

SMVector Drive

Flexible, simple, economical



SMV NEMA 4X (IP65)

SMV NEMA 1 (IP31)

Lenze
AC Tech

SMVector | Our promise

Commitment to Value

The finest product at the best price is serious business. It takes continuous life cycle management to achieve this goal. We are always investigating techniques to improve efficiency and take advantage of the latest microprocessor and power module technology. When we achieve efficiency gains or material cost reductions, we pass those savings on to our customers. This simple philosophy has permitted us to build and maintain a very loyal base of customers.

Commitment to Quality

From product design to manufacture, service and training, quality is at the foundation of Lenze-AC Tech's corporate philosophy. A quality product is built of superior materials by highly skilled personnel equipped with state-of-the art instruments. And a quality product is backed by expert training, knowledgeable sales representatives and experienced repair personnel. Continuous life cycle improvement fueled by our pledge to our Customers drives our technology forward. We feel so strongly about quality that each SMVector is backed with a two-year warranty.

Commitment to Innovation

We pride ourselves on delivering products to the market that are designed to meet specific customer needs. Our portfolio of innovative products is broad and covers very simple variable speed applications up through complex motion control. Each product, including the SMVector, is positioned so our customers pay only for the level of technology necessary for their application.

Commitment to Simplicity

One of the cornerstones of our design philosophy is to make our products simple to use. Technology only benefits the user if it can be easily understood and applied. The SMVector's intuitive display and EPM technology dramatically simplifies installation, commissioning and operation for our customers.

Commitment to Performance

The SMVector is in a class by itself when it comes to performance. At the heart of the SMV are sophisticated vector algorithms that achieve new heights in torque production and speed control. This technology breakthrough allows our customers to cover a full range of applications from simple speed control through advanced torque and process control with the same product.

Our Promise

At Lenze - AC Tech it is not good enough to deliver part of a promise. Our products deliver the entire package; Price Leadership, Quality, Innovation, Simplicity and Performance.



SMVector | Features and Benefits:

The SMVector continues our price leadership tradition in the highly competitive AC drive market. Its performance and flexibility make it an attractive solution for a broad range of applications including:

- ▶ Food processing machinery
- ▶ Packaging machinery
- ▶ Material handling/conveying systems
- ▶ HVAC systems

The SMVector makes good its promise of price leadership in delivering unparalleled performance and simplicity. The SMVector is the right choice when you need it all – performance, power, packaging and intuitive programming.



Superior Performance

- ▶ Modes of Operation:
 - V/Hz (Constant and Variable)
 - Enhanced V/Hz (Constant and Variable)
 - Vector Speed Control
 - Vector Torque Control
- ▶ Dynamic Torque Response
- ▶ Sophisticated Auto-tuning (Motor Calibration)
- ▶ Impressive Low Speed Operation

Flexible Power Ranges

- ▶ International Voltages:
 - 120/240V, 1Ø (up to 1.5 Hp)
 - 200/240V, 1/3Ø (up to 3 Hp)
 - 200/240V, 3Ø (up to 20 Hp)
 - 400/480V, 3Ø (up to 30 Hp)
 - 480/600V, 3Ø (up to 30 Hp)

Industrial Grade Packaging

- ▶ NEMA Type 1 (IP31) Enclosure
- ▶ NEMA 4X (IP65) Indoor Only
- ▶ NEMA 4X (IP65) Indoor/Outdoor

Simplicity

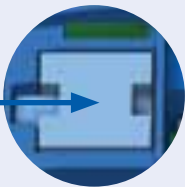
- ▶ Intuitive User Interface
- ▶ Electronic Memory Module (EPM)

Two Year Warranty

Electronic Programming Module (EPM)

Program the SMVector quickly and easily using the electronic programming module (EPM). The EPM stores the drive's parameter configuration and simplifies initial setup:

- ▶ Three ways to program the EPM
 - Use the intuitive SMVector integrated keypad
 - Program in a Microsoft Windows™ environment with Techlink
 - Or with the lightweight portable EPM programmer. The crystal clear 16-character LCD display makes programming multiple drives a snap.

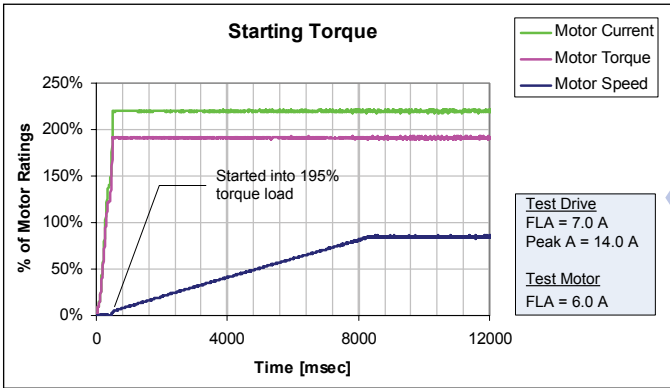


- ▶ The EPM saves time and money. It's as easy as 1, 2, 3...
 1. Create your parameter profile and archive to the EPM programmer, a master EPM or your PC.
 2. Insert the EPM into the programmer and copy parameters in a matter of seconds!
 3. Plug the EPM into the drive and it is fully programmed and ready to go.

Imagine programming 20 drives in less than one minute!

- ▶ Improve efficiency. Program the drive anytime and anywhere it makes sense during your manufacturing or commissioning process. You can even plug in a fully programmed EPM before connecting the drive to power. Now the drive is ready and waiting for power to be connected.
- ▶ Safeguard your configuration. When you program the EPM your parameter settings are automatically archived. This truly unique feature allows the SMVector to be reset to factory default settings or to customer settings.

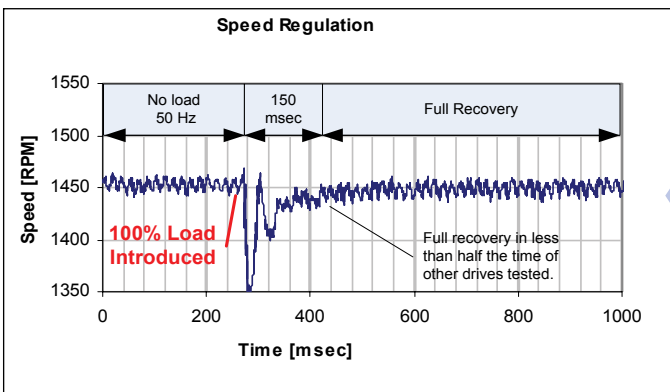
The EPM. Another example of the innovative thinking that separates Lenze-AC Tech from its competition.



Exceptional Starting Torque

Overpower demanding applications

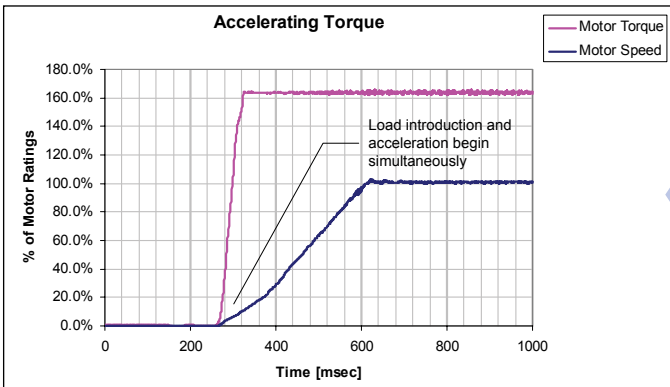
The SMVector is peerless in controlling the motor's ability to convert current into torque. In this example, the SMVector is started into a stiff 195% torque load. Not only does the motor start the load, but it also delivers a full 195% torque while accelerating to 50 Hz in 8 seconds.



Dynamic Speed Regulation

Recovery from 100% shock load in 0.15 seconds

Shock loads are no match for the SMVector. Here an instantaneous 100% load is dealt with in a mere 0.15 seconds. Remarkably, this level of speed regulation is achieved open loop without the benefit of a feedback device.



Quick Acceleration

0 to 100 in 0.33 seconds!

Motors controlled by the SMVector benefit from a sophisticated motor control algorithm that drives motor performance to maximum levels. In this application the the motor is able to drive a 165% torque load while accelerating from 0 to 100% speed in an impressive 0.33 seconds.

The SMV Thrives in Harsh Environments

Plastic Housing/Black Anodized Heatsink

- Light weight and corrosion resistant
- Available for indoor and indoor/outdoor use

Totally Enclosed Non-Ventilating Housing

Compact Enclosures



Optional Quick Disconnect

- Available on certain models

High Pressure Washdown Version

- Can be ordered without keypad and display

Optional Integrated EMC Filters

- Meets CE regulations

SMVector | Specifications

World Class Control

Modes of Operation

- Open Loop Flux Vector
- Speed or Torque Control
- V/Hz (Constant or Variable)
- Enhanced V/Hz with Auto-tuning

Acceleration/Deceleration Profiles

- ▶ Two Independent Accel Ramps
- ▶ Two Independent Decel Ramps
- ▶ Linear
- ▶ S-Type
- ▶ Auxiliary Ramp-to-Stop

Output Frequency

- ▶ 500 Hz Standard
- ▶ 1,000 Hz Optional

Switching Frequency

- ▶ 4, 6, 8, 10, 12 or 16 kHz

Universal Logic Assertion (Selectable)

- ▶ Positive Logic Input
- ▶ Negative Logic Input

Braking Functions

- ▶ DC Injection Braking
- ▶ Optional Regenerative Braking

Speed Commands

- ▶ Keypad
- ▶ Jog
- ▶ Floating Point Control
- ▶ Voltage: Scalable 0 – 10 VDC
- ▶ Current: Scalable 4 – 20 mA
- ▶ Potentiometer
- ▶ 8 Preset Speeds

Process Control

- ▶ PID Modes: Direct and Reverse Acting
- ▶ PID Sleep Mode

Vigilant System Protection

Voltage Monitoring

- ▶ Low DC Bus V Protection
- ▶ High DC Bus V Protection
- ▶ Low Line V Compensation

Current Monitoring

- ▶ Motor Overload Protection
- ▶ Current Limiting Safeguard
- ▶ Phase Loss Protection
- ▶ Ground Fault
- ▶ Short Circuit Protection

Loss of Follower Management

- ▶ Protective Fault
- ▶ Go to Preset Speed or Preset Setpoint
- ▶ Initiate System Notification

Over Temperature Protection

Comprehensive Diagnostic Tools

Real Time Monitoring

- ▶ 8 Register Fault History
- ▶ Software Version
- ▶ Drive Network ID
- ▶ DC Bus Voltage (V)
- ▶ Motor Voltage (V)
- ▶ Output Current (%)
- ▶ Motor Current (A)
- ▶ Motor Torque (%)
- ▶ Power (kW)
- ▶ Energy Consumption (kWh)
- ▶ Heatsink Temperature (°C)
- ▶ 0 – 10 VDC Input (User Defined)
- ▶ 4 – 20 mA Input (User Defined)
- ▶ PID Feedback (User Defined)
- ▶ Analog Output (Speed, Load, Torque, kW)
- ▶ Network Speed (Baud Rate)
- ▶ Terminal Status
- ▶ Keypad Status
- ▶ Elapsed Run Time (Hours)
- ▶ Elapsed Power on Time (Hours)

Status Outputs

- ▶ Programmable Form "A" Relay Output
- ▶ Programmable Open Collector Output
- ▶ Scalable 0-10 VDC / 2-10 VDC Analog Output

Rugged Environmental Capabilities

NEMA Type 1 (IP31)

NEMA Type 4X (IP65) Indoor Only

NEMA Type 4X (IP65) Indoor/Outdoor

Ambient Temperature

- ▶ -10 to 55°C @ 6 kHz
- ▶ Derate 2.5% per °C Above 40°C

International Voltages

- ▶ +10/-15% Tolerance
- ▶ 120/240V, 1Ø
- ▶ 200/240V, 1 or 3Ø
- ▶ 200/240V, 3Ø
- ▶ 400/480V, 3Ø
- ▶ 480/600V, 3Ø

Global Standards

UL, cUL

CE Low Voltage Directive (EN61800-5-1) (Europe)

CE EMC Directive (EN61800-3) with Optional EMC filter

GOST (Russia/Ukraine)

C-Tick (Australia/New Zealand)

Two Year Warranty

Simple Six Button Programming

Start

Stop

Forward/Reverse

Scroll Up

Scroll Down

Enter/Mode

Informative LED Display

Vivid Illumination

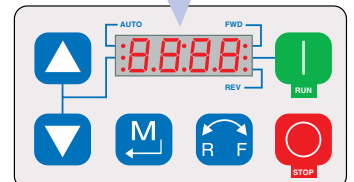
Easily Read from a Distance

Five Status LEDs

- Run
- Automatic Speed mode
- Manual Speed Mode
- Forward Rotation
- Reverse Rotation

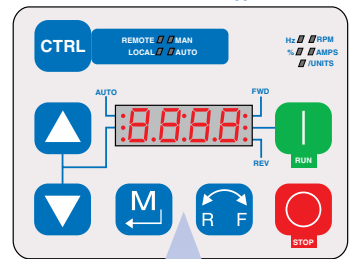
Status Display

- Motor Status
- Fault Management
- Operational Information



NEMA1 (Up to 10HP), NEMA4/4x Keypad

NEMA1 15-30HP Keypad



Additional CTRL Button

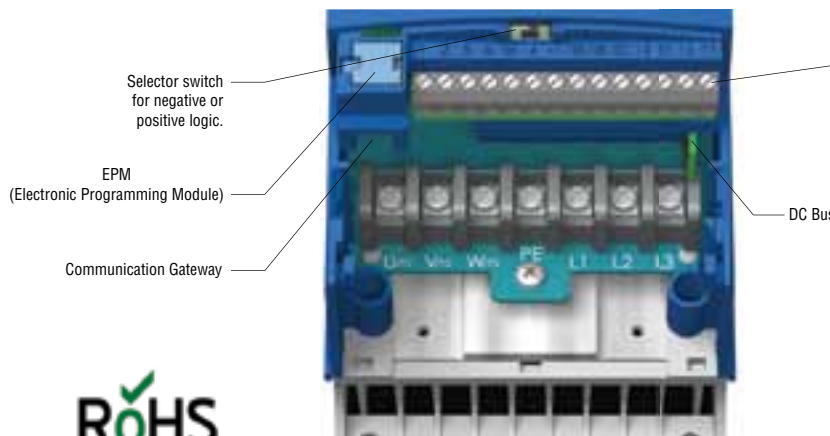
Switch between control modes

- Local-Manual
- Local-Auto
- Remote-Manual
- Remote-Auto

Additional LED Indicators

Define the units being displayed

- Hz
- RPM
- %
- Amps
- /Units



Control Terminals

Digital Inputs

- Dedicated Start/Stop
- (3) Programmable

Digital Outputs

- Form "A" Relay
- Open Collector

Analog Inputs

- 0 - 10 VDC
- 4 - 20 mA

Analog Outputs

- 0 - 10 VDC/2 - 10 VDC

Power Supplies

- 10 VDC Potentiometer Ref
- 12 VDC, 20 mA Digital Input Ref or 0VDC Common
- 12 VDC, 50 mA Supply Common

Additional Control Terminals

(NEMA1, 15-30 HP only)

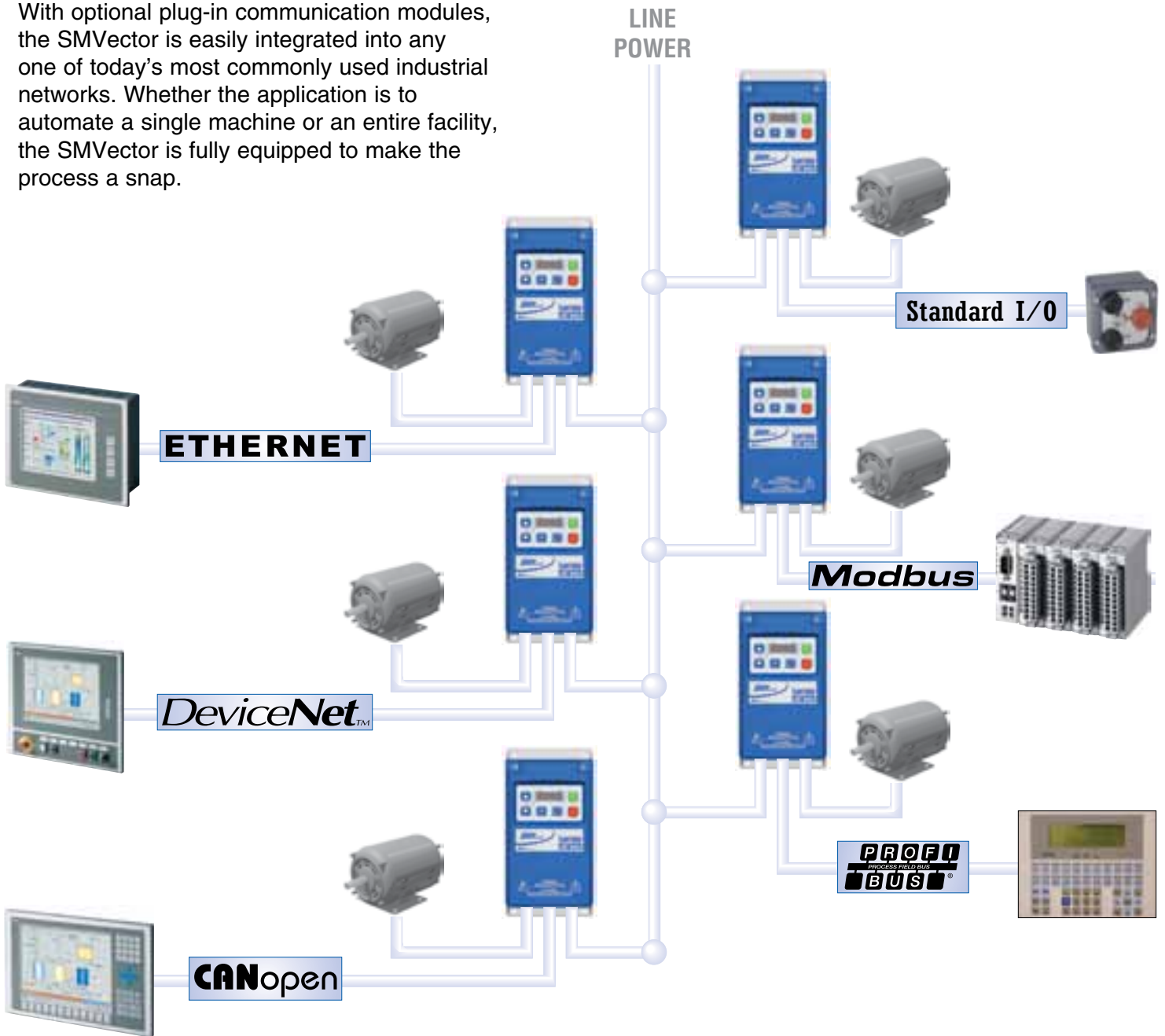
- 1 Programmable Digital Input
- 1 Common

RS-485 Modbus Communications

- TXA
- TXB

SMVector | Connectivity

With optional plug-in communication modules, the SMVector is easily integrated into any one of today's most commonly used industrial networks. Whether the application is to automate a single machine or an entire facility, the SMVector is fully equipped to make the process a snap.



NOTE: Communication options are available in NEMA 1 (IP31) and NEMA 4X (IP65) models.



Communication Module

Setting up a drive in a network has never been so simple. Order the SMVector and your choice of communication module. Simply snap the communication module into the terminal cover and the drive is ready to connect to the network. Or if the SMVector is already installed it can be easily upgraded in the field.



120/240V - 1Ø Input (3Ø Output)

Model Number	Output Current I_n [A]	Power		NEMA 1 (IP31)	Size NEMA 4X (IP65)	NEMA 4X w / Disconnect
		Hp	kW			
ESV251N01SX*	1.7	0.33	0.25	G1	N/A	N/A
ESV371N01SX*	2.4	0.5	0.37	G1	R1	AA1
ESV751N01SX*	4.2	1	0.75	G1	R1	AA1
ESV112N01SX*	6.0	1.5	1.1	G2	R2	AA2

Notes: Output voltage will be twice line voltage when connected to a 120V source.
Output voltage will not exceed line voltage when connected to a 240V source.

200/240V - 1 or 3Ø Input (3Ø Output)

Model Number	Output Current I_n [A]	Power		NEMA 1 (IP31)	Size NEMA 4X (IP65)	NEMA 4X w / Disconnect
		Hp	kW			
ESV251N02SX*(1)(2)	1.7	0.33	0.25	G1	N/A	N/A
ESV371N02YX*(2)	2.4	0.5	0.37	G1	R1	AA1
ESV751N02YX*(2)	4.2	1	0.75	G1	R1	AA1
ESV112N02YX*(2)	6.0	1.5	1.1	G2	R2	AA2
ESV152N02YX*(2)	7.0	2	1.5	G2	R2	AA2
ESV222N02YX*(2)	9.6	3	2.2	G2	S1	N/A

200/240V - 3Ø Input (3Ø Output)

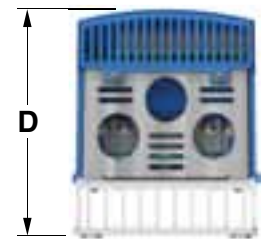
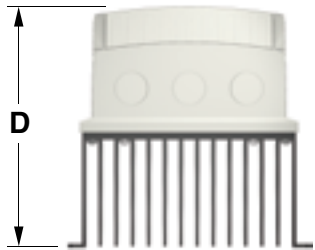
Model Number	Output Current I_n [A]	Power		NEMA 1 (IP31)	Size NEMA 4X (IP65)	NEMA 4X w / Disconnect
		Hp	kW			
ESV112N02TX*	6.0	1.5	1.1	G2	N/A	N/A
ESV152N02TX*	7.0	2	1.5	G2	N/A	N/A
ESV222N02TX*	9.6	3	2.2	G2	N/A	N/A
ESV402N02TX*	16.5	5	4.0	G3	V1	N/A
ESV552N02TX*	23	7.5	5.5	H1	T1	N/A
ESV752N02TX*	29	10	7.5	H1	T1	N/A
ESV113N02TX*	42	15	11.0	J1	N/A	N/A
ESV153N02TX*	54	20	15.0	J1	N/A	N/A

400/480V - 3Ø Input (3Ø Output)

Model Number	Output Current I_n [A]	Power		NEMA 1 (IP31)	Size NEMA 4X (IP65)	NEMA 4X w / Disconnect
		Hp	kW			
ESV371N04TX*(2)	1.3/1.1	0.5	0.37	G1	R1	AA1
ESV751N04TX*(2)	2.4/2.1	1	0.75	G1	R1	AA1
ESV112N04TX*(2)	3.5/3.0	1.5	1.1	G2	R2	AA2
ESV152N04TX*(2)	4.0/3.5	2	1.5	G2	R2	AA2
ESV222N04TX*(2)	5.5/4.8	3	2.2	G2	R2	AA2
ESV302N04TF*	7.6/6.3	4	3.0	N/A	R2	AA2
ESV402N04TX*(2)	9.4/8.2	5	4.0	G3	V1	N/A
ESV552N04TX*(2)	12.6/11	7.5	5.5	H1	V1	N/A
ESV752N04TX*(2)	16.1/14	10	7.5	H1	T1	N/A
ESV113N04TX*	24/21	15	11.0	J1	N/A	N/A
ESV153N04TX*	31/27	20	15.0	J1	N/A	N/A
ESV183N04TX*	39/34	25	18.5	J1	N/A	N/A
ESV223N04TX*	46/40	30	22	J1	N/A	N/A

480/600V - 3Ø Input (3Ø Output)

Model Number	Output Current I_n [A]	Power		NEMA 1 (IP31)	Size NEMA 4X (IP65)	NEMA 4X w / Disconnect
		Hp	kW			
ESV751N06TX*	1.7	1	0.75	G1	R1	AA1
ESV152N06TX*	2.7	2	1.5	G2	R2	AA2
ESV222N06TX*	3.9	3	2.2	G2	R2	AA2
ESV402N06TX*	6.1	5	4.0	G3	V1	N/A
ESV552N06TX*	9	7.5	5.5	H1	V1	N/A
ESV752N06TX*	11	10	7.5	H1	T1	N/A
ESV113N06TX*	17	15	11.0	J1	N/A	N/A
ESV153N06TX*	22	20	15.0	J1	N/A	N/A
ESV183N06TX*	27	25	18.5	J1	N/A	N/A
ESV223N06TX*	32	30	22	J1	N/A	N/A



Bottom Entry with NEMA 1 Steel Conduit Plate



Bottom Entry with IP31 Finger Guard

* NOTE: For complete part number, replace "*" with B, C, D, E or F.

B = NEMA 1 (IP31) Indoor Only enclosure

C = NEMA 4X (IP65) Indoor Only enclosure, convection cooled

D = NEMA 4X (IP65) Indoor Only enclosure, fan cooled

E = NEMA 4X (IP65) Indoor/Outdoor enclosure, convection cooled

F = NEMA 4X (IP65) Indoor/Outdoor enclosure, fan cooled

Dimensions

	H		W		D	
	in.	mm	in.	mm	in.	mm
G1	7.48	190	3.90	99	4.35	110
G2	7.52	191	3.90	99	5.45	138
G3	7.52	191	3.90	99	5.80	147
H1	9.83	250	5.12	130	6.30	160
J1	12.50	318	6.92	176	8.09	206
R1	8.00	203	6.28	160	4.47	114
R2	8.00	203	6.28	160	6.31	160
S1	8.00	203	7.12	181	6.77	172
T1	10.00	254	8.04	204	8.00	203
V1	10.00	254	8.96	228	8.00	203
AA1	10.99	279	6.28	160	4.47	114
AA2	10.99	279	6.28	160	6.31	160

(1) The model ESV251N02SXB is 1Ø input only. For 3Ø INPUT use the ESV371N02YXB.

(2) NEMA 4X (IP65) models are also available with an integrated filter. For models ending with "SX" and "TX", replace the "X" with an "F". For models ending with "YX", replace "YX" with "SF". The filtered drive can be operated on single-phase supply only.

Worldwide Coverage | We're everywhere you are



Growth requires drive. Competitive, committed and consistent drive. At Lenze-AC Tech we concentrate 110% of our energies on providing our Customers with everything “from the load up”.

“Customer Service has always been and will always be our number one commitment. Our success depends on it.”



Driving design technology forward means we never stop thinking about process improvements. Did we deliver a quality product to market that meets the Customer's needs? That is the key.



Innovation takes art and skill to combine what's new and what's proven to produce a product with exceptional form, fit and function.

Industrial Drives and Controls... That's All We Do!



A Global Drives Company

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