

Described below are some of the basic concepts useful to know when choosing an AC electric motor.

- Standard mounting arrangements
- Basic Formula & Conversions
- Connection
- IP Ratings
- Acronyms

Standard mounting arrangements

Foot mount			Large flange and feet		
B3 (IM1001)	V5 (IM1011)	V6 (IM1031)	B6 (IM1051)	B7 (IM1061)	B8 (IM1071)
Large flange			Small flange (face) and feet		
B5 (IM3001)	V1 (IM3011)	V3 (IM3031)	B3/B5 (IM2001)	V1/V5 (IM2011)	V3/V6 (IM2031)
Small flange (face)					
B14 (IM3601)	V18 (IM3611)	V19 (IM3631)	B3/B14 (IM2101)	V5/V18 (IM2111)	V6/V19 (IM2131)

Basic Formula and Conversions

$$\text{kW} \rightarrow \text{HP} = \text{kW} / 0.76$$

$$\text{HP} \rightarrow \text{kW} = \text{HP} * 0.76$$

$$\text{Rated Torque (Nm)} = \text{Rated Power (kW)} / \text{Rated Speed (r/min)} * 9550$$

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.

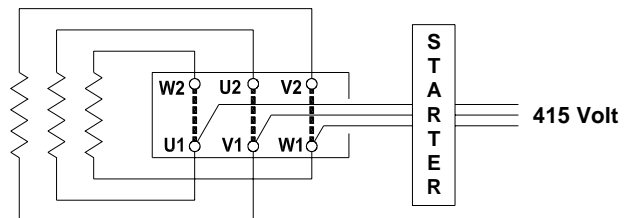
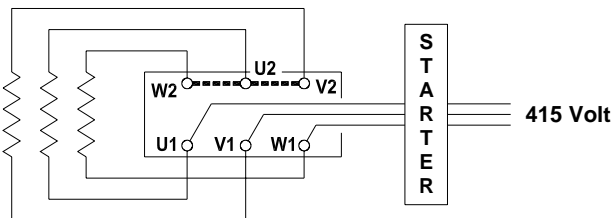
Standard terminal connections for low kW motors (check nameplate for connection details) is 240 volt delta / 415 volt star. These motors are designed for 415 volt Direct On Line (D.O.L.) starting, when

connected in the star configuration. They are also suitable for operation with 240 volt three phase variable frequency drives, when connected in the delta configuration.

Standard terminal connections for larger kW motors is 415 volt delta / 720 volt star. These motors are designed for 415 volt Direct On Line (D.O.L.) starting, when connected in the delta configuration. They are also suitable for operation with 415 volt three phase variable frequency drives. Alternatively they can be operated D.O.L. in the star configuration from a 720 volt supply or with a 720 volt 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 415 volt star-delta starting as described below.

Motor connected for D.O.L. starting with bridges in place for star connection

Motor connected for D.O.L. starting with bridges in place for delta connection



IP (Ingress Protection) Ratings for Equipment and Enclosures

A two-digit number (as specified in Australian Standards AS1939 and EN60529) is used to provide an IP Rating to a motor or its enclosure.

The two digits represent two different forms of environmental influence:

- The first digit represents protection against ingress of solid objects
- The second digit represents protection against ingress of liquids

The larger the value of each digit, the greater the protection from that influence.

Value	First Digit Protection against ingress of solids	Second Digit Protection against ingress of liquids
0	No protection	No protection
1	Protected against solid objects over 50mm e.g. hands, large tools.	Protected against vertically falling drops of water.
2	Protected against solid objects over 12mm e.g. hands, large tools.	Protected against direct sprays of water up to 15° from vertical.
3	Protected against solid objects over 2.5mm e.g. wire, small tools.	Protected against direct sprays of water up to 60° from vertical.
4	Protected against solid objects over 1.0mm e.g. wires.	Protected against water sprayed from any direction. Limited ingress permitted.
5	Limited protection against dust ingress (no harmful deposit)	Protected against low pressure water jets from any direction. Limited ingress permitted.
6	Totally protected against dust ingress.	Protected against high pressure water jets from any direction. Limited ingress permitted.
7		Protected against immersion between 15cm and 1M.
8		Protected against long periods of immersion under pressure.

Motor Acronyms

Motor Cooling

TEFC – Totally Enclosed Fan Cooled

TEAOM – Totally Enclosed Air Over Motor
TESC – Totally Enclosed Self Cooled
DPFC – Drip Proof Fan Cooled

Motors for Hazardous Locations

Ex e motor protection designates Increased safety. The increased safety (Ex e) type of protection describes electrical equipment that does not produce arcs or sparks in normal service in which additional measures are applied so as to give increased security against the possibility of excessive temperatures and of the occurrence of arcs and sparks. Increased safety (Ex e) motors are suitable for Class I, Zone 1, Group IIA,B&C hazardous areas.

Ex n motor protection designates Non-sparking as. The non-sparking (Ex n) type of protection describes electrical equipment that, in normal operation, is not capable of igniting a surrounding explosive atmosphere, and a fault capable of causing ignition is not likely to occur. Non-sparking (Ex n) motors are suitable for Class I, Zone 2, Group IIA,B&C hazardous areas.

DIP motor protection designates Dust-excluding Ignition Proofing. The Dust-excluding ignition proofing (DIP) type of protection describes electrical equipment which is enclosed so that it excludes dust, and which will not permit arcs, sparks or heat otherwise generated or liberated inside the enclosure to cause ignition of exterior accumulations or atmospheric suspensions of a specific dust on or in the vicinity of the enclosure. Dust-excluding ignition proofed (DIP) motors are suitable for Class II hazardous areas.