ADVANTAGES IN USE

- Large starting torque, ideal for driving of large inertias.
- Volume / power ratio much higher than other technologies.
- High output.

COMMUTATION

***Graphite brush and copper commutator*:**

- Very good for basic applications such as frequent starting or changes in direction of rotation

OVERHEATING

The maximum temperature a motor winding can be subjected to is limited. The principal cause of overheating is the amount of current passing through the winding and it is important to limit the average current.

USER GUIDE

Assembly

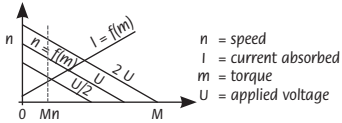
- Assembly with a centering nose: Sliding adjustment is necessary but excessive backlash must be avoided.
- Coupling: Use a flexible coupling to avoid restraining the motor shaft. Do not use more than 2 bearings.
- Forced assembly: Only carry out a forced assembly of a pinion or pulley when the motor shaft is blocked.
- Glued assembly: Protect the motor bearing so that the glue cannot penetrate into it. This method of assembly is strongly recommended for most of the range. Use a key or a set-screw rather than a flat section in cases where large value torques will be generated.
- Ensure that the pulley or pinion mounted on the motor shaft is not deformed, and that everything is concentric.

Cabling

- If there are cable lugs fitted to the motor, it is recommended to fit female connectors to the cables
- If soldering cables to the lugs, use a 40W (max) soldering iron
- Do not bend lugs more than once to avoid breaking them.

CHARACTERISTICS

The characteristics of a DC permanent magnet motor are illustrated in the graph below:



The current (I) is determined by the construction of the motor windings and is proportional to the load (M).
The speed (n) is linked to these two factors but more dependent on the applied voltage (U).
The speed with no load is proportional to the applied voltage (U).

Within the maximum characteristics, an infinite number of working points are possible.

Glossary

TORQUE CONSTANT: The torque constant, also known as the specific torque, is the ratio of the torque delivered by a motor to the current supplied to it.

ELECTROMECHANICAL TIME CONSTANT: This is the time it takes for the rotor to go from 0 to 63% of its nominal speed.

SPEED CONSTANT: Indicates the change in speed per Volt of supply voltage, without taking friction into account. The reciprocal of the speed constant is the voltage constant, also called the EMF constant (electromotive force).

STALL TORQUE: The value of torque that when applied to the drive-shaft at nominal voltage, will block rotation. Rapid increase in motor temperature causes this torque to decrease.

NOMINAL TORQUE: The value of output torque either measured at a constant value or calculated as an average that will raise the motor temperature to its maximum limit. This is based on an ambient temperature of 25°C.

STARTING CURRENT: Relationship between nominal voltage (terminal voltage) and the motor resistance. It is obtained from the stall torque.

MAX CONTINUOUS CURRENT: The current taken by the motor which, at an ambient temperature of 25°C, raises the rotor temperature to the maximum limit.

NO LOAD CURRENT: The current that is drawn from the supply when the motor is run with no load. It depends on the friction of the brushes and bearings and varies slightly with speed.

ROTOR INERTIA: This is the moment of inertia of the rotor and is dependent of the mass and geometry of the actual rotor.

TORQUE / SPEED CONSTANT: Indicates the force of the motor. The flatter this curve is, the less the speed is sensitive to variations in load. The speed / torque gradient is calculated at a working temperature of 25°C.

RECOMMENDED POWER: The normal working power of motor under constant conditions. To obtain this power, it is sometimes necessary to supply the motor at more than its rated voltage.

EFFICIENCY: Defined depending on the relationship between the no load current and the starting current. The higher it is, the closer it is to value with no load. In general it is about 1/7th of the stall torque. It does not always define the optimum working point.

TERMINAL RESISTANCE: The resistance measured at 25°C across the motor terminals. Determines start current at a given voltage. In cases where graphite brushes are involved, contact resistance varies depending on the load.

RATED VOLTAGE: The voltage for which all other nominal values are given or measured. It is chosen so that when the motor is run without a load, the maximum speed is not exceeded. However it is possible to exceed this to exceed this voltage, for example to obtain higher value of power. Maximum power supplied by the motor increases proportionally with applied voltage.

MAXIMUM SPEED: This should never be exceeded during normal use. Higher speeds may damage the commutator or other parts of the motor.

NOMINAL SPEED: The speed that the motor will reach at rated voltage and delivering nominal torque. This is based on an ambient temperature of 25°C.

NO LOAD SPEED: The speed that the motor will reach without a load and supplied at the nominal voltage. In practice, it is proportional to voltage applied