INTELLIPAK®
The Intelligent Packaged Rooftop

Applications Considerations

Introduction to Applications

This section contains a few application questions that the product support team has answered quite frequently over the past several years. This section, by all means, is not totally inclusive; however, this information is extremely useful and will be built upon in subsequent updates.

Question: Do you need a zone sensor on all IntelliPaks, whether Constant Volume or Variable Air Volume (VAV)?

Answer:

Yes, all 20-130 ton units need a zone sensor, even a VAV unit. On a VAV unit, the zone sensor is used for the unoccupied, morning warm-up and daytime warm-up modes. This is because the unit essentially operates constant volume in those modes and does not use the discharge air sensor. If none of these modes are being used, a fixed resistor of 10KΩ(77°F), 1/4 watt, can be installed on 1TB4 terminals 1 and 2. This is not recommended, however, because if the job needs change at sometime to include these functions and that resistor is still installed, the heating modes will not function due a lack of feedback from the actual space temperature. Possible sensors to use for minimum requirements are BAYSENS017B and BAYSENS016A.

Question: What is the difference between Emergency Stop, External Auto Stop, and Occupied/Unoccupied inputs?

Answer:

A. EMERGENCY STOP
This state can be entered only by the opening of the Emergency Stop binary input of the Roof Top Module (RTM). This function can be accomplished by the installation of field provided switches or contacts. The terminal strip location for this input is 1TB4-15 and 1TB4-16 (factory jumper must be removed). Emergency Stop immediately shuts down all unit functions and generates a **manual** reset diagnostic that must be reset at the unit human interface panel.

Applications Considerations

Typical Applications:
This feature is commonly used with a fire alarm management system that will immediately shut down unit operation upon an emergency. This application requires the unit to be manually reset after the fire alarm management system has been reset.

B. EXTERNAL AUTO/STOP
This state can be entered only by the opening of the External Auto/Stop binary input of the RTM. The terminal strip location for this input is 1TB4-17 and 1TB4-18 (factory jumper must be removed). External Auto/Stop will return the unit to the current operating mode when the input is closed. In other words, this diagnostic will **automatically** reset when External Auto/Stop is re-closed.

Typical Applications:
This feature is commonly used with a fire alarm management system that will immediately shut down unit operation upon an emergency. With this application, the unit will automatically reset after the fire alarm management system has been reset.

C. UNOCCUPIED
The unoccupied mode is entered when the Occupied/Unoccupied binary input is CLOSED for more than 5 seconds either from Tracer®, the Night Setback panel, or field supplied contact.

The field supplied contact can be initiated by either a time clock or a Building Automation System control output. The field supplied contact is connected to terminal strip location 1TB4-18 and 1TB4-19.

This feature is commonly used at night or on weekends when the building is not occupied. When in this state, the unit will control to the unoccupied setpoints (usually a lower heating setpoint and higher cooling setpoint). This is usually done to conserve energy during times when a building is traditionally unoccupied.

Applications Considerations

D. OCCUPIED

The transition from Unoccupied to Occupied is initiated when the Occupied/Unoccupied input on the RTM is OPEN for more than 5 seconds after having been closed. This input can be received from Tracer®, the Night Setback panel, or a field supplied contact. The field supplied contact is connected to terminal strip location 1TB4-18 and 1TB4-19.

Upon transition to this state, the unit will control to the "occupied" setpoints. These setpoints are usually selected to maintain satisfactory comfort level for the building when it is occupied.

Question: What does it take to implement a dehumidification control sequence on IntelliPak?

Answer:

Note: This is not possible for an IntelliPak with electric heat. The sizing of disconnects, terminal blocks, and wiring in these units do not allow for heating and cooling simultaneously.

The IntelliPak Roof Top Unit Control Module (UCM) will not allow simultaneous heating and cooling. Therefore, the only way to implement a dehumidification control sequence is to send a low supply air, or zone **cooling setpoint** (depending on whether the unit is VAV or Constant Volume respectively), and have something external to the IntelliPak UCM control reheat to maintain the space temperature.

The IntelliPak UCM does not have an analog input available to monitor space humidity. Therefore, the tasks of monitoring space relative humidity must be performed by something external to the IntelliPak UCM. This could be a Universal Programmable Control Module (PCM), or even a humidistat.

Since dehumidification requires that the active setpoint be modified when the dehumidification mode is active, IntelliPak must be provided with a means of remotely adjusting the setpoint. This can be accomplished with any of the zone sensors that include the slide potentiometer setpoint adjustment. This **can not** be done with one of the programmable sensors, such as the BAYSENS019B, or the BAYSENS020B.

Applications Considerations

If a Tracer system is connected, then the setpoint can be provided through Tracer. The external control of the reheat could be done through a PCM. A PCM could also monitor the space relative humidity, and make the determination as to when dehumidification is required.

In any case, due to the numerous possibilities for the configuration of a humidity control scheme, Clarksville Product Support should be contacted prior to committing to a dehumidification cycle.

Question: What is GBAS, and when is it required?

Answer:

GBAS is the acronym for Generic Building Automation System. The intent of developing the GBAS Module was to provide a means for a Building Automation System, other than Tracer®, to interface with the IntelliPak Roof Top Unit. This interface is comprised of (4) four analog inputs which represent setpoints, (1) one binary input for Demand Limit, and (5) five binary outputs that provide diagnostic information.

The (4) four analog inputs allow a 0-5 vdc signal to represent the desired setpoint.

The (1) one binary input is the Demand Limit input. This input can be programmed to provide either a 50%, or a 100% demand limit for only heating, only cooling, or both heating and cooling. This can be done in the Set Up Menu of IntelliPak under “Demand Limit Definition Cooling”, and “Demand Limit Definition Heating” screens. If the cooling Demand Limit is set to 50%, half of the cooling capacity will be disabled anytime the Demand Limit binary input is closed. If the heating Demand Limit Definition is set to 50%, half, or one stage of the heating will be disabled anytime the Demand Limit binary input is closed.

If the Demand Limit Definition is set to 100%, then all cooling, and or heating functions will be disabled anytime the Demand Limit input is closed.

The (5) five binary outputs are factory preset to the alarms described in the unit wiring diagram. These outputs can be field configured in any desired combination. In other words, any single diagnostic can be assigned to any output, or any group of diagnostics can be combined, and assigned to any

output. A listing of all of the possible diagnostics can be found in the IntelliPak programming guides.

Depending on the amount of interfacing that is required, the GBAS module may not always be necessary. Another vendors' control system can send setpoints for zone temperature, discharge air temperature, and economizer minimum position without GBAS. There also is one alarm output on the RTM that can signal the presence of a diagnostic.

If there is a requirement to interface the IntelliPak Roof Top Unit, it would be worthwhile to contact Clarksville Product Support to discuss the application before quoting a project. For more information, refer to RT-EB-109.

Question: When do I need to include a Ventilation Override Module (VOM)?

Answer:

First of all, the VOM should **never** be used to achieve any mode of operation, other than those required in special circumstances, such as a fire alarm shut down, or a smoke purge sequence. The VOM is not intended for normal unit operation. The only control functions that are active during any VOM mode, is the unit heat, and Inlet Guide Vane (IGV) control, if so configured.

The VOM allows up to (5) five independent modes of operation. These modes are designated "Mode A" through "Mode E". "Mode A" has the highest priority, and "Mode E" has the lowest. This means that if two modes are active at the same time (they are activated by a contact closure), the mode with the highest priority will be invoked.

The modes are factory preset as described in the IntelliPak programming guides. These modes can be custom programmed in the field to meet a specific sequence. In setting the modes, the programmer defines the positions, or the required states (on or off) of the Supply Fan, the Exhaust Fan, the Exhaust Dampers, the Outside/Return Air Dampers, the Inlet Guide Vanes, Heat, the Occupied/Unoccupied Relay, and the VOM relay.

Once these modes are programmed, they can be locked in. This will prevent any modifications to these sequences in the future. The VOM screen will prompt the programmer as to how to lock in the mode, or how to exit the VOM set up without locking in the mode. Once the mode is locked in, it can not be changed

at all. To change a mode after locking it in would require that the VOM be replaced.

Question: What is the function of the Traq™ Sensor Design Special available with IntelliPak?

Answer:

The Traq Ventilation Control system is now available as a Design Special on IntelliPak Roof Top Units. This system incorporates the Traq Velocity Pressure sensing configuration developed by Rushville, that is also applied on Lexington Air Handling equipment. In the IntelliPak version of the Traq system, the standard Roof Top Unit economizer dampers are used to modulate return, and outside air quantities. The Traq sensor assembly includes the metered orifices, the velocity pressure flow rings, a pressure transducer/calibration solenoid combination, and a new UCM module called the **Ventilation Control Module**, or VCM. The VCM monitors and controls the quantity of ventilation (outside) air entering the unit.

The outside air enters the unit through the Traq sensor assembly and is converted to a velocity pressure by the velocity pressure flow rings. The velocity pressure is measured by the pressure transducer. A solenoid is connected to the velocity pressure transducer for calibration purposes to compensate for temperature swings that could effect the transducer. The VCM utilizes the velocity pressure input to calculate the CFM value for the amount of outside air entering the unit.

An **optional** mixed air temperature sensor can be connected to the VCM. With the optional mixed air temperature sensor installed, and the **Preheat Control** enabled at the Human Interface, the VCM will control one stage of a **field supplied and installed preheat source**. The preheat temperature setpoint is adjustable from either the unit mounted Human Interface, a Remote Human Interface, or via Tracer®.

An **optional CO_2 Sensor** can be connected to the VCM to provide a CO_2 reset of the amount of outside air to be provided. As the CO_2 concentration increases above the CO_2 Reset Start value, the VCM will reset the Minimum Ventilation Setpoint upward to a maximum of the CO_2 Reset Max value. The maximum ventilation provided can be up to 100% of the unit's nominal airflow amount. As

Applications Considerations

the CO_2 concentration decreases, the Minimum Ventilation Setpoint will be reduced to the programmed Outside Air CFM Setpoint.

Question: What is Statitrac™?

Answer:

Simply stated Statitrac controls building pressure. The Statitrac system used on the IntelliPak unit has many new features over the old system used previously; and the old system was far superior to the competition!

Statitrac on IntelliPak is completely electronic and all the adjustable parameters are adjustable from the Human Interface, no more standing on your head adjusting end switches!

Talk about smart; The exhaust fan does not come on even if the system is enabled until the building static pressure rises above the dead band. And If the building state stays within the dead band for thirty minutes the fan stops.

Features:
Settings displayed digitally on human interface
Adjustable set point, 0.03 to 0.3 IWC
Adjustable enable point, 0 to 100 % economizer stroke
Adjustable dead band, 0.04 to 0.2 IWC
Smart start
Smart stop
Supports VOM sequences
VFD exhaust fan motor option

Question: Is horizontal return possible on an IntelliPak?

Answer:

Yes, horizontal return is possible on an IntelliPak unit and can be done as a design special from Clarksville as well. The considerations for converting an IntelliPak to horizontal return are as follows:

INTELLIPAK®
The Intelligent Packaged Rooftop

Applications Considerations

- You must block off the vertical return opening in the unit. If you do not have this done as a design special, then block off the opening in the curb (not the unit) as not to destroy the watertight integrity of the unit.
- Remove the return air section access panel of the unit and connect your ductwork to this opening (Refer to the IntelliPak catalog for size and location of this panel).
- As you have eliminated the only access to the return section of the unit, an access to this section will need to be provided in the return ductwork.

Question: Is horizontal discharge possible on an IntelliPak?

Answer:

It depends on what unit size and heat type you have - see the chart below:

	SAHF	SXHF/ SXHG	SEHF/ SEHG	SFHF/ SFHG	SLHF/ SLHG	SSHF/ SSHG
20 – 75 Ton	**NO**	Panel Q & R	**NO**	Panel R Only	Panel R Only	Panel R Only
90 – 130 Ton		Panel R & S	**NO**	**NO**	Panel R Only	Panel R Only

Notes:

- **Panel Q** = Supply section panel on return air side of unit closest to the condensing section.
- **Panel R**= Supply section panel on fresh air side of unit closest to the condensing section.
- **Panel S** = Supply section panel on fresh air side of unit farthest from the condensing section (90 – 130 Ton units only).

For the allowable combinations above, this can be done as a design special from Clarksville. The considerations for converting an IntelliPak to horizontal discharge are as follows:

- You must block off the supply air discharge opening in the unit. If you do not have this done as a design special, then block off the opening by sandwiching a piece of sheet metal between the curb and the unit.

INTELLIPAK®
The Intelligent Packaged Rooftop

Applications Considerations

- Connect your ductwork to the unit at the panels listed in the above table (Refer to the IntelliPak catalog for size and location of these panels).
- Discharge out of one side of the unit only – not both sides.
- You must reposition the supply air discharge sensing tube such that it is across the new discharge opening (this can also be done as a design special).
- Be careful with your ductwork design. The more straight length ductwork you allow on the discharge before a bend or transition, the less likely you are to experience stratification or "hot spots" in the supply section of the unit – there are no special baffles for this application.

Question: Is top discharge possible on an IntelliPak?

Answer:

It depends on what unit size and heat type you have - see the chart below:

	SAHF	SXHF/ SXHG	SEHF/ SEHG	SFHF/ SFHG	SLHF/ SLHG	SSHF/ SSHG
20 – 55 Ton	**NO**	Without Baffle	**NO**	Without Baffle	Without Baffle	Without Baffle
60 – 75 Ton	**NO**	With Baffle	**NO**	With Baffle	With Baffle	With Baffle
90 – 130 Ton		**NO**	**NO**	**NO**	**NO**	**NO**

For the allowable combinations above, this can be done as a design special from Clarksville.

Note: Clarksville suggests this NOT be done in the field as there are modifications made to the unit that will cause problems and possibly damage the unit if not done correctly.

The considerations for converting an IntelliPak to top discharge are as follows:

- The discharge opening must be blocked off.
- A new discharge opening must be made in the top of the unit. The factory makes special modifications to the unit for this that would be extremely

Applications Considerations

difficult to duplicate in the field (including, but not limited to special baffles for 60 – 75 TON units).
- The supply air discharge sensing tube must be repositioned such that it is across the new discharge.

Question: Is single zone VAV possible on an IntelliPak?

Answer:

Yes, single zone VAV is possible on an IntelliPak unit and can be done as a design special from Clarksville.

Basically, a single zone VAV unit performs two functions:

1. Control to discharge air temperature.
2. Control discharge cfm to space temperature.

Normally, a VAV unit would be used to control space pressure. In this case, the same VFD we use to accomplish this would be used to control space temperature instead.

As a design special, Clarksville can do this design special two different ways:

1. Clarksville will add a special temperature controller to control the VFD with a 0-10vdc signal based on space temperature. A special temperature sensor is included and will have to be field installed.
2. Clarksville will wire the 0-10vdc VFD signal input to a terminal block location in the unit so that a field supplied temperature controller can control the VFD.

Question: Can I use a conventional thermostat with an IntelliPak?

Answer:

No, the use of a conventional thermostat is not possible with an IntelliPak. The sensors and night setback panels TRANE uses communicate with the rooftop via resistance values or a proprietary communications link. There is no interface for using an IntelliPak with a conventional thermostat.

INTELLIPAK®
The Intelligent Packaged Rooftop

Applications Considerations

To interface an IntelliPak unit to another building automation system, use the optional GBAS module to provide external setpoint inputs (see description of GBAS above).