

ID300 Fusion

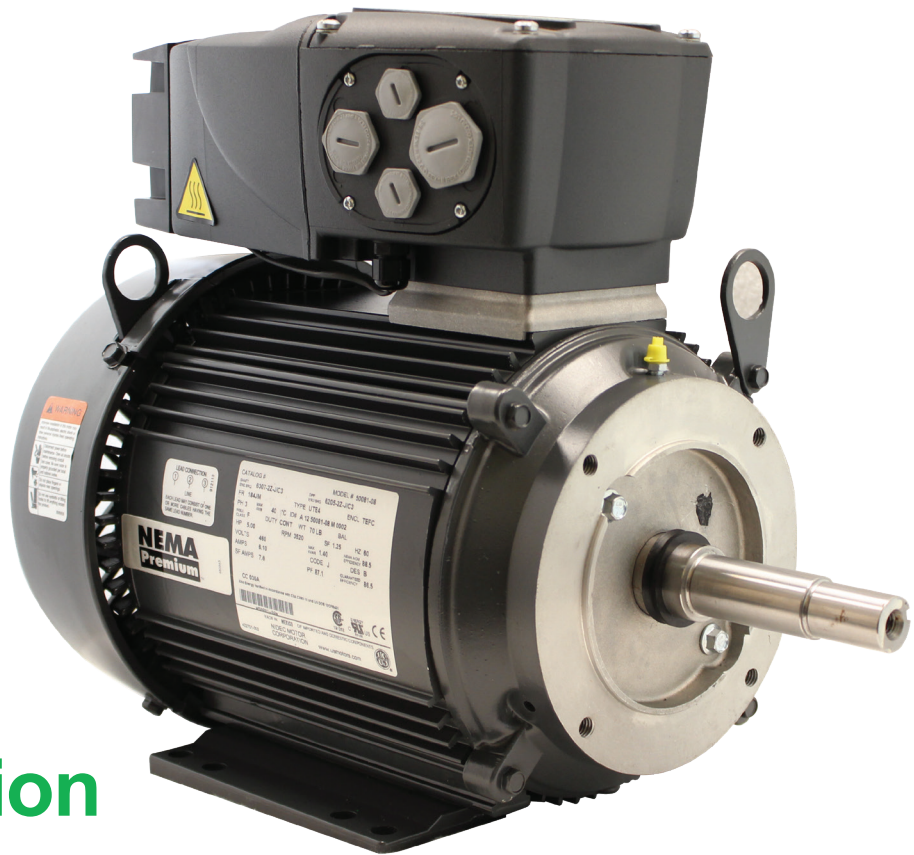
Integrated Motor Drive

ALL-IN-ONE DRIVE SYSTEM | 1 HP TO 10 HP



Countless Solutions. Expert Support.





ID300 Fusion

All in one pump drive system solution

Performance. Reliability. Efficiency. Cost. System designers are increasingly turning to highly integrated solutions to deliver innovative products that meet their customer's needs and exceed their expectations. Advances in electronics manufacturing technology make the fusion of motor and drive highly reliable, enabling novel approaches in system architecture. The demand for pump systems that are smaller and more compact than their predecessors, easier to transport, simpler to install, and quick to integrate into existing supervisory systems are exactly why Nidec Motor Corp developed the ID300 Fusion Integrated Motor Drive.

ID300 Fusion is our integrated high-performance drive solution for pumps requiring variable speed 1HP to 10HP drivers. All the functions of a variable speed drive are incorporated into the pump motor. The drive electronics are tuned for the motor characteristics and supplied in an IP55 rated conduit box as part of the motor. Simply wire up the motor, connect your communication cables and sensors and configure the ID300 for your application. And say goodbye to costly drive cabinets, long shielded VFD power cables, and motor protection filters.





The perfect combination between electronics and motors

Based on our most advanced drive and motor technologies, ID300 Fusion integrates the latest generation of electronic components for power and control.

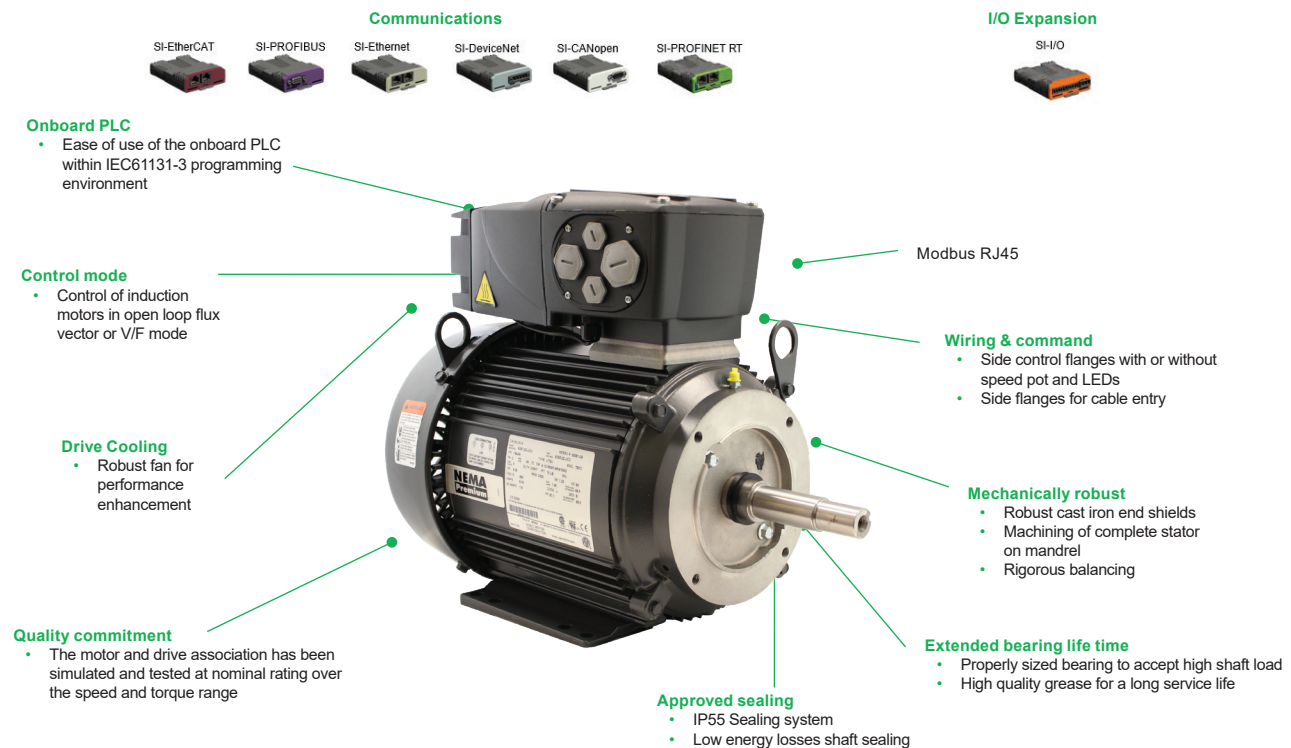
- The electronics have been packaged to ensure a very high level of reliability
- Conformally coated circuit boards for moisture and dust resistance
- Potting of control electronics to withstand vibration
- Thermal design of integrated motor drive performed as a package, not as separate components

The system, with 2-year warranty and UL certification, allows you to benefit from:

- High level of performance
- Advanced control of your pump system with onboard PLC
- Modular system, ready to use
- In addition, our skilled applications engineering team is ready to provide OEMs with system integration assistance and customer support.

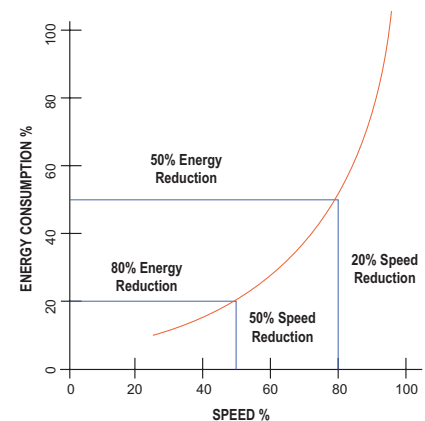
ID300 Fusion

Product configurations tailored to pump OEM needs



Control Options

- Tailor system ergonomics to suit customer needs with keypad mounted on drive or control panel
- Optional side mounted speed pot with LED indicators simplifies adjustment with the twist of a knob
- Integrated PLC and PID implements multiple pump control algorithms suited to your specific needs
- Real time clock enables time-based operation, setting on/off times based on customer requirements
- Multiple industrial protocols and interfaces support integration with your HMI and control systems



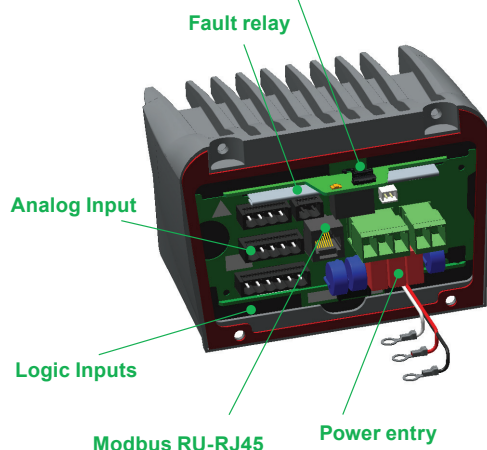
What if this were a 30 hp fan running at 90% of its speed?
 $0.9 \times 0.9 \times 0.9 = 73\%$
 Multiply 73% with 30 hp = consumption of 21.9 hp

STANDARD CONFIGURATION COMES READY TO INSTALL, CONNECT AND RUN

The base ID300 Fusion configuration is a fully integrated motor & drive. It comes ready to connect to power, sensors, switches and relays through 4 cable glands mounted on the side of the drive. The drive can be pre-programmed to OEM specifications to respond to pressure and flow sensors, external control signals and turn on/off external relays as desired.

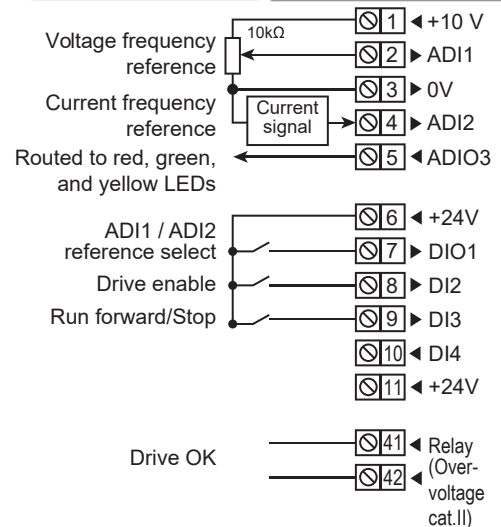
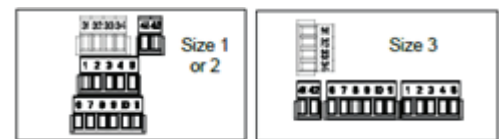


For extra option module



Flexible Base Configuration I/O

ID300 Control Wiring

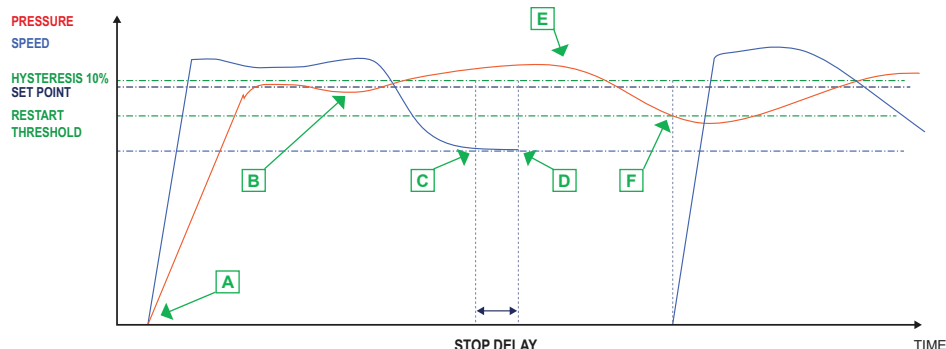


- Up to three analog input channels
- User programmable for voltage (0-10V) or current (4-20mA) feedback
- Connect to potentiometer for setpoint control and sensors for constant pressure/constant flow pump systems
- Configurable digital I/O for drive enable, run/stop and alarms
- 3 input only, 1 input or output
- 3 additional digital inputs, 1 digital output shared with analog channels
- One relay with N.C. contacts
- Modbus RTU connectivity for connection to HMI and control systems

ADVANCED CUSTOMIZABLE CONTROL FEATURES ADD VALUE TO YOUR PRODUCTS

ID300 Fusion provides pump system performance optimization

- Onboard PLC with real-time tasking reduces the need to add additional costly PLCs to your system
- Onboard pump program regulates the pressure (constant pressure / variable flow). When programmed with your pump curve, the ID300 PLC can perform sensor-less constant pressure control, eliminating sensor cost and simplifying installation & commissioning

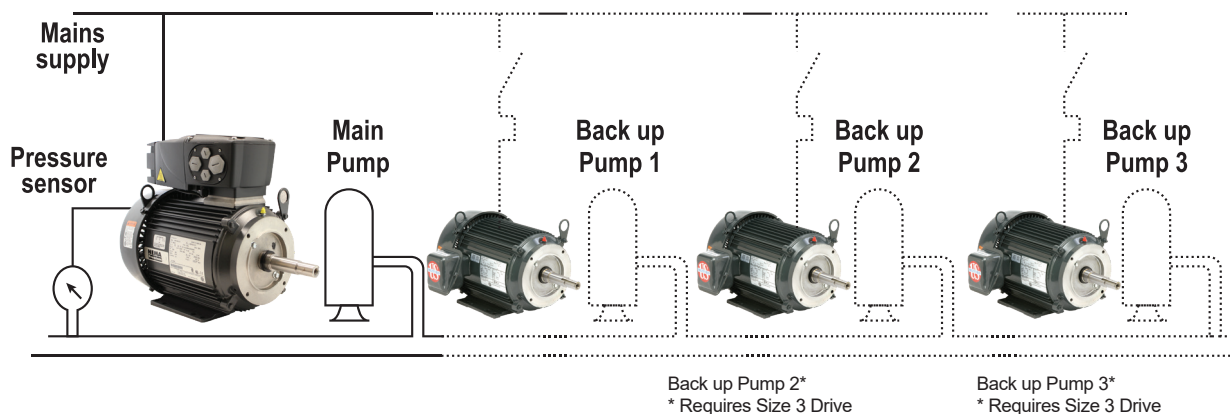
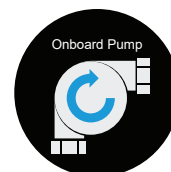


A – Automatic start
B – Normal operation – pressure regulated per demand
C – If pressure exceeds 110% of the setpoint (programmable), the pump speed is reduced to the minimum speed

D – if the pressure stays above 110% and the minimum speed is maintained for a programmable stop delay, the pump is considered in over-pressure condition and is shut off

E – pressure monitoring remains in effect
F – If the pressure falls below the restart threshold, the pump is automatically restarted.

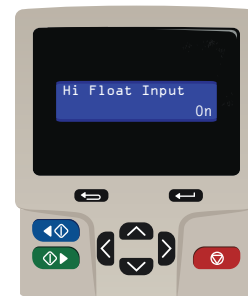
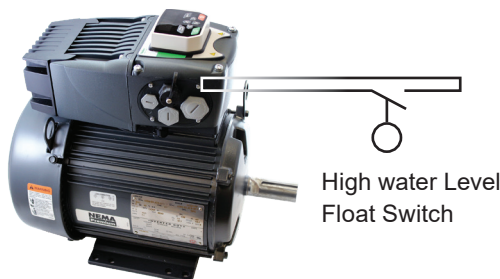
- Up to three additional constant speed backup pumps can be controlled by one variable speed ID300.



Customizable interface tailored to your end-product

ID300 Fusion can be configured to display messages specific to your products, enabling you to bring to market powerful and differentiated pump systems

- Application incorporates float switch for water detection
- Customer defined message displayed on keypad



Easily integrates into existing control systems

Network communications options

- Industrial Ethernet for remote monitoring and control from engineering stations
- Multiple fieldbus protocols for interfacing to industrial controllers within plant

Options

Communications



**OPERATIONS
MANAGEMENT
LEVEL**

**ENGINEERING
STATION**



**CONTROL
LEVEL**

■ PROFINET

■ INDUSTRIAL ETHERNET



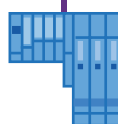
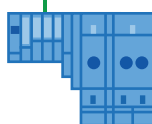
HMI



■ PROFIBUS, MODBUS,
INTERBUS, ETC.

CONTROLLER

**FIELD
LEVEL**





Built to withstand harsh environments

The ID300 Fusion offers guaranteed performance and protection against the three leading causes of field failures. It comes with a 24-month warranty from date of installation or 30 months from date of manufacturing, whichever comes first.

Protection

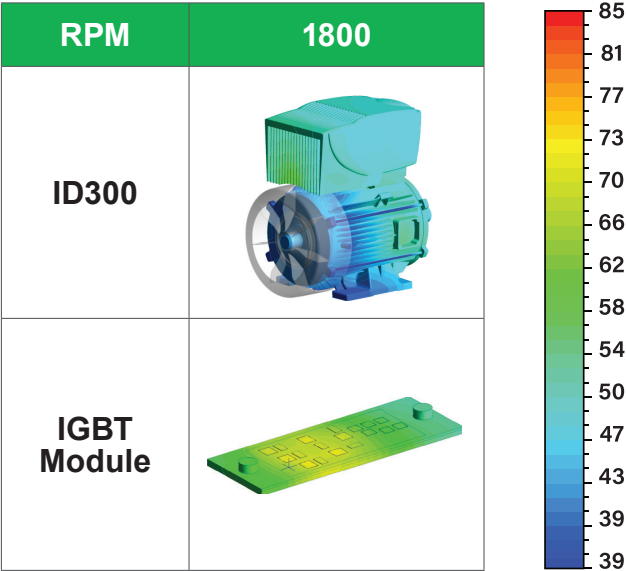
- Electronic components encapsulated in resin
- IP55
- Aluminum drive housing
- Protected and robust IP68 external fan

Electrical

Wide supply voltage range to compensate for power line variations and disturbances

Temperature

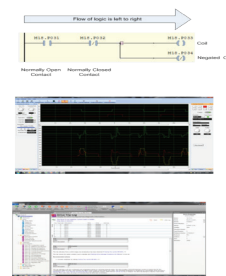
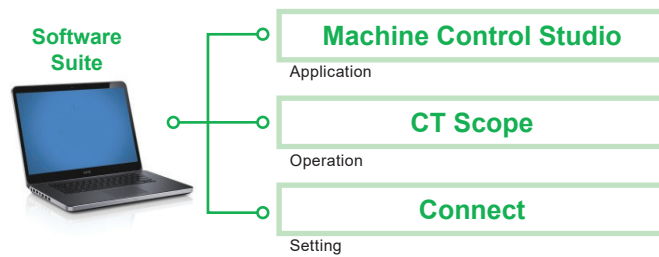
The combined motor and drive have been simulated and tested at nominal rating over the speed and torque range. For higher ambient and load conditions, an additional fan is available for the drive electronics.



ID300 Development Tools

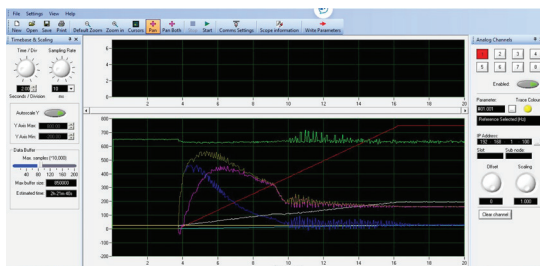
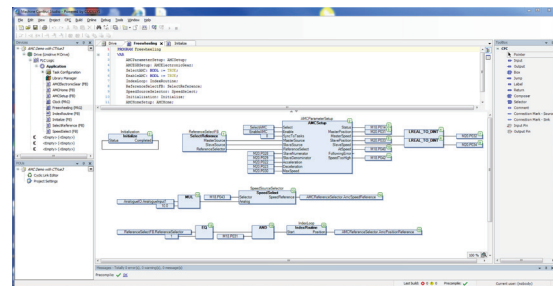
The ID300 Fusion is supported by a powerful suite of development tools, backed up by experienced applications engineers in our Motor Technical Center.

- Industrial Ethernet for remote monitoring and control from engineering stations
- Multiple fieldbus protocols for interfacing to industrial controllers within plant

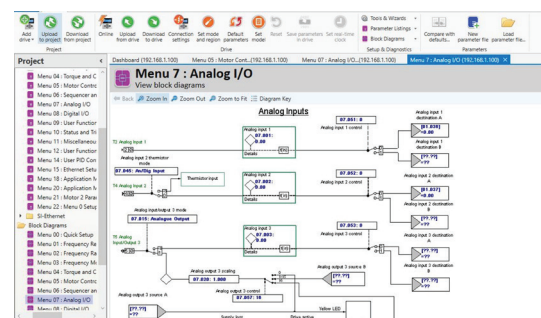


Machine Control Studio provides a Codesys compatible environment familiar to PLC developers. EN / IEC 61131-3 programming language support includes:

- Structured Text (ST)
- Function Block Diagram (FBD)
- Structured Function Chart (SFC)
- Ladder Diagram (LD)
- Instruction List (IL)
- Continuous Function Chart (CFC)



CT Scope provides real-time monitoring of up to 8 channels to verify the drive configuration is operating as expected



Connect software enables developers, system integrators and installation contractors to focus on application requirements when setting parameters, not on acquiring deep knowledge of the ID300's integrated drive.

ID300 Fusion OPTIONS

ID300 options are available pre-installed for high volume OEM applications. Unless otherwise indicated, options may also be ordered individually as separate line items for installation on the base ID300 configuration by customers for low volume applications.

LED and command side flanges



ID-BASE-FLANGE (standard)

Blank side flange when keypads or remote control is used e.g. with a fieldbus network



ID-RUN-POT-LED-FLANGE

Drive side flange for local control with 1 potentiometer to easily set the frequency reference, 3 command buttons (Run Forward / Run Reverse / Stop) and 3 LEDs, Command buttons may also be configured for Hand-Off-Auto functionality.

• LED Status Definitions:

Yellow: not assigned by default, can be set according to the application needs (user setting)

Green: supply OK (permanent) or Drive active (flashing)

Red: Trip (permanent) or alarm (flashing)

Trip code can be displayed if a keypad or a PC laptop with Connect software is connected to the drive (RJ45 connection)

• Mounting arrangements: either side of the ID300

Cable entry side flange



ID-4 CABLE FLANGE (standard)

Side flange with 4 plugs (1xM25 + 1xM20 + 2xM16) for power and control wiring arrangement

• Sealed RJ45 cable gland available for use with remote keypad kit or user provided HMI

Keypads



ID-SIZE1-Keypad and ID-SIZE3-Keypad

ID-SIZE1-Keypad for size 1 and 2 drives and ID-SIZE3-Keypad for size 3 drive.

The keypad consists of three line plain text, multi-language back-lit LCD display, navigation and command keys for rapid set-up and motor control

• Mounting arrangement: keypad mounted on a terminal cover which replaces the standard one and can easily be fitted by the user (possible keypad rotation of 90° or 180° on the cover)



Remote Keypad Kit

Remote keypad with real time clock. The keypad consists of a three line plain text, multi-language LCD display with navigation and command keys for rapid set-up and motor control. A battery operated real-time clock allows accurate time stamping of events, aiding diagnostics. It also has a parameter copy function. A 1m cable, sealing cable gland, and mounting hardware is included in the kit.

• Mounting arrangement: The keypad may be hand-held for prototyping or mounted in a control panel or enclosure door cutout

ID300 OPTIONS

Fieldbus and I/O expansion



PROFIBUS, CANopen, DeviceNet, Profinet RT, Ethernet or EtherCAT module

Size 1 and 2 drives: Those options are module boxes ref ID-SIZE1 + module name 2 x Fast M12 connectors for easy connection and 2 x M8 connectors for 24V backup
Size 3 drives: they are modules to be integrated SI-+module name for instance SI-PROFIBUS

They allow communication with a fieldbus network (Profibus, CANopen, DeviceNet, Profinet RT, Ethernet or EtherCAT). Not available as a user installed option for low volume applications.



Inputs/outputs module

this option increases the I/O capability of the drive (digital I/O and analog inputs, relays)

Size 1 and 2 drives: this option is a module box ref ID-SIZE1-I/O

Size 3 drives: this option is a module to be integrated ref SI-I/O

- Mounting arrangement: fieldbus or I/O modules are user fitted. For the module box, it can easily be fitted by the user, replacing the standard cover

EMC filter



ID-SIZE1-EMC filter-LV-LL or HV-LL, ID-SIZE3-EMC filter-HV-LL

- ID300 is intended for use in environments according to IEC 61800-3:2004 and EN 61800-3:2004+A1:2012 standards. For better emission compliance, the external filter should be added e.g in residential environment
- Mounting arrangements
Size 1 and 2: to be fitted by the user on the side of the drive
Size 3: to be fitted by the user inside the drive

ID300 Drive Features

Designation	Comments
Construction	
	<ul style="list-style-type: none"> • Environmental protection rating: IP55 (IP65 on request) • Aluminum housing, polyamide plugs • Captive cover screw • Removable screw terminal blocks for power and control wiring • Electronics encapsulated in resin
Characteristics	
	<ul style="list-style-type: none"> • Mains supply: <ul style="list-style-type: none"> • 200 V to 230 V $\pm 10\%$, 1 phase or 3 phases • 380 V to 480 V $\pm 10\%$, 3 phases • Frequency range: 45 to 66 Hz • 3% negative phase sequence • Power rating: 1, 2, 3, 5, 7-1/2, 10 HP • Motor poles: 2 or 4 poles • Overload: 150% of the full rated output current for 60 seconds or 180% for 3 seconds, 10 times per hour • Starts per hour: <ul style="list-style-type: none"> • by electronic control: unlimited • by interrupting the AC supply: ≤ 20 (equally spaced) • Motor frequency variation range: from 10 to 175 Hz maximum. The range can be different depending on the system (with drive fan, gearmotor, motor polarity) • Maximum output frequency: 175Hz • Efficiency: NEMA Premium
Environment	
	<ul style="list-style-type: none"> • Storage and transport temperature: -15°C to 55°C, relative humidity 90% maximum • Operating ambient air temperature: -16°C to 40°C, up to 50°C with derating (current derating of 1% per additional Celsius degree from 40°C) • Relative humidity 5 to 95% (non-condensing when operating) • Altitude: $< 1,000\text{m}$; up to $3,000\text{m}$ with derating. De-rate the maximum output current by 1% per 100 m • (330 ft) above 1,000 m (3,300 ft) • Vibration: meets the requirements of EN 61800-5-1, Table 27 and EN 50178 test 9.4.3.2 • EMC: as standard conforms to C3 level and with external filter conforms to C1 level of EN 61800-3 + A1 (2012). Commander ID302 also conforms to EN 61326-3-1 and NF EN 61000-6-7 • UL standards: Conforms to UL 61800-5-1_1 (except for associations with brake motors). File number is E211799 • RoHS Directive immunity: meets 2011/65/EU directive • Pollution: dry, non-conductive pollution only (pollution degree 2 according to IEC 60664-1)

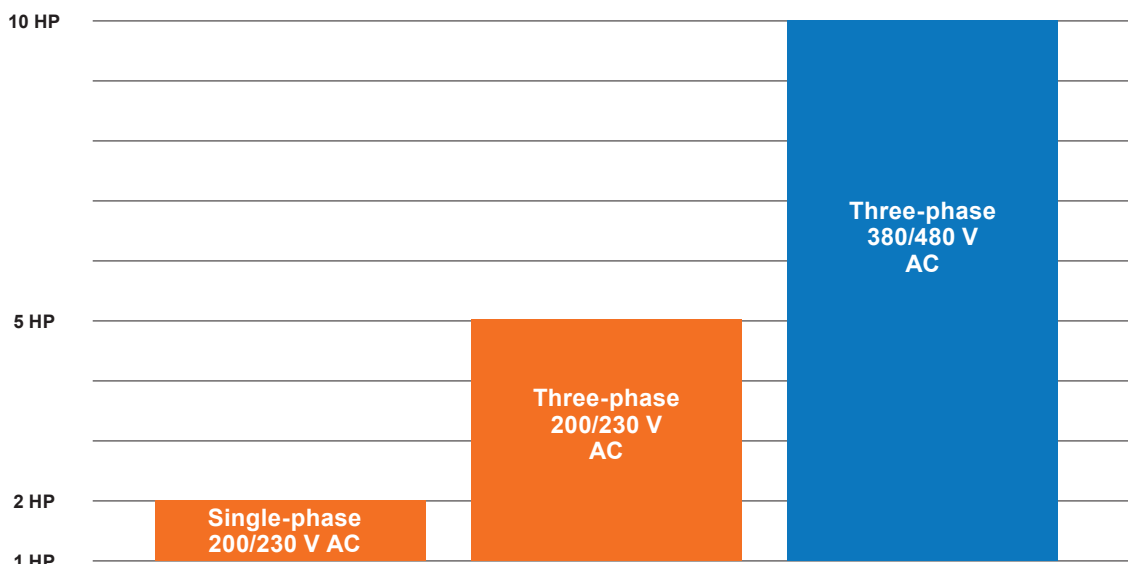
ID300 Drive Features

Features	Details
Resolution and Sample Rate	
Resolution	Preset frequency reference: 0.01 Hz Analog inputs: 11 bits Voltage output: 0.1%
Sample rate	Analog inputs: 4 mS PID: 4 mS
I/O	
Drive Capability	2 x Analog / Digital Inputs 1 x Analog / Digital Input 1 x Digital input or output 1x Analog / Digital input or analog output 3 x Digital inputs 1 x Relay
I/O Option	4x Digital I/O 3 x Analog inputs (default) / digital inputs 1 x Digital input 2 x Relays
Protection	
Drive thermal protection	When IGBT junction temperature reaches its limit, the drive trips
Motor thermal protection	Motor I2t value is continuously calculated. If it exceeds rated motor I2t, the drive trips The drive is provided with thermal memory retention
Motor thermistor	Motor thermistor (option) can be managed by the drive for additional thermal protection
Software detection	Drive detection of undervoltage/overvoltage, phase loss, overload, ground fault short circuit, motor
Security	
User security	User defined security levels: restricted access, read-only parameters
Motor Control	
Open loop vector or V/F motor control	Open loop vector control providing the easiest configuration. V/F mode is dedicated to specific motor configurations or applications Square law V/F mode is optimized for quadratic loads like pumps and fans to keep motor losses to a minimum Dynamic V/F mode is intended for applications where power loss should be kept to a minimum under low load conditions. This mode is also used in the case of motor instability (at no load)
Interfaces	
Fieldbus	Fieldbus options allow the drive to communicate with fieldbus networks: PROFIBUS, CANopen, DeviceNet, Ethernet/IP and Modbus TCP, EtherCAT, Profinet RT
RS485	RS485 serial port is available as standard.
Frequency or encoder input	Frequency follow-up is possible from an encoder or frequency input (maximum input frequency: 100 kHz)
Onboard Intelligence	
Programmable Logic Control (PLC)	It executes Machine Control Studio (IEC61131-3) programs Memory: 12 kB and user free programming
Pump program	It provides main functions required by a pump application with pressure regulation (constant pressure / variable flow). It includes back-up pump management which allows the system to start up to 3 additional pumps to maintain constant pressure when there is a high flow demand

ID300 Drive Features

Designation	Comments
Construction	
Preset references	8 preset references can be set by the user
Catch a spinning motor	If the drive output is inactive after the output bridge is reactivated, it will automatically recalibrate the output frequency to the measured value and reaccelerate the motor up to the reference frequency
Automatic restart after mains loss	On a mains supply loss, the drive will decelerate on a ramp. On return to normal conditions, the motor can be reaccelerated up to its reference speed
S Ramp	A curved part at the start and end of the speed ramp avoids load swinging
Slip compensation	Slip compensation can be used throughout the speed range of the motor to correct the motor speed and minimize the change of speed with load
Standby mode	Dedicated mode for applications where drives can sit idle for significant periods
Limit switch mode	The motor is stopped without ramps (under DC injection control)
Cost - per kWh electricity	Two parameters indicate the cumulative energy transferred through the drive
DC injection braking	DC injection can be set (injection braking level and time are adjustable)
Drive fan cleaning	Automatic fan cleaning (when the drive fan is fitted) to avoid any dust gathering. The time between fan cleanings can be adjusted
Cooling fan control	If a fan drive is fitted, it can be forced to run at full speed or controlled by the heatsink temperature
Scope mode	Acquire data up to 4 parameters (4 traces)
Skip speeds	3 skip speeds are available to avoid a machine running at critical speeds
Status word	Allows several operating indicators to be monitored by reading a single parameter
Trip log	Shows the last ten trips of the drive
PID controller	One general purpose PID controller is provided as standard
User preset configurations	User menu can be adjusted to your application by selecting one of the preset configurations
Function blocks	12 functions are included in the software like programmable logic, motorized pot, binary sum, timers, scope, threshold detectors and variable selectors, removing the need for additional devices
Cloning	
Drive Parameter set	Parameter cloning function is available by using Field keypad RTC option (5 sets of parameters and 1 application program)
Software Tools	
Connect	Drive commissioning and monitoring software. Drive parameters can be uploaded, downloaded and compared
Machine Control Studio	Programming software for onboard PLC programs, powered by IEC61131-3 environment
CTScope	Designed to trend/trace parameter values

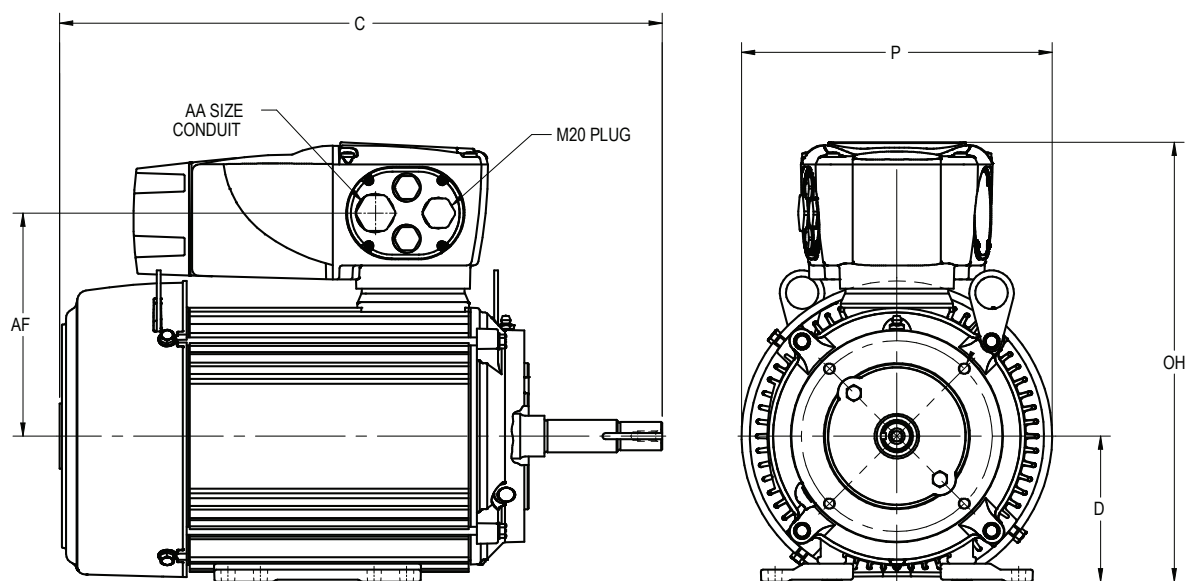
ID300 Range



ID300 Table

		Unimount			1-Ph 230V	3-Ph 230V	3-Ph 460V		
HP	RPM	T-Frame	TC-Frame	Pump	ID300 Size	ID300 Size	ID300 Size	Frame	Feet
1	3600	56/143T	56C/143TC	56J	1	1	1	Steel	Ftd/FtIs
1	1800	56/143T	56C/143TC	56J	2	2	1	Steel	Ftd/FtIs
2	3600	56/145T	56C/145TC	56J	2	2	1	Steel	Ftd/FtIs
2	1800	56/145T	56C/145TC	56J	2	2	1	Steel	Ftd/FtIs
3	3600	182T	182TC	182JM	-	3	2	Alum	Bolt on Ft
3	1800	182T	182TC	182JM	-	3	2	Alum	Bolt on Ft
5	3600	184T	184TC	184JM	-	3	2	Alum	Bolt on Ft
5	1800	184T	184TC	184JM	-	3	2	Alum	Bolt on Ft
7.5	3600	213T	213TC	213JM	-	-	3	Alum	Bolt on Ft
7.5	1800	213T	213TC	213JM	-	-	3	Alum	Bolt on Ft
10	3600	215T	215TC	215JM	-	-	3	Alum	Bolt on Ft
10	1800	215T	215TC	215JM	-	-	3	Alum	Bolt on Ft

ID300 Drawings



Unique assembly dimensions below. All other dimensions per NEMA

ID300 Features

Frame	ID300 Size	Length	Width	Overall Height	Connection Height	Conduit Size	Conduit Behind Front mount hole
		C or Overall Length	P	OH	D + AF	AA	BS
56	1	12.325	7.31	11.44	9.31	M25	2.38
56C	1	12.325	7.31	11.44	9.31	M25	1
143T	1	12.97	7.31	11.44	9.31	M25	2.38
145T	1	13.97	7.31	11.44	9.31	M25	2.38
143TC	1	13.13	7.31	11.44	9.31	M25	1
145TC	1	13.13	7.31	11.44	9.31	M25	1
182T	2	16.25	9.56	13.53	11.37	M25	1.78
184T	2	17	9.56	13.53	11.37	M25	1.78
182TC	2	16.19	9.56	13.53	11.38	M25	0.97
184TC	2	16.94	9.56	13.53	11.38	M25	0.97
182T	3	18.4	9.56	16.07	11.38	M25	0.97
184T	3	18.4	9.56	16.07	11.38	M25	0.97
182TC	3	18.34	9.56	16.07	11.38	M25	0.97
184TC	3	18.34	9.56	16.07	11.38	M25	0.97
213T	3	16.63	11.25	17.5	14.17	M30	0.75
215T	3	20.13	11.25	17.5	14.17	M30	0.75
213TC	3	18.66	11.25	17.5	14.19	M25	0
215TC	3	20.16	11.25	17.5	14.19	M25	0

Member of the following:



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