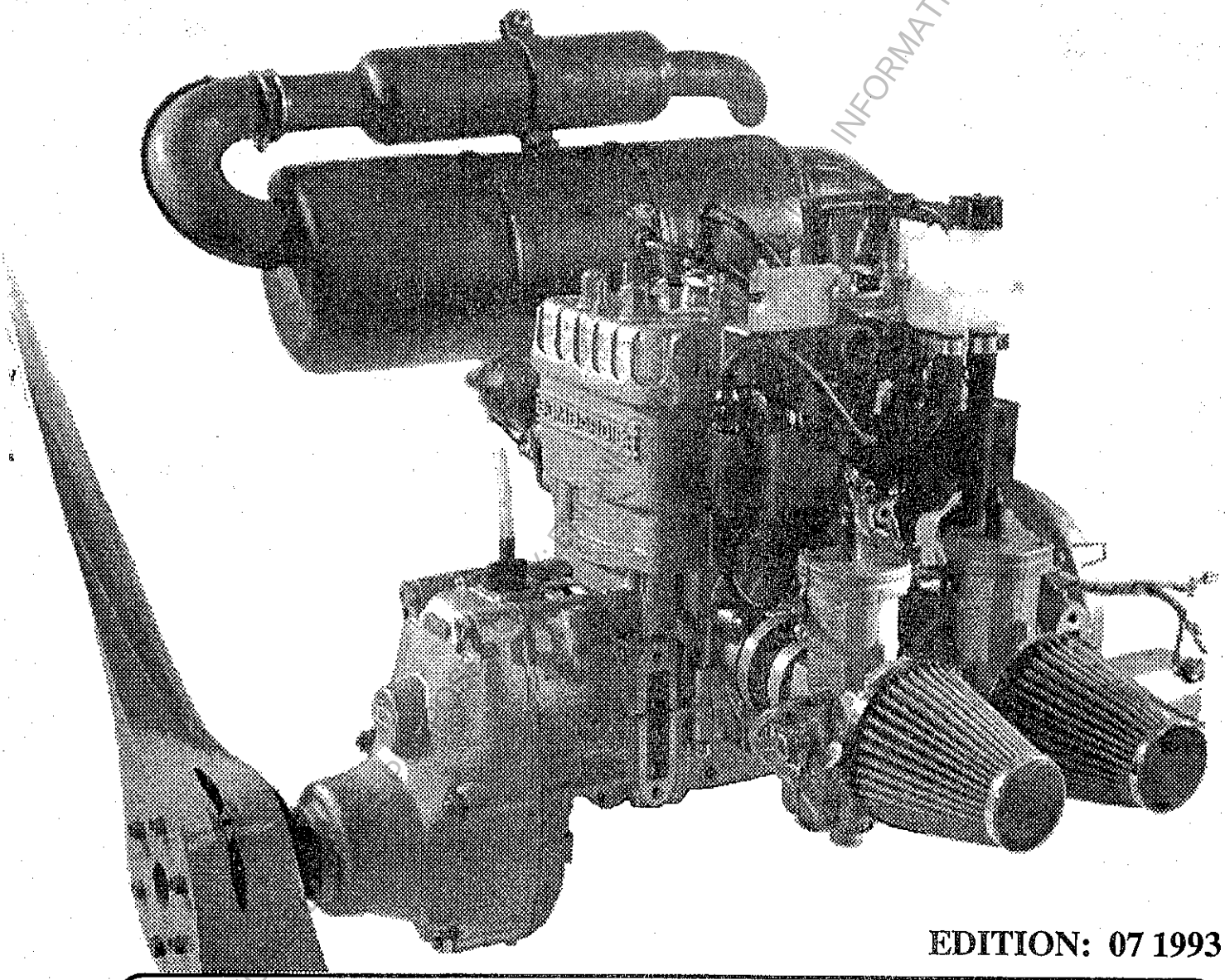
BOMBARDIER ROTAX®

OPERATOR'S MANUAL
ENGINE TYPE
582 UL DCDI

Equipped with
breakerless ignition system
and BING carburetor



EDITION: 07 1993

This manual contains important safety and maintenance information concerning your engine. It must remain with the engine at time of resale.

recommended price: ATS 100,--
part no.: 897 624 US $ 10,--

Modifications or special applications	Date

Index

2) Foreword:

The ROTAX engine is a liquid-cooled 2 stroke engine. Careful and extensively tested design and rugged construction as well as the use of high quality parts increase reliability and durability. With proper maintenance and care and with the use of suitable fuel and oil the engine should give you good service for many years.

The ROTAX design incorporates the latest technical developments.In order to take advantage of future developments we reserve the right to make modifications in the ROTAX design without notice.

■ NOTE: All fasteners are metric with the exception of the internal thread of the P.T.O. shaft which is 1/2" national fine thread and certain pipe fittings. It is to your advantage to read this manual carefully for the protection of your engine. There may be extreme differences from other types of two cycle engines you may have worked on.

■ Always use genuine ROTAX parts.

■▲ Never run engine without proper loading, e.g. correct propeller. Refer section 29, technical data.

3) Fuel and oil:

▲ Fuel contamination is a major cause of engine failure. The best place to avoid contamination is at the source. Once in your fuel container, a very harzadous potential exists.

Use a clean safety approved storage container. Filter all fuel entering and leaving this container. Do not over-fill container, allow for expansion.

▲ WARNING: Gasoline is flammable and explosive under certain conditions. Always perform procedures in a well ventilated area. Do not smoke or allow open flames or sparks in the vicinity. Never add fuel while engine is running.

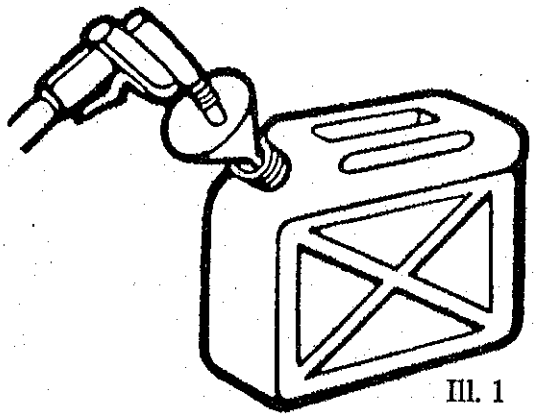
■ Refer to technical data. The engine is designed to operate on a fuel mix with 2 % oil. Be sure to use products of at least the standard shown in the technical data section.

If the engine is to be used inverted (with spark plugs pointing down) select a lubricant which features low carbon deposits. Oil residues tend to drain to low points, i.e. spark plug cavities. If these residues fail to burn clean during normal operation, plug fouling will occur, possible pre-ignition also. Manufactures of suitable lubricants will guarantee their products in writing.

Oil specifications: SUPER two stroke oil (for high performance air cooled two cycle engines, proposed ASTM/CEC standard TSC3) for instance: Castrol TTS or Blizzard oil.

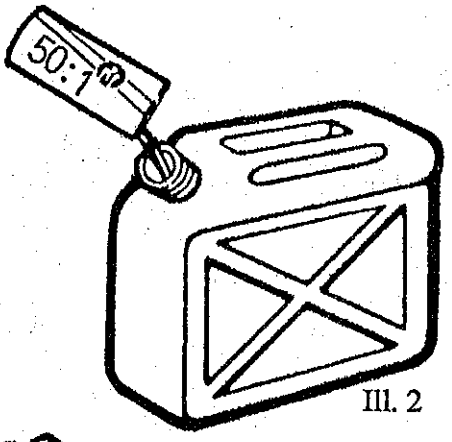
▲ Do not use fuel which has been stored for long periods of time. Do not leave fuel exposed to sunlight in translucent containers.

3.1) Mixing procedure:



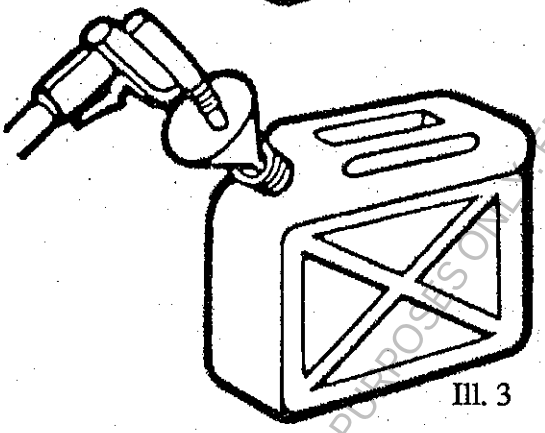
Ill. 1

STEP no.1: Use a clean approved container of known volume. To help predilute the oil, pour a bit of fuel into the container.



Ill. 2

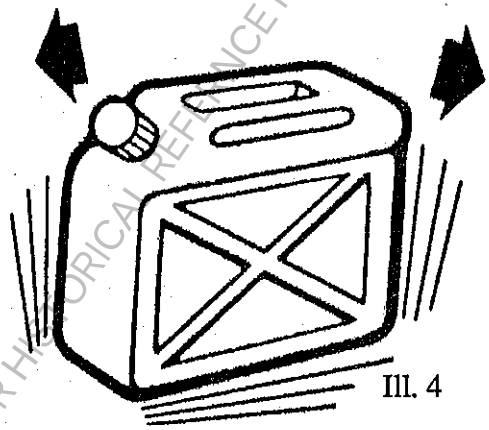
STEP no.2: ■ Fill known amount of oil into container. Oil must be approved for aircooled engines at 50:1 mixing ratio. Agitate slightly to dilute oil with gasoline.



Ill. 3

STEP no.3: Add gasoline to obtain desired mixture ratio (use fine mesh screen).

■ Fuel must be of minimum M.O.N. 83 or R.O.N. 90 octane rating.



Ill. 4

STEP no.4: Replace container cap and shake the container thoroughly. Then using a funnel with a fine mesh screen to prevent the entry of water and foreign particles, transfer mixture from container into the fuel-tank.

4) Starting Procedure

4.1) Pre-start check

■ ATTENTION: Prior to engine start, read Manual and pay attention to stated guidance.

▲ WARNING: Engine delivered in dry state (without oil in engine or reduction gear). Consult section 29) Technical Data, for recommended lubricant.

Before starting engine, read section dealing with starting and engine break-in thoroughly. The service life of the engine is largely determined by how well you follow these instructions.

▲ Before starting engine be sure your installation is complete, ensure that all controls operate easily and smoothly, and that you can operate them instinctively.

▲ Always ensure that you are in a safe run-up area.

■ Ensure throttle linkage allows piston valve in carb to bottom in idle position. Screw out idle speed adjustment screw (see section 8, no.14) until carb piston (no.3) bottoms. Carefully turn in adjustment screw until it engages piston and turn in a further 3 to 3 1/2 full turns. Check if fuel line is connected and tank vent is open.

4.2) Procedure:

On cold engine apply choke fully. Ensure idle position. (Opening throttle will greatly reduce choke effect resulting in hard starting). Make sure ignition switch is on and that you can shut it off instantly if necessary. Pull starter until firmly engaged and then pull smartly through.

Above procedure should be repeated until engine begins to "fire". As soon as engine starts, shift the throttle slowly to low speed and remove choke as soon as possible. (Prolonged use of choke can cause engine to flood).

If the engine fails to start or operates only on one cylinder, check whether the ignition wiring is correctly connected to the spark plug connectors and the ignition switch is in ON position.

■ Ensure shorting switch is in correct position and wired correctly.

If preceding checks do not solve the problem, remove the spark plugs and inspect. Wet spark plugs indicate a flooded engine. To correct replace with dry plugs and discontinue use of choke.

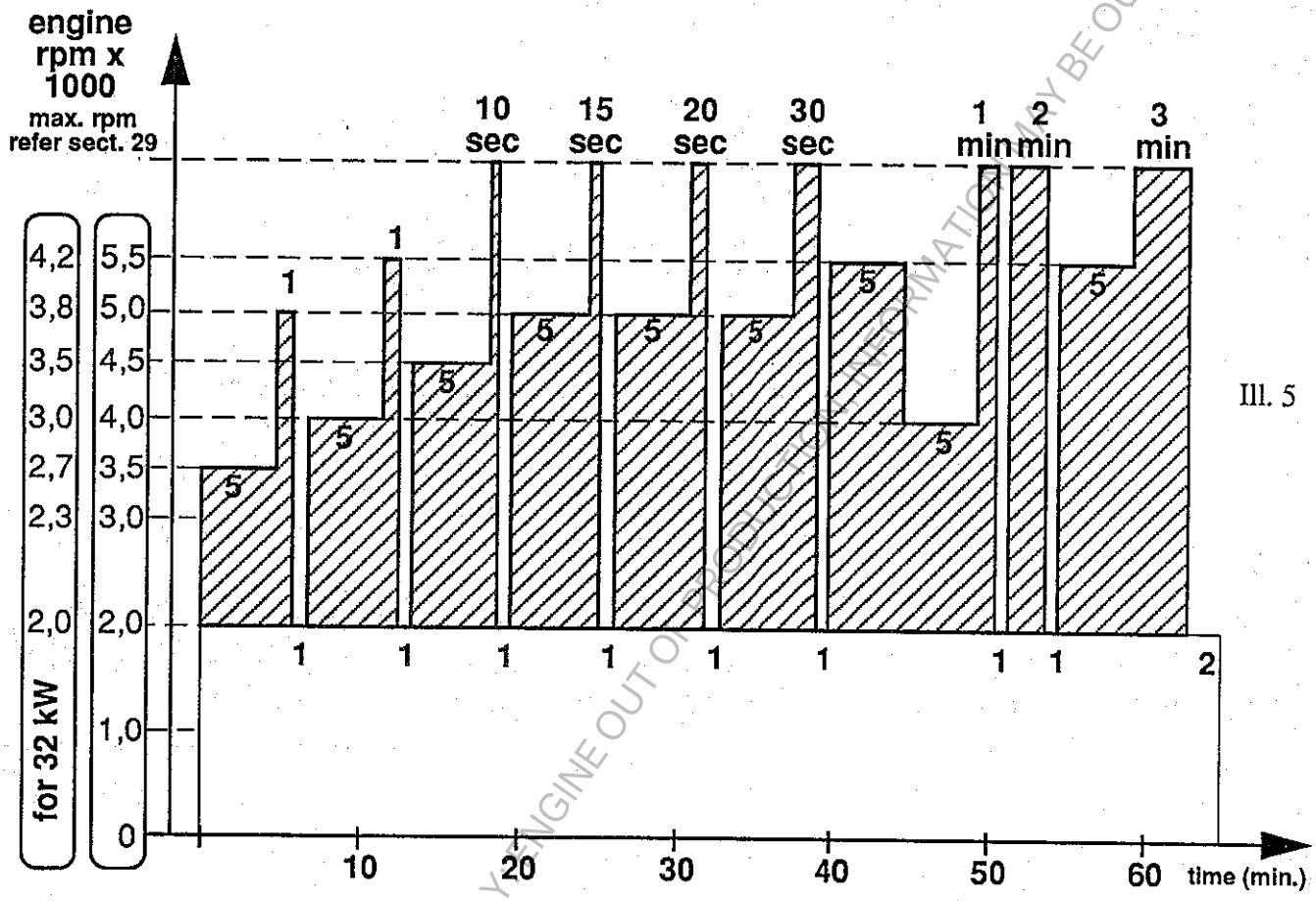
Switch off ignition; remove choke. Crank engine with throttle fully open to clear the excess fuel. Repeat start procedure.

Dry spark plugs indicate no fuel in engine. TO INSPECT: remove float bowl and ensure fuel is present in sufficient quantity. If not, inspect fuel level in tank, fuel valve and tank vent. Look for blockage or obstruction. Correct and repeat start procedure.

5) Break-in procedure

for aircraft installation (in other applications proceed accordingly)

The break-in has to be performed with the engine installed, properly loaded with matched propeller for max. R.P.M. In case of an aircraft, anchor the plane to the ground. Run the engine according to the following graph:



Ill. 5

▲ In case of a liquid cooled engine it is possible that the air flow (speed) on ground is not fast enough to provide the necessary cooling for a longer period. Therefore it is necessary to observe carefully the temperature of the cooling liquid during break-in procedure to avoid overheating. Before exceeding the maximum allowed liquid temperature on cylinder head (outlet) of 80 °C/180 °F interrupt the run-in and cool down the engine at idle for approximately one minute and continue where you have interrupted.

▲ Be sure to use a safe run-up area to anchor aircraft at those points approved by the airframe manufacturer, and to have someone present who is able to shut off the engine instantly and prevent people from entering the area. Proper clothing should be used at any engine run or ground test.

■ After this procedure the idle has to be adjusted. Then short take-offs can be conducted.

■ After initial break-in adjustment is performed, only normal maintenance is required (see maintenance schedule).

6) Operation in flight:

(or under working conditions-other applications)

It is recommended to use full throttle during take-off climb. Slight throttle reduction may create a leaner mixture and should be avoided. Select a cruising speed where the engine is running smooth.

Do not exceed maximum engine rpm. (refer technical data, section 29)!

During cruise and descending it is very important not to create a lean condition with high rpm and low throttle opening. The less fresh charge the engine gets, the more hot residual gas remains in the cylinder. This raises the temperatures to a critical level.

For this reason, you may also experience higher exhaust gas and cylinder head temperatures at reduced throttle openings.

Idling r.p.m. is 2000 minimum. Higher idle r.p.m. setting will reduce enrichment action of starting circuit in carburetor (choke) making cold starting difficult.

Prior to shutdown,engine should be run until latent heat build-up from previous high power settings has been dissipated (approx. 3000 r.p.m. or at nearest smooth running r.p.m. for a minimum of two minutes followed by a short period of idle - 2000 r.p.m.).

Do not idle for prolonged periods as normal rich condition present at this power setting can cause unnecessary carbon deposits and spark plug fouling. Additional shock loads present at idle cause gear box, propeller, and/or drive trains to operate in conditions which should be avoided whenever possible.

7) Rotary Valve:

7.1) General:

Different rotary valves and adjustments are in use:

7.1.1) Part no. 924 200 for standard and 582/40 kW version. For identification please check cut off section = 132°

7.1.2) Part no. 924 202 for 582/32 kW version. For identification please check cut off section = 117°

7.2) Rotary valve marking:

From top end of magneto side inlet port, mark crankcase at β = closing time (see ill. below). For rotary valve timing see technical data, section 29.

7.3) Rotary Valve Adjustment:

Installation: To correctly install the rotary valve disc proceed as follows:

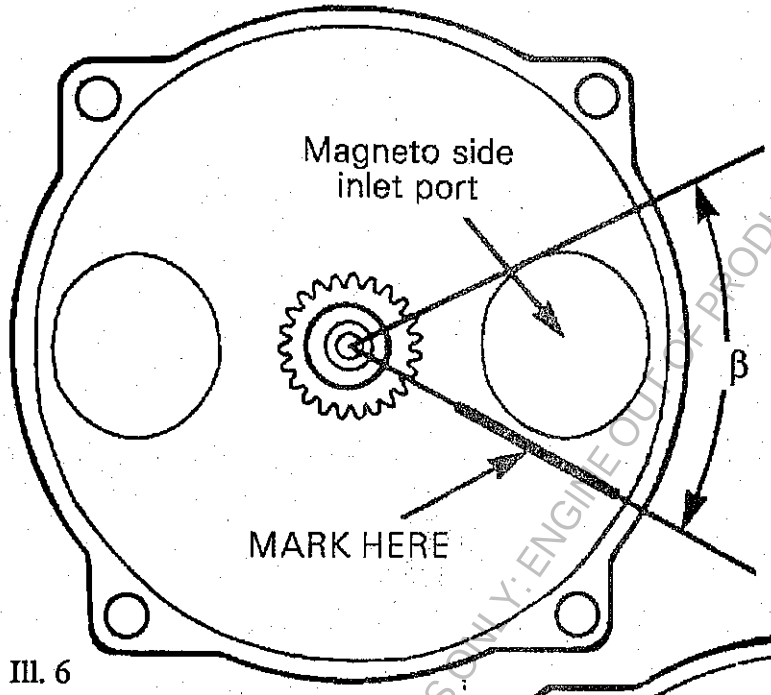
- Turning crankshaft counter-clockwise (p.t.o. side), bring magneto side piston to Top Dead Center using a T.D.C. gauge.

- Position the rotary valve disc on gear to have edge as close as possible to the mark.

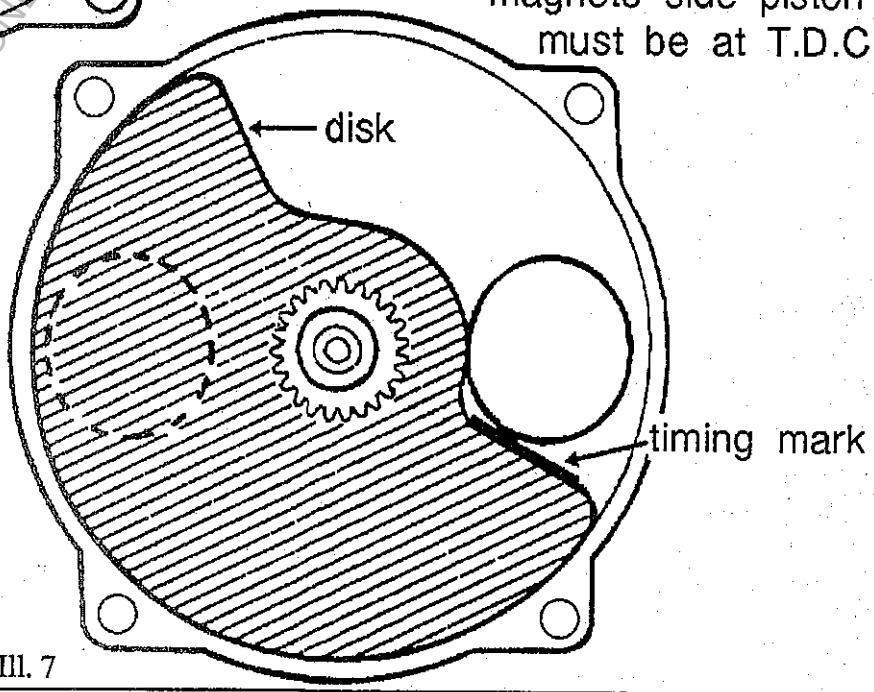
NOTE: The rotary valve disc is asymmetrical, therefore, at assembly try positioning each side of disc on gear to determine best installation position (see ill. below).

7.4) Rotary valve values:

For rotary valve values and timing see technical data, section 29.



Ill. 6

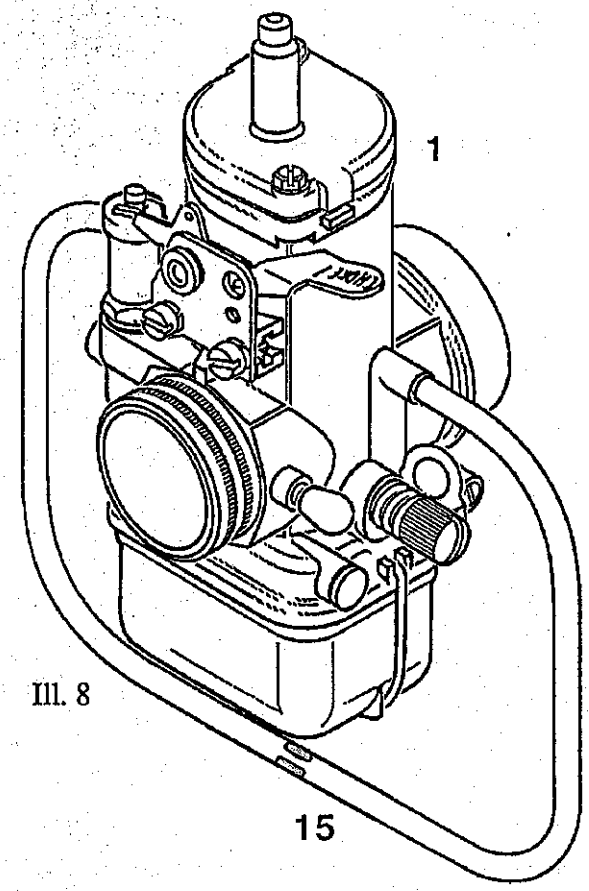


Ill. 7

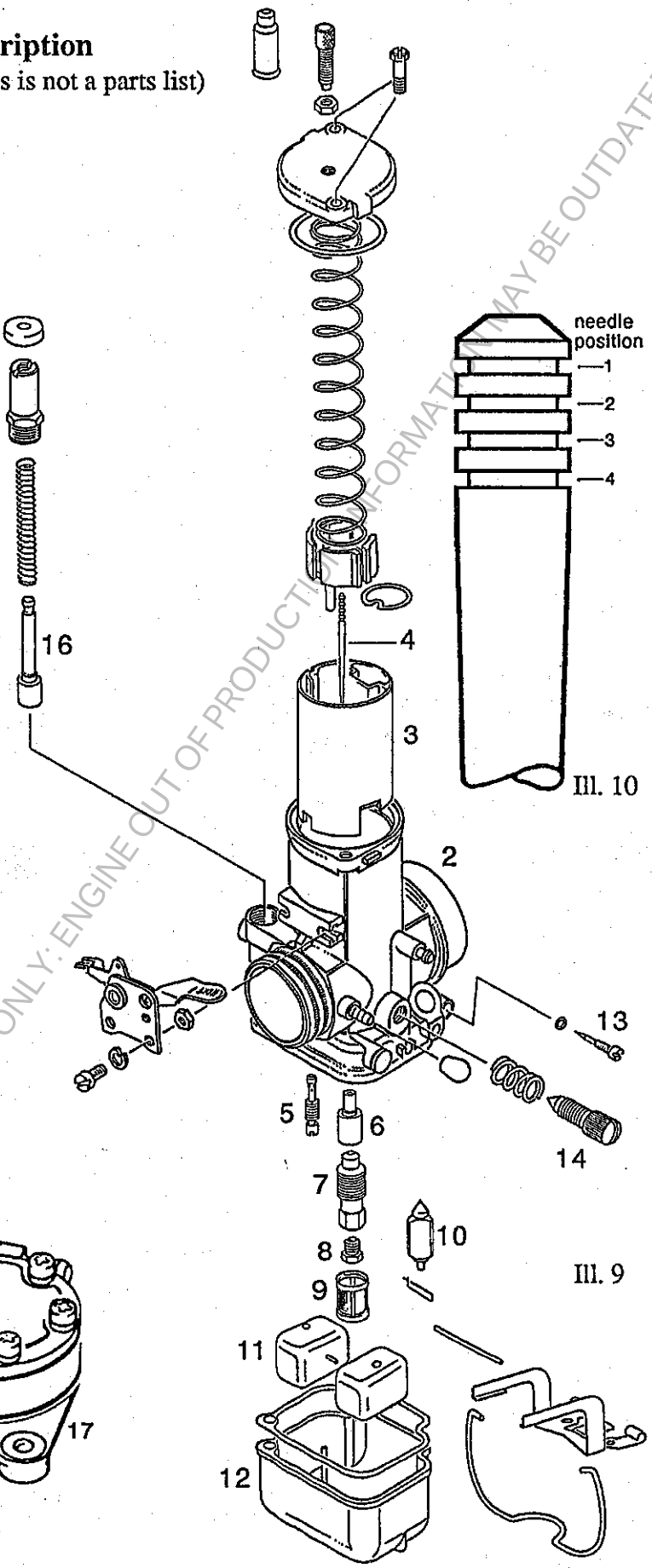
8) Carburetion

BING Carburetor - typical description

(Note: this is not a parts list)

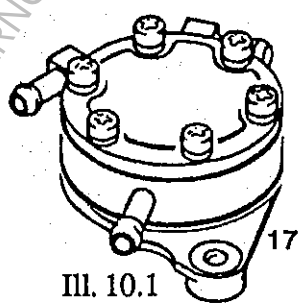


Ill. 8



Ill. 9

Ill. 10



Ill. 10.1

1) *BING-double float carburetor*
2) *carburetor housing*
3) *carburetor piston*
4) *jet needle*
5) *idler jet*
6) *needle jet*
7) *mixing tube*
8) *main jet*
9) *sieve sleeve*
10) *float needle valve*
11) *float*
12) *float chamber*
13) *air screw*
14) *idle adjustment screw*
15) *vent tube*
16) *starting piston*
17) *fuel pump assy.,*

■ The BING carburetor is a piston type carburetor with float chamber. The carburetor can be adjusted by jet replacement of various approved sizes, by adjusting idle air/fuel mixture screw, carb piston stop adjustment, needle sizes, and needle position.

The air/fuel mixture at idle speed is adjusted by the air adjusting screw (see ill.9, no. 13). The idle r.p.m. is adjusted by the carburetor piston adjustment screw (see ill.9, no. 14).

■ NOTE - these idle adjustments interact, so adjusting one may require minor adjustment of the other.

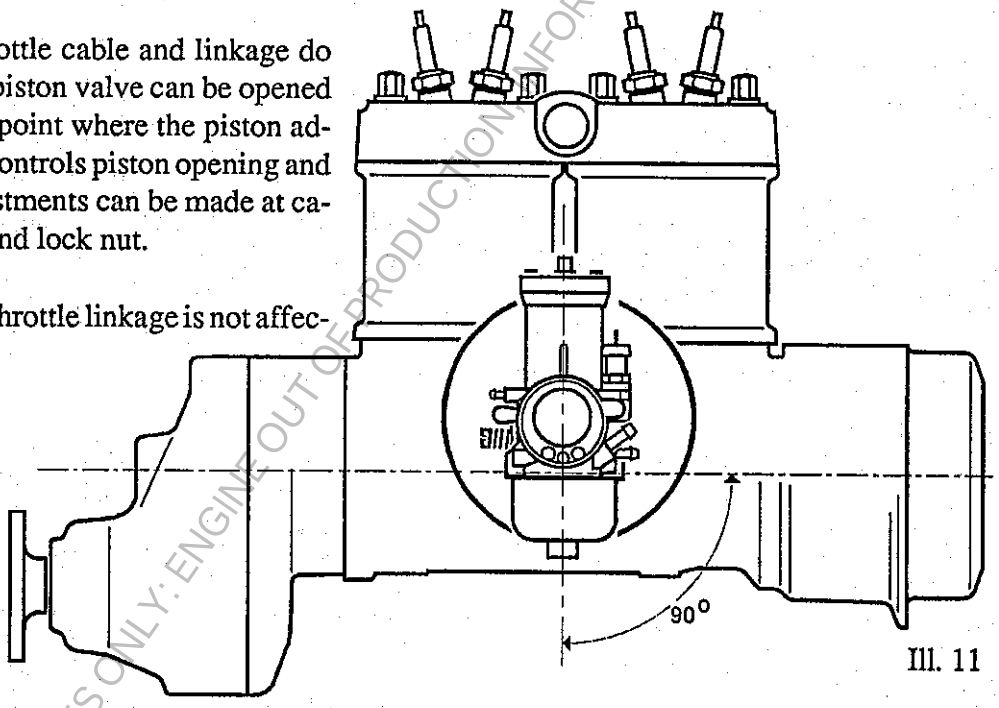
■ NOTE - The carburetor must be in an exact right angle position in relation to the crankshaft in both views from top and from the intake side to ensure an equal mixture distribution to both cylinders (see ill. below).
Changing parts should be done only after all other items have been checked, and then by an experienced two cycle mechanic.

▲ Ensure that throttle cable and linkage do not stick and that carb piston valve can be opened fully and closed to the point where the piston adjustment screw no. 14 controls piston opening and idle RPM. Minor adjustments can be made at cable adjustment screw and lock nut.

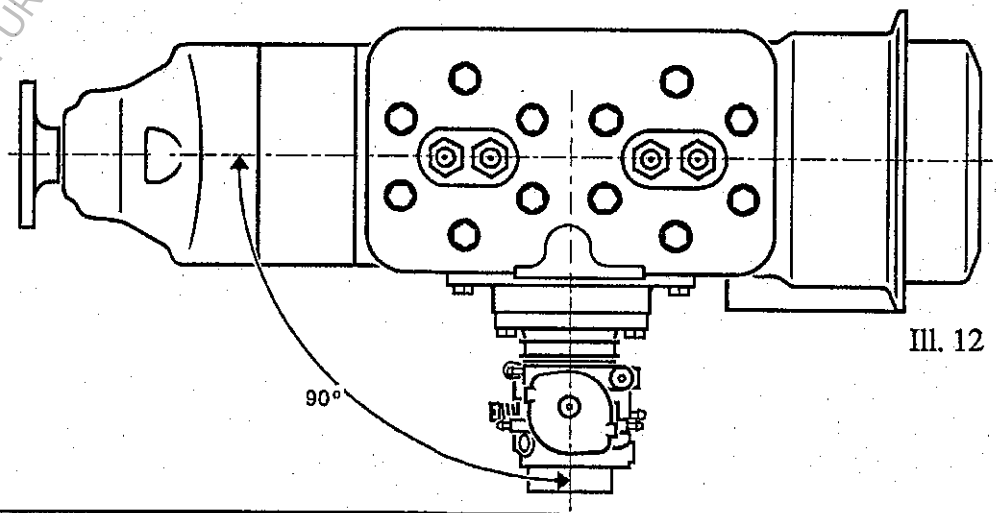
▲ Be certain that throttle linkage is not affected by engine or airframe movement. This could change throttle settings.

▲ Air intake filtration and/or noise reduction devices must be in place for proper carburetion. See section on special operating conditions.

■ Special operating conditions, such as severe climate or altitude change may require different jetting. Contact your dealer.



Ill. 11



Ill. 12

9) Exhaust systems:

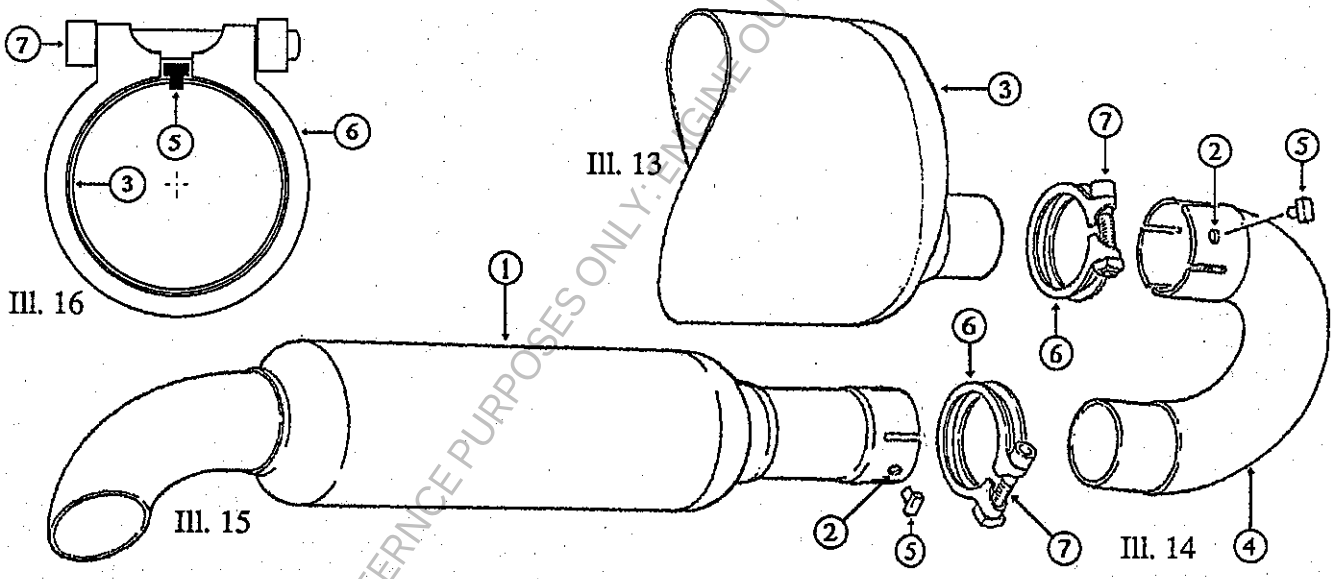
Considerable effort has gone into the design of the ROTAX exhaust systems. Any changes may severely deteriorate performance, reliability, engine life, fuel economy, and the system's ability to reduce noise to acceptable levels. Beware of any accessory systems that advertize an improvement over the stock components. Do not make any changes to the exhaust system supplied.

■ Vibration due to improper suspension is any exhaust system's worst enemy. Properly mounted and maintained, your exhaust system will provide a long service life.

▲ Never remove coupling spring with a sharp object which could mark the spring material. A rounded screw-driver shank or a hook fashioned from 1/4" bar is ideal. Safety-wiring of springs is highly recommended. Exhaust ball sockets should be kept lubricated by a heat resistant grease to allow movement between engine and muffler.

9.1) After-muffler:

For assembly of the after-muffler system, make 2 bores 5,7 ⌀ for the securing bolts, after having decided in which position the after-muffler ❶ should be installed. The outside bores ❷ are already made standard. After drilling the bores remove all chips from the exhaust system. To assure correct position of the after-muffler during engine operation, the connections between exhaust muffler ❸ and connecting elbow ❹ and between connecting elbow ❹ and after-muffler ❶ must be secured with the bolts ❺ against twisting. For keeping the securing bolts ❺ in position, fit the clamps ❻ so that the Allen screw ❼ clamps the securing bolt ❺.



10) Instruments - how and why:

Instruments can be a valuable addition if they are of good quality, correctly installed, maintained, and the operator understands what they are telling him.

▲ Never use a tachometer which is connected to the ignition system. Use a tachometer operating on the lighting coil (ref. section 14, electronic tachometer). All instruments requiring power source must be overload protected. (ref. section 13.7 and 13.8).

All wiring and sensor leads must be properly routed, protected from vibrations and abrasion.

■ Cylinder head temperatures are taken at the spark plug seat. Exhaust gas temperatures are measured at 100 mm (3,94 in.) from the cylinder sleeve. See section 29 (technical data), for temperatures.

11) Oil Injection for engine lubrication:

11.1) Product description:

In this case the engine is equipped with a gear driven oil pump to supply an adequate quantity of two stroke oil to each cylinder. The oil pump is a plunger type pump with metering system. The amount of oil is determined by engine RPM and pump lever position. This lever must be actuated by a Bowden cable connected with the throttle cable. The oil pump is gravity fed from an oil tank. In case of oil pump lubrication the engine carburetors are supplied with pure fuel (no mixture).

11.2) Technical data / characteristics:

11.2.1) Oil delivery: max 135 cc/h and discharge port at 1500 pump RPM.
11.2.2) Oil: High quality two-stroke injection oil with a pour point of 10 °C below lowest ambient temperature.
11.2.3) One oil inlet nipple
11.2.4) Two oil exit nipples with integrated check valve

11.3) Installation:

11.3.1) Oil tank capacity: It should be more thean 5 % of the fuel tank capacity .

11.3.2) An oil tank with above mentioned capacity with a bottom outlet not lower than the pump inlet nipple (see fig. 1, section 11.5).

11.3.3) A stiff suction pipe tube, oil resistant, with clamps in a way that no squeezing is possible.

11.3.4) An adeguate oil filter (eg.: Rotax part no. 956 330) between oil tank and oil pump inlet nipple

11.3.5) A Bowden cable to actuate the pump lever simultaneously with the carburetors.

11.3.6) Adjustment of oil injection pump alignment marks: At throttle lever idle position the marks must be aligned (see fig. 2).

11.3.7) Vent suction pipe before engine start by opening the vent plug (see fig. 2) until all air is vented from that line. Close vent plug thoroughly.

11.3.8) It is recommended to fill the first tank of fuel with a fuel / oil mixture at a ratio of 100 :1. This is for safety until the whole system is properly filled with oil.

11.4) Maintainance:

11.4.1) Check oil tank before every flight and refill if necessary.
11.4.2) Check oil lines, nipples, connections, oil pump lever adjustment at every preflight check.
11.4.3) Verify that the oil consumption is approximately of a ratio of 1 : 50 up to 1 : 70 of the fuel consumption.
NOTE: This oil injection will not affect or replace the rotary valve gear lubrication nor the propeller gear lubrication.

11.5) Examples of Installation:

Item numbers refer to both figures

❶ *Engine*
❷ *Oil tank*
❸ *Suction line*
❹ *Oil pump*
❺ *Discharge line*
❻ *Check valve*
❼ *Oil intake port*
❽ *Adjuster nuts*
❾ *Vent plug*
❿ *Oil filter*

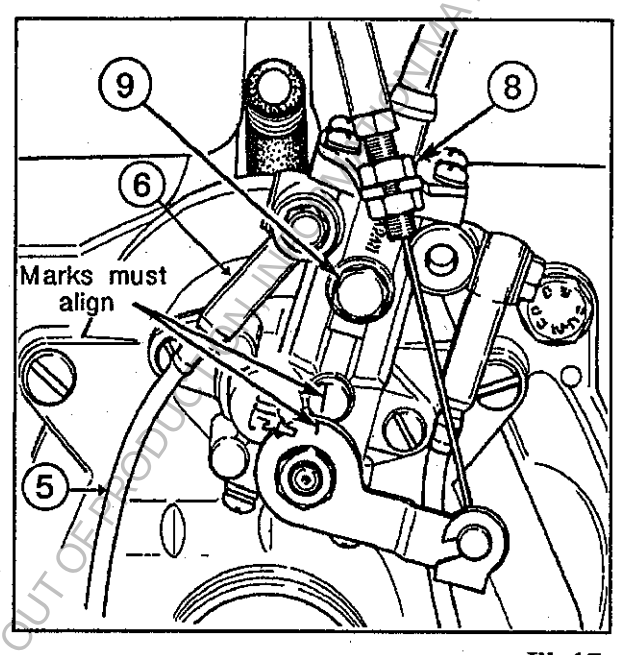
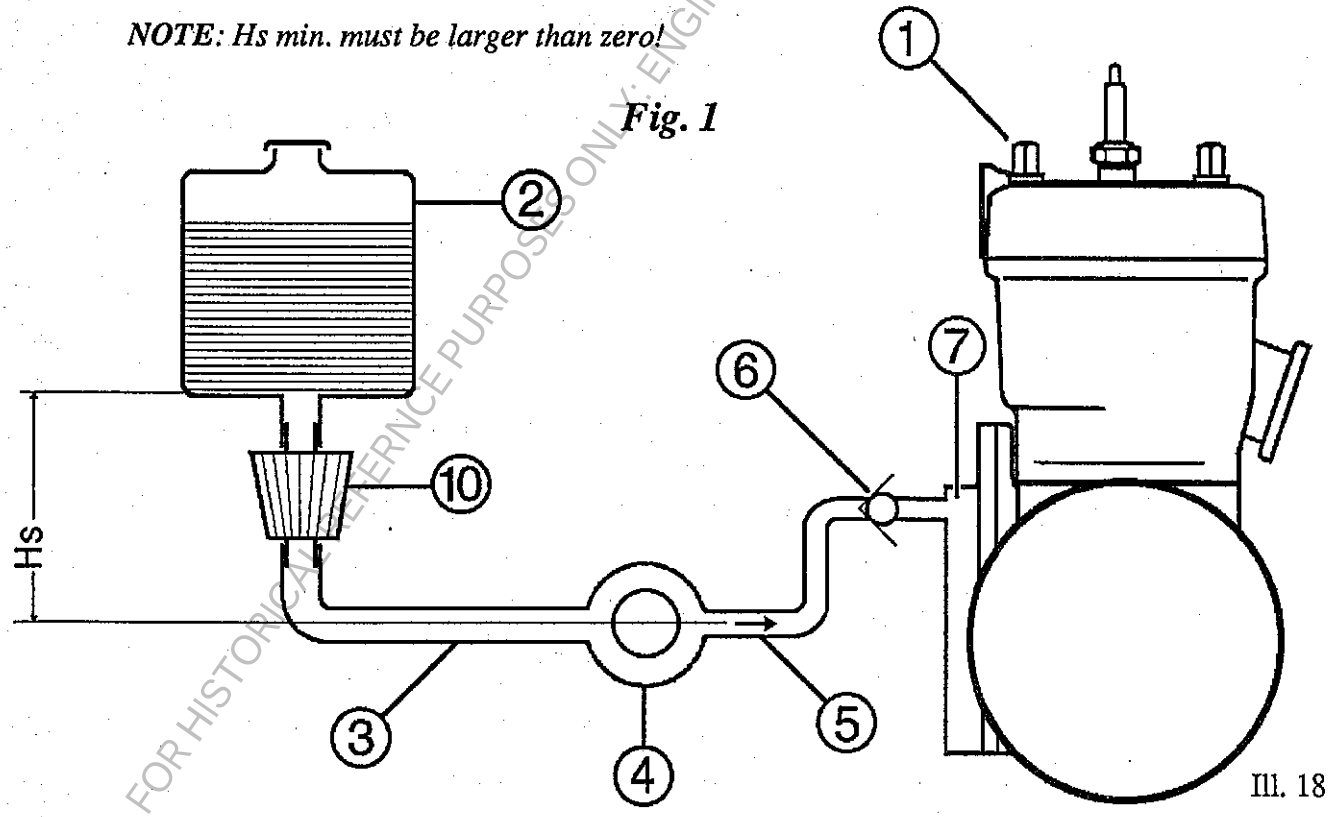


Fig. 2

Ill. 17

NOTE: Hs min. must be larger than zero!

Fig. 1



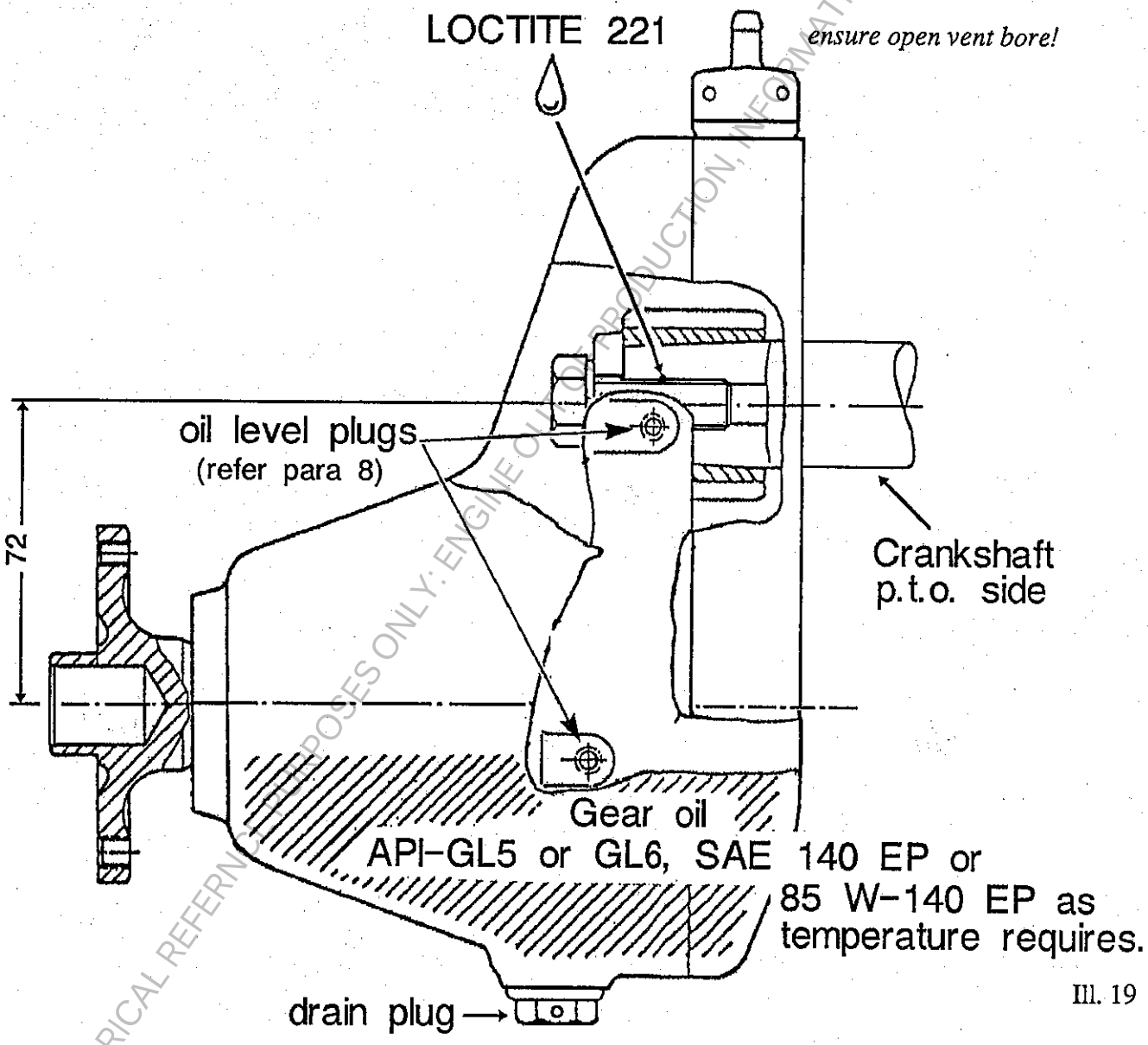
Ill. 18

12) Prop gear , Type "B"
for UL - prop gear on ROTAX engine type 582

12.1) Mounting instructions:

12.1.1) Clean contact surfaces between crankcase and gear-housing and moisten contact surfaces between crankcase and gear-housing with LOCTITE 648, green. Fit O-ring in O-ring groove, applying some light grease to ensure it remains in groove.

12.1.2) Clean and degrease taper of engine PTO shaft carefully with approved degreasing agent.Degrease also 1/2" bolt and PTO shaft thread.



Ill. 19

NOTE: Gear-boxes for this engine type can be fitted alternatively with prop shaft below or above crankshaft axis (see also paragr. 12.1.5).

■ 12.1.3) Fit drive gear with 1/2" bolt, washer and lock washer, use Loctite 221 (light) only on thread.

Torque for 1/2" bolt: 60 Nm (530 in.lb.)

■ 12.1.4) Fix complete gearbox with hex.screws to crankcase

Torque for hex.screws M8 8 Nm (70 in.lb.)

■ 12.1.5) Inspect correct position of oil drain plug (bottom) and vent plug (top).

▲ 12.1.6) Secure drain plug with approved safety wire.

12.1.7) Prop hub is tapped for 6 x 1/4" NF bolts (as well as 6 x M8), bolts not supplied by ROTAX.

▲ 12.1.8) Fill gear oil API-GL 5 or GL 6 SAE 140 or 85 W - 140 EP into gear-box (for both directions of prop. shaft - above and below crankshaft axis) up to lower level oil plug. Secure vent plug with approved safety wire.

12.2) Preflight Instructions

▲ ATTENTION: As supplied by the factory, irrespective whether gear-box is loose or fitted to engine, there is no oil in the gear-box.

Fill with oil as specified to proper level. Tighten drain plug. Tighten vent plug and oil level screws and secure with approved safety wire before use! Check tightness of screws.

12.3) Maintenance

▲ 12.3.1) Every 10 operating hours:

Check oil level on respective oil level screw and secure again with wire.
Change oil after 1st 10 hours of operation, clean magnetic drain plug at each oil change.
Check propeller tracking and tip clearance.

Change oil every 100 hours or every 2 years (which occurs first).

▲ NOTE: Mounting and maintenance operations must be done by skilled personnel only.

13) Ignition System:

13.1) General:

The engine is equipped with a breakerless 12V 170W DUCATI capacitor-discharge dual ignition. It consists of a flywheel magneto generator, 2 double ignition coils with integrated control-circuit and 2 external triggers (pick-up).

The 12-pole flywheel generator is an outer rotor type with 12 integrated permanent magnetos. The stator is equipped with 12 coils. 8 of them are used for feeding auxiliary equipment and 4 are used for the dual ignition. The grey cable is foreseen for connection of a tachometer.

13.2) Function of the ignition unit:

Two charging coil pairs fitted on the generator stator and independant from each other feed one each ignition circuit. The energy supplied is stored in the ignition capacitor. At the moment of ignition the external triggers supply an impulse to the control circuits and the ignition condensors are discharged via the primary winding of the ignition coil. The secondary winding supplies the high voltage for the ignition spark.

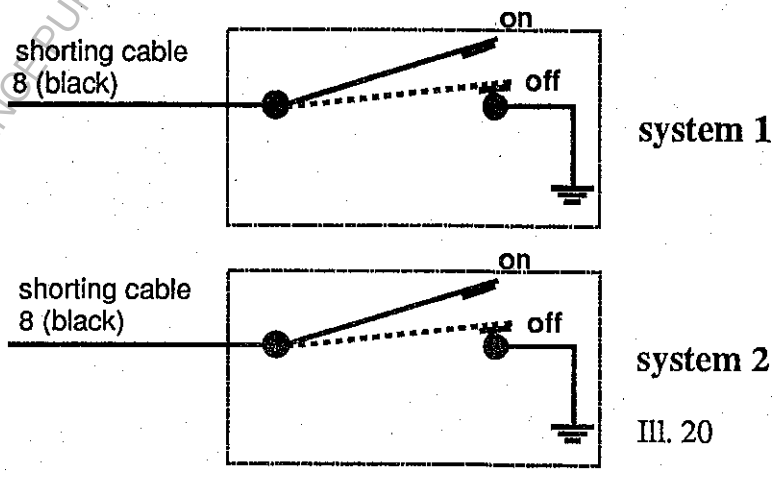
ATTENTION: When flying <u>both</u> ignition systems must be switched ON!

13.3) Checking of ignition unit:

Before every start the function of the two ignition systems has to be checked. For checking the ignition unit the engine must be operated at 3000 to 3500 l/min and alternately ignition system 1 and 2 must be switched off. The RPM-drop must not exceed max. 300 l/min.

ATTENTION: With engine running the trigger cable (red) must not be disconnected from the electronic box. This could destroy the electronic box.

Ignition Switches

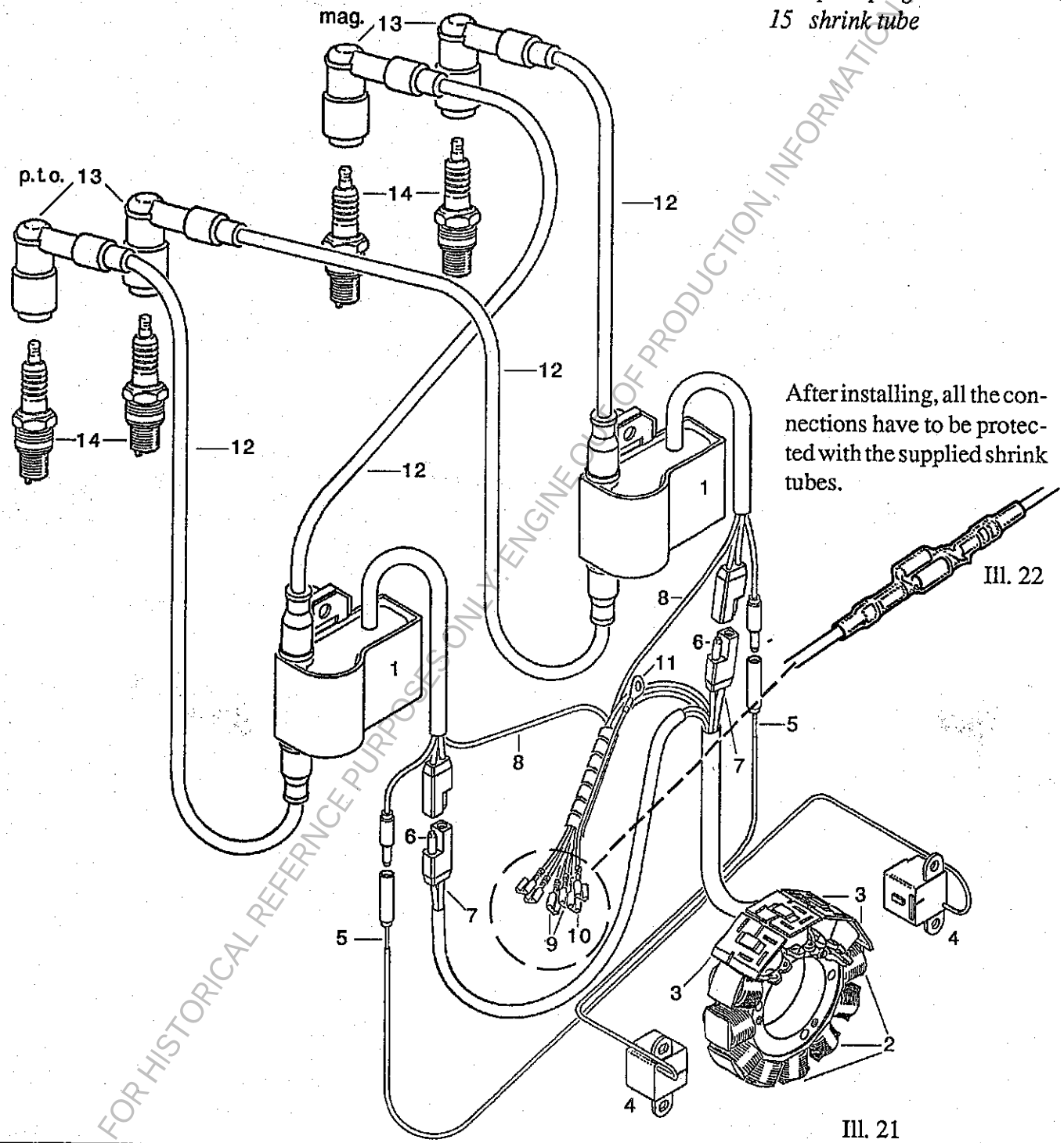


Ill. 20

13.4) Wiring diagram:

NOTE: When replacing wiring on the ignition system, connections must be as per wiring diagram below.

1 *Electronic box*
2 *eight lighting coils*
3 *four charging coils*
4 *pickup*
5 *trigger cable, red*
6 *charging cable, green*
7 *charging cable, white*
8 *shorting cables, black/yellow*
9 *lighting cables, yellow-yellow/black*
10 *rev.counter cable, gray*
11 *mass cable, brown*
12 *ignition cables*
13 *spark plug connectors*
14 *spark plugs*
15 *shrink tube*



Ill. 21

After installing, all the connections have to be protected with the supplied shrink tubes.

Ill. 22

13.5) Spark plugs:

Due to varying fuel properties etc., check every 10 hours of operation. Replace as required or annually: Provided that spark plug heat range and the carburetor calibration are correct, the spark plugs will have a brownish tinge at the electrodes of both spark plugs after full load operation.

On engines with single carburetor, one sooty spark plug by itself usually indicates a bad plug or faulty ignition system to that plug in a sound engine. If both plugs are sooty with oil deposits, carburetion and air system should be checked. On engines with two carburetors you should switch the carburetor to trace the problem.

■ Always change both plugs. Never interchange plugs from one cylinder to the other.

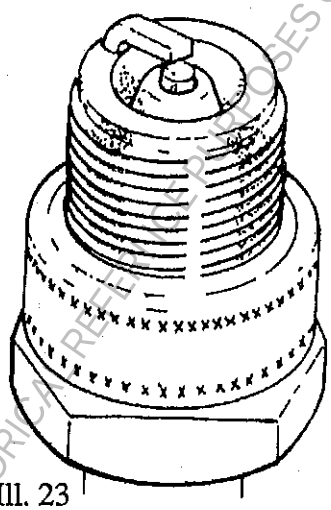
If both plugs have "white" electrodes with "melt" droplets, first suspect lean mixture. If calibration is correct and there is no evidence of manifold leaks, lack of fuel, or incorrect float settings, don't change the plugs to a colder range. Check if cooling system is operating correctly.

▲■ ATTENTION: Heavy oil deposits on the electrodes and insulator may cause engine problems, exchange regularly every 20 hours, or at any indications of trouble.

If, after cleaning or changing the spark plugs, you still have an ignition problem, check to see if only one cylinder is affected or both. Some thought to what is common to both systems or only one will isolate the problem more efficiently. If no external fault is found, the ignition unit must be checked.

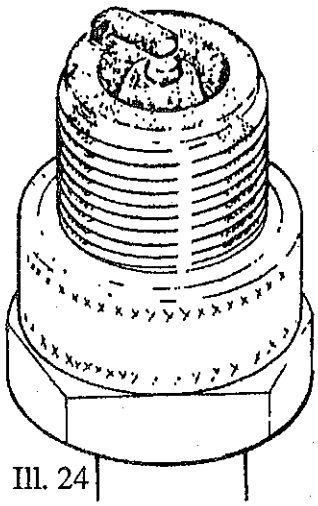
■ Never clean spark plugs with an abrasive cleaner.

Remember to correctly gap your plugs with a wire gauge (see technical data, section 29). Spark plugs must be torqued (see main torquing specifications, section 30). If problems occur too frequently, cause must be determined and rectified.



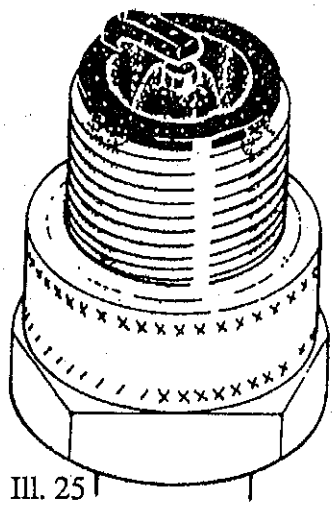
Ill. 23

Overheated (light grey)



Ill. 24

Normal (brownish)



Ill. 25

Fouled (black)

13.6) Lighting circuit:

In the stator 8 lighting coils are incorporated. The output is 170W A.C. and 13,5 V effective at 6000 l/min. This alternating current can be used directly to feed A.C. consumers, or via a rectifier-regulator for loading a battery and feeding direct current consumers.

To avoid the voltage to rise above permissible levels, a voltage regulator must be used.

To operate loads requiring direct current (e.g. charging battery), a rectifier-regulator is required.

A rectifier-regulator, part no. 866 080, is available. For feeding lights only, this rectifier-regulator can also be used without battery. In this case the regulated RMS voltage will be between 11 and 12 Volts as long as a minimum load of 1 amp is provided.

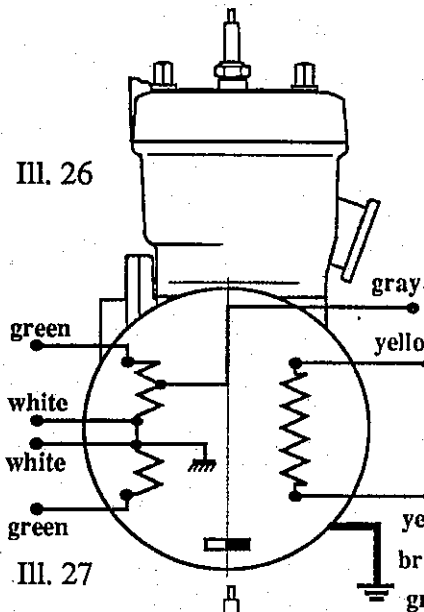
If a battery is used it has to be capable to absorb approx. 1 amp. minimum continuous charging load, even with full battery (suggested minimum battery capacity: 9 amp.h, resp. 16 amp.h with electric starter). Regulated voltage is 13.5 to 14.5 volts.

When using 3-phase rectifier-regulator 264 870 no minimum load is required.

13.7) Wiring diagram for rectifier-regulator 866 080

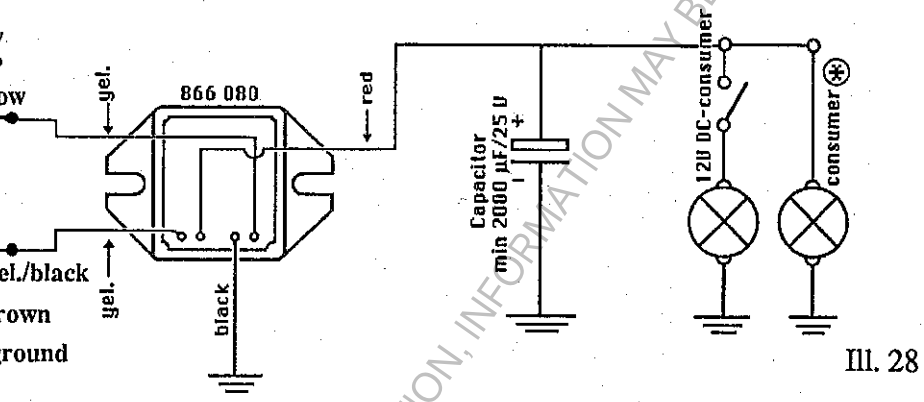
ATTENTION: ⊛ To avoid excessive voltage in conjunction with the rectifire regulator 866080, a constant minimum ballast load of 1 amp is required (example: lamp 12 V 15 W).

Ill. 26



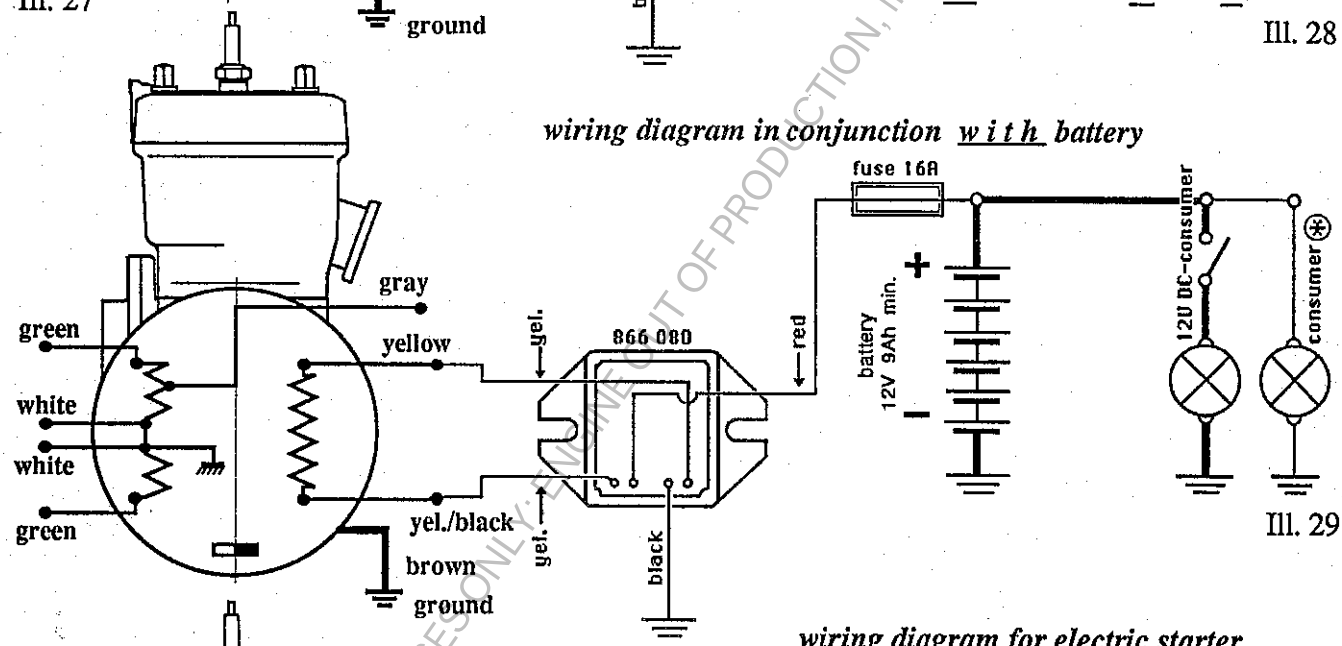
Ill. 27

wiring diagram in a circuit w i t h o u t battery



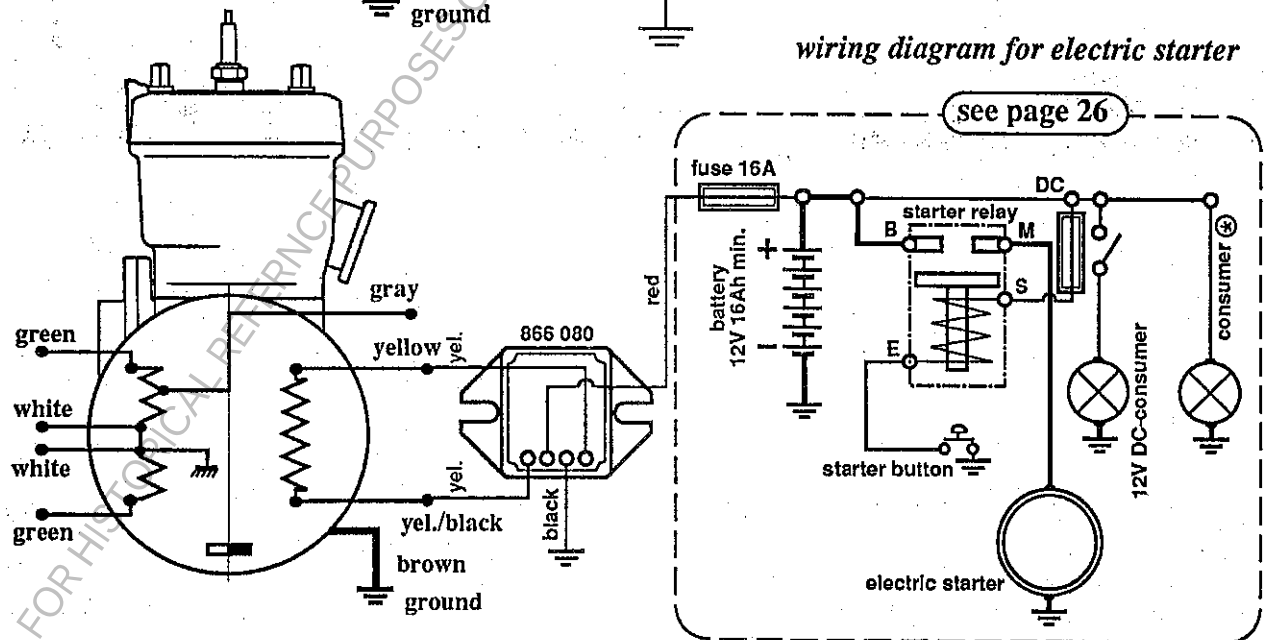
Ill. 28

wiring diagram in conjunction w i t h battery



Ill. 29

wiring diagram for electric starter



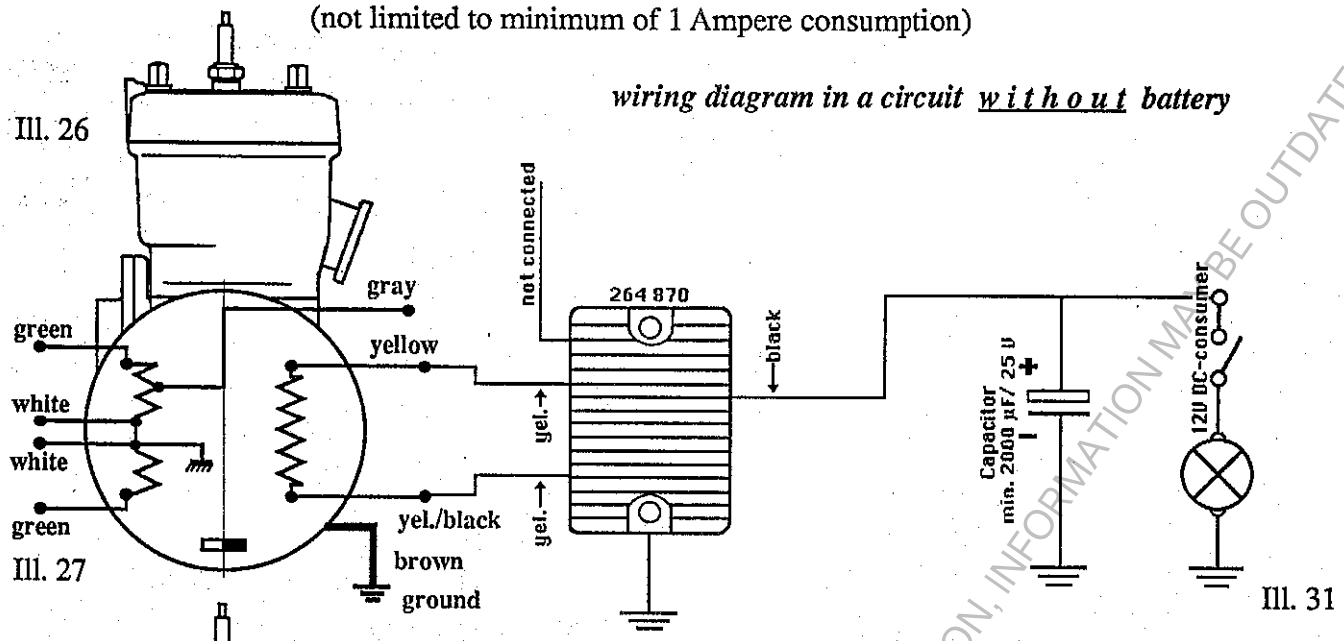
Ill. 30

13.8) Wiring diagram for rectifier-regulator 264 870

(not limited to minimum of 1 Ampere consumption)

Ill. 26

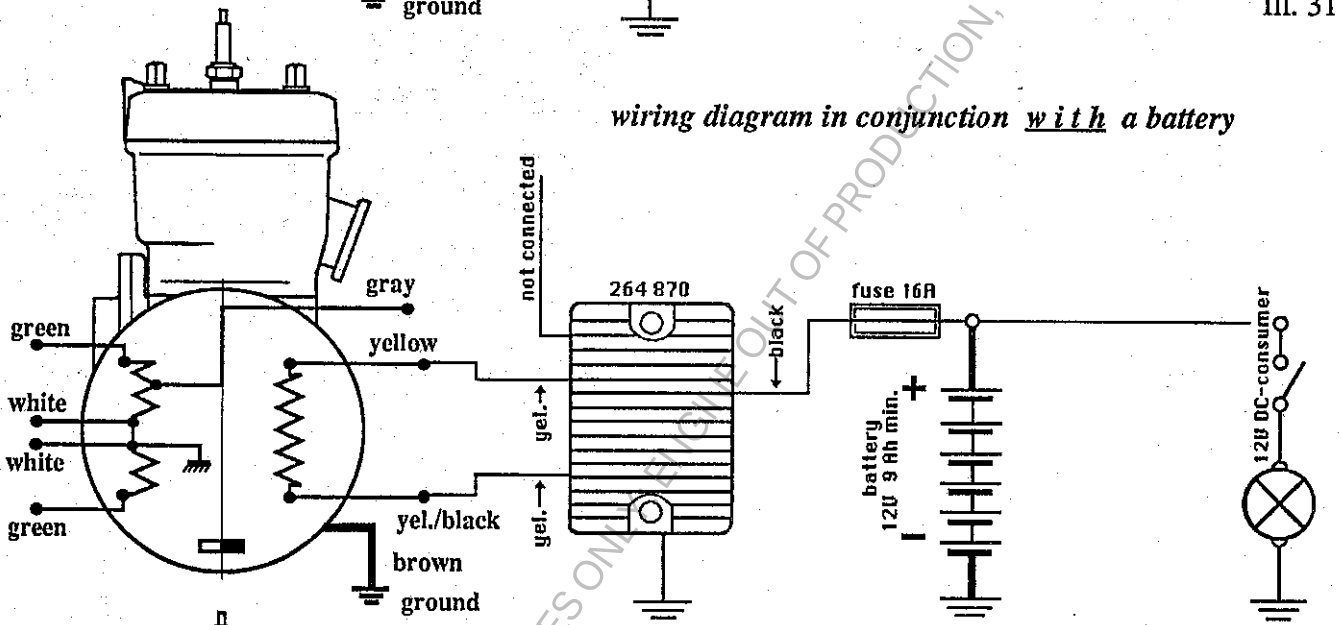
wiring diagram in a circuit w i t h o u t battery



Ill. 27

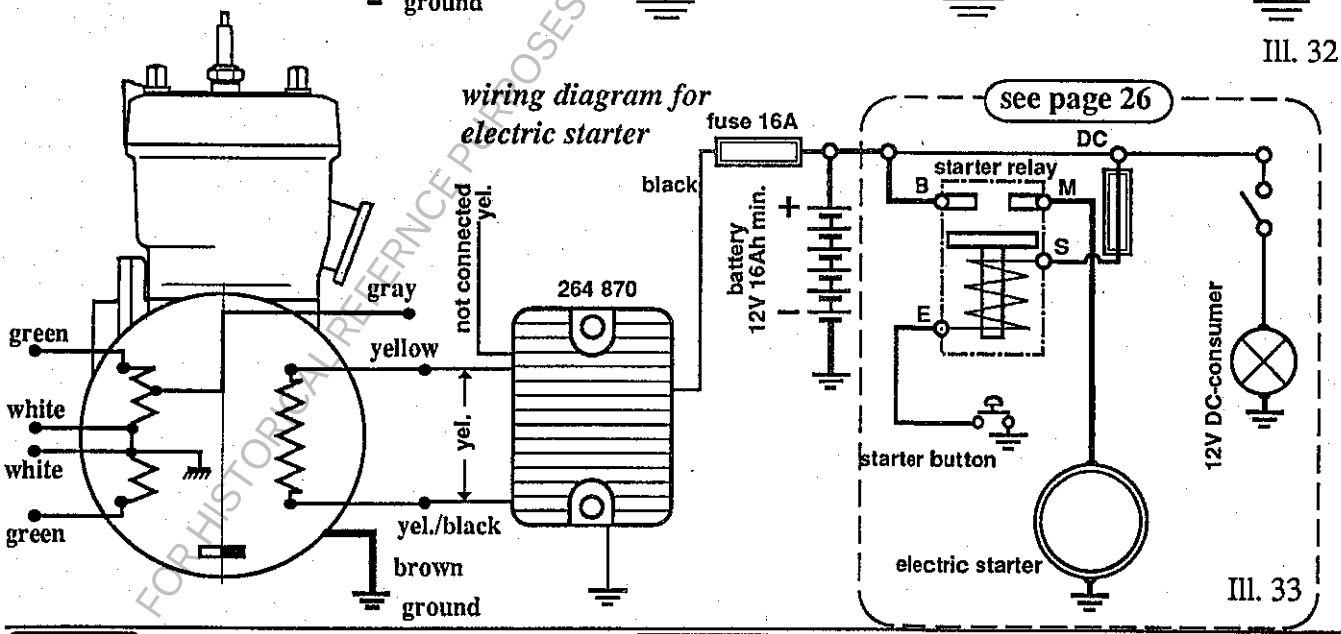
Ill. 31

wiring diagram in conjunction w i t h a battery



Ill. 32

wiring diagram for electric starter



Ill. 33

14) Electronic tachometer:

14.1) Introduction:

The Aviasport tachometer T8K12E, part no. 966 072, has been specifically designed to be connected to the 12 pole flywheel generator used on the Ducati CDI Systems.

The tachometer measures the frequency of the pulses provided by one of the transducers supply winding where it is connected. It does not require any external power supply. It is connected by two wires without polarity.

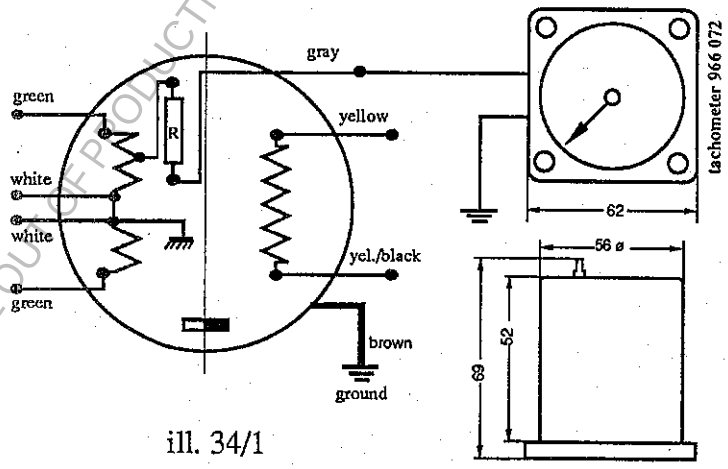
The indicating range comes up to 8000 r.p.m. The weight is 185 gram. The panel cut-out diameter should be 60 ∅ mm.

14.2) Connection to dual ignition system.

14.2.1) Tachometer 966 072 with resitor integrated in coil kit:

The generator integrated in the DUCATI dual ignition has a special grey cable for tachometer connection. The tachometer 966 072 has to be fitted between the grey cable and mass (brown cable).

On the coil kit 996 845 a 1 kΩ resistor is connected in series in front of the grey cable (ill. 34/1).

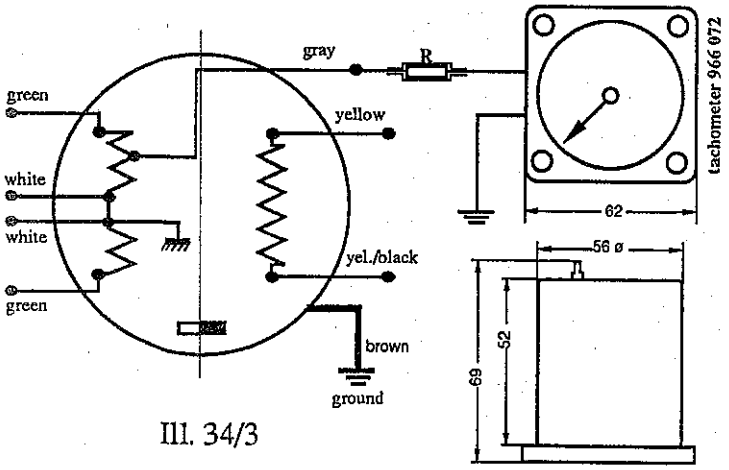


ill. 34/1

14.2.2) Tachometer 966 072 with externally fitted resitor:

In case of a short-circuit in the cable leading to the tachometer this resistor is foreseen to avoid ignition troubles. If this resistor is defective, it must be removed. In this case contact your dealer.

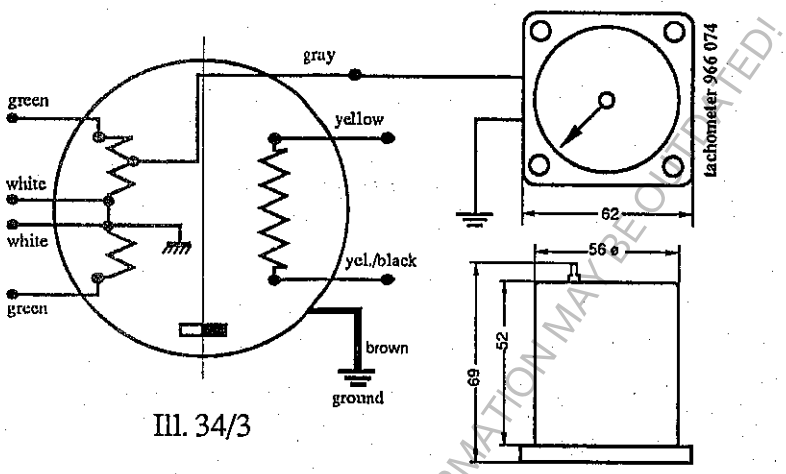
Then this resistor in front of the grey cable must be replaced by a 1 kΩ resistor 866 466 and shrink tube 860 532 and be installed in the grey cable in series-connection (see ill. 34/2).



Ill. 34/3

14.2.3) Tachometer 966 074 with integrated resitor:

If the new tachometer 966 074 is used, no such resistor has to be installed (already integrated in this tachometer). Refer ill. 34/3.



Ill. 34/3

The tachometer 966 072 has a red label on its back side, the new tachometer 966 074 has the same external appearance but a blue label on its back side.

The tachometer will indicate correct rpm even if one of the two ignition systems is turned off for ignition testing procedure or a transducer failure happens.

14.3) Calibration

A calibration potentiometer is located inside the instrument. The adjustment hole is covered by a red label on tachometer 966 072 and a blue label on the tachometer 966 074. It is possible to correct the scale factor by connecting the tachometer in parallel to a reference instrument or by using a precision mechanical, optical or electronic tachometer.

15) Electric starter:

15.1) Electric starter designs:

Two types of electric starters can be fitted to ease starting procedures especially in flight.

15.1.1) Electric starter fitted to p.t.o. side allows recoil starter to be retained, but cannot be fitted on engines using ROTAX gear reduction unit.

15.1.2) Electric starter fitted on magneto side. For use with engines utilizing ROTAX gear reduction unit,however this electric starter system prevents recoil start capability.

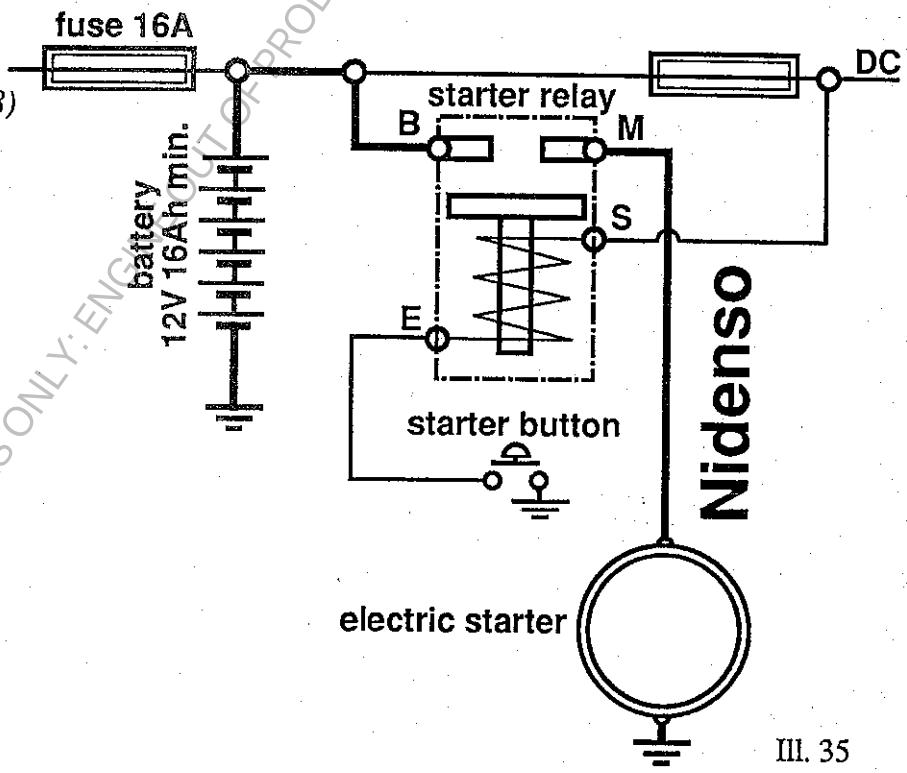
15.2) Battery:

Either case, to ensure reliable starting, a battery of least 16 Ah (high-discharge battery) should be utilized. A higher battery amp- hour-rate would be preferable. Cables supplying power to the starter from the battery and to ground should be a 10 mm^2 flexible multi-strand cable.

15.3) Power source:

see page 23 and 24

from rectifier regulator (see section 13.7 and 13.8)



III. 35

15.4) Power relay:

Starter control should be via a power relay (supplied with starter kit) wired as shown above.

15.5) Fuse:

A 16 Amp fuse must be installed between battery charging circuit and main power terminal.

16) Special operating conditions:

Off water operation is a real pleasant experience - usually. However, there are dangers to your engine you won't experience on land. Some of these dangers are water ingestion on take-off or landing for example, due to spray and splash, corrosion, electrolysis, and worst of all,unintentional submersion.

▲■ The high carbon content of high quality bearings, crankshaft etc., are highly susceptible to corrosion. Synthetic oils, although good lubricants, often attract moisture rather than repel it.

A good quality air intake system (e.g. K. & N. oil impregnated filter) will prevent most problems.

▲ Dry filter elements (paper type) are not acceptable especially in moist conditions. They will absorb water and choke the engine causing over rich carburetion mixtures which result in engine power loss.

■ NOTE: Significant engine noise reduction can be obtained with an air intake silencer kit. Further noise reduction may be obtained by the use of an after-muffler kit. Be aware that modifications may require carburetor modification.

Enquire at your dealer for more information, and consult ROTAX spare parts list.

■ On aircraft equipped with engine cowlings you must ensure that blower inlet size is not restricted and exit is double the inlet area. There should be no circulation between inlet and exit on cowling. Neither should it create any considerable increase or decrease of air pressure.

▲ Winter can create additional problems such as carburetor icing, frozen gas lines, higher air densities etc. which may affect carburetor calibration, longer warm-up periodes.

17) Maintenance schedule:

17.1) Warning:

▲ a) Maintenance on engines and systems requires special knowledge and tools. It is therefore recommended to have these works performed by authorized service centers or dealers.

b) Disconnect spark plug leads for all maintenance and inspection procedures.

17.2) Service times:

■ Service times are based on average use, assuming engine is run at least once per week for a normal duty cycle or average flight. Total time before teardown is determined by the frequency and conditions of usage. If the engine is not going to be used for a period of 2 months or more, consult storage procedures in this section.

After initial break-in period certain inspections and checks must be made to ensure all components and settings have remained tight and are within the specified tolerance. Failure to do so could lead to premature engine failure.

	✔
Post break-in inspection check list	
Engine timing check	
Spark plug(s) condition	
Carburetor adjustment	
Engine suspension nuts	
Muffler attachment	
Engine coolant system	
Air filtration system	
Fuel filtration system	
Electrical wiring (loose connections, stripped wires, damaged insulation), tighten all loose bolts, nuts and linkage.	

18) Rewind starter:

Check cord condition every 10 hours. Replace when worn or frayed.

To change the starter rope, follow the procedure outlined (the numbers stated in brackets refer to the illustration).

18.1) Rewind starter dismantling:

First remove the rewind starter assembly from the engine.

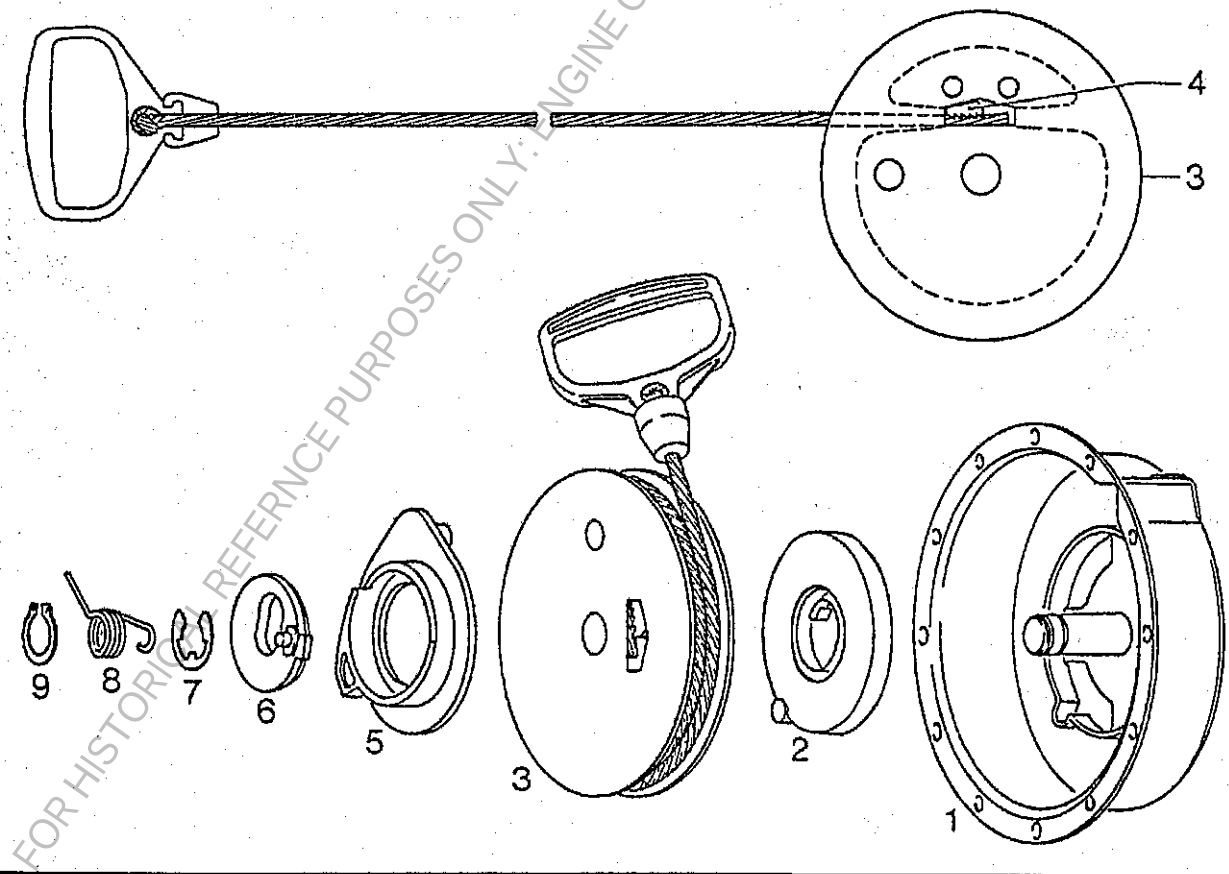
Second, remove the snap ring ❾, loop spring ❽, circlip ❼, pawl lock ❻, and the pawl ❺.

Pull out the starter rope fully to the end, hold starter housing ❶ and rope sheave ❸ together in their position. There is an opening in the rope sheave. The key clamp ❹ visible in the opening has to be pushed out in the opposite sense of the pulling direction. Pull the rope out of the rope sheave.

18.2) Rewind starter reassembly:

Insert the new starter rope into the rope sheave, fit the key clamp in the same position as it was before and refit the parts ❺, ❻, ❼, ❽ and ❾.

▲ WARNING: Do not remove spring container ❷, this might cause injuries.
Do not operate the engine if the rewind starter is defective.
Most starter problems are due to improper operation.



19) Liquid-cooling system:

The cooling liquid is supplied by a pump through the cylinders and the cylinder head to the radiator. The cooling system has to be installed so that vapour coming from the cylinders and the cylinder head can be released to top through a big tube either into the water tank of the radiator or to an expansion chamber.

Add anti-freeze up to -15° C also in summer for lubrication of the oil seal and to prevent corrosion. Make sure the anti-freeze is compatible with aluminum.

19.1) Attention:

19.1.1) Check cooling liquid before every operation and refill, if necessary.

19.1.2) The average temperature of cooling liquid should be 60÷80°C. In case of excessive temperature, look for the reason (liquid quantity, radiator or tubes blocked, pump resp. impeller defective, too much antifreeze in the water etc.).

19.1.3) The cooling effect is reduced by anti-freeze additives (under certain circumstances even considerably). This must be taken into consideration when chosing the radiator and for radiator installation.

19.1.4) Before opening the cooling tank cap, put a cloth over it and turn the cap only partially off. Sudden opening of the cap can result in water boiling over and scald injuries .

19.2) Cylinder head venting:

On engine installation with spark plugs up the cylinder head must be vented. For this purpose there are 2 venting bores M6 in the cylinder head, one on magneto side, one on p.t.o. side.

The nipple M6 with sealing ring is screwed into the venting bore which is usually on the higher position during flight. The second venting bore is closed with a hex. screw M6 x 8 and sealing ring.

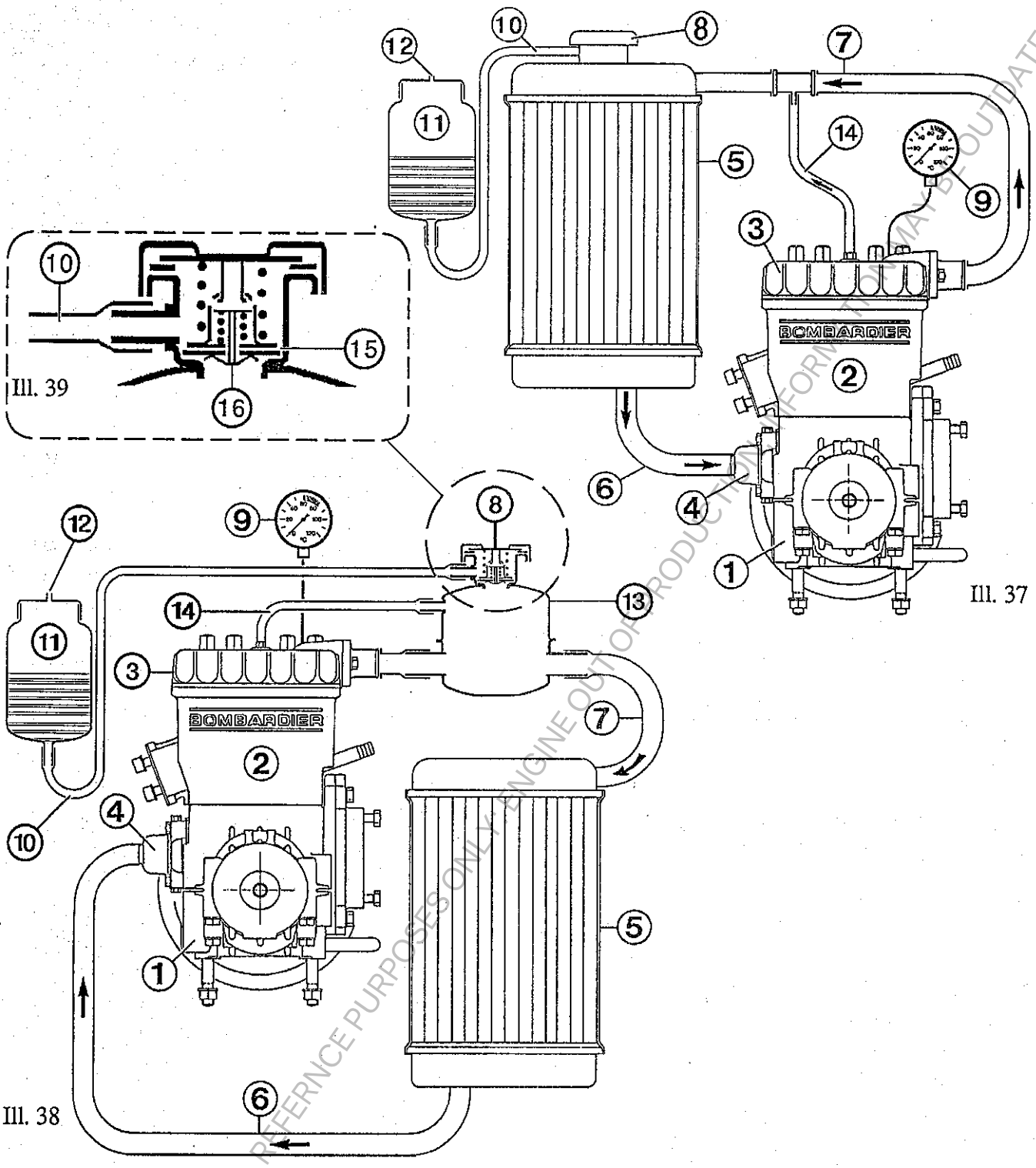
In case of the double radiators supplied standard by ROTAX the p.t.o. side venting bore on cylinder head is closed and the magneto side bore is connected to the cooling system via a low-pressure tube ⑭ (6 x 11/335 mm length). This in principle applies to pusher propellers.

In case of tractor propeller installation the venting- and tapping screws have to be interchanged and the low-pressure tube ⑭ be shortened.

If the radiator is installed lower than the cylinder head, it is absolutely necessary to use an expansion chamber ⑬ and to close the radiator with a screw tap w i t h o u t pressure valve ⑮ and return valve ⑯.

19.3) Cooling circuit for engine installation with spark plugs up:

Ill. 39



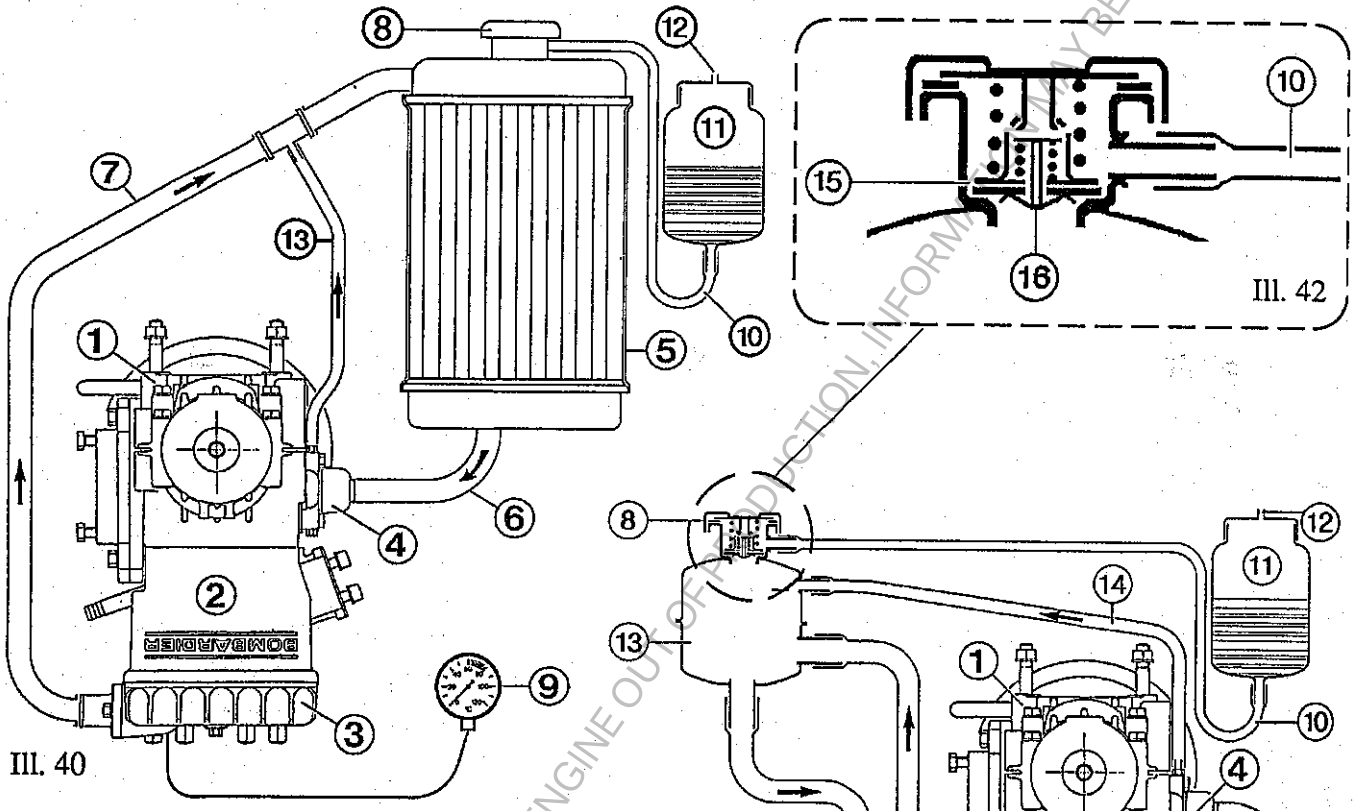
Ill. 37

Ill. 38

1 crankcase
2 cylinder
3 cylinder head
4 water pump
5 radiator
6 tube from radiator to water pump
7 tube from cylinder head to radiator
8 radiator screw cap, with excess pressure valve and return valve
9 temperature gauge for cooling water
10 overflow tube
11 overflow reservoir
12 reservoir venting
13 expansion tank
14 cylinder head venting tube
15 excess pressure valve
16 return valve

19.4) Cooling circuit for engine installation with spark plugs down:

For this installation, a vent tube has to be connected on top of the water pump housing ❹ leading to the expansion tank ⓭ resp. to the water chamber of the ratiator. The cooling system has to be vented well, to be checked after a short operating period, and cooling liquid has to be refilled, if necessary.
Only a perfectly vented cooling system will work satisfactory.



Ill. 42

Ill. 40

Ill. 41

1 crankcase
2 cylinder
3 cylinder head
4 water pump
5 radiator
6 tube from radiator to water pump
7 tube from cylinder head to radiator
8 radiator screw cap, with excess pressure valve and return valve
9 temperature gauge for cooling water
10 overflow tube
11 overflow reservoir
12 venting
13 expansion tank
14 water pump venting tube
15 excess pressure valve
16 return valve

20) Rotary valve and cooling liquid pump drive:

In the center of the crankcase there is a 90 ° gear with oil lubrication.

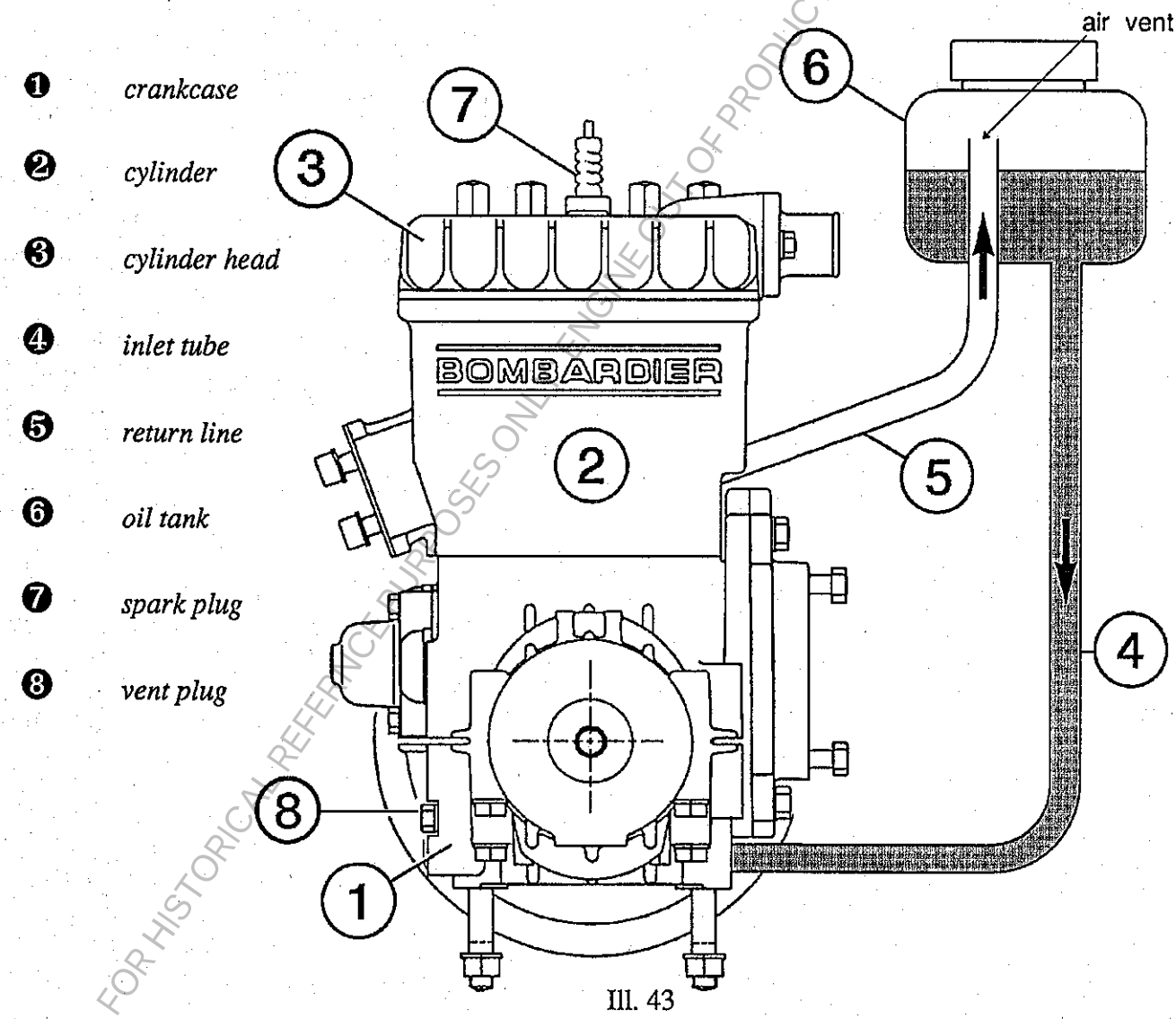
Use 2-stroke motor-oil for the rotary valve gear (same as used for 2-stroke fuel mixture). Oil quantity in case of new installation: approx. 310 cc.

An oil tube leads from the oil tank to the bottom side of the crankcase, and a return line from top of the gear leads back to the tank for air vent (see illustration).

Before every operation check the oil level (approx. medium height of the oil tank) as well as for tightness and good condition of oil tubes and connections.

In case of notable oil consumption (more than 1 c.c./hour) look for the leak and check the oil seals inside the crankshaft, if necessary.

20.1) Oil circuit for engine installation with spark plugs "up":



❶ *crankcase*
❷ *cylinder*
❸ *cylinder head*
❹ *inlet tube*
❺ *return line*
❻ *oil tank*
❼ *spark plug*
❽ *vent plug*

Ill. 43

20.2) Oil circuit for engine installation with spark plugs "down":

In this case the oil system for rotary valve drive and water pump drive has to be modified by the aircraft manufacturer as per the following illustration. The oil tank installation should not be below the oil inlet tube ❹.

Attention: For this inverted installation, the oil tank must be removed from the bracket and installed in a suitable location above the engine. Vent system by removing plug ❽ when filling the oil tank ❻.

❶ *crankcase*

❷ *cylinder*

❸ *cylinder head*

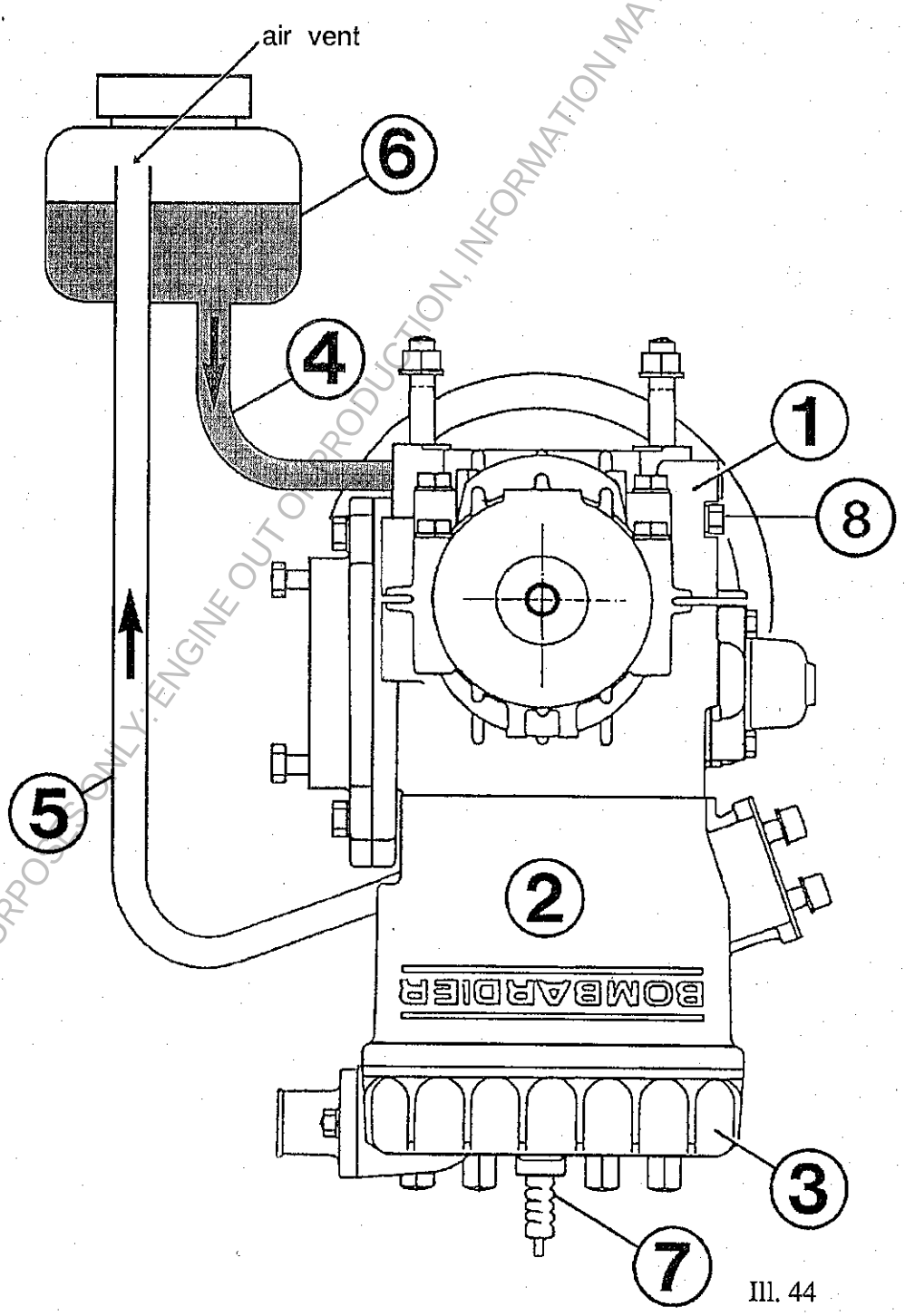
❹ *inlet tube*

❺ *return line*

❻ *oil tank*

❼ *spark plug*

❽ *vent plug*



Ill. 44

21) Engine suspension nut:

Inspect visually regularly (pre-flight check). Re-torque annually. Check procedure with airframe manufacturer.

22) Air filtration system:

Inspect frequently (10 hours) for cleanliness depending on type used (see special operation conditions).

23) Fuel filtration system:

Check at least every 10 hours (see fuel mixture). Ensure clean fuel at all times.

24) Check for carbon build up and piston ring condition:

After approximately 50 hours of use, the combustion chamber may require de-carbonizing. To inspect, remove exhaust manifold and check for deposits on piston crown. Decarbonizing is required if deposit thickness is in the range of 1 mm (.04 in.). On re-assembly of manifold, replace gaskets if necessary.To check for piston ring sticking in groove, move pistons only the minimum amount to determine free movement of the top ring.
For de-carbonizing remove the cylinders and the piston rings. Make a mark on cylinder and piston. Clean the piston ring grooves too. When reassembling the cylinders to the crankcase, it is important to have them properly aligned. Use new gaskets.

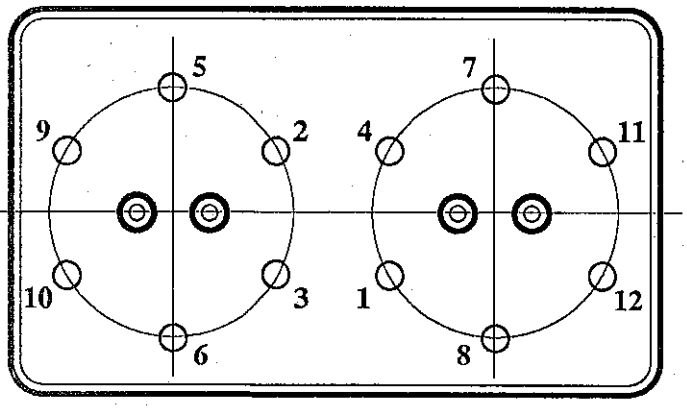
24.1) Cylinder head nuts:

Torque cylinder head nuts following illustrated sequence when the manifolds are in place.

■ For this procedure the engine has to be cold.

Ill. 45

TOOLS: insert 13 (socket wrench 13)
insert Allen head key 6
torque wrench



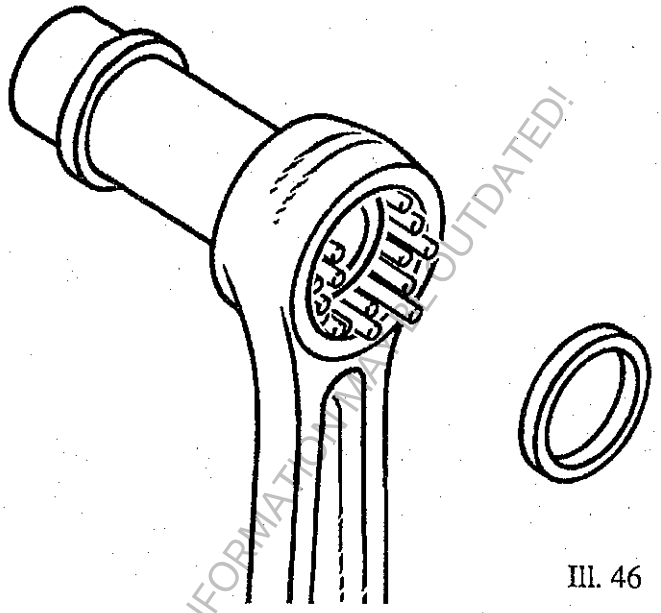
▲ NOTE: Use a cross-sequence for tightening the nuts. Consider both cylinders as one unit because they are joined by exhaust and intake manifolds.

This procedure is considered to be a technical operation and should therefore be performed by an authorized service center only.

24.2) Piston pin bearing:

The piston pin is supported in the con rod eye by 31 needle rollers, without a cage.

For disassembly a special piston pin puller and particular training for its use is necessary. Piston disassembly is allowed to be done only by an authorized workshop.



Ill. 46

25) Gearbox Maintenance (every 10 operating hours):

Check oil level on respective oil level screw and secure again with lock wire.
Change oil after 1st 10 hours of operation, clean magnetic drain plug at each oil change.
Change oil every 100 hours or every 2 years (which occurs first).
Check propeller tip clearance and tracking.

26) Storage:

If your engine is not going to be run for a period of 2 months or more, certain precautions must be taken to protect the engine and fuel system from heat, direct sun, corrosion and the formation of deposits.

The schedule below is a guide for storage procedure:

26.1) Internal engine components:

Remove air filtration system, start engine and allow to idle. Using an oil-can, flood the engine by injecting oil through the carburetor till the engine stalls, then proceed with fuel system draining.

26.2) Fuel system:

Drain float chamber, remove fuel from tank - drain fuel lines.

▲ Follow all safety rules and do not run for a prolonged period above idle.

26.3) After-storage check:

Ensure all residue oil is drained or removed by cranking the engine, and spark plugs are clean and gapped. Refill fuel tank, purge fuel lines and carburetor float chamber of air. Proceed with starting procedure (see section 4).

27) Trouble shooting:

Your ROTAX engine requires basicly two essentials to run. Spark and correct fuel/air mixture. The majority of problems quite often are a simple lack of one or the other.

Organize yourself and follow a set pattern to eliminate components to find your trouble.

Fuel: start by checking the supply (tank), fittings (loose?), filter (plugged?), float chamber (fouled?).

Spark: try new plugs.

Problems of a more complex nature are best left to a ROTAX engine technician: see your dealer.

28) Engine repair log:

Record any repairs or service on your ROTAX engine and use as a reference.

Purchase Date : _____

First Use : _____

Break-in Inspection: _____

	Engine repair log
Repair date	**Summary of work done**

	Engine repair log cont.:
Repair date	**Summary of work done**

29) Technical data:

DESCRIPTION:	Two-cycle, two-cylinder-, rotary valve engine, oil-in-fuel lubrication or by oil pump, liquid cooled, with integrated water pump.

ENGINE CONFIGURATIONS:

	a) 582	b) 582/40	c) 582/32
dual ignition, 1-carburator	no	no	yes
dual ignition, 2-carburators	yes	yes	no
dual ignition, with oil pump, 2-carburators	yes	yes	no

BORE:	76,0 mm (2,99 in.)
STROKE:	64,0 mm (2.52 in.)
DISPLACEMENT:	580,7 cm^3 (35,44 cu.in.)
COMPRESSION RATIO:	theoretical: 11,5 - effective: 5,75
POWER OUTPUT:	**a)** 48 kW (64,4 hp SAE) at 6500 1/min., perform. sheet Lb. 362 **b)** 40 kW (53,6 hp SAE) at 6000 1/min., perform. sheet Lb. 363 **c)** 32,5 kW (43,6 hp SAE) at 5100 1/min., perform. sheet Lb. 364 Match propeller to achieve above indicated full load r.p.m. as per engine version.
TORQUE:	**a)** 75 Nm (55,3 ft.lb.) at 6000 1/min., performance sheet Lb. 362 **b)** 68 Nm (50,1 ft.lb.) at 5500 1/min., performance sheet Lb. 363 **c)** 63 Nm (46,5 ft.lb.) at 4700 1/min., performance sheet Lb. 364
MAX. RPM.:	**a)** 6800 1/min. **b)** 6400 1/min. **c)** 5500 1/min.
DIRECTION OF ROTATION:	counter-clockwise, viewed towards p.t.o. (without reduction gearbox)
CYLINDER:	2 light alloy cylinders with cast iron sleeve
PISTON:	aluminium cast piston with 2 piston rings
PISTON/CYLINDER CLEARANCE:	0,06 mm (.0024 in.) for engine type 582 and 582/40 0.05 mm (.0020 in.) for engine type 582/32
TEMPERATURES OPERATIONAL VALUES:	CHT: (cyl. head temperature) normal: .....110÷130 °C .....(230÷270 °F) max.: .....150 °C .....(300 °F) difference between 2 cyl. .....10 °C .....(36 °F) EGT: (exhaust gas temperature) normal: .....500÷620 °C .....(930÷1150 °F) max.: .....650 °C .....(1200 °F) difference between 2 cyl. .....25 °C .....(45 °F)

	crankcase temp. max.: ..... 80 °C ..... (175 °F) cooling liquid temperature, max.: ..... 80 °C ..... (175 °F)
IGNITION SYSTEM:	breakerless DUCATI capacitor discharge dual ignition with magneto generator
GENERATOR OUTPUT:	170W AC at 6000 1/min. and 13,5V RMS
IGNITION TIMING:	1,96 mm = .077 in. (18 °) BTDC
SPARK PLUG:	14 mm, B8ES
ELECTRODE GAP:	0,5 mm (.02 in.)
ROTARY VALVE:	configuration **a+b**): 924 200, cut-off section 132 ° configuration **c**): 924 202, cut-off section 117 °
ROTARY VALVE TIMING:	for **a+b**) opens: 130 °BTDC - closes: 50 °ATDC for **c**) opens: 120 °BTDC - closes: 45 °ATDC measured on crankcase openings, ± 4 ° tolerance
CARBURETOR:	1 x BING 36, hand lever or cable choke - or 2 x BING 36, hand lever or cable choke
FUEL PUMP:	pneumatic fuel pump DF 52
FUEL:	regular or premium gasoline, octane number not below MON 83 or RON 90 (unleaded preferred)
LUBRICATION OF ENGINE:	1) oil-in-fuel with Super-two stroke oil, proposed ASTM/CEC standard TSC 3, mixing ratio 1:50 (2%) 2) by oil pump (optional) with the same oil ATTENTION: pour point 10 ° C below lowest operating temperature
LUBRICATION OF REDUCTION GEAR:	gear oil API-GL5 or GL6, SAE 140 EP, or 85 W-140 EP
DIRECTION OF PROPELLER SHAFT:	clockwise, viewed towards propeller flange
STARTER:	rewind starter
STANDARD VERSION INCLUDES :	engine with - carburetors with clamps - fuel pump - exhaust system

WEIGHTS:

Engine: (without: exhaust system, carburetor, intake silencer, fuel pump, radiator)	27,4 kg	(60,4 lb.)
2 carburators with carburator flanges and clamps	1,8 kg	(4,0 lb.)
exhaust system assy.	approx. 5,1 kg	(11,2 lb.)
2 air filters	0,3 kg	(,6 lb.)
1 double air filter	0,5 kg	(1,1 lb.)
1 intake silencer with filter, for single carb.,	0,8 kg	(1,8 lb.)
1 intake silencer with filter, for dual carb.,	1,1 kg	(2,4 lb.)
integrated 2-radiators kit	approx. 2,1 kg	(4,6 lb.)
electric starter kit, p.t.o. side	3,4 kg	(7,5 lb.)
electric starter kit, magneto side	3,5 kg	(7,7 lb.)
reduction gear box "B" , dry	4,5 kg	(9,9 lb.)
reduction gear box "C" , dry	8,0 kg	(17,6 lb.)

OPTIONAL FEATURES

Oil pump lubrication: the engine is lubricated by an oil pump fitted to the engine. The carburetor is supplied with pure fuel.

Intake silencer: 1) for 1-carburetor engine version
2) for 2-carburetor engine version
ATTENTION: If engine was supplied without intake silencer, the carburetor calibration has to be modified for use with intake silencer.

After-muffler: special after-muffler to be fitted in addition to the exhaust muffler.

Airfilter: 1) to be fitted directly on carburetor
2) to be fitted in the intake silencer
3) double filter (one filter for both carburetors)

High altitude compensator: automatic high altitude adjustment of carburetor calibration, with modified carburetor (on request)

Electric starter: 1) rewind starter with electric starter, p.t.o. side, for engine without gearbox,
2) electric starter, magneto side, without rewind starter (gearbox is possible)

Rectifier-regulator: 1) 866 080 requires minimum load of 12 W (1 A) to regulate
2) 264 870 no minimum load is required

Reduction gearbox: with torsional shock absorber
configuration "B": ratios available: i= 2,0 / 2,24 / 2,58
configuration "C": ratios available: i= 2,62 / 3,0 / 3,47 / 4,0

Cooling system: 1) 2-radiators kit, fitted on engine (with gearbox) 0,6 lt. = .16 gal US (cooling system 2,35 lt. = .62 gal US)
2) 1-radiator kit, not fitted on engine 0,8 lt. = (.21 gal.US)

30) Main torquing specifications:

			Nm	in.lb.
1)	Crankcase screws	M8	24	210
2)	Crankcase screws	M6	10	90
3)	Crankcase nuts (or screws)	M10	38	335
4)	Crankcase studs	M10	12	105
5)	Cylinder hex. coller screws	M8	24	210
6)	Cylinder head studs	M8	7	60
7)	Cylinder head nuts	M8	22	195
8)	Magneto housing nut	M22 x 1,5	95	840
9)	Allen screw for starting pulley	M8	22	195
10)	Hex. screws for rewind starter	M6	10	90
11)	Rotary valve cover screws	M8	22	195
12)	Intake rubber flange screws	M8	14	125
13)	Lock nut for oil pump gear	M6	7	60
14)	Banjo bolt for oil pump	M6	8	70
15)	Cyl. screw for oil pump	M5	5	45
16)	Spark plug (cold engine)	M14	27	240
17)	Allen screw for stator plate	M5	6	55
18)	Taptite screw for pickup	M5	6	55
19)	Lock nut for ignition coil,	M6	8	70
20)	Hex. screws for mounting plate,	M6	5	45
21)	Hex. screws for starter gear	M8	22	195
22)	Studs for water - outlet socket,	M6	3	25
23)	Hex nut for water - outlet socket,	M6	5	45
24)	Lock nut for water pump impeller,	M6	7	60
25)	Taptite screw for water pump housing,	M6	8	70
26)	Hex screws for gear box,	M8	24	210
27)	Hex collar screw for gear box housing,	M8	24	210
28)	Hex. screw for drive gear,	1/2-20 UNF	60	530

SUBJECT TO MODIFICATION WITHOUT NOTICE.

31) DAILY and PRE FLIGHT CHECK for all ROTAX UL-engines

	DAILY INSPECTION			PRE FLIGHT CHECK
1	Check ignition switched off.	→	1	Check ignition switched off.
2	Drain water from fuel tank sump and/or water trap (if fitted).	→	2	Check fuel content.
3	Check carburetter rubber socket or flange for cracks and secure attachment.		3	
4	Check carburetter float chamber for water and dirt		4	
5	Check security and condition of intake silencer and air filter.		5	
6	Check security of radiator mounting. Check radiators for damage and leaks.	→	6	Visual check for coolant leaks.
7	Check coolant overflow bottle level and security of cap.		7	
8	Check coolant hoses for security, leaks and chafing.		8	
9	Check engine for coolant leaks (Cylinder head, cylinder base and water pump).		9	
10	Check oil content for rotary valve gear lubrication and security of oil cap.		10	
11	Check oil hoses for security, leaks and chafing. (Rotary valve gear lubrication system and oil injection system.)	→	11	Check oil tank content (oil injection engines).
12	Check ignition coils / electronic boxes for secure mounting. Check ignition leads and all electrical wiring for secure connections and chafing.	→	12	Check spark plug caps for security.
13	Check electric starter for secure mounting, check cover for cracks.		13	
14	Check engine to airframe mounting for security and cracks.		14	
15	Check fuel pump mounting for security. Check all fuel hose connections filters, primer bulbs, & taps for security, leakage, chafing & kinks.		15	
16	Check fuel pump impulse hose for secure connections, chafing & kinks.		16	
17	Check wire locking of gearbox drain & level plugs.	→	17	Visual check of engine and gearbox for oil leaks.
18	Check rubber coupling for damage & ageing (C type gearbox only).	→	18	Visual check of engine and gearbox for loose or missing nuts, bolts and screws. Check security of gearbox to engine mounting.
19	Rotate engine by hand & listen for unusual noises. (Double check ignition OFF first.)		19	
20	Check propeller shaft bearing for play by rocking propeller.	→	20	Check propeller for splits and chips. If any damage, repair and/or rebalance before use.
21			21	Check security of propeller mounting.
22	Check throttle choke & oil pump lever cables for damage (end fittings, outer casing, and kinks).	→	22	Check throttle, oil injection pump and choke actuation for free and full movement.
23			23	Check cooling fan turns when engine is rotated (air cooled engines).
24			24	Check exhaust for cracks, security of mounting, springs and hooks for breakage and wear, check wire locking of springs.
25			25	Start engine after ensuring area clear of bystanders.
26			26	Single ignition engines - check operation of ignition switch (Flick ignition off and on again at idling).
27			27	Dual ignition engines - check operation of both ignition circuits.
28			28	Check operation of all engine instruments during warm up.
29			29	If possible, visually check engine and exhaust for excessive vibration during warm up (indicates propeller out of balance).
30			30	Check engine reaches full power rpm during take off roll.

MAINTENANCE-PLAN

	Checks and work	2 h	10 h	every 12,5 h	25 h	50 h	75 h	100 h	125 h	150 h	175 h	200 h	225 h	250 h	275 h	300h
1	Retorque cylinder head nuts (only air-															
	cooled engines) 1)	x														
2	Retorque exhaust manifold screws 1)	x														
3	Check rewind starter rope			x												
4	Check electric starter gear					x		x		x		x		x		
5	Inspect spark plugs			x												
6	Replace spark plugs				x	x	x	x	x	x	x	x	x	x	x	
7	Check and clean inside spark plug caps			x												
8	Check ignition timing (only breaker ignition)		x 2)				x						x			
9	Check contact breaker gap		x 2)				x						x			
10	Check ignition damping box						x			x			x			
11	Replace contact breakers and condenser									x						
12	Check V-belt tension		x		x	x	x	x	x	x	x	x	x	x	x	
13	Lubricate ball joints				x	x	x	x	x	x	x	x	x	x	x	
14	Replace exhaust muffler springs						x			x			x			
15	Oil control cables				x	x	x	x	x	x	x	x	x	x	x	
16	Check propeller balance and tracking 3)				x	x	x	x	x	x	x	x	x	x	x	
17	Inspect propeller mounting bolts 4)															
18	Clean and oil air filter				x	x	x	x	x	x	x	x	x	x	x	
19	Check fuel filter				x	x	x		x	x	x		x	x	x	
20	Replace fuel filter							x				x				
21	Check carburetor(s) and re-adjust															
	(idle speed, cable tension, ...)	x			x		x		x		x		x		x	
22	Clean carburetor(s) and check for wear					x		x		x		x		x		
23	Replace jet needle and needle jet									x						
24	Clean and check fuel pump						x			x			x			
25	Check gearbox oil level				x	x	x		x	x	x		x	x	x	

	Checks and work	2 h	10 h	every 12,5 h	25 h	50 h	75 h	100 h	125 h	150 h	175 h	200 h	225 h	250 h	275 h	300 h	
26	Replace gearbox oil		x					x				x					
27	Check and adjust gearbox, preload of																
	washers (type A + B gearboxes)							x				x					
28	Check gearbox backplate screws (type A)							x				x					
29	Replace rotary valve lubrication oil							x				x					
30	Inspect cylinder head and piston crown 5)					x		x		x		x		x			
31	Inspect piston ring grooves 6)					x		x		x		x		x			
32	Check piston diameter 8)					x 7)		x 7)		x		x 7)		x 7)			
33	Piston ring: check gap 8)					x 7)		x 7)		x		x 7)		x 7)			
34	Piston ring: check axial play(rectang.ring) 8)					x 7)		x 7)		x		x 7)		x 7)			
35	Check cylinder diameter 8)					x 7)		x 7)		x		x 7)		x 7)			
36	Cylinder: check for roundness 8)					x 7)		x 7)		x		x 7)		x 7)			
37	Replace cylinder head-, cylinder base- and																
	exhaust-gasket 9)					x		x		x		x		x			
38	Inspect piston pin and bearing									x							
39	Inspect crankshaft and replace outer seals									x							
40	General overhaul of engine 10)															x	

1) and after every replacement of gasket(s)
2) and after every replacement of contact breakers
3) also after any damage
4) according to instructions of manufacturer
5) if carbon layer is more than 0,5 mm thick, decarbonize
6) if piston rings stick, clean and replace if necessary
7) if used in very dusty atmosphere
8) wear limit see Service Information 5 UL / 91
9) if cylinders get dismantled
10) contact authorized ROTAX distributors or service centers

AUTHORIZED DISTRIBUTORS and SERVICE PARTNERS for ROTAX HOVERCRAFT and AIRCRAFT ENGINES *Edition: 1993 07 01*

1) EUROPE

AUSTRIA:

HB - FLUGTECHNIK GES.M.B.H.
Dr.-Adolf-Schärf-Str. 44
A-4053 HAID
Tel.: 07229 / 79104 / 79117 ; Fax: 07229 / 79104 15
Contact person: Ing. Heino Brditschka

BULGARIA:

GERGANOV - AIRCRAFT EINGINES
19 February 47 „A"
BG-6100 KAZANLAK
Tel.: 431 / 22 079 ; Fax: 431 / 23 777
Contact person: Radosslav D. Gerganov

CROATIA / former YUGOSLAVIA (except SLOWENIA):

VELOS - MURSA
Gunduliceva 16
HR-54000 OSIJEK
Tel.: 054 / 124 - 535 ; Fax: 054 / 31 - 723
Contact person: Ing. Ivan Vdovjak

CZECHIA:

I.F.M. GRAMPELHUBER
Skroupova 9
CS-50197 HRADEC KRALOVE
Tel.: 049 / 614 525 ; Fax: 049 / 612 400 / 616 654
Contact persons: Ing. Samal / Ing. Halek

DENMARK:

FLIGHT-CENTER
Flugplatz
DW-2875 GANDERKESEE, GERMANY
Tel.: 04222 / 3789 ; Fax: 04222 / 6042
Contact person: Volker Roßbach

FINLAND:

AUTO STARCKJOHANN OY
PL 63
SF-15101 LAHTI
Tel.: 18 51 55 15 ; Fax: 18 51 55 87; Tlx.: 16142 stj sf
Contact person: Timo Kemppinen

FRANCE / BELGIUM / MONACO / LUXEMBURG:

AVIREX
Aérodrome de Dreux
F-28500 VERNOUILLET
Tel.: 37 46 13 53 ; Fax: 37 46 26 86
Contact person: Patrick Coyette

SERVICE-CENTERS of AVIREX in FRANCE:

for postcodes 62-59-80-02-76-60-95-78-77-91-28-41-45-37-36-18-50-14-61-29-22-56-35-53-72-44-49-85:

AVIREX SHOP
Aerodrome de Dreux
F-28500 VERNOUILLET
Tel.: 37 42 30 09 ; Fax: 37 46 28 86
Contact person: Philippe Gueguen

for postcodes 01-03-04-05-06-07-11-13-15-26-30-34-38-42-43-48-63-66-73-74-83-84:

ZEN U.L.M.
Route de Lucey
F-73170 YENNE
Tel.: 79 36 76 52 ; Fax: 79 36 78 43
Contact person: Philippe Zen

for postcodes 09-12-16-17-19-23-24-31-32-33-40-46-47-64-65-81-82-87:

DELTA AQUITAINE DIFFUSION
Base Saint Exupery
F-47360 MONPEZAT D'AGENAIS
Tel.: 53 95 08 81 ; Fax: 53 95 01 02
Contact person: Philippe Bouchera

SERVICE-CENTER of AVIREX for BELGIUM AND LUXEMBURG:

AVIBEL
24 Rue delporte
B-1050 BRUXELLES
Tel.: 02 / 649 55 05 ; Fax: 02 / 647 28 33
Contact person: Philippe Claessens

GERMANY:

for postcodes DW 5-6-7-8 / DO 4-5-6-7-8-9:

M. & E. FRANZ
Kampenwandstr. 4
DW-8201 SCHECHEN-HOCHSTÄTT
Tel.: 08039 / 1431 ; Fax: 08039 / 4616
Contact person: Eduard Franz

SERVICE-CENTER OF FRANZ

for postcode DW 5:

ZWEIRADHAUS LEICHLINGEN
Am Buschtor 1
DW-5653 LEICHLINGEN 1
Tel.: 02174 / 38722 ; Fax: 02174 / 39217
Contact person: Gerhard Leide

for postcodes DW 1-2-3-4 / DO 1-2-3:

FLIGHT-CENTER
Flugplatz
DW-2875 GANDERKESEE
Tel.: 04222 / 3789 ; Fax: 04222 / 6042
Contact person: Volker Roßbach

GREAT BRITAIN / IRELAND / ICELAND:

CYCLONE HOVERCRAFT LTD.
Burnside, Deppers Bridge
LEAMINGTON Spa. CV 33 OSU
Tel.: 926 / 612 188 ; Fax: 926 / 613 781
Contact person: Nigel Beale

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MICHAEL POULIKAKOS
28 Parnithos Street
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Contact person: Michael Poulikakos

HUNGARY:

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Egészségház út 15
H-3300 EGER
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ICARO S.R.L.
Via Emilia, 83 bis
I-27050 REDAVALLE (PV)
Tel.: 0385 / 74 591 ; Fax: 0385 / 74 592
Contact person: Corrado Gavazzoni

SERVICE-CENTERS OF ICARO:

POLARIS MOTOR SRL
Fr. Valdichiascio
I-06024 Gubbio (PG)

SERGIO CHIAVEGATO
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I-37063 Isola Della Scala (VR)

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I-43010 Fraore Di S. Pancrazio (PR)

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Via Ca' Onorai No. 50
I-35015 Galliera Veneta (PD)

FERRARI ULM SRL
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MOTODELTA SNC
Via Abruzzi No. 13/B
I-27029 Vigevano (PV)

NIKEAERDELTA SRL
Via Sabbionara N. 5
I-40064 Ozzano Emilia (BO)

OFFICINE RODARO SRL
Via Uttano
I-33041 Aiello Del Friuli (UD)

PIANO FEDERICO
Campo di Voto Località San Giacomo
I-09010 Siliqua (CA)

SAMI SNC
Via S. Maria Del Pianto No. 42
I-80143 Napoli

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  Jol 11-07
  NL-8243 ED LELYSTAD
  Tel.: 3200 / 27 674 ; Fax: 3200 / 28 372
  Contact person: Henk de Vries

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- *COLBJÖRNSEN & CO. A/S*
  Box 80
  Fagertunveien 33
  N-1341 BEKKESTUA
  Tel.: 02 / 53 85 62 ; Fax: 02 / 53 20 74
  Contact person: Arne Laudal

POLAND:

- *FASTON LTD.*
  ul. Szeroka 2
  PL-05-860 PLOCHOCIN
  Tel. + Fax: (22) 40 01 96
  Contact person: Wojtek Madry, Manager

ROMANIA:

- *S.C. BERIMPEX S.R.L.*
  Str. Dr. Taranu Grigore No. 8, Ap. 2, Sector 5
  R-76241 BUCAREST
  Tel.: 63 86 162 ; Fax: 31 25 648
  Contact person: Dr. Christian Berar

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- *AVIASPORT S.A.*
  Almazara 11
  E-28760 TRES CANTOS (MADRID)
  Tel.: (1) 803 77 11 ; Fax: (1) 803 55 22
  Contact person: José Manuel Jiménez

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- *MOVAC SWEDEN AB*
  Brännland 301
  S-901 37 UMEA
  Tel.: 90 30 500 ; Fax: 90 30 484
  Contact persons: Henry Lindahl / Bo Strandberg

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- *S. JUD*
  Bergstraße 30
  CH-8902 URDORF
  Tel.: 01 / 734 02 91 ; Fax: 01 / 734 27 20
  Contact person: Mr. Jud

TURKEY:

- *KLASIK HALI A.S.*
  Cumhuriyet Mey. 9/B
  35210 Heykel, IZMIR
  Tel.: (51) 25 65 06 / 25 57 26 ; Fax: (51) 83 22 64
  Contact person: Tahir Önder, President

2) AMERICA

ARGENTINA / BOLIVIA / BRAZIL / CHILE / GUYANA / PARAGUAY / PERU / SURINAM / URUGUAY:

- *MOTAX COMERCIO E REPRESENTAÇÂO LTDA.*
  Estrada de Jacarepaguá No. 6793 - Freguesia
  22755 - RIO DE JANEIRO (RJ)
  Tel.: (21) 342 8545 / 7645 / 0703 ; Fax: (21) 342 0464
  Contact person: J.M. Carneiro de Rezende

SERVICE-CENTERS of MOTAX in BRAZIL:

- NORTH EAST: RECIFE, PERNAMBUCO STATE

AEROTEX - ARTIGOS AERONAUTICOS LTDA.
Rodovia Br. 232, km 14,5 Cristo Redentor
C.E.P. 54.220 Jaboatao dos Guararapes - RECIFE - PE
Tel.: 081 / 455 - 3966 ; Fax: 081 / 455 - 1747
Contact person: Antonio Teixeira

- NORTH: FORTALEZA, CEARA STATE

ULTRASPORT-AERONAVES E MOTORES LTDA.
Rodovia BR 116 S/N - KM 3 - Aeroleve
Bairro Aerolandia
C.E.P. 60.830, FORTALEZA - CEARA
Tel. + Fax: 085 / 272 - 5158
Contact person: Eduardo Campos

- CENTRAL + WEST: GOIANIA, GOIAS STATE

PROLAZER - PROMOCOES
REP. E VENDAS DE ULTRALEVE LTDA.
Rua T-68, Quadra 134, Lote 12 - Setor Bueno
C.E.P. 74610, GOIANIA - GO
Tel.: 062 / 261 - 6161 ; Fax: 062 / 261 - 6288
Contact person: Ubirajara Abbud

- CENTRAL + EAST: RIO DE JANEIRO, RJ STATE

ULTRAPLANNA-INDUSTRIA E COMERCIO LTDA.
Av. Alvorada, No. 2541 - Hangar 20
C.E.P. 22775, Jacarepagua - RIO DE JANEIRO
Tel..: 021 / 325 - 8197
Contact person: Elio Antonio F. Santos

- S O U T H E A S T : CURITIBA, PARANA STATE

GRACIOSA COMERCIO DE ULTRALEVE DO PARANA LTDA.
Tenente Brigadeiro Francisco Assis
Correia de Melo, No. 1023, Jardim Sta Barbara
C.E.P. 81.500, CURITIBA - PARANA
Tel. + Fax: 041 / 266 - 0285
Contact person: Joao Eduardo

- S O U T H : TAPES, R.G. DO SUL STATE

CENTENO ULTRALEVES COMERCIO E INDUSTRIA LTDA.
Estrada Estadual, KM 0,8 - Capivaras
C.E.P. 96760. 1° Distrito - TAPES - R.G. SUL
Tel.: 051 / 672 - 1476
Contact person: Fernando Centeno

SERVICE-CENTER of MOTAX in URUGUAY:

OSCAR CAMPODONICO
Juncal 1305 Of. 1202; MONTEVIDEO
Tel.: 02 / 96 - 4640 ; Fax: 02 / 96 - 4671

U S A / C A R R I B E A N /
C E N T R A L A M E R I C A:

*KODIAK RESEARCH, LTD. *)*
P.O. Box N10246
NASSAU BAHAMAS
Fax: 809 / 326 - 6110

*) Warranty registration and technical support handled by KODIAK RESEARCH, LTD., VERNON, B.C., for all customers.

C A N A D A :

KODIAK RESEARCH, LTD.
913, Kal Lake Road
VERNON, B.C., V1T 6V4
Tel.: 604 / 542-4151 ; Fax: 604 / 549-7111

SERVICE-CENTERS OF KODIAK IN CANADA:

- A L B E R T A:

A.C. ULTRA AVIATION LTD.
72 Wheatland Ave., P.O. Box 541
Smoky Lake, AB TOA 3CO
Tel.: 403 / 656-4207 ; Fax: 403 / 656-4206
Contact person: Mark Paskevich, President

- B. C. :

REG'S AIR-COOLED ENGINES
9708 Princess Drive
Surrey, B.C. V3V 2T4
Tel.: 604 / 581-7414 ; Fax: 604 / 581-7418
Contact person: Reg Lumsden, President

- O N T A R I O :

BUZZMAN ENTERPRISES, INC.
P.O. Box 310, 92 River Rd.
Holland Landing, ON LOG 1HO
Tel. + Fax: 416 / 836 - 2800
Contact person: Dave Loveman, President

- Q U E B E C :

CENTRE D'AVIATION RECREATIF LEGER C.A.R.L., INC.
1836 Rue Des Erables
St. Lambert de Levis, PQ GOS 2WO
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Contact persons: John Mc Donald (English)
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BERNARDO A. GOMEZ / AGROCOPTEROS
Calle 11A #50-45, A.A. 1789, CALI
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Maximo Tedesco (English)

EXPA CORP. „LUIS A GALLO"
Apartado A. 60399, Medellin, ANTIOQUIA
Tel.: 574 / 250 - 2019 ; Fax: 574 / 243 - 5441
Contact person: Luis A. Gallo

SERVICE-CENTER of KODIAK in COSTA RICA:

NEW COPESA
Apdo. 10108-1000, J. Santamaria Intl. Airport
SAN JOSE
Tel:. 506 / 41 54 11 ; Fax: 506 / 42 10 09
Contact person: Ingro. Francisco Sanabria

SERVICE-CENTER of KODIAK in ECUADOR:

AUGUSTO JOUVIN
P.O.Box 09-06-2434, GUAYAQUIL
Tel.: 593 / 4 - 306644 / 320507 ; Fax: 593 / 4 - 314126
Contact person: Augusto Jouvin

SERVICE-CENTER of KODIAK in EL SALVADOR:

AEROTEC
Avda. Las Magnolias 142, Colonia San Benito
SAN SALVADOR
Tel.: 503 / 23 - 2375 ; Fax: 503 / 24 - 4338
Contact person: Larry Zedan

SERVICE-CENTER of KODIAK in GUATEMALA:

FARRERA EXPORT & IMPORT
18 Avda. A 0-27 Zona 15, Vista Hermosa 2
CIUDAD GUATEMALA
Tel.: 502 / 269 - 2544
Contact person: Jose Farrera

SERVICE-CENTERS of KODIAK in MEXICO:

REFACCIONARIA VERGAS, S.A.
Apdo. Postal #66, Avda. Alvaro Obregon #242
CD. CHETUMAL, Q. ROO, YUCATAN
Tel.: 52 / 983 - 20007 ; Fax 52 / 983 - 20006
Contact person: Sergio Vargas

SERVICE-CENTER of KODIAK in NICARAGUA:

JENARO LUNA CASTILLO
Frente a Implagsa, LEON
Tel.: 505 / 0311 - 6454 ; Fax: 505 / 0311 - 3242
Contact person: Jenaro Luna

SERVICE-CENTER of KODIAK in PANAMA:

ULTRALIGHTS DE PANAMA
Apdo. #3405, PANAMA 4
Tel.: 507 / 36 - 0326 ; Fax: 507 / 36 - 3008
Contact person: Ismael E. Champsaur

SERVICE-CENTERS of KODIAK in the USA:

- A L A S K A :

ARCTIC SPARROW AIRCRAFT, INC.
7231 Rovenna Street
ANCHORAGE, AK 99518
Tel.: 907 / 349-4101 ; Fax: 907 / 563 - 3154
Contact person: Mike Jacober, President

- C A L I F O R N I A :

CALIFORNIA POWER SYSTEMS, INC.
790 - 139th Avenue, #4
SAN LEANDRO, CA 94578
Tel.: 510 / 357-2403 ; Fax: 510 / 357 - 4429
Contact person: Mike Stratman, President

ONLY FOR MOTORGLIDER ENGINES:

F. ROBERT MARSHALL
601 Sequoia Street
BRENTWOOD, CA 94513
Tel. + Fax: 510 / 644-2310
Contact person: Robert Marshall, President

- COLORADO:

LEADING EDGE AIR FOILS, INC.
331 South 14th Street
COLORADO SPRINGS, CO 80904-4096
Tel.: 719/632-4959 ; Fax: 719/632-2815
Contact person: Bill Raisner, President

- FLORIDA:

LOCKWOOD AVIATION, INC.
460 South Airport Road
LAKE WALES, FL 33853
Tel.: 813/676-0344 ; Fax: 813/676-5803
Contact person: Phillip Lockwood, President

- MISSISSIPPI:

SOUTH MISSISSIPPI LIGHT AIRCRAFT, INC.
Route 7, Box 337B
LUCEDALE, MS 39452
Tel.: 601/947-4953 ; Fax: 601/947-4959
Contact person: Ronald Smith, President

- OHIO:

GREEN SKY ADVENTURES, INC.
2377 Cream Ridge Road
ORWELL, OH 44076
Tel.: 216/293-6624 ; Fax: 216/293-6321
Contact person: Gerald Olenik, President

- WASHINGTON:

EASTSIDE ULTRALIGHTS, INC.
4700 - 188th St. N.E.
ARLINGTON, WA 98223
Tel.: 206/435-3737 ; Fax: 206/435-6480
Contact person: Jim Scott, President

- WISCONSIN:

JET AIR CORPORATION
1921 Airport Road, Austin Straubel Field
GREEN BAY, WI 54303
Tel.: 414 / 497 - 4900 ; Fax: 414 / 497 - 2678
Contact person: James Nemec, President

VENEZUELA:

- *MAXIMO OLIVIERI SRL*
3ra. Avenida de „Los Palos Grandes"
Esquina con „Transversal 8", Quinta 11-11
CARACAS
Tel.: 02 / 283-21 13 ; Fax: 02 / 285-54 54 ; Tlx.: 27876
Contact person: Maximo Olivieri

3) AUSTRALIA

- *AUSTFLIGHT AVIATION (INTERNAT.) PTY. LTD.*
P.O. Box 84
Boonah, QLD. 4310
Tel.: (074) 63 2755 ; Fax: (074) 63 2987
Tlx.: 40826 ulaust
Contact person: Jim Fenton

SERVICE-CENTER OF AUSTFLIGHT:

DENIS BEAHAN & CO.
P.O. Box 406, ROMA, QLD. 4455
Tel.: (076) 22 2742 ; Fax: (076) 22 2291

CHOPPERCARE PTY. LTD.
P.O. Box 351
CALOUNDRA, QLD. 4551
Tel.: (074) 91 4802 ; Fax: (074) 91 4577

- *BERT FLOOD IMPORTS PTY. LTD.*
7, 36 New Street
RINGWOOD, VICTORIA 3135
Tel.: 03 / 87 93 511 ; Fax: 03 / 87 96 575
Tlx.: 36444 brtfld
Contact person: Bert Flood

NEW ZEALAND:

- *LAWNBOYS - TIPPINS INTERNAT. AGENCIES*
28 F Cavendish Drive
Manukau City, AUCKLAND
Tel.: 09 / 262 - 2632 ; Fax: 09 / 262 - 2657
Contact person: Murray Tippins

4) AFRICA

EGYPT:

- *SALEM BALLOONS*
40 Talaat Harb St.
CAIRO
Tel.: (2) 2991 946 / (2) 3453 244 ; Fax: (2) 2430 541
Contact person: Weaam Salem, General Manager

SOUTH AFRICA / SWAZILAND / ZIMBABWE / MOZAMBIQUE / BOTSWANA / NAMIBIA :

- *MICROLIGHT ENGINES AND ACCESSORIES CC*
26 First Road, Hillcrest, PUTFONTEIN
Tel.: 011 / 968 2728 ; Fax: 011 / 968 2731
Contact persons: Mike Blyth

SERVICE-CENTERS of M ICROLIGHT ENGINES:

EASTERN MARINE
P.O. Box 4029, NELSPRUIT 1200
Tel.: (01311) 55 - 1832
Contact person: Howard Cochrane

BIKE WORLD
P.O. Box 309, UPINGTON 8800
Tel.: (054) 2 - 3322
Contact person: Deon Du Plessis

EAST COAST MOTORCYCLES
P.O. Box 709, KNYSNA 6570
Tel.: (0445) 2 - 1305
Contact person: Crant Pullin

LINK ENGINEERING
P.O. Box 15258, VLAEBERG 8018
Tel.: (021) 47 - 9410
Contact person: Cecil Link

MIDWEST AVIATION
P.O. Box 17526, Bainsvlei
BLOEMFONTEIN 9338
Tel.: (051) 511389
Contact person: Hennie Rossouw

SOLOWINGS
P.O. Box 214, GILLITTS 3603
Tel.: (031) 700 - 2806; Fax: (031) 700 - 5502
Contact person: David Miller

5) ASIA

CHINA / HONG KONG / MACAO:

- *DUEN MU CO.*
Room 303, Chit Lee Commercial Building
30 - 36 Shaukiwan Road
Tel.: 885 8372; Fax: 886 4030
Contact person: W. C. Choi

CIS:

- *AVIATICA J.S.C.*
33 a Leningradsky prospekt,
SU-125284 MOSCOW
Tel.: 095 / 945 56 54 ; Fax: 095 / 155 43 85
Contact person: Igor B. Piankov

- *REDA-MDT LTD.*
6/3, 1st. Kazachy per.
MOSCOW 109017
Tel.: 095 / 230 - 1204 ; Fax: 095 / 292 - 6676
Contact person: Alexey Tormakhov

INDIA:

- *GREAVES COTTON & CO. LTD*
  22-A, Janpath
  NEW DELHI - 110 001
  Tel.: 38 59 06 ; Fax: 37 82 553 ; Tlx.: 031-62663
  Contact person: Capt. S. Soota, General Manager

INDONESIA / MALAYSIA / SINGAPORE:

- *P.T. ESACON TRADA*
  Jl. Wolter Monginsidi 91
  JAKARTA 12180
  Tel.: (021) 715 906 / 739 8109
  Fax: (021) 739 8109 ; Tlx.: 62580 jlf ia

IRAN:

- *ALPAZEL - TASHAR CO. LTD.*
  54 Khaled Eslamboli Ave., TEHERAN 15117
  Tel.: 21/624-787 ; Fax: 21/886-3336 ; Tlx.: 88223708

ISRAEL:

- *CONDOR-AVIATION INDUSTRIES LTD.*
  34 Arlozorov St.
  IL-52481 RAMAT - GAN
  Tel.: 03 / 724 884 ; Fax: 03 / 723 753
  Contact person: David Viernik

JAPAN:

- *JUA, LTD.*
  1793 Fukazawa, Gotemba City
  SHIZUOKA PREF 412
  Tel.: 550 / 83 8860 ; Fax: 550 / 83 8224
  Contact person: Michio Oiwa, General Manager

KOREA:

- *HWA YUONG MEDICAL & SCIENCE CO.*
  3rd Floor, Jin Yang Bldg.
  1621-19, Seo-Cho Dong, Seo-Cho Ku
  SEOUL
  Tel.: 02 / 586 - 2925/6 ; Fax: 02 / 587 - 2610
  Contact person: John Lee, President

PAPUA NEW GUINEA:

- *BERT FLOOD IMPORTS PTY. LTD.*
  7, 36 New Street
  RINGWOOD, VICTORIA 3135
  AUSTRALIA
  Tel.: 03 / 87 93 511 ; Fax: 03 / 87 96 575
  Tlx.: 36444 brtfld
  Contact person: Bert Flood

PHILIPPINES:

- *PHILIPPINE AIRCRAFT CO, INC.*
  Metro Manila, P.O. Box 7633
  Airport Airmail Exchange Office
  Tel.: 832-2777 ; Fax: 833-0605 ; Tlx.: 66621 wpac pn
  Contact person: Rolando P. Moscardon

TAIWAN:

- *TAIWAN MAXIEM INDUSTRIES*
  7/1 Tung Feng Street
  TAIPEI, 10 651
  Tel.: 2 / 704 6163 ; Fax: 2 / 702 84 85
  Contact person: Lester Lin

THAILAND:

- *JONES COMPANY LIMITED*
  942/20-21 Rama 4th Road
  P.O. Box 686, BANGKOK
  Tel.: 2 / 233 9088 / 233 3628 ; Fax: 2 / 238 4965
  Contact person: Kit Chong

UNITED ARAB. EMIRATES:

- *AL MOALLA*
  P.O. Box 7787
  ABU DHABI
  Tel.: 2 / 723 248 ; Fax: 2 / 788 073
  Contact person: Hussain Al Moalla

34) The BOMBARDIER-ROTAX non-certified aircraft engines limited warranties

1) Period

BOMBARDIER-ROTAX as manufacturer, warrants through their authorized BOMBARDIER-ROTAX distributors FROM THE DATE OF SALE TO THE FIRST CONSUMER, every BOMBARDIER-ROTAX non-certified aircraft engine, sold as NEW AND UNUSED, and **delivered by an authorized BOMBARDIER-ROTAX distributor** for a period of the earliest of:

- 6 consecutive months for private use owners
- or 12 consecutive months from date of shipment of the manufacturer
- or the first 100 operation hours.

2) What an authorized BOMBARDIER-ROTAX distributer will do

The authorized BOMBARDIER-ROTAX distributor will, at its option, repair and/or replace components defective in material and/or workmanship under normal use and service, with a genuine BOMBARDIER-ROTAX component without charge for parts or labour, during said warranty period. All parts replaced under warranty become the property of BOMBARDIER-ROTAX.

3) Condition to have warranty work performed

You must present to an authorized BOMBARDIER-ROTAX service-center, the hard copy of the BOMBARDIER-ROTAX warranty registration card and/or proof of purchase delivered to the customer from the selling dealer at time of purchase.

4) Exclusions - are not warranted

- Normal wear on all items
- Replacement parts and/or accessories which are not genuine BOMBARDIER-ROTAX parts and/or accessories.
- Damage resulting from the installation of parts other than genuine BOMBARDIER-ROTAX parts.
- Damage caused by failure to provide proper maintenance as detailed in the Operator's Manual. The labour, parts and lubricants costs of all maintenance services, including tune-ups and adjustments will be charged to the owner.
- Aircraft engines designed and/or used for racing or commercial purposes.
- All optional accessories installed on the aircraft engine (The normal warranty policy for partsand accessories, if any, applies).
- Damage resulting from running the aircraft engine without propeller.
- Damage resulting from modification to the aircraft engine not approved in writing by BOMBARDIER-ROTAX
- Damage caused by electrolysis.
- Cold seizure and piston scuffing.
- Use of a gear reduction not designed by BOMBARDIER-ROTAX.
- Use of propellers which exceed the inertia and balance limits as specified by BOMBARDIER-ROTAX.
- If engine instruments recommended by BOMBARDIER-ROTAX have not been installed.
- Losses incurred by the aircraft engine owner other than the parts and labour, such as, but not limited to, mounting and dismounting of the engine from the aircraft, loss of use, transportation, towing, telephone calls, taxis, or any other incidental or consequential damage.
- Damage resulting from accident, fire or other casualty, misuse, abuse or neglect.
- Damage/rust/corrosion premature wear to the engine caused by water ingestion.
- Damage resulting from sand/stones infiltration.
- Damage resulting from any foreign material ingestion.
- Damage resulting from service by an unqualified mechanic.

5) Expressed or implied warranties

This warranty gives you specific rights, and you may also have other legal rights which may vary from state to state, or province to province. Where applicable this warranty is expressly in lieu of all other expressed or implied warranties of BOMBARDIER-ROTAX, its distributors and the selling distributor, including any warranty of merchantability or fitness for any particular purpose; otherwise the implied warranty is limited to the duration of this warranty. However, some states or provinces do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply.

Neither the distributor, nor any other person has been authorized to make any affirmation, representation or warranty other than those contained in this warranty, and if made, such affirmation, representation or warranty shall not be enforceable against BOMBARDIER-ROTAX or any other person.

BOMBARDIER-ROTAX reserves the right to modify its warranty policy at any time, being understood that such modification will not alter the warranty conditions applicable to aircraft engines sold while the above warranty is in effect.

6. Consumer assistance procedure

If a servicing problem or other difficulty occurs, please contact:- authorized BOMBARDIER-ROTAX service-center or- authorized BOMBARDIER-ROTAX distributor.

7. Warranty will only be valid if the end user completes this registration card as soon as the aircraft engine goes into service, and returns it to the national authorized BOMBARDIER-ROTAX distributor (marked with „ ✹“ in section 33) of the area in which the aircraft engine is firstly operated.

8. This warranty will be effective for all non-certified aircraft engines delivered by BOMBARDIER-ROTAX as of June 1st, 1992.

9. Danger!

This engine, by its design, is subject to sudden stoppage! Engine stoppage can result in crash landings. Such crash landings can lead to serious bodily injury or death.

Never fly the aircraft equipped with this engine at locations, airspeeds, altitudes, or other circumstances from which a successful no-power landing cannot be made, after sudden engine stoppage.
Aircraft equipped with this engine should only fly in DAYLIGHT VFR conditions.

WARNING!

This is not a certificated aircraft engine. It has not received any safety or durability testing, and conforms to no aircraft standards. It is for use in experimental, uncertificated aircraft and vehicles only in which an engine failure will not compromise safety.

User assumes all risk of use, and acknowledges by his use that he knows this engine is subject to sudden stoppage.

ENGINE TYPE: _____

SERIAL NO.: _____

PURCHASE DATE: _____

INSTALLATION IN: _____

_____

_____

DEALER IMPRINT AREA

BOMBARDIER-ROTAX—GMBH
MOTORENFABRIK
A-4623 GUNSKIRCHEN— AUSTRIA
Telefon: ..43-(0)7246-271-0*, Telefax: ..43-(0)7246-370
Telex: 25546 brgk a, Telegr.: Bombrotax Gunskirchen

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- All optional accessories installed on the aircraft engine (The normal warranty policy for partsa n d accessories, if any, applies).
- Damage resulting from running the aircraft engine without propeller.
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- Damage caused by electrolysis.
- Cold seizure and piston scuffing.
- Use of a gear reduction not designed by BOMBARDIER-ROTAX.
- Use of propellers which exceed the inertia and balance limits as specified by BOMBARDIER-ROTAX.
- If engine instruments recommended by BOMBARDIER-ROTAX have not been installed.
- Losses incurred by the aircraft engine owner other than the parts and labour, such as, but not limited to, mounting and dismounting of the engine from the aircraft, loss of use, transportation, towing, telephone calls, taxis, or any other incidental or consequential damage.
- Damage resulting from accident, fire or other casualty, misuse, abuse or neglect.
- Damage/rust/corrosion premature wear to the engine caused by water ingestion.
- Damage resulting from sand/stones infiltration.
- Damage resulting from any foreign material ingestion.
- Damage resulting from service by an unqualified mechanic.

5) Expressed or implied warranties

This warranty gives you specific rights, and you may also have other legal rights which may vary from state to state, or province to province. Where applicable this warranty is expressly in lieu of all other expressed or implied warranties of BOMBARDIER-ROTAX, its distributors and the selling distributor, including any warranty of merchantability or fitness for any particular purpose; otherwise the implied warranty is limited to the duration of this warranty. However, some states or provinces do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply.

Neither the distributor, nor any other person has been authorized to make any affirmation, representation or warranty other than those contained in this warranty, and if made, such affirmation, representation or warranty shall not be enforceable against BOMBARDIER-ROTAX or any other person.

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