the 10-32 screws and lock washers provided.
8. Lift the heater up to the heater mounting bar, aligning the mounting holes with the holes in the T-bar. Carefully start and then tighten the two 1/4-28 socket head screws and lock washers with a 3/16-inch hex wrench until the heater is level with the transport.
9. Repeat steps 7-8 if mounting a second heater module.
10. Make sure that the fan intake of all heaters is unrestricted.

*Note: If mounting a second heater module that was purchased separately from the original system, complete the following steps before repeating steps 7-8:*

1. Remove the black end cap from the heater mounting bar.
2. Remove the handle from the heater mounting bar.
3. Insert the T-bar into the heater mounting bar. Secure the T-bar in place with the thumb screws.

4. Replace the handle.
5. Replace the black end cap.

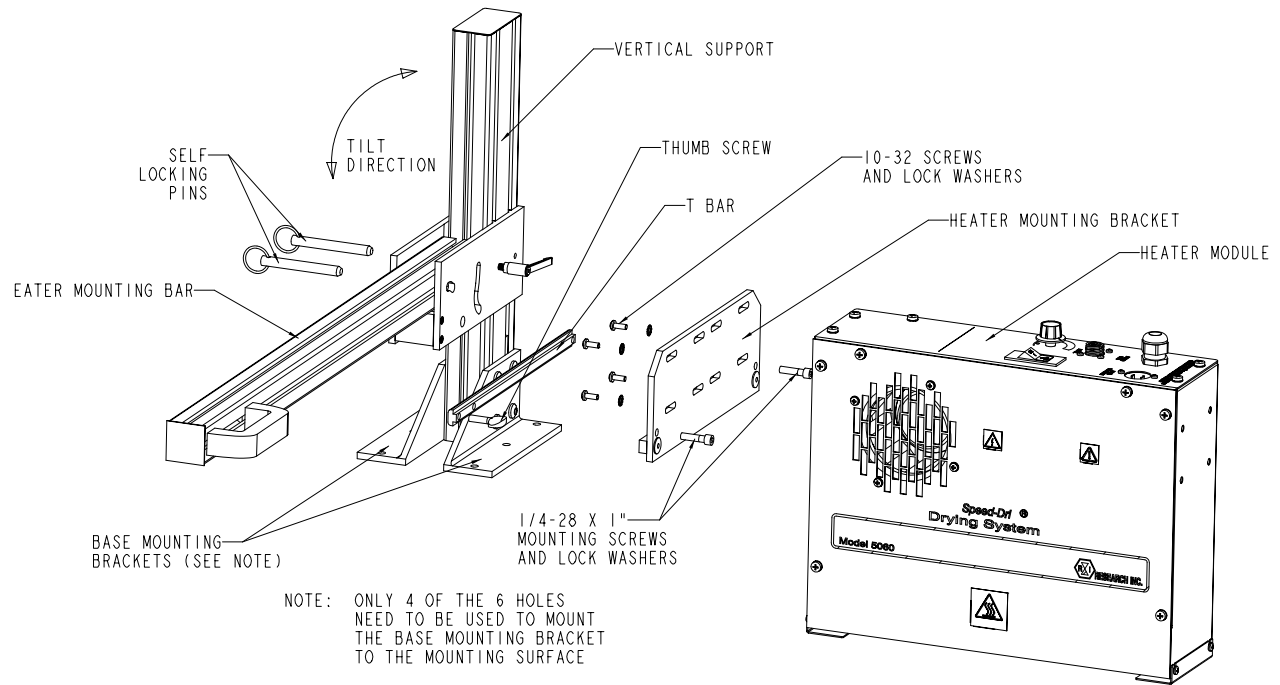


Figure 3-4. Mounting the Model 5060 Heater Module.

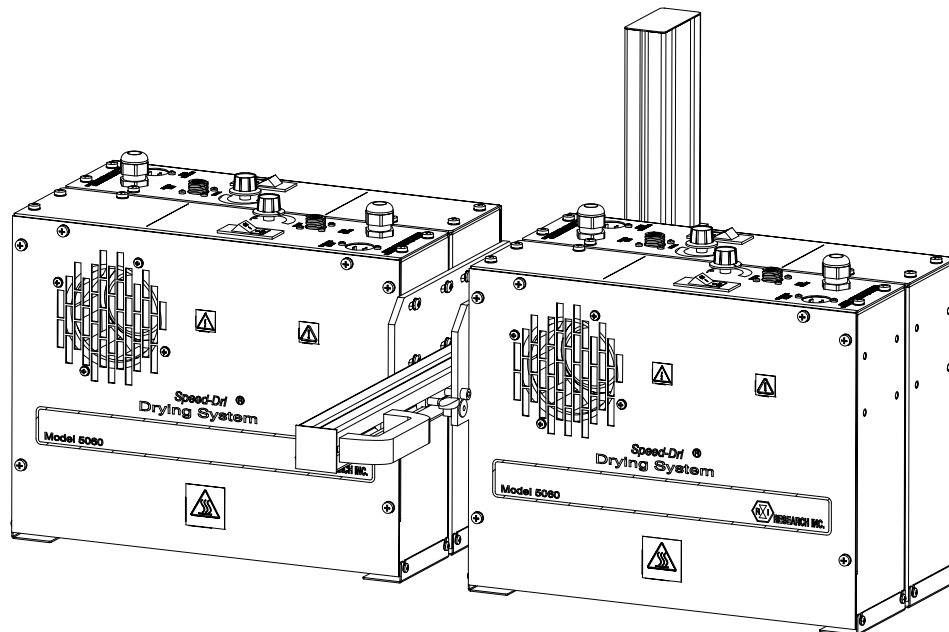


Figure 3-5. Mounting the Model 5060 Quad Heater Module System.

## Electrical Installation

### Installing Lamps

#### CAUTION!

- Wear soft, clean, oil-free flannel or plastic gloves when handling quartz lamps. If skin oils come in contact with the quartz tube, the lamp will fail prematurely.

When installing lamps in the heater module it is important to avoid touching the quartz glass lamp tubes. Finger prints and dirt marks on the tube will absorb more heat and may shorten lamp life. If a lamp does get touched or dirty, clean it with a soft tissue or cloth before using the system.

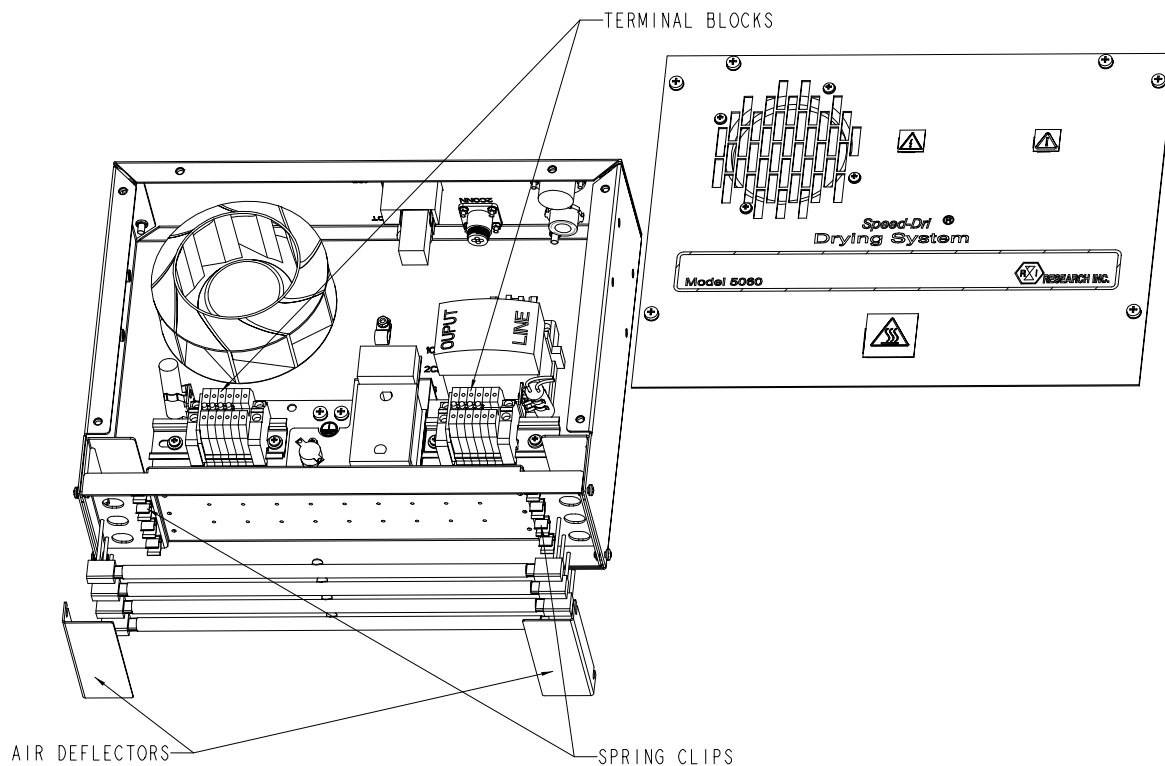


Figure 3-6. Model 5060 Spring Clip and Terminal Block locations.

#### CAUTION!

- Before installing or changing lamps, disconnect all power cords to the system.

To install or change the lamps:

1. With a Phillips screw driver, remove the screws that fasten the front cover of the heater module. Remove cover.
2. Loosen the 4 screws that hold the reflector in place and slide the air deflectors off.

3. Insert the lamp leadwires through the reflector and snap the lamp into the spring clips provided (Figure 3-6). If the lamp clips are excessively tight, gently spread the clip wider. Make sure that the lamp is held securely in the clip.

### **CAUTION!**

- **It is important that the lead between the lamp and barrier strip not be pulled tight when the lamp is installed. As the heater module and lamps heat and cool, they are also expanding and contracting which may damage the lamp if the lead is too tight.**

4. Insert the lamp leadwire into terminal blocks 1TB1-4 and 2TB1-4 and tighten the screw terminal. Make sure that the terminal block is not tightened on the insulation of the wire.
5. When all of the lamps have been installed, check for electrical shorts to the heater's metal chassis and then replace the air deflectors and front cover.

## **Connecting the Power Source**

The *Speed-Dri* Drying System must be connected to a dedicated 240V, 30 amp electrical circuit. Secure the power cord and interlock circuit cable to the mounting arm with the supplied nylon cable tie to keep it from being positioned under the heater module.

### **CAUTION!**

- **The heater module requires a dedicated power circuit.**

## **Making the Interlock Connections**

The purpose of the interlock line is to prevent the heater module from operating if the transport is not running. This helps minimize the risk of fires if paper is under the heater module when the transport comes to a halt. The Model 5060 may be ordered with a 24VAC relay, a 24VDC relay, or a 120VAC relay installed.

*Note: The Model 5060 will not operate unless a transport signal is supplied to the interlock circuit.*

Typically, an interlock cable is supplied from the printing base and is connected on top of the blower housing, near the ON/OFF switch. An interlock plug and cable assembly is available from Research Inc. (part number 098768-001). To connect the interlock to the transport:

### **WARNING!**

- **Disconnect the power to the heater module before proceeding.**

1. Connect the interlock cable between the transport and the interlock plug to supply the appropriate voltage interlock. To prevent the heater module from running when the transport is stopped, the transport interlock power source needs to be off when the transport is stopped.

*Note: After completely installing the Model 5060, please ensure the stability of the overall assembly.*

## Section 4 - Operation Instructions

*Note: The lamps in the heater module will respond very quickly when turned on, but the most effective drying results will occur after the heater module has been on for about 45 to 60 seconds. This allows the heater module enough time to start producing hot air.*

Once the *Speed-Dri* Drying System has been properly installed, it is very easy to operate. When used with an interlock to the transport, it will operate only when the transport is running.

### Using Extruded Aluminum Mounting Brackets

The extruded aluminum mounting brackets are designed for heater module attitude (tilt), height and position adjustments.

#### Attitude (Tilt) Adjustment

The two socket head mounting screws used to attach the heater module to the T-bar are also used for the heater module attitude adjustment. Tightening or loosening these screws will allow the heater module to be leveled over the transport using a 3/16-inch Allen wrench.

#### Height Adjustment

The heater module is positioned from ½- to 1-inch (13 to 26 mm) above the printed surface. This provides adequate clearance between the printed stock and the heater while providing good drying efficiency. To adjust the height of the heater module:

1. Loosen the two lever handled locking screws, move the heater to the correct height and retighten the locking screws.

#### Position Adjustment

The heater module can be positioned along the length of the T-bar. To adjust the position of the heater module along the length of the T-bar:

1. Loosen the thumb screw found on the T-bar.
2. Grasp the rear portion of the heater module.
3. Tilt the end of the heater module up and push in or out to the desired position on the T-bar.
4. Tighten the thumb screw to secure the heater module in place.

The heater module can also be placed in two locking tip-up positions. In the tip-up positions, the heater module will not operate. To place the heater module in the locking tip-up positions:

*Note: If the heater module does not shut off, please check for correct installation.*

## Position 1

Grasp the handle on the T-bar and lift the heater module up. This will lock the heater module into an approximately 30 degree tip-up position.

To return the heater module to the drying position:

1. Pull the heater module forward slightly and lower it into position.

## Position 2

1. Remove the T-handled clevis pin.
2. Tilt the heater to a full vertical position.
3. Replace the clevis pin in the locking hole.

To return the heater module to the drying position:

1. Remove the T-handled clevis pin.
2. Lower the heater to the drying position.
3. Replace the clevis pin in the locking hole.

## ON/OFF Switch

Turning the ON/OFF switch to ON will apply power to the heater module and blower.

*Note: The heater module must be in the drying position, the interlock circuit must be energized to allow the on/off switch to apply power to heater module.*

## Adjustable Heat

The intensity of the heat can be increased or decreased by turning the adjustable heat control provided on the top of the Model 5060 system.

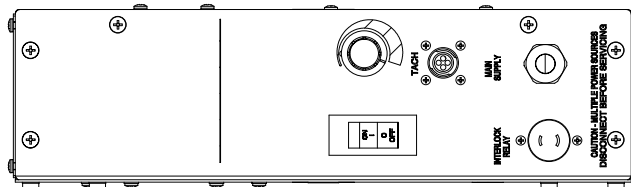


Figure 4-1. Top View of Model 5060 Controls



## Section 5 – Maintenance

In dusty environments the lamps and impeller blades should be inspected occasionally for a cloudy buildup. When this occurs it is recommended that they be cleaned. Doing so will extend the life of the lamp and improve the system's overall performance. Use the following procedure:

### **WARNING!**

- **Disconnect all power cords from the power sources and allow the heater to cool at least 15 minutes before continuing.**

### **CAUTION!**

- **Wear soft, clean, oil-free flannel or plastic gloves when handling quartz lamps. If skin oils come in contact with the quartz tube, the lamp will fail prematurely**

1. With a soft, dry cloth or tissue, wipe the residue from the lamps.

If a lamp burns out or breaks, refer to Appendix B, Replacement Parts, for ordering information and to Section 3, Installing Lamps, for lamp replacement instructions.

2. Remove dust build-up on the impeller blades using compressed air.

**Note: All service should be performed by qualified Service personnel.**

## Troubleshooting

PROBLEM	SOLUTION
Lamps do not come on	Check to see that the Adjustable Heat Pot is not turned all the way counterclockwise.
	Make sure the fan is spinning. Check that the supply voltage is 240 VAC.
	Check the Interlock connection. Power must be applied to the interlock before the lamps will turn on. Make sure that the proper relay is installed.
	Make sure that the heater is in the heating position and level. Check the tilt switches for proper operation.
	Check the tach signal. The tach signal should be 0-5 VDC, 0 is lamps off 5 V is maximum power. Try disconnecting the tach cable. This will set the heater to manual mode. If the lamps come on, check the signal from the tachometer. Try switching the wires on the tach.
	The lamp control board is not getting power or is not receiving an input. Check that there is 24 volts to the board. If it is not getting power, check the interlock relay and power supply. If it is getting power, check the 0-5 vdc signal and pot setting.
	Check that CR1 has power and is energized.
Circuit breaker does not stay on.	The undervoltage trip is not getting power. Check that the undervoltage trip has 24 Vdc. Verify that the power supply is producing 24vdc. Check for short circuits to ground.
	Check the supply voltage is 240 VAC.
	Check the thermostat to see if it is working properly and that the unit is not overheating.
Only some of the lamps come on.	Check for burned out lamps.
	Make sure that the lamp leads have a good connection to the terminal blocks. Make sure that the terminal blocks are not clamped on the lead wire insulation.
Fan does not rotate.	The fan should come on as soon as the breaker is turned on. If the breaker does not trip out, power is being applied to the system. Check the fan wiring and connector and check the incoming power.. Replace fan if required.
Lamps do not turn off.	The lamp control board is getting a faulty signal. Check the wiring connections to the control module. Replace the module if necessary.
	The solid state relay has failed. Replace the control module.

# **Appendix A**

## **Dimensions and Specifications**

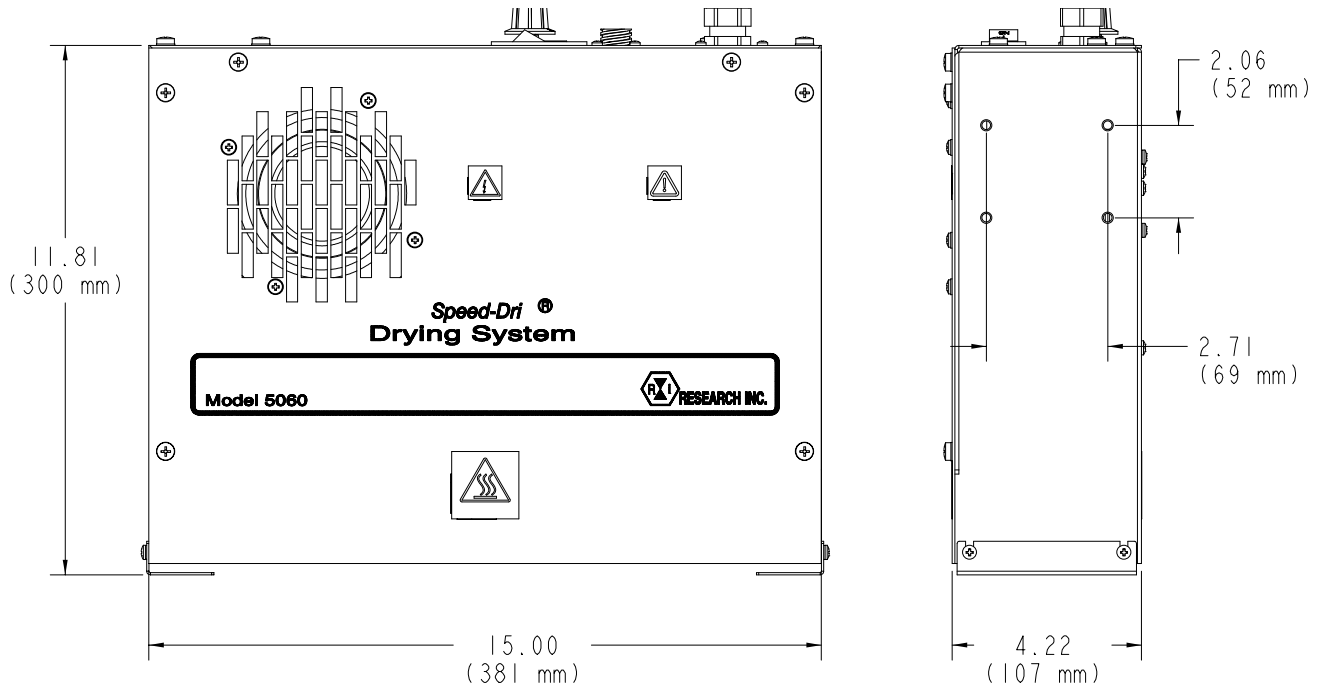


Figure A-1. Model 5060 Dimensions.

<b>Maximum Drying Width</b>	<b>4 inches (102 mm)</b>
<b>Overall Length</b>	<b>15 inches (381 mm)</b>
<b>Heated Length</b>	<b>10 inches (254mm)</b>
<b>Lamps (4 Total)</b>	<b>1000W-Rapido-COLL-14OAL</b>
<b>Lamp Rated Voltage</b>	<b>240 volts</b>
<b>Applied Lamp Voltage</b>	<b>240 volts</b>
<b>Amps at Applied Voltage</b>	<b>18.0 amps</b>
<b>KW at Applied Voltage</b>	<b>4.0 KW</b>
<b>Blower Air Volume</b>	<b>75 CFM (2.1m³/min)</b>
<b>Interlock Relays</b>	<b>120 VAC, 24 VAC, 24VDC</b>
<b>Mounting Hardware</b>	<b>Extruded Aluminum</b>
<b>Operator Controls</b>	<b>On/Off switch</b>
	<b>Heat Adjustment</b>
	<b>Automatic Heat Adjustment via Tachometer Input Circuitry and External Tachometer Kit (Tachometer Kit Option – ordered separately from Drying System)</b>
<b>Operation Interrupts</b>	<b>Heater module turns off automatically when raised from its horizontal position</b>
	<b>When the interlock connections are made, the heater module will not function unless the transport is running</b>
<b>Agency Approvals</b>	<b>CE, UL, cUL</b>
<b>Site Requirements</b>	<b>240VAC/30 amp 1ϕ service dedicated circuit.</b>
	<b>Personnel to position the system in place</b>
	<b>An electrician to install a 240VAC/30 amp IEC power cord, and connect the wiring between the power control and the transport.</b>

Table A-1. Model 5060 Speed-Dri Specifications.

## **Appendix B**

### **Spare & Replacement Parts**

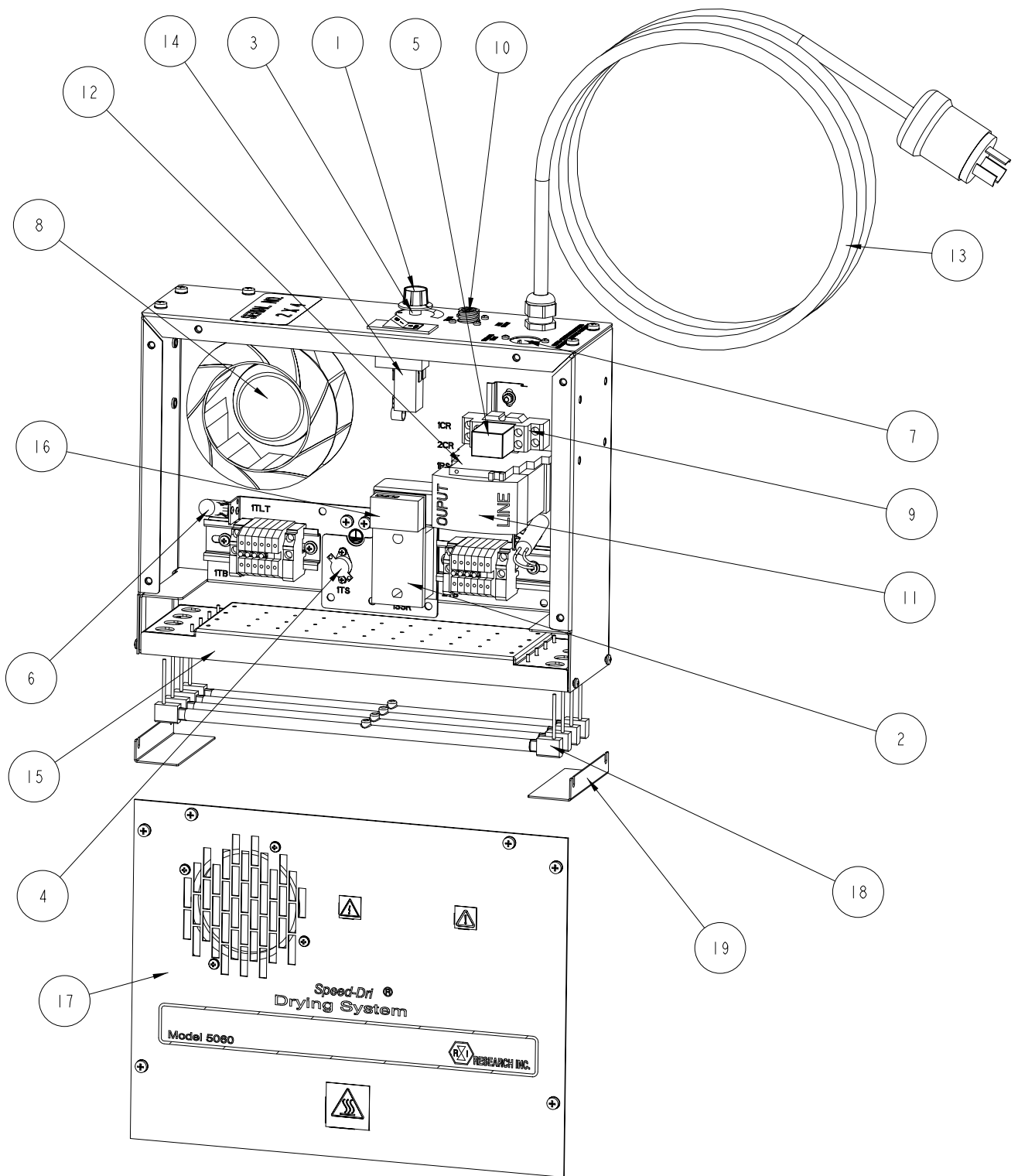


Figure B-1. Model 5060 Spare & Replacement Parts.

COMPONENT NO.	QTY	ITEM	DESCRIPTION
055770-001	1	1	KNOB-W/WHT PNTR 1/4 SHAFT
055899-007	1	2	RELAY-SOLID STATE
067513-001	1	3	POT-1 TRN 1K TYPE J
070025-017	1	4	THERMOSTAT- SURF NC 140F
080821-001	1	5 <sub>A</sub>	RELAY-DPDT,10A, 24VDC, 650 OHM
085143-002	1	5 <sub>B</sub>	RELAY-DPDT,10A, 24VAC, 160 OHM
085143-001	1	5 <sub>C</sub>	RELAY-DPDT,10A, 120VAC, 3900 OHM
084602-001	2	6	SWITCH-MERCURY WITHOUT LUGS
085990-001	1	7	CONNECTOR-2 COND, 15A/125V XXXX
095807-003	1	8	IMPELLER-5.25",170CFM 0",240V
096570-002	1	9	SOCKET-DPDT; 10A; FINGERSAFE
097074-009	1	10	CONN-RCPT, REV SEX, CIRC, 4 POS SQ
098215-001	1	11	POWER SUPPLY-24VDC, 7.5W
103426-001	1	12	RELAY, PLC-RSC-24VDC/21
106754-001	1	13	C/A-POWER CORD 5060 UL AND CE
105776-002	1	14	CIRCUIT BRKR/SWITCH-240VAC/20A, UVT
106630-001	1	15	ASSY-REFECTOR, SPEED DRY 5060
106653-001	1	16	CONTROL-TIME PROPORTION OUTPUT
106654-001	1	17	FAB-FAN GAURD, SPEED DRY 5060
106656-001	4	18	LAMP-RAPIDO 1000 W, CER.END
106806-001	1	19	FAB-END, AIR DEFLECTOR, 5060

**Table B-1. Model 5060 Spare & Replacement Parts.**

COMPONENT NO	DESCRIPTION
085131-002	Replacement Tachometer Kit for 1DM
085131-003	Replacement Tachometer Kit for 2DM
084160-002	Replacement Tachometer Cable for 1 DM
084160-003	Replacement Tachometer Cable for 2 DM
084160-004	Replacement Tachometer Cable for 4 DM
085990-003	NEMA ML-1P (2 pole 2 wire) Connector Male
085990-004	NEMA ML-1R (2 pole 2 wire) Connector Female
092669-001	NEMA ML-2P (2 pole 3 wire) Connector Male
098768-001	Replacement Interlock Cable Assembly NEMA ML-2P (2 pole 3 wire)
098621-001	Replacement Interlock Cable Assembly NEMA ML-1P (2 pole 2 wire)
107002-001	Replacement Interlock "Y" Cable Assembly NEMA ML-1P (2 pole 2 wire)
107002-002	Replacement Interlock "Y" Cable Assembly NEMA ML-2P (2 pole 3 wire)
106764-001	Field Replaceable Unit kit (Includes 5 lamps and Reflector)
106676-001	Lamp Control Assembly (Includes Solid State Relay, Control Board)

**Table B-2 Model 5060 Spare & Replacement Parts Not Shown on Exploded View**

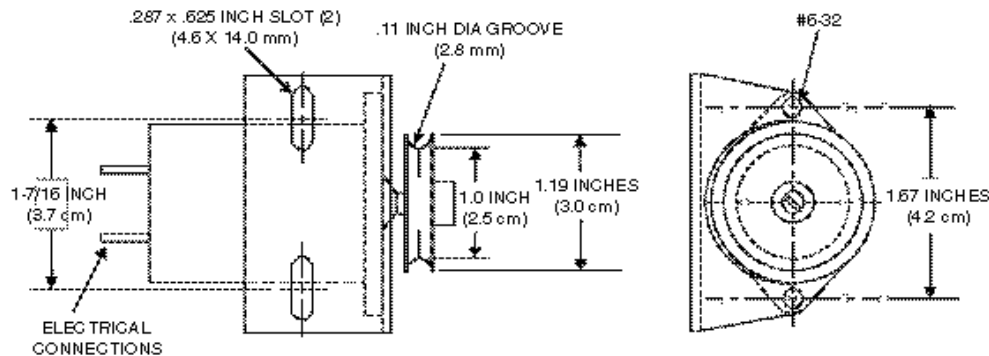
## Appendix C

### Installing the Tachometer Kit

The dryer may be mounted on a variety of equipment configurations. If the tachometer supplied with the *Speed-Dri* system is used (Fig. C-1), it must be properly installed so that it will send a “speed signal” to the control box ranging from zero volts when the conveyor is stopped to 10 volts when the conveyor is at full speed. Doing so will enable the controller to operate properly, and provide the widest range of heat control.

When a dual module system is ordered, the tachometer cable included has one end that connects to the tachometer, and one connection to go into each of the drying modules.

The tachometer furnished with the *Speed-Dri* system is a D.C. generator that creates a 5-volt output when rotating at about 650 rpm. Getting the tachometer to rotate at 650 rpm when the conveyor is at full speed requires that the correct size shaft or roller drive the O-Ring drive belt. The following two sections explain how to determine the correct size driving shaft depending on the type of equipment on which the dryer will be mounted.



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**Figure C-1. Tachometer and Mounting Bracket**

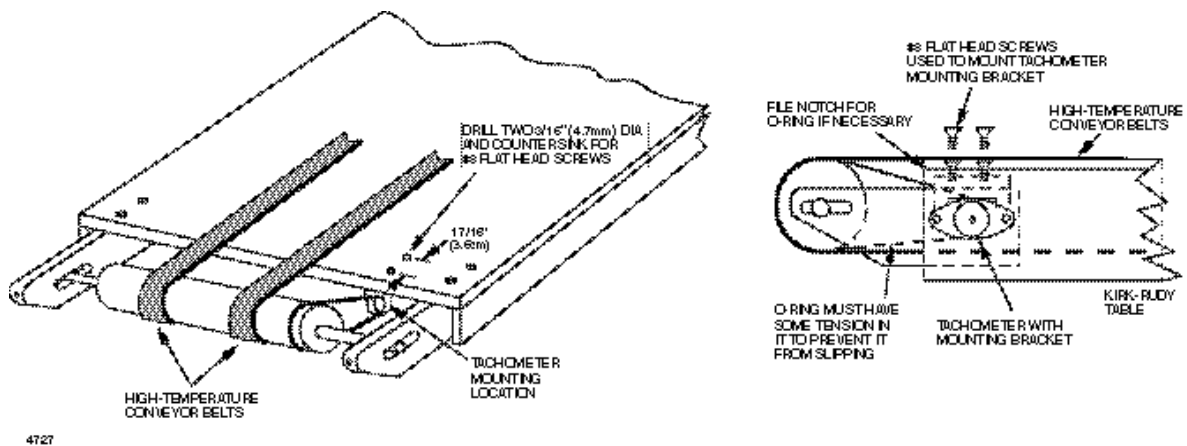
When the potentiometer is adjusted and used in conjunction with the tachometer kit, the potentiometer to output relationship remains the same as when run without the tachometer - the potentiometer trim maximum output and tachometer are directly proportional to line speed. The line speed dictates the dryer output, and the potentiometer further limits dryer output by controlling the voltage applied to the dryer.



## Mounting the Tachometer on Bases with Offloading Roller

If the system is being mounted on a typical conveyor base, place one of the O-Ring drive belts around the roller at the off-loading end of the conveyor (Fig. C-2). This roller can drive the one-inch tachometer pulley directly.

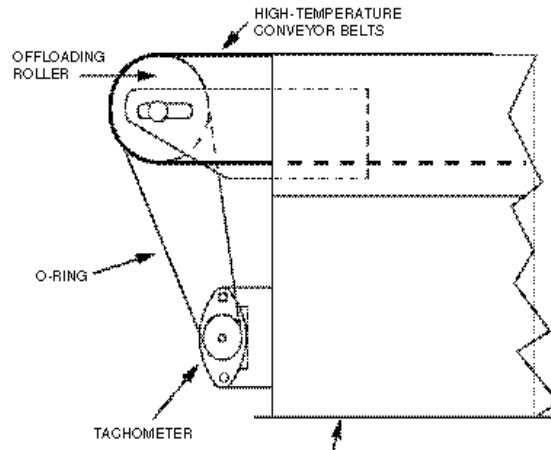
Two 8-32 screws and nuts are provided to fasten the tachometer mounting bracket to the conveyor. Drill two 3/16-inch (4.7 mm) diameter holes perpendicular to the roller axis at 1-7/16 inches (3.7 cm) apart to mount the bracket. The holes should be a distance from the roller such that when the screws are near the center of the slots on the tachometer mounting bracket, the O-Ring has a slight tension on it. By placing the holes near the center of the slots, the tension can be tightened or loosened as necessary if the tension in the conveyor belts is adjusted.



**Fig C-2 Installing the Tachometer on a Standard Base**

On standard bases one of the easiest places to mount the tachometer is to the bottom side of the tabletop. The general location is shown (Fig. C-2). After the holes are drilled they must be countersunk so the flat head screws will be flush with the conveyor top. It may be necessary to file a small notch in the end of the table to prevent the O-Ring drive belt from rubbing on it.

For other types of bases, the method showed in Fig. C-3 may be better. Here the tachometer is mounted on the end of the base. If mounted here, mount as high as possible to prevent interference with an off-load conveyor.



**Fig C-3 Alternate mounting location**

To determine the voltage for a given line speed use the equation:

$$\text{Line speed (ft/min)} / 34.2 = \text{Volts}$$

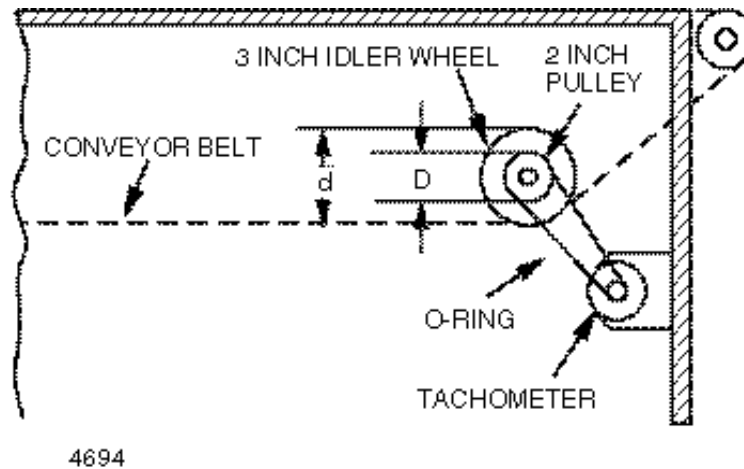
$$\text{Line speed (meters/sec)} / 0.1739 = \text{Volts}$$

## Mounting the Tachometer on Bases Using a Pulley

On other types of conveyors the tachometer is connected to a pulley driven by the shaft of an idler wheel. The maximum speed that the conveyor runs, the diameter of the idler wheel, and the size of the pulley used to drive the tachometer are required to get the correct speed signal from the base. To determine the pulley size, the following information will be needed (refer to Fig. C-4):

$S_{\text{max}}$  = the Maximum Operating Speed and

$d$  = the diameter of a sprocket, shaft, or roller that is in contact with the conveyor belt



**Figure C-4. Tachometer Mounting Example**

Use one of the following equations to determine “D”, the diameter of the drive pulley needed for the tachometer to function properly:

U.S. system of measurement:

$$D(\text{inches}) = S_{\text{max}}(\text{ft/min}) \times d(\text{inches}) / 342$$

Metric system of measurement:

$$D(\text{cm}) = S_{\text{max}}(\text{m/sec}) \times d(\text{cm}) / 1.739$$

EXAMPLE: A conveyor with a maximum speed of 225 ft/min has a belt idler wheel with a diameter of 3 inches.

$$D = 225 \times 3.0 / 342 = 1.97 \text{ inches}$$

Therefore, a pulley with a diameter of about 2.0 inches should be used on the idler shaft to drive the tachometer.

Once an adequately sized shaft has been chosen, select an O-Ring that is long enough to reach the location where the tachometer will be attached. Place it over the shaft or pulley, and mount the tachometer such that the O-Ring has a slight tension in it to prevent it from slipping.

Mounting the tachometer bracket requires drilling two 3/16 inch (4.7 mm) diameter holes perpendicular to the roller axis at 1-7/16 inches (3.7 cm) apart. Drill the holes near the center of the slots in the bracket, so the tension can be adjusted slightly in either direction.

## **Appendix D**

### **Schematic Drawings**