



INDUSTRIAL AND COMMERCIAL DUTY IEC MOTORS

FIVE PRODUCT FAMILIES DELIVERING
A WORLD OF OPPORTUNITY



LEESON® PASSPORT SERIES IEC MOTORS.

THERE'S A WORLD OF OPPORTUNITY
RIGHT HERE AT HOME.



The impact of a global economy on the way we do business is changing more than ever before. At REGAL, we're proud to offer the LEESON Passport series—electric motor solutions that enable OEMs to deliver products matched to this global standard. Rely on our expertise to help you make the right decisions.

GET TO KNOW IEC. THE GLOBAL STANDARD.

The International Electromechanical Commission (IEC) is the global governing body for electric motors. Over its century-plus history, IEC has developed standards that tend to be more specific than NEMA®* standards. In some cases, motors meeting NEMA standards will meet IEC specifications, but the two are not identical. That means that a motor meeting NEMA standards is not always interchangeable with a motor meeting IEC standards. This is especially true for flange (C-face, D-flange) type motor mounts.

NEMA CODE LETTERS FOR LOCKED ROTOR KVA/HP

CODE	KVA/HP	CODE	KVA/HP
A	0.00–3.14	L	9.00–9.99
B	3.15–3.54	M	10.00–11.19
C	3.55–3.99	N	11.20–12.49
D	4.00–4.49	P	12.50–13.99
E	4.50–4.99	R	14.00–15.99
F	5.00–5.59	S	16.00–17.99
G	5.60–6.29	T	18.00–19.99
H	6.30–7.09	U	20.00–22.39
J	7.10–7.99	V	22.40 and up
K	8.00–8.99		

Always check the KVA/HP code letter to determine starter sizes. See the formulas on page 7.

KEY FACTORS OF IEC RATED METRIC MOTORS

Specific considerations must be taken into account when building to IEC specifications, including dimensions, nameplate markings, torque and temperature performance, and ingress (IP) protection. Many IEC standards have been nationalized to parallel IEC 60034-1. The broad line of LEESON® Passport series IEC rated motors meets these criteria.

IP & IC: TWO CODES THAT DEFINE IEC MOTOR ENCLOSURES

There are two codes that define IEC rated motor enclosures: IC (Inherent Cooling) and IP (Ingress Protection).

The higher the number, the greater the protection. An IEC motor with a rating of IP00 has no special protection from solids or liquids. IP68, on the other hand, ensures a dust-tight enclosure that is also rated for immersion in liquids—under pressure—during operation.

IP Ratings

IEC	NEMA
IP00	Open
IP12	Drip-proof
IP22	Drip-proof Guarded
IP23	Weather Protected I
IP24	Weather Protected II
IP44	Totally Enclosed Guarded
IP54	Totally Enclosed Severe Duty
IP55	Waterproof (TE severe duty with Forsheda®* seals)
IP56	Waterproof (TE severe duty, Inpro/Seal®* seals both ends, waterproof conduit box)

IC Ratings

IEC	NEMA
IC410	Non Ventilated
IC411	Fan Cooled
IC611	Blower Cooled
IC00	Open Machine



Mount: IM B3/B5

Where will you find LEESON® Passport series IEC rated motors? Industries such as machine tool, textile machinery, food and beverage processing equipment, compressors and material handling rely on LEESON IEC rated motors for global solutions.



IEC PRODUCT DIFFERENTIATORS

CONDUIT BOXES:

The IEC standard location is on the top of the motor, with optional left side mounting indicated as F1 or right-side location indicated as F2. Terminal boxes can generally be rotated 4x90 degrees and terminal posts ensure easy lead connection.

The NEMA®* standard location is on the left side of the motor, facing the output shaft, and is indicated as F1. A right-side location is indicated as F2, and a location on top of the motor is indicated as F0 or F3. Typically, IEC rated motors will have terminal blocks.

ORIENTATION:

All references to an IEC configuration are based on looking at the motor's drive end shaft, flange type and conduit box location.

CONNECTIONS:

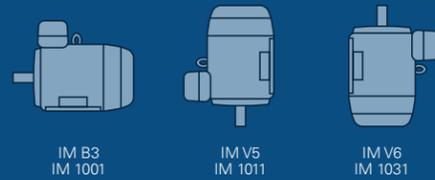
IEC rated motors typically use post- or stud-type terminal blocks, to connect the motor leads to the power leads. Wye-start/delta-run connections are common in Europe and standard in the industry.

In general, 7.5kW ratings and above are wye/delta. IEC rated motor leads are marked U1, V1, W1 etc. NEMA®* rated motor leads are typically marked T1, T2, T3, etc.

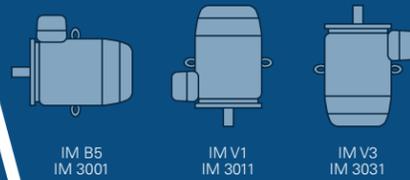
MOUNTING CODES:

LEESON® Passport series IEC rated motors are offered in foot-mounted B3, B3/B5, B3/B14 configurations, as well as vertical shaft-down mounted V5 and V1/V5 configurations. See the line drawings below to reference your installation needs.

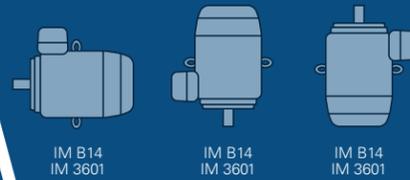
Foot-mounted



Flange-mounted, large flange



Flange-mounted, small flange



Foot- and flange-mounted with feet, large flange



Foot- and flange-mounted with feet, small flange



NEMA	—	42	48	56	145	—	182	184	213	215	254	256	284	286	324	326	364	365	404	405	444	445	447	449
IEC	56	63	71	80	90	100L	112S	112M	132S	132M	160M	160L	180M	180L	200M	200L	225S	225M	250S	250M	280S	280M	*280H	*280H

*Available in 315 K or M Frame (contact sales).

IEC MOTORS:

ALUMINUM FRAME AND CAST IRON FRAME HIGHLIGHTS

The Leeson® IRIS® insulation system provides superior protection against voltage spikes induced by variable frequency drives. Refer to page 7 to review the complete line of LEESON Passport series IEC rated motors

IP55 weatherproof enclosure enables use in a wide range of applications.

IRIS® inverter duty insulation system provides superior protection against voltage spikes induced by variable frequency drives.



D flange (B5) and C flange (B14) models available. Field conversion kits also offered.

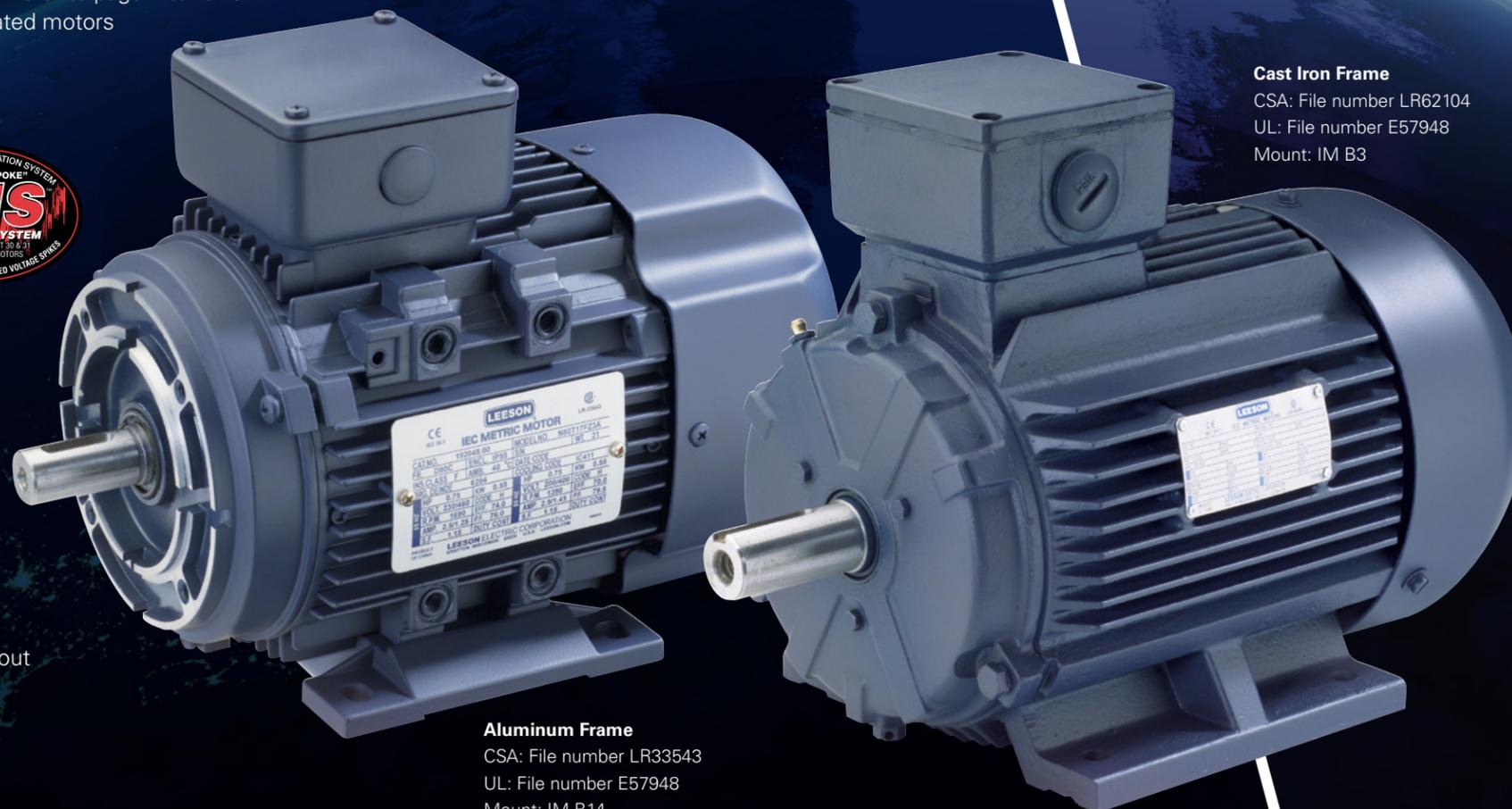
"Captive shaft" keyway.

Drilled and tapped shaft.

Oil seals on both the drive and non-drive end.

Drain hole locations in four quadrants can be drilled out for multi-position condensate drainage.

Removable feet on aluminum frame models.



Aluminum Frame
CSA: File number LR33543
UL: File number E57948
Mount: IM B14

Cast Iron Frame
CSA: File number LR62104
UL: File number E57948
Mount: IM B3

Conduit box with neoprene gaskets. Reposition metric "PG" tapped lead exit hole by rotating the box in 90 degree increments.

Terminal boards included.

Non-sparking fan and small size reduces noise and enhances efficiency.

Steel fan cover.

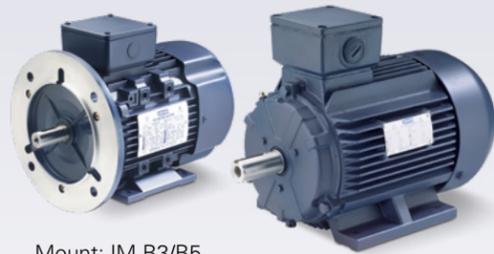
Full-face nameplate with information on motor efficiency and power factor. Both 60 Hz and 50 Hz data is listed.

High efficiency design utilizes low-loss steel laminations for optimum power and performance.

Class F insulation system with Class B temperature rise or lower.

Heavy-duty cast iron construction, 100 frame and larger, including frame, endbells and conduit box.

Rigid cast iron mounting feet on 100 frame and larger motors.



Mount: IM B3/B5



Mount: IM B3



Mount: IM B3/450 Frame (custom)

LEESON® PASSPORT SERIES MOTOR.

STOCK STANDARD SOLUTIONS READY TO DELIVER FROM LOCATIONS ACROSS THE COUNTRY.

IEC Rated Motors



	Aluminum Frame AC	Cast Iron Frame AC	Permanent Magnet DC	Commercial Duty DC	Stainless
Enclosure Type	TEFC	TEFC	TENV – TEFC	TENV	TENV – TEFC
Range	0.18 kW–2.2 kW	1.5 kW–37 kW	0.06 kW–2.2 kW	0.050–0.125 kW	0.25–1.5 kW
Voltage	230/460 & 575	230/460 & 575	24 & 180 Volts DC	12, 24 & 90 Volts DC	230/460 Volts
Speed	2, 4 & 6-Pole	2, 4 & 6-Pole	3000 & 1800 RPM	3000	1800 RPM
Frequency	60 Hz (50 Hz derated to next lowest HP)	60 Hz (50 Hz derated to next lowest HP)	DC	DC	60 Hz (50 Hz derated to next lowest HP)
IEC Frame	63–90	100–250	56, 63, 80, 90, 112	56	71–90
Mounting Flanges	B3, B5 and B14	B3, B5 and B14	B3, B5 & B14	B14	B5 & B14
Ambient	40°C	40°C	40°C	40°C	40°C
Insulation	Class F Class B Rise	Class F Class B Rise	Class F	Class F	Class F Class B Rise
NEMA®* Design B Breakdown Torque	175–300%	175–300%	N/A	N/A	NEMA Design B Breakdown Torque 175–300%
IEC Design N Breakdown Torque	160–200%	160–200%	N/A	N/A	IEC Design N Breakdown Torque 160–200%
NEMA Design B Lock Rotor Torque	70–275%	70–275%	N/A	N/A	NEMA Design B Lock Rotor Torque 70–275%
IEC Design N Lock Rotor Torque	75–275%	75–275%	N/A	N/A	IEC Design N Lock Rotor Torque 75–275%
Service Factor	1.15	1.15	1.0	1.0	1.15
Inverter Duty	10:1	10:1	SCR 10:1	SCR 10:1	6:1
Warranty	3 Years—Premium Efficient Models	3 Years	1 Year	1 Year	3 Years
Accessories	B5 & B14 Flange Kits	B5 & B14 Flange Kits	B5 & B14 Flange Kits	N/A	N/A
Shaft Seals	Yes	Yes	Yes	Yes	Yes
Terminals Boards	Yes	Yes	N/A	N/A	N/A
IP Construction	IP55	IP55	IP54	IP44	IP56 (Encapsulated designs available)
Efficiency	IE2, IE3 (90 Frame) EPACT and NEMA Premium®*	IE3—NEMA Premium	Varies by HP	Varies by HP	Standard and EPACT
Removable Base	Yes	No	Yes	No Base	No

THE FORMULAS FOR SUCCESS.

Once you get to know the LEESON® IEC rated motor product line, you'll find a world of applications waiting for these solutions. To know the product is one thing—understanding the technical relationships with NEMA® rated motors is another. We are confident that the formulas below will help you when specifying a LEESON Passport series IEC rated motor.

HORSEPOWER AND KILOWATTS	<p>HP → kW: HP * 0.746 = kW</p> <p>kW → HP: kW * 1.3410 = HP</p>	<p>Example: HP to kW Motor: 25HP NEMA (25 * 0.746) = 18.7kW</p>
FULL LOAD TORQUE AND HORSEPOWER	<p>Full Load Torque: FLTRQ = (HP * 5252) / RPM</p> <p>Horsepower: HP = (TRQ * FL RPM) / 5252</p>	<p>Example: Full Load Torque Motor: 50HP, 1800 RPM (50 * 5252) / 1800 = 145.9 ft-lbs</p>
NEWTON METERS AND FOOT POUNDS	<p>Newton Meters: Nm = √3 * ft-lbs</p> <p>Foot Pounds: LB-FT = 1.36 * Nm</p> <p>NOTE: Torque units = ft-lbs</p>	<p>Example: Ft-Lbs to Nm Motor: 10HP, 1800 RPM = 30 ft-lbs 30 * 1.36 = 40.8 Nm</p>
KVA/HP AND LOCKED ROTOR AMPS (STARTING AMPS)	<p>LRA: LRA = (KVA/HP * 1000 * HP) / (V * √3)</p> <p>KVA/HP: KVA/HP = (√3 * V * LRA) / (1000 * HP)</p>	<p>Example: LRA Motor: 93kW (125HP), NEMA Code G, 460V (6.29 * 1000 * 125) / (460 * 1.73205) = 987 Amps</p> <p>Example: KVA/HP Motor: 93kW (125HP), NEMA Code G, 460V (1.73205 * 460 * 987) / (1000 * 125) = 6.29</p>
KILOVOLT-AMPS AND 3-PHASE FULL LOAD AMPS	<p>KVA: KVA = √3 * V * FLA / 1000</p> <p>3-Phase FLA: FLA = (746 * HP) / (Volts * Eff. * PF * √3)</p>	<p>Example: 3-Phase FLA Motor: 93kW (125HP), 95.4% Efficiency, 86.0% PF (746 * 125) / (460 * .954 * .86 * 1.73205) = 143</p>

Scan this QR code with your smart phone to download catalog pages of the LEESON® Passport series motor. Visit regalbeloit.com/Brands/LEESON for more details.





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APPLICATION CONSIDERATIONS

The proper selection and application of power transmission products and components, including the related area of product safety, is the responsibility of the customer. Operating and performance requirements and potential associated issues will vary appreciably depending upon the use and application of such products and components. The scope of the technical and application information included in this publication is necessarily limited. Unusual operating environments and conditions, lubrication requirements, loading supports, and other factors can materially affect the application and operating results of the products and components and the customer should carefully review its requirements. Any technical advice or review furnished by Regal Beloit America, Inc. and/or its affiliates ("Regal") with respect to the use of products and components is given in good faith and without charge, and Regal assumes no obligation or liability for the advice given, or results obtained, all such advice and review being given and accepted at customer's risk.

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