Manual

for the

Engine SOLO type 2625 02 i

Serial No. .....
Manufactured .....

Aircraft type .....
Registration .....
Owner .....

Log of revisions

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Table of Content

1. General Engine Description

- Twin - cylinder inline two - stroke engine
- Liquid cooling
- Lubrication by fuel-oil-mixture
- Electronic fuel injection
- Dual electronic high-voltage ignition
- Crankshaft layout for belt transmission
- Three-phase generator

2. Technical Data

Displacement	625 ccm	bore 76 mm	stroke 69 mm
Compression ratio	9,5 : 1		
Ignition system	Dual electronic high-voltage ignition, mapped		
Spark plugs	BOSCH W5 AC (air gap at electrode 0.5 mm) or NGK B7HS (air gap at electrode 0.7 mm)		
Fuel injection	Electronic, two throttle-valves, mapped		
Sense of rotation	Clockwise in flight direction		
Fuel	Premium unleaded gasoline, min. 95 RON , AVGAS100LL, or mixtures of the two fuels		
Lubrication	Fuel oil mixture 1:50 (2%), above a density altitude of 6000ft: mixture 1:30 (3.3%) Oils according to the specification JASO FC or FD, recommended: SOLO two stroke oil		
Weight	24 kg without exhaust (aircraft manufacturer specific)		
Alternator	12 V 500 W		
Coolant	Antifreeze (Glysantin BASF G48) and tap water (0-20°dh) in a mixture ratio of 40:60		

3. Operational Data and Limitations

Takeoff	50 kW (68 hp) at a rotational speed of 6 600 rpm
Max. cont. power and rotational speed	50 kW (68 hp) at 6 600 rpm
Max. rotational speed	6 700 rpm, limited by the ECU
Idle rotational speed	approx. 2 300 rpm
Max. coolant temp.	115 °C (240°F) measured in the cylinder head
Fuel consumption	approx. 24,5 l/h at max. continuous power
Takeoff	50 kW (68 hp) at a rotational speed of 6 600 rpm

4. Redundancy System

In order to ensure a safe mode of operation, a redundancy system was developed. It can be activated manually if the normal engine control system fails.
The redundancy system includes a simple ECU, which contains a characteristic diagram. This diagram (fuel supply over engine speed) is used to control two additional injection valves. The engine speed and the fixed ignition timing are detected by an additional inductive sensor. (As no air temperature / pressure sensors are installed, there is no fuel quantity correction depending to the current density altitude.)
The redundancy ECU contains two ignition controllers. They use the same ignition coils that are also operated during a normal engine run.
The engine's operational limitations don't change if the engine is operated with the redundancy system. The additional weight is approx. 300 g.

5. Installing Instructions

- The cylinders have to be nearly vertical with cylinder heads on top when the engine is in its operating position.
- The engine can be mounted at the drive side flange with 4 bolts M8. At the cylinder heads are 4 more threads M8 and at the bottom of the crankcase are 4 threads M10.
- The load on the mounting threads may not exceed 5 kN each.
- If the propeller is driven by a belt, the static belt tension may not be higher than 5 000 N
- A water cooler with a cooling capability of 16 kW has to be used.
- If an electric starter is used, its power has to be at least 400 W.
- For the electrical wiring see the diagrams in chapter 9.
- The fuel pressure in the fuel distributor of the throttle valve unit must be 3 +0,1/-0,15 bar during engine operation.
- Upstream to each fuel pump, a fuel filter must be installed (mesh size defined by the pump manufacturer). Another filter (10 micron) needs to be placed between the fuel pump(s) and the injection valve. (suggestion for fuel supply system displayed in chapter 9)
- For the redundancy system, an inductive sensor (Bosch No. 0 261 210 147) has to be attached to the engine mount. It has to be in line with the two pins situated on the starter gearing disc so that an ignition timing of 22 +/- 2 degrees before TDC is achieved.

Table of Torques

Spark plug	20 Nm
Drive pulley on crankshaft	100 Nm
Bolts and nuts M 6	12 Nm
Bolts and nuts M 8	20 Nm
Bolts and nuts M 10	40 Nm
Alternator rotor on crankshaft	80 Nm

Annotation: All tightening torques specified here are nominal values. The display deviation of the torque tools used must not exceed ± 5%.

6. Operating Instructions

A basic requirement for the safe operation of the engine is compliance with the following instructions.

Before startup

- Check the fuel quantity in the tank and the coolant level.
- Check the engine visually and pay attention to leaks.
- Move the throttle lever to full throttle position and check it for free movement.
- Ignition: „OFF". Turn the propeller several times by hand and check for abnormal noise or hard motion of the engine. Move throttle lever to idle position again.

Starting the engine

- Main switch on, fuel cock open, throttle lever in idle position.
- ECU and ignition "ON".
- Check for safety space around the propeller and engage the wheel brake.
- Start the engine.

Takeoff and climbing

- Conduct an ignition check at approx. 4 000 RPM. Maximum rpm drop 300 RPM.
- Switch to the redundancy system at 4 000 RPM. After a short RPM drop the engine should run at approximately the same RPM level. Then switch back to normal operation mode.
- Accelerate to full throttle.
- Limits of RPM level and temperatures may not bee exceeded.

Stopping the engine

Switch the ignition off.

Starting the engine in flight

- Extend engine / propeller into flight position and disengage the propeller stop (according to the aircraft's flight manual.)
- Throttle in idle position, fuel cock open.
- ECU and ignition "On".
- Engage the starter until the engine runs.
- Push throttle into full.

7. Maintenance Instructions

Daily check before flight	Check fuel quantity and coolant level. Check throttle lever for free movement and push it to fully open. Check outside of engine, engine compartment, belt transmission and mountings for proper condition. Pay attention to leaks. Ignition: „OFF". Turn the propeller several times by hand and check for abnormal noise or hard motion of the engine. Move the throttle lever to idle position again.
Inspection after 25 hours of operation or after 1 year. (whatever is reached first)	Check the entire engine visually for loose or missing parts and pay attention to leaks. Check spark plugs. Clean air filter(s) and the engine's outside. Put grease on starter gearing. Check all accessible nuts and bolts for correct tightening torque. Check all Bowden cables and controls. Check wires and electrical connectors.
Inspection after 400 hours of operation.	Inspection and overhaul by the manufacturer.
Conservation and storage of the engine.	If the engine is stored for more than 2 months or if it is out of use, preserve and store it as follows: Inject approx. 2.5 ml of two stroke oil into each throttle body and crank the engine 10 turns by hand. Cover intake openings.

8. Troubleshooting

Engine does not start

No (sufficient) fuel supply	Check fuel line(s). Check function of fuel pump.
No spark at all spark plugs	Weak battery? Charge battery. Defective wires in the cable harness?

Engine does not run properly

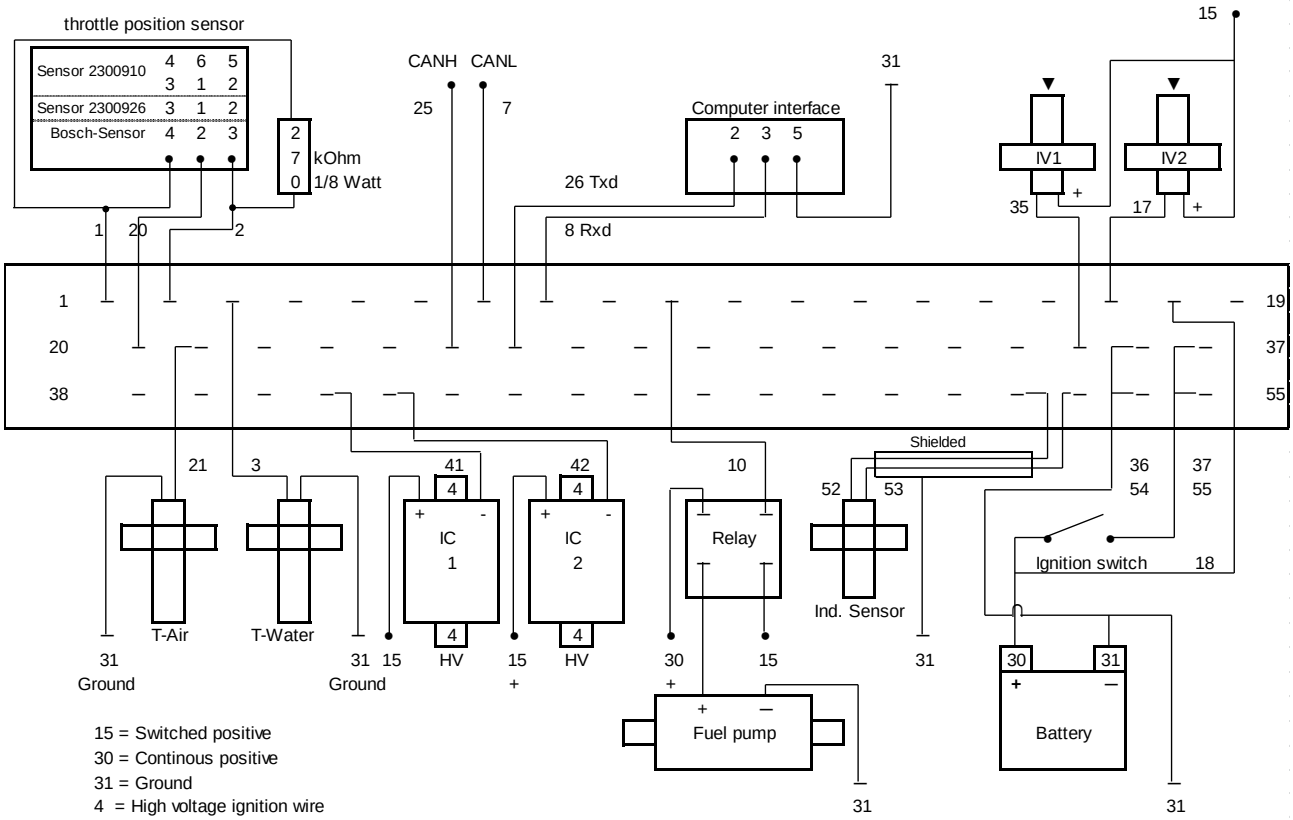
Engine gets too hot	Cooling liquid level low? Water pump faulty? Fuel pressure not sufficient? Radiator clogged? Hoses squeezed?
Engine does not reach full RPM	Fuel pressure not sufficient? Fuel filter(s) clogged? Throttle valves don't open completely? Defective fuel pump? One ignition circuit faulty? Air filters clogged? Any error messages stored in the fault memory of the ECU?

Fault memory

The ECU stores all errors which are detected during engine operation in its internal fault memory. For reading this, the software WinTrijekt is required. It can be downloaded from the Solo website: https://aircraft.solo.global/gb/.

9. Wiring Diagrams

Schematic for engines equipped with the Trijekt T 101 ECU

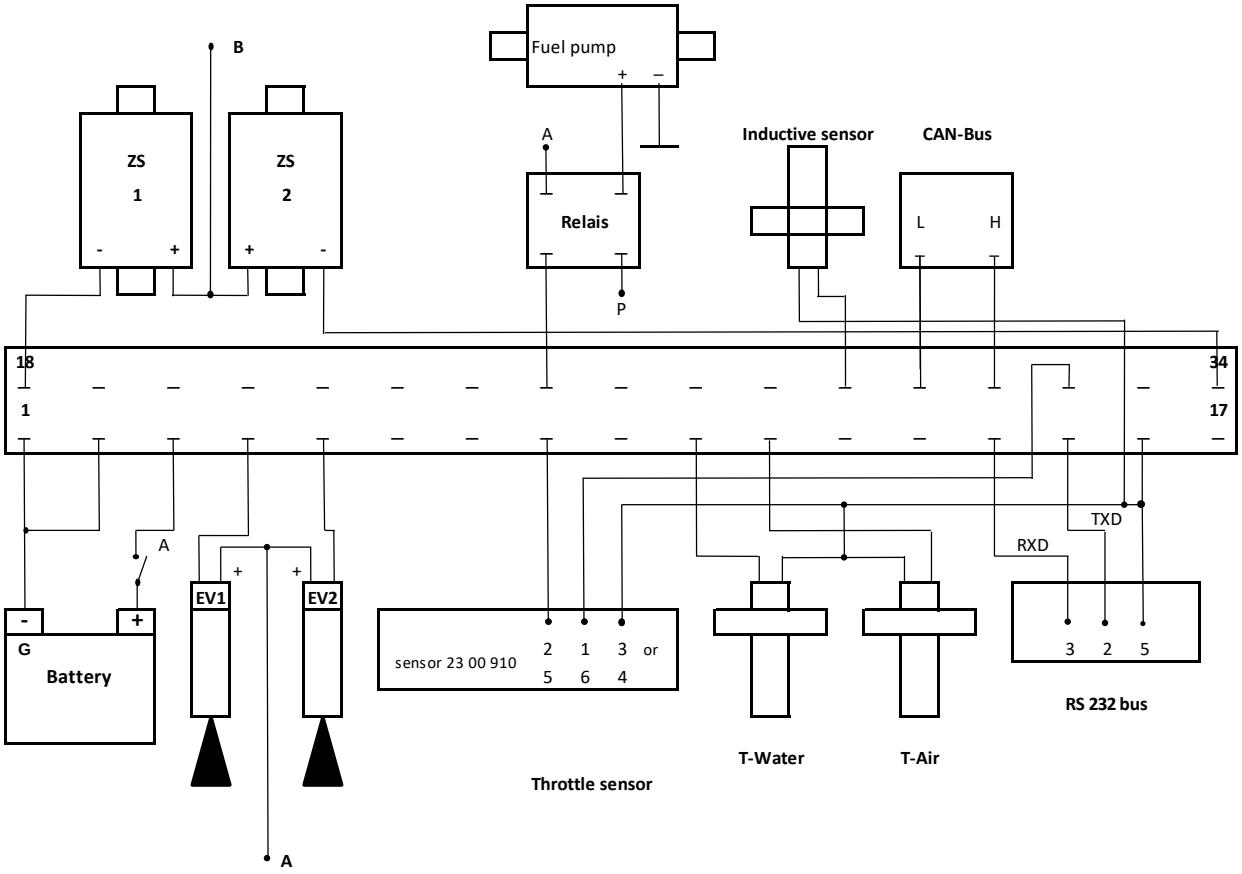


15 = Switched positive
30 = Continous positive
31 = Ground
4 = High voltage ignition wire

Plug connection ECU

1	Ground throttle position sensor	41	Ignition coil 1 (Alternator side)
20	5 Volts throttle position sensor	42	Ignition coil 2 (Drive side)
2	Signal throttle position sensor		
		10	Relay fuel pump
7	CAN L (CAN bus)		
25	CAN H (CAN bus)	53	RPM transducer (Induktive)
		52	Ground RPM transducer
8	Computer interface Rxd		
26	Computer interface Txd	36	Ground
		54	Ground
35	Injection valve 1 (Alternator side)		
17	Injection valve 2 (Drive side)	37	Switched positive
		55	Switched positive
21	Temperature transducer air		
3	Temperature transducer coolant	18	Continous positive (optional)

Schematic for engines equipped with the Trijekt bee ECU

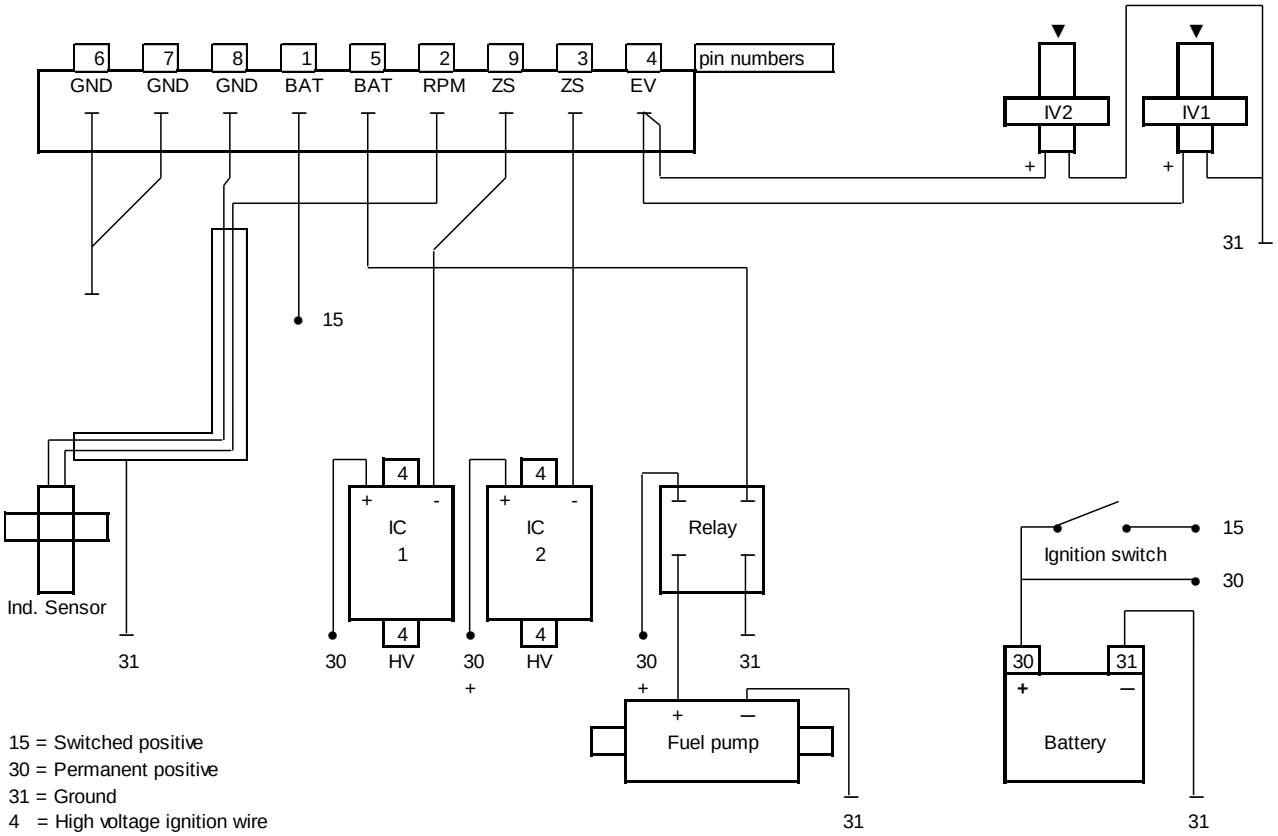


G = Ground
A = Power Engine System (Fuse 5A)
B = Power Ignition (Fuse 10A)
P = Power Fuel pump (Fuse 15A)

Plug connection ECU

1 & 2	Power Ground	18	Ignition coil 1
3	Power Engine System	34	Ignition cCoil 2
4	Injection Valve 1 (Alternator side)		
5	Injection Valve 2 (Drive side)	25	Relay Fuel Pump
8	Signal Throttle Valve Transducer	29	RPM Transducer
32	Power 5V Throttle Valve Transducer	16	Ground RPM Transducer
16	Ground Sensors		
		30	CAN-Bus (CANL)
10	Signal Water Temperature Sensor	31	CAN-Bus (CANH)
11	Signal Air Temperature Transducer		
14	Computer Interface RXD		
15	Computer Interface TXD		
16	Computer Interface Ground		

Redundancy System



15 = Switched positive
30 = Permanent positive
31 = Ground
4 = High voltage ignition wire

Plug connection Redundancy System

BAT :Switched positive
BAT :Switched positive

GND :Ground
GND :Ground

EV :Injection valve 1 and 2

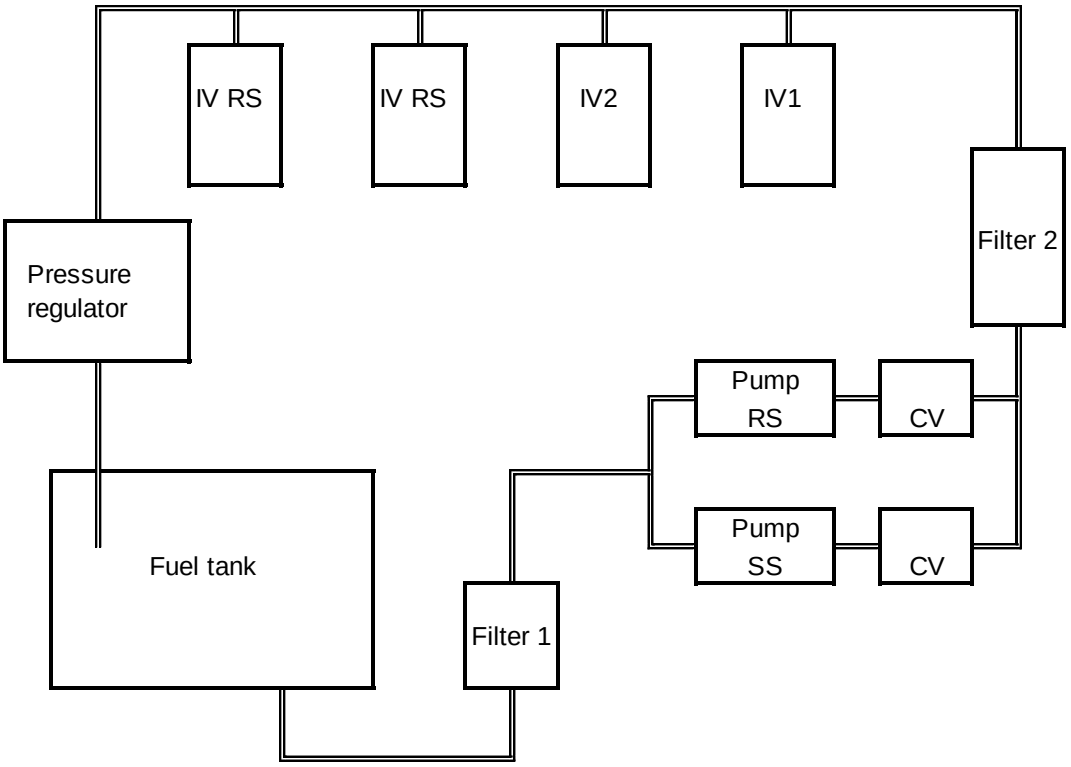
ZS :Ignition coil
ZS :Ignition coil

RPM :RPM sensor
GND :Ground RPM sensor

IMPORTANT:

If the trijekt bee ECU is used, the ignition couls must be disconnectrd from the ECU when engaging the redundancy system. (e.g. with a relay)

Fuel Supply



IV 1	:	Injection valve standard system generator side
IV 2	:	Injection valve standard system driveside
IV RS	:	Injection valve redundancy system
IV RS	:	Injection valve redundancy system
Pump SS	:	Fuel pump standard system
Pump RS	:	Fuel pump redundancy system
CV	:	Check valve

Annotation: If the throttle body unit according to SB 4600-9 is used, a T-fitting can be installed between the fine mesh filter (filter 2) and the pressure regulator. The third port of the T-fitting is connected to a hose leading to the injectors then.

10. Power Curve