SMVector

Frequency Inverter

Flexible, simple, economical, robust.

SMVector Drives
.33...60 Hp
.25...45 kW

The SMV range of IP31 (NEMA 1) and IP65 (NEMA 4/NEMA 4X) inverter drives offer sophisticated auto-tuning, fast dynamic toque 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 & pump systems.

Features and Benefits

The SMVector continues our price leadership tradition in the highly competitive AC drive market. With the benefit of a two year waranty, 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.

Lenze

SMVector

Features and Benefits

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, 1∅ (up to 1.5 Hp)
- 200/240V, 1/3∅ (up to 3 Hp)
- 200/240V, 3∅ (up to 20 Hp)
- 400/480V, 3∅ (up to 60 Hp)
- 480/600V, 3∅ (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)
- Optional EMC Filter (NEMA 4X)
- Dynamic Brake Modules
- Remote Keypad
- Additional I/O

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. 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.

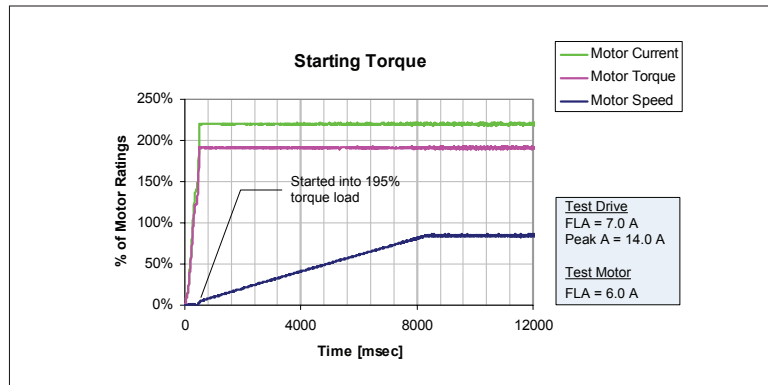SMV NEMA 4X (IP65)

SMV NEMA 1 (IP31)

Filter

SMVector

Performance

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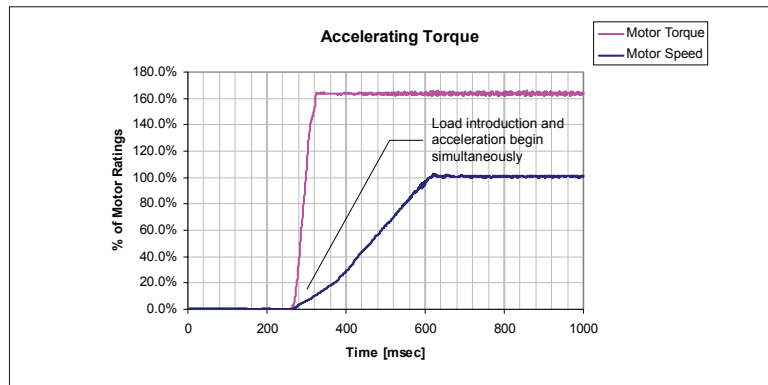
Overpower demanding applications
The SMVector is peerless in controlling the motor's ability to convert current into torque. In this example, the SMVector is started into a stiff 195% torque load. Not only does the motor start the load, but it also delivers a full 195% torque while accelerating to 50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

Starting Torque

— Motor Current
— Motor Torque
— Motor Speed

Started into 195% torque load

Test Drive
FLA = 7.0 A
Peak A = 14.0 A

Test Motor
FLA = 6.0 A

% of Motor Ratings — Time [msec]

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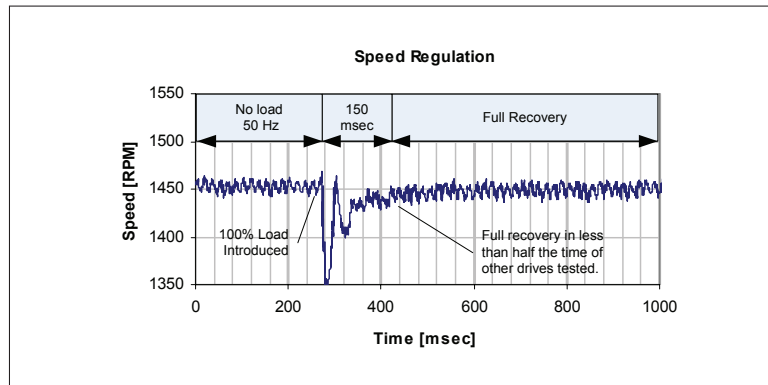
0 to 100 in 0.33 seconds!
Motors controlled by the SMVector benefit from a sophisticated motor control algorithm that drives motor performance to maximum levels. In this application, the the motor is able to drive a 165% torque load while accelerating from 0 to 100% speed in an impressive 0.33 seconds.

Accelerating Torque

— Motor Torque
— Motor Speed

Load introduction and acceleration begin simultaneously

% of Motor Ratings — Time [msec]

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.

Speed Regulation

No load 50 Hz | 150 msec | Full Recovery

100% Load Introduced

Full recovery in less than half the time of other drives tested.

Speed [RPM] — Time [msec]

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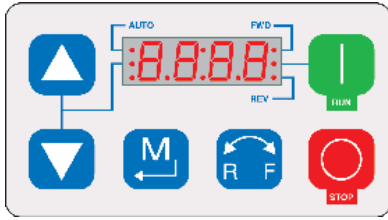
- +10/-15% Tolerance
- 120/240V, 1∅
- 200/240V, 1 or 3∅
- 200/240V, 3∅
- 400/480V, 3∅
- 480/600V, 3∅
-

Global Standards

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

SMVector

Specifications

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

Simple Six Button Programming
Start, Stop, Forward/Reverse, Scroll Up,
Scroll Down, Enter/Mode
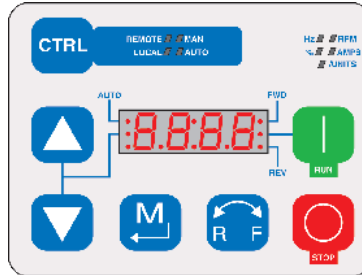**Informative LED Display**
Vivid Illumination
Easily Read from a Distance
Five Status LEDs
Run, Automatic Speed Mode, Manual Speed
Mode, Forward Rotation, Reverse Rotation
Status Display
Motor Status, Fault Management,
Operational Information

NEMA1 15HP (and greater),
NEMA 4X 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

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 Common

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

RoHS COMPLIANT

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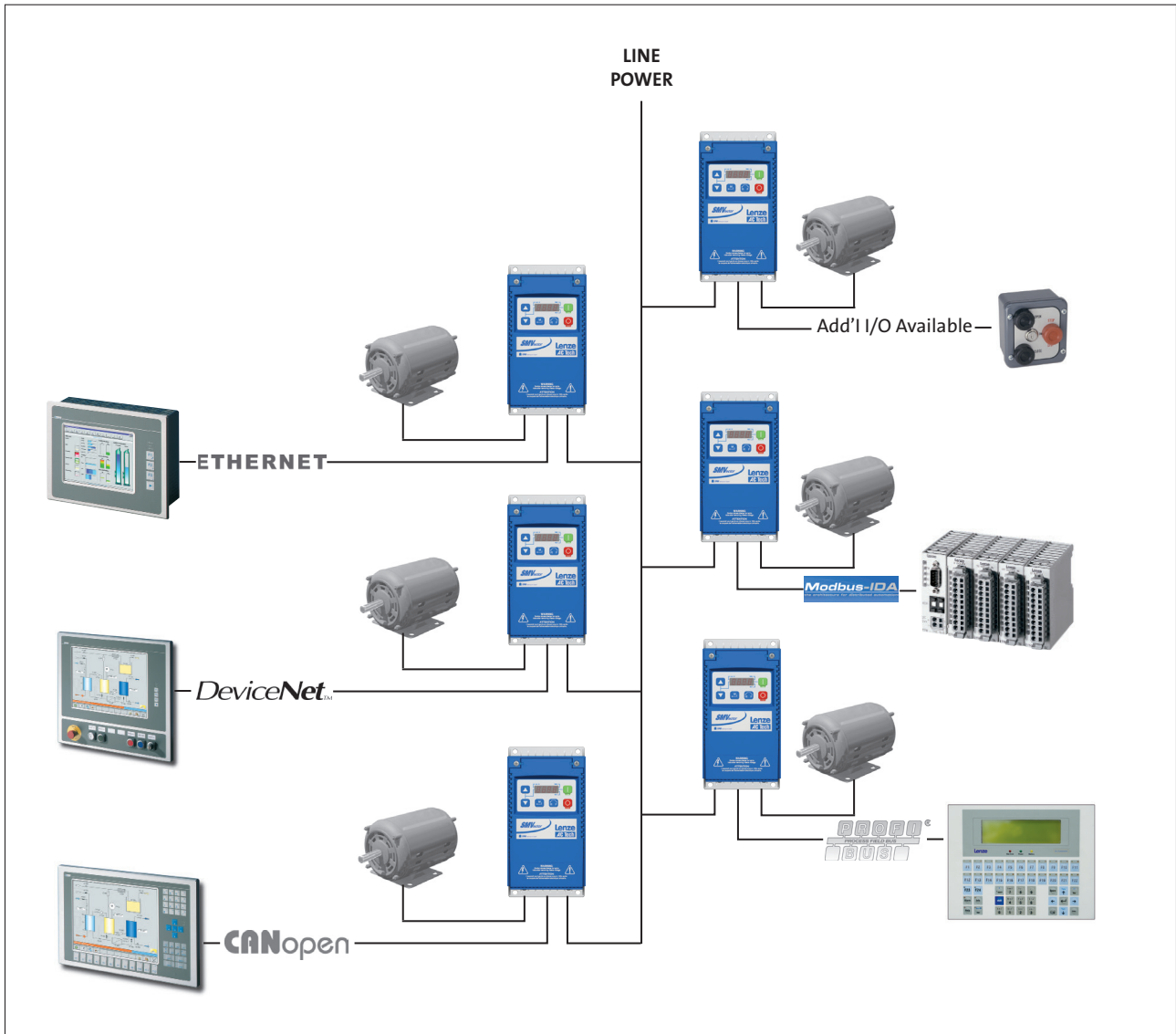
NOTE: Communication options are available in NEMA 1 (IP31) and NEMA 4X (IP65) models.

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.
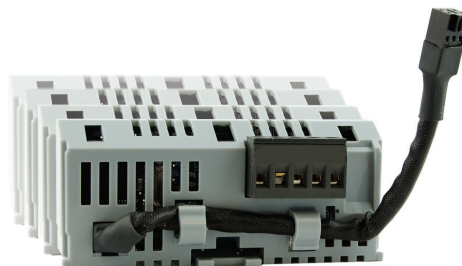
Communication Module

SMVector

Ratings & Dimensions

120/240V* - 1∅ Input (3∅ 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 3∅ Input (3∅ 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 - 3∅ Input (3∅ 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 - 3∅ Input (3∅ 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".

SMVector

Ratings & Dimensions

600V - 3∅ Input (3∅ 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			

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

	H		W		D	
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

SMV NEMA 1 (IP31)

Bottom Entry with NEMA 1 Steel Conduit Plate

Bottom Entry with IP31 Finger Guard

www.Lenze.com