Hawker - Siddeley

HS.748

Series 2A

Cockpit Manual

Version 1.0 April 2006

For use with Rick Piper's HS.748 for Flight Simulator 2004

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***The weather radar set displays AI traffic if a registered copy of Peter Dowson's FSUIPC is installed.**

CONTENTS

MUST READ

Most systems have been modelled where possible to make the operation of the aircraft in Flight Simulator as faithful as possible. The manual should be read before attempting to use the panel to avoid getting into difficulty. Due to the complexities if the aircraft, it is best to load a default aircraft first, before selecting the HS.748. The panel will load in a takeoff configuration, however takeoff flap and fuel trim must be set, and the alternators started.

Note that engine and propeller speed are controlled entirely by the throttle lever therefore joystick and keyboard commands for propeller and mixture control are not necessary.

1. ELECTRICAL SYSTEM

The controls pertaining to the electrical system are grouped on the overhead panels which are accessed with the and icons. The casual user can avoid altering most of the controls, however **the Ground Supply switch must be moved to ON if the engines are not running, and returned to OFF after start and generated power is on line. Additionally the alternators must be started once the engines settle at idle speed.**

HS7 V1

28VDC Supplies

The 28VDC system is powered by generators mounted on each engine accessory gearbox which feed their respective bus bars which are normally connected to the centre bus bar. The bus bar isolate switches are inoperative. Each generator is controlled by a triple throw switch which has three positions; ON, OFF and START & RESET. To start either generator, move the switch to START & RESET to bring the generator on line, then move the switch to ON. Amber GEN FAIL warning lamps for each generator are on the emergency panel between the pilots. On the ground the lamp will light if its generator is switched off or has failed. In flight if a generator is switched off the lamp will go out but will come on again on when the weight is on the undercarriage. A two position magnetic indicator forming part of the mimic diagram will show continuity when the generator is on line.

The two batteries are controlled by single throw ON/OFF switches, and have associated magnetic indicators which show continuity when connected to the centre bus bar.

The Ground Supply switch, when selected to ON, will simulate a ground supply provided there is sufficient battery voltage.

A single ammeter and voltmeter used in conjunction with the rotary switch can be used to check the output from either battery or generator when the switch is set to B or G respectively. With the switch at B/B the centre busbar voltage is displayed, unless the ground supply is connected in which case external power voltage is displayed.

115VAC Supplies

Some of the instruments and equipment require 115VAC supply, and this is provided by three inverters, which take their supply from the 28VDC system. Each inverter is controlled by a single throw switch ON/OFF and has a magnetic indicator which shows on if its bus is powered. Amber INV FAIL warning lamps on the emergency panel are provided for Nos 1 and 2 inverters only. No 3 Inverter supplies only the autopilot.

Distribution of supplies is as follows:

No1 INVERTER

ADF1	VHF Comm 2	Port De-icing Cyclic Timer
Port Oil Press Gauge	Port Fuel Contents	Port Gyro Horizon

No2 INVERTER

ADF2	VHF Comm 1	Stbd De-icing Cyclic Timer
Stbd Oil Press Gauge	Stbd Fuel Contents	Stbd Gyro Horizon
RMI	VOR/ILS	Transponder

No3 INVERTER

Autopilot

HS7 V1

A load transfer switch is provided for each inverter. If an inverter fails it should be switched off and its transfer switch moved to TRANSFER. No1 load is transferred to No2, No2 is transferred to No1 and No3 is transferred to No2. If No3 has been transferred and a subsequent inverter is lost, No3 will also be shed and the autopilot will not be available.

A voltmeter and frequency meter show inverter output through selection on the rotary switch.

200VAC Supplies

An alternator mounted in each nacelle provides 200VAC for the de-icing of its associated engine intake, propeller & spinner as well as windscreen heating. Weight switches restrict output on the ground to 145-155v to prevent overheating of the de-icing elements.The controls are on the port overhead panel and consist of two triple throw switches labelled START/RUN/OFF, the switches are sprung from START to RUN. Two amber ALT FAIL warning lamps are on the emergency panel, and will light on the ground when a failure occurs or an alternator is switched off. In flight the lamp will go out if an alternator is switched off. Above each alternator control switch is a LOW VOLTAGE & EARTH LEAKAGE amber warning lamp which will come on when the output of its alternator falls below 180v in the air. The light will go out if the alternator is switched off but will not come on again on the ground. Alternator voltage may be checked through use of the voltmeter and selector switch.

A load transfer double throw switch enables the load from a failed alternator to be taken by the serviceable one, provided the failed alternator is switched off. The magnetic indicator shows NORM/TRAN.

2. ENGINE & PROPELLER CONTROLS

Throttles and HP Cocks

Each engine drives a four bladed constant speed fully feathering propeller of 12 feet diameter. Fuel flow and propeller RPM are selected through a single lever referred to as the throttle. Movement of each lever will automatically select propeller RPM for that throttle position as well as the required fuel for that RPM. Keyboard or joystick propeller commands will be ineffective and should be avoided. The throttle quadrant can be opened with the icon. There are mouse areas and tooltips in each lever slot to move the throttle levers, however it is more convenient to use the engine selector E in conjunction with the joystick or keyboard controls. Clicking on 1 or 2 will select that particular engine, or on the + selects both engines.

Outboard of the throttle levers are two high pressure (HP) fuel cock levers, each having three positions. The functions of each position from fully forward (default) to fully rearward are:

ON - Fuel is supplied to the engine under pressure.

OFF – The fuel supply to the engine is cut off. This is the normal way of shutting down the engine.

FEATHER – Fuel supply to the engine is cut off. The lever must be placed in this position before manual feathering can take place, and after automatic feathering has taken place. (See Engine and Flight Handling).

The mouse areas to move the levers forward are at the top of each lever slot, while those to move them backward are at the bottom.

The fuel mixture is preselected through the HP cock levers and fuel trimming controls, therefore mixture controls on joysticks should be left at the fully rich or fully weak positions and movement avoided.

The quadrant also houses the levers for the propeller brakes and internal gust locks. With the propeller brake on the circuit to the engine starter motors and ignition are isolated. When the gust locks are engaged, the elevator and ailerons are locked leaving the rudder free for ground steering. In this condition the both throttles may only be opened approximately half way allowing sufficient power for taxying only.

Propeller Indicating Lamps

Each propeller blade can travel between 0’ and 87’ pitch. There is a fixed stop at the 0’ position called the ground fine pitch stop. This finest of angles provides a powerful brake on landing and minimum air resistance rotationally during start. Additionally the fine angle avoids overheating of the engine on the ground at low speeds. When the propeller is feathered, the blades can travel no further than the 87’ feathering stop.

There is also a removable pitch stop called the flight fine pitch stop (FFP Stop). The FFP Stop is at approximately 18’ and when engaged prevents the propeller returning to the ground fine range during flight (i.e. blades below 18’ pitch). A FFP Stop lever is between the throttle levers on the quadrant, and will move towards the ENGAGED position as the throttles are advanced for takeoff. The lever is required to be returned to the WITHDRAWN position on touchdown to allow the locks to withdraw, however for convenience this will happen automatically with the weight on the wheels and the either throttle closed. The locks are wired in series and a single amber FFP Stop Removed warning lamp provides an indication that the locks have withdrawn. When the throttles are opened and both propellers have passed above approximately 18’ the locks will engage and the lamp will extinguish. There is also an amber Below FFP Stop warning lamp for each propeller which illuminates when the blades reach approximately 17’ or below.

The propellers may by synchronised in the air through use if the automatic synchroniser, controlled by a switch adjacent to the weather radar.

Fuel Trimming

The characteristics of the engine are such that a 1’C rise in ambient air temperature produces a 4’C rise in jet pipe temperature, therefore to avoid the risk of overheating the fuel flow must be reduced. Adjusting the fuel trim varies the interconnected propeller and fuel flow controls so that fuel flow can be reduced without alteration of RPM. However reduction in fuel flow will produce a concomitant reduction in power.

Fuel trimming is accomplished through two switches and associated desynn indicators which can be opened with the icon. The indicators are calibrated in percentages, with 100% representing the fully rich, untrimmed condition. The fuel trimmers must be set to 50% for start if the OAT exceeds 14’C otherwise set to 100% for start. After starting is completed the trimmers should bet set in accordance with the chart, which can be viewed with the icon, then adjusted after takeoff and subsequent climb to as near 100% remaining within TGT limitations (see Engine & Flight Handling). Full decrease, 0%, should be set at the top of descent before retarding the throttles, then the trimmers should be reset to the destination airfield conditions in the final approach so that the engines are trimmed ready for a possible baulked landing.

The switches can be used to adjust the trimmers individually, or alternatively the area over the gauges can be used to adjust both trimmers simultaneously, the tooltip shows the average setting.

Water Methanol System

As previously mentioned, in order to remain within engine temperature limits at high ambient temperatures the rate of fuel flow must be reduced, by way of the fuel trimmers , with a resultant power loss. Water Methanol introduced in the first stage compressor, is used as a power restorative in conditions where ambient air temperature/pressure would otherwise limit the performance of the engine on take off or go around. The W/M effectively cools and densifies the pre combustion air before being burnt in the normal way.

If required the system should be switched on before taxying and off once established in the climb after takeoff. The system should be selected on in the initial approach if required and off after landing. A metering unit senses any power loss with the throttles set to produce in excess of 14200 RPM, with the system switched on and operates the injection system.

The pumps are controlled by two switches on the pedestal which is viewed with the ⬇ icon. The green warning lamps indicate sufficient system pressure. Beneath the engine instruments on the main panel is a contents gauge, clicking on its face while the aircraft is on the ground will recharge the tanks, each of which has a maximum capacity of 30 gallons. Each torquemeter has two markings, the green shows the minimum wet takeoff power and the yellow the minimum dry power, i.e. without water methanol. In practice the figure for each engine is very much individual, the power measurement being an oil pressure related system, for convenience the figures for both engines are 335 dry and 432 wet. (See engine limitations)

Starting Controls

The starting controls are located on the port overhead. The controls for normal ground starting consist of a starter master switch an engine selector switch and a starter button. Amber IGNITION warning lamps are on the pedestal together with the Relight switches. For a normal ground start the master should be selected to START, the appropriate engine selected and the start button pressed in (normally Stbd then Port) to initiate the start cycle. The ignition lamp will illuminate and extinguish at the end of the cycle, at which time the button will also pop out. The opposite starter cannot be operated while the other start cycle is in progress. When the master switch is selected to MOTOR the engine can be motored over without ignition by running the starter motor. When operating the igniters in the air the start master switch must be OFF. A RAPID START facility can be used to start the engines sequentially by clicking the R icon.

Emergency Controls

The emergency engine controls are located on the glare shield panel.

Each engine has a dual shot fire extinguisher guarded switch and bottle discharged indicators, a feathering pump control switch and amber warning lamp, a low pressure fuel cock switch and magnetic indicator and red engine fire and overheat warning lamps.

Outboard of these are the electrical system warning lamps described previously and a red low oil pressure warning lamp.

To feather a propeller manually the appropriate HP cock must be set to feather then the feathering switch operated. The amber lamp confirms the propeller is feathered. In reality the lamp would only glow while the feather pumps were working, however we don't have the luxury of looking out the window to check the blades visually. Unfeathering is accomplished by operating the switch again until the lamp remains out. (See Engine & Flight Handling)

Operation of the LP cock switch shuts off fuel upstream of the flowmeters, This is for emergency use only and should not be used under normal circumstances for shutting off the fuel supply.

The engine fire warning system may be checked by operation of the centre test push button. A fire bottle is contained in each nacelle, and each may be directed to either engine. Selection of the port extinguisher switch to SHOT 1 (down) will fire the port bottle methyl bromide into the spray rings of the port engine. Should the fire persist, selection of the port extinguisher to SHOT 2 (up) will discharge the contents of the stbd bottle into the port engine. The stbd system operates the same way using the contents of its own bottle first. There are two fuse indicators for each engine which are normally transparent, but will show opaque orange when the respective shots are fired. Note that when the second shot has been used, the other engine has no fire protection. After operation of the fire extinguisher the engine cannot be restarted.

Automatic Feathering

The autofeather system operates when the throttles are set to approximately 13500 RPM or greater and the engine torque is sensed at 50 PSI or below. Under this condition the blades will feather automatically, however the manual feathering drill must be completed to safely shut down the engine. (See Engine & Flight Handling.)

Instrumentation

The centre of the instrument panel houses the instruments relevant to the engines and each has an engine RPM indicator, a turbine gas temperature indicator, a torquemeter, a fuel flowmeter and a dual oil pressure/temperature gauge. A propeller synchroscope is positioned to the right of the engine instruments.

3. FUEL SYSTEM

Fuel is carried in integral tanks in each wing outboard of each engine. Each tank holds a maximum of 720 imperial gallons/864 US gallons/5760lb. There are two gauges on the main instrument panel beneath the oil indicators which show the contents of each tank in pounds. Note that an electrical failure will cause the gauges to remain at the contents shown when the failure occurred. Two adjacent amber lamps show fuel gauge failure.

Fuel Controls

The fuel is gravity fed to a collector tank in each inner wing in which there are duplicated booster pumps which raise the pressure of the fuel prior to delivery to the engine. These are controlled by switches on the pedestal, one for each pump, forward and aft. Outboard of the switches are two amber fuel pressure warning lamps.

Both pumps in each tank should normally be switched on for start, taxy and takeoff approach and landing, and should be switched off after shut down, when the pressure warning lamps will light.

Fuel Management

Under normal circumstances each tank feeds its respective engine, however a cross feed valve can be used to supply both engines from a single tank in an emergency. The cross feed valve can be opened with the icon. To use the cross feed facility open the cross feed valve, ensure both pumps in the tank to be used are on and the LP lights are out then switch off both pumps in the tank which is not to be used.

Take care to make the selections in the correct order to avoid fuel starvation.

Fuel Heaters

A fuel heater is mounted in each engine supply pipe, downstream of the flowmeter, to raise the temperature of the fuel and prevent particles of ice forming and causing a blockage.

The heaters are controlled by two switches on the pedestal; ON/OFF. Normal procedure calls for the fuel heaters to be switched on for two minutes during the approach if the temperature is below 20’C . Additionally the heaters should be switched on for two minutes while taxying for takeoff if the OAT is below 5’C or in conditions of high humidity. In flight the heaters should be used if the OAT is below -20’C or severe icing is anticipated. Use of fuel heat causes a slight power loss, therefore they should be switched off for takeoff and landing.

There are two fuel filter icing red warning lamps on the panel which illuminate when there is a difference in fuel pressure across the filter of 3 PSI or more.

4. FLYING CONTROLS & FLAPS

Gust Locks

The internal gust locks for the flying controls are operated by a lever on the quadrant. Operation of the lever rearward locks the elevator and ailerons, but leaves the rudder free for steering on the ground. With the locks engaged either engine may be run up to full power but not both.

Trim Controls

The trimming controls for the elevator are on the pedestal in the virtual cockpit. Mouse areas on the Autopilot Engage & Trim indicator can also be used to trim the flying controls.

Flaps

The flaps are electrically operated and have five settings;

0’	Fully retracted.
7 ½ ’	Takeoff setting.
15 ’	Takeoff setting
22 ½ ’	Approach setting
27 ½ ’	Landing setting

The flap position indicator is to the right of the engine instruments on the main instrument panel. Next to the indicator is an amber FLAP MOTOR RUNNING warning lamp.

Maximum speed for flap operation 7 ½ ’- 15 ’ 180kt IAS
Maximum speed for flap operation 15 - 22½ ’ 140kt IAS
Maximum speed for flap operation 22½ ’- 27½ ’ 120kt IAS

5. HYDRAULIC SYSTEM & UNDERCARRIAGE

The main hydraulic system supplies pressure for the operation of the undercarriage, wheel brakes, nosewheel steering, propeller brakes and airstairs. The system is charged by a hydraulic pump driven by each engine, and a cut out valve maintains pressure at 2000 – 2500 psi. Either pump can maintain sufficient pressure. A main system pressure indicator and two amber low pressure warning lamps are on the port side panel opened with the  icon.

The undercarriage is operated by a lever to the left of the pedestal in the virtual cockpit, or by clicking on the position indicator in either view. The indicator has three red and three green lamps which show the following:

Green : Undercarriage locked down
Red: Undercarriage unlocked or in transit.
No Lights: Undercarriage locked up

Additionally the nose red lamp will glow if the flap lever is selected beyond the 15 ’ position and any undercarriage leg is not locked down. FS also provides us with an aural warning if the flaps are extended beyond 15 ’ before undercarriage extension.

Maximum speed for undercarriage extension
Or with undercarriage extended – 160kt IAS

6. DEICING SYSTEMS

The de-icing controls are located on the port overhead panel opened with the icon.

Power Unit Deicing

The two alternators provide 200VAC power for the Power Unit De-icing. A weight switch restricts the supply on the ground to prevent overheating. The de-icing circuits are controlled by two double throw three position switches marked OFF/SLOW/FAST. The ammeter shows the current drawn as each cycle operates, and a selector switch allows either system to be displayed. The ammeter should read 20amps when the cycle is on and 2 amps between cycles on the ground and a maximum of 27 amps when the cycle is on in the air. The green indicator lamps show steady between cycles and flash during cycles according to the fast/slow setting.

The PUDs should be selected to fast when the outside air temperature falls below +10'C and to slow in temperatures below -6'C.

Note that the system has been arranged such that engine flame out may occur if the deicing equipment is not used correctly in icing conditions.

Airframe Deicing

The leading edges of the wing, fin and tailplane are deiced by pneumatic boots which inflate cyclically when a quantity of ice has been allowed to form, thus removing it in pieces of a predetermined size. The boots are held flush with the leading edge by vacuum pressure. Air is supplied from the compressor stage of each engine, and either may supply the system with sufficient pressure.

The system is controlled by a single throw ON/OFF switch and a HEAVY/LIGHT ICE selector switch. A vacuum/pressure gauge shows the cyclic operation as the boots are inflated and deflated in groups.

Windshield Deicing

The windshield deicing is controlled by a two switches which have LOW and HIGH settings. Magnetic indicators for the main and DV windows show ON/OFF.

Pitot Heaters

Two switches on the main instrument panel control the electrical supply to the pitot heaters, and two amber failure warning lamps are fitted. Pitot heat should be switched on before takeoff and off at the end of the landing run.

7. AIR CONDITIONING

Cabin Pressurising Controls

The cabin is pressurised with air supplied from cabin superchargers driven by air bled from the compressor stage of each engine. A cabin height of 8000ft can be maintained up to 25000ft. Airflow to the cabin is controlled by two spill valves, which can be controlled manually or automatically.

The controls for the pressurisation system are grouped on the co-pilots side panel and consist of a pressure controller, a cabin pressure differential gauge, a cabin altimeter, a cabin rate of climb indicator, a desynn spill valve position indicator and switches to control each spill valve. There are also warning lamps for high duct pressure and cabin height above 10000ft.

Before departure, the desired cabin altitude should be set on the pressure controller. The subscale shows the maximum altitude at maximum differential pressure for the selected cabin height. The RATE knob on the controller selects the rate of change in cabin pressure, by default this is set at +/- 500 feet per minute. On the ground both spill valves should be open. Immediately prior to takeoff set the spill valve master switch to AUTO. After takeoff check that the spill valves are operating and cabin pressure is rising. At the top of descent set the cabin altitude to destination airfield height plus 500 feet. In the approach check that the spill valves have almost fully opened. After landing the master switch should be set to MANUAL and each spill valve switches operated until the valves are fully open.

Maximum cabin pressure differential 5.5 psi
Maximum operating altitude 25000ft

8. RADIO INSTALLATION & AUTOPILOT

Radios

The overhead radio panel is accessed with the icon

The aircraft is fitted with dual Nav and Comm VHF radios and two ADF receivers. The mouse areas for the Nav/Comm radios are on the tuning knobs below the dialled frequency, those for the ADF sets are on the four tuning knobs on each set. VOR or ADF information is displayed on the radio magnetic indicator on the main panel and two selector switches at the beneath it enable any combination of bearings to be displayed.
Note that the pointers will not respond to ILS frequencies. A DME indicator shows DME1 in counter format and DME2 on the outer scale which by default shows nautical miles x 10. Clicking on the x 10 area selects nautical miles up to a maximum of 14.

The Course Deviation Indicator shows Nav 1 or Nav 2 information depending on the switch setting at the top of the radio panel, or by clicking on the centre of the instrument. The omni bearing selector knob is used to select the desired course to the top datum of the instrument.

Autopilot Controller

1. Power Switch. The Power switch must be pulled to initiate the supply to the Autopilot. This is effectively the FS Autopilot master. When the AP is ready for use the amber Ready lamp will illuminate.
2. Engage Button is pressed to engage the AP and hold the current pitch attitude. This must be pressed before engaging any other autopilot functions.
3. Channel Switches . May be used to isolate the Rudder, Elevator or Aileron channels from the Autopilot.
4. Height/Airspeed Lock. Turned to engage the height lock or airspeed hold. The airspeed function operates by varying pitch, therefore airspeed and height locks cannot be used simultaneously.
5. Alter Heading Button. When engaged the aircraft will turn onto a heading preselected on the heading index of the Gyrosyn compass, and will follow any change on the heading index.
6. Beam Coupling Switch. Pull to engage the FS Nav1 hold function. Only available with the CDI selector at Radio 1.
7. Glide Coupling Switch. Pulled to engage FS Approach Hold function. This will also cause the Beam Switch to engage. Only available with CDI selector at Radio 1.

8. Pitch Switch. Used to manually vary the nose up or down pitch after pressing the green Engage button.
9. Turn Knob. Used to accomplish manual turns using the autopilot. Not available with the Alter Heading button in.
10. Ready Lamp. The lamp will extinguish when any function is engaged.

Engage & Trim Indicator

The Engage and Trim Indicator shows elevator trim movements on the centre scale. Additionally three flags marked IN will appear when the relevant control surface channel is engaged.

9. MINOR SYSTEMS

Landing Lamps

The switches for the wing mounted landing lamps are located on the port overhead panel The motors are controlled by the EXTEND/RETRACT switches, the filaments by the ON/OFF switches. A green warning lamp illuminates whenever a filament is switched on or either lamp is away from the fully retracted position.

Navigation, Beacon & Ice Inspection Lamps

The navigation lamps, anti collision beacons and ice inspection lamps are controlled by switches on the stbd overhead panel. The panel also houses the control switches for the passenger notices.

Panel Lights

The panel lights are operated by dimmer switches on both overhead panels. In VC mode, the switches can be used to vary the lighting effects.

Door Warning Lamp

There is a DOOR UNSAFE red warning lamp to the left of the main instrument panel, the top half of which may be clicked to open or close the forward cargo door, clicking the bottom half will open or close the passenger entrance.

Checklists & Information Cards

A Normal and Emergency Operations checklist can be brought up on the screen with the and icons. The Normal checklist is not comprehensive but contains the essential items.

A card detailing the vital speeds can be opened with the icon, and the Fuel Trim chart can be viewed using the icon.

10. LIMITATIONS

Manoeuvring Speed 155kt
Never Exceed 260kt IAS
Normal Operating Speed Limit 225kt

Engine Limitations

DART 532	RPM	MAX TGT 'C	TIME LIMIT
Starting	**-**	**930**	**Momentary**
Idling	**Incidental**	**550**	**Unrestricted**
Approach Idling	**10700 +/- 100**	**680**	**Unrestricted**
Minimum Approach	**8000**	**550**	**Unrestricted**
Takeoff Dry	**15000**	**795**	**5 min**
Takeoff Wet	**15000**	**860**	**5 min**
Max Continuous	**14500**	**755**	**Unrestricted**
Climb & Cruise	**14200**	**755**	**Unrestricted**
Max Overspeed	**17000**	**-**	**20 sec**

11. ENGINE AND FLIGHT HANDLING

Engine Starting

Having completed the Before Start checks:

1. Fuel Trimmers.....SET
2. Brakes.....ON
3. Throttles.....CLOSED
4. HP Cocks.....CLOSED
5. Booster Pumps.....ALL ON, LAMPS OUT
6. Prop Lamps.....ALL ON
7. Prop Brakes…… …OFF
8. Start Master.....START
9. Start Selector.....STBD
10. Starter Button.....PRESS
    .....IGNITION LAMP ON
    .....1500-1800 RPM HP COCK OPEN
    .....CHECK OIL PRESSURE, FUEL FLOW
    .....STARTER LAMP OFF appx. 4500 RPM
    .....MONITOR RPM and TGT

    Repeat for Port engine
11. Start Master.....SAFE
12. Prop Lamps.....ALL ON
13. Generators……ON
14. Alternators……ON
15. External Power..... ..OFF

Note that maximum TGT may be MOMENTARILY exceeded on startup, however if this appears to be the case , Fuel Trim must be reduced , then reset when the engine has stabilised.

Taxying

After completion of the Before Taxy checks, open the throttles to approximately 11500 RPM and release the brakes. Once the aircraft is moving maintain 10700 -11300RPM checking the speed with the brakes. Complete the Taxy checks.

Take-Off

If there has been a change in OAT and/or ambient pressure between start up and take-off the Fuel Trimmers must be reset. When the Taxy and Before Take-Off checks have been completed and clearance received, enter the runway and return the throttles to idle. At the commencement of take-off , open the throttles smoothly to approximately 11500 RPM, observing the Oil Pressure and TGTs, then fully open the throttle to full power, 15000 RPM and ensure the minimum torque has been achieved. Check that the TGTs are within the limits, and that the FFP Stop lamps have extinguished. Do not open the throttle too rapidly, or with the F4 key, as there is a danger that the Autofeather system will operate if sufficient power has not built up before the throttles are fully forward.

When a positive rate is established, retract the undercarriage. Climb to the acceleration height, Ha, not less than 400ft above airfield level, then reduce power to 14200 RPM, and adjust fuel trim to maintain 755'C TGT. Adjust pitch to maintain initially 140-150kt. Complete the After Take-Off and Climb checks.

Cruise

Cruise power should be left at 14200 RPM and fuel trim adjusted to give a maximum 730'C TGT and the airspeed allowed to build up.

Descent

The engines can overheat when the throttles are retarded as well as when accelerating , therefore the Fuel Trimmers must be set to full decrease, 0%, before the power is brought back. Reduce power to 11300-11500 RPM, approximately 120 psi. Flight idle is 11000 +/- 250 RPM. Torque should not be allowed to drop below 60 psi.

Approach & Landing

For an ILS approach it is desirable to be level at approximately 2500ft clean, at 140kt . Set fuel trim for destination airfield. As the glide slope deviation bar on the CDI approaches the centre of the instrument, select flap 15 ' and extend the undercarriage. Once established on the glide path select flap 22 ½ ' adjusting power as required to maintain Vat Flap 22 ½ ' + 15. Complete the Final Approach checks. Select flap 27 ½ ' at about 400ft aal and reduce speed Vat Flap 27 ½ ' +10, aiming to cross the threshold at Vat Flap 27 ½'. On touchdown, close the throttles and ensure that the FFP Stop lamps are all on and TGTs are below 550'C. If the lamps do not come on, under no circumstances may the throttles be opened. Complete the After Landing checks

Closing Down

On stand apply the parking brake and check the throttles are closed. Allow the TGT's to stabilise and close the HP Cocks. Turn off all the Booster Pumps and complete the Shutdown checks.

Emergency Procedures

Manual Feathering

Should the need arise to shut down an engine in flight:

1. **Synchroniser……..…OFF**
2. **HP Cock.....TO FEATHER**
3. **Feathering Pump.....ON**
4. **Throttle.....CLOSE**

Automatic Feathering

The Autofeather system will feather the propeller blades if the throttle is set to produce more than 13500 RPM and the torque pressure is less 50 psi. If the system operates it MUST be followed by completion of the Manual Feathering Drill, i.e.

1. **Synchroniser……..…OFF**
2. **HP Cock.....TO FEATHER**
3. **Throttle.....CLOSE**

Flame Out

If propeller has not autofeathered:

1. **Throttle…… CLOSE**
2. **Ignition……ON (15 min MAX)**
3. **Booster Pumps…….. …..ALL ON**
4. **Throttle……OPEN**
5. **Ignition……...OFF**
6. **Anti Icing……AS REQUIRED**

Unfeathering and Relighting

1. **Flaps.....UP**
2. **Fuel Trimmer..... 50% MIN**
3. **Throttle .....CLOSE**
4. **Ignition Switch.....ON**
5. **HP Cock.....OPEN**
6. **Feathering Pump.....ON UNTIL LIGHT OUT**
7. **Throttle.....OPEN SLOWLY UNTIL RPM RISES**
8. **TGT.....CHECK**
9. **Ignition Switch.....OFF**
10. **Throttle.....OPEN TO MATCH OTHER**
11. **Fuel Trimmer.....SET**

Ice Ingestion

1. **Ignition……..…ON, UNAFFECTED ENGINE (15 min MAX)**

If Propeller has not autofeathered……..FLAMEOUT DRILL
Otherwise……..RELIGHT DRILL

Late Anti Icing Selection

1. **Ignition……ALL ON, (15 Min MAX)**
2. **PUDS……PORT ON**

If Engines run normally for 3 minutes:

3. **PUDS……STBD ON**
4. **Ignition…….. OFF AFTER A FURTHER 6 Min**

Fuel Starvation

Fuel Filter and/or Low Pressure lamps on:

1. **Fuel Heaters……ALL ON**
2. **Booster Pumps ……ALL ON**
3. **LE Deicing……ON (+10' & BELOW)**
4. **RPM……MAX CONTINUOUS IF POSS**
5. **Fuel Contents……CHECK**

The information contained in this manual is based on HS.748 data, and is for Flight Simulation use only and should not be considered for use with the real aircraft.

Fraser A. McKay, April 2006.