

SMV

Frequency Inverter

Flexible, simple, economical, robust.



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.

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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 Φ (up to 1.5 Hp)
- 200/240V 1/3 Φ (up to 3 Hp)
- 200/240V 3 Φ (up to 20 Hp)
- 400/480V 3 Φ (up to 60 Hp)
- 480/600V 3 Φ (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.



SMV NEMA 4X (IP65)



SMV NEMA 1 (IP31)



Dynamic Brake

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Performance

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.

Quick Acceleration

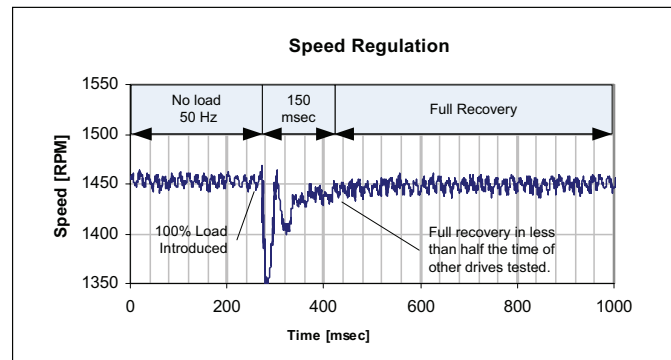
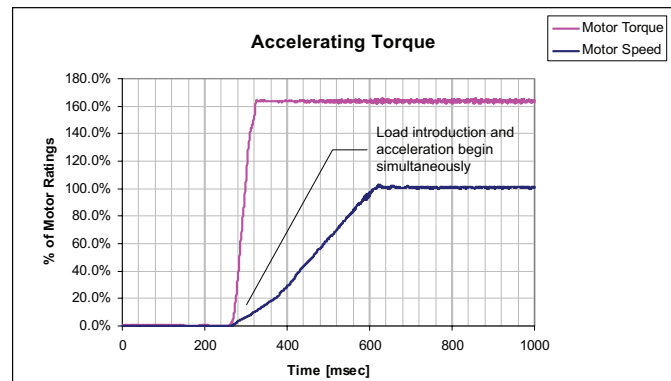
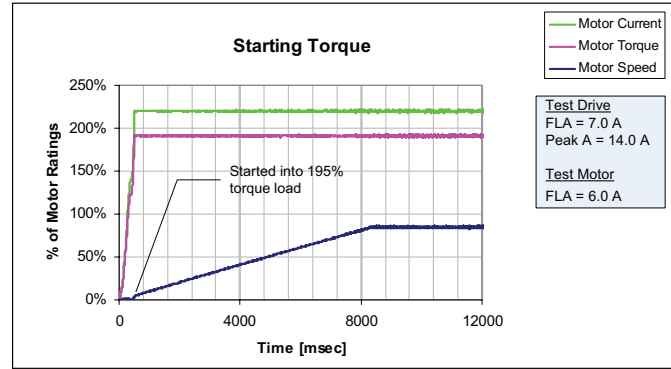
0 to 100 in .33 seconds!

Motors controlled by the SMV benefit from a sophisticated motor control algorithm that drives motor performance to maximum levels. In this application, the 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

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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 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

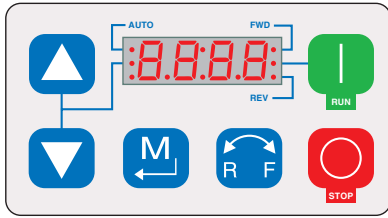
- +10/-15% Tolerance
- 120/240V, 1Ø
- 200/240V, 1 or 3Ø
- 200/240V, 3Ø
- 400/480V, 3Ø
- 480/600V, 3Ø

Global Standards

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

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Specifications



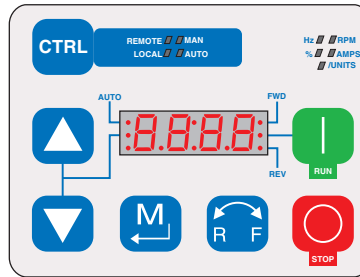
NEMA 1 (IP31) (up to 10 Hp)
NEMA 4X IP65

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

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

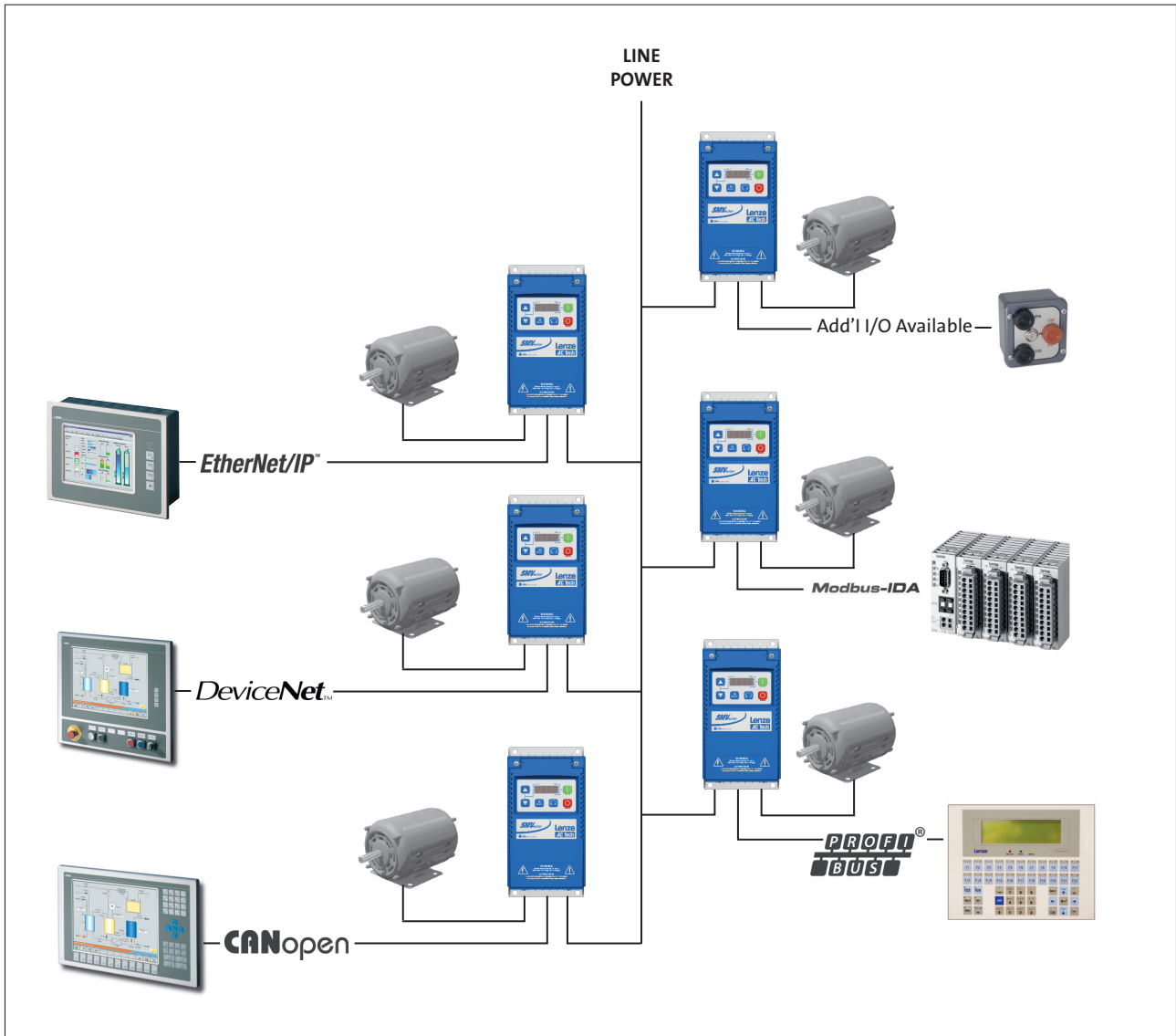
Removable terminal cover and steel conduit plate (not shown). Easy access for control and power wiring. An extra IP21 finger guard ships with every drive.

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Connectivity

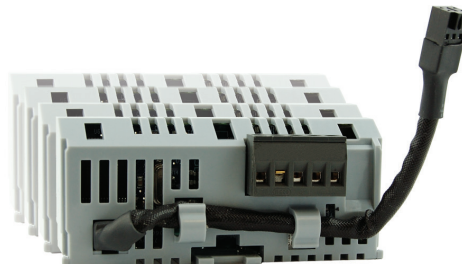
With optional plug-in communication modules, the SMVector is easily integrated into any one of today's most commonly used industrial networks.

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

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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
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: 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".

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Ratings & Dimensions

600V - 3Ø Input (3Ø Output)

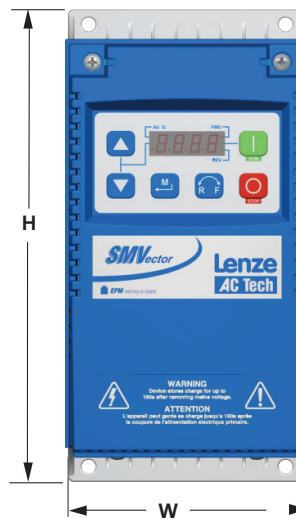
Power		NEMA1		NEMA4X - Indoor [C or D]/Outdoor[E or F]		NEMA4X w/Disconnect -Indoor	
Hp	kW	Model	Size	Model	Size	Model	Size
1	0.75	ESV751N06TXB	G1	ESV751N06TX[C] or [E]	R1	ESV751N06TMC	AA1
2	1.5	ESV152N06TXB	G2	ESV152N06TX[C] or [E]	R2	ESV152N06TMC	AA2
3	2.2	ESV222N06TXB	G2	ESV222N06TX[C] or [E]	R2	ESV222N06TMC	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		

Dimensions

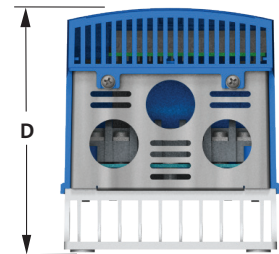
	H		W		D	
	in.	mm	in.	mm	in.	mm
G1	7.48	190	3.90	99	4.35	111
G2	7.52	191	3.90	99	5.45	138
G3	7.52	191	3.90	99	5.80	147
H1	9.83	250	5.12	130	6.30	160
J1	12.50	318	6.92	176	8.09	205
K1	14.19	360	8.72	221	10.07	256
K2	17.19	436	8.72	221	10.07	256
K3	20.19	513	8.72	221	10.07	256

R1	8.00	203	6.28	160	4.47	114
R2	8.00	203	6.28	160	6.31	160
S1	8.00	203	7.12	181	6.77	172
T1	10.00	254	8.04	204	8.00	203
V1	10.00	254	8.96	228	8.00	203
W1	14.50	368	9.42	240	9.45	241
X1	18.50	470	9.42	240	9.45	241
AA1	10.99	279	6.28	160	5.33	136
AA2	10.99	279	6.28	160	7.17	182
AB1	13.00	330	8.04	204	8.86	225
AC1	13.00	330	8.96	228	8.90	226
AD1	10.99	279	7.12	181	7.63	194
AE1	14.50	368	9.42	240	10.18	260
AF1	18.50	470	9.42	240	10.18	260

SMV NEMA 1 (IP31)



Bottom Entry with NEMA 1 Steel Conduit Plate



Bottom Entry with IP31 Finger Guard

