

QUICK REFERENCE

AC & DC Adjustable Speed Drives



Micro Series NEMA Enclosed AC Inverters

Speedmaster® adjustable speed drives with plain-English programming and read-out. Models range from 1/4 through 60 HP. NEMA 1 enclosure.

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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 60 HP.

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SM Plus Sub-Micro AC Inverters

Speedmaster® adjustable speed drives with “big drive” features and ultra-compact size. Models range from 1/4 through 25 HP. IP20 enclosure — chassis mount.

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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 15 HP. IP 20 enclosure — chassis mount.

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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.

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MICRO SERIES INVERTER DRIVES

Full feature, ultra-friendly operation. Programs and reads-out in plain English.

- Intelligent Power Module-IGBT's with a 16 bit Intel microprocessor.
- User choice programming with:
 - ✓ Choice of "Quick Start" factory presets.
 - ✓ Built-In English programmable options via the key touch-pad.
- Output Frequency: 0-120 Hz.
- Overload Current Capacity: 150% for one minute, based on nominal output of the control.
- Speed reference signal. Choice of potentiometer, 0-10VDC or 4-20mA inputs.
- Analog output signal, 0-10VDC, speed or load.
- Two auxiliary contacts: One form C relay and two open collector output.
- Preset speeds: Four.
- Slip compensation.
- Adjustable carrier frequency.
- Adjustable acceleration and deceleration times.
- Forward/Reverse.
- DC braking—time and voltage adjustable.
- Password protected.
- Constant torque—with adjustable current limit.
- 150% overload capacity for one minute based on nominal output rating of the control.
- Rugged, heavy-gauge steel enclosures with barrier type terminal strips.
- Underwriters Laboratories Listed.
- Dynamic Braking is available as a kit for installation in the field (see page 83), or as a Modification (see page 103).
- Remote keypad is available as a kit for installation in the field (see page 83), or as a Modification (see page 103).



NEMA 1

Speedmaster® Micro Series compact inverters offer "big drive" features for adapting standard or premium efficiency three phase motors to adjustable speed operation. Utilizing the latest micro-processor and advanced IGBT power conversion devices, these high performance controls program and read-out in plain English, eliminating the frustration and time involved in looking-up confusing coded symbols. Complete, rugged steel enclosures for NEMA 1 (IP31) or NEMA 4/12 (IP65) service do not require additional enclosure protection as with many plastic-housed compact drives. Built-in thermal overload protection reduces additional costs. Heavy duty wiring terminals accessible via three conduit openings on the bottom of the housing for power in/out and input/output signals speeds installation and reduces installation costs.

NEMA 1 (IP31) • THREE PHASE INPUT/OUTPUT

	HP	Output Amps	Input Voltage ✕	Catalog Number	List Price	App. Wgt. (lbs.)	Disc. Sym.	Dimension Key
200-240 Volts	1/2	2.2	200-240	174914	\$763	6	A	B
	1	4.0	200-240	174915	802	6	A	C
	1 1/2	5.2	200-240	174916	840	6	A	C
	2	6.8	200-240	174917	898	9	A	E
	3	9.6	200-240	174918	966	9	A	E
	5	15.2	200-240	174919	1141	11	A	F
	7 1/2	25.0	200-240	174545	1649	13	A	M
	10	28.0	200-240	174551	2186	15	A	L
	15	42.0	200-240	174557	2884	19	A	N
	20	54.0	200-240	174560	3914	21	A	P
400-480 Volts	1	2.0	400-480	174920	963	6	A	B
	2	3.4	400-480	174921	1056	7	A	D
	3	4.8	400-480	174922	1141	9	A	E
	5	7.6	400-480	174923	1283	9	A	E
	7 1/2	11.0	400-480	174924	1744	11	A	I
	10	14.0	400-480	174552	2369	13	A	M
	15	21.0	400-480	174558	3043	15	A	L
	20	27.0	400-480	174561	4038	17	A	N
	25	34.0	400-480	174563	4761	21	A	P
	30	40.0	400-480	174565	5184	21	A	P
480-590 Volts	1	1.6	480-590	174925	1067	6	A	B
	2	2.7	480-590	174926	1179	7	A	D
	3	3.9	480-590	174927	1304	9	A	E
	5	6.1	480-590	174928	1420	9	A	F
	7 1/2	9.0	480-590	174929	1737	11	A	I
	10	11.0	480-590	174553	2647	13	A	R
	15	17.0	480-590	174559	3495	17	A	N
	20	22.0	480-590	174562	4439	19	A	O
	25	27.0	480-590	174564	5243	21	A	P
	30	32.0	480-590	174566	5734	22	A	S
40	41.0	480-590	174599	6511	38	A	T	
50	52.0	480-590	174594	7900	45	A	W	
60	62.0	480-590	174573	8837	51	A	W	

✕ User programmable for 50Hz and other voltage inputs

NEMA 1 (IP31) • SINGLE PHASE INPUT 230V THREE PHASE OUTPUT

(Use with three phase 230V motor)

HP	Output Amps 230 VAC	Input Voltage	Catalog Number	List Price	App. Wgt. (lbs.)	Disc. Sym.	Dimension Key
1/4	1.4	115/230	174930	\$721	5	A	A
1/2	2.2	115/230	174997	870	7	A	AC
1	4.0	115/230	174931	877	7	A	D
1 1/2	5.2	115/230	174932	971	7	A	D
2	6.8	200-230	174933	927	9	A	E
3	9.6	200-230	174934	1021	9	A	E

FOR INFORMATION ON REMOTE KEYPAD OPTION, SEE PAGE 83.



Dimension Table see page 82

Catalog numbers in blue are NEW items.

LEESON® AC ADJUSTABLE SPEED DRIVES

MICRO SERIES INVERTERS

WASHGUARD® NEMA 4/12 (IP65/IP54) EPOXY COATED

FOOD-SAFE epoxy finish. No external cooling fan required on NEMA 4 (IP65) drives. NEMA 12 drives have external cooling fan. Fully gasketed, water, oil and dust-tight enclosure. These Speedmaster® Micro Series drives have the same features as units shown on the previous page.



WASHGUARD® NEMA 4/12

WASHGUARD® NEMA 4X (IP65) STAINLESS STEEL

300-SERIES STAINLESS STEEL enclosures are fully gasketed to withstand frequent washdown in corrosive or caustic environments. These Speedmaster® Micro Series drives have the same features as units shown on the previous page.



WASHGUARD® NEMA 4X

WASHGUARD® NEMA 4/12 (IP65/IP54) THREE PHASE INPUT/OUTPUT

	HP	Output Amps	Input Voltage:☆	Catalog Number	List Price	App. Wgt. (lbs.)	Disc. Sym.	Dimension Key
200-240 Volts	1/2	2.2	200-240	174935	\$1082	8	A	G
	1	4	200-240	174936	1174	8	A	G
	1 1/2	5.2	200-240	174482	1190	8	A	Y
	2	6.8	200-240	174937	1259	10	A	H
	3	9.6	200-240	174938	1361	11	A	J
	5	15.2	200-240	174730	1679	11	A	K
	7 1/2	22	200-240	174734	2329	27	A	Q
	10	28	200-240	174737	2938	32	A	U
	15	43	200-240	174740	3543	40	A	V
	20	54	200-240	174743*	4548	42	A	AA
	25	68	200-240	174595	6232	53	A	Z
	30	80	200-240	174596	6604	53	A	Z
400-480 Volts	1	2	400-480	174939	1324	8	A	G
	2	3.4	400-480	174940	1461	10	A	H
	3	4.8	400-480	174941	1565	10	A	H
	5	7.6	400-480	174942	1730	11	A	J
	7 1/2	11	400-480	174548	2193	11	A	K
	10	14	400-480	174554	2925	11	A	Q
	15	21	400-480	174749	3643	32	A	U
	20	27	400-480	174752	4672	36	A	V
	25	34	400-480	174755*	5394	42	A	AA
	30	40	400-480	174757*	5895	53	A	AA
	40	52	400-480	174513*	6819	54	A	Z
	50	65	400-480	174511*	7914	75	A	AB
60	77	400-480	174574*	8910	98	A	AB	
480-590 Volts	1	1.6	480-590	174943	1440	8	A	G
	2	2.7	480-590	174944	1607	10	A	H
	3	3.9	480-590	174945	1751	10	A	H
	5	6.1	480-590	174946	1886	11	A	J
	7 1/2	9	480-590	174549	2593	13	A	K
	10	11	480-590	174556	3401	17	A	Q
	15	17	480-590	174763	4109	38	A	U
	20	22	480-590	174766	5001	40	A	V
	25	27	480-590	174769*	5964	42	A	AA
	30	32	480-590	174597*	6546	53	A	AA
	40	41	480-590	174512*	7578	54	A	Z
	50	52	480-590	174510*	8847	75	A	AB
60	62	480-590	174575*	9896	98	A	AB	

☆ User programmable for 50Hz and other voltage inputs
* Enclosures are NEMA 12 only – others are NEMA 4/12

WASHGUARD® NEMA 4 (IP65) • SINGLE PHASE INPUT 230V THREE PHASE OUTPUT

HP	Output Amps	Input Voltage:☆	Catalog Number	List Price	App. Wgt. (lbs.)	Disc. Sym.	Dimension Key
1/4	1.4	115/230	174996	\$1006	8	A	AD
1/2	2.2	115/230	174998	1099	8	A	X
1	4	115/230	174999	1202	11	A	H
1 1/2	5.2	115/230	174515	1413	11	A	H
2	6.8	208-230	174475	1279	11	A	H
3	9.6	208-230	174729	1355	12	A	J

WASHGUARD® NEMA 4X (IP65) THREE PHASE INPUT/OUTPUT

	HP	Output Amps	Input Voltage:☆	Catalog Number	List Price	App. Wgt. (lbs.)	Disc. Sym.	Dimension Key	
200-240 Volts	1/2	2.2	200-240	174527	\$1270	8	A	G	
	1	4	200-240	174528	1363	8	A	G	
	1 1/2	5.2	200-240	174529	1427	8	A	Y	
	2	6.8	200-240	174530	1512	10	A	H	
	3	9.6	200-240	174531	1589	11	A	J	
	5	15.2	200-240	174732	2212	11	A	K	
	7 1/2	22	200-240	174735	2723	27	A	Q	
	10	28	200-240	174738	3396	32	A	U	
	15	43	200-240	174741	4150	40	A	V	
	400-480 Volts	1	2	400-480	174532	1498	8	A	G
		2	3.4	400-480	174533	1696	10	A	H
		3	4.8	400-480	174534	1821	10	A	H
5		7.6	400-480	174535	2078	11	A	J	
7 1/2		11	400-480	174745	2818	11	A	K	
10		14	400-480	174747	3491	11	A	Q	
480-590 Volts	15	21	400-480	174750	4177	32	A	U	
	20	27	400-480	174753	5156	36	A	V	
	1	1.6	480-590	174536	1628	8	A	G	
	2	2.7	480-590	174537	1817	10	A	H	
	3	3.9	480-590	174538	1965	10	A	H	
	5	6.1	480-590	174539	2224	11	A	J	
	7 1/2	9	480-590	174759	3006	13	A	K	
	10	11	480-590	174761	3859	17	A	Q	
15	17	480-590	174764	4635	38	A	U		
20	22	480-590	174767	5603	40	A	V		

☆ User programmable for 50Hz and other voltage inputs

WASHGUARD® NEMA 4X (IP65) • SINGLE PHASE INPUT 230V THREE PHASE OUTPUT

HP	Output Amps	Input Voltage:☆	Catalog Number	List Price	App. Wgt. (lbs.)	Disc. Sym.	Dimension Key
1/4	1.4	115/230	174519	\$1243	8	A	AD
1/2	2.2	115/230	174520	1382	8	A	X
1	4	115/230	174521	1481	11	A	H
1 1/2	5.2	115/230	174517	1821	11	A	H
2	6.8	208-230	174525	1557	11	A	H
3	9.6	208-230	174526	1633	12	A	J



Standard at no extra cost on all LEESON stock NEMA three phase motors, 1 HP and larger, is the exclusive Inverter Rated Insulation System (IRIS™), providing superior protection against voltage spikes induced by variable frequency drives.

Catalog numbers in blue are NEW items.
Dimension table – see page 83.

ACCESSORIES FOR THE MICRO SERIES DRIVES

MICRO SERIES INVERTERS



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 103.

DYNAMIC BRAKING BOARDS*

Drive HP	Drive Voltage Rating	Catalog Number	List Price	Disc. Sym	App. Wgt.(lbs.)
1/2-3	All	174184	\$299	A	2
5	200-230V	174185	326	A	2
5	460-480V	174185	326	A	2
5	550-575V	174184	299	A	2

* Dynamic braking Resistors are required with the Dynamic Braking Boards.

DYNAMIC BRAKING BOARDS WITH FORM C RELAY BOARD*

Drive HP	Drive Voltage Rating	Catalog Number	List Price	Disc. Sym	App. Wgt.(lbs.)
7 1/2	200-230V	174192	\$289	A	2
7 1/2	460-480V	174193	289	A	2
7 1/2	550-575V	174193	289	A	2
10 - 60	All	174192	289	A	2

* Dynamic braking Resistors are required with the Dynamic Braking Boards.

DYNAMIC BRAKING RESISTORS**

Drive HP	Drive Voltage Rating	Catalog Number	List Price	Disc. Sym	App. Wgt.(lbs.)
1/2	200-230V	174178	\$131	A	1
1	200-230V	174179	131	A	1
	460-480V	174179	131	A	1
	550-575V	174178	131	A	1
1 1/2	200-230V	174179	131	A	1
	200-230V	174180	131	A	1
	460-480V	174180	131	A	1
2	460-480V	174179	131	A	1
	550-575V	174179	131	A	1
	550-575V	174179	131	A	1
3	200-230V	174182	187	A	1
	460-480V	174182	187	A	1
	550-575V	174181	187	A	1
5	200-230V	174183	187	A	1
	460-480V	174183	187	A	1
	550-575V	174182	187	A	1
7 1/2	200-230V	174143	216	A	1
	460-480V	174143	216	A	1
	550-575V	174148	216	A	1
10	200-230V	174143	216	A	1
	460-480V	174143	216	A	1
	550-575V	174148	216	A	1
15-20	200-230V	174144	329	A	1
	460-480V	174144	329	A	1
	550-575V	174149	329	A	1
25-30	200-230V	174145	555	A	1
	460-480V	174145	555	A	1
	550-575V	174140	555	A	1
40	200-230V	174146	725	A	1
	460-480V	174146	725	A	1
	550-575V	174141	725	A	1
50-60	460-480V	174147	838	A	1
	550-575V	174142	838	A	1

** Dynamic braking Resistors are provided with mounting brackets.

REMOTE KEYPADS & CABLES FOR MICRO SERIES DRIVES*

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.



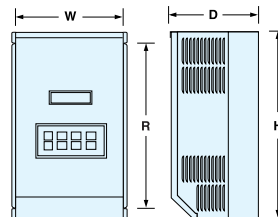
Item	Catalog Number	List Price	Disc. Sym	App. Wgt.(lbs.)
Keypad	174177	\$172	A	2
2.5 ft. Cable	174174	50	A	2
5 ft. Cable	174175	72	A	2
10 ft. Cable	174176	118	A	2

* Compatible with any Micro Series drive.

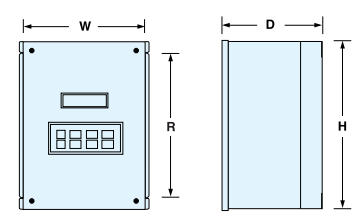
MICRO SERIES INVERTER DIMS. (Inches) • NEMA 1, NEMA 4/12 & NEMA 4X

Dimension Key	H	W	D	N	P	Q	R	S
A	7.50	4.70	3.33	2.35	1.60	1.37	5.50	0.88
B	7.50	4.70	3.63	2.35	1.90	1.37	5.50	0.88
C	7.50	4.70	4.33	2.35	2.60	1.37	5.50	0.88
D	7.50	6.12	4.22	3.77	2.40	1.37	5.50	0.88
E	7.50	6.12	5.12	3.77	3.30	1.37	5.50	0.88
F	7.88	7.86	5.94	5.13	3.95	1.50	5.88	1.13
G	7.88	6.12	4.35	3.06	2.70	1.37	5.88	0.88
H	7.88	7.86	4.90	4.80	3.25	1.37	5.88	0.88
I	9.38	7.86	6.25	5.13	3.95	1.50	7.38	1.13
J	7.88	7.86	5.90	4.80	4.25	1.37	5.88	0.88
K	9.75	10.26	7.20	5.13	5.25	2.00	7.75	1.13
L	11.25	7.86	6.84	3.93	4.19	2.00	7.75	1.38
M	9.38	7.86	6.84	3.93	4.19	2.00	5.88	1.13
N	12.75	7.86	6.84	3.93	4.19	2.00	9.25	1.38
O	12.75	7.86	7.40	3.93	4.19	2.00	9.25	1.38
P	12.75	10.26	7.74	5.13	5.00	2.50	9.25	1.38
Q	11.75	10.26	8.35	5.13	5.75	2.00	9.75	1.13
R	9.38	7.86	7.40	3.93	4.19	2.00	5.88	1.13
S	12.75	10.26	8.25	5.13	5.00	2.50	9.25	1.38
T	15.75	10.26	8.35	5.13	5.75	2.50	12.25	1.38
U	13.75	10.26	8.35	5.13	5.75	2.00	11.75	1.38
V	15.75	10.26	8.35	5.13	5.75	2.00	13.75	1.38
W	19.75	10.26	8.55	5.13	5.75	2.50	16.25	1.75
X	7.88	7.86	3.75	4.80	2.10	1.37	5.88	0.88
Y	7.88	6.12	5.25	3.06	3.60	1.37	5.88	0.88
Z	20.25	10.26	8.35	5.13	5.75	2.00	16.25	1.38
AA	15.75	10.26	8.35	5.13	5.75	2.00	11.75	1.38
AB	21.00	13.72	8.35	5.13	6.10	2.00	16.25	1.38
AC	7.50	6.12	3.63	3.77	1.80	1.37	5.50	0.88
AD	7.88	6.12	3.63	3.06	2.00	1.37	5.88	0.88

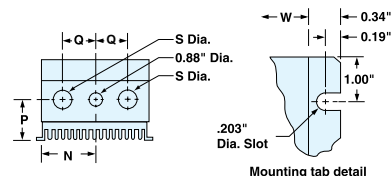
NEMA 1 ONLY



NEMA 4/12 WASHGUARD® ONLY



NEMA 1 & NEMA 4/12



AC Inverters

SM PLUS SUB-MICRO INVERTER DRIVES

BIG performance from an ultra-compact design. Provides 18 isolated I/O terminals plus RS485 Modbus® serial communication. Other features include:

- Removable electronic programming module allows off-line set-up and program replication.
- 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
- I²t motor thermal overload protection; meets UL requirements for motor protection in single motor applications
- 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 page 86



SM PLUS

SINGLE PHASE INPUT/THREE PHASE OUTPUT

	HP	Output Amps 230 VAC	Input Voltage	Catalog Number	List Price	App. Wgt.(lbs.)	Disc. Sym.	Dimension Key
115/230 Volts	1/4	1.4	115/230	174450 ^d	\$522	2	A	A1
	1/2	2.2	115/230	174451 ^d	559	3	A	A1
	1	2.0	115/230	174492	675	4	A	B1
	1 1/2	6.0	115/230	174445	762	5	A	B1

^d To be discontinued when present stock is depleted.

SINGLE OR THREE PHASE INPUT/THREE PHASE OUTPUT

	HP	Output Amps	Input Voltage	Catalog Number	List Price	App. Wgt.(lbs.)	Disc. Sym.	Dimension Key
200-230 Volts	1/4	1.4	200-230	174452	\$483	2	A	A1
	1/2	2.2	200-230	174453	504	2	A	A1
	1	4.2	200-230	174454	543	3	A	A2
	1 1/2	6.0	200-230	174493	645	4	A	B1
	2	6.8	200-230	174494	713	5	A	B2
	3	9.6	200-230	174495	867	5	A	B2
	5	15.2	200-230	174444	1188	8	A	C1

THREE PHASE INPUT/OUTPUT

	HP	Output Amps	Input Voltage	Catalog Number	List Price	App. Wgt.(lbs.)	Disc. Sym.	Dimension Key
200-230 Volts	1	4.2	200-230	174455	\$500	3	A	A2
	1 1/2	6.0	200-230	174456	589	3	A	A3
	2	6.8	200-230	174457	649	4	A	A3
	3	9.6	200-230	174458	773	4	A	A3
	5	15.2	200-230	174446	995	4	A	B2
	7 1/2	22.0	200-230	174438	1359	8	A	C1
	10	28.0	200-230	174439	1624	8	A	C1
	15	42.0	200-230	174429	2104	13	A	D1
	20	54.0	200-230	174430	2581	14	A	D1
	460-480 Volts	1/2	1.1	460-480	174459	563	2	A
1		2.1	460-480	174460	607	3	A	A2
1 1/2		3.0	460-480	174461	663	3	A	A3
2		3.4	460-480	174462	731	4	A	A3
3		4.8	460-480	174463	817	4	A	A3
5		7.6	460-480	174447	1042	5	A	B2
7 1/2		11.0	460-480	174440	1359	8	A	C1
10		14.0	460-480	174441	1624	8	A	C1
15		21.0	460-480	174431	2063	13	A	D1
20		27.0	460-480	174432	2526	14	A	D1
550-575 Volts	1	1.7	550-575	174464	649	3	A	A2
	2	3.0	550-575	174491	777	4	A	A3
	3	4.2	550-575	174497	923	5	A	B2
	5	6.6	550-575	174448	1129	5	A	B2
	7 1/2	9.9	550-575	174442	1466	8	A	C1
	10	12.2	550-575	174443	1737	8	A	C1
	15	19.0	550-575	174434	2275	8	A	D1
	20	24.0	550-575	174435	2783	14	A	D1
25	27.0	550-575	174436	3291	14	A	D1	



DIMENSIONS ON PAGE 82

☆ User programmable for 50Hz and other voltage inputs

SPECIFICATIONS:

Storage Temperature	-20° to 70° C
Ambient Operating Temperature	0° to 50° C
Ambient Humidity	<95% (non-condensing)
Maximum Altitude	3300 ft (1000m) above sea level
Input Line Voltages	115/230 VAC, 200-230 VAC, 460-480 VAC, and 550-575 VAC
Input Voltage Tolerance	+10%, -15%
Input Frequency Tolerance	48 to 62 Hz
Output Wave Form	Sine Coded PWM
Output Frequency	0-240 Hz
Carrier Frequency	4 kHz to 10 kHz

Enclosure	IP20
Service Factor	1.0
Efficiency	up to 98%
Power Factor (displacement)	>0.96
Overload Current Capacity	150% for 60 seconds 180% for 20 seconds
Speed Reference Follower	0-10 VDC, 4-20 mA
Control Voltage	15 VDC
Analogue Outputs	0-10 VDC or 2-10 VDC: Proportional to frequency or load
Digital Outputs	Open-collector: 40 mA at 30 VDC
Power Supply for Aux. Relays	40 mA at 12 VDC

AC ADJUSTABLE SPEED DRIVES



SM SERIES SUB-MICRO INVERTERS

SM SERIES SUB-MICRO INVERTER DRIVES

For applications requiring a simpler drive without the advanced features of the SM-Plus drive. Provides 11 isolated I/O terminals with one Form A relay output. Other features include:



SM SERIES

- Removable electronic programming module allows off-line set-up and program replication.
- 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
- Output signal calibration
- I²t motor thermal overload protection; meets UL requirements for motor protection in single motor applications
- 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

SINGLE PHASE INPUT/THREE PHASE OUTPUT

	HP	Output Amps 230 VAC	Input Voltage	Catalog Number	List Price	App. Wgt.(lbs.)	Disc. Sym.	Dimension Key
110-120 Volts	1/3	1.7	110-120	174263	\$329	2	A	A5
	1/2	2.4	110-120	174264	357	2	A	A5
	1	4.2	110-120	174265	474	3	A	B5
	1 1/2	6.0	110-120	174266	538	3	A	B5

SINGLE PHASE INPUT/THREE PHASE OUTPUT

	HP	Output Amps	Input Voltage	Catalog Number	List Price	App. Wgt.(lbs.)	Disc. Sym.	Dimension Key
208-240 Volts	1/3	1.7	208-240	174267	\$305	2	A	A5
	1/2	2.4	208-240	174268	321	2	A	A5
	1	4.2	208-240	174270	357	3	A	A6
	1 1/2	6.0	208-240	174271	430	4	A	B5
	2	7.0	208-240	174272	505	5	A	B5
	3	9.6	208-240	174273	594	5	A	B6

THREE PHASE INPUT/THREE PHASE OUTPUT

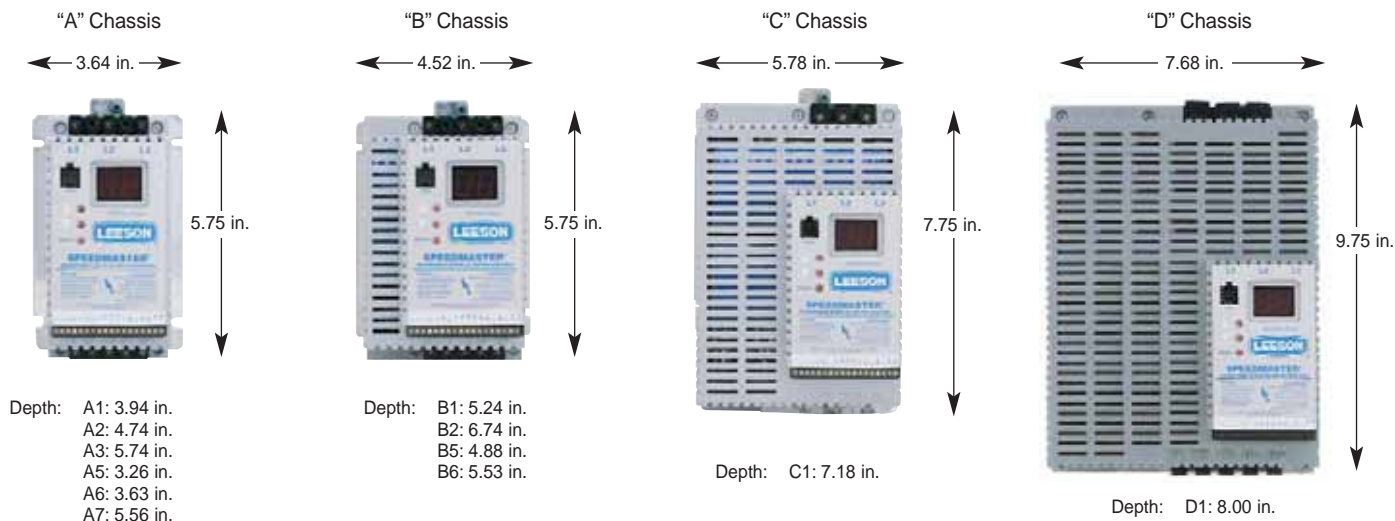
	HP	Output Amps	Input Voltage	Catalog Number	List Price	App. Wgt.(lbs.)	Disc. Sym.	Dimension Key
208-240 Volts	1/2	2.4	208-240	174274	\$305	2	A	A5
	1	4.2	208-240	174276	338	2	A	A6
	1 1/2	6.0	208-240	174277	402	3	A	A7
	2	7.0	208-240	174278	458	3	A	A7
	3	9.6	208-240	174279	508	3	A	B6
	5	15.2	208-240	174288	648	5	A	B2

THREE PHASE INPUT/THREE PHASE OUTPUT

	HP	Output Amps	Input Voltage	Catalog Number	List Price	App. Wgt.(lbs.)	Disc. Sym.	Dimension Key
400-480 Volts	1/2	1.1	400-480	174281	\$407	2	A	A1
	1	2.1	400-480	174282	435	3	A	A2
	1 1/2	3.0	400-480	174283	472	3	A	A3
	2	3.4	400-480	174284	504	4	A	A3
	3	4.8	400-480	174286	553	4	A	B1
	5	7.8	400-480	174287	662	5	A	B2



DIMENSIONS: SM AND SM PLUS INVERTERS



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

AC Inverters

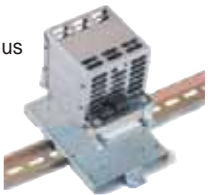
LEESON AC ADJUSTABLE SPEED DRIVES

SUB-MICRO INVERTER ACCESSORIES

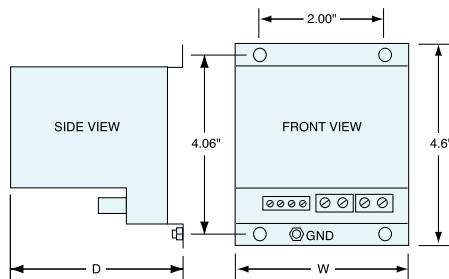
ACCESSORIES FOR THE SM & SM-PLUS SERIES DRIVES

Dynamic Braking Components for the SM & SM-Plus Series Drives

Dynamic braking is available for the SM & SM-Plus 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.



Dimensions (inches)		
HP	W	D
0.25-1.5	3.1	3.1
2-3	3.1	4.3
5	3.1	5.6
7.5-10	4.2	6.7



DYNAMIC BRAKING MODULES WITHOUT RESISTORS*

Drive HP	Motor Voltage Rating	Catalog Number	List Price	Disc. Sym.	App. Wgt. (lbs.)
15-20	208-230V	174417	\$299	A	10
15-25	400-480V	174418	299	A	10
15-25	480-590V	174419	299	A	10

* Dynamic Braking Resistors are purchased and mounted separately.

DYNAMIC BRAKING RESISTORS**

Drive HP	Motor Voltage Rating	Catalog Number	List Price	Disc. Sym.	App. Wgt. (lbs.)
15-20	208-230V	174144	\$329	A	1
15-20	400-480V	174144	329	A	1
15-20	480-590V	174149	329	A	1
25	400-480V	174145	555	A	1
25	480-590V	174140	555	A	1

** Dynamic Braking Resistors are provided with mounting brackets.

DYNAMIC BRAKING MODULES WITH BUILT-IN DYNAMIC BRAKING RESISTORS*

Drive HP	Motor Voltage Rating	Catalog Number	List Price	Disc. Sym.	App. Wgt. (lbs.)
1/4-1/2	208-230V	174400	\$222	A	2
1/4-1/2	400-480V	174406	222	A	2
1 - 1 1/2	208-230V	174401	259	A	3
1 - 1 1/2	400-480V	174407	259	A	3
1 - 1 1/2	480-590V	174412	259	A	3
2 - 3	208-230V	174402	352	A	4
2 - 3	400-480V	174408	352	A	4
2 - 3	480-590V	174413	352	A	4
5	208-230V	174403	459	A	5
5	400-480V	174409	459	A	5
5	480-590V	174414	459	A	5
7 1/2	208-230V	174404	580	A	6
7 1/2	400-480V	174410	580	A	6
7 1/2	480-590V	174415	580	A	6
10	208-230V	174405	700	A	8
10	400-480V	174411	700	A	8
10	480-590V	174416	700	A	8

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

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	Disc. Sym.	App. Wgt. (lbs.)
174189	\$648	A	2

EPM BULK PACK

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



Catalog Number	List Price (10 pcs.)	Disc. Sym.	App. Wgt. (lbs.)
174190	\$135	A	1

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.



Catalog Number	List Price (6 pcs.)	Disc. Sym.	App. Wgt. (lbs.)
174186	\$132	A	3
174187	148	A	3
174188	176	A	3

REMOTE KEYPAD

Remote keypad kit for includes eight-foot connecting cable and gasket. Mounted in proper enclosure, the keypad kit will provide up to NEMA 4 protection. **These keypads can only be used with Sub-Micro drives manufactured May, 1999 or later (date code of 9922 or higher).**



Depth: .625"

Drive Type	Catalog Number	List Price	App. Disc. Sym.	Wgt. (lbs.)
SM Plus	174191	\$178	A	2
SM	174194	145	A	2

FOR NEMA FRAME MOTORS & GEARMOTORS
SCR CONTROLS • ENCLOSED • SINGLE PHASE 50/60 HZ



Description	Catalog Number	List Price	Output Current Amps	HP Range		App. Wgt. (lbs.)	Disc. Sym.
				115V	230V		
NEMA 1 General Purpose							
—Non-Reversing	174307	\$286	10	1/8 to 1 ^(H)	1/4 to 2 ^(H)	5	A
—Reversing with dynamic braking	174308	391	10	1/8 to 1 ^(H)	1/4 to 2 ^(H)	5	A
—Heat Sink	174316	60	—	—	—	1	A
NEMA 4X Washdown—Dust-Tight							
—Non-Reversing, Plastic Enclosure	174102	389	10	1/4 to 1	1/4 to 2	6	A
—Non-Reversing, Plastic Enclosure with Signal Follower	174103 ◇	566	10	1/4 to 1	1/4 to 2	7	A
—Reversing, Plastic Enclosure*	174107	528	10	1/4 to 1	1/4 to 2	7	A
NEMA 4							
—Non-Reversing 3HP	174709	747	15	—	3	8	A

SCR CONTROLS • OPEN CHASSIS

Description	Catalog Number	List Price	Output Current Amps	HP Range		App. Wgt. (lbs.)	Disc. Sym.
				115V	230V		
Chassis with Speed Pot-Non Reversing	174311	\$157	10	1/8 to 1 ^(J)	1/4 to 2 ^(J)	1	A
Chassis Heat Sink ^(J)	174314	38	—	—	—	1	A

REGENERATIVE SCR DRIVES • FOUR QUADRANT • FULL WAVE

Description	Catalog Number	List Price	Output Current Amps	HP Range		App. Wgt. (lbs.)	Disc. Sym.
				115V	230V		
NEMA 4X Washdown ✓	175720	\$817	10	1/4 to 1 ^(K)	1/2 to 2 ^(K)	8	A
Open Chassis with Speed Pot ✓	175721	526	10	1/4 to 1 ^(K)	1/2 to 2 ^(K)	2	A
Chassis Heat Sink ^(K)	175722	75	—	—	—	2	A

FOR SUBFRACTIONAL HP MOTORS & GEARMOTORS
PWM & SCR CONTROLS • ENCLOSED • SINGLE PHASE 50/60 HZ

Description	Catalog Number	List Price	Output Current Amps	HP Range		App. Wgt. (lbs.)	Disc. Sym.
				115V	230V		
NEMA 1 General Purpose							
—SCR Non-Reversing	M1740005	\$274	3	1/40 to 1/8	1/40 to 1/4	5	A
—SCR Reversing With Dynamic Braking	M1740006	371	3	1/40 to 1/8	1/40 to 1/4	5	A
—PWM Non-Reversing	M1740008	238	3	1/40 to 1/8	1/40 to 1/4	2	A

PWM & SCR CONTROLS • OPEN CHASSIS

Description	Catalog Number	List Price	Output Current Amps	HP Range		App. Wgt. (lbs.)	Disc. Sym.
				115V	230V		
Open Chassis SCR Type							
—Chassis with Speed Pot-Non Reversing	M1740007	\$153	1.5	1/40 to 1/8	1/40 to 1/4	1	A
Open Chassis PWM Type							
—Chassis with Speed Pot-Non Reversing	M1740009	175	2.0	1/40 to 1/8	—	1	A

* Drive does not have dynamic braking. Motor shaft must be at zero speed before reversing.
^(H) Heat sink #174316 is required for NEMA 1 type 3/4 and 1HP 115V and 1 1/2 and 2HP 230V
^(J) Chassis Heat Sink #174314 required for 3/4 and 1HP 115V and 1 1/2 and 2HP 230V
^(K) Chassis Heat sink #175722 required for 1HP and above.
 ✓ Regenerative drives are reversible and have regenerative braking.
 ◇ Available August 2004.

LEESON Speedmaster® DC controls are general purpose drives designed for use with permanent magnet type direct current motors. NEMA 1 enclosed drives are suitable for most industrial applications, with the NEMA 4X enclosures best suited for washdown or outdoor installations or for extremely dusty applications. Chassis only units are available for building into equipment, machinery or existing enclosures. Most controls have a dual voltage switch allowing the control to be used on 115 or 230 volt, single phase, 50/60 Hertz service. However, the proper voltage motor should be selected for use with the power supply input, i.e., 90 volt DC motors for 115 volt input or 180 volt motors for 230 volt input service. Installation and adjustment instructions are included.

SCR/Thyristor drives are available in unidirectional and electro-mechanical type reversing styles for NEMA frame ratings and sub-fractional HP sizes.

Regenerative, four quadrant controls in NEMA 4X or chassis style available for applications requiring more precise motion control. These controls will produce both motoring and braking torque regulation for NEMA frame 1/4 HP through 2 HP motors.

Pulse Width Modulated (PWM) controls are available in NEMA 1 and chassis style units for subfractional HP frame motors from 1/40 through 1/4 HP. Due to their improved form factor, these PWM controls will result in quieter operation, lower operating temperatures, longer brush life, and greater motor overload capacity than for the same motor on an SCR type control.