Instruction manual
6V Kerosene Startsystem

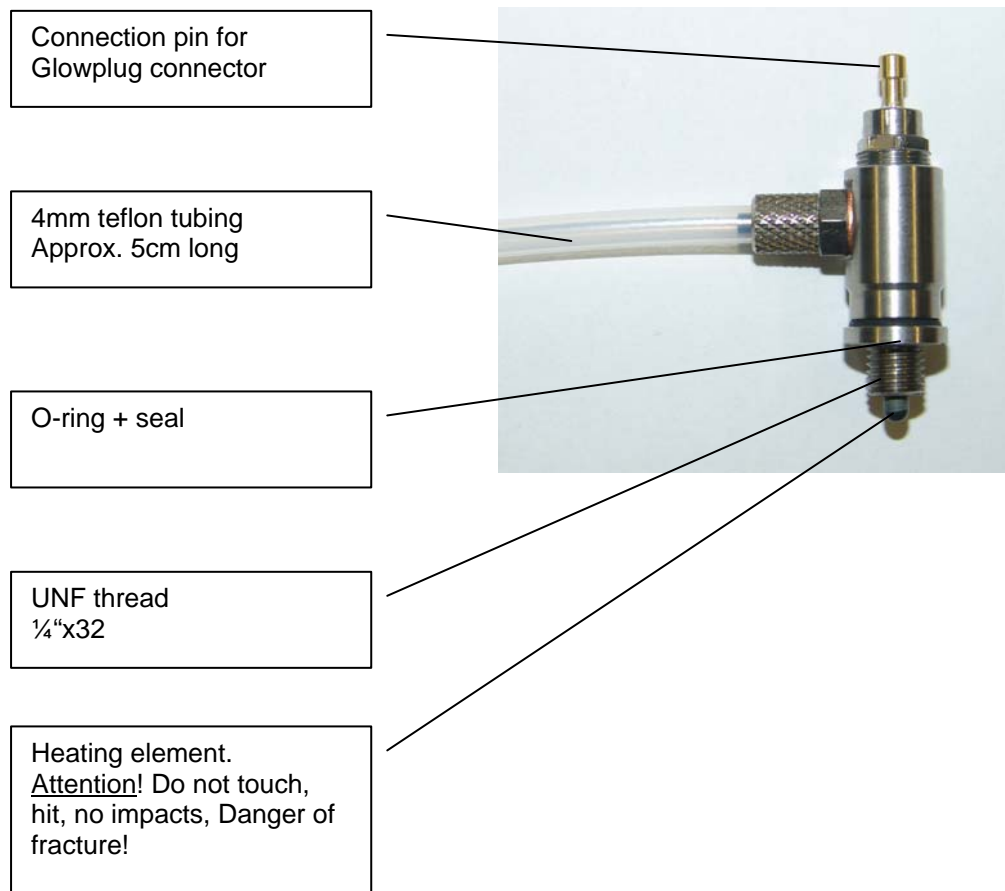(Art.Nr.: 61166-00)

Content

Page

Package content

> 1x Kerosene-Ignitor incl. seal-ring
> 1x Teflon tubing (4mm diam., 5 cm long)
> 1x Festo 4/4 Adaptor
> 1x Fest 3/4 Adaptor
> 1x Festo T-connector (4 mm)
> 1x Kerosene tubing (2 m)
> 2x Gas plug (3 mm, 4mm)
> 1x Instruction manual

System requirements

For operation of the Kerosene startup system an ECU software version 6.00A or higher is needed. ECU´s from V4.90 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

| Connection pin for Glowplug connector |

| 4mm teflon tubing Approx. 5cm long |

| O-ring + seal |

| UNF thread ¼"x32 |

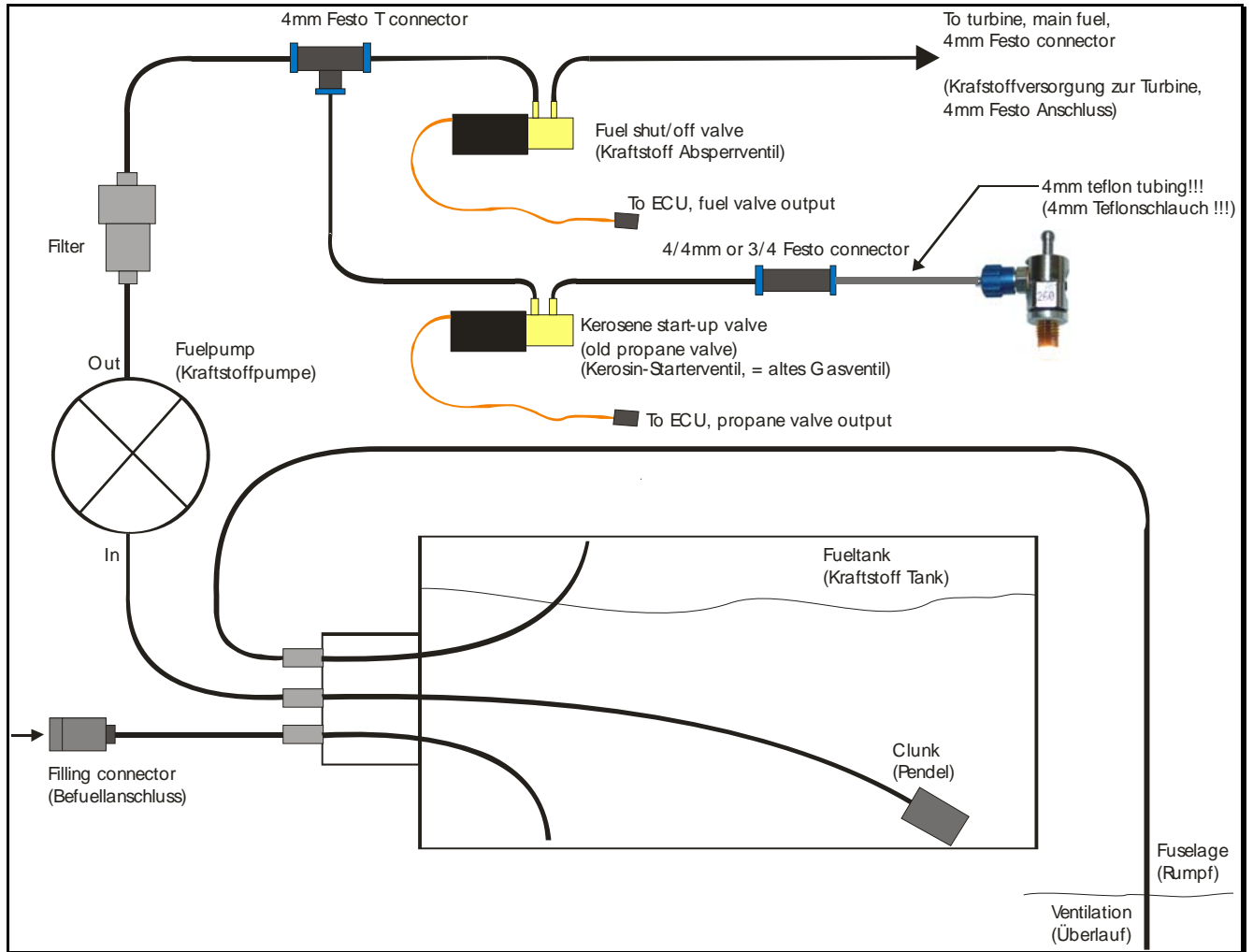| Heating element. <u>Attention</u>! Do not touch, hit, no impacts, Danger of fracture! |

Kerosene-Ignitor installation

1. Remove „old" glow plug.

2. Before you scew in the Kerosene-Ignitor into the turbine engine, please check with a caliper or similar that the free immersion depth from the outside diameter of the turbine housing to the inside (direction of the combustion chamber). The free immersion depth must be a minimum of 9,5mm!
   On older engines, there is a possibility, that in the area of the hole for the glow plug, inside of the engine, there is an evaporisation stick located very close to the outer wall of the combustion chamber. If the measured distance here is too small, the Kerosene-Ignitor would touch this stick once one screws it in. This then could easily destroy the ceramic heating element of the Kerosene-Ignitor!
   If the distance should be too small please contact a JetCat service point.
   On turbine engines of type: P60 / SPT5 / SPT5-H / SPH5 / P180 / P200 / P160 and TITAN this check does not need to be performed.

3. Is the measured distance large enough, the Kerosene-Ignitor can now be screwed in and tightend <u>by hand</u>! Do not use any tooling for this, otherwise you risc to damage the thin tread of the Kerosene-Ignitor due to too high torque applied!

4. Remove the „old" 3mm propane tubing from the engine and thereafter close the propane supply connector on the engine with the supplied 3mm plug.

5. Install the fuel supply connection according to the connection diagram on the next page.
   <u>Important</u>: Between the Kerosene-Ignitor and the normal fuel tubing a short piece of teflon tubing must be installed (Kerosene-Ignitor gets very hot!)

Connection diagram

4mm Festo T connector

To turbine, main fuel,
4mm Festo connector

(Krafstoffversorgung zur Turbine,
4mm Festo Anschluss)

Fuel shut/off valve
(Kraftstoff Absperrventil)

4mm teflon tubing!!!
(4mm Teflonschlauch !!!)

To ECU, fuel valve output

4/4mm or 3/4 Festo connector

Filter

Kerosene start-up valve
(old propane valve)
(Kerosin-Starterventil, = altes Gasventil)

Out

Fuelpump
(Kraftstoffpumpe)

To ECU, propane valve output

In

Fueltank
(Kraftstoff Tank)

Clunk
(Pendel)

Filling connector
(Befuellanschluss)

Fuselage
(Rumpf)

Ventilation
(Überlauf)

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

Set Ecu 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 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)
- 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.

Air out the kersosene supply to the engine

1. First remove the 4mm kerosene fuel feed line from the engine and put he end of the tube into a small container. This step is required because otherwise the turbine would be flooded with kerosene in the following steps!
2. Fill fuel tank.
3. Connect the GSU to the ECU and select the parameter „`Pump TestVolt`" 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 „`Pump TestVolt`" ist displayed).
4. Now press the „Change Value" button to start the fuelpump (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.

Air out the kersosene supply tubing to the kerosene ignition system

1. First air out the kerosene main supply tubing (as described above). Fill the fuel tank.
2. Interrupt the 4mm kerosene fuel feed line to the Kerosene-Ignitor (→ transition from fuel tubing to teflon tubing, 4mm Festo connector) and put he end of the tube into a container. This step is required because otherwise the turbine would be flooded with kersosene 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` " ist displayed).
4. Now press the „Change Value" button to start the fuelpump on a low power setting and to pump kerosene in the tubings to the kerosene-Ignitor (the pump runs on a low power setting, the valve for the Kerosene-Ignitor is On/Off pulsed, 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-Ignitor (4mm Festo connector). Thereafter once again pump a little bit of fuel until the teflon tubing attached to the Kerosene-Ignitor is also filled and the kerosene just reaches the Kerosene-Ignitor.

Start-up the engine

The triggering of a turbine start is exactly the same as on 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 startermotor is shortly coupled in to give an „acoustical feedback" that the start sequence has been initiated.
- Now the burner is pre-heated for 5 seconds (the starter motor is not running during this phase)
- Thereafter the startermotor spools up the engine to it´s ignition rpm (arround 2000-6000 1/min, depending on engine type). After an other 5 seconds the ignition of the engine is engaged by injecting kerosene into the Kerosene-Ignitor.
- After the engine has ignited, the engine is spooled up to idle rpm as usual.

Troubleshooting

Turbine is not igniting:

The reason for this normally is, that no fuel is delivered to the Kerosene-Ignitor or the ignitor is not glowing.

Posible reasons fort his could be:

1. Too low pump start voltage (adjust pump start voltage → see instruction manual)
2. Fuel supply lines empty or not aired out.
3. The shut-off valve of the Kerosene-Ignitor is not opening (cable of the valve plugged in reversed into the ECU, or valve is defective)
4. ECU battery weak or empty
5. Too long or too thin power-connection wires from ECU to the engine (3-wire powercable)

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 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 out of the disconnected supply tubing.

Technical data

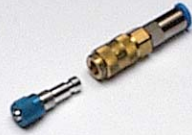ECU power supply : 6-8 cells (7,2-9,6V)
Kerosene-Ignitor : 5,9V / 37 Watts
Do not connect the kerosene-ignitor directly to
a NiCad battery, danger of destruction!

Suitable accessories

Picture	Connections	Description	Order #	Price/€uro incl.16%VAT.
	2x female hose connector for 4mm tubing	Fuel/propane/smokerl Shut-off valve electromagnetic	61106-00	68,21
	Clunk for fueltank	Special clunk for bubble free fuel delivery	21105-09	13,05
	4mm ∅ outside 2.5mm ∅ inside	Fuel tubing 4mm transparent, PVC 2.5mm inner ∅	21100-15	1,97/ Meter
	4mm → 4mm 4mm → 3mm 3mm → 3mm	Festo fast connectors	21105-01 21105-06 21100-30	3,01 3,13 2,67
	M5 (inside)→ 4mm	Quick connector M5	21105-02	2,84
	M5 (outside) → 4mm	Quick connector M5	21100-34	2,84
	3 x 4mm	T- Quick connector	21100-28	6,21

	Quick coupling socket → M5 (außen)	Quick coupling socket self-shutting fits to 21105-04 / 21105-02)	21105-03	10,67
	tubing 4mm → Quick coupling socket	Coupling plug (fits to 21105-03)	21105-04	2,67
	M5 (außen) → female hose connector	female hose connector (e.g. for fuel tank)	21105-05	1,27
	2x tubing 4mm	Quick coupling connector complete	Consists of: 21105-03 21105-04 21105-02	16,37