Zonex Systems GEN V: VRF-VAV System enhances VRF operation, 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 up to 20 Smart Air Valves (SAV) to be connected to a VRF Fan Coil and uses VRF Manufacturer's Legacy Thermostat Interface to place calls for heating, cooling, or ventilation without compromising VRF operations or logic, in any way.

The GEN V system is an auto changeover, vote based VAV system. The system's algorithm is based on a first call, first served majority wins on changeover. As thermostats call for heating or cooling, votes are tallied by the GEN V controller. Each minute the GEN V controller polls all thermostats in the system to determine majority vote and then initiates a call for Heat, Cool, or if no votes for heating or cooling are present – VENT mode of operation is initiated. If voting majority switches from Heat to Cool or vice versa, GEN V controller will initiate a changeover sequence shutting down the current mode of operation, performing a time delay and after delay energize majority call to meet current majority demand.

System configuration, onsite management, and control are performed via the GEN V's HUB thermostat. The HUB thermostat is a zone stat that is also the single point where system wide changes can be made such as scheduling, set point changes, lock/unlock stats, system diagnostics, system configuration and much more.

Cooling

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 V controller, this vote will be counted and if there is a single vote or majority vote for cooling the GEN V controller will initiate cooling call.

Once a cooling call is initiated, GEN V 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 V 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 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 V. If other zone stats continue calling for cooling the cool call will remain active by the GEN V, 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 Smart Air Valve (SAV) is controlled via the EzTouchX zone thermostat that monitors zone temperature. When zone temperature drops 1° below zone thermostat's heating set point it will send a vote for heating. On the next poll of the GEN V controller, this vote will be counted and if there is a single vote or majority vote for heating, GEN V controller will initiate the heating call.

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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 V 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 V will initiate a changeover strategy allowing cooling to run for an additional 3-20 minutes (Configured via the HUB stat), 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 V will initiate a changeover strategy allowing heating to run for an additional 3-20 minutes (Configured via the HUB stat), 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 V 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 V controller is configured for FAN Intermittent, Air Handler blower will shut down.

GEN V: VRF – VAV - designed to simplify and streamline VRF installations and operation.