



JMB T120-T150-T200 JET ENGINE



USER MANUAL

JMB Jet engines

Bizzotto Mauro

Via Friuli n.20

36061

Bassano del Grappa -VI-

Italy

Tel : 340 9674367



DECLARATION OF INCORPORATION

The company JMB JET ENGINES located in Via Friuli, 20 - 36061 Bassano del Grappa (VI)
Italy

DECLARES

The partly machinery JMB T120-T150-T200, matr. N °

complies with the essential requirements of Annex I of Direttiva 2006/42/CE.

It also complies with the following other directives:

- 2006/95/EC - Low Voltage Directive
- 89/336/EEC - Electromagnetic compatibility
- Draft under GTBA concerning engine models

The partly machinery JMB T120-T150-T200 complies with the essential requirements of Annex I of Directive 2006/42/EC. The relevant technical documentation is attached hereto. VII B to that directive. It also complies with the following other directives:

- 2006/95/EC - Low Voltage Directive
- 89/336/EEC - Electromagnetic compatibility
- Draft under GTBA concerning engine models

The undersigned undertakes to provide, following a reasoned request by the national authorities, relevant information on the partly completed machinery. This shall include the method of transmission and shall not affect the rights of intellectual property of the manufacturer of the partly completed machinery.

Declares that the partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of Directive 2006/42/EC.

The person authorized to compile the relevant technical documentation is established in the Community is:

Mr. Mauro Bizzotto
Via Friuli, 20
36061 Bassano del Grappa (VI)
Italy

Bassano del Grappa, _____



Legal news

The turbojet JMB T120-T150-T200 complies with Directive 2006/42/EC as partly completed machinery

The turbojet you have purchased is designed to be mounted on aircraft or other models, controlled by remote control and unmanned. The engine manufacturer, disclaims any liability for damage to persons, property, or animals, if the turbojet is mounted on aircraft or other, driven by individuals. The engine manufacturer, disclaims any responsibility, generally use, neglect, mishandling of use, failure to news reported on this manual.

The engine manufacturer, disclaims any responsibility in case of a negligent and improper construction of the model of aircraft or other, powered by this turbojet.

This turbojet, is a complex engine achieved after a particular development. Required experience and basic knowledge on argument for safe operation. For more information and tips on how to operate, please visit www.gtba.co.uk

The use of this engine is allowed only to adults and leaders with high experience in piloting radio-controlled model airplanes.

It should be noted that models mounting this turbojet can reach very high speeds, the use of the full power is only recommended for takeoff, emergency and maneuvers in positives climb positions.

The continuous use of full power can lead to the loss of the model.

The turbojet and all attached devices are delivered after regular test of the manufacturer.

Data sheet attached shows the technical specifications of the turbojet obtained from the manufacturer, with bench testing and compared with ISA conditions of temperature and atmospheric pressure.

Any variation of thrust and temperature within the acceptable limits are due to variations in climatic conditions in which the turbojet is operating.

The color of exhaust cone, it is a sign of the test took place before the sale of the motor and not of a used product.

The following manual will provide precise directions on how to operate properly and safely, the use of the turbojet.

Therefore is important to use a thorough reading of the manual to avoid operations that may compromise user safety and integrity of the turbojet.

No part of this manual may be reproduced, translated, transcribed and redistributed without the prior written consent of JMB Jet engines.

All product information in this manual are subject to change without notice.

For other information not included and your interest, please contact the manufacturer below.

JMB Jet engines

Mauro Bizzotto

Via Friuli 20 of

36061

Bassano del Grappa, Vicenza

Italy

Tel: 340 9674367

e-mail: info@jmbengines.it

Warranty

JMB Jet engines manufacturer, apply a warranty period on turbojet JMB T120-T150-T200, for 2 years from purchase date, or 25 hours of flight and to the first owner only.

During this period, parts that will be replaced free, if defects in material or manufacturing.

The warranty does not include: The electric motor of starter, glow plug and battery.

In case of failure, the turbojet must be returned to the manufacturer without that has been opened or tampered. Otherwise, the warranty becomes void.

The engine manufacturer, does not assume any responsibility in case of damage to property, peoples or animals, loss of the model and other consequences arising from bad use of this engine.

The warranty is void when it appears at least one of these conditions:

1 - If user is not agree to all or part of steps below.

2 - If serial number has been deleted, modified or altered.

3 - If turbojet has been used for another purpose than that for radio controlled models without authorization by the manufacturer.

4 - If the engine has been damaged in a crash, improper installation, ingestion of foreign bodies and other actions fatal to the engine.

5 - If the engine ran with fuel / oil ratio inadequate.

6 - If used dirty fuel.

7 - If maintenance is not authorized by the manufacturer.

8 - If you have not respected the time and checks for routine maintenance (TBO).

9 - If used a different fuel system than shown and unsuitable materials.

10 - If used different devices (ECU, pump, lines) than those attachments.

11 - If engine has been tampered or improperly used.

12 - If you change parameters set on ECU except parameters allowed.

13 - If you do not follow instructions and sequences mentioned in this manual.



Summary of user manual

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Technical spec JMB T120

Engine Type:	single shaft reverse flow turbojet engine
Compressor:	Centrifugal single stage aluminum alloy C355
Turbine:	Centripetal stage Inconel 713C
Bearings:	Hybrid ceramic ball bearings without cage
Static thrust min-max:	from 6 N to 120 N
RPM	33000 - 123000
EGT:	from 420 °C idle to 680 °C at full throttle
Compression ratio:	3.1
Consumption min-max:	from 76 cc / min to 395 cc / min
Airflow :	0.28 Kg / sec
Diameter:	122 mm
Length:	305 mm
Weight:	1720 g starter with and without accessories
Fuel:	Kerosene, Jet A1, JP4, JP8, Diesel
Lubrication:	4% of Aeroshell 500 or similar turbine oils
Control:	Projet ECU Hornet III
Ignition:	With preheating propane or Kerostart
Max operating temp:	-5 °C +35 °C
Acceleration:	4 sec from Idle to Full
Deceleration:	3 sec from Full to Idle
Max noise level:	110 dB

Technical spec JMB T150

Others data as JMB T120

Static thrust min-max:	from 6 N to 150 N
RPM	33000 - 126000
EGT:	420 °C min RPM to 680 °C max RPM
Compression ratio:	3.1
Consumption min-max:	80 cc / min at idle to 460 cc / min at full throttle
Airflow :	0.32 Kg / sec
Diameter:	122 mm
Length:	305 mm
Weight:	1740 g engine only
Max operating temp:	-5 °C +35 °C
Acceleration:	4 sec from Idle to Full
Deceleration:	3 sec from Full to Idle
Max noise level:	120 dB

Technical spec JMB T200

Others data as JMB T120

Static thrust min-max:	from 7 N to 200 N
RPM	from 32000 to 120000
EGT:	from 420 °C to 680 °C
Compression ratio:	3
Consumption min-max:	from 110 cc / min to 655 cc / min
Airflow :	0.41 Kg / sec
Diameter:	132 mm
Length:	330 mm
Weight:	2130 g engine only
Max operating temp:	-5 °C +35 °C
Acceleration:	4 sec from Idle to Full
Deceleration:	3 sec from Full to Idle
Max noise level:	140 Db

All data compared at ISA conditions (15 °C and 1 bar of pressure)

Package contents



The contents of JMB Gas turbines box packaging, shall be as follows:

- 1 Turbojet JMB T120 or T150 or T200
- 1 ECU Projet Hornet III
- 1 GSU Projet
- 1 I / O LED board
- 1 Solenoid propane valve
- 1 Solenoid fuel valve
- 1 Fuel pump
- 1 7.2 v 2200 mAh LiPo 2C
- 1 Set telephone cable connections
- 1 3-wire cable connection ECU-Turbojet
- 1 User manual JMB jet engine
- 1 User manual ECU Projet Hornet
- 2 meters 4x2.5 mm diameter polyurethane hose for propane and fuel



Safety standards

JMB turbojets are sophisticated jet engines provides a very high power at very high speed. Must therefore be used with high levels of expertise and security to avoid damage to persons or property and to continue to have fun during flight activity.

Rules listed below, must always be kept in mind.

1 - Co2 fire extinguisher: for all refueling operations, start-up, shutdown and discharger tanks, it is very important always have a fire extinguisher to avoid unwanted fires. Before starting operations with turbojet, be sure to be able to properly use the fire extinguisher in case of fire. Avoid powder fire extinguishers as they cause permanent damage both model and turbojet.

2 - Noise level: the large power output, generates a high level of noise which could lead to permanent damage to hearing if you do not use ears protection. Its use should therefore be made as far from populated areas or sensitive to noise".

3 - Protection: protect always eyes and ears when operating near the turbojet running.

4 - Place: flammability of gas and fuel and the loud noise generated by the turbojet running, require all operations on engine, must be made mandatory outdoor and fit for purpose.

5 - Fuel handling: When using kerosene and propane, remember to stay away from open flames, cigarettes and sources of heat dangerous since these are highly flammable.

6 - Safety zones: during operation of the turbojet, does not remain in hazardous areas such as: area close to suction compressor, in correspondence with rotation plans of wheels and immediately close the exhaust nozzle (See p.25).

7 - Danger burns: It is absolutely forbidden touch the turbojet during operation as it reaches very high temperatures with a risk of severe burns to the hands and other body parts that come into contact with.

8 - Installation: turbojet must be placed securely into the model. The displacement of engine from its housing, cause serious damage both model and turbojet with subsequent crash.

9 - Abnormal operation: in case of strong vibrations, hissing abnormal, flames from the exhaust and other irregularities on turbojet when running, cancel the flight and call the manufacturer.

10 - People: keep out animals, children and all unauthorized peoples from the area of turbojet running (minimum 15 meters).

11 - Exhaust: Do not ever get behind the exhaust when engine is running. Temperature and speed of outflow are very high and therefore dangerous

12 - ECU: parameters on ECU must not be changed, except parameters related to learning RC, kerosene start and min-max RPM. For each variation of other parameters, please contact the manufacturer.

13 - Electrical: All wiring should be of right section (1.5 mm² silicone covered). The welds must be well done and connectors fixed between of them.

14 – ECU battery : recharge the battery every 3 flights from about 9 minutes each. These data are valid for LiPo 2200 mAh 7.2V(with propane start-up).

15 - Fuel: use kerosene, Jet A1, Diesel or JP4 carefully filtered. Filter type auto-moto plastic can be used (2 or 3 in series) only in the supply system. On fuel line of model, use appropriate filters (see Fuel connections diagram).

16 -Lubrication oil: Use only turbines oils such as: Aeroshell 500, Aeroshell 560, Aeroshell 750, 2380 Exxon, Mobil Jet Oil II. This type of oils prove to be harmful to health if they are in contact with the skin, accidentally ingested or long inhaled vapors. Use of adequate protections are required for the handling of these products.

17 – Model tanks: always use rigid tanks, not flexible tanks such as bags etc. In the main tank of model always use a pendulum without filter.

18 - Fuels: fuels such as kerosene, gasoline, Jet A1, etc. appear to be harmful to health if they come into contact with the skin, accidentally ingested or inhaled vapors. Use of protective gloves is mandatory for safe handling of these substances.

19 - Medical prothesis: The user, if provided with medical devices for various diseases and / or hearing aids, must consider the fact of high engine noise may cause damage to these devices and the consequent breaking of these. The user must keep away (15 m minimum), people unrelated to the operations with the turbojet

20 - Exhaust: Do not inhale exhaust gases produced by the turbojet. As combustion products contain substances harmful to health



Overview ECU

The ECU is an independent control unit manages the turbojet in all of its parameters. It provides security functions if an abnormal situation happens, locking fuel flow to the turbojet.

Connecting the external terminal (GSU), the ECU can be programmed for various functions.

For all other features of the ECU see "Projet ECU user manual" attached.



Basically, the ECU controls:

- Consumption
- Minimum and maximum RPM
- Minimum and maximum temperature
- Radio signal
- Battery voltage
- Acceleration and deceleration
- Start-up, shutdown and cooling sequences
- Other functions such as GPS, speed model, informations, test devices



The ECU has been programmed by the manufacturer with the exception of radio system learning. It must be done by the user.

You must not modify other data set (except Rpm, RC learning and kerosene start), **just to avoid bad running of turbojet.**



Main operational sequences

The following description give you basic sequences for start-up, running and shutdown of turbojet.

If first time you start-up the turbojet, see chapter "First start-up."

- **Engine Start-up:** Turn on the transmitter, then the reciver. If you want, connect the GSU at I/O LED board to follow all sequences.

- Put Throttle Trim on transmitter in max position.

- Put Throttle stick first in maximum then minimum and maximum position again and wait.

- After an audible signal given by the ECU, the engine will start-up.

- When engine is stabilized, the GSU, show the message "AUTO" and the LED on the I/O board is orange, lower the throttle stick to the minimum. Now the engine is under your control.

- Increase and decrease power: It is done simply by up and down the throttle stick (trim must be always in Max position).

- **Engine Shut-down:** Put both trim and throttle stick in minimum position.

- Engine will shut-down starting the cooling process till the set temperature.

- If you want start-up again, when engine is mounted on the model, please turn off your radio system for a few secods then turn it on.

- **NOTE: AT ANY TIME, THE ENGINE CAN BE SHUT-DOWN BY LOWERING TRIM AND THROTTLE STICK ON YOUR TRASMITTER.**

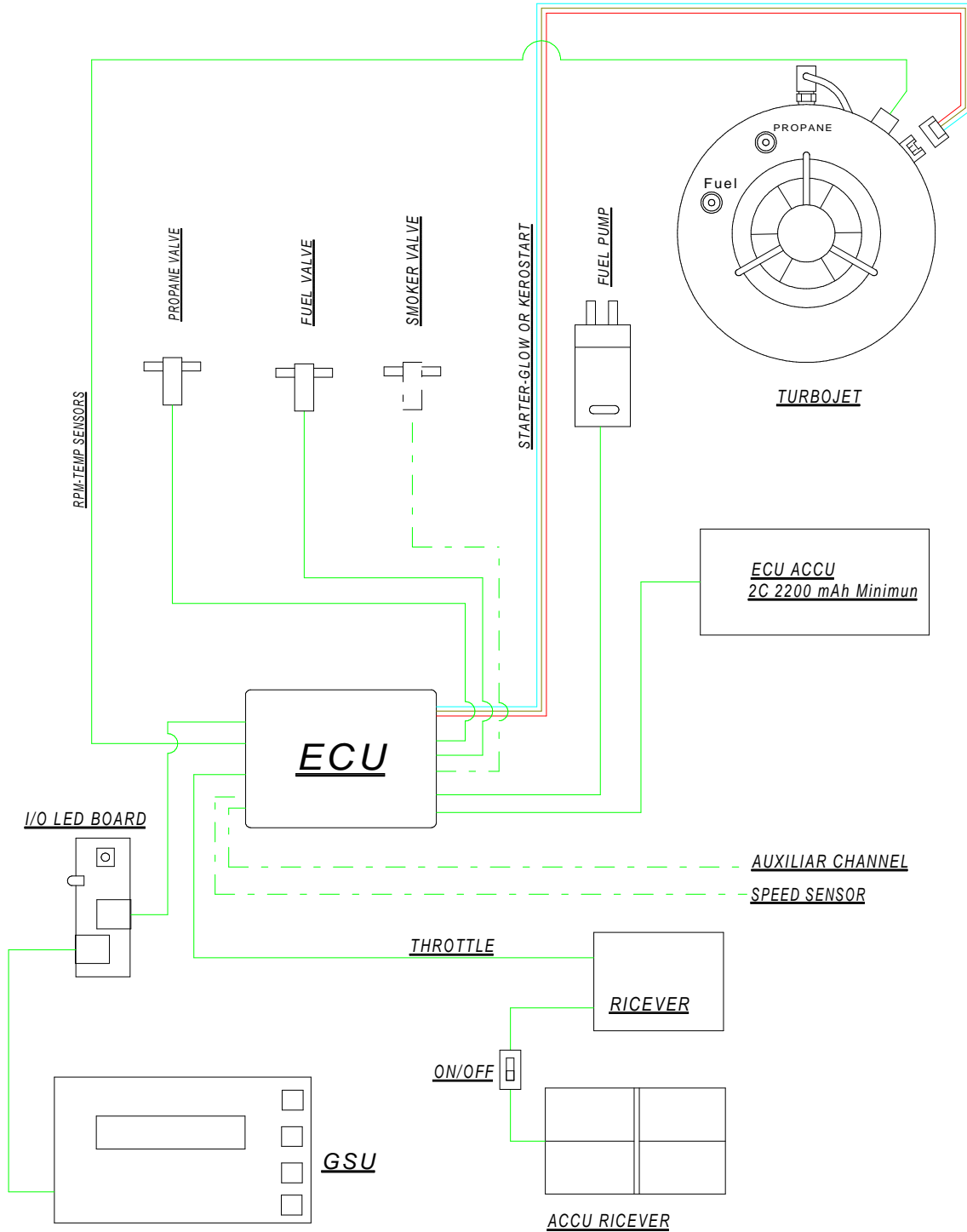


Electrical connections

For a proper connection of turbojet to the ECU, follow the diagram below.

Please note that **ECU IS NOT PROTECTED AGAINST THE REVERSAL OF POLARITY AND SHORTS CIRCUITS.**

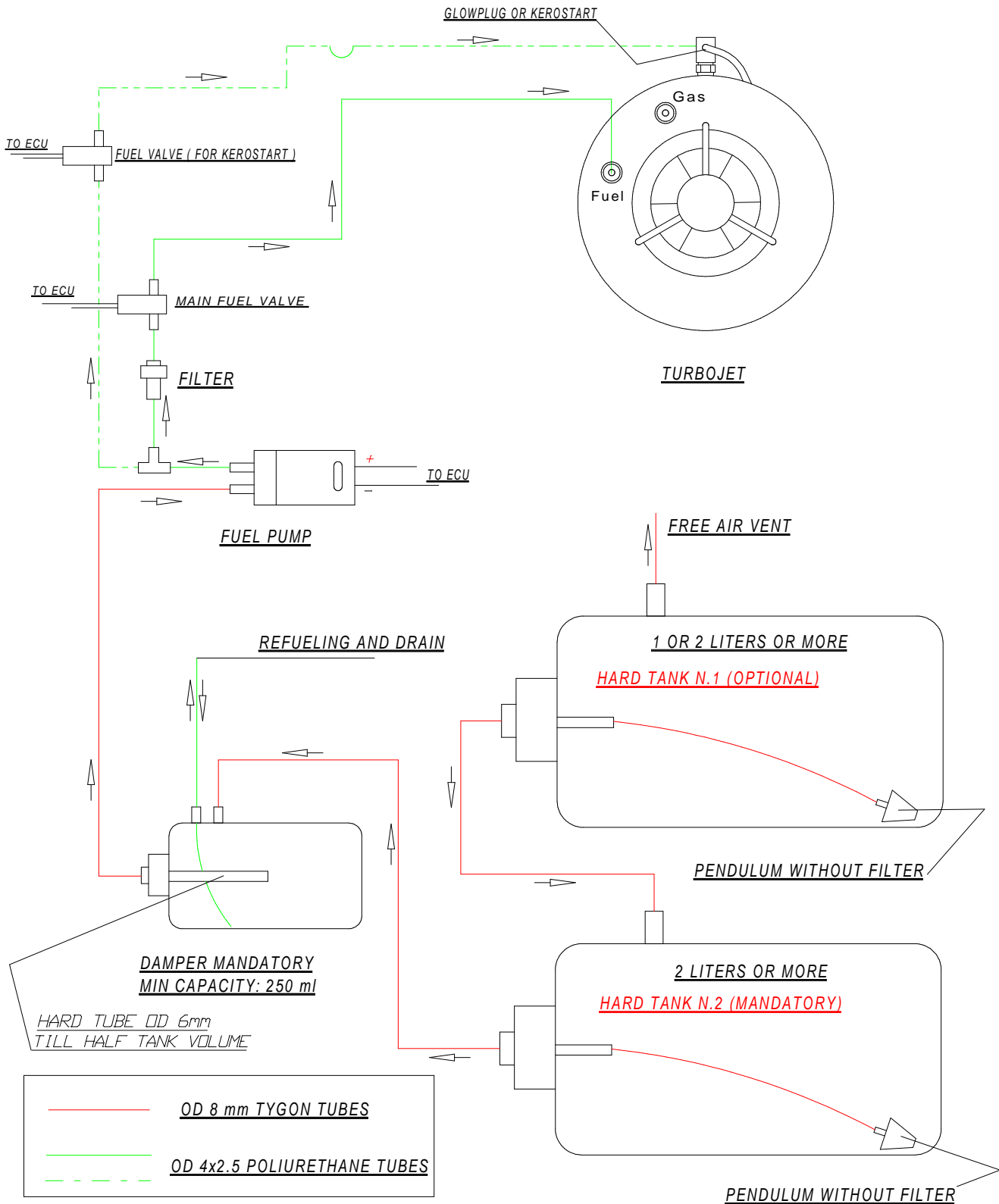
ELECTRICAL CONNECTIONS



Fuel connections

For a proper connection of turbojet to the fuel system, follow the diagram below

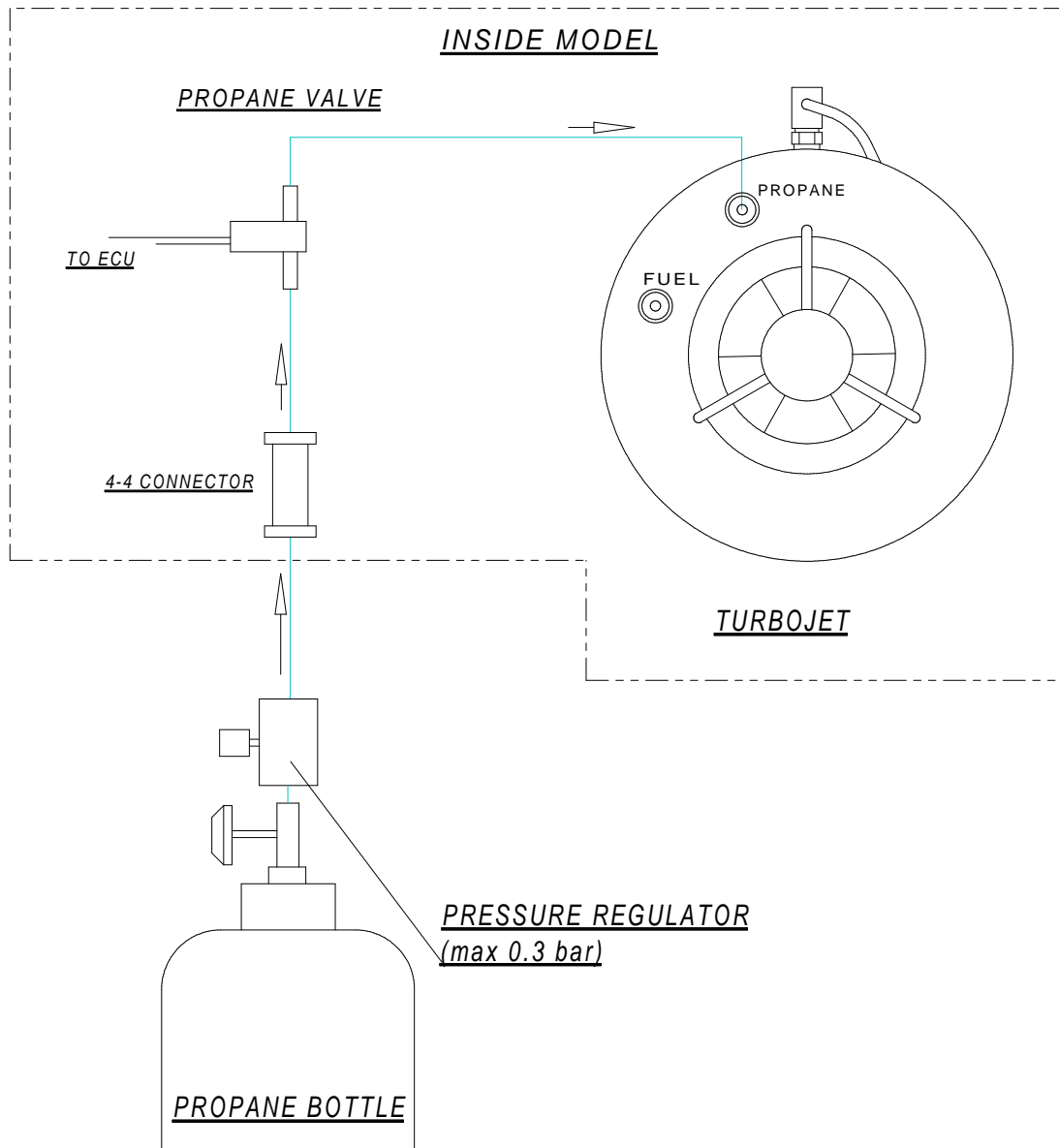
FUEL CONNECTIONS



Propane connections

For a proper connection of turbojet to the propane line, follow the diagram below. For kerosene start see diagram "Fuel connections".

PROPANE CONNECTIONS



Other equipment

Following devices are needed for normal and safe operating sequences with JMB T120-T150-T200 turbojet engine.

Is therefore necessary get the following:

Tanks refueling system: refueling system must have an external tank (according to the laws for flammable liquids), 10 or 20 liters to contain kerosene which will be transferred to the tanks of the model by a suitable electric pump fuel resistant. The pump must be driven by a 3-position switch for filling, emptying and stop. All manual fillings of fuel can be a fire hazard may happens.

It's very important and essential a good fuel filter before filling model's tanks. It will be a good thing put one or more filters in series in the dip tube located inside main external fuel tank.

Start up propane bottle: to preheat the turbojet during start-up sequence, you need a propane bottle easily available, with mounted a pressure regulator will be regulated at a pressure of 0.3 bar. Given the flammability of propane, every start-up should be always done outdoor and away from flammable materials.

During Summer this pressure value can take small reductions, while during Winter, you will increase slightly to compensate low outdoor temperatures.

IMPORTANT: DURING START-UP SEQUENCE, THE PROPANE BOTTLE MUST BE ALWAYS WITH HIS COCK UP. NEVER FLIP THE BOTTLE. THIS SERIOUSLY DAMAGE THE TURBOJET ENGINE AND MODEL.

Co2 fire extinguisher: for all refueling and emptying operations, start-up and shutdown, it is very important have always with you a CO2 fire extinguisher in case of fire. Before beginning all operations with the turbojet engine, be sure to be able properly to use the fire extinguisher in case you need it.

We strongly discourage powder fire extinguishers as they cause permanent damage to the model and turbojet also in case of small fire.



First propane start-up

Before start-up of turbojet inside model, check all phases and sequences below:

1 - Complete all the steps outdoor. Never in a garage or other enclosed places or dangerous.

2 - Prepare the mixture kerosene-oil 4%. This means put 40 cc of suggested turbine oil per liter of kerosene, ie 800 cc of oil every 20 liters of kerosene. The mixture will be well shaken and well filtered before filling model' s tanks.

3 - Before filling model' s tanks, be sure that all air vents are open.

4 - If you don't use kerosene valve, put a manual valve between fuel pump and turbojet to prevent kerosene entering into the engine during refueling. Before refueling make sure the manual valve is closed.

5 - Refuel model' s tanks making sure to empty air bubbles(if happens). When tanks are full, disconnect refueling pump and disconnect refueling system from model and close the connector on the model. Get a well-control during refueling there are no leaks from the tanks or from others points of fuel line.

6 – Propane Start-up: Connect the hose of the propane bottle (make sure it is always charged and adjusted in pressure as indicated above) to the connector inside the model.

7 - Before turning on the radio, make sure the batteries are charged and connected. NOTE: DO NOT USE ANY SWITCH BETWEEN BATTERY AND ECU. When receiver is turned on, ECU will automatically turn on.

8 - Connect, if you want, the GSU to I / O LED board to follow all sequences.

9 - On the transmitter, put trim and throttle stick at minimum. Then turn on transmitter and receiver.

10 - As first Start-up on the model, you have to discharge from air, the whole fuel line. To do it, unplug the kerosene hose arrives till the turbojet and connect the hose, to an external drain bottle.

11 – If you have manual valves inside model, open all these on fuel line and repeatedly press the small button on I / O LED board. This will activate the fuel pump for few seconds allowing the circuit to drain all fuel from the air. Do this until you all air into fuel line is drained. Then reconnect the fuel hose to the turbojet.

12 - This sequence should be done only in case of a new installation of the engine on the model or when the model does not fly for a long time.

13 - Put the bow of the model against the wind, this will facilitate good ventilation inside model.

14 - Ready for the ignition (Start-up). Raise the max with throttle trim on transmitter.

15 - Put Throttle stick first in maximum then minimum and maximum position again and wait

16 - After an audible signal given by the ECU, the turbojet will start up. When you hear the propane valve begins to pulsate gently open the tap of the propane bottle.

17 - If you don't hear any propane ignition, close tap on propane bottle than lower trim and stick on transmitter. The starter will spin-up of turbojet to eject the propane stagnation. Repeat the ignition sequence according point 15.

18 - When you hear the classic "POF" , it means propane ignition, the engine will continues automatically start-up sequence accelerating till his calibration RPM. Open even more propane.

19 - The whole sequence is automatic, and when the message "AUTO" is shown on GSU and the LED on the I / O board is orange, lower the throttle stick to the minimum. Close and disconnect the propane bottle from the model. **Now the engine is under your control.**

20 - Take a test engine at full power for a few seconds, then back to idle. Disconnect the GSU from model. Now you are ready to fly.

21 - We remember you don't hold turbojet at full throttle for more than 2 consecutive minutes (engine less stressed and model speed more safely).

22 - The whole start-up sequence must be done with a CO2 fire extinguisher always ready in case of fire.

NOTE: AT ANY TIME, THE ENGINE CAN BE SHUT-DOWN BY LOWERING TRIM AND THROTTLE STICK ON YOUR TRASMITTER.

First kerosene start-up

The kerosene start-up of turbojet requires some care to avoid stagnation of fuel that could lead to fires. Replace the glowplug with the kerostart chosen.

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1 - Make fuel connections as shown on page.....

2 - For ECU, use a 3300 mAh or more LiPo 2c minimum and be sure that's charged.

3 - Before turning on the radio system, make sure all batteries are charged and well connected. **DO NOT USE ANY SWITCH BETWEEN BATTERY AND ECU.**
When receiver is turned on, ECU will automatically turn on.

5 - Connect, if you want, the GSU to I / O LED board to follow all sequences.

4 - On the ECU, set ignition type: Kerosene seq2 (parameter 9.14).

5 - On ECU, modify parameters involved in the second list attached according Kerostart.

6 - On transmitter, put trim and throttle stick at minimum. Then turn on your transmitter then the receiver.

7 - As first start-up into the model or bench, you have to fill the whole fuel line till the turbojet and kerostart. To do it, disconnect the hose from fuel connector on turbojet, and connect the hose to a little drain bottle.

8 - Press the small button on I / O LED board. This will activate the fuel pump allowing the circuit to drain all fuel from the air. Do this until you all air into fuel line is drained. Then reconnect the fuel hose to the turbojet and kerostat

10 - This sequence should be done only in case of a new installation of the engine on the model or when the model does not fly for a long time.

11 - Put the bow of the model against the wind, this will facilitate good ventilation inside model.

12 - Ready for the ignition (Start-up). Raise the max with throttle trim on transmitter.

12 - Put Throttle stick first in maximum then minimum and maximum position again and wait.

13 - After an audible signal given by the ECU, the turbojet will start-up.

14 - After 7 seconds of kerostart preheating, starter will spin-up the turbojet. After 2-3 seconds should clearly hear the ignition of the flame. After that, the starter will start-up in a short time. If does not happens and you see white smoke get out from exhaust nozzle, stop the procedure, wait ventilation and repeat the sequence

.

15 - If the second attempt fails, put low trim and throttle stick. Wait ventilation.

16 - At this point, inside the turbojet, may be a stagnation of fuel has been achieved and must be extracted. To do this, put a cloth on the air intake of (raising the filter anti-FOD if any), and put the model in vertical position with the bow on the ground, to ensure fuel get out and be absorbed by the cloth .

17 - This problem happens when batteries are low, the data set on the ECU (eg kerostart voltage too low) are incorrect or kerostart is damaged or too worn. Run a check of these points and repeat the start-up, remembering to empty the stagnation that will be formed in case of two or more failed start-up.



Kerostart mounted

Shut-down after flight

At the end of the flight or test bench, follow as written below.

1 - If the landing was smooth, bring the model in parking area and pay attention to the hot jet engine. It must not cause damage to people, things or animals.

2 - Let the turbojet to idle for 5 about seconds to normalize temperature inside the engine.

3 - Put trim and throttle on idle. Engine will shut-down starting the cooling sequence till the set temperature.

4 - If you want, connect the GSU to the I / O board LED to control consumption, temperature, RPM and other flight data that you may have set. It 's an good idea check parameters of temperature and RPM every 3-4 flights.

5 - Close any taps (if you have them) on the fuel line.

6 - If you want fly again, you must turn off for a few second your radio system, than turn on.

7 - At the end of each flight, always make a visual inspection to the engine and model to discover any defects.

8- Remember of disconnect battery from ECU.

Pre-flight check-list (only for turbojet)

Before each flight check the following. If you are unsure, do not hesitate to cancel the flight. When everything is ok, the flight is safer and more fun.

1 – Be sure that model and the turbojet are in perfect condition.

2 - All batteries must be charged, connected and efficient. Even the electrical wiring and connections must appear in excellent condition (cables right section, plugs well connected, etc.).

3 – Be sure that turbojet is securely attached to the model with the appropriate supports and can not in any way move from its location.

4 - Be sure into the model there is no debris or other free materials that can be ingested from the turbojet running. Everything must be fixed securely. To protect the engine from ingestion of foreign bodies (FOD), you can mount the appropriate filter on air intake of engine

5 - After refueling be sure always there are no fuel leaks.

6 - Do not use silicone tubing. The kerosene irreparably destroy this material.

7 - Before refueling be sure all vents are open.

8 - Before start-up, be sure the refueling connectors inside model has been closed.

9 - Check the propane bottle should well connected and efficient.

10 – Turn-on the radio system. Ceck engine data on GSU. They must be correct.

11 - Before start-up, be sure, nobody is within 12 meters behind the engine exhaust

12 - During start-up, the bow of model must be positioned against the wind.

13 - When all of these points are OK, you can fly safely and enjoy yourself.

What do's and don'ts

Following guidelines are to be applied when you have described situations and to use turbojet correctly (not of the aircraft).

1 - **Hard Landing:** If possible, shut-down the engine before model touches the ground to prevent ingestion of foreign bodies due to impact with the ground. Before fly again, clean very carefully the entire model and turbojet.

2 – **Start-up:** in case fuel entering into the turbojet when it is turned off, do not start for any reason, but put the model with the bow down to release fuel from the air intake of turbojet and put a cloath or paper to absorb fuel getting out.

3 – **Start-up:** During start-up sequence, put always the model with the bow against wind.

4 - **Start-up:** If during the start-up sequence, propane valve does not activate, press a few times the green botton for manual operation on the valve. This could occur when the engine has been non-active for long periods.

5 - **Start-up :** If during start-up sequence the starter slide from compressor spinner, stop the sequence. This means that you should replace the o-ring on starter. Please contact the manufacturer.

6 - **Fuel line:** Use only tubes and connectors compatible with kerosene. The Tygon and polyurethane tubes are suitable for all use.

7 - **Fuel line:** all tubes located between tanks and extending till fuel pump, must be of large section (Tygon Ø 8 mm OD). All tubes run from fuel pump till turbojet must be of Ø4x2.5 mm diameter polyurethane. Do not use tubes type Elastolan, Rislán which are too rigid.

8 - **Fuel line:** every 5-7 flights clean fuel filters.

9 - **Fuel pump:** place fuel pump as close as possible the dumper tank. If distance is too high, you should have problems of cavitation of the pump.

10 - **Fuel pump:** Never run dry fuel pump.

11 - **Turbojet running:** if sound of turbojet running is changed producing whistles or other unusual noise, stop the engine immediately and contact the manufacturer.

12 - **Flames from exhaust nozzle:** if you see flames get out from exhaust nozzle during normal running (except start-up), stop the engine immediately and contact the manufacturer.

13 - **Flight:** never take-off from runways are dirt, full of dust and debris, danger of FOD

14 - **Outdoor temperature:** if temperature exceeds the prescribed limits, avoid flying for possible freezing of condensations or significant loss of thrust in case of excessive too hot.

15 - **Defects of model and turbojet:** If you notice any defects on the model and / or turbojet, cancel the flight.

16 - **Turbojet running:** you should not feel any vibration from the turbojet. Otherwise contact the manufacturer.

17 – **Turbojet repairing:** absolutely do not try to repair yourself the engine or ECU. In case you need assistance please contact the manufacturer.

18 - **Fuel:** the kerosene-oil mixture must be always well filtered before filling model' s tanks

19 - **Fuel:** always empty fuel tanks of model at the end of each session of flights.

20 - **Fuel:** do not put together mixtures of fuel / oil containing different types of oil.

21 - **Flight:** during the flight you should not hold the throttle at max speed for more than 2 consecutive minutes.

22 - **Flight:** always remember to set the FAIL-SAFE on your radio system in such a way as to bring the turbojet to a minimum security RPM in case of radio fail.

23 - **Flight:** if you have had a shutdowns during the flight, check the entire fuel line, filters, fittings etc.. The ECU still provides the error message cause of shutdown.

24 - **Flight:** never fly while raining, the water ingested may damage the turbojet compressor wheel.

25 - **Maintenance:** see chapter "Maintenance".

26 - **Tanks:** Always use rigid tanks. Never use plasma bags wich are too weak in case of impact

27 - **Turbojet on test bench:** Always be sure that all of test bench system is fully safe, otherwise it will be dangerous for your safety. When you give full throttle, stay only 3-4 sec to avoid too stress at the turbojet. Keep attention at the rapid increase of thrust in the event of a "slam" of throttle.

28 – **Turbojet mounting:** Remember to insulate all model components (cables, servos, etc..) mounted behind the exhaust of turbojet.

29 - **Glow plug:** you should change the glow plug (Rossi R4) after 25 flights. When installing the new one, be sure to put out the wire at least 3 mm as shown on picture in "Overview ECU" chapter.

30 – **LiPo Accu:** For proper operation with the turbojet, it is a good idea well charge the ECU LiPo accu with chargers are able check accu conditions. If you are unsure, do not hesitate to replacement.

31 -**Kerostart:** use at least a 3300 mAh (or more) LiPo 2c.

Maintenance

To have always best results from turbojets JMB, please apply these basic rules.

1 - 2-3-4-5 check points, should be performed after each flight.

2 - Check the external casing of turbojet to verify its integrity.

3 - Check if compressor has been damaged by ingestion of foreign bodies.

4 – Check free rotation of compressor. It must be free and without abnormal noises.

5 - Pay attention to the sound of the bearings must be smooth and without abnormal beats.

6 - Check filter of fuel line. It should be cleaned after 5 flights about.

7 - If turbojet will not be used for more than 3 weeks is recommended to cap the intake and exhaust of engine with absorbent paper.

8 - If turbojet will not be used for a period of 1-12 months, it is recommended to remove it from the model, clean it, plug the intake and exhaust with a absorbent paper. With compressed air, blow into the fuel connection to remove any residual fuel which may lead to obstruction of injectors.

9 - Protect, fuel and gas connectors, put the turbojet in a plastic bag and store it in a horizontal position.

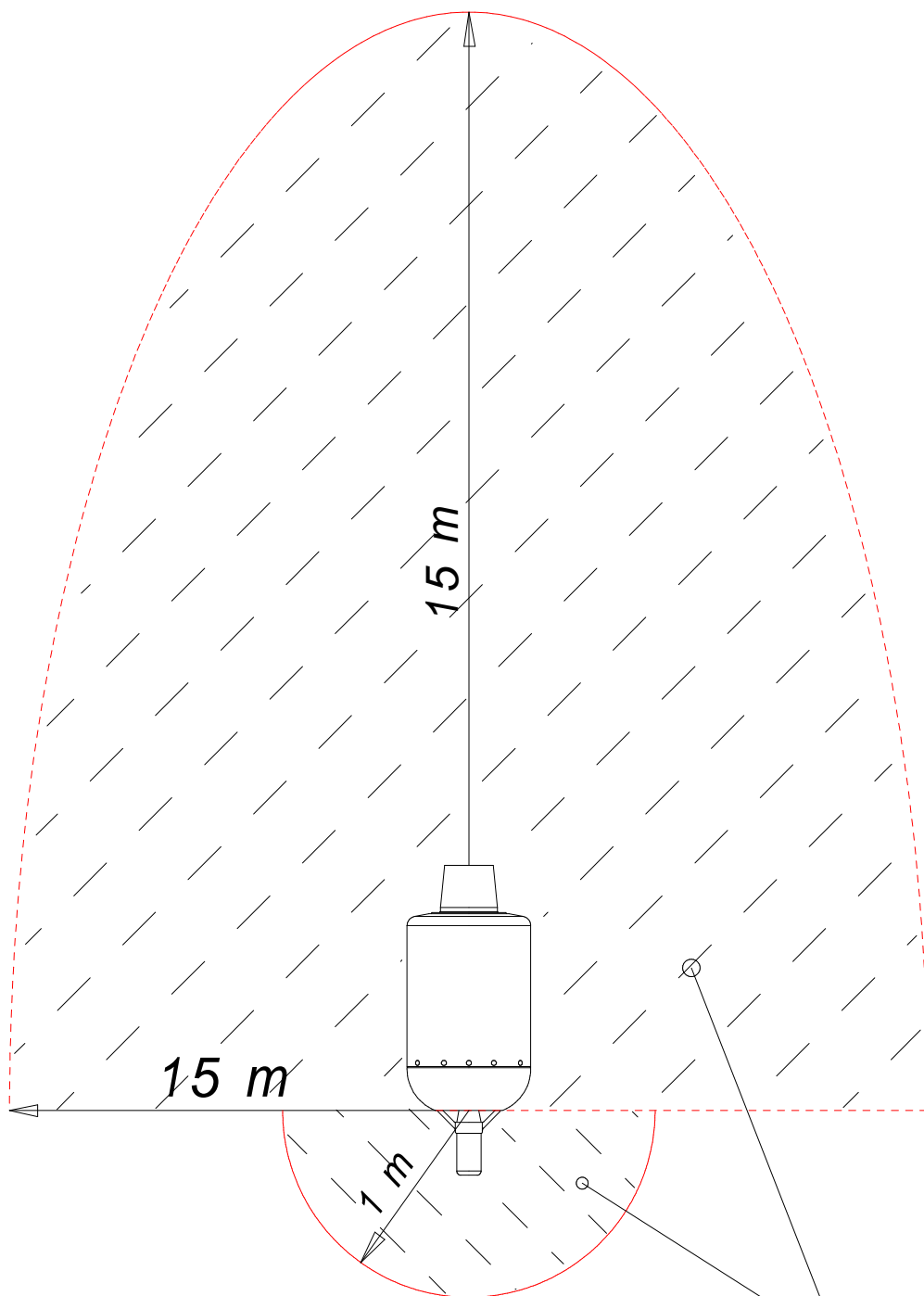
10 - After 25 hours running, it is recommended send the turbojet to the manufacturer for inspection / maintenance.

11 - In case of ingestion of foreign bodies, grass, dirt, sand, etc., send the turbojet to the manufacturer for an inspection.

12 - After 5 hours of flight, replace the glow plug (Rossi R4).

13 - In case of overtemperature shutdown during normal flight, perform a visual inspection of turbine wheel, make a run test on the ground. If the problem persists, please contact manufacturer.

Danger zones



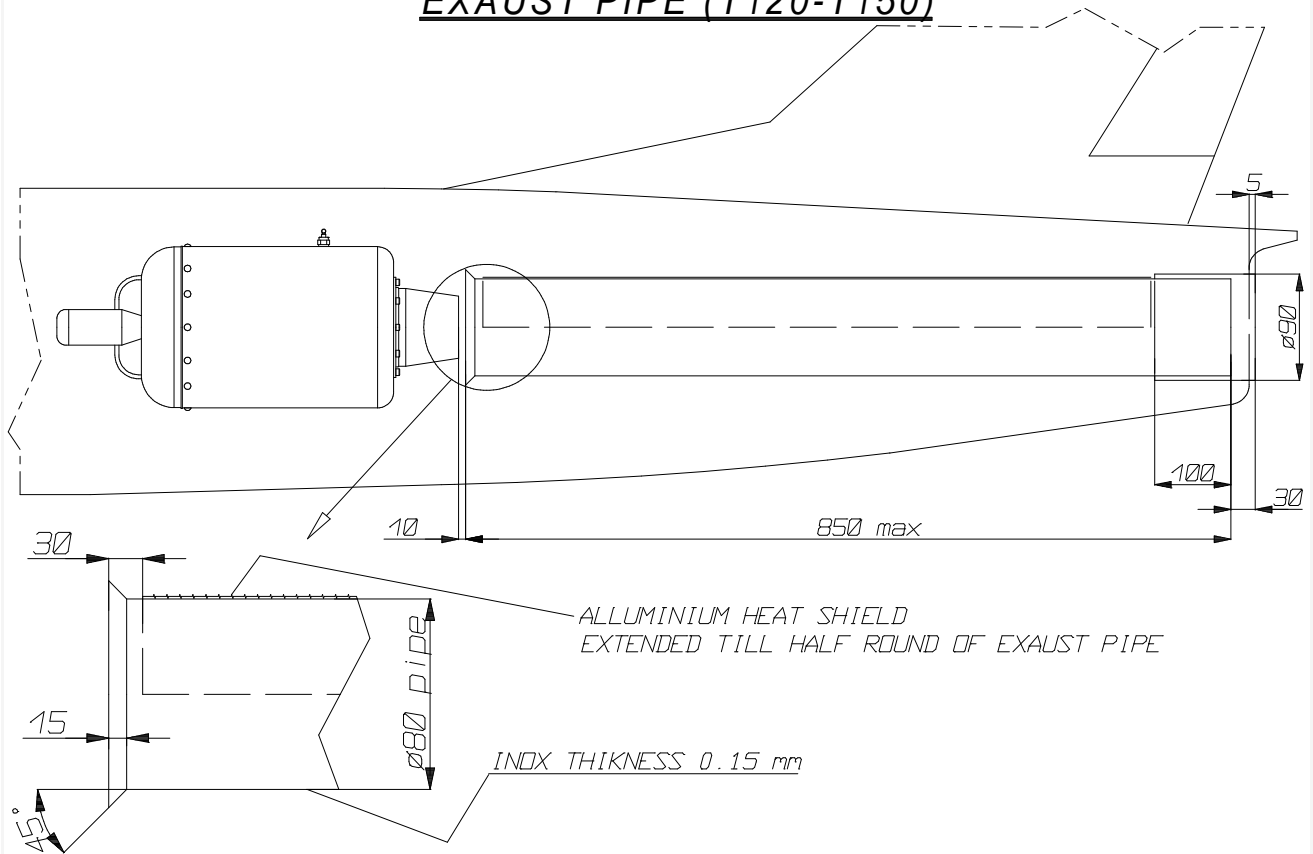
Max danger zone
Keep out from this area
when turbojet is running



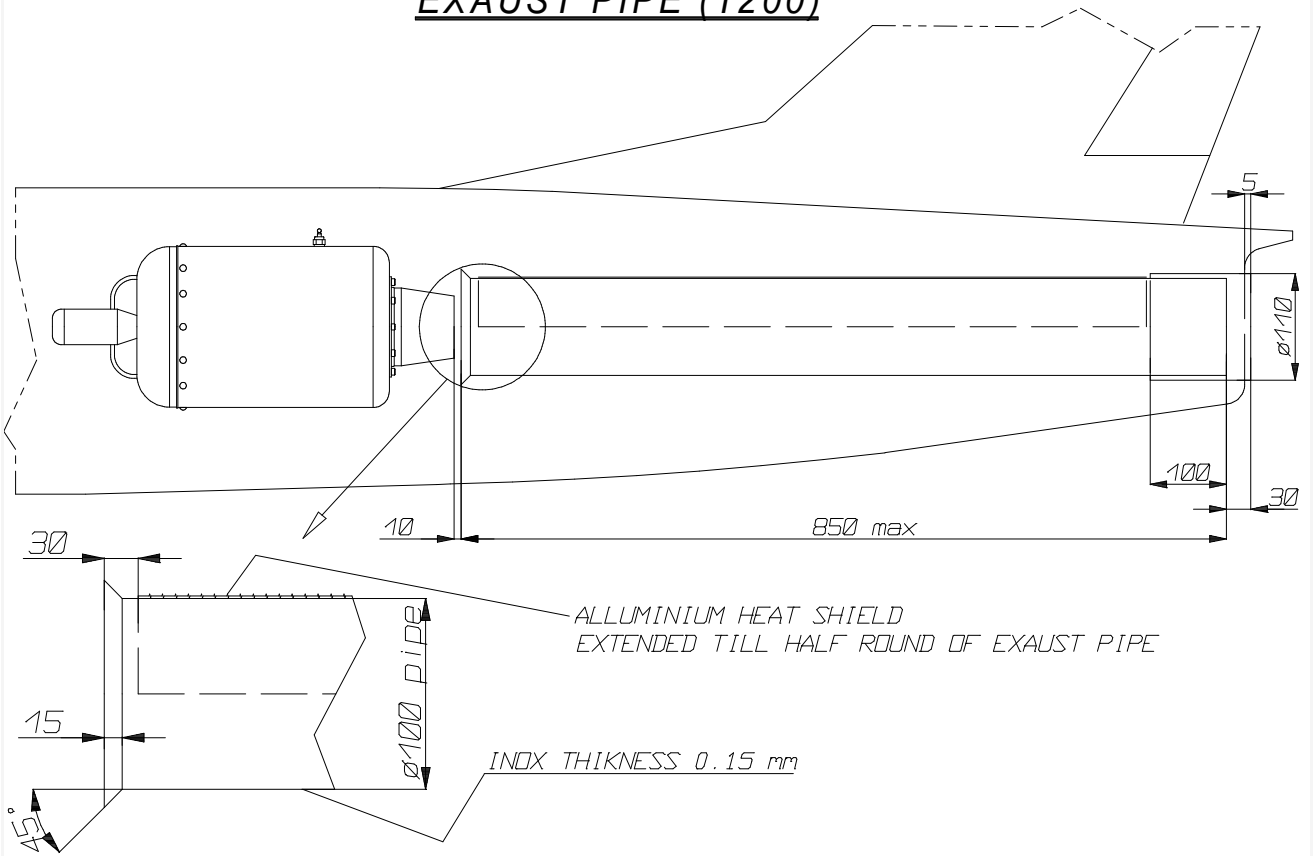
Engine inside aircraft: indicative drawings

(for JMB T120-T150)

EXHAUST PIPE (T120-T150)



EXHAUST PIPE (T200)

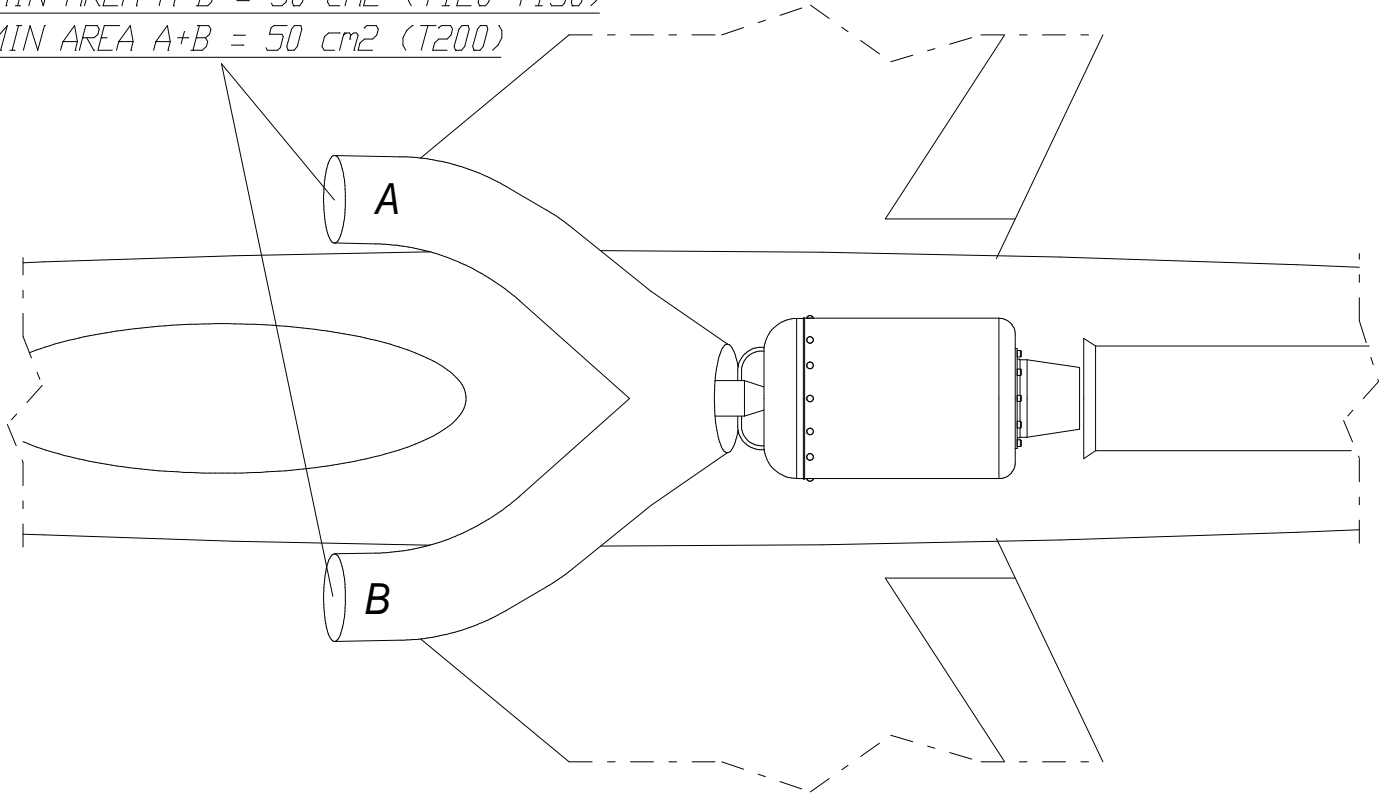


Engine inside aircraft: indicative drawings
(for JMB T200)

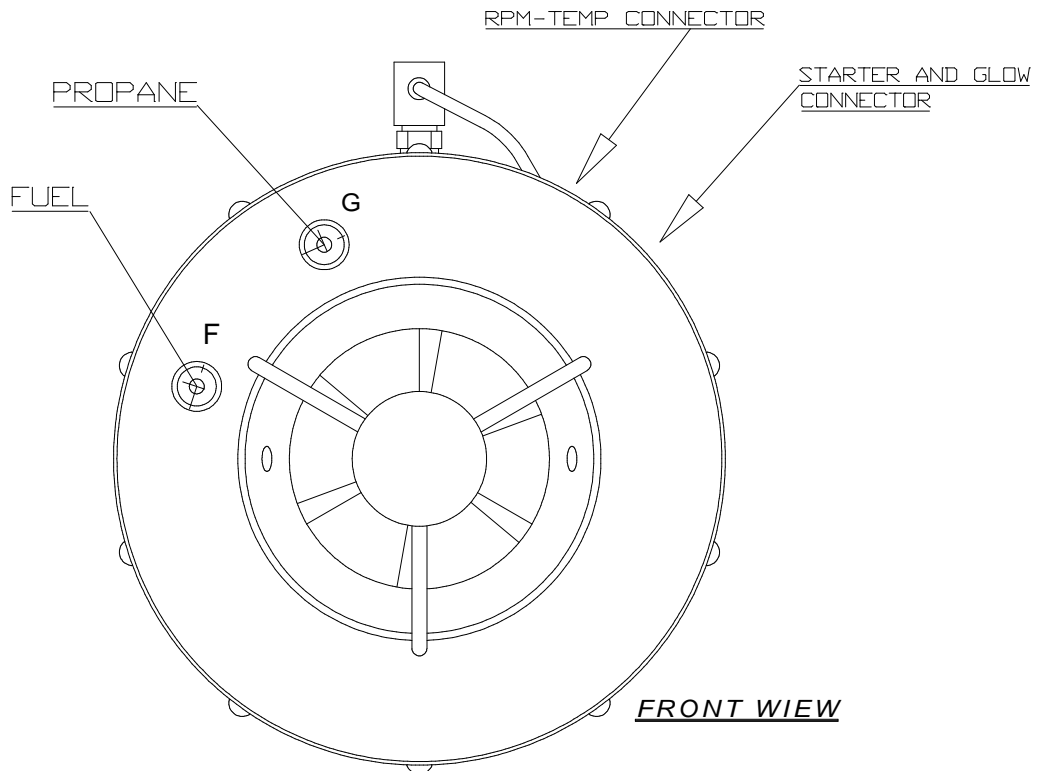
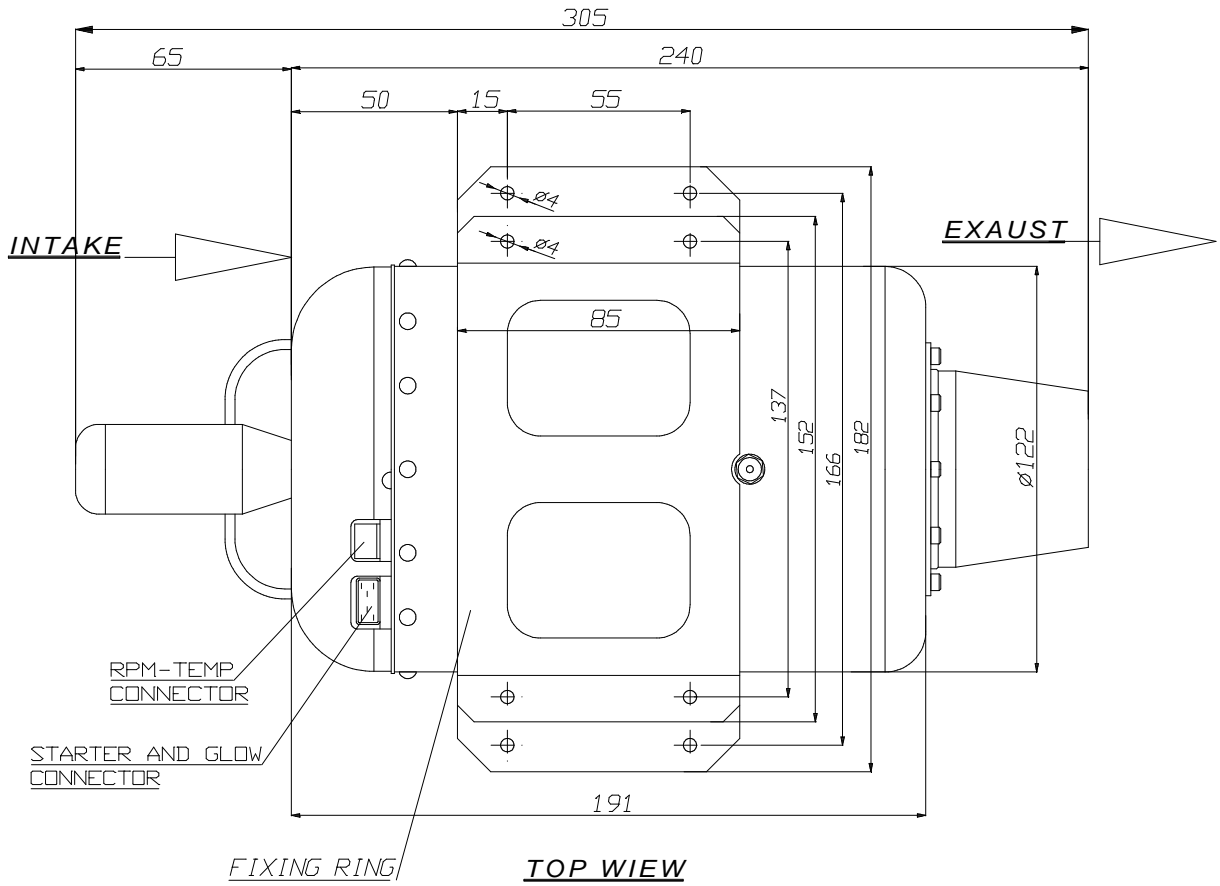
INTAKE LAY-OUT (JMB T120-T150-T200)

MIN AREA A+B = 30 cm² (T120-T150)

MIN AREA A+B = 50 cm² (T200)



Dimensions (JMB T120-T150)



Dimensions (JMB T200)

