

**CONTROL
TECHNIQUES**[™]

DFS SERIES

DRIVE FREE STANDING
HIGH POWER PRE-ENGINEERED
PACKAGED DRIVES



Ready-to-ship
Ready-to-use

100 HP to 1,250 HP
460 V | 575 V

Nidec
All for dreams

Efficient System Build

For many drive users, designing and building a high power drive enclosure requires extensive in house engineering expertise that they do not have...

The DFS Drive is a pre-assembled, ready to install drive enclosure system designed for higher power applications, providing a robust, serviceable AC drive solution for reliable motor control and optimal efficiency.



Unidrive DFS2
700 HP as shown

Key Highlights

Ready-to-ship | Ready-to-use

- Industry standard integratable enclosures (Rittal)
(for dimensions see pages 7-8)
- Includes line input reactor, Molded Case Circuit Breaker (MCCB), easy to service UL fuses & mounting plate, Unidrive M600|M70x AC Drive, and output reactor*.
*DFS2 & DFS3 sizes standard (option on DFS1 sizes)
- Pre-installed available options include:
 - Harmonic and EMC filters
 - Broad suite of door controls
 - Additional terminal rails
 - Configuration options including isolated incomer section, interior lighting, provisioning for top or bottom entry, and additional bays for customer controls
- See page 9 for full list of options
- Chassis interior rail-system allows easy & secure front access to service drive

Fast turnaround

- Factory stocked units available for 1 business day emergency shipment
- Factory stocked 460 V units available:
 - 175 HP HD/200 HP ND
 - 250 HP HD/300 HP ND
 - 350 HP HD/400 HP ND
- Best-in-class lead-times up to 1,250 HP
- Up to 800 HP in as little as 5 days;
1,250 HP in as little as 10 days
- Factory options support wide variety of applications
- Contact your local Control Techniques' distributor for fast & easy quoting of DFS configurations

Easy set-up

- All DFS enclosures are factory tested prior to shipment
- Easy-to-use Connect PC tool for optimized commissioning
 - Full parameter management features including easy cloning
 - Guided setup wizard for drive-motor pairing & auto-tuning
 - Real time visualization and manipulation of drive control system with dynamic logic diagrams



Fans & Pumps

(Variable torque,
Normal Duty)

Extremely simple to install and operate.

■ Energy savings features

- » Dynamic V/Hz, optimizing the V/Hz to the variable torque load
- » Sleep/wake functions & Standby power mode
- » Variable speed heatsink cooling fan

■ Control features:

- » Catch-a-spinning load, for smooth transition when starting a rotating or windmilling load like an axial fan blade or blower wheel
- » Skip-Frequencies feature allows easy avoidance of resonate equipment frequencies, which may cause high levels of vibration
- » Torque mode for better control of applications using a blower wheel
- » Braking
 - Trip less over voltage control, limiting the amount of regenerative power based on the system losses without the need to add a dynamic braking resistor
 - DC Injection
 - Dynamic Braking
- » On-board dual PID functions
- » Real Time Clock
- » Interface
 - Analog & Digital IO control
 - Fieldbus communications, (EtherNet/IP, PROFINET, Modbus TCP/IP, EtherCAT, PROFIBUS, DeviceNet, Modbus RTU)
- » Advanced user configurations
 - Onboard user logic functions
 - Onboard PLC user program area
 - Second processor support, (PLC option)

■ Protection

- » Over Voltage
- » Instantaneous Over Current
- » Motor Over load
- » Control & Power Over Temperature
- » Supply & Motor Phase-Loss
- » Controls Trips (communication trips)

■ Applications/Solutions

- » Simplex & Multiplex constant pressure control
- » Duty Assist: Duty drive with fix speed starter Assist
- » Pump anti-ragging control





Compressors

(Constant torque & variable torque, Normal Duty & Heavy Duty)

- **Control the following compressors:**

- » Reciprocating
 - » Scroll
 - » Screw
 - » Rotary
 - » Centrifugal (variable torque)
- Onboard PLC & PID functionalities for advanced control without the cost and footprint of an external controller
 - Increased energy efficiency and optimal control for increased Coefficient of Performance (CoP)
 - Improve power factor (>0.95) and reduce motor starting current by a factor of 8:1 to further reduce power demand from your utility
 - On-board kWh energy, run-time and running cost meters help document and capture energy savings



General Automation

(Constant torque & constant power applications, Heavy Duty, high performance)

- **Precise speed & current control with rapid dynamic response and high overload capability.**

- **Typical applications include:**

- » Traction
 - » Hoisting
 - » Tension control
 - » Position control
 - » Conveying
 - » Mixing & Crushing
 - » Extrusion
 - » Machining – Drilling, Milling, Grinding, Cutting
- Maximum control for **conveyors** with S-ramp acceleration/deceleration profiling and automated load control
 - Efficient control of **mixer** and **extruder** applications with up to 200% overload
 - Precise speed & current control for rapid dynamic response in **extruder** applications
 - Closed-loop control for **cranes** and **hoists** for precision accuracy
 - High reliability and control for **crushers** and impact loads
 - Quick and easy retrofits for **web handling** applications such as **unwind**, **rewind** and **nip control** applications
 - An additional bay can be included for third-party input/output provisioning for easy retrofitting across applications

Maintain plant uptime with high reliability, easy maintenance and fast service support

Rugged, reliable drive systems

- Highly robust enclosures with ingress protection options to meet the needs of the application
 - UL Type 12 (IP54) as standard
 - UL Type 1 (IP44) as selectable option
- Chassis interior rail-system allows easy & secure front access to service drive
- Enclosure temperature control via intelligent fan system
- High quality auxiliary components sourced from leading automation industry vendors
- Built with stringent quality controls with full traceability and rigorous testing gives our plant ISO-9001 accreditation

Optimum local service support to minimize downtime

- Control Techniques is active in 70 countries, offering local support through experienced factory technical & field services, including an extensive network of Certified Partners
- **Factory Flat-Rate Startup service packages** are available, offering efficient commissioning of the drive system to keep your project on-time and on-budget
- Comprehensive online support & complimentary user-friendly drive commissioning and diagnostic Connect software, including a guided drive setup wizard



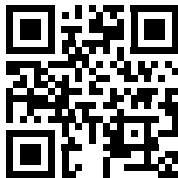
Drive set-up

Easy Drive Setup using our complimentary Connect commissioning software, including a guided setup wizard
Visit: www.ctdrives.com/connect



Diagnostics tool

Quickly resolve any error codes that the drive displays
To download our Diagnostics Tool app
Visit: www.ctdrives.com/mobile-apps



Download support

To gain access to a comprehensive collection of manuals available for download
Visit: www.ctdrives.com/DFS-manuals or scan the QR code



Certification

Each enclosure is UL marked



Drive Warranty

For peace of mind
2 year warranty as standard





Maximum versatility variants for every application

DFS is available with a control stage to suit any application:

- Ultimate motor control of precision AC Induction, high-efficiency Permanent Magnet, or high dynamic Servo Motors.
- DFS supports the latest high-efficiency motors to maximize return on investment and minimize impact on the environment.

Select from:

Unidrive M600, M700, M701, or M702 control

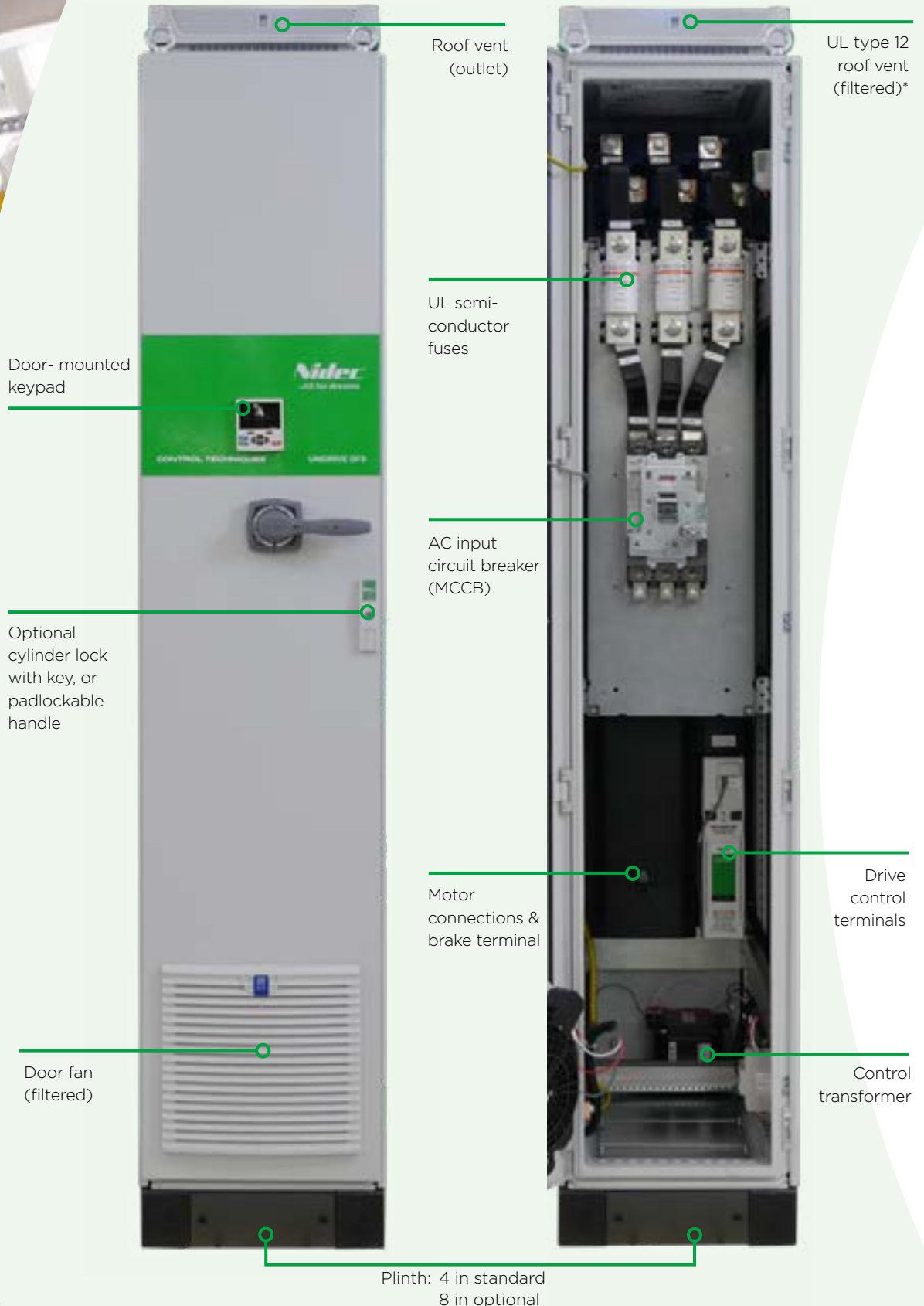
	M600	Process	<p>High Performance Sensorless PM and IM Control.</p> <ul style="list-style-type: none"> ■ Modbus RTU over RS485 communications ■ 1 x STO certified to SIL3/PLe ■ Analog and digital I/O ■ Optional IM closed loop vector control
	M700	Ethernet	<p>High Performance PM and IM Control.</p> <ul style="list-style-type: none"> ■ Multi-protocol Ethernet communications ■ 1 x STO certified to SIL3/PLe ■ Analog and digital I/O ■ Advanced Motion Controller and optional Machine Controller
	M701	Unidrive SP replacement	<p>High Performance PM and IM Control.</p> <ul style="list-style-type: none"> ■ Modbus RTU over RS485 communications ■ 1 x STO certified to SIL3/PLe ■ Analog and digital I/O ■ Advanced Motion Controller and optional Machine Controller
	M702	Safety enhanced	<p>High Performance PM and IM Control.</p> <ul style="list-style-type: none"> ■ Multi-protocol Ethernet communications ■ 2 x STO certified to SIL3/PLe ■ Digital I/O onboard, analog I/O option available ■ Advanced Motion Controller and optional Machine Controller

Please refer to the individual product brochures for full information.

Output frequency

DFS drives have a maximum output frequency of 599 Hz and are, therefore, not subject to special export controls. High-frequency drives are available on request.

DFS1



*Shown: UL Type 12 construction with drive heatsink thru-panel mounted.
 UL Type 1 construction available, totally enclosed drive design within enclosure, with roof fan.
 Optional Incomer Bay, isolating drive section from circuit breaker, not shown.

DFS SERIES

DFS2

Door-mounted Keypad

Optional cylinder lock with key, or padlockable handle



AC input circuit breaker (MCCB)



UL Type 12 roof vents (filtered)

UL Fusing

Incomer bay isolation barrier

Motor connections

Output sharing choke

UL Type 12 door fans (filtered)

DFS DIMENSIONS



UL Type 1 or Type 12

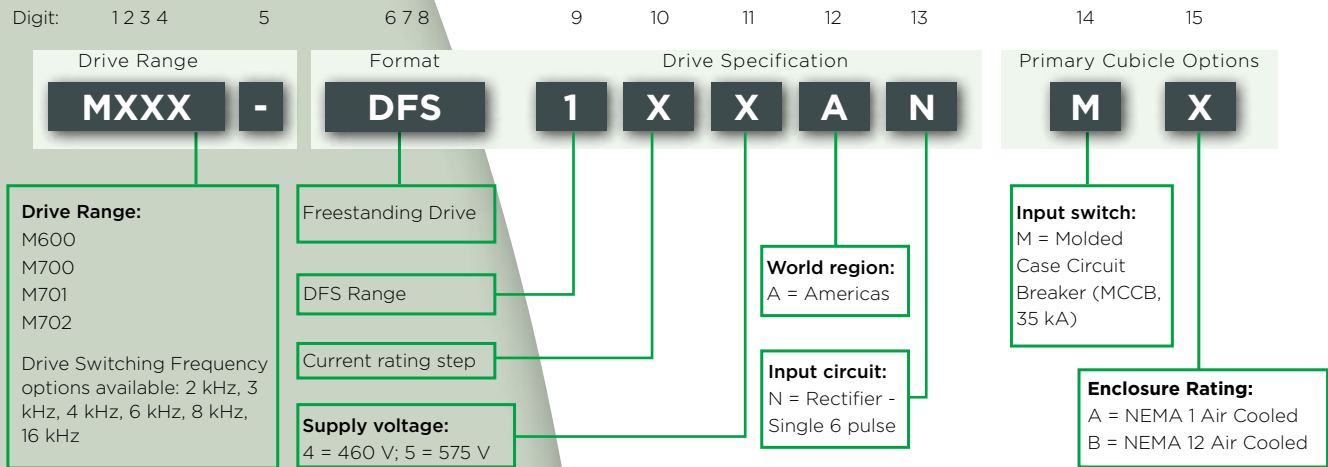
89 in (2,260 mm)

3.94 in (100 mm) or 7.87 in (200 mm)

23.62 in (600 mm)

- DFS1 - 15.75 in (400 mm)
- DFS2L,M,N - 47.25 in (1,200 mm)
- DFS2Q - 55.12 in (1,400 mm)
- DFS3 70.87 (1,800 mm)

Order Code



Options

NOTE: Contact your local distributor to configure factory options

Feature	Description
Enclosure rating	NEMA1 (Totally Enclosed, Filtered) NEMA12 (IP54)
Environmental	35°C (95°F) Standard or 45°C (113°F) Ambient Temperature Rating (Drive rating of 40°C (104°F) and 50°C (122°F) respectively) Anti-condensation Heaters
Supply	Molded Case Circuit Breaker (MCCB) 35 kA* Molded Case Circuit Breaker 65 kA* Molded Case Circuit Breaker 100 kA* MCCB Shunt Trip 110 V MCCB Under Voltage Trip 110 V MCCB Auxiliary Contacts Harmonic Filters Input Contactor Incomer Bay (DFS1 Only - Isolated MCCB & Fuses, supports top or bottom cable supply)
Door Controls	Remote Mounted Keypad (Standard) Start & Stop Pushbuttons Running & Power-On Lamps Fault/Reset Pushbutton & Lamp Auto/Manual Selector Switch Speed Potentiometer Ethernet/110Vac Outlet Emergency Stop (Standard or w/ relay) Power / Energy Meter 180 degree hinged doors Locks: Barrel Type (Standard), Key, or Padlockable HMI
Motor	dV/dt Protection Brake Control Motor Blower Starter
Enclosure Configuration Options	MOV protection for use on un-earthed supplies Removal of internal EMC filter for use on un-earthed supplies 24 Vdc External Supply (maintains control of drive with isolator open) Additional terminal rail for customer control connections 110Vac Control Interface (24 Vdc Standard) Interior Lighting 4" Plinth-base (Standard), 8" Plinth-base (Optional) Additional Enclosure Bay with backplate (15.75")
Freight & Packaging	Expedited Shipping Additional Crating Options

*Dependent on DFS frame and voltage ratings

Drive selection for 460 VAC

with standard primary enclosure options:
isolater MCCB, UL fuses and NEMA12 protection

35°C (95°F) Ambient† NEMA1 & NEMA12				
460 VAC +/-10% 60 Hz				
Order Code (Short)	Normal Duty 2 kHz 110 % Rated Current		Heavy Duty 3 kHz Open Loop = 150 % Rotor Flux Control = 170 %	
	xxxx = M600, M700, M701, M702			
	Motor Shaft Power	Max Cont. Current	Motor Shaft Power	Max Cont. Current
	HP*	Amps	HP*	Amps
xxxx-DFSIG4AN	125	155	100	134
xxxx-DFSIH4AN	150	184	125	157
xxxx-DFSIJ4AN	175	221	150	180
xxxx-DFSIK4AN	200	266	175	211
xxxx-DFSIL4AN	250	320	200	270
xxxx-DFSIM4AN	300	361	250	307
xxxx-DFSIN4AN	350	437	300	377
xxxx-DFSIP4AN	400	487	350	415
xxxx-DFSIQ4AN	450	507	350	415
xxxx-DFS2L4AN	500	608	450	513
xxxx-DFS2M4AN	600	686	500	583
xxxx-DFS2N4AN	700	830	600	716
xxxx-DFS2Q4AN	850	963	700	789
xxxx-DFS3N4AN	1000	1245	900	1075
xxxx-DFS3P4AN	1150	1388	1000	1185
xxxx-DFS3Q4AN	1250	1445	1000	1185

†Drive rating is 40°C (104°F)

45°C (113°F) Ambient‡ NEMA1 & NEMA12				
460 VAC +/-10% 60 Hz				
Order Code (Short)	Normal Duty 2 kHz 110 % Rated Current		Heavy Duty 3 kHz Open Loop = 150 % Rotor Flux Control = 170 %	
	xxxx = M600, M700, M701, M702			
	Max Cont. Current	Motor Shaft Power	Max Cont. Current	Motor Shaft Power
	HP*	Amps	HP*	Amps
xxxx-DFSIG4AN	125	155	100	134
xxxx-DFSIH4AN	150	184	125	146
xxxx-DFSIJ4AN	175	221	150	180
xxxx-DFSIK4AN	200	253	175	193
xxxx-DFSIL4AN	250	320	200	270
xxxx-DFSIM4AN	300	343	250	282
xxxx-DFSIN4AN	350	437	300	377
xxxx-DFSIP4AN	375	462	325	380
xxxx-DFSIQ4AN	400	462	325	380
xxxx-DFS2L4AN	500	608	450	513
xxxx-DFS2M4AN	570	651.7	475	535
xxxx-DFS2N4AN	700	830.3	600	716
xxxx-DFS2Q4AN	800	877.8	650	722
xxxx-DFS3N4AN	1000	1245	900	1074
xxxx-DFS3P4AN	1100	1316	950	1083
xxxx-DFS3Q4AN	1150	1316	950	1083

‡Drive rating is 50°C (122°F)

*Horsepower ratings reflect typical 4-pole 60 Hz motor. For correct drive selection, use motor nameplate Amps

Drive selection for 575 VAC

with standard primary enclosure options:
isolater MCCB, UL fuses and NEMA12 protection

35°C (95°F) Ambient† NEMA1 & NEMA12				
575 VAC +/-10% 60 Hz				
Order Code (Short)	Normal Duty 2 kHz 110 % Rated Current		Heavy Duty 3 kHz Open Loop = 150 % Rotor Flux Control = 170 %	
	xxxx = M600, M700, M701, M702			
	Motor Shaft Power	Max Cont. Current	Motor Shaft Power	Max Cont. Current
	HP*	Amps	HP*	Amps
xxxx-DFSIB5AN	75	86	60	63
xxxx-DFSIC5AN	100	108	75	86
xxxx-DFSID5AN	125	125	100	104
xxxx-DFSIE5AN	150	150	125	131
xxxx-DFSIF5AN	200	200	150	152
xxxx-DFSIG5AN	200	200	175	190
xxxx-DFSIH5AN	250	248	200	200
xxxx-DFSIJ5AN	300	288	250	254
xxxx-DFSIK5AN	350	315	250	254
xxxx-DFS2F5AN	375	380	300	288
xxxx-DFS2G5AN	375	380	350	361
xxxx-DFS2H5AN	500	471	375	380
xxxx-DFS2K5AN	600	598	450	419
xxxx-DFS3H5AN	700	706	600	570
xxxx-DFS3J5AN	800	820	650	629
xxxx-DFS3K5AN	900	897	650	629

†Drive rating is 40°C (104°F)

45°C (113°F) Ambient‡ NEMA1 & NEMA12				
575 VAC +/-10% 60 Hz				
Order Code (Short)	Normal Duty 2 kHz 110 % Rated Current		Heavy Duty 3 kHz Open Loop = 150 % Rotor Flux Control = 170 %	
	xxxx = M600, M700, M701, M702			
	Max Cont. Current	Motor Shaft Power	Max Cont. Current	Motor Shaft Power
	HP*	Amps	HP*	Amps
xxxx-DFSIB5AN	75	86	60	63
xxxx-DFSIC5AN	100	104	75	86
xxxx-DFSID5AN	125	125	100	104
xxxx-DFSIE5AN	150	150	125	131
xxxx-DFSIF5AN	200	200	150	150
xxxx-DFSIG5AN	200	200	175	190
xxxx-DFSIH5AN	225	226	200	200
xxxx-DFSIJ5AN	250	262	200	200
xxxx-DFSIK5AN	300	296	200	200
xxxx-DFS2F5AN	375	380	275	285
xxxx-DFS2G5AN	375	380	350	361
xxxx-DFS2H5AN	450	429	375	380
xxxx-DFS2K5AN	550	562	375	380
xxxx-DFS3H5AN	650	644	600	570
xxxx-DFS3J5AN	750	746	600	570
xxxx-DFS3K5AN	850	843	600	570

‡Drive rating is 50°C (122°F)

*Horsepower ratings reflect typical 4-pole 60 Hz motor.
 For correct drive selection, use motor nameplate Amps



Nidec

All for dreams

#1 for advanced motor and drive technology

Nidec Corporation is a global manufacturer of electric motors and drives. Founded in 1973, Nidec has worldwide operations and a workforce of more than 110,000 who develop, manufacture and install motors, drives and control systems in industrial plants, automobiles, home appliances, office equipment and information technology.



110,000
EMPLOYEES
WORLDWIDE



\$11B
GROUP
TURNOVER



70+
COUNTRIES



230+
COMPANIES

CONTROLTM TECHNIQUES

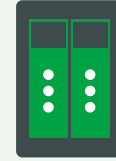
DRIVE SPECIALISTS SINCE 1973

Drives: they're what we do. Whether you're designing a new machine or installing a replacement, we know you need quick delivery and an easy set up, with the confidence that your drive's going to keep on performing with accurate control.

So leave it to the specialists. We've dedicated ourselves to designing and manufacturing variable speed drives since 1973. This means quick set up, high reliability, maximum motor control and fast, efficient service.



1,000+
OEM
CUSTOMERS



5M+
INSTALLED
DRIVES



1,500+
EMPLOYEES
WORLDWIDE



70
COUNTRIES



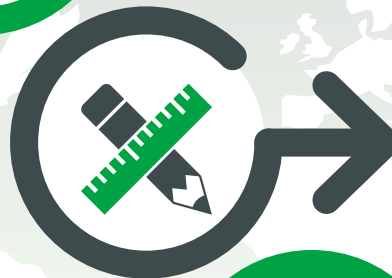
Outstanding performance

The outstanding performance of our drives is the fruit of over 45 years of engineering experience in drive design.



Technology you can rely on

Robust design and the highest build quality ensure the enduring reliability of the millions of drives installed around the world.



Open design architecture

Based on open design architecture, our drives integrate with all primary communication protocols.



Embedded intelligence

Precision motor control is combined with the highest embedded intelligence, ensuring maximum productivity and efficiency of your machinery.

Global reach, local support

Highly experienced, locally based Application Engineers design and support drive technology to provide maximum value, wherever you are in the world.

A part of the Nidec Group

Connect with us at:



www.controltechniques.us

www.ctdrives.com/DFS

Control Techniques is your global drives specialist.

With operations in over 70 countries, we're open for business wherever you are in the world.

For more information, or to find your local drive center representatives, visit

www.controltechniques.us



© 2020 Control Techniques a Nidec Motor Corporation business. The information contained in this brochure is for guidance only and does not form part of any contract. The accuracy cannot be guaranteed as Control Techniques has an ongoing process of development and reserves the right to change the specifications of its products without notice. Unidrive and Control Techniques are registered marks of Nidec Control Techniques Limited in the USA.

Control Techniques Americas. Registered Office:
7078 Shady Oak Road Eden Prairie, MN 55344-3505 USA
+1 800 893-2321