



HVAC DRIVE H300



CONTROL TECHNIQUES™

HVAC Drive for Building Automation

1.0 HP - 4,200 HP (0.75 kW - 2,800 kW)
208-230 V | 460 V | 575 V

Nidec
All for dreams

Nidec

Leading the world in motor control technologies

Nidec's promise to our customers

Nidec is the "world's No. 1 comprehensive motor manufacturer" with a full range of HVAC motors and matching motor controls.

HVAC Drive H300: The drive for building HVAC

The HVAC Drive H300 is the result of extensive research and builds on our vast experience in the HVAC market. It has been designed to meet the needs of:

- 1. Consultants and design engineers**
 - All the necessary features to meet your building HVAC project specification requirements.
 - A highly reliable product and support service: Simply specify, install and forget.
- 2. Contractors**
 - Fast, easy and secure installation, commissioning and maintenance.
- 3. Owners of commercial buildings**
 - Achieves maximum building occupant comfort.
 - Optimum energy saving and value with rapid ROI.





Specifying HVAC drives with confidence

Control Techniques' HVAC products and services

- Our regional support network provides you with the information, support and services that ensure you can deliver fully optimized solutions on time and within budget.
- HVAC Drive H300 is a robust product, tested to meet the most demanding environments.
- Continued after hours support following installation, so you can have total confidence in your HVAC system's reliability and performance.

Value and rapid ROI

- Value-optimized feature set for HVAC.
- Incorporates a number of energy saving features such as low losses (98% efficient), stand-by mode and optimized pump/fan control.
- Provides a low-lifetime cost product and ensures a rapid return on investment demonstrated with an energy efficiency calculator tool.
- Includes sensorless permanent magnet motor control mode, optimized for use with Leroy-Somer's Dyneo® Permanent Magnet motors from Nidec.

Compact and powerful HVAC solutions

The HVAC Drive H300 drive dimensions are among the smallest in class at every power rating. This saves valuable building real estate, makes the drives easy to handle and maximizes mounting flexibility.

Integrated Electronic Bypass packages

UL508A approved, our fan and pump controller bypass packages are fully integrated with HVAC Drive H300 and are available in NEMA 1, NEMA 12, NEMA 3R & NEMA 4X enclosures.



Highly efficient Leroy-Somer Dyneo® permanent magnet motors from Nidec



HVAC Drive H300
NEMA 1 HMI Bypass

HVAC Drive H300: Meeting your specification

Consultants' Specification	Nidec Control Techniques' HVAC Drive H300 Features
Easy integration with Building Automation Systems	<ul style="list-style-type: none"> • Industry standard BACnet, Metasys N2 and Modbus RTU communications onboard • A range of optional communication system integration modules available, including PROFIBUS DP, EtherNet/IP, DeviceNet, CANopen, PROFINET RT, and Modbus TCP/IP • Optional SI-I/O modules for additional digital I/O, analog I/O, and relays • A PT1000 RTD temperature sensor input is available which can directly provide an analog input without a transducer for control of fans and pumps • Generous onboard I/O and two integrated form C relays for the majority of HVAC system requirements
Flexibility without a Building Management System	<ul style="list-style-type: none"> • HVAC Drive H300 offers the possibility of using Proportional Integral Differential (PID) controllers, temperature control, real-time clock and flexible I/O. The system is easy to configure, is able to cope with any building automation problem and requires no additional space or external components. • Built-in dual process PID loops that can operate independently or be combined to provide more complex functionality • Optional co-processor for running application software
Occupant safety/Fire mode	<ul style="list-style-type: none"> • The HVAC Drive H300 has onboard Fire mode which allows the drive to continue running in the event of a fire. It can allow the safe extraction of smoke while the drive's other functions are maintained.
Environmental, safety and electrical conformance	<ul style="list-style-type: none"> • NEMA1 / UL TYPE 1* / IP20, *UL open class as standard, additional UL Type 1 conduit kit needed to achieve UL Type 1 • Drive is cULus listed with panels built to UL 508A (Electrical Safety) • Active Front End (AFE) available for low harmonic distortion compliant with IEEE19-2014 at drive input terminals that is superior to 12- and 18-pulse solutions • Supply harmonics estimator ensures HVAC System Conformance to required electrical standards • Ambient temperature -4 °F to 104 °F (-20 °C to 40 °C) as standard. Up to 131 °F (55 °C) with derating • Humidity 95% maximum (non-condensing) at 104 °F (40 °C) • Altitude: 0 to 9900 ft. (3000 m), derate 1% per 330 ft. (100 m) between 3300 ft. (1000 m) and 9900 ft. (3000 m) • Random vibration tested in accordance with IEC 60068-2-64 • Mechanical shock tested in accordance with IEC 60068-2-29 • Storage temperature -40 °F to 158 °F (-40 °C to 70 °C) • Electromagnetic Immunity complies with EN 61800-3 and EN 61000-6-2 • With onboard EMC filter, complies with EN 61800-3 (Category C3) • EN 61800-3 (Category C1/C2) with optional footprint EMC filter • IEC 60146-1-1 Supply conditions, IEC 61800-5-1 (Electrical Safety), IEC 61131-2 I/O • Single channel Safe Torque Off (STO), independently assessed by TÜV to IEC 61800-5-2 SIL 3 and EN ISO 13849-1 PLe
Low audible noise for building occupants	<ul style="list-style-type: none"> • HVAC Drive H300's Rotor Flux Control modes and high switching frequencies (up to 16 kHz) ensure quiet motor operation so the HVAC system is inconspicuous to all building occupants • Ultra fast current loop reduces motor/fan vibration (noise) • S Ramp acceleration curves to reduce motor/fan starting noise • Sleep / Wake mode stops and starts the motor during periods of low demand to reduce audible noise • Intelligent 10 speed drive cooling fan with Minimum Fan Noise operation that only runs the fan when the circuits require additional cooling
Product reliability	<ul style="list-style-type: none"> • Unique advanced cooling design featuring a patented flow system that helps cool the drive more effectively while protecting internal components • Conformally coated PCBs to increase resilience in harsh environments • Wide supply voltage tolerance • Phase loss detection on input and output to safeguard components, increase system lifetime, and help prevent unnecessary downtime • Intelligent 10 speed user-replaceable drive cooling fan with patented fan-fail detection circuit
Easy system installation and ongoing management	<ul style="list-style-type: none"> • Easy-to-use PC tools to quickly and efficiently set-up the system • Intuitive keypads for superior diagnostics and rapid fault resolution • Simple and clear user documentation/installation guide • Static and rotational autotune optimizes drive and motor performance • Catch a spinning motor and coast to stop functions • 8 preset speeds (8 sets of accel/decel rates) with speed/frequency skipping • Remote connectivity allows easy system monitoring through the onboard RS485 communications or an optional SI-Ethernet (EtherNet/IP & Modbus TCP) module • NV Media card for quick parameter copying and data storage • Drive Diagnostic mobile APP available for quick fault resolution (Apple and Android compatible) • Two timers are available to switch an output on a routine basis • Built-in filter change timer • Real time clock is available for timer functions and timestamp trip log
Maximize energy efficiency	<ul style="list-style-type: none"> • Low losses, up to 98% efficient • Control of super high efficiency sensorless permanent magnet motors • Onboard power metering for energy management (cost per kWh) • Efficient system management through optimized pump or fan speed to match environmental conditions • Low power stand-by mode and onboard real-time clock ensure minimal wasted energy • Sleep / Wake mode stops and starts the motor during periods of low demand to improve system efficiency • Active Front End (AFE) available for energy efficient motor braking • Slip compensation to maintain efficiency throughout motor temperature range • Energy efficiency tool to estimate energy saving
Compact dimensions	<ul style="list-style-type: none"> • Reduced dimensions at every frame size

Installation and commissioning: right first time

Control Techniques' support services

Control Techniques is with you at all stages of your project and provides you with the knowledge, support and confidence to deal with any project need.

- Helping you rapidly source drives and components for your installation
- Providing dedicated all hours HVAC technical support
- HVAC drives training, available from widespread locations or even at your site

Simple HVAC system set-up and easy maintenance

- Special HVAC macros are pre-set for fan and pump modes, enabling a faster, simpler set-up rather than manual configuration.
- Autotune features enable you to quickly achieve the optimum set-up for your drive and motor combination.
- Dedicated PC tools are available to enable fast, simple commissioning and maintenance of HVAC systems. These have been developed with contractors to ensure intuitive and easy set-up and monitoring.



- User manual developed specifically for HVAC drive contractors, providing clear installation and commissioning instructions and efficient maintenance assistance.
- HVAC Drive H300 portable memory devices: A Smartcard enables simplified maintenance and commissioning without a PC, storing parameters and system upgrades. An SD card (with adaptor) provides a large memory capability, allowing a complete system reload and can be pre-programmed on a common PC.

Diagnostic Software

The **Drive Diagnostics APP** allows users to quickly diagnose faults. In the unlikely event that you get a drive error, download our complimentary Diagnostics Tool. It is available for Apple, Android and Windows operating systems. Just input the error code on your device and you'll be given a solution. You can download our Diagnostics Tool App at: www.ctdrives.com/diagnostics

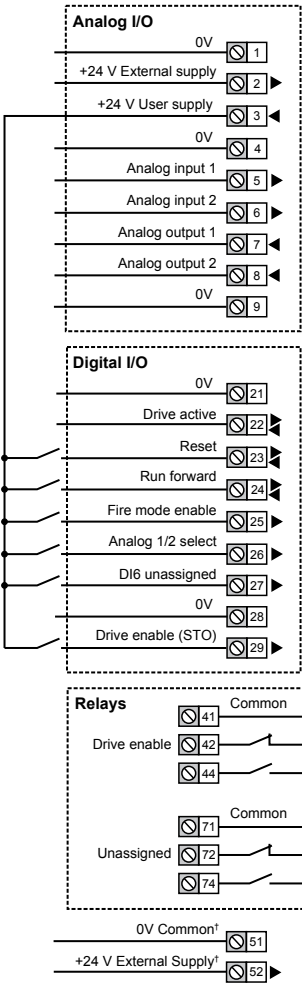


User interface options

Type		Benefit
HOA-Keypad-RTC: Removable plain text LCD with real-time clock		Plain text, multi-language LCD keypad for in depth parameter and data descriptions gives an enhanced user experience. Enables quick commissioning and provides four lines of real text in guiding the user through set-up, with Hand-Off-Auto control. A battery operated real-time clock allows accurate time stamping of diagnostics and aids quick fault resolution.
Remote-HOA-Keypad-RTC: Remote mountable plain text LCD with real-time clock		The keypad is remote mountable, allowing flexible mounting on the outside of a panel (meets IP54/NEMA 12 ratings). Three line plain text, multi-language LCD keypad for rapid set-up and helpful diagnostics. Battery operated real-time clock allows accurate time stamping of events, aiding diagnostics. Requires the use of a KI-485-ADAPTOR and an UM-LCD-485-XXX interconnect cable. (XXX = cable length in feet)

HVAC Drive H300 Features & Options

Terminal Layout



[†]Terminal 51 and 52 must be connected to an external 24 V power supply if backup is required (frame sizes 6-11E only).

Control Mode

- Open loop vector or V/Hz induction motor control
- Open loop Rotor Flux Control for induction motors (RFC-A)
- Sensorless permanent magnet motor control (RFC-S)

- Removable multi-language Real Time Clock LCD keypads available for rapid set-up and superior diagnostics

- 3 x System Integration (SI) module slots for additional communications and I/O

- Single screw removable cover for easy commissioning and maintenance



- Terminal cover

Optional Drive Programming & Operator Interface

HVAC-CONNECT



HOA-KEYPAD-RTC

REMOTE-HOA-KEYPAD-RTC



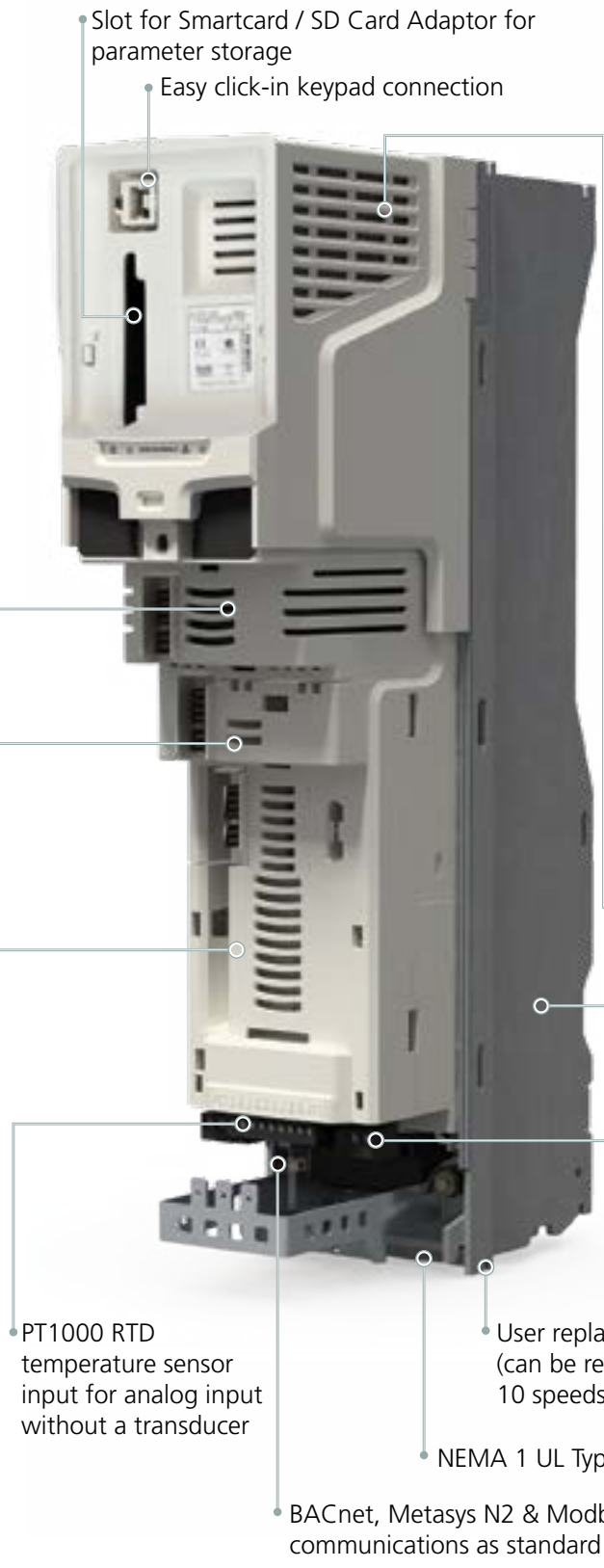
SMARTCARD-64

SD-CARD using SD-CARD-ADAPTOR

CT-USB-CABLE

KI-485-ADAPTOR






Slot for Smartcard / SD Card Adaptor for parameter storage

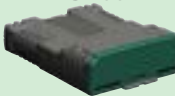
Easy click-in keypad connection

Automation Options


Standard IEC61131-3 programming




MCI200



MCI210




SI-APPS-PLUS




Communications Options

Standard RS485
BACnet
Metasys N2
Modbus RTU




SI-ETHERNET




EtherNet/IP & Modbus TCP


SI-PROFINET-V2




SI-PROFIBUS



SI-CANOPEN




SI-DEVICENET



Optional Input/Output

SI-I/O



4 x Digital I/O
3 x Analog inputs (default) / Digital inputs
1 x Analog output (default) / Digital input
2 x Relay

Standard

4 x Analog I/O
6 x Digital I/O
2 x Relay output (Form C)
1 x STO



- Terminal cover for DC bus and onboard EMC filter
- Aluminum chassis - allows flexible mounting with high performance extruded heatsink incorporated
- User-friendly power connections with removable terminals*
- User replaceable cooling fan (can be replaced after installation) 10 speeds optimized for quiet operation
- NEMA 1 UL Type1 conduit kits available
- BACnet, Metasys N2 & Modbus RTU communications as standard

PT1000 RTD temperature sensor input for analog input without a transducer

*Features and their locations vary on some drive sizes

HVAC Drive H300 ratings and specifications

200/240 Vac $\pm 10\%$			
Drive	Normal Duty		
	Max Continuous Current (A)	Motor Shaft Power (kW)	Motor Shaft Power (HP)
H300-03200066A	6.6	1.1	1.5
H300-03200080A	8	1.5	2
H300-03200110A	11	2.2	3
H300-04200180A	18	4	5
H300-04200250A	25	5.5	7.5
H300-05200300A	30	7.5	10
H300-06200500A	50	11	15
H300-06200580A	58	15	20
H300-07200750A	75	18.5	25
H300-07200940A	94	22	30
H300-07201170A	117	30	40
H300-08201490A	149	37	50
H300-08201800A	180	45	60
H300-09202160E	216	55	75
H300-09202660E	266	75	100
H300-10203250E	325	90	125
H300-10203600E	360	110	150

380/480 Vac $\pm 10\%$			
Drive	Normal Duty		
	Max Continuous Current (A)	Motor Shaft Power (kW)	Motor Shaft Power (HP)
H300-03400034A	3.4	1.1	1.5
H300-03400045A	4.5	1.5	2
H300-03400062A	6.2	2.2	3
H300-03400104A	10.4	4	5
H300-03400123A	12.3	5.5	7.5
H300-04400185A	18.5	7.5	10
H300-04400240A	24	11	15
H300-05400300A	30	15	20
H300-06400380A	38	18.5	25
H300-06400480A	48	22	30
H300-06400630A	63	30	40
H300-07400790A	79	37	50/60
H300-07400940A	94	37	60
H300-07401120A	112	55	75
H300-08401550A	155	75	100
H300-08401840A	184	90	125/150
H300-09402210E	221	110	150
H300-09402660E	266*	132	200
H300-10403200E	320	160	250
H300-10403610E	361	200	300
H300-11404370E	437	225	350
H300-11404870E	487*	250	400
H300-11405070E	507*	280	450

*At 2 kHz switching frequency, all other models at 3 kHz

500/575 Vac ±10%

Drive	Normal Duty		
	Max Continuous Current (A)	Motor Shaft Power (kW)	Motor Shaft Power (HP)
H300-05500039A	3.9	2.2	3
H300-05500061A	6.1	4	5
H300-05500100A	10	5.5	7.5
H300-06500120A	12	7.5	10
H300-06500170A	17	11	15
H300-06500220A	22	15	20
H300-06500270A	27	18.5	25
H300-06500340A	34	22	30
H300-06500430A	43	30	40
H300-07500530A	53	45	50
H300-07500730A	73	55	60
H300-08500860A	86	75	75
H300-08501080A	108	90	100
H300-09501250E	125	110	125
H300-09501500E	150	110	150
H300-10502000E	200	150	200
H300-11502480E	248	185	250
H300-11502880E	288*	225	300
H300-11503150E	315*	250	325

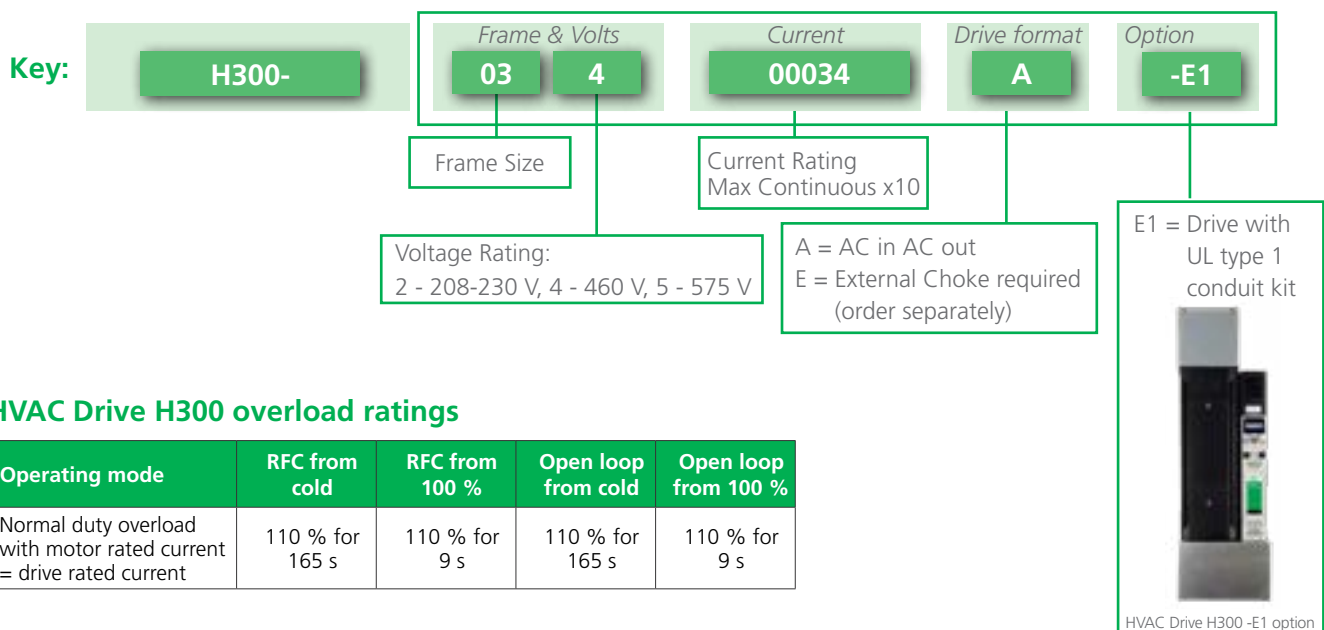
Note: Ratings up to 4,200 HP available

Switching frequency range: 2, 3, 4, 6, 8, 12, 16 kHz (3 kHz default, frames 3 to 10, 2 kHz default frame 11)

*At 2 kHz switching frequency, all other models at 3 kHz

Normal Duty

Suitable for applications with a current overload capacity of 110%



HVAC Drive H300 overload ratings

Operating mode	RFC from cold	RFC from 100 %	Open loop from cold	Open loop from 100 %
Normal duty overload with motor rated current = drive rated current	110 % for 165 s	110 % for 9 s	110 % for 165 s	110 % for 9 s

HVAC Drive H300 ratings and specifications

Environmental safety & electrical conformance

- IP20 / NEMA1 / UL TYPE 1 (UL open class as standard, additional kit needed to achieve Type 1)
- IP65 / NEMA4 / UL TYPE 12 rating is achieved on the rear of the drive when through panel mounted (frame sizes 9, 10 & 11 achieve IP55)
- Ambient temperature -20 °C to 40 °C as standard. Up to 55 °C with derating
- Humidity 95 % maximum (non-condensing) at 40 °C
- Altitude: 0 to 3000m, derate 1 % per 100 m between 1000 m and 3000 m
- Random Vibration: Tested in accordance with IEC 60068-2-64
- Mechanical Shock Tested in accordance with IEC 60068-2-29
- Storage temperature: -40 °C to 70 °C short term, -40 °C to 50 °C long term
- Electromagnetic Immunity complies with EN 61800-3 and EN 61000-6-2
- With onboard EMC filter, complies with EN 61800-3 (2nd environment)
- EN 61000-6-3 and EN 61000-6-4 with optional footprint EMC filter
- IEC 61800-5-1 (Electrical Safety)
- IEC 61131-2 I/O
- Safe Torque Off, independently assessed by TÜV to IEC 61800-5-2 SIL 3 and EN ISO 13849-1 PL
- UL 508C (Electrical Safety) Plenum rated

Options

Option	Description	Order code
Drive Configuration & Programming	Configuration software	UNIDRIVE-M-CONNECT
	Drive to PC USB cable (requires a 485 adaptor)	CT-USB-CABLE
	Smartcard 64k memory	SMARTCARD-64
	Smartcard with SD card adaptor, no SD card	SD-CARD-ADAPTOR
	8 GB SD card	CTSD8GB
Operator Interfaces	Plain text LCD keypad with hand/auto and real-time clock	HOA-KEYPAD-RTC
	Remote LCD display with hand/auto and real-time clock	REMOTE-HOA-KEYPAD-RTC†
	Remote display cable	UM-LCD-485-XXX*
Input / Output	Extended I/O	SI-I/O
Communications	PROFIBUS DP	SI-PROFIBUS
	DeviceNet	SI-DEVICENET
	CANopen	SI-CANOPEN
	PROFINET RT	SI-PROFINET-V2
	EtherNet/IP, Modbus TCP	SI-ETHERNET
	Modbus RTU	KI-485-ADAPTOR
Machine Control	Applications, SyPTPro	SI-APPS-PLUS
	Advanced machine control	MCi200
	Advanced machine control, Ethernet	MCi210
Application Programming Software & Diagnostics	PLC programming	MACHINE-CONTROL-STUDIO
	Digital oscilloscope	CTSCOPE

*Shielded RS485 patch cable, CAT5e, conductive metal RJ45 connectors, XXX=cable length in 5 foot increments (max 330 ft), standard lengths are (005, 010, 015, 025 and 050)

† Requires KI-485-ADAPTOR for operation

Optional Fan replacement, through panel

Description	Order code
HVAC Drive H300 fan replacement kit fame 3	3251-0029
HVAC Drive H300 fan replacement kit fame 4	3251-0245
HVAC Drive H300 fan replacement kit fame 5	3251-0245
HVAC Drive H300 fan replacement kit fame 6	3251-0030
HVAC Drive H300 fan replacement kit fame 7	3251-8247
HVAC Drive H300 fan replacement kit fame 8	3251-8240
HVAC Drive H300 fan replacement kit fame 9, 10, 11	3251-1750
HVAC Drive H300 Aux fan replacement kit frame 7	3251-0041
HVAC Drive H300 Aux fan replacement kit frame 8	3251-0091
HVAC Drive H300 Aux fan replacement kit frame 9 & 10 (Frame 11 575 V)	3251-0042
HVAC Drive H300 Aux fan replacement kit frame 11 (460 V models)	3251-1202

Through Hole Panel Mount Kit

Description	Order code
Through hole mount kit - frame 3	THM-KIT-F3
Through hole mount kit - frame 4	THM-KIT-F4
Through hole mount kit - frame 5	THM-KIT-F5
Through hole mount kit - frame 6	THM-KIT-F6
Through hole mount kit - frame 7	THM-KIT-F7
Through hole mount kit - frame 8	THM-KIT-F8
Through hole mount kit - frame 9E & 10E	THM-KIT-F9E-F10E
Through hole mount kit - frame 11E	THM-KIT-F11

Built to meet rigorous international standards for quality, safety and interoperability, Control Techniques' drives carry one or more of the following approval ratings:



UL Type 1 Conduit kit

Frame size	Order code
3 & 4	C-BOX-GF3-4
5	C-BOX-F5
6	C-BOX-F6
7	C-BOX-F7
8	C-BOX-F8
9E & 10E	C-BOX-F9-10
11E	C-BOX-F11

Retrofit brackets

HVAC Drive H300 drives can be fitted in existing Affinity drive surface mount installations with retrofit brackets.









Frame size	Order code
4	3470-0062
5	3470-0066
6	3470-0074
7	3470-0078
8, 9E & 10E	3470-0118

Optional external EMC filters

HVAC Drive H300 built-in EMC filter complies with EN 61800-3 (Category C3). An external EMC filter is required for compliance with EN 61800-3 (Category C1/C2)

Frame size	Voltage	Order code
3	230 V - 3 phase	4200-3230
	460 V - 3 phase	4200-3480
4	230 V - 3 phase	4200-0272
	460 V - 3 phase	4200-0252
5	230 V - 3 phase	4200-0312
	460 V - 3 phase	4200-0402
	575 V - 3 phase	4200-0122
6	230 V - 3 phase	4200-2300
	460 V - 3 phase	4200-4800
	575 V - 3 phase	4200-3690
7	230 V & 460 V - 3 phase	4200-1132
	575 V - 3 phase	4200-0672
8	230 V & 460 V - 3 phase	4200-1972
	575 V - 3 phase	4200-1662
9E & 10E	230 V & 460 V - 3 phase	4200-4460
	575 V - 3 phase	4200-2210
11E	460 V - 3 phase	4200-0400
	575 V - 3 phase	4200-0690

Dimensions and Weight

Frame Size	Dimensions (H x W x D)		Weight
	in	mm	lb (kg)
3 	15.0 x 3.3 x 7.9	382 x 83 x 200	9.9 (4.5)
	with E1 option 15.0 x 3.3 x 7.9	with E1 option 382 x 83 x 200	
4 	15.4 x 4.9 x 7.9	391 x 124 x 200	14.3 (6.5)
	with E1 option 15.4 x 4.9 x 7.9	with E1 option 391 x 124 x 200	
5 	15.4 x 5.6 x 7.9	391 x 143 x 200	16.3 (7.4)
	with E1 option 16.7 x 5.6 x 7.9	with E1 option 424 x 143 x 200	
6 	15.4 x 8.3 x 8.9	391 x 210 x 227	30.9 (14)
	with E1 option 17.3 x 8.5 x 8.9	with E1 option 439 x 216 x 227	
7 	21.9 x 10.6 x 11.0	557 x 270 x 280	61.7 (28)
	with E1 option 33.2 x 10.6 x 11.6	with E1 option 843 x 269 x 305	
8 	31.7 x 12.2 x 11.4	804 x 310 x 290	114.6 (52)
	with E1 option 44.8 x 12.4 x 12	with E1 option 1138 x 315 x 305	
9E 10E 	Requires external line choke 42.1 x 12.2 x 11.4	Requires external line choke 1069 x 310 x 290	101.4 (46)
	with E1 option 55.1 x 12.2 x 12	with E1 option 1401 x 310 x 305	
11E 	Requires external line choke 46.9 x 12.2 x 12.3	Requires external line choke 1190 x 310 x 312	138.9 (63)
	with E1 option 62.1 x 12.2 x 12.8	with E1 option 1578 x 310 x 328	

CONTROL TECHNIQUES™

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Theautomationengineer.com (blog)



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Control Techniques
7078 Shady Oak Road Eden Prairie, MN 55344-3505 USA