# SPECIFICATION AND PERFORMANCE CHECK

## SPECIFICATION

### Performance Conditions

The electrical characteristics are valid only if the AF 501 has been calibrated at an ambient temperature between +20-degrees Celsius and +30-degree Celsius and is operating at an ambient temperature between 0-degree Celsius and +50-degree Celsius unless otherwise noted.

Items listed in the Performance Requirements column of the Electrical Characteristics are verified by completing the Performance Check in this manual. Items listed in the Supplemental Information column are not verified in this manual; they are either explanatory notes or performance characteristics for which no limits are specified.

**Table 2-1**

**ELECTRICAL CHARACTERISTICS**

| Characteristics | Performance Requirements | Supplemental Information |
|---|---|---|
| | **BANDPASS FILTER** | |
| Frequency Range | | 3 Hz to 35 Hz<br>In 4 decade steps<br>Single knob tuning |
| Frequency Dial Error | <5% dial between 3—20<br><10% dial between 20—30 | |
| Frequency Multiplier | | X1, X10, X100, X1k |
| Phase Shift | | <10° at tuned frequency<br>Below 5 kHz |
| Dial Readout | | Hz, and cycles per minute (cpm) |
| Dial Range | | 3 to 40 Hz, 180—2400 cpm |
| Dial Rotation | | 360°, no stops |
| Knob Rotation | | ≈6 turns per one dial turn |
| Max. Filter Attenuation | | >70 dB |
| Filter Selectivity | | Q ≈ 5 (BROAD)<br>Q ≈ 15 (NARROW) |

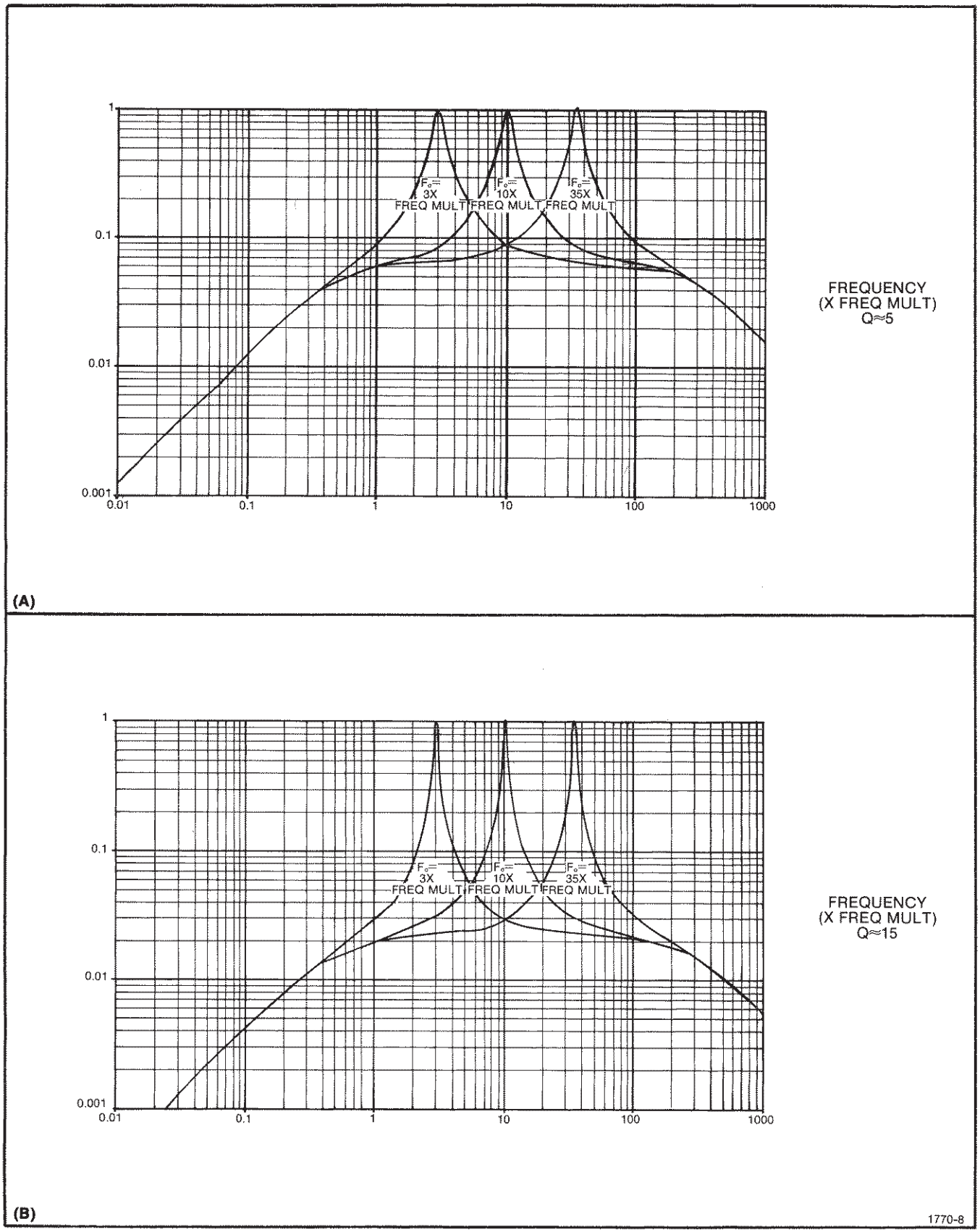


**Fig. 2-1. Attenuation vs frequency (A) Q=5, (B) Q=15.**

Table 2-1 (cont)

ELECTRICAL CHARACTERISTICS

| Characteristics | Performance Requirements | Supplemental Information |
|---|---|---|
| Filter Roll-Off | | See Fig. 2-1. |
| Gain Range | | 1—500, 1, 2, 5 Sequence |
| Gain Accuracy | ±3 dB (BROAD)<br>±5 dB (NARROW) | |
| Input Impedance | | ≈1 MΩ paralleled by ≈47 pF |
| Max. Non-Destruct ac Input Voltage | | 130 volts rms |
| Max. Non-Destruct dc Input Voltage | | ±100 volts |
| Output Voltage | 20 V p-p (product of output amplitude in volts and frequency in kHz not to exceed 400) | |
| Output Current | | 20 mA p-p max. (at 20 V p-p). See graph Fig. 2-2 |
| Output Impedance | | <1 Ω (with output voltage and current within limits of graph, Fig. 2-2). |
| | **AMPLIFIER** | |
| Single Ended | | Ac coupled |
| Gain | | 1 to 500; 1, 2, 5 sequence |
| Gain Accuracy | ±3% | |
| Bandwidth | <0.5 Hz to >50 kHz (at 3 dB point) | |
| Input Impedance | | 1 MΩ paralleled by ≈47 pF |
| Noise | | <25 mV rms (referred to Output) |
| Max. Non-Destruct ac Input Voltage | | 130 volts rms |
| Max. Non-Destruct dc Input Voltage | | ±100 Volts |
| Output Voltage | 20 V p-p (product of output amplitude in volts and frequency in kHz not to exceed 400) | |
| Output Current | | 20 mA p-p max. (at 20 V p-p). See Graph Fig. 2-2. |
| Output Impedance | | <1 Ω (with output voltage and current within limits of graph, Fig. 2-2). |

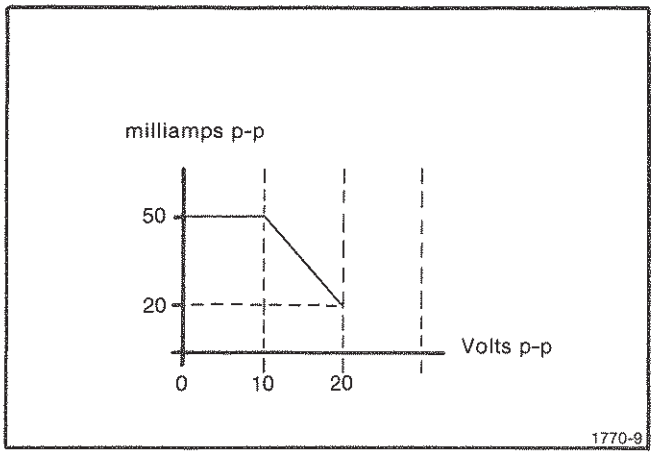


**Fig. 2-2. Graph of output current vs volts.**

**Table 2-1 (cont)**

**ELECTRICAL CHARACTERISTICS**

**OSCILLATOR**

| Characteristics | Performance Requirements | Supplemental Information |
|---|---|---|
| Sine-Wave Output Range | | 3 Hz to 35 kHz |
| Dial Readout | | Hz and cpm |
| Dial Range | | 3 to 40 Hz, 180—2400 cpm |
| Dial Rotation | | 360°, no stops |
| Knob Rotation | | ≈6 turns per one dial turn |
| Output Amplitude | | 1.2, or 5 V p-p ±20%. Depending on gain position. |
| Waveform Distortion | | >3% |
| Output Current | | Max. 50 mA p-p |
| Output Impedance | | <1 Ω (within 50 mA output current limit). |
| **TRIGGER OUT** | | |
| Trigger Out | | Positive pulse, triggered when positive slope of output signal goes through 0 (used for counter, strobe-light, etc.). |
| Pulse Amplitude | >10 volts | |
| Pulse Duration | 10 ±5 μs | |
| Minimum Signal Out Required To Set Trigger | | 500 mV, p-p |
| Rise and Fall Time | | <1 μs |
| Output Impedance | | ≈50 Ω |

Table 2-2 (cont)

ENVIRONMENTAL

| Characteristic | Information |
|---|---|
| Temperature | |
| Operating | 0° C to +50° |
| Storage | −40° C to +75° C |
| Altitude | |
| Operating | To 15,000 feet, maximum operating temperature decreased by 1° C/1000 feet from 5000 to 15000 feet. |
| Storage | To 50,000 feet |
| Vibration | |
| Operating and Non-Operating | With the instrument complete and operating, vibration frequency swept from 10 to 55 to 10 Hz at 1 minute per sweep. Vibrate 15 minutes in each of the three major axes at 0.015" total displacement. Hold 10 minutes at any major resonance, or if none, at 55 Hz. Total time, 75 minutes. |
| Shock | |
| Operating and Non-Operating | 30 g's, 1/2 sine, 11 ms duration, 3 shocks in each direction along 3 major axes, for a total of 18 shocks. |
| Transporation | Qualified under National Safe Transit Committee Test Procedure 1A, Category II. |

Table 2-3

PHYSICAL

| Characteristic | Information |
|---|---|
| Overall Dimensions (measured at maximum points) | |
| Height | 5.0 inches (12.7 cm) |
| Width | 2.6 inches (6.6 cm) |
| Length | 12.20 inches (31.0 cm) |
| Net Weight (Instrument only) | 1 lb 13 oz (821 grams) |