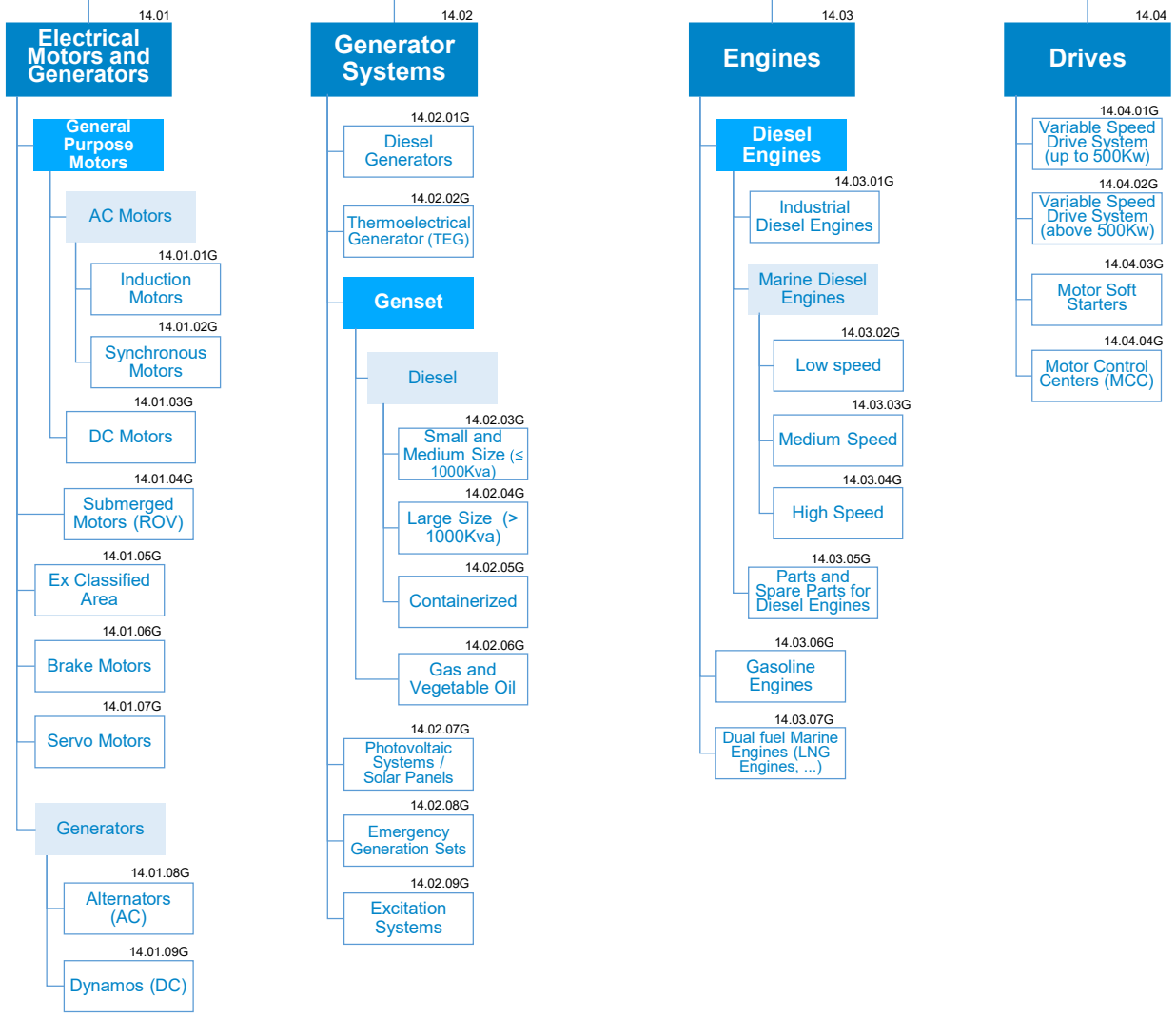
14 Engines, Motors, Generators and Drives



Engines, Motors, Generators and Drives

The engine is the industry's heart. Whether you are a manufacture or a transport company to achieve the purpose of your business you will need a source of energy and an engine to convert that source into useful power. Equally, each manufacturer will have the need to install an engine as the first move to produce motion and to power the process equipment which is part of the production line, the same way a transport company must have an engine to carry out any delivery.

Main rationales behind the Standard Categorization

Electrical Motors and Generators

- Electrical motors and generators are machines which either convert electrical energy inputs into forces or convert applied kinetic energy inputs into electrical energy. In principle, any electrical generator can also be operated as a motor and vice-versa. In practice they will often be optimized for one application or the other.
- General purpose Motors have certain operating characteristics that allow them to be used for many different applications. In contrast, the other categories refer to engines built to meet specific needs such as ROVs or Brake motors.
- An alternator is an electrical generator (asynchronous or Synchronous) that converts mechanical energy to electrical energy in the form of alternating current while a dynamo produces direct current with the use of a commutator.

Generator Systems

- Here it is worth noting the difference between a Engine generator and a Generating set. On the one hand the former is a combination of an electrical generator (often an alternator) and an engine (prime mover), typically Diesel, mounted together to form a single piece of equipment that generates electrical energy. On the other hand, a “Genset” is The turnkey packaged combination of an engine, an electric generator and various ancillary devices such as base, canopy, sound attenuation, control systems, circuit breakers, jacket water heaters and starting system.
- A photovoltaic system consists of an arrangement of several components: solar panels, which absorb and convert sunlight into electricity, a solar inverter which changes the electric current from DC to AC, as well as mounting, cabling and other electrical accessories to set up a working system.
- The primary application of an emergency or Standby Genset is to supply power for a limited duration during a power outage. These units do not require some of the more elaborate and robust features expected in continuous power diesel generators.

Notes:

- A large size Genset is considered a device for industrial purpose with a power above 1000 Kva.

Engines

- This family refers to the main internal combustion engine (ICE) in which combustion is intermittent, typically fed with fossil fuels like natural gas or petroleum products such as gasoline and diesel fuel.
- Therefore all ICEs with a continuous combustion (e.g. gas turbines) and systems with an external combustion, such as steam or Stirling engines will be excluded from this group.
- The diesel engine definitely occupies a leading position in this family, being the most widely used solution in the industrial sector, given its strength and reliability. In this node distinction is made between industrial engines and marine engines as the latter has to be adapted for use inside boats and ships.
- According to the rotational speed, Marine diesel engines can be divided into (all diesel engines can be divided according to this criteria, but in the case of Marine diesel engines, since the applications vary greatly, it is worth making the distinction clear):
  - Low-Speed (<300 rpm)
  - Medium-Speed (300–1,000 rpm)
  - High-Speed (>1,000 rpm)
- High- and medium-speed engines are predominantly four-stroke engines, while Slow-speed engines are predominantly large two-stroke crosshead engines, hence very different from high- and medium-speed engines.
- Dual fuel Marine engines enable owners and operators to be fully flexible in the choice of fuels.

Drives

- Wherever motors are used, they must be controlled. This family refers to any device that serves to govern the performance of an electric motor in a predetermined manner.
- An adjustable-speed drive (ASD) or variable-speed drive (VSD) is an interconnected combination of equipment that provides a means of driving and adjusting the operating speed of a process machinery, leading it to efficiency both in cost and in time.
- A motor soft starter is a device used with AC electrical motors to temporarily reduce the load and torque in the power train and electric current surge of the motor during start-up. This reduces the mechanical stress on the motor and shaft, as well as the electrodynamic stresses on the attached power cables and electrical distribution network, extending the lifespan of the system.
- It is often desirable to control some or all of the motors from a central location. The apparatus designed for this function is the motor control center (MCC). It is a packaged combination of motor starters, fuses or circuit breaker, indicator lights and variable speed drives.