



January 2022

Auto Fan Control™ Installation, Operation, and Maintenance Instructions

Description:

The Larkin Auto Fan Control™ will automatically energize the fan(s) prior to cooking operations commencing per IMC code 507.1.1 by means of a temperature sensor.

System Components:

The Larkin Industries AFC (Auto Fan Control™) wall mount Control Box includes the following:

- Wall mounted 12" x 22" x 6" stainless steel enclosure with hinged door and tamper resistant latch. Enclosure may be recess mounted (with optional trim ring).
- Switches with LED indicator lights mounted on enclosure door for system operation.
- Exhaust and Make Up Air (MUA) fan(s) are interlocked. If hood fire suppression system is activated, the lights and MUA fan(s) shut down. The Exhaust fan(s) will continue to operate.
- Temperature sensor(s) factory mounted in hood(s).
- Exhaust and MUA fan starter(s) (3 Ph) or contactor(s) (1 Ph).
- Prewired with terminal strips and wiring diagrams.

Note: Wall mounted box size 12" x 22" x 6" for up to 4 starters or contactors and 18" x 26" x 8" for 5-8 starters or contactors.

Mounting

Wall Mounted:

- For wall mounted AFC, the Control Box will be housed in a 12" x 22" x 6" stainless steel enclosure and should be secured to a fixed wall near the exhaust hood(s) it controls (Fig. 1). Enclosure may be recess mounted with optional trim ring. (see Figure 2)

Fig. 1

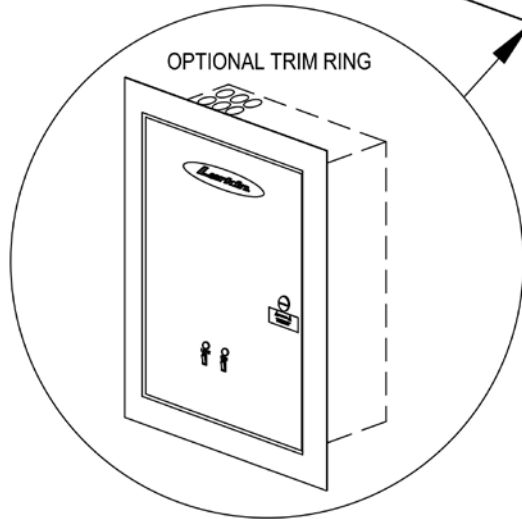
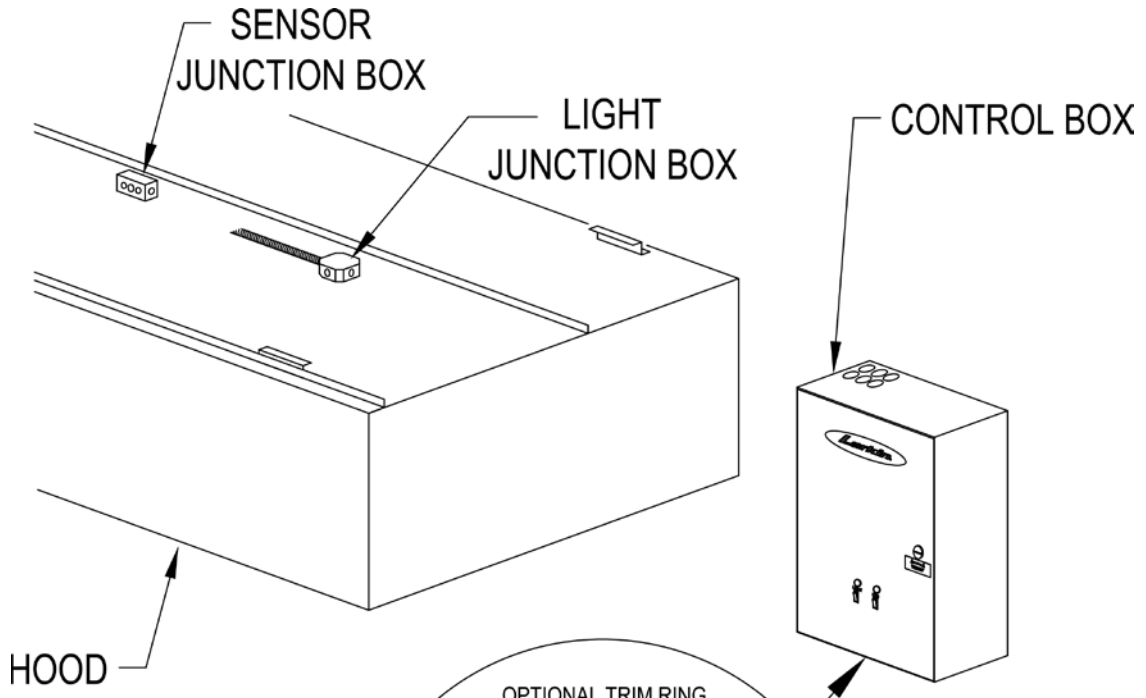


Fig.2

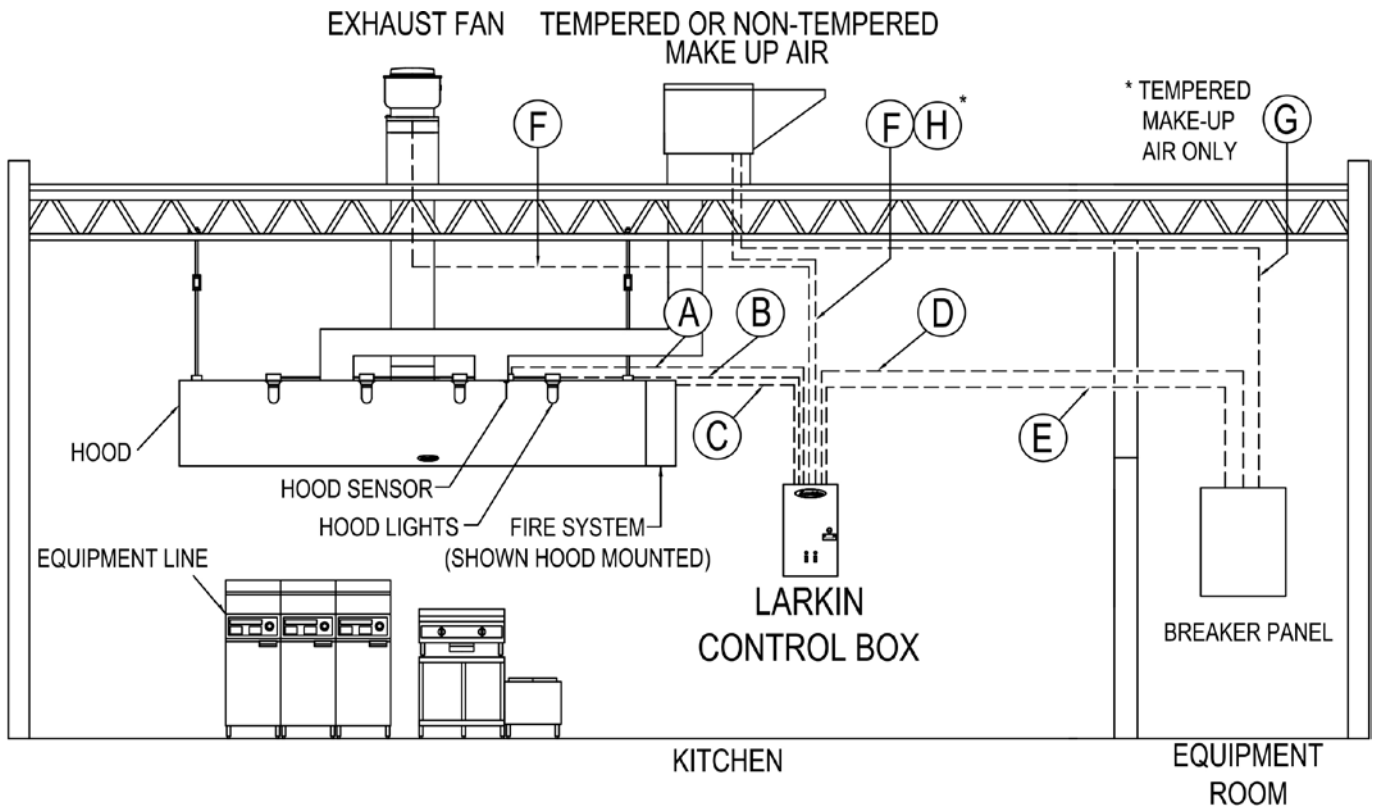


Figure 3

Connections Required for System

Larkin S/S 12" x 22" x 6" AFC Control Box with hinged door and switches:

- A - Low Voltage wiring to hood sensor(s)
- B - Wiring to lights in hood(s)
- C - Fire suppression micro switch wiring
- D - Two separate circuits wired from breaker panel:
 - (1)120VAC 15AMP for control voltage
 - (1)120VAC 15AMP for hood light(s)
- E - 1 or 3 Phase power as required wired from breaker panel to Control Box for fan(s) (See wiring diagram)
- F - 1 or 3 Phase wired from Control Box to fan(s) (See wiring diagram)
- G - *1 or 3 Phase power (if Tempered MUA is provided) wired from breaker panel to Tempered MUA unit.

***Note:** If Tempered MUA is provided, the input power wiring for the Tempered MUA unit must be connected directly from the breaker panel (G) and a separate Run-Stop control circuit connected from the Control Box terminals R and G to the Tempered MUA unit control panel terminals R and G.

H - *Low voltage Run-Stop control wiring (if Tempered MUA is provided) from the Control Box to the Tempered MUA unit. *

Hood Mounted Temperature Sensor

When the Larkin AFC is ordered with a Larkin Industries hood model, the temperature sensor will be factory mounted in each hood, so no field installation is required. Any AFC ordered for a non-Larkin hood(s), or Retro-fit application, the temperature sensor(s) will have to be field installed in each hood controlled by the system. A 3/4"-7/8" diameter hole must be cut in the top of the hood(s), and the compression seal(s) with sensor(s) installed as shown in (Figure 4).

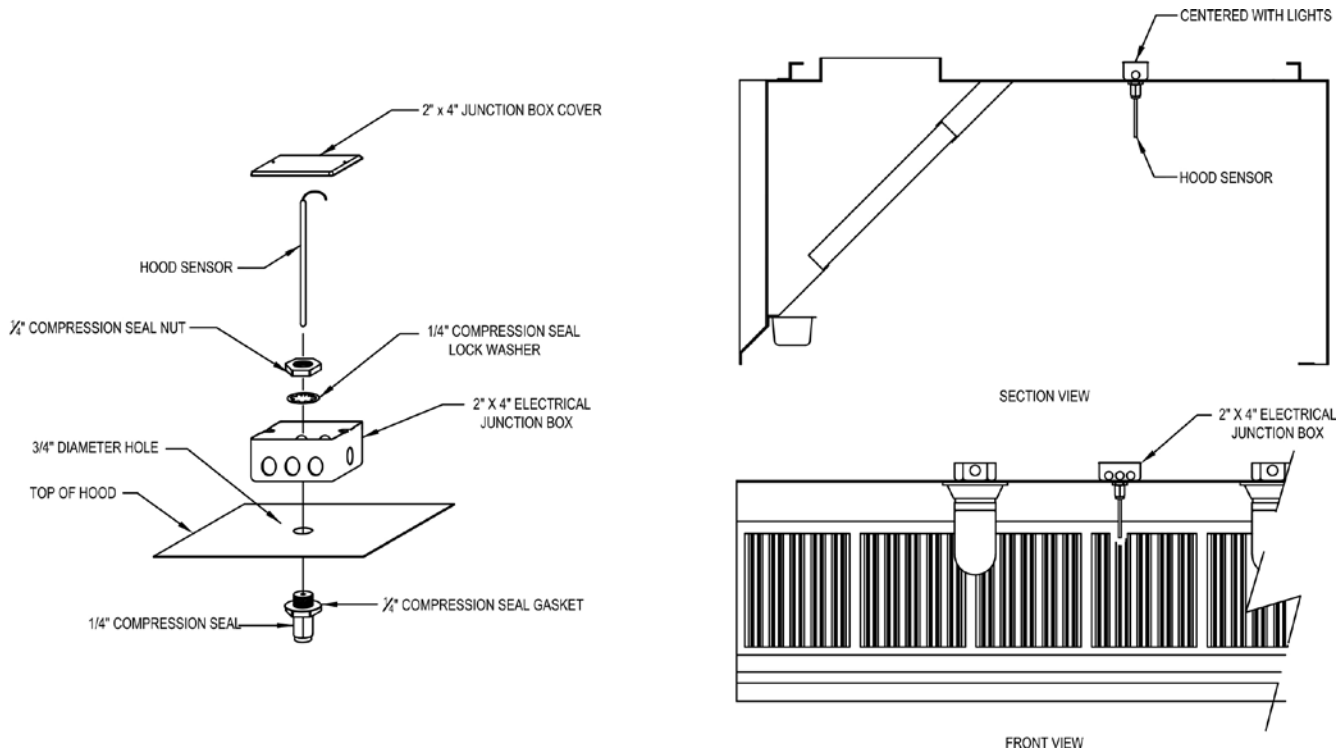


Figure 4

Note: Mount sensor(s) in top of the hood(s) centered front to rear as close to the center of the hood left to right, as possible. Mounting sensor between a light and end of the hood may be necessary on shorter hoods.

CAUTION: If sensor is located too close to a light fixture, the heat generated could activate the system. The sensor(s) should be centered between lights.

Wiring Instructions

The Larkin AFC components are all prewired. The field wiring required to connect the Control Box to the hood(s) and breaker panel should be made in accordance with the wiring diagram provided with these instructions and the NEC (National Electrical Code) requirements.

CAUTION! More than one disconnect switch may be required to de-energize the equipment before servicing. Ensure all power sources have been disconnected before installing or servicing the system. High voltage electrical input is needed for this system. Only a qualified licensed electrician should perform this installation.



Important Wiring Information to Prevent Damage to Equipment



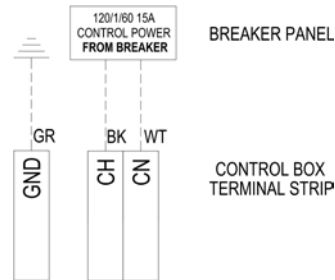
1. Check the power source to see if it is compatible with the requirements of the provided system. The AFC wiring diagram lists the proper phase, voltage, and amp load.
2. Verify input power voltage before connecting to starters or contactors.
3. Check rotation of fan(s). Exhaust fans will move some air in reverse (See rotation arrow on fan). To correct rotation of fan(s), reverse any two leads from the 3 Ph starter to the fan.
4. When wiring to a Larkin Industries Tempered MUA unit, a separate Start-Stop control circuit must be connected to the Tempered MUA unit from the control panel, or the unit will not operate. (See Heated MUA unit wiring diagram)

Note: The input power wiring for Tempered MUA unit must be pulled from the breaker panel directly to the Tempered MUA unit.

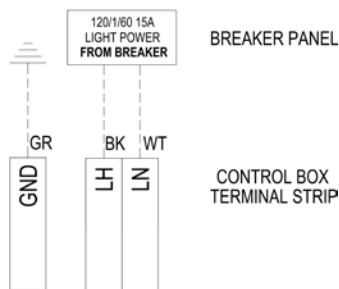
***Only control wiring should be connected from the AFC control box to the Tempered MUA unit.**

Field Wiring Requirements for Control Panel

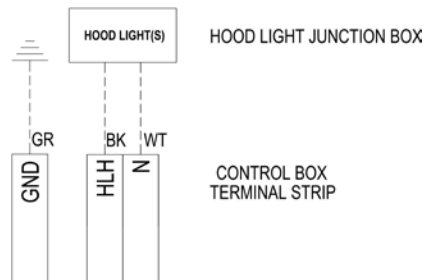
Control Circuit: Field wire 120 VAC 1 Phase 15 AMP to the Control Panel terminals Control Hot (CH), Control Neutral (CN) and Ground (GND) from breaker panel. **Control circuit should not be wired to a shunt trip breaker.**



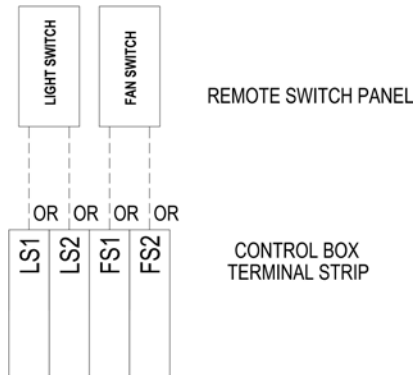
Light Circuit: Field wire 120 VAC 1Phase 15 AMP circuit to the Control Box terminals Light Hot (LH), Light Neutral (LN) and Ground (GND) from breaker panel.



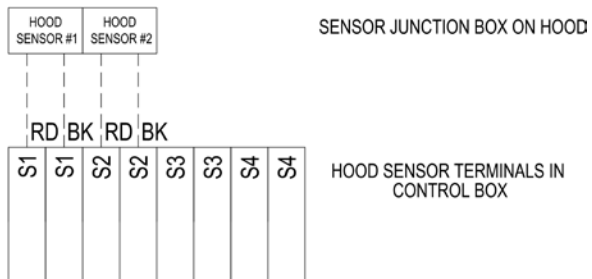
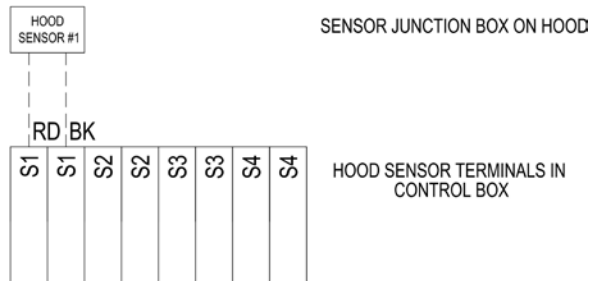
Hood Lights: Field wire hood light(s) from the hood light junction box to the Control Box terminals Hood Light Hot (HLH), Neutral (N) and Ground (GND).

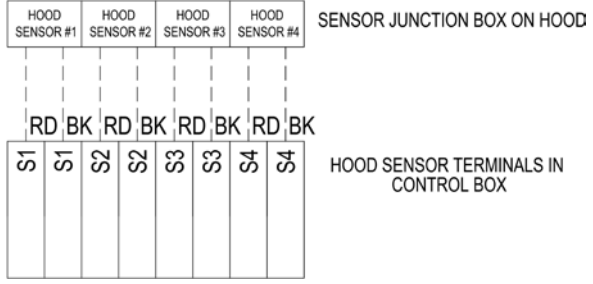
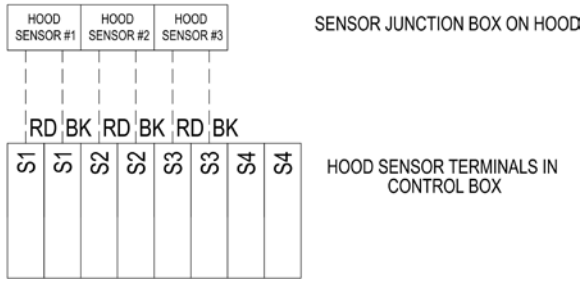


Remote Switch Panel: When a remote switch panel is required, field connections must be made from the Light Switch to terminals Light Switch 1 (LS1) and Light Switch 2 (LS2). Field connections also must be made from the Fan Switch to terminals Fan Switch 1 (FS1) and Fan Switch 2 (FS2) in the Control Box. Non-lighted switches are provided for contact closure that will activate the lights and fans.

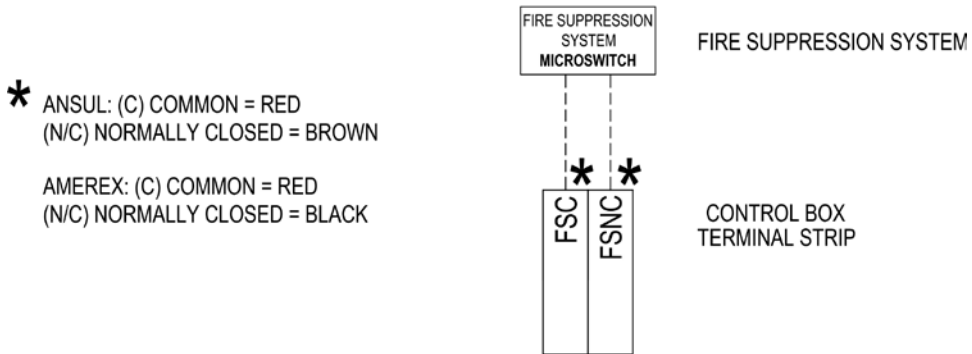


Hood Sensor(s): Field-wire low voltage wiring from the hood sensor to the sensor terminals S1 located in the Control Box (22 AWG Min.). For a system controlling more than one hood, connect the second hood sensor to terminals S2, the third sensor to terminals S3, and the fourth sensor to terminals S4. **Sensors must be wired separately. The corresponding “Sensor Dip Switch” must be in the ON position for every sensor connected to the terminal strip.** If a dip switch is in the on position and that sensor is not connected, the system will be in error and will not operate. If a sensor is connected to the terminal strip and the dip switch for that sensor is in the off position, the auto activation portion of the system will not function for that sensor.



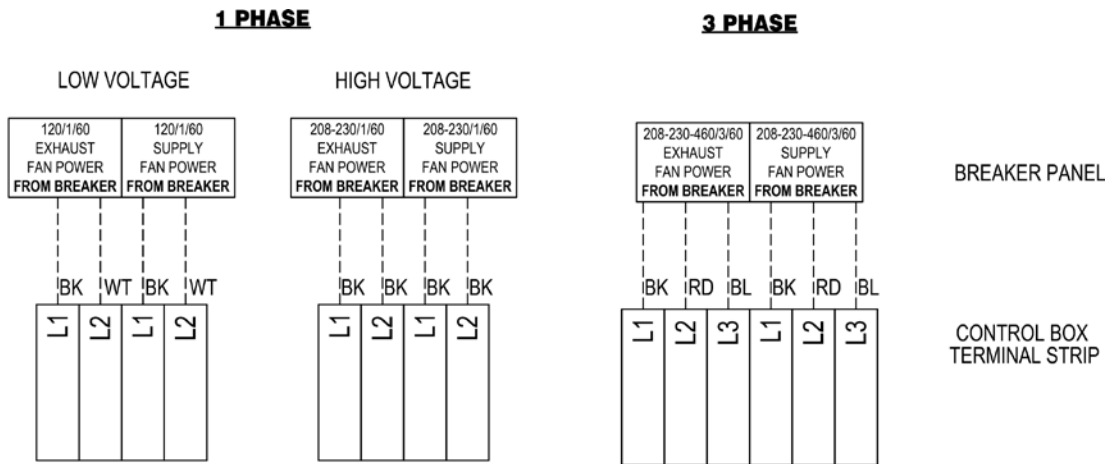


Micro Switch: The Larkin AFC requires a Fire Suppression System Micro-Switch connection. The Micro-Switch should be field wired from the Fire Suppression System to the Control Box connecting the Common (C) lead from the Micro-switch to the Fire Switch Common (FSC) terminal in the Control Box. Connect the Normally Closed (NC) lead from the Micro-switch to the Fire Switch Normally Closed (FSNC) terminal in the Control Box. Isolate the Normally Open (NO) lead from the Micro-switch. **WARNING: DO NOT APPLY VOLTAGE THROUGH MICRO-SWITCH. THIS WILL CAUSE DAMAGE TO THE CONTROL BOARD.**

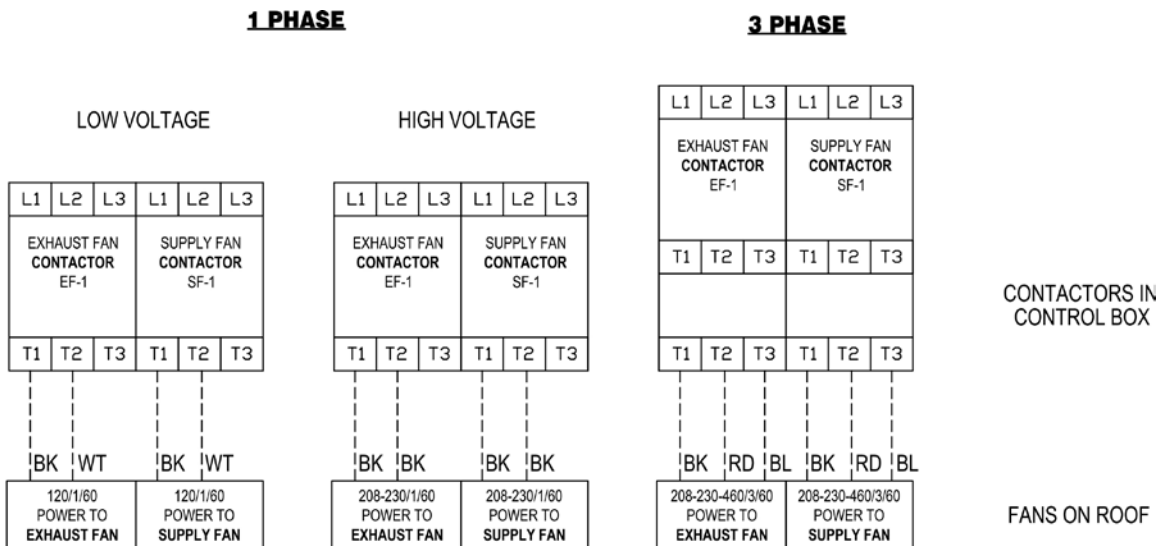


(See micro switch mounting options on page 14)

Fan Input Power From Breaker Panel: Check the power source to see if it is compatible with the requirements of the provided system. The AFC wiring diagram lists the proper Phase, Voltage, and Amp load. Verify input power voltage before connecting to starters or contactors. Field wire proper Phase and Voltage from the breaker panel to the correct terminals in the Control Box for each fan being controlled.



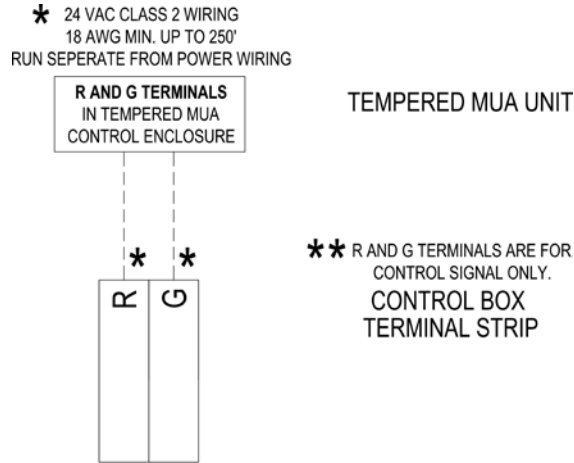
Fan Output Power From Contactor(s) or Starter(s): Field wire output power to proper fan from contactor(s) or starter(s) terminals T1 and T2 (1 Phase) or T1, T2, and T3 (3 Phase). Check rotation of fan(s). **Note:** Exhaust fan(s) will move some air in reverse (See rotation arrow on fan). Changing rotation may be accomplished by reversing any two leads from the 3 Ph starter(s) in the Control Box to the fan(s). For 1 Ph fan(s), see instructions on motor plate to reverse rotation.



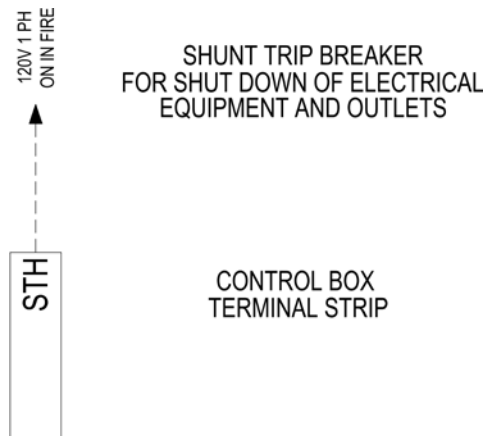
Temper MUA Connection: When wiring a Larkin Industries Tempered MUA unit to the control box, use low voltage wiring (18 AWG Min. up to 250') from terminals R and G in Control Box to terminals R and G in the Tempered MUA control panel. Other manufacturers Tempered MUA units have connections for this Run-Stop control signal. See MUA wiring diagram or IOM for proper connection points. **DO NOT run low voltage wiring in same conduit as input power circuits (high voltage).**

NOTICE: Remove jumper from terminals R and G in the Tempered MUA unit.

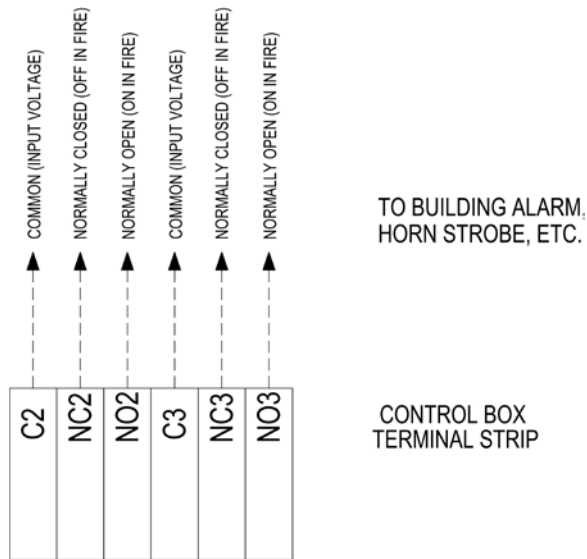
Note: The input power wiring for the Tempered MUA unit must be pulled directly from the breaker panel to the Tempered MUA unit.



Shunt Trip Breaker Connection: Field install wiring from the Control Box terminal Shunt Trip Hot (STH) to the trip connections on the shunt trip breaker (a neutral may be supplied from breaker panel). This will provide 120V 1 PH power to trip the breaker in Fire Mode. **WARNING: DO NOT APPLY VOLTAGE TO TERMINAL STH. THIS WILL CAUSE DAMAGE TO THE FIRE RELAY.**



Spare Dry Contact Connections: Two spare dry contacts with normally open and normally closed connections, C2, NC2, NO2 and C3, NC3, NO3. Contacts are provided for activation of building alarm, horn strobe, etc. Up to 120V 15A power may be connected to C2 and/or C3 for activation or de-activation of auxiliary controls in Fire Mode. The NC2 and NO2 terminals will have whatever voltage has been connected to C2. The NC3 and NO3 terminals will have whatever voltage has been connected to C3. In Fire Mode, NC2 and NC3 contacts will open and no longer have the connected voltage through these terminals for “Off in Fire”. At the same time, NO2 and NO3 will close in Fire Mode supplying the connected voltage to those terminals for “On in Fire”.



Installation Check List

- Is control box mounted next to the exhaust hood(s) it controls (See Pg. 2)?
- Are two separate circuits (120VAC 15AMP control and 120VAC 15AMP hood lights) connected from breaker panel to Control Box per NEC (See Pg. 5)?
- Are hood lights connected from the Control Box to the hood light junction box per NEC (See Pg. 5)?
- Are hood sensor(s) connected from hood(s) to Control Box (One sensor per hood or hood section)? Check dip switch position (See page 6 & 7).
- Is there a Micro-Switch wired to the Control Box from the fire system (See Pg. 7)? **Warning: Do not apply voltage through Micro-Switch. This WILL cause damage to the control board.**
- Is input power of proper Phase and Voltage from the breaker panel connected to each starter or contactor terminals L1, L2 (1 Phase) or L1, L2, L3, (3 Phase) per NEC in the Control Box (See Pg. 8)?
- Is output power from starter or contactor terminals T1, T2 (1 Ph) or T1, T2, and T3 (3 Ph) in the Control Box connected to the proper fan(s) on the roof (Exhaust to Exhaust, Supply to Supply) per NEC (See Pg. 8)?

Optional Equipment:

If a shunt trip breaker is required, connect the shunt trip control voltage from the Control Box terminal Shunt Trip Hot (STH) to the trip terminals on the shunt trip breaker (a neutral may be supplied from breaker panel). This will provide 120V 1 PH power to trip the breaker in Fire Mode (See Pg. 9).

If a Tempered MUA unit is used, it must have a starter/ contactor in unit and power wiring from the breaker panel of proper Voltage and Phase connected to the unit (See wiring Diagram) and a separate low voltage (18 AWG Min. up to 250') connection must be wired from the Tempered MUA unit control panel terminals R and G to the Control Box terminals R and G (See Pg. 9). The jumper from between terminals R and G in the Tempered MUA unit must be removed if this connection is made.

If Wiring for building fire alarm, strobe horn, etc. is required field wire to the proper Common, Normally Closed or Normally Open terminals in the control box. Up to 120V 15A power may be connected to C2 and/or C3 for activation or de-activation of auxiliary controls in Fire Mode. The NC2 and NO2 terminals will have whatever voltage has been connected to C2. The NC3 and NO3 terminals will have whatever voltage has been connected C3. In Fire Mode, NC2 and NC3 contacts will open and no longer have the connected power through these terminals for "Off in Fire". At the same time, NO2 and NO3 will close in Fire Mode supplying the connected voltage to those terminals for "On in Fire" (See Pg. 10).

For technical support contact Larkin Industries, Inc. 1-800-322-4036

System Startup

Turn on all breakers that power the fan starter(s) or contactor(s), Control Box power, hood lights, and Tempered MUA unit power (If Tempered MUA is used). Check for proper voltage at all terminals with fan switch off. Cooking equipment should be off, and fan(s) should not be operating.

If the fan(s) and light(s) come on with the switches in the "OFF" position, the temperature sensor in the hood has detected a temperature rise. If only the Exhaust fan(s) come on immediately, check for proper connection of Fire System Micro-Switch (See Pg. 7) or check that the Fire Suppression system is not in the discharged position.

With the fan switch in the off position, turn on the light switch to energize the hood lights. The light indicator lamp should illuminate to show that the lights are on. If the hood light(s) are not working:

1. Verify that the bulbs are installed.
2. Verify that all connections to hood(s) have been made and breakers are on. If the light(s) are working properly, de-energize the light(s) by returning the light switch to the off position.

Turn on fan(s) using the "FAN" switch. The fan and light indicator lamps should illuminate (hood lights are interlocked with fan switch). This indicates the fan(s) and light(s) should be operating. If fan(s) are not operating, check all connections to and from Control Box.

Check the rotation of the fans. **Note:** The exhaust fan(s) will exhaust some air while rotating in reverse. Checking rotation may be accomplished in two different ways, (1) by comparing the direction the fan wheel is rotating to the direction arrow on the fan(s) or (2) check the amperage of each fan with a meter. A fan turning in reverse rotation will exceed the rated FLA of the motor. If the amperage is higher than the listed FLA for the fan, it is spinning in reverse rotation. To reverse rotation, (3 Ph only) change any 2 leads connected to the starter (T1, T2, T3). For 1 Phase, rotation must be changed at the motor (See instructions on motor plate).

CAUTION! More than one disconnect switch may be required to de-energize the equipment before servicing. Ensure all power sources have been disconnected before installing or servicing the system.

See Fan IO&M for further instructions on fan start-up procedures.

The start up is now complete. To test the systems fire suppression interlock, and Auto Fan Control for IMC 507.1.1 compliance, follow the Test Procedures in the next section. For operation information and system adjustments see System Operation section.

Test Procedures

Testing of the System for IMC 507.1.1 Compliance: Please read complete test procedures prior to attempting function test for Fire Marshal.

Note: For timely automatic de-activation, the test should be done in the following order: 1) Auto-Activation, 2) Fire System Activation, 3) Auto Shut-Down. When the test is done in this sequence, the Micro-Switch trip will bypass the 30-minute run timer initiated on start-up and the system will Auto-Shut Down in 3-5 minutes. If not, the system will run for approximately 33 minutes before shutting down.

1. Cycle power to the Control Box to reset the system prior to test.
2. Place the light and fan switches in the "OFF" position. Indicator lights should be "OFF". Fan(s) and light(s) should be de-energized prior to initiating the test procedures below.
3. Conduct the test by applying heat to any one of the hood sensor(s) located in the center of the hood(s), in between and in line with the light(s) and in front of the grease filters. **Note:** It does not require much heat. The palm of your hand or hot water should be enough. **DO NOT USE A TORCH!** When the hood sensor(s) detect a rise in temperature the fan(s) and light(s) will automatically energize. Both Fan and light indicator lights will illuminate indicating that power is going to the fan(s) and light(s). For multiple hood systems, when any hood sensor detects a temperature rise, the fan(s) and light(s) will automatically energize for all hoods connected to that Control Box. **Note: Allow the system to continue operating after the automatic activation to perform fire system test described next.**
4. For this portion of the test, the system should still be operating in automatic mode, described above. The system is designed to shut down the lights and MUA fan(s), continue to run the Exhaust fan(s), and provide 120V for shunt trip breaker(s) in Fire Mode. To conduct this test, simply trip the fire suppression Micro-Switch to simulate Fire Mode. The Exhaust fan(s) should continue to run, the light(s) and MUA fan(s) should shut off, the Auxiliary Contacts should change state and 120V should be provided for shunt breaker(s). After testing, place the Micro-Switch back to the normal position. The light(s) and MUA fan(s) should re-energize. Shunt trip breakers will need to be reset, if applicable. The system will shut down automatically after the sensor(s) have cooled to the factory pre-set Low End Turn Off temperature of 88° F. (may be accomplished with cool water), and the system detects no additional rise in temperature, within 3-5 minutes. This will complete the test procedure.

If the light and/or fan switch have been turned to the "ON" position the system is running in manual mode and will not shut off automatically, it must be manually shut down. The switches must be in the "OFF" position for the auto de-activation portion of the system to function. In normal operation there will be a factory set 30-minute Initial Safety Timer that must elapse before the system will de-energize. For multiple hood systems, the warmest sensor must cool to the factory set point before automatic de-activation will occur.

System Operation

To comply with the International Mechanical Code 507.1.1 the commercial kitchen exhaust system shall operate during the cooking operation and have automatic controls that will activate the fan(s) no more than 15 minutes after the first appliance under the hood has been turned on.

The AFC (Auto Fan Control) will accomplish this by automatically activating the fan(s) and light(s) anytime a hood sensor detects a rise in temperature. The fan and light indicator lights will be illuminated indicating power is going to the fan(s) and light(s). The fan(s) and light(s) will continue to operate in Auto Run Mode until all of the following shut down conditions are met: the fan and light switches are in the "OFF" position, the factory set 30 minute Initial Safety Timer has elapsed, the cooking equipment has been turned off, the sensor(s) do not detect a temperature above the factory pre-set Low End Turn Off (88° F.) for 3-5 minutes.

The system may also be manually operated by turning the light and fan switches “ON” and “Off”; however, the system will enter “Auto Run Mode” if the system detects a temperature rise associated with cooking operations. If the system changes from “Manual Mode” to Auto-Mode” because of a temperature rise, it will shut down automatically once the system no longer detects a cooking operation. **Note: The system will not shut down manually or automatically until all the above shut down conditions have been met.** For multiple hood systems, the warmest sensor must cool to the factory set point of 88° F. before automatic de-activation can take place.

WARNING: It is not recommended to adjust this system except in extreme cases. Please consult factory before attempting any adjustments.

The microprocessor-based controller contains 4 basic adjustments:



RV1 - DELTA TEMPERATURE
FACTORY PRE-SET AT 9



RV2 - DELTA TIME
FACTORY PRE-SET AT 120



RV3 - HIGH END TURN ON FAIL SAFE
FACTORY PRE-SET AT 99



RV4 - LOW END TURN OFF FAIL SAFE
FACTORY PRE-SET AT 88

Note: If your system is not operating properly, do not attempt adjusting controller before contacting customer support at 800-322-4036.

The AFC system is designed to shut down the light(s) and supply fan(s) and continue to run the exhaust fan(s) in the event of fire and activate two Normally Open/Normally Closed (NO/NC) spare dry contacts (may be used for building alarm, horn strobe, etc.). Terminal STH (Shunt Trip Hot) will also provide 115 VAC for shunt trip breaker in fire mode.

Maintenance

CAUTION! More than one disconnect switch may be required to de-energize the equipment before servicing. Ensure all power sources have been disconnected before installing or servicing the system.

- The Control box door should be securely closed after opening to avoid tampering or electrical shock.
- The Control Box is a type1 electrical enclosure and is not watertight. Do not spray, soak, or submerge with water. Control Box should only be cleaned with a mild cleaner and damp cloth.
- Hood temperature sensor(s) should be cleaned weekly to prevent grease build up and ensure a quick response to temperature changes. Sensor(s) should be cleaned with a mild cleaner to remove grease.

(See Pg. 7)

ANSUL MICRO SWITCH WIRING

* DIAGRAM INDICATES MICRO SWITCH MOUNTED INSIDE ANSUL AUTOMAN WITH SYSTEM ARMED.

