

AC / DC Controls

Quick Reference

IEC Motors

DC Motors

Gearmotors

AC / DC Controls

Accessories / Kits

Mods / Factory Options

X-Ref / Index

Tech Information

Terms / Warnings



DC Adjustable Speed Drives

Speedmaster® DC drives for use with SCR rated motors. Models range from sub-FHP through 3 HP. NEMA 1, NEMA 4/12 and NEMA 4X enclosures available. Low voltage controls available through 120 amps @12/24 V and 100 amps @ 36/48 V.



SM2/SM4 Series Flux Vector Sub-Micro AC Inverters

Speedmaster® sensorless vector drives with "big drive" features and ultra-compact size. SM2 - 1/2 through 25 HP. IP31 enclosure — NEMA 1 Type. SM4 - 1/2 through 10HP IP65 NEMA 4.



SM Series Sub-Micro AC Inverters

Speedmaster® adjustable speed drives for simpler applications not requiring the advanced features of the SM-Plus Series. Models range from 1/3 through 25 HP. IP 20 enclosure — chassis mount.



Micro Series NEMA Enclosed AC Inverters

Speedmaster® adjustable speed drives with plain-English programming and read-out. Models range from 1/4 through 150 HP. NEMA 1 enclosure.



Micro Series WASHGUARD AC Inverters

Speedmaster® adjustable speed drives in NEMA 4/12 and NEMA 4X enclosures. Plain-English programming and read-out. Models range from 1/4 through 125 HP.



Inverter Kits

Dynamic braking kits, din rail kits, remote keypads, EPM bulk packs

LEESON Speedmaster® inverters are feature rich controls offering great process control and operating efficiency for your AC Motors. Our 3 families of controls have the solution to your application needs at a competitive price



Basic Features	Stand alone inverter, does not need to be mounted in an enclosure	Open control, needs to be mounted in an enclosure	Open control, needs to be mounted in an enclosure	Low cost vector inverter	Stand alone Vector inverter
	English read out display, rugged construction features	Digital display readout	Less Features than the SM-Plus Control	Vector speed control for great speed regulation	Many features and control parameters
	Steel enclosure	Over 50 programmable functions	Low cost	4 modes of operation	Easy set-up and operation
	Micro Series	SM-Plus	SM-Basic	SM2 Vector	SM4 Vector
Enclosure Type	IP 31 & IP65/54	IP20	IP20	IP20	IP 65
Enclosure Material	Steel	Plastic	Plastic	Plastic	Plastic
Number Pre-set Speeds	4	7	7	8	8
Washdown Duty	Yes	No	No	No	Yes
FWD & REV	Yes	Yes	Yes	Yes	Yes
Password Protected	Yes	Yes	Yes	Yes	Yes
Dynamic Brake Kits	Yes	Yes	Yes	No	No
Relays	Yes	Yes	Yes	Yes	Yes
EPM Programmable	No	Yes	Yes	Yes	Yes
Open Loop Vector	No	No	No	Yes	Yes
PID Software	Yes	No	No	Yes	Yes
Remote Keypads	Yes	Yes	Yes	Yes	Yes
Slip Compensation	Yes	Yes	Yes	Yes	Yes
Speed Reference Signals	Yes	Yes	Yes	Yes	Yes
Display - Words or odes	Words	3- digit	3 - digit	4 - digit	4 - digit
Adjustable carrier frequency	2.5 - 14 kHz	4 - 10 kHz	4 - 10 kHz	4 - 10 kHz	4 - 10 kHz
DC Braking	Yes	Yes	Yes	Yes	Yes
Fault History	Yes	Yes	Yes	Yes	Yes
Max. HP @ 460 Volts	150	30	15	25	10
Max. HP @ 230 Volts	60	20	15	20	10
1 Phase Input / 3 Phase Output	Yes	Yes	Yes	Yes	Yes
Output frequency	120	240 Hz	240 Hz	500 Hz	500 Hz



AC / DC Controls

DC Adjustable Speed Drives SCR Thyristor Controls



LEESON Speedmaster DC Control information

PWM and SCR Controls

General Specifications:

- General purpose for permanent magnet or shunt wound DC motors
- NEMA 4X and 4/12 suitable for washdown applications
- Dual voltage capable on most designs – see HP range
- 115 / 230 volt single-phase input voltage – DC 90 volt or 180 volt output
- Adjustable minimum and maximum speed
- Speed pot included on chassis controls
- Adjustable IR compensation
- Heat sinks required as noted
- PWM controls provide quieter operation, lower motor temperature and greater motor overload capacity

Regenerative Controls

General Specifications:

- Four quadrant controls for precise motion control
- NEMA 4X or chassis style
- Motoring and braking torque regulation ¼ HP through 2 HP

For NEMA Frame Motors & Gearmotors

SCR Controls - Enclosed - Single Phase Input 50/60 Hz

Description	Catalog Number	List Price	Output Amps	HP Range		App. Wgt. (lbs.)
				115V	230V	
NEMA 1 General Purpose						
—Non-Reversing	174307.00	447	10	1/8 to 1 [Ⓜ]	1/4 to 2 [Ⓜ]	5
—Reversing with dynamic braking	174308.00	611	10	1/8 to 1 [Ⓜ]	1/4 to 2 [Ⓜ]	5
—Heat Sink H	174316.00	100	—	—	—	1
NEMA 4X Washdown—Dust-Tight						
—Non-Reversing, Plastic Enclosure	174102.00	608	10	1/8 to 1	1/4 to 2	6
—Non-Reversing, Plastic Enclosure with Signal Follower	174103.00	885	10	1/8 to 1	1/4 to 2	7
—Reversing, Plastic Enclosure*	174107.00	826	10	1/8 to 1	1/4 to 2	7
NEMA 4						
—Non-Reversing 3HP	174709.00	1169	15	—	3	8

See footnotes on page 357

Specifications are subject to change without notice



AC / DC Controls

DC Adjustable Speed Drives

SCR Thyristor Controls

LEESON Speedmaster DC Control information

SCR Controls - Open Chassis

Description	Catalog Number	List Price	Output Amps	HP Range		App. Wgt. (lbs.)
				115V	230V	
Chassis with Speed Pot-Non Reversing	174311.00	248	10	1/8 to 1 ①	1/4 to 2 ①	1
Chassis Heat Sink ①	174314.00	74	—	—	—	1

Specifications are subject to change without notice

Regenerative SCR Drives - Four Quadrant - Full Wave

Description	Catalog Number	List Price	Output Amps	HP Range		App. Wgt. (lbs.)
				115V	230V	
NEMA 4X Washdown □	175720.00	1276	10	1/4 to 1 ②	1/2 to 2 ②	8
Open Chassis with Speed Pot □	175721.00	823	10	1/4 to 1 ②	1/2 to 2 ②	2
Chassis Heat Sink ②	175722.00	143	—	—	—	2

Specifications are subject to change without notice



For Subfractional HP Motors & Gearmotors

PWM & SCR Controls - Enclosed - Single Phase Input 50/60 Hz

Description	Catalog Number	List Price	Output Amps	HP Range		App. Wgt. (lbs.)
				115V	230V	
NEMA 1 General Purpose						
—SCR Non-Reversing	M1740005.00	429	3	1/40 to 1/8	1/40 to 1/4	5
—SCR Reversing With Dynamic Braking	M1740006.00	579	3	1/40 to 1/8	1/40 to 1/4	5
—PWM Non-Reversing	M1740008.00	372	3	1/40 to 1/8	1/40 to 1/4	2

Specifications are subject to change without notice

PWM & SCR Controls - Open Chassis

Description	Catalog Number	List Price	Output Amps	HP Range		App. Wgt. (lbs.)
				115V	230V	
Open Chassis SCR Type						
—Chassis with Speed Pot-Non Reversing	M1740007.00	238	1.5	1/40 to 1/8	1/40 to 1/4	1
Open Chassis PWM Type						
—Chassis with Speed Pot-Non Reversing	M1740009.00	277	2	1/40 to 1/8	—	1

* Drive does not have dynamic braking. Motor shaft must be at zero speed before reversing.

① Heat sink #174316.00 is required for NEMA 1 type 3/4 and 1HP 115V and 11/2 and 2HP 230V when the amp draw of the motor exceeds 5 amps.

② Chassis Heat Sink #174314.00 required for 3/4 and 1HP 115V and 11/2 and 2HP 230V when the amp draw of the motor exceeds 5 amps.

③ Chassis Heat sink #175722.00 required for 1HP and above when the amp draw of the motor exceeds 5 amps.

□ Regenerative drives are reversible and have regenerative braking.

Specifications are subject to change without notice



AC / DC Controls

DC Adjustable Speed Drives - SCR Controls

15 Series

General Specifications:

- 0-90 / 0-180 volts DC
- Adjustable min. and max. speed
- Adjustable IR compensation
- Fixed acceleration - 5 seconds
- 5K ohm speed potentiometer included
- 25:1 speed range and 1% speed regulation



NEMA 4/12
Non-Reversing

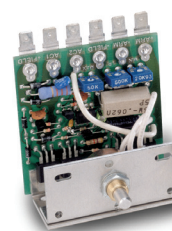


Figure 1



Figure 2

Description	Catalog Number	List Price	Output Amps	HP Range		App. Wgt. (lbs.)
				115V	230V	
NEMA 4/12 Non-Reversing	174696.00	289	3	1/3	2/3	1
Chassis - Figure 1	174695.00	166	2	1/6	1/6	1
Chassis - Figure 2	174694.00	166	2	1/6	1/6	1

Specifications are subject to change without notice

Low Voltage Adjustable Speed Controllers

General Specifications:

- Chassis type design
- DC input / DC output
- Speed potentiometer shipped loose
- High efficient designs increase battery life



Features:

- 40 : 1 speed range
- Holds speed control as battery discharges
- Adjustable min. and max. speeds
- IR compensation
- 200% current limit overload protection
- Inhibit pins provide optional start-stop
- Power on LED indicator

Input Voltage	Catalog Number	List Price	Output Amps	Dimensions (inches)			App. Wgt. (lbs.)
				Length	Width	Height	
12/24	175290.00	535	16	6.90	4.44	2.19	2
12/24	175291.00	652	60	7.78	6.90	3.25	4
36/48	175292.00	652	60	7.78	6.90	3.25	4

Specifications are subject to change without notice



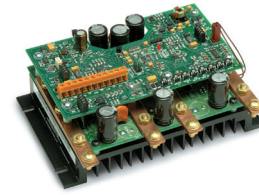
Low Voltage Adjustable Speed Controllers

General Specifications:

- Chassis type design
- DC input / DC output
- Speed potentiometer shipped loose
- High efficient designs increase battery life

Features:

- Sleep mode feature
- Accepts switch closure for reversing and braking
- Built-in short circuit protection
- 1.01 Form factor
- Built-in temperature sensor
- On board trim pots for calibration, speed and forward and reverse settings



Four Quadrant Control

Input Voltage	Catalog Number	List Price	Output Amps	Dimensions (inches)			App. Wgt. (lbs.)
				Length	Width	Height	
12/24	174298.00	1157	120	6.90	5.00	2.50	3
36/48	174299.00	1157	100	6.90	5.00	2.50	3

Specifications are subject to change without notice

Dual Mode - Dual Speed Controllers

- SCR Control designed to run two DC motors at the same time in either Independent mode or Slave/ Master mode
- Open chassis design
- Dual voltage, 115-230 VAC input with jumper
- Selectable 90/180 VDC output
- Jumper selectable speed and torque mode
- Two trim pots each for the minimum speed, maximum speed, IR compensation, current limit and acceleration/deceleration
- Comes standard with two potentiometers



HP	Input Voltage	Output Amps	Output Voltage	Catalog Number	List Price	App. Wgt. (lbs)
1 HP @ 90 VDC	115/230	10*	0-90/0-180	174422.00	385	3
2 HP @ 180 VDC						

Specifications are subject to change without notice

* Heat sink 174314.00 is required if one side provides more than 5A or the output on both sides is more than 6.5A.

Control Accessories

Description	Catalog Number	List Price
Inhibit Plug	900282.01	51
Speed Pot (10k/5w pot, washers & nut)	006708.01	64

Specifications are subject to change without notice



AC / DC Controls

FHP Series AC Controls

AC Adjustable Speed Drives

General Specifications:

The FHP Series volts/hertz-type AC drives are as simple to set-up and calibrate as an SCR-type DC drive.

Compact chassis design maintain industry standard mounting hole locations.

Features:

Common features for chassis and enclosed units:

- Compact size – (4.30" x 3.70")
- Output voltage on dual voltage models is jumper selectable and has voltage doubler
- Acceleration and deceleration trim pots
- Torque, maximum speed and torque limit trim pots
- Torque 'foldback' feature – Allows up to 200% torque for short periods
- 16kHz switching frequency, with option to change between 4 and 16kHz
- Adjustable torque boost for startup – Up to 200%
- Color-coded on-board LEDs for power, fault and torque limit
- Easy start/stop and direction control with enable and direction terminal connections
- Accepts speed reference from 0-5VDC isolated signal
- Speed potentiometer shipped loose
- Plug-in Process Control Module (PCM) kit available to accept 0-5VDC, 0-10VDC or 4-20mA input
- UL listed

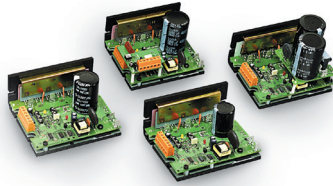
Special features of the NEMA 4X drive:

- NEMA 4X enclosure
- Jumper selectable DC injection braking or coast to stop
- Brake time and current are adjustable
- Built-in isolation card to accept a speed reference signal
- Min speed adjustment
- Auto or manual restart after power loss

PARAMETER	SPECIFICATIONS FOR ALL FHP MODELS
Max load	150% for 5 minutes
Output frequency	0-120Hz
Output type	6 step PWM
Switching frequency	4-16kHz range* with 16kHz as factory default
Speed regulation and range	±3% of base speed; up to 50:1
On-board adjustable trim pots	Max speed, accel, decel, boost & torque limit
Adjustable maximum frequency range	32-120Hz
Adjustable accel and decel time range	1-12 seconds
Torque boost range	0-200%
LED indicators	Power (green), Fault† (red), Torque Limit (yellow)
Instantaneous over-current trip time	3 µsec
Analog reference input and impedance	0-5VDC isolated, ~100Kohm
Plug-in PCM isolator card input	0-5 VDC, 0-10VDC, 4-20mA
Ambient temperature range	0-40°C
Weight (Chassis Models)	1.2 lbs.
Vibration	0.5G max (20-50Hz); 0.1G max (>50Hz)
Approvals	UL, cUL

* Plug-in capacitor kit (175325.00) for field adjustments to less than 16khz
 † Faults are Over-voltage, Under-voltage and Instantaneous Over Current trip





Single Phase Input / Single or Three Phase Output

HP	Input Voltage	Output Amps	Output Voltage	Catalog Number	List Price	App. Wgt. (lbs)
1/4	115	2.4	115	175320.00	393	3
1/2	230	2.4	230	175321.00	393	3
	115/230	2.4	230	175310.00	499	3
	115	4.0	115	175322.00	488	4
1	230	4.0	230	175323.00	483	4
	115/230	4.0	230	175311.00	632	4

Specifications are subject to change without notice

FHP Series AC Drives - Accessories

Description	Catalog Number	List Price	App. Wgt. (lbs)
Process Control Module (PCM) Kit*	175324.00	121	2
Carrier Frequency Capacitor Kit	175325.00	29	1

* PCM Kit is for use with chassis drives only.

Specifications are subject to change without notice

- NEMA 4X enclosure
- Min speed adjustment
- Jumper selectable features:
 - DC injection braking or coast to stop
 - Brake time and current are adjustable
 - Auto or manual restart after power loss
- Built-in isolation card to accept a speed reference signal



Single Phase Input / Three Phase Output

HP	Input Voltage	Output Amps	Output Voltage	Catalog Number	List Price	App. Wgt. (lbs)
1/6 - 1	115/230	4.0	230	175326.00	888	7

Specifications are subject to change without notice



AC / DC Controls

Micro Series AC Inverters

NEMA 1, IP31 Enclosure Protection

Features:

- Full feature, English read-out parameters
- 16 bit Intel microprocessor
- Choice of using factory "Quick Start" program settings
- Output frequency to 120 Hz. Higher frequency available
- 150% overload capacity for one minute
- Speed reference signals - potentiometer, 0-10 VDC or 4-20mA inputs
- Output signal, 0-10 VDC, speed or load
- Two auxiliary contacts, one form C relay and two open collector outputs
- 4 preset speeds
- Slip compensation
- Adjustable carrier frequency
- Adjustable acceleration and deceleration times
- Forward and reverse
- Time and voltage adjustable DC braking
- Password protected
- Constant torque-with adjustable current limit
- Steel enclosure with Aluminum heat sinks
- Dynamic braking kits available
- Remote keypads available
- PID software built-in for motor feedback
- UL Listed



NEMA 1

PDF file of Manual available at
www.leeson.com/Technical Information

NEMA 1 (IP31) • Single Phase Input / 230V Three Phase Output (Use with three phase 230V motor)

HP	Output Amps @ 230 Volts	Input Voltage	Catalog Number	List Price	App. Wgt. (lbs)	Dimension Key
1/4	1.4	115/230	174930.00	1,060	5	A
1/2	2.2	115/230	174997.00	1,278	7	AC
1	4	115/230	174931.00	1,289	7	D
1 1/2	5.2	115/230	174932.00	1,428	7	D
2	6.8	200-230	174933.00	1,362	9	E
3	9.6	200-230	174934.00	1,499	9	E

Specifications are subject to change without notice

Dimension Table see page 378-379



AC / DC Controls

Micro Series AC Inverters

NEMA 1, IP31 Enclosure Protection

Voltage	HP	Output Amps	Input Voltage	Catalog Number	List Price	App. Wgt. (lbs)	Dimension Key
200-240 Volts	1/2	2.2	200-240	174914.00	1,123	6	B
	1	4	200-240	174915.00	1,179	6	C
	1 1/2	5.2	200-240	174916.00	1,235	6	C
	2	6.8	200-240	174917.00	1,320	9	E
	3	9.6	200-240	174918.00	1,419	9	E
	5	15.2	200-240	174919.00	1,677	11	F
	7 1/2	25	200-240	174545.00	2,481	13	M
	10	28	200-240	174551.00	3,211	15	L
	15	42	200-240	174557.00	4,237	19	N
	20	54	200-240	174560.00	5,749	21	P
	25	68	200-240	174569.00	6,964	38	T
	30	80	200-240	174571.00	8,356	44	T
	40	104	200-240	174576.00	12,871	130	AE
	60	154	200-240	174578.00	18,187	185	AF
400-480 Volts	1	2	400-480	174920.00	1,414	6	B
	2	3.4	400-480	174921.00	1,551	7	D
	3	4.8	400-480	174922.00	1,677	9	E
	5	7.6	400-480	174923.00	1,887	9	E
	10	14	400-480	174552.00	3,482	13	M
	15	21	400-480	174558.00	4,471	15	L
	20	27	400-480	174561.00	5,932	17	N
	25	34	400-480	174563.00	6,994	21	P
	30	40	400-480	174565.00	7,615	21	P
	40	52	400-480	174567.00	8,776	35	T
	50	65	400-480	174593.00	10,697	44	W
	60	77	400-480	174572.00	11,753	67	W
	75	96	400-480	174580.00	14,899	185	AG
	100	124	400-480	174582.00	18,117	250	AH
	125	156	400-480	174584.00	20,356	260	AH
	150	180	400-480	174586.00	27,770	360	AL
480-590 Volts	1	1.6	480-590	174925.00	1,568	6	B
	2	2.7	480-590	174926.00	1,733	7	D
	3	3.9	480-590	174927.00	1,914	9	E
	5	6.1	480-590	174928.00	2,088	9	F
	7 1/2	9	480-590	174929.00	2,552	11	I
	10	11	480-590	174553.00	3,889	13	R
	15	17	480-590	174559.00	5,134	17	N
	20	22	480-590	174562.00	6,521	19	O
	25	27	480-590	174564.00	7,701	21	P
	30	32	480-590	174598.00	8,625	22	S
	40	41	480-590	174599.00	9,567	38	T
	50	52	480-590	174594.00	11,604	45	W
	60	62	480-590	174573.00	12,982	51	W

Specifications are subject to change without notice
 ■ User programmable for 50Hz and other voltage inputs

Dimension Table see page 378-379



AC / DC Controls

Washguard® Micro Series AC Inverters

NEMA 4/12 (IP65/IP54)

Epoxy Coated

General Specifications:

- Food-safe white epoxy finish
- No external cooling fan required
- Water, oil and dust-tight enclosure protected
- Same features as Micro Series inverters as shown on previous page



WASHGUARD NEMA 4/12

Three Phase Input / Output

Voltage	HP	Output Amps	Input Voltage	Catalog Number	List Price	App. Wgt. (lbs)	Dimension Key
200-240 Volts	1/2	2.2	200-240	174935.00	1,590	8	G
	1	4.0	200-240	174936.00	1,727	8	G
	1.5	5.2	200-240	174482.00	1,750	8	Y
	2	6.8	200-240	174937.00	1,849	10	H
	3	9.6	200-240	174938.00	2,001	11	J
	5	15.2	200-240	174730.00	2,466	11	K
	7.5	22.0	200-240	174734.00	3,421	27	Q
	10	28.0	200-240	174737.00	4,316	32	U
	15	43.0	200-240	174740.00	5,204	40	V
	20	54.0	200-240	174743.00 □	6,682	42	AA
	25	68.0	200-240	174595.00 □	9,156	53	Z
	30	80.0	200-240	174596.00 □	9,702	53	Z
400-480 Volts	1	2.0	400-480	174939.00	1,945	8	G
	2	3.4	400-480	174940.00	2,146	10	H
	3	4.8	400-480	174941.00	2,300	10	H
	5	7.6	400-480	174942.00	2,542	11	J
	10	14.0	400-480	174554.00	4,296	11	Q
	15	21.0	400-480	174749.00	5,353	32	U
	20	27.0	400-480	174752.00	6,863	36	V
	25	34.0	400-480	174755.00 □	7,924	42	AA
	30	40.0	400-480	174757.00 □	8,661	53	AA
	40	52.0	400-480	174513.00 □	10,018	54	Z
	50	65.0	400-480	174511.00 □	11,626	75	AB
	60	77.0	400-480	174574.00 □	13,090	98	AB
480-590 Volts	75	96.0	400-480	174581.00 □	16,159	200	AJ
	100	124.0	400-480	174583.00 □	19,517	300	AO
	125	156.0	400-480	174585.00 □	22,176	310	AO
	1	1.6	480-590	174943.00	2,116	8	G
	2	2.7	480-590	174944.00	2,360	10	H
	3	3.9	480-590	174945.00	2,574	10	H
	5	6.1	480-590	174946.00	2,771	11	J
	7.5	9.0	480-590	174549.00	3,808	13	K
	10	11.0	480-590	174556.00	4,996	17	Q
	15	17.0	480-590	174763.00	6,035	38	U
	20	22.0	480-590	174766.00	7,347	40	V
	25	27.0	480-590	174769.00 □	8,762	42	AA
480-590 Volts	30	32.0	480-590	174597.00 □	9,615	53	AA
	40	41.0	480-590	174512.00 □	11,132	54	Z
	50	52.0	480-590	174510.00 □	12,997	75	AB
	60	62.0	480-590	174575.00 □	14,538	98	AB

□ Enclosures are NEMA 12 only – others are NEMA 4/12

■ User programmable for 50Hz and other voltage inputs

Specifications are subject to change without notice

Dimension Table see page 378-379



NEMA 4X (IP65)
Stainless Steel

WASHGUARD NEMA 4X

General Specifications:

- 300-Series stainless steel
- No external cooling fans
- Must be protected from caustic agents
- Same features as NEMA 1 Micro Series inverters

Three Phase Input / Output

Voltage	HP	Output Amps	Input Voltage	Catalog Number	List Price	App. Wgt. (lbs)	Dimension Key
200-240 Volts	1/2	2.2	200-240	174527.00	1,867	8	G
	1	4.0	200-240	174528.00	2,003	8	G
	1.5	5.2	200-240	174529.00	2,096	8	Y
	2	6.8	200-240	174530.00	2,222	10	H
	3	9.6	200-240	174531.00	2,334	11	J
	5	15.2	200-240	174732.00	3,250	11	K
	7.5	22.0	200-240	174735.00	4,000	27	Q
	10	28.0	200-240	174738.00	4,989	32	U
	15	43.0	200-240	174741.00	6,096	40	V
400-480 Volts	1	2.0	400-480	174532.00	2,200	8	G
	2	3.4	400-480	174533.00	2,494	10	H
	3	4.8	400-480	174534.00	2,674	10	H
	5	7.6	400-480	174535.00	3,053	11	J
	10	14.0	400-480	174747.00	5,128	11	Q
	15	21.0	400-480	174750.00	6,137	32	U
	20	27.0	400-480	174753.00	7,575	36	V
480-590 Volts	1	1.6	480-590	174536.00	2,391	8	G
	2	2.7	480-590	174537.00	2,669	10	H
	3	3.9	480-590	174538.00	2,887	10	H
	5	6.1	480-590	174539.00	3,267	11	J
	7.5	9.0	480-590	174759.00	4,417	13	K
	10	11.0	480-590	174761.00	5,668	17	Q
	15	17.0	480-590	174764.00	6,808	38	U
	20	22.0	480-590	174767.00	8,231	40	V

Specifications are subject to change without notice

- User programmable for 50Hz and other voltage inputs

Dimension Table see page 378-379



AC / DC Controls

Washguard® Micro Series AC Inverters

NEMA 4X (IP65)

Stainless Steel

Washguard® NEMA 4X (IP65) Stainless Steel - Single Phase Input - 230 Volt Three Phase Output

(Use with three phase 230V motor)

HP	Output Amps @ 230 Volts	Input Voltage [□]	Catalog Number	List Price	App. Wgt. (lbs)	Dimension Key
1/4	1.4	115/230	174519.00	1,826	8	AD
1/2	2.2	115/230	174520.00	2,030	8	X
1	4.0	115/230	174521.00	2,176	11	H
1 1/2	5.2	115/230	174517.00	2,674	11	H
2	6.8	208-230	174525.00	2,288	11	H
3	9.6	208-230	174526.00	2,399	12	J

Specifications are subject to change without notice

Washguard[®] NEMA 4 (IP65) Epoxy Coated - Single Phase Input - 230 Volt Three Phase Output

(Use with three phase 230V motor)

HP	Output Amps @ 230 Volts	Input Voltage [□]	Catalog Number	List Price	App. Wgt. (lbs)	Dimension Key
1/4	1.4	115/230	174996.00	1,439	8	AD
1/2	2.2	115/230	174998.00	1,571	8	X
1	4.0	115/230	174999.00	1,720	11	H
1 1/2	5.2	115/230	174515.00	2,021	11	H
2	6.8	208-230	174475.00	1,831	11	H
3	9.6	208-230	174729.00	1,939	12	J

Specifications are subject to change without notice

Dimension Table see page 378-379



SM2 Series Flux Vector Series AC Inverters NEMA 1 IP21 Enclosure Protection

General Specifications:

- Designed to be used with Vector duty rated AC motors
- Open Loop Flux Vector designs
- Typical applications would include: food processing, machinery, material handling and HVAC systems
- 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)



AC / DC Controls

SM2 Series Flux Vector Series AC Inverters NEMA 1 IP31 Enclosure Protection

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
- 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)

Single Phase Input / 230 Volt Three Phase Output

Voltage	HP	Output Amps	Input Voltage [□]	Catalog Number	List Price	App. Wgt. (lbs)	Dimensions H x W x D (in.)
115-230 Volts	1/3	1.7	115/230	174603.00	555	2.9	7.5 x 3.9 x 4.35
	1/2	2.4	115/230	174604.00	570	3	7.5 x 3.9 x 4.35
	1	4.2	115/230	174605.00	636	3.2	7.5 x 3.9 x 4.35
	1.5	6.0	115/230	174651.00	801	5	7.5 x 3.9 x 5.45

Specifications are subject to change without notice

Single or Three Phase Input / 230 Volt Three Phase Output

Voltage	HP	Output Amps	Input Voltage [□]	Catalog Number	List Price	App. Wgt. (lbs)	Dimensions H x W x D (in.)
208-240 Volts	1/3	1.7	208/240	174606.00£	505	2.5	7.5 x 3.9 x 4.35
	1/2	2.4	208/240	174607.00	531	2.9	7.5 x 3.9 x 4.35
	1	4.2	208/240	174608.00	561	3.2	7.5 x 3.9 x 4.35
	1.5	6.0	208/240	174609.00	625	3.7	7.5 x 3.9 x 5.45
	2	7.0	208/240	174610.00	679	3.7	7.5 x 3.9 x 5.45
	3	9.6	208/240	174611.00	860	3.9	7.5 x 3.9 x 5.45

£ LEESON model 174606.00 is single-phase input only

□ User programmable for 50Hz and other voltage inputs

Specifications are subject to change without notice



AC / DC Controls

SM2 Series Flux Vector Series AC Inverters

NEMA 1 IP31 Enclosure Protection

Three Phase Input / Output

Voltage	HP	Output Amps	Input Voltage	Catalog Number	List Price	App. Wgt. (lbs)	Dimensions H x W x D (in.)
200-240 Volts	1.5	6.0	200/240	174612.00	598	3.7	7.5 x 3.9 x 5.45
	2	7.0	200/240	174613.00	642	3.7	7.5 x 3.9 x 5.45
	3	9.6	200/240	174614.00	807	3.8	7.5 x 3.9 x 5.45
	5	16.5	200/240	174615.00	963	4.2	7.5 x 3.9 x 5.8
	7.5	23.0	200/240	174616.00	1,286	7.3	9.83 x 5.12 x 6.3
	10	29.0	200/240	174617.00	1,588	7.3	9.83 x 5.12 x 6.3
	15	42.0	200/240	174618.00	2,468	20	12.33 x 6.88 x 8.08
	20	54.0	200/240	174619.00	3,034	20	12.33 x 6.88 x 8.08
400-480 Volts	1/2	1.1	400/480	174620.00	613	3	7.5 x 3.9 x 4.35
	1	2.1	400/480	174621.00	658	3.2	7.5 x 3.9 x 4.35
	1.5	3.0	400/480	174622.00	713	3.6	7.5 x 3.9 x 5.45
	2	3.5	400/480	174623.00	761	3.7	7.5 x 3.9 x 5.45
	3	4.8	400/480	174624.00	896	3.7	7.5 x 3.9 x 5.45
	5	8.2	400/480	174625.00	1,014	4.3	7.5 x 3.9 x 5.8
	7.5	11.0	400/480	174626.00	1,284	7.3	9.83 x 5.12 x 6.3
	10	14.0	400/480	174627.00	1,586	7.3	9.83 x 5.12 x 6.3
	15	21.0	400/480	174628.00	2,475	20	12.33 x 6.88 x 8.08
	20	27.0	400/480	174629.00	3,043	20	12.33 x 6.88 x 8.08
	25	35.0	400/480	174630.00	3,776	20	12.33 x 6.88 x 8.08
	30	45.0	400/480	174991.00	4,483	13.5	12.5 x 6.92 x 8.09
	40	59.0	400/480	174992.00	4,984	24	14.19 x 8.72 x 10.07
	50	74.0	400/480	174710.00	6,846	31	17.19 x 8.72 x 10.07
	60	87.0	400/480	174711.00	8,330	35	20.19 x 8.72 x 10.07
480-590 Volts	1	1.7	480/590	174631.00	758	3.2	7.5 x 3.9 x 4.35
	2	2.7	480/590	174632.00	845	3.7	7.5 x 3.9 x 5.45
	3	3.9	480/590	174633.00	977	3.8	7.5 x 3.9 x 5.45
	5	6.1	480/590	174634.00	1,104	4.2	7.5 x 3.9 x 5.8
	7.5	9.0	480/590	174635.00	1,378	7.3	9.83 x 5.12 x 6.3
	10	11.0	480/590	174636.00	1,700	7.3	9.83 x 5.12 x 6.3
	15	17.0	480/590	174637.00	2,727	20	12.33 x 6.88 x 8.08
	20	22.0	480/590	174638.00	3,512	20	12.33 x 6.88 x 8.08
	25	27.0	480/590	174639.00	4,067	20	12.33 x 6.88 x 8.08

■ User programmable for 50Hz and other voltage inputs

Specifications are subject to change without notice



AC / DC Controls

SM4 Series Flux Vector Series AC Inverters NEMA 4 IP65 Enclosure Protection



General Specifications:

- Indoor use only inverter that is designed to be used with vector duty motors
- Typical applications would include: packaging machinery, food processing, conveying systems, machinery and HVAC systems
- Enclosure: NEMA 4, IP65, -10 to 55°C, 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
- 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)



SM4 Series Flux Vector Series AC Inverters

NEMA 4 IP65 Enclosure Protection

Single Phase Input / Three Phase Output

(Use with three phase 230V motor)

Voltage	HP	Output Amps	Input Voltage ^a	Catalog Number	List Price	App. Wgt. (lbs)	Dimensions H x W x D (in.)
115/230 Volts	1/2	2.4	115/230	174652.00	737	3.6	8.0 x 6.28 x 4.47
	1	4.2	115/230	174653.00	840	3.6	8.0 x 6.28 x 4.47
	1 1/2	6.0	115/230	174654.00	1,022	3.6	8.0 x 6.28 x 4.47

Specifications are subject to change without notice

Single or Three Phase Input / Three Phase Output

(Use with three phase 230V motor)

Voltage	HP	Output Amps	Input Voltage ^a	Catalog Number	List Price	App. Wgt. (lbs)	Dimensions H x W x D (in.)
208-240 Volts	1/2	2.4	208-240	174655.00	663	3.6	8.0 x 6.28 x 4.47
	1	4.2	208-240	174656.00	710	3.6	8.0 x 6.28 x 4.47
	1 1/2	6.0	208-240	174657.00	831	5.9	8.0 x 6.28 x 6.31
	2	7.0	208-240	174658.00	901	5.9	8.0 x 6.28 x 6.31
	3	9.6	208-240	174659.00	1,078	7.1	8.0 x 7.12 x 6.77

Specifications are subject to change without notice

^a User programmable for 50Hz and other voltage inputs -3-phase only

Three Phase Input / Three Phase Output

Voltage	HP	Output Amps	Input Voltage ^a	Catalog Number	List Price	App. Wgt. (lbs)	Dimensions H x W x D (in.)
208-240 Volts	5	16.5	208-240	174660.00	1,339	11.58	10.0 x 8.96 x 8.0
	7.5	23.0	208-240	174661.00 f	1,801	10.98	10.0 x 8.04 x 8.0
	10	29.0	208-240	174662.00 f	2,273	10.98	10.0 x 8.04 x 8.0
	15	42.0	208-240	174699.00 f	3,204	25	14.5 x 9.42 x 9.45
	20	54.0	208-240	174700.00 f	4,368	26	14.5 x 9.42 x 9.45
400-480 Volts	1/2	1.1	400-480	174671.00	794	3.6	8.0 x 6.28 x 4.47
	1	2.1	400-480	174672.00	854	3.6	8.0 x 6.28 x 4.47
	1.5	3.0	400-480	174673.00	924	5.9	8.0 x 6.28 x 6.31
	2	3.5	400-480	174674.00	1,007	5.9	8.0 x 6.28 x 6.31
	3	4.8	400-480	174675.00	1,148	5.9	8.0 x 6.28 x 6.31
	5	8.2	400-480	174676.00	1,423	11.58	10.0 x 8.96 x 8.0
	7.5	11.0	400-480	174677.00	1,792	11.58	10.0 x 8.96 x 8.0
	10	14.0	400-480	174678.00 f	2,142	10.98	10.0 x 8.04 x 8.0
	15	21.0	400-480	174701.00 f	3,091	25	14.5 x 9.42 x 9.45
	20	27.0	400-480	174702.00 f	4,141	26	14.5 x 9.42 x 9.45
	25	34.0	400-480	174703.00 f	5,182	26	14.5 x 9.42 x 9.45
	30	40.0	400-480	174704.00 f	5,979	31	18.5 x 9.42 x 9.45
480-590 Volts	1	1.7	480-590	174663.00	924	3.61	8.0 x 6.28 x 4.47
	2	2.7	480-590	174664.00	1,093	5.9	8.0 x 6.28 x 6.31
	3	3.9	480-590	174665.00	1,264	5.9	8.0 x 6.28 x 6.31
	5	6.1	480-590	174666.00	1,563	11.58	10.0 x 8.96 x 8.0
	7.5	9.0	480-590	174667.00	1,978	11.58	10.0 x 8.96 x 8.0
	10	11.0	480-590	174668.00 f	2,357	10.98	10.0 x 8.04 x 8.0

f = fan cooled - other controls are convection cooled

^a User programmable for 50Hz and other voltage inputs

Specifications are subject to change without notice



AC / DC Controls

SM Plus Sub-Micro AC Inverters IP 20 Enclosure Protection



SM PLUS

General Specifications:

- Ultra-compact designs include 18 isolated I/O terminals plus
- RS485 Modbus® serial communication

Features:

- Removable electronic programming module
- Input line voltage calibration—optimizes over and under voltage trip levels
- Current limit to 180% with frequency foldback
- Adjustable carrier frequency (4 to 10 kHz)
- Adjustable V/Hz
- Output frequency to 240 Hz
- Seven preset speeds
- Automatic restart after fault
- Control via drive face, terminal strip or optional remote keypad
- Coast or ramp to stop
- Independent accel and decel adjustment
- Forward only or forward and reverse direction
- Adjustable DC injection braking
- Speed reference: Keypad, 0-10 VDC, or 4-20 mA
- Speed reference calibration
- Speed and load indicating output signal selection: 0-10 VDC or 4-20mA
- Output signal calibration
- Fixed boost for high starting torque
- Accel boost for high torque accelerating at any speed
- Slip compensation
- Three-digit LED display
- Password protection
- Fault history: Stores eight previous trips
- Terminal status indication
- IP20 enclosure with finger safe terminals
- Dynamic braking and remote keypad kits available on pages 380-381



AC / DC Controls

SM Plus Sub-Micro AC Inverters

IP 20 Enclosure Protection

Single Phase Input / Three Phase Output (Use with three phase 230V motor)

Voltage	HP	Output Amps	Input Voltage	Catalog Number	List Price	App. Wgt. (lbs)	Dimensions H x W x D (in.)
115/230 Volts	1	4.2	115/230	174492.00	992	4	B1
	1 1/2	6.0	115/230	174445.00	1,119	5	B1

Specifications are subject to change without notice

Single or Three Phase Input / Three Phase Output (Use with three phase 230V motor)

Voltage	HP	Output Amps	Input Voltage	Catalog Number	List Price	App. Wgt. (lbs)	Dimensions H x W x D (in.)
200-240 Volts	1/4	1.4	200-240	174452.00	711	2	A1
	1/2	2.2	200-240	174453.00	743	2	A1
	1	4.2	200-240	174454.00	798	3	A2
	1 1/2	6.0	200-240	174493.00	949	4	B1
	2	6.8	200-240	174494.00	1,050	5	B2
	3	9.6	200-240	174495.00	1,272	5	B2
	5	15.2	200-240	174444.00	1,746	8	C1

Specifications are subject to change without notice

□ User programmable for 50Hz and other voltage inputs 3-phase only

Three Phase Input / Three Phase Output

Voltage	HP	Output Amps	Input Voltage	Catalog Number	List Price	App. Wgt. (lbs)	Dimensions H x W x D (in.)
200-240 Volts	1	4.2	200-240	174455.00	735	3	A2
	1 1/2	6.0	200-240	174456.00	863	3	A3
	2	6.8	200-240	174457.00	953	4	A3
	3	9.6	200-240	174458.00	1,136	4	A3
	5	15.2	200-240	174446.00	1,462	4	B2
	7 1/2	22	200-240	174438.00	1,999	8	C1
	10	28	200-240	174439.00	2,387	8	C1
	15	42	200-240	174429.00	3,090	13	D1
	20	54	200-240	174430.00	3,791	14	D1
	25	66	200-240	174431.00	4,492	15	D1
400-480 Volts	1/2	1.1	400-480	174459.00	828	2	A1
	1	2.1	400-480	174460.00	891	3	A2
	1 1/2	3.0	400-480	174461.00	975	3	A3
	2	3.4	400-480	174462.00	1,075	4	A3
	3	4.8	400-480	174463.00	1,200	4	A3
	5	7.6	400-480	174447.00	1,530	5	B2
	7 1/2	11	400-480	174440.00	1,999	8	C1
	10	14	400-480	174441.00	2,387	8	C1
	15	21	400-480	174431.00	3,030	13	D1
	20	27	400-480	174432.00	3,711	14	D1
480-590 Volts	25	34	400-480	174433.00	4,417	14	D1
	30	40	400-480	174500.00	5,133	14	D1
	1	1.7	480-590	174464.00	953	3	A2
	2	3.0	480-590	174491.00	1,142	4	A3
	3	4.2	480-590	174497.00	1,356	5	B2
	5	6.6	480-590	174448.00	1,659	5	B2
	7 1/2	9.9	480-590	174442.00	2,154	8	C1
	10	12.2	480-590	174443.00	2,552	8	C1
	15	19	480-590	174434.00	3,343	8	D1
	20	24	480-590	174435.00	4,087	14	D1
	25	27	480-590	174436.00	4,836	14	D1

Specifications are subject to change without notice

□ User programmable for 50Hz and other voltage inputs



Dimension Table see page 377

AC / DC Controls

SM Series Sub-Micro AC Inverters IP 20 Enclosure Protection



SM SERIES

General Specifications:

- For applications that require less control features that you may find in the SM-Plus series inverters
- Provides 11 isolated I/O terminals with one Form A relay output

Features:

- Removable electronic programming module
- Input line voltage calibration—optimizes over and under voltage trip levels
- Current limit to 180% with frequency foldback
- Adjustable carrier frequency (4 to 10 kHz)
- Adjustable V/Hz
- Output frequency to 240 Hz
- Seven preset speeds
- Automatic restart after fault
- Control via drive face, terminal strip or optional remote keypad
- Coast or ramp to stop
- Independent accel and decel adjustment
- Forward only or forward and reverse direction
- Adjustable DC injection braking
- Speed reference: Keypad, 0-10 VDC, or 4-20 mA
- Speed reference calibration
- Fixed boost for high starting torque
- Accel boost for high torque accelerating at any speed
- Slip compensation
- Three-digit LED display
- Password protection
- Fault history: Stores eight previous trips
- Terminal status indication
- Default parameter reset
- IP20 enclosure with finger safe terminals
- Dynamic braking and remote keypad kits available on pages 380



AC / DC Controls

SM Series Sub-Micro AC Inverters

IP 20 Enclosure Protection

Single Phase Input / Three Phase Output (Use with three phase 230V motor)

Voltage	HP	Output Amps	Input Voltage	Catalog Number	List Price	App. Wgt. (lbs)	Dimensions H x W x D (in.)
110-120 Volts	1/3	1.7	110-120	174263.00	484	2	A5
	1/2	2.4	110-120	174264.00	525	2	A5
	1	4.2	110-120	174265.00	697	3	B5
	1 1/2	6.0	110-120	174266.00	791	3	B5

Specifications are subject to change without notice

Single Phase Input / Three Phase Output (Use with three phase 230V motor)

Voltage	HP	Output Amps	Input Voltage	Catalog Number	List Price	App. Wgt. (lbs)	Dimensions H x W x D (in.)
200-240 Volts	1/3	1.7	200-240	174267.00	447	2	A5
	1/2	2.4	200-240	174268.00	471	2	A5
	1	4.2	200-240	174270.00	525	3	A6
	1 1/2	6.0	200-240	174271.00	632	4	B5
	2	7.0	200-240	174272.00	744	5	B5
	3	9.6	200-240	174273.00	874	5	B6

Specifications are subject to change without notice

Three Phase Input / Three Phase Output

Voltage	HP	Output Amps	Input Voltage	Catalog Number	List Price	App. Wgt. (lbs)	Dimensions H x W x D (in.)
200-240 Volts	1/2	2.4	200-240	174274.00	447	2	A5
	1	4.2	200-240	174276.00	497	2	A6
	1.5	6.0	200-240	174277.00	591	3	A7
	2	7.0	200-240	174278.00	674	3	A7
	3	9.6	200-240	174279.00	747	3	B6
	5	15.2	200-240	174288.00	952	5	B2
	7.5	22.0	200-240	174280.00	1,316	8	C1
	10	28.0	200-240	174290.00	1,338	8	C1
	15	42.0	200-240	174292.00	2,406	14	D1
	1/2	1.1	400-480	174281.00	600	2	A1
400-480 Volts	1	2.1	400-480	174282.00	640	3	A2
	1.5	3.0	400-480	174283.00	695	3	A3
	2	3.4	400-480	174284.00	743	4	A3
	3	4.8	400-480	174286.00	813	4	B1
	5	7.8	400-480	174287.00	974	5	B2
	7.5	11.0	400-480	174285.00	1,264	5	B2
	10	14.0	400-480	174291.00	1,506	8	C1
	15	21.0	400-480	174293.00	1,780	8	C1

□ User programmable for 50Hz and other voltage inputs
Specifications are subject to change without notice

Dimension Table see page 377



AC / DC Controls

AC Control Kits

Dynamic Braking Components For The Micro Series Drives Micro Series Drives can be modified to include dynamic braking. The modifications involve replacing board(s) inside of the drive as well as adding a Dynamic Braking Resistor in a separate enclosure. Larger drives require a combination of Dynamic Braking Board and an additional Form C Relay Board. Instructions are included with the boards. Also available as a modification, see Mod Squad section, see page 408.

Dynamic Braking Boards*

Drive HP	Drive Voltage Rating	Catalog Number	List Price	App. Wgt. (lbs)
1/2-3	All	174184.00	441	2
5	200-230V	174185.00	480	2
5	460-480V	174185.00	480	2
5	550-575V	174184.00	441	2

* Dynamic braking resistors are required with the dynamic braking boards.

Specifications are subject to change without notice

Dynamic Braking Resistors**

Drive HP	Drive Voltage Rating	Catalog Number	List Price	App. Wgt. (lbs)
1/2	200-230V	174178.00	194	1
1	200-230V	174179.00	194	1
	460-480V	174179.00	194	1
	550-575V	174178.00	194	1
1 1/2	200-230V	174179.00	194	1
2	200-230V	174180.00	194	1
	460-480V	174180.00	194	1
	550-575V	174179.00	194	1
3	200-230V	174182.00	274	1
	460-480V	174182.00	274	1
	550-575V	174181.00	274	1
5	200-230V	174183.00	274	1
	460-480V	174183.00	274	1
	550-575V	174182.00	274	1
7 1/2	200-230V	174143.00	318	1
	460-480V	174143.00	318	1
	550-575V	174148.00	318	1
10	200-230V	174143.00	318	1
	460-480V	174143.00	318	1
	550-575V	174148.00	318	1
15-20	200-230V	174144.00	484	1
	460-480V	174144.00	484	1
	550-575V	174149.00	496	1
25-30	200-230V	174145.00	816	1
	460-480V	174145.00	816	1
	550-575V	174140.00	837	1
40	460-480V	174146.00	1,065	1
	550-575V	174141.00	1,065	1
50-60	460-480V	174147.00	1,231	1
	550-575V	174142.00	1,231	1

** Dynamic braking Resistors are provided with mounting brackets.

Specifications are subject to change without notice

Dynamic Braking Boards With Form C Relay Board*

Drive HP	Drive Voltage Rating	Catalog Number	List Price	App. Wgt. (lbs)
7 1/2	200-230V	174192.00	424	2
7 1/2	460-480V	174193.00	424	2
7 1/2	550-575V	174193.00	424	2
10-60	All	174192.00	424	2

* Dynamic braking resistors are required with the dynamic braking boards.

Specifications are subject to change without notice

AC Control Kits



Cable and Keypad are purchased separately. Installing the remote keypad and cable involves partially dis-assembling the drive. Instructions are included with the keypad. Also available as a modification, see Mod Squad section.

Remote Keypads & Cables (For Micro Series, NEMA 1, Drives*)

Item	Catalog Number	List Price	App. Wgt. (lbs)
Keypad	174177.00	255	2
2.5 ft. Cable	174174.00	75	2
5 ft. Cable	174175.00	108	2
10 ft. Cable	174176.00	175	2

* Compatible with any Micro Series, NEMA 1, drive.

NOTE: Using the remote keypad on a WASHGUARD Duty Inverter is not recommended, for the control will no longer meet NEMA 4/12 sealing requirements.

Specifications are subject to change without notice



Micro Series Dimension Information Techlink Programming and Monitoring Software

TechLink Software is a powerful Drive Configuration tool that works in a Microsoft Windows environment. TechLink supports the following drives sold by LEESON: Micro Series, SM Plus Series and SM Vector Series.

TechLink allows a drive program to be created off line and to access the drive directly while connected over RS232 or RS485 (depending on the drive). RS485 supports several drives on one drive network but will require an RS232 to RS485 converter for most personal computers.

First time users visit LEESON's website, under "Links and Downloads" to download TechLink Software.

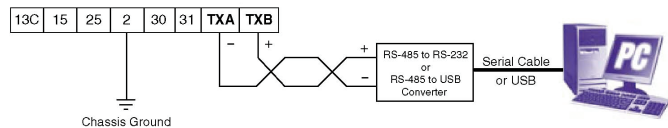
LEESON frequently updates Techlink software and the Models files to keep current with our expanding product offering and upgrades to our existing lines. If you have Techlink software installed on your computer and would like to check to see if you have the most current version of the TechLink program or the Models data, check the versions on the opening TechLink screen to the versions below. You will only need to download the program that has been updated. Each program below is a self extracting zip file; after expanding, run setup.exe to install.

The diagrams below illustrate how to connect the LEESON Micro Series, SM Plus and SM Vector Series drives to a computer in order to use the TechLink software.

Note 1: When using serial communications, terminal 2 on the drive MUST be connected to chassis ground.

SM Plus & SM Vector Series

The SM Plus and SM Vector Series drives are RS-485, so a RS-232 to RS-485 or USB to RS-485 converter is required. The converter connects to the computer using a standard serial connection. A twisted pair connects the converter to the drive.

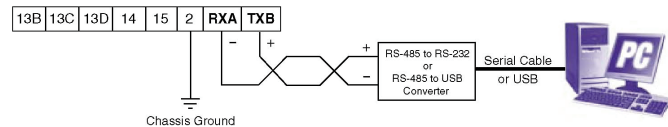


SM Plus & SM Vector Series Control Strip

Note 2: Refer to the converter manufacturer's instructions for proper converter configuration. The converter is not supplied by LEESON.

Micro Series

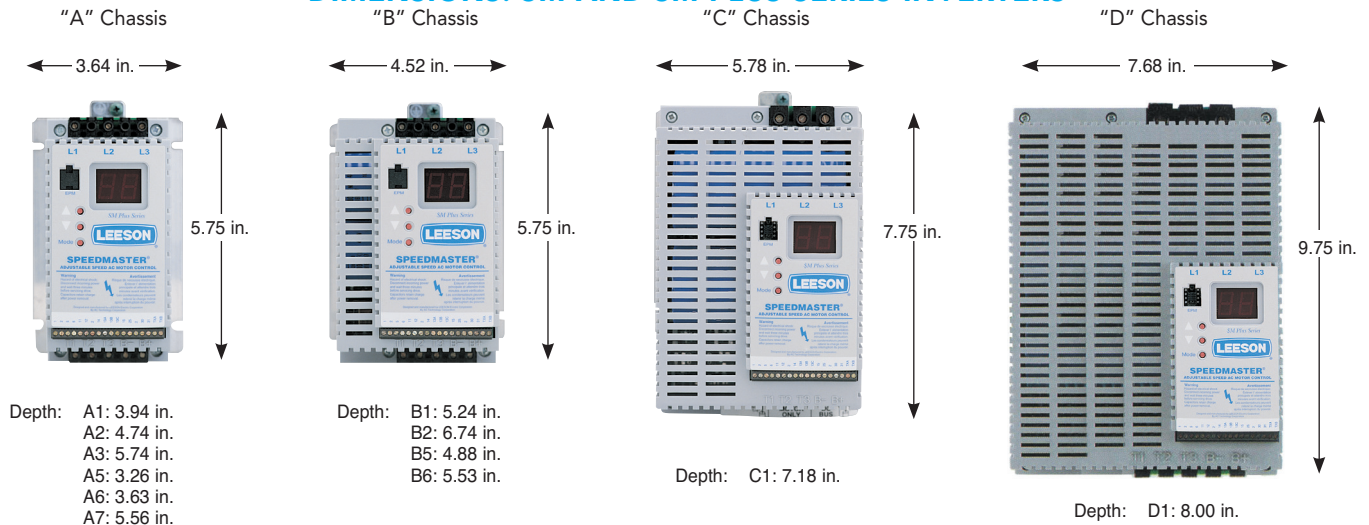
The Micro Series is RS-485, so a RS-232 to RS-485 or USB to RS-485 converter is required. The converter connects to the computer using a standard serial or USB connection. A twisted pair connects the converter to the drive.



Micro Series Control Strip

Note: 3 Refer to the converter manufacturer's instructions for proper converter configuration. The converter is not supplied by LEESON.

DIMENSIONS: SM AND SM PLUS SERIES INVERTERS



Dimensions shown for reference only. Contact LEESON for detailed drawing.

PDF file of Manual available at www.leeson.com/Technical Information

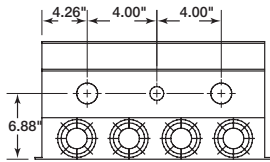
Specifications are subject to change without notice



AC / DC Controls

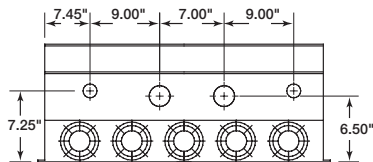
Dimension Information for Micro Series Drives

CONDUIT HOLES FOR 174578.00



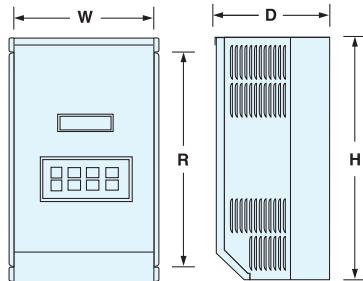
Conduit Holes: Large holes = 1.75"
Small hole = 1.13"

CONDUIT HOLES FOR 174586.00

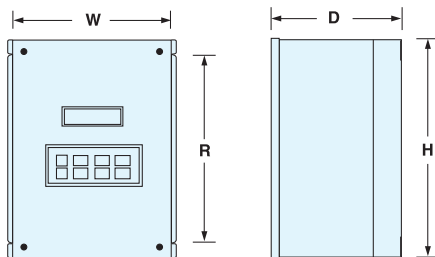


Conduit Holes: Large holes = 3.00"
Small holes = 1.13"

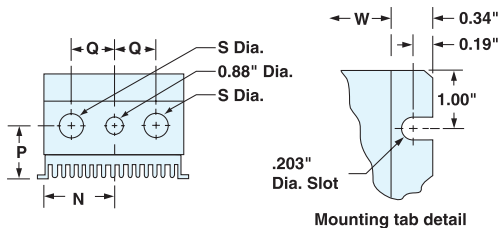
NEMA 1 ONLY



NEMA 4/12
WASHGUARD ONLY



NEMA 1 & NEMA 4/12

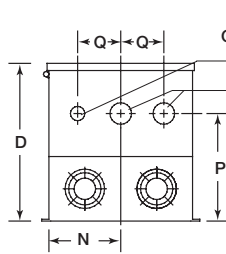
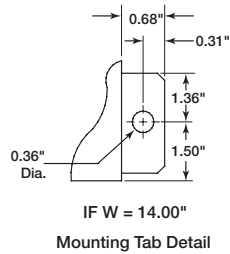
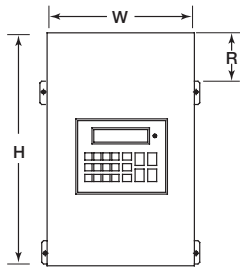


Micro Series Inverter - Dims. (Inches) -
NEMA 1, NEMA 4/12 & NEMA 4X

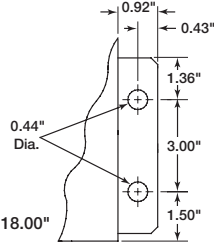
Dimension Key	H	W	D	N	P	Q	R	S
A	7.5	4.7	3.33	2.35	1.6	1.37	5.5	0.88
B	7.5	4.7	3.63	2.35	1.9	1.37	5.5	0.88
C	7.5	4.7	4.33	2.35	2.6	1.37	5.5	0.88
D	7.5	6.12	4.22	3.77	2.4	1.37	5.5	0.88
E	7.5	6.12	5.12	3.77	3.3	1.37	5.5	0.88
F	7.88	7.86	5.94	5.13	3.95	1.5	5.88	1.13
G	7.88	6.12	4.35	3.06	2.7	1.37	5.88	0.88
H	7.88	7.86	4.9	4.8	3.25	1.37	5.88	0.88
I	9.38	7.86	6.25	5.13	3.95	1.5	7.38	1.13
J	7.88	7.86	5.9	4.8	4.25	1.37	5.88	0.88
K	9.75	10.26	7.2	5.13	5.25	2	7.75	1.13
L	11.25	7.86	6.84	3.93	4.19	2	7.75	1.38
M	9.38	7.86	6.84	3.93	4.19	2	5.88	1.13
N	12.75	7.86	6.84	3.93	4.19	2	9.25	1.38
O	12.75	7.86	7.4	3.93	4.19	2	9.25	1.38
P	12.75	10.26	7.74	5.13	5	2.5	9.25	1.38
Q	11.75	10.26	8.35	5.13	5.75	2	9.75	1.13
R	9.38	7.86	7.4	3.93	4.19	2	5.88	1.13
S	12.75	10.26	8.25	5.13	5	2.5	9.25	1.38
T	15.75	10.26	8.35	5.13	5.75	2.5	12.25	1.38
U	13.75	10.26	8.35	5.13	5.75	2	11.75	1.38
V	15.75	10.26	8.35	5.13	5.75	2	13.75	1.38
W	19.75	10.26	8.55	5.13	5.75	2.5	16.25	1.75
X	7.88	7.86	3.75	4.8	2.1	1.37	5.88	0.88
Y	7.88	6.12	5.25	3.06	3.6	1.37	5.88	0.88
Z	20.25	10.26	8.35	5.13	5.75	2	16.25	1.38
AA	15.75	10.26	8.35	5.13	5.75	2	11.75	1.38
AB	21	13.72	8.35	5.13	6.1	2	16.25	1.38
AC	7.5	6.12	3.63	3.77	1.8	1.37	5.5	0.88
AD	7.88	6.12	3.63	3.06	2	1.37	5.88	0.88
AE	25	13	10.5	5.56	6.5	2.62	-	1.38
AF	47	16.64	11.85	SEE CHART				
AG	29	16.64	11.85	7.14	6.88	3.12	-	1.75
AH	29	24.42	11.85	11.12	6.5	4.5	-	2.5
AI	29	36.66	11.85	11.5	9	4.5	-	2.5
AJ	37	18	13.3	7.5	8	3.13	7.14	1.75
AK	39	26	13.3	11.5	9	4.5	9.14	2.5
AL	29	36.66	11.85	SEE CHART				
AM	31	14	11.86	6	7.5	2.62	5.64	1.38
AN	49	18	13.3	7.5	8	3.13	7.14	1.75
AO	39	26	13.3	11.5	9	4.5	9.14	2.5



Type 12 Dimensions for models rated above 30HP at 240/200 VAC and 60 HP at 400/480 VAC

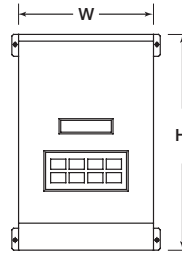


Conduit Holes:
1.13" Dia.
S Dia.

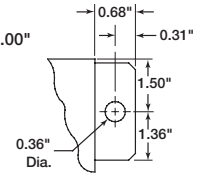


IF W ≥ 18.00"

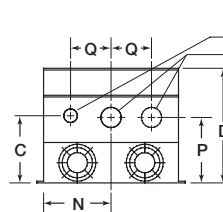
Type 1 Dimensions for models rated above 30HP at 240/200 VAC and 60 HP at 590/480/400 VAC



IF W = 13.00"

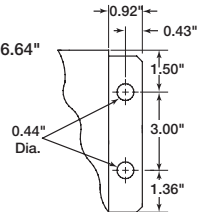


Mounting Tab Detail



Conduit Holes:
1.13" Dia.
S Dia.

IF W ≥ 16.64"



Electronic Programming Unit

Electronic Programming Unit allows off-line set-up and replication of the drive's plug-in electronic programming module (shown at right). Excellent for multi-drive applications. Keypad input and alphanumeric display simplify programming. RS-232 serial port allows downloading of configuration files from personal computer.



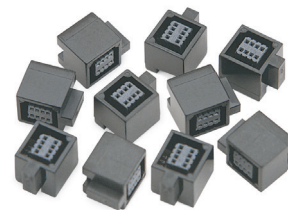
Catalog Number	List Price	App. Wgt. (lbs)
174189.00	883	2

EPM Bulk Pack

Plug-in electronic programming modules (EPM). Allow off-line set-up and replication of program using Electronic Programming Unit. Set of 10.

Catalog Number	List Price	App. Wgt. (lbs)
174190.00	195	1

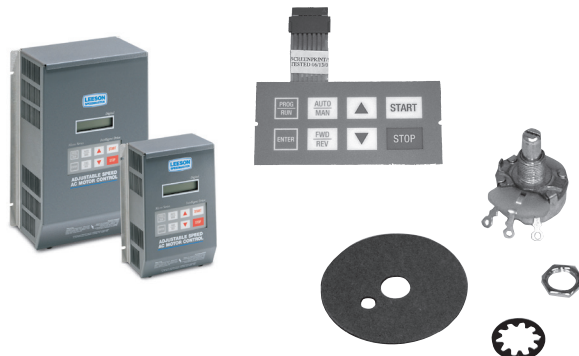
Specifications are subject to change without notice



Inverter Accessory Parts

Discriptor	Catalog Number	List Price
Micro Series Keypad	006707.01	59
Speed Pot (10k/5w pot, washers & nut)	006708.01	62

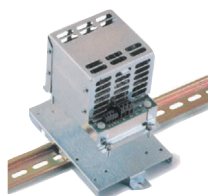
Specifications are subject to change without notice



AC / DC Controls

AC Control Kits

Accessories For The SM, SM-Plus & SM Vector Series Drives



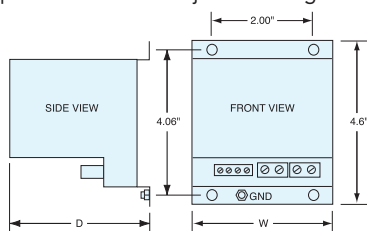
Dynamic Braking Modules With Built-in Dynamic Braking Resistors[□]

Dynamic Braking Components for the SM, SM-Plus & SM Vector Series Drives Dynamic braking is available for the SM, SM-Plus and SM Vector series drives as a separate Dynamic Braking Module. Lower HP modules have the control electronics and the dynamic braking resistor in one convenient package. Larger units require a separate resistor. The modules can be panel or DIN rail mounted.

Drive HP	Motor Voltage Rating	Catalog Number	List Price	App. Wgt. (lbs)
1/4-1/2	208-230V	174400.00	328	2
	400-480V	174406.00	328	2
1 - 1 1/2	208-230V	174401.00	381	3
	400-480V	174407.00	381	3
1 - 1 1/2	480-590V	174412.00	381	3
	208-230V	174402.00	517	4
2 - 3	400-480V	174408.00	517	4
	480-590V	174413.00	517	4
5	208-230V	174403.00	675	5
	400-480V	174409.00	675	5
	480-590V	174414.00	675	5
	208-230V	174404.00	853	6
7 1/2	400-480V	174410.00	853	6
	480-590V	174415.00	853	6
10	208-230V	174405.00	1,030	8
	400-480V	174411.00	1,030	8
	480-590V	174416.00	1,030	8

□ Braking Resistors are included with the module and not purchased separately.

Specifications are subject to change without notice

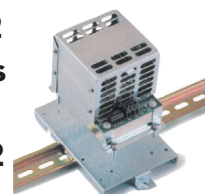


Dynamic Braking Modules Without Resistors^{*}

Drive HP	Motor Voltage Rating	Catalog Number	List Price	App. Wgt. (lbs)
15-20	208-230V	174417.00	441	10
15-30	400-480V	174418.00	441	10
15-25	480-590V	174419.00	441	10

^{*} Dynamic Braking Resistors are purchased and mounted separately. Specifications are subject to change without notice

Accessories For The SM2 Flux Vector Series Drives Dynamic Braking Components for the SM2 Vector Series Drives



Dynamic Braking Modules With Built-in Dynamic Braking Resistors[□]

Dynamic Braking Components for the SM2 Vector Series Drives Dynamic braking is available for the SM2 Vector Series drives as a separate Dynamic Braking Module. 10 HP and lower modules have control electronics and the dynamic braking resistor in one convenient package. Larger units require a separate resistor. The modules can be panel or DIN rail mounted.

Drive HP	Motor Voltage Rating	Catalog Number	List Price	App. Wgt. (lbs)
1/3-1/2	208 - 230V	174157.00	319	2
	400 - 480V	174158.00	319	2
1 - 1 1/2	208 - 230V	174151.00	373	3
	400 - 480V	174152.00	373	3
	480 - 590V	174153.00	373	3
2 - 3	208 - 230V	174154.00	508	4
	400 - 480V	174155.00	508	4
	480 - 590V	174156.00	508	4
5	208 - 230v	174159.00	662	5
	400 - 480V	174160.00	662	5
	480 - 590V	174161.00	662	5
7 1/2	208 - 230V	174162.00	836	6
	400 - 480V	174163.00	836	6
	480 - 590V	174164.00	836	6
10	208 - 230V	174165.00	1010	8
	400 - 480V	174166.00	1010	8
	480 - 590V	174167.00	1010	8

□ Braking Resistors are included with the module and not purchased separately.

Specifications are subject to change without notice

Dynamic Braking Resistors^{**}

Drive HP	Motor Voltage Rating	Catalog Number	List Price	App. Wgt. (lbs)
15-20	208-230V	174144.00	484	1
15-20	400-480V	174144.00	484	1
15-20	480-590V	174149.00	496	1
15-30	400-480V	174145.00	816	1
25	480-590V	174140.00	837	1

^{**} Dynamic Braking Resistors are provided with mounting brackets. Specifications are subject to change without notice

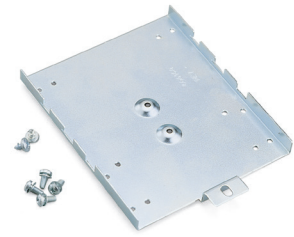


DIN Rail - Mounting Kits

Steel plates and fasteners for mounting drives on standard 35mm DIN rails for panel building. Set of six.
 174186 for "A" chassis drives.
 174187 for "B" chassis drives.
 174188 for "C" chassis drives.
 Refer to SM Plus and SM Series Dimension Tables for A, B & C listing information.

Catalog Number	List Price	App. Wgt. (lbs)
174186.00	181	3
174187.00	203	3
174188.00	242	3

Specifications are subject to change without notice



SM4 Remote Keypad

Potentiometer Kit takes the place of the up/down buttons on the drive's keypad gives operators hands-on speed control over the Inverter's speed range

Use with Width (W) dim. of:	Catalog Number	List Price	App. Wgt. (lbs)
6.28 or 7.12	174693.00	152	2
8.04 or 8.96	174697.00	157	2

Specifications are subject to change without notice



EPM Bulk Pack

Plug-in electronic programming modules (EPM). Allow off-line set-up and replication of program using Electronic Programming Unit. Set of 10.

Catalog Number	List Price	App. Wgt. (lbs)
174190.00	195	1

Specifications are subject to change without notice

Remote Keypad

Remote keypad kit includes eight-foot connecting cable and gasket. Mounted in proper enclosure, the keypad kit will provide up to NEMA 4 protection.

Drive Type	Catalog Number	List Price	App. Wgt. (lbs)
SM Plus	174191.00	262	2
SM Series	174194.00	213	2
SM2 Vector	174150.00	257	2

Specifications are subject to change without notice

