

Vote Based Auto Changeover with Programmable Thermostats Accessed Remotely or On-site from a Phone, Mobile Device or Web Browser

GENERAL OPERATION

Zonex Systems VRF-VAV System enhances VRF operations by providing engineers, contractors and building owners a means to maximize system efficiency, reduce installation costs, and provide greater comfort to individual zones within a building. This system allows for up to 20 Smart Air Valves (SAV) to be connected to a VRF Fan Coil, & uses the VRF Manufacturer's Legacy Interface to place calls for heating, cooling, or ventilation without compromising VRF operations or logic.

The GEN XV system is an auto changeover, vote based VAV system. As zone thermostats call for heating or cooling, votes are tallied by the GEN XV controller. Each minute the GEN XV controller will poll all thermostats to determine majority vote and initiate call for Heat, Cool, or if no votes for heating or cooling are present - VENT modes of operation. If voting majority switches from Heat to Cool or vice versa, GEN XV controller will initiate a changeover sequence shutting down current mode of operation, and energize the majority call to meet the current demand.

System configuration, remote & onsite monitoring, and system adjustments can be performed via the Zonex GEN XV mobile App or any web browser. The Mobile App allows for system configuration, scheduling, set point changes, and monitoring from mobile devices. This includes alarming and alerts via app notifications and/or email and provides accessibility to VRF-VAV system operation at any time day or night.

The GEN XV also relies on the VRF unit's built time delay after a heat/cool call is satisfied or in the event of an opposing call changeover to the opposite mode of operation. High/Low Limit protection is controlled by the VRF unit.

Cool Call

Each SAV is controlled via a EzTouchX zone thermostat that monitors zone temperature. When zone temperature rises 1° above the zone thermostat's cooling set point, stat will call for cooling. On the next poll of the GEN XV controller, this vote will be counted and if there is a single vote or majority vote for cooling the GEN XV controller will initiate cooling call.

Once a cooling call is initiated, GEN XV controller will energize 24 volt legacy outputs to the VRF manufacturer's thermostat interface (the interface is VRF Manufacturer Specific). The "Y" control circuit will be energized for cooling operations, and VRF interface will convert 24 volt input and send this call for cooling to VRF Air Handler. VRF Air Handler then uses proprietary logic to initiate a cooling call to the VRF outdoor unit. VRF Air Handler will automatically set fan speed, enable compressor operations, and allow superheat to be communicated to outdoor unit to maximize efficiency.

The GEN XV controller sends current mode of operation (heat or cool) to all zone thermostats so that their corresponding SAVs can be in the appropriate mode of operation. The CFM of an SAV corresponds to its size, see sizing and engineering charts (pg 27) for airflow information. SAV controller continuously monitors air velocity to automatically reposition SAV to provide the targeted CFM to its zone. Once set point has been reached the EzTouchX ends its call for cooling and its vote will be removed from tally on the next poll by the GEN XV. If other zone stats continue calling for cooling the cool call will remain active by the GEN XV, the SAVs will continue to maintain targeted air flows, and satisfied stats will switch their SAVs to VENT mode. VENT CFM is set within the SAV controller at the factory. During this mode, a minimal amount of cool air will enter the zone to assist in maintaining system operation and minimize compressor cycling. If room temperature falls 2° below cooling set point the SAV will go to the closed position.

Heating

Each SAV is controlled via a EzTouchX that monitors zone temperature. When zone temperature falls 1° below EzTouchX heating set point, a EzTouchX will call for heating. On the next poll of the GEN XV controller, this vote will be counted and if there is a single vote or majority vote for heating, GEN XV controller will initiate heating call.

Once a heating call is initiated, GEN XV controller will energize 24 volt legacy outputs to the VRF manufacturer's thermostat interface (the interface is VRF Manufacturer Specific). The "W" control circuit will be energized for heating operations, and VRF interface will convert 24 volt input and send this call for heating to VRF Air Handler. VRF Air Handler then uses proprietary logic to initiate a heating call to the VRF outdoor unit. VRF Air Handler will automatically set fan speed, enable compressor operations, and allow superheat to be communicated to outdoor unit to maximize efficiency.

The GEN XV controller sends current mode of operation (heat or cool) to all zone thermostats so that their corresponding SAVs can be in the appropriate mode of operation. The CFM of an SAV corresponds to its size, see sizing and engineering charts (pg 27) for airflow information. SAV controller continuously monitors air velocity to automatically reposition SAV to provide the targeted CFM to its zone. Once set point has been reached the EzTouchX ends its call for heating and its vote will be removed from tally on the next poll by the GEN XV. If other zone stats continue calling for heating the heat call will remain active by the GEN XV, the SAVs will continue to maintain targeted air flows, and satisfied stats will switch their SAVs to VENT mode. VENT CFM is set within the SAV controller at the factory. During this mode, a minimal amount of hot air will enter the zone to assist in maintaining system operation and minimize compressor cycling. If room temperature rises 2° above heating set point the SAV will go to the closed position.

Each EzTouchX has the ability to control auxiliary heating devices such as reheat or baseboard heat. Auxiliary heat is configured at the zone thermostat. If there is a cool call, heat call, or the VRF system is a cooling only unit, the EzTouchX will energize AUX heat outputs if the zone temperature drops 2° below heat set point. If the EzTouchX is configured for reheat, SAV will position damper to provide airflow over electric strip heat, hot water coil or other heating element.

Changeover

VRF-VAV operating strategy is based on auto changeover majority vote first call first served system. GEN XV controller polls all associated EzTouchXs each minute to tally calls for cooling and heating. If the majority of calls are for cooling, the system will operate in cooling mode. If the majority of calls are for heating, the system will operate in heating mode.

If the system is operating in cooling and after system poll a majority of EzTouchXs are calling for heating, GEN XV will initiate a changeover strategy allowing cooling to run for an additional 3-20 minutes (Configured via the Zonex Mobile App), and shut down cooling operations and initiate Heat operations.

If the system is operating in heating and after system poll a majority of EzTouchXs are calling for cooling, GEN XV will initiate a changeover strategy allowing heating to run for an additional 3-20 minutes (Configured via the Zonex Mobile App), shut down heating operations and initiate cool operations.

All Calls Satisfied

When all calls for cooling or heating are satisfied EzTouchX will operate in Vent Mode. Outputs for cooling and heating are de-energized and if GEN XV controller is configured for Fan On - Continuous, VRF Air Handler blower will be operational during Occupied times and ventilation air will be provided to all zones. If GEN XV controller is configured for FAN Intermittent, Air Handler blower will shut down.