MAGNUM

XL-400

65 cc 5 Cyl. Radial Engine Operating Instructions

Distributed In Australia By :-

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SPECIFICATIONS

Displacement	12.8cc X 5 (0.781 cu. in. X 5)
Bore	26.5mm (1 043 in.)
Stroke	23.2 mm (0.913 in.)
Practical R.P.M.	1,800-9,000 r.p.m.
Weight	2800g. (6.17 lbs.) including motor mount

IMPORTANT:

Before attempting to operate your Magnum XL 400R5, please read through this instruction booklet to familiarize yourself with the controls and other features of this engine.

SAFTEY INSTRUCTIONS & WARNINGS

NOTICE: Read and follow these safety instructions and warnings before attempting to operate this engine!

The model engine you have purchased will give you dependable performance and it will be a source of satisfaction and pleasure if you follow these instructions and warnings as to its proper and safe use. Do not let pleasure turn into injury or tragedy! You alone are responsible for the safe operation of your engine, so act sensibly and with care at all times. This engine is not a toy, but a precision built machine whose power is capable of harming you and others if abused, misused, or if you fail to observe these safety precautions.

At all times:

1. Keep spectators, especially small children, who can be hurt when the engine is running, at least 20 feet away.
2. Mount engine properly and securely in a test stand, or on proper engine mount. Follow the mounting recommendations on the airplane kit's plan or in the test stand manufacturer's instructions. DO NOT clamp the engine in a vise.
3. Use the correct size and pitch of propeller for your engine. See the Propeller Specification Chart in these instructions, consult your model's plans, and always follow the instructions of the propeller manufacturer.
   Note: We recommend using wooden propellers when possible. Nylon and other non-wooden propeller require special care and handling.
4. Install the propeller with the curved side facing toward you. Tighten the propeller nut securely against the washer and the propeller. Use a propeller wrench to tighten or loosen the nut. Do not use pliers.
5. Inspect your propeller regularly. If propeller has any nicks, scratches, cracks or any other sign of wear, discard it! Never alter, repair, bend or shave a propeller, as this will weaken it.
6. Inspect the propeller nut between each run and tighten if necessary. Normal engine vibration can cause loosening.
7. To stop engine, adjust throttle linkage to close and cut off air supply. Alternative method: cut off fuel supply by pinching the fuel line or disconnecting the fuel line from the carburetor. NEVER use hands, fingers or any part of your body to stop the propeller. NEVER throw anything into a running engine to stop it.
8. Stand behind engine while performing any adjustments. Keep your face, body, and any objects away from the path of the propeller while starting and running your engine.
9. Never lean your face over the engine while you are starting or running engine.
10. If you carry your model while engine is running, be very cautious. Keep your eye of the propeller and keep it away from you and others.
11. Do not have tight fitting cowlings or oversized spinners, as they will impede airflow to engine, causing overeating and damage to the engine.
12. Do not fly your model under or near high tension electrical wires.

Recomendations:

1. Use safety glasses or a safety shield when starting or running your engine.
2. Follow all warnings regarding engine fuel. Keep it in a safe place, away from the danger of sparks, cigarettes, excessive heat, and anything which could ignite the fuel. Engine fuel is extremely flammable and must be handled with great care.
3. Do not run engine in an area containing loose gravel or sand, as these may be thrown in your face, and may also weaken the propeller, causing failure.
4. Do not allow loose clothing (shirts, ties, etc.) to come near the propeller. Keep loose objects (pencils, screwdrivers) out of pockets to prevent them from falling into propeller.
5. If using spinner of any kind, ensure that its edges do not come in contact with the propeller blades.
6. Keep glow plug clip and its cord away from spinning propeller.

CAUTION:

1. Model engines create considerable heat as they run. Do not touch any part of your engine until it has cooled.
2. Never run engine in enclosed area (garage, basement, etc.). Model engines, like automobile engines, emit deadly carbon monoxide gas. Run your engine only in a well ventilated open area.
3. Operating any model with your engine requires skill and safety precautions. A flying model can develop a great deal of power, enough to seriously injure people and do substantial property damage. KNOW WHAT YOU ARE DOING — get proper training from an experienced modeler before operating your model!

REMEMBER:

1. Respect the power of your engine and keep it working for your pleasure by following all instructions, warnings, and safety rules.
2. You and you alone are responsible for the safe operation of your engine. Use good safety sense at all times. If you have any questions, do not hesitate to contact your dealer or the Magnum Service Center.

The Magnum XL 400R5 is a 5 Cylinder Radial overhead valve 4 Stroke engine of 400 cubic inch, 65.38 cc total displacement. The XL 400R5 has been designed to meet the needs of the modelers who enjoy the larger airplanes, like 1/4 scale, who demand the high standards of refinements that are not available in larger displacement 2 Stroke engines.

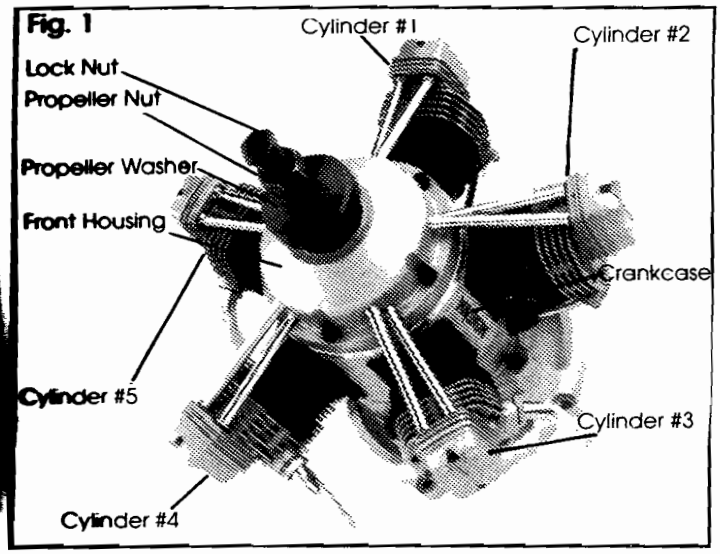
Accessories -

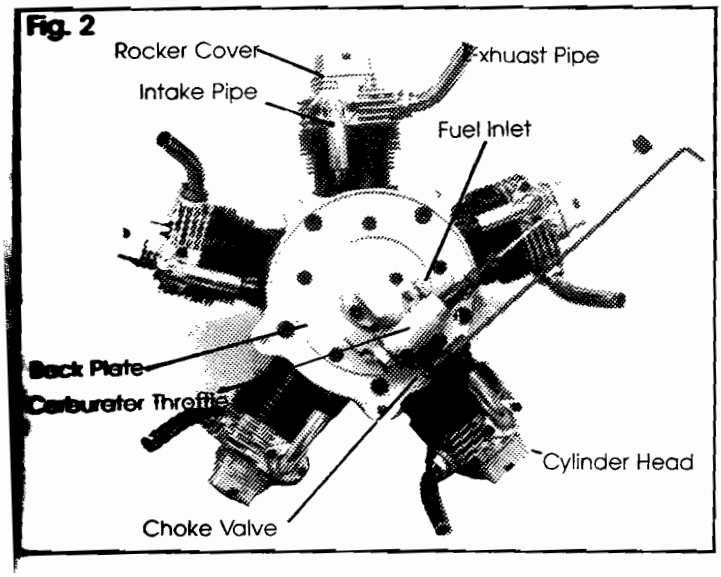
1 - set glow plug connector leads

Optional Accessories -

Scale Type Exhaust Ring - Call Tates Performance Hobbies 03 52224201

ENGINE PARTS





INSTALLATION:

• The Magnum XL 400R5 includes a strong 1 piece CNC machined aluminum radial type mount for easy and secure installation to the firewall of your aircraft.

• When installing the XL 400R5 to the firewall of your aircraft, it is imperative that the firewall is strong, at least 15 mm thick and secure, and firmly attached to the structure of your aircraft.

Installation Procedures

• Locate the center of the firewall.

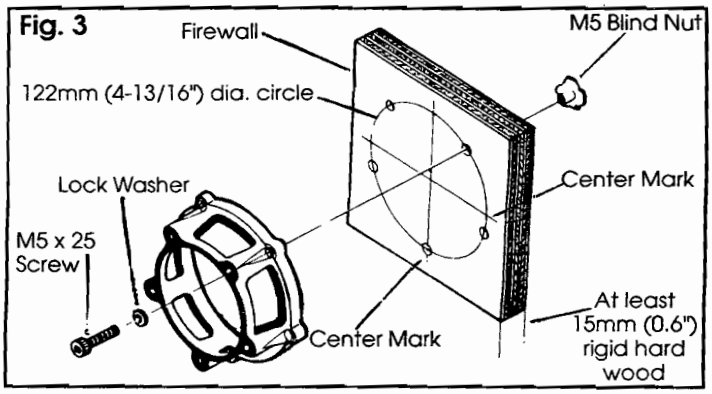
• Place the engine on a sheet of paper, mount down. Using a sharp pencil, outline the outside radius of the motor mount. Then mark the exact location of the mounting holes.

• Take engine off sheet of paper, and find center of outlined motor mount.

• Tape sheet of paper, matching center of mount to center of firewall.

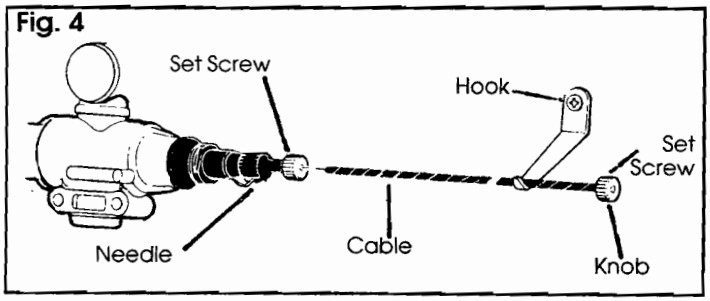
• Drill mounting holes for 5mm screws (M5 x 25) in proper locations.

• Secure the engine to the firewall, using the supplied screws, nuts and washers, *making sure that the Magnum Nameplate on the front housing is facing up.*



Needle-valve extension

The needle-valve supplied with your XL 400R5 is designed to use an extension so that the needle valve may be adjusted from outside the airplane once the engine is enclosed within the fuselage. An flexible cable with knob on 1 end, approximately 1.6 mm in diameter, should be inserted into the needle valve's center hole. Secure cable by tightening the set screw in the needle valve with the small Allen key included with your engine. On the outside end of cable, secure the included know with the set screw using the small Allen key.



NOTE: *Do not use an excessively long extension cable* that is unsupported, as this may cause a vibration which might affect the needle valve setting and/or damage the needle valve thread. If you need to have a longer extension cable so that the needle valve can be adjusted from outside of the airplane, always provide a suitable support at the outer end. Additionally, be sure not to position the support for the needle valve extension near the exhaust pipe.

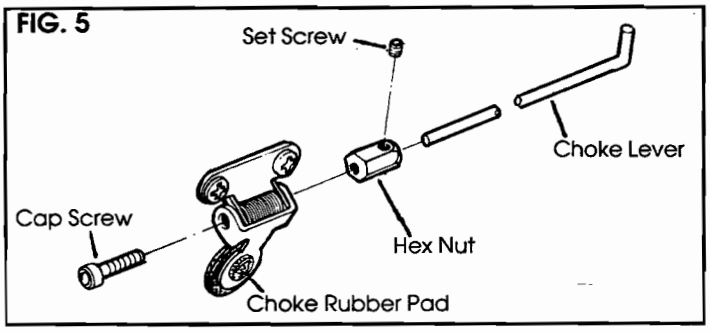
NOTE: The carburetor cannot be reversed in order to reverse the needle valve location.

Choke Valve

• The choke valve operating lever can be located either on the left or right side by reversing the hexagon nut and cap screw.

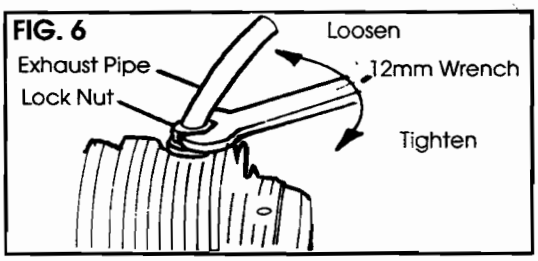
• Unscrew the cap screw while holding the hexagon nut with the included wrench supplied, and refit the lever to your required location.

• If the supplied rod is too long, cut it to required length. A unnecessarily long rod may tend to vibrate. The rod should be as short as possible, or should have its outer end supported.



Exhaust Pipe Adjustment

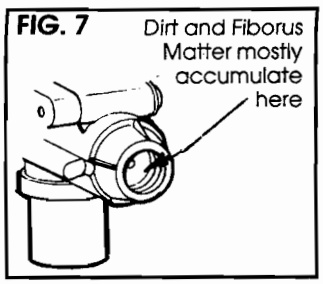
The direction of the exhaust pipes may be altered in accordance with individual installation requirements. The angle is easily adjusted by loosening the nut that secures the exhaust pipe to the cylinder head. Use the supplied wrench.

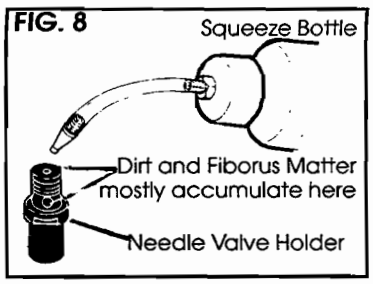


Carburetor Cleanliness

• It is vitally important for all engines, including the XL 400, that the fuel entering the carburetor is pure and clean. For this reason, it is recommended that the fuel is passed through a filter when the tank is filled and that a good in-line filter is installed between the fuel tank and the carburetor.

• Additionally, occasionally remove the needle valve holder from the carburetor and rinse out the locations shown in Figures 5 & 6 with methanol or fuel. Be careful not to lose the gasket when removing the needle valve holder from the carburetor.



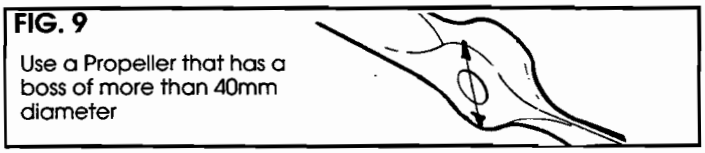


PROPELLER CHOICE

The choice of propeller for your XL 400 depends on the size, weight, and performance level of the model. Determine the best propeller size after practical experiment. As a starting point, refer to the propeller chart below for expected RPM with specific propellers:

PROPELLER	R.P.M.
18 x 10	8,200 - 8,400
18 x 12	7,200 - 7,400
18 x 14	6,800 - 7,000
20 x 8	7,900 - 8,100
20 x 10	7,000 - 7,200
22 x 8	6,900 - 7,100

Be sure to use only well balanced propellers only. An unbalanced propeller causes vibration and loss of power. It is also important to ensure that the propeller has no nicks, splits, or cracks and shows no other signs of wear.

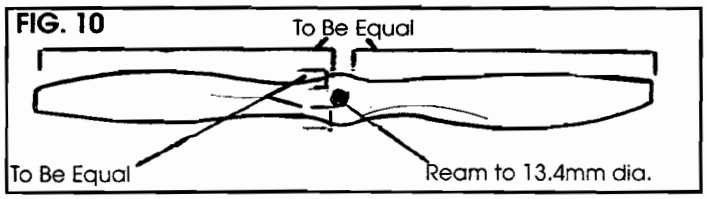


NOTE: For safety reasons, at all times keep your face, hands, and rest of body well away from the path of the propeller during all operating procedures, including starting, and needle valve adjustments. Please refer to the Safety Instructions and Warnings in this Manual for added safety cautions.

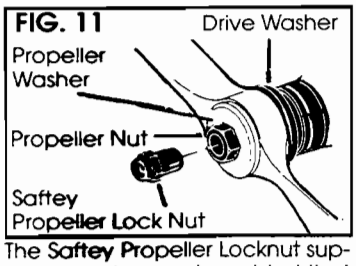
Securing the Propeller to the Magnum XL 400

When securing the selected propeller to the Magnum XL 400, it is recommended to use the Propeller Safety Locknut Assembly, included with the engine, to prevent the propeller from flying off or splintering, even if it loosens. Be sure to securely tighten the propeller nut.

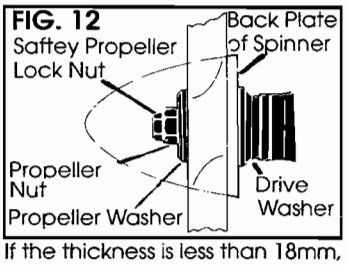
Installation of the propeller is as follows:



1) Ream the propeller center hole 17/32 inch.
2) Balance the propeller.
3) Ensure that the Woodruff Key and drive washer are properly and firmly attached. The Woodruff Key allows the drive washer to lock into place, as it is the only place where the the washer can slide into place to meet the crankcase.
4) Fit the propeller nut and washer to the propeller, and screw onto the engine shaft. Tight nut firmly with wrench.
5) Insert the Propeller Safety Locknut Assembly, and tighten firmly with wrench, being sure not to use excessive force.



The Saftey Propeller Locknut supplied can be used provided that the propeller thickness is between 18mm (23/32") and 28mm (1-1/8").



If the thickness is less than 18mm, use an appropriate washer between propeller washer and propeller nut.

6) It is important to remember, especially with wooden propellers, that there is a tendency for propeller materials to shrink due to wear or to heat. Always check to ensure that the propeller is properly secured to the shaft. Tighten the propeller nut if necessary after loosening the Propeller Safety Locknut. RE-Tighten Locknut once propeller nut is secure.

GLOW PLUG HEATING

A 4 cycle engine fires every 2 revolutions, and it is imperative that a proper glow plug be fitted to the XL 400. Five Thunderbolt 4 Cycle Glow Plugs are included with the Magnum XL 400. The Thunderbolt Glow Plug is recommended for best all around performance with this engine.

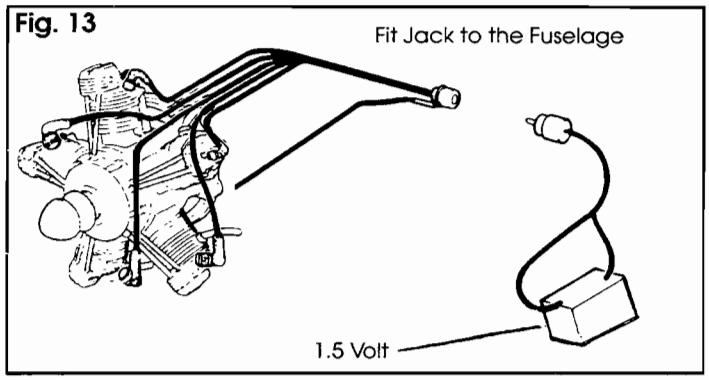
NOTE: If you choose glow plugs other than the Thunderbolt 4 Cycle, it is important to use the same type for all cylinders.

Glow Plug Ignition

For best performance, use an onboard battery to ignite the glow plugs when the throttle is set at + or less. The onboard glow will ensure that all glow plugs stay "hot" even when the engine RPM slows.

• The Magnum XL 400 includes 10 (5 for spare use) spring loaded connectors for connecting the glow plugs to the battery. These special connecting heads will snap onto the head of the glow plug to ensure firm contact.

• Once the connectors are secure to the glow plugs, join the 5 glow plug leads together. If the connecting wires need to be extended once they have been joined, use a 16 guage or larger wire to employ a single lead.



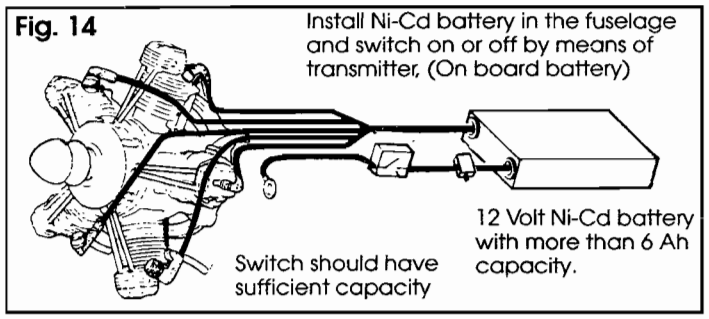
• The glowplug wires should be connected to the positive battery terminal when in use.

• The Ground Wire can be connected to the motor mount, and will connect to the negative battery terminal.

• A 15 amp or larger capacity switch should be wired into the negative lead to turn the system on and off during transport and priming procedures. The switch should be easily accessible on the outside of the aircraft.

• A second 15 amp or larger switch should be wired into the same line as well and linked to the throttle servo to turn on when the throttle is set below + throttle.

• The battery source should be above 1.2 volts, and no more than 1.5 volts, and needs to have a capacity of 6 - 10 amps. The use of a small lead acid battery or 4 -5 (wired in parallel) sub-C batteries has shown to work perfectly and should easily be carried by your aircraft.

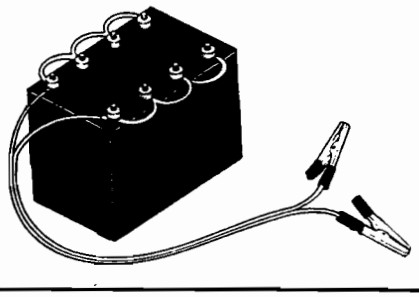


• As an option, you may want to have a separate power source to use during starting procedures. The use of a separate battery will extend the time between charges of the on-board battery. Remember, If using an external battery, the onboard battery should be off. See Glow Plug Battery Section Below:

Glow Plug Battery

When starting the XL 400, it is necessary to use a glow plug battery of large capacity, 10 Ah or greater, to heat 5 glow plugs simultaneously. A heavy duty 1.5 volt dry battery or preferably a 1.2 volt rechargeable Ni-Cd battery may be used. A 2 volt lead acid cell (accumulator) may also be used but only if a method for reducing the voltage at the plugs is in place, since the plugs are only rated at 1.5 volt. See Below for instructions for 2 volt.

Fig. 15



• If a lead acid 2 volt lead acid rechargeable cell is used, it is necessary to reduce the applied voltage at the glow plugs to approximately 1.5 volt. The recommended method is to insert an appropriate resistor in each individual plug lead. It is seriously discouraged to use a rheostat attached to the 2 volt cell, or to use extra long leads of at least 2 meters in length, to obtain the required drop in voltage. The disadvantage of this system is that if 1 glow plug should become disconnected, voltage to the remaining 4 glow plugs will be increased dramatically and may cause burning out of the elements.

FUEL

Our Eeperience has shown that poor running is usually caused by poor quality or low Nitro fuels.
ALWAYS use COOL POWER Multi Viscosity (Purple) Synthetic oil at around 15 to 20%.
This engine requires high Nitro content to run smoothly.
15% to 25% is highly reccommended.
Cool Power 25% Nirto Heli low smoke fuel is an excellent choice and a proven formula.
Combined with an on - board glow system, most operating problems are solved....
Do not use Castor Oil Fuels.

Lubrication:

• All parts of the XL 400 are automatically lubricated by the oil content of the fuel mixture.

• During the running of the engine, as well as while the engine is sitting properly mounted with the drain nipple pointed down, the excess oil will leave through the drain nipple. To protect your airplane, connect silicon tubing to the drain nipple and have it release the oil outside of your aircraft.

• After you complete your day of flight, run engine dry (removing fuel line from tank) to remove all methanol engine. The remaining castor oil in the engine will protect the engine. Be sure to use after run oil, SEE NEXT STEP!

• Make a habit of using after-run oil in your engine after each flying session. This will prevent rusting in the crankcase as well as preventing the excess castor oil from solidifying and locking the engine.

OPERATING THE XL 400

Starting Precautions

NOTE: For your safety and the safety of others, please observe the following instructions before attempting to start the XL 400.

• Read and follow the "Safety Instructions and Warnings Section" of these instructions.

• Make sure that an assistant helps you start the XL 400. Make sure that your assistant, while securely aft of the aircraft, uses both hands and firmly holds the aircraft at the leading edge of the wing.

• Prime the engine properly. Turn the propeller counter clockwise to draw fuel from the fuel tank. BE SURE that the battery is not connected to the glow plugs.

• **NEVER** start the engine with the throttle fully open. Doing so will cause the aircraft to move forward abruptly due to the strong thrust of the propeller movement.

• Never make any adjustments, other than to the needle valve, while the engine is running

• The engine should be started by rotating the propeller counter clockwise, the normal running direction, when viewed from the front.

• The engine may be hand-started, however, the use of a High Torque Electric Starter is strongly suggested.

• After the engine has been run, residual oil will tend to accumulate in the lower 2 cylinders. This also happens in the full size radial engines. Between flying sessions, this accumulation may be great enough to prevent the pistons from passing over top dead center on the compression stroke, ie: an a hydraulic lock will occur. Any attempt to start the engine is this condition may cause serious damage. Make sure that this type of damage does not occur by first removing the glow plugs to allow the excess oil to drain out of the glow plug holes.

• Strongly recommended also is to disconnect the tubing from the fuel tank to the carburetor, especially if the fuel level in the tank is above the carburetor, as fuel can be siphoned into the engine if you do not disconnect the tubing.

Starting Procedure

1) From a completely closed position, open the needle valve 2 - 3 turns.

• MAKE SURE THAT GLOW PLUG BATTERY IS NOT CONNECTED. THE GLOW PLUGS MUST NOT BE HEATED WHILE THE ENGINE IS BEING PRIMED.

Fig. 16

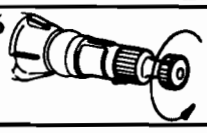
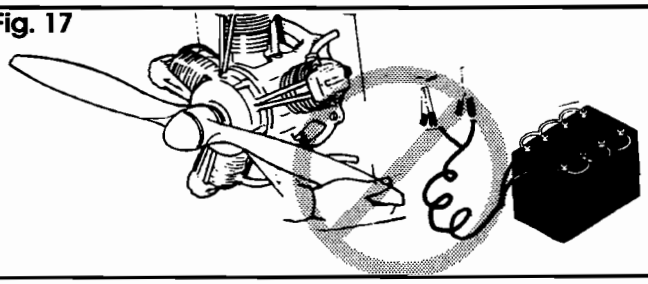
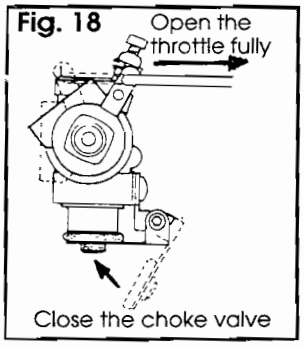
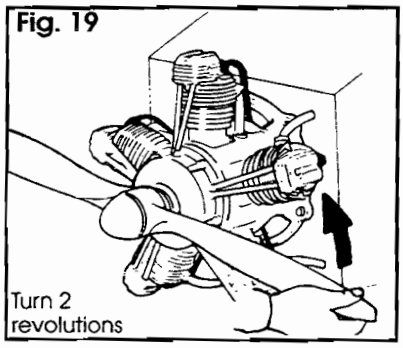


Fig. 17



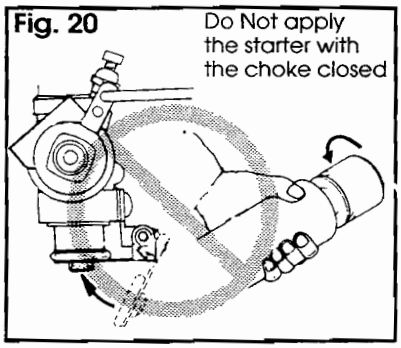
2) Prime the engine by opening the throttle valve fully, and closing the choke valve while turning the propeller counter clockwise through 2 full revolutions.

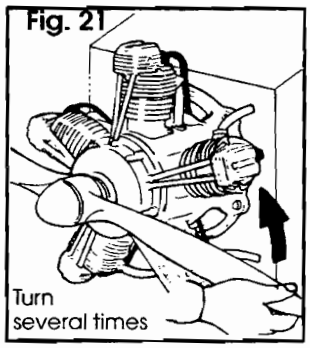




• If strong compression is felt when trying to rotate the propeller counter clockwise, too much fuel has been drawn into the engine. If this occurs, do not use force! Remove all glow plugs from the engine.Then, ensure that the choke valve is open and turn the propeller clockwise to force fuel out of the engine through the exhaust pipes.

• **Warning!!!!** Never close the choke valve when applying the starter to the engine. Doing so will cause too great an amount of fuel to be drawn into the cylinders and will result in hydraulic lock and the risk of severe damage. See Fig 20

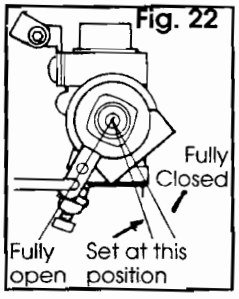


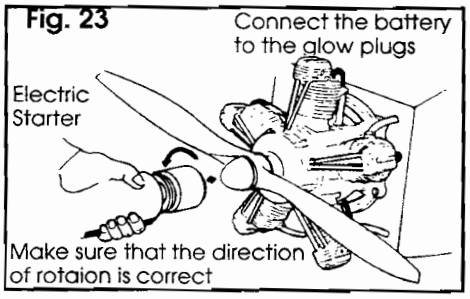


NOTE: After the engine has been primed, excess fuel may drip from the carburetor when the choke valve is reopened. Therefore, if your engine is enclosed in a cowl, be sure to fuel proof any surface that may be accessible to these fuel drippings to prevent fuel from penetrating the airframe structure.

3) Release the choke control and immediately turn the propeller counter clockwise several times so that fuel is drawn well into the cylinders.

4) From the fully closed position, set the throttle valve approximately + open. See Figure 22





5) Using an Electric Starter with your XL 400:

• Be sure that the direction of the rotation of the starter is correct.

• Connect the glow plug battery.

• Apply the electric starter.

6) Handstarting your XL 400:

NOTE: Be sure to us a heavily padded glove or chicken stick when hand starting the engine.

• Ensure that he propeller is fixed in such a way that it is positioned horizontally as compression is felt.

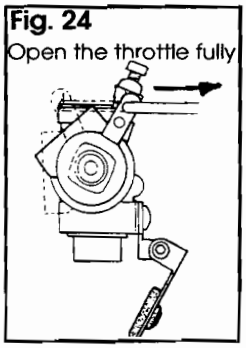
• Connect the glow plug battery.

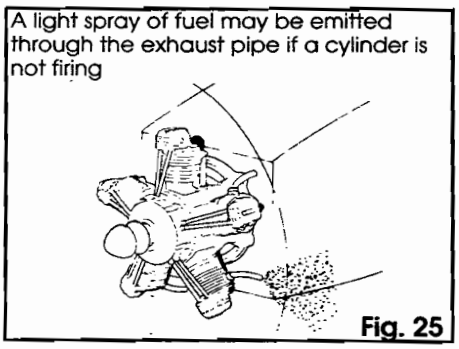
• From the center of the right blade, firmly swing the propeller counter clockwise.

7)Once the engine starts, open the throttle valve completely and allow it to run (approximately 10 seconds), with the original needle valve setting.

8) Make sure that all 5 cylinders are firing.

• The engine is running properly if white smoke is emitting from all exhaust pipes equally. You will find a slight fuel spray from the exhaust pipe of any cylinder that is not firing.





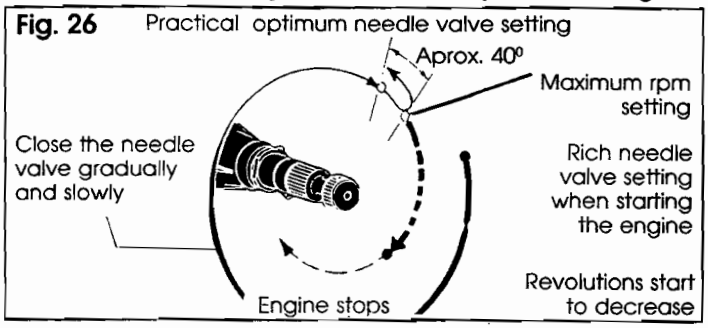
• If you are not using the onboard glow system and a cylinder stops firing, reduce the throttle setting to approximately + open from the fully closed position and re-connect the glow plug battery. You will notice the propeller revolutions will increase once all cylinders are firing consistently.

9) The firing order of the Magnum XL 400 5 Cylinder engine is 1,3,5,2,4 as seen from behind the engine. See Figure 2

Adjusting the needle valve

• Abrupt adjustment of the needle valve may cause the engine to stop, especially when it is new and inot fully broken in. **Disconnect the glow plug battery.**

• As the speed of the engine does not instantly change with the needle valve readjustment, small movements, with pauses between, are necessary to arrive at the optimum setting.



START THE ENGINE

OPEN THE THROTTLE FULLY
Disconnect the glow plugs from the battery

ADJUST THE NEEDLE VALVE
Slightly open (appox. 40°) from the maximum rpm
Make sure that all 5 cylinders are firing

CLOSE THE THROTTLE GRADUALLY

If glowplug re-heat is employed, on board battery should energize glowplugs at this position

FIND THE IDLING POSITION
The position where the lowest possible rpm with steady running, is obtained

OPEN THE THROTTLE FULLY
Set the throttle opening by means of the throttle trim on the transmitter so that the lowest practical speed, without risk of the engine stopping is obtained.
Make sure glow plug heat is switched off.

DOES THE ENGINE INCREASE SPEED SMOOTHLY?

YES

CONTINUE RUNNING AT HIGH SPEED FOR 5 SECONDS

CLOSE THE THROTTLE SMOOTHLY

RUN AT IDLING SPEED FOR 5 SECONDS

DOES THE ENGINE STOP?

NO

SMOOTHLY APPLY FULL THROTTLE

DOES THE ENGINE RUN AT HIGH SPEED?

YES

O.K.

ATTENTION:
Do Not leave the battery connected while adjusting the carburator

RE-SET THE THROTTLE STOP FOR SLIGHTLY HIGHER IDLING SPEED

ENGINE STOPS

CHECK MIXTURE ADJUSTMENT AT IDLING SPEEED. MAKE SURE THAT ALL CYLINDERS ARE FIRING
Adjustment should be carried out after stopping the engine
Do not move needle valve while adjusting other controls
Repeat this procedure while opening and closing the throttle until the best result is obtained. See Fig. 28

THE ENGINE HESITATES BEFORE PICKING UP TO FULL SPEED WITH REDUCED POWER.

RE-SET THE THROTTLE STOP FOR SLIGHTLY HIGHER IDLING SPEED

ENGINE STOPS

CHECK MIXTURE ADJUSTMENT AT IDLING SPEEED. MAKE SURE THAT ALL CYLINDERS ARE FIRING
Adjustment should be carried out after stopping the engine
Do not move needle valve while adjusting other controls
Repeat this procedure while opening and closing the throttle until the best result is obtained. See Fig. 28

THE ENGINE HESITATES BEFORE PICKING UP TO FULL SPEED WITH REDUCED POWER.

Re-starting the engine When Warm

To re-start the engine when warm, simply re-energise the plugs, and re-apply the starter with the throttle in the idling position. If the engine does not start, disconnect the battery from the glow plugs and re-prime by closing the choke valve while rotating the propeller twice with the throttle open. Initially, the high temperature inside the combustion chambers may turn the liduid fuel into gas and emit it through the exhaust pipes. Therefore, repeat the priming procedure once or twice until the cylinders become cool enough for re-starting.

BREAK-IN PROCEDURES

All internal combustion engines benifit, to some degree, from extra care when they are run for the first few times. This process is known as breaking in an engine. This is to allow the working parts of the engine time to settle down after being subjected to high temperatures and stress. However, because Magnum engines are made with the aid of the finest modern presision machenery and from the best suitable materials, only a very short and simple break-in procedure is required and can be carried out with the engine installed in the model. We suggest using a 18 x 10 or 20 x 8 propeller for breaking-in.

Start the engine and run it for about 10 seconds with the needle valve set at + open, allowing engine to reach about 6,300 RPM, then open the needle valve to reduce speed to approximately 5,000 RPM and run for 20 seconds at this cooler setting. Keep the throttle fully open, using only the needle valve to reduce speed.

Repeat this procedure, alternately running the engine fast and slow with the needle valve adjustments, while gradually extending the short period of high speed running until the engine has been run at least 10 minutes. Once this minimum 10 minute ground break-in has been achieved, continue break-in in the air.

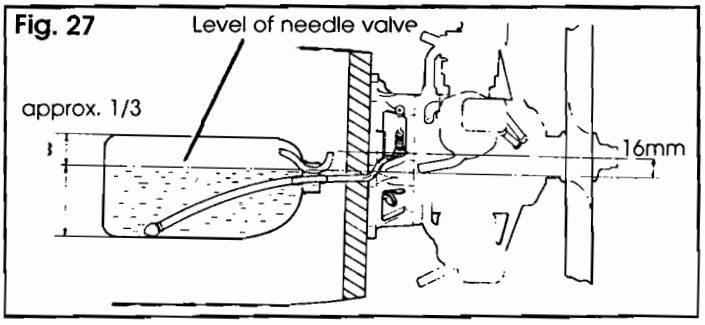
For the first few flights, set the needle valve as rich as possible, consistent with necessary take off power and, if necessary, readjust the throttle trim on the transmitter so that the engine does not shut off when the throttle is fully closed.

After every flight, close the needle valve slightly, until, after at least 10 flights, set the needle valve for maximum power. The carburetor can not be adjusted for optimum throttle performance with the Throttle Valve Adjustments. See next section.

THROTTLE VALVE ADJUSTMENT

The carburetor of the XL 400 has been set at the factory for best performance with the fuel tank located in the normal position (close to the back of the engine and where the level of the needle valve is at 2/3 height of the tank). However, the settings may, in some cases, vary slightly because of variations of fuel and climate. Additionally, during engine break-in, the needle valve is set rich, thus, the carburetor cannot be expected to show the best response. Therefore, it is recommended that the XL 400 be run first with the throttle settings as set at factory. After proper engine break-in, check the operation of the throttle according to the following chart.

NOTE: Only adjust controls when necessary.



Adjusting the Idle Mixture Control Screw

The special Magnum Carburetor fitted to the XL 400 controls the amount of fuel entering the engine according to the throttle opening and thus, maintains the correct mixture strength at all speeds from idle to full power. As previously explained, the idle mixture control screw is set at the factory, but should be rechecked after proper break-in:

1) Start the engine, allow it to warm up, then close the throttle. Allow engine to idle for a few moments and then reopen the throttle for full power. If engine performs well, move to Flight Section. If engine hesitates, move to Step A,B, or C.

NOTE: Any adjustments to engine should be done after engine is shut off.

A If the engine hesitates at this point, while emitting an amount of smoke before acceleration, the setting is too rich. If the setting is too rich, turn the Idle Mixture Control Screw clockwise to lessen the mixture. About 1/12 (30 degrees) turn should correct the mixture setting.

B If the engine stops or is slow to pick up speed, without smoking, it is probable that the idling mixture is too lean. In this case, it will be necessary to turn the Mixture Control screw counter clockwise, approximately 1/12 (30 degrees) turn should correct the mixture setting.

C If the revolutions increase but the engine still appears sluggish, it is possible that one of the cylinders has stopped firing. This can be detected by checking for exhaust from all pipes. The cease firing of the cylinder may be caused by the idling speed being set too low or the idling mixture either being too rich or too lean. Normal safe idling speeds are in the 2,000-2,200 RPM range.

- If the idle speed is set too low, reset the idle at a higher RPM using the throttle trim on the transmitter.
- If the idle mixture is too rich, turn the Idle Mixture Control Screw clockwise approximately 1/12 (30 degrees) turn should correct the mixture setting.
- If the idle mixture is too lean, turn the Idle Mixture Control Screw counter-clockwise approximately 1/12 (30 degrees) turn to correct the mixture setting.

NOTE: Please note that a 5 cylinder, 4 cycle engine may appear to have a higher idling RPM than actual. It is strongly recommended to always use a tachometer when determining actual idling RPM.

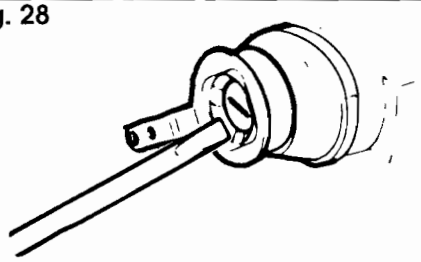
NOTE: Readjustment of the carburetor may be necessary whenever a change of glow plug or fuel is made.

Resetting the Idle Mixture Control Screw

While carburetor adjustments are being made, it is possible that the Mixture Control Screw setting may be unintentionally changed. The pre-set setting can be found as following:

• Carefully tighten the Mixture Control Screw until it is completely closed. Then turn the Screw a full 2 revolutions back.

Fig. 28



Carefully turn the screw in the direction of the + mark with the screwdriver supplied until it stops, then turn back again exactly 2 revolutions.

NOTE: If an onboard glow plug system is being used with the XL 400, it is proper to have the system operating while adjusting Mixture at idling speed.

FLIGHT

Engine Check before flight:

• Ensure that all 5 cylinders are firing.

• As with a full size car or airplane engine, it is essential that the Magnum XL 400 be properly warmed before flight. Once started, allow the engine to run at full throttle for at least 10 seconds before releasing the model. NEVER attempt to take-off immediately after the engine has been started.

INSTRUCTIONS FOR VALVE ADJUSTMENT AND TOOL KIT

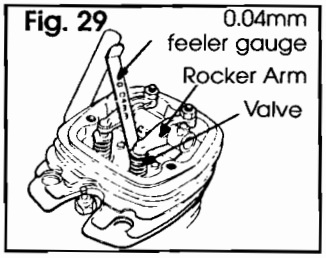
Valve clearances are correctly set before any Magnum Four Stroke Engine leaves the factory. In normal use, the valve clearances are not necessary to adjust until extended running time of the XL 400. However, in case of loss of power after extended running time or when the related parts are replaced due to crash, etc., valve clearances should be checked and adjusted. These adjustments may necessitate using the Valve Adjusting Tool Kit. ***Additionally, we suggest that after proper break-in of the XL 400, carefully check to ensure that the valve clearances are correctly set.***

Note: ONLY check and re-set the valve clearances when the engine is cold.

IMPORTANT: Valve clearances that are too small may cause difficulty in starting your XL 400R5 because the valve will not be able to close properly, while valve clearances that are too great may cause loss of power because the valve will not be able to open sufficiently.

A: To check the valve clearances:

Fig. 29



1) Remove rocker cover by unscrewing the Allen screws from the rocker box on the top of the cylinder head. Use the Allen key supplied with your XL 400R5 to remove the Allen screws.

2) Turn propeller until compression is first felt. Once you feel compression, turn the propeller an additional 1/4 turn. At this position, both valves should now be closed.

3) With the valves closed, the required valve clearance is between 0.04 mm and 0.10 mm (0.0015 to 0.004 inch) measured between the valve stem and the rocker arm. Use the 0.04 mm and 0.10 mm feeler gauges to check clearances. (See Fig. 29) If tolerances are within range, move to step 4. If tolerances are outside of range, see NOTE and move to step B.

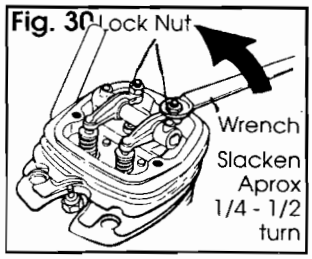
4) It is important to ensure that the valve clearances are consistently within range. It is for this reason that 3 valve clearance checks are completed. Rotate propeller through compression stroke (approximately 2 rotations) and complete steps 2 & 3 again to ensure that tolerances are within range. Complete step 4 again.

Note: In most cases, the 0.04 mm feeler gauge should pass through the gap, while the 0.10 mm feeler gauge should not. However, if your engine is starting easily, and running satisfactorily, it may not need any adjustment, even if the valve clearance is below .04 mm, and up to .14 mm (can be tested by having .04 mm and .10 mm on top of one another)

B: Setting Valve Clearances

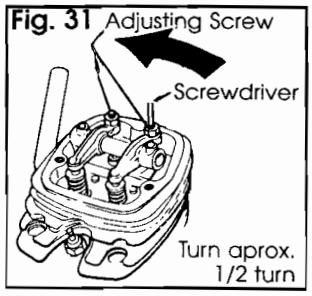
If your engine is not starting easily and running satisfactorily, and the gap is found to be less than .04 mm, or greater than .10 mm, reset the valve clearance as follows:

Fig. 30



1) Using the special offset wrench included with your XL 400R5, carefully loosen the locknut on the rocker arm about 1/4 to 1/2 turn. See Figure 30.

Fig. 31



2) Using either the supplied screwdriver, turn the adjusting screw approximately 1/2 turn counter-clockwise to open gap with matched tool at screw head. See Figure 31.

3) Insert the 0.04 mm feeler be-

tween the valve stem and the rocker arm. Using your fingers, turn the adjusting screw clockwise until it stops. See Figure 32.

4) While the 0.04 mm feeler gauge is still in place, use the screw driver at screw head to hold adjusting screw in place, and tighten the locknut with special offset wrench. See Figure 33.

5) Remove the 0.04mm feeler, and re-check valve clearance by completing Steps A: 1 - 3. If the valve clearance is correctly adjusted, check fit, and secure rocker cover in place.

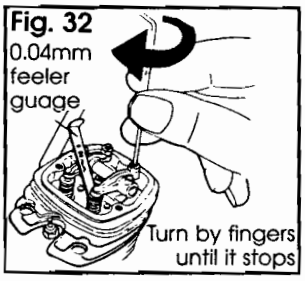


Fig. 32

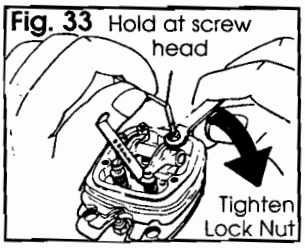


Fig. 33

CARE & MAINTENANCE

To ensure that you obtain long life and peak performance from your engine, observe the following.

Avoid running the engine under dusty conditions. If necessary, lay a sheet of plywood under and around the nose of the model when starting the XL 400.

Clean fuel is essential to keeping the carburetor clear and the engine running properly. To ensure clean fuel, following these steps:

Rinse the fuel tank with methanol before installing in aircraft.
Install a fuel filter between tank and carburetor.
Install a fuel filter between fuel pump and tank.
Check and clean filters often.
Keep fuel can closed whenever not using.

Do not close the needle valve to too lean a setting. This lean setting will cause overheating and slowdown the engine performance. Additionally, this setting will cause internal rusting of the engine due to nitromethane oxide being produced by the high engine temperature. Always adjust the needle valve very slightly to the rich side of the peak RPM setting.

After every use, always clean the exterior of the engine with a clean cotton cloth. This will prevent oil and dirt from burning, and blackening the exterior of the XL 400.

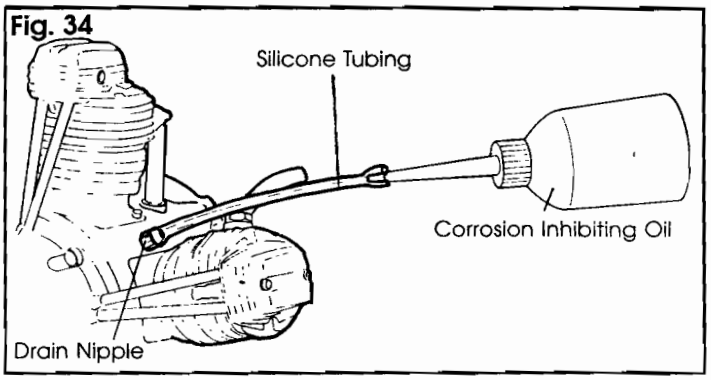


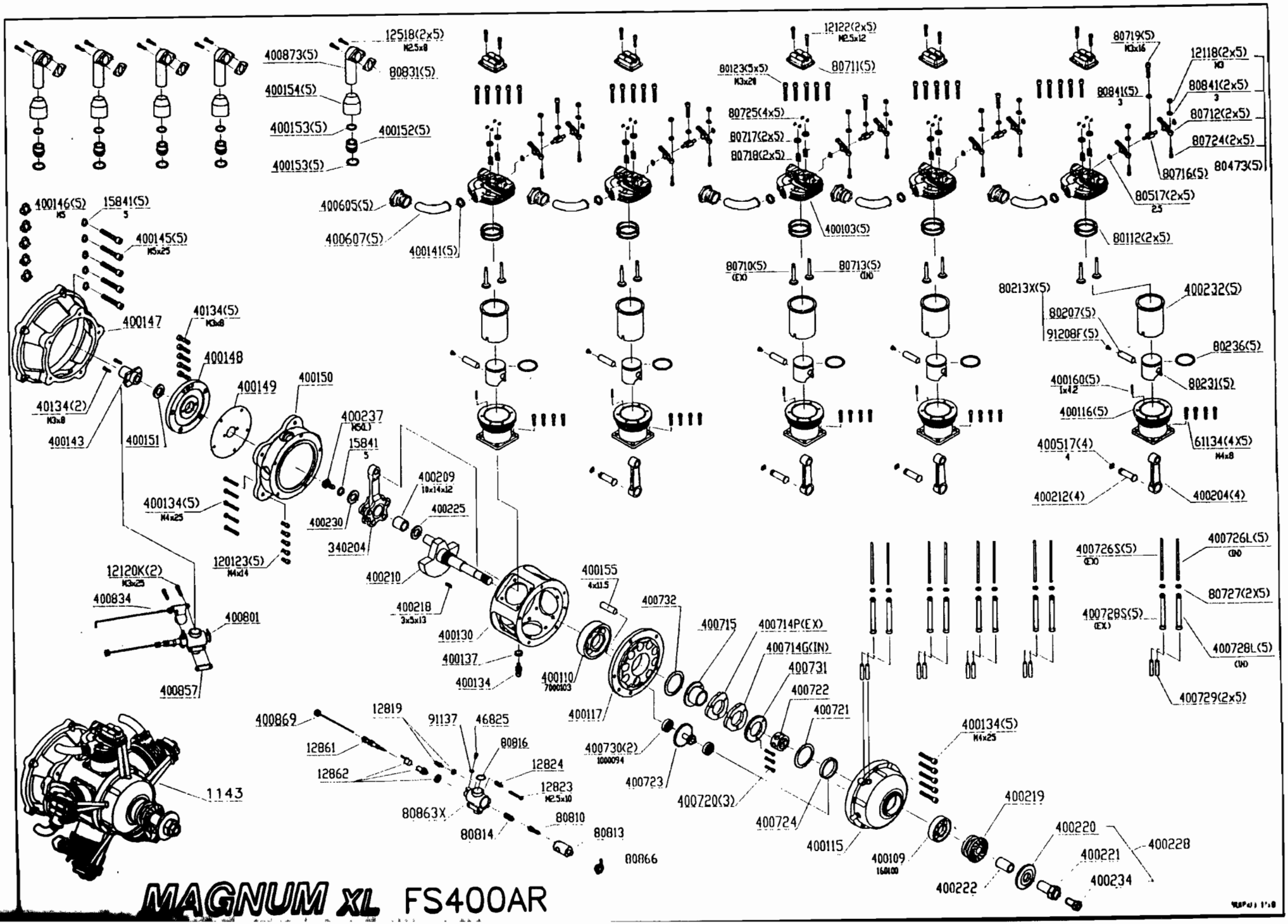
Fig. 34

If the XL 400 is not to be run for more than 2 months at any time, remove the glow plugs and rinse out the interior of the engine by injecting kerosene (not gasoline) into the cylinders through the glow plug holes and into the crankcase through the drain nipple.Once the kerosene is injected, slowly rotate the crankshaft to and fro, distributing the kerosene and dissolve residue throughout the engine. Once this has been accomplished, drain out the kerosene mixture by turning propeller to help remove from cylinders. Finally, add light machine oil through glow plug holes and drain nipple, rotating crankshaft slowly to distribute oil to all working parts.

MAGNUM XL 400 PARTS LIST

ITEM NO.	DESCRIPTION
284044	CARBURETOR ASSEMBLY
281804	NEEDLE VALVE SET
281901	NEEDLE VALVE DETENT SPRING
282450	O-RING FOR NEEDLE VALVE
282304	IDLE NEEDLE SET
284017	IDLE STOP SCREW SET
284045	CARBURATOR ROTOR BOLT
282002	FUEL NIPPLE
284046	CARB O-RING
284035	CYLINDER HEAD
284036	BEARING FRONT
284037	BEARING REAR
284038	HEAD BOLT SET
284039	HEAD GASKET SET
284040	PISTON ONLY
284041	SLEEVE ONLY
284042	CYLINDER
284043	PISTON RING
284011	PROP NUT AND WASHER
284020	THROTTLE LEVER
284021	WRIST PIN ASSEMBLY
284022	DRIVE WASHER
284023	FRONT HOUSING
284024	CAM PLATE

ITEM NO.	DESCRIPTION
284025	CENTER HOUSING
284026	REAR HOUSING
284027	CARBURATOR PLATE
284029	CARBURATOR MOUNT
284030	CARB MOUNT O-RING
284031	WOODRUFF KEY
284033	MASTER ROD
284034	LINK ROD
284001	INTAKE PUSHROD SET
284002	EXHAUSTPUSHROD SET
284003	INTAKE PIPE SET
284004	EXHAUST PIPE SET
284005	VALVE SET
284006	ROCKER ARM SET
284007	CRANKPIN BEARING SET
284008	CAM SET
284009	CAM GEAR SET
284010	CAM BEARING SET
284012	CRANKCASE BOLT SET
284013	CARBURATOR CHOKE SET
284014	VALVE COVER SET
284015	ALIGNMENT PIN SET
284016	LINK ROD PIN SET



MAGNUM XL FS400AR

SLE Radial engines, seven cylinders, 4-stroke, 90cc.

The SL Engines motor is made by craftsman in Italy and is the only 90cc 7- cylinder radial engine currently on the market.

The engine is built with Italian craftsmanship and precision, for performance, reliability and power.
No shortcuts were taken to produce this amazing piece of workmanship.

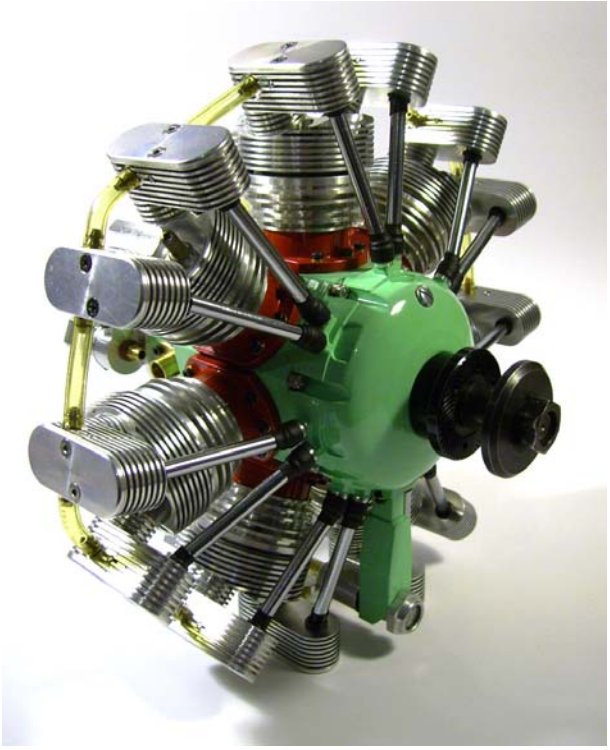
It includes separate lubrication for the camshaft, not from the fuel.

The look is very close to the most famous radial engines used in the past on real airplanes.

The 90cc Glow version produces around 9,5-10 Hp when running at maximum power.

The max. rpm varies from 6700 rpm to 3400 rpm when using high pitch and large diameter propellers.

The idle rpm is from 800 rpm to 1200 rpm. When running at the min. of 800 rpm it's necessary to use an "on board" glow driver system or an electronic glow driver with a li-po battery to supply a consistent current to the glow plugs improve reliability.



The camshaft system uses a large diameter drum to ensure a smoother running cycle.

Acceleration from low to high RPM is very smooth and controllable - similar to a 2 stroke engine.

Special materials and metal alloys were used for the construction, such as ergal, titanium, NCD steel, etc. and were chosen for the application. Thermal treatments and coatings were used for longevity. The rotary cams were nitrite treated to avoid wear.

A lubricating pump works via crankcase pressure to lubricate the buckets that hold the rocker arms and push-rods.
Push-Rods covers are a feature not found on other Radial engines. This allows the oil circulate and provide a constant lubrication to all the moving parts of the engine.
Engine color on request , special paints are used.

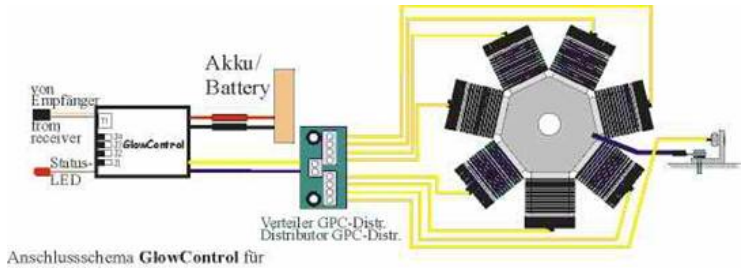
Technical data:

Displacement:	**89.6 cc** (12,8 cc per cylinder)
Stroke:	23,2 mm
Bore:	26,5mm
RPM Idle.:	800/1000
RPM max.:	6500/7500
Weight:	Including engine mount and radial silencer - 3.9 kg – 8.47 lb for the gas engine 3.2 kg – 7.2 lb for the glow engine

Power : 8/10 hp
Propeller: **24x6/8/10-26x8-28x6/8-max 30x6/8**
RPM per propeller: 24x8/10 7500max 26x6/8/10 6400 suggested rpm 28x6/8 5700/6000 30x6/8 3200/3400 max suggested

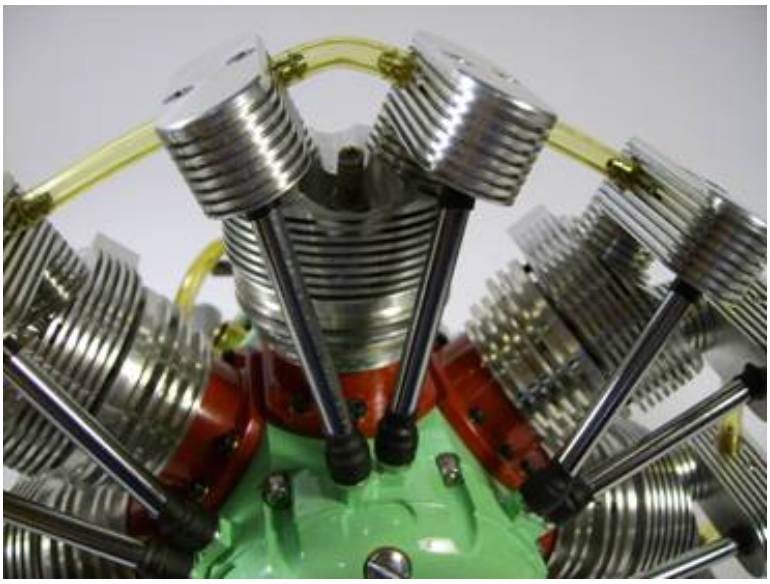
Fuel consumption: 1,8-2,6 liter/h
Kit available for conversion to gas - includes electronic CDI plus parts to convert.

SLE 90 cc Rdaial Engine



Anschlussschema **GlowControl** für
7-Zylinder Sternmotoren
Connection diagram **GlowControl** for 7 cyl. radial engines

Electronic Glow Driver with li-po battery to provide a consistent current to the glow plugs. Or use NmiH packs and micro Switch



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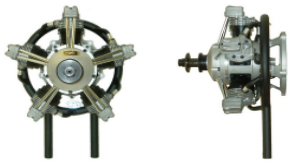
Ph 03 52227958 Fax 03 52231257

Kit No	Code	Kit Description			NEW	Order Qty
KORADIAL	**22145**	Exhaust Ring for Magnum Radial				
KOMAG160	**22146**	Exhaust Scale Type for Magnum FS 160 Twin				
KOMAGFS80	**22147**	Exhaust Scale Pitts Style for Magnum FS 80				
KOMAGFS91	**22148**	Exhaust Scale Pitts Style for Magnum FS 91				
KOMAGFS120	**22149**	Exhaust Scale Pitts Style for Magnum FS 120				
KOYS160	**22150**	Exhaust Scale Pitts Style for YS 140 - 160