

Cascade **TEK**

FORCED AIR AND VACUUM OVENS

Cascade TEK

Division of Cascade Technical Sciences, Inc.

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This instruction manual applies to Models TFO-1, TFO-3, TFO-5, TFO-10, TFO-28, TVO-1, TVO-2, and TVO-5

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AN INVITATION

Please take a few minutes to peruse this instruction manual before using your new oven. We want you to be happy with the equipment, and use it safely. Please be sure that each person who uses the oven reads the instructions.

1.0 RECEIVING AND INSPECTION

The carrier, when accepting shipment, also accepts responsibility for safe delivery, and is liable for loss or damage claims. On delivery, you must inspect for visible exterior damage. Note and describe on the freight bill any damage you find; then enter your claim on the form supplied by the carrier.

Inspect the oven for concealed damage. If you find any, the carrier will arrange for official inspection to substantiate your claim.

Save the packing material until you're sure all is well. If, for any reason, you must return the oven, contact your service representative; give the serial number, and request authorization for return. We want you to be satisfied with your oven, and will be as helpful as possible.

2.0 WARNING

THIS IS NOT AN EXPLOSION-PROOF OVEN. Don't put anything in the oven that gives off combustible vapors. Don't put combustible or flammable material in the oven. Be sure about this. Play it safe.

Don't put tightly sealed or filled containers in this or any other oven. The contents may expand and burst the container.

This oven is not designed for use in Class I, II, or III locations as described in the National Electrical Code. It is not intended, nor shall it be used as a patient-connected device as described in Article 517 of the National Electrical Code.

3.0 POWER SUPPLY

A prime cause of poor oven performance is an inadequate power source. Before installing your oven, inspect its proposed power supply. When the oven is operating at full draw, voltage at its terminals must be no lower than 10% below its nameplate voltage and preferable no lower than 5% below.

The best arrangement, if at all possible, is to energize the oven from a receptacle that is on a branch circuit of its own, no other receptacles being on the same branch. In the best installation, voltage at this receptacle will drop no more than 5% when the oven is switched on full.

If you are using a receptacle that shares a branch circuit with several other receptacles, the oven may work just fine until someone plugs a hot plate into one of the other receptacles. Then the circuit breaker may trip, and the oven will go cold.

AVOID EXTENSION CORDS

Use of extension cords, particularly stringy, abraded ones are dangerous. They also cause added voltage drop and violate most electrical codes. It is best not to use them at all.

POWER REQUIREMENTS

Note: 240-volt ovens may be operated on 208-volts. Heat-up will be slightly slower.

GROUND YOUR OVEN

Our 120-volt ovens are fitted with a power cord having a plug with grounding blade. Be sure the plug is used with a matching receptacle and that the grounding blade is used. DO NOT cut off the grounding blade or plug into a non-grounded receptacle. This would leave the oven's cabinet ungrounded in violation of electrical codes and common sense.

If you have any doubts about receptacle grounding, have an electrician test the receptacle; making sure it is correctly wired.

Some 240-volt ovens are set up to be hard wired. Have these models connected by a qualified person; and make sure the oven grounding wire is connected to the equipment-grounding conductor in the branch circuit feeding the oven.

4.0 INSTALL YOUR OVEN CAREFULLY

Location: Place your oven close to your power receptacle. Try to locate it away from drafts, air conditioners and hot air ducts. Rapid changes in ambient temperature make it more difficult for the controller to hold temperature at an exact level. This is true even though the controller is highly responsive.

Keep it Level: The oven has heavy-duty adjustable leveling legs. After you locate the chamber, use the legs to level it.

Keep it Clean: The oven was thoroughly cleaned at the factory. But you might want to clean it again before putting it to work. Then, from time to time, clean it when its walls or shelves get stained. Remove the shelves. Clean them. Clean the entire interior, with particular attention to the corners.

5.0 KNOW THE CONTROLS

Power Switch: Turns the oven ON or OFF.

Overtemperature Safety: has a rotating knob allowing you to select the over temperature set point. To operate, simply, turn the dial to the approximate desired temperature. Note: Scale is in °C and is $\pm 10^{\circ}\text{C}$. **RECOMMENDED OPERATION:** Set the main oven temperature controller (per the instructions below) to your desired oven set point. Allow the oven to stabilize at that set point. Turn the OTP knob to the left until the safety light comes on. Back OTP knob off three to five degrees after the safety light goes off.

Temperature Controller: is a **Watlow 981** programmable controller. Please refer to the controller manual supplied with your oven for programming and more detailed information regarding your controller. For simple set point information, turn to *Paragraph 6.0*. Before you operate the oven it would be a good idea to turn to *page 3.1* of the **Watlow** manual for a description of the key functions.

Vacuum Ovens: In addition to the controls listed above your vacuum oven has two additional controls.

Vacuum Inlet Valve: SMALL KNOB located to the left of the vacuum gauge. This knob allows is for venting of the oven or use with an inert gas backfill. The connection for this valve is at the back of the oven and is the smaller $\frac{1}{4}$ " tube.

Vacuum Pump/Suction Valve: LARGE KNOB located just below the smaller vacuum inlet valve. This knob opens the suction line that should be connected to the $\frac{3}{8}$ " tube located at the rear of the vacuum oven. Disregard this connection if you intend to use the 1" vacuum/accessory port located in the center of the back of the oven for your main vacuum connection.

Vacuum Gauge: Measures the vacuum level in the oven from 0 – 30” of vacuum.

6.0 HOW TO RUN THE OVEN

The following instructions are for single set point operations only. The **Watlow 981** controller has 4 automatic settable profiles with six steps within each profile. For programming and set-up instructions turn to Chapter 7 (page 7.1) in the Watlow manual supplied with your oven.

Set Point Operation: After the oven has been inspected and the proper power connection has been made, follow the instructions below:

1. Flip the power switch (located at the left of the instrument panel) It should glow with a green light if it is connected to the power correctly.
2. The Process (upper window on your Watlow 981 controller) will display the current chamber temperature.
3. The lower window of your controller will indicate the current temperature set point.
4. To increase the set point, press the up arrow key until the desired set point is displayed in the lower controller window.
5. To decrease the set point, press the down arrow key until the desired set point is displayed in the lower controller window.
6. The oven will heat to your selected set point and remain there until changed. Note: The set point will not change even if the power is turned on and off.

Using the exhaust damper: If you want moderate ventilation in the oven, open the vent on top. The slide damper controls volume of ventilation. Maximum flow will slightly increase heat up and recovery time.

7.0 PREVENTIVE MAINTENANCE

Disconnect the oven before servicing it.

- A.** Remove the shelves. Clean the oven interior and shelves whenever they get stained or dirty.
- B.** Inspect the door gasket, making sure it is in good condition, and that the door seals snugly against its mullion.
- C.** Level the oven, using its adjustable feet.
- D.** If you suspect that air flow across the work space has decreased, have the blower wheel cleaned. It is possible for the blower to get dirty if the oven is used with dirty, lint-laden loads.
- E.** Run the oven at some usual temperature. Stabilize. Turn the overtemperature safety thermostat to a temperature lower than that on the main temperature controller. Make sure the overtemperature light comes on, and that oven temperature falls.

8.0 TROUBLE-SHOOTING

No Heat:

1. The branch circuits serving the oven are dead.
2. Oven cord plug is not in its receptacle.
3. Oven power switch is open (off).
4. The temperature controller is set too low.
5. The overtemperature safety is set too low. It must be higher than the controller.
6. The controller's Thermocouple temperature sensor is open circuited.
7. The solid state relay is open circuited.
8. Line contactors have failed open circuited. (Model TFO-28)
9. The overtemperature safety has failed open circuited.
10. A heater element has failed.

The Controller Calls For Heat Constantly:

1. The controller's Thermocouple temperature sensor has failed. Oven temperature is now controlled by the overtemperature safety.
2. A solid state relay has failed closed. Temperature is now controlled by the overtemperature safety.

Blower Does Not Run (Heater Heats):

1. Motor leads are disconnected at terminal blocks.
2. Either the motor or blower wheel is jammed.

Blower Runs, But Air Volume is Reduced:

1. Impeller and plenum are dirty.

9.0 PARTS LIST

FORCED AIR OVENS

<u>PART NO.</u>	<u>DESCRIPTION</u>
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TFO-1

1800516	Power Cord
9570762	Element Assy.
9600565	Blower Motor Assy.
100056	Blower Wheel 6 x 2
4880512	Blower Motor
600002	Gasket 10 ft
5120689	Shelf
200129	Adjustable Feet

TFO-5

101990	Power Cord
9570665	Element Assy.
890081	Heating Element
9600565	Blower Motor Assy.
100056	Blower Wheel 6 x 2
4880512	Blower Motor
600002	Gasket 12 ft
5120691	Shelf
200129	Adjustable Feet

TFO-28

9570666	Element Assy.
9600550	Motor Assy.
100056	Motor Wheel
4880512	Motor
600002	Gasket 17 ft
5120894	Shelf
2700500	Adjustable Feet

<u>PART NO.</u>	<u>DESCRIPTION</u>
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TFO-3

1800516	Power Cord
9570537	Element Assy.
9600565	Blower Motor Assy.
100056	Blower Wheel 6 x 2
4880512	Blower Motor
600002	Gasket 10 ft
5120690	Shelf
200129	Adjustable Feet

TFO-10

9570679	Element Assy.
9600562	Motor Assy.
100056	Motor Wheel 6 x 2
4880512	Motor
600002	Gasket 12 ft
5120888	Shelf
2700500	Adjustable Feet

PARTS FOR ALL FORCED AIR OVENS

1750571	Thermostat 6' Probe
102162	Solid State Relay
9650503	Solid State Relay Assy.
101827	TC Probe Closed End
200020	Red Pilot Light
103351	Green I/O Switch
4450506	Soft Touch Knob
200116	Shelf Clips - Small
800542	Terminal Block 18 Position
101097	Power Exhaust 110V
101098	Power Exhaust 220V
1750540	Watlow 981 Controller
200137	Shelf Clips - Large

VACUUM OVENS

TVO-1

9570739 Element Assy., top / bottom
5620506 Shelf - Top 2
5620519 Shelf - Bottom 1

TVO-2

9570742 Element Assy.
5620518 Shelf - Top 2
5620520 Shelf - Bottom 1

TVO-5

9570765 Element Assy., top / bottom
5620523 Shelf
5220580 Shelf Sliders
9570764 Element Assy., side

PARTS FOR ALL VACUUM OVENS

9530535 Needle Valve Kit .250
9530536 Needle Valve Kit .375
100031 Vacuum Gauge
1800516 Power Cord
X1000771 Soft Touch Knob
103351 Green I/O Switch
200020 Red Pilot Light
8000542 Terminal Block 18 Position
100026 Overtemperature Safety Thermostat
101827 TC Probe Closed End
1750540 Watlow 981 Controller
102162 Solid State Relay
200129 Adjustable Feet

Gaskets for TVO's

	Silicone	HI-Temp Sill.	Viton Acids	Buna -N Solvents
TVO-1	100029	3450508	110085	100049
TVO-2	100037	3450509	100578	100038
TVO-5	310028	3450510	100233	891054

10.0 LIMITED WARRANTY

North America

Cascade TEK agrees to correct for the original user of this product, either by repair or at our election, by replacement, any defect in material or workmanship which develop within twelve (12) months after delivery of this product to the original user. In the event of replacement, replacement unit will be warranted for the original twelve (12) month period or ninety (90) days, whichever is longer.

If this product should require service, contact *Cascade TEK*, Hillsboro, OR at (503) 648-1818. When return of the product is necessary, a return authorization number will be assigned and the product should be shipped, transportation charges pre-paid, to the service center. To insure prompt handling, the return authorization number should be placed on the outside of the package and a detailed explanation of the defect enclosed with the item.

This warranty shall not apply if accident, neglect, unreasonable use, improper service caused the defect or malfunction, or other causes not arising out of defects in material or workmanship.

THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THOSE MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WHICH EXTEND BEYOND THE DESCRIPTION AND PERIOD SET FORTH HEREIN.

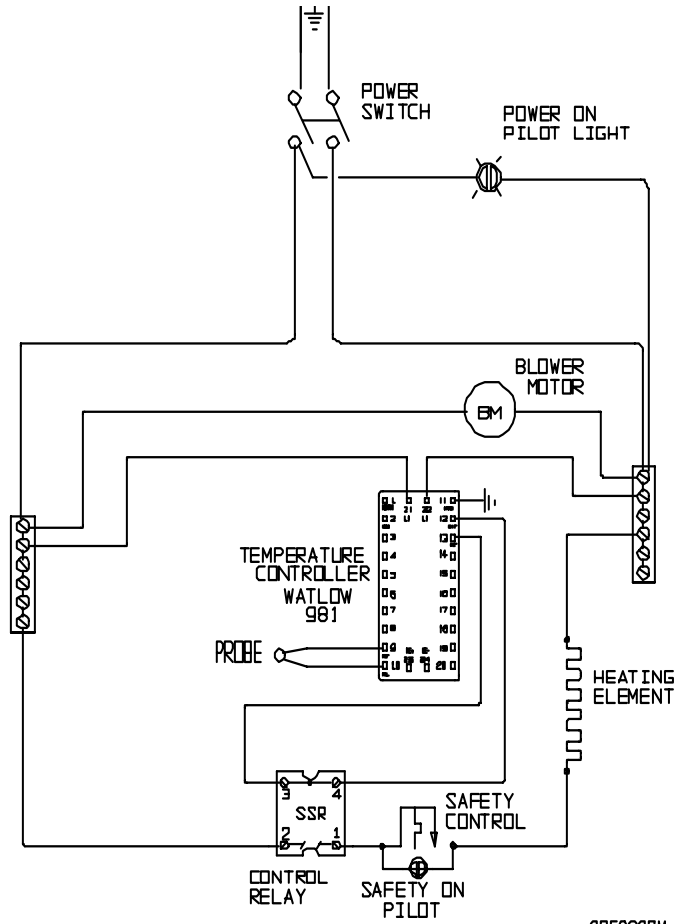
***Cascade TEK'S* SOLE OBLIGATION UNDER THIS WARRANTY IS LIMITED TO THE REPAIR OR REPLACEMENT OF A DEFECTIVE PRODUCT AND *Cascade TEK* SHALL NOT, IN ANY EVENT, BE LIABLE FOR ANY ACCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND RESULTING FROM USE OR POSSESSION OF THE PRODUCT.**

Export

The *Cascade TEK* warranty for all equipment delivered outside the continental US or Canada is 1 year on defective parts. The purchaser will be responsible for all labor costs for on-site repairs or parts installation. All replacement parts provided under warranty by *Cascade TEK* are shipped F.O.B. our plant in Hillsboro Oregon.

WIRING DIAGRAM

TFO-1, TFO-3

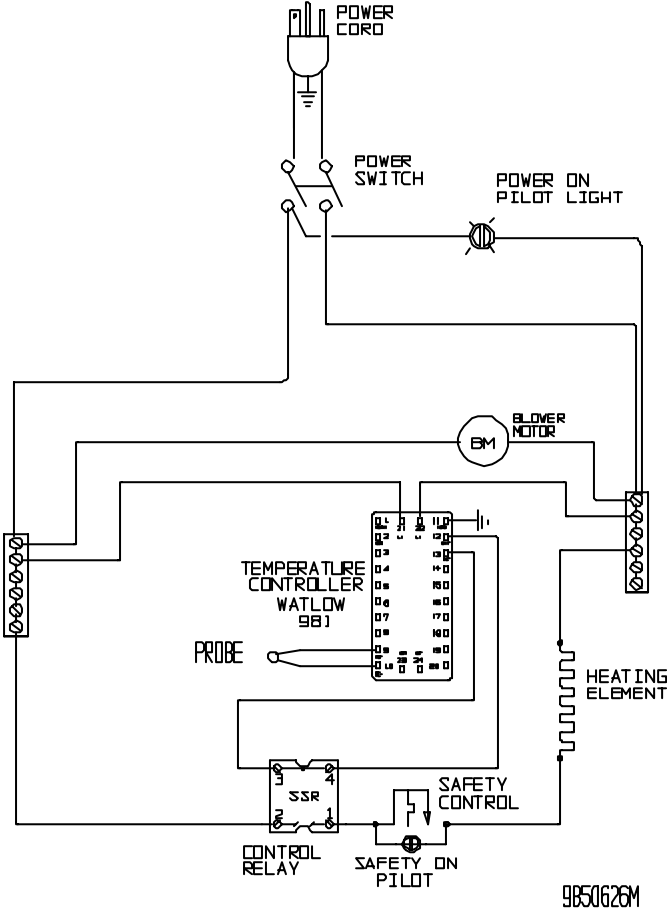


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**WIRING DIAGRAM
TFO-5**

WIRING DIAGRAM

TFO-5

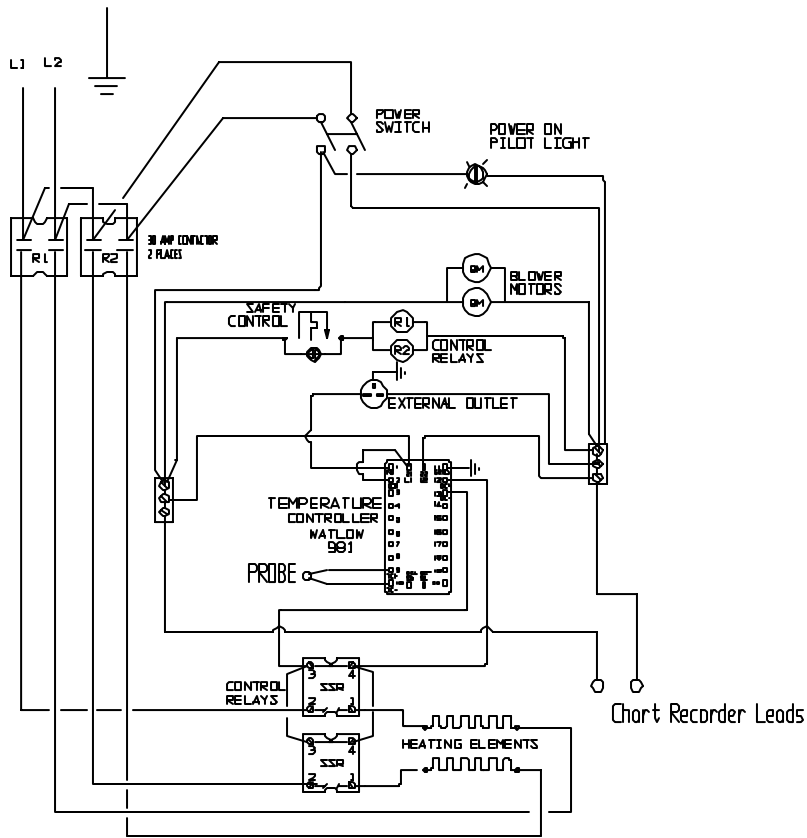


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WIRING DIAGRAM TFO-10

WIRING DIAGRAM

TFO-28

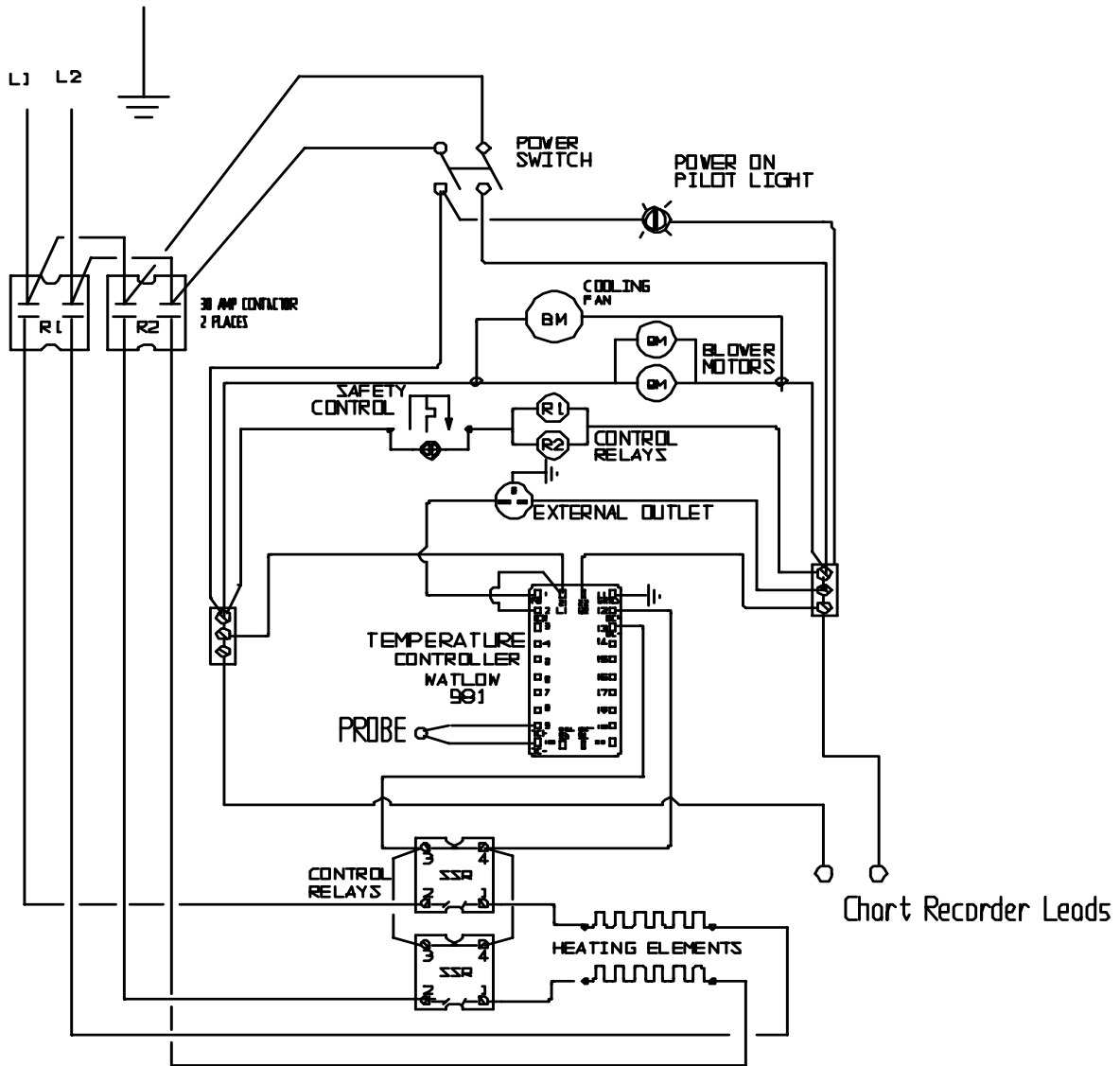


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WIRING DIAGRAM
TFO-28

WIRING DIAGRAM

TFO-28



9850625M

WIRING DIAGRAM TVO-1, TVO-2, TVO-5

