

AEROSPACE INFORMATION REPORT

AIR4298

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Impulse Test Machine, Sine Wave, Equipment and Operation of

RATIONALE

AIR4298 has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE:

This SAE Aerospace Information Report (AIR) describes equivalent type equipment and operational guidelines for a standard sine wave impulse test machine. The machine may be used for testing hydraulic tubing, fittings, hose assemblies, and similar fluid system components, if desired.

The standard sine wave impulse test machine is established for the following purposes:

1. A design guide for future machines being built by manufacturers and users.
2. As a referee in the event of conflicting data from two or more nonstandard impulse machines. Such a referee machine might be built by an impartial testing activity.

2. REFERENCES:

2.1 Applicable Documents:

MIL-H-5606	Hydraulic Fluid, Petroleum Base
MIL-H-83282	Hydraulic Fluid, Synthetic Hydrocarbon Base
AS4265	Impulse Testing of Hydraulic Tubing and Fittings, S-N Curve

3. DISCUSSION:

3.1 General:

The sine wave impulse machine consists of four basic systems integrated into one operational system.

- 3.1.1 Hydraulic Power Circuit: This is the hydraulic system, operating at normal room temperature, that provides the hydraulic pressure to the impulse generating system. This system has all of its critical components or circuits.

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- 3.1.2 Pressure Intensification Unit: This is the hydraulic system that provides the impulse waveform to a test manifold. This unit includes an 8 to 1 low to high pressure ratio servodriven intensifier, a rapid response servovalve, a high pressure accumulator, and other critical components needed to adjust and control the hydraulic pressure coming to and from the unit.
- 3.1.3 Control Circuit: This is the hydraulic to electrical system that controls the signals to the PIU (pressure intensification unit) and the impulse waveform at the test manifold. A typical waveform is shown in Figure 1.

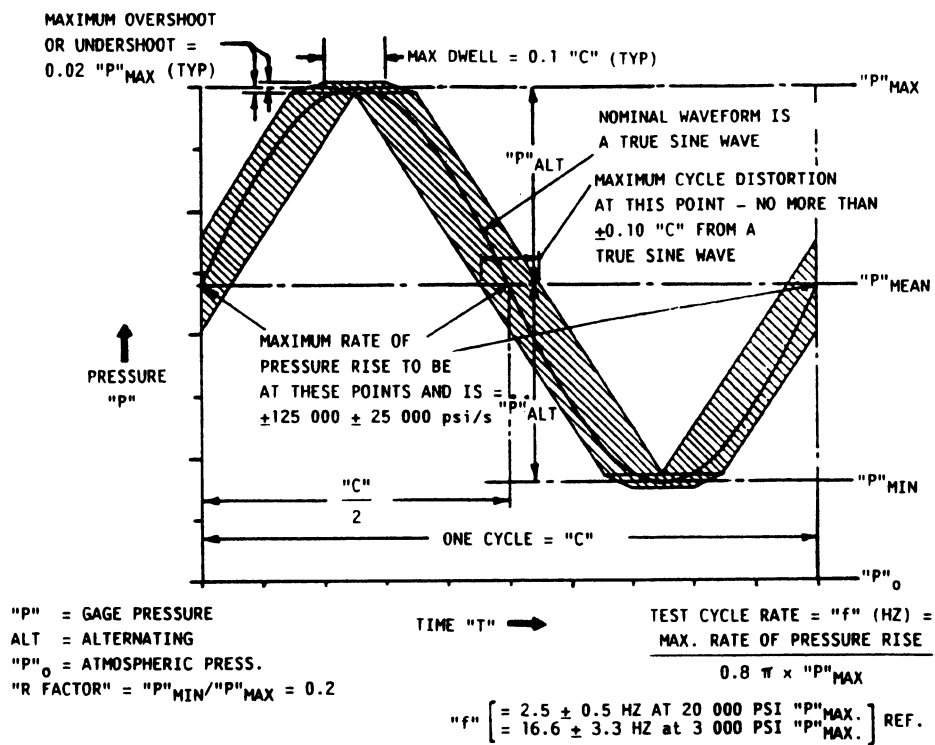


FIGURE 1 - Typical Sine Wave Impulse Curve

- 3.1.4 Environmental Control Unit: This unit consists of an environmental chamber capable of controlling the test ambient temperatures and fluid temperatures within the parameters of the test document.

3.2 Schematic:

The schematic for the sine wave impulse machine is shown in Figure 2.

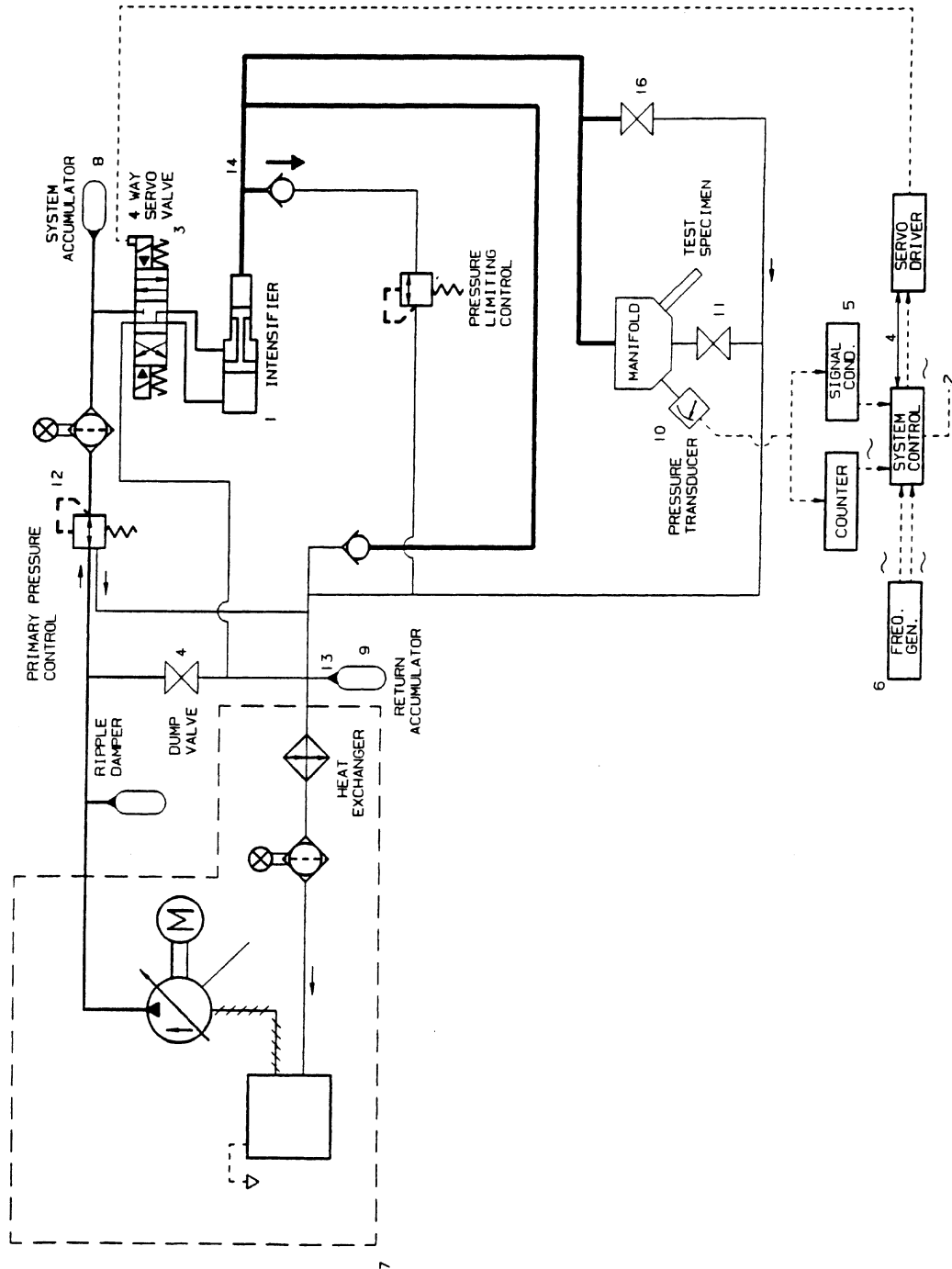


FIGURE 2 - Sine Wave Impulse Machine Schematic