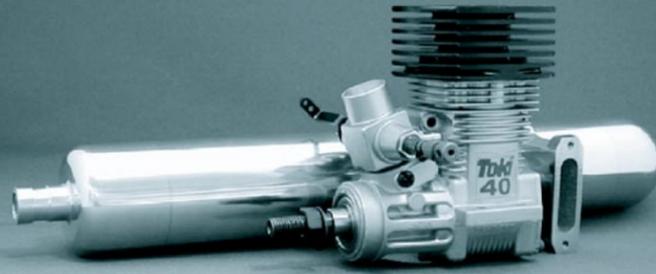


TOKI-40H Engine

INSTRUCTION MANUAL



TOKI Engine
SHUWA INDUSTRY CO., LTD

TOKI-40H Specification

Displacement	6.6 c.c./0.403 cu/in
Bore	21.6mm
Stroke	18.0mm
Practical RPM Range	2,000 ~ 21,000 R.P.M.
Weight	324 g

Thank you for choosing our TOKI engine. Please read the instruction manual thoroughly and carefully before operation. Pay particular attention to the SAFETY INSTRUCTION in this manual.

TOKI-40H engine has been designed incorporating modern CAD/CAM technology and an abundant amount of experience and manufacturing to match most of the 30-class nitro powered helicopters available on the market(*1).

The engine has been manufactured with carefully selected high quality materials, by CNC machinery in order to obtain the maximum performance and the best durability. The quality and performance of our TOKI-40H engine has been achieved by a complete testing throughout prototype to final production.

(*1)

The engine may not fit some of the newly marketed helicopters that were put on the market after the release of our TOKI-40H engine, in some cases, the optional item, TK-084 --- Drive washer may need to be used.

Do not over-tighten the propeller nut when you are installing the cooling fan and other parts on the engine shaft as it might cause damage to the front ball bearing inner case. Although the engine will start up, excessive load will be exerted causing damage to the engine that may result in engine breakage.

SAFETY INSTRUCTIONS

~ before starting ~

- * Read the "Safety Instructions" and "Instruction Manual" carefully in order to operate the engine properly all the time.
- * Keep the manuals readily available for easy reference.
- * Please follow the instructions shown below. They will help to prevent injuries to yourself and other persons nearby as well as protecting property from damage.

Graphics Indications

The following graphic indications are being used for this manual. Please understand the indications and read the Safety Instructions thoroughly



Danger:

Indicates a seriously hazardous situation that, if not avoided, can directly cause bodily injury and/or death.

Warning:

Indicates a potentially hazardous situation that, if not avoided, may result in causing bodily injury and/or death.

Caution:

Indicates a potentially hazardous situation that, if not avoided, may cause minor injury and/or damage to property.

Example of Graphic Indications



The Δ mark urges warning and/or caution. The illustration shows the meaning of warning and/or caution. This graphic indicates "high temperature".



This O mark indicates any actions prohibited. The illustration shows the meaning of warning and/or caution. This graphic indicates "do not touch".



This mark compels or instructs certain actions. You are requested to follow it compulsorily. The graphic indicates "compulsory".

This engine is not a toy. It is a precision manufactured machine. You need to understand that the engine can injure you and others nearby and also cause damage to property. Improper operation may be very dangerous. You must remember that you have full responsibility of any injury and/or damage to property when you are operating your engine.

Installation of the engine

Warning



Compulsory

The engine has been designed specially for use for RC helicopters. Do not use the engine for other applications



Compulsory

The cooling fan and clutch must be attached to the engine by tightening the nut firmly but do not over-tighten the nut. Red thread lock should be used on the threads of the engine. If not tightened enough, the nut may come lose during operation that may cause mechanical failure and problems to the engine as well as the helicopter. It is recommended to use a piston locking tool to lock the piston as you tighten the nut.



Compulsory

When installing the engine, use a small amount of blue thread lock on the threads of the bolts. **Do not** operate the engine without securing the model to a test bench.

Starting the engine

Warning



Prohibited

Do not operate the engine in an enclosed room, such as a basement and/or garage. The engine emits polluted exhaust gas similar to automobiles. It is recommended to operate the engine outdoors only.



Prohibited

When operating the engine, **do not** allow children or persons to get close to you and the engine.

Caution



Compulsory

Before flying the helicopter, make sure that the linkage to the throttle has been firmly attached. If the throttle linkage becomes disconnected, the throttle of the engine will become uncontrollable with serious complications occurring.



Prohibited

Do not operate the engine in a dusty and/or sandy area. The rotor blades will blow dust and/or sand that may cause bodily injury and cause debris to enter the carburetor causing damage to the engine.



No fire

Remember that model fuel is highly flammable and must be handled with extreme care. Keep any flammable objects away from the engine and fueling equipment. **No smoking!**

Operating the engine

Warning



Prohibited

If you want to move the helicopter while the engine is running, make sure that the throttle is at the idle position and you are holding the rotor head to prevent blade rotation



Prohibited

Do not try to stop the rotor blades rotation by hands. **Do not** throw any object to the revolving rotor blades. Doing so will cause severe damage in which the rotor blades and broken parts may fly off causing bodily injury and/or damage to property.



Do not touch

To stop the engine, put the throttle stick to the lowest position and shutting off any fuel supply to the engine.

After operation and maintenance

Warning



Compulsory

The engine fuel contains methanol and other highly toxic ingredients and is very flammable. You must store fuel safely in a, cool and dark place, out of the reach of children. If you or anyone has been splashed with fuel on the face, eyes etc. wash it with water and soap and seek immediate medical attention. In case of swallowing fuel, rush to a doctor for emergency treatment.



No fire

Fuel is extremely flammable. Do not store fuel in a place where sparks may occur and/or high temperature. Fuel must be stored in a safe place, otherwise it may cause fire. **Always keep it in mind that fuel is extremely flammable.**



Prohibited

Since your helicopter is powered by a model engine, it may become a dangerous tool if you loose control for any reason. Remember that it takes skill and practice to control the model and you need to pay close attention and take precautions any time while you are flying your helicopter. If you are a beginner, we suggest having a qualified flight instructor attend to you while you are flying your helicopter.

Caution



High Temperature

Do not touch any part of the engine while it is running, or immediately after the engine has been stopped. Most parts of the engine becomes considerably hot.



Prohibited

When you check the glow plug electrode condition, use a tool or clamps to hold it. **Do not** touch the plug directly by hand (fingers). Do not get your face and eyes close to the hot electrodes of the plugs as bubbling fuel may cause your face to be scalded.



Prohibited

Immediately after the engine is stopped, it may restart by cranking up even without the glow plug heating. Be careful as such an incident may happen which may cause bodily injury or mechanical failure of the engine itself.

Engine installation

According to the instruction manual of the helicopter manufacturer, install the engine to the engine mount (frame) firmly and securely using blue thread lock on the bolt threads.

Break-in

It is essential to break-in the engine for it to obtain its maximum performance and durability. Install the engine to your helicopter, then set the needle valve at richer mixing and fly your helicopter gently for break-in.

For break-in, it would be best to have the needle valve opened approximately 1/2 turn. After break-in, a good test for the valve position is the pinch test. With the engine running, pinch closed the fuel line going to the carburetors. After approximately 3 seconds, you should hear the engine wanting to quit. If it wants to quit before the 3 seconds, the engine is running too lean and you must open the needle valve a couple of clicks at a time. If, during the pinch test, the engine wants to continue running after 3 seconds, it is running too rich and you need to lean the engine by closing the needle valve a couple of clicks at a time.

Fuel

It is recommended to use high quality fuel (containing 20% or more lubricant and 15-30% nitro-methane by volume ratio or more preferably) for break-in and normal flights.

Muffler (Silencer)

We recommend using the Toki Tuned Muffler for optimum performance. **If you buy TOKI-40H engine only, the muffler for TOKI-40H is not included. (TK-907)**

Glow Plug

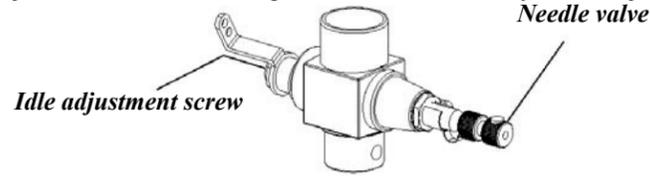
The character and quality will decide your engine's performance and reliability as well as fuel selection. You can simply use TOKI genuine plug (normal type) or high quality glow plugs available on the market. You are requested to test with several plugs to get the best one for your engine. The glow plug is to be replaced with new ones occasionally to maintain maximum engine performance

Carburetor adjustment

The carburetor has been pre-adjusted at the factory before shipping to obtain the maximum performance under normal operation.

However, according to fuel, muffler, glow plug, weather condition etc. it is necessary to make precise adjustment.

Without any adjustment of the carburetor except the needle valve turning, run the engine for testing and breaking-in. If the engine does not run smoothly and properly, you need to make slight adjustments. There are two places on the carburetor you can adjust.



Needle valve

The needle valve adjusts the air-fuel mixture ratio for the full range of rpm, particularly for higher rpm.

- * Open the needle valve 3 and 3/4 turns from the fully closed position.
- * Need to apply the muffler pressure.
- * When the throttle stick is at the highest position, adjust the carburetor rotor to be fully open, and when the throttle stick and the throttle trim is at the lowest position, adjust the carburetor rotor to be fully closed.
- * **SEE ENGINE BREAK-IN SECTION FOR NEEDLE VALVE ADJUSTMENT**

Idle adjustment screw

The idle adjusting screw controls the air-fuel mixture from idling to middle range of rpm for smooth acceleration. The idle adjustment screw of each engine has been pre-set precisely at the factory, so that no immediate adjustment is needed. If necessary, while watching idling of the engine and the status of the helicopter hovering, adjust it step-by-step with great attention and care. The factory default setting for the idle adjustment screw is 4 and 1/4 turns open from the closed position.



Factory setting position

same surface

If the carburetor does not take up the fuel, turn the idle adjustment screw open step-by-step.

Engine maintenance

Always keep your engine surface clean. Keep fuel, fuel containers, and fueling systems free from dirt, dust or foreign objects. Install a clean filter between the fuel tank and the carburetor, and the fuel and the fuel pump to prevent any objects from entering your engine.

Model engine fuel contains methanol which is highly hygroscopic (meaning that it collects moisture from the atmosphere) and fuel containing moisture may corrode the internal parts of the engine. After the completion of your flying sessions, it is recommended that you pull the fuel pipe (line) to the carburetor and run the engine at idle until all fuel inside of the engine is burnt completely. To protect the ball bearings and internal parts of your engine from rusting or corrosion, put 4~5 drops of anticorrosive oil and crank several times.

If you are not going to use the engine for a long period of time, remove the engine from your model (helicopter) and apply enough anticorrosive oil to the glow plug hole and the carburetor. Then wrap the engine in a soft cloth and keep it in a sealed plastic bag.

Do not disassemble your engine unnecessarily. It may cause deformation of matching of the piston/cylinder liner and the pin. If you need to clean inside of your engine, just take the carburetor, muffler and back cylinder head off. Clean all internal parts of the engine with methanol or fuel thoroughly and reassemble the engine. **(No limited warranty will be applied if you disassemble your engine more than described above.)**

After service

When you need repair services for your TOKI-40H engine, follow the instructions below. To get repair service under the limited warranty, you are requested to enclose the receipt or any other documents that proves the date and place from where you have purchased your engine. The warranty can be only applied for one year from the date of purchase.

- * Contact Century Helicopter Products and request a RMA number, send the engine to the address listed below and enclose a note detailing the problem or service you are requesting together with your name, mailing address, telephone number and e-mail address. All engines sent in without a RMA number will be rejected.
- * Send the engine for repairing service to the shop where you have made the purchased, or send to our Customers Service Department.
- * Repair service cannot be conducted if you send the engine with optional accessories. Remove all accessories from the engine and send the engine itself.
- * We will charge you if it is necessary to repair the engine if it is outside of the limited warranty terms. In this case the repaired engine will be sent back COD.

Limited warranty terms

Even within the warranty period, repairs for the following cases will be charged.

- * Any component parts damaged by misuse (Ref: Safety Caution in this operation manual).
- * Modification or unnecessary disassembly.
- * Breakage or damage caused by careless handling after purchasing, such as damage during transportation, from falling down, from shock and from CRASH.
- * Broken glow plug.
- * Damage of the piston and cylinder caused by sucked foreign materials.
- * Damage or breakage caused by natural disaster and/or environmental pollution, fire, earthquake, flooding, lightning etc.
- * Trouble or damage caused by improper maintenance and inappropriate storage conditions for the engine, high temperature, high humidity, surrounded with insecticide and other chemicals.
- * No evidence of your purchasing date and place.

Shipping address for engine repair

1740-C Junction Ave.

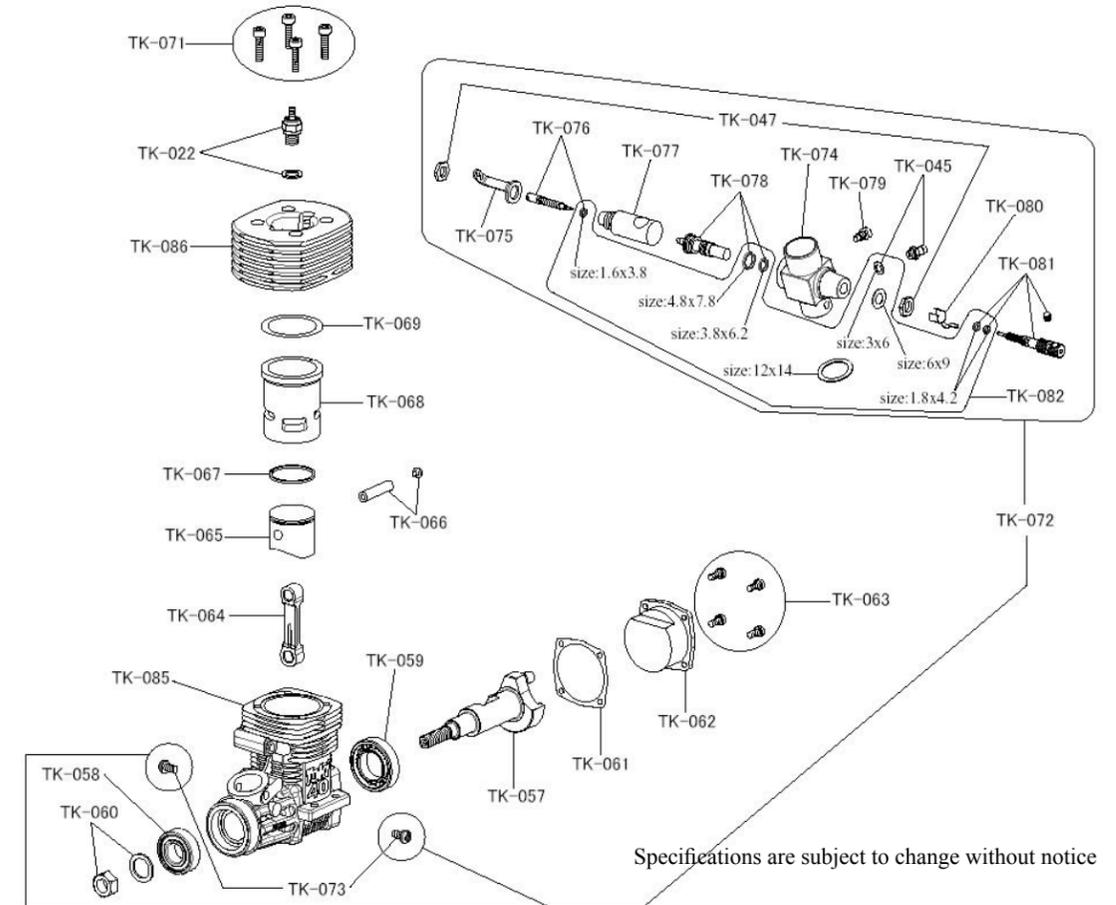
San Jose, CA 95112

Century Helicopter Products

Tel: (408) 451 1155

Fax: (408) 451 1156

TOKI-40H Parts List (TK-907 & TK-908)



Specifications are subject to change without notice

TOKI Engine

CODE NO.	DESCRIPTION
TK-022	Glow plug w/gasket
TK-045	Fuel inlet
TK-047	Nozzle nut
TK-057	Crank shaft
TK-058	Front bearing
TK-059	Rear bearing
TK-060	Propeller nut & Washer set
TK-061	Cover plate gasket
TK-062	Rear plate
TK-063	Screw for rear plate (cap M2.6X8=4pcs)
TK-064	Connecting rod
TK-065	.40 Piston
TK-066	.40 Piston ini w/pad
TK-067	Piston ring
TK-068	.40 Cylinder
TK-069	.40 head shim
TK-071	Screw for head (cap M3x14=4pcs)

CODE NO.	DESCRIPTION
TK-072	Carburetor assembly
TK-073	Screw for carburetor
TK-074	Carburetor main body
TK-075	Throttle arm
TK-076	Idle screw w/o ring
TK-077	Carburetor rotor
TK-078	Spray nozzle
TK-079	Guide screw
TK-080	Ratchet spring
TK-081	Needle
TK-082	Gasket & O-ring set for carburetor
TK-083	TOKI-40H Muffler
TK-085	TOKI-40H Crank case
TK-086	.40 Heat sink head (Black)
TK-084	Drive washer & collet setv