

# INVERTER-CAPABLE MOTORS

## Available From Stock

With LEESON, you don't have to wonder whether your motor is suitable for use with an inverter. That's because all LEESON SPEEDMASTER® Inverter-Duty motors, WATTSAYER® premium efficiency motors, and WASHGUARD washdown-duty motors, as well as general-purpose three-phase motors 1HP and larger include our exclusive IRIS™ Inverter-Rated Insulation System at no extra cost.

IRIS™ is a multi-level system that results in a motor truly hardened for inverter service. Careful placement of wire within the stator, well thought-out winding and lamination design, and precise insulation practices (including phase insulation, sleeving, connection insulation and varnish) all play critical roles. Second-generation spike-resistant magnet wire, specially coated to resist corona inception, completes the system – offering service life well beyond conventional double, triple or even quad-build wire in inverter-fed applications.

For true inverter-duty performance, meeting NEMA MG1 parts 30 & 31, LEESON's SPEEDMASTER® motor is readily available from stock in either TENV or TEBC designs. LEESON's WATTSAYER® line offers NEMA Premium™ efficiency levels and an inverter-rated design. With the addition of a constant speed blower kit, Watsaver® motors are capable of full torque to zero speed. Encoder kits for closed loop



See chart (opposite page) of inverter motor capabilities.

control are available for both SPEEDMASTER® and WATTSAYER® motors, making them excellent for use with vector drives. Both SPEEDMASTER® and WATTSAYER® carry a three-year warranty...even in inverter service!

**WATTSAYER®**  
Inverter-Duty Premium Efficiency Motor

Premium efficiency WATTSAYER® motors are built with greater copper and steel mass, which results in additional tolerance to heat rise in inverter-fed applications. As with all LEESON motors, WATTSAYER® efficiencies are verified to IEEE 112B test standards.



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™). This provides superior protection against voltage spikes induced by variable frequency drives.



Encoder kits are available for LEESON cast iron TEFC motors from NEMA 182-4T through 284-6T frame size. The encoder slips over the motor's fan-end shaft to provide speed-reference signals for closed-loop control systems. Industrial-duty encoders are isolated from shaft currents, and electrical noise immunity exceeds international standards.



Constant-speed blower kits convert LEESON cast iron TEFC motors to NEMA MG1.6 (IC46) standard for inverter and vector drive applications where continuous cooling is required. Installation requires no shaft modification. Available for NEMA frame sizes 182-4T through 324-6T.

# IRIS™ PROTECTED MOTOR INVERTER CAPABILITIES

## STEEL FRAME MOTORS

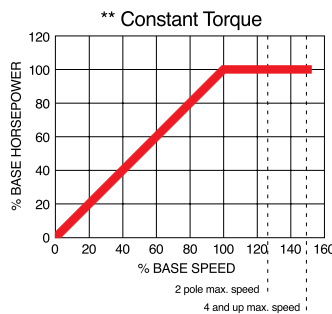
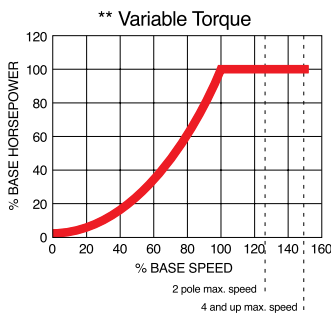
	NEMA Frame	Variable Torque**	Constant Torque**	Constant HP**	Notes
<b>Standard General Purpose</b>					
TEFC	56-210 frame	6-60 Hz	6-60 Hz	to 90 Hz*	
ODP	56-210 frame	6-60 Hz	20-60 Hz	to 90 Hz*	
<b>WATSAVER® Premium Efficiency</b>					
TEFC	56-210 frame	6-60 Hz	6-60 Hz	to 90 Hz*	
ODP	56-210 frame	6-60 Hz	6-60 Hz	to 90 Hz*	
<b>Special Purpose Motors</b>					
<b>WASHGUARD MOTORS</b>					
TENV	56-140 frame	6-60 Hz	6-60 Hz	to 90 Hz*	
TEFC	56-210 frame	6-60 Hz	6-60 Hz	to 90 Hz*	

## CAST IRON MOTORS

	NEMA Frame	Variable Torque**	Constant Torque**	Constant HP**	Notes
<b>Standard General Purpose</b>					
TEFC	180-440 frame	6-60 Hz	6-60 Hz	to 90 Hz*	
ODP	180-440 frame	6-60 Hz	6-60 Hz	to 90 Hz*	
TEFC with blower kit	180-320 frame	5-60 Hz	5-60 Hz	to 90 Hz*	full torque at low speed with vector drive
<b>WATSAVER® Inverter Duty, Premium Efficiency</b>					
TEFC	180-280 frame	6-60 Hz	6-60 Hz	to 90 Hz*	
	320-440 frame	6-60 Hz	6-60 Hz	to 90 Hz*	
ODP	180-280 frame	6-60 Hz	6-60 Hz	to 90 Hz*	
	320-440 frame	6-60 Hz	6-60 Hz	to 90 Hz*	
TEFC with blower kit	180-320 frame	0-60 Hz	0-60 Hz	to 90 Hz*	full torque at zero speed with vector drive
<b>SPEEDMASTER® Extreme-Duty Inverter Motors</b>					
TENV	143TC-256TC	0-120 Hz	0-120 Hz		
TEBC	284T-449T	0-90 Hz	0-90 Hz		

\* The maximum recommended frequency (speed) for 2 pole (3600 rpm) motors, without application analysis, is Hz=75, rather than 90 Hz. Contact factory for details.

\*\* Operation for variable or constant torque is up to a base frequency of 60 Hz only. Operation above 60 Hz to the maximum frequency listed is constant horsepower (horsepower equal to motor rated horsepower).



### NOTES:

- All motors are class F insulated, 40°C ambient, 3300 ft. and 1.0 service factor when used with an inverter.
- Optimized voltage boost is required for continuous operation throughout the frequency range specified. (See operating curves.)
- Motors with blower kits have continuous cooling and are capable of full rated torque at 0 speed with properly tuned vector drive.
- Maximum recommended cable length for IGBT inverters is 250 ft. (longer cable lengths may require noise or voltage suppression).
- All motors have LEESON's IRIS™ insulation system, which is designed to meet the NEMA requirements for peak voltages up to 1600 volts, and pulse rise time greater than or equal to 0.1 microseconds.
- Operating curves are available for WATSAVER® motors. Refer to curves for more details about frequency ranges.



### DC Adjustable Speed Drives

SPEEDMASTER® DC drives range from sub-fractional-horsepower through 3 HP. SCR and PWM versions are offered, in reversing or non-reversing options. Four-quadrant regenerative drives are also available. NEMA 1, NEMA 4X or open chassis styles. For more information, request Catalog 1050.

