

# PSR Jet System

PSR T01 KS engine and PSR R01 retraction system

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**PSR Jet System** an auxiliary engine for gliders of the 15 and 18m class

The PSR Jet System consists of

- engine, **PSR T01 KS engine**, Kerosene Start
- engine service data terminal
- engine control unit
- engine fuel board
- retraction system, **PSR R01 retraction system**
- fuel and electrical lines

**engine** figure 1, page 6

The basic data of the engine are

- single spool turbojet engine with radial compressor and axial turbine
- thrust 230N at rotspeed 108500rpm, fuel consumption 640g/min
- thrust 180N at rotspeed 100000rpm, fuel consumption 480g/min
- started and operated using kerosene

**engine service data terminal** figure 2, page 6

The engine service data terminal is used to deploy, start, operate, stop and retract the engine.

The display shows software version, remaining fuel volume and elapsed runtime after connecting the battery. During engine operation the display shows rotspeed **rpm**, exhaust gas temperature **egt**, throttle **thro** and remaining fuel volume **fuel**.

The engine is operated as follows

- **engine deployment**  
press **jet-out**  
deployment of engine and power on of engine control unit
- **engine start**  
switch from **stop** to **run**  
automatic start of engine  
engine is calibrated while green **calib** LED is blinking

- **engine operation**

use throttle-knob to select throttle

rotspeed, redline, 108500rpm, maximum 5min per engine run

rotspeed, maximum continuous, 100000rpm

- **engine stop**

use throttle-knob to select idle

switch from **run** to **a.st**, auto stop

automatic stop of engine

Engine restart is possible in case of exhaust gas temperature below 88°C.

Engine retraction is possible in case of exhaust gas temperature below 50°C.

switch to **stop**

- **engine retraction**

press **jet-in**

retraction of engine and power off of engine control unit

- **engine glow-plug check**

The engine is equipped with an engine glow-plug.

In order to check the engine glow-plug, set throttle-knob to 30 and press **func**.

A lit green **calib** LED indicates that the engine glow-plug is functioning. A lit red **temp** LED indicates an engine glow-plug failure.

- **program fuel volume**

During engine stop press **tank** and program the initial fuel volume by means of throttle-knob.

- **fuel system purge**

To ensure a smooth engine start after fuel system venting the fuel system could be purged.

Disconnect engine fuel line from engine and locate engine fuel line inside of collecting vessel. Set throttle-knob to 50 and press **func** until fuel is emitting from engine fuel line. Connect engine fuel line to engine.

Disconnect engine fuel start line from engine and locate engine fuel line inside of collecting vessel. Set throttle-knob to 60 and press **func** until fuel is emitting from engine fuel line. Connect engine fuel start line to engine.

The fuel system purge function is disabled in flight.

- **other functions**

set throttle-knob to 80, press **func**, run engine starter motor continuously

set throttle-knob to 90, press **func**, run engine starter motor in alternation

set throttle-knob to 100, press **func**, run engine starter motor until exhaust gas temperature below 88°C

## **engine control unit** figure 3, page 7

The engine is controlled by the engine control unit. Control inputs are exhaust gas temperature, engine rotspeed sensor, battery voltage and commands from the engine service data terminal. The output controls engine starter motor, engine fuel pump, valves and engine glow-plug. The engine service data terminal functions are generated by the engine control unit.

The engine control unit includes the following safety mechanisms

- rotspeed higher than 112000rpm, engine stop
- engine rotspeed sensor failure, engine stop
- fuel pump voltage above limit, engine stop
- software problem, engine stop
- engine thermocouple failure, engine does not start
- compressorblade counting failure, fuel pump voltage will not be increased

In addition the fuel pump voltage level is monitored by an autonomous engine safety circuit. If the maximum fuel pump voltage is exceeded, the power supply of the engine fuel pump is interrupted and the engine stops.

## **engine fuel board** figure 4, page 7

The engine fuel board mounts the following components

- fuel start system: engine fuel start valve
- fuel system: engine fuel filter, engine fuel flow meter, engine fuel pump and engine fuel valve

## **fuel and electrical lines**

The engine fuel lines are fire resistant. The electrical system, consisting of engine, engine service data terminal, engine control unit and electrical lines, is electromagnetic compatibility tested.

## **fuel system**

The fuel system consists of two flexible wing tanks and fuel collection tank. Flexible wing tanks do not need to be air refreshed. A special condition regarding flexible wing tanks in combination with the usage of kerosene is to be issued by EASA.

Alternatively a vented tank could be installed in the fuselage.

**retraction system** figure 5, page 8

The retraction system is driven by a single geared motor and two tooth wheels.

The retraction time is two seconds.

The retraction system is small and retrofitable for most sailplanes.

The installation of the PSR Jet System on sailplanes is covered by EASA Supplemental Type Certificates.



figure 1: engine

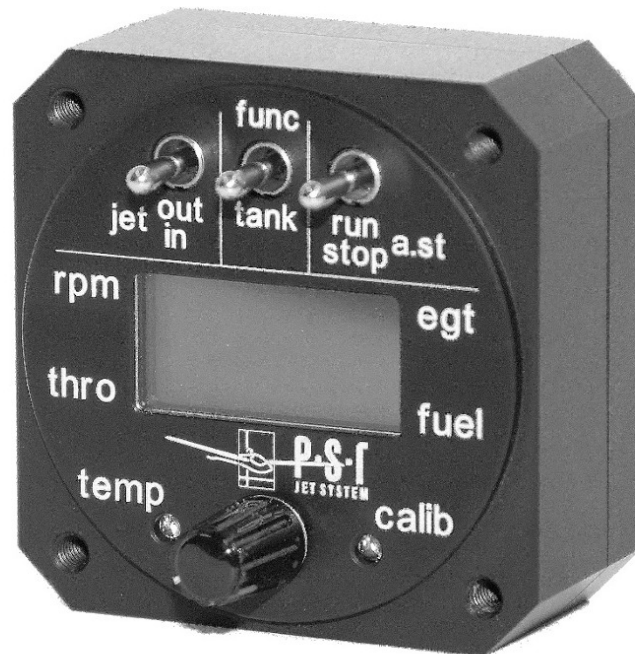


figure 2: engine service data terminal



figure 3: engine control unit



figure 4: engine fuel board

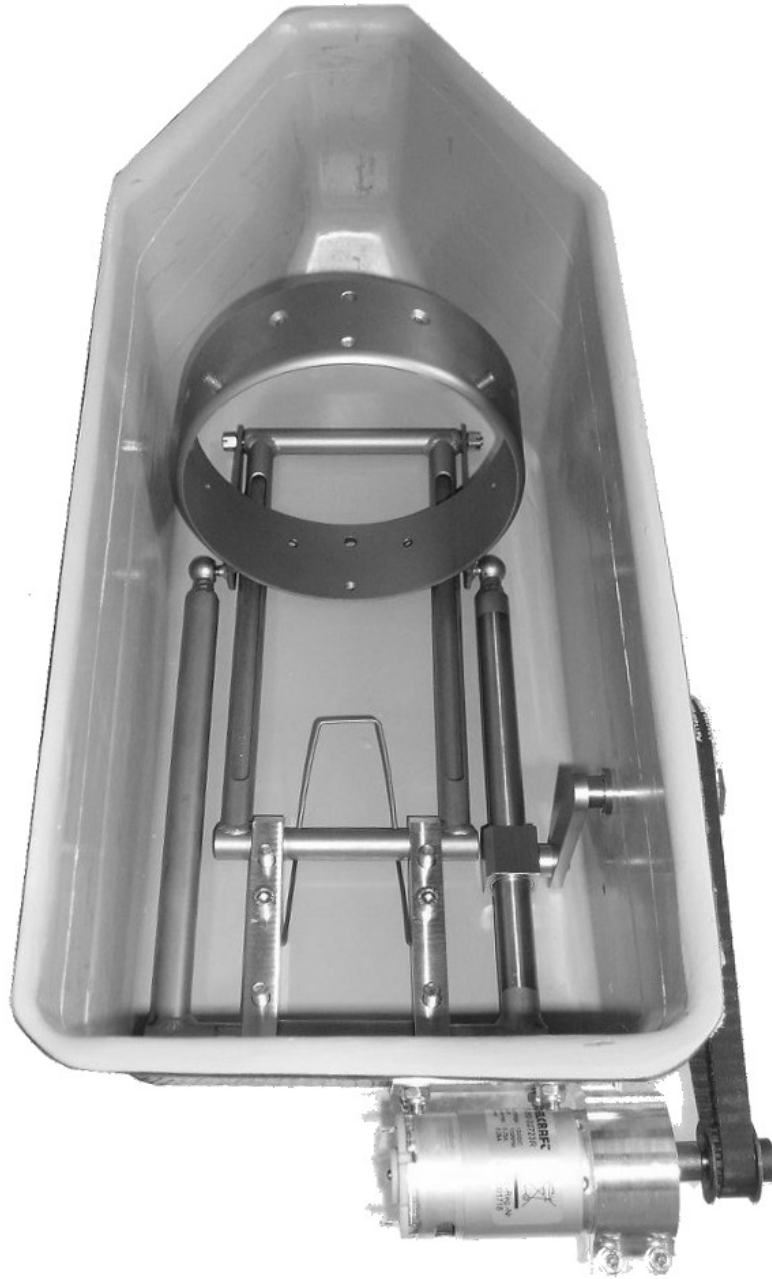


figure 5: retraction system



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