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 110), or as a Modification (see page 131).
- Remote keypad is available as a kit for installation in the field (see page 110), or as a Modification (see page 130).

Effective July 1, 2006, the Micro Series inverters have PID software built in making them a closed-loop inverter if needed.

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	$801	6	A	B
	1	4.0	200-240	174915	842	6	A	C
	1 1/2	5.2	200-240	174916	882	6	A	C
	2	6.8	200-240	174917	943	9	A	E
	3	9.6	200-240	174918	1014	9	A	E
	5	15.2	200-240	174919	1198	11	A	F
	7 1/2	25.0	200-240	174545	1731	13	A	M
	10	28.0	200-240	174551	2295	15	A	L
	15	42.0	200-240	174557	3028	19	A	N
	20	54.0	200-240	174560	4110	21	A	P
	25	68.0	200-240	174569	4977	38	A	T
	30	80.0	200-240	174571	5973	44	A	T
	40	104.0	200-240	174576	9200	130	A	AE
	60	154.0	200-240	174578	13000	185	A	AF
400-480 Volts	1	2.0	400-480	174920	1011	6	A	B
	2	3.4	400-480	174921	1109	7	A	D
	3	4.8	400-480	174922	1198	9	A	E
	5	7.6	400-480	174923	1347	9	A	E
	7 1/2	11.0	400-480	174924	1831	11	A	I
	10	14.0	400-480	174552	2487	13	A	M
	15	21.0	400-480	174558	3195	15	A	L
	20	27.0	400-480	174561	4240	17	A	N
	25	34.0	400-480	174563	4999	21	A	P
	30	40.0	400-480	174565	5443	21	A	P
	40	52.0	400-480	174567	6273	35	A	T
	50	65.0	400-480	174593	7647	44	A	W
	60	77.0	400-480	174572	8400	44	A	W
	75	96.0	200-240	174580	10650	185	A	AG
	100	124.0	200-240	174582	12950	250	A	AH
	125	156.0	200-240	174584	14550	260	A	AH
	150	180.0	200-240	174586	19850	360	A	AL
480-590 Volts	1	1.6	480-590	174925	1120	6	A	B
	2	2.7	480-590	174926	1238	7	A	D
	3	3.9	480-590	174927	1369	9	A	E
	5	6.1	480-590	174928	1491	9	A	F
	7 1/2	9.0	480-590	174929	1824	11	A	I
	10	11.0	480-590	174553	2779	13	A	R
	15	17.0	480-590	174559	3670	17	A	N
	20	22.0	480-590	174562	4661	19	A	O
	25	27.0	480-590	174564	5505	21	A	P
	30	32.0	480-590	174598	6021	22	A	S
	40	41.0	480-590	174599	6837	38	A	T
	50	52.0	480-590	174594	8295	45	A	W
	60	62.0	480-590	174573	9279	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	$757	5	A	A
1/2	2.2	115/230	174997	914	7	A	AC
1	4.0	115/230	174931	921	7	A	D
1 1/2	5.2	115/230	174932	1020	7	A	D
2	6.8	200-230	174933	973	9	A	E
3	9.6	200-230	174934	1072	9	A	E

FOR INFORMATION ON REMOTE KEYPAD OPTION, SEE PAGE 110.

Dimension Table see page 111

Catalog numbers in blue are NEW items.

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 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	$1136	8	A	G
	1	4	200-240	174936	1233	8	A	G
	1 1/2	5.2	200-240	174482	1250	8	A	Y
	2	6.8	200-240	174937	1322	10	A	H
	3	9.6	200-240	174938	1429	11	A	J
	5	15.2	200-240	174730	1763	11	A	K
	7 1/2	22	200-240	174734	2445	27	A	Q
	10	28	200-240	174737	3085	32	A	U
	15	43	200-240	174740	3720	40	A	V
	20	54	200-240	174743✻	4775	42	A	AA
	25	68	200-240	174595	6544	53	A	Z
	30	80	200-240	174596	6934	53	A	Z
	40	104	200-240	174577	10100	150	A	AM
	60	154	200-240	174579	13950	200	A	AN
400-480 Volts	1	2	400-480	174939	1390	8	A	G
	2	3.4	400-480	174940	1534	10	A	H
	3	4.8	400-480	174941	1643	10	A	H
	5	7.6	400-480	174942	1817	11	A	J
	7 1/2	11	400-480	174548	2303	11	A	K
	10	14	400-480	174554	3071	11	A	Q
	15	21	400-480	174749	3825	32	A	U
	20	27	400-480	174752	4906	36	A	V
	25	34	400-480	174755✻	5664	42	A	AA
	30	40	400-480	174757✻	6190	53	A	AA
	40	52	400-480	174513✻	7160	54	A	Z
	50	65	400-480	174511✻	8310	75	A	AB
	60	77	400-480	174574✻	9356	98	A	AB
	75	96	200-240	174581	11550	200	A	AJ
	100	124	200-240	174583	13950	300	A	AP
	125	156	200-240	174585	15850	310	A	AO
480-590 Volts	1	1.6	480-590	174943	1512	8	A	G
	2	2.7	480-590	174944	1687	10	A	H
	3	3.9	480-590	174945	1839	10	A	H
	5	6.1	480-590	174946	1980	11	A	J
	7 1/2	9	480-590	174549	2723	13	A	K
	10	11	480-590	174556	3571	17	A	Q
	15	17	480-590	174763	4314	38	A	U
	20	22	480-590	174766	5251	40	A	V
	25	27	480-590	174769✻	6262	42	A	AA
	30	32	480-590	174597✻	6873	53	A	AA
	40	41	480-590	174512✻	7957	54	A	Z
	50	52	480-590	174510✻	9289	75	A	AB
	60	62	480-590	174575✻	10391	98	A	AB

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

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 111.

WASHGUARD NEMA 4X (IP65) STAINLESS STEEL

300-SERIES STAINLESS STEEL NEMA 4X enclosures are fully gasketed to withstand frequent washdown but must be protected from caustic agents. Paint-free stainless steel, no external fans, and anodized aluminum heat sinks provide superior heat transfer and greater structural integrity compared to plastic or fiberglass enclosures. These Speedmaster™ Micro Series drives have the same features as the NEMA 1 drives on the previous page.

WASHGUARD NEMA 4X

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	$1334	8	A	G
	1	4	200-240	174528	1431	8	A	G
	1 1/2	5.2	200-240	174529	1498	8	A	Y
	2	6.8	200-240	174530	1588	10	A	H
	3	9.6	200-240	174531	1668	11	A	J
	5	15.2	200-240	174732	2323	11	A	K
	7 1/2	22	200-240	174735	2859	27	A	Q
	10	28	200-240	174738	3566	32	A	U
	15	43	200-240	174741	4358	40	A	V
400-480 Volts	1	2	400-480	174532	1573	8	A	G
	2	3.4	400-480	174533	1781	10	A	H
	3	4.8	400-480	174534	1912	10	A	H
	5	7.6	400-480	174535	2182	11	A	J
	7 1/2	11	400-480	174745	2959	11	A	K
	10	14	400-480	174747	3666	11	A	Q
	15	21	400-480	174750	4386	32	A	U
	20	27	400-480	174753	5414	36	A	V
480-590 Volts	1	1.6	480-590	174536	1709	8	A	G
	2	2.7	480-590	174537	1908	10	A	H
	3	3.9	480-590	174538	2063	10	A	H
	5	6.1	480-590	174539	2335	11	A	J
	7 1/2	9	480-590	174759	3156	13	A	K
	10	11	480-590	174761	4052	17	A	Q
	15	17	480-590	174764	4867	38	A	U
	20	22	480-590	174767	5883	40	A	V

☆ User programmable for 50Hz and other voltage inputs

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

(Use with three phase 230V motor)

HP	Output Amps	Input Voltage☆	Catalog Number	List Price	App. Wgt. (lbs.)	Disc. Sym.	Dimension Key
1/4	1.4	115/230	174519	$1305	8	A	AD
1/2	2.2	115/230	174520	1451	8	A	X
1	4	115/230	174521	1555	11	A	H
1 1/2	5.2	115/230	174517	1912	11	A	H
2	6.8	208-230	174525	1635	11	A	H
3	9.6	208-230	174526	1715	12	A	J

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

(Use with three phase 230V motor)

HP	Output Amps	Input Voltage☆	Catalog Number	List Price	App. Wgt. (lbs.)	Disc. Sym.	Dimension Key
1/4	1.4	115/230	174996	$1056	8	A	AD
1/2	2.2	115/230	174998	1154	8	A	X
1	4	115/230	174999	1262	11	A	H
1 1/2	5.2	115/230	174515	1484	11	A	H
2	6.8	208-230	174475	1343	11	A	H
3	9.6	208-230	174729	1423	12	A	J

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 131.

DYNAMIC BRAKING BOARDS❄

Drive HP	Drive Voltage Rating	Catalog Number	List Price	Disc. Sym	App. Wgt.(lbs.)
1/2-3	All	**174184**	$314	A	2
5	200-230V	**174185**	342	A	2
5	460-480V	**174185**	342	A	2
5	550-575V	**174184**	314	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**	$303	A	2
7 1/2	460-480V	**174193**	303	A	2
7 1/2	550-575V	**174193**	303	A	2
10 - 60	All	**174192**	303	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**	$138	A	1
1	200-230V	**174179**	138	A	1
	460-480V	**174179**	138	A	1
	550-575V	**174178**	138	A	1
1 1/2	200-230V	**174179**	138	A	1
2	200-230V	**174180**	138	A	1
	460-480V	**174180**	138	A	1
	550-575V	**174179**	138	A	1
3	200-230V	**174182**	196	A	1
	460-480V	**174182**	196	A	1
	550-575V	**174181**	196	A	1
5	200-230V	**174183**	196	A	1
	460-480V	**174183**	196	A	1
	550-575V	**174182**	196	A	1
7 1/2	200-230V	**174143**	227	A	1
	460-480V	**174143**	227	A	1
	550-575V	**174148**	227	A	1
10	200-230V	**174143**	227	A	1
	460-480V	**174143**	227	A	1
	550-575V	**174148**	227	A	1
15-20	200-230V	**174144**	345	A	1
	460-480V	**174144**	345	A	1
	550-575V	**174149**	345	A	1
25-30	200-230V	**174145**	583	A	1
	460-480V	**174145**	583	A	1
	550-575V	**174140**	583	A	1
40	460-480V	**174146**	761	A	1
	550-575V	**174141**	761	A	1
50-60	460-480V	**174147**	880	A	1
	550-575V	**174142**	880	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**	$181	A	2
2.5 ft. Cable	**174174**	53	A	2
5 ft. Cable	**174175**	76	A	2
10 ft. Cable	**174176**	124	A	2

❄ Compatible with any Micro Series 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.

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 "Literature" to download Tech-Link 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.

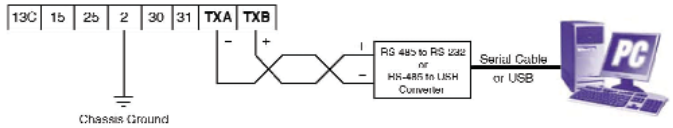
The diagrams below illustrate how to connect the LEESON Micro Series, SM Plus and SM Vector Series drives to a computer in order to use the TechLink software.

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

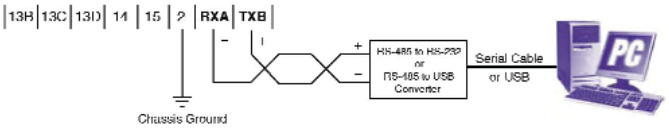


Note 2: Refer to the converter manufacturer's instructions for proper converter configuration. The converter is not supplied by LEESON.

Micro Series

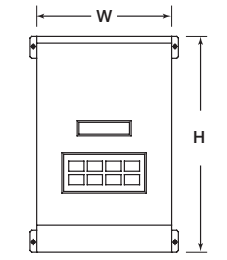
The Micro Series is RS-485, so a RS-232 to RS-485 or USB to RS-485 converter is required. The converter connects to the computer using a standard serial or USB connection. A twisted pair connects the converter to the drive.

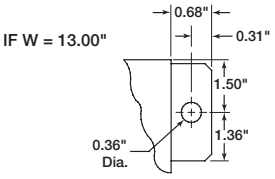
Micro Series Control Strip



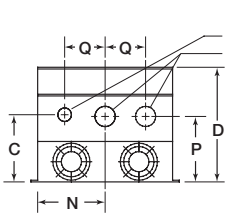
Note: 3 Refer to the converter manufacturer's instructions for proper converter configuration. The converter is not supplied by LEESON.

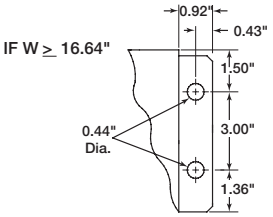
TYPE 1 DIMENSIONS FOR MODELS RATED ABOVE 30 HP AT 240/200 VAC & 60 HP AT 590/480/400 VAC



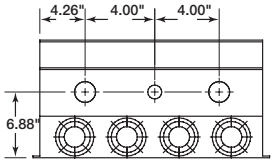


Mounting Tab Detail



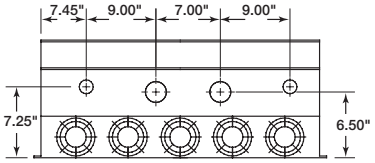


CONDUIT HOLES FOR 174250.00



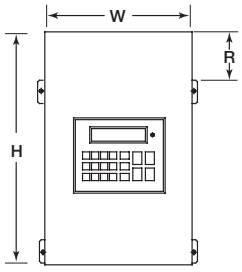
Conduit Holes: Large holes = 1.75"
Small hole = 1.13"

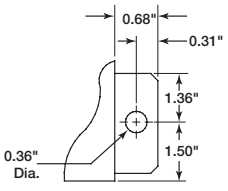
CONDUIT HOLES FOR 174258.00



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

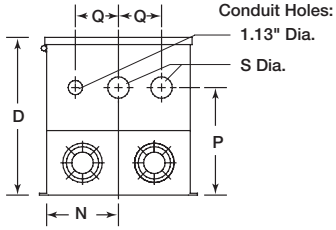
TYPE 12 DIMENSIONS FOR MODELS RATED ABOVE 30 HP AT 240/200 VAC AND 60 HP AT 400/480 VAC

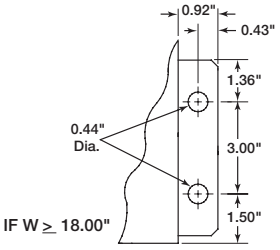




IF W = 14.00"

Mounting Tab Detail

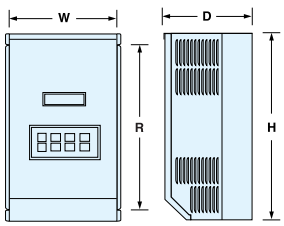




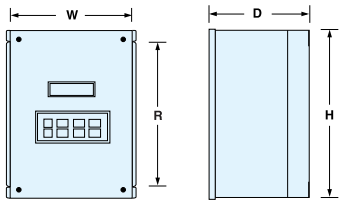
MICRO SERIES INVERTER DIMS. (Inches) • NEMA 1, NEMA 4/12 & NEMA 4X

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
AE	25.00	13.00	10.50	5.56	6.50	2.62	–	1.38
AF	47.00	16.64	11.85	SEE CHART				
AG	29.00	16.64	11.85	7.14	6.88	3.12	–	1.75
AH	29.00	24.42	11.85	11.12	6.50	4.50	–	2.50
AI	29.00	36.66	11.85	11.50	9.00	4.50	–	2.50
AJ	37.00	18.00	13.30	7.50	8.00	3.13	7.14	1.75
AK	39.00	26.00	13.30	11.50	9.00	4.50	9.14	2.50
AL	29.00	36.66	11.85	SEE CHART				
AM	31.00	14.00	11.86	6.00	7.50	2.62	5.64	1.38
AN	49.00	18.00	13.30	7.50	8.00	3.13	7.14	1.75
AO	39.00	26.00	13.30	11.50	9.00	4.50	9.14	2.50

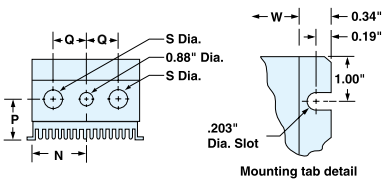
NEMA 1 ONLY



NEMA 4/12 WASHGUARD ONLY



NEMA 1 & NEMA 4/12



Mounting tab detail

SM PLUS SUB-MICRO INVERTER DRIVES

SM PLUS

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
- I^2t 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 115

☆ User programmable for 50Hz and other voltage inputs

DIMENSIONS ON PAGE 113

SINGLE PHASE INPUT/THREE PHASE OUTPUT

(Use with three phase 230V motor)

	HP	Output Amps	Input Voltage☆	Catalog Number	List Price	App. Wgt.(lbs.)	Disc Sym.	Dimension Key
115/230 Volts	1	2.0	115/230	174492	709	4	A	B1
	1 1/2	6.0	115/230	174445	800	5	A	B1

SINGLE OR THREE PHASE INPUT/THREE PHASE OUTPUT

(Use with three phase 230V motor)

	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	$507	2	A	A1
	1/2	2.2	200-230	174453	529	2	A	A1
	1	4.2	200-230	174454	570	3	A	A2
	1 1/2	6.0	200-230	174493	677	4	A	B1
	2	6.8	200-230	174494	749	5	A	B2
	3	9.6	200-230	174495	910	5	A	B2
	5	15.2	200-230	174444	1247	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	$525	3	A	A2
	1 1/2	6.0	200-230	174456	618	3	A	A3
	2	6.8	200-230	174457	681	4	A	A3
	3	9.6	200-230	174458	812	4	A	A3
	5	15.2	200-230	174446	1045	4	A	B2
	7 1/2	22.0	200-230	174438	1427	8	A	C1
	10	28.0	200-230	174439	1705	8	A	C1
	15	42.0	200-230	174429	2209	13	A	D1
	20	54.0	200-230	174430	2710	14	A	D1
460-480 Volts	1/2	1.1	460-480	174459	591	2	A	A1
	1	2.1	460-480	174460	637	3	A	A2
	1 1/2	3.0	460-480	174461	696	3	A	A3
	2	3.4	460-480	174462	768	4	A	A3
	3	4.8	460-480	174463	858	4	A	A3
	5	7.6	460-480	174447	1094	5	A	B2
	7 1/2	11.0	460-480	174440	1427	8	A	C1
	10	14.0	460-480	174441	1705	8	A	C1
	15	21.0	460-480	174431	2166	13	A	D1
	20	27.0	460-480	174432	2652	14	A	D1
	25	34.0	460-480	174433	3156	14	A	D1
	30	40.0	460-480	174500	3669	14	A	D1
550-575 Volts	1	1.7	550-575	174464	681	3	A	A2
	2	3.0	550-575	174491	816	4	A	A3
	3	4.2	550-575	174497	969	5	A	B2
	5	6.6	550-575	174448	1185	5	A	B2
	7 1/2	9.9	550-575	174442	1539	8	A	C1
	10	12.2	550-575	174443	1824	8	A	C1
	15	19.0	550-575	174434	2389	8	A	D1
	20	24.0	550-575	174435	2922	14	A	D1
	25	27.0	550-575	174436	3456	14	A	D1

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
Analog 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

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
- I^2t 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 115

☆ User programmable for 50Hz and other voltage inputs

SINGLE PHASE INPUT/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
110-120 Volts	1/3	1.7	110-120	174263	$345	2	A	A5
	1/2	2.4	110-120	174264	375	2	A	A5
	1	4.2	110-120	174265	498	3	A	B5
	1 1/2	6.0	110-120	174266	565	3	A	B5

SINGLE PHASE INPUT/THREE PHASE OUTPUT

(Use with three phase 230V motor)

	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	$320	2	A	A5
	1/2	2.4	208-240	174268	337	2	A	A5
	1	4.2	208-240	174270	375	3	A	A6
	1 1/2	6.0	208-240	174271	452	4	A	B5
	2	7.0	208-240	174272	530	5	A	B5
	3	9.6	208-240	174273	624	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	$320	2	A	A5
	1	4.2	208-240	174276	355	2	A	A6
	1 1/2	6.0	208-240	174277	422	3	A	A7
	2	7.0	208-240	174278	481	3	A	A7
	3	9.6	208-240	174279	533	3	A	B6
	5	15.2	208-240	174288	680	5	A	B2
	7 1/2	22	208-240	174280	939	8	A	C1
	10	28	208-240	174290	956	8	A	C1
	15	42	208-240	174292	1720	14	A	D1

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	$427	2	A	A1
	1	2.1	400-480	174282	457	3	A	A2
	1 1/2	3.0	400-480	174283	496	3	A	A3
	2	3.4	400-480	174284	529	4	A	A3
	3	4.8	400-480	174286	581	4	A	B1
	5	7.8	400-480	174287	695	5	A	B2
	7 1/2	11	400-480	174285	903	5	A	B2
	10	14	400-480	174291	1076	8	A	C1
	15	21	400-480	174293	1272	8	A	C1

DIMENSIONS: SM, SM PLUS AND SM VECTOR INVERTERS

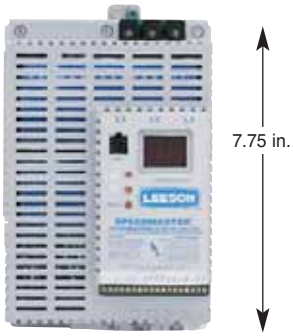
"A" Chassis

Depth: A1: 3.94 in.
A2: 4.74 in.
A3: 5.74 in.
A5: 3.26 in.
A6: 3.63 in.
A7: 5.56 in.

"B" Chassis

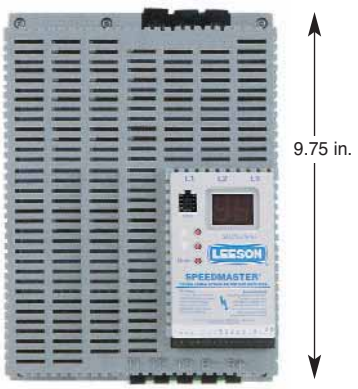
Depth: B1: 5.24 in.
B2: 6.74 in.
B5: 4.88 in.
B6: 5.53 in.

"C" Chassis



Depth: C1: 7.18 in.

"D" Chassis



Depth: D1: 8.00 in.

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

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!

SM VECTOR

- 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 page 115

☆ User programmable for 50Hz and other voltage inputs

DIMENSIONS ON PAGE 113

SINGLE OR THREE PHASE INPUT/THREE PHASE OUTPUT

(Use with three phase 230V motor)

	HP	Output Amps 230VAC	Input Voltage☆	Catalog Number	List Price	Wgt. (lbs.)	Disc Sym.	Dimension Key
208-240 Volts	**1/2**	2.2	208-240	**174000**	$532	2	A	A1
	1	4.2	208-240	**174001**	599	3	A	A2
	1 1/2	6.0	208-240	**174002**	711	4	A	B1
	2	6.8	208-240	**174003**	786	5	A	B2
	3	9.6	208-240	**174004**	956	5	A	B2

THREE PHASE INPUT/THREE PHASE OUTPUT

	HP	Output Amps 230VAC	Input Voltage☆	Catalog Number	List Price	Wgt. (lbs.)	Disc Sym.	Dimension Key
208-240 Volts	**1**	4.2	208-240	**174006**	$551	3	A	A2
	1 1/2	6.0	208-240	**174007**	649	3	A	A3
	2	6.8	208-240	**174008**	715	4	A	B2
	3	9.6	208-240	**174009**	853	4	A	B2
	5	15.2	208-240	**174010**	1097	4	A	B2
	7 1/2	22	208-240	**174011**	1498	8	A	C1
	10	28	208-240	**174012**	1790	8	A	C1

THREE PHASE INPUT/THREE PHASE OUTPUT

	HP	Output Amps	Input Voltage☆	Catalog Number	List Price	Wgt. (lbs.)	Disc Sym.	Dimension Key
400-480 Volts	**1/2**	1.1	400-480	**174015**	$621	2	A	B1
	1	2.1	400-480	**174016**	669	3	A	B1
	1 1/2	3.0	400-480	**174017**	731	3	A	B1
	2	3.4	400-480	**174018**	806	4	A	B2
	3	4.8	400-480	**174019**	901	4	A	B2
	5	7.8	400-480	**174020**	1149	5	A	B2
	7 1/2	11	400-480	**174021**	1498	8	A	C1
	10	14	400-480	**174022**	1790	8	A	C1

THREE PHASE INPUT/THREE PHASE OUTPUT

	HP	Output Amps	Input Voltage☆	Catalog Number	List Price	Wgt. (lbs.)	Disc Sym.	Dimension Key
480-590 Volts	**1**	1.7	480-590	**174027**	$715	3	A	B1
	2	3.0	480-590	**174028**	857	4	A	B2
	3	4.2	480-590	**174029**	1017	5	A	B2
	5	6.6	480-590	**174030**	1244	5	A	B2
	7 1/2	9.9	480-590	**174031**	1616	8	A	C1
	10	12.2	480-590	**174032**	1915	8	A	C1

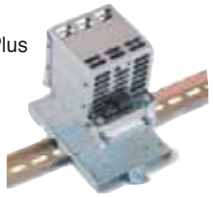
SPECIFICATIONS:

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	208-240 VAC, 400-480 VAC, 480-590 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	2 kHz, 4 kHz, 8 kHz
Enclosure	IP20
Service Factor	1.0
Efficiency	up to 98%
Power Factor (displacement)	0.96 or better
Overload Current Capacity	150% for 60 seconds 200% for 25 seconds
Speed Reference Follower	0-10 VDC, 4-20 mA
Control Voltage	15 VDC
Analog Outputs	0-10 VDC or 2-10 VDC: Proportional to speed, load, or torque
Digital Outputs	Open-collector: 50 mA at 30 VDC
Power Supply for Aux. Relays	50 mA at 12 VDC

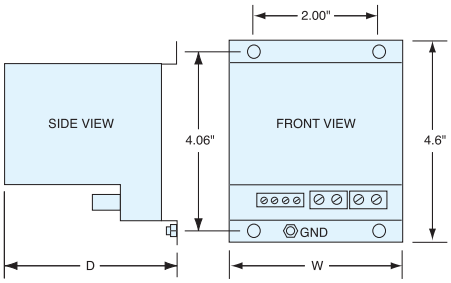
ACCESSORIES FOR THE SM & SM-PLUS SERIES DRIVES

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 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**	$233	A	2
1/4-1/2	400-480V	**174406**	233	A	2
1 - 1½	208-230V	**174401**	272	A	3
1 - 1½	400-480V	**174407**	272	A	3
1 - 1½	480-590V	**174412**	272	A	3
2 - 3	208-230V	**174402**	370	A	4
2 - 3	400-480V	**174408**	370	A	4
2 - 3	480-590V	**174413**	370	A	4
5	208-230V	**174403**	482	A	5
5	400-480V	**174409**	482	A	5
5	480-590V	**174414**	482	A	5
7½	208-230V	**174404**	609	A	6
7½	400-480V	**174410**	609	A	6
7½	480-590V	**174415**	609	A	6
10	208-230V	**174405**	735	A	8
10	400-480V	**174411**	735	A	8
10	480-590V	**174416**	735	A	8

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

DYNAMIC BRAKING MODULES WITHOUT RESISTORS❄

Drive HP	Motor Voltage Rating	Catalog Number	List Price	Disc. Sym.	App. Wgt. (lbs.)
15-20	208-230V	**174417**	$314	A	10
15-25	400-480V	**174418**	314	A	10
15-25	480-590V	**174419**	314	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**	$345	A	1
15-20	400-480V	**174144**	345	A	1
15-20	480-590V	**174149**	345	A	1
25	400-480V	**174145**	583	A	1
25	480-590V	**174140**	583	A	1

❄❄ Dynamic Braking Resistors are provided with mounting brackets.

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	$142	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**	$187	A	2
SM	**174194**	152	A	2
SM Vector	**174306**	187	A	2

FHP SERIES AC DRIVES

General Specifications:

The FHP Series volts/hertz-type AC drives are as simple to setup and calibrate as an SCR-type DC drive. Rated from 1/4 to 1HP with 115V, 230V, or 115/230V "doubler" input power ratings.

The cost-conscious and compact chassis design of the FHP Series maintains the industry standard for mounting hole location.

The NEMA 4X enclosed drive has additional features in a compact package size.

With its compact size, standard features and application flexibility, the FHP Series is an excellent choice for most 1 hp and under AC applications.

Common features for chassis and enclosed units:

- Compact size – (4.30" x 3.70")
- Industry standard mounting
- Output voltage on dual voltage models is jumper selectable and can double the output voltage – allowing the use of a 230V motor when only 115V power is available.
- Quickly and easily change trimmer pot ranges for 1/15 to 1 hp motors.
- Easy calibration and setup with on board trim pot adjustments for boost, max speed, acceleration, deceleration, to overcome intermittent peak loads, then reduces the torque and torque limit.
- Torque 'foldback' feature – Allows up to 200% torque for short periods (output current) to a safe level that is set with the TQ LIMIT trim pot.
- 16kHz switching frequency, with option to change between 4 and 16kHz in the field.
- Adjustable torque boost for startup – Up to 200% additional torque for loads with high inertia or friction.
- Color-coded on-board LEDs for Power, Fault and Torque Limit enable easy visual determination of drive status.
- Easy start/stop and direction control with enable and Direction terminal connections.
- Accepts speed reference from 0-5VDC isolated signal or wired in speed potentiometer.
- 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

FHP SERIES AC DRIVES • CHASSIS MOUNT SINGLE PHASE INPUT/SINGLE OR THREE PHASE OUTPUT

HP	Input Voltage	Output Amps	Output Voltage	Catalog Number	List Price	Disc. Sym.	App. Wgt. (lbs.)
1/4	230	1.2	230	**175318**	$272	A	2
	115/230	1.2	230	**175319**	324	A	2
	115	2.4	115	**175320**	280	A	3
1/2	230	2.4	230	**175321**	280	A	3
	115/230	2.4	230	**175310**	357	A	3
	115	4.0	115	**175322**	348	A	4
1	230	4.0	230	**175323**	344	A	4
	115/230	4.0	230	**175311**	452	A	4

FHP SERIES AC DRIVES • ACCESSORIES

Item Description	Catalog Number	List Price	Disc. Sym.	App. Wgt. (lbs.)
Process Control Module (PCM) Kit*	**175324**	$88	A	2
Carrier Frequency Capacitor Kit	**175325**	21	A	1

* PCM Kit is for use with chassis drives only.

FHP SERIES AC DRIVES • NEMA 4X (IP65) SINGLE PHASE INPUT/THREE PHASE OUTPUT

- 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

HP	Input Voltage	Output Amps	Output Voltage	Catalog Number	List Price	Disc. Sym.	App. Wgt. (lbs.)
1/6-1	115/230	4.0	230	**175326**	$634	A	7

FHP MOTORS FOR AC DRIVES THREE PHASE • TEFC • C FACE WITH BASE

- Compact 48-frame design with keyed shaft
- Class F insulation
- 20:1 Constant torque rated
- Inverter IRIS™ insulation system
- 1/2" diameter keyed shaft with 48-C Face
- 115/230V 3-phase design optimized for FHP drives

HP	RPM 60 Hz	NEMA Frame	Catalog Number	List Price	Disc. Sym.	App. Wgt. (lbs.)	F.L. Amps 230V	% F.L. Eff.	"C" Dim. (Inches)
1/6	1725	48CZ	**102792**	$227	A	25	1.25	56.0	8.94
1/4	1725	48CZ	**102793**	257	A	26	1.4	58.0	8.94
1/3	1725	48CZ	**102794**	282	A	28	1.6	64.3	9.19
1/2	1725	48CZ	**102795**	317	A	30	1.8	77.0	10.19

* Plug-in capacitor kit (175325) for field adjustments to less than 16khz; ‡ Faults are Over-voltage, Under-voltage and Instantaneous Over Current trip.

NEMA 4/12 NEMA 1
CHASSIS

NEMA 4X
TOTALLY ENCLOSED

174102
Non-Reversing

174107
Reversing

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. All SCR/Thyristor drives have Shunt Field Supply Terminals and can be used with Shunt Wound DC Motors.

All SCR/Thyristor drives have Shunt Field Supply Terminals and can be used with Shunt Wound DC Motors.

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.

FOR NEMA FRAME MOTORS & GEARMOTORS

SCR CONTROLS • ENCLOSED • SINGLE PHASE 50/60 HZ

Description	Catalog Number	List Price	Output Current Amps	HP Range 115V	HP Range 230V	App. Wgt. (lbs.)	Disc. Sym.
NEMA 1 General Purpose							
—Non-Reversing	**174307**	$305	10	1/8 to 1Ⓗ	1/4 to 2Ⓗ	5	A
—Reversing with dynamic braking	**174308**	416	10	1/8 to 1Ⓗ	1/4 to 2Ⓗ	5	A
—Heat Sink	**174316**	72	—	—	—	1	A
NEMA 4X Washdown—Dust-Tight							
—Non-Reversing, Plastic Enclosure	**174102**	414	10	1/4 to 1	1/4 to 2	6	A
—Non-Reversing, Plastic Enclosure with Signal Follower	**174103**	603	10	1/4 to 1	1/4 to 2	7	A
—Reversing, Plastic Enclosure*	**174107**	562	10	1/4 to 1	1/4 to 2	7	A
NEMA 4							
—Non-Reversing 3HP	**174709**	796	15	—	3	8	A

SCR CONTROLS • OPEN CHASSIS

Description	Catalog Number	List Price	Output Current Amps	HP Range 115V	HP Range 230V	App. Wgt. (lbs.)	Disc. Sym.
Chassis with Speed Pot-Non Reversing	**174311**	$167	10	1/8 to 1Ⓙ	1/4 to 2Ⓙ	1	A
Chassis Heat Sink Ⓙ	**174314**	48	—	—	—	1	A

REGENERATIVE SCR DRIVES • FOUR QUADRANT • FULL WAVE

Description	Catalog Number	List Price	Output Current Amps	HP Range 115V	HP Range 230V	App. Wgt. (lbs.)	Disc. Sym.
NEMA 4X Washdown ✓	**175720**	$870	10	1/4 to 1Ⓚ	1/2 to 2Ⓚ	8	A
Open Chassis with Speed Pot ✓	**175721**	560	10	1/4 to 1Ⓚ	1/2 to 2Ⓚ	2	A
Chassis Heat Sink Ⓚ	**175722**	94	—	—	—	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 115V	HP Range 230V	App. Wgt. (lbs.)	Disc. Sym.
NEMA 1 General Purpose							
—SCR Non-Reversing	**M1740005**	$292	3	1/40 to 1/8	1/40 to 1/4	5	A
—SCR Reversing With Dynamic Braking	**M1740006**	395	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 115V	HP Range 230V	App. Wgt. (lbs.)	Disc. Sym.
Open Chassis SCR Type							
—Chassis with Speed Pot-Non Reversing	**M1740007**	$163	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**	201	2.0	1/40 to 1/8	—	1	A

* Drive does not have dynamic braking. Motor shaft must be at zero speed before reversing.
Ⓗ Heat sink #174316 is required for NEMA 1 type 3/4 and 1HP 115V and 1½ and 2HP 230V
Ⓙ Chassis Heat Sink #174314 required for 3/4 and 1HP 115V and 1½ and 2HP 230V
Ⓚ Chassis Heat sink #175722 required for 1HP and above.
✓ Regenerative drives are reversible and have regenerative braking.

FOR LOW VOLTAGE DC MOTOR CONTROLS, SEE PAGE 85