



AC ADJUSTABLE SPEED DRIVES SM VECTOR SUB-MICRO INVERTERS

SM VECTOR SUB-MICRO INVERTER DRIVES

Sensorless Vector AC Drive delivers up to 200% starting torque and can control a vector duty motor down to 1Hz at full output torque!

- The SM-Vector drive is designed for operation with vector duty rated induction motors rated for 200, 230, 400, 460, or 590VAC from 0 to 240Hz.
- IP20 enclosure with finger safe terminals
- Easy setup and operation – Program the SM-Vector drive one of four different ways:
 - From the front of the drive
 - The optional remote keypad
 - A PC using the TechLink Software
 - The EPM Programmer
- Modes of operation:
 - Constant Torque V/Hz
 - Variable Torque V/Hz
 - Sensorless Vector – speed mode
 - Sensorless Vector – torque mode
- Auto Tuning determines key performance values based on the motor and installation variables. Required for operation in vector modes, but can be used to enhance performance in V/Hz mode.
- The SM-Vector drive is an approved thermal overload protection device for single motor applications.
- 18 isolated terminals provide 5 logic inputs and 2 logic outputs.
- Two reference inputs allow for 4-20mA and either 0-10V or bipolar –10 to +10V
- Two analog outputs indicate speed and load.
- Two wire RS485 serial communication.
- Dynamic braking and remote keypad kits available on pages 118 and 119.



SM VECTOR

SINGLE OR THREE PHASE INPUT/THREE PHASE OUTPUT (Use with three phase 230V motor)

	HP	Output Amps 230VAC	Input Voltage ⚡	Catalog Number	Wgt. (lbs.)	Disc Sym.	Dimension Key
200-240 Volts	1/2	2.2	200-240	174000	2	A	A1
	1	4.2	200-240	174001	3	A	A2
	1 1/2	6.0	200-240	174002	4	A	B1
	2	6.8	200-240	174003	5	A	B2
	3	9.6	200-240	174004	5	A	B2

THREE PHASE INPUT/THREE PHASE OUTPUT

	HP	Output Amps 230VAC	Input Voltage ⚡	Catalog Number	Wgt. (lbs.)	Disc Sym.	Dimension Key
200-240 Volts	1	4.2	200-240	174006	3	A	A2
	1 1/2	6.0	200-240	174007	3	A	A3
	2	6.8	200-240	174008	4	A	B2
	3	9.6	200-240	174009	4	A	B2
	5	15.2	200-240	174010	4	A	B2
	7 1/2	22	200-240	174011	8	A	C1
	10	28	200-240	174012	8	A	C1

THREE PHASE INPUT/THREE PHASE OUTPUT

	HP	Output Amps	Input Voltage ⚡	Catalog Number	Wgt. (lbs.)	Disc Sym.	Dimension Key
400-480 Volts	1/2	1.1	400-480	174015	2	A	B1
	1	2.1	400-480	174016	3	A	B1
	1 1/2	3.0	400-480	174017	3	A	B1
	2	3.4	400-480	174018	4	A	B2
	3	4.8	400-480	174019	4	A	B2
	5	7.8	400-480	174020	5	A	B2
	7 1/2	11	400-480	174021	8	A	C1
	10	14	400-480	174022	8	A	C1

THREE PHASE INPUT/THREE PHASE OUTPUT

	HP	Output Amps	Input Voltage ⚡	Catalog Number	Wgt. (lbs.)	Disc Sym.	Dimension Key
480-590 Volts	1	1.7	480-590	174027	3	A	B1
	2	3.0	480-590	174028	4	A	B2
	3	4.2	480-590	174029	5	A	B2
	5	6.6	480-590	174030	5	A	B2
	7 1/2	9.9	480-590	174031	8	A	C1
	10	12.2	480-590	174032	8	A	C1

⚡ User programmable for 50Hz and other voltage inputs



DIMENSIONS ON PAGE 115

PDF file of Manual available at www.leeson.com

SPECIFICATIONS:		Enclosure	IP20
Storage Temperature	-20° to 70° C	Service Factor	1.0
Ambient Operating Temperature	0° to 50° C	Efficiency	up to 98%
Ambient Humidity	<95% (non-condensing)	Power Factor (displacement)	0.96 or better
Maximum Altitude	3300 ft (1000m) above sea level	Overload Current Capacity	150% for 60 seconds 200% for 25 seconds
Input Line Voltages	208-240 VAC, 400-480 VAC, 480-590 VAC	Speed Reference Follower	0-10 VDC, 4-20 mA
Input Voltage Tolerance	+10%, -15%	Control Voltage	15 VDC
Input Frequency Tolerance	48 to 62 Hz	Analog Outputs	0-10 VDC or 2-10 VDC: Proportional to speed, load, or torque
Output Wave Form	Sine Coded PWM	Digital Outputs	Open-collector: 50 mA at 30 VDC
Output Frequency	0-240 Hz	Power Supply for Aux. Relays	50 mA at 12 VDC
Carrier Frequency	2 kHz, 4 kHz, 8 kHz		

AC ADJUSTABLE SPEED DRIVES

SM2 SERIES SUB-MICRO INVERTERS



SM2 SERIES FLUX VECTOR DRIVE

With its price, its flexibility and a power range of up to 25 Hp, the SM2 SERIES FLUX VECTOR drive excels in environments where inverter technology was once considered too costly, including packaging machinery, food processing machinery, material handling/conveying systems and HVAC systems.

The SM2 SERIES FLUX VECTOR carries all the features required by demanding applications including four modes of operation (V/Hz, Enhanced V/Hz, Vector Speed, and Torque), high starting torque, auto-tuning, advanced low-speed control, and dynamic speed regulation.



General Specifications:

- **Horsepower:** 1 to 25HP (0.75 to 18.5kW)
- **Supply Power:**
 - Single Phase: 120, 208, 220 or 240VAC
 - Three Phase: 208, 240, 400, 480 or 600VAC
 - 50 / 60 Hz

Motors: Designed for operation with vector duty rated induction motors rated for 120, 200, 230, 400, 460 or 575VAC from 0 to 240Hz.

Enclosure: NEMA1, IP21, -10 to 55°C, 2.5% derate per °C above 40°C

Standard Features: Easy Set-up and Operation: Program the Vector control in one of four convenient ways:

- From the front of the drive
- The optional remote keypad
- A PC Using TechLink Software (Available free from www.leeson.com)
- The innovative EPM Programmer.

Modes of operation:

- Open Loop Flux Vector (Speed or Torque)
- V/Hz (constant or variable)
- Enhanced V/Hz with Auto-tuning

Easy to Use Keypad & Display 6-Button Interface:

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

Vivid Illumination:

- 4 digit LED display
- Easy to read from a distance
- Movable Decimal Point

Acceleration/Deceleration Profiles:

- Two Independent Accel Ramps
- Two Independent Decel Ramps
- Linear or S-Type
- Auxiliary Ramp-to-Stop

Output Frequency:

- 500 Hz Std., 1000 Hz Optional

Selectable Logic Assertion:

- Positive Logic Input (PNP current sourcing)
- Negative Logic Input (NPN current sinking)

Multiple Braking Functions

Loss of Follower Management

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 or Reverse Acting, PID Sleep Mode

PDF file of Manual available at www.leeson.com

SINGLE PHASE INPUT/THREE PHASE OUTPUT

115-230 Volts	HP	Output Amps 230 VAC	Input Voltage	Catalog Number	App. Wgt.(lbs.)	Disc. Sym.	Dimension H x W x D (in.)
	1/3	1.7	115/230	174603	2.9	A	7.5 x 3.9 x 4.35
1/2	2.4	115/230	174604	3.0	A	7.5 x 3.9 x 4.35	
1	4.2	115/230	174605	3.2	A	7.5 x 3.9 x 4.35	

SINGLE OR THREE PHASE INPUT/THREE PHASE OUTPUT

208-240 Volts	HP	Output Amps 230 VAC	Input Voltage	Catalog Number	App. Wgt.(lbs.)	Disc. Sym.	Dimension H x W x D (in.)
	1/3	1.7	208/240	174606 Ⓢ	2.5	A	7.5 x 3.9 x 4.35
1/2	2.4	208/240	174607	2.9	A	7.5 x 3.9 x 4.35	
1	4.2	208/240	174608	3.2	A	7.5 x 3.9 x 4.35	
1 1/2	6.0	208/240	174609	3.7	A	7.5 x 3.9 x 5.45	
2	7.0	208/240	174610	3.7	A	7.5 x 3.9 x 5.45	
3	9.6	208/240	174611	3.9	A	7.5 x 3.9 x 5.45	

Ⓢ LEESON model 174606 is single-phase input only

THREE PHASE INPUT/OUTPUT

200-240 Volts	HP	Output Amps 230 VAC	Input Voltage	Catalog Number	App. Wgt.(lbs.)	Disc. Sym.	Dimension H x W x D (in.)
	1 1/2	6.0	200/240	174612	3.7	A	7.5 x 3.9 x 5.45
2	7.0	200/240	174613	3.7	A	7.5 x 3.9 x 5.45	
3	9.6	200/240	174614	3.8	A	7.5 x 3.9 x 5.45	
5	16.5	200/240	174615	4.2	A	7.5 x 3.9 x 5.8	
7 1/2	23.0	200/240	174616	7.3	A	9.83 x 5.12 x 6.3	
10	29.0	200/240	174617	7.3	A	9.83 x 5.12 x 6.3	
15	42.0	200/240	174618 Ⓢ	20	A	12.33 x 6.88 x 8.08	
20	54.0	200/240	174619 Ⓢ	20	A	12.33 x 6.88 x 8.08	
400-480 Volts	1/2	1.1	400/480	174620	3.0	A	7.5 x 3.9 x 4.35
	1	2.1	400/480	174621	3.2	A	7.5 x 3.9 x 4.35
	1 1/2	3.0	400/480	174622	3.6	A	7.5 x 3.9 x 5.45
	2	3.5	400/480	174623	3.7	A	7.5 x 3.9 x 5.45
	3	4.8	400/480	174624	3.7	A	7.5 x 3.9 x 5.45
	5	8.2	400/480	174625	4.3	A	7.5 x 3.9 x 5.8
	7 1/2	11.0	400/480	174626	7.3	A	9.83 x 5.12 x 6.3
	10	14.0	400/480	174627	7.3	A	9.83 x 5.12 x 6.3
	15	21.0	400/480	174628 Ⓢ	20	A	12.33 x 6.88 x 8.08
	20	27.0	400/480	174629 Ⓢ	20	A	12.33 x 6.88 x 8.08
480-590 Volts	1	1.7	480/590	174631	3.2	A	7.5 x 3.9 x 4.35
	2	2.7	480/590	174632	3.7	A	7.5 x 3.9 x 5.45
	3	3.9	480/590	174633	3.8	A	7.5 x 3.9 x 5.45
	5	6.1	480/590	174634	4.2	A	7.5 x 3.9 x 5.8
	7 1/2	9.0	480/590	174635	7.3	A	9.83 x 5.12 x 6.3
	10	11.0	480/590	174636	7.3	A	9.83 x 5.12 x 6.3
	15	17.0	480/590	174637 Ⓢ	20	A	12.33 x 6.88 x 8.08
	20	22.0	480/590	174638 Ⓢ	20	A	12.33 x 6.88 x 8.08
	25	27.0	480/590	174639 Ⓢ	20	A	12.33 x 6.88 x 8.08

Ⓢ Coming in 4th quarter 2008

Voltage Monitoring

Current Monitoring

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 (% Load, % Torque, kW), Network Speed (baud rate), Terminal Continuity, Keypad Status,

Elapsed Run Time (hours), Elapsed Power on Time (hours)

Standards: UL (USA), cUL (Canada), CE (Europe), GOST (Russia/Ukraine) C-Tick (Australia/New Zealand)