

SMVector IP31 Drive



Flexible, simple, economical



Simplicity

By making Lenze products easy to install, program and commission, we can provide the ideal motor control solution for both OEM designers and electrical systems engineers. An innovative removable EPM chip feature allows instant programming of multiple drives before or after installation, and a simple intuitive front panel display also facilitates easy in-situ operation.

Flexibility

The smv range of inverter drives offer fast dynamic torque response, sophisticated auto-tuning and impressive low speed operation from a compact, and simple to use package. The smv range is designed for motor applications where dynamic speed and torque control are required, ideal for conveyors, packaging lines and HVAC systems.

Performance

Initially available in the power range 0.37kW to 2.2kW for single-phase supplies and up to 22kW for 3 phase supplies. Operating modes include standard and enhanced V/Hz (constant and variable) operation, vector speed control and vector torque control. Motor calibration is via an auto-tune function and a range of communication options are available including DeviceNet, RS-485 Modbus, LECOM, CANopen, Ethernet/IP and Profibus with further options introduced progressively.

Quality

A firm commitment to design quality and continuous development of our products ensures both high performance and reliability. Manufacturing facilities have recently been expanded with manufacturing systems and quality control procedures also upgraded to provide the highest possible quality product is delivered to customers worldwide.

Technical Support

With hundreds of experienced engineers on hand to help customers at all levels to solve problems and find the best solutions for their applications. End users can also be assured that Lenze is always there throughout the lifecycle of its products. Technical information, literature and guides are also available from a multi-language website or the worldwide network of Lenze branches and certified distributors.

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, 1 ϕ (up to 1.1kW)
 - 200/240V, 1/3 ϕ (up to 2.2kW)
 - 200/240V, 3 ϕ (up to 15kW)
 - 400/480V, 3 ϕ (up to 22kW)
 - 480/600V, 3 ϕ (up to 22kW)

Simplicity

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

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:

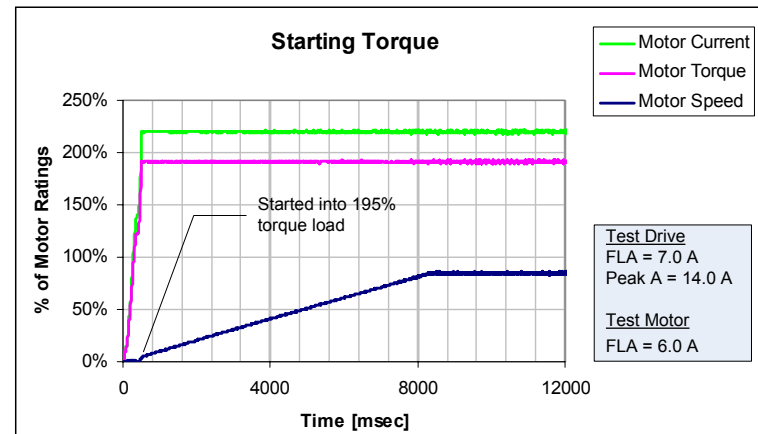
- ▶ Three ways to program the EPM
 - Use the intuitive SMVector integrated keypad
 - Program in a Microsoft Windows™ environment with Techlink
 - Or with the lightweight portable EPM programmer. The crystal clear 16-character LCD display makes programming multiple drives a snap.
- ▶ The EPM saves time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



Exceptional Starting Torque

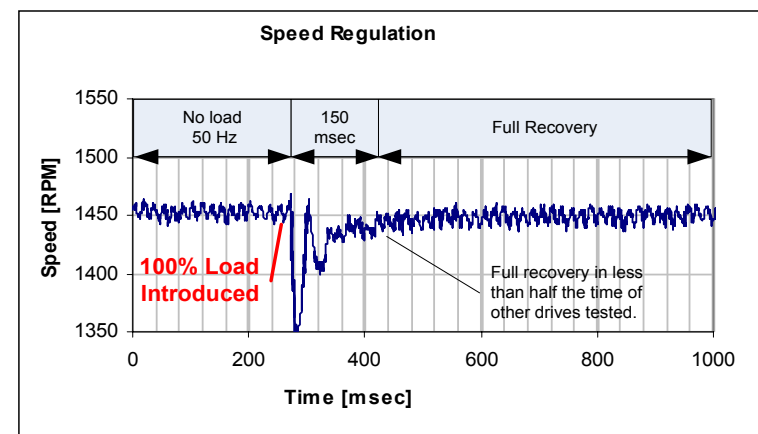
Overpower demanding applications
The SMVector is peerless in controlling the motor's ability to convert current into torque. In this example, the SMVector is started into a stiff 195% torque load. Not only does the motor start the load, but it also delivers a full 195% torque while accelerating to 50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



Dynamic Speed Regulation

Recovery from 100% shock load in 0.15 seconds

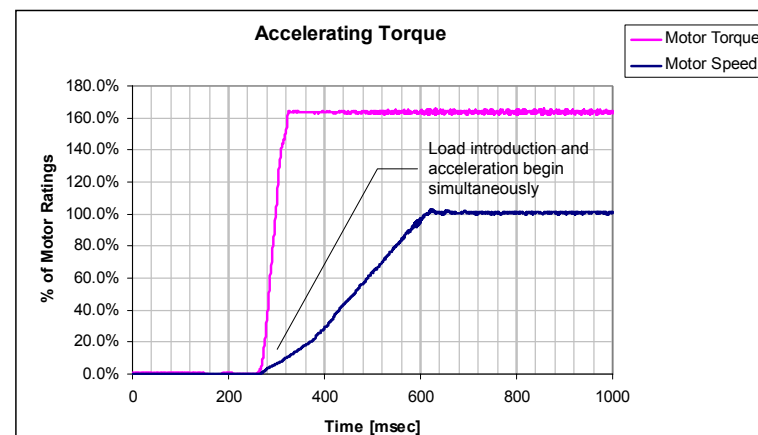
Shock loads are no match for the SMVector. Here an instantaneous 100% load is dealt with in a mere 0.15 seconds. Remarkably, this level of speed regulation is achieved open loop without the benefit of a feedback device.



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.



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 optional 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

Ambient Temperature

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

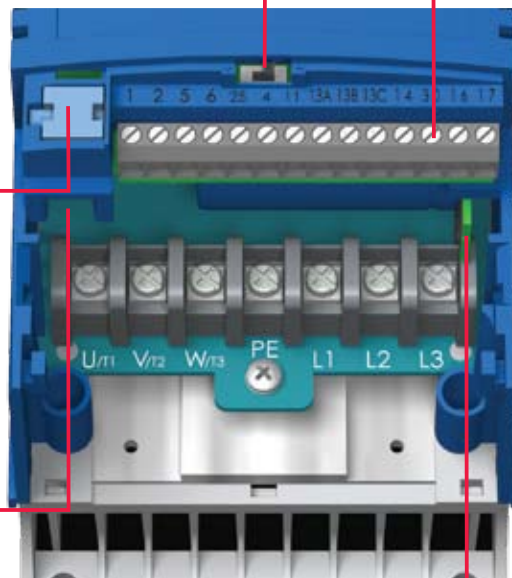
Global Standards

- ▶ 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)

Selector switch for negative or positive logic.

EPM
(Electronic Programming Module)

Communication Gateway



DC Bus

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

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

Additional Control Terminals

- (11-22kW only)
- 1 Programmable Digital Input
 - 1 Common
 - RS-485 Modbus Communications
 - ▶ TXA
 - ▶ TXB

Simple Six Button Programming

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

Informative LED Display

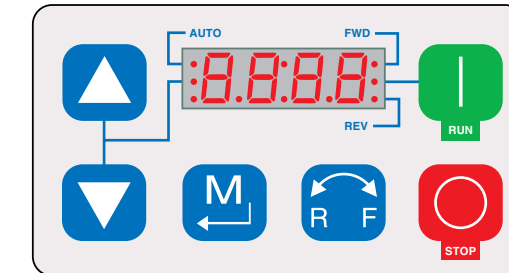
- Vivid Illumination
- Easily Read from a Distance

Five Status LEDs

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

Status Display

- ▶ Motor Status
- ▶ Fault Management
- ▶ Operational Information



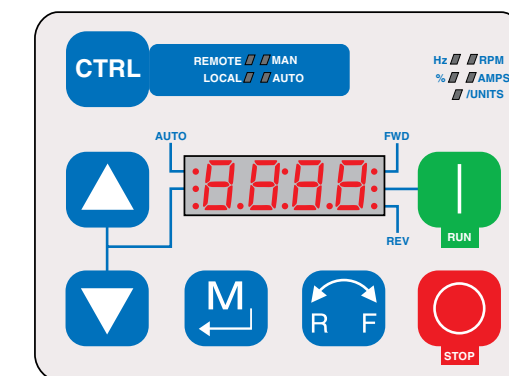
Keypad (up to 7.5kW)

Additional CTRL Button

- Switch between control modes
- ▶ Local-Manual
 - ▶ Local-Auto
 - ▶ Remote-Manual
 - ▶ Remote-Auto

Additional LED Indicators

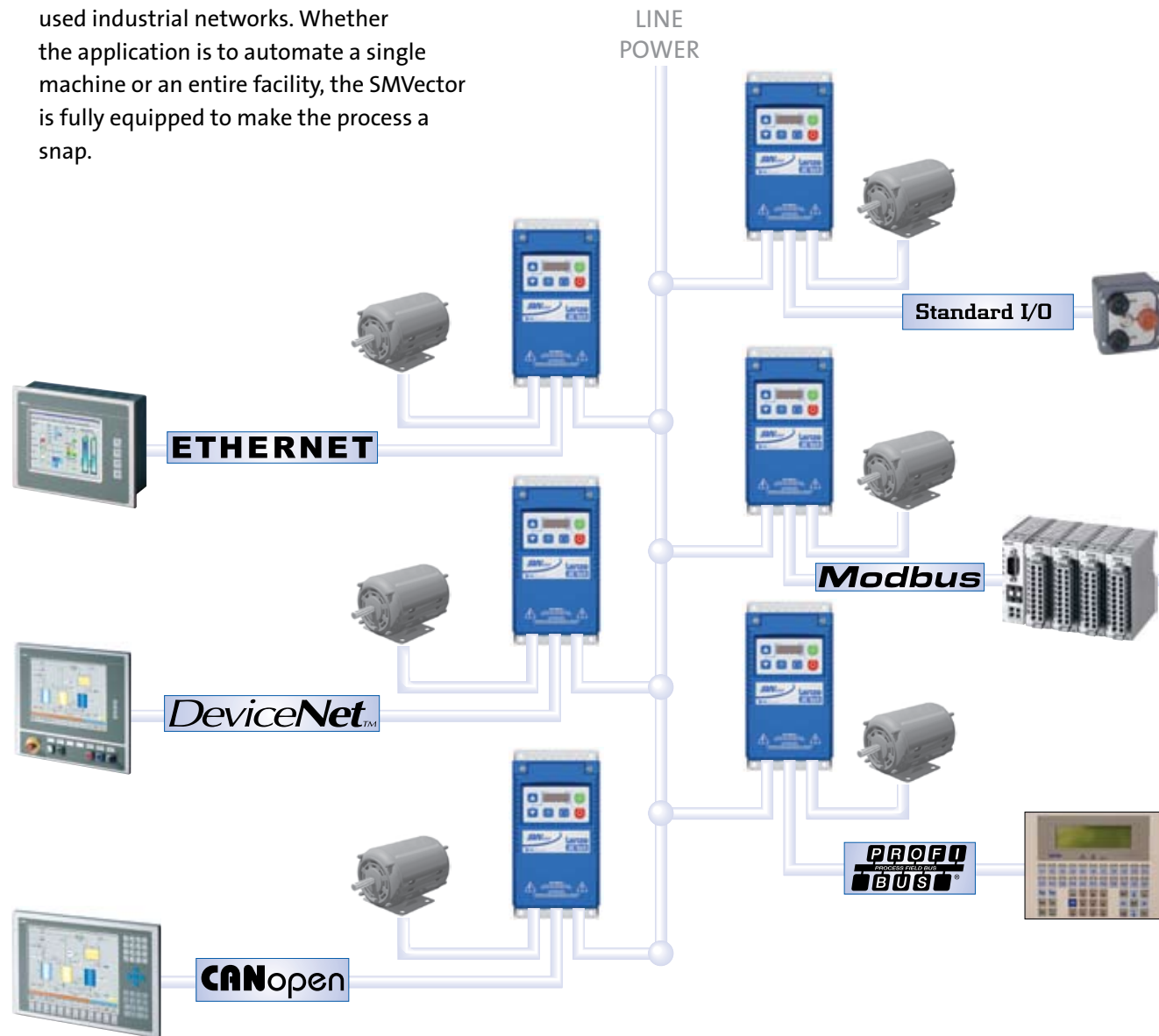
- Define the units being displayed
- ▶ Hz
 - ▶ RPM
 - ▶ %
 - ▶ Amps
 - ▶ Units



Keypad (11-22kW)

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.



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 - 1 Φ Input (3 Φ Output)

Model Number	Output Current	Power	Size
	I_N [A]	kW	
ESV251N01SXB	1.7	0.25	G1
ESV371N01SXB	2.4	0.37	G1
ESV751N01SXB	4.2	0.75	G1
ESV112N01SXB	6.0	1.1	G2

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 3 Φ Input (3 Φ Output)

Model Number	Output Current	Power	Size
	I_N [A]	kW	
ESV251N02SXB ⁽¹⁾	1.7	0.25	G1
ESV371N02YXB	2.4	0.37	G1
ESV751N02YXB	4.2	0.75	G1
ESV112N02YXB	6.0	1.1	G2
ESV152N02YXB	7.0	1.5	G2
ESV222N02YXB	9.6	2.2	G2

200/240V - 3 Φ Input (3 Φ Output)

Model Number	Output Current	Power	Size
	I_N [A]	kW	
ESV112N02TXB	6.0	1.1	G2
ESV152N02TXB	7.0	1.5	G2
ESV222N02TXB	9.6	2.2	G2
ESV402N02TXB	16.5	4.0	G3
ESV552N02TXB	23	5.5	H1
ESV752N02TXB	29	7.5	H1
ESV113N02TXB	42	11.0	J1
ESV153N02TXB	54	15.0	J1

400/480V - 3Ø Input (3Ø Output)

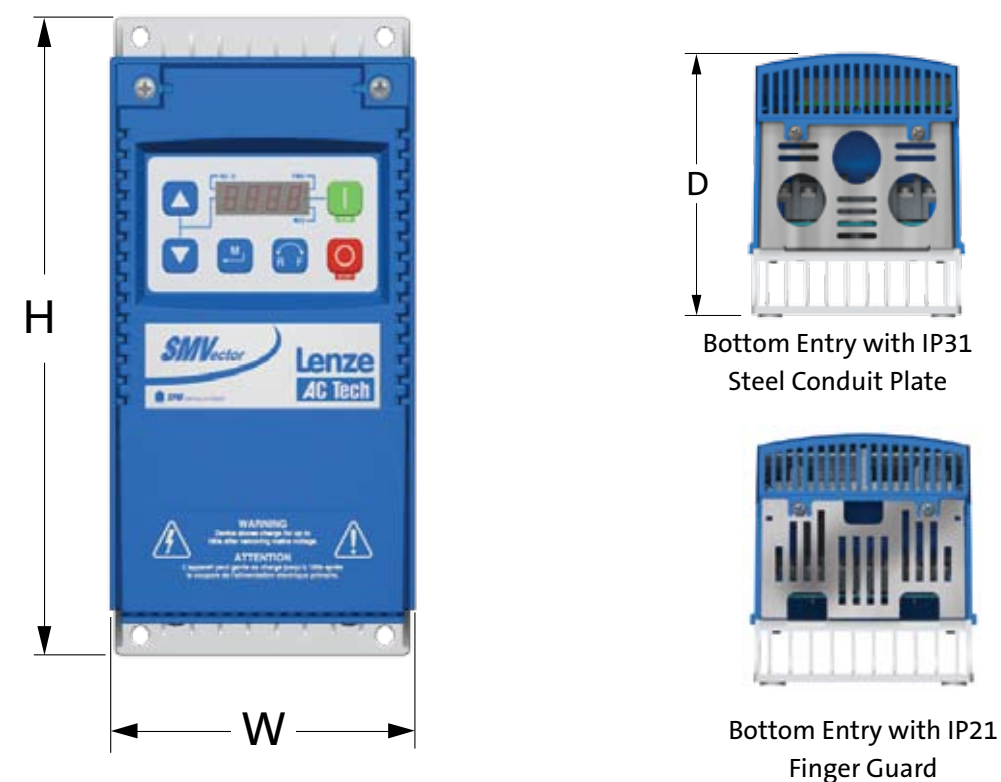
Model Number	Output Current	Power kW	Size
	I_N [A]		
ESV371N04TXB	1.3/1.1	0.37	G1
ESV751N04TXB	2.4/2.1	0.75	G1
ESV112N04TXB	3.5/3.0	1.1	G2
ESV152N04TXB	4.0/3.5	1.5	G2
ESV222N04TXB	5.5/4.8	2.2	G2
ESV402N04TXB	9.4/8.2	4.0	G3
ESV552N04TXB	12.6/11	5.5	H1
ESV752N04TXB	16.1/14	7.5	H1
ESV113N04TXB	24/21	11.0	J1
ESV153N04TXB	31/27	15.0	J1
ESV183N04TXB	39/34	18.5	J1
ESV223N04TXB	46/40	22	J1

480/600V - 3Ø Input (3Ø Output)

Model Number	Output Current	Power kW	Size
	I_N [A]		
ESV751N06TXB	1.7	0.75	G1
ESV152N06TXB	2.7	1.5	G2
ESV222N06TXB	3.9	2.2	G2
ESV402N06TXB	6.1	4.0	G3
ESV552N06TXB	9	5.5	H1
ESV752N06TXB	11	7.5	H1
ESV113N06TXB	17	11.0	J1
ESV153N06TXB	22	15.0	J1
ESV183N06TXB	27	18.5	J1
ESV223N06TXB	32	22	J1

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

SMV (IP31)



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

Service | you can trust

For us, service is more than just supporting the use of our drives. Lenze offers free practical application advice and shared experience.

We can help test your ideas and check any integration issues you have in order to help you reach the perfect drive solution. Lenze also offers comprehensive training, commissioning, maintenance and repairs.

Our service is always at your disposal.

Available around the world

Expert advice is available for all your technical queries from your local Lenze service support centre or Lenze distribution partner.

Our products are also available for speedy delivery worldwide. Lenze companies, Lenze factories and sales agencies are based in major countries around the world.

You can contact us and our distribution partners around the world through our website at www.Lenze.com.

The website also gives you 24-hour access to technical instructions and product manuals.

Lenze

www.Lenze.com

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