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Maintenance

**GROUND OPERATION OF INSTALLED
AIRCRAFT ENGINES**



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This instruction implements AFD 21-1, *Managing Aerospace Equipment Maintenance*. It establishes policies, procedures and responsibilities for ground operations of installed aircraft engines for maintenance. It applies to 18th Wing (18 WG) and associate units at Kadena AB. This publication does not apply to the Air National Guard or US Air Force Reserve.

SUMMARY OF REVISIONS

Para **3.1**. PACAF Sup 1 and 21-101-18WG Sup 1 were added. Para **3.3.6**. was added. Para **4.1.1**. The open Trim Pad will not be used for engine operation if the Hush House is operational and no other aircraft or uninstalled TF-34 engines are currently being run in facility was removed. Aircraft that are next day flyers have priority during quiet hours. If TF-34 engines are below WRE, they will have priority over all other engine runs except next day flyers, was added. Paragraphs **4.1.2**. - 4.1.4. were deleted. Para **4.3.1**. The use of anti-personnel guards (run screens) will be the preferred method of intake protection was removed. However, a qualified intake monitor will be used in lieu of run screens, was removed. Paragraphs **5.1.2**. - **5.1.3**. Changes were made to reflect new 909ARS engine run qualifications and certifications. Para **5.1.6**. - **5.1.11**. New engine run parking locations, power settings and requirements were added. Paragraph **6.1.2**. AFSC 2A6X6 was added. Para **7.1**., AFOSH STD was revised to read 91-100. The checklists were revised to read as follows, 1H-60(H)G-2-1CL-4, and 1H-60(H)G-2-1CL-6. Para **7.2**., Helo spot 4 was removed. Spots Poppa 1- Poppa-3 were added. The **NOTE** was removed. The following words were added, with applicable unit commander through 18 WG Command Post to 18 OG/CC for approval. New or revised material is indicated by a bar (|).

1. References: AFI 21-101, *Aerospace Equipment Maintenance Management*, AFI 11-218, *Aircraft Operation and Movement on the Ground*, AFOSH Standard 91-100, *Aircraft Flight Line Ground Operations and Activities*, 18 WGI 13-203, *Kadena Air Base Noise Abatement Policies and Procedures*, 18 WGI 11-401, *Orientation Flight Program*, 18 WGI 21-102, *Foreign Object Damage*, 18 OG/LG OI 21-140, *Certification of Personnel for Engine Ground Operation, Engine Trim, and Fiberscope Opera-*

tion, TOs 00-25-172, *Ground Servicing of Aircraft and Static Grounding/Bonding*, 1H-60(H) G-2-CL-4, *Auxiliary Power Unit Operation*, 1H-60(H) G-2-CL-6, *Engine Run*, 1H-60(U) A-1, *Flight Manual* and 00-20-5-1-1, *Engine Historical Records Instructions for F100PW100/-200/-220E Engines*.

2. Responsibilities: Squadron maintenance officers (SMO's) through flight chiefs and supervisors are responsible for ensuring compliance with this wing instruction (WGI).

3. General: Because operating procedures and personnel qualifications may differ between organizations assigned to the 18 WG, this WGI specifies procedures by unit. General procedures are outlined below.

3.1. Only personnel properly certified/authorized IAW AFI 21-101, AFI 11-218/PACAF Sup 1 and 21-101/18 WG Sup 1 will operate engines in order to validate maintenance performed, troubleshoot malfunctions or perform rapid defuels of aircraft.

3.2. Supervisors and expeditors will notify Maintenance Operations Center (MOC) of aircraft location, employee number of run person, aircraft tail number, reason for engine operation and if engine is preserved (green).

3.2.1. After engine run, inform MOC of aircraft status.

3.3. MOC will:

3.3.1. Provide run clearance only after all items of paragraph 3.2. are complied with.

3.3.2. If a preserved engine (green) will be operated, contact Fire Department and Kadena Ground Control and inform them of aircraft tail number.

3.3.3. Provide 18 WG Command Post (18 WG/CP) with the aircraft tail number, location and reason for operation any time engine run is between the hours of 1800-0600.

3.3.4. Maintain a log of all engine operations which will include employee number of run person, aircraft tail number, location and reason for engine operation.

3.3.5. Ensure compliance with 18 WGI 13-203 for noise abatement procedures.

3.3.6. Upon termination of an engine run, update CAMS course code 210 (90 day engine run certification requirement) for the individual who ran the aircraft.

3.4. Engine run certified personnel will ensure:

3.4.1. Aircraft forms are properly documented prior to and after engine run.

3.4.2. All personnel involved with the engine run are briefed on emergency procedures prior to engine start.

3.4.3. Compliance with all foreign object damage prevention procedures in 21-101/18 WG Sup 1, para. 22.29.24.

3.4.4. Contact is maintained with Kadena Ground Control via Ultra High Frequency (UHF) radio, frequency 275.8, throughout duration of engine run. F-15 personnel will contact Kadena Ground Control immediately after engine start.

3.4.5. Engine operation is terminated immediately upon notification by Kadena Ground Control, MOC or ground observer.

4. Procedures for the 18th Maintenance Squadron (18 MXS), 44th Fighter Squadron and 67th Fighter Squadrons Sortie Generation Flights.

4.1. Engine run certified personnel will ensure:

4.1.1. If single engine operation above 80 percent revolutions per minute (RPM) is required, or if both engines are to be operated above idle RPM simultaneously, the aircraft is taken to the Hush House for hold back and noise abatement. Aircraft that are next day flyers have priority during quiet hours. If TF-34 engines are below WRE, they will have priority over all other engine runs except next day flyers.

4.1.2. An AFTO Form 93, **Modular Engine Time/Cycle Accumulation Record**, is completed after termination of (unsuppressed) engine runs above 80% N2 RPM and delivered to 18 MXS Engine Management (EM) section no later than 0900 the next duty day. Hush House personnel will deliver the AFTO Form 93 to the EM no later than 0900 the next duty day for suppressed engine runs.

4.1.3. Accomplish Comprehensive Engine Diagnostics System (CEDDS) downloads within one hour after completion of engine run on F100-220E engines. This will only be accomplished if the engine is run for an engine anomaly.

4.2. The ground observer will:

4.2.1. Maintain communication via headset throughout all maintenance ground runs with the operator.

4.2.2. Be in full view of the operator throughout the duration of engine start(s).

4.2.3. Maintain surveillance of the area surrounding the aircraft and immediately inform the operator to return engine to idle or shutdown if vehicles, equipment or personnel approach or enter designated danger areas with engines operating.

4.3. Anti-personnel guards and intake monitor.

4.3.1. If run screens are not used, as a minimum, a qualified intake monitor will be used to ensure personnel do not enter the intake danger areas. **CAUTION: When troubleshooting stalls/stags or augmentor malfunctions, personnel guards will NOT be used.**

4.3.2. The intake monitor will remain clear of designated danger areas and will be stationed in front of the aircraft at all times, except when preventing personnel from entering dangerous areas. The intake monitor will be dedicated to this position only and will not perform any other duties.

4.3.3. Run screens are not required on the open field trim pad if, as a minimum, a qualified intake monitor is used. The intake monitor will be in full view of the operator, standing in front and to the side of aircraft operating at high power. The engine operator will give a safety briefing prior to engine start to ensure danger areas are clearly understood by everyone.

4.3.4. Run screens and intake monitors are not required in the Hush House.

5. Procedures for the 909th Air Refueling Squadron.

5.1. Only maintenance personnel designated by the SMO and properly certified will operate engines.

5.1.1. The following applies to F108 engines:

5.1.2. Two five-level, E-4 or above, certified personnel may run four engines to flight idle, not to exceed 80 percent N2.

5.1.3. A seven-level (2A671A or 2A571) and one five-level (2A651A or 2A551), E-4 or above, certified personnel may run one engine to Takeoff Rated Thrust (TRT)/Maximum Continuous Thrust (MCT) with the corresponding engine providing symmetrical thrust per technical data.

5.1.4. For training purposes, a seven-level technician (MCT/TRT qualified) will occupy the pilot's seat. No less than a five-level, E-4 or above, will occupy the co-pilot's seat when receiving training.

5.1.5. Engine run parking locations and power settings:

5.1.6. Ensure any unnecessary equipment is moved out to the wing tip and secured prior to operating engine(s) above idle RPM.

5.1.7. Four engines can be run to 62% N2. The following parking locations apply: Lima, Mike, & November rows, Warm-up Pad 1, Taxiway Bravo between Taxiway Lima and Runway 05L/23R.

5.1.8. Two engines can be run to 75% N1 with other two engines at idle. The following parking locations apply: Lima, Mike, & November, Bravo Patio, Habu Pad, Taxiway Bravo between Taxiway Lima and Runway 05L/23R. **Exceptions:** Lima 9, 10 & 11 November 3, 5, 7 & 9.

5.1.9. Two engines can be run to MCT/TRT with other two engines at idle. The following parking locations apply: Lima 12 & 13, Mike row, November 2, 6, 10-15, Warm-up Pad 1, Taxiway Bravo between Taxiway Lima and Runway 05L/23R.

5.1.10. For ground runs on Nancy (N) Row, Mike (M) Row, or Lima (L) Row spots 12 and 13 (four engines, 80 % N2), approval will be requested/coordinated through the MOC.

5.1.11. Four engines can be run to flight idle (80% N2). The following parking locations apply: Lima 12 & 13, Mike row, November 2, 6, 10-15, Warm-Up Pad 1, Taxiway Bravo between Taxiway Lima and Runway 05L/23R.

6. Procedures for the 961st Airborne Air Control Squadron.

6.1. The following applies to TF33-P100A engines:

6.1.1. For engine runs to 80 percent N2, the flight deck crew will consist of two five-levels, E-4 or above, engine certified personnel running the left seat and flight engineer's station. The person in the right seat will be a qualified brake and radio operator. Two qualified personnel will be on the ground to fire guard and observe engine operation.

6.1.2. For engine runs above 80 percent N2, the flight deck crew must have at least one engine run certified seven-level at either the left seat or flight engineer's position. All other requirements are per paragraph **6.1.1**. Two or four engines may be run to TRT providing symmetrical (opposing engines) thrust is maintained per technical data. TRT runs for engine trim will be accomplished by PAFSC 2A5X1, 2A6X6 and 2A6X1A personnel only.

6.1.3. For ground runs on N Row (four Engines, 80 percent power), approval will be requested/coordinated through the MOC.

6.1.4. Engine run power settings above 80 percent, two engines max TRT or four engines, (two at max setting and two at idle) will be accomplished on Taxiway B between Taxiway L and runway 05L/23R, Taxiway L or AMC ramp. At other engine run locations, power settings and/or times requires MOC coordination.

6.1.5. For training purposes, a seven-level technician (engine run and/or authorized engine run max engine pressure ratio certified) will occupy the instructor pilot's and/or navigator's seat to observe trainee.

6.1.6. Ensure any unnecessary equipment is moved out to the wing tip and secured prior to operating engine(s) above idle RPM.

7. Procedures for the 33d Rescue Squadron.

7.1. Only maintenance personnel properly authorized and certified IAW AFI 21-101, AFI 11-218, *Aircraft Operation and Movement on the Ground*, AFOSH STD 91-100, TOs 1H-60(U) A-1, 00-25-172, 1H-60(H) G-2-1CL-4 and 1H-60(H) G-2-1CL-6 will operate helicopter engines.

7.2. Engine operation will be conducted on Helo spots 1-3 and Poppa 1- Poppa-3. At other engine run locations, power settings/times requires MOC coordination with applicable unit commander through 18 WG Command Post to 18 OG/CC for approval.

7.3. Minimum engine run crew will consist of a fire guard on intercom posted outside the helicopter, one certified engine operator (five-level or above) and one person qualified in auxiliary power unit and UHF radio operation (five-level or above). Engine run operators will be highly experienced technicians selected by the SMO.

7.4. Helicopters will have a fully engaged, functioning gust lock, to prevent rotor rotation during ground operation of engines by other than qualified pilots and co-pilots.

7.5. All unnecessary tools and support equipment will be removed from the rotor path area prior to engine operation. Pay particular attention to the stabilator area prior to applying power, as the stabilator will program down on initial run-up.

7.6. Personnel other than qualified pilots and co-pilots are limited to operating only one engine at a time. The engine will not be operated above ground idle or for more than 10 minutes.

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