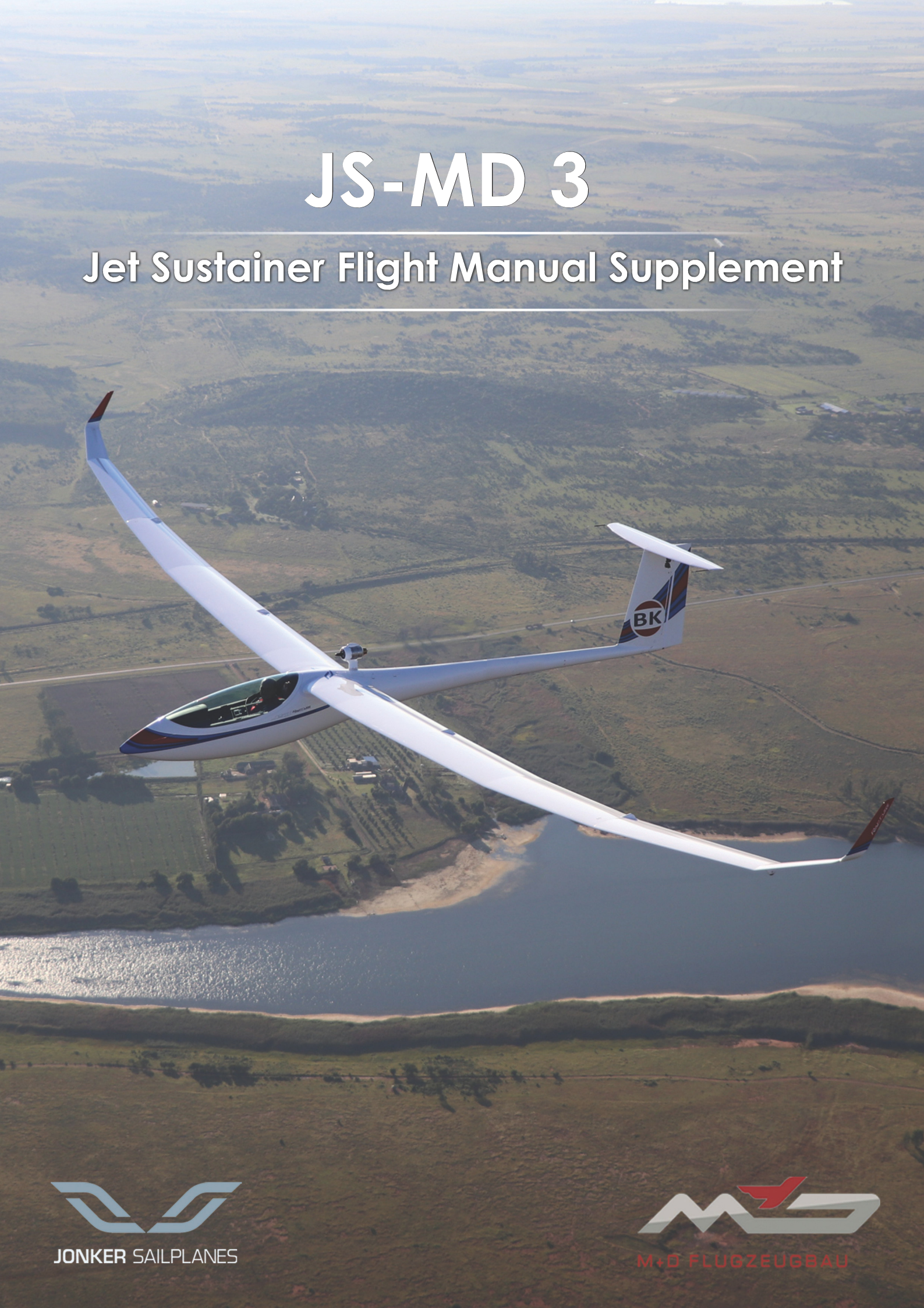
JS-MD 3

Jet Sustainer Flight Manual Supplement



JONKER SAILPLANES

M+D FLUGZEUGBAU

JS-MD 3 Jet Sustainer
Flight Manual Supplement

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0 Document Management

0.1 Record of Revisions

Issue	Date	Reason for Change
00	08.02.2019	Initial Issue
01	11.08.2021	5-minute time limit for maximum RPM added EGT temperature limit during start-up corrected Amendments to the graphical layout of the cockpit placards Minor corrections Editorial changes

0.2 List of effective Sections

Section	Revision	Date	Number of Pages	Reference
0	01	02.11.2021	8	List of effective sections adjusted
1	00	11.08.2021	4	Initial Issue
2	01	02.11.2021	10	Editorial changes in section 2.4. *(Revision markings include amendments made in I01 R00)*
3	00	11.08.2021	6	Initial Issue
4	01	02.11.2021	22	Audio buzzer signal descriptions amended, editorial changes. *(Revision markings include amendments made in I01 R00)*
5	00	11.08.2021	22	Initial Issue
6	00	11.08.2021	6	Initial Issue
7	00	11.08.2021	8	Initial Issue
8	00	11.08.2021	8	Initial Issue
9	00	11.08.2021	2	Initial Issue
10	00	11.08.2021	2	Initial Issue
11	00	11.08.2021	2	Initial Issue

0.3 Record of Amendments

Date of Issue/ Revision	Date of Insertion	Signature

0.4 Table of Contents

0.5 List of Figures

0.6 List of Tables

0.7 List of Abbreviations

ECU	Electronic Control Unit
EGT	Exhaust Gas Temperature
JDU	Jet Display Unit
M&D	M&D Flugzeugbau GmbH & Co. KG
OAT	Outside Air Temperature
RPM	Revolutions Per Minute
L/H	Liters Per Hour
GPH	Gallons per hour (US Gallons)
VFR	Visual flight rules
VMC	Visual meteorological conditions

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1 General

1.1 Introduction

This manual has been prepared to provide pilots, instructors and maintenance personnel with all the information for the safe and efficient operation of the JS-MD 3 sailplanes equipped with the jet sustainer system MD-TJ42.

The marketing name for model JS-MD 3 is the JS-3 Rapture, and referred to in this manual as the JS-3

1.2 Certification Basis

Refer to the JS-MD 3 Aircraft Flight Manual Section 1.2.

1.3 Warnings, Cautions and Notes

The following definitions apply to Warnings, Cautions and Notes used in this Flight Manual Supplement.

WARNING: means that the non-observation of the corresponding procedure leads to an immediate or important degradation of the flight safety.

CAUTION: means that the non-observation of the corresponding procedure leads to a minor or to a more or less long-term degradation of the flight safety.

NOTE: draws the attention on any special item not directly related to safety but which is important or unusual.

1.4 Descriptive Data

The JS-3 with the MD-TJ42 is a sustainer version of the pure sailplane. A jet system designed to sustain the aircraft in flight is fitted in the rear fuselage. The system is completely retractable and does not impact the normal operation of the aircraft during conventional soaring flight.

1.5 Technical Data

Engine technical data	
Engine	MD-TJ42
Manufacturer	M&D Flugzeugbau GmbH, Friedeburg
Maximum rotary speed	97 000 RPM
Idle speed	30 000 RPM
Thrust at maximum rotary speed	35 daN (at MSL and ISA conditions)
Consumption at maximum rotary speed	60 kg/h
Thrust at idle speed	3 N
Consumption at idle speed	7.47 kg/h
Air consumption	0.5 m^3/s
Compression ratio	1 : 3.8
Exhaust gas temperature at Idle speed	500 °C (932 °F)
Exhaust gas temperature at maximum RPM	790 °C (1472 °F)
System technical data	
Complete system weight – no fuel	16 kg

Table 1.5-1: Engine Technical Data

1.6 Engine System Illustration

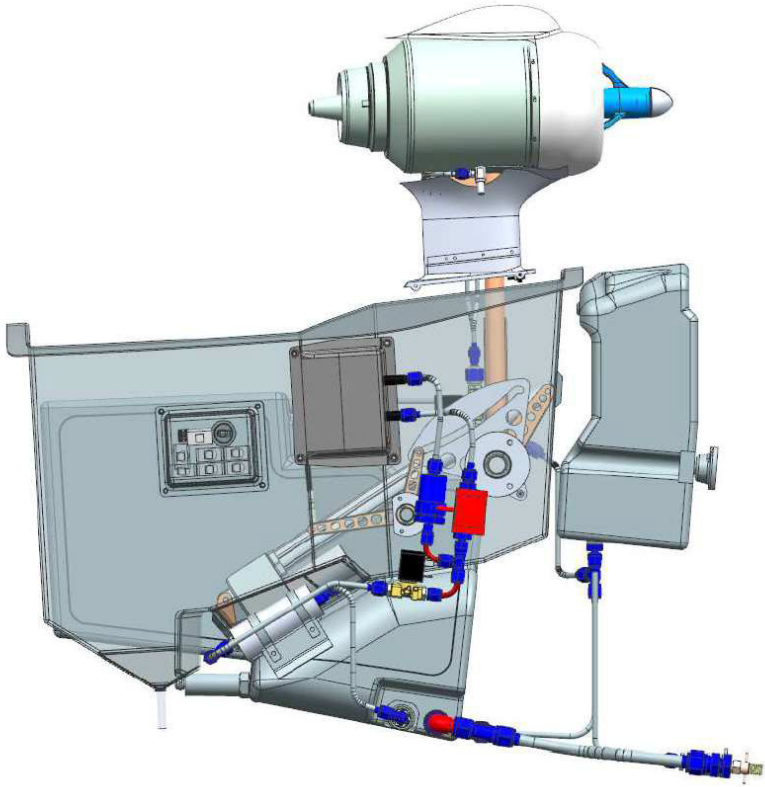

Figure 1-1: Jet System Illustration

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2 Limitations

2.1 Introduction

Section 2 includes operating limitations, instrument markings, and basic placards necessary for safe operation of the aircraft's engine systems.

The limitations included in this section have been approved by EASA.

2.2 Airspeed limits

Speed limitations and their operational significance are shown below.

Speed		IAS	Remarks
V_{POmax}	Maximum power plant extension & retraction speed	140 km/h 76 kts	Do not extend or retract the engine above this speed.
V_{PE}	Power plant extended maximum permitted speed	250 km/h 135 kts	Do not exceed this speed with the engine extended.

Table 2.2-1: Airspeed Limits

2.3 Airspeed indicator markings

The airspeed indicator requires the following additional markings when fitted with the jet turbine:

Marking		IAS	Significance
Blue line	—	135 km/h 73 kts	Best rate-of-climb speed V_Y (if engine is fitted)

Table 2.3-1: Airspeed Indicator Markings

2.4 Power-plant fuel and oil

Table 2.4-1 gives the power plant, fuel and oil information.

Engine technical data	
Fuel	Diesel mixed with 2% 2-stroke oil
Oil	Synthetic two stroke oil complying with specification API TA, API TB, API TC or JASO FC
Fuel capacity	~ 22.2 liters
Unusable fuel	0.2 liters

Table 2.4-1: Engine Technical Data

2.5 Power plant instrument markings

The following information is displayed to the pilot on the Jet Display Unit (JDU):

- RPM
- Throttle setting
- EGT
- Fuel quantity
- Battery voltage
- Fuel flow
- Engine status
- Error messages

Refer to Section 5 for a detailed description of the power plant instrument markings.

2.6 Power plant limitations

Parameter	Limitation
Maximum Engine RPM	97 000 RPM (maximum 5 minutes)
Maximum Continuous RPM	80 000 RPM
Maximum EGT	790 °C
Maximum EGT during startup	1000 °C (maximum 3 seconds)
Minimum operational outside air temperature	-15 °C
Maximum operating altitude (AMSL)	3000 m (10 000 ft)

Table 2.6-1: Power Plant Limitations

CAUTION: The maximum engine RPM of 97 000 is only allowed for 5 minutes. Operating the engine for long periods at maximum power will reduce the engine life and may lead to permanent engine damage.

2.7 Approved manoeuvres

This aircraft is certified in the Utility category (U), but aerobatic maneuvers with the engine running are not permitted.

2.7.1 Approved flight rules

Operation of the JS-3 in sustained flight is approved for VFR flight by day in VMC conditions only.

2.7.2 Engine start, run-up, taxi procedures

Taxi is not permitted for the jet sustainer. Engine start-up may be performed on the ground for maintenance purposes only.

2.7.3 Self-launch

Self-launch with the jet sustainer is not permitted.

2.7.4 Approach and landing

Approaches and landing with the jet sustainer running is not approved.

NOTE: Operation of the Jet engine over unlandable terrain is not approved.

NOTE: Cloud flying with the engine extended is not approved.

CAUTION: Operating the jet sustainer in heavy rain is not recommended, as it may cause damage to the turbine blades.

2.8 Minimum equipment list

Additional instrumentation required if engine is fitted:

- Magnetic direction indication
- Jet display unit (JDU)

2.9 Temperature restrictions when flying with the engine running

The engine operation is certified for an air temperature range of -15 °C to +40 °C. Flights in conditions below -15 °C are prohibited. When the outside air temperature is less than -15 °C, a descent to lower altitudes (higher temperatures) must be conducted or the engine must be shut down.

2.10 Altitude limitations

The aircraft is limited to an altitude of 3 000 m or 10 000 ft AMSL whilst operating the jet engine.

2.11 Limitations and jet system operation placards

Limitation placards can be either fixed against the side walls or instrument panel or furnished as a single Placard Booklet located against the left-hand cockpit sidewall. Refer to information furnished in the Placard Booklet in the JS-MD 3 Aircraft Maintenance Manual Chapter 11.

The limitation placard for the operation of the Jet System is listed below Figure 2-1). This placard is positioned on the left-hand side of the cockpit frame.

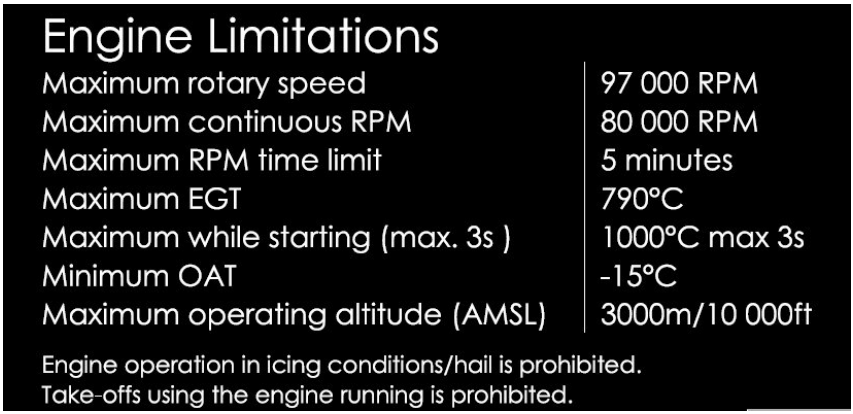

Figure 2-1: Jet Sustainer Limitation Placard

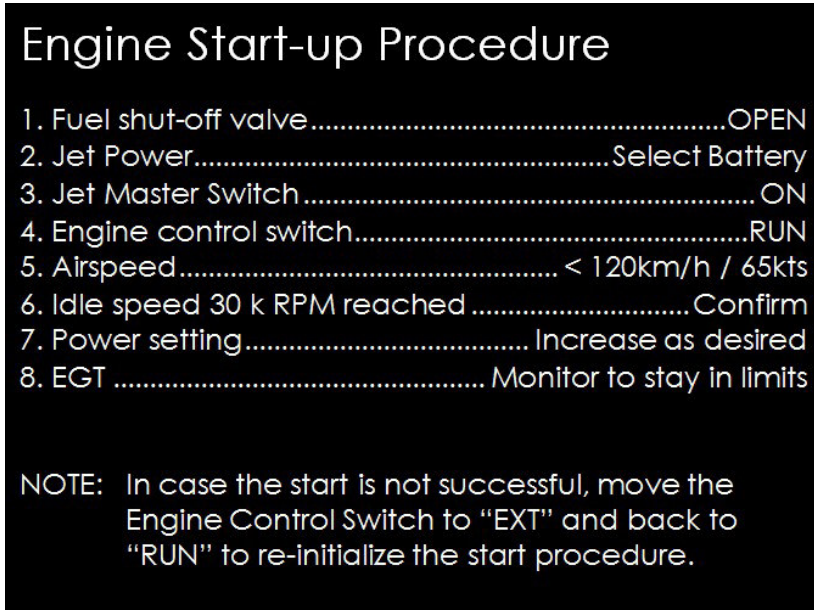

Figure 2-2: Engine Start-up Procedure Placard

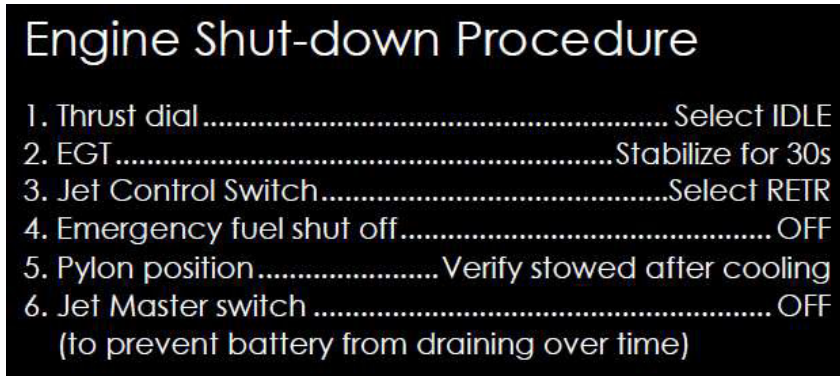

Figure 2-3: Engine Shut-down Procedure Placard

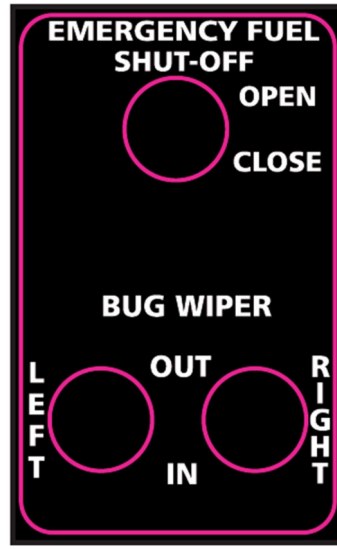

Figure 2-4: Emergency Fuel Shutoff Placard

The Emergency fuel shutoff for the jet is installed forward of the Bugwiper switches (optional). Forward is open and back will close both the fuel lines.

Figure 2-5: Fuel Type and Mixture Placard

The fuel type as well as the mixture is shown on the Fuel Type and Mixture placard. The placard is in the jet box rear surface.

Figure 2-6: Refueling/Defueling Placard

The refueling placard gives the direction of flow when refueling the aircraft. The refueling procedure is described in detail in Section 4.10.3.

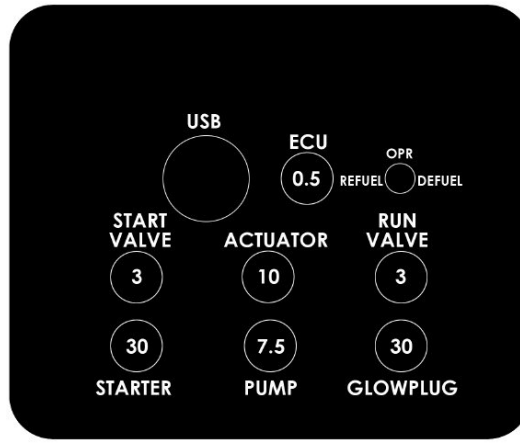

Figure 2-7: Fuse Box Layout Placard

The fuse box layout placard shows the fuse types (values) as well as the corresponding component that the fuse protects. The refuel and defuel switch is also indicated on the placard. The USB communication port is also installed on the jet fuse box.

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3 Emergency procedures

3.1 Introduction

Section 3 provides checklists and amplified procedures for coping with emergencies that may occur relevant to the Jet System.

3.2 Engine failure in flight

If an engine failure occurs during flight, the engine can be restarted or retracted. Retraction will only be initiated after the cooling down cycle has been completed.

Procedure to restart engine in flight

1. Restore normal flight attitude and stabilize airspeed at a safe flying speed below 120 km/h (65 kts)).
2. Ensure that the fuel shut off switch is open, and that sufficient fuel is available.
3. Cycle the Jet Control toggle switch from “RUN” to “EXT” and back to “RUN”.
4. Observe the start-up screen for sufficient battery voltage, and normal EGT and RPM increase or other error messages.
5. Once the engine runs normally, the throttle may be adjusted to the required setting.

NOTE: If a restart is not possible, the engine may be retracted and the soaring flight continued, or a landing may be performed with the engine extended.

NOTE: If no action is taken after an engine failure, the engine will be automatically cooled down, provided that the electrical supply is sufficient.

CAUTION: After an engine failure, the normal gliding attitude must be restored to ensure that sufficient airspeed is maintained**.**

3.3 Fire

3.3.1 Engine fire on the ground

An engine fire may occur following one or more failed start attempts. In such a case unburned fuel inside the turbine may be ignited, resulting in exhaust flames from a “wet start”. If an engine fire is observed while the engine is running, the following action can be taken:

1. Reduce throttle position to the IDLE setting.
2. Wait until all excess fuel inside the turbine is burnt.
3. If engine EGTs are within normal range, operation can continue normally.
4. If EGTs seem to be too high, the engine should be shut down by closing the fuel valve switch in the cockpit.
5. Do not retract the engine while hot or while any flames are visible.

If an engine fire is observed with the engine not running, the following action should be taken:

1. Close the fuel valve switch positioned on left side of the cockpit, forward of the Bugwiper switches (optional).
2. Move the Jet Control toggle switch to “EXT” position. Do not retract the engine.
3. During the cooling cycle air will be forced through the turbine, also forcing the flames to exit at the exhaust. It is important to keep the air flowing through the turbine, either with the starter motor or by external high-pressure air.
4. Wait until all excess fuel inside the turbine is burnt.
5. Do not retract the engine while hot or while any flames are visible.

If an engine fire spreads into the fuselage area, it is regarded as a hazardous situation and immediate action is required:

1. Close the fuel valve switch positioned on the left console.
2. If the engine is not fully extended and the engine bay doors are open, extend engine immediately to close the bay doors by moving the Jet Control toggle switch to “EXT” position.
3. Use an aircraft type fire-extinguisher to extinguish the fire.
4. Do not retract the engine while hot or while any flames are visible.
5. Allow the engine to cool down completely before further investigation is initiated.
6. Ensure the aircraft is serviceable before commencing with further flying.

3.3.2 Engine fire in flight

If an engine fire occurs during flight, the engine must be immediately shut down. An engine fire can be suspected with abnormal high EGTs especially with the engine running at a low RPM or not running.

1. Move the fuel valve switch to “OFF”
2. Leave the Jet Control toggle switch in “RUN” position until engine stops.
3. Move the Jet Control toggle switch to “EXT” position. Do not retract engine.
4. Observe the EGT – if the exhaust is cooled below 50 °C (122 °F), switch the Jet Master toggle switch off, with the engine still extended.
5. Open ventilation if smoke is visible or fumes are smelt inside the cockpit.
6. Land as soon as possible with the engine extended.
7. Ensure the aircraft is serviceable before commencing with further flying.

3.3.3 Electrical fire

An electrical fire is very unlikely due to the protection with circuit breakers for all systems. Each battery has a circuit-breaker at the terminals and each battery device has a circuit breaker switch on the instrument panel.

In the event of smoke or fumes coming from the instrument panel, take the following action:

1. Switch off the master switch supplying the circuits.
2. If a circuit breaker “pops”, reset once only. This is most probably the faulty circuit.
3. Land as soon as possible.
4. Ensure the aircraft is serviceable before commencing with further flying.

3.3.4 Electrical failure

If an electrical failure occurs or the batteries supplying the Jet System being fully discharge with the engine extended, the engine cannot be retracted.

The pilot may continue flight with the engine extended, provided the maximum speed is limited to V_{PE}.

3.3.5 Retracted temperature exceeding maximum temperature

If the jet system is retracted and the measured temperature exceeds 55 °C the red warning light on the JDU will be illuminated. Immediate action should be taken:

1. Move the fuel valve switch to “OFF”
2. Move the Jet Control toggle switch to the “EXT” position
3. Observe the EGT – if the exhaust stabilizes below 50 °C (122 °F), the engine can be retracted once the pilot has assured himself that no abnormalities have been observed.
4. If the EGT remains high, switch off the Jet Master Switch and land as soon as possible with the engine extended.
5. Open ventilation if smoke is visible or fumes are smelt inside the cockpit.
6. Ensure the aircraft is serviceable before commencing with further flying.

WARNING: A very high EGT in the retracted position is a possible indication of an engine bay fire. The engine must be extended immediately.

4 Normal operating procedure

4.1 Introduction

Section 4 provides checklist and amplified procedures for the conduct of normal operations. Additional information relevant to the display unit is described in Section 5.

4.2 Daily Inspection

Before the first flight of the day, the jet sustainer must be inspected carefully to ensure its reliable operation.

NOTE: If the jet system is not serviceable the aircraft is still deemed airworthy for normal gliding operation. In this case the power supply to the system must be disconnected to prevent inadvertent operation.

4.3 System inspection

Extend the engine using maintenance mode and check the following:

1. Wiring plugs on left hand side of box secured
2. Fuel tubing on right hand side secured
3. No loose articles in box
4. No signs of fuel leaks or fuel build-up in box
5. Re-fueling switch set to the “OPR”
6. Exit maintenance mode and perform the extension and retraction operations.

4.3.1 Fuel related inspection

1. Check that the drain in the bottom of the box is clear of obstruction
2. Check for any signs of fuel leaks from the fuel drain
3. Drain a small amount of fuel from the fuel strainer located in the wheel bay to the left of the main wheel. Check for water or contaminants.
4. Check fuel level
5. Cycle emergency fuel shutoff switch located in the cockpit (clicking noise should be audible).

4.3.2 Operational inspection

1. Compare the EGT displayed on the JDU with the ambient OAT. Compare EGT with ambient air temperature (when OAT is available)
2. Manually spin compressor blade and verify positive RPM indication on JDU
3. If airfield is suitable for ground starts, perform a ground start and ensure the correct functionality of the system.
4. Shutdown engine (if started) and retract engine after the engine temperatures has stabilized below the retracted temperature.

4.4 JDU primary Controls

The JDU has 3 primary controls:

- Jet Master Switch (OFF – ON)
- Jet Control toggle switch (RET – EXT – RUN)
- Jet Thrust Dial

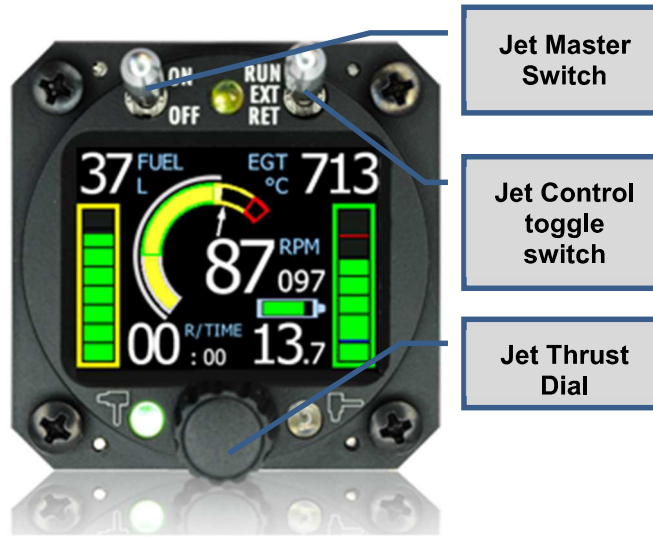


Figure 4-1: JDU Primary Controls

The Jet Master switch is a 2 position ON-OFF toggle switch, while the Jet Control switch is a 3-position toggle switch.

The Jet Thrust Dial consists of a rotary dial combined with a push button. The rotating dial is used to adjust the throttle setting, and to enter information in the settings and configuration mode.

The Jet Thrust Dial is used as follows in the settings mode:

- Press and hold – Enter settings mode
- Short press – Select option
- Rotate dial – Move cursor or change value
- Press and hold – Exit settings mode

4.5 Modes overview

The main operating modes for the jet sustainer are selected using the JDU Jet Control toggle switch. The primary modes are:

- Retracted mode
- Extended mode
- Run mode

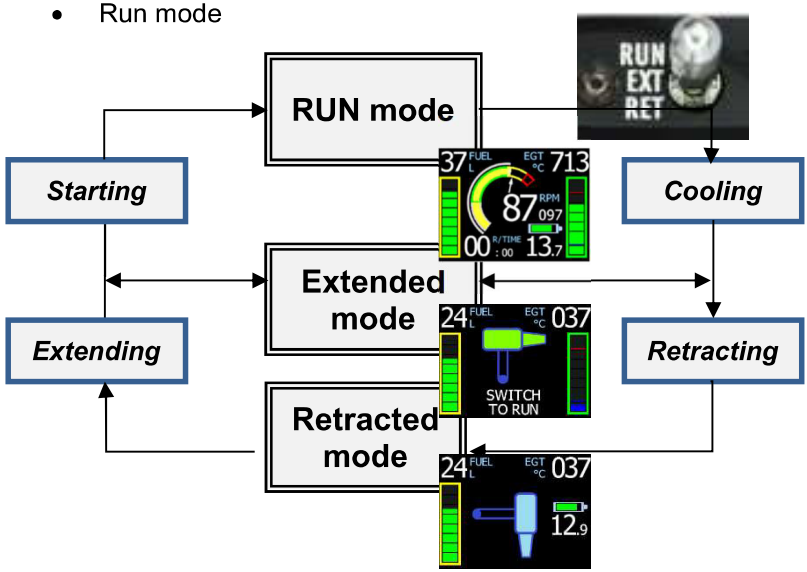


Figure 4-2: Modes Overview

The transition modes (not directly selectable by the pilot) are:

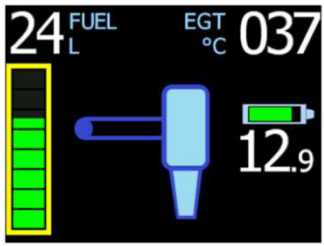
- Starting
- Extending
- Retracting
- Cooling

4.6 Primary Modes

4.6.1 Retracted Mode

The retracted mode is selected by moving the Jet Control toggle switch to the bottom position. The pylon will move to this position only if the EGT is below a set limit.

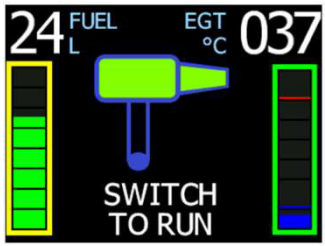
The JDU will display the pylon in the retracted state during this mode.



4.6.2 Extended Mode

The Extended mode is selected by moving the Jet Control toggle switch to the center position. If this mode is selected while the Jet Engine is running, the engine will be switched OFF and cooled down.

The JDU will display the pylon in the extended state during this mode.



In the extended mode, the RUN screen can be displayed on the JDU by pressing the Thrust Control Dial. This allows the pilot to familiarize himself with the Jet screen in the run mode, without having to actually start the Jet. This screen is also handy during the pre-flight inspection of the system.

CAUTION: During the Extended mode the electrical start motor will automatically spool-up the compressor if the EGT is above a threshold temperature set by the engine manufacturer in order to cool the engine. Do not turn the compressor by hand during this mode, as this may result in injury or damage to the compressor.

4.6.3 Run Mode

The Run Mode is selected by moving the Jet Control toggle switch to the top position, resulting in the Jet initiating the start sequence.

The JDU will display the running screen during this mode.

The thrust may be adjusted using the Thrust Control Dial.

Turning the dial clockwise increases the thrust and anti-clockwise decreases the thrust.

During Normal Operation the Status LED (the top LED) will be constant green.

The thrust control dial is programmed for 18 different speed settings. The factory default settings are defined in the following table:

Setting	1	2	3	4	5	6	7	8	9
RPM	30K	40K	50K	60K	65K	70K	75K	80K	83K
Thrust %	6%	8%	15%	26%	32%	40%	50%	60%	67%

Setting	10	11	12	13	14	15	16	17	18
RPM	86K	90K	93K	95K	96K	97K			
Thrust %	73%	80%	90%	96%	99%	102%			

Table 4.6-1: Throttle Settings and Thrust

The minimum RPM (idle) is 30 000. The desired RPM is indicated by the white arc on the outside of the RPM arc.

NOTE: It is good practice to advance the RPM slowly. At higher density altitudes a flameout may occur if rapid throttle changes are made.

To shut down the turbine engine the Jet Control toggle switch is moved to the Retract (bottom) position or Extend (middle) position. The system will automatically enter the cool-down sequence.

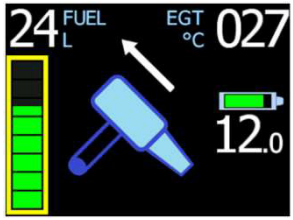
4.7 Transition modes

Transition modes are modes not directly selectable by the pilot but are required to transition from the current mode to the newly selected mode. The following main transition modes are explained:

- Extending
- Starting
- Cooling
- Retracting

4.7.1 Extending

Extending is initiated when the Jet engine is retracted and the Jet Control toggle switch is moved to the EXT (middle) or RUN (top) position.



During extension the JDU will display an extending pylon and the Engine Extension LED will be flashing green.

4.7.2 Starting

The Start Mode is automatically initiated when the Jet Control toggle switch is moved to the RUN (top) position. The Jet Electronic Control Unit (ECU) automates the following start sequence:

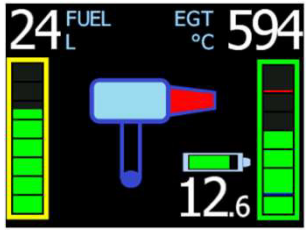
- Switch glow plug on
- Starter motor spools up compressor
- Fuel is introduced in the starter fuel line
- Fuel supply to the engine is handed over from the start line to main fuel supply line.
- Starter motor is disengaged
- ECU ramps engine up to idle RPM (30 000)

During Start Mode the Status LED (the top LED) will be flashing green.

CAUTION: Do not advance the throttle to a high RPM setting during the start sequence. A ramp-up flame-out may result, especially at higher density altitudes. It is also good practice to allow the engine temperatures to stabilise while at idle, before advancing the throttle to higher power settings.

NOTE: During start-up the displayed EGT may exceed 790°C for a maximum duration of 3 seconds. However, the EGT may not exceed 1000°C.

4.7.3 Cooling



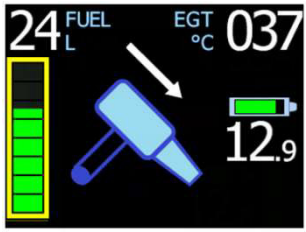
The Cooling Mode is automatically initiated when the Jet Control toggle switch is moved to the EXT (middle) position or RET (bottom) position after the engine was running.

During this mode the starter motor will be turning the compressor to facilitate the correct cooling of the engine.

The JDU will display the pylon in the extended state during this mode while cooling is in progress.

WARNING: Do not touch the engine or have any object close to the intake while the engine is extended. The electric starter motor may operate without warning while in this mode.

4.7.4 Retracting



Retraction is initiated when the Jet Control toggle switch is moved to the RET (bottom) position and the temperature (EGT) is below a pre-set threshold.

If the measured EGT exceeds the maximum set temperature (factory default is 55 °C or 131 °F), the system will remain in the Cooling Mode. Retracting will be initiated automatically only after the cooling cycle is completed.

During retraction the JDU will display a retracting pylon and the Engine Retraction LED will be flashing green.

CAUTION: The engine is retracted automatically when the EGT is below a factory set value. As the core temperature of the engine may still be above the retraction temperature, a rise in EGT may be observed. The warning light on the JDU will be illuminated if 55 °C (131 °F) is exceeded. In this case the engine must be extended to allow further cooling. Refer to section 3.3 for further details.

4.8 Engine Protection modes

4.8.1 Safe mode operation

The system has been designed to enter a Safe mode when RPM signal is lost temporarily. If safe mode is entered, the fuel flow is reduced to ensure that the engine will not over-speed. The RPM is monitored consistently - if reliable RPM signals are restored, the system returns to normal operation.

The pilot can only increase the power after normal operation has been restored.

4.8.2 Over temperature protection

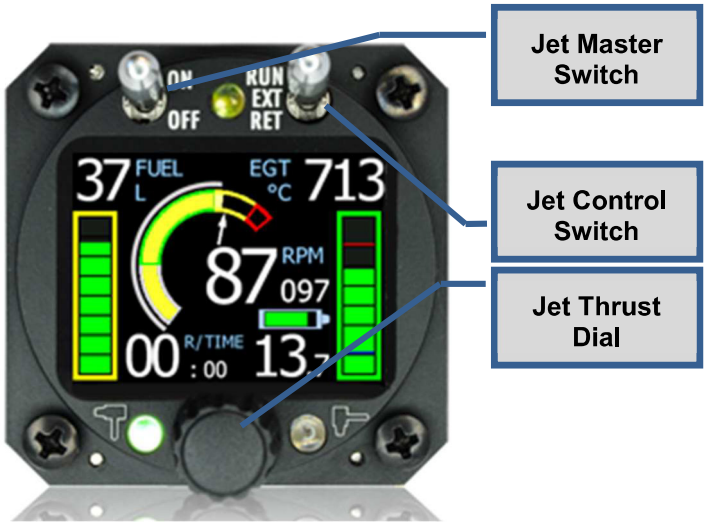
If the measured EGT exceeds the normal operation EGT limit for a duration exceeding a pre-set duration, the throttle will be automatically reduced. The pilot may increase the power setting, but the system will not allow an RPM setting with a resulting EGT exceeding the maximum allowable EGT.

4.8.3 Automatic Shut down

In case the maximum allowable engine temperature is exceeded, the engine will be shut down instantly. The normal cooling cycle will follow an automatic shutdown.

4.9 In-flight operating procedures

4.9.1 Inflight start procedure



The inflight start procedure is as follows:

1. Ensure fuel shut off switch, positioned on the left-hand side of the cockpit, is in the “OPEN” (forward) position.
2. Move the Jet Master Switch on the JDU to the “ON” position.
3. Maintain a safe airspeed below 120 km/h (65 kts).
4. Move the Jet Control Switch to the “RUN” position.
5. After a successful start-up, the engine will spool up to a pre-set condition. (IDLE setting is the factory default)
6. After the RPM and EGTs have stabilized at idle (30000 RPM), the thrust can be adjusted using the “Thrust Control Dial”.

NOTE: The time duration from initiating extension to idle power is approximately 40 seconds.

NOTE: If a start was unsuccessful or the engine stops running in RUN mode, a restart can be initiated by cycling the Jet Control toggle switch from RUN to EXT and back to RUN.

NOTE: The start reliability degrades with an increase in airspeed. Starts above an indicated airspeed of 140 km/h are unlikely.

WARNING: Although the Jet Engine adds very little additional drag when extended, the pilot must ensure enough height is available to land on a suitable field before attempting in-flight engine start.

4.9.2 Inflight engine stop procedure

The inflight shut down procedure is as follows:

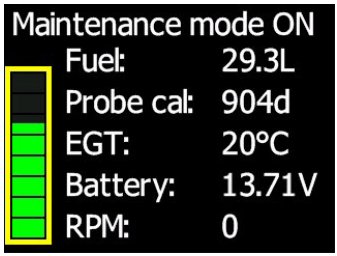
1. Reduce the Thrust to the IDLE setting. Maintain a safe airspeed below V_{PE} (140 km/h or 76 kts).
2. Allow the temperatures to stabilize for at least 30 seconds.
3. Switch the Jet Control toggle switch to the “RET” position.
4. Select “OFF” on the emergency fuel shutoff switch – this will reduce the possibility of an engine fire inside the fuselage bay.
5. After automatic cool-down, the engine will be stowed automatically.
6. Switch the Jet Master Switch on the JDU to the “OFF” position after the engine is retracted.

4.10 Ground operation procedures

4.10.1 Maintenance mode

Within the retracted mode, a maintenance mode can be selected from the Settings screen. The Settings Screen is selected by pressing and holding the Thrust Control Dial. The maintenance mode option is visible by scrolling down on the menu.

The maintenance mode can be used to set the pylon in a specific position to do inspections or refueling. The pylon position is adjusted by rotating the Thrust Control Dial.



To exit the maintenance mode, the Thrust Control Dial is pressed and held until the Retracted Screen is displayed.

4.10.2 Ground start procedure

Ground starts may be performed using the same start procedure used during flight. The following safety measures must be taken:

- Ensure the aircraft is positioned in an area safe for testing the engine.
- Ensure that no loose object can be sucked into the compressor – ensure the canopy is closed during operation.
- Check that the Jet blast will not cause damage or irritation to property, aircraft or people.
- Position the nose of the aircraft into the wind.
- Securing the aircraft using chocks in front of main wheel.
- Ensure that a fire extinguisher is available

Ground Start procedure:

1. Ensure fuel shut off switch, positioned on the left-hand side of the cockpit, is in the “OPEN” (forward) position
2. Switch the Jet Master Switch on the JDU to the “ON” position.
3. Switch the Jet Control toggle switch to the “RUN” position.
4. Only advance the throttle once the engine temperature has stabilised and it is safe to do so.

CAUTION: Use ear-protection during all Jet running tests.

WARNING: Do not touch the engine or have any object close to the intake or exhaust nozzle during operation.

NOTE: If the fuel supply lines to the engine require bleeding, it may take 3 or more start cycles to have a successful start. A rise in EGT will confirm that fuel is supplied to the engine and is being ignited.

4.10.3 Refueling

Refueling is done using the internal fuel pump activated by the refueling switch in the engine box.

The engine box is accessed by switching the engine to maintenance mode. This will extend the engine to the correct position for refueling.

The fuel supply line is connected with a quick connector fitting located on the right side of the engine box. The fuel quantity can be read on the “Maintenance page” while refueling.

If the system is overfilled, excess fuel will dump out of the vent located on the bottom of the fuselage, behind the main wheel. The system refueling system is designed with an overpressure-protection switch.

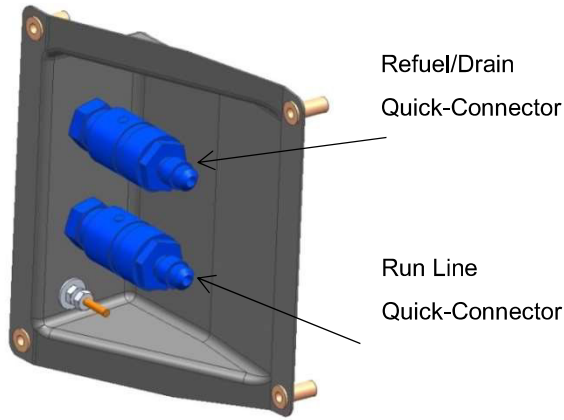


Figure 4-3: Quick Connector for Refueling

Refueling is performed as follows:

1. Power up the jet system and enter maintenance mode to partially extend the engine.
2. Ensure that the fuel tank vent hole is clear. This is done by visually inspecting the vent hole, located in the wheel box.
3. Connect the refueling tube to the refueling/de-fueling quick connector located in the engine box on right. (Figure 4-3)
4. Ensure the fuel shut off switch, positioned on the left-hand side of the cockpit, is in the “OPEN” (forward) position.
5. Switch the re-fueling switch in the engine box (right hand side above the circuit breakers) to the “**forward**” position for refueling.

NOTE: When Jet Pressure Sensor Controller V2.0 is installed, audio signals provide status information to the operator:

- Two short audio signals – refueling in progress
- Two long audio signals – refueling process terminated and unit not switched to **“OPR”** yet.

6. When the tanks are full (determined by visual inspection of top tank) or the desired amount of fuel has been dispensed, the refueling/de-fueling switch must be switched to “**OPR”** and the refueling tube disconnected.

NOTE: The refueling process is terminated when the fuel tank pressure increases rapidly. This happens when the tanks are full or when the fuel vent is blocked.

CAUTION: Monitor the fuel quantity during refueling. Although fitted with an over-pressure sensor, do not rely on this feature-overpressure may damage the tanks.

CAUTION: The fuel pump requires fuel for lubrication and cooling. Do not operate without fuel as this will cause permanent damage to the pump.

CAUTION: Ensure refueling tube is kept free of contamination. Dirt and dust will reduce reliability of the system.

CAUTION: Keep the Jet system powered up while refueling, to avoid the pylon moving unintentionally.

CAUTION: Ensure the correct fuel pre-mix with the correct oil is used. Incorrect fuel may destroy the engine.

CAUTION: Only use a refuel supplied pipe approved by M&D with proper filters. Fuel contamination may cause engine failures.

CAUTION: Do not switch the system OFF and back ON while refueling. The pylon will be automatically retracted when powered ON. The refueling pipes may cause damage to the bay doors while extending or retracting the pylon.

CAUTION: Switch the re-fueling switch back to "**OPR**" after refueling. Failure to do so will prevent the fuel pump to be activated during operation resulting in the system being in-operational.

CAUTION: Avoid moving the refuel/defuel switch instantaneously from refueling to defueling or vice versa. Move the switch first to the centre position (Operation) for a couple of seconds to allow the fuel pump to stop before moving the switch in the opposite direction. Reversing the direction of the fuel pump instantaneously may damage the fuel pump circuit board.

4.10.4 De-fueling

Defueling may be required for maintenance purposes, replacement of old fuel, when fuel probe calibration is required or when fuel quantities are reduced for transport purposes.

Defueling is performed using the same procedure and hardware as with refueling. Reverse flow is achieved by switching the refueling switch to the "**-** "position. After defueling switch the selector to "OPR".

NOTE: When Jet Pressure Sensor Controller V2.0 is installed, audio signals provide status information to the operator:

- One short audio signal – defueling in progress
- Two long audio signals – defueling process terminated and unit not switched to **"OPR"** yet.

After the fuel has been pumped from the tanks, approximately 0.4 litre will still remain in the main tanks. This fuel can be drained through the drain valve in the wheel box behind the main wheel.

CAUTION: Ensure the fuel container has adequate capacity for amount of fuel to be removed from the aircraft's fuel tanks.

CAUTION: Monitor the fuel quantity during defueling. The fuel pump requires fuel for lubrication and cooling. Do not operate without fuel as this will destroy the pump.

NOTE: When transporting the aircraft with full tanks, normal acceleration forces small quantities of fuel out through the vent, causing spillage in the trailer. It is good practise not to transport with more than halve tanks.

4.10.5 Alternative Refueling/De-fueling

If the refueling system of the aircraft malfunctions the alternative refueling method can be used in order to fill the tanks. For this method of refueling/defueling, an external pump is required. The fuel hose is plugged into the connector in the wheel well and fuel is then pumped into the tanks until the required amount of fuel has been dispensed. Defueling is accomplished using the same method.

5 Engine status and information display

Information is displayed to the pilot on the Jet Display Unit (JDU).

5.1 Status Indicators

Powerplant status is indicated by colored LEDs above and below the screen, as illustrated in Figure 5-1 as follows:

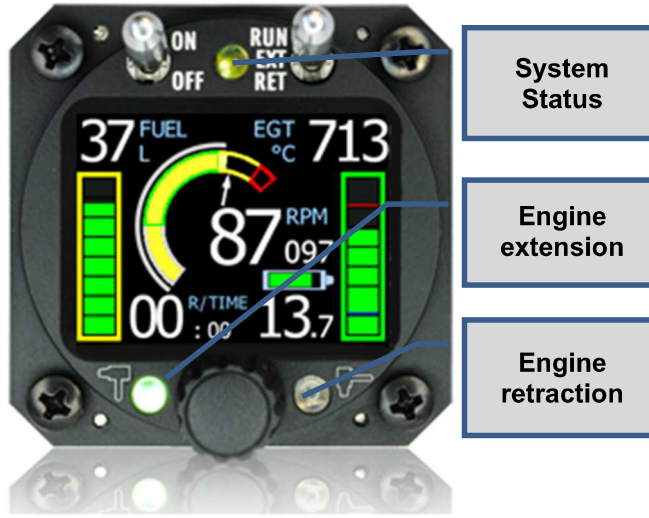


Figure 5-1: Status Indicators

Status light	Description
System Status	Steady green - Engine is running normally Flashing green - Starting mode in progress Steady amber - Caution condition, example low fuel Steady red - Warning condition • Any normal operational warning • Retracted temperature too high
Retraction Status	Steady green - Engine fully retracted, Flashing green - Engine in retraction process Flashing red - Retraction error has occurred
Extension Status	Steady green - Engine fully extended, Flashing green - Engine in extension process Flashing red - Extension error has occurred

Table 5.1-1: Status Indicators Description

5.1.1 Display

Information is displayed to the pilot on the 50 mm color display screen. Figure 5-2 gives the detail of symbols used on the display.

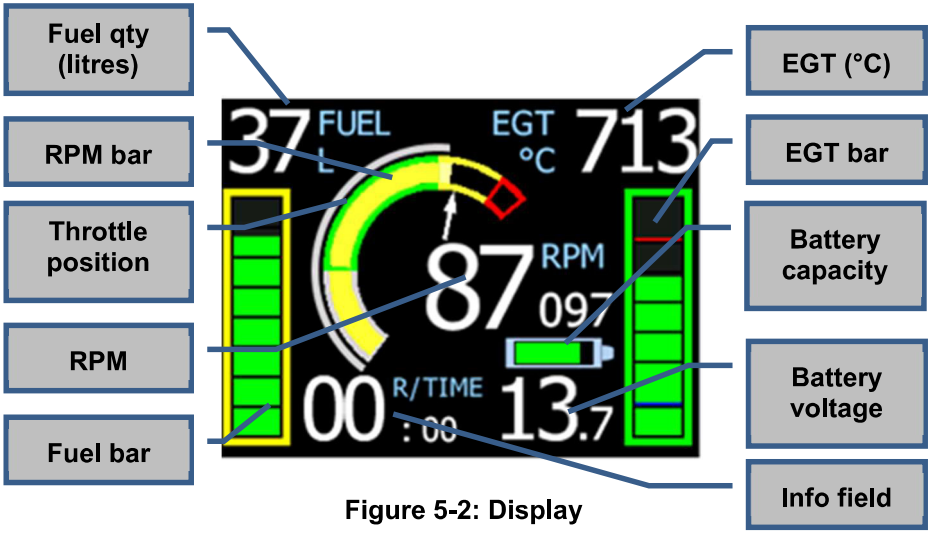


Figure 5-2: Display

5.1.2 RPM

RPM is displayed in the center of the screen. A needle indicates the RPM on an analogue scale and the numeric value is also indicated in the center. The limitations and color convention are given in the following table.

Speed range	RPM	Color of bar
Normal range	30 000 to 80 000	Green
Caution range (limited to 5 min)	Above 80 000 to 97 000	Yellow
Over-speed	Above 97 000	Red

Table 5.1-2: RPM Limitations Display

5.1.3 Throttle setting

The throttle setting is indicated by the light grey arc on the outside of the RPM bar. The desired throttle setting is adjusted by rotating the Jet Thrust Dial.

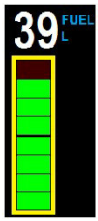
5.1.4 EGT

Exhaust gas temperature is displayed in analogue format on the right-hand side of the screen, and the numeric value in degrees Celsius is displayed in the top right corner. The limitations and color convention are given in Table 5.1-3.

EGT range	EGT	Bar Color
Normal range	450 °C to 790 °C (842 °F to 1454 °F)	Green
Over-temperature	Above 790 °C (1454 °F)	Red

Table 5.1-3: Temperature Limitations Display

5.1.5 Fuel level



The fuel quantity is displayed on the JDU in graphical and numerical format on the left-hand side of the screen.

The displayed fuel quantity is dependent on the configuration set in Fuel Configuration. The options are “Probe”, “Calculations” or “Both”:

5.1.6 Probe

When “Probe” is selected, both the fuel bar and the quantity text are determined using the input from the fuel probe. The fuel bar and quantity text displays similar values. During sustained increased G-maneuvers the fuel probe may be over-reading slightly.

5.1.7 Calculation

When “Calculation” is selected, both the fuel bar and the quantity text are determined using the calculation method. The fuel quantity is calculated using the user set value and measured fuel flow during operation.

The fuel bar and quantity text displays similar values.

5.1.8 Probe and calculation

When “Both” is selected, the fuel bar displays the fuel quantity as measured by the fuel probe. The quantity text is determined using the calculation method.

The fuel bar and quantity text display may therefore show different values.

If the fuel level is below the minimum set level, the fuel bar is displayed in amber.

The maximum fuel quantity and low fuel warning values are set in the configuration screen.

5.1.9 Battery

Battery voltage and capacity are displayed in the lower right-hand side of the screen. The numeric value displays the battery voltage, while the battery symbol indicates the theoretical calculated capacity of the battery.

5.1.10 Other information

Additional information is displayed on the bottom left of the screen. Pressing the Thrust Control Dial, cycles the bottom left display window between:

- Fuel flow (in litres/hour) 

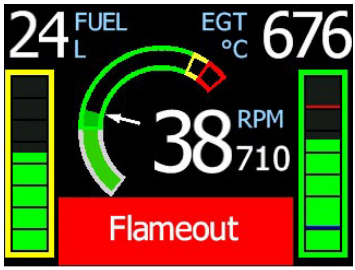
- Thrust (%) 

- Endurance (in mm:ss) 

- Run time (in mm:ss) 

5.2 Error messages

Error messages are displayed on the bottom of the JDU screen.



5.2.1 Errors during Starting

Following error messages may occur during start up:

- No Ignition
- No Idle Speed
- No Heater Current
- Heater Over-current
- Starter Over-current
- Starter Valve Over-current
- Fuel Valve Over-Current

5.2.1.1 No Ignition

Error Description:

The temperature did not reach the required value during start. As a result, the start sequence was terminated.

Possible Causes:

- Fuel valve not open
- No fuel in fuel tanks
- No fuel in start or main fuel lines – priming required
- Glow plug not warm enough, due to:
  - Battery voltage too low
  - Defective glow plug
  - Airspeed too high when starting in flight

Pilot action required:

- Check fuel valve and fuel quantity
- Attempt to restart (if priming is required, up to 4 attempts are normal)

5.2.1.2 No idle speed

Error Description:

The RPM did not reach idle RPM after a pre-set time interval (factory default is 30 seconds). As a result, the start sequence was terminated.

Possible Causes:

- Fuel valve not open
- No fuel in fuel tanks
- No fuel in start or main fuel lines – priming required
- Wrong airspeed

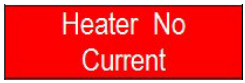
Pilot action required:

- Check that fuel valve is in the Open position
- Attempt to restart (if priming is required, up to 4 attempts are normal)

5.2.1.3 Heater No Current

Error Description:

No current was detected after the glow plug was switched on.



Possible Causes:

- Glow plug fuse blown on the ECU
- Defective glow plug
- Wiring defect

Pilot action required:

- Retract engine and switch system off
- Ground maintenance actions are required

5.2.1.4 Heater Over-current

Error Description:

Glow plug exceeded maximum allowed current.

Possible Causes:

- Defective glow plug
- Wiring defect

Pilot action required:

- Attempt one more start
- Retract engine and switch system off
- Ground maintenance actions are required if problem re-occurs.

5.2.1.5 Starter Over-current

Error Description:

Starter motor exceeded maximum allowable current.

Possible Causes:

- Defective starter motor
- Serious engine defect

Pilot action required:

- Attempt one more start
- Retract engine and switch system off
- Ground maintenance actions are required if problem re-occurs.

5.2.1.6 Start valve Over-current

Error Description:

Start fuel line exceeded maximum allowable current.

Possible Causes:

- Electrical defect

Pilot action required:

- Retract engine and switch system off
- Ground maintenance actions are required.

5.2.1.7 Fuel valve Over-current

Error Description:

Main Fuel line solenoid exceeded maximum allowable current.

Possible Causes:

- Electrical defect

Pilot action required:

- Retract engine and switch system off
- Ground maintenance actions are required.

5.2.2 Errors during Running

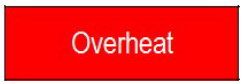
The following lists the error messages that may occur during the RUN state:

- Overheat
- Flameout
- No RPM
- Pump Overcurrent

5.2.2.1 Overheat

Error Description:

Measured EGT exceeded 850 °C (1562 °F).



Possible Causes:

- Defective engine
- Engine fire
- Defective RPM sensor causing an engine over-speed
- Incorrect EGT measured

Pilot action required:

- Close fuel valve
- Toggle Jet Control toggle switch to Extend.
- Only retract engine when temperatures stabilised below 55 °C (131 °F).
- Ground maintenance actions are required

5.2.2.2 Flameout

Error Description:

Measured EGT dropped below minimum pre-set value.

Possible Causes:

- Fuel starvation
- Throttle advance too fast after start-up
- Spool-up failure at high density altitudes
- Low battery voltage
- Incorrect EGT measured

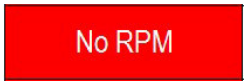
Pilot action required:

- Check fuel valve and quantities
- Attempt restart
- Retract engine and switch system off
- Ground maintenance actions may be required

5.2.2.3 No RPM

Error Description:

No RPM signal is measured during operation.



Possible Causes:

- Engine stopped during RUN mode
- RPM sensor failure
- Sensor board failure

Pilot action required:

- Attempt restart
- Retract engine and switch system off
- Ground maintenance actions may be required

5.2.2.4 Pump overcurrent

Error Description:

Fuel pump exceeded maximum allowable current.

Possible Causes:

- Fuel pump failure
- Blocked or restricted fuel filters
- Fuel solenoid failure

Pilot action required:

- Attempt restart
- Retract engine and switch system off
- Ground maintenance actions may be required

5.2.3 Other errors

The following are error messages not associated specifically with Start or Run modes:

- Kinematic overcurrent
- Kinematic timeout
- No Data from ECU
- No SD Card

5.2.3.1 Kinematic overcurrent

Error Description:

The electromechanical actuator driving the pylon exceeded maximum allowable current

Possible Causes:

- Mechanical obstruction in the jet box area
- Limit switches not set up accurately
- Damage to engine doors or to door mechanism

Pilot action required:

- Attempt Retraction and Extension again
- Ground Maintenance actions may be required

5.2.3.2 Kinematic timeout

Error Description:

The electromechanical actuator driving the pylon did not reach the limit switches within the pre-set time duration.

Possible Causes:

- Mechanical defect in the jet box area

Pilot action required:

- Attempt Retraction and Extension again
- Ground maintenance actions may be required

5.2.3.3 No data from ECU

Error Description:

The JDU cannot establish communication with ECU.

Possible Causes:

- Low battery voltage
- Cable not plugged into the JDU
- Wiring defect
- ECU defect (possible internal fuse blown)

Pilot action required:

- Ground maintenance actions are required

5.2.3.4 No SD Card

Error Description:

The ECU cannot detect the internal SD card.

Possible Causes:

- Internal SD card is removed from ECU
- Defective SD card
- ECU defect

Pilot action required:

- Attempt operation. If operation is OK, system may be used.
- Ground maintenance actions required

6 Performance

6.1 Engine performance

Figure 6-1 provides an indication of the change in static thrust and fuel consumption versus RPM.

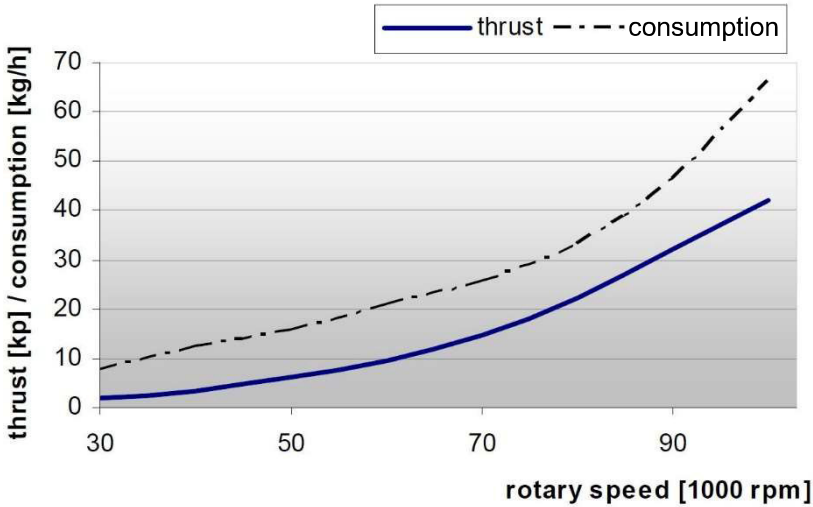


Figure 6-1: Static Thrust and Fuel Consumption vs RPM

6.2 Flight performance

6.2.1 Climb performance and range

Table 6.2-1 gives the optimum IAS to climb for best range at empty weight with the following assumptions:

- Fuel quantity (20 liters / 5.28 US gal)
- All up weight of 400 kg ((882 lbs) excl. fuel).
- Flight profile: Saw tooth profile

NOTE: Optimum range is obtained by flying a saw tooth profile with climbs at maximum continuous power and glide with engine off and retracted.

NOTE: The range specified in Table 6.2-1 and Table 6.2-2 applies to both the 15 m and 18 m configurations. In 18 m configuration, fly 3% less than specified climb airspeeds.

NOTE: The glide distance calculated in Table 6.2-1 and Table 6.2-2 assumes a glide ratio of 50:1 at best glide speed with the engine retracted.

NOTE: The performance values listed in this section are theoretical predictions based on experimental studies and aircraft in clean configuration achieving optimal drag performance with engine extended and retracted as required. These values will vary depending on the atmospheric conditions and configuration of the aircraft.

RPM	Pressure Altitude (m)	IAS (km/h)	Climb Rate (m/s)	Climb Dist. (km)	Glide Dist. (km)	Total Dist. (km)
80 000	SL 1000	151	0.7	70	55	**125**
	1000 2000	144	0.6	80	50	**130**
	2000 3000	137	0.5	90	45	**135**
97 000	SL 1000	173	2.1	47	97	**144**
	1000 2000	165	1.8	54	93	**147**
	2000 3000	155	1.5	61	90	**151**

Table 6.2-1: Range from Saw-tooth Profile for Different RPM Settings at 400 kg – SI units

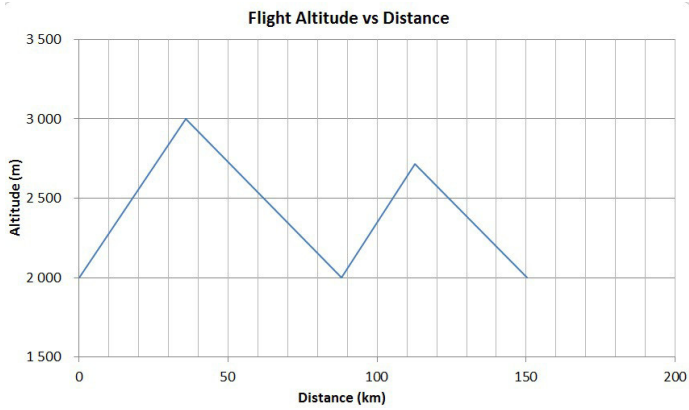


Figure 6-2: Expected Saw-tooth Profile Flown Between 2000 and 3000 m at 95000 RPM

RPM	Pressure Altitude (ft)	Indicated Airspeed (kts)	Climb Rate (kts)	Climb Dist. (NM)	Glide Dist. (NM)	Total Dist. (NM)
80 000	SL 3300	82	1.4	38	30	68
	3400 6700	78	1.2	43	27	70
	6700 10000	74	1.0	49	24	73
97000	SL 3300	93	4.0	25	52	77
	3300 6700	89	3.5	29	50	79
	6700 10000	84	2.9	33	49	82

Table 6.2-2: Range from Saw-tooth Profile for Different RPM Settings at 882 lbs – US customary units

NOTE: An increase in mass of 10 % reduces the range with approximately 10 %.

CAUTION: The maximum engine RPM of 97 000 is only allowed for 5 minutes. Operating the engine for long periods at maximum power will reduce the engine life and may lead to permanent engine damage.

6.2.2 Cruise performance

Table 6.2-3 gives the expected range and endurance in level flight for RPM settings at different altitudes and a weight of 400 kg (incl. fuel). Table 6.2-3 is based on ISA conditions and fuel quantity of 20 litres (5.28 US gal).

Pressure Altitude AMSL	RPM	Indicated Airspeed		Endurance (hh:mm)	Range	
		(km/h)	(kts)		(km)	(nm)
300 m (1000 ft)	70000	158	85	00:39	105	57
	75000	183	99	00:32	99	53
	80000	202	109	00:27	92	50
	85000	219	118	00:23	84	45
	90000	235	127	00:20	77	42
	95000	250	135	00:17	71	38
1500 m (5000 ft)	70000	144	78	00:45	118	46
	75000	167	90	00:37	113	61
	80000	185	100	00:31	105	57
	85000	196	106	00:26	96	52
	90000	216	117	00:22	88	48
	95000	230	124	00:19	81	44
3000 m (10000 ft)	70000	122	66	00:54	133	72
	75000	146	79	00:45	130	70
	80000	185	100	00:31	104	56
	85000	202	109	00:26	96	52
	90000	216	117	00:22	88	48
	95000	230	120	00:19	81	44

Table 6.2-3: Endurance & Range vs RPM in Level Flight

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7 System description

7.1 Kinematic system

The kinematic system is driven by a 12-volt electromechanical linear actuator with integral limit switches. The actuator is controlled by the JDU and is used to operate the front pylon, main doors, as well as the front finger door. The system is described in more detail in this section.

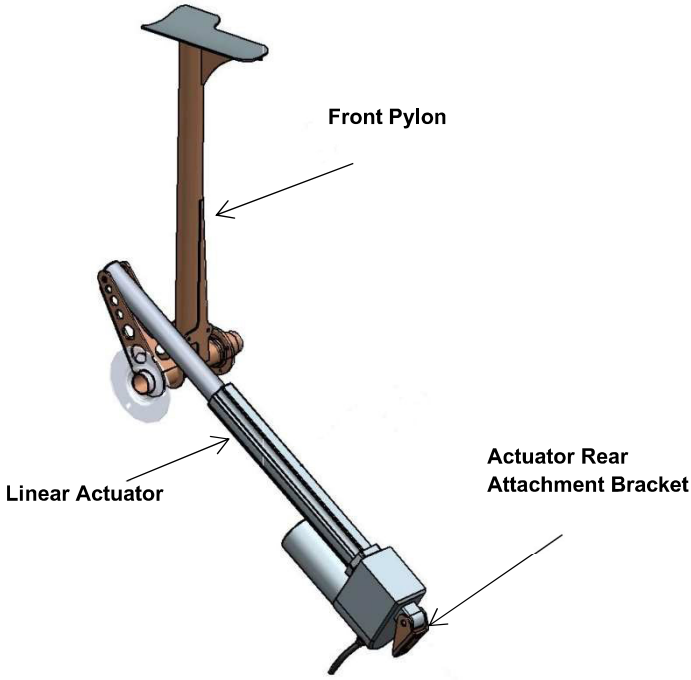


Figure 7-1: Kinematics System

7.1.1 Front pylon

The front pylon's movement is operated by an arm attached to the linear actuator as shown in Figure 7-1. The actuator lowers and raises the pylon to which the MD-TJ42 Jet engine is mounted. Figure 7-1 shows the pylon in the fully extended (raised) position.

7.1.2 Main doors

The opening and closing of the jet main doors are operated by a cam driven bellcrank assembly. Two pushrods attached to the bellcrank assembly open and close the main doors.

The opening and closing cycle of the doors is controlled by a cam follower, connected to the main doors. The linear actuator also drives this cam which is attached to the front pylon. Figure 7-2 shows the system in the engine extended (raised) position with the jet doors closed (pylon not shown).

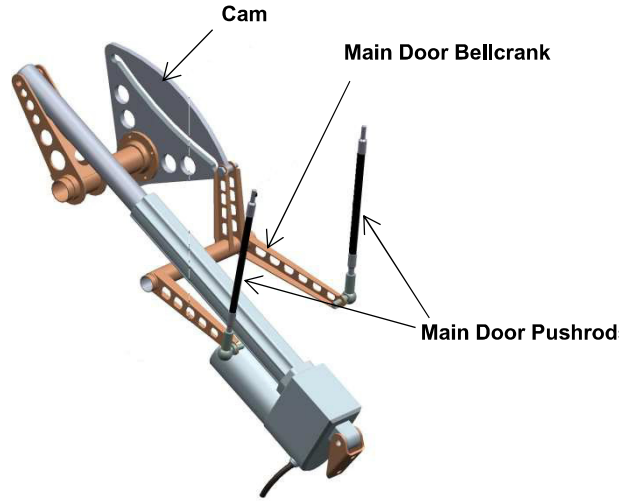


Figure 7-2: Kinematics System

7.1.3 Front door

The front door is also attached to the cam system and is opened and closed by a pushrod and spring attached to the cam. Figure 7-3 shows the pylon in the extended (raised) position with the front door opened (downwards movement into the engine bay).

When the pylon is retracted by the linear actuator the front door is closed (upwards movement to seal off the engine bay) by a pushrod linked to the cam.

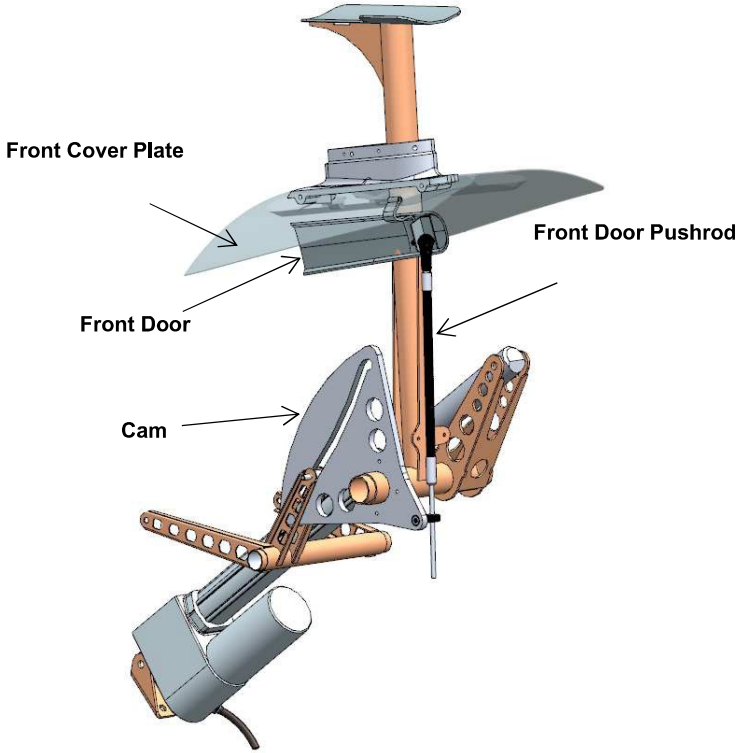


Figure 7-3: Front Doors Kinematics

7.1.4 Fuel System

Fuel is contained in two interconnected tanks located inside the fuselage. No possibility exists to select fuel supply from the different tanks. Fuel management is facilitated by components fixed to the right side of the bottom fuel tank.

The fuel circuit is comprised of aluminum tubing and aluminum aerospace fittings (except for portions of the circuit inside the engine box which are flexible hoses, allowing for the retraction of the engine).

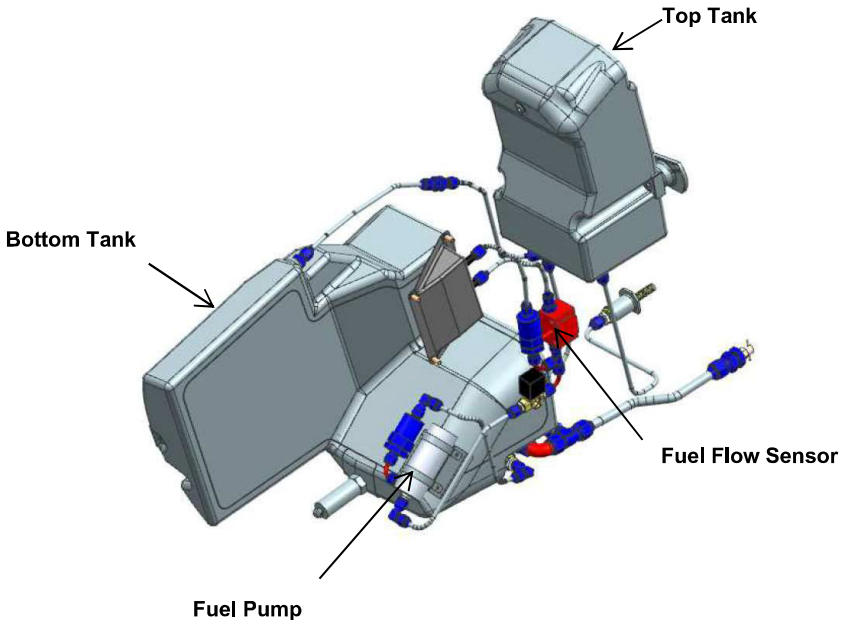


Figure 7-4: Fuel System and Tanks

There are three fuel filters in the fuel system. The first filter, using a brass sintered element, is situated between the tank outlet and the fuel pump. The second filter is situated between the refueling inlet and the bottom tank. The remaining fuel filter is situated in the fuel line inside the engine box.

Refueling is accomplished by means of the internal pump connected by a quick connector on the right-hand side of the engine box (Refer to section 4.10 for more detail on refueling and de-fueling). This same connection can be used to drain the fuel from the tanks. Alternatively, the fuel drain fitting installed in the rear of the main landing gear wheel box can be used to drain fuel.

The fuel system is vented by means of a single vent tube running from the bottom of the top tank into the left side of the wheel well. The fuel system schematic layout can be seen in Figure 7-5.

NOTE: The pre-flight should include an inspection of the vent inlet beneath the fuselage for debris that could be obstructing the opening (a plugged vent can result in tanks collapsing inwards due to fuel pump suction)

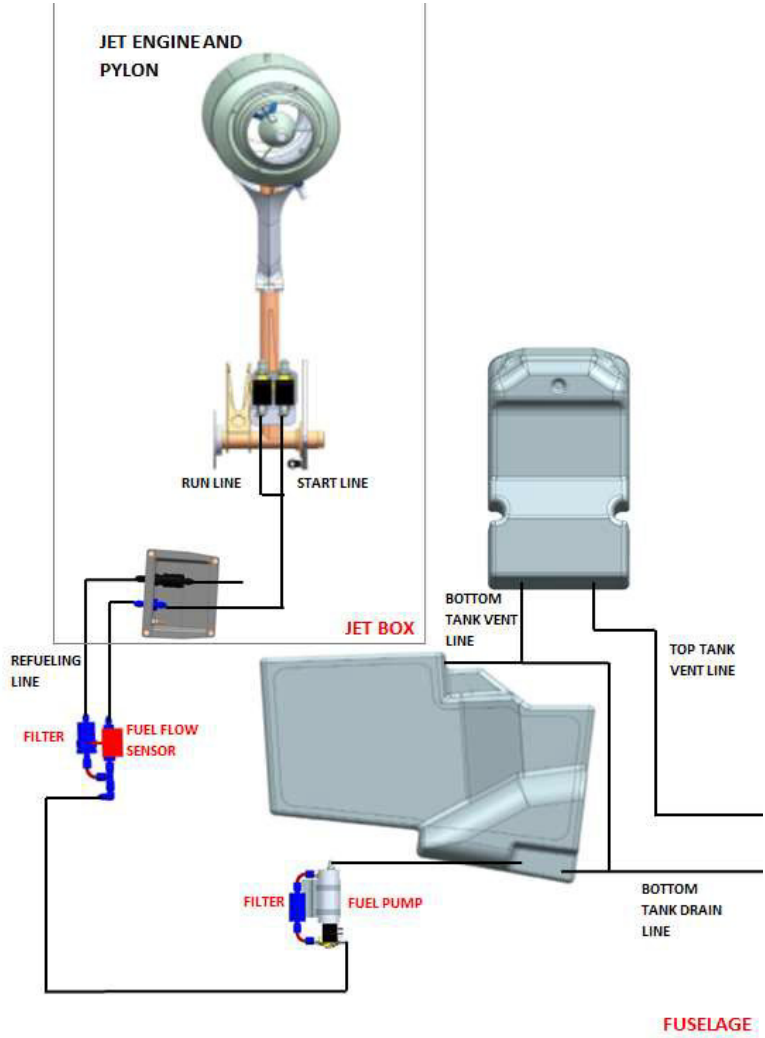


Figure 7-5: Fuel System Layout Diagram

7.2 Electrical system

The electrical power of the jet sustainer system is supplied by maintenance-free LiFePO type 12-volt batteries. One (or optionally two) main batteries in the luggage compartment area are fitted with an additional connector that is plugged into the jet sustainer electrical system.

A fully charged 10 Ah LiFePO battery is sufficient for 6 extension-start-retract cycles and 45 minutes of run time. At maximum RPM the system consumes approximately 5.5 A at 12 V.

The Jet System battery is connected through a bulkhead fitting in the fuselage center section shelves. The turbine ECU is located in the center section and all related wiring is distributed throughout the aircraft from this point. Wiring looms connect the ECU to the individual system throughout the aircraft.

Circuit breakers are supplied for all the individual electrical components, located in a remote fuse unit located in the right hand side of the jet box.

Figure 7-6 illustrates a simplified electrical schematic of the jet sustainer system.

NOTE: When the battery is connected to the system a leak current of 50 mA is drawn by the Jet system, even if the Jet Master Switch is in the OFF position. Disconnect the battery from the jet system when not used to prevent battery drainage.

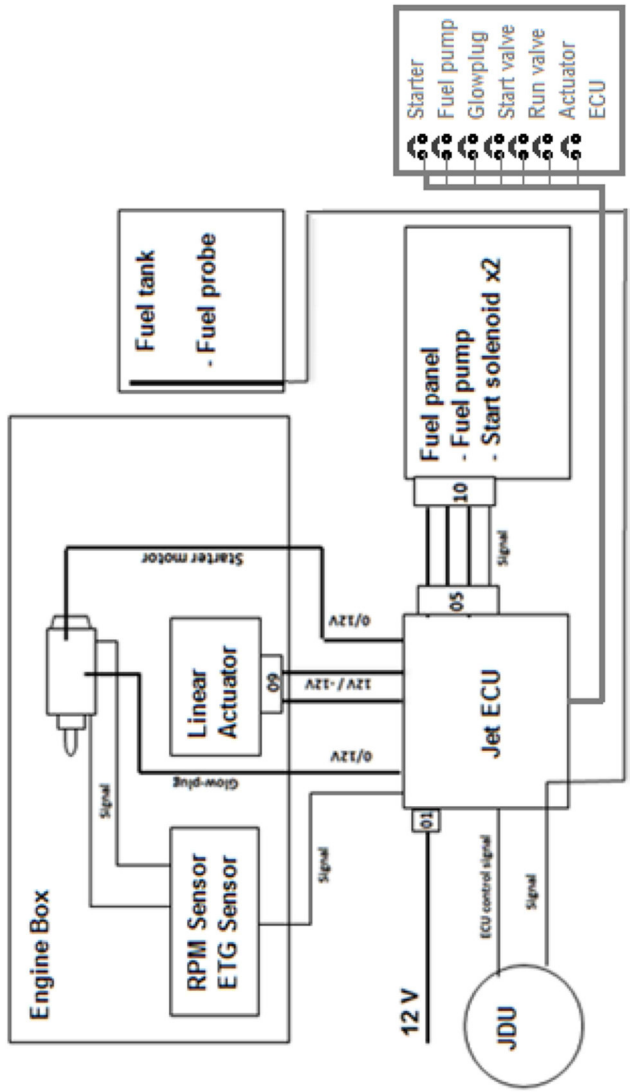
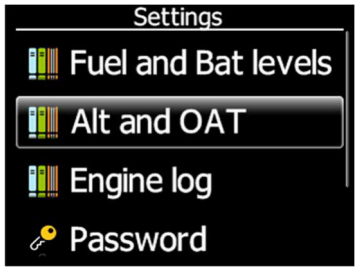


Figure 7-6: Schematic Layout of Electrical System

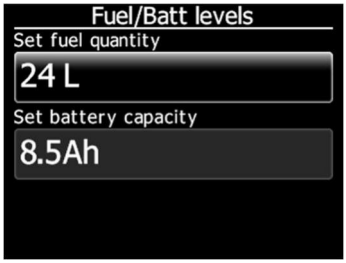
8 Settings

The Settings Screen is selected by pressing and holding the Thrust Control Dial. The following options are available in the Settings menu:

- Setting fuel and battery Levels
- Setting operation altitude and temperatures
- Viewing the engine logbook
- Entering the system configuration (under Password)



8.1 Fuel and battery levels



This setting allows the pilot to adjust the calculated fuel levels and remaining battery capacity.

The fuel quantity is set by selecting the fuel quantity using the Thrust Control Dial.

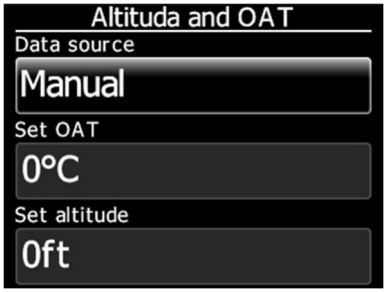
NOTE: If the fuel quantity determination is configured to use the fuel probe only as input, the fuel quantity cannot be adjusted. Refer to the configuration section to change this configuration.

The remaining battery capacity can be seen when selecting the “Set battery capacity” selection box. As it is normally not possible to measure the remaining capacity of a battery, the battery should be fully charged, and this value adjusted to the maximum capacity of the battery.

The maximum battery capacity can be adjusted. Refer to the configuration section to change this configuration.

NOTE: The remaining capacity is determined mathematically by integrating consumption over time during operation. When the Jet System is not switched on, a small leak current is required to keep the system “alive”, slowly draining the Jet battery.

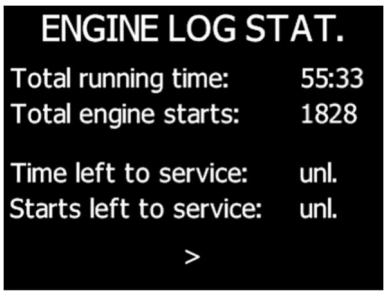
8.2 Altitude and Outside air temperature



This setting allows the pilot to adjust the operating altitude and OAT. Engine performance may be enhanced in the future using these parameters. Optionally, the JDU may in future be linked with the instruments that would provide these values in real time.

The Engine Control Unit (ECU) logs all engine parameters, including the set Altitude and OAT.

8.3 Viewing Engine log



The Engine log pages provide engine usage data. On the main page, the Total engine time and total number of starts are displayed, and the number of starts and hours left until service.

Scrolling through the log pages is performed using the Thrust Control Dial.

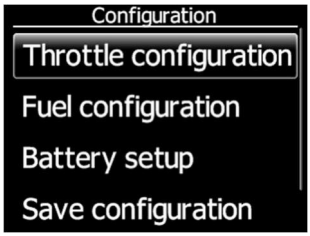
NOTE: The JDU only displays a limited number of logged entries. The complete logbook is saved on the ECU, and accessible by approved maintenance personnel using the Turbine Tool software.

8.4 Password

The Configurations section is accessible by entering the given code in the Password box, using the Jet Thrust Dial.

CAUTION: Incorrect configuration of the system may cause the jet system not to function as designed.

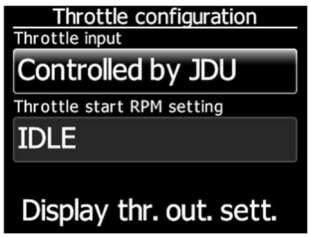
8.5 Configuration



The configuration menu consists of

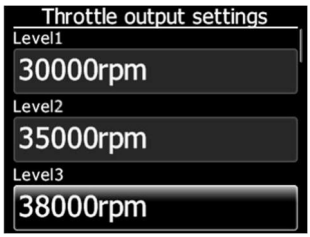
- Throttle configuration
- Fuel configuration
- Battery setup

8.5.1 Throttle configuration



The throttle configuration allows selection of the throttle input between either, controlled via the JDU Trust Dial (default) or via an external analogue throttle. (The second option is not available in M&D installations.)

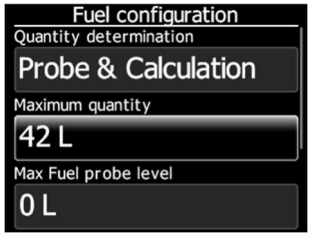
In the “Throttle start RPM setting”, the power setting after start can also be selected. The recommended setting is “IDLE”, as this setting gives the pilot the opportunity to allow the temperatures to stabilize before spooling up to higher power settings.



The system is designed to operate on 18 different power settings. These settings are configurable on the ECU, using Turbine Tool. To view the current settings, select “Display thr. Out. Sett.”

8.5.2 Fuel configuration

8.5.2.1 Quantity determination



The fuel configuration allows selection of the way the fuel quantity is display during operation.

8.5.2.2 Maximum quantity

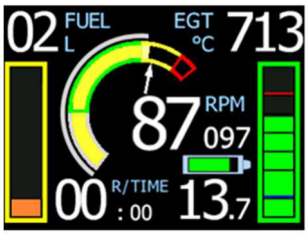
The maximum usable fuel quantity is adjustable in the “Maximum quantity” box. The default setting for the JS-3 is 21 l (5.55 gal.).

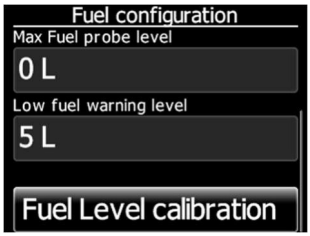
8.5.2.3 Max Fuel sensor level

The maximum fuel level can be adjusted to show the correct quantity when once the fuel pressure sensor has been calibrated.

8.5.2.4 Low fuel warning

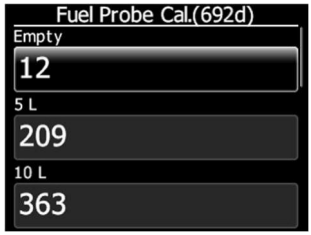
Low fuel warning is adjustable in the “Low Fuel warning level” box. The default setting is 2 l.





8.5.2.5 Fuel level calibration

Fuel probe calibration is done via the “Fuel Probe Cal” screen. A 10-bit digital value displayed in brackets (692d) represents the measured fuel level from the fuel probe (0 is empty, 1024 is full).



When rotating the Thrust Control Dial, the d-value is updated from the fuel probe.

Calibration of the fuel pressure sensor is explained in the Jet Sustainer Maintenance Manual Supplement and must be completed by an approved person.

NOTE: The fuel pressure sensor value is only measured if the “Quantity Determination” in the “Fuel Configuration” page is set to “Probe” or “Probe and Calculation”.

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9 Service Bulletins

This section starts with an overview table of all optional SBs, in which the owner or operator should mark which SBs he voluntary implemented and which not.

All implemented optional SBs must be printed and added to this section by the owner or operator. Not implemented SBs do not need to be added to this section.

SB No.	Rev	Date	Description	SB implemented	
				Yes	No

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10 STCs and Minor Change Approvals

Reference No.	Rev.	Date	Description

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11 Contact

11.1 Type Certificate Holder

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