AHRI CERTIFIED®
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Variable Frequency Drives
ANSI/AHRI Standard 1210

# S-Flex enclosed drive

The best drive for commercial pump and fan applications




altivardrives.com

Life Is On | Schneider Electric



## 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.

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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* | hp | Full load | Height | | Width | | Depth | | Weight | | Options |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Catalog number | | A | in. | mm | in. | mm | in. | mm | lb | kg | |
| SFD212CG4Yˆ | 1 | 2.1 | 40.375 | 1,025.5 | 8.714 | 221.3 | 7.895 | 200.5 | 52 | 23.587 | A06 = BACnet<br>B06 = LonWorks<br>C06 = Metasys N2<br>D06 = APOGEE P1<br>N06 = Modbus monitoring<br>W = Without bypass<br>Y = Full-voltage bypass<br>A07 = Drive input disconnect switch<br>B07 = Line contactor<br>D07 = LCD text keypad<br>X07 = Three-phase AC line reactor |
| SFD212DG4Yˆ | 2 | 3.4 | 40.375 | 1,025.5 | 8.714 | 221.3 | 7.895 | 200.5 | 52 | 23.587 | |
| SFD212EG4Yˆ | 3 | 4.8 | 40.375 | 1,025.5 | 8.714 | 221.3 | 7.895 | 200.5 | 52 | 23.587 | |
| SFD212FG4Yˆ | 5 | 7.6 | 40.375 | 1,025.5 | 8.714 | 221.3 | 7.895 | 200.5 | 52 | 23.587 | |
| SFD212GG4Yˆ | 7.5 | 11 | 40.375 | 1,025.5 | 8.714 | 221.3 | 7.895 | 200.5 | 52 | 23.587 | |
| SFD212HG4Yˆ | 10 | 14 | 40.375 | 1,025.5 | 8.714 | 221.3 | 7.895 | 200.5 | 52 | 23.587 | |
| SFD212JG4Yˆ | 15 | 21 | 40.375 | 1,025.5 | 8.714 | 221.3 | 7.895 | 200.5 | 52 | 23.587 | |
| SFD212KG4Yˆ | 20 | 27 | 45.142 | 1,146.6 | 12.215 | 310.3 | 8.725 | 221.6 | 111 | 50.349 | |
| SFD212LG4Yˆ | 25 | 34 | 45.142 | 1,146.6 | 12.215 | 310.3 | 8.725 | 221.6 | 111 | 50.349 | |
| SFD212MG4Yˆ | 30 | 40 | 62.006 | 1,575.0 | 12.532 | 318.3 | 10.916 | 277.3 | 140 | 63.503 | |
| SFD212NG4Yˆ | 40 | 52 | 62.006 | 1,575.0 | 12.532 | 318.3 | 10.916 | 277.3 | 140 | 63.503 | |
| SFD212PG4Yˆ | 50 | 65 | 62.006 | 1,575.0 | 12.532 | 318.3 | 10.916 | 277.3 | 140 | 63.503 | |
| SFD212QG4Yˆ | 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** | **hp** | **Full load** | **Height** | | **Width** | | **Depth** | | **Weight** | | **Options** |
| Catalog number | | A | in. | mm | in. | mm | in. | mm | lb | kg | |
| SFD212CG3Y | 1 | 4.2 | 40.375 | 1,025.5 | 8.714 | 221.3 | 7.895 | 200.5 | 52 | 23.587 | A06 = BACnet<br>B06 = LonWorks<br>C06 = Metasys N2<br>D06 = APOGEE P1<br>N06 = Modbus monitoring<br>W = Without bypass<br>Y = Full-voltage bypass<br>A07 = Drive input disconnect switch<br>B07 = Line contactor<br>D07 = LCD text keypad<br>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*** | **hp** | **Full load** | **Height** | | **Width** | | **Depth** | | **Weight** | | **Options** |
| Catalog number | | A | in. | mm | in. | mm | in. | mm | lb | kg | |
| SFD212CG2Yˆ | 1 | 4.6 | 40.375 | 1,025.5 | 8.714 | 221.3 | 7.895 | 200.5 | 52 | 23.587 | A06 = BACnet<br>B06 = LonWorks<br>C06 = Metasys N2<br>D06 = APOGEE P1<br>N06 = Modbus monitoring<br>W = Without bypass<br>Y = Full-voltage bypass<br>A07 = Drive input disconnect switch<br>B07 = Line contactor<br>D07 = LCD text keypad<br>X07 = Three-phase AC line reactor |
| SFD212DG2Yˆ | 2 | 7.5 | 40.375 | 1,025.5 | 8.714 | 221.3 | 7.895 | 200.5 | 52 | 23.587 | |
| SFD212EG2Yˆ | 3 | 10.6 | 40.375 | 1,025.5 | 8.714 | 221.3 | 7.895 | 200.5 | 52 | 23.587 | |
| SFD212FG2Yˆ | 5 | 16.7 | 40.375 | 1,025.5 | 8.714 | 221.3 | 7.895 | 200.5 | 52 | 23.587 | |
| SFD21GG2Yˆ | 7.5 | 24.2 | 40.375 | 1,025.5 | 8.714 | 221.3 | 7.895 | 200.5 | 52 | 23.587 | |
| SFD212HG2Yˆ | 10 | 30.8 | 40.375 | 1,025.5 | 8.714 | 221.3 | 7.895 | 200.5 | 52 | 23.587 | |
| SFD212JG2Yˆ | 15 | 46.2 | 45.142 | 1,146.6 | 12.215 | 310.3 | 8.725 | 221.6 | 111 | 50.349 | |
| SFD212KG2Yˆ | 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.*
*ˆAHRI Standard 1210 Certified*

# Specifications

| Accessories catalog numbers | |
|---|---|
| EZ-M mounting channel, 72 in. length | EZM72MC |

## 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/

**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<br>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<br>Two analog inputs; VIA (4 mA to 20 mA or 0 V to 10 V), VIB (0 V to 10 V)<br>One analog output; X mA to Y mA or 0 V to 10 V, software selectable<br>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:<br>1.5 mm zero to peak from 3 Hz to 13 Hz<br>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)

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