33K1-4-178-1

FLUKE 510A/AN

SCANNED 5/19/99

SECTION VI
DIFFERENCE DATA SHEETS

6-1. GENERAL

6-2. This section contains data on ac reference standard Model 510A/AN which is different than Model 510A/AD. The paragraph numbers shown in parenthesis correspond with the paragraphs in sections I through V. Paragraphs in sections I through V not indicated herein apply to both models.

6-3. (1-2) The ac reference standard Model 510A/AN is a precision ac reference standard producing eight transformer-coupled 400Hz output with an amplitude of 10V rms. The unit can be phase-locked to an external 400Hz, 10 to 200V rms reference if desired. The phase relationship between the 400Hz reference and the eight outputs is individually programmable to provide either a 0° or 180° phase shift.

Table 6-1. List of Specifications — Model 510A/AN

OUTPUT VOLTAGE
Eight outputs each at 10V rms ±0.05% into 100k ohms. Each output transformer isolated.

OUTPUT CURRENT
10 mA rms, short-circuit protected.

FIXED FREQUENCY OUTPUT
400 Hz

TOTAL HARMONIC DISTORTION
Less than 0.15%

TERMINAL VOLTAGE
Maximum allowable dc or peak ac potential between the Low Terminal and Shield Terminal is 300 volts.

PHASE LOCK
Capable of locking to external 400 Hz, 10 to 200V rms, phase reference.

OUTPUT PHASE RELATIONSHIP TO PHASE REFERENCE INPUT
0 ±1 degree or 180 ±1 degree

ISOLATION
Between any two shields: 300V dc or peak ac; Between any two windings with the shield connected to the guard: 10 pF maximum capacitance; common mode rejection between windings: 8db at 400 Hz.

LOAD REGULATION
Less than 20 ppm, ±10% line change.

LINE REGULATION
Less than 10 ppm, ±10% line change.

OUTPUT CONNECTIONS
24 pin female Amphenol connector providing a HI, LO and Shield Connection for each of the eight outputs.

INPUT CONNECTION
Single High, Low, and ground binding posts on rear panel for the Ø REFERENCE INPUT; 14 pin Amphenol connector LOGIC INPUT for the programmable phase reversal.

UNCALIBRATED INDICATION
Front panel display, labeled "UNCAL", indicates when load exceeds 10 mA.

MANUAL CONTROLS
Front panel Power Switch

ENVIRONMENTAL
Operating Temperature . . 32° F(0° C) to 122° F(50° C)
Storage Temperature . . -40° F(-40° C) to 167° F(75° C)
Humidity Range. . Up to 80%RH, 32° F(0° C) to 95° F (35° C). Up to 70%RH, 95° F(35° C) to 122° F(50° C)
Shock . . 20g, 11 millisec half-sine wave
Vibration . . 4.5g, 10 hz to 55 hz
Altitude . . 0 to 10,000 feet operating. 50,000 feet non-operating.

INPUT POWER
115/230V ac ±10%, 50 to 500 Hz, single phase

SIZE
3-1/2 inches high x 19 inches wide x 15-1/2 inches deep (See Figure 6-3).

MOUNTING
Rack mountable in standard 19 inch EIA equipment rack.

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...in the Performance Checks, paragraphs ...gh 4-18, which calls out a check for OUT-...nd OUTPUT 2, the check should be performed ... eight outputs of the instrument.

6-20. SPECIAL TOOLS AND TEST EQUIPMENT. Table 6-4 list special tools and test equipment required to support the 510A/AN. Alternate equipment of equal or greater accuracy may be subtituted.

6-21. (4-17) PHASE LOCK CHECK

d. Vary the phase reference source from 380 to 420 Hz and observe that phase error after settling is 0 ± 1 degree.

e. Vary the phase reference source from 10 to 200V rms and observe that phase error after settling is 0 ± 1 degree.

f. Return the phase reference source voltage to 26V rms.

g. Apply +5 volts dc from the DC Voltage Calibrator source to pins 3 and 5 of the Logic input connector. Apply dc common to pins 2 and 8.

h. Apply the +5V dc to Phase Control, pins 4 and 11 of the Logic input connector.

i. In turn, apply and remove the dc common to pins 1, 7, 8, 9, 10, 12, 13 and 14 of the Logic Input Connector.

j. Externally trigger the scope with phase reference source and check each output to verify the output is in phase with the reference.

k. Apply the dc common to Phase Control, pins 4 and 11 of the Logic Input Connector.

l. In turn, apply and remove the dc common to pins 1, 7, 8, 9, 10, 12, 13 and 14 of the Logic Input Connector.

m. Externally trigger the scope with phase reference source and check each output to verify the output is 180° out of phase with the reference.

n. Reduce the DC voltage calibrator to 4.5 Volts dc. Repeat steps h through m to insure the relays operate with the reduced voltage supply.

o. Remove phase meter. Return phase reference source to 26 V rms. Leave the loads and phase reference source connected for the next check.

6-22. (4-19) ADJUSTMENT PROCEDURE. In each case in the Adjustment procedure, paragraphs 4-19 through 4-32 which calls out a check or adjustment for OUTPUT 1 and OUTPUT 2, the step should be performed on all eight outputs of the instrument.

6-23. (4-31) PHASE LOCK PCB ALIGNMENT.

k. Remove digital voltmeter and connect a phase reference source variable from 10 to 200V rms, 400 Hz, to the ∅ REFERENCE INPUT of the 510A/AN. Set the variable input to 26V rms.

l. Connect an oscilloscope to TP1. Externally trigger scope with phase reference source.

m. Signal observed at TP1 should be a symmetrical square wave approximately 0 to +5 volts peak to peak and in phase with reference signal.

n. Connect scope input to TP2 observing that signal is a symmetrical square wave of approximately 0 to +5 volts peak to peak and in phase with reference signal.

o. Change reference signal to 370 Hz then to 430 Hz. Observe that signal at TP2 comes into phase with reference signal at each frequency, indicating a phase locked condition.

p. Change reference signal to 10V rms and then 200V rms. Observe that signal at TP2 comes into phase with reference signal at each voltage level, indicating a phase locked condition.

q. Apply +5 volts dc from the DC Voltage Calibrator source to pins 3 and 5 of the Logic input connector. Apply dc common to pins 2 and 8.

r. Apply the +5V dc to Phase Control, pins 4 and 11 of the Logic input connector.

s. In turn, apply and remove the dc common to pins 1, 7, 8, 9, 10, 12, 13 and 14 of the Logic Input connector.

t. Externally trigger the scope with phase reference source and check each output to verify the output is in phase with the reference.

u. Apply the dc common to Phase Control, pins 4 and 11 of the Logic Input Connector.

v. In turn, apply and remove the dc common to pins 1, 7, 8, 9, 10, 12, 13 and 14 of the Logic Input connector.

w. Externally trigger the scope with phase reference source and check each output to verify the output is 180° out of phase with the reference.

x. Reduce the dc source to 4.5 Volts dc. Repeat steps r through w to insure the relays operate with the reduced voltage supply.

y. Remove the test equipment.

6-24. (4-32) FINAL ADJUSTMENTS. Equipment required to perform final adjustments is a Thermal Transfer standard (accurate to at least ±.05%), phase meter, distortion analyzer, eight 100K ohm loads, and one 110K ohm load. Adjustments are located on the Phase Lock PCB Assembly and are illustrated in Figure 4-4.

a. Connect Thermal Transfer voltmeter across R109 on Main PCB Assembly (see Figure 4-3 for location). Calibrate voltmeter accounting for error recorded