

## 1. PURPOSE OF EQUIPMENT

The 478A-3 Zifor (Zero Indicator for Omnirange) III VOR Radial Standard (hereinafter referred to as Zifor III), CPN 622-3701-001, demodulates and extracts bearing information from a VOR audio signal generator, used for VOR testing and alignment, and displays the zero radial information to an accuracy of  $\pm 0.01^\circ$  (relative to the primary standard used to calibrate the Zifor III). In addition, the Zifor III displays radial bearing runout error to within  $\pm 0.01^\circ$  at any radial from 0.00 to 359.99°. Input signal status and automatic self-test information are also displayed. Refer to figure 1.

The Zifor III acts as a precise phase meter, measuring the phase relationship of the 30-Hz reference tone (which has been stripped from the 9960-Hz FM subcarrier) to the 30-Hz variable signal. The amplitude of the 30-Hz variable signal is monitored to ensure that the input tones are within proper levels.

The Zifor III may be used to check the audio output of any VOR audio generator such as the Collins 479S series and their military equivalents.

## 2. RELATED PUBLICATIONS

Related publications are listed in table 1.

Table 1. Related Publications.

PUBLICATION	COLLINS PART NUMBER
Planar Card Repair Instructions	523-0768039

## 3. EQUIPMENT SPECIFICATIONS

Equipment specifications for the Zifor III are listed in table 2.

## 4. EQUIPMENT DISPLAYS

The Zifor III monitors the input signal and displays an error message if the input amplitude of the

tones falls outside a defined window. In addition, upon power-on and every five (5) minutes during normal operation, the Zifor III performs automatic self-check and auto-zeroing, which monitors internal digital and analog circuitry to verify correct operation and phase offset. If a fault is detected, an error message is displayed. Refer to table 3 for a list of the messages, and their meaning, displayed by the Zifor III.

## 5. PHYSICAL DESCRIPTION

### 5.1 Mechanical Description

The Zifor III (figure 2) consists of an integral front panel, wraparound chassis, and a dust cover. Electrical components are mounted on the front panel; three circuit card assemblies, a power supply, and an overvoltage assembly are attached to the wraparound chassis. Internal airflow is provided by a blower attached to the inside of the wraparound chassis. The Zifor III should be placed on a workbench during operation.

### 5.2 Electrical Description

Electrical components mounted on the front panel of the Zifor III include POWER ON-OFF switch S1 and VOR COMP INPUT connector J1. Within the Zifor III are power supply PS1, display circuit card A1, digital I/O circuit card A2, analog circuit card A3, overvoltage protector A4, fuse F1, and input power connector J2.

Power supply PS1 converts the single-phase, 115- or 230-V ac, 50- to 60-Hz input power into +5-, +12-, and -12-V dc circuit operating voltages. Display circuit card A1 contains the six LED's (light emitting diodes) required to display the phase error, radial bearing runout, input signal status, and self-test information. Digital I/O circuit card A2 contains the lamp drivers, CPU, and I/O interface circuitry; and analog circuit card A3 provides FM demodulation of the 30-Hz reference tone, input level monitoring, AGC, and squaring of the two 30-Hz tones. Overvoltage protector A4 provides voltage limiting protection for the power supply, and fuse F1



TP6-5154-017

478A-3 Zifor III VOR Radial Standard  
Figure 1

Table 2. Equipment Specifications.

CHARACTERISTIC	SPECIFICATION
Physical	
Height (including pads)	139.7 mm (5.5 in)
Height (front, with stand extended)	209.55 mm (8.25 in)
Width	304.8 mm (12.0 in)
Depth (including handles)	419.1 mm (16.5 in)
Weight	7.71 kg (17.0 lb)
Environmental	Normal ambient conditions at test area
Electrical	
Power input	115 or 230 $\pm 10$ V ac, 50 to 60 Hz, single phase
Input frequency range	All frequencies within $\pm 1.5\%$ of nominal
Input amplitude range (per tone)	0.200 V rms $< V_{in} < 4.0$ V rms
Distortion	
9960-Hz amplitude modulation	$< 5\%$
30-Hz ref } THD 30-Hz var }	$< 2\%$
FM deviation limits	$\pm 480$ Hz $\pm 30$ Hz
Output phase parameters	
Audio phase accuracy	Zero = $\pm 0.01^\circ$ To 359.99 = $\pm 0.02^\circ$
	<b>Note</b>
	The unit will hold to $\leq 0.01^\circ$ of the VOR zero as indicated by the primary standard.
Resolution	$0.01^\circ$
Short-term stability	$\leq 0.004^\circ$ (phase jitter on display induced by VOR indicator)