

# Altivar 212 & S-Flex enclosed variable speed drives

for 3-Phase asynchronous motors from 1 to 100 hp, 0.75 to 75 kW

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- **Altivar 212 variable speed drives.....7**
- **S-Flex enclosed variable speed drives.....29**
- **Quality Assurance.....40**
- **Services & Support.....42**



# Altivar 212 variable speed drives



S-Flex enclosed  
variable speed drives



# Altivar 212 variable speed drives

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■ <b>Introduction.....</b>	<b>8</b>
□ Applications .....	8
□ Product.....	10
□ Functions.....	11
■ <b>Specifications .....</b>	<b>12</b>
□ Electrical .....	12
□ Environmental.....	12
□ Certifications & Compliance.....	13
□ I/O & Control.....	14
■ <b>Selection Tables.....</b>	<b>17</b>
□ Dimensions .....	17
□ Short Circuit Current Ratings.....	19
■ <b>Accessories &amp; Options.....</b>	<b>20</b>
□ Configuration Tools.....	20
□ User Interface Keypads.....	21
□ Communication Networks.....	22
□ Mounting Accessories.....	24
□ Drive Input Filters.....	25
□ Drive Output Filters.....	27
■ <b>S-Flex enclosed variable speed drives.....</b>	<b>29</b>
■ <b>Quality Assurance.....</b>	<b>40</b>
■ <b>Services &amp; Support.....</b>	<b>42</b>



## Introduction

The **Altivar™ 212** drive is a frequency inverter for **1-100 HP, 0.75-75 kW three-phase asynchronous motors**.

It has been designed for the most common HVAC (Heating, Ventilation and Air Conditioning) systems.

Its design is based on eco-energy with a reduction in energy consumption of up to 70% compared to a conventional control system.

It is eco-friendly and complies with directives such as RoHS, WEEE, etc. relating to environmental protection.

The Altivar 212 is operational from the moment the power is turned on; it can be used to achieve your building's maximum energy efficiency.

## Applications

### Ventilation



### Heating & Air conditioning



### Pumping



### *Optimization of building management*

The Altivar 212 drive considerably improves building management by:

- Simplifying circuits by removing flow control valves and dampers,
- Offering flexibility and ease of adjustment for installations, thanks to its compatibility with building management system connectivity
- Reducing noise pollution (noise caused by air flow and motor)

Its various standard versions make it possible to reduce installation costs by integrating EMC filters, categories C1 to C3 depending on the model, which has the following advantages:

- Compact size
- Simplified wiring

The Altivar 212 offer helps to reduce equipment costs while optimizing its performance.

### *Compliance with international standards & certifications*

The Altivar 212 conforms to international standards and is in accordance with recommendations relating to electrical industrial control devices, including the Low Voltage Directive and IEC/EN 61800-5-1. It takes into account observing requirements in respect of electromagnetic compatibility and conforms to international standard IEC/EN 61800-3 (immunity and conducted and radiated EMC emissions).

The entire range has obtained **CE** marking according to the European Low Voltage (2006/95/EC) and EMC (2004/108/EC) Directives. The range is UL 508C, CSA, C-Tick and NOM certified.

### *Flexible communication adapted to building management*

The Altivar 212 drive is easily adapted to building management systems thanks to its numerous functions and communication protocols integrated as standard: Modbus, METASYS N2®, APOGEE FLN P1® and BACnet®. With these protocols offered as standard and the LonWorks® communication card offered as an option, the Altivar 212 drive is optimized for the building market (HVAC).

### *Quick and easy dialogue to make your installations easier to use*

Numerous programming tools are also included in the Altivar 212 offer, making installations quick, easy and cost-effective.





ATV 212H075M3X



ATV 212W075N4,  
ATV 212W075N4C



ATV 212HD22N4

## Applications (continued)

The Altivar 212 range of variable speed drives extends across a range of motor power ratings from 1 HP to 100 HP, 0.75 kW to 75 kW with the following types of power supply:

- 200...240 V three-phase, 1 HP to 40 HP, 0.75 kW to 30 kW, IP 21  
(**ATV 212H●●●M3X**)
- 380...480 V three-phase, 1 HP to 100 HP, 0.75 kW to 75 kW, IP 21  
(**ATV 212H●●●N4**)
- 380...480 V three-phase, 1 HP to 100 HP, 0.75 kW to 75 kW, UL Type 12/IP 55  
(**ATV 212W●●●N4** and **ATV 212W●●●N4C**)

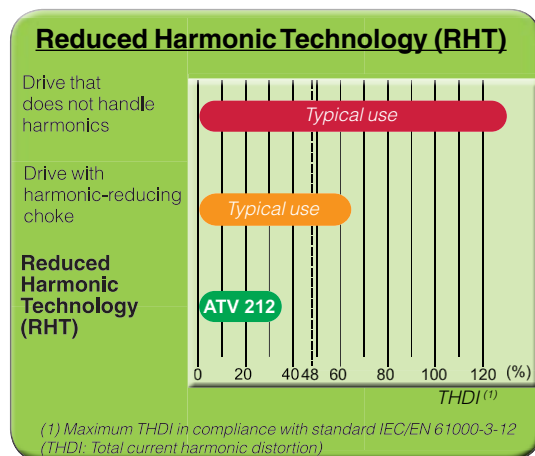
Altivar 212 drives are compact IP 21 or UL Type 12/IP 55 products which meet electromagnetic compatibility requirements and reduce current harmonics, causing minimal temperature rise in the cables.

### Compliance with electromagnetic compatibility (EMC) requirements for the protection of equipment

The built-in EMC filters in **ATV 212●●●●N4** and **ATV 212W●●●●N4C** drives and compliance with EMC requirements simplify installation and provide a very economical means of ensuring devices meet the criteria to receive the **CE** mark.

The EMC filters can be used to meet the requirements of the IEC/EN 61800-3, category C2 or C3 for **ATV 212●●●●N4**, category C1 for **ATV 212W●●●●N4C**.

**ATV 212H●●●M3X** drives have been designed without an EMC filter. Filters are available as an option and can be installed by the user to reduce emission levels.



An innovative technology for managing current harmonics: cable temperature rise reduction technology

### Innovative technology for managing harmonics

Thanks to its Reduced Harmonic Technology (RHT), the Altivar 212 drive offers immediate, disturbance-free operation. This technology avoids having to resort to additional options such as a line choke or DC choke to deal with current harmonics. This makes it possible to obtain a THDI<sup>(1)</sup> of less than 35%, a much lower value than the 48% level of THDI imposed by standard IEC/EN 61000-3-12.

With the Altivar 212 range, you avoid the cost of adding a line choke or DC choke, you reduce the time spent on wiring, you optimize the enclosure size and you reduce the losses.

This technology can also triple the service life of the DC capacitors.

### Better management of motor disturbance

The Altivar 212 offers optional motor chokes which can increase the maximum cable lengths between the drive and the motor and limit disturbance at the motor terminals.

# Altivar 212 variable speed drives

## Introduction



Side-by-side mounting of Altivar 212 drives

## Product

The compact nature of the Altivar 212 range simplifies installation and reduces costs by optimizing the size of enclosures (whether floor-standing or wall-mounted).

Altivar 212 drives can be mounted in a variety of ways to adapt to the needs of an installation. They can be mounted side by side, and can also be wall-mounted in compliance with UL Type 1 requirements using kits **VW3A3181** and **VW3A920**. They are designed to operate in an enclosure at an ambient temperature of + 40°C or + 50°C depending on the model, without derating, or from + 50°C or + 60°C depending on the model, with derating.

The Altivar 212 drive includes 3 logic inputs, 2 analog inputs, 1 analog output and 2 relay outputs (with 1 NO and 1 NO/NC contacts). It also includes an integrated 4 digit, 7 segment LED display with 7 button keypad, as well as RJ45 Modbus™ port, plus a 4 screw removable terminal block for software selectable BACnet, Modbus, METASYS N2 or APOGEE P1 communication protocols. LonWorks is available in an option card.

### Numerous configuration tools

The Altivar 212 range offers a wide range of dialogue and configuration tools that make it quick, easy and cost-effective to install.

#### LCD Keypad (3)

The Altivar 212 drive (1) can be used with the remote graphic display keypad, common to all Schneider Electric's variable speed drive ranges.

This keypad is very user-friendly when performing startup and maintenance operations thanks to its full-text screen, online help screens and text in the user's language (6 factory-installed languages available).

It can be remotely mounted on an enclosure door with IP 54 or IP 65 degree of protection.

#### SoMove software (2)

SoMove software is a PC based application. It can be used to edit the Altivar 212 drive parameters, save configurations, import them from a PC and export them to a PC.

#### Multi-Loader configuration tool (4)

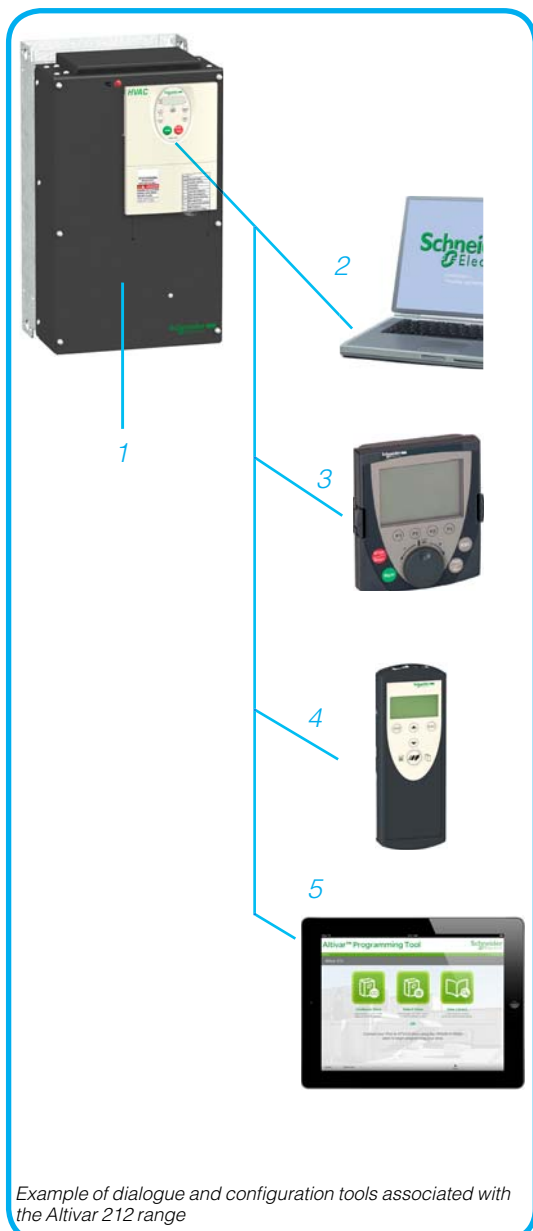
The Multi-Loader tool enables configurations to be copied from a PC or a drive and duplicated on another drive. The Altivar 212 drives must be powered-up.

#### Quick menu tool

The Altivar 212 drive offers a quick setup function in the form of its Quick menu, which includes the 10 key installation parameters (acceleration, deceleration, motor parameters, etc.).

#### Free iPad® app (5)

The Altivar 212 drive can be connected directly to an iPad with optional 30-pin mobile to RS485 with RJ45 connector converter cable (model VW3A8151R20U).



Example of dialogue and configuration tools associated with the Altivar 212 range



Example of an application requiring the use of dedicated building functions

## Functions

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### *Dedicated functions for ventilation applications*

- Noise reduction due to the switching frequency, which is adjustable up to 16 kHz during operation
- Automatic catching of a spinning load with speed detection
- Adaptation of current limiting according to speed
- Reference calibration and limitation

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### *Protection functions*

- Smoke purge system (forced operation with fault inhibition)
- Damper control with end switch interlock
- Machine protection via skip frequency function (resonance suppression).

### *Dedicated functions for pumping applications*

- Sleep/wake-up

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### *Protection functions*

- Protection against overloads and overcurrents in continuous operation (pump jamming)
- Machine mechanical protection with control of operating direction
- Protection of the installation by means of underload and overload detection

### *Universal functions designed specifically for building applications*

- Energy saving ratio
- Auto-tuning
- Integrated PID regulator with preset references and automatic/manual ("Auto/Man.") mode
- Automatic ramp adaptation, ramp switching, ramp profile
- Switching between sets of motor rating data (Multimotor)
- Switching of references and run command using the LOC/REM key
- Preset speeds
- Monitoring, measurement of energy consumption
- kWh and elapsed run time meters

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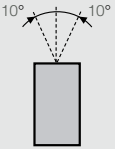
### *Protection functions*

- Motor and drive thermal protection, via a built-in PTC thermistor probe
- Protection via management of multiple detected faults and configurable alarms

### Electrical Specifications

<b>Input power</b>	Voltage	V	200 - 15% to 240 + 10% three-phase for drives ATV212H●●●M3X 380 - 15% to 480 + 10% three-phase for drives ATV212H●●●N4, W●●●N4, W●●●N4C
	Frequency	Hz	50...60 ± 5%
<b>Drive output voltages</b>		V	200...240 three-phase for drives ATV212H●●●M3X 380...480 three-phase for drives ATV212H●●●N4, W●●●N4, W●●●N4C
<b>Output frequency range</b>		Hz	0.5...200
<b>Configurable switching frequency</b>		kHz	The switching frequency can be set between 6 and 16 kHz for all ratings. These values are given for a nominal switching frequency of: <ul style="list-style-type: none"> <li>■ 12 kHz up to ATV212HD15M3X and up to ATV212HD15N4</li> <li>■ 8 kHz for ATV212HD18M3X...HD30M3X and ATV212HD18N4...HD75N4 drives</li> <li>■ 6 kHz for ATV212HD22N4S</li> </ul> for use in continuous operation at 104 °F (40 °C) ambient.  In general, derate is 10% for every 2kHz increase in carrier frequency. Refer to the Installation Manual for derating curves for each Altivar 212 drive.
<b>Speed range</b>			1...10 for asynchronous motors
<b>Transient overtorque</b>			Transient overload: 110% of the nominal drive current for 60 seconds
<b>Braking torque</b>			DC Injection only
<b>Maximum transient current</b>			110% of the nominal drive current for 60 seconds, 180% for 2 seconds
<b>Motor control profiles</b>			"For asynchronous motors: Sensorless flux vector, 2 point volts/hertz, quadratic volts/hertz, energy savings mode: an optimization motor algorithm that automatically optimizes voltage based on load."
<b>Maximum length of motor cable (including tap links)</b>	Shielded cable	m	50
	Unshielded cable	m	100
<b>Drive noise level</b>	All drives	dBA	54 dB conforming to 86/188/EEC
<b>Electrical isolation</b>			Galvanic isolation between power and control (inputs, outputs and power supplies)

### Environmental Specifications

<b>Vibration resistance</b>	Drive not DIN rail mounted		<b>According to IEC/EN 60068-2-6:</b> <ul style="list-style-type: none"> <li>■ 1,5 mm peak from 3 to 13 Hz</li> </ul> <b>According to IEC/EN 60068-2-8:</b> <ul style="list-style-type: none"> <li>■ 1 gn from 13 to 200 Hz</li> </ul>
<b>Shock resistance</b>			15 gn for 11 ms conforming to EN/IEC 60068-2-27
<b>Maximum ambient pollution</b>	Definition of insulation		<b>1 HP to 25 HP @ 200/240 V, 1 HP to 5 HP @ 380/480 V:</b> <ul style="list-style-type: none"> <li>■ Pollution degree 2 per IEC/EN 61800-5-1,</li> </ul> <b>30 HP to 40 HP @ 200/240 V, 30 HP to 100 HP @ 380/480 V:</b> <ul style="list-style-type: none"> <li>■ Pollution degree 3 per IEC/EN 61800-5-1</li> </ul>
<b>Environmental conditions Use</b>			IEC 60721-3-3 classes 3C1 and 3S2
<b>Relative humidity</b>		%	up to 95% non-condensing, IEC 60068-2-3
<b>Ambient air temperature</b>	Operation		32 °F to 104 °F (0 °C to 40 °C) operational without de-rating, up to 122 °F (50 °C) with de-rating. See Installation Manual for deratings
	Storage	ATV12●●●●●●	-13 °F to 158 °F (-25 °C to 70 °C)
<b>Maximum operating altitude</b>			Up to 3,300 ft (1,000 m) without de-rating, de-rate nominal current by 1% for each additional 330 ft (100 m) up to 10,000 ft (3,000 m) Limit to 6,600 ft (2,000 m) if supplied by corner grounded distribution system
<b>Operating position</b>	Maximum permanent angle in relation to the normal vertical mounting position		

### Certifications and Compliance

<b>Conformity to standards</b>	Altivar 212 drives have been developed to conform to international standards and the recommendations relating to electrical industrial control equipment (IEC, EN), in particular: IEC/EN 61000-3-12 THDI harmonic standard, IEC 61800-5-1.
EMC Immunity	<p>Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-6</p> <p>Radiated radio-frequency electromagnetic field immunity test level 3 conforming to IEC 61000-4-3</p> <ul style="list-style-type: none"> <li>■ Voltage dips and interruptions immunity test conforming to IEC 61000-4-11</li> <li>■ 1.2/50 µs - 8/20 µs surge immunity test level 3 IEC 61000-4-5</li> <li>■ Electrical fast transient/burst immunity test level 4 conforming to IEC 61000-4-4</li> <li>■ Electrostatic discharge immunity test level 3 conforming to IEC 61000-4-2</li> </ul>
Conducted & Radiated EMC emissions for drives	<p><b>ATV212H●●●N4 and W●●●N4 range:</b></p> <ul style="list-style-type: none"> <li>■ Integrated Class 2 EMC filter for radiated and conducted emissions, IEC 61800-3, category C2 and C3</li> </ul> <p><b>ATV212W●●●N4C range:</b></p> <ul style="list-style-type: none"> <li>■ Integrated Class 2 EMC filter for radiated and conducted emissions, IEC 61800-3, category C1</li> </ul> <p><b>ATV212H●●●M3X range:</b></p> <ul style="list-style-type: none"> <li>■ No integrated EMC filter (use optional filters to reduce emission levels)</li> </ul>
<b>CE marking</b>	The drives are marked CE according to the European low voltage (2006/95/EC) and EMC (2004/108/EC) directives
<b>Product certifications</b>	UL File E116875, CSA 2278406, UL508C, Plenum rated per UL508C for UL1995 installations, C-Tick, NOM 117, CE marked
<b>Degree of protection</b>	<p><b>ATV212H range:</b></p> <ul style="list-style-type: none"> <li>■ IP 20, Conformal coating per IEC 60721-3-3 classes 3C2 and 3S2, Type 1 with optional conduit entrance kit</li> </ul> <p><b>ATV212W range:</b></p> <ul style="list-style-type: none"> <li>■ Type 12/IP 55, Conformal coating per IEC 60721-3-3 classes 3C2 and 3S2</li> </ul>

### I/O and Control Specifications

Available internal supplies	P24	<b>Short-circuit and overload protection:</b> <ul style="list-style-type: none"> <li>24 Vdc supply (min. 21 Vdc, max. 27 Vdc), maximum current: 200 mA</li> </ul>
Configurable Analog input	VIB	Voltage analog input, configurable as an analog input or as a PTC probe input. <b>Voltage analog input:</b> <ul style="list-style-type: none"> <li>0–10 Vdc, impedance 30 kW max. voltage 24 Vdc</li> <li>Max. sampling time: 22 ms ±0.5 ms</li> <li>Resolution: 10 bits</li> <li>Accuracy: ±0.6% for a temperature variation of 140 °F (60 °C)</li> <li>Linearity: ±0.15% of the maximum value</li> </ul> <b>PTC probe input:</b> <ul style="list-style-type: none"> <li>6 probes max. mounted in series</li> <li>Nominal value &lt; 1.5 kW</li> <li>Trip resistance 3 kW, reset value 1.8 kW</li> <li>Short-circuit detection threshold &lt; 50 W</li> </ul>
Configurable Analog output	FM	<b>1 switch-configurable (SW101) voltage or current analog output:</b> <ul style="list-style-type: none"> <li>Voltage analog output 0–10 Vdc, minimum load impedance 7.62 kW</li> <li>Current analog output X–Y mA by programming X and Y from 0 to 20 mA, maximum load impedance: 970 Ω</li> <li>Max. sampling time: 2 ms ±0.5 ms</li> <li>Resolution: 10 bits</li> <li>Accuracy: ±1 % for a temperature variation of 140 °F (60 °C)</li> <li>Linearity: ±0.2%</li> </ul>
Configurable Relay outputs	FLA, FLB, FLC	1 relay logic output, 1 N/O contact, and 1 N/C contact with common point <b>Minimum switching capacity:</b> <ul style="list-style-type: none"> <li>10 mA for 5 Vdc</li> </ul> <b>Maximum switching capacity:</b> <ul style="list-style-type: none"> <li>On resistive load (cos φ = 1): 5 A for 250 Vac or 30 Vdc</li> <li>On inductive load (cos φ = 0.4 and L/R = 7 ms): 2 A for 250 Vac or 30 Vdc</li> </ul> Max. response time: 10 ms
	RYA, RYC	1 relay logic output, 1 N/O contact <b>Minimum switching capacity:</b> <ul style="list-style-type: none"> <li>3 mA for 24 Vdc</li> </ul> <b>Maximum switching capacity:</b> <ul style="list-style-type: none"> <li>On resistive load (cos φ = 1): 3 A for 250 Vac or 30 Vdc</li> <li>On inductive load (cos φ = 0.4 and L/R = 7 ms): 2 A for 250 Vac or 30 Vdc</li> </ul> Max. response time: 7 ms ± 0.5 ms
LI logic inputs	F, R, RES	<b>3 programmable logic inputs, 24 Vdc, compatible with level 1 PLC, IEC 65A-68 standard</b> <ul style="list-style-type: none"> <li>Impedance: 4.7 kW</li> <li>Maximum voltage: 30 Vdc</li> <li>Max. sampling time: 2 ms ±0.5 ms</li> <li>Multiple assignment makes it possible to configure several functions on one input</li> </ul> <b>Positive logic (Source):</b> State 0 if ≤ 5 Vdc or logic input not wired, state 1 if ≥ 11 Vdc <b>Negative logic (Sink):</b> State 0 if ≥ 16 Vdc or logic input not wired, state 1 if ≤ 10 Vdc
Configurable Analog/Logic output	VIA	<b>Switch-configurable voltage or current analog input:</b> <ul style="list-style-type: none"> <li>Voltage analog input: 0–10 Vdc, impedance 30 kW maximum voltage: 24 Vdc</li> <li>Analog current input: X–Y mA by programming X and Y from 0 to 20 mA, impedance = 250 W</li> <li>Max. sampling time: 3.5 ms ±0.5 ms</li> <li>Resolution: 10 bits</li> <li>Accuracy: ±0.6% for a temperature variation of 140 °F (60 °C)</li> <li>Linearity: ±0.15% of the maximum value</li> </ul> *This analog input is also configurable as a logic input. Consult the Altivar 212 Programming Manual for more information.

### I/O and Control Specifications (continued)

<b>Protocol</b>		Modbus
<b>Structure</b>	Connector	1 RJ45 connector
	Physical interface	2-wire RS 485
	Transmission mode	RTU
	Transmission speed	Configurable via the Human-Machine interface, remote graphic display keypad or SoMove setup software: 4800 bps, 9600 bps, 19200 bps or 38400 bps
	Number of subscribers	31 maximum
	Polarization	No polarization impedance. This must be provided by the wiring system (for example, in the master)
	Address	1 to 247, configurable via the Human-Machine interface, remote display terminal or SoMove setup software
<b>Embedded Communications</b>		<ul style="list-style-type: none"> <li>■ RJ45 port for remote keypad connection</li> <li>■ Multi-loader</li> <li>■ PC software</li> <li>■ Bluetooth dongle</li> </ul> <p><b>Embedded four screw removable terminal for daisy chain connection for these communication networks:</b></p> <ul style="list-style-type: none"> <li>■ Modbus</li> <li>■ BACnet</li> <li>■ Metesys N2</li> <li>■ Apogee P1</li> </ul>
<b>Diagnostics</b>	Via the on board interface or remote graphic display keypad	On display unit: 4 digit, 7 segment LED display
<b>Maximum I/O wire size and tightening torque</b>		<p><b>Screw Terminals</b></p> <ul style="list-style-type: none"> <li>■ Wire size: 0.75 to 2.5 mm<sup>2</sup> (AWG 18 to 14)</li> <li>■ Tightening Torque: 0.5 to 0.6 N•m (4.4 to 5.3 lb-in)</li> </ul> <p><b>Spring Terminals</b></p> <ul style="list-style-type: none"> <li>■ 0.2 to 1 mm<sup>2</sup> (AWG 24 to 16)</li> </ul>
<b>Acceleration and deceleration ramps</b>		<p>Ramp profile:</p> <ul style="list-style-type: none"> <li>■ Linear from 0 to 3200 s</li> <li>■ S ramp</li> <li>■ U ramp</li> </ul> <p>Automatic adaptation of deceleration ramp time if braking capacities exceeded, although this adaptation can be disabled (use of braking unit)</p>
<b>Internal braking</b>		By DC injection: automatically as soon as the estimated output frequency drops to < 0.2 Hz, period adjustable from 0.1 to 30 s or continuous, current adjustable from 0 to 1.2 In
<b>Main drive protection features</b>		<ul style="list-style-type: none"> <li>■ Thermal protection against overheating</li> <li>■ Protection against short-circuits between motor phases</li> <li>■ Overcurrent protection between motor phases and ground protection in the event of line overvoltage and undervoltage</li> <li>■ Input phase loss protection, in three-phase</li> </ul>
<b>Motor protection</b>		Class 10 thermal protection integrated in the drive by continuous calculation of the I <sup>2</sup> t
<b>Frequency resolution</b>		Display unit: 0.1 Hz Analog inputs: 10-bit A/D converter
<b>Response time on a change of setpoint</b>		<p>22 ms ± 0.5 ms (VIB) - analog input(s)</p> <p>3.5 ms ± 0.5 ms (VIA) - analog input(s)</p> <p>2 ms ± 0.5 ms (RES) - discrete input(s)</p> <p>2 ms ± 0.5 ms (R) - discrete input(s)</p> <p>2 ms ± 0.5 ms (F) - discrete input(s)</p>

### Additional Information

<b>Integrated Fan and Pump Functionality</b>	<ul style="list-style-type: none"> <li>■ Run command Input to drive by remote contact from the BAS, 24 vdc supplied by VFD</li> <li>■ Speed command Input to drive from the BAS; typically 4-20mAdc or 0-10 Vdc</li> <li>■ Run status Output contact from drive to the BAS; 1 N.O. contact on drive</li> <li>■ Speed feedback Analog output from drive to the BAS; typically 4-20mAdc, or assignable to meter values</li> <li>■ Detected Fault Output contact from drive to the BAS; 1 N.O. &amp; 1 N.C. contact on drive</li> <li>■ Loss of Speed Configuration to run at last speed or a pre-defined speed on loss of speed command</li> <li>■ Automatic Restart Selectable configuration to automatically restart after cause of the detected fault is cleared</li> <li>■ Skip Frequency Bands Three skip frequency settings with adjustable bandwidth to tune out resonating frequencies in piping or ductwork</li> <li>■ Local/Remote Control Keypad selectable: local keypad control for Run, Stop and speed control or from remote signal from BAS</li> <li>■ Catch on the fly configuration to initiate speed and direction search to provide smooth start of windmilling fans</li> <li>■ Damper Control Relay Output on the drive to control damper opening sequence, and wait for feedback to start the motor</li> <li>■ Smoke Purge Override Logic Input on the drive configured to run the motor at configured speed for forced ventilation</li> <li>■ Broken Belt Detection Configuration to detect under load condition and initiate alarm sequence</li> <li>■ PID Control Set point and feedback inputs for proportional, integral, and derivative control</li> <li>■ Sleep/Wake-up Configuration in the drive to stop the pump at low or no flow and re-start on demand for flow</li> <li>■ Pump Jam Management Configuration to manage blocked pump impeller</li> <li>■ Motor direction protection Configuration to avoid operation in reverse direction</li> </ul>
<b>Typical Air Handling Applications</b>	<ul style="list-style-type: none"> <li>■ HVAC supply and return fans</li> <li>■ Exhaust and ventilation fans</li> <li>■ Cooling tower fans</li> <li>■ Energy recovery wheels</li> <li>■ Typical pumping</li> </ul>
<b>Harmonic Abatement</b>	<p>Embedded reduced harmonic technology provides &lt;35% THDI at VFD input terminals, which is equivalent to a 3% line reactor or DC choke.</p>
<b>Power Factor</b>	<p>Above 99%</p>
<b>Efficiency</b>	<p>Above 96% at full load</p>



# Altivar 212 variable speed drives

# Selection Table IP 21 drives



ATV 212H075M3X  
EMC plate not mounted



ATV 212HD15N4  
EMC plate not mounted



ATV 212HD55N4  
EMC plate not mounted

## IP 21 drives (frequency range from 0.5 to 200 Hz)

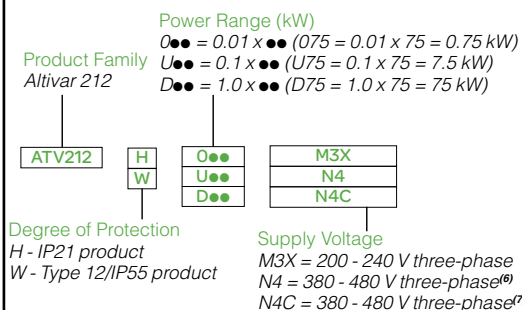
Motor Power	Line supply		Altivar 212							Part number	Frame size	Weight	
	Line current <sup>(1)</sup>	Maximum prospective line Isc	Max. continuous output current (In) <sup>(2)</sup>	Maximum transient current for 60 s	Dissipated power at maximum output current	THDI <sup>(3)</sup>	200 V 240 V		230 V			240 V	
							A	A				A	A
<b>Three-phase supply voltage: 200...240 V 50/60 Hz, without EMC filter<sup>(4)</sup></b>													
1	0.75	3.3	2.7	5	4.6	5.1	63	31.3		ATV212H075M3X	1	4.0	1.8
2	1.5	6.1	5.1	5	7.5	8.3	101	31.6		ATV212HU15M3X	1	4.0	1.8
3	2.2	8.7	7.3	5	10.6	11.7	120	30.7		ATV212HU22M3X	1	4.0	1.8
-	3	-	10	5	13.7	15.1	146	32.4		ATV212HU30M3X	2	6.7	3.1
5	4	14.6	13	5	18.7	19.3	193	31.1		ATV212HU40M3X	2	6.7	3.1
7.5	5.5	20.8	17.3	22	24.2	26.6	249	30.7		ATV212HU55M3X	3	13.5	6.1
10	7.5	27.9	23.3	22	32	35.2	346	30.8		ATV212HU75M3X	3	13.5	6.1
15	11	42.1	34.4	22	46.2	50.8	459	35.5		ATV212HD11M3X	4	25.4	11.5
20	15	56.1	45.5	22	61	67.1	629	33.3		ATV212HD15M3X	4	25.4	11.5
25	18.5	67.3	55.8	22	74.8	82.3	698	32		ATV212HD18M3X	4	25.4	11.5
30	22	80.4	66.4	22	88	96.8	763	35		ATV212HD22M3X	5	60.6	27.4
40	30	113.3	89.5	22	117	128.7	1085	32.1		ATV212HD30M3X	7	85.4	38.7
			<b>380 V 480 V</b>		(5)		<b>380 V</b>						
HP	kW	A	A	kA	A	A	W	%			lbs	kg	
<b>Three-phase supply voltage: 380...480 V 50/60 Hz, with integrated category C2 or C3 EMC filter</b>													
1	0.75	1.7	1.4	5	2.2	2.4	55	32.8		ATV212H075N4	1	4.4	2.0
2	1.5	3.2	2.5	5	3.7	4	78	30.9		ATV212HU15N4	1	4.4	2.0
3	2.2	4.6	3.6	5	5.1	5.6	103	30.5		ATV212HU22N4	1	4.4	2.0
-	3	6.2	4.9	5	7.2	7.9	137	31.2		ATV212HU30N4	2	7.4	3.4
5	4	8.1	6.4	5	9.1	10	176	30.6		ATV212HU40N4	2	7.4	3.4
7.5	5.5	10.9	8.6	22	12	13.2	215	30.5		ATV212HU55N4	2	7.4	3.4
10	7.5	14.7	11.7	22	16	17.6	291	30.9		ATV212HU75N4	3	14.2	6.5
15	11	21.1	16.8	22	22.5	24.8	430	30.4		ATV212HD11N4	3	14.2	6.5
20	15	28.5	22.8	22	30.5	33.6	625	30.9		ATV212HD15N4	4	25.7	11.7
25	18.5	34.8	27.8	22	37	40.7	603	30.5		ATV212HD18N4	4	25.7	11.7
30	22	41.1	32.6	22	43.5	47.9	723	31.9		ATV212HD22N4S	4	25.7	11.7
30	22	41.6	33.1	22	43.5	47.9	626	30.7		ATV212HD22N4	5	58.3	26.4
40	30	56.7	44.7	22	58.5	64.4	847	30		ATV212HD30N4	5	58.3	26.4
50	37	68.9	54.4	22	79	86.9	976	30.3		ATV212HD37N4	6	84.0	38.1
60	45	83.8	65.9	22	94	103.4	1253	30.2		ATV212HD45N4	6	84.0	38.1
75	55	102.7	89	22	116	127.6	1455	32.7		ATV212HD55N4	7	122.1	55.4
100	75	141.8	111.3	22	160	176	1945	31.1		ATV212HD75N4	7	122.1	55.4

### Dimensions (overall)

Frame size	W x H x D			
	EMC plate mounted		EMC plate not mounted	
	inches	mm	inches	mm
1	4.2 x 7.6 x 5.9	107 x 192 x 150	4.2 x 5.6 x 5.9	107 x 143 x 150
2	16.2 x 9.1 x 5.9	142 x 232 x 150	16.2 x 7.2 x 5.9	142 x 184 x 150
3	7.1 x 12.1 x 6.7	180 x 307 x 170	7.1 x 9.1 x 6.7	180 x 232 x 170
4	9.6 x 15.9 x 7.5	245 x 405 x 190	9.6 x 13 x 7.5	245 x 330 x 190
5	9.4 x 21.3 x 8.4	240 x 542 x 214	9.4 x 16.5 x 8.4	240 x 420 x 214
6	9.4 x 26.1 x 9.6	240 x 663 x 244	9.4 x 21.7 x 9.6	240 x 550 x 244
7	12.6 x 28.5 x 11.4	320 x 723 x 290	12.6 x 23.8 x 11.4	320 x 605 x 290

- (1) Typical value for the indicated motor power and for the maximum prospective line Isc.  
 (2) Values given for nominal switching frequency of 12 kHz up to ATV212HD15M3X and up to ATV212HD15N4 or 8 kHz for ATV21HD18M3X...HD30M3X and ATV212HD18N4...HD75N4, for use in continuous operation. Switching frequency can be set between 6 and 16 kHz for all ratings. Above 8 kHz or 12 kHz, depending on the rating, drives will reduce switching frequency automatically in the event of an excessive temperature rise. For continuous operation above the nominal switching frequency, derate nominal drive current. Nominal motor current must not exceed this derating value. See the derating curves on our website [www.schneider-electric.com](http://www.schneider-electric.com).  
 (3) Total current harmonic distortion in accordance with IEC/EN 61000-3-12.  
 (4) Drives are supplied with an EMC plate, for customer assembly.  
 (5) Value given at 380 V (IEC)/460 V (NEC).  
 (6) with integrated EMC filter C2, C3  
 (7) with integrated C1 EMC filter for UL Type 12/IP55 products ATV212W\*\*\*\*\*

### Part Number Explanation



# Altivar 212

## variable speed drives

# Selection Table

## UL Type 12/IP 55 drives



ATV 212W075N4



ATV 212WU55N4



ATV 212WD22N4,  
ATV 212WD22N4C

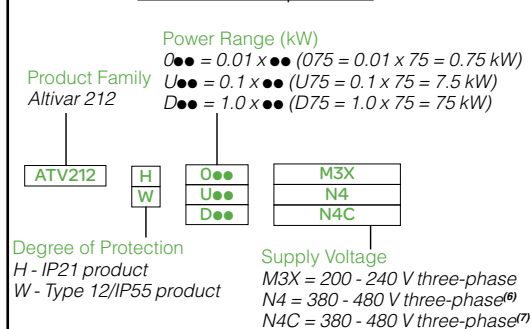
### UL Type 12/IP 55 drives (frequency range from 0.5 to 200 Hz)

Motor Power	Line supply				Altivar 212						
	Line current <sup>(1)</sup>		Maximum prospective line Isc	Max. continuous output current (In) <sup>(2)</sup>	Maximum transient current for 60 s	THDI <sup>(3)</sup>	Part number	Frame size	Weight		
	380 V	480 V							lbs	kg	
HP	kW	A	A	kA	A	A	%				
<b>Three-phase supply voltage: 380...480 V 50/60 Hz, with integrated category C2 or C3 EMC filter</b>											
1	0.75	1.7	1.4	5	2.2	2.4	32.8	ATV212W075N4	8	15.4	7.0
2	1.5	3.2	2.5	5	3.7	4	30.9	ATV212WU15N4	8	15.4	7.0
3	2.2	4.6	3.6	5	5.1	5.6	30.5	ATV212WU22N4	8	15.4	7.0
-	3	6.2	4.9	5	7.2	7.9	31.2	ATV212WU30N4	9	21.3	9.7
5	4	8.1	6.4	5	9.1	10	30.6	ATV212WU40N4	9	21.3	9.7
7.5	5.5	10.9	8.6	22	12	13.2	30.5	ATV212WU55N4	9	21.3	9.7
10	7.5	14.7	11.7	22	16	17.6	30.9	ATV212WU75N4	9	24.1	11.0
15	11	21.2	16.9	22	22.5	24.8	30.9	ATV212WD11N4	10	66.8	30.3
20	15	28.4	22.6	22	30.5	33.6	30.4	ATV212WD15N4	10	66.8	30.3
25	18.5	34.9	27.8	22	37	40.7	30.5	ATV212WD18N4	11	82.5	37.4
30	22	41.6	33.1	22	43.5	47.9	30.7	ATV212WD22N4	12	109.1	49.5
40	30	56.7	44.7	22	58.5	64.4	30	ATV212WD30N4	12	109.1	49.5
50	37	68.9	54.4	22	79	86.9	30.3	ATV212WD37N4	13	126.5	57.4
60	45	83.8	65.9	22	94	103.4	30.2	ATV212WD45N4	13	126.5	57.4
75	55	102.7	89	22	116	127.6	32.7	ATV212WD55N4	14	136.5	61.9
100	75	141.8	111.3	22	160	176	31.1	ATV212WD75N4	14	136.5	61.9
<b>Three-phase supply voltage: 380...480 V 50/60 Hz, with integrated category C1 filter</b>											
1	0.75	1.7	1.4	5	2.2	2.4	32.8	ATV212W075N4C	8	16.5	7.5
2	1.5	3.2	2.6	5	3.7	4	30.9	ATV212WU15N4C	8	16.5	7.5
3	2.2	4.6	3.7	5	5.1	5.6	30.5	ATV212WU22N4C	8	16.5	7.5
-	3	6.2	5	5	7.2	7.9	31.2	ATV212WU30N4C	9	23.3	10.6
5	4	8.2	6.5	5	9.1	10	30.6	ATV212WU40N4C	9	23.3	10.6
7.5	5.5	11	8.7	22	12	13.2	30.5	ATV212WU55N4C	9	23.3	10.6
10	7.5	14.7	11.7	22	16	17.6	30.9	ATV212WU75N4C	9	26.1	11.9
15	11	21.1	16.7	22	22.5	24.8	30.9	ATV212WD11N4C	10	80.5	36.5
20	15	28.4	22.8	22	30.5	33.6	30.4	ATV212WD15N4C	10	80.5	36.5
25	18.5	34.5	27.6	22	37	40.7	30.5	ATV212WD18N4C	11	99.2	45.0
30	22	41.1	33.1	22	43.5	47.9	30.7	ATV212WD22N4C	12	129.0	58.5
40	30	58.2	44.4	22	58.5	64.4	30	ATV212WD30N4C	12	129.0	58.5
50	37	68.9	54.4	22	79	86.9	30.3	ATV212WD37N4C	13	170.6	77.4
60	45	83.8	65.9	22	94	103.4	30.2	ATV212WD45N4C	13	170.6	77.4
75	55	102.7	89	22	116	127.6	32.7	ATV212WD55N4C	14	194.9	88.4
100	75	141.8	111.3	22	160	176	31.1	ATV212WD75N4C	14	194.9	88.4

### Dimensions (overall)

Frame size	W x H x D	
	inches	mm
8	8.5 x 11.7 x 7.6	215 x 297 x 192
9	9.1 x 13.4 x 8.2	230 x 340 x 208
10	11.4 x 22 x 12.4	290 x 560 x 315
11	12.2 x 26.2 x 12.4	310 x 665 x 315
12	11.2 x 28.3 x 12.4	284 x 720 x 315
13	11.2 x 34.6 x 13.5	284 x 880 x 343
14	14.3 x 39.4 x 14.3	362 x 1000 x 364

### Part Number Explanation



# Altivar 212

## variable speed drives

## Short Circuit Current Ratings

Altivar 212					Short Circuit Current Ratings <sup>(6)</sup>								
(Y) Input voltage 60 Hz V	HP	kW	Input rating: <sup>(1)</sup> kA	Part number	With circuit breaker			With GVxP				With fuses	
					(Z1),(Z2) PowerPact	(X) SCCR <sup>(3)</sup> kA	(X) SCCR <sup>(4)</sup> kA	(Z1),(Z2) GV2P/3P Type E <sup>(4),(5)</sup>	GVxP voltage rating V	HP	(X) SCCR kA	(Z1),(Z2) Fuse <sup>(6)</sup> 600V A	(X) SCCR <sup>(3),(4)</sup> kA
<b>Three-Phase Input, without line reactor</b>													
208V, 3 phase	1	0.75	100	ATV212H075M3X	HDL36015	22	22	GV2P10	240	1.5	22	10	100
	2	1.5	100	ATV212HU15M3X	HDL36015	22	22	GV2P14	240	3	22	15	100
	3	2.2	100	ATV212HU22M3X	HDL36020	22	22	GV2P16	240	3	22	30	100
	4	3	100	ATV212HU30M3X	HDL36040	22	22	GV2P20	240	5	22	35	100
	5	4	100	ATV212HU40M3X	HDL36040	22	22	GV2P20	240	5	22	35	100
	7.5	5.5	100	ATV212HU55M3X	HDL36050	22	22	GV2P22	240	7.5	22	50	100
	10	7.5	100	ATV212HU75M3X	HDL36070	22	22	GV2P32	240	10	22	60	100
	15	11	100	ATV212HD11M3X	HDL36100	22	22	GV3P50	240	10	22	100	100
	20	15	100	ATV212HD15M3X	HDL36125	22	22	GV3P65	240	15	22	125	100
	25	18.5	100	ATV212HD18M3X	HDL36175	22	22	-	-	-	-	150	100
	30	22	100	ATV212HD22M3X	HDL36200	22	22	-	-	-	-	175	50 <sup>3</sup> /100 <sup>4</sup>
	40	30	100	ATV212HD30M3X	HDL36250	22	22	-	-	-	-	200	100
230V, 3 phase	1	0.75	100	ATV212H075M3X	HDL36015	22	22	GV2P10	240	1.5	22	10	100
	2	1.5	100	ATV212HU15M3X	HDL36015	22	22	GV2P10	240	1.5	22	15	100
	3	2.2	100	ATV212HU22M3X	HDL36020	22	22	GV2P14	240	3	22	30	100
	4	3	100	ATV212HU30M3X	HDL36035	22	22	GV2P20	240	5	22	35	100
	5	4	100	ATV212HU40M3X	HDL36035	22	22	GV2P20	240	5	22	35	100
	7.5	5.5	100	ATV212HU55M3X	HDL36045	22	22	GV2P21	240	7.5	22	45	100
	10	7.5	100	ATV212HU75M3X	HDL36060	22	22	GV2P32	240	10	22	60	100
	15	11	100	ATV212HD11M3X	HDL36090	22	22	GV3P40	240	10	22	90	100
	20	15	100	ATV212HD15M3X	HDL36125	22	22	GV3P50	240	10	22	110	100
	25	18.5	100	ATV212HD18M3X	HDL36150	22	22	-	-	-	-	150	100
	30	22	100	ATV212HD22M3X	HDL36175	22	22	-	-	-	-	175	50 <sup>3</sup> /100 <sup>4</sup>
	40	30	100	ATV212HD30M3X	HDL36225	22	22	-	-	-	-	200	100
480V, 3 phase	1	0.75	100	ATV212H075N4	HDL36015	-	22	GV2P07	480Y/277	1	22	5	100
	2	1.5	100	ATV212HU15N4	HDL36015	-	22	GV2P08	480Y/277	2	22	7.5	100
	3	2.2	100	ATV212HU22N4	HDL36015	-	22	GV2P10	480Y/277	3	22	10	100
	4	3	100	ATV212HU30N4	HDL36020	-	22	GV2P14	480Y/277	5	22	15	100
	5	4	100	ATV212HU40N4	HDL36020	-	22	GV2P14	480Y/277	5	22	15	100
	7.5	5.5	100	ATV212HU55N4	HDL36025	-	22	GV2P16	480Y/277	10	22	20	100
	10	7.5	100	ATV212HU75N4	HDL36030	-	22	GV2P20	480Y/277	10	22	30	100
	15	11	100	ATV212HD11N4	HDL36045	-	22	GV2P21	480Y/277	15	22	45	100
	20	15	100	ATV212HD15N4	HDL36060	10	22	GV2P22	480Y/277	15	22	60	100
	25	18.5	100	ATV212HD18N4	HDL36070	10	22	GV2P32	480Y/277	20	22	80	100
	30	22	100	ATV212HD22N4S	HDL36090	10	22	GV3P40	480Y/277	25	22	90	100
	30	22	100	ATV212HD22N4	HDL36090	-	22	-	-	-	-	90	100
	40	30	100	ATV212HD30N4	HDL36125	-	22	-	-	-	-	110	100
	50	37	100	ATV212HD37N4	HDL36125	10	10	-	-	-	-	125	100
	60	45	100	ATV212HD45N4	HDL36150	10	10	-	-	-	-	150	100
	75	55	100	ATV212HD55N4	JDL36175	10	10	-	-	-	-	200	100
100	75	100	ATV212HD75N4	JDL36225	10	10	-	-	-	-	-	100	

(1) The max. prospective short-circuit current value for which these Altivar 212 drives can be installed on without adding impedance, with regard to input current peaks.

The Short Circuit Current Rating for the drive may be lower due to the type of overcurrent protection and type of installation.

(2) An output short-circuit test performed for 100 kA. A breakdown of components test was also performed by shorting components internal to the drive.

These ratings allow proper coordination of short-circuit protection.

(3) Ratings also apply to ATV212 Type 1 product, ie: an ATV212 fitted with a conduit box.

(4) Ratings apply to an ATV212 mounted in a non-ventilated Type 1, 3R, 4(X) or 12 rated enclosure. Minimum enclosure volume is 3.375 times the drive volume.

(5) 480Y/277 V ratings are for Wye connected electrical distribution systems only. GV2P•• self protected manual combination starter must be used with GV2GH7 insulating barrier to meet UL 508

Type E rating. GV3P•• must be used with GV3G66 and GVAM11 in order to meet UL508 rating.

(6) Fuse type: Class J, can be fast acting or time delay, or Class CC.

# Altivar 212 variable speed drives

## Accessories & Options



Configuration with SoMove software

### Configuration tools

#### SoMove setup software

SoMove is PC user-friendly setup software for the device that allows users to configure, start-up, and maintain.

#### USB/RJ45 cable

A USB connector and an RJ45 connector used for connecting a PC to the Altivar 212 drive. Length: 8.2 ft., 2.5 m

#### Modbus/Uni-Telway-Bluetooth® adaptor

For establishing a Bluetooth® wireless connection between the Altivar 212 drive and a PC equipped with a Bluetooth® wireless link. Pack contents:

- 1 Bluetooth® adaptor (range 65.6 ft., 20 m, class 2) with an RJ45 connector
- For SoMove : 3.3 x .3 ft., 1 x 0.1 m, cordset with 2 RJ 45 connectors <sup>(1)</sup>
- For TwidoSuite : 3.3 x .3 ft, 1 x 0.1 m, cordset with 1 RJ 45 connector and 1 connector of mini DIN type

#### USB - Bluetooth® adaptor for PC

Required for a PC which is not equipped with Bluetooth® technology. Connects to a USB port on the PC. Range of 32.8 ft, 10 m, (class 2).

Description	For drives	Part number	Weight	
			lbs	kg
SoMove setup software	ATV212●●●●●●	Direct download above	-	-
USB/RJ45 cable	ATV212●●●●●●	TCSMCNAM3M002P	-	-
Modbus/Uni-Telway-Bluetooth® adaptor	ATV212●●●●●●	TCSWAAC13FB	0.1	0.1
USB - Bluetooth® adaptor for PC	-	VW3A8115	0.4	0.2



Configuration with Multi-Loader tool or iPad connected to the Altivar 212 drive

#### Multi-Loader tool (1)

For copying a configuration on a PC or drive and duplicating it on another drive. The Altivar 212 drives do not need to be powered-up.

Supplied with the tool:

- 1 cordset equipped with 2 RJ45 connectors
- 1 cordset equipped with a USB type A connector and a USB Mini-B type connector
- 1 x 2 GB SD memory card
- 1 female/female RJ45 adaptor
- 4 AA/LR6 1.5 V batteries

**Note:** Parameter files created using SoMove cannot be directly transferred to the Multi-Loader tool.

#### Cordset for Multi-Loader tool (2)

For connecting the Multi-Loader tool to the Altivar 212 drive. Equipped with a non-locking RJ45 connector with special mechanical catch on the drive end and an RJ45 connector on the Multi-Loader end.

#### Altivar Programming Tool iPad App(3)

For creating and saving configurations for the Altivar 212 and S-Flex variable speed drives. Available for free on iTunes.

#### Cordset for iPad (4)

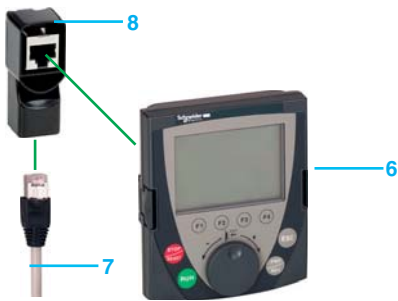
For connecting the iPad to the Altivar 212 drive. Equipped with one 30-pin mobile to RS485 converter cable with RJ45 connector.

Description	For drives	Part number	Weight	
			lbs	kg
Multi-Loader tool (1)	ATV212●●●●●●	VW3A8121	-	-
Cordset for Multi-Loader tool (2)	ATV212●●●●●●	VW3A8126	-	-
Altivar Programming Tool iPad App	ATV212●●●●●●	Available on iTunes	-	-
30-pin mobile / RS485 with RJ45 connector	ATV212●●●●●●	VW3A8151R20U	-	-

(1) Also includes other components for connecting compatible Schneider Electric devices.



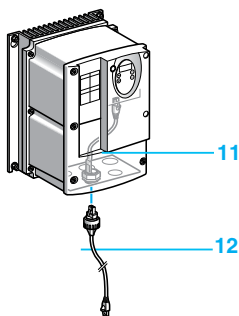
Remote graphic display keypad



Remote mounting accessories for graphic display keypad



Remote location of the graphic display keypad on enclosure door: 6 + 7 + 9 if IP 54, 6 + 7 + 9 + 10 if IP 65



Remote mounting accessories for RJ45 connection with IP 55 degree of protection

## User interface keypads

### Remote graphic display keypad

This graphic display keypad, common to all Schneider Electric's variable speed drive ranges, provides a user-friendly interface for configuration, debugging and maintenance. In particular, it is possible to transfer and store up to 4 configuration files. Used as a portable unit or mounted on an enclosure door, it can also be connected to several drives using remote mounting accessories (see below) or multidrop connection accessories.

It is supplied with six languages installed (Chinese, English, French, German, Italian and Spanish). The available languages can be modified using the Multi-Loader configuration tool (VW3A8121).

Its maximum operating temperature is 140°F (60°C), and it features IP 54 protection; this can be increased to IP 65 when mounted on an enclosure door.

#### Graphic display (1):

- Plain text display on 8 lines of 24 characters, 240 x 160 pixels, large digit display

#### Assignable function (2): keys F1, F2, F3, F4:

- Dialogue functions: direct access, help screens, navigation
- Application functions: "Local Remote", preset speed

**ESC key (3):** aborts a value, a parameter or a menu to return to the previous selection

#### Motor local control keys (4):

- RUN:** starts the motor
- STOP/RESET :** stops the motor/resets drive detected fault state
- FWD/REV:** reverses the direction of rotation of the motor

#### Navigation button (5): for quick, easy access to the drop-down menus

- Rotate ±: goes to the next/previous line, increases/decreases the value
- Press: saves the current value (ENT)

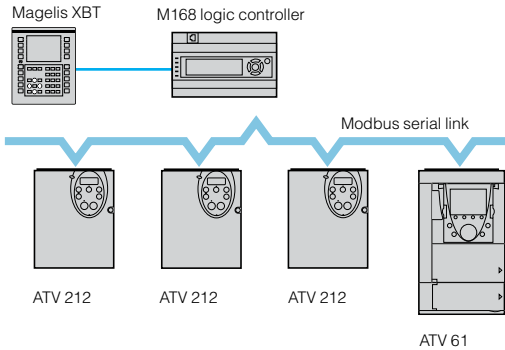
Description	Item no.	Length		Part number	Weight	
		ft	m		lbs	kg
<b>Remote graphic display keypad</b> A remote-mounting cable VW3A1104R●●● and an RJ45 adaptor VW3A1105 must be provided	(6)	-	-	VW3A1101	0.4	0.2

#### Accessories for mounting the graphic display keypad remotely

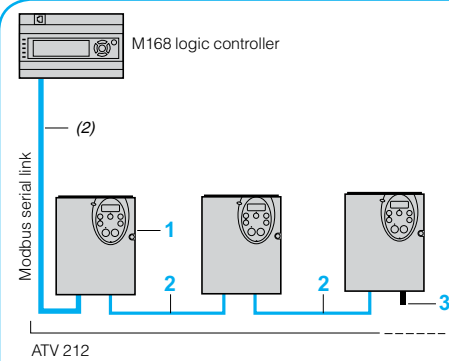
Cables	(7)	Length		Part number	Weight	
		ft	m		lbs	kg
equipped with 2 RJ45 connectors		3.3	1	VW3A1104R10	0.1	0.1
		9.8	3	VW3A1104R30	0.3	0.2
		16.4	5	VW3A1104R50	0.6	0.3
		32.8	10	VW3A1104R100	1.1	0.5
<b>Female/female RJ45 adaptor</b>	(8)	-	-	VW3A1105	0.02	0.1
<b>Remote mounting kit</b> for mounting on an enclosure door IP 54 degree of protection	(9)	-	-	VW3A1102	0.3	0.2
<b>Door</b> for remote mounting kit VW3A1102 Can be used to provide IP 65 degree of protection	(10)	-	-	VW3A1103	0.1	0.4

#### Remote mounting accessories for RJ45 connection with IP 55 degree of protection

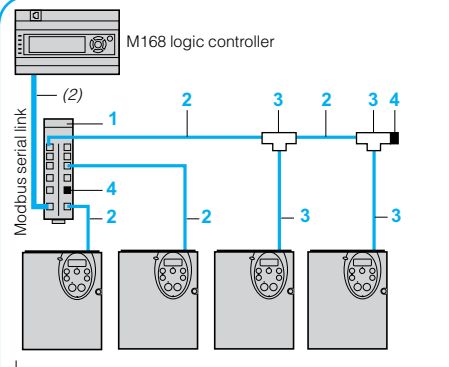
Internal IP 55 cables	(11)	Length		Part number	Weight	
		ft	m		lbs	kg
equipped with an RJ45 connector and an IP 55 RJ45 base. For remote location of the drive's RJ45 port while maintaining IP 55 protection		1.0	0.3	VW3A01500	0.1	0.1
		2.0	0.6	VW3A01502	0.2	0.1
<b>IP 55 cable</b> equipped with an RJ45 connector and an IP 55 RJ45 connector. For connecting an drive equipped with a VW3A0150● cable	(12)	9.8	3	VW3A01501	0.3	0.1



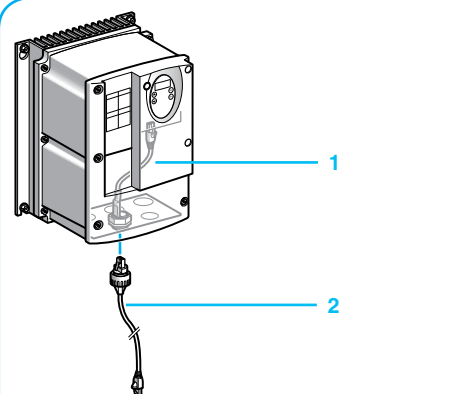
Example of configuration on the Modbus serial link



Optimized solution for daisy chain connection to the Modbus serial link



Connection via splitter box with RJ45 connectors on Modbus serial link



Remote mounting accessories for RJ45 connection with IP 55 degree of protection

## Communication networks

The Altivar 212 drive is designed to suit the configurations found in communicating installations created for buildings (HVAC)<sup>(1)</sup>. It is easily integrated in building management systems thanks to its integrated communication protocols. In addition, the LonWorks communication card offered as an option provides the user with an open and interoperable system.

The Altivar 212 drive integrates a standard card which supports the Modbus, METASYS N2, APOGEE FLN P1 and BACnet communication protocols.

For optimum management flexibility, two communication ports located on the front of the drive (with the door open) enable simultaneous connection to a communication network and an HMI terminal.

The Altivar 212 drive has been designed to simplify connections to communication networks by offering directly accessible connections:

- An RJ45 communication port for the Modbus serial link:
  - This network port is mainly assigned to the remote graphic display keypad (Drive Navigator).
- **It is also used to connect:**
  - The Multi-Loader configuration tool
  - The Bluetooth® serial link
  - A Magelis industrial HMI terminal
  - iPad with appropriate adapter cable
- A screw terminal block for Modbus, METASYS N2, APOGEE FLN P1 and BACnet networks (optimized solution for daisy chain connection). This screw terminal block is assigned to control and signalling by a PLC or by another type of controller.

Description	Item no.	Length		Part number	Weight	
		ft	m		lbs	kg

### Connection accessories for Modbus serial link (optimized solution for daisy chain connection)

<b>RS 485 double shielded twisted pair Modbus cable</b>	(1)	328.1	100	<b>TSXCSA100</b>	-	-
Supplied without connector						
<b>Modbus drop cable</b>	(2)	9.8	3	<b>VW3A8306D30</b>	0.3	0.2
1 RJ45 connector and one stripped end						
<b>Line termination</b>	(3)	-	-	<b>VW3A8306DRC</b>	0.4	0.2
for screw terminals <sup>(2)</sup>						
	(3)	-	-	<b>VW3A8306DR</b>	0.4	0.2

### Other connection accessories for Modbus serial link

<b>Modbus splitter box</b>	(1)	-	-	<b>LU9GC3</b>	1.1	0.5
10 RJ45 connectors and 1 screw terminal block						
<b>Cordsets for Modbus serial link</b>	(2)	1.0	0.3	<b>VW3A8306R03</b>	0.1	0.1
equipped with 2 RJ45 connectors		3.3	1	<b>VW3A8306R10</b>	0.1	0.1
		9.8	3	<b>VW3A8306R30</b>	0.3	0.1
<b>Modbus T-junction boxes</b>	(3)	1.0	0.3	<b>VW3A8306TF03</b>	0.4	0.2
with integrated cable		3.3	1	<b>VW3A8306TF10</b>	0.5	0.2
<b>Line terminator<sup>(2)</sup></b>	(4)	-	-	<b>VW3A8306RC</b>	0.1	0.1
for RJ45 connector		-	-	<b>VW3A8306R</b>	0.02	0.01
		-	-			

### RJ45 connection accessories with IP 55 degree of protection

Internal IP 55 cable equipped with an RJ45 connector and an IP 55 RJ45 base.	(5)	1.0	0.3	<b>VW3A01500</b>	0.1	0.1
For remote location of the drive's RJ45 port while maintaining IP 55 protection		2.0	0.6	<b>VW3A01502</b>	0.1	0.1
IP 55 cordsets equipped with an RJ45 connector and an IP 55 RJ45 base. They can be used to connect a drive equipped with a VW3A0150 cable	(6)	9.8	3	<b>VW3A01501</b>	0.3	0.13

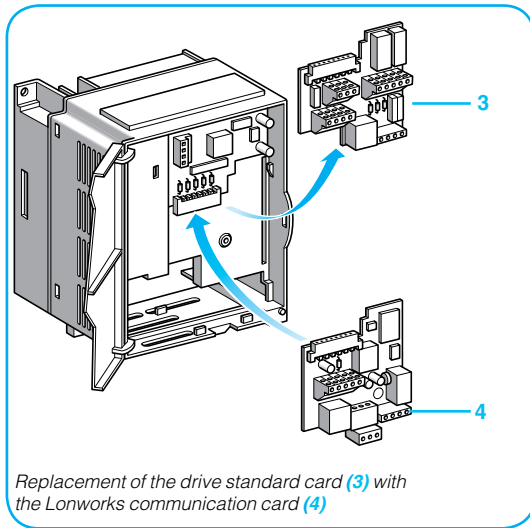
(1) Heating, Ventilation and Air Conditioning.

(2) Cable dependent on the type of controller or PLC.

(3) Sold in lots of 2.

# Altivar 212 variable speed drives

## Accessories & Options



Replacement of the drive standard card (3) with the Lonworks communication card (4)

### Optional LonWorks communication card

The Altivar 212 drive can also be connected to the LonWorks network by using the communication card (4) available as an option. It is connected by replacing the standard card (3) on the drive.

The connections are identical to those on the standard card:

- An RJ45 communication port for the Modbus serial link: this network port is mainly assigned to the remote graphic display keypad (Drive Navigator).

#### It is also used to connect:

- The Multi-Loader configuration tool
- The Bluetooth® serial link
- A Magelis industrial HMI terminal
- iPad using 30-pin mobile to RJ485 cable
- A screw terminal block for the Modbus serial link and the LonWorks network (optimized solution for daisy chain connection). This screw terminal block is assigned to control and signalling by a PLC or by another type of controller.

The Altivar 212 drive can be controlled using the LonWorks 6010 (Variable Speed Motor Drive) and LonWorks 0000 (Node Object) profiles.

### LonWorks communication

#### All the drive functions can be accessed via the network:

- Control
- Monitoring
- Adjustment
- Configuration

#### The speed control and reference may come from different sources:

- I/O terminals
- Communication network
- Drive Navigator

The advanced functions of the Altivar 212 enable switching of these drive control sources to be managed in accordance with the application requirements.

Communication is monitored according to criteria specific to each protocol.

However, regardless of the protocol, it is possible to configure how the drive responds to a communication fault:

- Freewheel stop, stop on ramp or braked stop
- Maintain last command received



LonWorks communication card VW3 A21 212

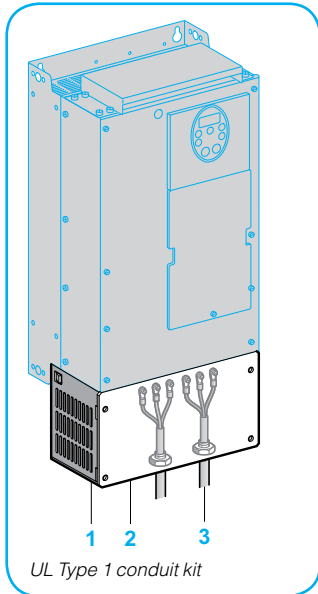
Description	Part number	Weight	
		lbs	kg
LONWORKS communication card	VW3A21212	0.4	0.2



### iPad Programming

#### The iPad application can perform the following programming actions:

- Create parameter files
- Validate drive configurations
- Upload, download or clone drive settings
- Retain digital file copies of drive settings
- Links to all product information embedded in app



### Mounting accessories

#### DIN rail mounting kit

This kit enables easy installation of ATV212H075M3X...HU22M3X and ATV212H075N4...HU22N4 drives by mounting them directly on a 35 mm wide DIN rail.

For drives	Part number	Weight	
		lbs	kg
ATV212H075M3X...HU22M3X ATV212H075N4...HU22N4	<b>VW3A31852</b>	0.8	0.4

#### UL Type 1 mounting kit

When the drive is mounted directly on a wall outside the enclosure, this kit can be used to ensure UL Type 1.

The shielding is connected inside the kit.

##### The kit consists of:

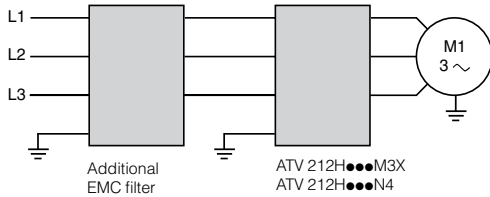
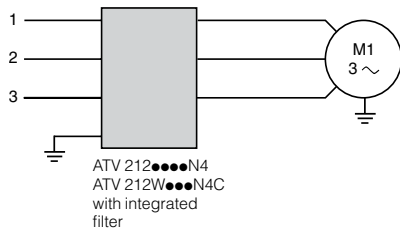
- All the mechanical parts (1) including a pre-cut plate (2) for connecting the tubes (3)
- Mounting accessories
- A manual

For drives	Part number	Weight	
		lbs	kg
ATV212H075M3X...HU22M3X ATV212H075N4...HU22N4	<b>VW3A31814</b>	1.1	0.5
ATV212HU30M3X, HU40M3X ATV212HU30N4...HU55N4	<b>VW3A31815</b>	1.1	0.5
ATV212HU55M3X, HU75M3X ATV212HU75N4, HD11N4	<b>VW3A31816</b>	2.0	0.9
ATV212HD11M3X...HD18M3X ATV212HD15N4...HD22N4S	<b>VW3A31817</b>	2.6	1.2
ATV212HD22M3X ATV212HD22N4, HD30N4	<b>VW3A9206</b>	8.8	4.0
ATV212HD37N4, HD45N4	<b>VW3A9207</b>	11.0	5.0
ATV212HD30M3X ATV212HD55N4, HD75N4	<b>VW3A9208</b>	15.4	7.0



# Altivar 212 variable speed drives

## Accessories & Options



Mounting the filter beside the Altivar 212 drive



Mounting the filter under the Altivar 212 drive

## Drive input filters

### EMC Compliance

#### Integrated EMC input filters

Altivar 212 drives, except for ATV212H●●●●M3X, have integrated radio interference input filters to comply with the EMC standard for variable speed electrical power drive "products" IEC/EN 61800-3, edition 2, category C1, C2 or C3 in environment 1 or 2 and to comply with the European EMC (electromagnetic compatibility) directive.

Drives	Maximum length of shielded cable <sup>(1)</sup> according to:						Leakage current <sup>(2)</sup>	
	EN 55011 class B Gr1		EN 55011 class A Gr1					
	IEC/EN 61800-3		IEC/EN 61800-3					
	Category C1		Category C2	Category C3				
		ft	m	ft	m	ft	m	mA

IP 21 drives								
ATV212H075N4...HU22N4	-	-	65.6	20	65.6	20	4.5	
ATV212HU30N4...HU55N4	-	-	16.4	5	65.6	20	5.8	
ATV212HU75N4, HD11N4	-	-	16.4	5	65.6	20	2.9	
ATV212HD15N4, HD18N4	-	-	16.4	5	65.6	20	4.8	
ATV212HD22N4S	-	-	-	-	16.4	5	25.3	
ATV212HD22N4, HD30N4	-	-	-	-	65.6	20	25.3	
ATV212HD37N4, HD45N4	-	-	-	-	65.6	20	21.5	
ATV212HD55N4, HD75N4	-	-	-	-	328.1	100	9.1	

UL Type 12/IP 55 drives								
ATV212W075N4...WU22N4	-	-	16.4	5	-	-	4.5	
ATV212WU30N4...WU55N4	-	-	16.4	5	65.6	20	5.8	
ATV212WU75N4	-	-	16.4	5	32.8	10	2.9	
ATV212WD11N4, WD15N4	-	-	16.4	5	32.8	10	13.3	
ATV212WD18N4	-	-	16.4	5	65.6	20	9.4	
ATV212WD22N4, WD30N4	-	-	16.4	5	-	-	25.3	
ATV212WD37N4, WD45N4	-	-	-	-	65.6	20	21.5	
ATV212WD55N4, WD75N4	-	-	-	-	328.1	100	9.1	
ATV212W075N4C...WU22N4C	65.6	20	65.6	20	65.6	20	18.4	
ATV212WU30N4C...WU55N4C	65.6	20	164.0	50	164.0	50	42.8	
ATV212WU75N4C	65.6	20	164.0	50	164.0	50	37.2	
ATV212WD11N4C, WD15N4C	65.6	20	164.0	50	164.0	50	81	
ATV212WD18N4C	65.6	20	164.0	50	164.0	50	77.2	
ATV212WD22N4C, WD30N4C	65.6	20	164.0	50	164.0	50	84.5	
ATV212WD37N4C, WD45N4C	65.6	20	164.0	50	164.0	50	53.6	
ATV212WD55N4C, WD75N4C	65.6	20	16.4	20	164.0	50	56.9	

(1) Maximum lengths for shielded cables connecting motors to drives for a switching frequency of 6 to 16 kHz. If motors are connected in parallel, the sum of the cable lengths must be taken into account.

(2) Maximum ground leakage current at 480 V 60 Hz on a TT system.



VW3 A31 404

### Optional EMC input filters

Additional EMC input filters enable drives to meet more stringent requirements. They are designed to reduce conducted emissions on the line supply below the limits of standards EN 55011 group 1, class A or B, and IEC/EN 61800-3 category C1, C2 or C3.

- The additional EMC filters can be mounted beside or under the drive. The drive's power supply is then connected directly via the filter output cable.
- The filters act as a support for the drives and are attached to them via tapped holes.
- Additional filters can only be used on TN (neutral connection) and TT (neutral to ground) type systems.
- Standard IEC/EN 61800-3, appendix D2.1, states that on IT systems (isolated or impedance grounded neutral), filters can cause permanent insulation monitors to operate in a random manner. In addition, the effectiveness of additional filters on this type of system depends on the type of impedance between neutral and ground, and therefore cannot be predicted.
- If a machine has to be installed on an IT system, the solution would be to insert an isolation transformer and connect the machine locally on a TN or TT system.
- ATV 212●●●●N4 and ATV 212W●●●●N4C drives have integrated EMC filters. These filters can be easily disconnected for use on the line supply and, if necessary, reconnected just as easily (see the User Manual).

For drives	Maximum length of shielded cable <sup>(1)</sup> according to				In <sup>(2)</sup>	If <sup>(3)</sup>	Loss <sup>(4)</sup>	Part number	Weight	
	EN 55011 class B Gr1		EN 55011 class A Gr1						A	mA
	IEC/EN 61800-3 category C1		IEC/EN 61800-3 category C2 or C3							
	ft	m	ft	m						
<b>Three-phase supply voltage: 200...240 V 50/60 Hz</b>										
ATV212H075M3X	65.6	20	65.6	20	15	6.7	0.47	VW3A31404	2.2	1.0
ATV212HU15M3X	65.6	20	65.6	20	15	6.7	1.6	VW3A31404	2.2	1.0
ATV212HU22M3X	65.6	20	65.6	20	15	6.7	3.3	VW3A31404	2.2	1.0
ATV212HU30M3X	65.6	20	65.6	20	25	17.8	3.6	VW3A31406	3.7	1.7
ATV212HU40M3X	65.6	20	65.6	20	25	17.8	6.2	VW3A31406	3.7	1.7
ATV212HU55M3X	-	-	65.6	20	47	20.6	3.7	VW3A31407	10.3	3.2
ATV212HU75M3X	-	-	65.6	20	47	20.6	6.8	VW3A31407	10.3	3.2
ATV212HD11M3X	-	-	65.6	20	83	14.5	9.1	VW3A31408	17.4	5.3
ATV212HD15M3X	-	-	65.6	20	83	14.5	16	VW3A31408	17.4	5.3
ATV212HD18M3X	-	-	65.6	20	83	14.5	23.1	VW3A31408	17.4	5.3
ATV212HD22M3X	-	-	65.6	20	90	40.6	27.1	VW3A4406	49.2	15.0
ATV212HD30M3X	-	-	65.6	20	180	86.3	23.1	VW3A4408	131.2	40.0
<b>Three-phase supply voltage: 380...480 V 50/60 Hz</b>										
ATV212H075N4	65.6	20	164.0	50	15	13.8	0.13	VW3A31404	3.3	1.0
ATV212HU15N4	65.6	20	164.0	50	15	13.8	0.45	VW3A31404	3.3	1.0
ATV212HU22N4	65.6	20	164.0	50	25	13.8	0.9	VW3A31404	3.3	1.0
ATV212HU30N4	65.6	20	164.0	50	25	37	1	VW3A31406	5.4	1.7
ATV212HU40N4	65.6	20	164.0	50	25	37	1.6	VW3A31406	5.4	1.7
ATV212HU55N4	65.6	20	164.0	50	25	37	3	VW3A31406	5.4	1.7
ATV212HU75N4	65.6	20	164.0	50	47	42.8	1.9	VW3A31407	10.3	3.2
ATV212HD11N4	65.6	20	164.0	50	47	42.8	3.9	VW3A31407	10.3	3.2
ATV212HD15N4	65.6	20	164.0	50	49	42.8	9.2	VW3A31409	15.6	4.8
ATV212HD18N4,HD22N4S	65.6	20	164.0	50	49	42.8	13.8	VW3A31409	15.6	4.8
ATV212HD22N4	-	-	328.1	100	90	84.5	7.3	VW3A4406	49.2	15.0
ATV212HD30N4	-	-	328.1	100	90	84.5	13.5	VW3A4406	49.2	15.0
ATV212HD37N4	328.1	100	328.1	100	92	106	16	VW3A4407	55.8	17.0
ATV212HD45N4	328.1	100	328.1	100	92	106	23	VW3A4407	55.8	17.0
ATV212HD55N4	328.1	100	328.1	100	180	193	18	VW3A4408	131.2	40.0
ATV212HD75N4	328.1	100	328.1	100	180	193	34	VW3A4408	131.2	40.0

(1) The above table gives the maximum lengths for shielded cables connecting motors to drives for a switching frequency of 6 to 16 kHz. These limits are given as examples only as they vary depending on the stray capacitance of the motors and the cables used. If motors are connected in parallel, the sum of the cable lengths must be taken into account.

(2) Nominal filter current.

(3) Maximum ground leakage current at 230 V and at 480 V 60 Hz on a TT system.

(4) Via heat dissipation.



### Drive output filters

#### Motor Chokes

Motor chokes, also known as load reactors, can be inserted between the Altivar 212 drive and the motor to:

- Reduce the peak voltage in the motor and motor cable
- Limit the dv/dt at the motor terminals (500 to 1500 V/μs) for cables longer than 164 ft (50m)
- Filter interference caused by opening of a contactor placed between the filter and the motor
- Reduce the motor ground leakage current and lower the chance of nuisance ground fault trips
- Smooth the motor current wave form to reduce motor noise

Choke performance is optimized by not exceeding the cable lengths given below. For an application with several motors connected in parallel, the cable length must include all cabling. If a cable longer than that recommended is used, the motor chokes may overheat.

For drives	Maximum motor cable length					Losses W	Nominal current A	Sold in lots of	IEC Part number	Weight		UL recognized CSA certified part number	Weight	
	For a maximum switching frequency	Shielded cable		Unshielded cable						lbs	kg		lbs	kg
		kHz	ft	m	ft									
<b>Three-phase supply voltage: 200...240 V 50/60 Hz</b>														
ATV212H075M3X	6	328.1	100	328.1	150	350	90	–	VW3A5103	22.0	10.0	RL00412	11.0	5.0
ATV212HU15M3X	6	328.1	100	328.1	150	350	90	–	VW3A5103	22.0	10.0	RL00812	15.0	6.8
ATV212HU22M3X	6	328.1	100	328.1	150	350	90	–	VW3A5103	22.0	10.0	RL01212	17.0	7.7
ATV212HU30M3X	6	328.1	100	328.1	150	350	90	–	VW3A5103	22.0	10.0	RL01812	19.0	8.6
ATV212HU40M3X	6	328.1	100	328.1	150	350	90	–	VW3A5103	22.0	10.0	RL01812	19.0	8.6
ATV212HU55M3X	6	328.1	100	328.1	150	350	90	–	VW3A5103	22.0	10.0	RL02512	45.0	20.4
ATV212HU75M3X	6	328.1	100	328.1	150	350	90	–	VW3A5103	22.0	10.0	RL03512	47.0	21.3
ATV212HD11M3X	6	328.1	100	328.1	150	350	90	–	VW3A5103	22.0	10.0	RL04512	59.0	26.8
ATV212HD15M3X	6	328.1	100	328.1	150	430	215	3	VW3A5104	34.2	15.5	RL05512	59.0	26.8
ATV212HD18M3X	6	492.1	150	984.3	300	430	215	3	VW3A5104	34.2	15.5	RL08012	82.0	37.2
ATV212HD22M3X	6	492.1	150	984.3	300	430	215	3	VW3A5104	34.2	15.5	RL10012	82.0	37.2
ATV212HD30M3X	6	492.1	150	984.3	300	430	215	3	VW3A5104	34.2	15.5	RL13012	88.0	39.9
<b>Three-phase supply voltage: 380...480 V 50/60 Hz</b>														
ATV212H075N4, W075N4, W075N4C	6	328.1	100	328.1	150	350	90	–	VW3A5103	22.0	10.0	RL00212	11.0	5.0
ATV212HU15N4, WU15N4, WU15N4C	6	328.1	100	328.1	150	350	90	–	VW3A5103	22.0	10.0	RL00413	12.0	5.4
ATV212HU22N4, WU22N4, WU22N4C	6	328.1	100	328.1	150	350	90	–	VW3A5103	22.0	10.0	RL00413	12.0	5.4
ATV212HU30N4, WU30N4, WU30N4C	6	328.1	100	328.1	150	350	90	–	VW3A5103	22.0	10.0	RL00813	18.0	8.2
ATV212HU40N4, WU40N4, WU40N4C	6	328.1	100	328.1	150	350	90	–	VW3A5103	22.0	10.0	RL00813	18.0	8.2
ATV212HU55N4, WU55N4, WU55N4C	6	328.1	100	328.1	150	350	90	–	VW3A5103	22.0	10.0	RL01213	25.0	11.3
ATV212HU75N4, WU75N4, WU75N4C	6	328.1	100	328.1	150	350	90	–	VW3A5103	22.0	10.0	RL01813	49.0	22.2
ATV212HD11N4, WD11N4, WD11N4C	6	328.1	100	328.1	150	350	90	–	VW3A5103	22.0	10.0	RL02513	49.0	22.2
ATV212HD15N4, WD15N4, WD15N4C	6	328.1	100	328.1	150	430	215	3	VW3A5104	34.2	15.5	RL03513	61.0	27.7
ATV212HD18N4, WD18N4, WD18N4C	6	492.1	150	984.3	300	430	215	3	VW3A5104	34.2	15.5	RL03513	61.0	27.7
ATV212HD22N4, WD22N4, WD22N4C	6	492.1	150	984.3	300	430	215	3	VW3A5104	34.2	15.5	RL04513	70.0	31.8
ATV212HD30N4, WD30N4, WD30N4C	6	492.1	150	984.3	300	430	215	3	VW3A5104	34.2	15.5	RL05513	72.0	32.7
ATV212HD37N4, WD37N4, WD37N4C	6	492.1	150	984.3	300	430	215	3	VW3A5104	34.2	15.5	RL08013	86.0	39.0
ATV212HD45N4, WD45N4, WD45N4C	6	492.1	150	984.3	300	430	215	3	VW3A5104	34.2	15.5	RL08013	86.0	39.0
ATV212HD55N4, WD55N4, WD55N4C	6	492.1	150	984.3	300	430	215	3	VW3A5104	34.2	15.5	RL10013	105.0	47.6
ATV212HD75N4, WD75N4, WD75N4C	6	492.1	150	984.3	300	430	215	3	VW3A5104	34.2	15.5	RL13013	105.0	47.6

#### IP 20 protection kit

VW3A510● motor chokes provide IP 00 degree of protection as standard. This kit gives the VW3A5104 choke IP 20 degree of protection.

Designation	For motor choke	Reference	Weight lbs kg
Mechanical kit including an IP 20 cover and cable clips	VW3A5104	VW3A9612	– –



S-Flex enclosed  
variable speed drives

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- **Introduction.....30**
  - Applications .....31
  - Product.....32
  - Functions.....33
- **Specifications .....34**
  - Electrical .....34
  - Environmental.....34
  - I/O & Control.....35
- **Selection Tables.....36**
  - Dimensions .....36
- **Accessories & Options.....38**
  - More Accessories & Options.....39
- **Quality Assurance.....40**
- **Services & Support.....42**

# S-Flex enclosed variable speed drives

## Introduction



## Introduction

Take advantage of the Altivar 212 features by selecting the S-Flex enclosed version. The S-Flex provides an Altivar 212 packaged with the most common options required for commercial fan and pump applications. The **S-Flex** drive is an enclosed frequency converter for **1-100 HP, 0.75-75 kW three-phase asynchronous motors**.

### Save Time

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

- Simple start-up including preprogrammed parameters
- Quick installation with EZ-M mounting
- Easy wiring conduit knockouts on the enclosure
- Dedicated wiring terminal block
- Stock availability with bypass and main circuit breaker

### 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 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

### 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 reduced speed and load control



Save Time



Save Money



Think Green



S-Flex enclosed drive, door closed

## Applications

### Optimization of building management

The S-Flex enclosed drive considerably improves building management by:

- Simplifying circuits by removing flow control valves and dampers,
- Offering flexibility and ease of adjustment for installations, thanks to its compatibility with building management system connectivity
- Reducing noise pollution (noise caused by air flow and motor)

Its various standard versions make it possible to reduce installation costs by integrating EMC filters, categories C1 to C3 depending on the model, which has the following advantages:

- Compact size
- Simplified wiring

The S-Flex enclosed offer helps to reduce equipment costs while optimizing its performance.

### 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

### Altivar 212 with RHT compared to traditional 6-pulse rectifiers

The figure to the left shows a typical waveform of the Altivar 212 drive controller's output current using a 460 V Altivar 212 (15 HP) and Schneider Electric's HarmCalc software per IEEE 519 recommendations for calculating harmonic distortion in <600V applications. The motor control processor and the motor control algorithm are designed to produce a sinusoidal waveform with very little distortion to the motor.

With lower DC bus capacitance, the Altivar 212 drive controller has a reduced capacity to ride through AC power line dips or sags. The Altivar 212 drive controller has an auto-restart feature and a robust catch-on-the-fly algorithm designed to minimize the effect of voltage dips and sags. The catch-on-the-fly algorithm has also proven to do an exceptional job of catching a reverse spinning load, bringing the load to a standstill and accelerating in the proper direction. This catch-on-the-fly algorithm is a useful feature for wind-milling fan loads. If voltage ride-through is a major concern in an installation, the Altivar 61, with its industry leading voltage sag ride-through capability may be the preferred solution.

Drive description	THDI (% of fundamental drive current)
6-pulse, no added impedance	163% <sup>(1)</sup>
6-pulse, 3% AC reactor or DC bus choke	44.6%
6-pulse, 5% AC reactor or DC bus choke	31.8%
ATV212, no added impedance	31.1%
ATV212, 1.5% AC reactor	30.8%

(1) Higher than fundamental current due to mathematical model

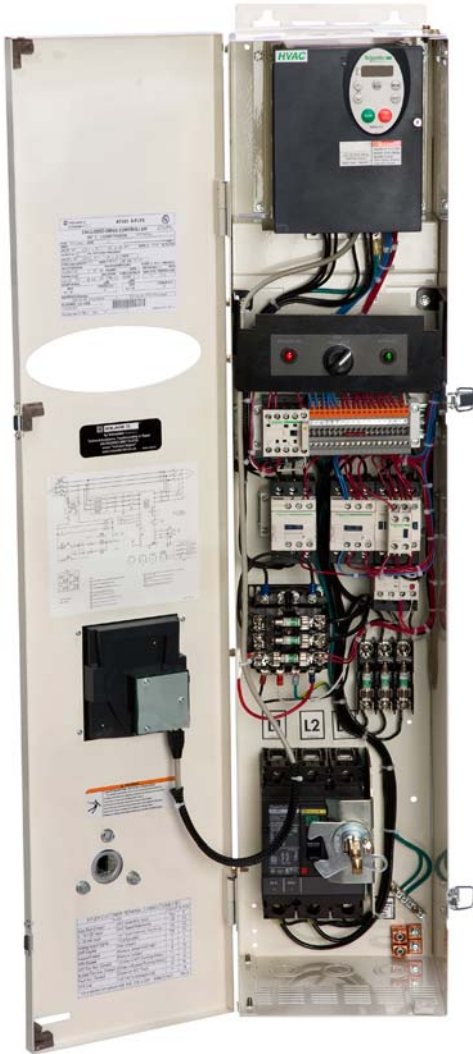
### Product

The S-Flex range of enclosed variable speed drives extends across a range of motor power ratings:

- 200...240 V three-phase, 1 HP to 40 HP, 0.75 kW to 30 kW, IP 21
- 380...480 V three-phase, 1 HP to 100 HP, 0.75 kW to 75 kW, IP 21
- 380...480 V three-phase, 1 HP to 100 HP, 0.75 kW to 75 kW, UL Type 12/IP 55

#### The S-Flex range also includes:

- Optional three-phase AC line reactor for line transient protection and even further line harmonic reduction
- Altivar™ 212 drive power converter with reduced harmonic technology 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
- Adjustable frequency controller — 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
- Full-voltage bypass contactors
- 100 kAIC UL® 508C rating and full-voltage bypass
- Square D circuit breaker or fused disconnect for power interruption and overcurrent protection
- Hinged door with latches for quick and easy interior access
- Conduit knockouts on bottom of enclosure for quick and easy wiring



S-Flex enclosed drive, door open



### Product (continued)

#### Features

**(1) Keypad display for configuration and monitoring**

- Optional LCD keypad

**(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 — off — bypass selector switch
- 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



Features of the S-Flex enclosed drive

### Functions

The S-Flex™ 212 enclosed drive is a full-featured adjustable speed package solution for variable torque applications. The S-Flex enclosed drive is a bypass package that includes an Altivar™ 212 adjustable speed drive on a wall-mountable back plane with pre-packaged model number options for both power and control functions. The following features are available for the standard bypass package:

- AFC-Off-Bypass selector switch
- Local/Remote configurable on controller
- Power On red LED
- Bypass Run green LED
- Freeze/Firestat interlock
- Form C AFC detected fault contact
- Modbus™ RJ-45 communication port
- Smoke purge and damper control relays
- Circuit breaker disconnect
- Optional line disconnect switch or line contactor
- Optional full text keypad
- Optional non-bypass power circuit

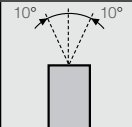
# S-Flex enclosed variable speed drives

## Specifications Electrical & Environmental

### Electrical Specifications

<b>Input</b>	Voltage	V	208 Vac $\pm$ 10%, 230 Vac $\pm$ 10%, 460 Vac $\pm$ 10%
	Frequency	Hz	50...60 $\pm$ 5%
<b>Displacement power factor</b>			Approximately 0.96%
<b>Output voltage</b>		V	Three-phase output, maximum voltage equal to input voltage
<b>Frequency range of the power converter</b>		Hz	0.5...500 (factory setting of 60 Hz maximum)
<b>Configurable switching frequency</b>		kHz	Selectable from 6 to 16 kHz Factory setting: 12 kHz <sup>(1)</sup> 1–20 hp; 8 kHz <sup>(2)</sup> above 25 hp
<b>Speed reference</b>			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
<b>Inputs and outputs</b>			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
<b>Current limit</b>			150% of nominal drive full-load amperage (FLA) for 60 s
<b>Electrical isolation</b>			Galvanic isolation between power and control (inputs, outputs and power supplies)
<b>Frequency resolution in analog reference</b>		Hz	0.1 Hz to 100 Hz (10 bits)
<b>Speed regulation</b>			V/f: determined by motor slip, typically 3% SLFV (sensorless flux vector): 1%
<b>Efficiency</b>			Typically greater than 95%
<b>Reference sample time</b>			2 ms
<b>Acceleration and deceleration ramps</b>			0.1 s to 999.9 s (adjustable in 0.1 s increments)
<b>Motor protection</b>			Class 10 and Class 20 overload protection with bypass in addition to controller internal electronic thermal protection
<b>Keypad display</b>			Self-diagnostics with status messages. 7-segment LED display (standard) Full text keypad, 8 languages (optional) Also see Altivar 212 Installation Guide

### Environmental Specifications

<b>Enclosure type<sup>(3)</sup></b>			UL Type 1
<b>Vibration resistance</b> (Power converter only)	Drive not mounted on DIN rail		According to IEC 60068-2-6: ■ 1.5 mm peak to peak from 3 to 13 Hz ■ 1 g from 13 to 150 Hz
<b>Shock resistance</b> (Power converter only)			15 gn for 11 ms conforming to EN/IEC 60068-2-27
<b>Maximum ambient pollution</b> Definition of insulation			Pollution degree 2 per NEMA ICS-1 and IEC 60664-1
<b>Environmental conditions use</b>			IEC 60721-3-3 classes 3C1 and 3S2
<b>Relative humidity</b>		%	95% with no condensation or dripping water, conforming to IEC 60068-2-3.
<b>Ambient air temperature</b> around the device	Operation	°C	-10 to + 40 operational without de-rating, up to 50 with de-rating. See Installation manual for deratings
	Storage	°C	- 25...+ 70 with vent cover removed and without derating
<b>Maximum operating altitude</b>		m	Up to 3,300 ft (1,000 m) without de-rating, de-rate nominal current by 1% for each additional 330 ft (100m) up to 10,000 ft (3,000 m) Limit to 6,600 ft (2,000 m) if supplied by corner grounded distribution system
<b>Transit test to shock</b>			Conforms to International Safe Transit Association guidelines
<b>Codes and standards</b>			UL/cUL Listed per UL508C as incorporating Class 10 electronic and electromechanical overload protection. Conforms to applicable NEMA ICS, NFPA, IEC, and ISO 9001 standards.  Seismic Certification: ■ IBC, NFPA 5000 and ASCE7 ■ ICC ES AC 156 <sup>(4)</sup>
<b>Operating position</b> Maximum permanent angle in relation to the normal vertical mounting position			

(1) Above 12 kHz derate the drive per the graphs in the Altivar 212 Installation Guide, S1A53832.

(2) Above 8 kHz derate the drive per the graphs in the Altivar 212 Installation Guide, S1A53832.

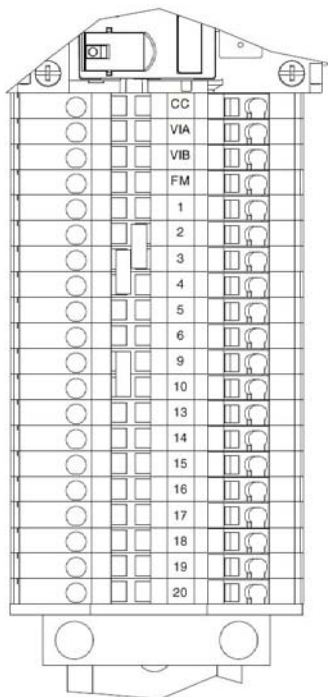
(3) Plenum rated; suitable for placement in a compartment handling conditioned air.

(4) Acceptance criteria test protocol with an importance factor of 1.5.

# S-Flex enclosed variable speed drives

## Specifications I/O & Control

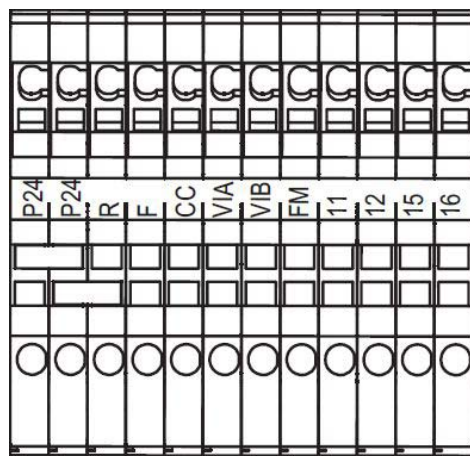
Bypass Power Circuit Y



### I/O & Control Specifications

	Function	Description	Customer Terminals (Bypass power circuit Y)	
With bypass	0–10 Vdc Input	AFC Speed Reference	VIB	CC
	4–20 mA or 0–10 Vdc Input	AFC Speed Reference <sup>(1)</sup>	VIA	CC
	Analog Output Signal	Configurable	FM1	CC
	Smoke Purge Relay Disable	Add Jumper	1	2
	Freeze/Firestat	Remove Jumper / Add Interlock	2	3
	Damper End Switch Enable	Remove Jumper	3	4
	Auto Start Contact	AFC Mode Run Input	5	6
	Smoke Purge Relay Disable	Remove Jumper	9	10
	System Run Auxiliary Contact	Closes on Motor Running (AFC or BYP)	13	14
	AFC Trip Auxiliary Contact	Closes on AFC Trip	15	16
	Smoke Purge Relay Coil	120 Vac to Energize Coil	17	18
	Open Damper Signal	Closes when Run Signal Provided	19	20

Non-Bypass Power Circuit W



	Functions	Description	Customer terminals (Non-bypass power circuit W)	
Without bypass	Auto Start Contact	AFC Mode Run Input	P24	F
	Freeze/Firestat	Remove Jumper / Add Interlock	P24	R
	0–10 Vdc Input	AFC Speed Reference	VIB	CC
	4–20 mA or 0–10 Vdc Input	AFC Speed Reference <sup>(1)</sup>	VIA	CC
	Analog Output Signal	Configurable	FM1	CC
	AFC Run Auxiliary Contact	Closes with AFC Running Motor <sup>(1)</sup>	11	12
	AFC Detected Fault Auxiliary Contact	Closes on AFC Detected Fault	15	16

<sup>(1)</sup> Factory set for current control. To change the input VIA to voltage control, see Altivar 212 Programming and Operation Guide, S1A53838.

# S-Flex enclosed variable speed drives

# Selection Tables 208/230 Vac



S-Flex enclosed drive, frame size A

## S-Flex drives

Input Voltage 60 Hz	HP <sup>(1)</sup>	kW	Input current	Output current	Max. transient output current 60 s	Total dissipated power at rated load	S-Flex catalog number <sup>(2)</sup>	Weight		Frame size	Power converter part number <sup>(5)</sup>
			A <sup>(3)</sup>	A <sup>(1)</sup>	A <sup>(1)</sup>	W <sup>(1,4)</sup>		lbs	kg		
208 Vac	1	0.75	3.3	4.8	5.1	184.2	SFD212CG2•	52	23.587	A	ATV212HU075M3X
	2	1.5	6.1	7.8	8.3	228.3	SFD212DG2•	52	23.587	A	ATV212HU15M3X
	3	2.2	8.7	11	11.7	256.0	SFD212EG2•	52	23.587	A	ATV212HU22M3X
	5	4	15.7	17.5	19.3	326.8	SFD212FG2•	52	23.587	A	ATV212HU40M3X
	7.5	5.5	20.8	25.3	36.6	384.7	SFD212GG2•	52	23.587	A	ATV212HU55M3X
	10	7.5	27.9	32.2	35.2	495.0	SFD212HG2•	52	23.587	A	ATV212HU75M3X
	15	11	42.1	48.3	50.4	641.2	SFD212JG2•	111	50.349	B	ATV212HD11M3X
	20	15	56.1	62.1	67.1	846.1	SFD212KG2•	111	50.349	B	ATV212HD15M3X
	25	18.5	67.3	78.2	82.3	939.1	SFD212LG2•	111	50.349	B	ATV212HD18M3X
	30	22	80.4	92	96.8	1017.6	SFD212MG2•	140	63.503	C	ATV212HD22M3X
230 Vac	40	30	113.3	120	128.7	1414.3	SFD212NG2•	206	93.440	D	ATV212HD30M3X
	1	0.75	2.8	4.2	5.1	183.1	SFD212CG3•	52	23.587	A	ATV212HU075M3X
	2	1.5	5.3	6.8	8.3	226.1	SFD212DG3•	52	23.587	A	ATV212HU15M3X
	3	2.2	7.6	9.6	11.7	252.1	SFD212EG3•	52	23.587	A	ATV212HU22M3X
	5	4	13.5	15.2	19.3	323.5	SFD212FG3•	52	23.587	A	ATV212HU40M3X
	7.5	5.5	18.1	22	26.6	381.0	SFD212GG3•	52	23.587	A	ATV212HU55M3X
	10	7.5	24.4	28	35.2	489.1	SFD212HG3•	52	23.587	A	ATV212HU75M3X
	15	11	35.7	42	50.8	630.6	SFD212JG3•	111	50.349	B	ATV212HD11M3X
	20	15	47.6	54	67.1	829.5	SFD212KG3•	111	50.349	B	ATV212HD15M3X
	25	18.5	58.0	68	82.3	918.3	SFD212LG3•	111	50.349	B	ATV212HD18M3X
30	22	69.0	80	96.8	994.1	SFD212MG3•	140	63.503	C	ATV212HD22M3X	
40	30	93.0	104	128.7	1378.4	SFD212NG3•	206	93.440	D	ATV212HD30M3X	

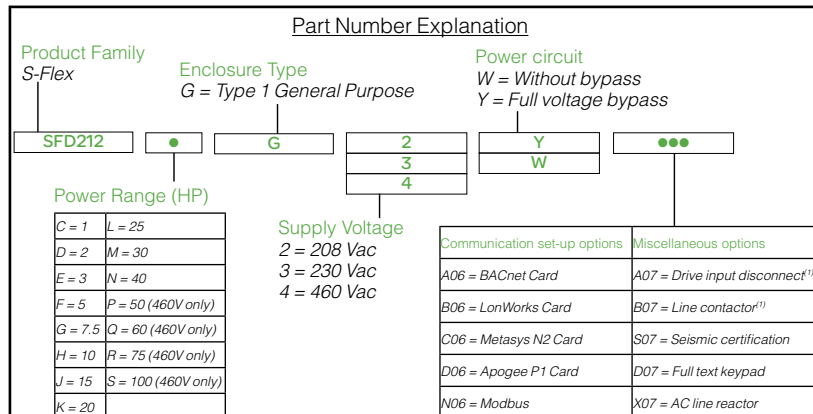
(1) These power, amperage, and wattage ratings apply to:  
 -Power converters ATV212HU075••• to HD15••• (1–20 hp) operating at a switching frequency of 12 kHz, and at 40 °C (104 °F) ambient temperature.  
 -Power converters ATV212HD18••• to HD75••• (25–100 hp @ 460 V) operating at a switching frequency of 8 kHz, and at 40 °C (104 °F) ambient temperature.  
 For a switching frequency between 13 kHz and 16 kHz, select the next largest size drive. If the duty cycle does not exceed 60% (36 s for a 60 s cycle) this is not necessary.  
 (2) The "•" indicates that the catalog number can end in a "Y" (for an S-flex drive with full voltage bypass) or a "W" (for an S-Flex drive without bypass).  
 (3) Select the conductor based on the input line current or the motor FLA, whichever is greater.  
 (4) For btu/hr, multiply values by 3.413.  
 (5) Drives shown in the table are installed in SFD212 controllers.

## Options

Communication set-up options		Miscellaneous options	
A06	BACnet Card	A07	Drive input disconnect
B06	LonWorks Card	B07	Line Contactor
C06	Metasys N2 Card	S07	Seismic certification
D06	Apogee P1 Card	D07	Full text keypad
N06	Modbus	X07	AC line reactor

## Dimensions

Frame Size	W x H x D	
	Inches	mm
A	8.714 x 40.375 x 7.895	221.3 x 1025 x 200.5
B	12.215 x 45.142 x 8.725	310.3 x 1146.6 x 221.6
C	12.532 x 62.006 x 10.916	318.3 x 1575 x 277.3
D	15.243 x 64.9 x 11.915	387.5 x 1648.5 x 302.7



# S-Flex enclosed variable speed drives

# Selection Tables 460 Vac

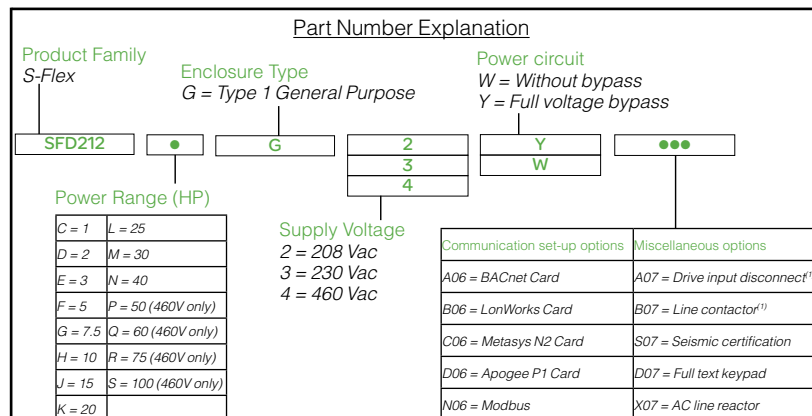


S-Flex enclosed drive, frame size A

## S-Flex drives

Input voltage 60 Hz	HP <sup>(1)</sup>	kW	Input current	Output current	Max. transient output current 60 s	Total dissipated power at rated load	S-Flex catalog number <sup>(2)</sup>	Weight		Frame size	Power converter part number <sup>(5)</sup>
			A <sup>(3)</sup>	A <sup>(1)</sup>	A <sup>(1)</sup>	W <sup>(1,4)</sup>		lbs	kg		
460 Vac	1	0.75	1.4	2.1	2.4	173.1	SFD212CG4•	52	23.587	A	ATV212HO75N4
	2	1.5	2.5	3.4	4	197.6	SFD212DG4•	52	23.587	A	ATV212HU15N4
	3	2.2	4.9	4.8	5.6	224.7	SFD212EG4•	52	23.587	A	ATV212HU22N4
	5	4	6.4	7.6	10	303.6	SFD212FG4•	52	23.587	A	ATV212HU40N4
	7.5	5.5	8.6	11	13.2	352.5	SFD212GG4•	52	23.587	A	ATV212HU55N4
	10	7.5	11.7	14	17.6	418.8	SFD212HG4•	52	23.587	A	ATV212HU75N4
	15	11	16.9	21	24.8	572.9	SFD212JG4•	52	23.587	A	ATV212HD11N4
	20	15	22.6	27	33.6	765.8	SFD212KG4•	111	50.349	B	ATV212HD15N4
	25	18.5	27.8	34	40.7	766.5	SFD212LG4•	111	50.349	B	ATV212HD18N4
	30	22	33.1	40	47.9	806.0	SFD212MG4•	140	63.503	C	ATV212HD22N4
	40	30	44.7	52	64.4	1041.5	SFD212NG4•	140	63.503	C	ATV212HD30N4
	50	37	54.4	65	86.9	1241.6	SFD212PG4•	140	63.503	C	ATV212HD37N4
	60	45	65.9	77	103.4	1622.1	SFD212QG4•	140	63.503	C	ATV212HD45N4
	75	55	89	96	127.6	2007.5	SFD212RG4•	206	93.440	D	ATV212HD55N4
	100	75	111.3	124	176	2866.8	SFD212SG4•	206	93.440	D	ATV212HD75N4

- (1) These power, amperage, and wattage ratings apply to:  
 -Power converters ATV212HO75●●● to HD15●●● (1–20 hp) operating at a switching frequency of 12 kHz, and at 40 °C (104 °F) ambient temperature.  
 -Power converters ATV212HD18●●● to HD75●●● (25–100 hp @ 460 V) operating at a switching frequency of 8 kHz, and at 40 °C (104 °F) ambient temperature.  
 For a switching frequency between 13 kHz and 16 kHz, select the next largest size drive. If the duty cycle does not exceed 60% (36 s for a 60 s cycle) this is not necessary.
- (2) The "•" indicates that the catalog number can end in a "Y" (for an S-flex drive with full voltage bypass) or a "W" (for an S-Flex drive without bypass).
- (3) Select the conductor based on the input line current or the motor FLA, whichever is greater.
- (4) For btu/hr, multiply values by 3.413.
- (5) Drives shown in the table are installed in SFD212 controllers.



## Options

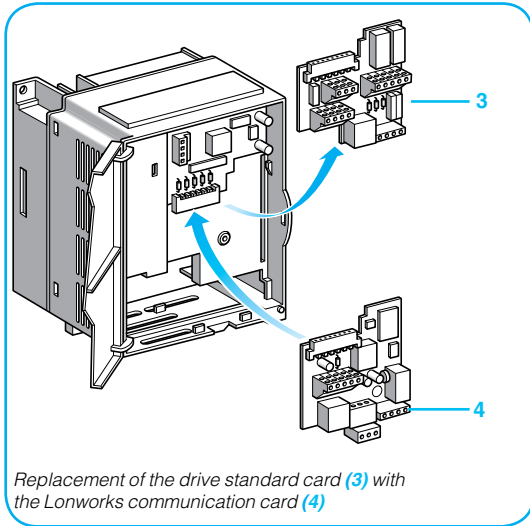
Communication set-up options		Miscellaneous options	
A06	BACnet Card	A07	Drive input disconnect
B06	LonWorks Card	B07	Line Contactor
C06	Metasys N2 Card	S07	Seismic certification
D06	Apogee P1 Card	D07	Full text keypad
N06	Modbus	X07	AC line reactor

## Dimensions

Frame Size	W x H x D	
	Inches	mm
A	8.714 x 40.375 x 7.895	221.3 x 1025 x 200.5
B	12.215 x 45.142 x 8.725	310.3 x 1146.6 x 221.6
C	12.532 x 62.006 x 10.916	318.3 x 1575 x 277.3
D	15.243 x 64.9 x 11.915	387.5 x 1648.5 x 302.7

# S-Flex enclosed variable speed drives

## Accessories & Options



### Optional LonWorks communication card

The Altivar 212 drive can also be connected to the LonWorks network by using the communication card (4) available as an option. It is connected by replacing the standard card (3) on the drive.

The connections are identical to those on the standard card:

- An RJ45 communication port for the Modbus serial link: this network port is mainly assigned to the remote graphic display keypad (Drive Navigator).

#### It is also used to connect:

- The Multi-Loader configuration tool
- The Bluetooth® serial link
- A Magelis industrial HMI terminal
- A screw terminal block for the Modbus serial link and the LonWorks network (optimized solution for daisy chain connection). This screw terminal block is assigned to control and signalling by a PLC or by another type of controller.

The Altivar 212 drive can be controlled using the LonWorks 6010 (Variable Speed Motor Drive) and LonWorks 0000 (Node Object) profiles.

### LonWorks Communication

#### All the drive functions can be accessed via the network:

- Control
- Monitoring
- Adjustment
- Configuration

#### The speed control and reference may come from different sources:

- I/O terminals
- Communication network
- Drive Navigator

The advanced functions of the Altivar 212 enable switching of these drive control sources to be managed in accordance with the application requirements.

Communication is monitored according to criteria specific to each protocol.

However, regardless of the protocol, it is possible to configure how the drive responds to a communication fault:

- Freewheel stop, stop on ramp or braked stop
- Maintain last command received



LonWorks communication card VW3 A21 212

Description	Part number	Weight	
		lbs	kg
LONWORKS communication card	VW3A21212	0.4	0.2



### iPad programming

#### The iPad application can perform the following programming actions:

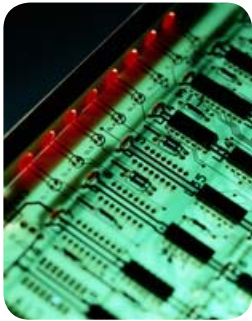
- Create parameter files
- Validate drive configurations
- Upload, download or clone drive settings
- Retain digital file copies of drive settings
- Links to all product information embedded in app

For all other S-Flex  
ATV212 accessories  
and options refer to  
pages 20 - 27.



## Quality Assurance

This document communicates a summary of the processes, procedures & quality assurance that are in place for the manufacturing of the Altivar 212. Altivar 212 drives are produced in ISO certified facilities. Customers can be assured that these processes and procedures are followed. Audits conducted by third party representatives verify documented processes and procedures are followed and provide certification to ISO 14001. Schneider Electric utilizes quality assurance processes and procedures to verify the integrity of components and the assembly process. Data is gathered on each unit and tracked via the unique serial number of each unit during the manufacturing process. The document was not intended to imply this data is available in a format that could be easily communicated externally nor that a written report is generated for each product.



### *Outline of Test Process and Procedures*

Printed circuit board testing, dielectric testing, preliminary memory and functional test, unit operation with burn-in testing, and final verification testing are conducted at various points in the manufacturing process for each drive. All aspects of these tests during the assembly are logged electronically for internal tracking purposes. Each unit is checked and product conformance status is recorded at each test station. Appropriate conformance information is carried in nonvolatile memory within the unit. The sequence of testing is monitored. Each test station requires a successful bar code scan on entry to ensure each drive has successfully completed any prerequisite test stations.

In addition to the processes and procedures detailed below, each test station has a visual quality inspection check list. This check list includes a physical inspection for proper connections, power component polarities, proper assembly torques, mechanical integrity and proper documentation.

### *Printed Circuit Board Testing*

Printed circuit boards used in the assembly of the ATV212 undergo testing as a part of the board assembly. These tests include:

- In-circuit, component level testing
- Functional power-on testing
- Thermal-cycle stress testing
- High-potential test applied to high voltage boards

### *Dielectric Testing (Hi Pot Test)*

This test verifies the dielectric withstand between customer connection points and ground to validate that the required isolation barriers are intact. Isolation barriers are typically tested for a duration of one (1) second during which a high voltage is applied according to IEC 61800-5-1 standard. This station is also used to verify placement of the power circuit connections.

### *Preliminary memory and functional testing*

During this test, the unit's on-board communication port is utilized to read internal memory and set aside a portion of memory to track the processes performed on the drive and its main components. Each tracked process must have been completed successfully to proceed. These include:

- Supplier performed tests of printed circuit boards with on-board memory.
- Successful drive hi-pot test.

#### **A preliminary test is run to verify:**

- Heatsink ground screw presence
- RFI filter jumper setting
- DC bus Jumper presence
- EEPROM test
- Product rating verification
- Initial rating verification
- Analog input calibration
- Analog output calibration
- Self test (verification of the display board and control terminal board)
- Pre-motor test



### *Unit operation and burn-in testing*

Burn-in testing involves four aspects - (I) sample plan, (II) thermal profile, (III) electrical cycling, and (IV) load cycling. Each will vary slightly by the equipment available at each production facility and by the current quality results experienced by each production facility.

#### *(I) Sample Plan*

Burn-in is sampled at a rate that varies from 5% to 100%. The rate is based on current quality results for each production facility. Each production facility is required to burn-in at sample rates determined by the following model.

#### *(II) Thermal Profile*

Constant elevated temperature of 60°C for two hours during which the drive is subjected to electrical cycling for the entire duration of the thermal profile.

#### *(III) Electrical Cycles*

The electrical cycle runs concurrently with the thermal profile. An electrical cycle energizes and de-energizes the drive by connecting and removing AC input power. The drive is energized for the duration of a load cycle (typically 4 minutes) and de-energized to allow the drive power supply to shut down (typically 40 seconds). This cycle repeats continuously during the portions of the thermal profile indicated above. This cycle is repeated continuously during the thermal profile.

#### *(IV) Load Cycles*

Drives are connected to an inertial motor load during burn-in. When the drive is energized, the drive is cycled between high speed forward and reverse operations. Load cycles are made at a minimum interval of 10 seconds. Acceleration and deceleration rates are 0.1s (minimum). The rates are selected to maximize transition stress.

### *Monitoring during burn-in cycle*

The drive detected fault register and drive speed are monitored during the load cycle. If the drive does not reach the commanded speed then it stops and then indicates that it did not pass the test.

### *Final verification testing*

This test validates proper operation after burn-in and prepares the drive settings for customer shipment. The following checks are made:

- DC bus pre-charge check
- Communication port test
- Product model verification
- 7 segment LED display check
- DC charge LED check
- CPU version check
- DC bus level check
- Fan operation test
- Nominal load characteristic check
- Overcurrent test
- Ground fault trip test
- Brake transistor off check
- Brake transistor on check
- Set factory default configuration

This document provides information regarding the quality assurance processes and procedures that are in place for the manufacturing of Altivar 212. These are in place to monitor and confirm the quality of the product line that has been designed in from the outset.



## Solutions for every stage of your equipment's life cycle

Schneider Electric™ provides services far beyond meeting your immediate needs for application or equipment repair. We take a long-term, holistic approach to determine your facility and operational needs and develop a strategy for improving the performance of your people, systems, and processes.

Schneider Electric provides services from system design and consulting, to maintenance support, modernization of your installation, and project delivery. Schneider Electric provides the people, tools, and processes to help maximize your business's infrastructure.

Our expertise enables you to cut costs, reduce energy consumption, and keep your systems up and running through routine maintenance, added enhancements, and migrations to new state-of-the-art functionality.

### > Start-up and commissioning

Expert installation support to provide assistance in the start-up of your new system. Service includes a comprehensive power-up and diagnostic check on system components to minimize risk and optimize operation.

### > Technical training

Training offered on-site, off-site, or online for Schneider Electric automation products taught by professional instructors with up-to-date knowledge of our latest hardware and software.

### > Remote technical support

Comprehensive online and phone support from experts specially trained on Schneider Electric drive products, helping to reduce downtime and costs and optimize your system's life cycle.

### > On-site technical support

Support service to perform regular maintenance, upgrades, and conversion assistance, small application and programming assistance, on-the-job training, equipment repair, support and troubleshooting, even in emergency situations.

### > Preventative maintenance

Maintenance programs to scan for, and proactively detect, potential issues or problems with your automation system to help you avoid the costs of unscheduled downtime and short equipment service life. Also serves to extend the life of your installed base by using our services to properly maintain your equipment.

### > Industrial repair services

Repair capabilities for over 400,000 part numbers from more than 2,500 manufacturers at our Greensboro, NC repair facility. Repair is available for both Schneider Electric and non-Schneider Electric equipment.

### > Spare parts management

Save money and reduce downtime through our parts management program. An on-site assessment is performed to determine parts and inventory levels needed to maintain proper system operation and reduce downtime and inventory costs.

### > Migration and modernization

Realize the productivity benefits of the latest Schneider Electric automation technology by using our assessment tools to identify and implement replacement of your legacy automation products, regardless of brand. We make extensive use of existing hardware and wiring for a cost-effective solution with minimal downtime.

### > Software renewals

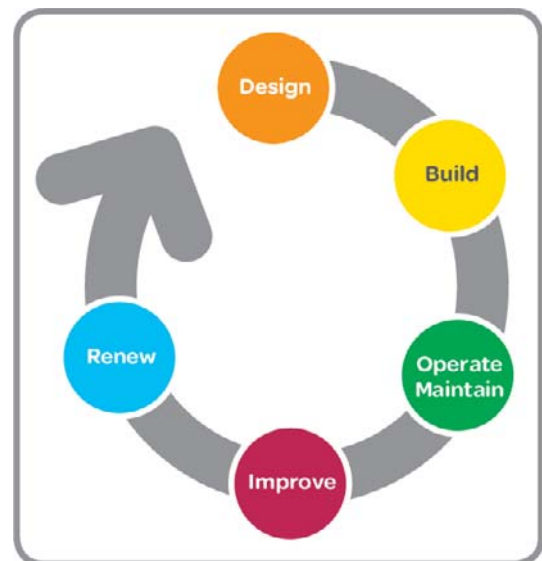
Access the latest software, firmware, and custom options to ensure you always have the latest functionality available to optimize your system's life cycle.

### > Extended warranty

Extend your Schneider Electric standard manufacturer warranty from one year to five years. Protection plans are tailored to your needs reducing costs and out-of-service time.

### > When it comes to your automation equipment, we can help you

- Increase productivity
- Improve reliability and safety
- Mitigate risk and limit downtime
- Keep equipment up to date
- Extend the life of your installed base
- Cut costs and increase savings
- Improve your return on investment



## Talk to someone you can trust

The Altivar family of variable speed AC drives and the Altistart family of soft starts presents the most advanced and user-friendly solutions in the marketplace. Featuring proprietary motor control algorithms to achieve optimal reaction times and complete scalability to match your application requirements for speed, size, and protection, the complete line of Altivar and Altistart products provides the flexibility and performance to:

- Meet the needs of a broad range of industries, including HVAC, pump, material handling, hoisting, packaging and many more.
- Reduce your energy costs using proprietary energy-saving technologies available only from Schneider Electric.
- Improve your up-time by simplifying installation, commissioning and maintenance by providing advanced diagnostics, industry-leading voltage ride thru capability and seismic qualified products.

We also work with you to deliver the benefits of a global service and support of a global service and support organization to further increase the value of working with Schneider Electric. Our product specialists, industry experts, distributors, partners, and the countless other members of the Schneider Electric family are dedicated to helping you make the most of your energy everyday. Contact your local sales representative today to learn how Schneider Electric can improve operational performance and help your business to achieve a competitive advantage. Or visit [www.schneider-electric.com](http://www.schneider-electric.com)

### >Drive Product Support Group

For support and assistance, contact the Drive Product Support Group. The Drive Product Support Group is staffed from 8:00 am until 6:00 pm Eastern time to assist with product selection, start-up, and diagnosis of product or application problems.

EMERGENCY Technical phone support is available 24 hours a day, 365 days a year.

Toll Free **1-888-778-2733**

E-mail **[drive.products.support@us.schneider-electric.com](mailto:drive.products.support@us.schneider-electric.com)**

Fax **919-217-6508**

### >Schneider Electric Service (On-Site)

The Schneider Electric Services division is committed to providing quality on-site service that consistently meets customer expectations. Services responds to your requests, seven days a week, 24 hours a day.

Phone **1-888-778-2733**

### >Schneider Electric Customer Training

Schneider Electric offers a variety of instructor-led skill enhancing and technical product training programs for customers. For a complete list of drives/soft start training with dates, locations, and pricing please call:

Phone **978-975-9306**

Fax **978-975-2821**

### >Customer Care Center

(Assist with stock checks, claims, and order management)

To provide additional support, Schneider Electric has rolled out new Technical Service Representatives in local offices which have the strongest needs.

Due to time zone changes and different time operation requirements business operation times vary.

Phone **888-778-2733**

Fax **888-329-9773**



**Schneider Electric USA, Inc.**

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