KES ENVIRO
MAINTENANCE MANUAL

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KES Enviro Maintenance Manual

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KES OPERATIONS AND MAINTENANCE MANUAL

INTRODUCTION

The SPRING AIR SYSTEMS INC. kitchen enviro system (KES), Exhaust Cleaning Assembly for Kitchen Exhaust Duct, "Enviro Unit" is ULC and UL listed for use in a commercial kitchen exhaust system. KES units are available in sizes ranging from 1,000 CFM to 40,000 CFM for indoor or outdoor applications.

The primary function of a KES enviro unit is to filter the grease, lint and dust particles and remove the odour from the exhaust air.

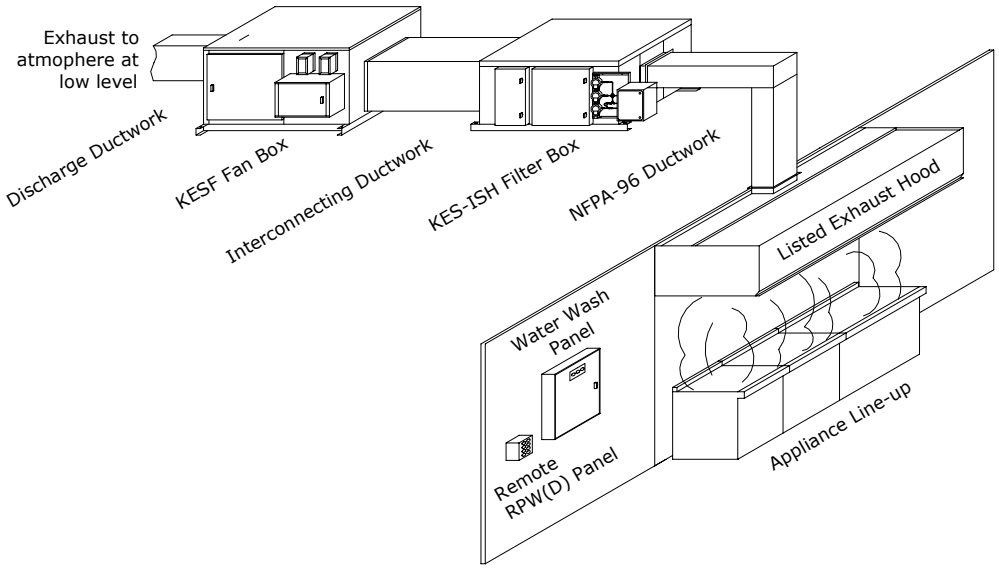
The Underwriters' Laboratories of Canada Limited (ULC) listing allows the use of non-NFPA-96 exhaust ductwork after the exhaust air is discharged from the KES unit. In other words the discharge ductwork can be treated similar to standard HVAC ducting. Also after the kitchen exhaust air has been treated with the KES unit the exhaust can be discharged outdoors at low levels.

The Underwriters Laboratories Inc. (UL) listing allows the kitchen exhaust air to be discharge to atmosphere at low levels.

Prior to any installation the installer must seek approval from the authorities having jurisdiction.

THE SYSTEM

The grease-laden air rises from the cooking equipment into a UL or ULC exhaust hood. The exhaust hood removes some of the airborne grease particulate. Typically most micron and submicron particles escape into the exhaust ductwork. The exhaust ducting is connected from the hood to the inlet of the KES enviro unit. This exhaust ductwork must be supplied and installed in accordance with the NFPA-96 code.



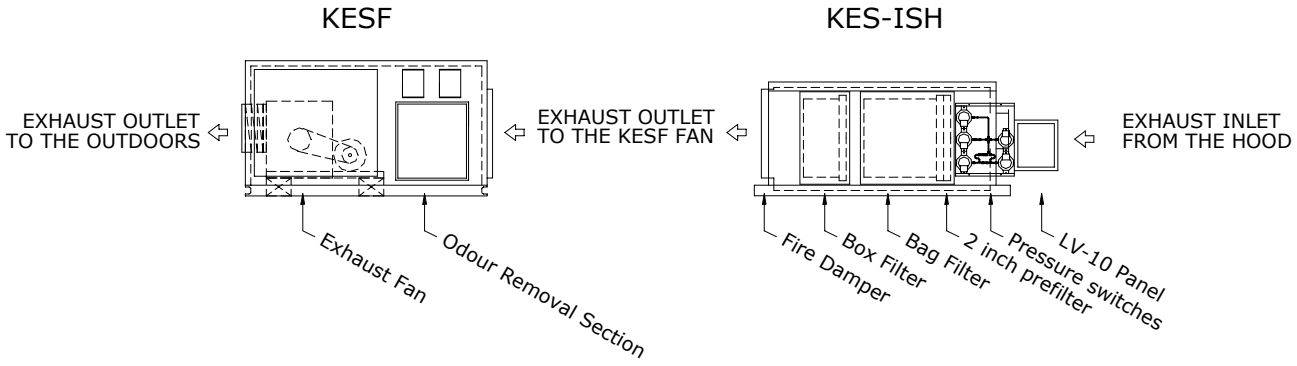
KES System Schematic
Figure 1

Within the KES unit the exhaust air travels through three stages of particulate filters:

1 Two (2) inches pleated - 30 percent ASHRAE 52-76 prefilters.
2 Twenty-one (21) to twenty-two (22) inch bag - 90 percent ASHRAE 52-76 filters.
3 Twelve (12) inches box - 95 percent DOP filters.

Once through the particulate filter sections the exhaust air enters the optional odour removal section. The odour section is only required when discharging the cooking smells may be offensive. This section consists of two optional odour removal systems.

1. Odour Cells filled with activated alumina impregnated with potassium permanganate. The odour is controlled through a combination of sorption and the chemical modification of the gaseous contaminates. The odour media is non-toxic and non-flammable.
2. Odour spray solution. The odour is control by spraying an odour reducer into the exhaust air stream intermittently during the operation of the cooking systems.



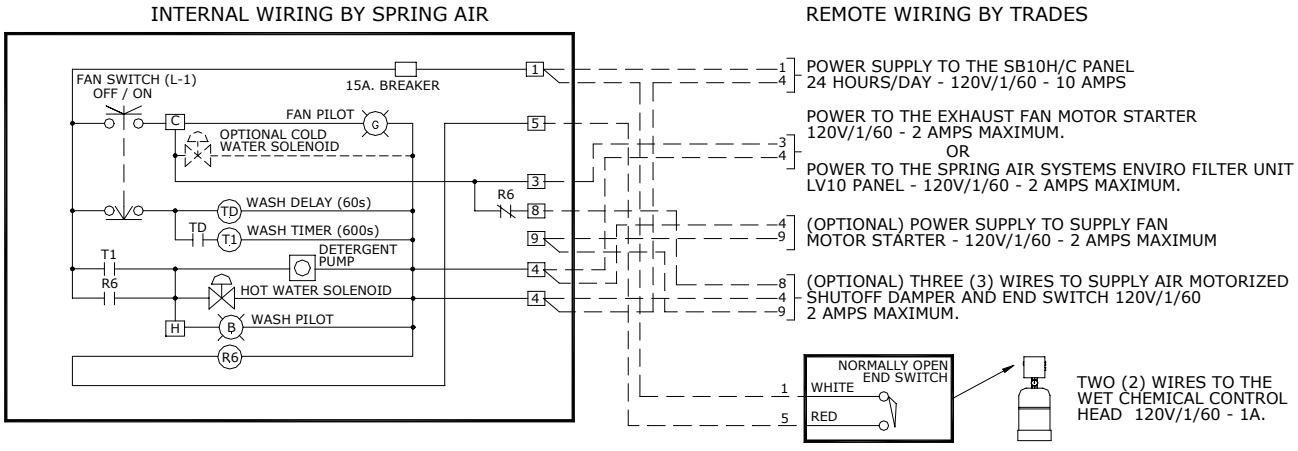
KES Components
Figure 2

The exhaust air is discharged from the KES unit through a single width, single inlet (SWSI) or double width, double inlet (DWDI) exhaust fan. The discharge ductwork transfers the exhaust air outdoors.

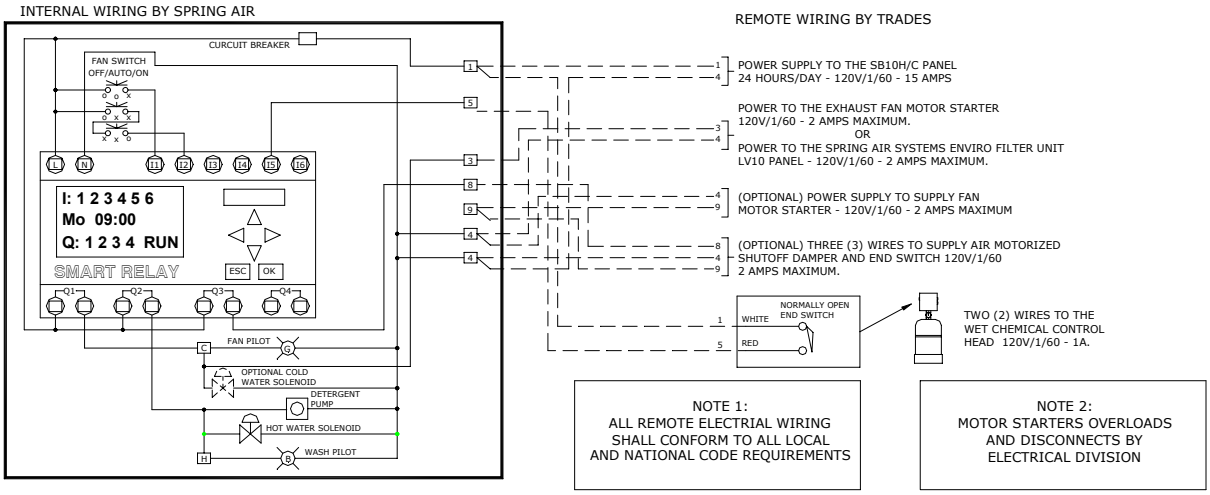
CONTROL SYSTEM

Water wash Ventilator System: SB, SBA Panels

The KES unit off/on operation is controlled from the SB, or SBA water wash ventilator control panel. The fan selector switch on the water wash control panel closes and sends power through terminals 3 & 4 to the LV10 panel to energize the exhaust fan circuit. (The LV10 panel is mounted on the



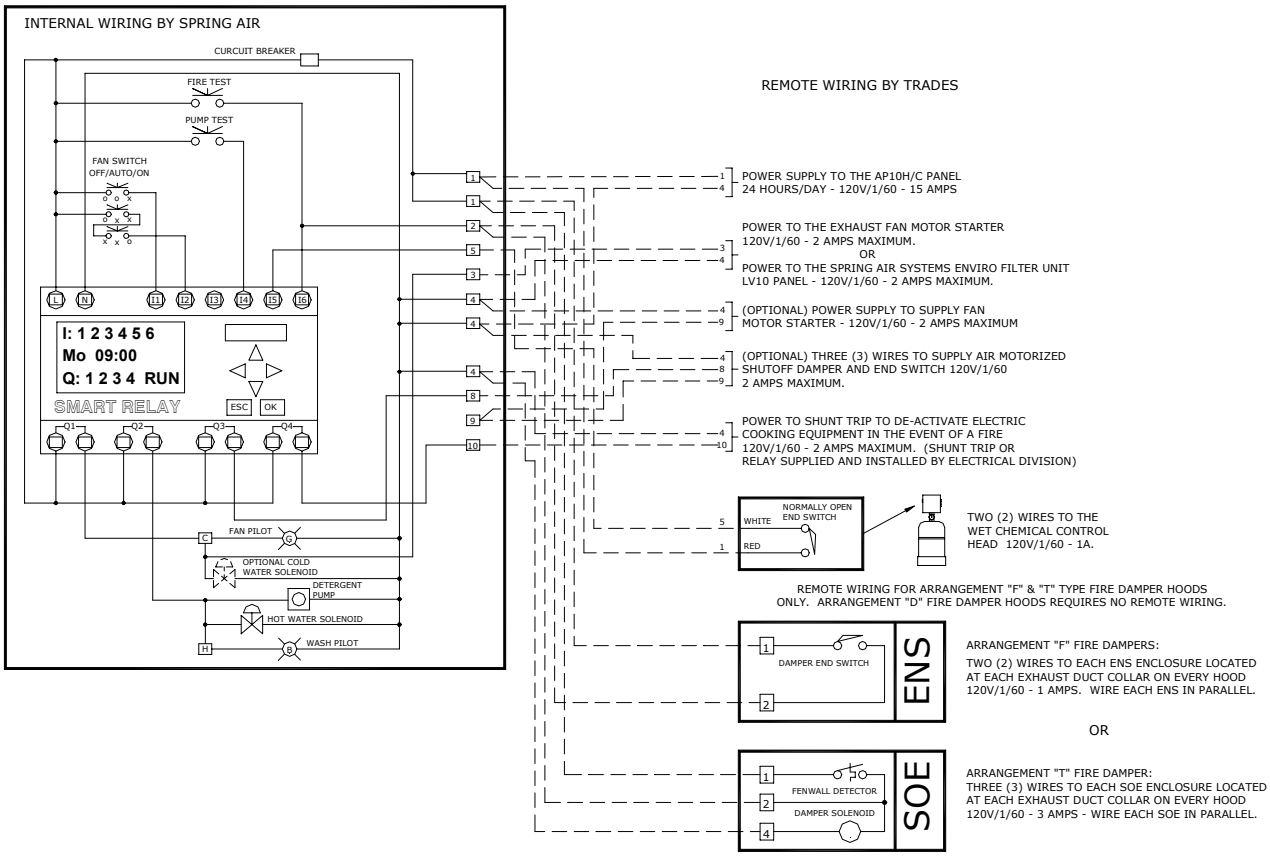
Typical KES wiring to SB10C water wash panel
Figure 3



Typical KES wiring to SBA10C water wash panel
Figure 3b

Water wash Ventilator System: AP, MP, Panels

The KES unit off/on operation is controlled from the MP or AP water wash ventilator control panel. The fan selector switch on the water wash control panel closes and sends power through terminals 3 & 4 to the LV10 panel to energize the exhaust fan circuit. (The LV10 panel is mounted on the KES-ISH filter section).



Typical KES wiring to AP10H water wash panel
Figure 3c

The “NORMAL” operation pilot energizes on the RPW10. After 30 seconds the KES control circuit within the LV10 panel is activated. See Figure 6 for RPW10 internal wiring. The exhaust fan motor is energized through the terminals 9 & 4 to the motor starter located on the KESF fan section. See figure 9 for internal wiring of LV10 panel with water wash panel.

Filter Hood or Dry Grease Extractor: RPD10 Remote Panel

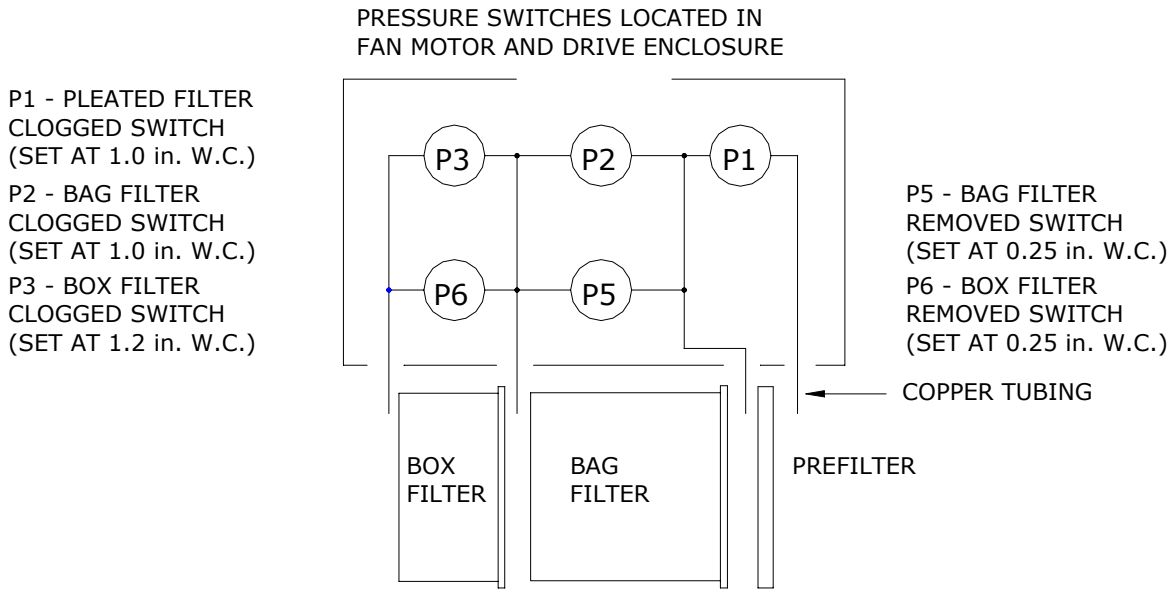
The KES unit off/on operation is controlled from RPD10 remote annunciation panel. The fan selector switch on the RPD10 remote panel closes and sends power through terminals 3 & 4 to the LV10 panel to energize the exhaust fan circuit. (The LV10 panel is mounted on the KES-ISH filter section). The “NORMAL” operation pilot on the RPD10 remote kitchen annunciation panel energizes and after 30 seconds the KES control circuit within the LV10 panel is activated. The exhaust fan motor is energized through the terminals 9 & 4 to the motor starter. See figure 5 for the RPD10 panel wiring and dimensions. See figure 8 for internal wiring of LV10 panel with RPD10 and motor starter.

CONTROL CIRCUIT

Filter Clogged:

During normal operation of the KES unit three filter stages collect grease, dust, and lint particulate. The type of cooking equipment and the hours of operation determines the useful life of the individual filters.

Pressure switches have been installed to determine when the filters are totally used and must be replaced. As the filter reaches the grease loading capacity the static pressure across each filter increases. When the maximum static pressure is reached the pressure switch is activated. The switch in turn energizes a relay in the fan limit circuit, which shuts off the exhaust fan and annunciates a filter clogged condition on the remote kitchen panel. (The remote panel indicates which stage of filters has clogged. PREFILTER, BAG FILTER,



Pressure Switch Locations
Figure 4

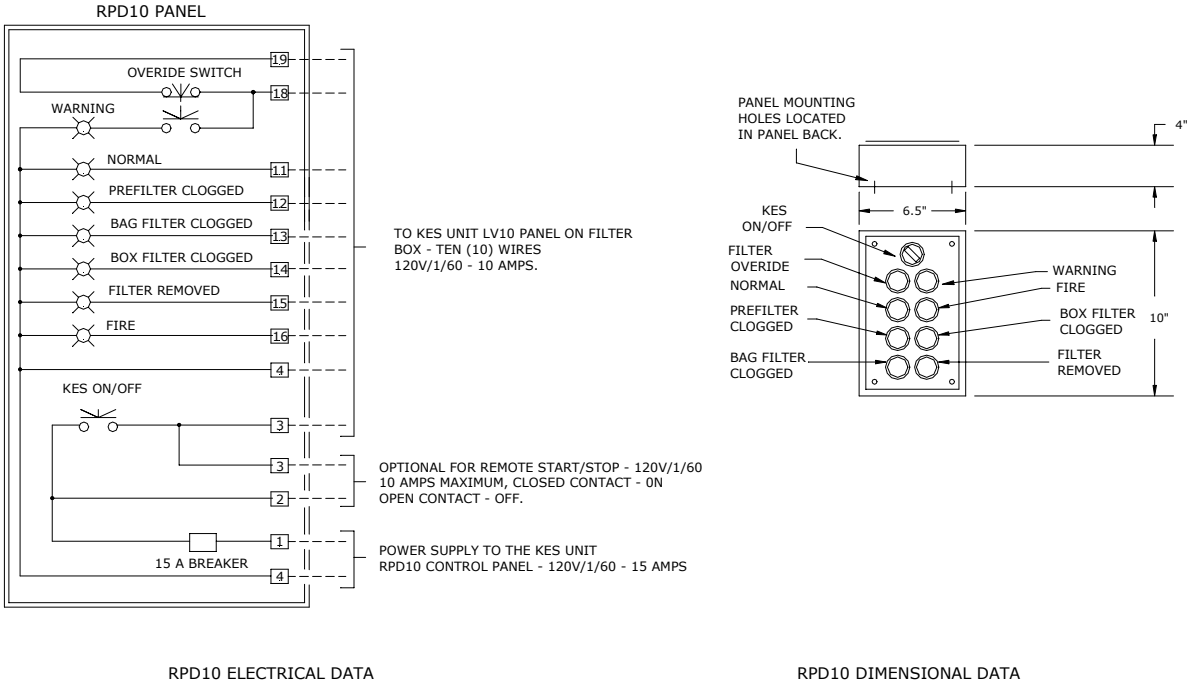
and BOX FILTER.) In addition the “NORMAL” pilot goes out. The clogged filter must be replaced and the system reset to resume normal operation. If this condition occurs during normally operating hours the OVERRIDE selector switch is rotated and the fan will come back on. The systems can run in the OVERRIDE position for about 8 hours. If the system is run longer than 8 hours the fan will shut down on FILTER OUT and can not be reset without a filter change. The filter must be changed and the systems reset. It is recommended that the filters be changed prior to the filter clogged light energizing. A filter usage chart is attached to record when the filters are being changed. Using this chart a regular maintenance schedule can be set up to ensure constant uninterrupted operation of the commercial kitchen.

Filter Removed:
Should the bag or box filters be removed during normal operation the KES unit is automatically shut down. A pressure switch across the bag filters and box filters monitors a minimum pressure drop of 0.25" W.C. When the filter is removed the pressure differential falls and the pressure switch is activated. The pressure switch energizes a relay in the exhaust fan limit circuit, which shuts off the exhaust fan and annunciates a "FILTER REMOVED" condition on the remote kitchen panel. In addition the "NORMAL" pilot goes off. To resume normal operation the filter must be replaced and the system reset.

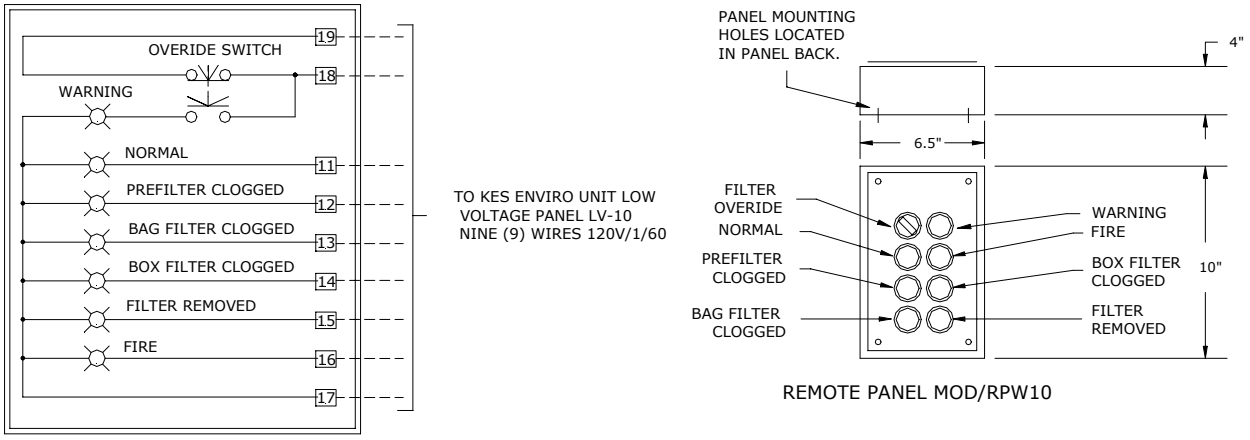
Fire:
In the event of a fire in the ductwork leading to the KES unit or within the KES unit a firestat located at the inlet of the KES filter section is activated. When the exhaust air reaches 160 F the firestat is energized. The firestat then activates a relay in the exhaust fan limit circuit, which shuts off the exhaust fan and enunciates a "FIRE" condition on the remote kitchen panel. In addition the "NORMAL" pilot goes off. Should the exhaust temperature continue to rise the fusible link melts and closes the fire damper in the exhaust discharge of the KES filter section. The fire damper is always located between the fan and filter section. The fire damper fusible link is rated at 165 F. Shut off all cooking equipment and notify the fire department. To resume normal operation, replace the fusible link and reset the system. An authorized SPRING AIR SYSTEM INC. service technician should be called to inspect the unit.

Override Switch: (located on RPW10 or RPD10 panel)
In the event that the filter clogged annunciation shuts off the KES unit during a peak cooking time rotate the OVERRIDE SWITCH located on the RPW10 panel clockwise. The WARNING pilot light will energize and the FILTER CLOGGED and NORMAL lights will turn off. This is a temporary override to allow for the cooking equipment to be shut off prior to changing the filters. The dirty filter should be changed as soon as possible. Once the dirty filter has been replaced rotate the OVERRIDE SWITCH to counter clock wise to resume normal operation.

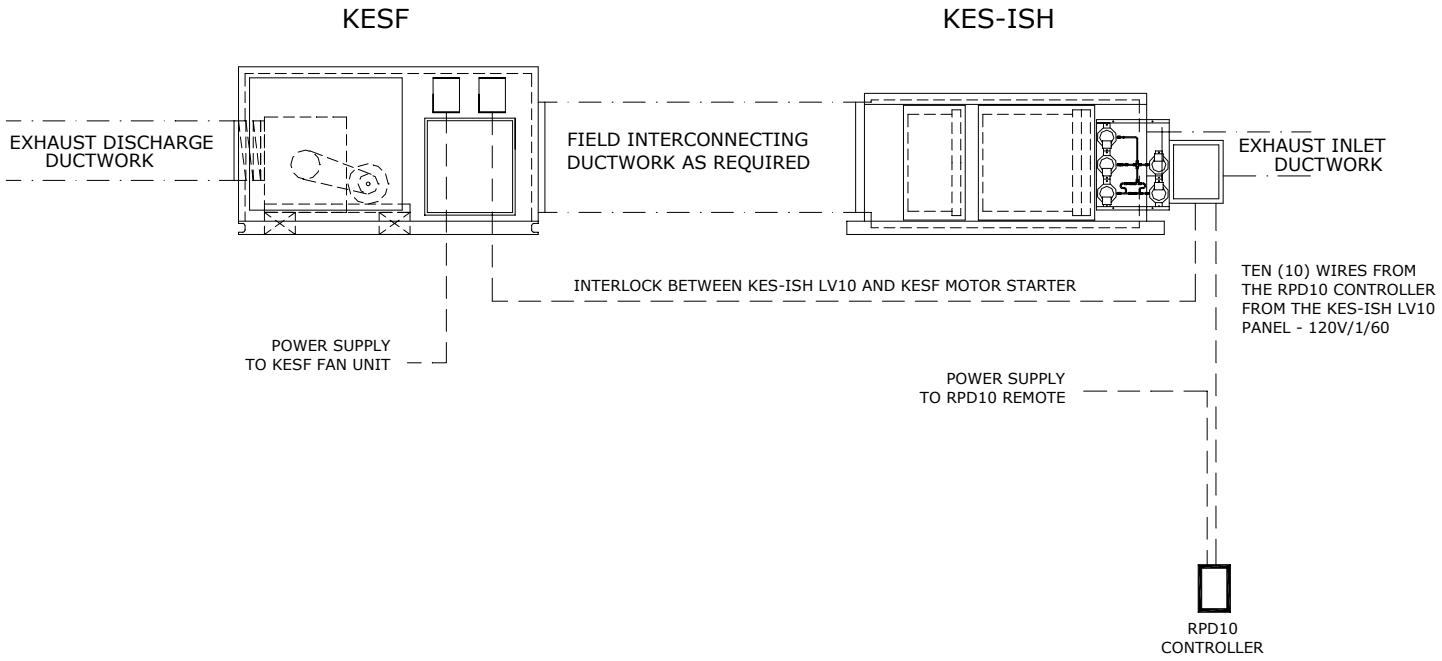
System Reset:
After any of the safety circuit annunciation, the system must be reset. The system is reset by switching the "RESET" button in the LV10 panel on/off, or switching the OVERRIDE SWITCH on the RPW10 or RPD10 on/off, or turning the fan selector switch to the "OFF" and then the "ON" position.



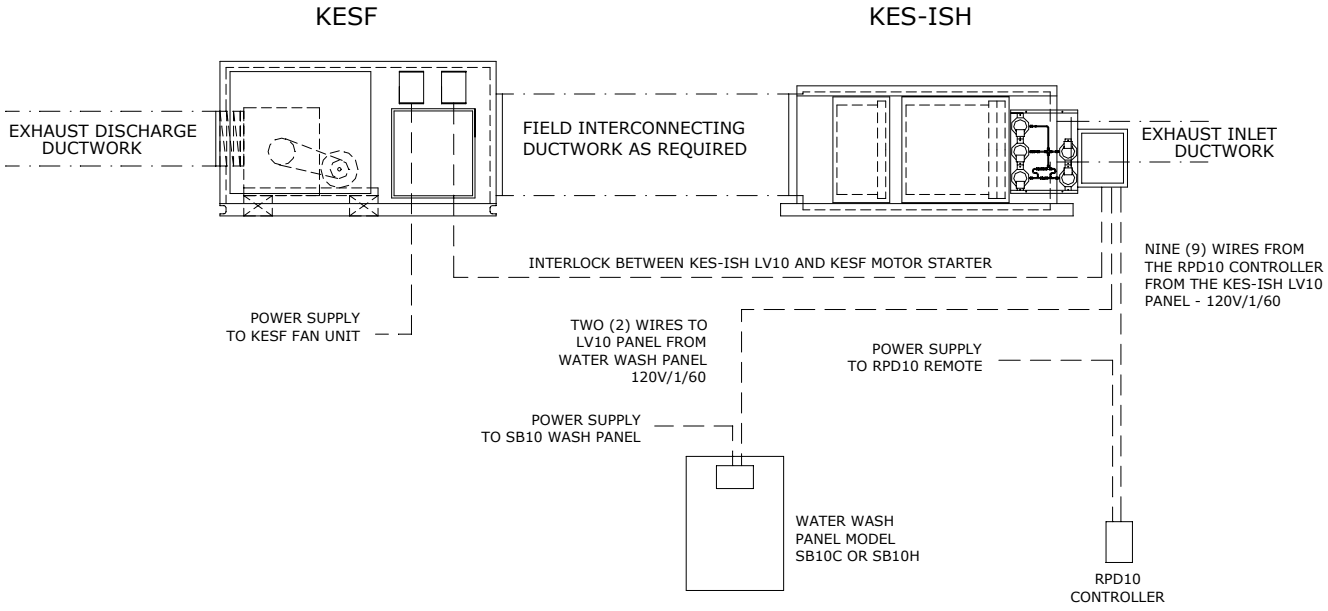
RPD10 remote panels
Figure 5



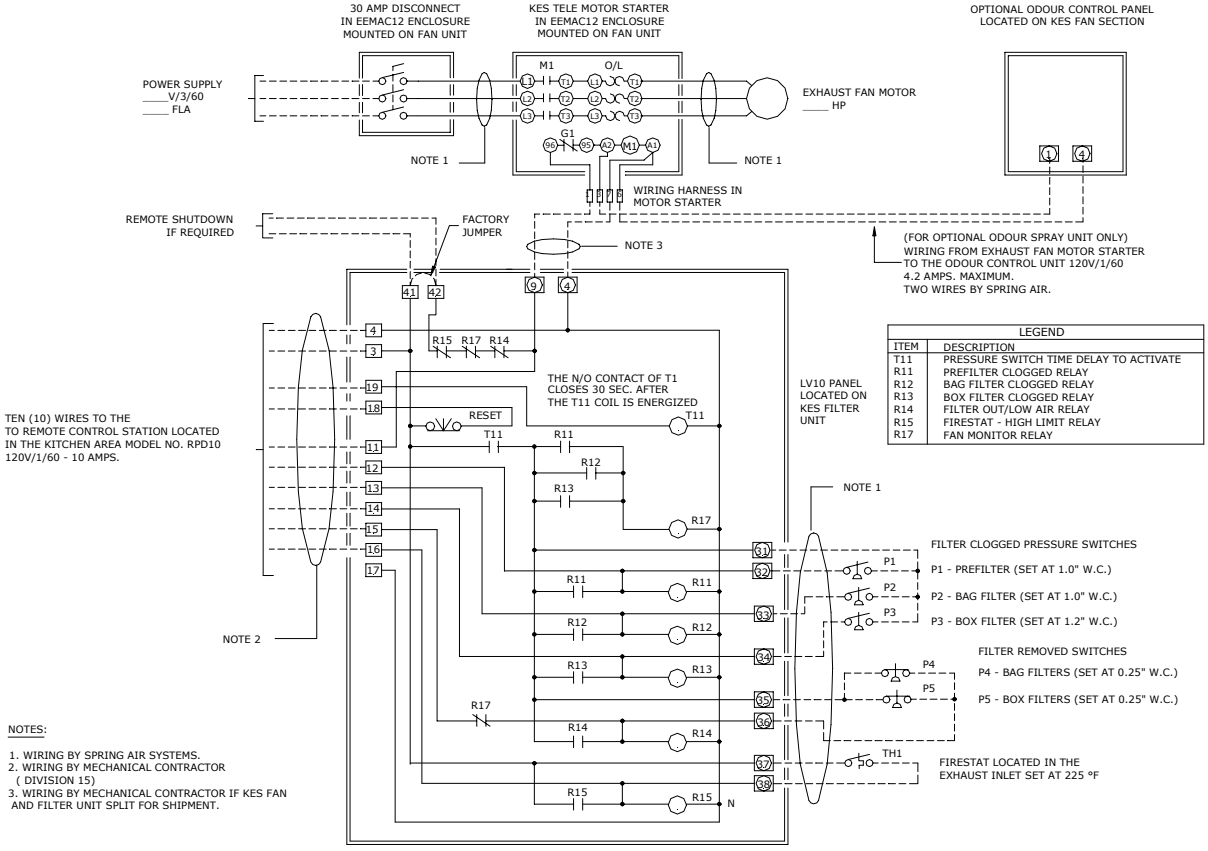
RPW10 internal wiring schematics
Figure 6



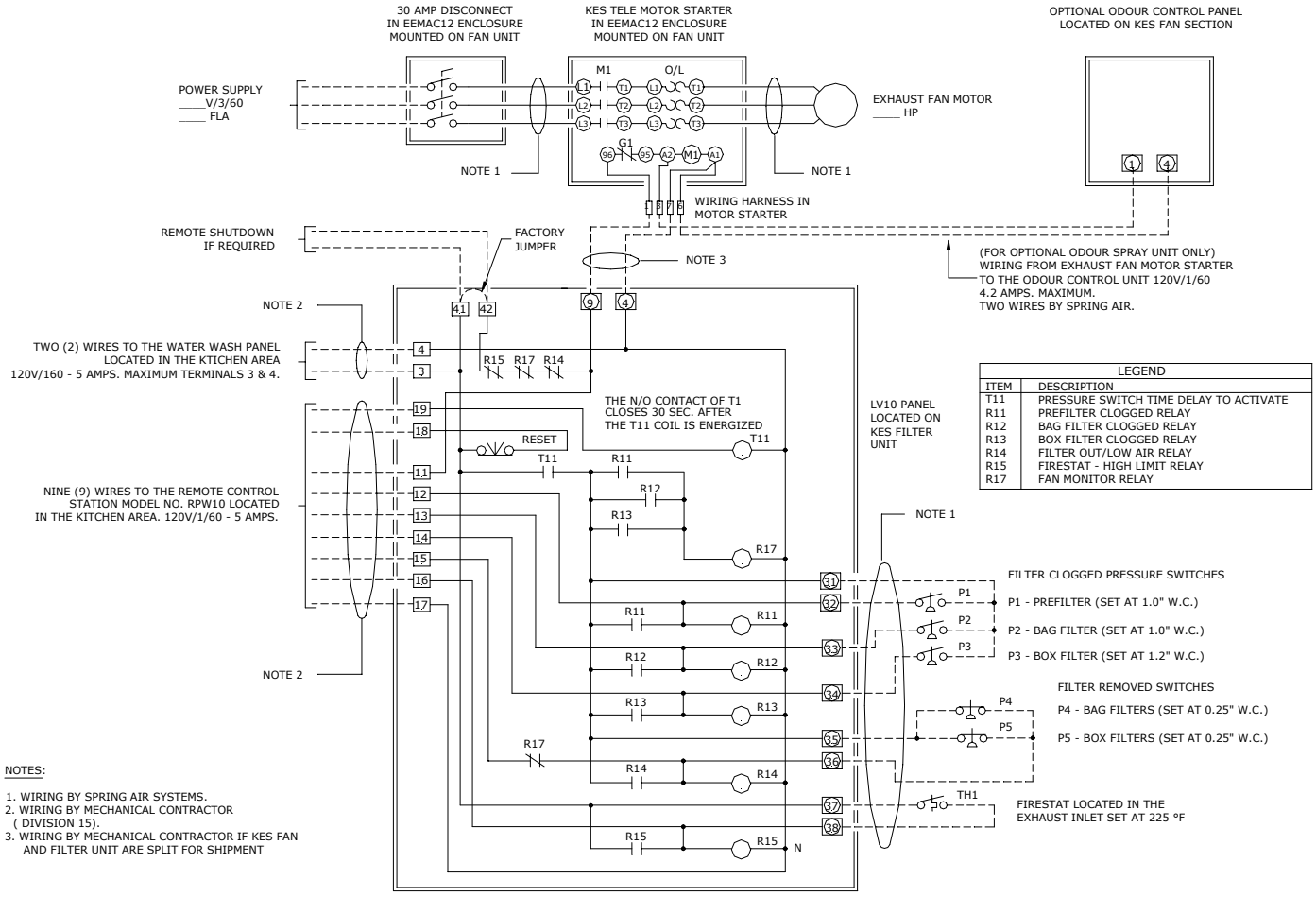
Remote wiring of KES enviro units with Dry Hood
Figure 7



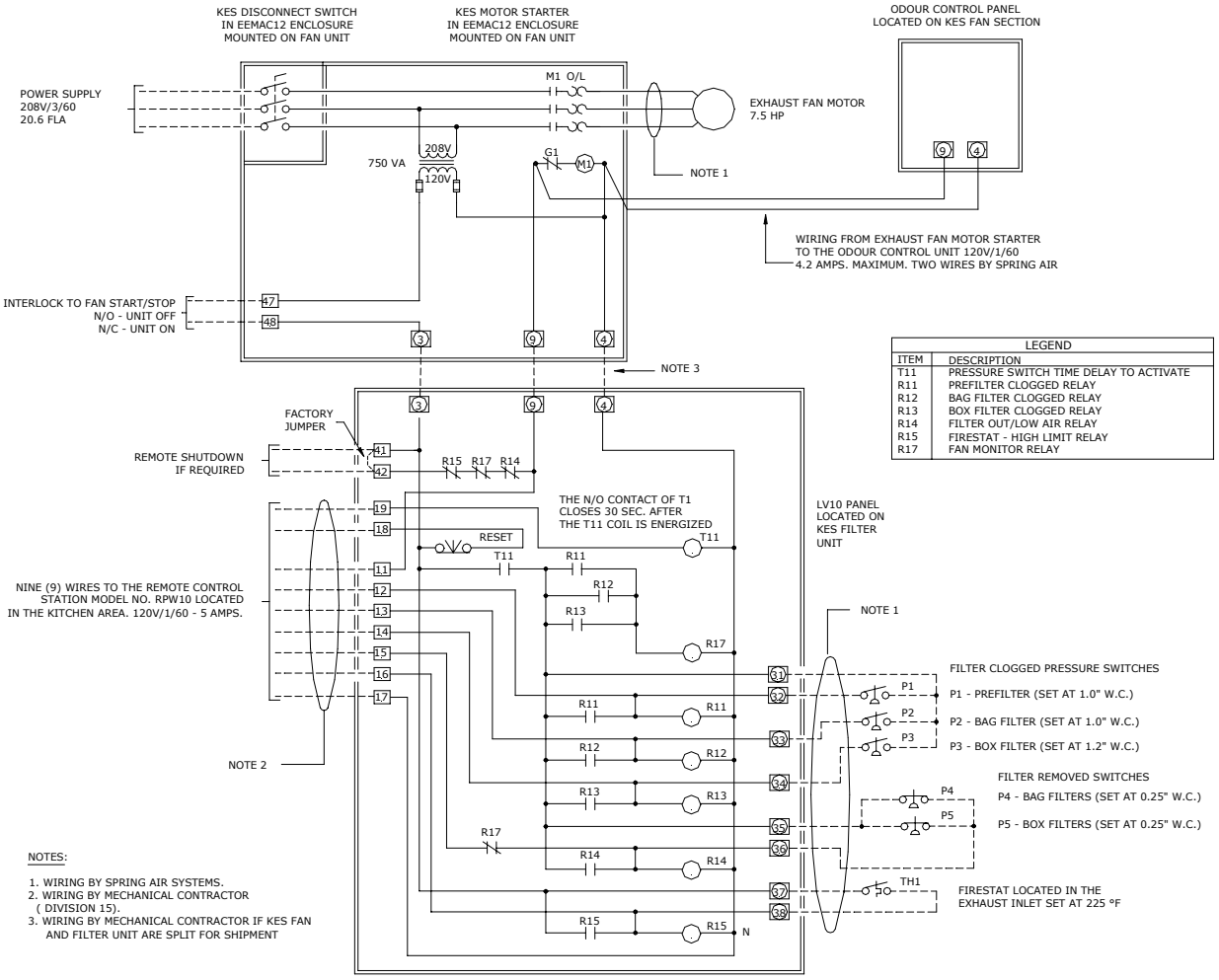
Remote wiring of KES enviro units with Water Wash Hood and Panel
Figure 8



Wiring diagram for LV10 panel with RPD10 and motor starter
Figure 8A



Wiring diagram for LV10 panel with SB panel and motor starter
Figure 9



Wiring diagram KES controls with control transformer and dry contact from Start/Stop station
Figure 10

Odour Spray Systems
Operating and Maintenance

The Spring Air Systems Inc. odour spray unit has for a one-year warranty from startup. The two timers T1 and T2 are factory set and then adjusted during startup for the odour reducing intensity required for your application. Timer T2 is generally set between 5 to 10 minutes cycle. Timer T1 is generally set between 5 to 60 seconds.

The odour spray bottle must be changed regularly depending on the length of time set on timers T1 and T2. The odour spray line from the spray bottle to the spray nozzle must be cleaned every 6 months in a water and detergent mixture. The compressed air gauge should read between 10 and 15 psi. When the air gauge is reading below 10 psi clean out the compressed air line. If the pressure is still low proceed to the next step

Compressor Maintenance

Do not, at any time lubricate any of the parts with oil, grease, or petroleum products nor clean with acids, caustics or chlorinated solvents. Be very careful to keep the diaphragm from contacting any petroleum product of hydrocarbons. It can affect the service life of the pump.

To clean or replace the filters and/or rubber gasket, remove the five screws in the top of the unit. The filters and gaskets are located beneath this top plate. Remove the filters and wash then in a solvent and/or blow off with air and replace. The gasket may be cleaned with water. Replace the filters in proper position and replace the gasket. Note that the gasket and top plate will fit in one position only.

To replace the diaphragm, remove the socket cap screws from the head of the pump. The diaphragm is held in place by two Philip head screws. Remove screws, retainer plate, and diaphragm. The diaphragm will fit in any position on the connecting rod. Replace the plate and the two Phillips head screws. Torque to 30 inch-pounds on DOA and DAA.

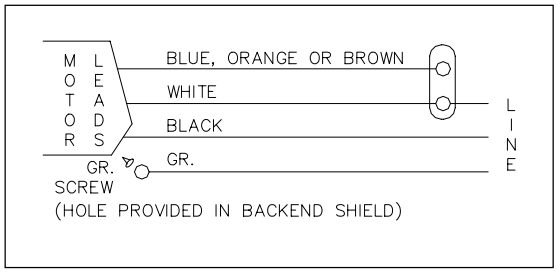
Caution: Do not raise and burrs or nicks on the heads of these screws. These burrs could cause damage to the inlet valve.
For replacing the inlet and outlet valve, remove the slotted machine screw that holds each valve in place. The stainless steel inlet and outlet valves are interchangeable.* Clean them with water. When replacing the outlet valve, place the new valve in location and note there is a retaining bar near the machine screw hole. This retaining bar holds the valve in position. When replacing the inlet valve, note that the valve holder is marked with an X in one corner. This X should be in the lower right hand corner toward the inlet of the air chamber. Replace the head and tighten the socket head screws to 90-100 inch-pounds or torque on DOA and DAA.

WARNING - *The motor is thermally protected and can automatically restart when the protector resets. ALWAYS disconnect KES fan power source before servicing.*

Do not attempt to replace the connecting rod or motor bearings. If after cleaning the unit and/or installing a new service kit, the unit still does not operate properly, contact your representative, the factory, or return the pump to one of our authorized Service Centers.

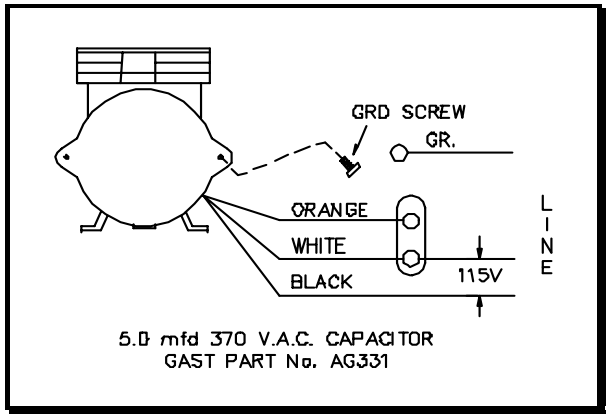
IF YOUR PUMP IS EQUIPPED WITH PLASTIC PLUGS IN THE EXHAUST AND/OR INTAKE POTS, REMOVE BEFORE STARTING THE UNIT

WIRING INFORMATION



For any permanent split capacitor motor, which has four(4) leads is as follows:
Brown leads to capacitor. Black-leads to Power Source.

For any permanent split capacitor for DOA & DAA motor, which has three(3) leads is as follows:



IMPORTANT NOTICE:

DO NOT AT ANY TIME ATTEMPT TO REMOVE THE CONNECTING ROD OR COMPLETELY DISASSEMBLE THE PUMP. IF IT DOES NOT GIVE YOU THE PROPER SERVICE EVEN AFTER INSTALLING A NEW SERVICE KIT, PLEASE RETURN IT TO ONE OF THE AUTHORIZED SERVICE CENTERS

WHERE TO PURCHASE FILTERS :

Spring Air Systems Inc.
1388 Cornwall Rd.
Oakville Ont., L6J 7W5
(905) 338-2999

Airguard Industries
116 Rayette Rd.
Concord Ont., L4K 2G3
(905) 660-7852

American Air Filters
34 Hansen Rd. S.
Brampton Ont., L6W 3H4
(905) 456-3432

Farr Filters
67 Steelecase Rd. W.
Markham Ont., L3R 2M4
(905) 415-3030

RECOMMENDATION
TO ENSURE TROUBLE FREE OPERATION FOR YOUR KITCHEN EXHAUST SYSTEM A PROPER PREVENTATIVE MAINTENANCE PROGRAM IS A NECESSITY.
SPRING AIR SYSTEMS RECOMMENDS THAT A YEARLY SERVICE CONTRACT BE SET UP WITH A REPUTABLE SERVICE ORGANIZATION. THIS WILL REDUCE UNEXPECTED DOWN TIME TO A MINIMUM.

TROUBLE SHOOTING

I. Exhaust fan does not run.

Reset the system once. Press the reset button in the LV10 panel or turn the fan selector switch to “OFF” and “ON”. Observe the sequence that follows.

1. The fan does not start and there is no indication on remote panel.

a. Check main disconnect on KESF fan unit or the HV10 motor control panel. Close if open.
b. Check main power into KESF fan unit or the HV10 motor control panel.
c. Check control voltages fuses F1 in the HV10 panel if supplied and F2 in the LV10 panel.
d. Check wiring between LV10 Panel terminals 3 & 4 and the water wash control panel or the remote panel RPD10 or RPW10. Check for 120V/1/60 in the LV10 panel across terminals 3 & 4. If 120V/1/60 does not exist check remote wiring.

2. The fan does not start but the green normal pilot energizes for 30 seconds goes out and “Filter removed” pilot energizes.

a. Reset the exhaust fan overload in the exhaust fan motor starter or HV10 motor control panel.
b. Check the high voltage fuses F1 in HV10 motor control panel. Replace if blown.
c. Check exhaust fan motor.
d. Check exhaust fan motor starter coil. Replace or repair.
e. Check if fan belts are loose or broken.

3. The exhaust fan runs for 30 seconds then shuts off and the “Filter Removed” pilot energizes.

a. One of the bag or box filters has been removed. Replace.
b. The prefilter or box filter access door on the KES unit is open.
c. If all the filters are in place check if pressure tips on the end of the pressure switch manifolds are plugged.
d. If all the filters are in place calibrate the pressure switches P4, & P5.
e. Check if exhaust duct access door is open between the KES filter section and hood.
f. Measure Exhaust air volume. If low increase fan RPM to within FLA of fan motor.

II. Low Exhaust Air

1. Exhaust fan is running but exhaust air is low.

a. Check if fan belts are slipping. Tighten if necessary.
b. Check if fusible link fire damper has closed in the KES filter section. Replace fusible link.
c. Check if filters are dirty but have not activated the “Filter Clogged” pilot. Replace dirty filters.
d. Check for correct fan rotation.

III. Filter Clogged Pilot On.

a. Filter clogged pilot indicates which filter section has plugged. Replace filter and reset system.

IV. Filter Removed Pilot On.

a. A filter has been removed or access door left open. Replace if necessary.

V. Fire Pilot On.

a. The firestat in the KES filter section exhaust outlet has activated and shut the KES system down. If a fire is not present check calibration of firestat TH1. Firestat should be set at 160F.

If operation problems persist check the individual operation of the control panel relays in the LV10 panel. If problems still exist contact an authorized SPRING AIR SYSTEMS service technician.

Replacement Filter Equivalents

PREFILTERS: 30% ASHRAE 52-76 - ULC Class II
Airguard: 24" x 24" x 2" - DP40 Class II
12" x 24" x 2" - DP40 Class II
American Air Filter:
24" x 24" x 2" - AM-AIR Class II
12" x 24" x 2" - AM-AIR Class II
Farr Filters: 24" x 24" x 2" - 30% ASHRAE 52-76 Class II
12" x 24" x 2" - 30% ASHRAE 52-76 Class II

BAG FILTERS: 90 - 95% ASHRAE 52 - 76 - ULC Class II
Airguard: 24" x 24" x 22" - V9-4M Class II
12" x 24" x 22" - V9-4M Class II
American Air Filter:
24" x 24" x 21" - DRI-PAK - Class II
12" x 24" x 21" - DRI-PAK - Class II
Farr Filters: 24" x 24" x 22" - 90% ASHRAE 52-76 Class II
12" x 24" x 22" - 90% ASHRAE 52-76 Class II

BOX FILTERS: 95% DOP/99% ASHRAE 52-76 ULC Class II
Airguard: 24" x 24" x 12" - VMB- 904 Class II
12" x 24" x 12" - VMB-904 Class II
American Air Filter:
24" x 24" x 12" - BIOCELL Class II
12" x 24" x 12" - BIOCELL Class II
Farr Filter:
24" x 24" x 12" - 6 pocket - 95% DOP Class II
12" x 24" x 12" - 6 pocket - 95% DOP Class II

ODOUR MEDIA: 1/8" Activated alumina pellets impregnated with potassium permanganate.
Airguard: Barneby-Cheney CP-2
American Air Filter:
Permasorb
Farr Filters: Unisorb.

Odour Spray: Spring Fresh, Spring Air Systems

KES Maintenance Schedule

Every two weeks:

1. Inspect the prefilters. Replace if necessary. It is important to maintain clean prefilters. Replacing the inexpensive prefilters often extends the life of the bag and box filters and reduces unnecessary down time due to clogged filter shutdowns.

The RPD or RPW annunciation panel will indicate separately when the "prefilter", "bag" and "box" filters are clogged. When this occurs the unit shuts down. Rotate the override switch to energize the system for about 12 hours. This provides time to change the filters after the day of cooking. This is a final dirty filter warning. The filter life of all the filters is constant for each operation. Once the approximate filter life for your application is determined we recommend that a regular filter change schedule be set up before the filter out switches activate.

Every Month:

1. Complete the two week list.
2. Inspect the exhaust fan belt for correct tension and wear. All belts usually require adjustment at this time. Failure to tighten may result in the belt falling off and no air flow.
3. Inspect the bag filters (2nd stage filtration). Replace if necessary. The life of the bag filter depends on the type of cooking equipment and exhaust hood system. For heavy cooking applications the bag filters may require replacement every month.
4. **(Odour Spray Option)** Inspect the odour spray bottle. Refill if necessary.

At startup the odour spray is adjusted to the desired level. The amount of odour spray used varies with this initial setting. It is important to inspect the level in the bottle every two weeks until the normal rate of use is determined.

Every Three Months:

Complete the two week and monthly check list.

Inspect the exhaust fan belt for correct tension and wear. Adjust if necessary.

1. Inspect the box filters (3rd stage filtration). Replace if necessary. Once again the life of the box filter depends on the type of cooking equipment and exhaust hood system. The box filter may provide one year of service on most applications with high efficiency water wash ventilators.
2. Inspect all electrical connections. Tighten if necessary.
3. Test the filter removed circuit. Open the prefilter access door while the KES unit is in operation. The unit should shut down and indicate a filter removed condition.

Every Six Months

1. Complete the two week, monthly and three month check list.
2. Open the fan wheel access door or hatch on the KES fan section. Inspect the fan wheel for grease build up. Clean as required.
3. Inspect the exhaust inlet fire damper and fusible link. Replace link annually.
4. Check the motor and fan bearings for noise or overheating.
5. (Odour Pellet Option) Inspect the condition of odour media.

The odour media pellets can be checked for remaining life by sending a sample to an accredited test laboratory. Most major filter suppliers have access to such service. Replace media if required. To replace the media remove the cells from the KES unit. Open the side panel on each odour cell and pour out the used media. Refill the cells with new media. Shake cells while filling to allow pellets to settle evenly in the cell. ***Note****: Do not allow odour media to come in contact with water as this will immediately render the pellets useless*.

Fan Bearings
STY and FYC bearings are factory prelubricated lifetime sealed and require no further lubrication. SY and FY bearings are prelubricated and equipped with pressure grease fittings for regreasing. Under normal service conditions grease after six months of operation.

Motor Bearings:
All motors leave the factory with bearings custom greased for many years of service under most conditions. Regreasing of motors depends on the application and is best left to trained service technicians. Periodically check if motor is running hotter then normal.

Centrifugal Exhaust Fan:
Make sure the wheel rotates freely before startup. Inspect and clean the wheel periodically. If dirt is allowed to build up the wheel could become out of balance and cause premature bearing wear. A noisy fan is a typical sign of a fan out of balance.

V-Belt Drives:
ALWAYS KEEP SPARE SET OF BELTS. Periodically check the belt tension and adjust if necessary. Some slack should be left in the belt, typically 1/4" per foot of belt from the fan to the motor sheave. Always replace the complete set of belts to ensure even tension and wear. When replacing belts loosen the motor mounts. Do not force belts over sheaves.

Fuses:
Keep a set of spare high voltage fuses (located in the HV10 panel) and low voltage fuses (located in the LV10 panel) in case of emergency. If fuses continue to blow contact a qualified SPRING AIR SYSTEMS service technician.

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Frequency Chart

Enter the date of each filter change				
Startup date				
Change No.	Prefilter	Bag Filter	Box Filter	Odour
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				

KES ENVIRO STARTUP REPORT

Job Name		**Date**	
Location		**File No.**	
KES No.		**Motor HP**	
S/N		**Voltage**	

Item	Description	Y / N
1	Check all electrical connections. Tighten as necessary	
2	Check all remote wiring to ensure it has been connected	
3	LV10 Panel wiring to terminal 3 & 4	
4	LV10 Panel wiring to terminal 11 through 19	
5	LV10 Panel wiring to motor starter terminals 9 & 4	
6	Power wiring to disconnect switch	

Check if all filters are in the unit

Type of Filter		Size	Qty
7	Prefilter	12” x 24” x 2”	
8	Prefilter	24” x 24” x 2”	
9	Bag Filter	12” x 24” x 22”	
10	Bag Filter	24” x 24” x 22”	
11	Box Filter	12” x 24” x 12”	
12	Box Filter	24” x 24” x 12”	

Item	Decryption		Y / N
13	Check of the inlet exhaust ductwork to the KES unit from the kitchen exhaust hood is all welded NFPA-96		
14	Check if clearance to top, sides, and ends of KES filter box is available: 18” to combustible or 6” to non-combustibles		
15	Check power at disconnect switch	3/60/ V	
16	Check fan rotation as follows: Turn on the main disconnect to the HV10 panel Turn “FAN ON” switch in the wash panel or remote RPD10 panel to the ON position Turn on the reset switch in the LV10 panel Turn “FAN OFF” switch in the wash panel or remote RPD10 panel to the OFF position. Observe the fan rotation. Change one of L1, L2 or L3 if fan is rotating backwards		

Item	Description				Y / N
17	Turn “FAN ON” switch in the wash panel or remote RPD10 panel to the ON position				
18	Check the FLA	L1	L2	L3	
19	Adjust the overload setting on GV1 to FLA rating of motor				

Safety Circuit Check

20	Turn “FAN OFF” switch in the wash panel or remote RPD10 panel to the OFF position		
21	Switch reset toggle switch to the off position.		
22	Adjust timer T11 to 20 seconds		
23	Remove the front covers from the pressure switches .		
24	Turn “FAN ON” switch in the wash panel or remote RPD10 panel to the ON position		

Switch P1

25	Jumper switch P1		
26	KES unit shuts off	Yes	No
27	Prefilter clogged light on	Yes	No
28	Reset unit at LV10 panel reset switch by turning on and off		

Switch P2

29	Jumper switch P2		
30	KES unit shuts off	Yes	No
31	Bag clogged light on	Yes	No
32	Reset unit at LV10 panel reset switch by turning on and off		

Switch P3

33	Jumper switch P3		
34	KES unit shuts off	Yes	No
35	Box clogged light on	Yes	No
36	Reset unit at LV10 panel reset switch by turning on and off		

Switch P4

33	Jumper switch P4		
34	KES unit shuts off	Yes	No
35	Filter removed light on	Yes	No
36	Reset unit at LV10 panel reset switch by turning on and off		

Switch P5

33	Jumper switch P5		
34	KES unit shuts off	Yes	No
35	Filter removed light on	Yes	No
36	Reset unit at LV10 panel reset switch by turning on and off		

Filter Out Test #1

33	Replace pressure switch covers and turn of the unit and remove all the bag filters. Shut the access door and turn the unit on. Wait for 20 sec.		
34	KES unit shuts off	Yes	No
35	Filter removed light on	Yes	No
36	Reset unit at LV10 panel reset switch by turning on and off		

Filter Out Test #2

37	Replace pressure switch covers and turn of the unit and remove all the box filters. Shut the access door and turn the unit on. Wait for 20 sec.		
38	KES unit shuts off	Yes	No
39	Filter removed light on	Yes	No
40	Reset unit at LV10 panel reset switch by turning on and off If the unit does not shut off and the filter clogged light does not come on for this test the pressure switch setting must be adjusted. With the filters out rotate the pressure adjustment screw slowly clock wise until the unit shuts off.		

Fire Switch Test

41	Jumper terminals 37 & 38 in the LV10 panel.		
42	KES unit shuts off	Yes	No
43	Fire light on	Yes	No
44	Reset unit at LV10 panel reset switch by turning on and off		

Check override switch

45	Turn “FAN OFF” switch in the wash panel or remote RPD10 panel to the OFF position		
46	Jumper terminals 31 & 32		
47	Turn “FAN ON” switch in the wash panel or remote RPD10 panel to the ON position		
48	After 20 seconds the KES shuts off and the prefilter clogged light turns on.		
49	Rotate the OVERRIDE switch on the RPW or RPD panel to the ON position.		
50	KES unit turns on	Yes	No
51	Warning light turns on	Yes	No
52	Turn unit off by pressing the stop switch on the GV1		
53	Remove the jumper		
54	Turn the unit on		
55	Turn unit on and off with the selector switch on the water wash control or the RPD10 panel		
56	Measure the exhaust air volume at each hood Use hood start up form for this		

Comments:

Service Technician:_____

Yes I have received a set of Spring Air Systems Inc. maintenance manuals.

Signature _____ Print Name _____

Other Fine Products From

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- Hot Water Wash
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