marathon®
Motors

# HGM / HGMT CATALOGUE

STANDARD EFFICIENCY
CAST IRON

REGAL®

# HGM & HGMT SERIES, STANDARD EFFICIENCY, CAST IRON SIZES 71 TO 315, 0.37 TO 160kW, THREE PHASE

# INTRODUCTION

Standard HGM motors are three phase squirrel cage TEFC (Totally Enclosed Fan Cooled), with IEC frame sizes from 71 to 315, with CENELEC frame allocation as standard. They combine excellent electrical characteristics with the robust strength of cast iron.

In addition to standard design, the range includes:

**HGMB** - Brake motors
**HGMC** - Cooling tower application
**HGMR** - Airstream rated for axial flow fans

All units are supplied with F Class insulation, with temperature rise being limited to less than 80K (unless otherwise marked). This provides the end user with a wide safety margin under general operating conditions.

In addition we also offer motors wound with H Class insulation and temperature rise still limited to 80K.

**HGMH** - High ambient temperature application

Additional protection is provided by installation of 150°C thermistors in all units from 160 frame upward to continuously protect the winding.

The conservative rating of Regal Australia type HGM motors provides additional operational safeguards, ensures long unit life, and renders this series inherently suitable for most arduous mining, industrial or agricultural applications.

## EFFICIENCY

The HGM range meets or exceed MEPS2 requirements of AS/NZS1359.5:2004 with many sizes meeting High Efficiency levels of the same standard. HGM motors exceed European Eff1 levels and correspond to IE2 (High Efficiency) of the new international standard IEC60034-30-1.

## STANDARDS AND SPECIFICATIONS

The main dimensions and rated outputs of Regal Australia type HGM motors generally conform to International Standards IEC60034, IEC60072 and Australian Standard AS1359.

## PRODUCT CODE SPECIFICATION

When placing an order, the motor product code should be specified. The product code of the motor is composed in accordance with the following example:

| M | 3 | 2 | 0 | 0 | 1 | 5 | 0 | 3 | H | G | M | T | | / | A | 0 | 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 - 8 | | | | | 9 | 10 - 12 | | | 13 | 14... | Suffix | | | |

**POSITION 1**
**M** = metric frame size

**POSITION 2**
Winding design
**3** = Standard three phase motors

**POSITION 3**
Number of poles
**2** = 2 poles
**4** = 4 poles
**6** = 6 poles
**8** = 8 poles

**POSITIONS 4 TO 8**
Rated power output
(kW x 100)

**POSITION 9**
Mounting arrangements

| | | |
|---|---|---|
| **1** = V1 | **5** = B5 | **8** = B3/B14B |
| **3** = B3 | **6** = B3/B14A | **9** = B14B |
| **4** = B3/B5 | **7** = B14A | |

**POSITIONS 10 TO 12**
Series
**HGM** = Regal Australia HGM series

**POSITIONS 13**
Terminal box position
**T** = Top mount terminal box
**L** = Left mounted terminal box

**POSITIONS 14...***
Series variation
**BLANK** = Standard
**B** = Brake motor
**C** = Cooling tower motors
**F** = Flying leads
**H** = 'H' class insulation
* Multiple letters indicate multiple variation.

**SUFFIX**
Winding design
**BLANK** = 380 - 415V/50Hz, 440 - 480V/60Hz

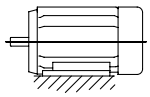
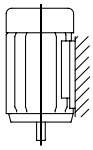
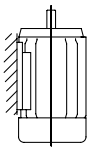
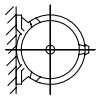
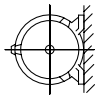
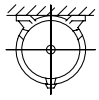
| | |
|---|---|
| **/A05** = 1000V/50Hz | **/386** = 380V/60Hz |
| **/B05** = 1100V/50Hz | **/525** = 525V/50Hz |

# MECHANICAL DESIGN

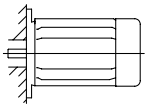
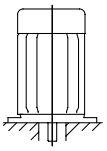
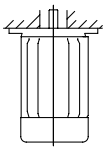
## MOUNTINGS

Regal Australia HGM/HGMT motors are available in the mounting arrangements listed in the table below:

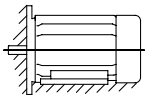
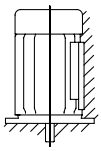
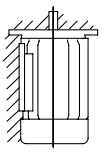
**Foot mount**

| | | | | | |
|---|---|---|---|---|---|
|  B3 (IM1001) [71 - 315] |  V5 (IM1011) [71 - 280] |  V6 (IM1031) [71 - 280] |  B6 (IM1051) [71 - 180] |  B7 (IM1061) [71 - 180] |  B8 (IM1071) [71 - 180] |

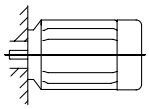
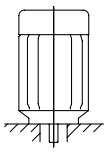
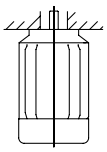
**Large flange**

| | | |
|---|---|---|
|  B5 (IM3001) [71 - 250] |  V1 (IM3011) [71 - 315] |  V3 (IM3031) [71 - 180] |

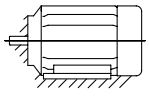
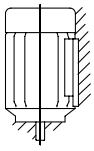
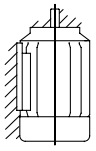
**Large flange and feet**

| | | |
|---|---|---|
|  B3/B5 (IM2001) [71 - 315] |  V1/V5 (IM2011) [71 - 180] |  V3/V6 (IM2031) [71 - 180] |

**Small flange (face)**

| | | |
|---|---|---|
|  B14 (IM3601) [71 - 160] |  V18 (IM3611) [71 - 160] |  V19 (IM3631) [71 - 160] |

**Small flange (face) and feet**

| | | |
|---|---|---|
|  B3/B14 (IM2101) [71 - 160] |  V5/V18 (IM2111) [71 - 160] |  V6/V19 (IM2131) [71 - 160] |

Note: Bearing arrangement may require review for vertical shaft mounting.

## PROTECTION

**For vertically mounted motors**
Motors to be mounted with the shaft vertically down must be provided with a suitable cover (available on request) to ensure foreign bodies are prevented from blocking the air intake.

Special care is necessary in fitting protective covers to ensure air flow is not impeded (refer to Cooling section on page 7).

To maintain IP rating, special additional measures may be required to protect the motor against the ingress of water or foreign bodies.

Please contact Regal Australia for further information.

**Against solar radiation**
High solar radiation will result in undue temperature rise.

In these circumstances, motors should be screened from solar radiation by placement of adequate sunshades which do not inhibit air flow.

**Degree of protection**
Standard levels of enclosure protection for all HGM frame sizes for both motor and terminal box is IP55, with IP56, IP65 and IP66 available on request.

Enclosure designations comply with IEC or AS60529. The enclosure protection required will depend upon the environmental and operational conditions within which the motor is to operate.

**IP standards explanation**

| IP | 5 | 5 |
|---|---|---|
| 1-2 | 3 | 4 |

**Positions 1 and 2**
International protection rating prefix

**Position 3**
First characteristic numeral
Degree of protection of persons against approach to live parts or contact with live or moving parts (other than smooth rotating shafts and the like) inside the enclosure, and degree of protection of equipment within the enclosure against the ingress of solid foreign bodies.

4 = *Protected against solid object greater than 1.0 mm*: Wires or strips of thickness greater than 1.0 mm, solid objects exceeding 1.0 mm dia.
5 = *Dust protected*: Ingress of dust is not totally prevented but it does not enter in sufficient quantity to interfere with satisfactory operation of the equipment.
6 = *Dust tight*: No ingress of dust.

**Position 4**
Second characteristic numeral
4 = *Protected against splashing water*: Water splashed against the enclosure from any direction shall have no harmful effect.
5 = *Protected against water jets*: Water projected by a nozzle against the enclosure from any direction shall have no harmful effect.
6 = *Protected against heavy seas*: Water from heavy seas or water projected in powerful jets (larger nozzle and higher pressure than second numeral 5) shall not enter the enclosure in harmful quantities.

## MATERIALS AND CONSTRUCTION

| Element | Motor frame size | |
|---|---|---|
| | 80-180 | 200-315 |
| Frame | Cast iron | Cast iron |
| Endshields | Cast iron | Cast iron |
| Terminal box | Cast iron | Cast iron |
| Fan | Plastic (cast iron optional) | Cast iron |
| Fan cowl | Sheet steel | Sheet steel |
| Fasteners | Corrosion protected | Corrosion protected |

**Shaft**
HGM motors have standard shaft extension lengths and are provided with standard key, and drilled and tapped hole. Non standard shaft extensions are available upon special order, with shaft design outlined on a detailed drawing.

Shaft extension run out, concentricity and perpendicularity to face of standard flange mount motors, comply with normal grade tolerance as specified in IEC 60072-1. Precision grade tolerance is available upon special order.

**Finish**
Standard HGM motor color is RAL 7030 Stone Grey. Other colors are also available. All castings and steel parts are provided with a prime coat of rust-resistant paint.
The finishing coat of enamel paint is sufficient for normal conditions, however special paint systems can be provided to accommodate stringent requirements for motors in corrosive environments. Special coatings are needed to resist such substances as acid, salt water and extreme climatic conditions.

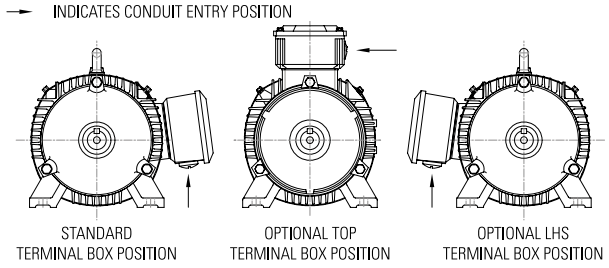
Different colors and paint systems apply for application specific motors as identified later in this catalogue.

## TERMINAL BOX

HGM motors have a cast iron terminal box with a one piece nitrile rubber barrier gasket between terminal box and motor, and a flat gasket under the terminal box lid. The earthing arrangement is available within the terminal box.

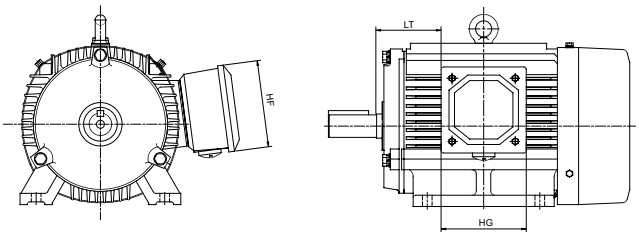
As standard, the terminal box is mounted on the right hand side, when viewed from the drive end. Motors are also available with terminal boxes on top and on the left hand side.

The terminal box can be rotated through 4 positions at 90° intervals.




Conduit entries for motor frame sizes 80 to 315 are provided tapped, with thread details set out below.

| Motor frame | Dimension BL [ mm ] |
|---|---|
| 80-100 | 15 |
| 112-132 | 30 |
| 160-180 | 40 |
| 200-280 | 50 |
| 315 | 65 |



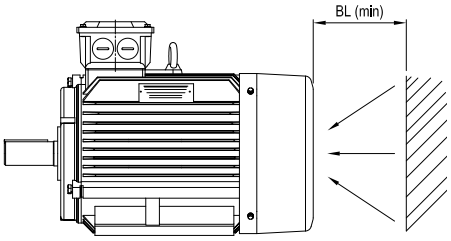

| Motor frame | Dimension BL [ mm ] |
|---|---|
| 80-100 | 15 |
| 112-132 | 30 |
| 160-180 | 40 |
| 200-280 | 50 |
| 315 | 65 |

## COOLING

HGM motors are totally enclosed fan cooled (TEFC) over an externally ribbed frame, with free movement of internal air by rotation of rotor blades, which is in accordance with IC0141 of IEC 60034-6 and AS1359.106.

Cooling air flows from the non-drive-end to the drive end. The fan is independent of the direction of rotation of the motor.

When the motor is installed care should be taken not to impede the air flow into the motor cowl. As a guide, the following minimum dimension BL should be adopted.




| Motor frame | Dimension BL [ mm ] |
|---|---|
| 80-100 | 15 |
| 112-132 | 30 |
| 160-180 | 40 |
| 200-280 | 50 |
| 315 | 65 |

## BEARINGS

As standard, frame sizes 80 to 160 have high quality deep groove sealed ball bearings. Bearings are prepacked with grease which, under normal operating conditions provides a high degree of operational reliability. Frame sizes 180 to 315 have high quality bearings with facilities to enable replenishment of the lubricant during operation. Grease nipples are fitted to end shields with the grease relief blanked off by a removable plug.

The table below sets out the permissible forces that can be applied to the motor shaft. Values assume the occurrence of only radial or axial loading. Point of application of the force is assumed to be at the tip of the shaft. Rotor weights have already been allowed for in the calculation of radial and axial loads. These loads are applicable for horizontal mounting only. The values are calculated on the basis of basic rating life or fatigue life $L_{10}$ of 40,000 hours. Adjusted rating life for specific applications can be calculated if all influencing factors are known.

Greater axial forces can be tolerated if the motors are provided with angular contact ball bearings. Note that in such cases, the axial force must operate in one direction.

Bearing arrangement should be reviewed for motor frame sizes 180 and above if they are vertically mounted. Please contact Regal Australia for further information.

**High capacity bearings**

For frame sizes 180 to 280 in applications with increased radial force, cylindrical roller bearings can be substituted for ball bearings at the drive end, according to the accompanying table. When a roller bearing is fitted to the D-end, the N-end ball bearing is locked with a circlip to prevent axial movement. Note that the use of roller bearings is not recommended for 2 pole motors.

## LUBRICATION

HGM/HGMT motors with open bearings are lubricated with a polyurea based rolling contact bearing grease (Polyrex* EM) suitable for operation within the cooling air temperature range of -20°C to +55°C. For operation outside this temperature range special lubricants are required.

Special lubricants or additional maintenance may be required in the case of motors exposed to comparatively high degrees of pollution, high humidity, increased or changed bearings loads, or prolonged continuous operation.

## BALANCING

Rotors have been dynamically balanced with a half key. Pulleys or couplings used with motors must also be appropriately balanced.

**Permissible radial force - high capacity**

| Motor frame | D-end Roller | N-end Ball | Permissible radial force [ N ] | | |
|---|---|---|---|---|---|
| | | | 4 pole | 6 pole | 8 pole |
| 200 | NU312 | 6312 | 5825 | 6730 | 7455 |
| 225 | NU313 | 6313 | 6015 | 7055 | 7740 |
| 250 | NU314 | 6314 | 7295 | 8420 | 9315 |
| 280 | NU317 | 6317 | 13445 | 15320 | 16770 |

**Permissible radial and axial forces – standard B3 mounted motors**

| Motor frame | Bearing | | Permissible radial force [ N ] | | | | Permissible axial force [ N ] | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | D-end | N-end | 2 pole | 4 pole | 6 pole | 8 pole | 2 pole | 4 pole | 6 pole | 8 pole |
| 80 | 6204-2Z | 6204-2Z | 465 | 595 | 685 | - | 395 | 540 | 650 | - |
| 90 | 6205-2Z | 6205-2Z | 490 | 620 | 720 | - | 415 | 570 | 685 | - |
| 100 | 6206-2Z | 6206-2Z | 700 | 885 | 1030 | 1140 | 570 | 775 | 940 | 1075 |
| 112 | 6306-2Z | 6306-2Z | 960 | 1230 | 1415 | 1575 | 785 | 1080 | 1305 | 1515 |
| 132 | 6308-2Z | 6308-2Z | 1410 | 1815 | 2095 | 2320 | 1160 | 1590 | 1910 | 2200 |
| 160 | 6309-2Z | 6309-2Z | 1825 | 2345 | 2710 | 3020 | 1470 | 2030 | 2450 | 2800 |
| 180 | 6311-2Z | 6311-2Z | 2495 | 3200 | 3765 | 4200 | 1985 | 2700 | 3265 | 3755 |
| 200 | 6312 | 6312 | 2905 | 3745 | 4345 | 4825 | 2220 | 3055 | 3705 | 4225 |
| 225 | 6313 | 6313 | 3265 | 4010 | 4725 | 5205 | 2460 | 3385 | 4120 | 4730 |
| 250 | 6314 | 6314 | 3570 | 4635 | 5370 | 5960 | 2730 | 3775 | 4560 | 5220 |
| 280-2 | 6314 | 6314 | 3455 | | | | 2605 | | | |
| 280-4,6,8 | 6317 | 6317 | | 8170 | 9360 | 10270 | | 4560 | 5580 | 6365 |
| 315-2 | 6316 | 6316 | 3550 | | | | 2730 | | | |
| 315-4,6,8 | NU319 | 6319 | | 15720 | 17925 | 19660 | | 4835 | 5890 | 6770 |

* Polyrex is believed to be the trademark of Exxon Mobil Corporation and is not controlled by Regal Beloit Corporation.

**Vibration, balancing and noise Vibration**

HGM/HGMT motors fall within the Level N (normal) limits of vibration severity set out in standards IEC 60034-14 and AS1359.114 (which are listed in the table below). As specified in the standards, these values relate to rotating machinery measured in soft suspension.

**Vibration severity limit, Level N**

| Motor frame | Maximum RMS ibration velocity [ mm/s ] |
|---|---|
| 80 | 1.8 |
| 90 | 1.8 |
| 100 | 1.8 |
| 112 | 1.8 |
| 132 | 1.8 |
| 160 | 2.8 |
| 180 | 2.8 |
| 200 | 2.8 |
| 225 | 2.8 |
| 250 | 3.5 |
| 280 | 3.5 |
| 315 | 3.5 |

## NOISE

Noise levels for HGM/HGMT motors comply with limits set by IEC 60034.9. HGM/HGMT sound pressure levels at 1 metre are set out in the table (above right). Data relates to motors tested at no load.

**Sound pressure level**

| Output [ kW ] | Sound pressure level dB(A) at 1 metre | | | |
|---|---|---|---|---|
| | 3000 r/min | 1500 r/min | 1000 r/min | 750 r/min |
| 0.75 | 65 | 61 | 59 | 56 |
| 1.1 | 65 | 61 | 60 | 56 |
| 1.5 | 69 | 61 | 60 | 56 |
| 2.2 | 69 | 63 | 60 | 56 |
| 3.0 | 72 | 63 | 64 | 59 |
| 4.0 | 72 | 67 | 64 | 59 |
| 5.5 | 76 | 68 | 68 | 65 |
| 7.5 | 76 | 71 | 68 | 65 |
| 11 | 80 | 72 | 70 | 65 |
| 15 | 80 | 74 | 70 | 67 |
| 18.5 | 80 | 74 | 70 | 67 |
| 22 | 85 | 74 | 70 | 68 |
| 30 | 87 | 76 | 73 | 70 |
| 37 | 87 | 76 | 73 | 70 |
| 45 | 89 | 76 | 76 | 70 |
| 55 | 89 | 78 | 76 | 74 |
| 75 | 91 | 81 | 78 | 76 |
| 90 | 91 | 81 | 78 | 76 |
| 110 | 92 | 84 | 79 | 76 |
| 132 | 92 | 86 | 80 | - |
| 160 | 92 | 87 | - | - |

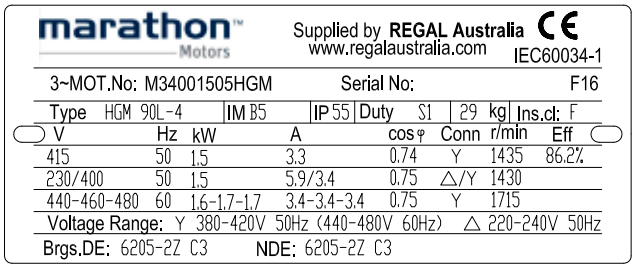
# ELECTRICAL DESIGN

As standard, HGM/HGMT motors have the following design and operating parameters. Performance data is based on this standard. Any deviation should be examined and performance values altered in accordance with the information provided in this section.

Three phase, 380 - 415V/ 50Hz, 440 - 480V/ 60Hz
Ambient cooling air temperature, 40°C
Altitude - 1000m
Duty cycle - S1 (continuous)
Rotation - Clockwise viewed from drive end
Connection - 240V Delta/415V Star (3kW and below)
- 415V Delta/720V Star (4kW and above)

## NAMEPLATE DESIGN

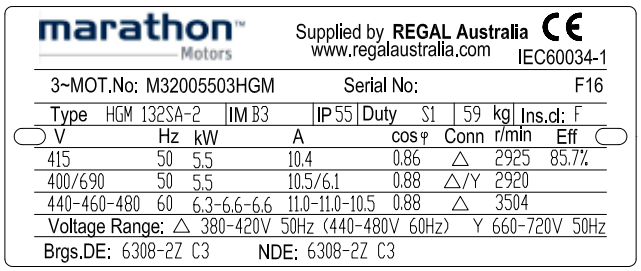
Standard HGM/HGMT motors are suitable to operate at 380-415V 50Hz and 440-480V 60Hz supplies. This is indicated on the standard nameplate design as shown below.


marathon Motors
Supplied by REGAL Australia
www.regalaustralia.com
CE IEC60034-1
3~MOT.No: M34001505HGM Serial No: F16
Type HGM 90L-4 | IM B5 | IP 55 | Duty S1 | 29 kg | Ins.cl: F

| V | Hz | kW | A | cosφ | Conn | r/min | Eff |
|---|---|---|---|---|---|---|---|
| 415 | 50 | 1.5 | 3.3 | 0.74 | Y | 1435 | 86.2% |
| 230/400 | 50 | 1.5 | 5.9/3.4 | 0.75 | △/Y | 1430 | |
| 440-460-480 | 60 | 1.6-1.7-1.7 | 3.4-3.4-3.4 | 0.75 | Y | 1715 | |

Voltage Range: Y 380-420V 50Hz (440-480V 60Hz) △ 220-240V 50Hz
Brgs.DE: 6205-2Z C3 NDE: 6205-2Z C3

TYPICAL NAMEPLATE LAYOUT FOR MOTORS
UP TO 3.0kW


marathon Motors
Supplied by REGAL Australia
www.regalaustralia.com
CE IEC60034-1
3~MOT.No: M32005503HGM Serial No: F16
Type HGM 132SA-2 | IM B3 | IP 55 | Duty S1 | 59 kg | Ins.cl: F

| V | Hz | kW | A | cosφ | Conn | r/min | Eff |
|---|---|---|---|---|---|---|---|
| 415 | 50 | 5.5 | 10.4 | 0.86 | △ | 2925 | 85.7% |
| 400/690 | 50 | 5.5 | 10.5/6.1 | 0.88 | △/Y | 2920 | |
| 440-460-480 | 60 | 6.3-6.6-6.6 | 11.0-11.0-10.5 | 0.88 | △ | 3504 | |

Voltage Range: △ 380-420V 50Hz (440-480V 60Hz) Y 660-720V 50Hz
Brgs.DE: 6308-2Z C3 NDE: 6308-2Z C3

TYPICAL NAMEPLATE LAYOUT FOR MOTORS
4.0kW AND ABOVE

Nameplate currents correspond to the mid-point of the supply range when indicated. Currents and torques at other supplies in reference to standard 415V 50Hz supply are shown in table above right.

| Supply | | Data[1] in percentage of values at 415V/ 50Hz supply | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Output | r/min | $I_N$ | $I_L/I_N$ | $T_N$ | $T_L/T_N$ | $T_B/T_N$ |
| 380V | 50Hz | 100 | 100 | 109 | 84 | 100 | 84 | 84 |
| 400V | 50Hz | 100 | 100 | 104 | 93 | 100 | 93 | 93 |
| 415V | 60Hz | 100 | 120 | 98 | 83t | 83 | 70 | 85 |
| 440V | 60Hz | 105 | 120 | 98 | 90 | 87 | 80 | 90 |
| 460V | 60Hz | 110 | 120 | 98 | 95 | 91 | 85 | 94 |
| 480V | 60Hz | 115 | 120 | 100 | 100 | 96 | 95 | 98 |

[1] $I_N$ Full load current; $T_N$ Full load torque; $I_L/I_N$ Locked rotor current/ full load current; $T_L/T_N$ Locked rotor torque/ full load torque; $T_B/T_N$ Breakdown torque/full load torque

## ALTERNATIVE SUPPLIES

HGM/HGMT motors can be manufactured for any voltage between 100V and 1100V and frequencies other than 50Hz. In case motor winding is designed for a specific voltage x, performance data will be in line with standard 415V data except current which is calculated with the following formula:

$$I_X = \frac{415 \times I_N}{U_X}$$

Where:
$I_X$ = Current
$I_N$ = Full load current at 415 volt
$U_X$ = Design voltage

## TEMPERATURE AND ALTITUDE

Rated power specified in the performance data tables apply for standard ambient conditions of 40°C at 1000m above sea level. Where temperature or altitude differ from the standard, multiplication factors in the table below should be used.

| Ambient temperature | Temperature factor | Altitude above sea level | Altitude factor |
|---|---|---|---|
| 30°C | 1.06 | 1000m | 1.00 |
| 35°C | 1.03 | 1500m | 0.98 |
| 40°C | 1.00 | 2000m | 0.94 |
| 45°C | 0.97 | 2500m | 0.91 |
| 50°C | 0.93 | 3000m | 0.87 |
| 55°C | 0.88 | 3500m | 0.82 |
| 60°C | 0.82 | 4000m | 0.77 |

**Effective Power = Rated Power x Temperature Factor x Altitude Factor**

Example 1

Effective Power required = 15kW
Air temperature = 50°C (factor 0.93)
Altitude = 2500 metres (factor 0.91)

$$\text{Rated power required} = \frac{15}{0.93 \times 0.91} = 17.7\text{kW}$$

The appropriate motor is one with a rated power above the required, being 18.5kW.

Example 2

Rated power = 11kW
Air temperature = 50°C (factor 0.93)
Altitude = 1500 metres (factor 0.98)

**Effective Power = 11 x 0.93 x 0.98 = 10.0kW**

## ROTATION

For clockwise rotation viewed from drive end, standard three phase HGM/HGMT motor terminal markings coincide with the sequence of the phase line conductors.

For counter clockwise rotation, viewed from drive end, two of the line conductors have to be reversed. This is made clear in the accompanying table.

| Terminal box location (viewed from drive end) | Sequential connection of L1, L2 and L3 | Direction of rotation |
|---|---|---|
| Right or Top | U1 V1 W1<br>V1 U1 W1 | Clockwise<br>Counter-clockwise |
| Left | V1 U1 W1<br>U1 V1 W1 | Clockwise<br>Counter-clockwise |

## DUTY

HGM/HGMT motors are supplied suitable for S1 operation (continuous operation under rated load). When the motor is to operate under any other type of duty the following information should be supplied to determine the correct motor size:

- Type and frequency of switching cycles as per duty factors S3 to S7 and duty cycle factor.
- Load torque variation during motor acceleration and braking (in graphical form).
- Moment of inertia of the load on the motor shaft.
- Type of braking (eg mechanical, electrical through phase reversal or DC injection).

### Permissible output

Apply the factors in the accompanying table to the output rating for motors with duty cycles that are not continuous.

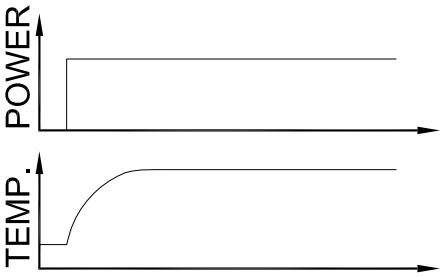
| | Poles | Duty cycle factor | | |
|---|---|---|---|---|
| | | For frames 80 to 132 | For frames 160 to 250 | For frames 280 to 315 |
| **Short-time duty, S2** | | | | |
| 30 min | 2 | 1.05 | 1.20 | 1.20 |
| | 4 to 8 | 1.10 | 1.20 | 1.20 |
| 60 min | 2 to 8 | 1.00 | 1.10 | 1.10 |
| **Intermittent duty, S3** | | | | |
| 15% | 2 | 1.15 | 1.45 | 1.40 |
| | 4 to 8 | 1.40 | 1.40 | 1.40 |
| 25% | 2 | 1.10 | 1.30 | 1.30 |
| | 4 to 8 | 1.30 | 1.25 | 1.30 |
| 40% | 2 | 1.10 | 1.10 | 1.20 |
| | 4 to 8 | 1.20 | 1.08 | 1.20 |
| 60% | 2 | 1.05 | 1.07 | 1.10 |
| | 4 to 8 | 1.10 | 1.05 | 1.10 |

For other duties (S4, S5, S6 and S7) contact Regal Australia for appropriate duty cycle factors.

## DUTY CYCLES

### S1 Continuous duty

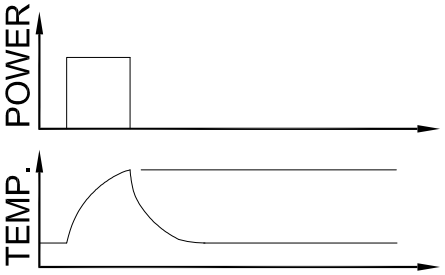
Operation at constant load of sufficient duration for thermal equilibrium to be reached.




| Ambient temperature | Temperature factor | Altitude above sea level | Altitude factor |
|---|---|---|---|
| 30°C | 1.06 | 1000m | 1.00 |
| 35°C | 1.03 | 1500m | 0.98 |
| 40°C | 1.00 | 2000m | 0.94 |
| 45°C | 0.97 | 2500m | 0.91 |
| 50°C | 0.93 | 3000m | 0.87 |
| 55°C | 0.88 | 3500m | 0.82 |
| 60°C | 0.82 | 4000m | 0.77 |

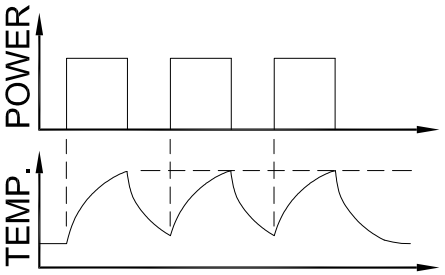
### S2 Short - time duty

Operation at constant load during a given time, less than that required to reach thermal equilibrium, followed by a rest (de-energised) period of sufficient duration to allow machine temperatures to reduce to within 2K of the rated inlet coolant temperature.



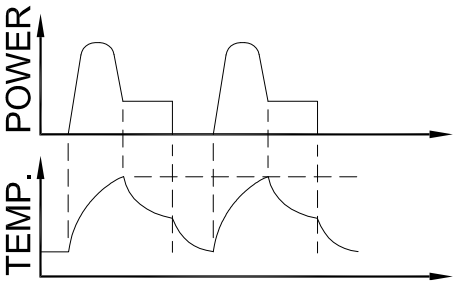

### S3 Intermittent periodic duty with insignificant starting time

A sequence of identical duty cycles where each consists of a period of operating at constant load and a period at rest. The cycle is such that the starting current does not significantly affect the temperature rise.



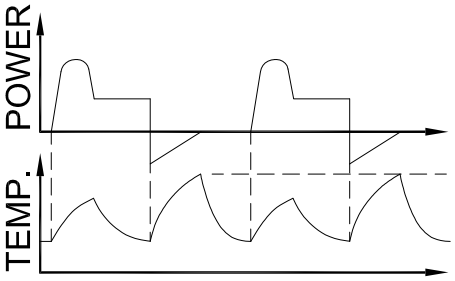

### S4 Intermittent periodic duty with significant starting time

Sequence of identical duty cycles where each cycle consists of a significant period of starting, a period of operation at full load and a period of rest.



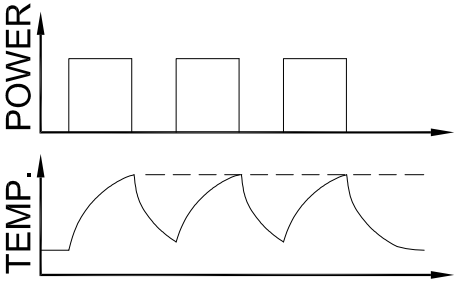

### S5 Intermittent periodic duty with influence of running up period and electric braking

As S4, but with each cycle including a period of rapid electric braking.



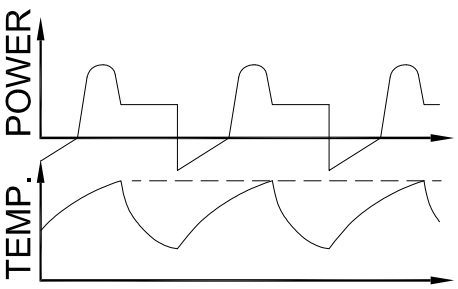

### S6 Continuous periodic duty

A sequence of identical duty cycles, each cycle consisting of a period of operation at no-load. There is no rest or de-energised period.




### S7 Continuous periodic duty with starting and electric braking

As S6, with each cycle including a period of starting and a period of electric braking.



## CONNECTION

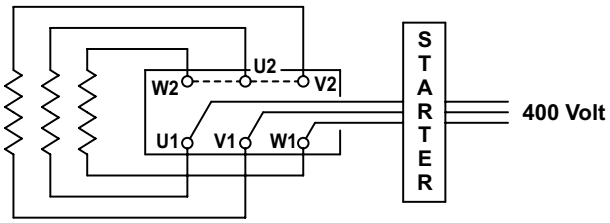
A motor's rated voltage must agree with the power supply line-to-line voltage. Care must therefore be taken to ensure the correct connection to the motor terminals.

### Internal connections, voltages and VF drive selection

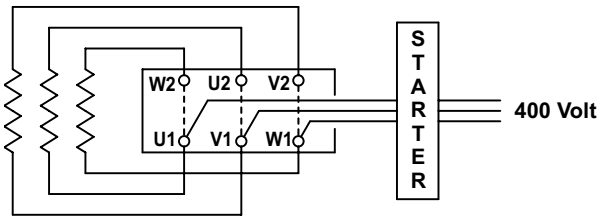
Standard terminal connections for motors 3.0kW and below is 240V delta / 415V star. These motors are designed for 400V Direct On Line (D.O.L.) starting, when connected in the star configuration. They are also suitable for operation with 240V three phase variable frequency drives, when connected in the delta configuration.

Standard terminal connections for motors 4.0kW and above is 415V delta / 720V star. These motors are designed for 415V Direct On Line (D.O.L.) starting, when connected in the delta configuration. They are also suitable for operation with 415V three phase variable frequency drives. Alternatively they can be operated D.O.L. in the star configuration from a 720V supply or with a 720V variable frequency drive. In this case the drive must be supplied with an output reactor to protect the winding insulation. These size motors are also suitable for 415V star-delta starting as described below.

Motor connected for D.O.L. starting with bridges in place for star connection (3.0kW and below)




Motor connected for D.O.L. starting with bridges in place for delta connection (4.0kW and above).




## STARTING

All of the following starter options are available through Regal Australia Drives division, and are best supplied together with the motor.

### D.O.L. Starters

When an electric motor is started by direct connection to the power supply (D.O.L.), it draws a high current, called the 'starting current', which is approximately equal in magnitude to the locked rotor current $I_L$. As listed in the performance data, locked rotor current can be up to 8 times the rated current $I_N$ of the motor. In circumstances where the motor starts under no load or where high starting toque is not required, it is preferable to reduce the starting current by one of the following means.

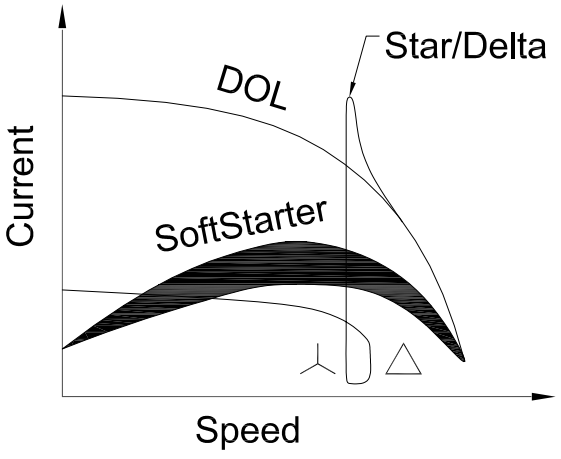
### Star - Delta starting

HGM/HGMT motors 4.0kW and above are suitable for the star-delta starting method. Through the use of a star-delta starter, the motor terminals are connected in the star configuration during starting, and reconnected to the delta configuration when running.

The benefits of this starting method are a significantly lower starting current, to a value approximately 1/3 of the D.O.L. starting current, and a corresponding starting torque also reduced to approximately 1/3 of its D.O.L. value. It should be noted that a second current surge occurs on changeover to the delta connection. The level of this surge will depend on the speed the motor has reached at the moment of changeover.

### Electronic soft starters

Through the use of an electronic soft starter, which controls such parameters as current and voltage, the starting sequence can be totally controlled. The starter can be programmed to limit the amount of starting current. By limiting the rate of the current increase the startup time is extended. This starting method is particularly suitable for centrifugal loads (fans and pumps).



**VVVF Drives**

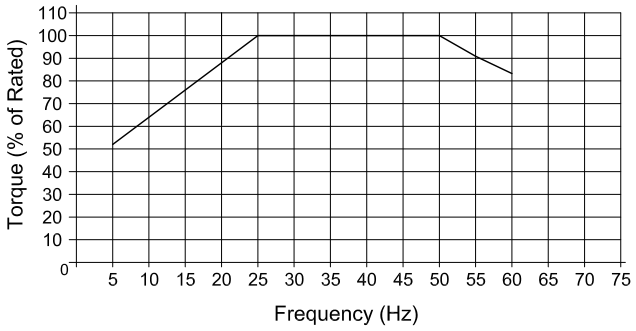
The HGM/HGMT motor performs excellently without cogging at low speed when operating in conjunction with a VVVF (Variable Voltage Variable Frequency) drive. VVVF drives are primarily recognised for their ability to manipulate power from a constant 3 phase 50/60Hz supply converting it to variable voltage and variable frequency power. This enables the speed of the motor to be matched to its load in a flexible and energy efficient manner. The only way of producing starting torque equal to full load torque with full load current is by using VVVF drives. The functionally flexible VVVF drive is also commonly used to reduce energy consumption on fans, pumps and compressors and offers a simple and repeatable method of changing speeds or flow rates.

For operation below 25Hz motor cooling fan efficiency drops significantly. Hence, in constant torque applications, a separately driven cooling fan should be fitted to provide sufficient cooling of the motor.

For operation between 25Hz and 50Hz speed range the motor is capable of delivering full rated torque with its standard fan.

For operation above 50Hz, all HGM/HGMT motors are capable of delivering constant rated power up to 60Hz. However, most of these motors are suitable to run and deliver constant power at much higher frequencies than 60Hz to a maximum of 100Hz. In the case of applications between 60Hz and 100Hz please contact Regal Australia for advice on suitability.

The HGM/HGMT range of motors will operate without modification on VVVF drives however under certain conditions additional features should be considered (see EDM Concerns). The graph below shows the HGM/HGMT motors' loadability with a frequency converter:




**EDM concerns**

Capacitive voltages in the rotor can be generated due to an effect caused by harmonics in the waveform causing voltage discharge to earth through the bearings. This discharge results in etching of the bearing running surfaces. This effect is known as Electrical Discharge Machining (EDM). It can be controlled with the fitment of appropriate filters to the drive.

To further reduce the effect of EDM, an insulated non drive bearing can be used. Regal Australia recommends the use of insulated bearings for all motors 315 frame and above.

## INSULATION

Standard HGM/HGMT series motors are wound with F class insulation and winding designs limit the temperature rise to 80K (unless otherwise noted) for which B Class insulation would normally be sufficient. The use of F class insulation provides an additional safety margin of 25K, as shown in the accompanying table, together with an extended operating life.

| | Insulation class | | |
|---|---|---|---|
| | B | F | H |
| Max. permissible winding temp. (°C) | 130 | 155 | 180 |
| Less ambient temp. (°C) | -40 | -40 | -40 |
| Less hotspot allowance (K) | -10 | -10 | -15 |
| Equals max. permissible temp.rise (K) | 80 | 105 | 125 |
| Less max. design temp. rise (K) | -80 | -80 | -80 |
| Equals min. safety margin (K) | - | 25 | 45 |

The HGMH/HGMTH (Class H) version will provide a safety margin of 45K and can be safely operated at elevated ambient temperatures.

Due to their conservative design, many sizes in the HGM/HGMT range of motors have temperature rises less than 80K and therefore provide even greater safety margins.

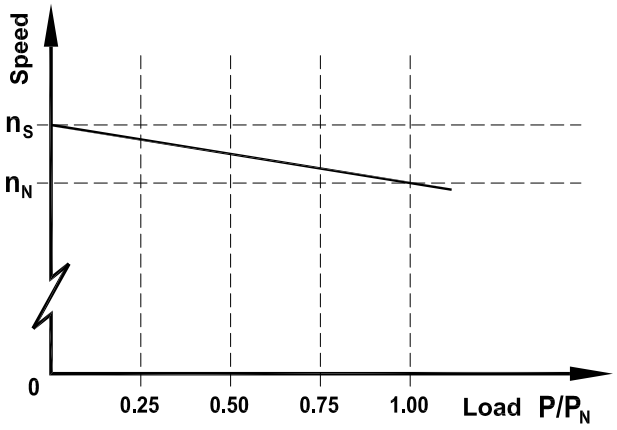
## THERMAL PROTECTION

Motors can be protected against excessive temperature rise by inserting, at various positions within the windings, thermal probes which can either give a warning signal or cut off the supply to the motor in the event of a temperature abnormality.

The units fitted to HGM/HGMT motors, frame sizes 160 and above, are PTC thermistors. These thermovariable resistors, with positive temperature co-efficient, are fitted one per phase, series connected and are terminated in a terminal strip located in the terminal box. Trip temperature is 150°C (180°C for HGMTH series). Additional 130°C thermistors can be fitted as an option for alarm connection.

## SPEED AT PARTIAL LOADS

The relationship between motor speed and degree of loading on an HGM/HGMT motor is approximately linear up to the rated load. This is expressed graphically in the accompanying drawing.




Where:

$n_N$ = full load speed
$n_S$ = synchronous speed
$P/P_N$ = partial load factor

## CURRENT AT PARTIAL LOADS

Current at partial loads can be calculated using the following formula:

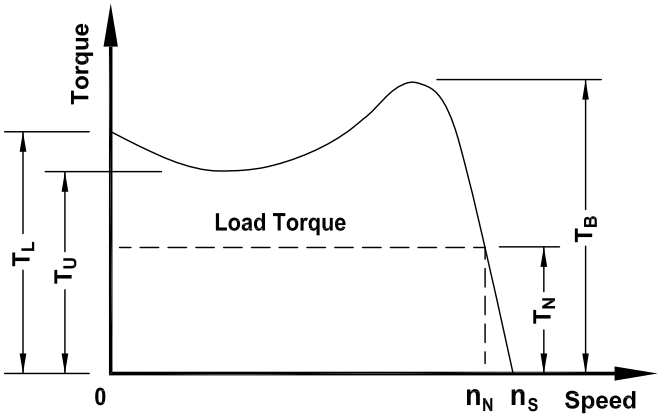
$$I_X = \frac{Pout_X}{\sqrt{3} \times U_N \times \cos\varphi_X \times \eta_X} \times 10^5$$

Where:

$I_X$ = partial load current (amps)
$Pout_X$ = partial load (kW)
$U_N$ = rated voltage
$\cos\varphi_X$ = partial load power factor
$\eta_X$ = partial load efficiency (%)

## TORQUE CHARACTERISTICS

Typical characteristics of torque behaviour relative to speed are shown in the torque speed curve example below.




Where:

$T_N$ = full load torque
$T_L$ = locked rotor torque
$T_U$ = pull-up torque
$T_B$ = break down torque
$n_N$ = full load speed
$n_S$ = synchronous speed

HGM/HGMT motors all exceed the minimum starting torque requirements for Design N (Normal torque) as specified in IEC60034-12.

Rated torque can be calculated with the following formula:

$$T_N = \frac{9550 \times P_N}{n_N}$$

Where:

$T_N$ = full load torque (Nm)
$P_N$ = full load output power (kW)
$n_N$ = full load speed (r/min)

# INSTALLATION, OPERATION & MAINTENANCE

For a copy of the HGM/HGMT Installation, Operation & Maintenance manual, please contact Regal Australia or download from our website at www.regalaustralia.com.au

# PERFORMANCE DATA

## HGM/HGMT SERIES, THREE PHASE 380-415V 50HZ
## IP55, F CLASS INSULATION, B CLASS TEMPERATURE RISE

| kW | Motor frame | | Speed [r/min] | 415V 50Hz | | | | | | | | | | | | | | 380V 50Hz | 400V 50Hz | Moment of inertia $J=¼GD^2$ [kg m²] | Weight of foot mount motor [kg] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Efficiency % | | | | Power factor | | | | Current | | Torque | | | | Current | Current | | |
| | | | | at % full load | | | | at % full load | | | | Full load $I_N$ [A] | Locked rotor $I_L/I_N$ | Full load $T_N$ [Nm] | Locked rotor $T_L/T_N$ | Break down $T_B/T_N$ | | Full load $I_N$ [A] | Full load $I_N$ [A] | | |
| | | | | 125 | 100 | 75 | 50 | 125 | 100 | 75 | 50 | | | | | | | | | | |
| **3000 R/MIN = 2 POLES** | | | | | | | | | | | | | | | | | | | | | |
| 0.75 | 80A | -19 | 2890 | 80.4 | 82.2 | 82.6 | 80.7 | 0.86 | 0.82 | 0.74 | 0.61 | 1.55 | 8.0 | 2.5 | 2.2 | 3.5 | | 1.69 | 1.61 | 0.00068 | 18 |
| 1.1 | 80B | -19 | 2880 | 80.9 | 83.2 | 84.5 | 84.0 | 0.86 | 0.83 | 0.77 | 0.65 | 2.3 | 7.8 | 3.6 | 2.6 | 3.6 | | 2.5 | 2.4 | 0.00080 | 19 |
| 1.5 | 90S | -24 | 2815 | 79.2 | 82.6 | 84.9 | 85.2 | 0.87 | 0.84 | 0.79 | 0.68 | 3.0 | 7.0 | 5.1 | 2.7 | 3.3 | | 3.3 | 3.1 | 0.00093 | 23 |
| 2.2 | 90L | -24 | 2820 | 80.7 | 84.1 | 86.6 | 87.6 | 0.89 | 0.87 | 0.82 | 0.71 | 4.2 | 7.3 | 7.5 | 2.9 | 3.1 | | 4.6 | 4.4 | 0.00119 | 26 |
| 3 | 100L | -28 | 2850 | 82.6 | 85.3 | 87.2 | 87.5 | 0.91 | 0.89 | 0.86 | 0.77 | 5.5 | 7.9 | 10.1 | 2.9 | 3.4 | | 6.0 | 5.7 | 0.00216 | 34 |
| 4 | 112M | -28 | 2870 | 84.0 | 86.3 | 87.9 | 88.1 | 0.93 | 0.93 | 0.89 | 0.81 | 7.0 | 8.8 | 13.3 | 2.7 | 4.2 | | 7.6 | 7.3 | 0.0043 | 44 |
| 5.5 | 132SA | -38 | 2905 | 86.5 | 88.3 | 89.4 | 89.4 | 0.88 | 0.87 | 0.84 | 0.76 | 10.0 | 7.8 | 18.1 | 2.4 | 3.7 | | 10.9 | 10.4 | 0.0113 | 59 |
| 7.5 | 132SB | -38 | 2900 | 86.2 | 88.1 | 89.4 | 89.4 | 0.90 | 0.89 | 0.85 | 0.77 | 13.4 | 7.5 | 24.7 | 2.2 | 3.5 | | 14.6 | 13.9 | 0.0131 | 62 |
| 11 | 160MA | -42 | 2935 | 88.6 | 89.5 | 89.8 | 88.6 | 0.90 | 0.89 | 0.86 | 0.80 | 19.3 | 7.1 | 35.8 | 2.1 | 3.3 | | 21.1 | 20.0 | 0.032 | 109 |
| 15 | 160MB | -42 | 2935 | 89.3 | 90.3 | 90.9 | 90.3 | 0.90 | 0.89 | 0.87 | 0.80 | 26.0 | 7.3 | 48.8 | 2.3 | 3.3 | | 28.4 | 27.0 | 0.037 | 119 |
| 18.5 | 160L | -42 | 2925 | 89.5 | 90.8 | 91.6 | 91.4 | 0.91 | 0.91 | 0.89 | 0.84 | 31.2 | 7.6 | 60.4 | 2.6 | 3.4 | | 34.1 | 32.4 | 0.046 | 142 |
| 22 | 180M | -48 | 2950 | 90.3 | 91.2 | 91.6 | 91.0 | 0.92 | 0.91 | 0.88 | 0.82 | 37.0 | 9.1 | 71.2 | 3.1 | 4.1 | | 40.4 | 38.4 | 0.073 | 188 |
| 30 | 200LA | -55 | 2950 | 91.3 | 92.0 | 92.3 | 91.5 | 0.90 | 0.89 | 0.87 | 0.81 | 50.9 | 7.1 | 97.1 | 2.5 | 3.3 | | 55.6 | 52.8 | 0.132 | 230 |
| 37 | 200LB | -55 | 2955 | 91.9 | 92.5 | 92.7 | 91.8 | 0.91 | 0.90 | 0.89 | 0.83 | 61.8 | 7.2 | 120 | 2.4 | 3.5 | | 67.5 | 64.1 | 0.147 | 250 |
| 45 | 225M | -55 | 2960 | 92.1 | 92.9 | 93.3 | 92.8 | 0.92 | 0.92 | 0.91 | 0.86 | 73.2 | 8.5 | 145 | 3.0 | 3.7 | | 79.9 | 75.9 | 0.22 | 330 |
| 55 | 250M | -60 | 2970 | 92.8 | 93.2 | 93.2 | 92.2 | 0.91 | 0.90 | 0.88 | 0.82 | 91.3 | 8.2 | 177 | 2.4 | 3.8 | | 99.7 | 94.7 | 0.23 | 445 |
| 75 | 280S | -65 | 2970 | 93.3 | 93.9 | 94.1 | 93.5 | 0.89 | 0.89 | 0.88 | 0.84 | 124.5 | 6.7 | 241 | 2.4 | 3.1 | | 136.0 | 129.2 | 0.46 | 565 |
| 90 | 280M | -65 | 2970 | 93.8 | 94.2 | 94.3 | 93.6 | 0.90 | 0.90 | 0.89 | 0.85 | 147.4 | 7.0 | 289 | 2.6 | 3.3 | | 161.0 | 152.9 | 0.57 | 645 |
| 110 | 315S | -65 | 2980 | 94.3 | 94.5 | 94.3 | 93.1 | 0.89 | 0.88 | 0.86 | 0.79 | 183.1 | 8.0 | 353 | 2.4 | 3.7 | | 200.0 | 190.0 | 1.05 | 920 |
| 132 | 315MA | -65 | 2980 | 94.5 | 94.8 | 94.7 | 93.9 | 0.90 | 0.90 | 0.89 | 0.83 | 214.5 | 7.7 | 423 | 2.4 | 3.8 | | 234.3 | 222.5 | 1.25 | 970 |
| 160 | 315LA | -65 | 2975 | 94.6 | 95.0 | 95.1 | 94.4 | 0.90 | 0.90 | 0.89 | 0.85 | 259.4 | 7.5 | 514 | 2.4 | 3.5 | | 283.3 | 269.1 | 1.41 | 1170 |
| **HIGH OUTPUT DESIGN - CENELEC +1 FRAME ALLOCATIONS (HGM1)** | | | | | | | | | | | | | | | | | | | | | |
| 75 | 250MX | -60 | 2970 | 93.6 | 94.0 | 94.1 | 93.3 | 0.92 | 0.91 | 0.89 | 0.85 | 121.8 | 8.1 | 241 | 2.5 | 3.7 | | 133.6 | 126.8 | 0.59 | 515 |
| 110 | 280MX | -65 | 2975 | 94.2 | 94.5 | 94.4 | 93.4 | 0.91 | 0.91 | 0.90 | 0.85 | 177.4 | 7.6 | 352 | 2.8 | 3.7 | | 193.7 | 184.0 | 0.96 | 645 |

This data is provided for guidance only. Results are guaranteed only when confirmed by test results.

# PERFORMANCE DATA

## HGM/HGMT SERIES, THREE PHASE 380-415V 50HZ
## IP55, F CLASS INSULATION, B CLASS TEMPERATURE RISE

| kW | Motor frame | Speed [r/min] | 415V 50Hz | | | | | | | | | | | | | | 380V 50Hz | 400V 50Hz | Moment of inertia $J=¼GD^2$ [kg m²] | Weight of foot mount motor [kg] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Efficiency % | | | | Power factor | | | | Current | | Torque | | | | Current | Current | | |
| | | | at % full load | | | | at % full load | | | | | | | | | | | | | |
| | | | 125 | 100 | 75 | 50 | 125 | 100 | 75 | 50 | Full load $I_N$ [A] | Locked rotor $I_L/I_N$ | Full load $T_N$ [Nm] | Locked rotor $T_L/T_N$ | Break down $T_B/T_N$ | | Full load $I_N$ [A] | Full load $I_N$ [A] | | |
| **1500 R/MIN = 4 POLES** | | | | | | | | | | | | | | | | | | | | |
| 0.37 | 71B -14 | 1382 | 62.1 | 68.5 | 70.8 | 68.8 | 0.80 | 0.72 | 0.60 | 0.46 | 1.02 | 4.2 | 2.6 | 2.9 | 3.0 | | 1.11 | 1.06 | 0.00079 | 11 |
| 0.55 | 80A -19 | 1410 | 76.6 | 79.2 | 80.2 | 78.7 | 0.79 | 0.73 | 0.64 | 0.50 | 1.34 | 5.4 | 3.7 | 4.0 | 3.2 | | 1.46 | 1.39 | 0.00118 | 17 |
| 0.75 | 80B -19 | 1415 | 78.8 | 80.5 | 80.8 | 78.2 | 0.76 | 0.69 | 0.60 | 0.46 | 1.88 | 6.0 | 5.1 | 2.9 | 3.4 | | 2.05 | 1.95 | 0.00125 | 19 |
| 1.1 | 90S -24 | 1415 | 80.2 | 82.8 | 84.3 | 83.7 | 0.80 | 0.76 | 0.68 | 0.54 | 2.5 | 6.2 | 7.4 | 3.0 | 3.2 | | 2.7 | 2.6 | 0.00166 | 23 |
| 1.5 | 90L -24 | 1410 | 80.2 | 83.5 | 85.5 | 85.9 | 0.81 | 0.77 | 0.70 | 0.57 | 3.3 | 6.4 | 10.2 | 3.1 | 2.9 | | 3.6 | 3.4 | 0.0021 | 29 |
| 2.2 | 100LA -28 | 1430 | 83.2 | 84.9 | 85.7 | 84.4 | 0.85 | 0.81 | 0.74 | 0.61 | 4.5 | 7.4 | 14.7 | 3.2 | 3.6 | | 4.9 | 4.7 | 0.00516 | 34 |
| 3 | 100LB -28 | 1410 | 83.3 | 86.0 | 88.1 | 88.7 | 0.85 | 0.81 | 0.75 | 0.61 | 6.0 | 6.9 | 20.3 | 3.0 | 3.4 | | 6.6 | 6.2 | 0.00573 | 35 |
| 4 | 112M -28 | 1435 | 85.2 | 87.0 | 88.5 | 88.5 | 0.87 | 0.84 | 0.79 | 0.68 | 7.6 | 7.6 | 26.6 | 2.7 | 3.5 | | 8.3 | 7.9 | 0.0095 | 52 |
| 5.5 | 132S -38 | 1445 | 86.4 | 87.7 | 88.3 | 87.4 | 0.84 | 0.81 | 0.76 | 0.64 | 10.8 | 7.2 | 36.3 | 2.6 | 3.4 | | 11.8 | 11.2 | 0.0213 | 66 |
| 7.5 | 132M -38 | 1440 | 86.9 | 88.7 | 89.9 | 90.0 | 0.85 | 0.83 | 0.78 | 0.67 | 14.2 | 7.2 | 49.7 | 2.7 | 3.3 | | 15.5 | 14.7 | 0.0277 | 80 |
| 11 | 160M -42 | 1465 | 88.7 | 89.9 | 90.4 | 89.8 | 0.86 | 0.85 | 0.81 | 0.71 | 20.1 | 7.2 | 71.7 | 2.5 | 3.0 | | 22.0 | 20.9 | 0.061 | 125 |
| 15 | 160L -42 | 1460 | 89.5 | 90.8 | 91.6 | 91.3 | 0.84 | 0.83 | 0.80 | 0.71 | 27.6 | 7.1 | 98.1 | 2.5 | 2.9 | | 30.1 | 28.6 | 0.079 | 135 |
| 18.5 | 180M -48 | 1470 | 90.5 | 91.2 | 91.3 | 90.2 | 0.86 | 0.83 | 0.77 | 0.65 | 34.0 | 8.6 | 120 | 3.0 | 4.0 | | 37.1 | 35.3 | 0.118 | 181 |
| 22 | 180L -48 | 1475 | 90.8 | 91.6 | 92.0 | 91.3 | 0.87 | 0.85 | 0.79 | 0.67 | 39.5 | 8.3 | 142 | 2.8 | 4.0 | | 43.1 | 41.0 | 0.135 | 196 |
| 30 | 200L -55 | 1470 | 91.3 | 92.3 | 92.8 | 92.5 | 0.88 | 0.88 | 0.85 | 0.77 | 51.7 | 6.5 | 195 | 2.1 | 3.1 | | 56.5 | 53.6 | 0.225 | 240 |
| 37 | 225S -60 | 1480 | 92.1 | 92.8 | 93.1 | 92.4 | 0.86 | 0.85 | 0.82 | 0.72 | 65.2 | 7.4 | 239 | 2.7 | 3.5 | | 71.2 | 67.6 | 0.378 | 306 |
| 45 | 225M -60 | 1475 | 92.3 | 93.1 | 93.6 | 93.2 | 0.87 | 0.86 | 0.83 | 0.75 | 78.2 | 7.5 | 291 | 2.7 | 3.5 | | 85.4 | 81.1 | 0.44 | 343 |
| 55 | 250M -65 | 1480 | 92.8 | 93.5 | 94.0 | 93.7 | 0.89 | 0.88 | 0.86 | 0.80 | 92.8 | 7.9 | 355 | 2.4 | 3.5 | | 101.3 | 96.3 | 0.56 | 455 |
| 75 | 280S -75 | 1485 | 93.2 | 94.0 | 94.3 | 94.0 | 0.89 | 0.88 | 0.86 | 0.79 | 125.6 | 8.2 | 482 | 2.9 | 3.7 | | 137.2 | 130.3 | 1.42 | 620 |
| 90 | 280M -75 | 1480 | 93.8 | 94.4 | 94.8 | 94.5 | 0.89 | 0.88 | 0.86 | 0.78 | 150.6 | 8.2 | 581 | 3.0 | 3.7 | | 164.5 | 156.2 | 1.58 | 695 |
| 110 | 315S -85 | 1485 | 94.0 | 94.7 | 95.1 | 94.9 | 0.90 | 0.90 | 0.87 | 0.81 | 180.2 | 6.7 | 707 | 2.1 | 3.3 | | 196.8 | 187.0 | 2.09 | 925 |
| 132 | 315MA -85 | 1485 | 94.5 | 94.9 | 95.1 | 94.5 | 0.90 | 0.89 | 0.86 | 0.79 | 218.5 | 7.1 | 849 | 2.3 | 3.7 | | 238.6 | 226.7 | 2.35 | 1010 |
| 160 | 315LA -85 | 1480 | 94.6 | 95.2 | 95.5 | 95.2 | 0.90 | 0.90 | 0.88 | 0.81 | 260.6 | 6.8 | 1032 | 2.2 | 3.4 | | 284.6 | 270.4 | 2.81 | 1080 |
| **HIGH OUTPUT DESIGN - CENELEC +1 FRAME ALLOCATIONS (HGM1)** | | | | | | | | | | | | | | | | | | | | |
| 75 | 250MX -70 | 1480 | 93.5 | 94.1 | 94.3 | 93.8 | 0.89 | 0.88 | 0.86 | 0.80 | 125.6 | 8.6 | 484 | 2.6 | 3.7 | | 138.4 | 131.1 | 1.05 | 505 |
| 110 | 280MX -80 | 1485 | 94.0 | 94.8 | 95.1 | 94.8 | 0.91 | 0.92 | 0.92 | 0.88 | 175.0 | 8.4 | 707 | 2.8 | 3.4 | | 191.1 | 181.6 | 2.06 | 685 |

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# PERFORMANCE DATA

## HGM/HGMT SERIES, THREE PHASE 380-415V 50HZ
## IP55, F CLASS INSULATION, B CLASS TEMPERATURE RISE

| kW | Motor frame | | Speed [r/min] | 415V 50Hz | | | | | | | | | | | | | 380V 50Hz | 400V 50Hz | Moment of inertia $J=¼GD^2$ [kg m²] | Weight of foot mount motor [kg] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Efficiency % | | | | Power factor | | | | Current | | Torque | | | Current | Current | | |
| | | | | at % full load | | | | at % full load | | | | | | | | | | | | |
| | | | | 125 | 100 | 75 | 50 | 125 | 100 | 75 | 50 | Full load $I_N$ [A] | Locked rotor $I_L/I_N$ | Full load $T_N$ [Nm] | Locked rotor $T_L/T_N$ | Break down $T_B/T_N$ | Full load $I_N$ [A] | Full load $I_N$ [A] | | |
| **1000 R/MIN = 6 POLES** | | | | | | | | | | | | | | | | | | | | |
| 0.75 | 90S | -24 | 935 | 73.7 | 76.0 | 76.1 | 72.6 | 0.75 | 0.68 | 0.57 | 0.43 | 2.1 | 4.4 | 7.7 | 2.4 | 3.0 | 2.3 | 2.2 | 0.00277 | 24 |
| 1.1 | 90L | -24 | 925 | 74.9 | 78.3 | 79.6 | 78.0 | 0.75 | 0.69 | 0.60 | 0.46 | 2.9 | 4.6 | 11.4 | 2.4 | 2.8 | 3.2 | 3.0 | 0.00349 | 26 |
| 1.5 | 100L | -28 | 925 | 76.8 | 79.9 | 81.6 | 81.0 | 0.82 | 0.77 | 0.68 | 0.54 | 3.4 | 5.7 | 15.5 | 2.6 | 3.5 | 3.7 | 3.5 | 0.00761 | 34 |
| 2.2 | 112M | -28 | 955 | 80.0 | 81.9 | 82.5 | 80.8 | 0.79 | 0.73 | 0.64 | 0.50 | 5.2 | 6.4 | 22.0 | 2.6 | 3.3 | 5.7 | 5.4 | 0.01083 | 45 |
| 3 | 132S | -38 | 965 | 81.9 | 83.3 | 83.7 | 82.0 | 0.82 | 0.78 | 0.71 | 0.59 | 6.5 | 6.7 | 29.7 | 1.6 | 3.4 | 7.1 | 6.7 | 0.02737 | 58 |
| 4 | 132MA | -38 | 965 | 83.2 | 84.6 | 85.0 | 83.3 | 0.83 | 0.80 | 0.73 | 0.60 | 8.3 | 7.2 | 39.6 | 1.9 | 3.6 | 9.1 | 8.6 | 0.0314 | 71 |
| 5.5 | 132MB | -38 | 965 | 84.7 | 86.0 | 86.4 | 84.9 | 0.82 | 0.78 | 0.71 | 0.58 | 11.4 | 7.7 | 54.4 | 2.1 | 3.9 | 12.5 | 11.8 | 0.0438 | 78 |
| 7.5 | 160M | -42 | 970 | 87.6 | 88.6 | 88.9 | 87.8 | 0.78 | 0.75 | 0.68 | 0.55 | 15.9 | 6.5 | 73.8 | 2.4 | 3.2 | 17.4 | 16.5 | 0.0784 | 114 |
| 11 | 160L | -42 | 970 | 87.5 | 88.7 | 89.2 | 88.3 | 0.79 | 0.76 | 0.69 | 0.57 | 22.8 | 6.5 | 108 | 2.7 | 3.0 | 24.9 | 23.7 | 0.104 | 132 |
| 15 | 180L | -48 | 980 | 89.1 | 89.6 | 89.6 | 89.1 | 0.86 | 0.81 | 0.74 | 0.71 | 28.8 | 7.4 | 146 | 2.9 | 3.6 | 31.5 | 29.9 | 0.188 | 190 |
| 18.5 | 200LA | -55 | 980 | 89.7 | 90.4 | 90.6 | 89.4 | 0.89 | 0.87 | 0.81 | 0.69 | 32.9 | 7.0 | 180 | 2.2 | 3.1 | 35.9 | 34.1 | 0.287 | 220 |
| 22 | 200LB | -55 | 975 | 89.6 | 90.8 | 91.4 | 90.8 | 0.85 | 0.84 | 0.80 | 0.71 | 40.2 | 6.5 | 215 | 2.2 | 3.1 | 43.9 | 41.7 | 0.330 | 230 |
| 30 | 225M | -60 | 985 | 91.1 | 91.8 | 91.7 | 90.5 | 0.83 | 0.82 | 0.78 | 0.68 | 55.5 | 6.5 | 291 | 2.3 | 3.0 | 60.6 | 57.6 | 0.534 | 324 |
| 37 | 250M | -65 | 985 | 91.4 | 92.2 | 92.5 | 91.7 | 0.88 | 0.87 | 0.84 | 0.75 | 64.4 | 7.1 | 359 | 2.3 | 3.1 | 70.3 | 66.8 | 0.696 | 415 |
| 45 | 280S | -75 | 985 | 92.1 | 92.8 | 92.9 | 92.0 | 0.86 | 0.85 | 0.82 | 0.74 | 79.4 | 6.6 | 436 | 2.2 | 3.2 | 86.7 | 82.4 | 1.27 | 555 |
| 55 | 280M | -75 | 985 | 92.6 | 93.2 | 93.4 | 92.5 | 0.87 | 0.87 | 0.84 | 0.77 | 94.9 | 7.1 | 533 | 2.4 | 3.3 | 103.6 | 98.5 | 1.53 | 640 |
| 75 | 315S | -85 | 985 | 93.0 | 93.7 | 94.2 | 93.7 | 0.86 | 0.86 | 0.84 | 0.77 | 130.0 | 6.2 | 727 | 2.1 | 3.0 | 142.0 | 134.9 | 2.34 | 861 |
| 90 | 315MA | -85 | 985 | 93.5 | 94.2 | 94.6 | 94.3 | 0.87 | 0.86 | 0.85 | 0.78 | 153.9 | 6.3 | 873 | 2.1 | 3.0 | 168.1 | 159.7 | 2.76 | 940 |
| 110 | 315LA | -85 | 985 | 93.9 | 94.5 | 94.8 | 94.2 | 0.87 | 0.87 | 0.84 | 0.77 | 187.2 | 6.6 | 1066 | 2.1 | 3.2 | 204.4 | 194.2 | 3.39 | 1110 |
| 132 | 315LB | -85 | 985 | 94.2 | 94.8 | 95.2 | 94.8 | 0.87 | 0.87 | 0.85 | 0.78 | 222.4 | 6.9 | 1280 | 2.4 | 3.1 | 242.9 | 230.7 | 3.89 | 1175 |

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# PERFORMANCE DATA

## HGM/HGMT SERIES, THREE PHASE 380-415V 50HZ
## IP55, F CLASS INSULATION, B CLASS TEMPERATURE RISE

| kW | Motor frame | | Speed [r/min] | 415V 50Hz | | | | | | | | | | | | | | 380V 50Hz | 400V 50Hz | Moment of inertia $J=¼GD^2$ [kg m²] | Weight of foot mount motor [kg] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Efficiency % | | | | Power factor | | | | Current | | Torque | | | | Current | Current | | |
| | | | | at % full load | | | | at % full load | | | | Full load $I_N$ [A] | Locked rotor $I_L/I_N$ | Full load $T_N$ [Nm] | Locked rotor $T_L/T_N$ | Break down $T_B/T_N$ | Full load $I_N$ [A] | Full load $I_N$ [A] | | |
| | | | | 125 | 100 | 75 | 50 | 125 | 100 | 75 | 50 | | | | | | | | | | |
| **750 R/MIN = 8 POLES** | | | | | | | | | | | | | | | | | | | | | |
| 0.75 | 100LA | -28 | 703 | 71.8 | 73.3 | 72.4 | 68.0 | 0.72 | 0.64 | 0.53 | 0.41 | 2.2 | 4.5 | 10.2 | 2.5 | 3.1 | 2.4 | 2.3 | 0.00851 | 33 |
| 1.1 | 100LB | -28 | 711 | 73.9 | 74.9 | 73.7 | 68.8 | 0.68 | 0.61 | 0.51 | 0.39 | 3.4 | 4.3 | 14.8 | 1.9 | 3.1 | 3.7 | 3.5 | 0.01037 | 33 |
| 1.5 | 112M | -28 | 711 | 76.6 | 78.4 | 78.6 | 75.6 | 0.72 | 0.65 | 0.55 | 0.41 | 4.1 | 4.8 | 20.1 | 2.5 | 3.2 | 4.5 | 4.2 | 0.01755 | 44 |
| 2.2 | 132S | -38 | 709 | 77.8 | 80.2 | 81.1 | 79.6 | 0.77 | 0.72 | 0.64 | 0.51 | 5.3 | 4.5 | 29.6 | 1.9 | 2.8 | 5.8 | 5.5 | 0.041 | 62 |
| 3 | 132M | -38 | 706 | 80.3 | 82.3 | 83.2 | 82.0 | 0.81 | 0.76 | 0.69 | 0.56 | 6.7 | 5.9 | 40.6 | 1.8 | 3.2 | 7.3 | 7.0 | 0.0518 | 75 |
| 4 | 160MA | -42 | 724 | 85.5 | 86.5 | 87.0 | 85.5 | 0.76 | 0.71 | 0.63 | 0.50 | 9.1 | 6.1 | 52.8 | 2.2 | 3.3 | 9.9 | 9.4 | 0.0916 | 106 |
| 5.5 | 160MB | -42 | 720 | 84.0 | 85.3 | 85.8 | 84.8 | 0.79 | 0.72 | 0.63 | 0.52 | 12.6 | 6.1 | 73.0 | 2.3 | 3.3 | 13.7 | 13.0 | 0.119 | 118 |
| 7.5 | 160L | -42 | 726 | 88.5 | 89.6 | 90.1 | 89.0 | 0.79 | 0.74 | 0.66 | 0.54 | 15.7 | 6.3 | 98.7 | 1.9 | 3.2 | 17.1 | 16.3 | 0.174 | 145 |
| 11 | 180L | -48 | 730 | 87.9 | 88.9 | 89.4 | 88.4 | 0.78 | 0.74 | 0.66 | 0.53 | 23.4 | 6.9 | 144 | 2.4 | 3.3 | 25.6 | 24.3 | 0.301 | 195 |
| 15 | 200L | -55 | 734 | 89.1 | 90.0 | 90.4 | 89.3 | 0.78 | 0.74 | 0.66 | 0.53 | 31.5 | 7.1 | 195 | 2.4 | 3.4 | 34.4 | 32.7 | 0.475 | 248 |
| 18.5 | 225S | -60 | 730 | 88.4 | 90.0 | 90.9 | 90.5 | 0.82 | 0.80 | 0.76 | 0.65 | 35.8 | 6.4 | 242 | 2.0 | 2.6 | 39.1 | 37.1 | 0.672 | 292 |
| 22 | 225M | -60 | 732 | 90.0 | 91.1 | 92.0 | 91.6 | 0.83 | 0.81 | 0.76 | 0.66 | 41.6 | 6.6 | 287 | 1.9 | 2.8 | 45.4 | 43.2 | 0.877 | 342 |
| 30 | 250M | -65 | 740 | 90.6 | 91.5 | 91.6 | 90.7 | 0.83 | 0.80 | 0.74 | 0.62 | 57.9 | 6.3 | 387 | 2.2 | 3.1 | 63.2 | 60.1 | 1.32 | 440 |
| 37 | 280S | -75 | 740 | 90.8 | 91.8 | 92.2 | 91.5 | 0.80 | 0.80 | 0.76 | 0.67 | 70.1 | 5.1 | 478 | 2.3 | 2.6 | 76.6 | 72.7 | 2.00 | 550 |
| 45 | 280M | -75 | 740 | 91.8 | 92.5 | 92.8 | 91.9 | 0.81 | 0.80 | 0.75 | 0.64 | 84.7 | 5.9 | 581 | 2.0 | 2.9 | 92.5 | 87.9 | 2.63 | 660 |
| 55 | 315S | -85 | 742 | 92.9 | 93.3 | 93.1 | 92.1 | 0.80 | 0.79 | 0.69 | 0.57 | 102.0 | 6.9 | 708 | 2.1 | 3.3 | 111.4 | 105.8 | 5.59 | 930 |
| 75 | 315M | -85 | 742 | 93.2 | 93.9 | 94.0 | 93.3 | 0.80 | 0.80 | 0.72 | 0.60 | 137.0 | 6.6 | 965 | 2.0 | 3.1 | 149.6 | 142.1 | 7.42 | 1115 |
| 90 | 315L | -85 | 740 | 94.1 | 94.2 | 94.0 | 92.9 | 0.82 | 0.79 | 0.74 | 0.62 | 164.0 | 7.3 | 1161 | 2.5 | 3.3 | 179.1 | 170.2 | 7.94 | 1071 |
| 110 | 315L | -85 | 742 | 94.4 | 94.8 | 94.7 | 93.9 | 0.81 | 0.80 | 0.75 | 0.65 | 197.0 | 6.6 | 1416 | 2.1 | 3.0 | 215.1 | 204.4 | 8.46 | 1190 |

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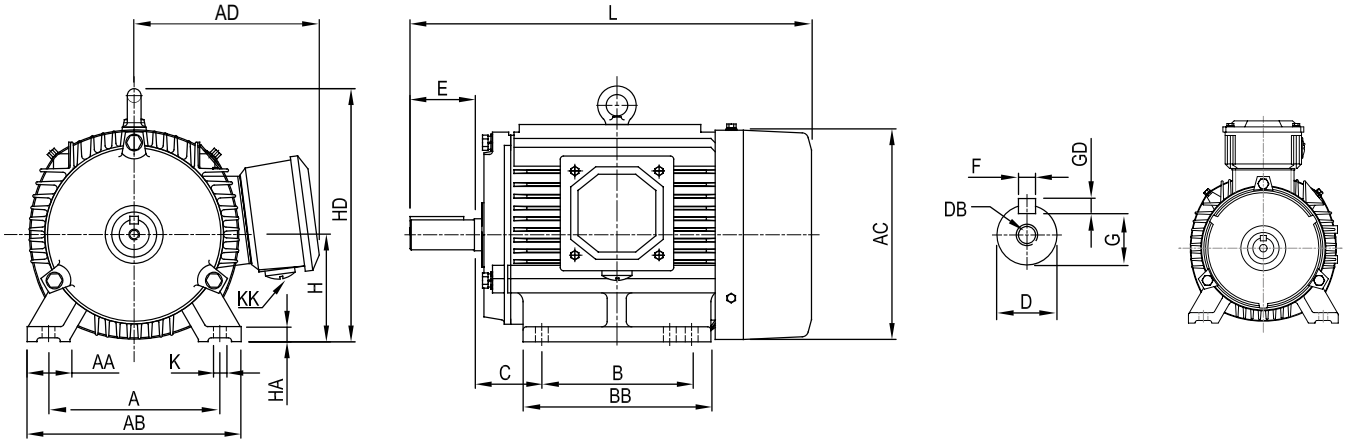
# DIMENSIONS

## FOOT MOUNT B3 (IM1001)

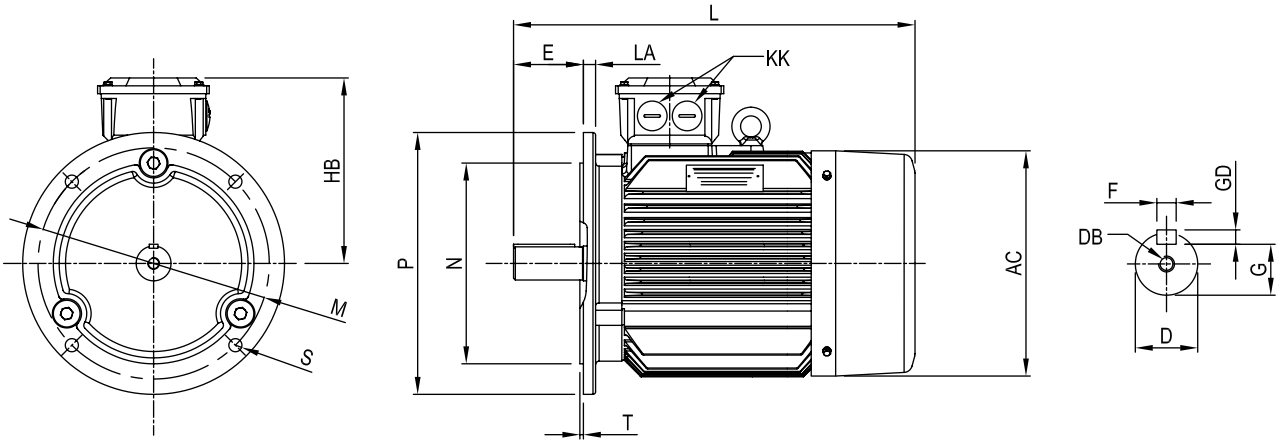



| Motor frame | | A | AA | AB | AC | B | BB | C | D | DB | E | F | GD | G | H | HA | HD | K | KK | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80 | -19 | 125 | 35 | 160 | 172 | 100 | 130 | 50 | 19 | M6 | 40 | 6 | 6 | 15.5 | 80 | 10 | 225 | 10 | 1 x M20 x 1.5 | 285 |
| 90S | -24 | 140 | 36 | 174 | 185 | 100 | 140 | 56 | 24 | M8 | 50 | 8 | 7 | 20 | 90 | 12 | 245 | 10 | 1 x M20 x 1.5 | 335 |
| 90L | -24 | 140 | 36 | 174 | 185 | 125 | 165 | 56 | 24 | M8 | 50 | 8 | 7 | 20 | 90 | 12 | 225 | 10 | 1 x M20 x 1.5 | 360 |
| 100L | -28 | 160 | 40 | 200 | 205 | 140 | 176 | 63 | 28 | M10 | 60 | 8 | 7 | 24 | 100 | 14 | 270 | 12 | 1 x M20 x 1.5 | 375 |
| 112M | -28 | 190 | 45 | 226 | 220 | 140 | 180 | 70 | 28 | M10 | 60 | 8 | 7 | 24 | 112 | 15 | 305 | 12 | 2 x M25 x 1.5 | 420 |
| 132S | -38 | 216 | 60 | 265 | 265 | 140 | 186 | 89 | 38 | M12 | 80 | 10 | 8 | 33 | 132 | 18 | 348 | 12 | 2 x M25 x 1.5 | 463 |
| 132M | -38 | 216 | 60 | 265 | 265 | 178 | 224 | 89 | 38 | M12 | 80 | 10 | 8 | 33 | 132 | 18 | 348 | 12 | 2 x M25 x 1.5 | 500 |
| 160M | -42 | 254 | 70 | 315 | 315 | 210 | 260 | 108 | 42 | M16 | 110 | 12 | 8 | 37 | 160 | 20 | 420 | 15 | 2 x M32 x 1.5 | 620 |
| 160L | -42 | 254 | 70 | 315 | 315 | 254 | 304 | 108 | 42 | M16 | 110 | 12 | 8 | 37 | 160 | 20 | 420 | 15 | 2 x M32 x 1.5 | 670 |
| 180M | -48 | 279 | 70 | 350 | 355 | 241 | 311 | 121 | 48 | M16 | 110 | 14 | 9 | 42.5 | 180 | 22 | 455 | 15 | 2 x M40 x 1.5 | 690 |
| 180L | -48 | 279 | 70 | 350 | 355 | 279 | 349 | 121 | 48 | M16 | 110 | 14 | 9 | 42.5 | 180 | 22 | 455 | 15 | 2 x M40 x 1.5 | 730 |
| 200L | -55 | 318 | 70 | 390 | 395 | 305 | 370 | 133 | 55 | M20 | 110 | 16 | 10 | 49 | 200 | 25 | 510 | 19 | 2 x M50 x 1.5 | 775 |
| 225S | -60 | 356 | 75 | 435 | 445 | 286 | 368 | 149 | 60 | M20 | 140 | 18 | 11 | 53 | 225 | 28 | 555 | 19 | 2 x M50 x 1.5 | 810 |
| 225M | -60 | 356 | 75 | 435 | 445 | 311 | 394 | 149 | 60* | M20 | 140* | 18* | 11* | 53* | 225 | 28 | 555 | 19 | 2 x M50 x 1.5 | 835* |
| 250M | -65 | 406 | 80 | 485 | 485 | 349 | 445 | 168 | 65* | M20 | 140* | 18* | 11* | 58* | 250 | 30 | 620 | 24 | 2 x M50 x 1.5 | 915* |
| 280S | -75 | 457 | 85 | 545 | 540 | 368 | 485 | 190 | 75* | M20 | 140* | 20* | 12* | 67.5* | 280 | 35 | 685 | 24 | 2 x M50 x 1.5 | 1005* |
| 280M | -75 | 457 | 85 | 545 | 545 | 419 | 536 | 190 | 75* | M20 | 140* | 20* | 12* | 67.5* | 280 | 35 | 685 | 24 | 2 x M50 x 1.5 | 1055* |
| 315S | -85 | 508 | 120 | 630 | 630 | 406 | 570 | 216 | 85* | M20 | 170* | 22* | 14* | 76* | 315 | 45 | 845 | 28 | 2 x M63 x 1.5 | 1235* |
| 315M | -85 | 508 | 120 | 630 | 630 | 457 | 680 | 216 | 85* | M20 | 170* | 22* | 14* | 76* | 315 | 45 | 845 | 28 | 2 x M63 x 1.5 | 1285* |
| 315L | -85 | 508 | 120 | 630 | 630 | 508 | 680 | 216 | 85* | M20 | 170* | 22* | 14* | 76* | 315 | 45 | 845 | 28 | 2 x M63 x 1.5 | 1340* |

[1)] 71 frame is Top Terminal Box Mount only.

# DIMENSIONS

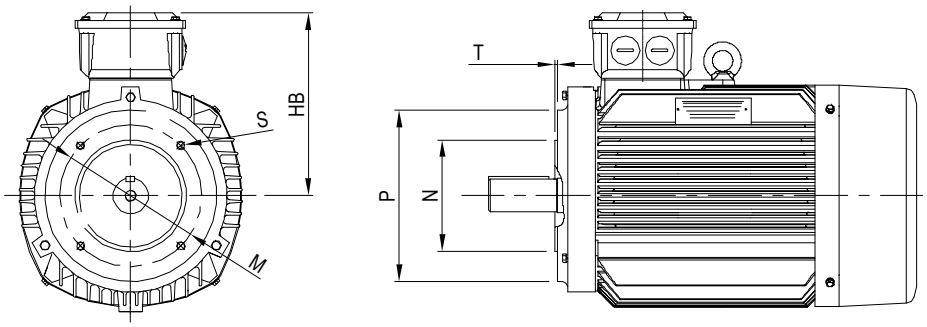
## LARGE FLANGE MOUNT B5 (IM3001)




| Motor frame | | AC | D | DB | E | F | GD | G | HB | KK | L | LA | M | N | P | S | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80 | -19 | 172 | 19 | M6 | 40 | 6 | 6 | 15.5 | 145 | 1 x M20 x 1.5 | 285 | 12 | 165 | 130 | 200 | 12 | 3.5 |
| 90S | -24 | 185 | 24 | M8 | 50 | 8 | 7 | 20 | 155 | 1 x M20 x 1.5 | 335 | 12 | 165 | 130 | 200 | 12 | 3.5 |
| 90L | -24 | 185 | 24 | M8 | 50 | 8 | 7 | 20 | 155 | 1 x M20 x 1.5 | 360 | 12 | 165 | 130 | 200 | 12 | 3.5 |
| 100L | -28 | 205 | 28 | M10 | 60 | 8 | 7 | 24 | 170 | 1 x M20 x 1.5 | 375 | 12 | 215 | 180 | 250 | 15 | 4.0 |
| 112M | -28 | 220 | 28 | M10 | 60 | 8 | 7 | 24 | 193 | 1 x M25 x 1.5 | 420 | 12 | 215 | 180 | 250 | 15 | 4.0 |
| 132S | -38 | 265 | 38 | M12 | 80 | 10 | 8 | 33 | 210 | 2 x M25 x 1.5 | 463 | 12 | 265 | 230 | 300 | 15 | 4.0 |
| 132M | -38 | 265 | 38 | M12 | 80 | 10 | 8 | 33 | 210 | 2 x M25 x 1.5 | 500 | 12 | 265 | 230 | 300 | 15 | 4.0 |
| 160M | -42 | 315 | 42 | M16 | 110 | 12 | 8 | 37 | 260 | 2 x M32 x 1.5 | 620 | 16 | 300 | 250 | 350 | 19 | 5.0 |
| 160L | -42 | 315 | 42 | M16 | 110 | 12 | 8 | 37 | 260 | 2 x M32 x 1.5 | 670 | 16 | 300 | 250 | 350 | 19 | 5.0 |
| 180M | -48 | 355 | 48 | M16 | 110 | 14 | 9 | 42.5 | 275 | 2 x M32 x 1.5 | 690 | 18 | 300 | 250 | 350 | 19 | 5.0 |
| 180L | -48 | 355 | 48 | M16 | 110 | 14 | 9 | 42.5 | 275 | 2 x M32 x 1.5 | 730 | 18 | 300 | 250 | 350 | 19 | 5.0 |
| 200L | -55 | 395 | 55 | M20 | 110 | 16 | 10 | 49 | 310 | 2 x M50 x 1.5 | 775 | 18 | 350 | 300 | 400 | 19 | 5.0 |
| 225S | 60 | 445 | 60 | M20 | 140 | 18 | 11 | 53 | 330 | 2 x M50 x 1.5 | 810 | 20 | 400 | 350 | 450 | 19 | 5.0 |
| 225M | -60 | 445 | 60* | M20 | 140* | 18* | 11* | 53* | 330 | 2 x M50 x 1.5 | 835* | 20 | 400 | 350 | 450 | 19 | 5.0 |
| 250M | -65 | 485 | 65* | M20 | 140* | 18* | 11* | 58* | 370 | 2 x M63 x 1.5 | 915* | 22 | 500 | 450 | 550 | 19 | 5.0 |
| 280S | -75 | 540 | 75* | M20 | 140* | 20* | 12* | 67.5* | 405 | 2 x M63 x 1.5 | 1005* | 22 | 500 | 450 | 550 | 19 | 5.0 |
| 280M | -75 | 545 | 75* | M20 | 140* | 20* | 12* | 67.5* | 405 | 2 x M63 x 1.5 | 1055* | 22 | 500 | 450 | 550 | 19 | 5.0 |
| 315S | -85 | 630 | 85* | M20 | 170* | 22* | 14* | 76* | 530 | 2 x M63 x 1.5 | 1235* | 22 | 600 | 550 | 660 | 24 | 6.0 |
| 315M | -85 | 630 | 85* | M20 | 170* | 22* | 14* | 76* | 530 | 2 x M63 x 1.5 | 1285* | 22 | 600 | 550 | 660 | 24 | 6.0 |
| 315L | -85 | 630 | 85* | M20 | 170* | 22* | 14* | 76* | 530 | 2 x M63 x 1.5 | 1340* | 22 | 600 | 550 | 660 | 24 | 6.0 |

# DIMENSIONS

## SMALL FLANGE (FACE) MOUNT B14 (IM3601)




**FACE MOUNT B14A**

| Motor frame | M | N | P | S | T |
|---|---|---|---|---|---|
| 71 | 85 | 70 | 105 | M6 | 2.5 |
| 80 | 100 | 80 | 120 | M6 | 3.0 |
| 90 | 115 | 95 | 140 | M8 | 3.0 |
| 100 | 130 | 110 | 160 | M8 | 3.5 |
| 112 | 130 | 110 | 160 | M8 | 3.5 |
| 132 | 165 | 130 | 200 | M10 | 3.5 |
| 160 | 215 | 180 | 250 | M12 | 4.0 |

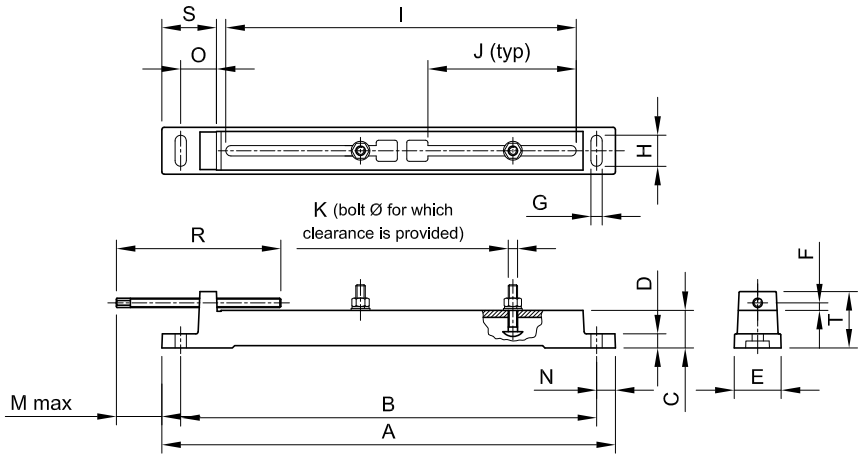
**FACE MOUNT B14B**

| Motor frame | M | N | P | S | T |
|---|---|---|---|---|---|
| 80 | 130 | 110 | 160 | M8 | 3.5 |
| 90 | 130 | 110 | 160 | M8 | 3.5 |
| 100 | 165 | 130 | 200 | M10 | 3.5 |
| 112 | 165 | 130 | 200 | M10 | 3.5 |
| 132 | 215 | 180 | 250 | M12 | 4.0 |

# SLIDE RAILS

Slide rails are designed for motor position adjustment when belt drives are used. Applications include tension adjustment for belt driven equipment.

Regal Australia stocks slide rails to suit frame sizes 80 to 355. Rail sets are manufactured from cast iron and provided with mounting bolts and nuts between motor and rail.




Slide rail dimensions

| Slide rail product code | To suit motor frame | Dimensions [ mm ] | | | | | | | | | | | | | | | | | Weight per set [ kg ] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | G | H | I | J | K | M | N | O | R | S | T | |
| MR080090 | 80 & 90 | 380 | 328 | 30 | 15 | 48 | 10 | 15 | 25 | 245 | 95 | 8 | 75 | 25 | 40 | 145 | 65 | 50 | 3 |
| MR100132 | 100, 112 & 132 | 475 | 425 | 37 | 19 | 70 | 10 | 14 | 35 | 340 | 150 | 10 | 135 | 26 | 42 | 200 | 68 | 62 | 6.5 |
| MR160180 | 160 & 180 | 567 | 515 | 48 | 19 | 72 | 11 | 18 | 35 | 390 | 162 | 12 | 115 | 28 | 57 | 200 | 85 | 70 | 10 |
| MR200225 | 200 & 225 | 790 | 730 | 60 | 32 | 92 | 16 | 20 | 20 | 610 | 265 | 16 | 200 | 30 | 60 | 290 | 90 | 92 | 22 |
| MR250280 | 250 & 280 | 945 | 870 | 70 | 38 | 105 | 16 | 21 | 21 | 725 | 305 | 20 | 240 | 35 | 70 | 350 | 105 | 110 | 40 |
| MR315355 | 315 & 355 | 1220 | 1115 | 125 | 40 | 122 | 22 | 30 | 30 | 920 | 420 | 24 | 285 | 50 | 105 | 450 | 155 | 170 | 105 |

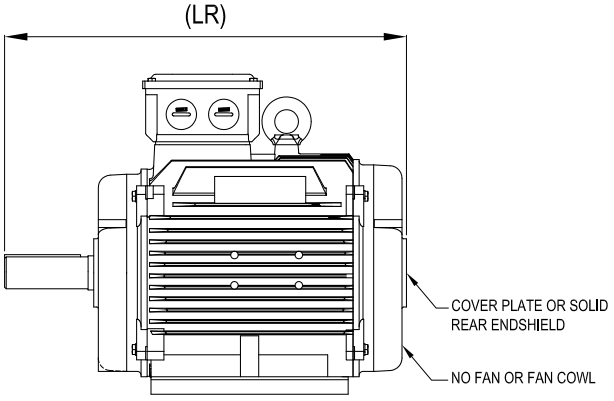
# AIRSTREAM RATED MOTORS FOR AXIAL FANS

Regal Australia offers a comprehensive range of motors specifically built for use with axial flow fans, where the motor is mounted in the airstream.

Provided the airstream ensures ample cooling, the fan and cowl normally fitted to a standard TEFC motor is redundant. Enclosure rating of the motor is also improved with the use of a solid rear end shield.

Due to the elimination of losses associated with the motor fan these motors have a higher efficiency than standard HGMT motors.

**Standard mount - HGMr/HGMTR (B3, B5, B3/B5)**




| Motor frame | Dimension [ LR ] |
|---|---|
| 80 | 265 |
| 90S | 300 |
| 90L | 325 |
| 100L | 360 |
| 112M | 390 |
| 132S | 400 |
| 132M | 440 |
| 160M | 540 |
| 160L | 585 |
| 180M | 595 |
| 180L | 635 |
| 200L | 685 |

| Motor frame | Dimension [ LR ] |
|---|---|
| 225S | 725 |
| 225M | 750 |
| 250M* | 825 |
| 280S | 890 |
| 280M | 940 |
| 315S* | 1020 |
| 315S | 1050 |
| 315M* | 1070 |
| 315M | 1100 |
| 315L* | 1120 |
| 315L | 1150 |

*2 pole variation

[X] High output variation

HGMRF/HGMTRF is a popular alternative to HGMR/HGMTR, with the terminal box replaced by blanking plate and extended leads (see page 25 for details on blanking plates and extended leads). In this case, terminal box and block are supplied loose with motor for convenience of remote leads termination. These motors are also available in H class insulation (HGMRHF/HGMTRHF).

# COOLING TOWER - HGMC/ HGMTC

HGMC/HGMTC cooling tower motors are specially developed for operation in air stream rated cooling towers. HGMC/HGMTC motors are available in frame sizes 80 to 315, and rated power outputs of 0.75 to 160kW.

**Applications**

HGMC/HGMTC motors are ideally suited to the cooling tower application, in industries such as food and beverage, air conditioning, chemical processing, and petrochemical.

**Protection**

Regal Australia HGMC/HGMTC motors have a protection rating of IP66 for maximum protection against water and dust.

**Additional enhancements**

- 2 part epoxy coated for excellent protection against corrosive solids and liquids
- Stainless steel name plate
- Corrosion protection on threads
- Extra insulation coating (Red Isonel 300)
- Shaft seal fitted
- Silastic sealed
- Non-drive end shaft extension cut and blanking plate fitted. Alternatively, HGMR/HGMTR used as base motor.

**Paint**

Standard paint finish for HGMC/HGMTC motors is a 2 part epoxy RAL 9005 Jet Black paint. Regal Australia's HGMC/HGMTC range of cooling tower motors combine the HGM/HGMT's standard high strength and high efficiency with significant enhancements to give the perfect motor for cooling tower applications.

# BRAKE MOTORS - HGMB/HGMTB

Regal Australia offers a wide range of Brake motors, HGMB/HGMTB, from frame size 71 through to 160. 4 pole models are stocked as standard. 2,6 and 8 pole and other non-standard sizes and speeds are available on special order.

HGMB/HGMTB brake motors are "fail to safe" design, as the brake will engage when power is interrupted.

Brake motors are designed for use in applications requiring rapid stopping, holding and position control.

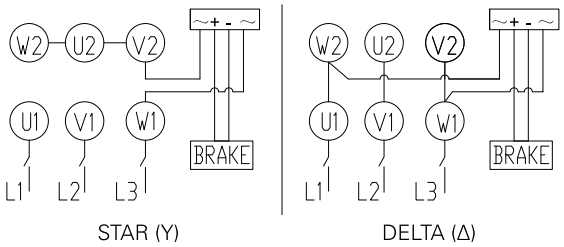
HGMB/HGMTB motors are available in all mounting arrangements. Brakes are made to the 'Euro' standard mounting dimension, providing interchangeability with other brands.

**Dimensions**

The only dimensional variations of HGMB/HGMTB from HGM/HGMT is the overall motor length, due to the extended length of the cowl. These dimensional variations are listed in the accompanying table. Overall length L is replaced by LB.

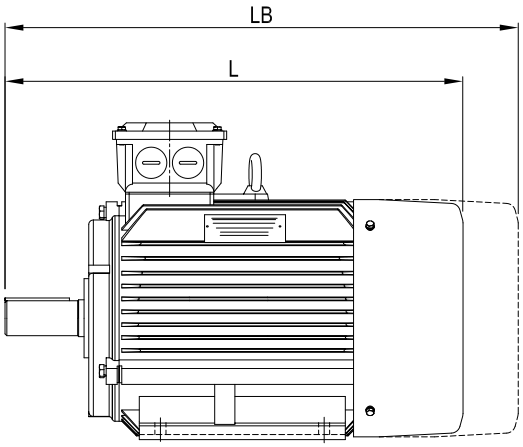
**Connection**

HGMB/HGMTB motors 3kW and below are connected in 415V star connection with brake connected as shown below left. HGMB/HGMTB motors 4kW and above are connected in 415 volt delta connection with brake connected as shown below right.




The HGMB/HGMTB 3 phase motor is fitted with a CE certified DC brake and rectifier mounted in the terminal box enabling direct connection of the brake to the AC supply.

Where response time is important, this time can be improved by switching the brake independently.




| Motor frame | Brake motor overall length [ LB ] |
|---|---|
| 80 | 360 |
| 90S | 395 |
| 90L | 420 |
| 100L | 480 |
| 112M | 525 |
| 132S | 570 |
| 132M | 615 |
| 160M | 700 |
| 160L | 745 |
| 180M | 790 |
| 180L | 830 |

## BRAKE DETAILS

| Output kW | Motor frame | Brake size | Brake weight [kg] | Motor full load torque $T_N$ [Nm] | Brake torque [Nm] | Brake torque as % of full load |
|---|---|---|---|---|---|---|
| | | | | | Nominal | Nominal |
| 0.37 | 71B-4 | M4 | 1.1 | 2.6 | 4 | 150% |
| 0.55 | 80A-4 | 08 | 2.0 | 3.7 | 8 | 215% |
| 0.75 | 80B-4 | 08 | 2.0 | 5.1 | 8 | 157% |
| 1.1 | 90S-4 | 10 | 4.0 | 7.4 | 16 | 216% |
| 1.5 | 90L-4 | 10 | 4.0 | 10.2 | 16 | 157% |
| 2.2 | 100LA-4 | 12 | 6.0 | 14.7 | 32 | 218% |
| 3 | 100LB-4 | 12 | 6.0 | 20.3 | 32 | 158% |
| 4 | 112M-4 | 14 | 8.6 | 26.6 | 60 | 226% |
| 5.5 | 132S-4 | 16 | 12 | 36.3 | 80 | 220% |
| 7.5 | 132M-4 | 16 | 12 | 49.7 | 80 | 161% |
| 11 | 160M-4 | 18 | 18 | 71.7 | 150 | 209% |
| 15 | 160L-4 | 18 | 18 | 98.1 | 150 | 153% |

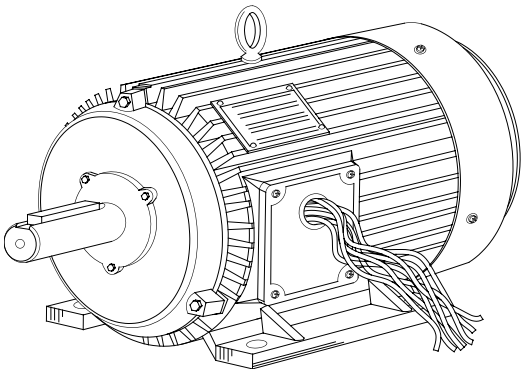
# MODIFICATIONS, VARIATIONS AND OPTIONAL EXTRAS

Regal Australia offers an extensive range of variations to the HGM/HGMT motor series. Other HGM/HGMT ranges outlined in other sections include:

Brake motors - HGMB/HGMTB
Airstream motors for axial fans - HGMR/HGMTR, HGMRF/HGMTRF, HGMRHF/HGMTRHF
Cooling tower motors - HGMC/HGMTC

Additional to these motor ranges Regal Australia offers a large array of modifications available on order. These modifications are outlined below.

**Extended leads**
HGM motors come standard with RHS terminal box and HGMT motors come standard with top terminal box.



| Motor frame | Conduit size |
|---|---|
| 80-132 | M25 x 1.5 |
| 160-180 | M32 x 1.5 |
| 200-250 | M50 x 1.5 |
| 280-315 | M63 x 1.5 |

**Bearings**
Regal Australia can address applications where bearings need special consideration. Attention may need to be given to the following:

- Bearing monitors
- Alternative bearing types
- Low/high temperature bearing grease
- Oil seals
- Non contact labyrinth seals
- Insulated bearings

**Shafts**
HGM/HGMT motors come standard with a single output shaft to standard dimensions. The following alternatives are available:

- Double shaft extension
- Special shaft extension
- Stainless steel shaft material type
- Reduced shafts for geared motors

**Environmental considerations**
Where environmental factors need special consideration, Regal Australia can provide the following modifications:

- Winding temperature monitors and thermistors
- Anti-condensation heaters
- Tropic proofing
- Special paint finish
- Higher Protection ratings, IP56, IP65 and IP66
- High ambient temperature motors – HGMH/HGMTH with H class insulation

**Special performance**
Regal Australia has the ability to provide HGM/HGMT motors with special windings. These may include:

- Windings for alternative operating voltages and frequencies.
- Windings designed for increased outputs and short time ratings.

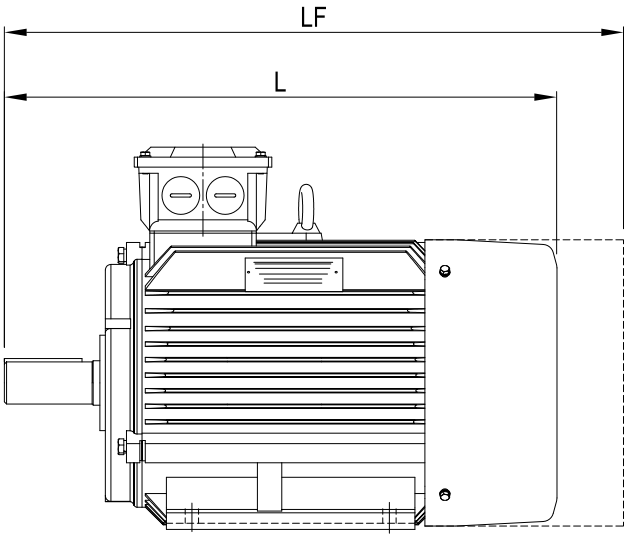
**VVVF drives**
Two types of VVVF drives kit are available for the HGM/HGMT range to assist in maintaining satisfactory operation.

VVVF drive kit A - Separately driven cooling fan
This fan should be used when the motor speed is required to be reduced below 25Hz in constant torque mode. Refer to page 26 for Cooling Fan details. For centrifugal fan or pump, no separate cooling fan is required. For all other loads refer to the loadability curve in the section on VVVF Drives, refer page 14.

VVVF drive kit B - Standard motor (EDM)
This kit incorporates a single insulated bearing, normally at the non-drive end, designed to remove the effect of electrical discharge through the bearings.

A separately driven cooling fan is required if the motor is to be operated at below 25Hz with a VVVF drive for constant torque applications.

The increase in length due to the separately driven cooling fan is shown in the table below. Length L is replaced by LF.




| Motor frame | Dimension [ LR ] |
|---|---|
| 80 | 265 |
| 90S | 300 |
| 90L | 325 |
| 100L | 360 |
| 112M | 390 |
| 132S | 400 |
| 132M | 440 |
| 160M | 540 |
| 160L | 585 |
| 180M | 595 |
| 180L | 635 |
| 200L | 685 |

| Motor frame | Dimension [ LR ] |
|---|---|
| 225S | 725 |
| 225M | 750 |
| 250M | 825 |
| 280S | 890 |
| 280M | 940 |
| 315S* | 1020 |
| 315S | 1050 |
| 315M* | 1070 |
| 315M | 1100 |
| 315L* | 1120 |
| 315L | 1150 |
| | |

**Testing services**

Regal Australia can provide both type test certificates and individual motor test reports on any Regal Australia HGMT motor.

Type test reports and outline drawings of standard motors are available at www.regalaustralia.com.au

marathon®
Motors

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