Intelli-Hood®

OPERATION MANUAL

Melink®

Melink Corporation (513) 965-7300 www.melinkcorp.com

Revision 130829

Table of Contents

I. About this Document

The purpose of this document is to provide basic Operation and Maintenance information for the Intelli-Hood Kitchen Ventilation Control System. The intended audience of this document is the end user of the system: the building owner, kitchen manager, kitchen staff, or maintenance technician. This document will instruct the reader on basic operation, maintenance, and troubleshooting.

II. Related Documents

Related documents should be referenced as needed for additional information.

203-3101 Submittal and Technical Overview

- Provides brief overview of system and high level description of each component.

203-3102 Operations and Maintenance Manual

- This document.
- Provides information regarding basic operation, maintenance, and troubleshooting

203-3103 Installation Manual

- Provides detailed installation instructions of the components including mechanical installation of parts, power wiring, and control wiring.

203-3104 Technical Manual

- Provides detailed technical instructions regarding function, sequence of operations, programming, control wiring, and computer networking of the Intelli-Hood system.
- Provides detailed instructions on system startup and advanced troubleshooting for problems likely encountered in installation.

VFD Manuals

- Refer to documents provided by VFD OEM for information regarding any aspect of the Variable Frequency Drives including power wiring, control wiring, programming, and faults.

III. Glossary of Abbreviations

The following terms and abbreviations are used throughout literature pertaining to the Intelli-Hood System.

- Intelli-Hood: Intelli-Hood
- VFD: Variable Frequency Drive
- TP: Touchpad
- APU: Air Purge Unit
- SC: System Controller
- HC: Hood Controller
- AT: Aux Touchpad

IV. Operational Modes of the Intelli-Hood

There are four (4) Modes of the Intelli-Hood. The Modes are defined below. Other sections of the manual will describe more detail about how the Intelli-Hood system changes modes.

Energy Saving Mode

Energy Saving Mode is the operational state when one or more exhaust fans are on. In most cases, all exhaust fans controlled by Intelli-Hood will be in Energy Saving Mode at the same time, however, in some installations, it is possible that some fans be in Energy Saving Mode while others remain in Standby.

Standby Mode

In Standby Mode, the exhaust fans are not operating, but Intelli-Hood is monitoring temperature and optic sensors. The Touchpads are typically used to manually change the mode of the system between Standby and Energy Saving Mode. Depending on conditions detected by sensors and programmable options, it is possible for Intelli-Hood to automatically change modes.

100% Mode (Bypass)

100% Mode (also referred to as Bypass or Sensor Bypass) is a secondary function. Typically, the Intelli-Hood is set to appropriately send the exhaust fans to full speed based on conditions detected by temperature and optic sensors. The kitchen staff person has the ability to send the fans to full speed by placing the system into 100% Mode when it is currently operating in Energy Saving Mode. 100% Mode is a timed function with a default expiration time of 10 minutes. After the timer expires, fans will revert back to Energy Saving Mode.

Emergency Fire Mode

Emergency Fire Mode is triggered by the hood fire suppression system or other fire prevention system of the building. This mode is activated when the main power (120 or 230 VAC single phase) to the Intelli-Hood System Controller is shut off. Through control wiring and programming of VFDs, the exhaust fans are commanded to run at full speed. In most cases, supply fan VFDs are commanded to stop running. In this mode, the Intelli-Hood System Controller, User Interfaces and Hood Sensors have no power and function.

V. Touchpad

The Touchpad is the primary user interface point of the Intelli-Hood system. Every Intelli-Hood is equipped with at least one Touchpad. Some systems are installed with multiple Touchpad's. Figure 1 illustrates the Touchpad and descrptions of each component are listed below.

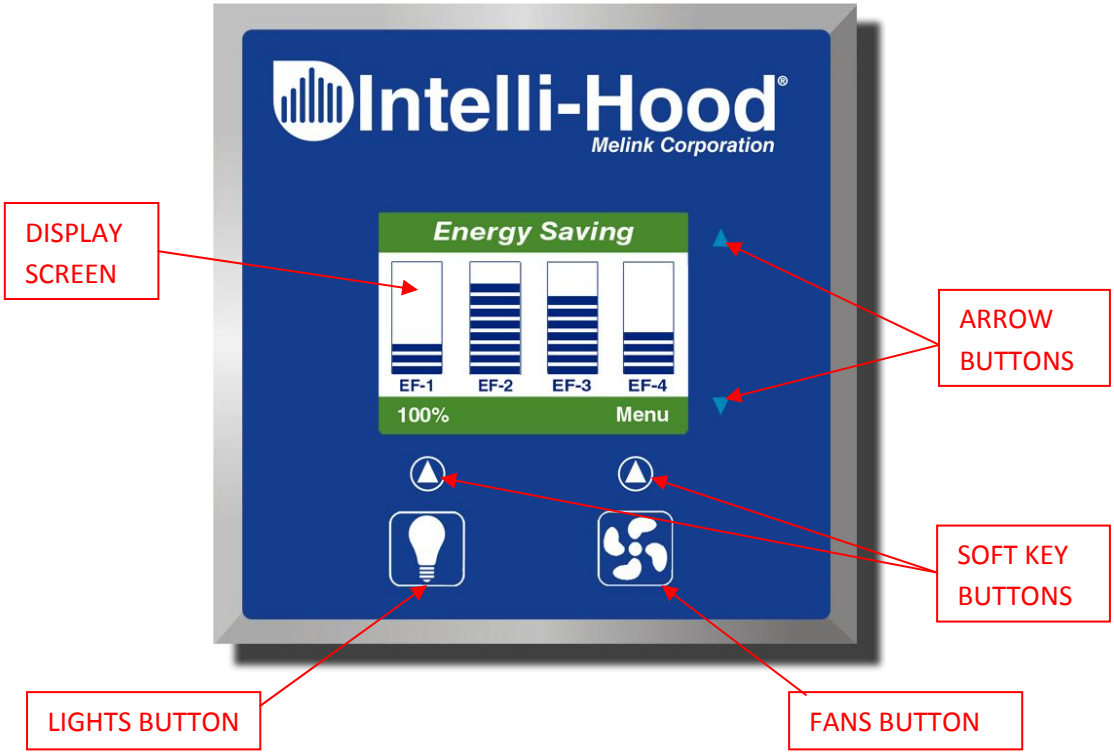


Figure 1: Touchpad

Fans Button

The Fans Button is typically used to change the state of the system between STANDBY MODE (exhaust fans off) and ENERGY SAVING MODE (exhaust fans running).

Lights Button

The Lights Button is typically used to turn the lights of the hood on/off. This function is optional and may not be used in all installations of Intelli-Hood. Consult the design documents of your particular installation to determine if this button is used.

Display Screen

The Display Screen shows the operational state of the Intelli-Hood system. Symbols and Messages that appear on the screen are explained elsewhere in this manual.

Softkey Buttons

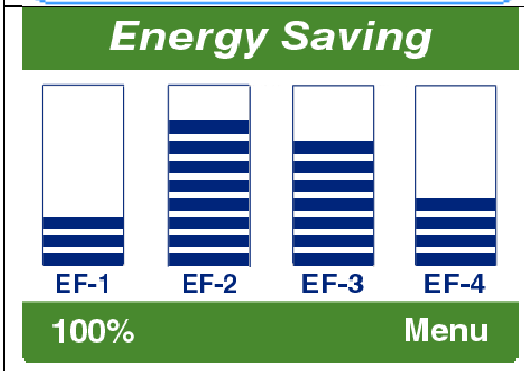
Two Softkey Buttons below the Display Screen are used for the function displayed on the screen. In Normal Operation Modes, the Right Button is used to access programming and help Menus, and the left button is used to active the "100% Fan Speed Mode". In Programming Modes, the functions of the buttons change.

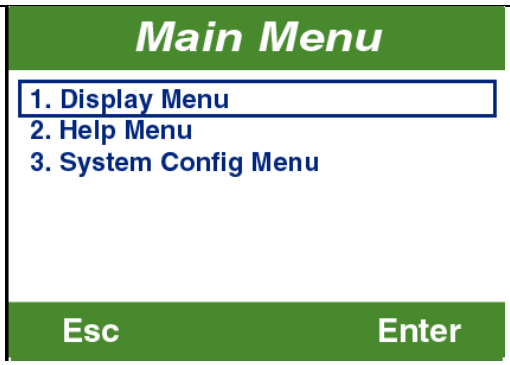
Arrow Buttons

Two Arrow Buttons are used to move among programming parameters and change programming values.

Display Screen

The Display shows the status of the Intelli-Hood System. Screenshots of the display in various situations are shown Figures 2 through x.

	Standby Mode • Intelli-Hood logo splash screen • Fans are off • Right Softkey can be used to enter Menus
	Energy Saving Mode • Energy Saving in top bar denotes Energy Saving Mode. • At least one fan associated to this Touchpad is in Energy Saving Mode, but not necessarily all fans. • Display will scroll through the Hoods and Fans that are Active and display their operating speeds. • Left Soft Key can be used to send the system to 100% Mode. • Right Soft Key can be used to enter Menus
	100% Mode • "Bypass Mode" in top bar denotes 100% Mode. • Display will scroll through the Hoods and Fans and display their operating speeds. • Left Soft Key can be used to send the system to "Normal" Energy Saving Mode. • Right Soft Key can be used to enter Menus



Menus Home Screen

- The screenshot shown is the Main Menu Screen, the first screen of the Menus.
- Arrows and Enter key (right softkey) can be used to make choices.
- ESC button (left softkey) will exit the Menu and return to the operating screen(s).
- Refer to the Menus section of this document and the Intelli-Hood Technical Manual for more information regarding menus.

Typical Operation

The FANS button is typically used to change the system mode from Standby to Energy Saving and vice-versa. If multiple Touchpads are installed, then it is possible to program relationships to dictate which fan is controlled by each Touchpad.

VI. Touchpad Main Menu

Display Menu

The Display Menu will allow the Kitchen Staff Person or Maintenance Technician to view basic system status items such as Faults, VFD Speeds, and Hood Sensor status in a list format. The Display Menu is accessible to any user.

System Configuration Menu

The System Configuration Menu is a mean by which one can change the setup of the Intelli-Hood system for the particular kitchen installation. The number of hoods, fans, and many parameters can be configured through the System Configuration Menu. The Intelli-Hood Technical Menu contains detailed information about the System Configuration Menu.

When one selects System Configuration Menu from the Main Menu, the screen will prompt the user to input a pass code to proceed. This pass code is intended to prevent the accidental access of the System Configuration Menu. One should not attempt to modify the System Configuration Menu parameters without a thorough knowledge of Intelli-Hood programming. Refer to the Intelli-Hood Technical Manual or contact Melink Corporation or your Intelli-Hood Regional Distributor for more assistance.

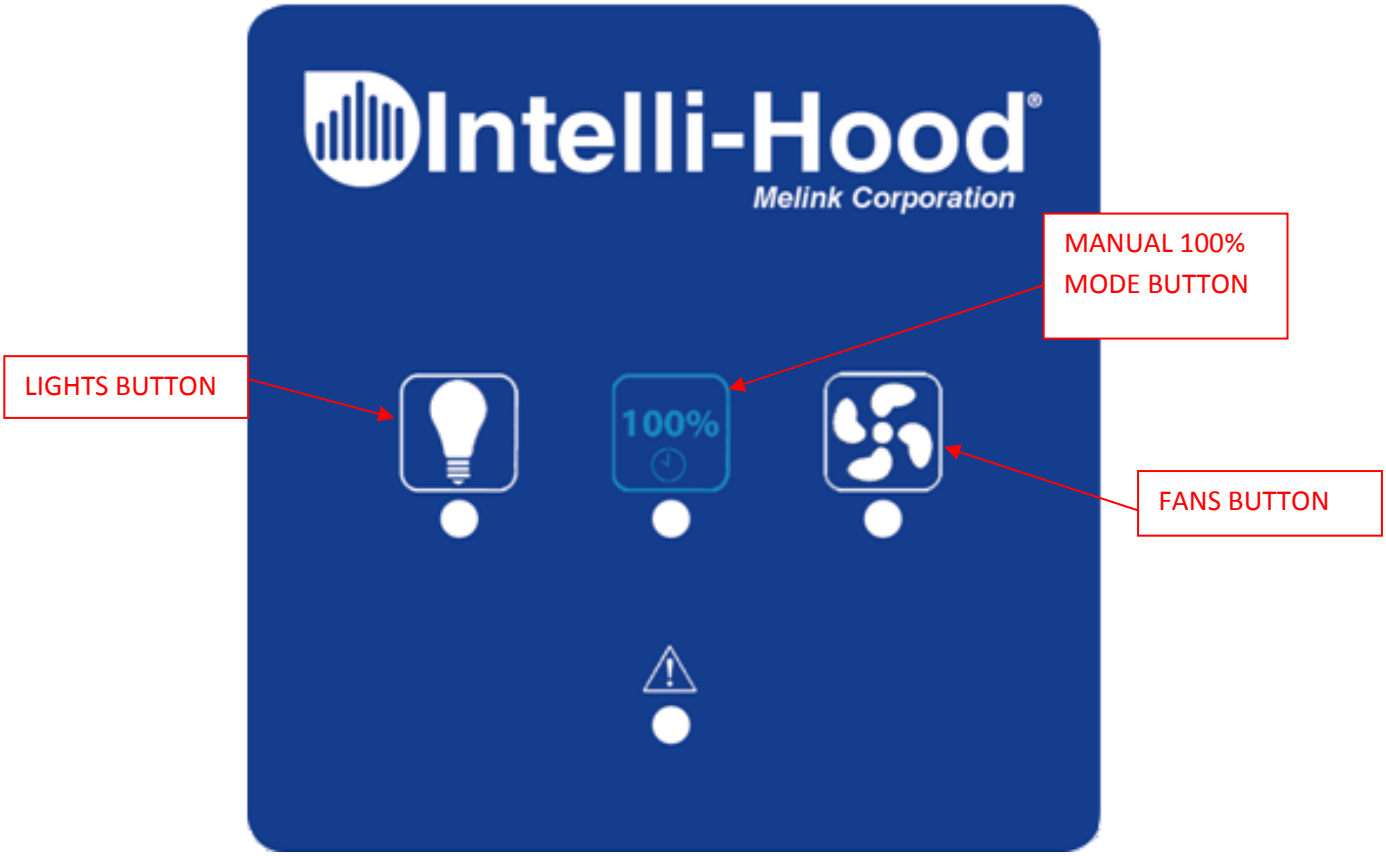
Help Menu

The Help Menu contains instructions for contacting Technical Support and other information.

VII. Aux Touchpad

The Aux Touchpad (AT) is a secondary user interface point of the Intelli-Hood system. The Aux Touchpad is intended to be used in large installations with hoods and fans where there is desire to operate some fans without operating other fans. Aux Touchpads provide additional on/off user interface points to the Intelli-Hood system. Up to 10 Aux Touchpads can be installed on an Intelli-Hood.

The Aux Touchpad can not show status or speeds of the fans. The Aux Touchpad can indicate a fault, but it can not indicate the fault type. The Intelli-Hood Configuration parameters can not be adjusted with a Aux Touchpad. Therefore, the Aux Touchpad should never be used as the only user Interface Device of an Intelli-Hood installation.



Fans Button

The Fans Button is used to change the state of the system from STANDBY MODE (exhaust fans off) to ENERGY SAVING MODE (exhaust fans running). When the system is in ENERGY SAVING MODE, the green indicator light under the fans button will illuminate.

Lights Button

The Lights Button will control an output signal to turn the lights of the hoods on/off. The indicator light under the button will show the state of the lights output.

100% Mode Button

The 100% Mode Button may be used to change the system from ENERGY SAVING MODE to 100% MODE. The 100% Button will have no function if the system is in STANDBY MODE. The indicator light under the 100% Button shows that exhaust fans are in 100% MODE.

Fault Light

The Fault Light is an alarm indicator light. The Fault Light indicates a fault of some type. There are several fault types as listed in the Troubleshooting Section. The Aux Touchpad does not show the fault type. A Fault Message will appear on one of the Touchpad Devices.

VIII. Methods of Turning Fans On/Off

It is important to understand that there are several methods by which the fans can turn on and off (change from STANDBY to ENERGY SAVING MODE). Depending on the installation, different methods may be used. In various installations, some methods are disabled. Refer to the installation documents of the individual installation to understand how a particular installation is setup. Refer to the Intelli-Hood Technical Guide for programming information for how to change the features and sequence of operations.

Fans Button

In most Intelli-Hood installations, the kitchen staff person will use the Fans Button to turn the fans on/off. However, sometime, the keypad is disabled and the Fans Button will have no funtion. There will be other methods to turn the fans on/off. Refer to the other possible methods described below.

If there are multipe user interface devices on an Intelli-Hood system, then relationships are be setup in programming parameters such that Keypad A controls some hoods while Keypad B controls other hoods. Refer to a the Technical Manual for more information regarding system programming.

Auto On/Off by Hood Temperature

The Intelli-Hood system can be programmed to turn on automatically by hood temperature. When the temperature in the hood reaches a certain threshold (100F), the fans will turn on. In most kitchens, several exhaust fans share a common supply fan. In these kitchens, if one hood triggers its fan to turn on, then the other exhaust fans and the supply fan must turn on as well. In other kitchens, exhaust fans may be able to turn on independently of one another.

Auto-Off is a separate function from Auto-On. The system can be programmed such that if a hood is below a setpoint temperature (75F), then the exhaust fan will shut off. Similar to the Auto-On function, hoods that share the supply fan cannot turn off independently of one another. Therefore, all hoods associated to a common supply fan must be below the setpoint temperature before any of them turn off automatically.

Remote Input by Toggle Switch

Intelli-Hood can be programmed to turn the fans on/off based on the state of an external toggle switch, such as a traditional wall or hood mounted switch. This setup is common in retrofit projects where Intelli-Hood is being installed after the kitchen has been in use for many years. The existing kitchen staff may not want to change the method of turning fans on/off. Intelli-Hood can be setup to accept a signal from the existing toggle switch.

Remote Input by Special Hood Feature such as Water Wash, Ultraviolet Light System, Hood Damper System

Some exhaust hood systems have sophisticated control panels that may control Water Wash, UV Lights, or Hood Damper Systems. These systems have their own electronic sequence of operation for processes that must be performed before the exhaust fans are turned on. When Intelli-Hood is

interfaced to these Hood System, the sequence of operation will vary. Sometimes the Intelli-Hood will trigger the Hood Panel while in other installations, the Hood Panel will give a start signal to Intelli-Hood. Refer to project-specific documentation for more information.

Remote Input by Building Automation System

The Intelli-Hood System supports BACnet protocol. Through BACnet communication, a Building Automation Network may command Intelli-Hood system to turn fans on/off at specific times.

High Temperature Alarm Mode

High Temperature Alarm Mode is similar to Auto On Function. When the temperature of a hood reaches a setpoint (default setting is 200F), the exhaust fan will turn on full speed and run for a minimum time of 5 minutes. After the 5 minute time period, the Intelli-Hood system will operate in normal Energy Saving Mode. High Temperature Alarm mode is a default feature of Intelli-Hood.

Internal Clock Schedule

Intelli-Hood can be programmed to turn on and off at specific times of the day based on the real time clock of the Intelli-Hood Controller.

Multiple Modes

Intelli-Hood can be programmed such that several of the above methods can turn on a system. For example, Intelli-Hood can be programmed to turn on at a specific time of day every day, but if a kitchen staff person wanted to start or stop the fans with the Touchpad or Aux Touchpad, then he/she would be able to do so.

IX. Emergency Fire Mode aka Purge Mode

Per the building safety codes in most jurisdictions, when a fire occurs in the kitchen, all exhaust fans are required to run at full speed and all supply air sources are required to shut off. Intelli-Hood can be triggered into this mode by shutting off the 120/230V single phase input power System Controller. Through wiring and programming of the Variable Frequency Drives, the drives will run at full speed. In most installations, the Intelli-Hood System Controller input power is wired through a fire relay or from a shunt-tripped breaker such that it automatically loses power in the event of a fire.

X. Program Settings

Below is a list of program settings for Intelli-Hood. Please reference the Program Settings Explanation Manual for additional details.

#	Parameter	Default Value	Range of Values
Hood Controller Parameters			
HCxx-01	Hood Network Address	1	0 To 39
HCxx-02	Name	HC-x	Up to 20 Characters
HCxx-03	Optic Sensor	Yes	Yes or No
HCxx-04	Temp Channel 1	Hood	No, Hood, Auto Only, Supply, Space
HCxx-05	Temp Channel 1 Span Max. (°F)	90	50F To 200F (Increments Of 5F)
HCxx-06	Temp Channel 2	No	No, Hood, Auto Only, Supply, Space
HCxx-07	Temp Channel 2 Span Max. (°F)	Match Channel 1	50F To 200F (Increments Of 5F), Match Channel 1
HCxx-08	Temp Channel 3	No	No, Hood, Auto Only, Supply, Space
HCxx-09	Temp Channel 3 Span Max. (°F)	Match Channel 1	50F To 200F (Increments Of 5F), Match Channel 1
HCxx-10	Temp Channel 4	No	No, Hood, Auto Only, Supply, Space
HCxx-11	Temp Channel 4 Span Max. (°F)	Match Channel 1	50F To 200F (Increments Of 5F), Match Channel 1
HCxx-12	Temp Actual Channel 1	Measured Temp	User Inputs Actual Temperature 0 To 500F
HCxx-13	Temp Actual Channel 2	Measured Temp	User Inputs Actual Temperature 0 To 500F
HCxx-14	Temp Actual Channel 3	Measured Temp	User Inputs Actual Temperature 0 To 500F
HCxx-15	Temp Actual Channel 4	Measured Temp	User Inputs Actual Temperature 0 To 500F
HCxx-16	Temp Channel 1 Span Min. (°F)	75	50F to 90F (Increments of 1F)
HCxx-17	Temp Channel 2 Span Min. (°F)	Match Channel 1	50F to 90F (Increments of 1F), Match Channel 1
HCxx-18	Temp Channel 3 Span Min. (°F)	Match Channel 1	50F to 90F (Increments of 1F), Match Channel 1
HCxx-19	Temp Channel 4 Span Min. (°F)	Match Channel 1	50F to 90F (Increments of 1F), Match Channel 1
HCxx-20	Optic Smoke Density	Medium	Low, Medium, or High
Exhaust Hood Parameters			
EHxx-01	Primary Exhaust ID	1	1 to 39
EHxx-02	Name	Hood x	Up To 20 Characters
EHxx-03	Minimum Speed	50%	30% To 100%, Increments Of 5%
EHxx-04	Maximum Speed	100%	30% To 100%, Increments Of 5%
EHxx-05	Select Hood Controllers	None Selected	0 to 39
EHxx-06	Temperature Sensor Node(s)		00-1 to 39-4
EHxx-07	Optic Sensor Node(s)		00 to 39
EHxx-08	Auto On Hood Temperature	Auto On 120F	Not Used, Auto On 70F - 120F
EHxx-09	Auto On Space Differential	Not Used	Not Used, Room Difference +1F - +40F
EHxx-10	Auto Off Hood Temp	Not Used	Not Used, Auto Off 65F - 100F
EHxx-11	Auto Off Space Differential	Not Used	Not Used, Room Difference +1F - +20F
EHxx-12	Auto On/Off Grouping	Yes	Yes Or No
EHxx-13	Digital Inputs To Utilize	Select All	DI 1, DI 2, DI 3
EHxx-14	Digital Outputs To Affect	Select All	Relay 1, Relay 2, 24VDC 1, 24VDC 2
EHxx-15	Temperature Alarm Auto On	System	Not Used, System, 100F, 125F, 150F, 200F, 250F, 300F
EHxx-16	Short Cycle Ratio	Not Used	Not Used, 20%, 30%, 40%, 50%, 60%, 70%, 80%
EHxx-17	User Interface On/Off	TP1	None, Touchpad 1-10, Aux Touchpad 0-9
EHxx-18	Exhaust CFM	1000	0 to 100,000
EHxx-19	Groups	1	1-10
EHxx-20	Touchpad Display Node	1	1-10
EHxx-21	Optic Hang time	System	System, 5, 10, 15, 30, 45, 60, 120, 180, 300

Exhaust Fan Parameters

EFxx-01	Primary Exhaust Output Address	1	1 to 39
EFxx-02	Name	EF-x	Up To 5 Characters
EFxx-03	Output Type	A-B Powerflex 4/40	System Output A-B Powerflex 4/40 A-B Powerflex 400 ABB ACH550
EFxx-04	Touchpad Display Node	1	1-10
EFxx-05	Exhaust CFM		

Aux Airflow Parameters

AAxx-01	Aux Airflow ID	41	40 to 128
AAxx-02	Name	Airflow-x	Up To 5 Characters
AAxx-03	Algorithm	Average	Average, Highest, Lowest
AAxx-04	Related Airflows	None	List All Programmed Primary, Aux, and External Airflows
AAxx-05	Output Type	System Output	System Output A-B Powerflex 4/40 A-B Powerflex 400 ABB ACH550
AAxx-06	VFD Address	41	1 to 256
AAxx-07	Airflow CFM	1000	100-100,000
AAxx-08	Related Touchpad Display	1	None, 1-10

Touchpad Parameters

TPx-01	Touchpad Hood Network Address	1	1-10
TPx-02	Light Controller Addresses	SC	SC
TPx-03	Bypass Softkey Visible	Yes	Yes Or No

System Parameters

SY-01	Relay 1 Output	Damper	None Exhaust Temp Alarm Smoke Fan On MUA Damper Temperature Fault Optic Fault VFD Fault 24/7
SY-02	Relay 2 Output		
SY-03	24VDC Output 1		
SY-04	24VDC Output 2		
SY-05	Digital Input 1	None	None Remote On/Off Remote On/Off w/ Enable Remote Enable/Disable 50% Min Speed 60% Min Speed 70% Min Speed 80% Min Speed 90% Min Speed 100% Min Speed External Fault Input
SY-06	Digital Input 2		
SY-07	Digital Input 3		
SY-08	Analog Output Function	None	None, Average, Highest, Lowest

SY-09	Analog Output Source	None	List All Programmed Primary, Aux, and External Airflows
SY-10	Analog Input Function		
SY-11	Bypass Timer	10 minutes	30 sec, 1 min, 5 min, 10 min, 20 min, 30 min, 1 hr, 2 hr, 4 hr
SY-12	Optic Hang Time	15 seconds	5, 10, 15, 30, 60, 90, 120, 180, 240, 300
SY-13	Fan Speed Reporting Method	Feedback	VFD Feedback, Command Speed
SY-14	Temperature Alarm Auto On	200	Not Used, 100F, 125F, 150F, 200F, 250F, 300F
SY-15	Temperature Alarm Auto Off	Not Used	Not Used, On-10, On-20, On-30,
SY-16	Temperature Alarm Tone	No	Yes or No
SY-17	Temperature Alarm Hoods to Activate	All	All Hoods, Hood Group, Hood Only, None
SY-18	Data Log Sample Rate, Speed	5 minutes	10s, 30s, 1min, 2min, 3min, 5min, 10min, 30min
SY-19	Data Log Sample Rate, Temperature	5 minutes	10s, 30s, 1min, 2min, 3min, 5min, 10min, 30min
SY-20	Data Log Sample Rate, Optics	5 minutes	10s, 30s, 1min, 2min, 3min, 5min, 10min, 30min
SY-21	Auto On, Manual Off, Delay Time	2 minutes	10s, 30s, 1min, 2min, 3min, 5min, 10min, 30min
SY-22	Unit Display	12H/F	12H/F, 24H/F, 12H/C, 24H/C

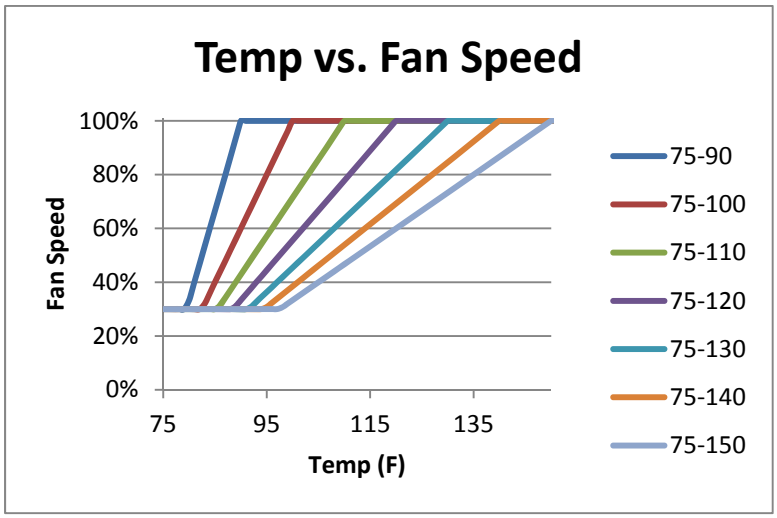
XI. Optimizing Energy Savings

Understanding Fan Speed Modulation, Building Balance, and Smoke Capture

At its core, Melink Corporation believes that all citizens should strive to be efficient with energy usage. Melink would like Kitchen Managers and Maintenance technicians to understand a little bit about how Intelli-Hood operates in order to make smart decisions about the setup and save as much energy as possible.

Melink Corporation assumes that a kitchen is designed for correct amounts of exhaust and supply air before Intelli-Hood is installed. If a kitchen does not have sufficient smoke capture or is out of balance, then the exhaust and supply systems must be corrected before Intelli-Hood is installed. Intelli-Hood cannot correct building imbalances on its own.

Intelli-Hood uses two types of sensors to control fan speed. Temperature sensors installed in the exhaust duct monitor the temperature of the exhaust air. Programming parameters for minimum/maximum temperature and minimum/maximum speed determine the relationship of fan speed to temperature. The second sensor set is optical sensors. Any time that the optic sensors see smoke or other effluent, the System Controller sends the VFDs to full speed.



Tuning the temperature and speed setpoints is very important to gaining maximum energy savings. One method is to set the Intelli-Hood maximum temperature 10 to 20 degrees Fahrenheit more than the actual maximum temperature of the hood exhaust air. Thus, when there is maximum cooking load with no smoke, the fan runs at 80 to 90% speed, and the only time that the fans will run at 100% speed is when the optical sensors see effluent.

Also, adjusting the minimum speed as low as possible is improves energy savings as well. The default minimum speed is 50%. It is possible to change the minimum speed to as low as 30%; however, one should be aware that when the minimum speed is extremely low, smoke may roll out of the hood before the optic sensors see it. Minimum speeds below 30% cause too much stress on fan motors and should not be used.

It should be noted that fan energy is proportional to the square of fan speed. Thus a fan running at 90% of maximum speed uses 81% (0.90 * 0.90) for the energy as the fan running at 100% speed. A fan running at 50% speed uses 25% of the energy. Thus, most of the energy savings come from trimming the high end of the fan speed profile. It is more important to shave off speed at the high end by properly calibrating temperature span than it is to shave off speed at the low end with the minimum speed.

XII. Maintenance

Cleaning the Optic Sensors

The Intelli-Hood Optic Sensors must be cleaned periodically. The time between cleanings will vary depending on the application and quantity of grease in the airstream of a ventilation hood. Optic sensors in applications with high amounts of grease may need to be cleaned a 2 or 3 times per month. Some applications may have optic sensors that can go several months between cleanings.

If the sensors get too much contamination on the lenses, an optic fault will occur. The fans will run at full speed until the sensors are cleaned and reset.

In order to clean the optic sensors, follow the steps below. Cleaning of the optic sensors may be performed with the fans on or off.

- Press the pushbutton latches on the sides of the optic box and remove the cover.
- Wipe the lens of the optic circuit board with a soft, moist cloth
- Replace the cover of the optic box ensuring that the cable connecting the optic box cover to the optic bracket does notis not in front of the lens.
- If the fans were on during cleaning, turn them off.
- Turn on the fans.

Cleaning the Hoods

When doing a general cleaning of the kitchen hood, cover the optic sensors with plastic wrap and thick tape before using high pressure water, steam or other cleaning chemicals in the hood.

Do not get any of the circuit boards in any other devices of Intelli-Hood wet.

Cleaning the Temperature Sensors

Temperature sensors rarely need to be cleaned. If extremely large amounts of grease and other contamination build on the sensor, the probes should be brushed or wiped clean.

Maintenance of Touchpad and Aux Touchpad Devices

Do not use a sharp kitchen utensil or other object to press buttons on the Touchpad or Aux Touchpad. Press the buttons with human fingers only.

Clean the keypad surfaces with a moist cloth. Light-duty cleaning chemicals such as Simple-Green and 409 may be used.

XIII. Troubleshooting

Intelli-Hood Touchpad Devices will beep every 30 seconds and display fault messages when fault conditions arise. Also, if the Intelli-Hood has internet access and is properly configured, email messages can be sent to owners or managers of the kitchen alerting them of the situation. Aux Touchpads will illuminate their Fault Light, but one must consult a Touchpad in order to see the fault code.

Fault codes and recommended actions to resolve faults are listed in the tables below.

Communication Faults

In general, Communication Faults arise when Intelli-Hood Controller is not able to communicate with other Intelli-Hood devices. The Fault Code will list the problematic item by its address such as "HC1" for Hood Controller Address 1, or "VFD2" for VFD Address 2.

Code	Brief Description	Detailed Desciption and Recommended Corrective Action
C1-HC#	Communications Fault 1 - Hood Controller # Hood Controller Not Found	A Hood Controller Device is programmed but is not found on the Hood Network. Check system programming, the Hood Controller addresses, and Hood Network wiring.
C2-HC#	Communications Fault 2 - Hood Controller # Duplicate Hood Controller Device Found	Multiple Hood Controller Devices of the same address are found on the Hood Controller Network. Check the Hood Controller addresses.
C1-VFD#	Communications Fault 1 - VFD # VFD Not Found	A VFD is programmed but is not found on the VFD Network. Check system programming, the VFD addresses, VFD device programming, and VFD Network wiring.
C2-VFD#	Communications Fault 2 - VFD # Duplicate VFDs Found	Multiple VFDs of the same address are found on the VFD Network. Check the VFD addresses.
C1-GUI#	Communications Fault 1 - GUI # Graphical User Interface Not Found	A GUI Device is programmed but is not found on the Hood Network. Check system programming, the GUI addresses, and Hood Network wiring.
C2-GUI#	Communications Fault 2 - GUI # Duplicate Graphical User Interface Devices Found	Multiple GUI Devices of the same address are found on the Hood Network. Check the address selection switches of the GUI devices.

Code	Brief Description	Detailed Desciption and Recommended Corrective Action
C1-BOK#	Communications Fault 1 - BOK # Button Only Keypad Not Found	A BOK Device is programmed but is not found on the Hood Network. Check system programming, the BOK addresses, and Hood Network wiring.
C2-BOK#	Communications Fault 2 - BOK # Duplicate Button Only Keypad Devices Found	Multiple BOK Devices of the same address are found on the Hood Network. Check the address selection switches of the BOK devices.
C1-APS#	Communications Fault 1 - APS # Auxiliary Power Supply Not Found	An Auxiliary Power Supply is programmed but is not found on the Hood Network. Check system programming, the Aux Power Supply addresses addresses, and Hood Network wiring. Verify that the 120/230 single phase power feeding the Aux Power
C2-APS#	Communications Fault 2 - APS # Duplicate Auxiliary Power Supplies Found	Multiple APS Devices of the same address are found on the Hood Network. Check the address selection switches of the APS devices.
C1-ALC#	Communications Fault 1 - ALC # Auxiliary Light Controller Not Found	An ALC Device is programmed but is not found on the Hood Network. Check system programming, the ALC addresses, and Hood Network wiring.
C2-ALC#	Communications Fault 2 - ALC # Duplicate Auxiliary Light Controllers Found	Multiple ALC Devices of the same address are found on the Hood Network. Check the address selection switches of the ALC devices.
C1-AIO#	Communications Fault 1 - VFD # Auxiliary I/O Device Not Found	An Aux I/O Device is programmed but is not found. Check system programming. Verfiy correct wiring to the the Aux I/O Device. Verify that Aux I/O Device has power. Verify the programming of the Aux I/O Device and the Aux I/O Device
C2-AIO#	Communications Fault 2 - VFD # Duplicate Auxiliary I/O Devices Found	Multiple AUX I/O Devices of the same address are found. Check the programming of the Aux I/O Devices.

Hood Network Power Faults

These fault codes are to be discussed with Jeff and Bryan E. They may not be possible to detect and report.

Code	Brief Description	Detailed Desciption and Recommended Corrective Action
P1-HN#	Power Fault 1 - Hood Network Port # 24 VDC on the Hood Network is shorted.	Disconnect all devices on the Hood Network String. Plug the devices in one at a time until the short reoccurs. Replace damaged cable or device.
P1-APS#	Power Fault 1 - Aux Power Supply # 24 VDC on the APS is shorted.	Disconnect all devices on the Hood Network String after the indicated Aux Power Supply. Plug the devices in one at a time until the short reoccurs. Replace damaged cable or device.
P2-HN#	Power Fault 2 - Hood Network Port # Hood Network String # is overloaded, but not shorted	Reduce the power consumed by Devices on Hood Network Port x. Reduce the number of devices on the Hood Network Port, reduce the cable length, or install an Aux Power Supply. Is this possible to detect?
P2-HN#	Power Fault 2 - Aux Power Supply # Aux Power Supply # is overloaded, but not shorted	Reduce the power consumed by Devices on Hood Network Port x. Reduce the number of devices on the Hood Network Port, reduce the cable length, or install an Aux Power Supply. Is this possible to detect?

Sensor Faults

Sensor Faults indicate problems with the Hood Temperature and Optic Sensors.

Code	Brief Description	Detailed Desciption and Recommended Corrective Action
O1-HC#	Optic Fault 1 - Hood Controller # Optic Receiver Not Found	Hood Controller is attempting to communicate to an Optic Receiver but not getting a response. Check and/or replace components such as Cables, APU Header, Optic Receiver, Hood Controller.
O2-HC#	Optic Fault 2 - Hood Controller # Optic Emiter Not Found	Hood Controller is attempting to communicate to an Optic Receiver but not getting a response. Check and/or replace components such as Cables, APU Header, Optic Emitter, Hood Controller.
O3-HC#	Optic Fault 3 - Hood Controller # Receiver is saturated.	Receiver is saturated with light from Emitter. Optic sensors are too close. Optic sensors should not be installed closer than 4 feet. Contact Melink for special short distance optic sensors.
O4-HC#	Optic Fault 4 - Hood Controller # Weak Emitter Signal	Receiver is seeing light from the Emitter at calibration, but the signal is weak, below the acceptable range. Check alignment. Make sure there is not smoke or obstruction in the hood, restart the -calibrate optic
O5-HC#	Optic Fault 5 - Hood Controller # Receiver sees no light from the Emitter	Receiver is not seeing any signal from the Emitter. Emitter has verified that it is working. Check for an obstruiction between the optic sensors. RemoVe the obstruction and shut off, and restart the system.
O6-HC#	Optic Fault 6 - Hood Controller # Emitter self check failed	Emitter is able to self-test to determine if its diode is working. Emitter is reporting the diode does not work. Replace the Emitter

Code	Brief Description	Detailed Desciption and Recommended Corrective Action
T1-HC#-x	Temperature Sensor Fault 1, Hood Controller #, Temperature Port x Temperature Sensor not found	Hood Controller is expected to have a temperature sensor wired to Port "x". No Temperature Sensor is found. Check the Hood Controller wiring and system programming.
T2-HC#-x	Temperature Sensor Fault 2, Hood Controller #, Temperature Port x High Resistance on the Temperature Circuit	Hood Controller is seeing a temperature sensor, but the resistance value is out of range. Resistance value is too high. Replace the temperature sensor or temperature sensor cable.
T3-HC#-x	Temperature Sensor Fault 3, Hood Controller #, Temperature Port x Low Resistance on the Temperature Circuit	Hood Controller is seeing a temperature sensor, but the resistance value is out of range. Resistance value is too low. Replace the temperature sensor or temperature sensor cable.

VFD Faults

As VFDs control the motors, they may experience various problems. VFDs are designed to fault in order to protect themselves, motors, and circuits. When a VFD fault occurs, Intelli-Hood is able to detect the fault if the system is setup in the preferred method using Modbus communication to the VFD. The Intelli-Hood Touchpad will display a Fault Code such as "V01-##" where "##" is the address of the VFD.

Code	Brief Description	Detailed Description and Recommended Corrective Action
V01-##	VFD Fault Type 1 - VFD ## Motor Over Current Fault	VFD is experiencing a motor overcurrent fault. Check the operating current draw of the VFD. Check that fan is running in the correct direction. Check drive programming. Reduce the maximum speed of the VFD or adjust pulleys to reduce the load. Clear the fault on the VFD and restart the IH3 system to restart the drive. Refer to VFD manufacturer's documentation.
Equivalent VFD OEM Fault Codes		Allen Bradley Power Flex Drive: Fault Code F007 ABB HVAC 550 Drive: Fault Code 1 Yaskawa E7 Drive: Fault Code OL1 or OL2
V02-##	VFD Fault Type 2 - VFD ## Under Voltage Fault	VFD is experiencing an undervoltage fault. Monitor incoming AC Line for Low Voltage. Clear the fault on the VFD and restart the IH3 system to restart the drive. Refer to VFD manufacturer's documentation.
		Allen Bradley Power Flex Drive: Fault Code F003 or F004 ABB HVAC 550 Drive: Fault Code 6 Yaskawa E7 Drive: Fault Code UV1
V03-##	VFD Fault Type 3 - VFD ## Over Voltage Fault	VFD is experiencing an over-voltage fault. Monitor incoming AC Line for High Voltage or Transient Conditions. Fast decelerations may cause motor regeneration voltage resulting in this fault. Faulty motors may also cause this fault. Clear the fault on the VFD and restart the IH3 system to restart the drive. Refer to VFD manufacturer's documentation.
Equivalent VFD OEM Fault Codes		Allen Bradley Power Flex Drive: Fault Code F005 ABB HVAC 550 Drive: Fault Code 2 Yaskawa E7 Drive: Fault Code OV
V04-##	VFD Fault Type 4 - VFD ## Over Temperature Fault	VFD internal temperature is too high. Check that VFD is installed in a properly Ventilated location. Check that VFD Vents and heat sinks are clear. Check that internal fan on VFD is working properly. Find a method to cool the VFD. Refer to VFD manufacturer's documentation.
Equivalent VFD OEM Fault Codes		Allen Bradley Power Flex Drive: Fault Code F008 ABB HVAC 550 Drive: Fault Code 3 Yaskawa E7 Drive: Fault Code OH, OH2, OH3

Code	Brief Description	Detailed Description and Recommended Corrective Action
V05-##	VFD Fault Type 5 - VFD ## Ground Fault	Check the Motor or drive output wiring for a grounded condition. Check the fan disconnect switch for water or corrosion. Refer to VFD manufacturer's documentation.
Equivalent VFD OEM Fault Codes		Allen Bradley Power Flex Drive: Fault Code F013, 38, 39, ABB HVAC 550 Drive: Fault Code 16 Yaskawa E7 Drive: Fault Code GF
V06-##	VFD Fault Type 6 - VFD ## Drive Overload or Output Short	Extreme overcurrent condition on the output side of the VFD. Possible causes are phase-to-phase short, shorted motor, locked rotor, arcing across contactor or disconnect. Refer to VFD manufacturer's documentation. Special Case: When Yaskawa E7 VFDs are used on IH3, a Ground Fault and Over
Equivalent VFD OEM Fault Codes		Allen Bradley Power Flex Drive: Fault Code F012, F41, F42, F43 ABB HVAC 550 Drive: Fault Code 4 Yaskawa E7 Drive: Fault Code OC
V07-##	VFD Fault Type 7 - VFD ## Motor Undercurrent	VFD is running, but the motor current is extremely low, <0.1 Amps. Check the motor disconnect or contactors that the motor is connected to the VFD.
Equivalent VFD OEM Fault Codes		Allen Bradley Power Flex Drive: no available fault ABB HVAC 550 Drive: Fault Code 17 Yaskawa E7 Drive: Fault Code LL3
V08-##	VFD Fault Type 08- VFD Disabled	VFD Enable Input is missing. Check the VFD control wiring and programming
Equivalent VFD OEM Fault Codes		Allen Bradley Power Flex Drive no available fault ABB HVAC 550 Drive: Alarm Code 2021 or 2022 Yaskawa E7 Drive: no available fault
V99-##	VFD Fault Type 99 - VFD ## General VFD Fault	A VFD Fault other than those setup to be diagnosed by IH3. Refer to the VFD display to see the fault code and refer to manufacturer's documentation.