

2.10 POST INSTALLATION TESTS

The purpose of this series of tests is to assure proper operation of the installed avionics equipment. First, and most important, is a complete inspection of the installation to be sure that all aircraft flight controls operate freely and with full travel or deflection.

Since these procedures cover Units with and without glideslope, simply bypass those functions (glideslope) which do not apply to the system being tested. A remote mounted Marker Beacon or Glideslope Receiver whose operation is dependent upon the NAV Unit being tested should be considered as an integral part of the system and included in this procedure. If an audio control panel is part of the installation, remember to select the NAV and MKR audios at the appropriate points in the procedure.

2.10.1 NAV Preflight Tests

For this series of in-aircraft tests, the aircraft's engine(s), rotating beacon, electrical and avionics equipments should be operating. Note any abnormal interaction or interference (ignition or rotating beacon noise, abnormal meter deflection, compass deviation, etc.) observed during these tests.

The following procedure requires a ramp type test equipment such as that offered by Tel-Instrument Corp. or Instrument Flight Research, Inc.

A. Keep-Alive and Transfer checks

1. Turn the MK-12D ON. The Active display shall show a valid NAV frequency and the Standby 110.50.
2. Press the NAV transfer button and observe that the Active and Standby frequencies exchange position.
3. Reset the Active display to 114.15.
4. Turn the MK-12D OFF and wait a minimum of 10 seconds. Turn the MK-12D ON and observe that the Active display reads 114.15 and the Standby 110.50.

B. General

1. Set NAV Active channel to a VOR frequency.
2. Rotate the VOL-IDENT control clockwise until NAV Receiver noise is heard in the speaker and headphones. (NOTE: IDENT knob must be pulled out). Note presence of NAV and GS warning flags and centered Left-Right and Up-Down needles.
3. Modulate test equipment 30% with 1020 Hz.
4. Note presence of adequate Audio level. Depress VOL-IDENT knob and note decrease in volume level.

2.10.1 Continued

C. VOR

1. Set NAV Active display to a desired VOR frequency.
2. Set test equipment to desired VOR frequency.
Modulation should be a composite VOR signal. TO/FROM switch set to the TO position.
3. Set test equipment and Indicator OBS to Zero degree course.
Spec: Left-Right needle must center within ± 1.5 degrees with a TO flag: NAV Flag shall not be visible. VOR bearing Zero set adjustment (R2152) is shown in Figure 2-2.
4. Turn Indicator OBS knob first to 10 degrees, then to 350 degrees.
Spec: Left-Right needle should deflect full scale (5 dots).
5. Check remaining three cardinal points (90, 180, and 270).
Spec: Left-Right needle must center within ± 1.5 degrees, with a TO flag.
6. With OBS remaining at 270, set test equipment to 90.
Spec: Left-Right needle must center within ± 1.5 degrees with a FROM flag.

D. LOC

1. Set test equipment and NAV Active display to a LOC frequency. Modulation should be a standard LOC centering signal.
Spec: Centering, ± 1 needle width with a TO flag. NAV Flag shall not be visible. LOC Zero Set adjustment (R2153) is shown in Figure 2-2.
2. Change modulation to .093 dBm left, then right.
Spec: Deflection, 3 dots, ± 1 needle width.
3. Remove modulation or decrease test equipment RF output to minimum.
Spec: NAV Flag shall be visible.

2.10.1 Continued

E. Glideslope

1. Set test equipment and NAV Active channel to a GS frequency. Modulation should be a standard GS centering signal.
Spec: Centering, ± 1 needle width with a TO Flag.
GS Zero set, R2154 is shown in Figure 2-2.
2. Change modulation to .091 dB ddm Up, then Down.
Spec: Deflection, 2.5 dots, ± 1 needle width.
GS Flag shall not be in view.
3. Remove modulation or decrease test equipment RF output to minimum. Spec: **GS Flag shall be visible.**

2.10.2 COM General Preflight Test

With the aircraft engine(s), avionics equipment, and other on-board electronics operating, transmit and receive on several different frequencies. There should be no excessive interference and intelligible two-way communications should be demonstrated.

During this exercise make a panel illumination check:

COM READOUT SEGMENTS AND TRANSFER CHECK - Set 120.20 Active - 135.95 Standby, push arrowed white transfer button. If complete frequencies were seen in both positions - all segments are OK. (Transfer button does not illuminate.)

TRANSMIT - "T" will be seen to the right of the Active frequency whenever the Mike Key is depressed.

DIMMING CIRCUIT - The photocell, being sensitive to light, will dim the display when an opaque material is placed upon it. The display will "come back" upon taking the material away.

KEEP-ALIVE CHECK - Set the COM Active window to 120.20. Turn the MK-12D OFF. Wait 15 seconds and turn the MK-12D ON. The Active window should display 120.20 and the Standby 121.90.

2.11 FLIGHT TEST

A flight test is recommended to perform the following checks and adjustments:

- A. Check all avionics under actual operating conditions for abnormal indications (ignition noise, audio distortion at in-flight volume settings, rotating beacon noise, interference between avionics equipments, etc.).
- B. Look for variations in performance due to various landing gear and flight control surface configurations.

All of these tests must be performed at an ILS facility, on an airway, and in an area where the ground station signal quality and strength has been verified.

2.11.1 NAV Section

VOR

- A. Flying at an altitude of 6000 feet above ground level (AGL) channel the NAV Active to a VOR facility 50 nm away.
 - 1. Check course accuracy, warning flag indication, and Left-Right needle sensing.
 - 2. Check the antenna pattern by flying the aircraft in a 10 degree bank completing a 360 degree turn: The warning flag should remain out of view throughout the turn and audio should remain intelligible.
- B. Flying at an altitude of 6000 feet AGL, channel the NAV Active to a VOR facility 10 nm away and fly inbound.
 - 1. Check course width (± 10 degrees of selected radial).
 - 2. Observe the VOR warning flag while approaching, passing over, and flying outbound: TO/FROM indicator shall indicate correctly and the warning flag must be observed except when passing directly over the station.
- C. Flying at an altitude of 6000 feet AGL, channel the NAV Active to a VOR facility 25 nm away and fly inbound.
 - 1. Operate the communication transceiver: VOR Left-Right indicator transient deviations should not exceed 2 dots and steady state errors should not exceed 0.5 dot.

LOC and GS

- A. Flying at an altitude of 3000 feet AGL, channel the NAV Active to a LOC frequency and fly inbound to intercept ILS.
 - 1. From point of intercept to termination of test, neither LOC of GS warning flags should appear.
 - 2. Establish glidepath and fly the ILS approach: request approach control confirmation of on-glide path condition.
 - 3. While on-glide path, maneuver aircraft through normal pitch and roll altitudes: Left-Right and Up-Down indicators should perform normally and a warning flag should not be visible at anytime.

2.11.2 COM Section

A flight test should be performed to check the antenna pattern and system compatibility.

- A. Flying at a altitude of 6000 feet establish two-way communications with a ground station facility at least 50 NM away.
- B. With the aircraft flying at 6000 feet, in right and left banks (up to 10°), at 10 of 12 equally spaced headings establish two-way communication with a ground station at least 50 NM away.
- C. At an altitude of 6000 feet and at a distance of 20 NM from the ground facility, fly directly toward the facility and for 20 NM beyond. Maintain satisfactory communications with the facility during the test run.
- D. At a distance of 10 NM from the ground station put the landing gear and the aircraft in the approach configuration. Maintain satisfactory communications with the facility.