

S-Flex™ – Enclosed drives

The S-Flex™ enclosed drive, designed with input from HVAC consultants and contractors, was developed specifically for commercial pump applications, providing the most effective solution with the quickest payback.



Features & Benefits

The best drive for commercial pump applications

Save Time

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

- Simple start-up including preprogrammed parameters for pump 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
- Quick installation with EZ-M mounting
- Easy wiring conduit knock-outs on the enclosure
- Dedicated wiring terminal block
- Stock availability so that the S-Flex™ drive is ready when you are

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.

You'll save more than dollars and cents, with:

- Industry-leading reduced harmonic technology – eliminating the need for line reactors and DC chokes
- Energy savings – designed with energy economizing motor algorithms that maximize 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 Space

The most slender design in the 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
- Minimal space requirements between drives for side-by-side wall mounting
- Retrofitting of HVAC systems in existing mechanical rooms

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 to existing systems
- The most efficient method of partial load control



Industry-leading Reduced Harmonic Technology

The S-Flex™ drive revolutionizes harmonic mitigation with its innovative reduced harmonic technology. 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

Built in EZ-M mounting feature for quick and easy parallel alignment and mounting

S-Flex™ drive uses an Advantage 2I drive power converter with reduced harmonic technology and IGBT inverter with pulse width modulated output

Built-in Modbus® communication capability and options for LonWorks, BACnet, Metasys N2 and Apogee PI

Programming and diagnostics in plain English with PCSoft software

Adjustable frequency controller (AFC) – off – bypass selector switch

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 terminal block

Full voltage bypass contactors

100 kAIC UL 508C rating and full voltage bypass

Square D circuit breaker for disconnect and over current protection

Hinged door with latches for quick and easy interior access

Conduit knockouts on bottom of enclosure for quick and easy wiring

Selection Guide

The enclosed drive catalog number, located on the inside of the door, is coded to describe the configuration and options present. Use the following illustration to translate the catalog number into a description of the controller:

460 V		HP	Full Load A	Height		Width		Depth		Weight	
Catalog Number	in.			mm	in.	mm	in.	mm	lbs	kgs	
SFD21CG4Y	1	2.1	40.375	1025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD21DG4Y	2	3.4	40.375	1025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD21EG4Y	3	4.8	40.375	1025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD21FG4Y	5	7.6	40.375	1025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD21GG4Y	7.5	11	40.375	1025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD21HG4Y	10	14	40.375	1025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD21JG4Y	15	21	40.375	1025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD21KG4Y	20	27	45.142	1146.6	12.215	310.3	8.725	221.6	111	50.349	
SFD21LG4Y	25	34	45.142	1146.6	12.215	310.3	8.725	221.6	111	50.349	
SFD21MG4Y	30	40	62.006	1575.0	12.532	318.3	10.916	277.3	140	63.503	
SFD21NG4Y	40	52	62.006	1575.0	12.532	318.3	10.916	277.3	140	63.503	
SFD21PG4Y	50	65	62.006	1575.0	12.532	318.3	10.916	277.3	140	63.503	
SFD21QG4Y	60	77	62.006	1575.0	12.532	318.3	10.916	277.3	140	63.503	
SFD21RG4Y	75	96	64.900	1648.5	15.243	387.2	11.915	302.7	206	93.440	
SFD21SG4Y	100	124	64.900	1648.5	15.243	387.2	11.915	302.7	206	93.440	
230 V		HP	Full Load A	Height		Width		Depth		Weight	
Catalog Number	in.			mm	in.	mm	in.	mm	lbs	kgs	
SFD21CG3Y	1	4.2	40.375	1025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD21DG3Y	2	6.8	40.375	1025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD21EG3Y	3	9.6	40.375	1025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD21FG3Y	5	15.2	40.375	1025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD21GG3Y	7.5	22	40.375	1025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD21HG3Y	10	28	40.375	1025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD21JG3Y	15	42	45.142	1146.6	12.215	310.3	8.725	221.6	111	50.349	
SFD21KG3Y	20	54	45.142	1146.6	12.215	310.3	8.725	221.6	111	50.349	
SFD21LG3Y	25	68	45.142	1146.6	12.215	310.3	8.727	221.6	111	50.349	
SFD21MG3Y	30	80	62.006	1575.0	12.532	318.3	10.916	277.3	140	63.503	
SFD21NG3Y	40	104	64.900	1648.5	15.243	387.2	11.915	302.7	206	93.440	
208 V		HP	Full Load A	Height		Width		Depth		Weight	
Catalog Number	in.			mm	in.	mm	in.	mm	lbs	kgs	
SFD21CG2Y	1	4.6	40.375	1025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD21DG2Y	2	7.5	40.375	1025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD21EG2Y	3	10.6	40.375	1025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD21FG2Y	5	16.7	40.375	1025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD21GG2Y	7.5	24.2	40.375	1025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD21HG2Y	10	30.8	40.375	1025.5	8.714	221.3	7.895	200.5	52	23.587	
SFD21JG2Y	15	46.2	45.142	1146.6	12.215	310.3	8.725	221.6	111	50.349	
SFD21KG2Y	20	59.2	45.142	1146.6	12.215	310.3	8.725	221.6	111	50.349	
SFD21LG2Y	25	74.8	45.142	1146.6	12.215	310.3	8.727	221.6	111	50.349	
SFD21MG2Y	30	88	62.006	1575.0	12.532	318.3	10.916	277.3	140	63.503	
SFD21NG2Y	40	114	64.900	1648.5	15.243	387.5	11.915	302.7	206	93.440	

Specifications

Electrical Specifications	
Input voltage	208 Vac \pm 10%, 230 Vac \pm 10%, 460 Vac \pm 10%
Displacement power factor	Approximately 0.96
Input frequency	60 Hz \pm 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	150% 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	3 Multi-function programmable Logic Inputs 2 Analog inputs; VIA (4 mA to 20 mA or 0 V to 10 V), VIB (0 V to 10 V) 1 Analog output; X mA to Y mA or 0 V to 10 V, software selectable 2 Assignable output relays; 1 fault relay, 1 assignable relay 1 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. Also refer to instruction manual, 30072-451-61

Environmental Specifications	
Storage temperature	-13° F to +158° F (-25° C to +70° C) with vent cover removed and without derating
Operating temperature	+14° F to +122° F (-10° C to +50° C)
Humidity	95% with no condensation or dripping water, conforming to IEC 60068-2-3
Altitude	3300 ft (100 m) maximum without derating; derate the current by 1% for each additional 330 ft (100 m)
Enclosure	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 lbs 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

Accessories Catalog Numbers	
Modbus Cable for PCSoft	VW3A8106
EZ-M mounting channel, 72 in. length	EZM72MC
LonWorks communication card for field mounting	VW3A21312
Metasys N2 communication card for field mounting	VW3A21313
Apogee P1 communications card for field mounting	VW3A21313
BACnet communication card for field mounting	VW3A21315

S-Flex™ Series Callout

1 Keypad display for configuration and monitoring

- LED four segment display
- Run status LED
- Local/remote operation button
- Programming buttons
- Run key with LED indicator
- Stop key

2 Through the door disconnect

- Electrical disconnect circuit breaker handle with electrical lock-out/tag-out

3 Front access selector and lights

- Adjustable Frequency Controller (AFC) – off – bypass selector switch
- Power-on mode red LED indicator
- Bypass mode green LED indicator

4 EZ-M channel mounting

- EZ-M mounting feature interface built into the enclosure makes parallel alignment of multiple drives quick and easy with an EZ-M mounting channel

5 Hinged NEMA I 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 over current protection
- 100,000 A Interrupt Current (AIC) fully coordinated current rating to UL 508C and NEMA ICS7.1

8 Bypass contactor or optional non-bypass contactor

- Full voltage bypass contactors with electrical interlocks allow for emergency full speed operation

9 Terminal block

- Easy customer control wiring interface with terminal block connections





In order to provide the most efficient pump solution to our customers, Taco is now working with Schneider Electric.

This collaboration brings together Taco's pump technology with Schneider Electric Variable Frequency Drives and the drive packaging of Square D enclosures to offer the best overall pumping solution for our customers.



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