

Precise Motor Control with VFDs



A Variable Frequency Drive controls motor speed by converting incoming AC power to DC power, stabilizing it through a DC bus, and converting it back to AC at the required frequency and voltage.

For HVAC, this allows equipment to operate based on actual system demands, reducing energy use, limiting mechanical wear, and improving system control.

How a VFD works

1

Rectifier – AC to DC

Incoming AC passes through a rectifier that converts it into DC power.

2

DC bus – stabilized power

The DC bus (DC link) filters and stores that power to create a stable supply.

3

Inverter – controlled AC out

The inverter utilizes Pulse Width Modulation for a simulated AC output at the required operating frequency.

Why VFDs make sense for HVAC.

For engineers, VFDs add control flexibility, system efficiency, and clean BAS integration. For contractors, they simplify startup, improve troubleshooting, and cut the mechanical stress of across-the-line starting.

- ✓ Reduced energy consumption at part load
- ✓ Improved pressure, temperature & airflow control
- ✓ Controlled acceleration and deceleration
- ✓ Allows for motor soft-start
- ✓ Reduced motor, belt, bearing & equipment wear
- ✓ Increased operational flexibility
- ✓ Better integration with BAS controls & safeties
- ✓ Dependable operation across the building

DESIGNED SPECIFICALLY FOR HVAC

The Yaskawa HV600.

Engineered for fan, pump, and cooling-tower applications through **250 HP**, the HV600 pairs HVAC-specific programming with practical features that carry a project from design through installation, commissioning, and long-term operation.

BUILT FOR Engineers

- Built-in **BACnet** and **Modbus** communications (other BAS Communication Protocols available)
- Two internal **PID** control loops
- BAS and damper interlock capability
- Emergency override operation
- Adjustable acceleration and deceleration
- Critical-frequency rejection to avoid resonance
- **Safe Torque Off** — SIL 3, PLe
- Programmable I/O for safeties, status, alarms & sequences
- Optional dV/dT filters, input & output reactors

BUILT FOR Contractors

- **Hand-Off-Auto** LCD keypad
- High-visibility **status ring** for quick indication
- HVAC application presets
- Fault history with date & time stamps
- Parameter backup and storage
- Programming **without three-phase** main power
- Mobile programming & parameter management
- Clearly identified **SCCR**
- Multiple enclosure & package configura

PACKAGED TO MATCH THE PROJECT

Standard drives, configured packages, bypass packages, and redundant-drive arrangements — i **Type 1**, **Type 12**, and **Type 3R** enclosures to fit a wide range of requirements.

Need Yaskawa VFD assistance?