SMV Inverter Drives
.33 to 60 Hp
(.25 to 45 kW)

The SMV range of NEMA 1 (IP31) and NEMA 4/4X (IP65) inverter drives offer sophisticated auto-tuning, fast dynamic torque response with impressive low-speed operation all from a compact and simple to use package.

The SMV range is designed for motor applications where dynamic speed and torque control is demanded, making the units ideal for conveyors, food production lines, packaging equipment plus fan and pump systems.

Features and Benefits

The SMV continues our price leadership tradition in the highly competitive AC drive market. With the benefit of a two year warranty, 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 SMV makes good its promise of price leadership in delivering unparalleled performance and simplicity. The SMV is the right choice when you need it all – performance, power, packaging and intuitive programming.

Lenze
Superior Performance

• Modes of Operation:
  • V/Hz (Constant and Variable)
  • Enhanced V/Hz (Constant and Variable)
  • Vector Speed Control with 60:1 Speed Range
  • Vector Torque Control
  • Dynamic Torque Response
  • Sophisticated Auto-tuning (Motor Calibration)
  • Impressive Low Speed Operation
  • Sequencer with 16 Programmable segments, Delayed start/stop, Over 65K repeat cycles

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)

Overload
  • 150% overload for 60 sec’s
  • 200% for 15 sec's (up to 10 Hp [7.5 kW])
  • 180% overload for 15 sec's
    • (15 to 30 Hp [11 to 22 kW])

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)

Options

• Disconnect Switch (NEMA 4X indoor only)
• Potentiometer Switch (NEMA 4X indoor only)
• EMC Filter (NEMA 4X)
• Dynamic Brake Modules
• Remote Keypad
• Additional I/O Module

EPM is your 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. 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 SMV 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.

Quick Acceleration

0 to 100 in 33 seconds!
Motors controlled by the SMV 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 33 seconds.

Dynamic Speed Regulation

Recovery from 100% shock load in 15 seconds
Shock loads are no match for the SMV. Here an instantaneous 100% load is dealt with in a mere 15 seconds. Remarkably, this level of speed regulation is achieved open loop without the benefit of a feedback device.

The SMV thrives in harsh environments

- Plastic enclosure/black anodized heatsink
  - Light weight and corrosion resistant
  - Available for indoor and indoor/outdoor use
- Totally Enclosed Non-Ventilating Enclosure
- Compact Enclosures
- Optional Potentiometer
- Optional disconnect switch
  - Available on certain models
- Optional integrated EMC filters
  - Meets CE regulations

SMV NEMA 4X (IP65) with Disconnect and Potentiometer
World Class Control

**Modes of Operation**
- Sequencer, timing and step functions, Open Loop Flux Vector, Speed or Torque Control with/without Auto Tuning
- 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 and Decel Time

**Speed Commands**
- Keypad, Potentiometer Jog and 8 Pre-set 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)
- 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

**Environment**
- 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 (Hp, 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 Restart Modes**
- Three Flying and One Auto
- User Enabled

**Loss of Follower Management**
- Protective fault
- Go to Pre-set speed or Pre-set set-point
- 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 EAC
- CE Low Voltage (EN61800-5-1)
- CE EMC (EN61800-3) with optional EMC filter
- RoHS
- EC
NEMA 1 (IP31) (up to 10 Hp)  
NEMA 4X IP65

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

NEMA 1 (IP31) (15 Hp and greater)  
NEMA 4X IP65

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

Selector switch for negative or positive logic

EPM (Electronic Programming Module)

Communication Option Module Port

Removable terminal cover and steel conduit plate (not shown). Easy access for control and power wiring. An extra IP21 finger guard ships with every drive.

RoHS Compliant

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 Hp and greater models)  
1 Programmable Digital Input  
1 Common  
RS-485 Modbus Communications  
• TXA  
• TXB
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.

Communication Module
## SMV
### Ratings & Dimensions

#### 120/240V* - 1Ø Input (3Ø Output)

<table>
<thead>
<tr>
<th>Power</th>
<th>kW</th>
<th>Model</th>
<th>NEMA1</th>
<th>NEMA4X - Indoor [C]/Outdoor[E]</th>
<th>NEMA4X w/Disconnect - Indoor</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.33</td>
<td>0.25</td>
<td>ESV251N01SXB</td>
<td>G1</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>0.5</td>
<td>0.37</td>
<td>ESV371N01SXB</td>
<td>G1</td>
<td>ESV371N01SX[C] or [E] R1</td>
<td>ESV371N01SMC AA1</td>
</tr>
<tr>
<td>1</td>
<td>0.75</td>
<td>ESV751N01SXB</td>
<td>G1</td>
<td>ESV751N01SX[C] or [E] R1</td>
<td>ESV751N01SMC AA1</td>
</tr>
<tr>
<td>1.5</td>
<td>1.1</td>
<td>ESV112N01SXB</td>
<td>G2</td>
<td>ESV112N01SX[C] or [E] R2</td>
<td>ESV112N01SMC AA2</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Power</th>
<th>kW</th>
<th>Model</th>
<th>NEMA1</th>
<th>NEMA4X - Indoor [C]/Outdoor[E]*</th>
<th>NEMA4X w/Disconnect - Indoor**</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.33</td>
<td>0.25</td>
<td>ESV251N02SXB***</td>
<td>G1</td>
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<td>0.37</td>
<td>ESV371N02YXB</td>
<td>G1</td>
<td>ESV371N02YX[C] or [E] R1</td>
<td>ESV371N02YMC AA1</td>
</tr>
<tr>
<td>1</td>
<td>0.75</td>
<td>ESV751N02YXB</td>
<td>G1</td>
<td>ESV751N02YX[C] or [E] R1</td>
<td>ESV751N02YMC AA1</td>
</tr>
<tr>
<td>1.5</td>
<td>1.1</td>
<td>ESV112N02YXB</td>
<td>G2</td>
<td>ESV112N02YX[C] or [E] R2</td>
<td>ESV112N02YMC AA2</td>
</tr>
<tr>
<td>2</td>
<td>1.5</td>
<td>ESV152N02YXB</td>
<td>G2</td>
<td>ESV152N02YX[C] or [E] R2</td>
<td>ESV152N02YMC AA2</td>
</tr>
<tr>
<td>3</td>
<td>2.2</td>
<td>ESV222N02YXB</td>
<td>G2</td>
<td>ESV222N02YX[C] or [E] S1</td>
<td>ESV222N02YMC AD1</td>
</tr>
</tbody>
</table>

*Filter versions are also available in 1-phase: Replace the “YX” in the Model Part Number with an “SF”.
**Filter versions are also available in 1-phase: Replace the “YM” in the Model Part Number with an “SL”.
***Model ESV251N02SXB is single-phase input only.

#### 200/240V - 3Ø Input (3Ø Output)

<table>
<thead>
<tr>
<th>Power</th>
<th>kW</th>
<th>Model</th>
<th>NEMA1</th>
<th>NEMA4X - Indoor [C or D]/Outdoor[E or F]</th>
<th>NEMA4X w/Disconnect - Indoor</th>
</tr>
</thead>
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<tr>
<td>1.5</td>
<td>1.1</td>
<td>ESV112N02TXB</td>
<td>G2</td>
<td>N/A</td>
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<tr>
<td>2</td>
<td>1.5</td>
<td>ESV152N02TXB</td>
<td>G2</td>
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<td></td>
</tr>
<tr>
<td>3</td>
<td>2.2</td>
<td>ESV222N02TXB</td>
<td>G2</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>ESV402N02TXB</td>
<td>G3</td>
<td>ESV402N02TX[C] or [E] V1</td>
<td>ESV402N02TMC AC1</td>
</tr>
<tr>
<td>7.5</td>
<td>5.5</td>
<td>ESV552N02TXB</td>
<td>G1</td>
<td>ESV552N02TX[D] or [F] T1</td>
<td>ESV552N02TMD AB1</td>
</tr>
<tr>
<td>10</td>
<td>7.5</td>
<td>ESV752N02TXB</td>
<td>H1</td>
<td>ESV752N02TX[D] or [F] T1</td>
<td>ESV752N02TMD AB1</td>
</tr>
<tr>
<td>15</td>
<td>11</td>
<td>ESV113N02TXB</td>
<td>J1</td>
<td>ESV113N02TX[D] or [F] W1</td>
<td>ESV113N02TMD AF1</td>
</tr>
<tr>
<td>20</td>
<td>15</td>
<td>ESV153N02TXB</td>
<td>J1</td>
<td>ESV153N02TX[D] or [F] W1</td>
<td>ESV153N02TMD AF1</td>
</tr>
</tbody>
</table>

#### 400/480V - 3Ø Input (3Ø Output)

<table>
<thead>
<tr>
<th>Power</th>
<th>kW</th>
<th>Model</th>
<th>NEMA1</th>
<th>NEMA4X - Indoor [C or D]/Outdoor[E or F]</th>
<th>NEMA4X w/Disconnect - Indoor**</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>0.37</td>
<td>ESV371N04TXB</td>
<td>G1</td>
<td>ESV371N04TX[C] or [E] R1</td>
<td>ESV371N04TMC AA1</td>
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<tr>
<td>1</td>
<td>0.75</td>
<td>ESV751N04TXB</td>
<td>G1</td>
<td>ESV751N04TX[C] or [E] R1</td>
<td>ESV751N04TMC AA1</td>
</tr>
<tr>
<td>1.5</td>
<td>1.1</td>
<td>ESV112N04TXB</td>
<td>G2</td>
<td>ESV112N04TX[C] or [E] R2</td>
<td>ESV112N04TMC AA2</td>
</tr>
<tr>
<td>2</td>
<td>1.5</td>
<td>ESV152N04TXB</td>
<td>G2</td>
<td>ESV152N04TX[C] or [E] R2</td>
<td>ESV152N04TMC AA2</td>
</tr>
<tr>
<td>3</td>
<td>2.2</td>
<td>ESV222N04TXB</td>
<td>G2</td>
<td>ESV222N04TX[C] or [E] R2</td>
<td>ESV222N04TMC AA2</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>ESV402N04TXB</td>
<td>G3</td>
<td>ESV402N04TX[C] or [E] V1</td>
<td>ESV402N04TMC AC1</td>
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<tr>
<td>7.5</td>
<td>5.5</td>
<td>ESV552N04TXB</td>
<td>H1</td>
<td>ESV552N04TX[C] or [E] V1</td>
<td>ESV552N04TMC AC1</td>
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<tr>
<td>10</td>
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<td>ESV752N04TXB</td>
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<td>ESV752N04TX[D] or [F] T1</td>
<td>ESV752N04TMD AB1</td>
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<tr>
<td>15</td>
<td>11</td>
<td>ESV113N04TXB</td>
<td>J1</td>
<td>ESV113N04TX[D] or [F] W1</td>
<td>ESV113N04TMD AE1</td>
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<tr>
<td>20</td>
<td>15</td>
<td>ESV153N04TXB</td>
<td>J1</td>
<td>ESV153N04TX[D] or [F] W1</td>
<td>ESV153N04TMD AE1</td>
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<tr>
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<td>J1</td>
<td>ESV183N04TX[D] or [F] W1</td>
<td>ESV183N04TMD AF1</td>
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<tr>
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<td>22</td>
<td>ESV223N04TXB</td>
<td>J1</td>
<td>ESV223N04TX[D] or [F] X1</td>
<td>ESV223N04TMD AF1</td>
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<tr>
<td>40</td>
<td>30</td>
<td>ESV303N04TXB</td>
<td>K1</td>
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<tr>
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<td>ESV373N04TXB</td>
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<td>45</td>
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<td>K3</td>
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</tbody>
</table>

*Filter versions are also available: Replace the “X” in the Model Part Number with an “F”.
**Filter versions are also available: Replace the “M” in the Model Part Number with an “L”.
## SMV

### Ratings & Dimensions

#### 600V - 3Ø Input (3Ø Output)

<table>
<thead>
<tr>
<th>Power</th>
<th>NEMA1</th>
<th>NEMA4X - Indoor [C or D]/Outdoor[E or F]</th>
<th>NEMA4X w/Disconnect - Indoor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hp</td>
<td>kW</td>
<td>Model</td>
<td>Size</td>
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<tr>
<td>1</td>
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<td>ESV751N06TXB G1 ESV751N06TX[C or E] R1 ESV751N06TMC AA1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1.5</td>
<td>ESV152N06TXB G2 ESV152N06TX[C or E] R2 ESV152N06TMC AA2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2.2</td>
<td>ESV222N06TXB G2 ESV222N06TX[C or E] R2 ESV222N06TMC AA2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>ESV402N06TXB G3 ESV402N06TX[C or E] V1 ESV402N06TMC AC1</td>
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</tr>
<tr>
<td>7.5</td>
<td>5.5</td>
<td>ESV552N06TXB H1 ESV552N06TX[C or E] V1 ESV552N06TMC AC1</td>
<td></td>
</tr>
<tr>
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<td>7.5</td>
<td>ESV752N06TXB H1 ESV752N06TX[D or F] T1 ESV752N06TMD AB1</td>
<td></td>
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<tr>
<td>15</td>
<td>11</td>
<td>ESV113N06TXB J1 ESV113N06TX[D or F] W1 ESV113N06TMD AE1</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>15</td>
<td>ESV153N06TXB J1 ESV153N06TX[D or F] W1 ESV153N06TMD AE1</td>
<td></td>
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<td>25</td>
<td>18.5</td>
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</tr>
<tr>
<td>30</td>
<td>22</td>
<td>ESV223N06TXB J1 ESV223N06TX[D or F] X1 ESV223N06TMD AF1</td>
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<td>30</td>
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<tr>
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<td>45</td>
<td>ESV453N06TXB K3</td>
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#### Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>H</th>
<th>W</th>
<th>D</th>
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</thead>
<tbody>
<tr>
<td>G1</td>
<td>7.48</td>
<td>190</td>
<td>3.90</td>
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<tr>
<td>G2</td>
<td>7.52</td>
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<td>3.90</td>
</tr>
<tr>
<td>G3</td>
<td>7.52</td>
<td>191</td>
<td>3.90</td>
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</tr>
<tr>
<td>K3</td>
<td>20.19</td>
<td>513</td>
<td>8.72</td>
</tr>
</tbody>
</table>

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**SMV NEMA 1 (IP31)**

**Bottom Entry with NEMA 1 Steel Conduit Plate**

**Bottom Entry with IP31 Finger Guard**

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www.Lenze.com

Lenze Americas · 630 Douglas Street · Uxbridge MA 01569 · USA · 800-217-9100

CB-SMV Jan 2017