

Introduction

Due to the TM 4603 – 10 the following changes result for the owner of aircraft engine **SOLO 2 350**:

1. The complete overhaul of the engine after a period of operation of 5 years, prescribed so far, is no longer applicable and is replaced by a special inspection, which can be accomplished either by the manufacturer or by an aeronautical-engineering enterprise, or also by a soaring engine inspector. For this purpose, this instruction for the special inspection serves the engine series SOLO ONE 2,350 after 5 years of operation, whatever indicates the necessary parts, which must be replaced. In principle if one of the examinations conclusion is negative and cannot be repaired by the implementing person, the engine has to be sent to the manufacturer.
2. The execution of the special inspection is to be documented in the finding report after the special inspection (see annex)

All parts necessary for the execution of the examination can be referred to the manufacturer as kit. For this purpose the factory serial number or the correct part number is to be indicated:

From Factory Serial N° 1 to Serial N°338
Starting from SN N° 339

Order N° 05 10 927
Order N° 05 10 928

Up to serial no.. 338 the used carburetor parts were from the company Tillotson, afterwards parts were coming from company Walbro.

Check List

1. Torques of all attainable screws and nuts examination.

The values from the current engine manual apply. (section 5, maintenance manual)

Spark plug	20	Nm	
Hub on crankshaft (left-hand thread)		50	Nm
Nuts M6 on cylinder head		13	Nm
Nuts M8 on cylinder head	20	Nm	
Nuts M8 on cylinder cylinder foot	13	Nm	

Hexagonal or socket head screws and remaining nuts

M4	3	Nm
M6	13	Nm
M8	23	Nm

Slotted bolts

M3	0,9	Nm
M4	2	Nm
M5	4	Nm

For pulling all nuts and screws tight a suitable torque wrench is to be used.

2. Decompression valves cleaning and examination

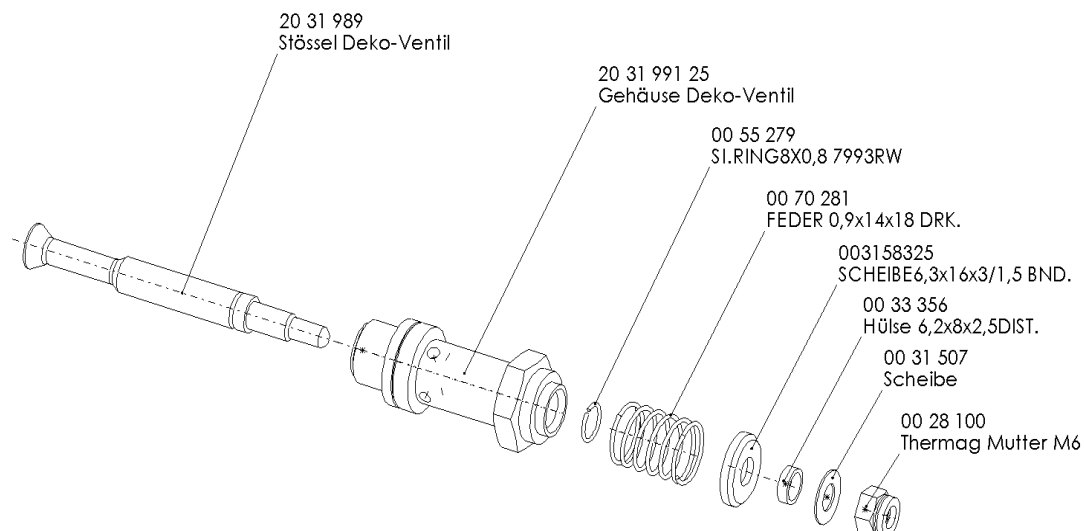
Remove the lever (1) for the decompression valves at the motor carrier. Remove decompression valves (2), wash with gasoline and clean the valve seat with a fine wire brush. All oil coal remainders must be removed. The tappet must be able to be moved easily in the valve body.



Bild 1: Set up of Decompressions-Valve

Bild 2: Cleaning of Decompressions-valve

If the valve in the assembled condition cannot be cleaned, then it must be divided. In addition, the snap ring (see fig. 1, 00 55 279) on the upper end has to be removed and tappets from the housing have to be pulled. Clean all parts thoroughly and assemble the valve again. Insert valves again into the cylinder head (torque 20 Nm). Pay attention thereby to the broken connecting metal. The shorter side must point forward to flight direction. Turn the propeller and examine the tightness of the decompression valves (no blowing off compressed air audibly). If the valves will not close after the cleaning, they must be replaced. (parts of NR. 28 00 272, decompression valve completely)



Picture 3: Set up of Decompressions valves

3. Examination of Tightness of the housings, particularly cylinder head gaskets. Examination of the Engine Compression.

Examine whether within the range of the cylinder head gasket oil seal withdrawal is to be determined. Leaky decompression valves can lead to erroneous findings. At the propeller slowly rotate the engine and pay attention to blowing off compressed air. With this examination the function of the piston rings can also be examined at the same time. The engine must rotate slowly in order to notice tangible compression and after exceeding the upper dead center of each piston in direction of rotation, it must accelerate. Missing compression is to be usually due to leaky cylinder head gaskets. Should one or both seals be found defective, the engine must be removed and the seals (stock NR. 20 61 407) replaced. See above for applying torques for the nuts at the cylinder head. If a suspicion of defective piston rings exists, these can be examined after disassembly of the exhaust. The engine is turned in such a way that the rings are visible by the discharge opening window. The piston rings as well as the piston may not exhibit deep scoring. With a small screwdriver the rings can be examined for free course in their slots. In addition press on each ring. They must be freely mobile and spring back into their original position. With defective piston rings the engine must be sent to the manufacturer. The guidance for removal and replacement of the engine is in the warranty of the airplane manufacturer.



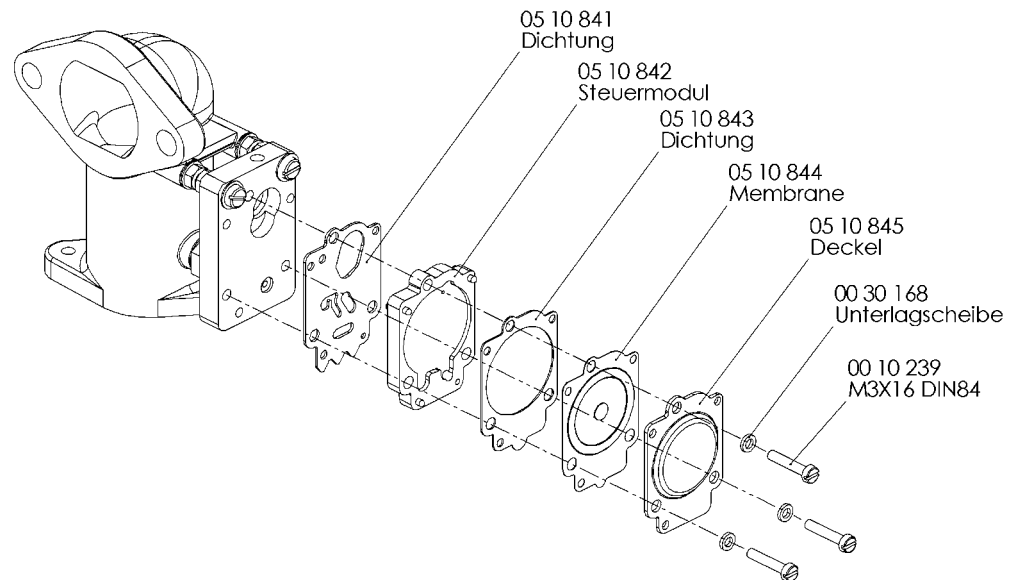
Picture 4: Examination of piston rings

Attention!!!

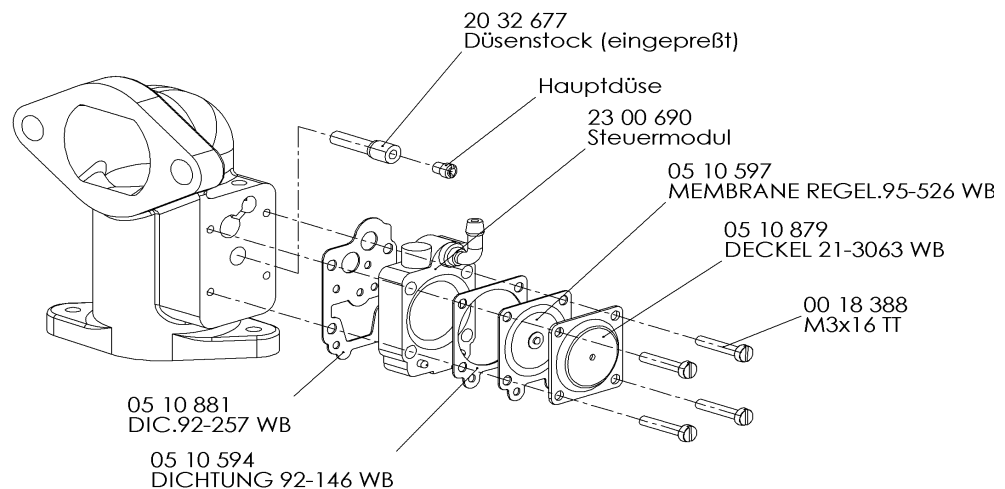
With all work on the engine with dismantled cylinder heads make certain that no foreign bodies and no dirt arrive into the engine. These parts can lead to the destruction of the engine.

4. Examination of carburators function

By factory serial number 1 up to 338 parts of the manufacturer Tillotson were used. Starting from factory serial number 339 parts of the manufacturer Walbro were used. This is recognizable from the fact that on use of the parts of Walbro the regulation unit is welded at the carburetor elbow unions.



Picture 5 : Set up of Main module Tillotson Serial Numbers from 1 to 338



Picture 6 : Set up of Main module Walbro from Serial Number 339

Remove Gasoline lines. Unscrew the 4 screws (3 with Tillotson) at the covers. Degrease the regulation modules and if available clean with compressed air. Operate in addition the small lever (1) against the spring action and blow out the valve seat (2) of the needle. Build up the regulation units in accordance with the picture again and replace all seals and both diaphragms. Pay attention to the correct order when the assembling the parts! Examine regulation units for tightness. Examination with manometer. At a test pressure of 0.4 bar, a decrease of pressure 0,1 bar/min is permissible. This examination is particularly important, since only close carburetors ensure a perfect engine run. Possibly replace main module. (parts of No. see list at the end the service instruction)



Picture 7: Test of air-tightness



Picture 8: Air blow of main unit

5. Replacement of fuel pipes

The provided fuel hose must be adjusted for proper length. In addition the hose as well as the woven metal shroud can be brought with a cutter to the correct length. It is to be made certain that the hoses are remaining in place when engine is rising, that no breaks develop and that the hoses are not too far away from the engine, in order to prevent snagging when bringing the engine into stowage position. The hoses are to be secured with binding wire on the nipples. The woven metal shroud is then fastened with the hose clamps over the nipples.

6. Replacement of spark plug and electrical connectors

Remove the spark plugs and judge color of the electrodes. The color of the sparking-plugs should be to grey brown. In the case of dark discoloration of the electrodes it is to be assumed that the main module in the carburetors was leaky (see checkpoint 3). Renew spark plugs (designation of the spark plug Bosch W5AC of parts of NR. 23 00 500). Renew the spark-plug connector. Unscrew the old spark-plug connector from the ignition cable. Screw new spark-plug connector in the clockwise direction on the ignition cable. Insert new spark plugs (torque 20 Nm) and attach spark-plug connector firmly.



Picture 9: Replacement of spark-plug connector

7. Visual check for tears on Exhaust.

The exhaust is to be examined for tears. Tears are to be recognized by withdrawn black oil coal. If the findings are uncertain, then the oil coal should be wiped off with petroleum ether. Thus possible tears become visible. If the exhaust is dismantled for more exact investigation, it is to be made certain that when assembling new seals must be used. Before the assembly, the sealing surfaces must be cleaned with petroleum ether to remove remaining sealing products.

Attention!!!

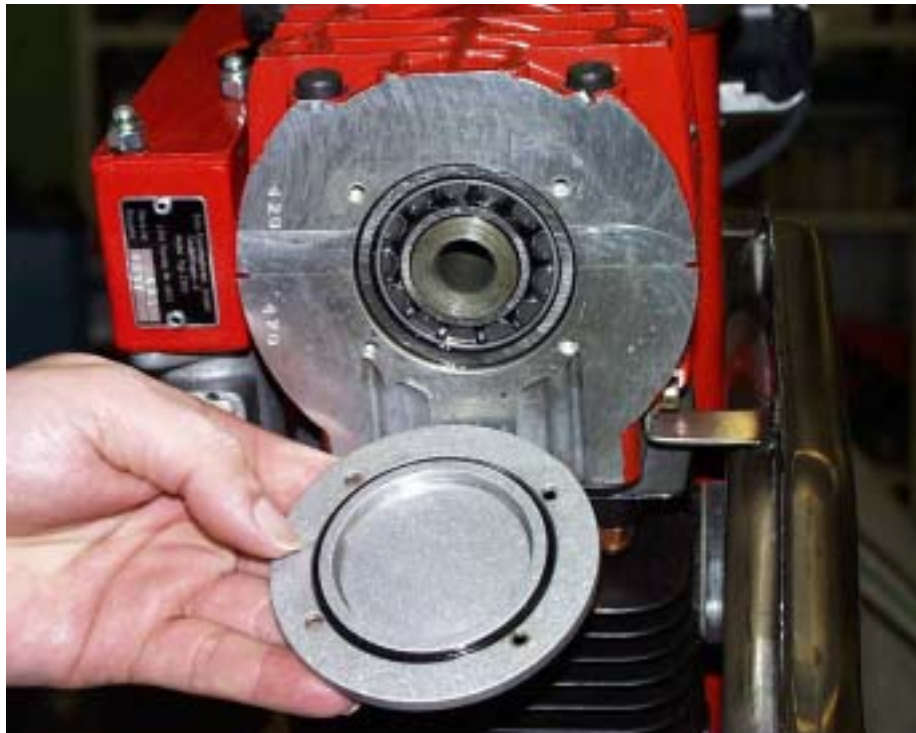
With all work on the engine with dismantled exhaust it is to be made certain that no foreign bodies and no dirt arrive into the engine. These parts can lead to the destruction of the engine.

8. Examination of entire engine, particularly the cooling fins for damages.

Examine the entire engine for damages and broken off ribs or housing tears. If individual cooling fins should have broken off, then the engine must be sent to the manufacturer.

9. Examination of the rear crankshaft bearing for corrosion or overheating.

Remove the rear frame cover, in addition strike first with a stamper and a hammer on the 4 countersunk screws. Examine taper roller bearing cage for corrosion (rust) or discoloration (blue started by overheating). (visual check). Should a damage be observed then the engine must be sent to the manufacturer. Screw by using Loctite 243.



Picture 10: Control of rear side

10. Examination of Distance of the ignition coils from the magnet wheel.

Examine the distance of the pole sheet metals at the ignition coils from the magnet wheel with a feeler gage. The distance may be between 0.2 mm and 0.4 mm. In no case should the magnet wheel at the ignition coils touch. If the gap dimension must be adjusted, then the fixing bolts of the ignition coil must be loosened. Then a feeler gage (0.4 mm) is put between magnet wheel and all pole sheet metals of the ignition coil and the ignition coil is pressed easily against the magnet wheel. It is to be made certain that the magnet wheel is turned in such a way that the magnet (surface at the extent of the magnet wheel worked on) is in the range of the ignition coil which can be adjusted. Tighten the fixing bolts with 2 Nm. Always press the ignition coil at tightening against the magnet wheel. Pull out the feeler gage and examine the distance again. If the distance is in the indicated range (0.2-0,4 mm) then the screws with the nuts on the back of the ignition anchor plate have to be locked.



Picture 11: Examination of distance of ignition coils

11. Examination of electrical wiring

All electrical wires are to be submitted of a visual check. Breaks of the isolation should, particularly with the high-voltage cables, be replaced. In the ignition coils and in the spark-plug connector are threads. For this reason the cables can turn simply through against the clockwise direction to be dismantled. When inserting of new cables turn in the clockwise direction. The cables are to be secured with heat shrink sleeve against break.

12. Examination of the rubber elements of the suspension

The rubber elements of the suspension are to be submitted to a visual check. They may not exhibit tears, damages or excessive pouring.

13. Functional test with test run

A test run on ground is not advisable. It is safer to accomplish the functional test during a flight by running the engine over the airfield. Engine performance is to be judged simply thru use of the RPM indication (green light emitting diode at the operating sector must light up). Pay attention to possible uneven engine run or to unusual vibrations

If a test run on ground is desired, then the airplane must be completely mounted and anchored. Open fuel valve. Switch ignition on and, if available, switch electrical gasoline pump on or operate manual pump. With a piece of lockwire, press gently the diaphragm at the carburetor (hole in the cover of the rear unit) briefly and thus inject some fuel into the engine. Start engine with provided starting pull belt. Is the engine "struggling", surplus fuel can be released by opening the decompression valves. The number of revolutions must be on the ground at least at 4,200 turn/Min. The number of revolutions can be measured on the operating sector with a voltmeter, which is attached at the clamps 10 and mass at lower border. A volt corresponds thereby to 1.000 turn/Min.

14. Visual check after the accomplished test run.

After the test run the engine is to be submitted again to a visual check. Pay attention in particular to leakages, which are recognizable by residue of oil or fuel. If the cylinder heads are dismantled then apply to all nuts at the cylinder head the indicated torques.

Hardware List

Pos.	Stck. (Nb of pieces)	Teilenr.	Bezeichnung (Designation)
1	2	00 55 279	Runddrahtsprengring RW8 DIN 7993
2	10	00 28 100	Thermag Sechskantmutter SW9 M6 SSN 441
3	10	00 20 208	Thermag Sechskantmutter SW12 M8 SSN 441
4	10	00 72 143	Sicherungsscheibe 6
5	10	00 72 145	Sicherungsscheibe 8
4	2	23 00 701	Kerzenstecker 5 k Ohm
5	2	23 00 500	Zündkerzen W5AC
6	1	27 00 397	Benzinleitung komplett
7	2	00 66 154	Schlauchschelle 9/9 S NORMA
8	1	00 62 231	O-Ring 62x2 NBR 70 SH
9	2	05 10 841	Dichtung Tillotson bis W.Nr.338
10	2	05 10 843	Dichtung Tillotson bis W.Nr.338
11	2	05 10 844	Membrane Tillotson bis W.Nr.338
12	2	05 10 881	Dichtung Walbro ab W.Nr.339
13	2	05 10 594	Dichtung Walbro ab W.Nr.339
14	2	05 10 597	Membrane Walbro ab W.Nr.339

Ordering number for complete kit up to Nr. 338 05 10 927

Ordering number for complete kit from Nr. 339 05 10 928

Additionally to the parts contained in the kit it can be that you need the following parts:

Pos.	Stck.	Teilenr.	Bezeichnung
1	2	28 00 272	Dekompressionsventile komplett (complete decompression valve)
2	2	20 61 407	Zylinderkopfdichtung
3	2	20 61 395	Dichtung, Auspuff, 1,5 dick
			Sicherungsdraht

For the work you need the following special tools:

Torque wrench

Carburetor testing set (stock NR. 00 80 314, manometers)

Finding Report on Special Inspection

Engine 2 350

Serial Number:.....

Nr.	Examination	Observations	Signature
1	Examination of Torques		
2	Decompression valves cleaning and examination		
3	Tightness of the housings and compression examination		
4	Carburator examination		
5	Fuel pipes replacement		
6	Spark plug and spark plug connector replacement		
7	Exhaust examination		
8	Engine examination for damages		
9	Rear crankshaft bearing examination		
10	Distance of the ignition coils examination		
11	Electrical wiring examination		
12	Rubber components examination		
13	Functional test on ground or in flight		
14	Visual check after test run		

Date of examination			
Special inspection accomplished by (name, signature)			
Confirmation of the special inspection by examiners	Name/Signature	Test stamp	Date