

STOCK DC ADJUSTABLE SPEED DRIVES

SCR THYRISTOR CONTROLS



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.

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	\$266	10	1/8 to 1	1/4 to 2	5	A
—Reversing with dynamic braking	174308	363	10	1/8 to 1	1/4 to 2	5	A
—Heat Sink	174316	56	—	—	—	1	A
NEMA 4X Washdown—Dust-Tight							
—Non-Reversing, Steel Enclosure	174100 ^d	376	10	1/4 to 1	1/4 to 2	7	A
—Non-Reversing, Plastic Enclosure	174102	361	10	1/4 to 1	1/4 to 2	6	A
	174902 ^d	361	10	1/4 to 1	1/4 to 2	2	A
—Reversing, Steel with dyn. braking	174105 ^d	618	10	1/4 to 1	1/4 to 2	8	A
—Reversing, Plastic Enclosure*	174107	491	10	1/4 to 1	1/4 to 2	7	A
	174903 ^d	491	10	1/4 to 1	1/4 to 2	2	A
NEMA 4							
—Non-Reversing 3HP	174709	695	15	—	3	8	A

SCR CONTROLS • OPEN CHASSIS

Description	Catalog Number	Output Current Amps	HP Range		App. Wgt. (lbs.)
			115V	230V	
Chassis with Speed Pot	174311	10	1/8 to 1 [Ⓢ]	1/4 to 2 [Ⓢ]	1
Chassis Heat Sink [Ⓢ]	174314	—	—	—	1

REGENERATIVE SCR DRIVES • FOUR QUADRANT • FULL WAVE

Description	Catalog Number	Output Current Amps	HP Range		App. Wgt. (lbs.)
			115V	230V	
NEMA 4X Washdown —Bi-Directional	175720	10	1/4 to 1	1/2 to 2	8
Open Chassis with Speed Pot	175721	10	1/4 to 1 [Ⓢ]	1/2 to 2 [Ⓢ]	2
Chassis Heat Sink [Ⓢ]	175722	—	—	—	2

FOR SUB-FHP MOTORS & GEARMOTORS

PWM & SCR CONTROLS • ENCLOSED • SINGLE PHASE 50/60 HZ

Description	Catalog Number	Output Current Amps	HP Range		App. Wgt. (lbs.)
			115V	230V	
NEMA 1 General Purpose					
—SCR Non-Reversing	M1740005	3	1/40 to 1/8	1/40 to 1/4	5
—SCR Reversing	M1740006	3	1/40 to 1/8	1/40 to 1/4	5
—PWM Non-Reversing	M1740008	3	1/40 to 1/8	1/40 to 1/4	2

PWM & SCR CONTROLS • OPEN CHASSIS

Description	Catalog Number	Output Current Amps	HP Range		App. Wgt. (lbs.)
			115V	230V	
Open Chassis SCR Type					
—Chassis with Speed Pot	M1740007	1.5	1/40 to 1/8	1/40 to 1/4	1
Open Chassis PWM Type					
—Chassis with Speed Pot	M1740009	2.0	1/40 to 1/8	—	1

FOR LOW VOLTAGE DC MOTOR CONTROLS, See page 9.

* Motor shaft must be at zero speed before reversing.

[Ⓢ] Heat sink #174316 is required for NEMA 1 type 3/4 and 1HP 115v. and 1 1/2 and 2HP 230v.

[Ⓢ] Chassis Heat Sink #174314 required for 3/4 and 1HP 115v. and 1 1/2 and 2HP 230v.

[Ⓢ] Chassis Heat sink #175722 required for 1HP and above.

^d To be discontinued when present stock is depleted.



GENERAL INFORMATION

APPLICATION & ENGINEERING DATA

DC MOTOR AND SPEED CONTROL FORM FACTOR

Pure DC power as delivered by a battery, for example, has a form factor of 1.0. When a "full-wave" SCR control converts AC power to rectified DC, the form factor ranges from 1.3 to 1.4 or higher because of the pulsing nature of the AC. This characteristic of the control output causes additional heating in the motor. All DC SCR drive motors in this catalog have been selected for unfiltered power of this type. If a control is chosen that has a filtering network or is of PWM type, resulting in an improved form factor (usually a form factor of 1.1) a smaller motor may be possible.

SCR RATED DC MOTORS ON PWM POWER SUPPLIES

Pulse width modulated DC controls have a voltage output similar to pure direct current which has a form factor of 1.00. SCR thyristor drives, such as the SPEEDMASTER™ controls listed on page 27, have a form factor of 1.4.

LEESON NEMA and IEC frame stock SCR rated motors can also be used with PWM controls. In fact, the motor's HP rating can be increased because of less heating in the motor. In addition, the motor will operate quieter and the brush life will be extended.

Rated HP 1.40 FF	Rated RPM	Rated Volts	Catalog Number	Rated HP 1.05 FF
1/4	1750	90	098002	0.40
	1750	90	108423	0.30
	1750	180	098003	0.50
1/3	1750	90	098004	0.50
	1750	90	108424	0.56
	1750	180	098005	0.50
1/2	2500	90	098006	0.75
	2500	180	098007	0.70
	1750	90	098000	0.70
	1750	90	108014	0.75
	1750	90	108226	0.75
	1750	180	098008	0.56
	1750	180	108015	0.70
1750	180	108227	0.70	
3/4	2500	90	098009	1.00
	2500	90	108016	1.00
	2500	180	098010	1.00
	2500	180	108017	0.86
	1750	90	098032	1.00
	1750	90	108018	1.00
	1750	90	108228	1.25
	1750	180	098069	1.00
	1750	180	108019	1.00
	1750	180	108229	1.25
1	2500	90	108020	1.50
	2500	180	108021	1.50
	1750	90	108022	1.25
	1750	90	108230	1.25
	1750	180	108023	1.25
1 1/2	1750	180	108231	1.25
	2500	180	108265	2.00
	1750	180	108092	1.75
	1750	180	108262	1.75
	1750	180	108232	1.75
2	1750	180	128000	—
	2500	180	108266	3.00
	1750	180	108010	—
	1750	180	128001	—
3	1750	180	108502	—

DC MOTOR SPEED RANGE

The speed ranges noted for PM DC motors and gearmotors in this catalog are based upon ideal conditions and can vary due to the nature of the load and the load regulation or IR compensation of the speed control. The upper end of the speed range is usually not critical. However, in some applications, and some motor and speed control combinations, erratic operation or "cogging" of the motor's speed may be noticed in the lower extremes of the listed speed range. Often, this can be eliminated through adjustment of the control or increasing the ratio of the drive train to reduce the minimum speed at which the motor is required to operate.

ENCLOSURES AND ENVIRONMENT

DRIP-PROOF: Venting in end frame and/or main frame located to prevent drops of liquid from falling into motor within a 15° angle from vertical. Designed for use in areas that are reasonably dry, clean, and well ventilated (usually indoors). If installed outdoors, it is recommended that the motor be protected with a cover that does not restrict the flow of air to the motor.

TOTALLY ENCLOSED NON-VENTILATED (TENV): No vent openings, tightly enclosed to prevent the free exchange of air, but not airtight. Has no external cooling fan and relies on convection for cooling. Suitable for use where exposed to dirt or dampness, but not for very moist or hazardous (explosive) locations.

TOTALLY ENCLOSED FAN COOLED (TEFC): Same as the TENV except has external fan as an integral part of the motor, to provide cooling by blowing air around the outside frame of the motor.

TOTALLY ENCLOSED, HOSTILE AND SEVERE ENVIRONMENT MOTORS: Designed for use in extremely moist or chemical environments, but not for hazardous locations.

EXPLOSION-PROOF MOTORS: These motors meet Underwriters Laboratories and Canadian Standards Association standards for use in hazardous (explosive) locations, as indicated by the UL label affixed to the motor. Locations are considered hazardous because the atmosphere does or may contain gas, vapor, or dust in explosive quantities. The motor user must specify the explosion proof motors required.

U.L., CSA, ISO AND OTHER STANDARDS & APPROVALS

UNDERWRITERS LABORATORIES INC.

1. All motor models listed with prefix "C" have U.L. component recognition (without thermal overload). File Number E57948, Guide Number PRGY2.
2. All units have U.L. recognized Class B insulation system unless otherwise noted. File Number E55555, Guide Number OBJY2.
3. Permanent Magnet DC motors, except PZ and P300 gearmotors, are recognized components under File Number E57948, Guide Number PRGY2.
4. PZ and P300 Permanent Magnet DC gearmotors and Low Voltage IEC metric motors: File Number E49849 or E49747, Guide Number PRGY2.
5. Speedmaster SCR Drives, Component Recognition, File E35603, except catalog numbers 174709, 174902 and 174903.
6. Speedmaster SCR Drives, catalog numbers 174902 and 174903. File Number E78180.

CANADIAN STANDARDS ASSOCIATION

1. Permanent Magnet DC motors are listed under File Number LR33543.
2. Speedmaster SCR Drives, catalog numbers 174902 and 174903. File Number LR 85877.

ISO QUALITY CERTIFICATION

Grafton and Saukville, Wisconsin administrative, design and manufacturing facility, ISO 9001, Certificate Number RvC #93-102. EN29001, BS5750: Part 1 and ANSI/ASQC Q91-19.

Black River Falls, Wisconsin manufacturing facility, ISO 9002, Certificate Number RvC #93-090.

Mississauga (Toronto), Ontario, administrative, distribution facility, ISO 9002, Certificate Number QMI #003027.

Hanover, Ontario, manufacturing facility, ISO 9002, Certificate Number QMI #003028.