Displacement:	2.49cc	Power:	.85@28,000 (w/Pull-Start)
Bore:	15mm		.95@30,000 (w/o Pull-Start)
Stroke:	14mm		
RPM Range:	Up to 30,000		
Weight:	252g (w/Pull-Start)		
	188g (w/o Pull-Start)		

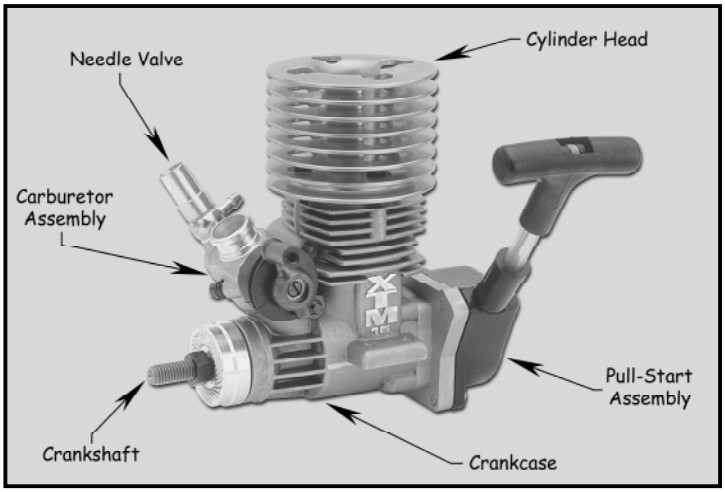
INTRODUCTION

Thank you for choosing the XTM series of .15 size car engines. All XTM series .15 size engines are designed for high power output and easy handling. All .15 series engines include dual ball bearing supported crankshafts, true ABC piston and sleeve technology and attention to detail and quality. There are several different variations of the XTM .15 size engines, from the standard version which includes a standard square cylinder head, rotary carburetor and pull start assembly, up to the racing version which includes a machined aluminum racing cylinder head and slide style carburetor. All XTM engines are manufactured on CNC manufacturing equipment to ensure every engine is produced to the exacting quality that you have come to expect from an engine of this caliber.

BECOMING FAMILIAR WITH YOUR ENGINE

Please read through this instruction guide in its entirety to familiarize yourself with the features and operation of your new XTM series engine. We have included a separate troubleshooting guide should you encounter any problems. Please use the photo below to familiarize yourself with the major components of the engine.

☛Because this instruction guide is used for different versions of XTM engines, your engine may differ slightly from the photos shown; however, information for each different style of engine is included in this guide.



CAUTION!!

XTM engines will consistently give you dependable performance and reliability and will be a source of satisfaction and pleasure if you follow these instructions as to the engine's proper and safe use. You alone are responsible for the safe operation of your engine, so act sensibly and with care at all times. This XTM model engine is not a toy. It is a precision-built machine whose power is capable of causing serious injury to yourself and others if abused, misused or if you fail to observe proper safety precautions while using it.

☛Never use any other fuel in your engine other than glow fuels specifically designed for use in model car engines. Use of any other types of fuel can cause severe damage to the engine and/or personal injury. **NEVER use gasoline!**

☛Never operate your model on any public streets. This could cause traffic accidents, personal injury or property damage.

☛Glow fuel engines emit exhaust vapors that are poisonous and can be dangerous to your health. It is important that you operate your engine in a very well ventilated area, preferably outdoors.

☛Before starting the engine, make sure that the throttle trim is set to the idle position. Starting the engine at any setting above idle can cause the car to lurch out of your hands.

☛When the engine is running, there are certain parts that rotate at high speeds. Be careful not to touch the drive belts, gears, clutch assembly or any other moving parts. Serious injury could result.

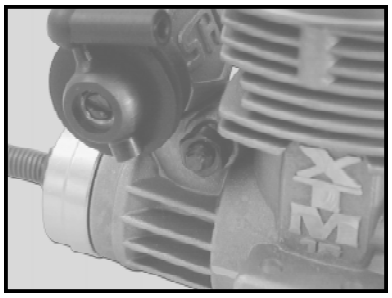
☛It is normal for the engine to get very hot during operation, especially the cylinder head and muffler or tuned pipe. Never touch the engine or muffler assembly while they are hot.

☛Model car engines produce vibration when they are running. It is important to periodically check the engine mounting screws, muffler screws and other assemblies to ensure they are tight. Running the engine with the engine mounting screws loose can lead to severe engine and/or chassis damage.

CARBURETOR INSTALLATION

☛The carburetor on your engine may come preinstalled at the factory; however, we suggest reading this section to familiarize yourself with the steps to install the carburetor properly should you need to remove it later for cleaning or maintenance.

❑ 1) The carburetor is held in place using the pinch bolt and retaining nut already installed in the crankcase. Slide the base of the carburetor into the crankcase, being careful to keep the carburetor perpendicular to the front of the engine. With your thumb, push down on the carburetor firmly so the base of the carburetor fits completely into the crankcase and the carburetor o-ring seals the gap between the two parts. While holding the carburetor in place, tighten the retaining nut to draw the pinch bolt in place.

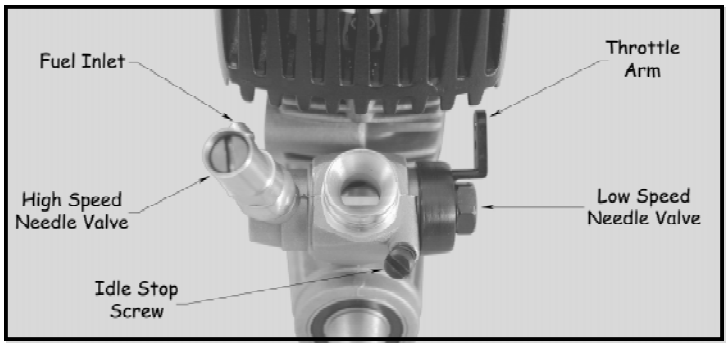


☛Do not overtighten the retaining nut. The nut only needs to be tightened enough to keep the carburetor from turning in the crankcase. Overtightening the nut can cause severe damage to the base of the carburetor.

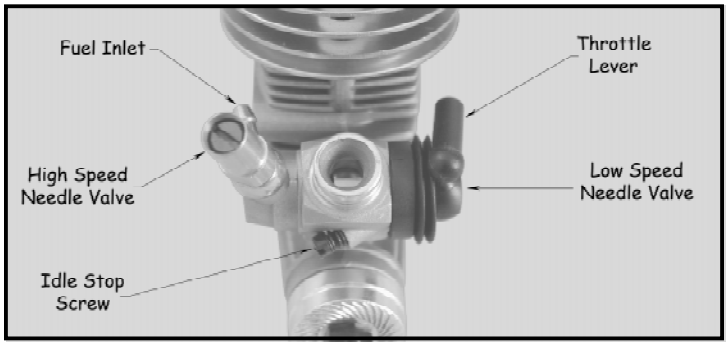
BECOMING FAMILIAR WITH THE CARBURETOR

Depending on which engine you have, it may have a rotary type carburetor or a slide type carburetor. Please refer to the photos below to familiarize yourself with each of the parts. You will need a small flat blade screwdriver to make adjustments to the carburetor.

ROTARY CARBURETOR



SLIDE CARBURETOR



Idle Stop Screw:

The idle stop screw adjusts the closure of the throttle barrel. We recommend that the idle stop screw be adjusted so that the carburetor barrel stays open about 1mm. Turning the screw clockwise will cause the barrel to stay open more. Turning the screw counterclockwise will allow the barrel to close more.

MUFFLER ASSEMBLY

The XTM .15 series engines do not include a muffler. The muffler is typically designed for the particular vehicle that you have, thus is usually included in the car kit. Both standard mufflers and tuned pipes that use the standard two bolt mounting pattern will work with the XTM .15 series engines.

FUEL RECOMMENDATION

Fuel can make a big difference in the way your engine performs. For the break-in period you should use a fuel specifically designed for R/C car engines that contains no more than 20% nitromethane. Once the engine has been adequately broken in (about 30 minutes of run-time) you can switch to an R/C car fuel containing up to, but no more than, 30% nitromethane.

☛We do not recommend using fuels designed for R/C airplane engine use. These fuels do not contain the proper amount of lubricants; therefore, they will cause the engine to overheat and severe damage to the engine will result.

GLOW PLUG RECOMMENDATION

The glow plug can make a big difference in how your engine performs. We recommend using a “hot” type glow plug intended specifically for performance engines like the Thunderbolt Standard Long # 115568 or the McCoy MC-9 # 690210. Do not use “cold” glow plugs or those intended for four cycle airplane engines. Using the wrong type of glow plug will cause the engine to run erratically and make it difficult to tune properly.

BEFORE STARTING YOUR ENGINE

WARNING - Please Read Before Starting

This warning is for those who have an XTM .15 engine that uses a pull-start assembly. If at any time the pull-start becomes very tight or difficult to pull - **STOP!** The engine has become flooded and the excess fuel must be removed or damage to the pull-start and/or engine could occur. To remove the excess fuel from the engine follow the steps listed below:

❑ 1) Completely close the high speed needle valve (turn clockwise) until it bottoms out.

❑ 2) Remove the glow plug from the cylinder head.

❑ 3) With the top of the engine pointing away from you, pull the pull-start cord several times to clear the excess fuel from the engine.

❑ 4) Check to make sure the glow plug has not been fouled, then reinstall it.

❑ 5) Reset the high speed needle valve 2-1/2 turns out from bottom.

HIGH & LOW SPEED NEEDLE VALVES

High Speed Needle Valve

The high speed needle valve is used to meter the air/fuel mixture at full throttle. Turn the needle clockwise to lean the mixture or turn the needle counter-clockwise to richen the mixture. When you start the engine for the very first time, the needle valve should be turned in completely, then backed out 2-1/2 turns. When you start the engine after that, leave the needle valve in the same position it was in when you shut down the engine.

Low Speed Needle Valve

The low speed needle valve meters the air/fuel mixture at idle and during transition from idle to full throttle. Turn the low speed needle clockwise to lean the mixture. Turn it counter-clockwise to richen the mixture. The low speed needle valve is preset from the factory, but minor adjustments may need to be made to suit your application: fuel used, glow plug and environment all contribute to the setting. To reset the low speed needle valve to the factory setting, follow these simple steps:

❑ 1) Open the carburetor barrel completely.

❑ 2) While holding the barrel open with your finger, use a small flat blade screwdriver and turn the idle mixture needle clockwise until it stops. From this point, turn the needle counter-clockwise 5-1/2 turns (for the rotary carb) or 10 turns (for the slide carb). This is the factory setting.

STARTING PROCEDURE

If your XTM .15 engine is equipped with a pull-starter, you should use this to start the engine. If your engine does not have a pull-starter we recommend using a starter box to start the engine. The XTM 1/10 Scale Nitro Car Starter Box # 146051 would be a good choice. *The following details the starting procedure for engines with pull-starter assemblies, but this procedure should also be used if you're using a starter box.*

❑ 1) To make the engine easier to start it should first be primed. The fuel tanks in the majority of car kits include a built in primer pump. Press this pump several times and watch the fuel as it is drawn up to the carburetor. When the fuel reaches the carburetor, stop priming. Over-priming the engine can cause the engine to "hydro-lock" or flood (see warning on page # 2). This is a result of too much fuel in the engine before it actually fires. Never try to start the engine if it is in a hydro-locked state. This could cause serious damage to both the engine and the pull-start assembly.

☛If the engine becomes hydro-locked, do not pull on the pull-start cord. Read the warning on page # 2 describing how to remove the excess fuel from the cylinder.

❑ 2) The engine is started by connecting the power to the glow plug then pulling on the pull-start cord. To do this properly you should pull the cord in short, quick, successive pulls until the engine starts. Once the engine has started, release the pull-start cord.

☛Never pull the pull-start cord out to its maximum length. This may damage the pull-start assembly. Always use short, rapid pulls. Do not pull any harder than necessary to turn the engine over.

BREAK-IN PROCEDURE

☛XTM .15 series engines are ABC engines. The cylinder sleeve is tapered at the top, causing severe resistance when the piston moves through the top of the stroke. This is normal. When the engine heats up to operating temperature, this resistance will decrease and the proper clearance will be achieved. The break-in procedure will guide you through the steps necessary to properly break in your new XTM .15 series engine. Please follow the steps closely.

☛The break-in process allows the engine parts to perfectly fit to each other and properly protect each part from premature wear. The engine should be broken in using a good quality R/C car fuel that contains no more than 20% nitromethane.

❑ 1) Turn the high speed needle valve out 2-1/2 turns from the fully closed position.

❑ 2) Follow the starting procedure in the previous section to prime and prepare the engine for starting.

❑ 3) Open the throttle barrel just above the idle position and connect the power to the glow plug. Pull the pull-start cord in short quick bursts until the engine starts.

❑ 4) Once the engine starts, allow it to run for about 1 minute without giving it throttle. This will allow the engine to warm up. At this point the engine should be running very "rich" and there should be excessive white smoke coming from the exhaust pipe.

❑ 5) After the engine has been running for about 1 minute, remove the power from the glow plug. Advance the throttle in short, quick bursts and drive the car around for about 2-3 minutes. If the engine is running rich enough, you should notice excessive white smoke coming from the exhaust and the engine should sound like it's running very rough. Also, the car will barely be moving. If there is not excessive white smoke coming from the exhaust, richen the high speed needle valve. After 2-3 minutes stop the engine by pinching the fuel line to the carburetor.

❑ 6) Let the engine cool for approximately 10 minutes, then restart it. Set the high speed needle valve mixture to a slightly leaner setting, about 1/8 turn more in. Repeat step # 5 above then stop the engine and let it cool for approximately 10 minutes.

❑ 7) Repeat the procedure in step # 6, while leaning the needle valve slightly more each time. In all, you should run the engine a total of about 30 minutes. After 30 minutes of run-time the engine will be broken in. Run the engine with the needle valve set slightly rich, but lean enough to power the car. At this point the engine should hold a good setting on the high speed needle valve and you can begin to fine tune the needle valve settings to increase performance.

☛It is of the utmost importance that the engine never be leaned out too much. When running the engine, you should always be able to see a trail of white smoke coming from the exhaust pipe. If you can't, stop the engine immediately and richen the mixture. You should also make sure there is plenty of air flowing over the cylinder head to keep the engine from overheating.

FINE TUNING THE XTM .15

Now that your engine has been broken-in, you can set the high and low speed needle valves for optimum engine performance.

☛Be careful to never lean the engine out too much. Remember that the lubricants for your engine are suspended in the fuel. If you lean out the fuel mixture too much you will also be lowering the amount of lubricant entering your engine. Less lubricant means more chance of your engine overheating and possible engine failure.

Setting the High Speed Needle Valve

❑ 1) Start the engine and remove the power from the glow plug. Allow the engine to warm up for about 1 minute.

❑ 2) After the engine has warmed up, drive the car as you normally would. If the engine seems to be running rich, lean the mixture screw about 1/16 of a turn at a time until the desired setting is achieved. Always make sure you run the engine slightly rich - you want to be able to see a white exhaust trail at all times.

❑ 3) To get more power from your engine you can use fuels containing up to 30% nitromethane. We must caution you, though, that once you run the engine with increased nitro you may not get satisfactory results if you decide to go back to a lower nitro content. Also, if you use fuels containing 30% nitro, we highly suggest replacing the stock .01mm head gasket with the thicker .02mm head gasket to lower the compression ratio. If you don't lower the compression ratio, overheating and erratic running will likely occur.

Setting the Low Speed Needle Valve

❑ 1) Start the engine and lean out the high speed needle valve as per the previous steps. Close the throttle until the engine slows down enough so that the clutch is disengaged and the wheels don't turn when the car is lifted from the ground. Allow the engine to idle for about 10-15 seconds.

☛Adjust the idle stop screw to raise or lower the idle speed.

❑ 2) While holding the car off the ground (making sure to keep your fingers out of the moving parts) quickly open the throttle in a short burst. If the engine just stops running as soon as the throttle is advanced, the idle mixture is too lean. With the engine stopped, richen the idle mixture about 1/16 of a turn.

❑ 3) Restart the engine and repeat step # 2 until the engine will transition smoothly and quickly. Very slight hesitation in the transition is normal.

❑ 4) If you quickly advance the throttle and the engine seems to be very rich during transition (i.e., lots of smoke coming from the exhaust and very rough sounding), the idle mixture is too rich. With the engine stopped, lean the idle mixture about 1/16 of a turn.

❑ 5) Restart the engine and repeat step # 4 until the engine will transition smoothly and quickly. Very slight hesitation in the transition is normal.

❑ 6) Now drive the car as you normally would for a while to get a feel for how the engine reacts to throttle. Now that you know the proper way to tune the engine, you can make slight adjustments to the carburetor until you are satisfied with the performance.

MAINTENANCE

Performing a basic maintenance routine on your XTM .15 series engine will extend the life of your engine and keep it performing like new at all times.

❑ 1) Always use a good quality "wet style" air filter on the carburetor. The air filter should be cleaned frequently, but if in doubt replace it.

❑ 2) We recommend using an in-line fuel filter in the fuel pickup line to prevent particles that may have gotten into the fuel tank from being drawn into the engine.

❑ 3) Always use new fuel and keep the cap on the fuel tightly closed. As fuel ages it absorbs water, which degrades the fuels performance and will cause erratic engine operation.

❑ 4) After you have finished using the engine for the day, remove the glow plug and squirt several drops of a high quality after-run oil into the cylinder. Reinstall the glow plug and crank the engine over a couple of times to distribute the oil. This will prevent corrosion inside the engine.

❑ 5) The outside of the engine should be wiped off often using a soft cloth and rubbing alcohol to prevent buildup of dirt and grime.

SERVICE

All XTM engines returned for warranty service must be within the warranty terms as stated on the warranty card provided with your engine. Do not return the engine to the place of purchase. They are not authorized or equipped to perform warranty work on XTM products. When requesting warranty service, please observe the following:

☛Always send the complete engine including the carburetor. The engine must be removed from the vehicle.

☛Include a note detailing the problem or service you are requesting. Service cannot be provided without this information. Include your daytime phone number and/or email address in the event we need more details pertaining to the service requested.

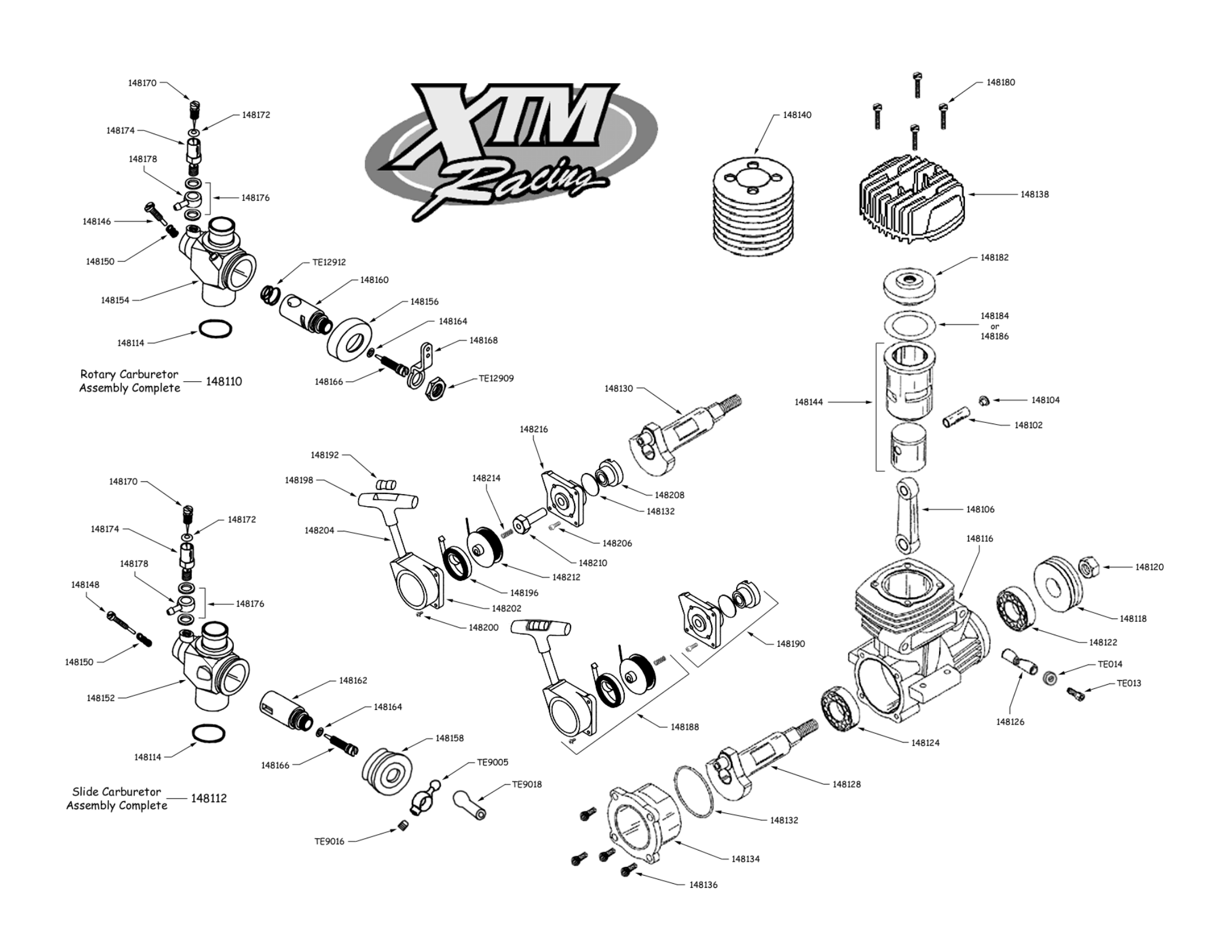
☛You may request an estimate of services at the time you return your engine for service. An omission of this request implies permission for the XTM Service Center to service your engine at our discretion.

☛Include a method of payment for any service charges. If not specified, the unit will be returned to you C.O.D.

☛Please include a check or money order in the amount of $6.50 to cover postage and handling charges for the return of your engine. Do not send cash.

☛Send the engine to us by United Parcel Service, Federal Express or by Insured Mail. Postage is non-refundable. Send to:

XTM Racing Service Center
18480 Bandilier Circle
Fountain Valley, CA 92728
Phone (714) 963-0329
Fax (714) 964-6236
Email: service@globalhobby.net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Rotary Carburetor Assembly Complete — 148110
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148164
148168
148166
TE12909
148140
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148114
Slide Carburetor Assembly Complete — 148112
148162
148164
148158
148166
TE9005
TE9018
TE9016

REPLACEMENT PARTS DESCRIPTIONS

148102	Wrist Pin
148104	Wrist Pin Keeper
148106	Connecting Rod
148110	Rotary Carburetor (Complete)
148112	Slide Carburetor (Complete)
148114	Carburetor Base O-Ring
148116	Crankcase
148118	Crankshaft Thrust Plate
148120	Crankshaft Nut
148122	Front Bearing
148124	Rear Bearing
148126	Carburetor Retaining Post
148128	Crankshaft (Non Pull-Start)
148130	Crankshaft (Pull-Start)
148132	Backplate O-Ring
148134	Backplate
148136	Backplate Bolt Set (4)
148138	Standard Cylinder Head (Cast)
148140	Aluminum Cylinder Head (Optional)
148144	Piston and Cylinder Assembly
148146	Idle Stop Screw (Rotary Carb)
148148	Idle Stop Screw (Slide Carb)
148150	Idle Stop Screw Spring
148152	Carburetor Housing (Slide Carb)
148154	Carburetor Body (Rotary Carb)
148156	Rubber Boot (Rotary Carb)
148158	Rubber Boot (Slide Carb)
148160	Carburetor Barrel (Rotary Carb)
148162	Carburetor Barrel (Slide Carb)
148164	Idle Needle Valve O-Ring
148166	Idle Mixture Screw
148168	Throttle Arm (Rotary Carb)
148170	High Speed Needle Valve
148172	High Speed Needle Valve O-Ring
148174	High Speed Needle Valve Housing
148176	High Speed Needle Valve Washers (2)
148178	Fuel Inlet Base
148180	Cylinder Head Bolt Set (4)
148182	Cylinder Head Button
148184	.01mm Thick Head Gasket
148186	.02mm Thick Head Gasket (Optional)
148188	Pull-Start Assembly (Rear)
148190	Pull-Start Assembly (Front)
148192	Starter Cord Retaining Pin
148196	Starter Spring
148198	Pull-Start Handle
148200	Pull-Start Cover Bolt Set (3)
148202	Pull-Start Cover
148204	Start Cord Tube
148206	Backplate Bolt Screws (Pull-Start)
148208	One Way Bearing
148210	Pull-Start Shaft
148212	Starting Wheel with Cord
148214	Cushion Spring
148216	Backplate (Pull-Start)
TE014	Retaining Post Split Washer
TE013	Retaining Post Bolt
TE9005	Throttle Arm (Slide Carb)
TE9016	Throttle Arm Set Screw (Slide Carb)
TE9018	Throttle Arm Ball Link (Slide Carb)
TE12909	Throttle Arm Retaining Nut (Rotary Carb)
TE12912	Barrel Spring (Rotary Carb)

TROUBLESHOOTING GUIDE

This troubleshooting guide has been provided to help you diagnose and solve most problems that you may encounter with your XTM .15 Series engine. Most problems encountered can be solved by carefully following the problem-cause-solution sections below. If you cannot solve the problem using this troubleshooting guide, please feel free to contact us at the address or phone number listed in Engine Operating Guide.

PROBLEM	CAUSE	SOLUTION
1) Engine does not start	A) Failed glow plug B) Glow Starter not charged and/or faulty C) Idle mixture screw set too lean D) Old or contaminated fuel E) Engine flooded with too much fuel F) Air leak in fuel system and/or engine	A) Replace glow plug with a new one B) Fully charge glow starter and/or replace C) Reset idle mixture to factory setting D) Replace with new fuel E) Remove glow plug and expel fuel from cylinder F) Replace fuel lines and/or tighten all engine bolts
2) Engine does not draw fuel	A) Air leak in fuel system and/or engine B) High speed needle valve fully closed C) Idle mixture screw set too lean D) Fuel lines kinked E) Defective fuel tank	A) Replace fuel lines and/or tighten all engine bolts B) Reset high speed needle valve to factory setting C) Reset idle mixture to factory setting D) Check and straighten fuel lines E) Replace fuel tank
3) Engine does not transition	A) Failed and/or wrong type glow plug B) Old and/or wrong type fuel C) High speed needle valve set too rich D) Idle mixture set too lean E) Idle mixture set too rich F) Air leak in fuel system and/or engine	A) Replace with new recommended glow plug B) Replace with new recommended fuel C) Reset high speed needle valve to leaner setting D) Set idle mixture richer E) Set idle mixture leaner F) Replace fuel lines and/or tighten all engine bolts
4) Engine overheats	A) Engine running too lean B) Body to Restrictive C) Wrong type of fuel used D) Engine not fully broken in	A) Richen high speed needle valve B) Open larger vents in body to allow air to enter and exit C) Use fuel recommended only for R/C cars D) Allow engine further break-in time
5) Engine vibrates excessively	A) Engine and/or engine mounts loose	A) Tighten all engine mounting bolts
6) Engine does not idle down	A) Idle stop screw out of adjustment	A) Adjust idle stop screw so carb barrel stays open 1mm