

## Motors and Special Loads

Certain of Seattle City Light's (SCL's) large commercial or industrial customers may require motors or special voltages for their businesses. This chapter identifies SCL's requirements related to motors and special loads and voltages.

The Utility requires detailed information about new installations of motor load. The specific information required is included in this chapter as well as a worksheet included in Appendix 4 at the end of this manual. This information should be provided to SCL well ahead of the installation. Manufacture of special equipment and major construction may require up to 18 months advance notice.

The customer is responsible to provide suitable protective devices on all motor installations, including adequate protection against single phasing on polyphase motors.

### Motor-Starting Limitations

The customer's use of electricity must not interfere with the quality of their own service and must not interfere with the quality of service to other customers. If any motor and associated device(s) cause interference with its owner's or another customer's electrical service, the owner of the motor/device is responsible for taking corrective action. Conforming to the requirements in the sections below does not assure that interference problems will not occur.

### Starting Limitations on Single-Phase Motors

One-half horsepower or larger motors on recurrent starting with more than one start per hour, such as those operating water pumps or furnace blowers, must be served at not less than 240 volts (208 volts in the Network system). Single-phase motors must not exceed the maximum locked rotor currents listed in Tables 12-1 and 12-2, unless approved in writing by SCL.

**Table 12-1**

**Single-Phase Motor Maximum Allowable Locked Rotor Currents**

Rated Size	At 208 Volts (Network only)	At 240 Volts
5 horsepower	149 amperes	129 amperes

**Table 12-2**

**Single-Phase Hermetic Refrigerant Motor Compressor Maximum Allowable Locked Rotor Currents (from NEMA Standards)**

Unit Size (in tons)	Motor Size (in horsepower)	At 208 Volts (in amps)	At 240 Volts (in amps)
2	2 hp	80 amps	69 amps
2 ½	2 ½ hp	100 amps	87 amps
3	3 hp	120 amps	104 amps
3 ½	3 ½ hp	140 amps	121 amps
4	4 hp	160 amps	138 amps
4 ½	4 ½ hp	180 amps	156 amps
5	5 hp	200 amps	173 amps

## Starting Limitations on Poly-Phase Motors

Across-the-line starting of 15-horsepower motors or less will normally be permitted for starting currents less than values in Table 12-3. Reduced starting current shall be required on all motors exceeding 15-horsepower nameplate rating, or motors started more frequently than one start per hour, unless otherwise agreed by SCL. The customer will provide specifications and details of motor characteristics for all motors larger than 15 horsepower at which time SCL will determine the maximum allowable starting current for a given installation. Upon failure to install the required starting device, SCL will disconnect the service until it is acceptable. Reconnection shall be at the customer's expense.

**Table 12-3**  
**Poly-phase Motor**  
**Maximum Allowable Locked Rotor Current**  
(Derived from NEMA Standards)

Rated Size in horsepower (hp)	At 208 volts 3-Phase In amperes	At 240 volts 3-Phase In amperes	At 480 volts 3-Phase In amperes
15 hp	256 amps	222amps	111 amps

### Starting in Group Start Installations

The maximum permissible current value in Table 12-3 applies to an installation of a single motor. Starters may be omitted on smaller motors of a group installation when the omission does not result in a starting current in excess of the starting current approved in writing by SCL for the largest motor in the group.

### Approval

The following information must be submitted to SCL in writing when reduced starting current is required.

- a. Address of motor installation
- b. Description of driven load
- c. Motor voltage
- d. Number of phases
- e. Motor horsepower
- f. Horsepower rating of the largest motor in a group
- g. Type of starting device
- h. Maximum number of motor starts per 8-hour period
- i. Locked rotor current guaranteed by the manufacturer or by test
- j. Power factor at locked rotor current
- k. Description of soft-starting device
- l. Maximum current during soft-start
- m. Power factor during soft-start
- n. Assumed frequency is 60 Hz

## **Electric Power Regeneration Due to Motor Drive/Control**

Regeneration of electric power while braking, or upon motoring-down, must not exceed circuit loading at the common point of termination unless the operation has been approved by SCL. Typically, regeneration is intermittent and can cause misoperation of the distribution system which may jeopardizing worker safety.

## **Interference of Non-inductive Loads**

Noninductive loads must comply with the interference-correction rules stated in Chapter 13.

## **Maximum Switched Load**

Maximum increment of load to be switched as a unit will be: 100 kilowatts, three-phase; or 30 kilowatts, 240 volts single-phase, without written approval from SCL. Loads in excess of these amounts may require the customer to furnish and install special switching equipment to reduce the magnitude of unit loads to be cycled on and off.

## **Welding Equipment**

Welding equipment shall conform to the standards of the National Electrical Manufacturers Association (NEMA).

## **Minimum Power-Factor Limitations**

### **Lighting**

Low power-factor lighting, such as neon, mercury vapor, and fluorescent must have suitable auxiliary equipment to provide a power factor of not less than 97% lagging at the meter location.

### **85% Minimum Power Factor**

The average monthly power factor should be at least 97% lagging and always above 85% lagging at the meter location. Any auxiliary power-factor-correction equipment must be switched with the load so that at no time will it supply leading Volt-Ampere-Reactive (VAR) to SCL's distribution system unless there is written approval by SCL to allow it as a result of financial or operational harm to customer equipment. The average monthly power factor must be greater than or equal to 85% lagging or else SCL is no longer obligated to serve the customer.

### **Capacitor Control**

Capacitors installed by the customer for power-factor correction must be switched by automatic means so that the capacitors will be switched off during periods of reduced load.

## **Special Voltage Requirements**

Transformation to other than the available service voltage will be furnished by the customer on the load side of the Utility's metering equipment, unless otherwise agreed to in writing by SCL.

## **Meter Requirements for Large Loads**

For more meter requirements for large loads, refer to Chapter 11, "Metering."