

H100 Fan Controller



INSTALLATION INSTRUCTIONS



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H100 Pressure Control System IOM

Installation, Operation and Maintenance Manual

Please read and save these instructions for future reference. The proper installation and maintenance of this system will allow years of dependable service. Read carefully before attempting to assemble, install, operate or maintain the system components described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage!

Installation and maintenance are to be performed only by qualified personnel who are familiar with local codes and regulations and who are experienced with this type of equipment. Personnel should have a clear understanding of these instructions and should be aware of general safety precautions.

DANGER! Always disconnect, lock and tag all power sources before installing or servicing. Failure to disconnect a power source can result in fire, shock or serious injury.

CAUTION! Consult and follow all applicable national, state and local codes. They will supersede this document.

WARNING! No installation, use or maintenance should be done in an explosive or hazardous environment.

Introduction

The H100 controller has been designed to maintain a user configurable flue system pressure and/or control a supply air system by controlling fan motor speed(s).

H100 Controller features include:

- 24VAC power supply
- 4-20mA current loop
- 0-5VDC analog output
- 0-100% duty cycle PWM output
- 0-100% speed control
- 0-100% current control
- 0-100% torque control
- 0-100% pressure control
- 0-100% temperature control
- 0-100% humidity control
- 0-100% CO2 control
- 0-100% O2 control
- 0-100% H2 control
- 0-100% CH4 control
- 0-100% NOx control
- 0-100% SO2 control
- 0-100% NH3 control
- 0-100% HCN control
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- 0-100% HCN control
- 0-100% HCN control

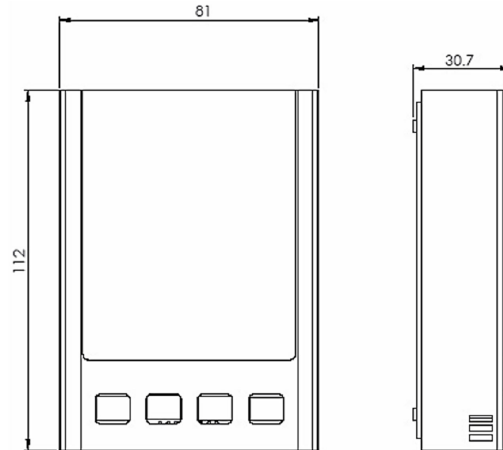
Note: Information contained within this manual may be updated without notice.

Component List

The H100 system is made up of several components dependent on the application:

1. **H100 Controller**
 - a. Controller
 - b. Power supply
2. **System Components**
 - a. **Flue Control System**
 - i. LP4: pressure transducer
 - ii. Flue pressure probe and tubing
 - iii. Draft inducer / flue fan
 1. VFD included with induction motors
 - b. **Supply Air System**
 - i. LP4: pressure transducer
 - ii. Flue pressure probe and tubing
 - iii. ZPS outdoor air static pressure pickup port
 - iv. Supply fan
 - v. CS75 current switch
3. **Optional / Additional Components**
 - a. CO detector
 - b. CS75 current switch
 - c. GFS differential air pressure switch
 - d. Alarm buzzer / light

Specifications



H100 Controller

Power Supply	24V AC/DC (12V-30V) Class 2
Power Consumption	100 mA max @ 12 VDC
Protection Circuitry	Reverse voltage protected, overvoltage protected, overcurrent with auto resetting fuse
Relay Output Ratings (Nominal)	2A @ 24V AC/DC individual relay 4A @ 24V AC/DC combined total maximum
Operating Temperature	-22-158 °F (-30-70 °C)
Ambient Humidity	10% to 90 % RH non-condensing
LCD Screen Temperature Limitation	0-35 °C (32-95 °F)
Wiring Connections	Screw terminal block (14 to 22 AWG)
Enclosure	3.2" w x 4.4" h x 1.2" d (81 x 112 x 30.7 mm)
Housing	Flammability rating UL 94-V file E194560
Enclosure Rating	IP31

LP4 Pressure Transducer

Power Supply	24V AC/DC (12V-30V) Class 2
Power Consumption	20 mA
Output Signal (design)	0-10 VDC
Pressure Range (design)	-1.0 to +1.0 In WC
Maximum Line Pressure	10 psi
Temperature Range	0°F to 150°F (-18°C to 65°C)
Humidity	10% to 90% RH non-condensing
Enclosure	Flammability rating UL 94-V Approved

GFS Differential Pressure Switch

Electrical Rating	Max. 1.0A resistive / 0.4A Inductive @250 VAC 50-60 Hz
Pressure Range	0.08 In WC to 1.20 In WC
Max. Operating Pressure	40 In WC
Temperature Range	-4F to 140F

CS75 Current Switch

Electrical Rating	Max. 500 mA @ 30 VAC/DC 50-60 Hz
Power Supply	Self-Powered
Maximum Input Current	75 Amps continuous
Set Point Range	0.75 - 75 Amps adjustable
Output Switch Action	Normally Open / SPST
Indicator	Status LED
Temperature Range	5F to 140F
Humidity	5% to 90% RH

Installation of the H100 Controller

Before Installation Read these instructions carefully before installing and commissioning the device. Failure to follow these instructions may result in product damage. **Do not use in an explosive or hazardous environment**, with combustible or flammable gases, as a safety or emergency stop device or in any other application where failure of the product could result in personal injury. Take electrostatic discharge precautions during installation and do not exceed the device ratings.

Mounting

The H100 controller installs directly on a standard electrical box or flat non-heated surface. The controller should not be installed in a wet or outdoor environment. Avoid locations with temperatures outside of controller ratings. Avoid locations that have severe vibrations. Avoid areas with electrical noise created by high power equipment, devices, and conductors.

To install, the controller must be removed from the terminal base to access the mounting holes. Follow normal anti-static procedures when handling the controller and be careful not to damage any components.

The controller is hooked to the terminal base at the top edge and must be removed from the bottom edge first. Use a small screwdriver to carefully pry each bottom corner if necessary. If a security screw is installed on the bottom edge, then it may have to be loosened or removed also. Tip the controller away from the terminal base and set it aside until the terminal base is mounted. The terminal base mounting hole locations are shown on Figure 1.

After the terminal base is screwed to an electrical box or surface using the appropriate holes, pull the wires through the wiring hole in the center of the terminal base and then make wiring connections.

Once the wiring connections have been completed, verify that the input terminal jumpers on back of controller board are properly configured.

Reinstall the controller to terminal base by hooking to the terminal base from the top and then carefully pressing the lower edge into the base. Once securely together, tighten security screw at bottom. Care should be taken not to over tighten security screw.

Electrical

Review the supplied wiring diagram(s) and verify the application before attempting to connect the H100 controller to any associated components or equipment. Follow all local electrical and safety codes, as well as the National Electrical Code (NEC) and the National Fire Protection Agency (NFPA), where applicable. Follow the Canadian Electric Code (CEC) in Canada.

Note: Do not locate any low voltage wires in the same conduit or adjacent to high voltage wiring or used to supply inductive loads such as motors.

It is recommended that 18 AWG shielded cable is used for all low voltage connections.

Disconnect the power supply before making any connections to prevent electrical shock or equipment damage. Follow proper electrostatic discharge (ESD) handling procedures when installing the device or equipment damage may occur.

Power Supply

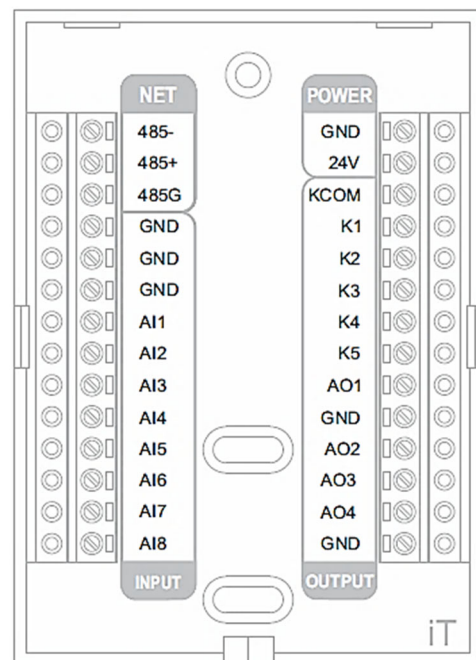
The H100 controller requires a 24V AC or DC power supply to operate. The device has a half-wave type power supply. The power supply common is the same as the signal common. Several devices may be connected to one power supply and share the same signal common.

Use caution when connecting the secondary of the power supply when wiring multiple devices. Ensure that the circuit ground and common points are the same on all devices.

When using a DC power supply, connect the positive DC voltage to the **24V** terminal and the negative power supply common to the **GND** terminal. The device is polarity protected and will not operate if the power supply is connected backwards.

Note: the GND terminal is NOT connected to the Relay KCOM terminal.

Figure 1



Installation of the H100 Controller (continued)

Terminal Connections

The H100 controller uses discrete sinking inputs. Use only a dry contact to signal a remote run command or limit status.

Warning! Do not apply external power to the H100 inputs.

The H100 controller is rated for low voltage (<30V) only. Applying high voltage to the H100 controller will cause damage to device. Install low voltage isolation relays when using the status contacts with a high voltage control circuit.

The H100 status relay contact outputs share the same common input (KCOM). Install low voltage relays to separate circuits when using the status contacts to connect control circuits with different power supplies.

H100 Controller Terminals

Terminal	Description
GND	Power supply and signal common
24V	24 V AC/DC power supply input
AI1	Remote run command input
AI4	Limit input
AI7	Flue pressure transducer input signal 0-10 VDC
AI8	Supply pressure transducer input signal 0-10 VDC
AO1	Flue fan speed reference signal output 0-10 VDC
AO2	Supply fan speed reference signal output 0-10 VDC
KCOM	Relay common input
K1	Fireplace enable output (N.O.)
K2	Auxiliary device enable output (N.O.)
K3	Auxiliary device enable output (N.O.)
K4	Alarm status output (N.O.)
K5	Alarm status output (N.O.)
485+	RS485 + signal
485-	RS485 - signal
485G	RS485 common / ground

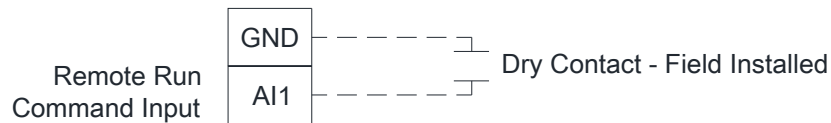
Installation of the H100 Controller (continued)

Run Command

The H100 may be enabled locally, via the LCD, by setting with the H100 run command parameter “**RUN CMD**” to RUN.

When the ability to enable and disable the system remotely is required, the H100 run command parameter “**RUN CMD**” is set to REMOTE and a dry contact or switch is installed between **Terminal AI1** and **ground** on the H100 terminal base (Figure 3).

Figure 3



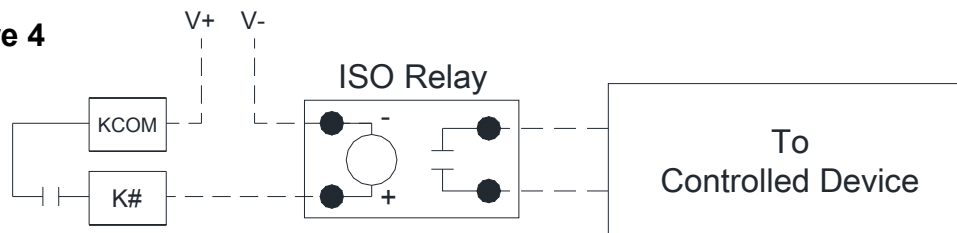
Status Relay Connections

The H100 has five dry SPST relay contacts for status outputs. The status relays may be used in different ways depending on the specific application (Figure 5).

The relay contacts are rated for low voltage (<30V). Install low voltage isolation relays when using the status contacts with a high voltage control circuit.

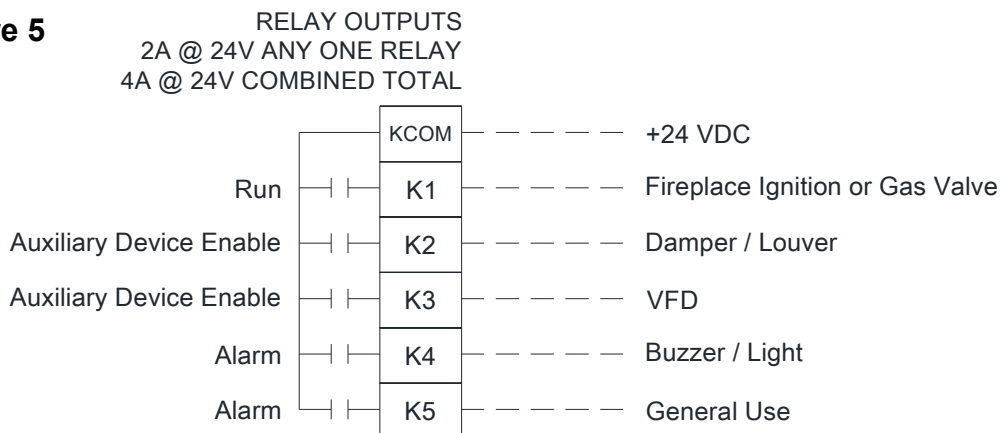
The H100 status relay contact outputs share the same common input (KCOM). Install low voltage relays to separate circuits when using the status contacts to connect control circuits with different power supplies (Figure 4).

Figure 4



Typical Status Relay Applications

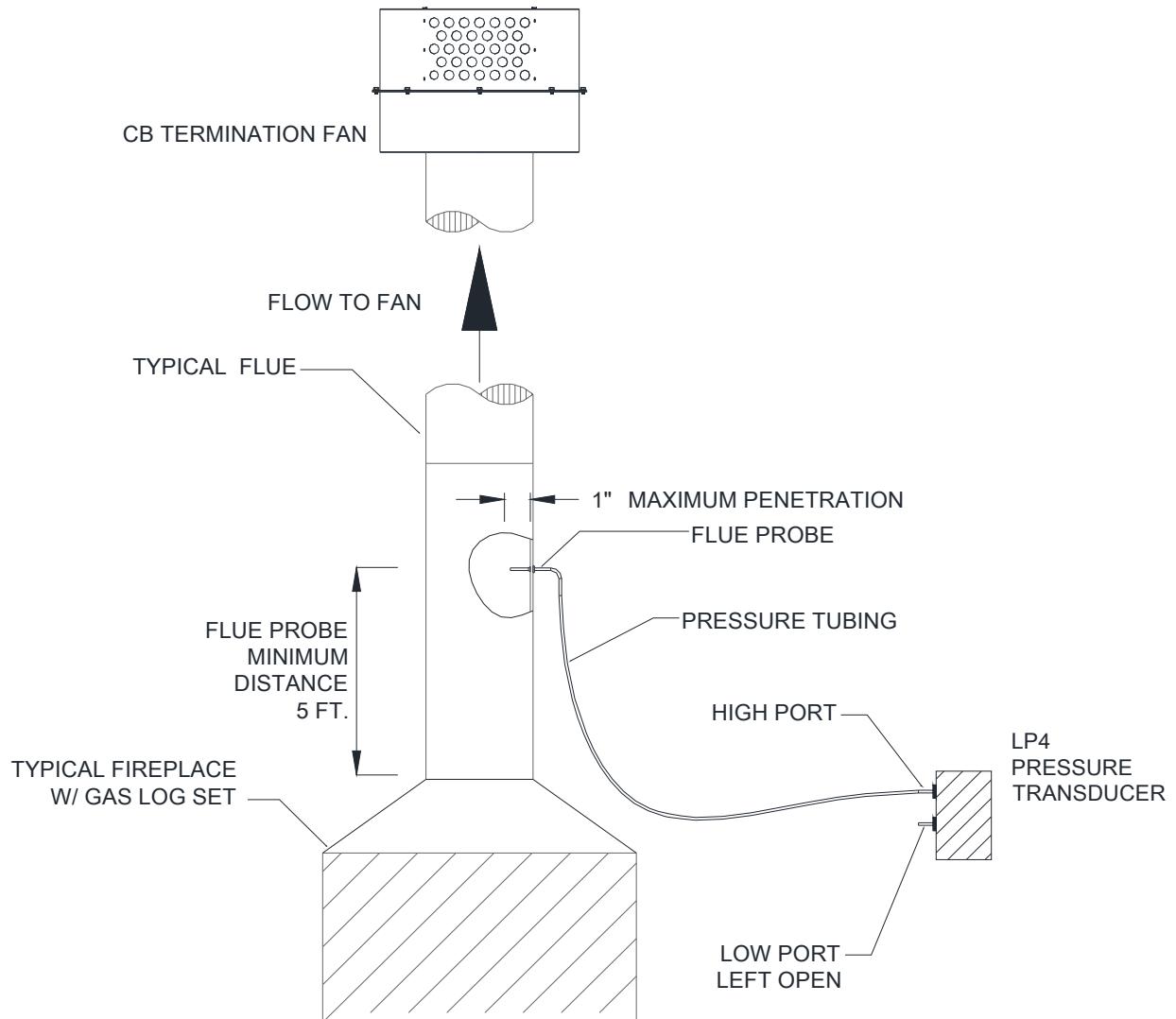
Figure 5



Flue Pressure Probe Installation

It is recommended to install the probe as illustrated below for a typical gas fireplace flue system. There may however be special situations or flue layouts that will dictate an optional location.

Figure 6



Note: the flue pressure probe should be cut to be as close to flush to the inner wall of flue as possible.

Flue LP4 Pressure Transducer Installation

Mounting

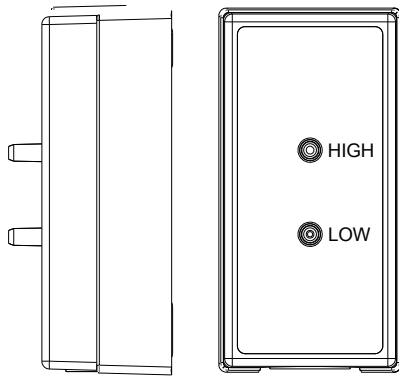
Locate the LP4 Pressure Transducer within 5 ft. of flue probe if using supplied tubing.

Mount vertically on a non-heated surface.

Avoid locations with severe vibrations, extreme heat, or excessive moisture. Ensure there is enough space around the unit to connect the pressure tubing without kinking.

Remove the enclosure cover. Secure with a minimum of two screws using holes inside the enclosure base.

Figure 7 Enclosure Cover



Mounting Holes

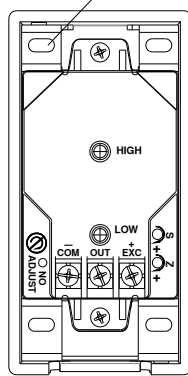
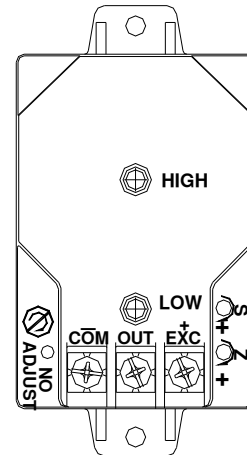


Figure 8



Pneumatic Connections

1/2" Conduit Connection

The two pressure ports on the transducer enclosure are labeled High and Low. The output signal is correct when the flue pressure is measured on the High port.

Connect the supplied high temperature tubing between the flue pressure probe and the High port on the LP4 transducer (Figures 6 & 7).

If mounting location is farther than the supplied 5ft of tubing, use 0.25" I.D. rigid tubing. Do not exceed 100ft. Cut 2 short pieces of the supplied high temperature tubing and use the pieces as couplings on each end of field supplied tubing for proper connection sealing and heat isolation.

Arrange the tubing to minimize stress on the connections. Ensure there are no kinks or potential condensate traps in the tubing. It is recommended that the tubing slope back to the flue for draining to prevent condensate from collecting in the sensing line.

Ensure the tubing is clean and do not allow material to fall into the pressure ports as contamination could damage the sensor. When removing tubing, use care to avoid damaging the ports.

Electrical

The enclosure has a standard 1/2" conduit opening and may be installed with either conduit and a conduit coupler or a cable gland type fitting.

The transducer has standard screw block connectors marked COM, OUT and EXC. It is recommended that a shielded 3 conductor cable at 18 AWG be used for connections.

Note: Do not run in the same conduit with high voltage wiring or wiring used to supply inductive loads such as motors.

Disconnect the power supply before making any connections to prevent electrical shock or equipment damage. Make all connections in accordance with national and local electrical codes.

- The pressure transducer has a half wave power supply
- The pressure transducer supply inputs are reverse voltage protected and will not operate if 24VDC connections are reversed
- Do not apply power to the OUT terminal, damage to the LP4 will occur.

Connections		
Location	To	LP4 Terminal
Power Supply +V	↔	EXC
Power Supply -V	↔	COM
H100 Terminal AI7	↔	OUT

ZPS Outdoor Air Static Pressure Pickup Port

Mounting

The ZPS outdoor air static pressure pickup port should be mounted at least 12 inches above surrounding obstacles so that you get the true static pressure reading. Mount the unit so that other equipment on the building cannot physically or mechanically obstruct it. Do not mount under awnings or other projections within fifteen feet. (Figure 9: option 1)

If the unit cannot be roof mounted with an unobstructed view of the horizon, then side-wall mount the unit (Figure 9: option 2). Do not mount near inlet louvers, economizers, intake or exhaust fans, or barometric dampers. Do not mount near building corners. Mount near the center of the building away from balconies and opening windows. Mount at least 24 inches from the wall using **field supplied** 1/2" EMT conduit.

Figure 9

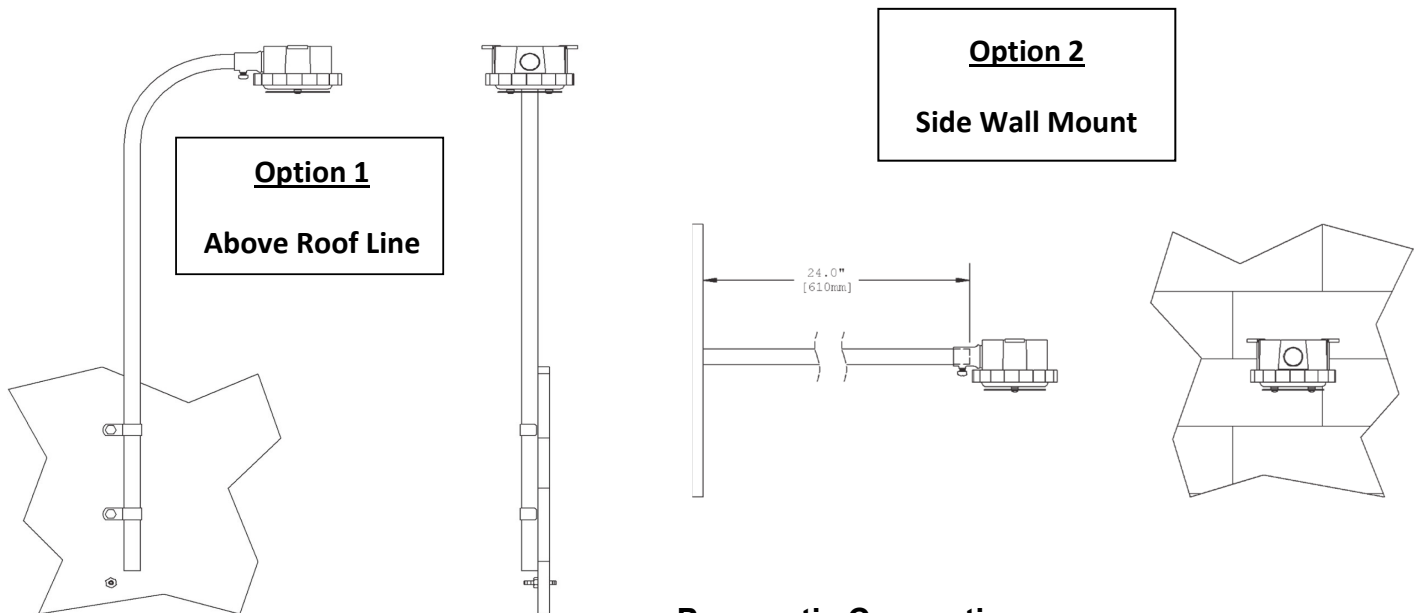
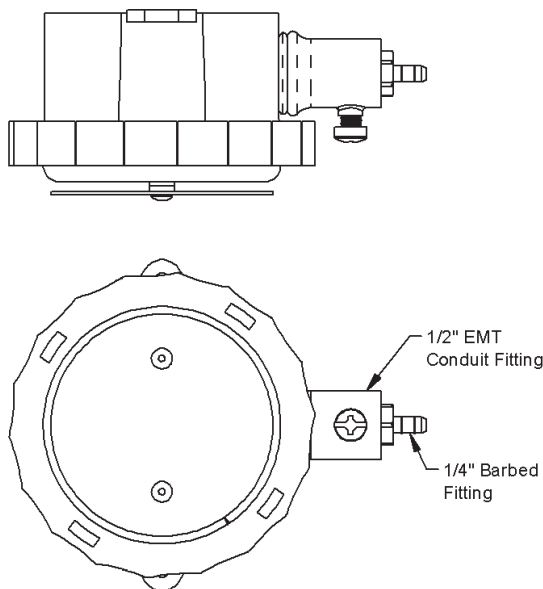


Figure 10



Pneumatic Connection

The pressure tubing transmits the outdoor pressure signal from the ZPS pressure pickup port unit to inside the building envelope to the LP4 (supply) transducer.

Route the field supplied tubing from the supply air system LP4 transducer to and through the 1/2" EMT mounting support conduit. Route the tubing to minimize stress on the connections and ensure there are no kinks in the tubing.

Tubing Size I.D.	Maximum Distance
3/16"	100 ft.
1/4"	300 ft.
3/8"	900 ft.

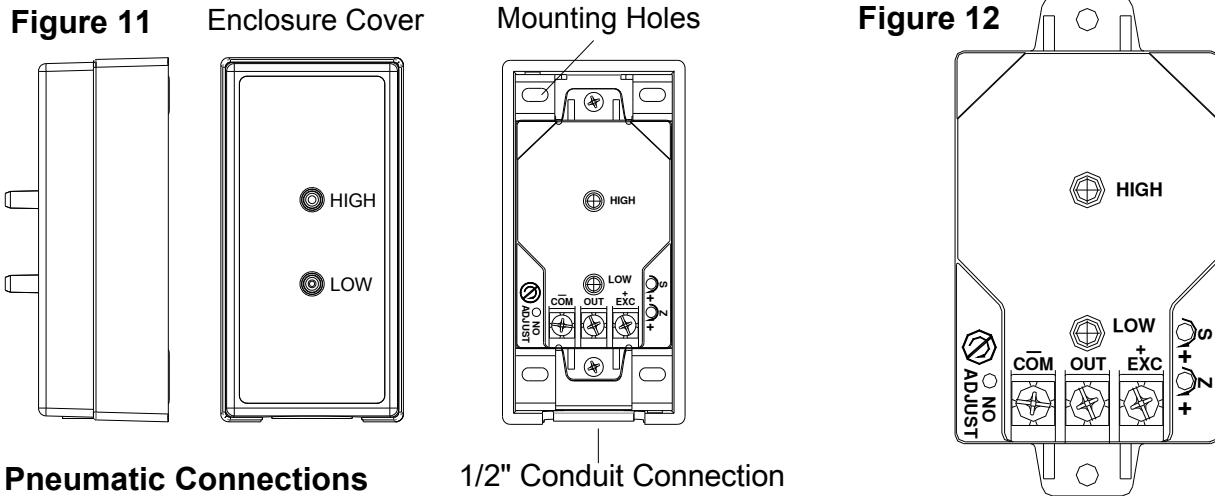
The ZPS pressure pickup port unit has a barb fitting to connect the pressure tubing. Connect tubing to barb fitting. Slide the pressure port unit on to the 1/2" EMT conduit mounting support and tighten the pickup port's fitting screw until unit is secured onto the EMT mounting support.

Supply LP4 Pressure Transducer Installation

Mounting

Locate in an accessible location in the room that is to be monitored by the H100 controller. It is recommended to mount LP4 48 to 60 inches above floor level. Avoid mounting near fans, louvers, or doorways.

Mount vertically on a non-heated surface. Avoid locations with severe vibrations, extreme heat, or excessive moisture. Ensure there is enough space around the unit to connect the pressure tubing without kinking. Remove the enclosure cover. Secure with a minimum of two screws using holes inside the enclosure base.



Pneumatic Connections

The two pressure ports on the enclosure are labeled High and Low. The output signal reads a positive value when the port pressure is higher on the High port than the Low port so ensure these ports are connected correctly.

Connect the tubing between the ZPS outdoor air static pressure port and the Low port on the LP4 transmitter (Figures 9-11). Cut a short piece of the supplied tubing and use as a coupling for proper sealing and ease of installation if hard tubing is used as sensing line.

Arrange the tubing to minimize stress on the connections. Ensure there are no kinks or potential condensate traps in the tubing. It is recommended that the tubing slope away from the LP4 to prevent any collected condensate from entering the LP4 transducer.

Ensure the tubing is clean and do not allow material to fall into the pressure ports as contamination could damage the sensor.

Electrical

The enclosure has a standard 1/2" conduit opening and may be installed with either conduit and a conduit coupler or a cable gland type fitting.

The transducer has standard screw block connectors marked COM, OUT and EXC. It is recommended that a shielded 3 conductor cable at 18 AWG be used for connections.

Note: Do not run in the same conduit with high voltage wiring or wiring used to supply inductive loads such as motors.

Disconnect the power supply before making any connections to prevent electrical shock or equipment damage. Make all connections in accordance with national and local electrical codes.

- The pressure transducer has a half wave power supply
- The pressure transducer supply inputs are reverse voltage protected and will not operate if 24VDC connections are reversed
- Do not apply power to the OUT terminal, damage to the LP4 will occur.

Connections		
Location	To	LP4 Terminal
Power Supply +V	↔	EXC
Power Supply -V	↔	COM
H100 Terminal AI8	↔	OUT

CS75 Current Switch Installation

The CS75 current switch monitors line current of the supply fan for proof of operation. The switch closes the output contacts and energizes an onboard LED when the adjustable trip point is exceeded. The CS75 factory set trip point is 0.75A with a maximum adjustment range between 0.75 to 75A. The switch should be adjusted for the specific installation and site conditions for proper system operation.

Mounting

Check the CS75 current switch for damages. Do not use if damaged!
Do not mount the switch on uneven, hot, or extreme vibrating surfaces!
Mount the CS75 using two screws through the holes in the base. Install within an appropriate electrical enclosure. Do not tighten the screws too much, to avoid damaging the CS75 base.

Electrical

Make sure that all voltage sources are secured before making any electrical connections!

Disconnect the power supply before making any connections to prevent electrical shock or equipment damage. Make all connections in accordance with national and local electrical codes. Route the load conductor to be monitored through the sensor hole in the CS75 current switch. Ensure the conductors are insulated and in good condition.

Figure 14

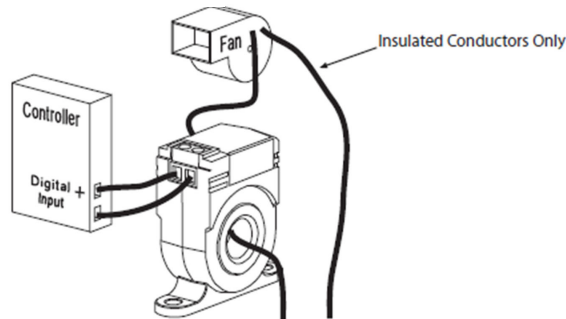


Figure 13

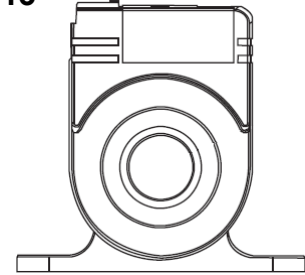
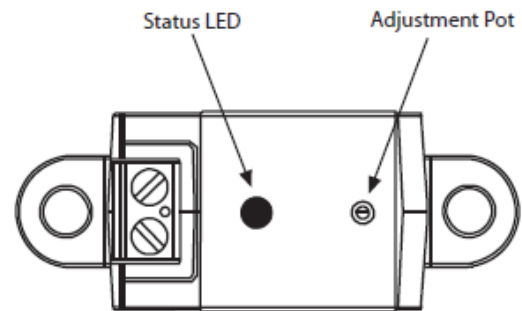


Figure 15



Switch Adjustment

With the sensor installed, energize supply fan. Enable the H100 controller and adjust so that the supply fan is running at minimum speed.

The CS is factory set to switch at 0.75 Amps the status LED should be lit, and the contacts should be closed if the supply fan motor draws more than 0.75 Amps at minimum speed.

With the supply fan running at minimum speed, rotate the multi-turn set point pot counter-clockwise until the status LED turns off. Then slowly turn the pot clockwise until the LED just comes on. Turn clockwise slightly more to eliminate false switching.

Test setting using a voltmeter across the contacts to verify switch operation. Disable the H100 controller. The supply fan should go into standby mode. The CS contacts should open and the LED off. If not readjust the CS switch and retest. After passing this test the CS is now set to detect the supply fan operational condition.

For applications with very small load currents at minimum speed (such as less than 1 Amp), wrap the monitored conductor through the sensor aperture several times to increase the current measured by the sensor.

For example, to monitor a 0-1 Amp load with a CS75, wrap the conductor through the sensor aperture 5 times so the sensor sees 0-5 Amps. For any application with multiple wraps, note that the CS75 maximum current rating must be divided by the number of wraps. For example, with one wrap the maximum current is 75 Amps, with 5 wraps the maximum current is $75/5 = 15$ Amps. Ensure the load current is < 15 Amps or the device may overheat and be damaged.

Connections		
H100 Terminal	To	CS75 Terminal
GND	↔	either
AI4	↔	either

Note: This is a low voltage circuit. Do not run low voltage conductors with high voltage conductors.

GFS Differential Air Pressure Switch Installation

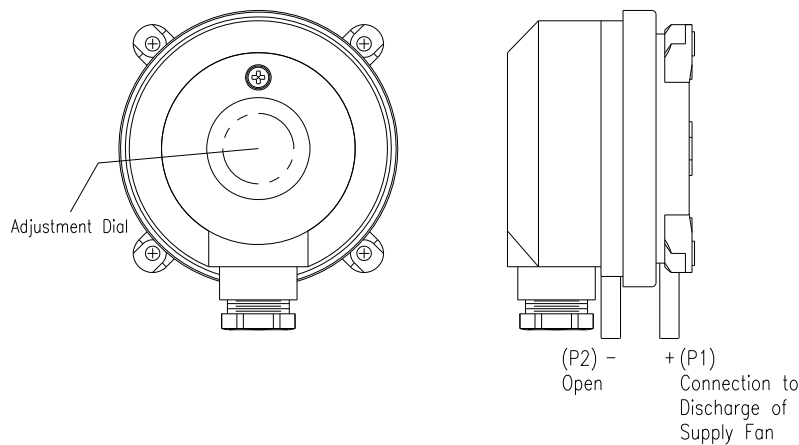
The GFS differential air pressure switch monitors outlet pressure of the supply fan for proof of operation. The GFS can be used as an alternate or complementary device to the CS75 current switch.

The GFS switch normally open contact closes when the adjustable trip point is exceeded. The GFS factory set trip point is 0.08 "WC with a maximum adjustment range between 0.08 to 0.8 "WC. The switch should be adjusted for the specific installation and site conditions for proper system operation.

Mounting

Check the pressure switch for damages. Do not use if damaged! Do not mount the pressure switch on uneven, hot, or vibrating surfaces! Do not tighten the screws too much, to avoid deforming of the device's base. Mount the pressure switch with the pressure connections pointing downwards, to drain condensation moisture which might occur. In general, the mounting with two screws next to each other is sufficient. The maximum diameter of the screws must not be bigger than 0.315" (8 mm).

Figure 16



Pneumatic Connections

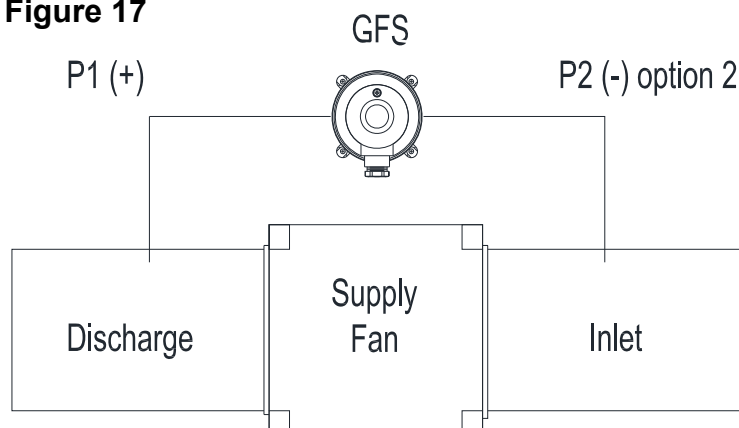
Remove plastic shipping caps from the pressure ports on the end of the GFS enclosure labeled P1(+) and P2(-) (Figure 16).

Option 1: Connect the tubing between the pressure probe on the discharge side of the supply fan outlet or duct and the P1(+) on the GFS (Figure 17). Use the supplied 0.170" I.D. flexible tubing for the pressure connections.

Option 2 (low pressure applications): Connect the tubing between the pressure probe on the discharge side of the supply fan outlet or duct and the P1(+) on the GFS. Install a second pressure probe on the inlet side of the fan or duct. Connect additional pressure tube to the P2(-) port.

Arrange the tubing to minimize stress on the connections and ensure there are no kinks in the tubing. Ensure the tubing is clean and do not allow material to fall into the pressure ports as contamination could damage the switch or block pressure signal.

Figure 17



GFS Differential Air Pressure Switch Installation (continued)

Electrical

Make sure that all voltage sources are secured before making any electrical connections!

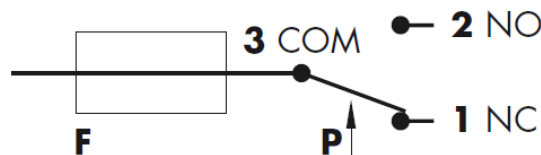
Disconnect the power supply before making any connections to prevent electrical shock or equipment damage. Make all connections in accordance with national and local electrical codes. Make and verify connections per supplied system wiring diagram.

Note: *This is a low voltage circuit. Do not run low voltage conductors with high voltage conductors*

Insert a conduit tube with 1/2" thread and tighten with a torque of 2.5 Nm. Assemble flex- and conductors accordingly.

The connections are intended for 0.25" (6.3 mm) crimp-type sockets. The switch (P) in the pressure switch is designed as a change-over contact. Pole 3 (COM) closes to pole 2 (NO) at increasing pressure and to pole 1 (NC) at decreasing pressure.

Figure 18



Connections for Supply System		
H100 Terminal	To	GFS Terminal
GND	↔	3
A14	↔	2

Switching Pressure Adjustment

Make sure that no voltage is applied to the electrical connections, before any settings on the pressure switch are carried out.

Set the desired pressure, which trips the switch at increasing pressure, on the setting button using a screwdriver. When the pressure falls, the switch returns into its resting position, as soon as the pressure falls below the set switching differential. Place the cover and screw it to the pressure switch. Do not operate the system until the housing is closed.

Check the trip and reset pressure by slowly increasing and decreasing pressure. Switch should be adjusted so that it makes upon supply fan enabling and opens when supply fan stops. If more switch sensitivity is needed refer to pneumatic connections option 2.

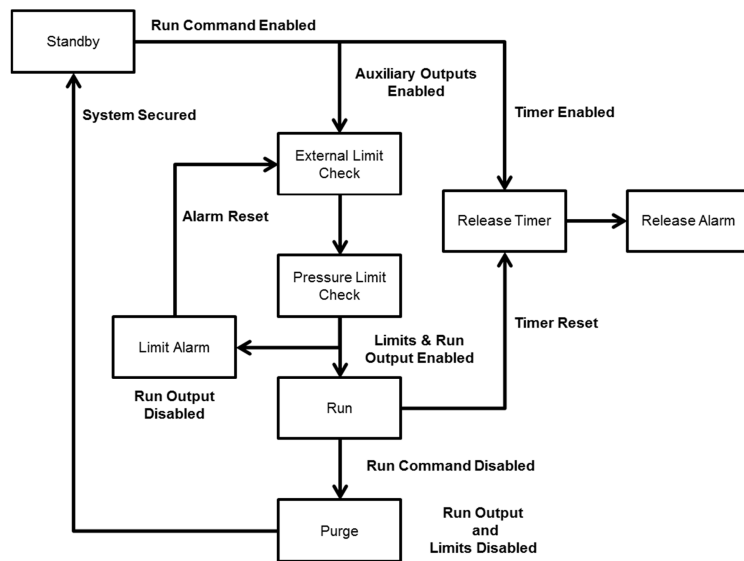
Additionally, if system discharge is open to a space, the supply fan minimum speed setting of the H100 may be increased till the GFS switch makes or the supply fan duct outlet adjusted slightly to increase discharge back pressure.

Flue System Operation

The H100 controller flue system operation allows the system to maintain a desired flue pressure for the proper exhausting of the flue. The H100 controller has been specifically programmed for this application. The controller contains many adjustable parameters allowing the operation to be tuned for specific application requirements.

Sequence of Operation

1. **Standby:** system is hibernating waiting for a run command signal
2. **External Limit Check:** controller verifies that the external limit circuit is complete
3. **Pressure Limit Check:** controller verifies that the pressure limits are in range before enabling the run relay
4. **Run:** controller enables the run relay and resets release timer
5. **Purge:** allows system to temporarily operate after the run command has been secured



Flue Fan Modes

The flue fan operation has two modes of operation that may be selected.

1. Modulate
2. Manual

The modulate mode adjusts the flue fan speed by comparing the set point pressure and the actual pressure measured by the transducer. As the measured pressure increases above the set point pressure the PI controller increases the fan speed to compensate. As the measured pressure decreases below the set point pressure the PI controller decreases the fan speed.

The manual selection operates the flue fan at the set manual speed setting when there is a run command.

Alarms and Limits

If an alarm event occurs, the H100 controller will annunciate the condition via the LCD, de-energizes the run relay and enables the alarm relays.

The alarm reset is automatic, the H100 controller will continue to operate the flue fan if there is a run command.

The release time function is active until the run relay is enabled. The release time is the maximum length of time during the initial run command that the system can operate with the run relay disabled. A release alarm will occur after the release time expiration. The release timer is reset when all the limits prove, and the run relay is enabled or when the run command is secured.

If the limit circuit opens, the limit timer for the circuit begins timing out. If the limit circuit is enabled before the limit timer times out, the timer is reset, and the system continues normal operation. If the limit does not recover before the time out, an alarm notification is sent, and the run relay contact opens till the alarm condition is clear.

If the flue pressure becomes higher or lower than the high and low pressure limits an alarm delay timer begins timing out. If the flue system pressure recovers before the alarm times out the timer is reset, and the system continues normal operation. If the system pressure does not recover before the alarm time out, an alarm notification is sent, and the run relay contact is opened till the alarm condition is clear.

In some cases, the low-pressure limit bypass should be enabled. The low-pressure limit bypass is a special function used when the flue pressure is below the low-pressure limit setting prior to the system start. This setting temporarily allows the system to run and the flue system to load before monitoring the low-pressure limit.

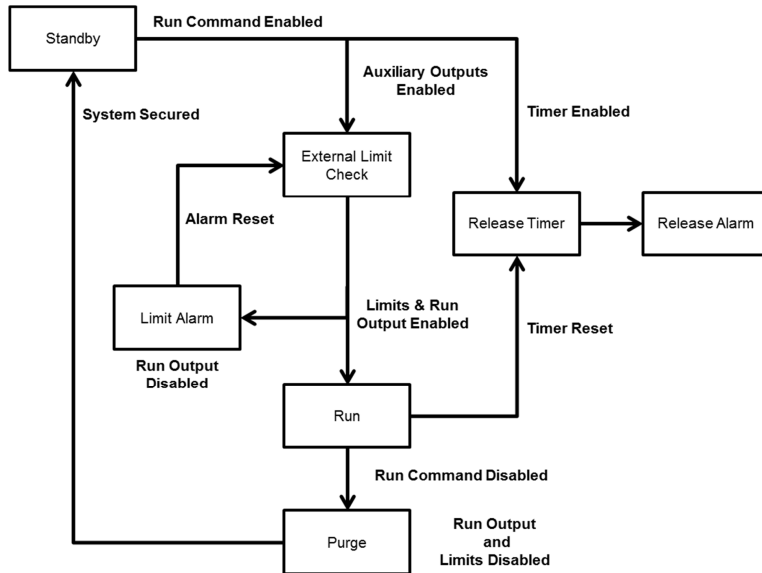
Note: All other alarm limits are still active.

Supply System Operation

The H100 controller supply system operation allows the system to maintain a desired supply pressure or makeup volume. The H100 controller has been specifically programmed for this application. The controller contains many adjustable parameters allowing the operation to be tuned for specific application requirements.

Sequence of Operation

1. **Standby:** system is hibernating waiting for an appliance demand signal
2. **External Limit Check:** controller verifies that the external limit circuit is complete
3. **Run:** controller enables the appliances and resets release timer
4. **Purge:** allows system to temporarily operate after the run command has been secured



Supply Fan Modes

The supply fan operation has two modes of operation that may be selected.

1. Modulate
2. Manual

The modulate mode adjusts the fan speed by comparing the set point pressure and the actual pressure measured by the transducer. As the measured pressure increases above the set point pressure the PI controller decreases the supply fan speed to compensate. As the measured pressure decreases below the set point pressure the PI controller increases the supply fan speed.

The manual selection operates the supply fan at the set manual speed setting when there is a run command.

Alarms and Limits

If an alarm event occurs, the H100 controller will annunciate the condition via the LCD, de-energizes the run relay and enables the alarm relays.

The alarm reset is automatic, the H100 controller will continue to operate the supply fan if there is a run command.

The release time function is active until the run relay is enabled. The release time is the maximum length of time during the initial run command that the system can operate with the run relay disabled. A release alarm will occur after the release time expiration. The release timer is reset when all the limits prove, and the run relay is enabled or when the run command is secured.

If the limit circuit opens, the limit timer for that circuit begins timing out. If the limit circuit is enabled before the limit timer times out, the timer is reset, and the system continues normal operation. If the limit does not recover before the time out, an alarm notification is sent, and the run relay contact opens till the alarm condition is clear.

Menus

The H100 LCD has two separate menus. The User menu and the Admin menu. The User menu is used for system monitoring and the Admin menu is used to access the system operation parameter settings.

The menu screens are in a linear structure and scroll in both directions.

USER Menu Navigation

The USER menu is the default menu. The USER menu only allows access to view system statuses and the system reset parameter.

Navigating the USER Menu

Use the ◀ key or the ▶ key on the front of the H100 controller to scroll to the desired status to view.

The H100 controller will return to the home screen after 5 minutes of non-use. The H100 controller will turn off the LCD backlight and hibernate after 60 seconds at the home screen without use. To wake the H100 controller press any key once.

Alarm Log

The Alarm Log default is set to show only active alarms. The Alarm Log may also be set to save and show the last past or first present active alarm. When the Alarm Log is set to capture alarms, the alarm log may be cleared by the Alarm Log parameter in the ADMIN menu by cycling the parameter when no alarms are active.

Changing the Run Command setting: Press the ▼ key or the ▲ key while at the “RUN CMD” screen.

Screen	Description	Range	Default
RUN CMD	REMOTE = uses the remote input AI1 status for run command	REMOTE	REMOTE
	OFF = System in standby	OFF	
	RUN = local demand to run When set and left in RUN, the system will continue to operate regardless of the remote input status.	RUN	

Run Command Override: press the override button on bottom of H100 controller and hold for 3 seconds to disable and lockout the H100. To re-enable the H100 for operations press and hold button again for 3 seconds.

USER Menu

Screen	Value	Description
Status Home Screen	STANDBY	System not operating and waiting for appliance demand
	LMT HOLD	Controller checking external limit circuit
	PRS HOLD	Controller checking pressure limits
	RUNNING	System in normal operation, run relay contact is closed
	PURGING	Remote demand secured, system purging
	ALARM	Alarm condition active
	DISABLED	H100 is disabled from operation by the run command override
	CONFIG..	H100 control application(s) not selected
H 1.00	H100 initializing	
FLUE PRS	(1.00) – 1.00 WC	Actual measured flue system pressure
SPLY PRS	(1.00) – 1.00 WC	Actual measured supply system pressure
DF OUT	0.00 – 10.00 VDC	Controller output to flue fan
SF OUT	0.00 – 10.00 VDC	Controller output to supply fan
REMOTE	OFF / ON	Remote input status
LIMIT	OFF / ON	Limit input status
RUN RLY	OFF / ON	Run enable relay status
AUX RLYS	OFF / ON	Auxiliary relay statuses
ALM LOG	NO ALARM	No alarms are active or have been recorded
	LIMIT	Limit circuit open
	HIGH PRS	High pressure limit exceeded
	LOW PRS	Low pressure limit exceeded
	RELEASE	Timer expired before the run relay was enabled
	ERROR	The high and low-pressure limit settings are reversed

ADMIN Menu Navigation

The ADMIN menu allows access to the system operation parameter settings.

Entering the ADMIN menu:

Press and hold both the ◀ key and the ▶ key on the front of the H100 controller till ADMIN is shown on LCD display.

Scrolling to a parameter:

Press the ◀ key or the ▶ key on the front of the H100 controller.

Changing the parameter setting:

Press the ▼ key or the ▲ key. The new setting is automatically saved to the H100 controller memory. Hold key to scroll faster for numeric settings.

Exiting the ADMIN menu:

Press and hold both the ◀ key and the ▶ key on the front of the H100 controller till USER is shown on LCD display. If left in the ADMIN menu longer than 5 minutes without use the H100 controller will return to the USER menu home screen automatically.

ADMIN Parameters

FLUE FAN

Parameter	Description	Range	Default
FLUE CTRL	Enables flue control operation	ON / OFF	ON
FF MODE	Flue fan speed control type Modulate = variable speed PI control Manual = fixed speed	MODULATE MANUAL	MODULATE
FLUE SP	Flue pressure set point for PI control	(0.75) – (0.02) WC	-0.05
FLUE P	Proportional is the change of output proportional to present error between FLUE SP and the measured flue pressure The larger the value the more aggressive the control output	1 – 999 %	50
FLUE I	Integral time is the error correction based on the sum of recent errors over time The larger the value the faster the control action	0 – 900 %/S	5
FLUE DB	Dead band above and below the FLUE SP before the PI control reacts to a pressure change	0 – 0.10 WC	0.02
FLUE MAN	Flue fan manual output percentage when operating	0 – 100 %	25
FLUE MIN	Flue fan range minimum output voltage when operating	0 – 10.00 VDC	2.00
FLUE MAX	Flue fan range maximum output voltage when operating	0 – 10.00 VDC	10.00

Tech Tip: Control Reaction Time

Start with the proportional setting. The proportional setting makes a larger impact on the stability and reaction of the controller. After finding the rough settings, make small changes and allow the system to stabilize before making more adjustments. Use the integral time parameter for finer adjustments.

On turbulent systems, adjusting the transducer filter parameter **F FLTR** should be done first to smooth the pressure signal before trying to adjust the control reaction.

ADMIN Parameters (continued)

SUPPLY FAN

Parameter	Description	Range	Default
SPLY CTRL	Enables supply control operation	ON / OFF	OFF
SF MODE	Supply fan speed control type Modulate = variable speed PI control Manual = fixed speed	MODULATE MANUAL	MODULATE
SPLY SP	Supply pressure set point for PI control	(1.00) – 1.00 WC	0.00
SPLY P	Proportional is the change of output proportional to present error between SPLY SP and the measured supply pressure The larger the value the more aggressive the control output	1 – 999 %	50
SPLY I	Integral time is the error correction based on the sum of recent errors over time The larger the value the faster the control action	0 – 900 %/S	5
SPLY DB	Dead band above and below the SPLY SP before the PI control reacts to a pressure change	0 – 0.10 WC	0.02
SPLY MAN	Supply fan manual output percentage when operating	0 – 100 %	25
SPLY MIN	Supply fan range minimum output voltage when operating	0 – 10.00 VDC	2.00
SPLY MAX	Supply fan range maximum output voltage when operating	0 – 10.00 VDC	10.00

Tech Tip: Control Reaction Time

Start with the proportional setting. The proportional setting makes a larger impact on the stability and reaction of the controller. After finding the rough settings, make small changes and allow the system to stabilize before making more adjustments. Use the integral time parameter for finer adjustments.

On turbulent systems, adjusting the transducer filter parameter **S FLTR** should be done first to smooth the pressure signal before trying to adjust the control reaction.

LIMITS

Parameter	Description	Range	Default
FLUE HI	Flue high pressure limit Highest pressure the flue system can operate Must be set to a higher pressure than set point	(0.80) – (0.01) WC	-0.02
FLUE LO	Flue low pressure limit Lowest pressure the flue system can operate Must be set to a lower pressure than set point	(0.80) – 0.80 WC	-0.80
PL DLY	Flue pressure limit delay The timer delays the pressure limit alarms and the disabling of the run enable output when the pressure exceeds either the high or low-pressure limit	1 – 120 S	30
BYPASS	Delays function of the flue low pressure limit during start-up to allow system to load	0 – 120 S	30
LMT DLY	Delays alarm and the disabling of the run output when the limit circuit opens	1 – 120 S	15
ALM LOG	ON = shows active alarm and saves event OFF = clears alarm status after each event To reset the alarm log, select OFF with no alarm event active. Then select ON to re-enable the alarm log capture function.	ON / OFF	OFF

Parameters (continued)

OP TIMER

Parameter	Description	Range	Default
PURGE	The length of time the H100 controller continues to operate after the run commands are disabled	0 – 300 S	30

TRANSDUCER

Parameter	Description	Range	Default
F FLTR	Data averaging filter of the flue pressure transducer analog signal input In a turbulent flow or noisy pressure environment increase setting until the pressure display swing is reduced A lower value provides the fastest response but allows higher analog input noise Too large of value will cause slow control reaction	0 – 100 %	4
F ZERO	Zero reference adjustment of the flue pressure transducer signal input	(0.25) – 0.25 WC	0.00
S FLTR	Data averaging filter of the supply pressure transducer analog signal input	0 – 100 %	4
S ZERO	Zero reference adjustment of the supply pressure transducer signal input	(0.25) – 0.25 WC	0.00

MODBUS COMMS

Parameter	Description	Range	Default
ADDRESS	Modbus network device address	1 – 253	1

Modbus Communications

The H100 controller supports the Modbus RTU RS-485 serial communication protocol. The H100 controller is a Modbus slave device. The H100 controller cannot initiate communications but will respond to information requests from the Modbus network master device.

Addressing

Each device on the network must have a unique address (1-253). Addresses 0 and 255 are reserved. Address 254 is a special universal address used by the H100 controller. The H100 controller will always respond to an address 254 request. Each H100 controller on the network will simultaneously respond to a single address 254 request.

- ***Do not use address 254 on a Modbus network when using the H100 controller!***

Number of Network Devices

The number of devices allowed on a Modbus network varies from system to system. The network is physically limited by each device's RS-485 transceiver. The Modbus RS-485 serial protocol specifies a standard of 32 devices. Device manufactures may specify fewer and some more than 32 devices.

More devices may be on the system when all the devices have low load RS-485 transceiver or when repeaters are used. Review each device manufacture's specifications and use the least number of devices specified as a guide.

The H100 controller uses a low load RS-485 transceiver. There could theoretically be up to 213 H100 controllers on a dedicated network if the Modbus master can support that number of devices. It is recommended to limit the number of H100 controllers to 100 for better system response times.

Network Cable Length

The maximum cable length is 4000 ft. The actual usable cable length depends on the baud rate, quality of wire, environmental conditions and the devices connected to the bus. If the communication is slow, unreliable or the distance needs to be extended a repeater maybe necessary.

Network Cable Specification

The conductor size and type of cable depends on the specific network. In general, 22- 18 AWG twisted pair shielded cable is required. When cable length is greater than 100 ft. 18 AWG conductors should be used. Some systems may require specific RS485 cable with a twisted pair, a 3rd common wire and shield drain.

Be aware of how the cable is routed. Do not route cable with line voltage or inductive load conductors. The cable type and the installation must be in accordance with national and local electrical codes.

H100 Controller Network Electrical Connections

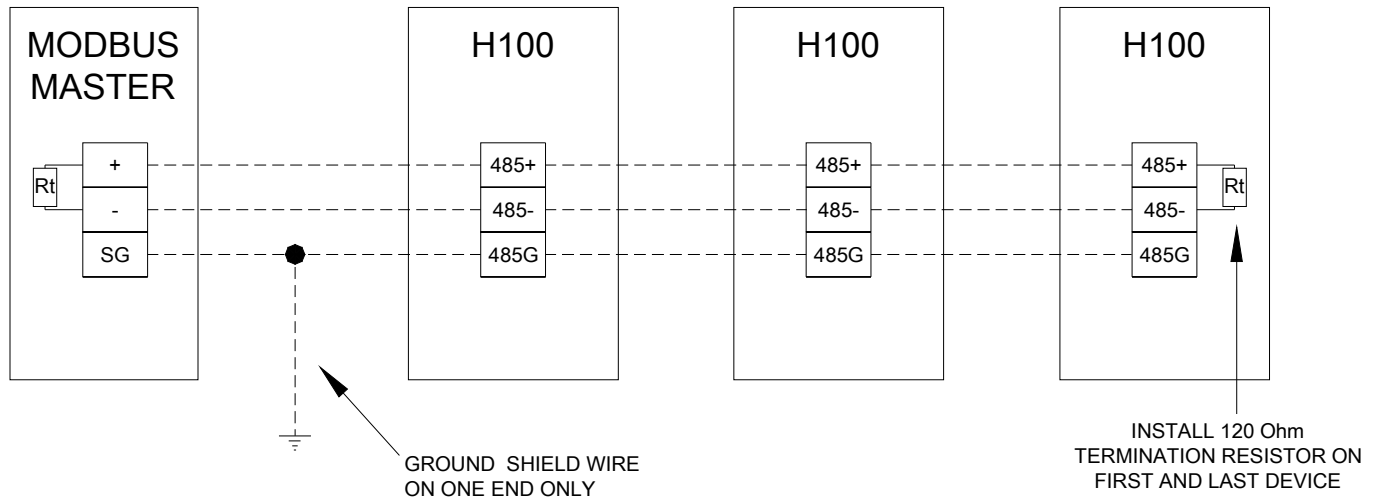
Each network device is installed in a parallel "daisy chain" configuration. The network cable twisted pair signal conductors will be connected to the H100 controller at terminals (485+) and (485-). The cable shield ground conductor will be connected to the (485G) terminal. The cable shield ground should be also connected to earth ground on only one end of the network.

On longer networks, termination resistors are required to prevent signal echoes. A 120 Ohm termination resistor should be installed at the first and last device on the network across the device's signal terminals. Some devices have a built-in termination resistor; therefore, an external termination resistor is not required.

The H100 controller does not have an internal termination resistor. When a H100 controller is the last device on the network, install the termination resistor across terminals (485+) and (485-).

Modbus Communications

TYPICAL MODBUS RS-485 NETWORK CONNECTIONS



Serial Communication Parameters

Serial communication parameters are set to 19200 / 8-N-1, i.e. 19200 BAUD, 8 data bits, no parity, and one stop bit. Different BAUD rate settings are available, but the 8-N-1 parameters are fixed.

Holding Register Addresses

The holding registers are READ ONLY, (Base 1), 16-bit signed integers. The register addresses are arranged into the following categories:

100 – 109: System Statuses

200 – 230: Parameter Settings

400 – 510: Alarm History

Alarm History Registers

The H100 utilizes an alarm history data capture facility. When an alarm is triggered, the H100 will capture the status values of the inputs, outputs and operation. The H100 stores those values along with a timestamp into flash memory. The H100 will store up to 10 alarm event records. Subsequent triggers will add additional records overwriting older data in a circular fashion.

The first register is the number of stored records and subsequent registers correspond to the stored data. Each record contains 11 registers. The first 6 registers of each record are the time stamp, formatted as (year, month, day, hour, minute, second), followed by the system status data. The last register is an alarm event total.

Modbus Register List

Status Registers

MB Register #	Name	Units	Format	Description
100	System Status			1 = Standby 5 = Limit Hold 6 = Pressure Limit Hold 8 = Running 9 = Purging 15 = Disabled 20 = Alarm 24 = H100 Not Configured 25 = Initializing
101	Flue System Pressure	in WC	X100	(1.00) – 1.00
102	Supply System Pressure	in WC	X100	(1.00) – 1.00
103	Flue Fan Output	VDC	X100	0 – 10.00
104	Supply Fan Output	VDC	X100	0 – 10.00
105	Remote Input			0 = OFF 1 = ON
106	Limit Input			0 = OFF 1 = ON
107	Run Status Relay			0 = OFF 1 = ON
108	Auxiliary Relays			0 = OFF 1 = ON
109	Alarm Log			0 = No Alarm 3 = External Limit Open 5 = Flue High Pressure Limit 6 = Flue Low Pressure Limit 9 = Release Time Expired 11 = Error

Modbus Register List

Parameter Registers

MB Register #	Name	Units	Format	Description
200	RUN CMD			0 = REMOTE 1 = OFF 2 = RUN
201	FLUE CTRL			0 = OFF 1 = ON
202	DF MODE			0 = MODULATE 1 = MANUAL
203	FLUE SP	in WC	X100	(0.75) – (0.02)
204	FLUE P	%		1 – 999
205	FLUE I	%/S		0 – 900
206	FLUE DB	in WC	X100	0 – 0.10
207	FLUE MAN	%		0 – 100
208	FLUE MIN	VDC	X100	0 – 10.00
209	FLUE MAX	VDC	X100	0 – 10.00
210	SPLY CTRL			0 = OFF 1 = ON
211	SF MODE			0 = MODULATE 1 = MANUAL
212	SPLY SP	in WC	X100	(1.00) – 1.00
213	SPLY P	%		1 – 999
214	SPLY I	%/S		0 – 900
215	SPLY DB	in WC	X100	0 – 0.10
216	SPLY MAN	%		0 – 100
217	SPLY MIN	VDC	X100	0 – 10.00
218	SPLY MAX	VDC	X100	0 – 10.00
219	FLUE HI	in WC	X100	(0.80) – (0.01)
220	FLUE LO	in WC	X100	(0.80) – (0.01)
221	PL DLY	S		1 – 120
222	BYPASS	S		0 – 120
223	LMT DLY	S		1 – 120
224	ALM LOG			0 = OFF 1 = ON
225	PURGE	S		0 – 300
226	F FILTER	%		0 – 100
227	F ZERO	in WC	X100	(0.25) – 0.25
228	S FILTER	%		0 – 100
229	S ZERO	in WC	X100	(0.25) – 0.25
230	ADDRESS			1 – 253

Modbus Register List

Alarm History Registers

MB Register #	Name	Units	Format	Description
400	# of Stored Records			
401	Year			
402	Month			
403	Day			
404	Hour			
405	Minute			
406	Second			
407	Alarm			0 = No Alarm 3 = External Limit Open 5 = Flue High Pressure Limit 6 = Flue Low Pressure Limit 9 = Release Time Expired 11 = Error
408	Flue System Pressure	in WC	X100	(1.00) – 1.00
409	Supply System Pressure	in WC	X100	(1.00) – 1.00
410	Flue Fan Output	VDC	X100	0 – 10.00
411	Supply Fan Output	VDC	X100	0 – 10.00
412...	Start of next record - Year			
423...	Start of next record - Year			
434...	Start of next record - Year			
445...	Start of next record - Year			
456...	Start of next record - Year			
467...	Start of next record - Year			
478...	Start of next record - Year			
489...	Start of next record - Year			
500...	Start of next record - Year			

Testing and Troubleshooting

The H100 has several built-in checks that are performed during operation, but the systems operations should be tested periodically to verify functionality. It is critically important to test system functions during the commissioning phase of the system life cycle.

The H100 controller has been programmed to monitor for several faults. These faults can be caused by either a hard or a soft condition and are used to notify user(s) when the system is outside of normal operating conditions.

A **hard condition** is a system component that is not functional. A **soft condition** is a result of a system condition caused by the present dynamics of the system or environment. The system dynamics are variables of the system that can change outside of the control of the H100 controller. Some of these variables are:

1. Changing building pressure
2. Outside weather
3. Controller parameters not adjusted properly for system conditions
4. Varying supply voltage
5. Pressure probe location for transducer
6. System load larger than flue system capacity
7. Natural draft larger than low pressure limit

LP4 Pressure Transducer Calibration

The pressure transducer is factory calibrated and no calibration is required. However, a zero-reference adjustment at the H100 controller may be required due to installation variables.

The zero-reference should be adjusted using the “F ZERO or S ZERO” parameter in the H100 controller user menu.

Zero Calibration Procedure:

1. Verify system is disabled and the status is STANDBY
2. Remove pressure tubing from high and low port of pressure transducer
3. Verify pressure on H100 controller pressure display
4. With both ports of the pressure transducer open to the ambient pressure make adjustment of H100 controller parameter setting “F ZERO or S ZERO” if required
5. Verify zero on H100 controller pressure display (0.00 WC)
6. Reconnect pressure tubing to high port of the pressure transducer
7. Place system back into normal operation

Flue Control System Function Test

To test flue system operations or to determine whether a condition is hard or soft, manipulate the flue LP4 transducer and observe the system response.

1. **Secure fireplace. Do not perform test while fireplace is enabled and in operation!**
2. Secure system operations
 - a. Scroll to RUN CMD in the USER menu and select OFF
 - b. Secure remote input command if being used
3. Enable the H100 controller by scrolling to RUN CMD in the USER menu
 - a. Select RUN to enable operations
4. Monitor status sequence
 - a. Allow system to enter the run phase and stabilize
 - b. If sequence does not enter the run phase secure test and investigate sequence issue
5. Remove flue LP4 pressure tubing and connect a piece of tubing on high port for manual testing below
6. If needed, create a slight positive pressure more than the set point pressure to the flue LP4 transducer's high port to simulate a positive pressure
 - a. The flue fan speed should increase
 - b. If pressure is held above the flue high pressure limit, an alarm will occur after the alarm delay has expired
7. Create a slight negative pressure less than the set point pressure to the flue LP4 transducer's high port to simulate a negative pressure
 - a. The flue fan speed should decrease
 - b. If pressure is held below the flue low pressure limit, an alarm will occur after the alarm delay has expired
8. Reconnect the flue pressure tubing to the LP4 transducer's high port
9. Secure system operations scrolling to RUN CMD in the USER menu
 - a. Select OFF
10. Allow system to complete purge phase and secure operation
11. Correct any abnormalities noted and retest, if not continue to next step
12. Reconnect any terminations removed during testing
13. Place system back into normal operation

If all the actions are correct per the flow chart and controller settings, the system is operational, and any previous alarm condition is soft.

Supply Air System Function Test

To test supply air system operations or to determine whether a condition is hard or soft, manipulate the supply LP4 transducer and observe the system response.

1. **Secure fireplace. Do not perform test while fireplace is enabled and in operation!**
2. Secure system operations
 - a. Scroll to RUN CMD in the USER menu and select OFF
 - b. Secure remote input command if being used
3. Enable the H100 controller by scrolling to RUN CMD in the USER menu
 - a. Select RUN to enable operations
4. Monitor status sequence
 - a. Allow system to enter the run phase and stabilize
 - b. If sequence does not enter the run phase secure test and investigate sequence issue
5. Connect a piece of tubing on the LP4 high port for manual testing below
6. Create a slight negative pressure less than the set point pressure to the supply LP4 transducer's high port to simulate a negative pressure
 - a. The supply fan speed should increase
7. If needed, create a slight positive pressure more than the set point pressure to the flue LP4 transducer's high port to simulate a positive pressure
 - a. The supply fan speed should decrease
8. Test supply fan limit interlock
 - a. Secure supply fan by opening fan power disconnect or secure VFD if induction motor fan
 - b. H100 should enter alarm mode after the limit delay has expired
 - i. If no alarm occurs secure test and investigate and correct issue
 - c. After the alarm, energize the supply fan by closing the disconnect or enable VFD
9. Secure system operations scrolling to RUN CMD in the USER menu
 - a. Select OFF
10. Allow system to complete purge phase and secure operation
11. Correct any abnormalities noted and retest, if not continue to next step
12. Reconnect any terminations removed during testing
13. Place system back into normal operation

If all the actions are correct per the flow chart and controller settings, the system is operational, and any previous alarm condition is soft.

Alarms

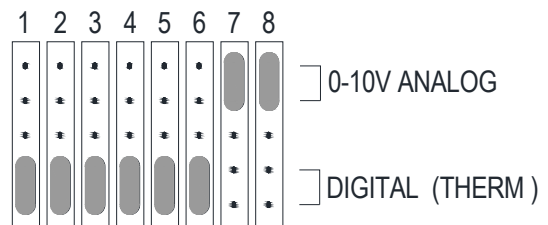
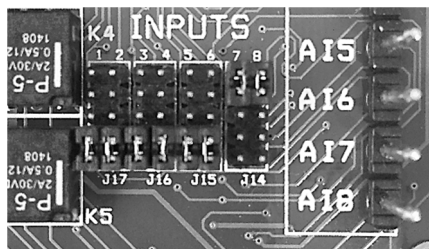
Alarm	Description	Possible Causes
RELEASE	Release period has expired The system has exceeded the release time setting before enabling the appliance outputs	<ul style="list-style-type: none"> • Component issue • Wiring issue • Flue mechanical issue
LIMIT	Limit circuit open Loss of limit input voltage at H100 controller terminal AI4 for longer than the limit alarm delay setting	<ul style="list-style-type: none"> • Limit device contact open • Incorrect or missing wiring • Limit delay time too short for operation
HIGH PRS	High pressure limit exceeded The system pressure measured by the LP4 transducer is higher than high pressure limit setting longer than the pressure limit delay (PL DLY) timer setting	<ul style="list-style-type: none"> • Pressure tubing on wrong LP4 port • Blocked pressure tubing or probe • Controller PI settings not aggressive enough • Too large of load for flue system • Flue blockage • LP4 transducer failure • Induced voltage into LP4 signal wiring
LOW PRS	Low pressure limit exceeded The system pressure measured by the LP4 transducer is lower than low pressure limit setting longer than the pressure limit delay (PL Dly) timer setting	<ul style="list-style-type: none"> • LP4 transducer wiring • Low pressure limit set too high • Pressure tubing on wrong LP4 port • Too small of system load for flue system • LP4 transducer failure
ERROR	High and Low-pressure alarm active	<ul style="list-style-type: none"> • High and Low-pressure limit settings reversed

General Issues

Issue Description	Check / Adjust
H100 LCD is blank	<ul style="list-style-type: none"> • Power supply input wiring polarity reversed • Disconnect to power supply • Supply power to power supply • Power supply detects a short • Damaged LCD or PCB
System has wide pressure swings	<ul style="list-style-type: none"> • Transducer filter setting • PI control settings • Pressure probe location
Fan does not run	<ul style="list-style-type: none"> • Power supply • Disconnect • Wiring connections • Speed reference wiring polarity • Mechanical binding or lockup • Min and Max output settings • Analog output jumpers set to (V)
Pressure transducer not working	<ul style="list-style-type: none"> • Supply voltage at transducer terminals • Wiring connections • Pressure tube and probe • Input jumper 7 and 8 are set to 0-10V
Constant 1.00 WC displayed	<ul style="list-style-type: none"> • Input jumper 7 and 8 are set to 0-10V • Transducer wiring • Sensing tube or probe obstructed
Constant -1.00 WC displayed	<ul style="list-style-type: none"> • Supply voltage at transducer terminals • Input jumper 7 and 8 are set to 0-10V • Transducer wiring

Input Jumper Positions

Located on
backside of
H100
Controller



System Commissioning Procedure

Do not skip any steps! Skipping steps may create a hazardous condition or damage equipment!

Pre-Commissioning Checks

1. Check that disconnect(s) are open/ de-energized
2. Verify all system components are installed properly and are secure
3. Verify wiring connections are correct per wiring diagram(s) and terminals are tight
4. Verify flue probe and pressure sensing tubing is installed and connected to correct port(s) on LP4 transducer (if flue system)
5. Verify pressure sensing tubing is installed and connected to correct port(s) on LP4 transducer and Outdoor Air Pressure Port (if supply system)
6. Remove all debris (metal chips loose, wire strand, etc.) from enclosure.
7. Verify fan assemblies are clear of obstructions and personnel.

Warning: Do not proceed unless the system is complete and ready to be commissioned. The following procedures require the H100 controller and associated components to be energized.

A. General

1. Verify pre-commission checks have been completed
2. Verify that the appliances are disabled
3. Prior to energizing disconnect(s) verify equipment voltage supplies
4. **Verify all personnel and equipment is clear rotating equipment!**
5. Energize H100 controller

B. Flue System (If not applicable, disable flue control parameter setting, step1 below)

1. Verify H100 controller is set up for the flue system application by scrolling to FLUE CTRL in the ADMIN menu
 - i. Verify "ON"
 - ii. Select "OFF" if not applicable and skip to section C
2. Set up VFD (if applicable)
 - i. Energize VFD
 - ii. Verify VFD is set for remote control
3. Close disconnect to fan
4. Enable the H100 to run fan
 - i. Place the controller into "RUN" in the USER menu. Enable and disable "RUNCMD" setting to simulate demand calls. Cycle as needed.
5. Open disconnect to EC motor fan or disable VFD if induction motor fan
6. Verify rotation as indicated on fan
 - i. Correct rotation and retest if required (refer to fan IOM for procedure)
7. Close disconnect to fan or enable VFD
8. Perform flue system function test (refer to test section)
 - i. Correct any issues and retest

C. Supply System (If not applicable skip section)

1. Set up H100 controller for the Supply system application by scrolling to SPLY CTRL in the ADMIN menu
 - i. Select "ON"
2. Perform supply system function test (refer to test section)
 - i. Correct any issues and retest

D. System Tuning

1. Verify system transducer zeros (refer to test section)
2. Place system into operation and observe
3. Adjust H100 parameters as required for satisfactory normal operation
4. Fill out commissioning forms

H100 System Commissioning Form

Job Name: _____ Commissioned By: _____
 Customer: _____ Date: _____

H100 Program Version # _____

System Type: Flue / Supply (circle)

Installation Checks

YES / NO / NA

Components installed per installation instructions	
Wiring correct per connection diagram(s)	
Transducer tubing connected correctly	
Debris removed from enclosure and fan assembly(s)	
All obstructions and personnel clear of fan assembly(s)	

Electrical Checks

H100 power supply input	VAC	H100 power supply output	VDC
L1 – N		24V - COM	
VFD supply voltage			YES / NO
L1 – L2		Flue fan rotation correct	
L1 – L3			
L2 – L3		Flue fan FLA	
ECM supply voltage		Supply fan FLA	
L1 – L2 (N)			
Supply fan supply voltage			
L1 – L2 (N)			
L1 – L3			
L2 – L3			

Operation Tests

PASS / FAIL

Flue system function test	
Supply system function test	

System Status

YES / NO

System commissioning completed	
System is online	

Parameter List

Category	Parameter	Setting Range	Default Setting	User setting
RUN COMMAND	RUN CMD	REMOTE OFF RUN	REMOTE	
FLUE FAN	FLUE CTRL	ON / OFF	ON	
	DF MODE	MODULATE MANUAL	MODULATE	
	FLUE SP	(0.75) – (0.02) WC	-0.05	
	FLUE P	1 – 999 %	50	
	FLUE I	0 – 900 %/S	5	
	FLUE DB	0 – 0.10 WC	0.02	
	FLUE MAN	0 – 100 %	25	
	FLUE MIN	0 – 10.00 VDC	2.00	
	FLUE MAX	0 – 10.00 VDC	10.00	
SUPPLY FAN	SPLY CTRL	ON / OFF	OFF	
	SF MODE	MODULATE MANUAL	MODULATE	
	SPLY SP	(1.00) – 1.00 WC	0.00	
	SPLY P	1 – 999 %	50	
	SPLY I	0 – 900 %/S	5	
	SPLY DB	0 – 0.10 WC	0.02	
	SPLY MAN	0 – 100 %	25	
	SPLY MIN	0 – 10.00 VDC	2.00	
	SPLY MAX	0 – 10.00 VDC	10.00	
LIMITS	FLUE HI	(0.80) – (0.01) WC	- 0.02	
	FLUE LO	(0.80) – (0.01) WC	- 0.80	
	PL DLY	1 – 120 S	30	
	BYPASS	0 – 120 S	0	
	LMT DLY	1 – 120 S	15	
	ALM LOG	ON / OFF	OFF	
OP TIMER	PURGE	0 – 300 S	30	
TRANSDUCER	F FLTR	0 – 100 %	4	
	F ZERO	(0.25) – 0.25 WC	0.00	
	S FLTR	0 – 100 %	4	
	S ZERO	(0.25) – 0.25 WC	0.00	
MODBUS	ADDRESS	1 – 253	1	



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