



Instruction manual
6V Kerosene Start System V2
(Part Number A1051-2)



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Content

	Page
Package content	3
System requirements	3
Installation	3
Connections.....	3
Kerosene-Igniter installation	4
Connection diagram	5
Setup the start-up mode of the ECU (Propane/Kerosene)	6
Set ECU to 6V Kerosene start mode	6
Set ECU to Propane start mode	6
Before the first start-up.....	7
Purge the air out the kerosene supply line to the engine.....	7
Purge the kerosene supply tubing to the kerosene ignition system.....	7
Start-up the engine.....	8
Troubleshooting.....	8
Technical data.....	10

Package content

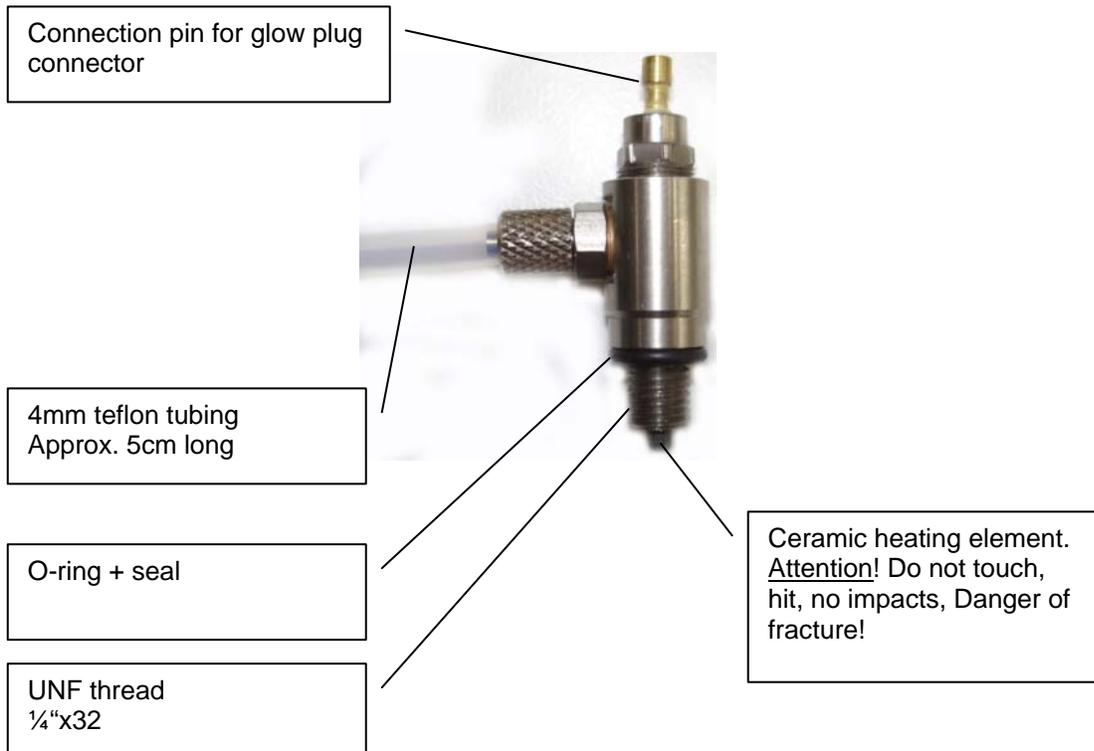
- 1x Kerosene-Igniter incl. seal ring
- 1x Teflon tubing (5 cm)
- 1x Festo 3/4 Adaptor (use 3/4 or 4/4 Adapter)
- 1x Festo 4/4 Adaptor
- 1x T-connector (4 mm)
- 1x Kerosene tubing (2 m)
- 1x Gas plug (3 mm)
- 1x Gas plug (4mm) (for helicopter engine)
- 1x Instruction manual

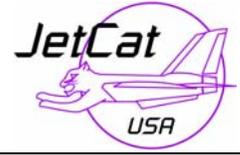
System requirements

For operation of the Kerosene startup system an ECU software version 5.00Q or higher is needed. ECU's from V4.00 or higher can be software updated to operate with the kerosene ignition system. Therefore the ECU needs to be sent in to a JetCat service point.

Installation

Connections





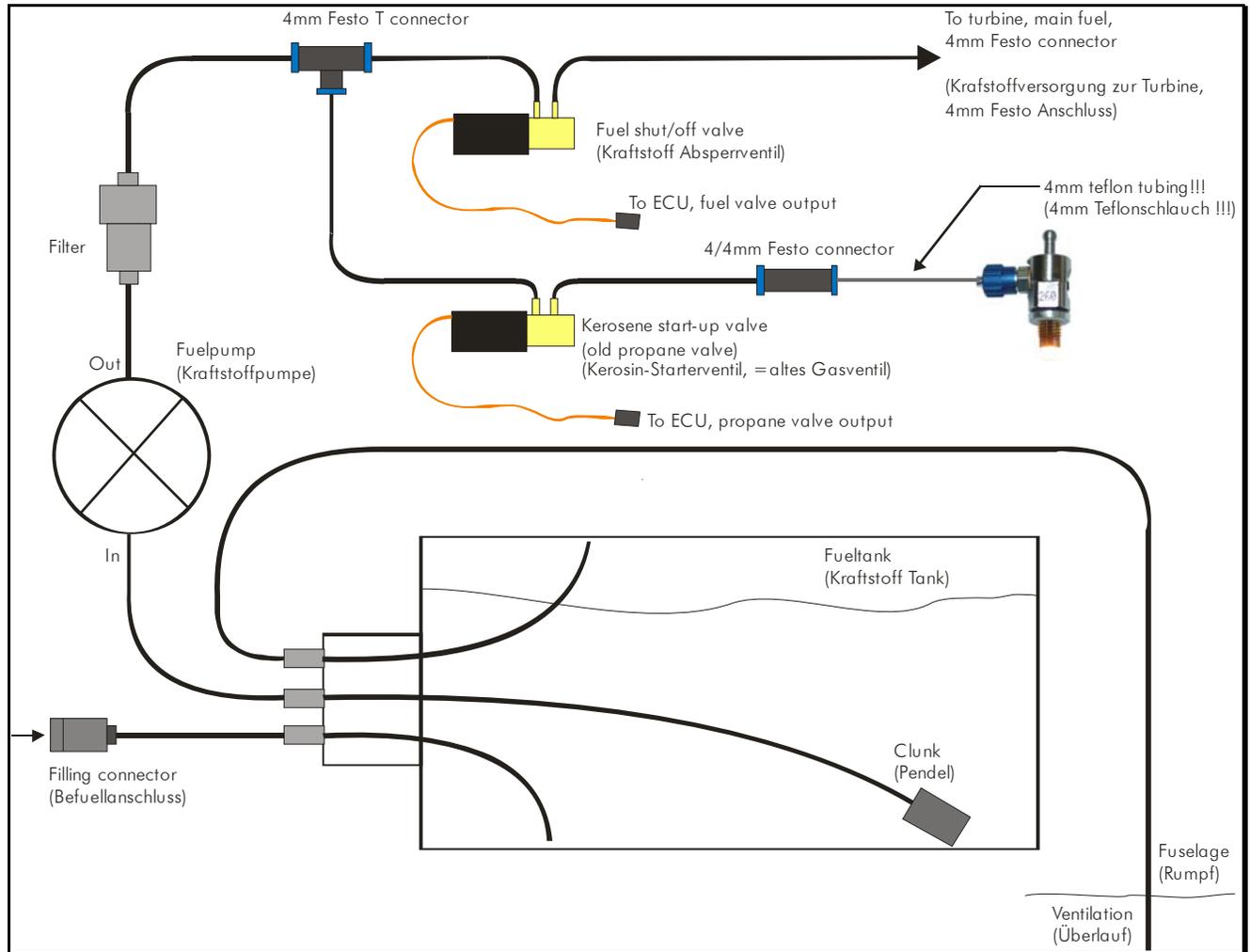
Kerosene-Igniter installation

1. Remove “old” glow plug.
2. Before you screw in the Kerosene-Igniter into the turbine engine, please check with a caliper or similar tool that the glow plug hole has a minimum clear depth of
at least 9.5mm or 3/8”
measured from the turbine housing into the hole. If it is less than this dimension, you may be able to press on the vaporizer stick with a screwdriver or drift and bend it in for the proper clearance. If you are uncomfortable doing this, call JetCat USA for assistance.
3. Is the measured distance large enough? The Kerosene-Igniter can now be screwed in and tightened **by hand!** Do not use any tooling for doing this, otherwise you risk damaging the thin tread of the Kerosene-Igniter due to excessive torque being applied! The threads of the engine may need to be chased with a ¼ x 32 tap if the Kerosene-Igniter doesn’t thread in easily. If this is the case, we recommend sending the engine to us to install the Kerosene-Igniter.
4. The P60 glow plug boss may have damaged threads near the combustion chamber. **DO NOT FORCE THE KEROSENE START UNIT IN AS IT WILL SURELY BE DAMAGED.** This is due to the fact the P60 glow plug boss is tig welded on instead of being brazed. In some cases the weld penetration distorted the threads deeper than what would affect the glow plug but would damage the longer kerosene start unit. We would suggest that you return the engine to JetCat USA if this is the case.
5. Remove the “old” 3mm propane tubing from the engine and then close the propane supply connector on the engine with the supplied 3mm plug.
6. Install the fuel supply connection according to the connection diagram on the next page.
Important: Between the Kerosene-Igniter and the normal fuel tubing is a short piece of Teflon tubing that must be installed (The Kerosene-Igniter gets very hot!)

JetCat 6V Kerosene Start system



Connection diagram





Setup the start-up mode of the ECU (Propane/Kerosene)

Set ECU V6.0F or newer to 6V Kerosene start mode

- Switch off RC-receiver
- Connect the GSU to ECU
- Simultaneously press and hold the buttons “Ignition” and “Min/Max”
- Switch on the RC receiver (keep the buttons pressed)
- After a few seconds the display of the GSU shows:

```
KEROSENE (6V N)  
Start activated!
```

- Release all buttons, the ECU is now configured for Kerosene start-up

Set ECU V6.0E or older to 6V Kerosene start mode

- Switch off RC-receiver
- Connect the GSU to ECU
- Simultaneously press and hold the buttons “Ignition” and “+”
- Switch on the RC receiver (keep the buttons pressed)
- After a few seconds the display of the GSU shows:

```
KEROSENE (6V)  
Start activated!
```

- Release all buttons, the ECU is now configured for Kerosene start-up

Set ECU to Propane start mode

- Switch off RC-receiver
- Connect the GSU to ECU
- Simultaneously press and hold the buttons “Ignition” and “-“
- Switch on the RC receiver (keep the buttons pressed)
- After a few seconds the display of the GSU shows:

```
PROPANE  
Startup activated!
```

- Release all buttons, the ECU is now configured for Propane start-up



Before the first start-up

Prior to the first start-up, or if the fuel lines should be empty or contain air bubbles, the system needs to be primed.

Purge the air out the kerosene supply line to the engine

1. First remove the 4mm kerosene fuel feed line from the engine and put the end of the tube into a small container. This step is required because the turbine would become flooded with kerosene in the following steps!
2. Fill fuel tank.
3. Connect the GSU to the ECU and select the parameter "Pump TestVolt" or "Purge Pump" in the "Test-Functions" menu. (→ press and hold the button "Menu Select" and use the +/- buttons to scroll until "Test-Functions" is displayed, now release the "menu select" button. Thereafter use the +/- buttons to scroll through the Test-Functions menu until "Pump TestVolt" or "Purge Pump" is displayed).
4. Now press the "Change Value" button to start the fuel pump (use the "Change value" button in connection with the +/- buttons to change the pump voltage/power). Continue pumping fuel until all air bubbles are removed.
5. Re-connect the fuel supply tubing to the engine.

Purge the kerosene supply tubing to the kerosene ignition system

1. First purge the kerosene main supply tubing (as described above). Fill the fuel tank.
2. Disconnect the 4mm kerosene fuel feed line to the Kerosene-Igniter (→ transition from fuel tubing to Teflon tubing, 4mm Festo connector) and put the end of the tube into a container. This step is required because the turbine would become flooded with kerosene in the following steps!
3. Connect the GSU to the ECU and select the parameter "BurnerValve Test" in the "Test-Functions" menu. (→ press and hold button "Menu Select" and use the +/- buttons to scroll until "Test-Functions" is displayed, now release the "menu select" button. Thereafter use the +/- buttons to scroll through the Test-Functions menu until "BurnerValve Test" is displayed).
4. Now press the "Change Value" button to start the fuel pump on a low power setting to pump kerosene through the kerosene-Igniter tubing (the pump runs on a low power setting, the valve for the Kerosene-Igniter is pulsed On/Off, the main fuel shut-off valve stays closed). Continue pumping fuel until all air bubbles are removed.
5. Re-connect the fuel supply tubing to the Kerosene-Igniter (4mm Festo connector). Then, once again pump a little bit of fuel until the Teflon tubing attached to the Kerosene-Igniter is filled with kerosene. Stop when it just reaches the Kerosene-Igniter.



Start-up the engine

The triggering of a turbine start is exactly the same as on the propane start-up (please refer to the instruction manual of the engine)

The difference on kerosene start-up is:

- After the start signal has been received, the starter motor is shortly activated to give an “acoustical signal” that the start sequence has been started.
- Now the burner is pre-heated for 5 seconds or less (the starter motor is not running)
- Thereafter the starter motor spools up the engine to its ignition rpm (around 2000-6000 RPM, depending on engine type). After another 5 seconds the ignition of the engine is engaged by injecting kerosene into the Kerosene-Igniter.
- After the engine has ignited, the engine is spooled up to idle rpm as usual.

Troubleshooting

Turbine is not igniting:

The reason for this is normally that no fuel is delivered to the Kerosene-Igniter or the igniter is not glowing.

Possible reasons for this could be:

1. Pump start voltage is too low (adjust pump start voltage → see instruction manual)
2. Fuel supply lines are empty or not purged.
3. The shut-off valve for the Kerosene-Igniter is not opening (the valve cable is plugged in reverse into the ECU, or the valve is defective)
4. ECU battery weak or empty
5. Too long or too light gauge power connection wire from ECU to the engine (3-wire power cable)

For identifying the problem, it is recommended to temporarily disconnect the fuel supply tubing at the 4/4mm Festo connector on the transition from fuel to the Teflon tubing and perform an engine start-up. After the Pre-heat phases (approx. 10 seconds), as soon as the Run menu of the GSU shows “Ignite”, one must see kerosene dripping out in pulses from the disconnected supply tubing.



Bob Wilcox

Attention Kero Start Engines Users:

If the engine fails to start, you can get excess kerosene in the engine. YOU CANNOT REMOVE EXCESS KEROSENE BY TILTING THE PLANE WITH THE NOSE UP IN THE AIR. The kerosene will be captured by the exhaust guide vanes and will not run out of the engine. The nose must be tilted down towards the ground. The excess kerosene will then run out the intake. You may need a towel around the intake to absorb the kerosene. You may also need to clean off the starter o-ring afterwards since it may get kerosene on it.

Now why would the engine not start in the first place -

- The kero start igniter failed. The automatic glow plug test may not detect a failed igniter! If you put your finger on it while the engine is starting and it feels cool, the igniter has failed. If you tried to start the engine with a failed igniter it will get some kerosene inside the engine. **Do not immediately install a new igniter and try again without draining the engine.**
- The kero start feed line has not been primed. Please refer to the kero start instructions on how to prime the feed line. The fuel should be all the way up to the igniter. If you DID prime the feed line and it gets more than 3" of air after a flight, make sure the fitting is tight on the kero start fuel connection and the festo fitting is not leaking. Also make sure the solenoid is fully shutting off. If the fuel does not get to the kero igniter in a few seconds it may not start.
- The fuel system has a high capillary resistance or the pump is a little weak and the kerosene will not get to the igniter. The pump will need to be adjusted to a higher start voltage. This is adjusted by holding down the limits key on the GSU and then press the + key. A three item menu will appear. The first selection is for the number of cells in your battery pack. Use the + key alone to index to the next selection, UACCEL 1. This sets the minimum pump voltage to start moving fuel through your fuel system. To increase the voltage, press and hold the change value key and then each press of the + key will advance the UACCEL1 voltage by 0.025V. Try one or two increases at a time. To test the flow to the kero start igniter go to the test functions menu and select the kero start valve test. Press the change value key to flow fuel to the kero start igniter. **MAKE SURE YOU DISCONNECT THE LINE TO THE KERO START IGNITER SO YOU DON'T GET FUEL IN THE ENGINE.....**

If your igniter fails please call JetCat USA for a replacement. I personally fly with the kerosene start igniter and I am always amazed how smoothly and reliable it starts the JetCat engines. I "grew up" owning mid 90s kero start engines and I know what it is like to have rivers of jet fuel running out the tail pipe 9 out of every 10 start attempts. The JetCat system will not do this if operated correctly!!!!

JetCat 6V Kerosene Start system



Technical data

ECU power supply : 6-8 cells (7,2-9,6V)
Kerosene-Igniter : 5,9V / 37 Watts