

# **GEN X**

## **Mobile APP based VVT System**

Using

### **Programmable Wireless Thermostats**

#### **GENERAL SEQUENCE OF OPERATION**

*GEN X* controller wires to the HVAC unit with legacy style connections Y1, Y2, W1, W2, OB, G, R, and C. Every minute the controller communicates to each damper via RS485 connection daisy chained along with 24v of power wired damper to damper. Each damper is equipped with a damper board ID and synced to its wireless programmable thermostat in the system.

The *GEN X* is an auto changeover, vote based VVT system. As thermostats call for heating or cooling, votes are tallied by the *GEN X* controller and based on the majority of votes received. The HVAC unit operates in the mode of majority votes. If majority changes, the system controller will automatically initiate a changeover sequence with built in time delays to protect the equipment before changing over to the new mode of operation.

When the last calling zone is satisfied (in either heat or cool mode), the *GEN X* controller will terminate outputs to the HVAC unit after the next "poll"; and the blower output will de-energize (unless controller is configured for constant fan) after a 3-minute purge cycle. During the purge cycle no heat or cool calls are recognized.

The wireless zone thermostats control and modulate the zone dampers on variance from set point to a position that will match the supply load to the demand requirement. When the HVAC unit is running, if a zone thermostat is not calling or is calling for the opposite mode, its corresponding damper fully closes. When the HVAC unit is not running, the thermostats open to the Vent mode to provide ventilation if the indoor blower fan is running continuously. When configured for Reheat operation and the zone temperature drops 2° below thermostat set point, the damper modulates to approximately 40% open providing airflow over electric heat strips or other supplemental heat source, the AUX terminal will energize and strip heat will energize.

While the HVAC unit is running the capacity control LAT (leaving air temperature sensor) monitors the leaving air temperature from the HVAC unit and will cycle the HVAC unit to maintain the air temperature with a preset range to eliminate coil freeze-up and premature heat exchanger failure. When the system is in the heating mode and a majority vote changes to cooling a changeover timer begins and will run heating for 4 minutes or until heat call is satisfied and then cycle into a changeover purge. After a 3-minute purge cycle, cooling is energized until the cool call is satisfied or there is a majority vote for heat received by the *GEN X* controller. If all calls have been satisfied, after the 3-minute off delay, dampers will modulate to approximately 40% open position for ventilation mode.

The system fan/blower operation can be configured for ON or intermittent AUTO operation.

All Zone thermostats are synced or paired with its respective modulating zone damper, which is equipped with a communicating damper board. Thermostats, scheduling and diagnostic reports to streamline system troubleshooting, are generated from a mobile App that interacts with all thermostats every minute and initiates control decisions for the system. The mobile App shall establish global or individual schedules for the system, lock thermostats individually and provide local adjustment, on site or remotely over internal Wi-Fi or the Internet. Air balance shortcuts, along with password protection, are also enabled from the App. Sleep and energy saving modes are available to extend battery life and enhance operation of the thermostats.

Voting demand strategy can be enhanced by adding Priority votes or by giving a NULL vote to individual thermostats in the system, thereby weighting certain zones more than others. Priority votes allow you to select 0, 1, 2, or 3 additional votes for a thermostat that has unusual loads, such as a conference room. A change to 0 for priority in that zone stat configuration will create a NULL vote for the HEAT/COOL and will not allow the stat to place a call for heat or cool, but will allow damper operation based on system mode of operation, HEAT/COOL/VENT.

The *GEN X* provides effective temperature control and minimizes wiring issues by using wireless programmable zone thermostats. Additional zoned systems, along with stand alone units, may be controlled with the *GEN X* RM that supports and networks additional units. Mobile Wi-Fi or web based App streamlines installation, commissioning or servicing the system.