5 Service Aids

5.1 Power Connections in the 7090 System
See Figure 5.1-1 for power connections in the 7090 system.

5.2 Measurements

5.2.1 Generator Frequency
Connect a Tektronix oscilloscope across any generator output terminal and ground. Adjust the oscilloscope controls for one cycle and convert the time required for one cycle to frequency.

\[
\text{Frequency (cps)} = \frac{1}{\text{time (seconds) required for 1 cycle}}
\]

The acceptable frequency tolerance is 389 to 441 cycles per second.

5.2.2 Voltage and Current per Phase
Measure terminal voltage and current in each phase of the 400 cycle generator output. Phase voltages should be within about 2 volts of each other and 208 volts AC ± 1 volt. Current in each phase should be not more than 70 amps and within about 2 amps of the other phases.

5.2.3 Amplitude Modulation
Modulation of the generator waveform (Figure 5.2-1) may be caused by harmonics in the generator output, noise because of arcing brushes, or noise introduced in the generator field by the regulator circuit. The combination of these effects should not modulate the output waveform on any phase by more than 2 percent. Amplitude modulation of the generator output waveform is measured with a Tektronix oscilloscope and calculated as follows:

\[
\text{Percent Modulation} = \times 100
\]

\[
\frac{E_{\text{Max}} - E_{\text{Min}}}{E_{\text{Max}} + E_{\text{Min}}}
\]

5.2.4 Power Factor
This measurement requires specialized test equipment not supplied to each installation. This equipment must be purchased locally or obtained from an mms district service center.

Connect a three-phase watt meter in series with the generator output wires and record the apparent power. Measure the actual power by connecting an ammeter in series and a voltmeter in parallel with each phase.

Calculate the power factor as follows:

\[
\frac{\text{Apparent Power (kw)}}{\text{Real Power (kVA)}} = \text{Power Factor}
\]

Maximum permissible values are:

\[
\frac{30.0 \text{ kw}}{37.5 \text{ kVA}} = 0.8
\]

Figure 5.2-1. 400 Cycle Generator Output Waveform