

SMVector Drive

Flexible, simple, economical



Lenze

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.

Lenze



Lenze Americas N.A. Headquarters, Uxbridge, MA

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.



SMV NEMA 4X (IP65)



SMV NEMA 1 (IP31)

Two Year Warranty

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

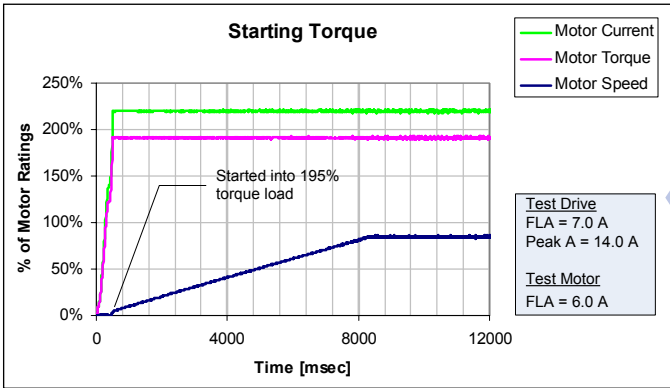
- ▶ Intuitive User Interface
- ▶ Electronic Memory Module (EPM)
- ▶ Optional Disconnect Switch (NEMA 4X only)
- ▶ Optional Potentiometer Switch (NEMA 4X only)

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.

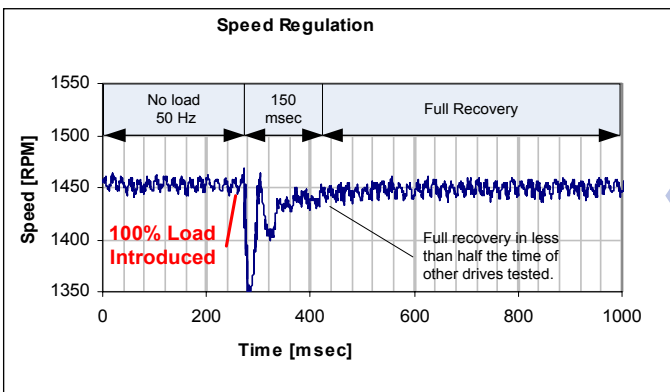
When drive reset is necessary, reset to factory default or customer settings in seconds with the EPM. When the EPM equipped drive is used on a line containing multiple drives with the identical setup, it takes just minutes to program the entire line. And EPMs can be replaced with or without power connected. 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

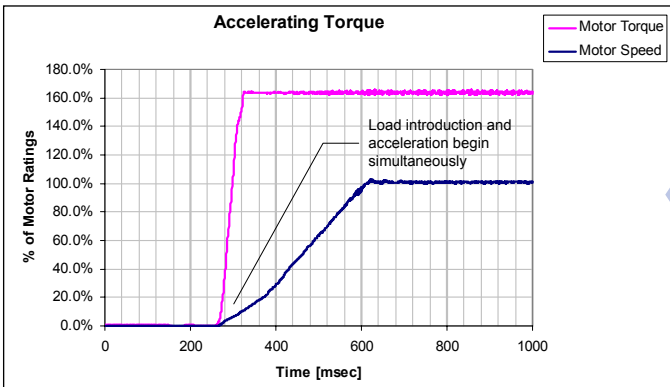
The SMVector is peerless in controlling the motor's ability to convert current into torque. In this example, the SMVector is started into a stiff 195% torque load. Not only does the motor start the load, but it also delivers a full 195% torque while accelerating to 50 Hz in 8 seconds.



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 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 Potentiometer



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

SMV NEMA 4X (IP65)
With Disconnect and Potentiometer

SMVector | Specifications

World Class Control

Modes of Operation

- 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 & 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

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

Simple Six Button Programming

- Start
- Stop
- Forward/Reverse
- Scroll Up
- Scroll Down
- Enter/Mode

Informative LED Display

Vivid Illumination

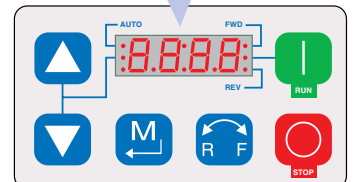
- Easily Read from a Distance

Five Status LEDs

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

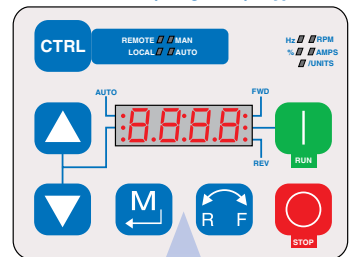
Status Display

- Motor Status
- Fault Management
- Operational Information



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

NEMA1 15HP (and greater) Keypad



Additional CTRL Button

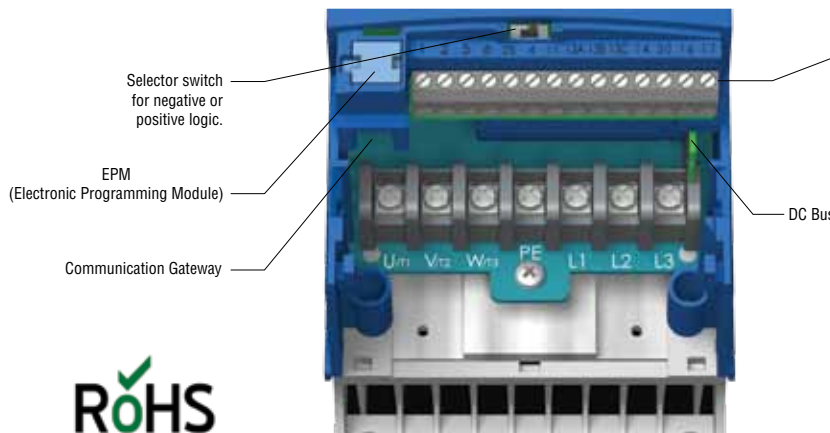
Switch between control modes

- 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

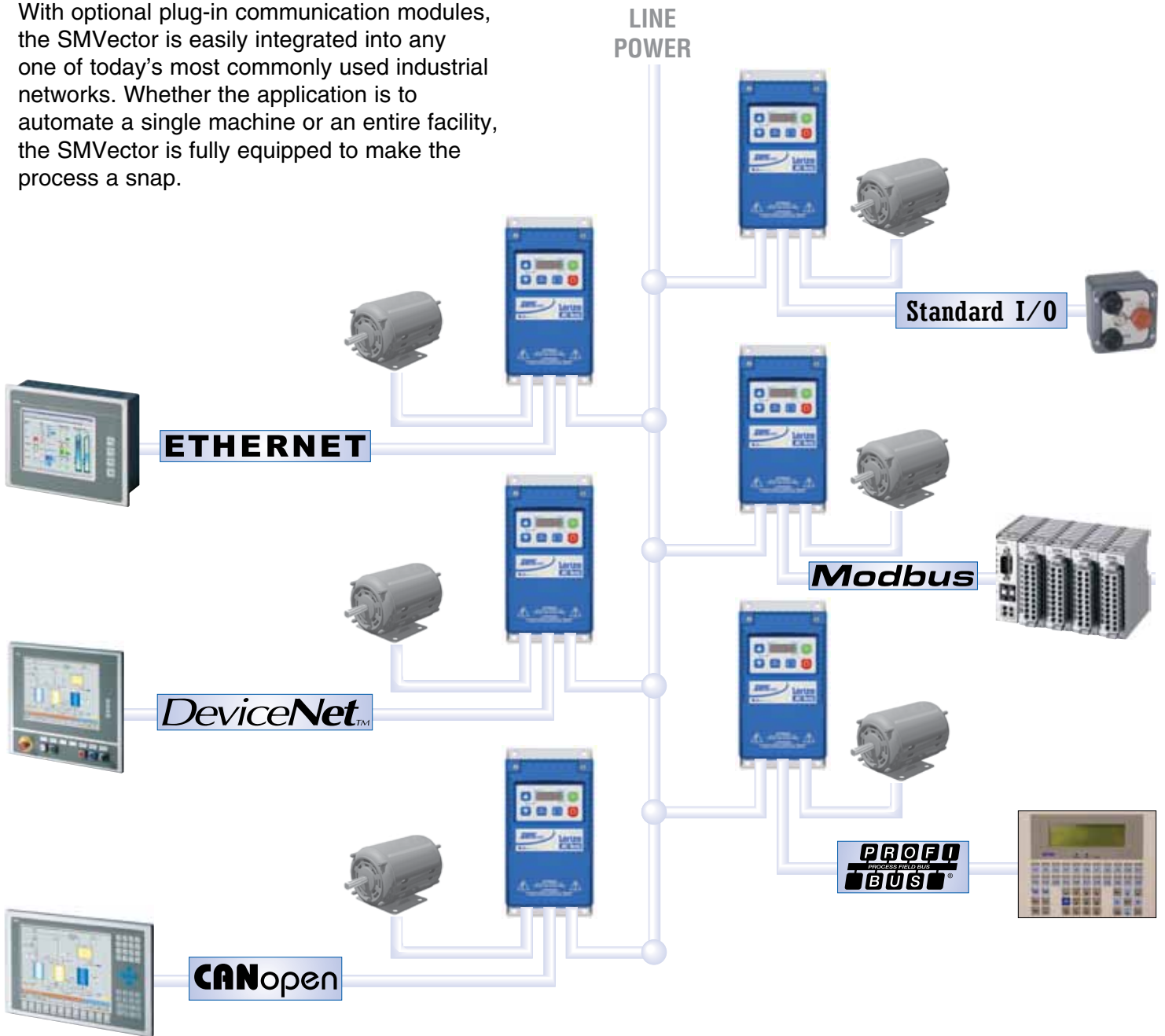
- (NEMA1, 15HP and greater models)
- 1 Programmable Digital Input
- 1 Common
- RS-485 Modbus Communications
 - TXA
 - TXB

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



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.



SMVector | Ratings & Dimensions

120/240V* - 1Ø Input (3Ø Output)

| Power | | NEMA1 | | NEMA4X - Indoor [C]/Outdoor[E] | | NEMA4X w/Disconnect - Indoor | |
|-------|------|--------------|------|--------------------------------|------|------------------------------|------|
| Hp | KW | Model | Size | Model | Size | Model | Size |
| 0.33 | 0.25 | ESV251N01SXB | G1 | N/A | | | |
| 0.5 | 0.37 | ESV371N01SXB | G1 | ESV371N01SX[C] or [E] | R1 | ESV371N01SMC | AA1 |
| 1 | 0.75 | ESV751N01SXB | G1 | ESV751N01SX[C] or [E] | R1 | ESV751N01SMC | AA1 |
| 1.5 | 1.1 | ESV112N01SXB | G2 | ESV112N01SX[C] or [E] | R2 | ESV112N01SMC | AA2 |

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

200/240V - 1 or 3Ø Input (3Ø Output)

| Power | | NEMA1 | | NEMA4X - Indoor [C]/Outdoor[E]* | | NEMA4X w/Disconnect - Indoor** | |
|-------|------|-----------------|------|---------------------------------|------|--------------------------------|------|
| Hp | KW | Model | Size | Model | Size | Model | Size |
| 0.33 | 0.25 | ESV251N02SXB*** | G1 | N/A | | | |
| 0.5 | 0.37 | ESV371N02YXB | G1 | ESV371N02YX[C] or [E] | R1 | ESV371N02YMC | AA1 |
| 1 | 0.75 | ESV751N02YXB | G1 | ESV751N02YX[C] or [E] | R1 | ESV751N02YMC | AA1 |
| 1.5 | 1.1 | ESV112N02YXB | G2 | ESV112N02YX[C] or [E] | R2 | ESV112N02YMC | AA2 |
| 2 | 1.5 | ESV152N02YXB | G2 | ESV152N02YX[C] or [E] | R2 | ESV152N02YMC | AA2 |
| 3 | 2.2 | ESV222N02YXB | G2 | ESV222N02YX[C] or [E] | S1 | ESV222N02YMC | AD1 |

*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)

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

400/480V - 3Ø Input (3Ø Output)

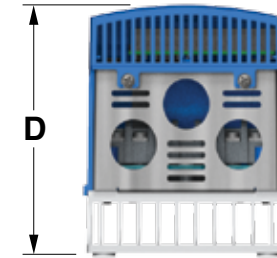
| Power | | NEMA1 | | NEMA4X - Indoor [C or D]/Outdoor[E or F]* | | NEMA4X w/Disconnect - Indoor** | |
|-------|------|--------------|------|---|------|--------------------------------|------|
| Hp | KW | Model | Size | Model | Size | Model | Size |
| 0.5 | 0.37 | ESV371N04TXB | G1 | ESV371N04TX[C] or [E] | R1 | ESV371N04TMC | AA1 |
| 1 | 0.75 | ESV751N04TXB | G1 | ESV751N04TX[C] or [E] | R1 | ESV751N04TMC | AA1 |
| 1.5 | 1.1 | ESV112N04TXB | G2 | ESV112N04TX[C] or [E] | R2 | ESV112N04TMC | AA2 |
| 2 | 1.5 | ESV152N04TXB | G2 | ESV152N04TX[C] or [E] | R2 | ESV152N04TMC | AA2 |
| 3 | 2.2 | ESV222N04TXB | G2 | ESV222N04TX[C] or [E] | R2 | ESV222N04TMC | AA2 |
| 5 | 4 | ESV402N04TXB | G3 | ESV402N04TX[C] or [E] | V1 | ESV402N04TMC | AC1 |
| 7.5 | 5.5 | ESV552N04TXB | H1 | ESV552N04TX[C] or [E] | V1 | ESV552N04TMC | AC1 |
| 10 | 7.5 | ESV752N04TXB | H1 | ESV752N04TX[D] or [F] | T1 | ESV752N04TMD | AB1 |
| 15 | 11 | ESV113N04TXB | J1 | ESV113N04TX[D] or [F] | W1 | ESV113N04TMD | AE1 |
| 20 | 15 | ESV153N04TXB | J1 | ESV153N04TX[D] or [F] | W1 | ESV153N04TMD | AE1 |
| 25 | 18.5 | ESV183N04TXB | J1 | ESV183N04TX[D] or [F] | W1 | ESV183N04TMD | AF1 |
| 30 | 22 | ESV223N04TXB | J1 | ESV223N04TX[D] or [F] | X1 | ESV223N04TMD | AF1 |
| 40 | 30 | ESV303N04TXB | K1 | N/A | | | |
| 50 | 37.5 | ESV373N04TXB | K2 | N/A | | | |
| 60 | 45 | ESV453N04TXB | K3 | N/A | | | |

*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 "M" in the Model Part Number with an "L".

600V - 3Ø Input (3Ø Output)

| Power | | NEMA1 | | NEMA4X - Indoor [C or D]/Outdoor[E or F] | | NEMA4X w/Disconnect - Indoor | |
|-------|------|--------------|------|--|------|------------------------------|------|
| Hp | KW | Model | Size | Model | Size | Model | Size |
| 1 | 0.75 | ESV751N06TXB | G1 | ESV751N06TX[C] or [E] | R1 | ESV751N06TMC | AA1 |
| 2 | 1.5 | ESV152N06TXB | G2 | ESV152N06TX[C] or [E] | R2 | ESV152N06TMC | AA2 |
| 3 | 2.2 | ESV222N06TXB | G2 | ESV222N06TX[C] or [E] | R2 | ESV222N06TMC | AA2 |
| 5 | 4 | ESV402N06TXB | G3 | ESV402N06TX[C] or [E] | V1 | ESV402N06TMC | AC1 |
| 7.5 | 5.5 | ESV552N06TXB | H1 | ESV552N06TX[C] or [E] | V1 | ESV552N06TMC | AC1 |
| 10 | 7.5 | ESV752N06TXB | H1 | ESV752N06TX[D] or [F] | T1 | ESV752N06TMD | AB1 |
| 15 | 11 | ESV113N06TXB | J1 | ESV113N06TX[D] or [F] | W1 | ESV113N06TMD | AE1 |
| 20 | 15 | ESV153N06TXB | J1 | ESV153N06TX[D] or [F] | W1 | ESV153N06TMD | AE1 |
| 25 | 18.5 | ESV183N06TXB | J1 | ESV183N06TX[D] or [F] | W1 | ESV183N06TMD | AF1 |
| 30 | 22 | ESV223N06TXB | J1 | ESV223N06TX[D] or [F] | X1 | ESV223N06TMD | AF1 |
| 40 | 30 | ESV303N06TXB | K1 | N/A | | | |
| 50 | 37.5 | ESV373N06TXB | K2 | N/A | | | |
| 60 | 45 | ESV453N06TXB | K3 | N/A | | | |

SMV NEMA 1 (IP31)



Bottom Entry with NEMA 1 Steel Conduit Plate



Bottom Entry with IP31 Finger Guard

Dimensions

| | H | | W | | D | |
|------------|-------|-----|------|-----|-------|-----|
| | in. | mm | in. | mm | in. | mm |
| G1 | 7.50 | 190 | 3.90 | 99 | 4.40 | 111 |
| G2 | 7.60 | 191 | 3.90 | 99 | 5.50 | 138 |
| G3 | 7.60 | 191 | 3.90 | 99 | 5.80 | 147 |
| H1 | 9.90 | 250 | 5.20 | 130 | 6.30 | 160 |
| J1 | 12.50 | 318 | 7.00 | 176 | 8.10 | 205 |
| K1 | 14.19 | 360 | 8.72 | 221 | 10.07 | 256 |
| K2 | 17.19 | 436 | 8.72 | 221 | 10.07 | 256 |
| K3 | 20.19 | 513 | 8.72 | 221 | 10.07 | 256 |
| R1 | 8.00 | 203 | 6.30 | 160 | 4.50 | 114 |
| R2 | 8.00 | 203 | 6.30 | 160 | 6.30 | 160 |
| S1 | 8.00 | 203 | 7.10 | 181 | 6.80 | 172 |
| T1 | 10.00 | 254 | 8.10 | 204 | 8.00 | 203 |
| V1 | 10.00 | 254 | 9.00 | 228 | 8.00 | 203 |
| W1 | 14.40 | 366 | 9.40 | 240 | 9.50 | 241 |
| X1 | 18.50 | 470 | 9.40 | 240 | 9.50 | 241 |
| AA1 | 11.00 | 279 | 6.30 | 160 | 5.40 | 136 |
| AA2 | 11.00 | 279 | 6.30 | 160 | 7.20 | 182 |
| AB1 | 13.00 | 330 | 8.10 | 204 | 8.90 | 225 |
| AC1 | 13.00 | 330 | 9.00 | 228 | 9.00 | 226 |
| AD1 | 11.00 | 279 | 7.10 | 181 | 7.70 | 194 |
| AE1 | 14.40 | 366 | 9.40 | 240 | 10.20 | 259 |
| AF1 | 18.50 | 470 | 9.40 | 240 | 10.20 | 259 |

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



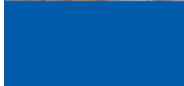
Positioning our Customers for Success. We take our Customer's requirements seriously. A new application is an opportunity to test, prove and expand our drive's capabilities while solving our Customer's motion control needs.



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.

Lenze

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