Chapter 5
Types and Characteristics of DC Generators

ABSTRACT

There are several types of Direct Current machines. In this chapter, the authors highlight the types and characteristics of DC generator. Load characteristics of DC generator are then discussed. They then discuss separately excited generators, self-excited shut generators, series generators, and compound generators. Finally, they discuss voltage build-up in self-excited generators and critical field resistance.

5.1 TYPES AND CHARACTERISTICS OF DC GENERATOR

D.C. machines are classified according to connection of field winding with the armature winding and accordingly these are called

1. Shunt
2. Series
3. Compound

The generators are classified according to type of field excitation i.e.

1. Self excited
2. Separately exited

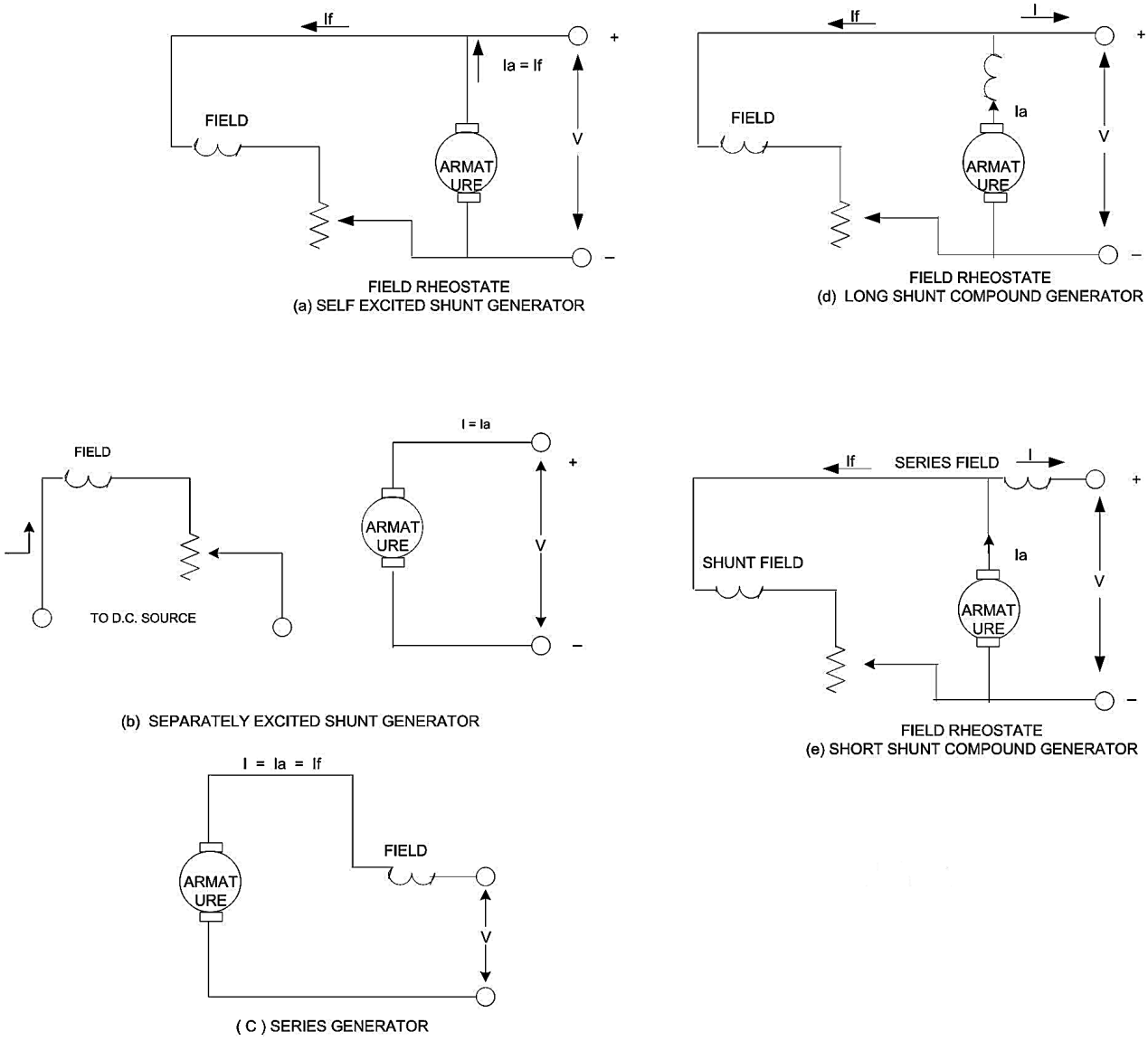
The fields winding in shunt machines are connected in parallel with the armature winding. The schematic diagram is shown in Figure 1 (a), excluding the interpole and compensating winding.

Field rheostat is an adjustable resistance connected in series with the shunt field to adjust the field current.

The shunt generator may be self excited/separately excited as shown in Figure 1 (a) and (b)

DOI: 10.4018/978-1-4666-8441-6.ch005

Figure 1. Self excited shunt generator, long shunt compound generator, and series generator



In series generator, as implies from the name, the field winding is connected in series with the armature winding see Figure 1 (c).

In compound generator, the field is splitted into two parts. A part is connected in series and the other is connected in parallel with the armature winding. The series part is called the series field and shunt part is called the shunt field. There two types of compound generator connections. The short shunt compound and long shunt compound as shown in Figure 1 (d) and (e).