

# S-Flex enclosed drive

The best drive for commercial pump and fan applications





For more than 100 years the Square D™ by Schneider Electric brand has been known for the most reliable electrical products.

Our industry-leading electrical expertise and commitment to quality fuels our passion for drives. The S-Flex™ enclosed drive, designed with input from HVAC consultants and contractors, was developed specifically for commercial pump and fan applications, providing the most effective solution with the fastest return on investment.

### S-Flex innovation

New features including Altivar™ 212 Programming Tool App that allows a user to create and save configurations for the S-Flex from an iPad and remote indication when an operator has placed the unit in “hand” mode are some of the latest product enhancements incorporated into the product.



Save time



Save money



Save space



Think green



## Save space

The most slender design in the Flex drive family, the S-Flex enclosed drive offers a compact product with just the right features for most HVAC applications. When space is a concern, we've got you covered with:

- Slender design for minimal wall space
- Nominal space requirements between drives for side-by-side wall mounting
- Retrofitting of HVAC systems into existing mechanical rooms

## Save money

Offering unmatched value in installed cost and functionality, the S-Flex drive allows building owners, consulting engineers, and contractors to focus on the essentials of demanding commercial building applications.

More than dollars and cents, you'll save with:

- Industry-leading reduced harmonic technology — eliminating the need for line reactors and DC chokes
- Energy savings — designed with energy-economizing motor algorithms — maximizing energy savings by reducing electricity usage
- Internal PID regulator — allowing flow rates to be adjusted for actual needs without additional hardware
- Reduced equipment maintenance cost and downtime
- 24/7 live technical support

## Save time

Because specifying drives can be time-consuming, the S-Flex drive includes the most common requirements in HVAC specifications for pump and fan applications, such as:

- Simple start-up including preprogrammed parameters for pump and fan applications
- Windows®-based PCSoft software that allows you to:
  - Adjust parameters
  - Store and transfer drive configuration files
  - Monitor drive performance, including historical data
  - Configure, adjust, and control remotely
  - Store drive configuration programs
- Easy wiring conduit knockouts on the enclosure
- Dedicated wiring terminal block
- Stock availability so that the S-Flex drive is ready when you are
- Altivar 212 Programming iPad App

## Think green

The S-Flex enclosed drive assists with Leadership in Energy and Environmental Design (LEED®) certification. Green buildings enhance occupant comfort and health, decrease vacancy rates, increase building valuation, and improve the bottom line by reducing operating costs. A building that runs smoothly ensures comfortable tenants, and comfortable tenants mean less vacancy.

Going green with the S-Flex drive offers:

- Building owners the ability to take advantage of state and local government energy incentives
- More marketable buildings to tenants seeking energy-efficient/sustainable facilities
- Retrofitting of HVAC systems into existing mechanical rooms
- The most efficient method of partial load control

## Certified performance ratings

Schneider Electric is the first VFD manufacturer to receive AHRI certification for drive performance.



S-Flex drives that feature the AHRI logo have been certified to AHRI Standard 1210 and are backed by independent data verifying performance for three critical drive performance measures: total harmonic distortion, efficiency, and dv/dt motor output waveform. Like other AHRI certification programs, this third-party verification ensures that listed products have been tested to defined procedures and their performance has been verified by an AHRI certified laboratory.

## > Industry-leading reduced harmonic technology

The S-Flex drive revolutionizes harmonic mitigation with its innovative reduced harmonic technology (RHT). Significant harmonic reduction is achieved within the diode capacitor and power conversion section of the variable frequency drive, eliminating the need for a line reactor or bus reactor, which results in:

- Higher equipment efficiency
- Reduced equipment cost
- Fewer points of electrical failure
- Smaller enclosure size
- Lighter weight

Harmonics can be present in voltage, current, or both. Any power source that converts AC to DC can generate harmonics. Typical sources include:

- Office equipment
- Computers
- Medical equipment
- Microprocessors
- Uninterruptible power supplies
- Fluorescent lamp ballasts

Harmonic currents do not add additional power to the electrical system, but additional current flows through electrical wires. Effects may include:

- Overheating of electrical distribution system wiring
- Shortened transformer life
- Decreased power factor
- Disturbance of power measuring systems



- ✓ Horsepower range:
  - 1 – 40 hp at 208 VAC and 230 VAC
  - 1 – 100 hp at 460 VAC
- ✓ Optional three-phase AC line reactor for line transient protection and even further line harmonic reduction
- ✓ S-Flex drive uses an Altivar 212 drive power converter with RHT and an IGBT inverter with pulse-width modulated output
- ✓ Optional LCD text keypad
- ✓ Built-in Modbus, BACnet®, Metasys® N2, APOGEE® P1 communication capability, and options for LonWorks®
- ✓ Smoke purge override and fan damper control in both adjustable frequency controller (AFC) and bypass modes of operation
- ✓ Simple Hand/Off/Auto and VFD/ByPass selector switch for operational mode control
- ✓ Optional drive input disconnect switch provides an input line power disconnect switch between the main power disconnect and the power converter
- ✓ Optional line contactor provides an electrically interlocked line contactor between the main power disconnect and the power converter
- ✓ Power-on mode red LED indicator
- ✓ Bypass mode green LED indicator
- ✓ Terminal block for customer's control connections
- ✓ Full-voltage bypass contactors
- ✓ 100 kAIC UL® 508C rating and full-voltage bypass
- ✓ Square D circuit breaker for disconnect and overcurrent protection
- ✓ Hinged door with latches for quick and easy interior access
- ✓ Conduit knockouts on bottom of enclosure for quick and easy wiring



# > Selection guide

460 V*		Full load	Height		Width		Depth		Weight		Options
Catalog number	hp		A	in.	mm	in.	mm	in.	mm	lb	
SFD212CG4Y^	1	2.1	40.375	1,025.5	8.714	221.3	7.895	200.5	52	23.587	A06 = BACnet B06 = LonWorks C06 = Metasys N2 D06 = APOGEE P1 N06 = Modbus monitoring W = Without bypass Y = Full-voltage bypass A07 = Drive input disconnect switch B07 = Line contactor D07 = LCD text keypad X07 = Three-phase AC line reactor
SFD212DG4Y^	2	3.4	40.375	1,025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD212EG4Y^	3	4.8	40.375	1,025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD212FG4Y^	5	7.6	40.375	1,025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD212GG4Y^	7.5	11	40.375	1,025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD212HG4Y^	10	14	40.375	1,025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD212JG4Y^	15	21	40.375	1,025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD212KG4Y^	20	27	45.142	1,146.6	12.215	310.3	8.725	221.6	111	50.349	
SFD212LG4Y^	25	34	45.142	1,146.6	12.215	310.3	8.725	221.6	111	50.349	
SFD212MG4Y^	30	40	62.006	1,575.0	12.532	318.3	10.916	277.3	140	63.503	
SFD212NG4Y^	40	52	62.006	1,575.0	12.532	318.3	10.916	277.3	140	63.503	
SFD212PG4Y^	50	65	62.006	1,575.0	12.532	318.3	10.916	277.3	140	63.503	
SFD212QG4Y^	60	77	62.006	1,575.0	12.532	318.3	10.916	277.3	140	63.503	
SFD212RG4Y	75	96	64.900	1,648.5	15.243	387.2	11.915	302.7	206	93.440	
SFD212SG4Y	100	124	64.900	1,648.5	15.243	387.2	11.915	302.7	206	93.440	
230 V		Full load	Height		Width		Depth		Weight		Options
Catalog number	hp		A	in.	mm	in.	mm	in.	mm	lb	
SFD212CG3Y	1	4.2	40.375	1,025.5	8.714	221.3	7.895	200.5	52	23.587	A06 = BACnet B06 = LonWorks C06 = Metasys N2 D06 = APOGEE P1 N06 = Modbus monitoring W = Without bypass Y = Full-voltage bypass A07 = Drive input disconnect switch B07 = Line contactor D07 = LCD text keypad X07 = Three-phase AC line reactor
SFD212DG3Y	2	6.8	40.375	1,025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD212EG3Y	3	9.6	40.375	1,025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD212FG3Y	5	15.2	40.375	1,025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD212GG3Y	7.5	22	40.375	1,025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD212HG3Y	10	28	40.375	1,025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD212JG3Y	15	42	45.142	1,146.6	12.215	310.3	8.725	221.6	111	50.349	
SFD212KG3Y	20	54	45.142	1,146.6	12.215	310.3	8.725	221.6	111	50.349	
SFD212LG3Y	25	68	45.142	1,146.6	12.215	310.3	8.725	221.6	111	50.349	
SFD212MG3Y	30	80	62.006	1,575.0	12.532	318.3	10.916	277.3	140	63.503	
SFD212NG3Y	40	104	64.900	1,648.5	15.243	387.2	11.915	302.7	206	93.440	
208 V*		Full load	Height		Width		Depth		Weight		
Catalog number	hp		A	in.	mm	in.	mm	in.	mm	lb	kg
SFD212CG2Y^	1	4.6	40.375	1,025.5	8.714	221.3	7.895	200.5	52	23.587	A06 = BACnet B06 = LonWorks C06 = Metasys N2 D06 = APOGEE P1 N06 = Modbus monitoring W = Without bypass Y = Full-voltage bypass A07 = Drive input disconnect switch B07 = Line contactor D07 = LCD text keypad X07 = Three-phase AC line reactor
SFD212DG2Y^	2	7.5	40.375	1,025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD212EG2Y^	3	10.6	40.375	1,025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD212FG2Y^	5	16.7	40.375	1,025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD212GG2Y^	7.5	24.2	40.375	1,025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD212HG2Y^	10	30.8	40.375	1,025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD212JG2Y^	15	46.2	45.142	1,146.6	12.215	310.3	8.725	221.6	111	50.349	
SFD212KG2Y^	20	59.2	45.142	1,146.6	12.215	310.3	8.725	221.6	111	50.349	
SFD212LG2Y	25	74.8	45.142	1,146.6	12.215	310.3	8.725	221.6	111	50.349	
SFD212MG2Y	30	88	62.006	1,575.0	12.532	318.3	10.916	277.3	140	63.503	
SFD212NG2Y	40	114	64.900	1,648.5	15.243	387.2	11.915	302.7	206	93.440	

\*460 V and 208 V catalog numbers with B07D07 options are stocked items available in 2 – 3 days (ex., SFD212CG4YB07D07); Additional catalog numbers available using product selection. Custom orders require additional lead time (approx.18 days).

Note: All dimensions and weights are shown for S-Flex drive with bypass option.  
\*AHRI Standard 1210 Certified

## Software and apps

### SoMove™

This software enables the user to configure, set, debug, and organize maintenance tasks for the Altivar and Altistart™ product lines. It can also be used to customize the integrated display terminal menus. It can be used with a direct connection or a Bluetooth® wireless connection. Free download at [www.schneider-electric.com/en/product-range/2714-somove/](http://www.schneider-electric.com/en/product-range/2714-somove/)

### Altivar 212 Programming Tool App

The Altivar Programming Tool by Schneider Electric allows users to create and save configurations for the ATV212 and S-Flex variable torque drives. This free app is available in the Apple® App Store — search “Schneider Electric ATV212.”

## Electrical specifications

Input voltage	208 VAC ±10%, 230 VAC ±10%, 460 VAC ±10%
Displacement power factor	Approximately 0.96
Input frequency	60 Hz ±5%
Output voltage	Three-phase output, maximum voltage equal to input voltage
Galvanic isolation	Galvanic isolation between power and control (inputs, outputs, and power supplies)
Frequency range of the power converter	0.1 Hz to 500 Hz (factory setting of 60 Hz maximum)
Current limit	110% of nominal drive full-load amperage (FLA) for 60 s
Switching frequency	Selectable from 2 kHz to 16 kHz (1)
Speed reference	AI1: 0 V to +10 V, impedance = 30 kOhms; AI3: 4 mA to 20 mA, impedance = 250 kOhms 0 mA to 20 mA (reassignable, X – Y range with keypad display), manual speed control via keypad
Frequency resolution in analog reference	0.1 Hz to 100 Hz (10 bits)
Speed regulation	V/f: determined by motor slip, typically 3% SLFV (sensorless flux vector): 1%
Efficiency	Typically greater than 95%
Inputs and outputs	Three multifunction programmable logic inputs Two analog inputs; VIA (4 mA to 20 mA or 0 V to 10 V), VIB (0 V to 10 V) One analog output; X mA to Y mA or 0 V to 10 V, software selectable Two assignable output relays; one fault relay, one assignable relay, one RJ45 RS485 Modbus port
Acceleration and deceleration ramps	0.1 s to 999.9 s (adjustable in 0.1 s increments)
Motor protection	Class 10 and Class 20 overload protection with bypass in addition to controller internal electronic thermal protection
Keypad display	Self-diagnostics with fault messages in three languages. Refer to instruction manual, 30072-451-61.

## Environmental specification

Storage temperature	-13 °F to +158 °F (-25 °C to +70 °C) with vent cover removed and without derating
Operating temperature	+14 °F to +104 °F (-10 °C to +40 °C)
Humidity	95% with no condensation or dripping water, conforming to IEC 60068-2-3
Altitude	300 ft (100 m) maximum without derating; derate the current by 1% for each additional 330 ft (100 m)
Enclosure	UL Type 1
Pollution degree	Pollution degree 2 per NEMA® ICS-1 and IEC 60664-1
Resistance to vibrations (power converter only)	According to IEC 60068-2-6: 1.5 mm zero to peak from 3 Hz to 13 Hz 1 g from 13 Hz to 150 Hz
Resistance to shocks (power converter only)	According to IEC 60068-2: 15 g, 11 ms
Transit test to shock	Conforming to National Safe Transit Association and International Safe Transit Association test for packaging weighing 100 lb or less
Codes and standards	UL listed per UL 508C as incorporating Class 10 and Class 20 electronic and electromechanical overload protection. Conforms to applicable NEMA ICS, NFPA®, IEC, and ISO 9001 standards.

# > Features

- 1 Keypad display for configuration and monitoring
  - Optional LCD keypad
- 2 Through-the-door disconnect
  - Electrical disconnect circuit breaker handle with electrical lockout/tagout
- 3 Front access selector and lights
  - Hand/Off/Auto and VFD/ByPass selector switches
  - Power-on mode red LED indicator
  - Bypass mode green LED indicator
- 4 EZ-M channel mounting
  - Having the interface built into the enclosure makes parallel alignment of multiple drives quick and easy with an EZ-M mounting channel
- 5 Hinged NEMA 1-rated enclosure
  - Hinged door for quick and easy interior access
  - Run status LED
- 6 Conduit knockouts
  - Conduit knockouts on bottom of enclosure for quick and easy wiring to line and load terminals and control wiring terminations
- 7 Short-circuit protection
  - Square D circuit breaker offers electrical disconnect and overcurrent protection
  - 100,000 A interrupt current (AIC), fully coordinated current rating to UL 508C and NEMA ICS7.1
- 8 Bypass contactor
  - Full-voltage bypass contactors with electrical interlocks allow for emergency full-speed operation
  - Damper Control and Smoke Purge relays for BAS interface
- 9 Terminal block
  - Easy customer control wiring interface with terminal block connections
- 10 Three-phase AC line reactor
  - Optional factory mounted and wired to provide increased protection from line transients as well as further reduction in drive-generated line harmonics



Additional Information 24 Hour Tech Support  
1-888-SQUARE-D (1-888-778-2733)



## Schneider Electric USA, Inc.

Automation and Control Center of Excellence  
Schneider Electric USA, Inc.  
8001 Knightdale Blvd.  
Knightdale, NC 27545

Tel: 919-266-3671

altivardrives.com

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Schneider Electric nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein.

© 2016 Schneider Electric. All Rights Reserved. Schneider Electric | Life Is On, Square D, SoMove, Altivar, and Altistart are trademarks and the property of Schneider Electric SE, its subsidiaries, and affiliated companies. All other trademarks are the property of their respective owners. Apple and App Store are registered trademarks of Apple Inc. Windows is a registered trademark of Microsoft Corporation in the United States and/or other countries. • 998-19786594\_GMA-US • Design: Schneider Electric • Photos: Schneider Electric