# AC690+HVAC

The SSD Drives AC690+ HVAC series is specially designed for HVAC applications with an emphasis on energy savings, flexibility, ease-of-use and being able to communicate with most popular building automation systems.

With standard features such as PID control, auto restart, flycatching, preset speeds and skip frequencies, it is ready to start any variable torque application, right out of the box.

Pre-configured packages for specific applications are also available, such as cooling towers, air handlers and chilled water pumps.

## Packages
HVAC10 is offered in two physical packages:
- Type 2: AC690+ HVAC drive plus fused input disconnect switch
- Type 3: Type 2 plus 3-contactor bypass with all safeties and status display

## Power Ranges
- 1 to 1600HP at 460VAC
- 1 to 60 HP at 208VAC

## Easy setup
The default parameters and configuration are tailored to HVAC applications. Simply enter the motor data and the drive is ready to start. Popular features such as preset speeds, PID control and auto restart are enabled and ready to go. Custom displays can be easily entered with parameters displayed in engineering units. Parameters can be downloaded and saved to/from the keypad and transported to other drives, or saved as a computer file.

## PID Process Control
A built-in PID maintains process setpoint for closed loop control of fans and pumps, regulating pressure, flow, level or temperature. This frees up resources in the BAS by eliminating the need for a process control loop and dedicated output.

## Silent Motor
Thanks to unique circuitry that drives the IGBT's, motors driven by the HVAC10 operate silently, without the need for high switching frequencies that can lead to problems with electrical interference. At 3 KHz, the HVAC10 produces less acoustic motor noise than others switching at 10KHz.

## Harmonic Mitigation
Built-in line reactors or DC bus chokes provide harmonic mitigation. External line reactors or other solutions offered if a higher level of mitigation is mandated.

## Building Automation
Optional plug-in modules communicate with the following protocols:
- Modbus / RS485
- Johnson-Metasys N2
- Siemens Apogee P1-FLN
- LonWorks

Operating temperature ...................................0 – 40°C

Storage temperature ................................... -25 - 55°C

Humidity ........................ 85% non-condensing at 40°C

Altitude If > 1000m, derate 1% per 100m (max 5000m)

Enclosure ......................................UL type 1, Nema 1

Approvals ................................................UL, cUL, CE

DC bus choke................................ 15 – 50 HP (460V)

Line reactor ................................. 60 – 150 HP (460V)

Voltage ..........208-240VAC ±10%, 380-460VAC ±10%

Ratings  (208V) .............................................1 - 60 HP

(460V) .........................................1 - 1600 HP

Overload............................110% for 60s, 130% for 2s

Current limit.................................................. 0 - 110%

Output Frequency........................ 0 – 60Hz, 0 – 120Hz

Efficiency.......................................................... ~ 98%

Displacement power factor ................................~ 0.95

Switching frequency ..........................................3 KHz

Starting Torque ...................................... 100% at 2 Hz

V/Hz pattern .................. Fan, Linear, Custom 10-point

Slip compensation.....................................0 – 600 rpm

Accel ramp time ...........................................0 - 3000s

Decel ramp time ...........................................0 - 3000s

Preset speeds ...................................................up to 8

Minimum speed................................... 0 to Max speed

Skip frequency .........................4 with individual bands

PID blocks ................................................................2

Purge speed........................................ 0 – Max speed

Auto restart..........adjustable time, and choice of faults

Flycatching ....................Bi-directional, adjustable time

Analog inputs
4 programmable, multi-range, voltage and current,
direct & inverse, offset, scalable with break detection

Analog Outputs
3 programmable, multi-range, voltage and current,
uni/bi-directional, offset.

Digital inputs
7 programmable, direct and inverse

Digital outputs
3 programmable, dry relay contact, direct and inverse

Energy/Power indication.........In KW, HP, KWh, KVAR

Timers .......................... 2 programmable elapsed time

Stop Modes ............. Ramp, injection braking, coasting

Power loss control ..........Programmable step and time

Output voltage control ................................Fixed, auto

Trip history .............................. Last 10 trips displayed

Custom screens .....................................................32

Display Languages
English, French, German, Spanish, Swedish, Italian

Value functions.........................................................20
Additional blocks that can be used to perform special mathematical functions on analog signals such as ...... Summing, comparator, subtractor, switch, greater than, less than, absolute value, hold signal, binary decode, pulse train, counters, min and max, on and off delay timer, linear profile, square root profile, exponential profile, rounding.

Logic functions .......................................................20
Additional blocks that can be used to perform special mathematical functions on logic signals such as.......... AND, OR, NOR, XOR gates, one shot triggers, set and reset dominant latches, edge triggers.

Protection ............ R-C snubbers, MOV's, Y-capacitors

Alarms

Overvoltage, undervoltage, overcurrent, heatsink temperature, external trip, analog input 1&2 break, motor stalled, op station disconnected, lost comms, ambient temperature, motor temperature, current limit, 24V failure, low speed overcurrent, de-saturation limit, dc bus ripple, mains low, stack trip, power loss, inverse time overload.

Keypad functions
- 2-line, 32 character English language backlit LCD display
- Buttons for start, stop, local/remote selector, jog
- Indicators for run, stop, direction, healthy status
- Four buttons for menu navigation
- Ability to store the drive configuration in the keypad and transport it to another drive, for cloning purposes

Type 3 drives have two selector switches:
Hand-Off-Auto ................................ Drive-Test-Bypass
Hand.....................................control from drive keypad
Off ..................................................no motion possible
Auto......................... control from remote terminal strip
Drive..........................running the motor with the drive
Drive test .............power to drive, motor not connected
Bypass ...................running the motor in bypass mode

Type 3 drives have status indicator LED's for ready, drive run, purge, interlock on, bypass run, bypass trip.

Type 2 and 3 drives have a fused input disconnect switch with class J fuses UL rated for 200KA interrupting rating

Type 3 drives have a control transformer primary tapped for 208V and 460V and fused on the primary and secondary sides.

Type 3 drives have a bypass logic sequencing board that controls the 3 contactors in all modes of operation.

The bypass contactor has a UL approved class 10 overload to protect the motor while operating in bypass mode.