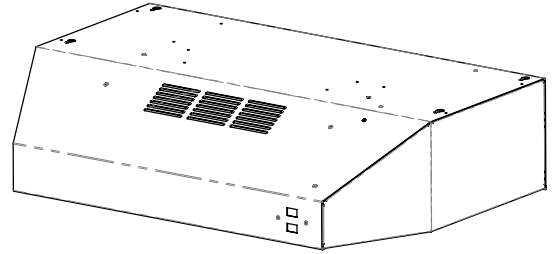


# Service & Testing Manual



## DESIGNER Series

Automatic Fire Suppression Range Hood

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### READ AND SAVE THESE INSTRUCTIONS

#### WARNING

**TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS, OBSERVE THE FOLLOWING:**

1. Use this unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer at the address or telephone number listed on the front cover of this manual.
2. Before servicing or cleaning unit, switch power off at service panel and lock the service disconnecting means to prevent power from being switched on accidentally. When the service disconnecting means can-not be locked, securely fasten a prominent warning device, such as a tag, to the service panel.
3. Installation work and electrical wiring must be done by a qualified person(s) in accordance with all applicable codes and standards, including fire-rated construction codes and standards.
4. Sufficient air is needed for proper combustion and exhausting of gases through the flue (chimney) of fuel burning equipment to prevent backdrafting. Follow the heating equipment manufacturer's guideline and safety standards such as those published by the National Fire Protection Association (NFPA), and the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE), and the local code authorities.
5. When cutting or drilling into wall or ceiling, do not damage electrical wiring and other hidden utilities.
6. To reduce the risk of fire or electric shock, do not use this range hood with an additional speed control device.
7. Ducted fans must always be vented to the outdoors.
8. To reduce the risk of fire, use only metal ductwork.
9. Use with approved wiring only.
10. This unit must be grounded.

**TO REDUCE THE RISK OF A RANGE TOP GREASE FIRE:**

1. Never leave surface units unattended at high settings. Boilovers cause smoking and greasy spillovers that may ignite. Heat oils slowly on low or medium settings.
2. Always turn hood ON when cooking at high heat or when flambéing food (i.e. Crepes Suzette, Cherries Jubilee, Peppercorn Beef Flambé).
3. Clean ventilating fans frequently. Grease should not be allowed to accumulate on fan or filter.
4. Use proper pan size. Always use cookware appropriate for the size of the surface element.

**TO REDUCE THE RISK OF INJURY TO PERSONS IN THE EVENT OF A RANGE TOP GREASE FIRE, OBSERVE THE FOLLOWING:\***

1. SMOTHER FLAMES with a close-fitting lid, cookie sheet, or metal tray, then turn off the burner. BE CAREFUL TO PREVENT BURNS. If the flames do not go out immediately, EVACUATE AND CALL THE FIRE DEPARTMENT.
2. NEVER PICK UP A FLAMING PAN — You may be burned.
3. DO NOT USE WATER, including wet dishcloths or towels - violent steam explosion will result.
4. Use an extinguisher ONLY if:
  - A. You know you have a Class ABC extinguisher and you already know how to operate it.
  - B. The fire is small and contained in the area where it started.
  - C. The fire department is being called.
  - D. You can fight the fire with your back to an exit.

\* Based on "Kitchen Fire Safety Tips" published by NFPA.

#### CAUTION

1. For general ventilating use only. Do not use to exhaust hazardous or explosive materials and vapors.
2. To avoid motor bearing damage and noisy and/or unbalanced impellers, keep drywall spray, construction dust, etc. off power unit.
3. For best capture of cooking impurities and performance of fire extinguisher, your range hood should be mounted so that the bottom of the hood is 20-26" above the cooking surface.
4. Please read specification sheets for further information and requirements.
5. To reduce risk of fire and to properly exhaust air, be sure to duct air outside — Do not vent exhaust air into spaces within walls or ceilings or into attics, crawl spaces, or garages. La PRUDENCE - Pour réduire le risque de feu et correctement épuiser l'air, soyez sûrs à l'air de conduit à l'extérieur — ne déchargez pas d'air épuisé dans les espaces dans les murs ou les plafonds ou dans les greniers, crawlent des espaces, ou des garages.

**Please take a moment to fill out the model and serial number for the Denlar Unit in the spaces provided, for future reference**

It's a good idea to record the model and serial number(s) of your Denlar Unit and the date you received it in the Service Manual. Our service department uses this information, along with the manual number, to provide help for the specific unit you installed.

Please keep this Service and Testing Guide along with the Installation Manual together for future reference.

Copy the information from the serial number tag inside the unit:

Model Number:

Serial Number:

Installation Date:

**DISCLAIMER:** Denlar Fire Protection LLC, shall not be liable for errors contained in this Manual or for incidental, consequential damages in connection with the furnishing, performance or use of this information. Denlar makes no warranty of any kind with regard to this information, including, but not limited to the implied warranties of merchantability and fitness for a particular purpose.

## TABLE OF CONTENTS

What is a Denlar?	4
Theory of Operation	4
Servicing the Unit	
Inspection Intervals	6
System Inspection Procedure	6
Cleaning	6
Inspecting the Nozzles	7
After a Discharge	8
Testing and Verification	
Testing Suppression and Alarm System- Test Tank	9
Testing Suppression and Alarm System- Retrofit Tank	10
Balloon Testing	12
Testing of all optional audio/visual alarms	12
Testing the Remote Manual Pull Station	13

Recommended Maintenance Schedule			
	Monthly	Annually	Every 12 years
Cleaning (p. 8)	○	○	○
Inspect Nozzles (p. 8)	○	○	○
Clean or Replace Fusible Links		○	○
Replace Extinguisher Bottle (p. 12)			○

## What is a Denlar Range Hood ?

The Denlar Designer series is the first affordable residential range hood with a fully integrated fire suppression system. Designed to be installed over a residential range, the Denlar unit functions as a standard ventilation range hood with the added capability to suppress stove top fires through a wet chemical suppression system.

The units are delivered from the factory ready to install and function. No servicing is required at initial installation.

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## Theory of Operation

The Designer Series Range Hood is comprised of a painted or stainless steel ventilation hood; a wet chemical suppression system including a mechanical fusible link chain to control discharge and outputs for audible and fire alarms.

The unit is powered from standard 115 VAC / 60Hz / single phase and is powered from a hard wire building circuit. Switches located at the front of the unit control the integral fan and lights. Power is not required for the suppression system to function.

The **Fan Control** switch is a 3 position switch with a High and Low settings, and a on / off **Light Switch** is provided for the incandescent bulbs. At the High settings, the fan provides approximately 250 CFM (free air) of flow, pulling air through a filter screen and discharging either through the front louvers or connected 7" duct. The inlet filter may be washed and should be replaced annually.

**Note that the wet-chemical suppression system is mechanically based and does not require power to be connected to allow normal operation.**

The **Wet Chemical Discharge System** is comprised of the following components:

- A nitrogen pressurized tank with 760 mL of a potassium based aqueous salt solution, that includes a pressure gauge;
- A distribution system with 2 discharge nozzles located near the front of the unit over the range surface; total discharge time is 35 – 40 seconds;
- A cable / link system comprised of (2) JOB brand FAST ACTING glass tube links (rated at 250 deg F), a turnbuckle for tension adjustment, a valve actuation lever and a tension spring;
- A pair of micro-switches located at the actuator paddle, one providing switched power to the fuel disconnect device, the other a set of dry contacts for the building alarm system;
- (Optional) A cable release mechanism designed to be attached to a manual pull station.

The glass tube link system operates simply. The glass links with the tension bar and turnbuckle serves to hold back the actuation lever from pressing on the tank valve assembly. As the heat from flames on the range

The tank assembly in the Designer Series Hoods is easily removable, allowing a system to be quickly placed back into service.

top reach the links and as the temperature of the glass tubes quickly reach 250 Deg F, one or both of the glass tube breaks, and separates causing the tension in the spring to pull the actuator paddle to press on the tank valve assembly. This causes discharge of the tank through the manifold and nozzles.

At the initiation of discharge, several additional events happen:

- 1) The energy disconnect to the stove (gas valve or contactor) is de-energized, shutting off power to the stove;
- 2) The “fire” alarm contact is closed, enunciating a fire alarm condition to the building system;
- 3) The on-board audible alarm sounds (90 db high pitched tone).

Note that the relays are dry contact type, rated for low voltage, and have normally open (NO) or normally closed (NC) contacts, with a common. They therefore do not produce any current or voltage output.

The Audible Alarm is LOUD and will continue to sound until power is removed from the hood or the tank assembly is replaced with a fully charged Unit!

**IMPORTANT NOTE:** Once the system is discharged, the micro-switches controlling the fuel shutoff can not be readily reset by the user, hence the range will remain disconnected from its fuel source until the **tank assembly is serviced or replaced**. This is a design feature integral to the fail safe nature of the product.

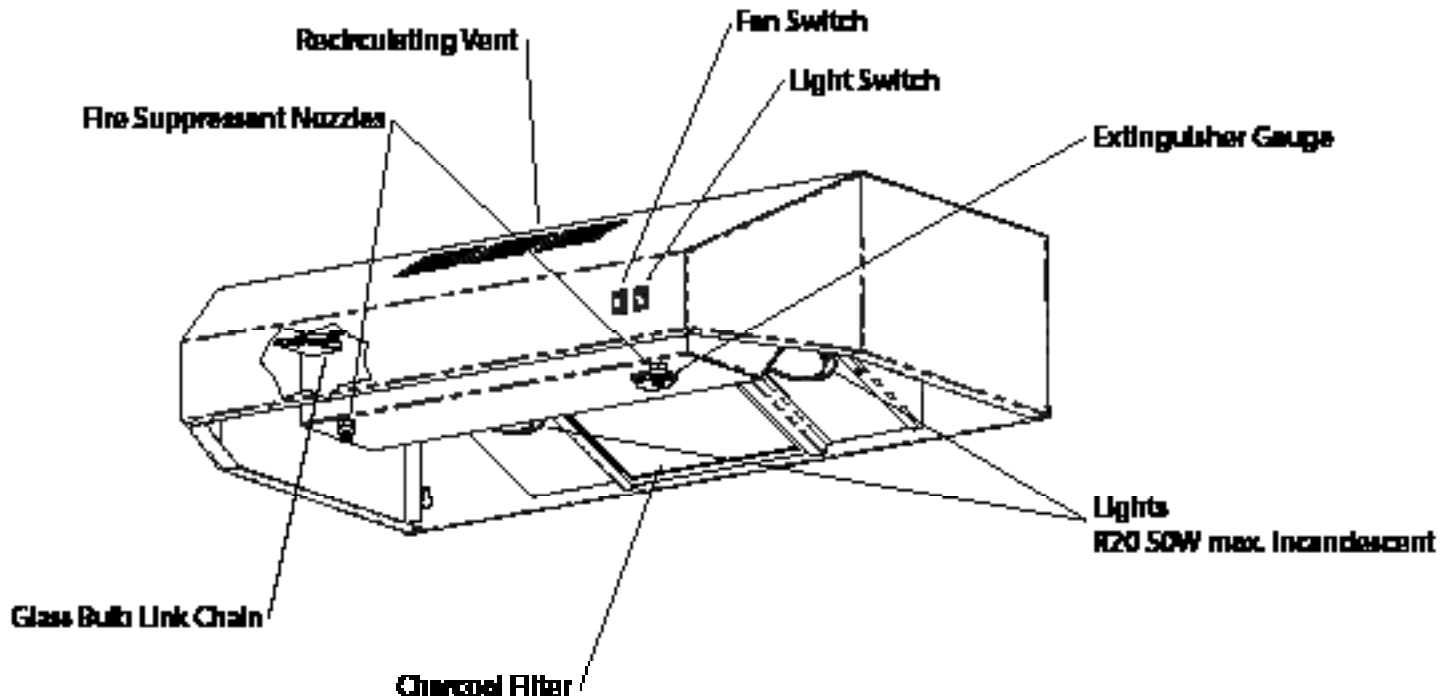


Figure 1 - Operational Features

# Periodic Servicing

The Denlar Range Hood System should be regularly inspected and serviced to insure proper operation and readiness for a fire event. Regular cleaning of the range hood interior should be conducted and the system should be inspected regularly.

**Regular servicing and cleaning will keep your range hood and the suppression system in good working order!**

## **Recommended Intervals:**

**Annual Inspection:** Installations that involve average western style residential cooking.

**Semi Annual Inspection:** Eastern style cooking or grease and oil intensive cooking use or as required by AHJ.

**Twelve (12) Year Inseption:** The pressure tank must be hydrostatically tested by an approved service facility OR the Suppressant Tank assembly should be replaced.

## **Cleaning The Range Hood:**

To insure proper operation of the ventilation fan, lights and suppression system, it is recommended that the visible hood components be regularly cleaned. Mild soap and warm water may be used periodically to prevent the buildup of grease or cooking fats on the surfaces of the hood.

Some care needs to be taken when washing around the mechanism of the tank assembly, as the glass tube links are somewhat fragile and may be broken by metal objects or rough handling. **Should they break, the system will discharge immediately, spraying high pressure solution downward.**

Tough buildups of grease may be cleaned with a mild detergent, or ordinary mineral spirits. Avoid using harsh chemicals as they may damage the painted surfaces or the glass tube links.

## **System Inspection:**

The Denlar Range Hood System should be regularly inspected and serviced to insure proper operation and readiness for a fire event. Regular cleaning of the range hood interior should be conducted with the following steps:

1. Verify that all components are clean and not damaged or corroded; Corrosion may be a sign that the tank system has leaked and should be serviced immediately;

2. Verify the tank pressure gauge is indicating pressure in the Green range, (100 psi nominal). Low pressure in the tank indicates a leak and it should be serviced immediately;
3. For maintenance personnel, check to see that the range operates normally;
4. Verify fan operation (high / low speed) and proper fan discharge volume and replace the fan filter if required;
5. Replace blown light bulbs as required;
6. Clean and inspect the JOB glass tube links. The links do not need to be replaced at regular inspection intervals, but may be at the owners discretion;
7. Inspect and clean nozzles per the following section;

## Warning!

Should you come into contact with the suppressant solution, or if it gets in your eyes, wash thoroughly with warm soap and water. Flush eyes out for 15 minutes with water until irritation is gone.

### Inspecting the Nozzles:

During cleaning, or periodically, the nozzles should be inspected for cleanliness. Remove the protective cap and note that the nozzle surfaces are completely clean and free from any residue, films or that the spray hole is clear and not blocked. A normal nozzle will be shiny brass in color and have a small hole in the end of the tip.

Should a nozzle appear clogged and may not be cleaned by simply wiping the end of the nozzle, have the unit serviced immediately. Do not attempt to clear any nozzle blockage by inserting a pin or other object into the nozzle hole as it may just push the blockage farther into the nozzle itself.

**A blocked nozzle will prevent proper operation of the suppressant system and therefore the range hood will not be able to control a fire!**



**Tank Assembly - Safety Key and Nozzle Assy**

## After an “Event” or Discharge:

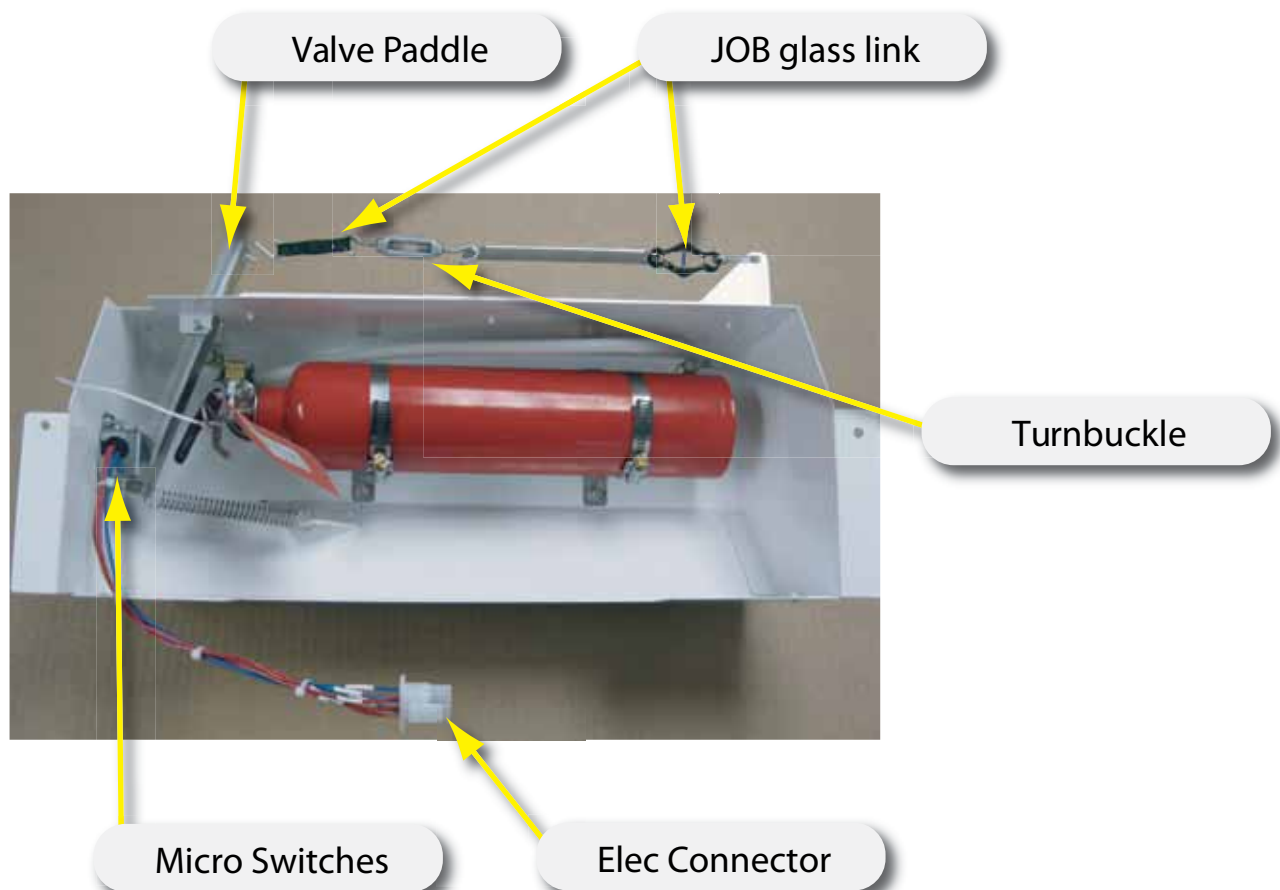
Should the system be triggered by a fire or inadvertent handling of the tank assembly, the system will discharge solution onto the range surface. This solution is slightly acidic and should be cleaned up completely using warm soapy water. Be sure to clean all surfaces including under burners, around the sides of the range, and even in the oven. Long term exposure to this solution will cause some corrosion of metal surfaces.

**The Audible Alarm is LOUD and will continue to sound until power is removed from the hood or the tank assembly is replaced with a fully charged Unit!**

You may want to shut the circuit breaker off that supplies power to the range hood, which will silence the audible alarm. Once a fully charged and reset tank assembly is installed, the power can be restored and the buzzer will be silenced.

Once the area is cleaned up, the tank assembly should be serviced by a qualified Denlar service technician and reinstalled in the unit.

Multiple unit installations may elect to have a spare charged tank assembly on hand to permit quick restoration of the range hood and allow the range to be put back into service.



**Tank Assembly - Internal Components**



# Testing and Verification

## CAUTION:

Discharge of the suppressant system will cause the nozzle caps to blow off and high pressure discharge through the nozzles. Wear **eye protection** for all phases of this test procedure.

### Testing Suppression & Alarm System - Using the Test Tank Assembly

The optional test tank assembly (purchased separately) is provided as a 'dry' system, i.e., no wet chemical, only charged with nitrogen and supplied with test links in place of the glass tube links. Test the discharge and alarm system by carrying out the following steps:

1. Insert the safety pin in the tank paddle as shown in Fig ()
2. Remove installed tank assembly by removing the 2 nuts holding the tank assembly in place; lowering the tank unit; disconnecting the multi-pin connector;
3. Install the test tank assembly into the hood by reversing the previous process;
4. Remove the safety pin from the test tank assembly;
5. Prepare for discharge of the system and to verify alarm outputs;
6. Using wire snips, cut one of the test links to initiate a mechanical actuation of the system.

When the test link is cut, the valve assembly should be actuated by the spring loaded paddle. Verify the following:

1. Discharge of nitrogen through both nozzles for approximately 20-30 seconds;
2. The audible alarm will sound (90 dB);
3. The building fire alarm system should be triggered;
4. The power / gas to the range should be 'OFF'
5. The hood fan and lights should be working.

**The audible alarm will continue to sound until a replacement tank assembly is installed or the 110VAC power to the range hood is disconnected.**

Upon completion of the test, replace the standard tank assembly following the steps above. Be sure to install the safety pin during installation to prevent injury from an inadvertent discharge.

With the fully charged suppressant tank assembly in place, the power may be reset to the range hood and the range should now operate normally.

## Testing Suppression & Alarm System - Using the Standard Tank Assembly

### CAUTION:

Discharge of the suppressant system will cause the nozzle caps to blow off and high pressure discharge through the nozzles. Wear eye **protection** for all phases of this test procedure.

Should a test be required without obtaining the optional test tank assembly, the supplied suppression tank may be used with minor modification. Be aware that the use of this tank assembly will result in the discharge of the suppressant fluid on the surface of the stove. Extra care should be taken to either collect the fluid during discharge or promptly and completely clean up afterward.

**Note that the tank assembly will have to be recharged by an authorized service representative and reinstalled after the test in order to allow normal operation of the hood or range.**

The suppressant solution is slightly acidic and may cause long term damage to the range due to corrosion, if not cleaned up properly.

The installed test tank assembly needs to be modified to replace one of the glass tube links with a special test link.

1. Insert the safety pin where the actuator arm protrudes from the tank assembly.
2. Remove installed tank assembly by removing the 2 nuts holding the tank assembly in place; lowering the tank unit; disconnecting the multi-pin connector;
3. Twist the turnbuckle to remove the tension from the link / bar system. Remove one of the JOB glass links and install one of the test links in its place.
4. Twist the turnbuckle in the opposite direction to restore tension in the link assembly, so that the safety pin may be freely removed. Do not overtighten - just enough tension to get the safety pin loose in its hole.
5. Re-install the tank assembly in the range hood, being sure to reconnect the electrical connector;

Prepare for the discharge test:

1. Prepare the range surfaces for discharge of the solution;
2. Remove the safety pin from the test tank assembly;
3. Prepare for discharge of the system and to verify alarm outputs;
4. Using wire snips, cut one of the test links to initiate a mechanical actuation of the system.

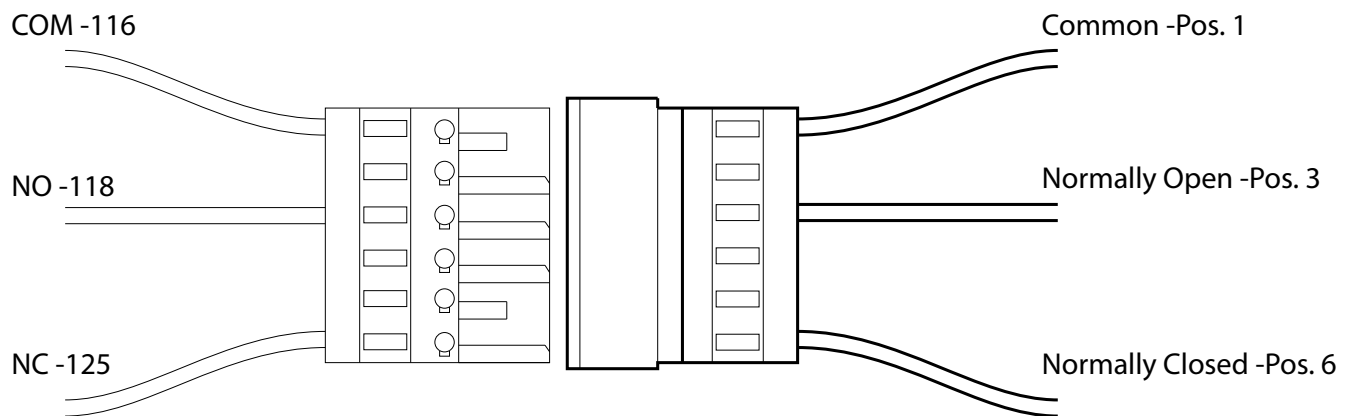
When the test link is cut, the valve assembly should be actuated by the spring loaded paddle. Verify the following:

1. Discharge of nitrogen through both nozzles for approximately 20-30 seconds;
2. The audible alarm will sound (90 dB);
3. The building fire alarm system should be triggered;
4. The power / gas to the range should be 'OFF'
5. The hood fan and lights should be working.

**The audible alarm will continue to sound until a replacement tank assembly is installed or the 110VAC power to the range hood is disconnected.**

Upon completion of the test, replace the standard tank assembly following the steps above. Be sure to install the safety pin during installation to prevent injury from an inadvertent discharge.

With the fully charged suppressant tank assembly in place, the power may be reset to the range hood and the range should now operate normally.



**Designer Alarm Wiring Connector**

## **Balloon Testing**

A balloon test may be conducted to make sure all the nozzles are operating properly, and to see that all the nozzles are capable of discharging similar amounts of extinguishing agent.

**It is strongly recommended that a test tank assembly be used for the balloon testing, as only nitrogen will be discharged during the test.**

Small balloons are available from Denlar Fire Protection for this purpose or any small latex balloon may be used for the purpose.

To prepare for the balloon test:

1. Remove the nozzle caps from the nozzles;
2. Attach one balloon to each nozzle, pushing the neck of the balloon on the nozzle as far as it will go;
3. Conduct the discharge test as noted previously. The balloons should fill and pop off during the test;
4. Replace the tank assembly and restore the hood to normal operation.

## **Testing of all optional audio/visual alarms**

The Designer Series of Range Hoods include both an audible and a remote alarm connection. Both these alarms are integrated into the range hood and suppressant tank assembly and do not have means to independently test them. Both of these alarms will operate at mechanical discharge of the system.

Alarm testing must be conducted as part of a discharge test as described above

## Testing the Remote Manual Pull Station

### **CAUTION:**

Discharge of the suppressant system will cause the nozzle caps to blow off and high pressure discharge through the nozzles. Wear **eye protection** for all phases of this test procedure.

The manual pull station option may be functionally tested as part of an in service inspection process. Be advised that with the Designer Series Units, this test will cause discharge of the system and accordingly, the suppressant tank assembly should be swapped out with a test tank assembly prior to conducting this test.

**It is highly recommended that a qualified service technician conduct this test and restore the system to normal operation.**

1. Install a 'Manual Pull Test Tank Assembly' (sold separately).
2. At the remote pull station, remove the plastic break (red) rod by removing the set screw in the side of the stud and sliding the rod out.
3. Pull the handle on the remote station. The cable should easily release the actuator arm on the tank assembly and the system should discharge. If not, you must check the pulleys and conduit, remote pull station, and cable path within the range hood to locate the source of the problem.
4. Replace the standard tank assembly and manual pull kit system and inspect for proper installation.