SMVector Drive

Flexible, simple, economical
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 Americas 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 Americas it is not good enough to deliver part of a promise. Our products deliver the entire package; Value, 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
- Sequencer with 16 Programmable Segments

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 60 Hp)
  - 480/600V, 3Ø (up to 60 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)
- Optional Disconnect Switch (NEMA 4X only)
- Optional Potentiometer Switch (NEMA 4X only)

Two Year Warranty

EPM | Just think of it as ... Ever Present Memory

When you need to program or replace a drive, whether it is 1 or 100 drives, the Electronic Programming Module (EPM) gets it done simply, quickly and most important, accurately. There is no hassle of reconfiguring each parameter or resetting the drive to factory or user default settings.

When drive reset is necessary, reset to factory default or customer settings in seconds with the EPM. When the EPM equipped drive is used on a line containing multiple drives with the identical setup, it takes just minutes to program the entire line. And EPMs can be replaced with or without power connected. When a drive must be replaced, the parameter configuration is not lost, simply plug in the pre-programmed EPM. You are good to go with Ever Present Memory.
**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 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 outdoor use

- **Totally Enclosed Non-Ventilating Housing**

- **Compact Enclosures**

- **Optional Disconnect Switch**
  - Available on certain models

- **High Pressure Washdown Version**
  - Can be ordered without keypad and display

- **Optional Integrated EMC Filters**
  - Meets CE regulations

- **Optional Potentiometer**

- **SMV NEMA 4X (IP65)**
  With Disconnect and Potentiometer
SMVector

Specifications

World Class Control

Modes of Operation
Open Loop Flux Vector, Speed or Torque Control
V/Hz (Constant or Variable)
Base Frequency Adjustable to Motor Specs
Enhanced V/Hz with Auto-tuning

Acceleration/Deceleration Profiles
Two Independent Accel Ramps
Two Independent Decel Ramps
Linear, S-Type
Auxiliary Ramp (or Coast)-to-Stop

Fixed Accel Boost for Improved Starting
500 Hz Output Frequency

High Carrier (PWM Sine-Coded) Frequency
4, 6, 8, 10 kHz

Universal Logic Assertion (Selectable)
Positive or Negative Logic Input
Digital Reference Available

Braking Functions
DC Injection Braking
Optional Dynamic Braking

Flux Braking w/ Adjustable Flux Level & Decel Time

Speed Commands
Keypad, Potentiometer
Jog, 8 Preset Speeds
Floating Point Control
Sequencer, 16 Segments
Voltage: Scalable 0 – 10 VDC
Current: Scalable 4 – 20 mA

Process Control
PID Modes: Direct and Reverse Acting
PID Sleep Mode w/ Adjustable Recovery Threshold
Analog Output (Speed, Load, Torque, kW)
Network Speed (Baud Rate)
Terminal and Keypad Status
Elapsed Run or Power On Time (Hours)

Status Outputs
Programmable Form “A” Relay Output
Programmable Open Collector Output
Scalable 0-10 VDC / 2-10 VDC Analog Output
4-20mA w/500 Ohm Total Impedance

Environmental
Ambient Temperature
-10 to 55°C
Derate 2.5% per °C Above 40°C

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)

Vigilant System Protection

Voltage Monitoring
Low and High DC Bus V Protection
Low Line V Compensation

Current Monitoring
Motor Overload Protection
Current Limiting Safeguard
Ground Fault
Short Circuit Protection

Four ReStarts
Three Flying and One Auto
User Enabled

Loss of Follower Management
Protective Fault
Go to Preset Speed or Preset Setpoint
Initiate System Notification

Over Temperature Protection

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 GOST
CeUL C-Tick
CE Low Voltage (EN61800-5-1)
CE EMC (EN61800-3) with optional EMC filter

Control Terminals

Digital Inputs
• Dedicated Start/Stop
• (3) Programmable

Digital Outputs
• Form “A” Relay
• Open Collector

Analog Outputs
• 0 – 10 VDC
• 4 – 20 mA

Power Supplies
• 10 VDC Potentiometer Ref
• 12 VDC, 20 mA Digital Input Ref or OVDC Common
• 12 VDC, 50 mA Supply Common

Additional Control Terminals (NEMA1, 15HP and greater models)
1 Programmable Digital Input
1 Common
RS-485 Modbus Communications
• TXA
• TXB

Additional Control Terminals

Selector switch for negative or positive logic.

EPM (Electronic Programming Module)

Communication Gateway

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 15HP (and greater) Keypad

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Voltage Monitoring
Low and High DC Bus V Protection
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• TXA
• TXB

Additional LED Indicators
Define the units being displayed
• Hz
• RPM
• %
• Amps
• /Units

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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.

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.
## SMVector

### Ratings & Dimensions

#### 120/240V - 1Ø Input (3Ø Output)

<table>
<thead>
<tr>
<th>Power (Hp)</th>
<th>NEMA1</th>
<th>Model Size</th>
<th>NEMA4X - Indoor [C] or Outdoor [E]</th>
<th>NEMA4X w/Disconnect - Indoor</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.33</td>
<td>0.25</td>
<td>ESV251N01SXB G1</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>0.5 0.37</td>
<td>1  0.75</td>
<td>ESV751N01SXB G1</td>
<td>ESV751N01SXB [C] or [E] R1 ESY751N01SMC AA1</td>
<td></td>
</tr>
<tr>
<td>1.5 1.1</td>
<td>1.5  1.1</td>
<td>ESV112N01SXB G2</td>
<td>ESV112N01SXB [C] or [E] R2 ESY112N01SXB AA2</td>
<td></td>
</tr>
</tbody>
</table>

### 200/240V - 1Ø or 3Ø Input (3Ø Output)

#### 200/240V - 1Ø Input (3Ø Output)

<table>
<thead>
<tr>
<th>Power (Hp)</th>
<th>NEMA1</th>
<th>Model Size</th>
<th>NEMA4X - Indoor [C] or Outdoor [E]</th>
<th>NEMA4X w/Disconnect - Indoor</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.33 0.25</td>
<td>ESV251N02SXB G1</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.5 0.37</td>
<td>ESV751N02SXB G1</td>
<td>ESV751N02SXB [C] or [E] R1 ESY751N02SMC AA1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1  0.75</td>
<td>ESV751N02SXB G1</td>
<td>ESV751N02SXB [C] or [E] R1 ESY751N02SMC AA1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5 1.1</td>
<td>ESV112N02SXB G2</td>
<td>ESV112N02SXB [C] or [E] R2 ESY112N02SXB AA2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2  1.5</td>
<td>ESV152N02SXB G2</td>
<td>ESV152N02SXB [C] or [E] R2 ESY152N02SXB AA2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3  2.2</td>
<td>ESV222N02SXB G2</td>
<td>ESV222N02SXB [C] or [E] R1 S1 ESY222N02SXB AA1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 400/480V - 3Ø Input (3Ø Output)

<table>
<thead>
<tr>
<th>Power (Hp)</th>
<th>NEMA1</th>
<th>Model Size</th>
<th>NEMA4X - Indoor [C] or Outdoor [E]</th>
<th>NEMA4X w/Disconnect - Indoor</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 0.37</td>
<td>ESV371N04TXB G1</td>
<td>ESV371N04TXB [C] or [E] R1 ESY371N04SMC AA1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1  0.75</td>
<td>ESV371N04TXB G1</td>
<td>ESV371N04TXB [C] or [E] R1 ESY371N04SMC AA1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5 1.1</td>
<td>ESV112N04TXB G2</td>
<td>ESV112N04TXB [C] or [E] R2 ESY112N04TXB AA2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2  1.5</td>
<td>ESV152N04TXB G2</td>
<td>ESV152N04TXB [C] or [E] R2 ESY152N04TXB AA2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3  2.2</td>
<td>ESV222N04TXB G2</td>
<td>ESV222N04TXB [C] or [E] R2 ESY222N04TXB AA2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5  4</td>
<td>ESV402N04TXB G3</td>
<td>ESV402N04TXB [C] or [E] R1 V1 ESY402N04SMC AC1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.5 5.5</td>
<td>ESV552N04TXB G1</td>
<td>ESV552N04TXB [C] or [E] R1 T1 ESY552N04TMD AB1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 7.5</td>
<td>ESV552N04TXB G1</td>
<td>ESV552N04TXB [C] or [E] R1 T1 ESY552N04TMD AB1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 11</td>
<td>ESV113N04TXB J1</td>
<td>ESV113N04TXB [C] or [E] R1 W1 ESY113N04TMD AF1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 15</td>
<td>ESV153N04TXB J1</td>
<td>ESV153N04TXB [C] or [E] R1 W1 ESY153N04TMD AF1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 600V - 3Ø Input (3Ø Output)

<table>
<thead>
<tr>
<th>Power (Hp)</th>
<th>NEMA1</th>
<th>Model Size</th>
<th>NEMA4X - Indoor [C] or Outdoor [E]</th>
<th>NEMA4X w/Disconnect - Indoor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  0.75</td>
<td>ESV751N06TXB G1</td>
<td>ESV751N06TXB [C] or [E] R1 ESY751N06TMC AA1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2  1.5</td>
<td>ESV152N06TXB G2</td>
<td>ESV152N06TXB [C] or [E] R2 ESY152N06TMC AA2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3  2.2</td>
<td>ESV222N06TXB G2</td>
<td>ESV222N06TXB [C] or [E] R2 ESY222N06TMC AA2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5  4</td>
<td>ESV402N06TXB G3</td>
<td>ESV402N06TXB [C] or [E] R1 V1 ESY402N06TMC AC1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.5 5.5</td>
<td>ESV552N06TXB G1</td>
<td>ESV552N06TXB [C] or [E] R1 T1 ESY552N06TMD AB1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 7.5</td>
<td>ESV552N06TXB G1</td>
<td>ESV552N06TXB [C] or [E] R1 T1 ESY552N06TMD AB1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 11</td>
<td>ESV113N06TXB J1</td>
<td>ESV113N06TXB [C] or [E] R1 W1 ESY113N06TMD AF1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 15</td>
<td>ESV153N06TXB J1</td>
<td>ESV153N06TXB [C] or [E] R1 W1 ESY153N06TMD AF1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 18.5</td>
<td>ESV183N06TXB J1</td>
<td>ESV183N06TXB [C] or [E] R1 W1 ESY183N06TMD AF1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 22</td>
<td>ESV223N06TXB J1</td>
<td>ESV223N06TXB [C] or [E] R1 W1 ESY223N06TMD AF1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40 30</td>
<td>ESV303N06TXB K1</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 37.5</td>
<td>ESV373N06TXB K2</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60 45</td>
<td>ESV453N06TXB K3</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Filter versions are also available in 1-phase: Replace the "M" in the Model Part Number with an "L".

### Filter versions are also available in 1-phase: Replace the "X" in the Model Part Number with an "F".

### Filter versions are also available in 1-phase: Replace the "YM" in the Model Part Number with an "SL".

### Filter versions are also available in 1-phase: Replace the "YX" in the Model Part Number with an "SF".

**120/240V models provide 0-230V output even with 120V input applied.**

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The best machines and production facilities around the world use Lenze.

Positioning our Customers for Success. We take our Customer’s requirements seriously. A new application is an opportunity to test, prove and expand our drive’s capabilities while solving our Customer’s motion control needs.

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.

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