





Interactive Maintenance

<u>Manual</u>

M0360 - Version 2.6 Click an engine or scroll to next page to continue



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Non-routine maintenance



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Welcome to the ULPower maintenance manual 2.6



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This guide provides a quick access to maintenance schedules, procedures for routine maintenance and also some selected non-routine maintenance activities. Your particular installation may vary slightly, and we refer you to your engine and OEM installation guides for further details.

You may always return to the 'Contents Page' for maintenance by clicking on the ULPower logo on the top right of each page. You may return to the previous chapter by clicking the \bigcirc or to the latest position in the maintenance shedule by clicking \bigcirc

You may also simply 'scroll' through the guide. If you are using this guide on a mobile phone or tablet you may need to download the Adobe Acrobat Reader to enable the links. Using the links will make use easier. Each page has a reference on the top right of the page, making reference when speaking to another guide user easier.

Please always verify that you are using the latest manuals available from ULPower - <u>http://ulpower.com</u> before carrying out any work on your engine.

The abbreviation "i.a.w. ... manuals" means 'in accordance with... manuals"



Preface

Thank you for choosing ULPower Aero Engines for your aircraft.

We wish you many happy hours of flying behind our engines.

Before carrying out maintenance work on the engine, carefully read the Maintenance Manual.

If you are unsure about the procedures mentioned in this manual, please contact a ULPower authorised service point. **Remarks**

The diagrams and other pictures in this manual show the typical construction. They may not represent in full detail or the exact shape of the parts which have the same or similar function.

In addition to this Maintenance Manual, please also refer to the Operating Manual available from www.ulpower.com **Modifications**

The information and components/system descriptions contained in this manual are correct at the time of publication. ULPower, however, maintains a policy of continuous improvement of its products without imposing upon itself any obligation to install them on its products previously manufactured.

ULPower reserves the right at any time to discontinue or change specifications, designs, features, models or equipment without incurring obligation.

Engine serial number

On all enquiries or spare parts orders, always indicate the engine serial number, as the manufacturer makes modifications to the engine for further development.

The engine serial number is located on the left side of the crankcase (near the front of the engine).





Safety information



This manual has been prepared as a guide to correctly service and maintain the ULPower aircraft engines.

Keep an engine log and respect engine and aircraft maintenance schedules. Keep the engine in top operating condition at all times. Do not operate any aircraft which is not properly maintained or has engine operating irregularities which have not been corrected.

Spare parts must meet with the requirements defined by the engine manufacturer. This is only warranted by use of genuine ULPower spare parts and/or accessories. They are available at the authorized ULPower distribution- and service partners.

The use of anything other than genuine ULPower spare parts and/or accessories will render any warranty relating to this engine null and void.

Please use proper hand tools and/or special service tools.

Torque wrench tightening specifications must be strictly adhered to. Locking devices must be installed or replaced with new ones, where specified. If the efficiency of a locking device is impaired, it must be renewed.

It is your responsibility to be completely familiar with the safety instructions described in this manual. Failure to follow these instructions can result in a serious engine malfunction or loss of power in flight, with possible loss of life, injury or damage to equipment.

It is, however, important to understand that the instructions are not exhaustive. ULPower cannot possibly know, evaluate and advise the user of all conceivable ways in which service might be done or the possible hazardous consequences of each way. Always use common workshop safety practice.

This information relates to the preparation and use of ULPower aircraft engines and has been utilised safely and effectively by ULPower. However, ULPower disclaims all liability for any damage and/or injuries resulting from the improper use its products. We strongly recommend that any service be carried out and/or verified by a highly skilled professional mechanic.

The maintenance functions detailed in this manual are to be considered as average line maintenance. Repairs beyond these levels are not recommended as maintenance functions and should be done by authorized overhaul facilities.



Authorized Personnel



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It is a requirement that every organization or individual possesses the required special tooling, training or experience to perform all tasks outlined. Any task outlined herein may be performed if the organization or individual has met the following conditions:

Requisite knowledge of the task through:

Experience in performing the task

Formal instruction from a ULPower authorized training facility or "on-the-job" instruction by a ULPower or authorized ULPower distributor representative.

Suitable work environment to prevent contamination or damage to engine parts.

Suitable tools and fixtures as outlined in the Maintenance Manual.

Reasonable and prudent maintenance practices are utilized.

Requirements of the applicable regulatory authority regarding maintenance procedures are met.

Maintenance organizations and individuals are encouraged to contact ULPower throughout its distribution network for information and guidance on any task outlined herein.



Procedure Notes



- Prior to maintenance or service work, make absolutely sure to comply with the stated safety instructions. Ensure the following at each maintenance event:
 - All electrical systems "OFF" (Key switch off)
 - Disconnect battery
 - Secure engine against unintentional operation.
- At maintenance work which requires ignition "ON" and battery connected, take care of the following:
 - Secure the propeller against unintentional turning by hand
 - Secure and observe propeller zone.
- At maintenance of lubricating and fuel system make sure that no contamination, metal chips, foreign material and/or dirt enters the system.
- Always allow engine to cool down to outside air temperature before start of any work. Severe burn and scalds may result if this is not respected.
- Before re-using parts, clean, inspect and refit them as per instructions.
- Before each re-assembly check units for any missing parts.
- Strictly observe the tightening torques for screws and nuts. Over or under tightening could cause severe engine damage.
- If during disassembling/reassembling the removal of a safety item (e.g. locking wire) is be necessary, it must always be replaced by a new one.
- Use clean screws and nuts only and inspect face of nuts and the thread for damage. If in doubt, use new screws and nuts.
- At disassembly of the engine, mark the components to avoid any mix-up. Do not remove these markings prior to re-assembly.
- At reassembly of the engine, replace all single use items such as sealing rings, gaskets, securing elements, o-rings and oil-seals.



Standard limited engine warranty & warranty conditions

PERIOD

ULPower Aero Engines, as manufacturer, warrants every ULPower noncertified aircraft engine, sold as new and delivered by an authorised ULPower distributor/reseller, to be free from defects in material and workmanship for a period of 36 months. For aerobatic engines (UL260i(S)a, UL350i(S)a, UL390i(S)a, UL520i(S)a, and the UL520T the warranty period is limited to 12 months. Warranty starts on the date of invoice.

Replacement of any engine, accessory or part under the warranties will not create a new warranty period or extend the period of coverage. But any engine, part or accessory so repaired or replaced will be warranted for the remainder of the original warranty period applicable to the engine, accessory or part repaired or replaced.

WARRANTY CLAIM

Written notice of any warranty claim must be submitted to ULPower within fifteen (15) days of a suspected defect in material or workmanship and the engine, accessory or part must be made available for ULPower's inspection within thirty (30) days after the claim has been made. To evaluate a claim, following items must also be made available: invoice delivered to the customer as proof of date of purchase/delivery. engine log book showing engine time and all maintenance performed signed and dated inspection/maintenance sheets.

ULPower reserves the right not to accept any claim not submitted in accordance with these requirements

TERMS AND CONDITIONS

The LIMITED WARRANTIES cover all parts and labour on engines and accessories subjected to normal use and operated and maintained in strict accordance with the corresponding Operating and Maintenance Manuals. All maintenance must be immediately noted, dated and signed in engine logbook when maintenance is performed or the warranties are VOID. Warranty service may be accomplished ONLY AFTER PRIOR WRITTEN APPROVAL from ULPower. ULPower retains the right to repair and/or replace any parts or accessories required for warranty service. All parts replaced under warranty become the property of ULPower. The warranties are VOID on any engine or accessory, disassembled, opened, repaired or altered without the prior written approval of ULPower. The warranties are also VOID on any engine or accessory which has been operated contrary to corresponding Installation, Operating and Maintenance procedures or which in ULPower's sole opinion has been subjected to misuse, neglect, improper installation, corrosion, foreign material ingestion, accident, the use of improper oil, fuel or non genuine ULPower replacement parts.

The warranties are also VOID on any engine or accessory if a gear reduction or other power transmission device (including propeller flange extensions) not designed or approved in writing by ULPower has been used. The warranties do not include reimbursement for normal maintenance expenses or for incidental expenses such as but not limited to, mounting and dismounting of the engine from the aircraft, loss of use, transportation, towing, communication costs, taxis, hotels, food or any other incidental or consequential damage..

DISCLAIMER

ULPOWER'S EXPRESS WARRANTEES AND THE REMEDIES THEREUNDER ARE EXCLUSIVE AND GIVEN IN PLACE OF (a) ALL OTHER WARRANTIES, EXPRESS, IMPLIED, OR STATUTORY, WHETHER WRITTEN OR ORAL, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTY OF MERCHANTABILITY, FITNESS OR PARTICULAR PURPOSE, OR IMPLIED WARRANTY ARRISING FROM PERFORMANCE, COURSE OF DEALING OR USAGE OF TRADE AND (b) ALL OTHER OBLIGATIONS, LIABILITIES, RIGHTS, CLAIMS OR REMEDIES, EXPRESS OR IMPLIED, ARISING BY LAW OR OTHERWISE, INCLUDING BUT NOT LIMITED TO ANY RIGHT OR REMEDIES IN CONTRACT, TORT, STRICT LIABILITY OR ARISING FROM ULPOWER'S NEGLIGENCE, ACTUAL OR IMPUTTED.

ULPOWER'S OBLIGATIONS AND PURCHASER'S REMEDIES UNDER ULPOWER'S EXPRESS WARRANTIES ARE LIMITED TO ULPOWER'S CHOICE OF REFUND, REPAIR OR REPLACEMENT ON AN EXCHANGE BASIS AND EXCLUDE LIABILITY FOR INCIDENTAL, SPECIAL, CONSEQUENTIAL OR ANY OTHER DAMAGES, INCLUDING WITHOUT LIMITATION, ANY LIABILITY OF CUSTOMER TO A THIRD PARTY OR FOR ECONOMIC LOSS, REPLACEMENT COST, COST OF CAPITAL, LOST REVENUE, LOST PROFITS, OR LOSS OF USE OF OR DAMAGE TO AN AIRCRAFT, ENGINE, COMPONENT OR OTHER PROPERTY AND IN NO EVENT WILL ULPOWER'S LIABILITY EXCEED THE ORIGINAL COST OF THE ENGINE OR ACCESSORY.

These LIMITED WARRANTIES are the only warranties offered by ULPower. No agreement varying these warranties or ULPower's obligations under them will be binding on ULPower unless made in writing by a duly authorised representative of ULPower and accepted in writing by ULPower.

ULPower will not process or honour warranty claims on delinquent accounts.

Effective as of December 1st , 2018

ERD ENGINES





TBO is 1500 hours or 12 years for i and iS(a) engines – 1200 hours or 12 years for the UL520T. (whichever comes first) After reaching this time limit the engine should be shipped to an authorized ULPower overhaul facility.

Six year replacement parts include:

- Venting and return hose between breather and oil/air separator
- All fuel lines
- Oil lines to/from oil cooler

Maintenance intervals, an initial 15 and 50 hour (bedding in maintenance), is followed by 100 hour interval or annual checks. It is recommend to reduce that to 50 hour intervals for those operating in dusty environments or for those using leaded fuels. For those aircraft doing low hours, each 'annual' may be considered a '100 hour' check. Therefore on the second 'annual' a 200 hour visit is required, etc.

After an overhaul, always do the 15 hour check up !

We suggest printing the maintenance schedule out and, when filled in, keep it with the engine maintenance records. You can download from the engine page for your engine from here <u>http://ulpower.com/en/engines</u> (under manuals)



Inspection sheet



Scheduled Maintenance checks

Inspection Sheet / Maintenance Schedule

Identification					
AIRCRAFT					
Registration number					
Aircraft Make				_	
Aircraft model and S/N					
TSN (Time Since New)				_	
Propeller make				_	
Propeller model and S/N					
ENGINE					
Engine type					
Engine S/N					
TSN (Time Since New)				_	
TSO (Time Since Overhaul) _					
Type of oil used					
Type of fuel used					
AIRCRAFT OPERATOR					
Name				_	
Contact					
Address _				_	
50 (1754) 17				_	
Tel / Fax				_	
E-mail _					
MAINTENANCE FACILITY					
Maintenance work shop				_	
Address					
- Tel / Fax				_	
E-mail				_	
This check is applicable (circle one)	15h*	50h	100h	200h	600h

*Shaded column for first 15 hr. only (from new or overhauled engine)

Maintenance logging file



Scheduled Maintenance checks

Maintenance Schedule

Perform the following inspection tasks at the intervals shown. Check our interactive maintenance manual for more info. (available from website www.ulpower.com) Legend: X = do the task at indicated time, but at least once a year

		Chec	k (Hr)	5 L.	Signature
Inspection Items	15	50	100	200	
Visual inspection of the engine	í			1	
a) General inspection of the engine for damage and abnormalities, including obstructions, cracks, wear and condition of cooling air ducts, baffling and cylinder cooling. Take note of changes caused by temperature.	x	x	x	x	
b) Thoroughly inspect engine for missing or loose bolts, nuts, pins, etc. Replace as necessary.	x	x	x	x	
c) Inspection of all temperature and pressure sensors.	X	x	х	х	
d) Inspection of all oil lines for damage, including leakage, hardening from heat, porosity, loose connections and secure attachments. Verify routing for kinks and restrictions like restricted elbows.	x	x	x	x	
 e) Inspect all fuel lines, filters, injectors and pressure regulator for damage, including leakage, hardening from heat, porosity, loose connections and secure attachments. Verify routing for kinks and restrictions like restricted elbows. 	x	x	x	x	
f) Verify the complete electrical wiring system including tight fit of connectors, damage and wear.	x	x	x	x	
g) Check exhaust system for cracks (especially when cabin heating is taken from around the exhaust).	x	x	x	x	
Verification of engine suspension	í				
 a) Inspect engine mounts, dampers and fasteners for secure fit, including damage from heat, deformation, cracks. Replace as necessary. 	x	x	x	x	
Engine external parts	1				
 a) Inspect attachment screws and nuts of all external parts for security and fit. Inspect safety wiring. Replace as necessary. 	x	x	x	x	
ECU					
Check connections are secure. Verify air pressure sender route/line is secure and free of blockages		x	x	x	
Oil level				Ĩ	
 a) Remove magnetic drain plug from bottom of oil sump and clean magnet pickup Drain old oil and inspect for foreign particles. Record findings 	x	x	x	x	

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led Maintenance checks

Maintenance logging file

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Inspection Items		Check (hr.)		
inspection items	15	50	100	200
Visual inspection of the engine				
 a) General inspection of the engine for damage and abnormalities, including obstructions, cracks, wear and condition of cooling air ducts, baffling and cylinder cooling. Take note of changes caused by temperature. 	х	Х	х	х
b) Thoroughly inspect engine for missing or loose bolts, nuts, pins, etc. Replace if necessary.	Х	Х	Х	Х
c)Inspection of all temperature and pressure sensors.	Х	Х	Х	Х
d) Inspection of all oil lines for damage, including leakage, hardening from heat, porosity, loose connections and secure attachments. Verify routing for kinks and restrictions like restricted elbows.	х	х	х	Х
e) Inspect all fuel lines, filters, injectors and pressure regulator for damage, including leakage, hardening from heat, porosity, loose connections and secure attachments. Verify routing for kinks and restrictions like restricted elbows.	Х	Х	х	x
f) Verify the complete electrical wiring system including tight fit of connectors, damage and wear.	Х	Х	Х	Х
g) Check exhaust system for cracks (especially when cabin heating is taken from around the exhaust).	Х	Х	Х	Х





Inspection Itoms		Chec)
inspection items	15	50	100	200
Verification of engine suspension				
 a) Inspect engine mounts, dampers and fasteners for secure fit, including damage from heat, deformation, cracks. Replace as necessary. 	Х	х	х	X
Engine external parts				
 a) Inspect attachment screws and nuts of all external parts for security and fit. Inspect safety wiring. Replace as necessary. 	Х	х	х	X
ECU				
Check connections are secure		Х	Х	X
Verify air pressure sender route/line is secure and free of blockages		X	Х	Х

The best way to approach a visual inspection is to remove cowls, as appropriate, and take a detailed, sequential look around the engine. Make yourself familiar with your engine installation. Take pictures to help you remember 'what it looks like' and watch for development of heat affected areas, mechanical wear, hardening, etc. Visual inspection may include (on a cool engine) 'looking with your fingers' for oil leaks, or exhaust gas blow-by, loose connections, etc. (watch out for locking wire and other sharps). Use of a good torch to light up dim areas may help in these tasks.



Inspection Items		Chec	:k (hr.))
inspection items	15	50	100	200
<u>Oil level</u>				
 a) Remove magnetic drain plug from bottom of oil sump inspect and clean magnetic pickup. Drain old oil and inspect for foreign particles. Record findings. 	Х	Х	Х	Х
b) Replace copper sealing washers of drain plug and refit to oil sump. Torque to 25Nm.			X	Х
 c) Refill oil sump with approx. [3 litres (iSA: 4l) 4 cylinder] [4 litres of oil (iSA 5l) 6 cylinder]. For correct volume and type of oil, refer to Op. Manual. NOTE: Turbo engine = replace oil every 50 hours or annually 	Х	Х	х	Х
d) For aerobatic engines(iSA): add 1 bottle of ULP ACRO+ oil additive (part number L0100120)	Х	Х	Х	Х
 e) Inspect oil level and add oil as necessary to maximum mark. For correct type of oil, refer to Op. Manual. Record quantity of oil added NOTE: If using AVGAS, recommended oil change is 50 hours 	Х	Х	Х	Х
<u>Oil Filter</u>				
 a) Remove oil filter from engine and install new oil filter. Wipe clean mating surface. Lubricate mating sealing ring of new oil filter with clean engine oil. Screw on new filter by hand and torque to 15Nm. Cut old filter (without creating metal chips/fillings) and inspect filter mat. Record findings 	Х	Х	х	Х





Inspection Items		Chec	: k (hr.))
Inspection items	15	50	100	200
<u>Air Filter</u>				
a) Inspection of the air filter. Replace as necessary.	Х	X	Х	
b) Replace air filter.				Х
<u>Fuel Filters</u>				
a) Clean (turbo-engine) or replace (all other engines) the fuel prefilter	Х			Х
b) Replace the fuel fine filter				Х
Cylinder heads (See note "Cylinder head bolts torque" - When checking torque, do not loosen first)				
a) Check torque of cylinder head bolts. Re-torque as necessary (36Nm) – Do not loosen first.			Х	Х
<u>Rocker/Tappet</u> (T = done on ENGINE time, as opposed to 'annual on a low hours engine)				
a) Check tappet-valve clearance and adjust as necessary				
(0.15mm ±0.05mm cold inlet and exhaust) (0.006in ±0.002in)	Т	T	Т	Т
Record results				





Inspection Items		Cheo	ck (hr.)
inspection items	15	50	100	200
Throttle Valve				
a) Inspect free movement of throttle lever.		X	Х	х
 b) Inspect that throttle cable allows full travel of throttle lever. 				
c) Inspect throttle cable. Replace as necessary.			Х	Х
<u>Spark Plugs</u>				
a) Renewal of spark plugs.				Х
Spark Plug Connectors				
a) Verify security of connectors on both spark plug and ignition coils.		Х	Х	Х
Compression Check				
a) Inspect compression by differential pressure method. Record results.				
 Leak test need to be done at least once a year 				Х
 In case running leaded fuel, leak test required every 50Hr 				





Inspection Items (for LII 520T only)		Check (hr.			
	15	50	100	200	
Turbo compressor					
a) Inspection of the turbo bracket for secure fit	Х	X	Х	Х	
b) Inspection oil supply/oil return line from turbo	Х	X	Х	Х	
Waste gate					
a) Clean filter and check connection with control valve	Х	X	Х	Х	
Boost control valve					
a) Clean filter and check pneumatic lines	X	X	Χ	Х	





Inspection Items (external drive/alternator only)		Che	eck (: (hr.)		
inspection items (external drive/alternator only)	5	15	50	100	200	
External drive/alternator						
a) Inspection of pulleys (visual)	Х	Х	X	Х	X	
b) Inspection of drive/alternator brackets (visual)		Х	X	Х	X	
c) Inspection of drive/alternator (visual)	Х	Х	X	Х	X	
d) Inspection of belt (visual)	Х	Х	X	Х	X	
e) Measurement of belt tension	Х	Х	X	Х	Х	





Inspection Items		Check (hr.)				
Inspection items	15	50	100	200		
Engine Test Run						
 a) Start the engine and run to operating temperature. Smoothly apply throttle to full power. Check temperatures and pressures are within limits. Record oil pressure, fuel pressure and engine speed (rpm). Bring engine to idle speed. Record engine speed (rpm) 	Х	x	Х	Х		
b) After engine test run, if replaced, re-torque oil-filter (15Nm)	Х	X	Х	Х		
c) After engine test run, inspect oil level and add oil as necessary to maximum mark.	Х	X	Х	Х		
d) After engine test run, adjust idle speed lever position if necessary. Record new engine idle speed.		X	Х	Х		
General Note						
a) All service instructions and service bulletins are complied with.	X	X	Х	Х		

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In order to discover more about each task, click on the relevant link below



Visual inspection Engine/suspension /external parts



ECU



Oil Level Oil Change Oil Filter



Air Filter inspection /Replacement



Fuel Filters



Cylinder Heads



Rocker/Tappet



Throttle valve/cable

Spark Plugs/ Connectors



Compression Check



Engine Test Run



Idle speed adjustment



Non-routine maintenance





Visual Inspection...



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Start at one point and work systematically around the engine looking for evidence of interference abrasion (where parts have rubbed on cowlings/hoses/etc) as well as signs of leaks of oil or combustion gasses. Look for degradation in hoses and wires, security of senders and their connectors, etc. Pay particular attention to the exhaust looking for cracks in material or welds. Check for damaged, broken or missing springs/bolts/cotter pins/etc.

Heat damage may occur and is often first spotted by discolouration or changes in surface appearance.

Take your time, and take photos for reference of any items you want to monitor.

Correct any anomalies found, making appropriate references in the logbook.



ECU...



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The 'old black ECU' requires that you disconnect the connectors from ECU, check the contacts ECUside and connector side, make sure that they are clean and there is no oxidation, replace both if necessary and re-connect the connectors to the ECU. This is NOT necessary on the RED ECU (see picture left).

The RED ECU should not normally need the connectors opened and checked, however if there is a connection issue you can check for corrosion there. If all is working well, it is probably best left closed.

The Air Pressure sender mounted inside the ECU is connected to either the outside air (naturally aspirated engines) or the the turbo pressure(turbo compressor engines). Generally this is done with a small hose. If the hose is damaged or blocked it will affect the mixture control of the engine. You may be able to check atmospheric pressure is reading correctly by using ULRead while the engine is on the ground and not turning.

If unsure of a clear line, **disconnect** the hose from the ECU and the other end and blow through, then reconnect.

CAUTION! NEVER BLOW INTO THE PRESSURE SENDER PORT/LINE AS THIS MAY DAMAGE THE SENDER INSIDE THE ECU.

Oil...







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1. Carefully remove cowling and place a clean oil pan/receptacle ready to catch the old oil (make sure that it is able to contain all of the oil drained).

2. Remove the magnetic drain plug (catch the copper sealing ring) and direct the old oil into the oil pan.

- 3. Inspect/clean the mag. plug (record findings). Replace the copper sealing ring , refit and torque to 25Nm.
- 4. Remove oil filter. Apply fresh oil to the seal of new oil filter. Install and torque to 15Nm.
- 5. Refill with correct grade and quantity of oil.
- 6. If you have an aerobatic engine, add 1 bottle of ULP ACRO+ oil additive (only after 15 h see schedule)

7. Cut old filter (without creating metal chips/fillings) and inspect filter mat. Record findings. Filter old oil from sump. Record findings.

Oil Qty (litres)	4-cylinder	6-cylinder
3	260/350i/iS	
4	260/350iSA	390/520i/iS/T
5		390/520iSA



CAUTION!! DO NOT change oil on a HOT engine. If you do warm the engine for quicker oil draining do not handle oil above 40C/104F to avoid burns/scalding. Air Filter...





The ULPower air filter is NOT a serviceable item. It is normally replaced at 200 hours, however, it may require more frequent changes dependent on operational conditions.

It is not normally necessary to remove the filter for inspection. If you do remove the filter ensure that it is correctly re-installed/replaced.

Look for signs of damage to the filter media and retaining mesh. Look for damage to the rubber flange and 'wiggle' the end of the filter gently watching for 'cracks' or other damage.

Replace if necessary.

Record findings.



Fuel Filters...





Fuel Filters

ULPower engines have a 'pre-filter' installed at the entry to each fuel pump and a 'fine filter' after the pumps and before the fuel rail.

The Naturally aspirated engines do not have washable filters. The turbo engines have washable (=reusable) prefilters. They are replaced (or cleaned) after the first 15 hours, and then are a 200 hour (or two year) replacement (cleanable) item. In dusty or adverse conditions more frequent changes may be required.

Simply remove the clips holding the filter in place and replace the filter itself.

Respect directions of flow and check for damage to hoses. Replace any damaged hoses.

Pay particular attention to any sensors (such as fuel pressure sensors) which may be attached to the fine filter, depending on your installation.

REMEMBER: Pressurise the fuel system and check for leaks before attempting to start the engine.



Cylinder Heads...



As part of a maintenance schedule you are asked to check the torque on FOUR of the cylinder head bolts as a precautionary safety measure.

For each cylinder head there are SIX bolts which must remain torqued to ensure that the head seals properly with the cylinder to avoid loss of combustion pressure.

TWO of these bolts are not easy to get to (one under the rocker cover and one behind the inlet manifold) and <u>DO NOT</u> normally need to be torque checked during this operation.

As part of regular maintenance, check the torque on the FOUR easily accessible cylinder head bolts. If these four are torqued correctly, there is no further action required. If they are NOT then refer to your nearest ULPower dealer for assistance.

The recommended torque check procedure is as follows:-.





Cylinder Heads...

Tools Needed T063018 Torque Key Cylinder head Torque wrench (36Nm)



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Set the torque wrench to 36Nm and fit the special tool T063018 Torque Key Cylinder head (supplied with first service kit).

Insert the tool tip securely into the first cylinder head bolt and check torque. Normally this will result in a 'click' and NO movement of the bolt.

Repeat with the other three bolts in sequence.

If any bolt needs tightened contact your nearest ULPower Aero Engine dealer for further advice.

CAUTION: When checking torque, do not loosen first.





Rocker / Tappet

Tools Needed 3mm & 5mm Allen Key Feeler Gauge (0.1/0.15/0.2mm) Torque wrench (20Nm / 6Nm)

13mm ring spanner [O ring(s) S1100020]



Checking the rocker/tappet clearance is a simple procedure that allows for adjustment of the correct valve opening and proper functioning of your engine. It is also an early warning system to identify excessive wear and can be likened to an ECG (EKG) as part of a medical examination of your engine, and the opportunity to adjust for any wear or bedding in that may occur.

In the early hours of operation, it is perfectly normal for adjustments to be needed. Over time, these adjustments should become smaller and in many cases you may find it unnecessary to adjust at every service. All the same, checking and recording findings provides insight to your engine as part of your planned maintenance.





- 1. On a cold engine (>10C and <25C) remove all the valve covers. Make a note of which cover goes where (you may use an indelible felt marker such as a 'Sharpie' to label the inside with the cylinder number, after wiping the oil away)
- Unscrew all three bolts on each valve cover with a 4mm Allen Key. Keep the nordlock washers in pairs. You may need to gently 'knock' with a soft hammer the edge of the cover to release it. Do not damage the gaskets.

Verify Rocker assembly, etc. has had proper lubrication. Look out for colour changes that could indicate bad lubrication and/or over heating.



2. Turn the prop until one of the cylinders has both valves closed and ready for gapping . We suggest starting with Cylinder 1. If the rockers at cylinder 1 are not even /equal , continue to turn the prop. (the rockers on cylinder 2 should now have exhaust valve depressed /rocker arms tumbling) You can double check if the valves are completely closed by looking if the locator marks are aligned at the rear of the engine. (the air filter has been removed in this image for clarity) TDC

At every half and full revolution of the engine (back to this position) ONE of the pistons will be ready for gapping.





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HINT: To check that you are ready for gapping on the cylinder you are looking at, rock the prop back and forth. If the rockers DO NOT move on the cylinder you are working on then you are ready for gapping. If they are moving then you are NOT! (see videos of this at ULPOWER.NEWS)

3. Check clearance on each tappet by sliding a feeler gauge in.

If the 0.20mm slides in – there is too much clearance.

If the 0.10mm will NOT slide in - there is too little clearance.

If re-setting, set to 0.15mm.

HINT: If you lay out your feeler gauge as shown left you can check really quickly with the 0.20 and 0.10 to make sure that the .10 DOES fit and the 0.20 DOESN'T fit. In the ideal world you are looking for a snug 0.15mm fit.





THEN HOLD



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HINT: The adjustment is VERY small, only a fraction of a turn on the Allen key, so try not to make big movements and keep tools and hands stable.

4. To adjust clearance, place a 13mm ring spanner over the lock nut and a 5mm Allen key in the adjustment screw. Keeping the Allen key very still, loosen the lock nut.

5. Place the 0.15mm feeler gauge in the gap and adjust using the Allen key. Then HOLD the Allen key really steady whilst you 'nip' the locking nut in place WITH the feeler gauge in situ. Do NOT over tighten. Just enough to hold it whilst you torque the lock nut (see next step)







6. Using a Torque wrench tighten the lock nut to 20Nm (14.7 ft lbs).

7. Use the feeler gauge to check that the adjustment is correct AFTER torqueing. If not correct, redo.

8. Turn the prop through 180/360 degrees from current position (anti-clockwise when facing the prop. on a standard engine) to put the next cylinder ready for gapping.

Repeat until all cylinders have been checked/set. **ALWAYS** check that both rockers are not moving and not 'tumbling' before gapping. Record clearances and adjustments.

HINT: If you have not done this before ask an experienced engineer/mechanic to assist you... DO NOT OVER-TORQUE!!!



Useful information

Firing order 4 cylinder: 1-3-2-4Firing order 6 cylinder: 1-4-5-2-3-6

9. Before closing valve covers ensure that the the O-ring is in good condition (replace if necessary), that it is completely seated in it's groove, in the correct position and that the surface is clean. Apply a little clean engine oil to O-ring if dry.





10. Replace rocker covers to the relevant cylinders and tighten valve cover cap screws M5x16mm to 6 Nm (4.5 ft lbs). Check the Nordlock washer for damage . If ok , reinstall them. Nordlock washers are in pairs and the side with the larger steps are faced towards each other. Bring all three screws to contact before torqueing .

CAUTION: When the same tappets are in need of adjustment every time maintenance is performed, it can be indicative of a developing problem. Contact your nearest ULPower dealer who may inspect the valve train for abnormal wear. Do check for proper lubrication and clogged oil lines.









Check that your throttle cable has no signs of fraying, kinks or compromised travel. Ensure that the installation allows full and free movement and that all attachments are appropriate for your installation.

There are many different installations for throttles. You may want to take a 'reference picture' of how it should be for your records and to compare to during servicing.



Spark Plugs...

Tools Needed

Anti -seize paste (e.g. Wacker P12) 16mm Spark plug socket (with rubber insert) Torque wrench (21Nm) New Spark Plugs (E070502)



As in any modern automobile, sparkplugs do NOT normally need cleaning. It is generally better to REPLACE spark plugs unless there is an exceptional reason to clean them. (If you must, use a plastic brush and solvent. Dry well and inspect before re-use at your own risk.)

These spark plugs consist of 3 electrodes round the core. The electrode gap cannot be changed. Do not try to bend the electrodes!

Note: Operation with leaded fuels (e.g. AVGAS 100LL) can result in increased wear of the spark plugs. Reduce renewal intervals accordingly.

NOTE: Only use original ULPower spark plugs. Use of incorrect spark plugs may result in ignition problems, electrical disturbance and other engine damage.



Spark Plugs ...



- 1. Unplug ignition leads (noting positions) and remove old spark plugs with 16mm Plug Socket
- 2. Before inserting new spark plugs back into the cylinder head, apply an anti-seize compound on the thread avoiding the last two threads towards the electrode. (shown right)
- 3. Screw in spark plugs with fingers to seat.
- 4. Using a Plug Socket (with rubber insert to protect plug) tighten to 21 Nm.



5.Refit ignition leads to the correct plugs. Check connectors are secure.



HINT: Pack the anti-seize paste into a small syringe to apply it more precisely and economically.



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		Tools needed :		50
Compress	sion	tester consisting of two separate pressure gauges pressure regulator		
		calibrated restrictor orifice (0,040" / 1 mm)	ULPO Aerd en	
Children and Child		an on/off valve (see schematic drawing).		014 110550
		A source of compressed air (minimum 100psi /7 bar)		ADAPTER
	The leak test should	d be done after the engine has run to operating temperature.		
		ie procedure with each cylinder and each time you check your	PRESSURE	
Compression	Keep accurate reco	rds of compression reading per cylinder		
Check	Make sure master	switch and ignition are OFF when performing work on the engine.	RESTRICTOR	CYLINDER

Remove all valve covers ,one sparkplug from each cylinder and, for safety, remove each ignition lead from all plugs. Rotate the prop by hand (anti-clockwise when standing in front of propeller) until cylinder 2 is exactly on top position while both rocker arms are tumbling. Now cylinder No.1 will be on compression. You can verify this by moving the prop back a quarter turn and then placing your thumb over the spark plug hole and feeling the pressure build-up while bringing the prop back to TDC. Now install the 14mm threaded adaptor (normally supplied with the compression tester) in the spark plug hole of the cylinder to be tested (Cyl.1).

Close air shutoff valve and make sure to have a firm grip on the tip of one of the prop blades before connecting the system to your source of compressed air



MM2.6

Compression...





Compression Check

Move the prop slightly away from TDC by turning clockwise. Adjust the pressure regulator to about 20 psi and slowly open the air shutoff valve. Carefully rotate the prop in the turning direction (anticlockwise) against the 20 psi pressure towards TDC until you feel a "flat spot" or rapid loss of turning resistance. If you go too fast, back up beyond top dead center and try again. It is important to reach TDC with the prop turning in the normal direction of rotation, not while backing the prop up since this would unseat the piston rings. The piston rings must be at the bottom of their lands in the piston with the piston at the top of its travel. Now make sure you have the prop tip securely held. This is a good time to have a second person help you. The air shutoff valve should be open and slowly adjust the pressure regulator to show exactly 80 psi on the pressure regulator gauge.

CAUTION !

Letting the prop move in either direction beyond TDC will allow it to start rotating ; severely injuring the person who was holding it .

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Compression...



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Gently move the prop tip back and forth, just a tiny amount.Watch the cylinder pressure gauge. (double check that regulator pressure gauge is at 80psi)Write down the peak steady pressure.Again, this will be while moving the prop in the normal direction of rotation.

Compression Check Lower pressure regulator and close off air shutoff valve. Disconnect system from cylinder.

Turn prop in normal direction half a turn and repeat test with next cylinder in following order (1-3-2-4).

Normal differential pressure are between 60 and 78 over 80 The numbers of the 4 cylinders should be fairly close to each other (e,g 76/80, 74/80, 73/80 and 75/80. Cylinder reading below 60/80 indicate a problem.

Leak compression tests needs to be done on a regularly base in order to have a good idea of the health of your engine. Compare each test and make your conclusion based on several tests conducted over a reasonable period of time. Compression...





Compression Check What if I have 1 low cylinder value ?

Start the engine and run it on the ground until warm. Test it again.

If it is still low, use a length of garden hose as a "stethoscope" and listen at the exhaust of the ailing cylinder. If you hear a hissing escape of compressed air here, you have an exhaust valve that is not seating.

Similarly, listen carefully with the "stethoscope" at the intake, throttle/air box. A hissing sound here may indicate leakage under the intake valve.

If neither of these areas is leaking significantly, listen at the breather or oil dipstick/filler tube. A leak in this area is indicative of ring blow-by. This could be ring wear, barrel wear or scoring, or all the ring gaps may be lined up.

Hissing between cylinder cooling fins is bad news, possibly a cracked cylinder.

Valve leakage is the most commonly found cause of a low cylinder.



Engine run...

HINT: When doing the engine run make sure to LISTEN to the engine during start-up and when running. For example, leave the headset off during the start-up, and then lift 'one ear' to listen to the engine when running at different speeds. This can be good habit as a pilot too!



MM2.6



The minimum requirement is to 'run the engine' and check for full power / idle and check temps and pressures. However, this is a great time to check all start-up systems too...

For example, a simple way to check ignition and fuel pumps are 'able to work alone' should they have to:-

- 1. Start engine with ignition 1 and main fuel pump
- 2. Start engine with ignition 2 and main fuel pump
- 3. Start engine with BOTH ignitions and auxiliary fuel pump
- 4. Start engine with BOTH ignitions and main fuel pump

a) Start the engine and run to operating temperature.

Smoothly apply throttle to full power.

Check temperatures and pressures are within limits. Record oil pressure, fuel pressure and engine speed (rpm).

Bring engine to idle speed. Record engine speed (rpm)

b) After engine test run, if replaced, re-torque oil-filter to 15Nm

c) After engine test run, inspect oil level and add oil as necessary to maximum mark.

d) After engine test run, inspect for oil and/or fuel leaks

e) After engine test run, adjust idle speed lever position if necessary. Record new engine idle speed.



Idle speed adjustment



Idle speed can only be tested when engine is at operating temperature.

Apply a little throttle so idle speed is at least 1000 rpm during warm-up.

The throttle lever stop (1) is factory set to a position that should correspond to a **warm** engine idle speed of approx. 850 rpm. If the warm idle speed of the engine is unsatisfactory, adjust as follows:

Idle speed is too low:

While engine is running apply throttle to the desired engine rpm.

Set friction to keep throttle in position and turn off engine.

Loosen throttle lever stop screws (3) with a 2.5mm Allan Key and move throttle lever stop (1)

towards the left until it touches the throttle lever (2).

Tighten throttle lever stop screws (3) to maximum 3 Nm (2.25 ft lbs)

Running the engine at less than 700 rpm will cause damage to the engine.

Idle speed is too high:

Verify if the throttle lever (2) is completely against the throttle lever stop (1).

If not, the stops of aircraft throttle system are not set correctly. Adjust according to aircraft manual or manufacturer.

If OK, loosen the throttle lever stop screws (3) with a 2.5mm Allan Key and move throttle lever stop (1) a few mm towards the right. Tighten throttle lever screws (3) and test engine idle.

Idle rpm will probably be too low; readjust as described above. Dia 15

Don't leave throttle lever stop screws (3) loose while engine is running

Switch off engine and master relay while adjusting idle speed

CAUTION : HOT ENGINE





External drive/alternator belt (if applicable)





- For V-belts, after initial installation tensioning, a re-tensioning of the belt is recommended after a period of operation, usually one to two days. Belt tension should be checked periodically, about every three to six months. A more frequent inspection for noise or vibration is recommended.
- There are several options for correctly measuring the belt tension, the most commonly used methods are measuring the belt tension by deflection by frequency.

Given the variety of applications (types of alternators, drives, pulleys, belts,...) and the many different installations applied to ULPower engines, it is impossible to list specific data (e.g. belt tension). We therefore refer to existing literature or the belt manufacturer.

You will need following information to determine the correct belt tension (deflection method and frequency method) :

- Belt type (printed on belt)
- Span length (between center pulleys)
- Belt mass (in case of frequency method- See belt type)

The deflection forces and vibration frequency is available from the belt manufacturer.



Non-Routine maintenance...





Alternator Flange Replacement

Change oil seal at the propeller side of the engine





Propeller flange Replacement



Change of oil seal at the alternator of the engine



Lubricate turbo bearings



Alternator rotor flange replacement...

Tools NeededT063002 Alternator removal tool setBreaker bar(s)Allen KeySpannersTorque Wrench (280Nm/10Nm)



REMOVAL PROCEDURE



1. Unscrew the 8 cap screws with an Allen key to remove alternator fan and starter ring gear. (NB Keep each pair of NordLock washers under the cap screws together.)



2. Keep starter ring gear and fan facing in the same direction as it was assembled.



3. Attach the alternator removal tool to the flange with 4 boltsM6X16. (included in the set)





4. Hold the alternator flange in place while unscrewing the central bolt. Note that the bolt has left hand thread and so you have to turn it clockwise to undo it! Keep the bolt aside.

Alternator rotor flange replacement ...





5. Remove the holder tool and insert the bolt that came with the tools. Remember you have to turn it anticlockwise to screw in the left hand thread. It does not have to be tight; just hand screw it in.



6. Attach the alternator flange pulley removal tool with the <u>4 bolts M6 X 16</u> and wind off the alternator flange by turning the bolt (clockwise).



7. Unscrew the central bolt (clockwise).

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If you are now changing the rear oil seal CLICK HERE



HINT: Take your time and be ready to manage a magnetic force when you are working on this. Place all items on a clean sheet and keep loose magnetic materials away from the work area (nuts/bolts/washers/etc!)

Alternator rotor flange replacement

INSTALLATION PROCEDURE



A. Put some
Loctite 266
(RED) on the
central bolt
(27) thread.



B. Put a couple of drops of Loctite 573 (GREEN) **on the face of the (new) alternator flange and spread using a clean spreader** to seal against oil leaks.





NOTE: You will have to turn the alternator a bit so that the flat faces on the flange and crankshaft mate and it will 'click' in. Do not hammer the flange over the crankshaft; just wind it up with the central bolt (anticlockwise).



C. Slide the (new) alternator flange over the crankshaft. Be careful not to get your fingers stuck as the magnets will attract the flange to the alternator stator.

Alternator rotor flange replacement...



INSTALLATION PROCEDURE (cont.)



D. Torque the central bolt to 280Nm (anticlockwise) while holding the flange with the holder tool as used to unscrew the bolt in step 3 & 4



E. Remove the holder tool and collect all 8 cap screws together with the NordLock washers. The washers are in pairs and the side with the larger steps are faced towards each other.

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Torque the cap screws to 10Nm.



Change O-rings in the oil return tubes...

- 1. Unscrew the 3 bolts (11) to remove the valve cover (10)
- 2. Remove the O-rings (9)
- 3. Turn prop until rocker arms are in neutral position (both valves closed)
- 4. Unscrew the 3 bolts (12)
- 5. Remove the complete rocker axe (13) with rockers and adjusting screws
- 6. Glide both pushrods (7) out of the tubes (Mark them to know which pushrod was on which side (left or right), orientation and from which cylinder)



NOTE: Use the latest Parts catalogue as a guide and for torque values. Here we have pictures from a UL350 parts catalogue.





Change O-rings in the oil return tubes...



- 7. Use screwdriver to bend the locking plate (7). Then unscrew screw (8) and remove locking plate (7).
- 8. Now you can slowly slide out the tubes (5) of the crankcase and remove the O-ring (6) from the tube (side engine casing)
- 9. Take out the tube completely from the cylinder head.
- 10. Carefully clean the seat (hole) in the crankcase and cylinder head.
- 11. Remove second O-ring from the tube
- 12. Install the new O-ring on the 'rocker' end of the tube
- 13. Slide the tube (side without O-ring first) through the cylinder head hole
- 14. Install the second O-ring on the 'crankcase' end of the tube
- 15. Put some sealing silicone (S700001 Elring n° 030.792) on both O-rings and glide them carefully into position on the crankcase and cylinder head.



Change O-rings in the oil return tubes...



- 16. Use a soft hammer and 19mm diameter 'driver' to gently knock the tube slowly to the bottom its crankcase seat.
- 17. Repeat for the second tube
- 18. Reinstall the locking plate (7) and screw (8) torque to 1.5Nm (or latest value)
- 19. Bend the locking plate to lock the screw (replace if damaged)
- 20. Glide both push rods (7) into their respective tubes
- 21. Re-install the rocker axe (13) assembly ensuring orientation (flat side rocker axe = cylinder head side)
- 22. Apply a drop of Loctite 266 to the threads and torque the 3 bolts (12) to 12Nm (or latest value)
- 23. Check condition (replace if necessary)and then carefully reinstall the valve cover seal sealing O-ring (9)
- 24. Check rocker tappet for valve clearance
- 25. Reinstall valve cover (10) with 3 screws (11) to 6Nm (or latest value)



Change oil seal at alternator side of engine...

FIRST: Follow the 'Removal of alternator flange procedure CLICK HERE FOR INSTRUCTIONS

Mark the position of the wires coming out of the alternator stator.



1. Unscrew the 3 bolts M6 to remove the alternator stator (30A)

Or unscrew the 4 bolts M5 to remove the alternator stator (50A)



Parts needed

S2506207 Oil seal Viton 50 x 62 x 7 S700001 Sealing silicone Elring n°030.792 S1066020 O-ring viton 66 x 2

Tools Needed

T063002 Alternator removal tool set T063007 Rear oil seal installation tool Allen Key Torque Wrench (280Nm/10Nm) Breaker bar(s) Spanners



Change oil seal at alternator side of engine...



2. To remove the alternator stator spacer, install the alternator flange pulley removal tool and fix it to the spacer.

For the 30a stator use 3 bolts M6 x 60 For the 50a stator use 4 bolts M5 X 60 **Don't forget to mark the position from the spacer in the back plate**

3. Remove the seal S2506207 from the spacer. Clean the spacer and the engine back plate carefully. (Remove all old silicone).



3a. Clean the crankshaft surface where the seal will slide over during installation to avoid damage to the seal.

4. Install the new seal.

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CAUTION: DO NOT damage the seal during installation.

NOTE Make sure that the seal is

installed the correct way around!



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Change oil seal at alternator side of engine...

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5. Put some sealing silicone (S700001) on the surface that will be in contact with the engine mount plate

6. Install special tool T063007 over the crankshaft gear and put some oil on the external surface. (shown left)

7. Slide the spacer with seal over the tool until the spacer is in the correct place. (shown right)

8. Remove the tool and put some sealing silicone (S700001) on each of the 3 bolts M6 (4 bolts M5) and tighten them to 10Nm

FINALLY: Follow the 'Installation of alternator flange' procedure CLICK HERE FOR INSTRUCTIONS









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Parts needed

BE010509 Thrust bearing mount (only when engine serial number is below 120000)

S2607510 Oil seal Viton 60 x 75 x 10S1052020 O-ring Viton 50x1.78E021506 Thrust bearing discE021504 Thrust bearing retention ring

S700001 Sealing silicone Elring n° 030.792 Loctite 542, 266 Tools Needed T063006 Prop flange holder 40mm socket Allen Key 3mm Torque Wrench (300Nm) Breaker bar(s) Spanners

FIRST: Follow the 'Propeller Flange Replacement Procedure' Steps 1-5 CLICK HERE FOR INSTRUCTIONS

REMOVAL PROCEDURE



1. Unscrew the 8 retaining bolts (4)

2. Carefully tap thrust bearing mount (3) with a rubber or soft nylon hammer to loosen the thrust bearing from the casing

(NOTE: sealing silicone has been used during the assembly of the engine.)

3. Remove the thrust bearing mount (3) from the engine.











 Remove the thrust bearing disc (16) from the crankshaft



5. Take the retention ring <mark>(7)</mark> from the crankshaft



6. Take the O-ring <mark>(6)</mark> out of the groove in the crankshaft



(11)

(10)







7. Carefully clean the crankcase and thrust bearing house until all sealing silicone is gone.

8. Carefully remove the old seal (2) without damaging the aluminium housing.

8a) Smear a little Loctite 5910 onto
the outside of the seal and install the
new seal (Part number S2607510)
(2) using a soft plastic/nylon hammer







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NOTE Make sure that the seal is installed this way around!

Change oil seal at prop side of engine... INSTALLATION PROCEDURE



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1. Apply clean oil (you can use the same oil as you use in the engine) on the outer and inner side of the retention ring.



2. Slide the retention ring into the seal from the 'prop flange side'

NOTE Install the retention ring from the same direction as shown!



3. Apply sealing silicone (S700001 Elring n° 030.792) onto the housing mating surface





(5)

4

4. Clean the crankshaft and O-ring groove.

(16)

5. Oil the O-ring and carefully install

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(10)

(9)

(8)

NOTE Always install a NEW O-ring

令ノ目号



MM2.6



6. Install the new thrust bearing disc in the housing



9. Push the retention ring over the O-ring



7. Push the ring against the collar



10. Re-install the 8 bolts and torque to 10Nm – NOTE: there is no Loctite applied to the threads.



8. Carefully slide the housing and retention ring over the bearings and crankshaft



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Propeller Flange Replacement...

Tools Needed T063006 Prop flange holder 40mm socket Allen Key 3mm * Torque Wrench (300Nm) / Breaker bar(s) Spanners



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Unscrew the M6 screw using a 3mm Allen key *

 A series of engines produced in 2019 and 2020 have an M5 screw. Use a 2.5mm Allen key. Replace them with an M6 screw when using a new propeller flange

2. Using an M6 bolt, remove the locking plate as shown



4. Hold the prop flange in place whilst unscrewing (right hand thread) the central bolt (40mm hex socket)



5. Pull off the prop shaft flange from the crankshaft



3. Attach the propeller flange holder (T063006) to the prop flange with M14 bolts

If you are now changing the front oil seal CLICK HERE



6. Carefully clean the crankshaft paying particular attention to the front face shown here

Propeller Flange Removal...



7. Carefully clean the prop flange paying particular attention to the flat mating surface face shown here





9. Carefully clean the bolt, especially cleaning the flat contact surface shown here.

Apply a small amount of grease to the flat surface AND the thread of the bolt.

10. By hand, screw the bolt (right hand thread) into the crankshaft as far as possible.



8. Carefully align then slide the prop flange over the splines of the crankshaft.





Installation of item 2 is mandatory for a good propeller performance

Nr.	Discription	Quantity
1	Propeller Flange	1
2	Propeller Reduction	1
3	Drive Lug	6

If not using the ULP standard flange, don't forget to install propeller reduction (2)

Propeller Flange Removal...



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11. Attach the propellerflange holder (T063006)to the prop flange withM14 bolts



13. Place the locking plate over the hex top of the bolt. Find out if the existing M6 hole in the locking plate correspond with the M6 hole in the flange. If not, move the ring through 60° (one flat) on the bolt.



12. Torque the bolt to 300Nm while holding theprop flange. (right handthread)

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13 a. IF the M6 holes do not match:
-Use a Ø6mm drill to center the hole (through the hole Ø6 in the prop flange) into the locking plate.
-Drill a hole Ø5,1 through the locking plate (till the drill touch the steel bolt)

-Cut M6 thread until just touch bottom of the hole.

14. Reinstall M6x15 grub screw until head is about 0.5mm below surface, using Loctite 243 and lock the screw again by punching 2 dimples

CAUTION!! It is possible during initial running that the flange bolt may loose a little torque. Therefore re-torque after 5 hours.

Revisions

Revision 2.1 - September 2019

Removal of the prop flange check at 5 / 15 hours Add extra info into the prop flange removal procedure (m5 for engines with serial number above 193801

Revision2.2 - July 2020

Remove m5 hole instruction in the prop flange removal procedure Add extra info into the prop flange removal procedure (5 hour torque check) remove 5 hour check column

Revision 2.3 - June 2021

Slide 8 : change warranty conditions Slide 16: maintenance for UL520T added Slide 20: change S3141815 to S3142015

Revision 2.4 - April 2022

Slide 8: add 1200h TBO for UL520T Slide 9 : remove referral to 5 hours check Slide 62 : Add instruction to lubricate turbo bearings Revision 2.5 - June 2022

Slide 13 : NOTE: Turbo engine = replace oil every 50 hours or annually

Slide 16 : visual inspection turbo compressor: add "check free spinning wheel"

Slide 62 : how to lubricate the turbo bearings

Revision 2.6 - July 2022

Slide 16 : visual inspection turbo compressor: remove "check free spinning wheel" Slide 62 : removed