Evaluating the use of fan powered air terminals should consider installed and operating costs, occupant comfort, ventilation requirements, and acoustical impact. Often, by reclaiming warmer ceiling plenum air during heating, the operating costs of a fan powered system may be lower than conventional single duct reheat systems. For this reason, fan powered terminals are typically used for perimeter zone temperature control, where some form of heat is required. Two configurations of fan powered air terminals should be considered – Series & Parallel. Each type offers specific operating characteristics which determine the configuration best suited for the climate, zone use, comfort, and system efficiency.

Design Parameter	Series Fan Terminals		Parallel Fan Terminals
	Model QST (PSC Motor)	**Model EST (ECM Motor)**	**Model QPT (PSC Motor)**
Energy Consumption of Fan Terminal	Terminal fan runs continuously during occupied conditions at design capacity for both heating and cooling. Intermittent operation during unoccupied conditions for heating only. Fan energy is higher than parallel fan terminals. Motor heat is reclaimed and added to the space during both cooling and heating.	Same operating modes as Model QST, except electronically commutated motors run more efficiently (less watts/cfm) with less motor heating. Control over fan flow (VAV fan) allows for energy saving control loops, particularly with DDC systems.	Terminal fan runs intermittently, only during heating. Fan energy is lower than series fan terminals using PSC motors. Heat generated by motor is reclaimed and added to the space during heating only.
Energy Consumption of Central System	Since terminal fan provides pressure required for downstream ductwork / air outlets, central system pressure requirements are reduced, and less than parallel fan terminals. Operating hours similar to parallel type.		Central system must provide pressure to move air through downstream ductwork and air outlets, requiring higher design pressure. Operating hours similar to series type.
Fan Air Flow	Pressure Dependent	Pressure Independent – Fan CFM can be factory preset	Pressure Dependent
Fan Operation	Continuous fan operation during both heating & cooling. Control strategy may include night cycling of fan for heating / night setback / night shut-down.	Continuous fan operation for both heating and cooling, Fan flow control with DDC systems allow for energy reducing strategies	Intermittent fan operation during heating mode.
Space Air Flow	Constant volume air delivery to the space with VAV primary air to meet the cooling load. Heating of the total discharged air to meet the heating load. Higher flow rates through entire operating range will improve occupancy comfort.		VAV cooling air flow is delivered to the space to meet cooling load. With minimum primary air and fan induction air (ceiling plenum air), heat may be added to the air to meet heating demand.
Discharge Air Temp to Zone	Variable discharge temperature, due to blending of primary air and ceiling plenum air. Supplemental hot water or electric heat raises discharge temperature.		Constant supply air temperature during VAV cooling mode. Variable temperature during heating, as supplemental hot water or electric heat raises discharge temperature.
Fan Capacity	Sized for maximum design cooling, or sized for tempering of low temp primary air with ceiling plenum air at maximum design cooling.		Sized for maximum design heating loads, typically 55-65% of maximum design cooling.
Fan "On" Signal	Often interlocked with central AHU by sensing primary duct pressure via air pressure switch. With Direct Digital controls, software based control loops.		Thermostat demand
Primary Inlet Flow Rate	Sized for maximum design cooling air flow rate, staying within inlet capacity range for flow control while meeting acoustical requirements. Primary Flow ? Fan CFM		Sized for maximum design cooling air flow rate, staying within inlet capacity range for flow control while meeting acoustical requirements. Primary Flow is independent of fan flow.
Minimum Operating Pressure	Central system pressure required to move the design air capacity through the wide open valve, and into the air terminal casing.		Central system pressure required to move the design air capacity through the entire fan terminal assembly, ie. wide open valve, casing, & heating coil.
Acoustical Consideration	Radiated and discharge sound levels are relatively constant for both heating and cooling. Radiated sound levels at 100% primary (fan on) often dictate room NC level. Selecting a larger fan terminal assembly running at reduced speed may meet critical acoustical goals.		During maximum to minimum cooling, the primary damper is source of radiated and discharge sound levels – the fan is off. Audible changes during heating, due to instantaneous fan start, which is the dominant sound source for radiated and discharge levels. Outlet generated sound level increase due to air flow increase.