

Owner's Manual & Safety Instructions

Save This Manual Keep this manual for the safety warnings and precautions, assembly, operating, inspection, maintenance and cleaning procedures. Write the product's serial number in the back of the manual near the assembly diagram (or month and year of purchase if product has no number). Keep this manual and the receipt in a safe and dry place for future reference.

21j

PREDATORTM RACING

212cc KART RACING ENGINE



⚠ DANGER

Using an engine indoors
CAN KILL YOU IN MINUTES.

Engine exhaust contains carbon monoxide.
This is a poison you cannot see or smell.



NEVER use inside
a home or garage,
EVEN IF doors and
windows are open.



Only use OUTSIDE
and far away from
windows, doors,
and vents.

GHOSTTM

57531

Visit our website at: <http://www.harborfreight.com>
Email our technical support at: predator@harborfreight.com
Email our engine support at: predator@harborfreight.com

When unpacking, make sure that the product is intact and undamaged. If any parts are missing or broken, please call 1-888-866-5797 as soon as possible.

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No portion of this manual or any artwork contained herein may be reproduced in any shape or form without the express written consent of Harbor Freight Tools. Diagrams within this manual may not be drawn proportionally. Due to continuing improvements, actual product may differ slightly from the product described herein. Tools required for assembly and service may not be included.

⚠ WARNING

Read this material before using this product.
Failure to do so can result in serious injury.
SAVE THIS MANUAL.

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Specifications






Displacement		212cc
Engine Type		Horizontal Single Cylinder 4-stroke
Cooling System		Forced air cooled
Fuel	Type	91+ octane stabilizer-treated unleaded gasoline
Engine Oil	Type SAE	10W-30 High quality synthetic oil
	Capacity	0.63 Quart
Bore x Stroke		70mm x 55mm
Compression Ratio		8.5:1
Torque Specification for Cylinder Head Bolts		26–30 Nm (19–22 ft-lb)
Rotation viewed from PTO (power takeoff - the output shaft)		Counterclockwise
Spark Plug	Type	Torch® F7TC
	Gap	0.023"–0.031"
Valve Clearance	Intake	0.003"–0.005"
	Exhaust	0.005"–0.007"
Speed	Idle	1600 RPM
	Maximum	6000 RPM
Shaft	Shaft	Ø0.75" x 2.43"
	Keyway	1.79" for 0.188" Key
	End Tapped	5/16"–24 UNF

THIS ENGINE IS FOR COMPETITION USE ONLY. INSTALLING THIS ENGINE IN ANY DIFFERENT APPLICATION MAY BE A VIOLATION OF FEDERAL LAW SUBJECT TO CIVIL PENALTY.









This Engine is for competition only and is exempt from emission standards and related requirements.

PREDATOR™

WARNING SYMBOLS AND DEFINITIONS

	This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.
	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
	Addresses practices not related to personal injury.

Symbol Definitions

Symbol	Property or Statement	Symbol	Property or Statement
	Revolutions Per Minute		WARNING marking concerning Risk of Respiratory Injury. Operate engine OUTSIDE and far away from windows, doors, and vents.
	Horsepower		WARNING marking concerning Risk of Fire while handling fuel. Do not smoke while handling fuel.
	WARNING marking concerning Risk of Eye Injury. Wear ANSI-approved safety goggles with side shields.		WARNING marking concerning Risk of Fire. Do not refuel while operating. Keep flammable objects away from engine.
	Read the manual before set-up and/or use.		
	WARNING marking concerning Risk of Hearing Loss. Wear hearing protection.		

IMPORTANT SAFETY INSTRUCTIONS**SAVE THESE INSTRUCTIONS –**


This manual contains important instructions that should be followed during installation and maintenance of the Engine.

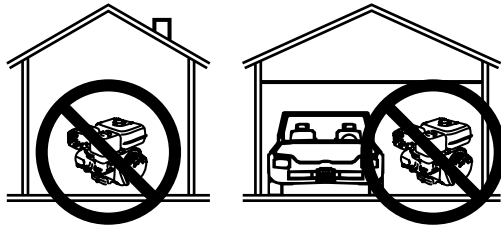
Set up Precautions

- Gasoline fuel and fumes are flammable, and potentially explosive. Use proper fuel storage and handling procedures. Do not store fuel or other flammable materials nearby.
- Have multiple ABC class fire extinguishers nearby.
- Operation of this equipment may create sparks that can start fires around dry vegetation. A spark arrestor may be required. The operator should contact local fire agencies for laws or regulations relating to fire prevention requirements.
- Set up and use only on a flat, level, well-ventilated surface.
- Wear ANSI-approved safety goggles, heavy-duty work gloves, and dust mask/respirator during set up.
- Use only lubricants and fuel recommended in the Specifications chart of this manual.

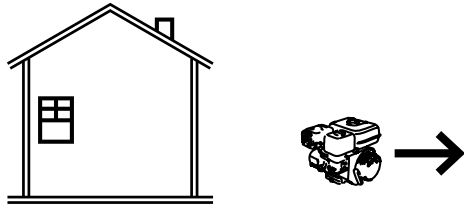
Operating Precautions

SAFETY

1.  **CARBON MONOXIDE HAZARD**
Using an engine indoors
CAN KILL YOU IN MINUTES.
Engine exhaust contains carbon monoxide. This is a poison you cannot see or smell.



NEVER use inside a home or garage,
EVEN IF doors and windows are open.



Only use OUTSIDE and far away from windows,
doors, and vents.

2. Keep children away from the equipment, especially while it is operating.
3. Keep all spectators at least six feet from the Engine during operation.
4. Fire Hazard! Do not fill fuel tank while engine is running. Do not operate if gasoline has been spilled. Clean spilled gasoline before starting engine. Do not operate near pilot light or open flame.
5. Do not touch engine during use. Let engine cool down after use.
6. Never store fuel or other flammable materials near the engine.
7. Only use a suitable means of transport and lifting devices with sufficient weight bearing capacity when transporting the engine.
8. Secure the engine on transport vehicles to prevent it from rolling, slipping, and tilting.
9. Industrial applications must follow OSHA requirements.
10. The engine can produce high noise levels. Prolonged exposure to noise levels above 85 dBA is hazardous to hearing. Wear ear protection when operating the or when working nearby while it is operating.
11. Wear ANSI-approved safety glasses and hearing protection during use.
12. People with pacemakers should consult their physician(s) before use. Electromagnetic fields in close proximity to a heart pacemaker could cause pacemaker interference or pacemaker failure. Caution is necessary when near the engine's magneto or recoil starter.
13. Use only accessories that are recommended by Harbor Freight Tools for your model. Accessories that may be suitable for one piece of equipment may become hazardous when used on another piece of equipment.
14. Do not operate in explosive atmospheres, such as in the presence of flammable liquids, gases, or dust. Gasoline-powered engines may ignite the dust or fumes.
15. Stay alert, watch what you are doing and use common sense when operating this engine. Do not use while tired or under the influence of drugs, alcohol or medication.
16. Dress properly. Do not wear loose clothing or jewelry. Keep hair, clothing and gloves away from moving parts. Loose clothes, jewelry or long hair can be caught in moving parts.
17. Parts, especially exhaust system components, get very hot during use. Stay clear of hot parts.
18. Do not cover the engine during operation.
19. Keep the engine and surrounding area clean at all times.
20. Do not smoke, or allow sparks, flames, or other sources of ignition around the equipment, especially when refuelling.
21. Use the equipment, accessories, etc., in accordance with these instructions and in the manner intended for the particular type of equipment, taking into account the working conditions and the work to be performed. Use of the equipment for operations different from those intended could result in a hazardous situation.
22. Do not operate the equipment with known leaks in the engine's fuel system.
23. When spills of fuel or oil occur, they must be cleaned up immediately. Dispose of fluids and cleaning materials as per any local, state, or federal codes and regulations. Store oil rags in a bottom-ventilated, covered, metal container.
24. Keep hands and feet away from moving parts. Do not reach over or across equipment while operating.
25. Before use, check for misalignment or binding of moving parts, breakage of parts, and any other condition that may affect the equipment's operation. **If damaged, have the equipment serviced before using.** Many accidents are caused by poorly maintained equipment.
26. Use the correct equipment for the application. Do not modify the equipment and do not use the equipment for a purpose for which it is not intended.

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Service Precautions

1. **Before service, maintenance, or cleaning:**
 - a. Turn the engine switch to its “OFF” position.
 - b. Allow the engine to completely cool.
 - c. Then, remove the spark plug cap from the spark plug.
 2. Keep all safety guards in place and in proper working order. Safety guards include muffler, air cleaner, mechanical guards, and heat shields, among other guards.
 3. Wear ANSI-approved safety goggles, heavy-duty work gloves, and dust mask/respirator during service.
 4. Maintain labels and nameplates on the equipment. These carry important information. If unreadable or missing, contact Harbor Freight Tools for a replacement.
 5. Have the equipment serviced by a qualified repair person using only identical replacement parts. This will ensure that the safety of the equipment is maintained. Do not attempt any service or maintenance procedures not explained in this manual or any procedures that you are uncertain about your ability to perform safely or correctly.
 6. Store equipment out of the reach of children.
 7. Follow scheduled engine and equipment maintenance.
- Refueling:**
1. Do not refill the fuel tank while the engine is running or hot.
 2. Do not smoke, or allow sparks, flames, or other sources of ignition around the equipment, especially when refuelling.
 3. **TO PREVENT FUEL LEAKAGE AND FIRE HAZARD, do not fill fuel tank to the top.** Leave a little room for the fuel to expand as needed.
 4. Refuel in a well-ventilated area only.
 5. Wipe up any spilled fuel and allow excess to evaporate before starting engine.
To prevent FIRE, do not start the engine while the smell of fuel hangs in the air.



SAVE THESE INSTRUCTIONS.

Set Up



Read the **ENTIRE IMPORTANT SAFETY INFORMATION** section at the beginning of this manual including all text under subheadings therein before set up or use of this product.

WARNING

TO PREVENT SERIOUS INJURY:

Operate only with proper spark arrestor installed.



Operation of this equipment may create sparks that can start fires around dry vegetation. A spark arrestor may be required.

The operator should contact local fire agencies for laws or regulations relating to fire prevention requirements.

TO PREVENT SERIOUS INJURY FROM ACCIDENTAL STARTING: Turn the Engine Switch to its “OFF” position, wait for the Engine to cool, and unplug the spark plug wire(s) before assembling or making any adjustments to the equipment.

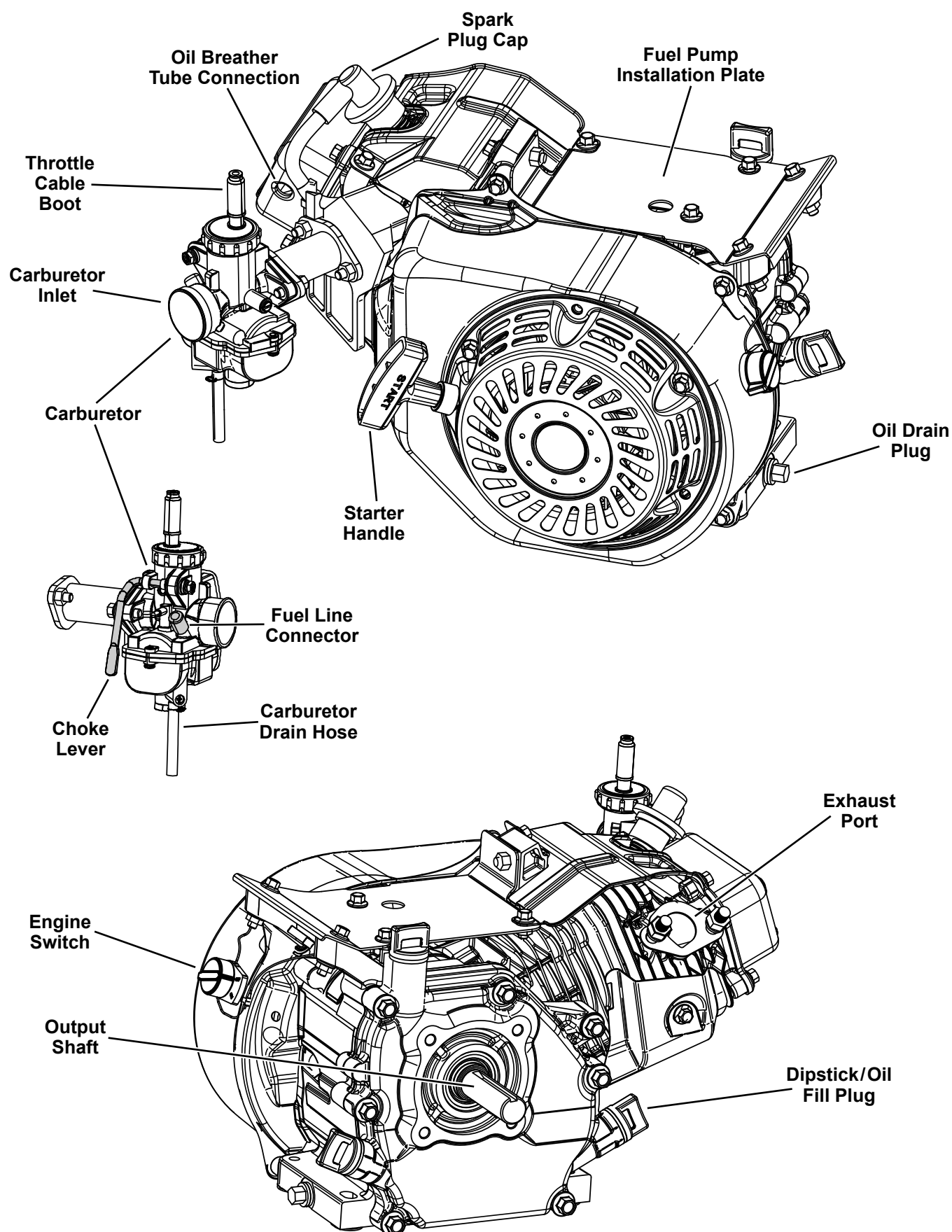
The preparation of this Engine for competitive events and sanctioned racing requires specific, specialized skill and knowledge. This preparation must be completed before starting or operating the engine. If you are uncertain about your ability to perform any procedures in this manual safely or correctly have the work performed by a qualified mechanic.

At high altitudes, the Engine's carburetor, governor (if so equipped), and any other parts that control the fuel-air ratio will need to be adjusted by a qualified mechanic to allow efficient high-altitude use and to prevent damage to the Engine and any other devices used with this product.

WARNING! TO PREVENT SERIOUS INJURY: INSTALL THIS ENGINE ACCORDING TO INSTRUCTIONS FOR THE EQUIPMENT ON WHICH THE ENGINE WILL BE PLACED BEFORE USE.

PREDATOR™

Components and Controls



SAFETY

SETUP

INSTALLATION

MAINTENANCE

Installation



Read the **ENTIRE IMPORTANT SAFETY INFORMATION** section at the beginning of this manual including all text under subheadings therein before set up or use of this product.

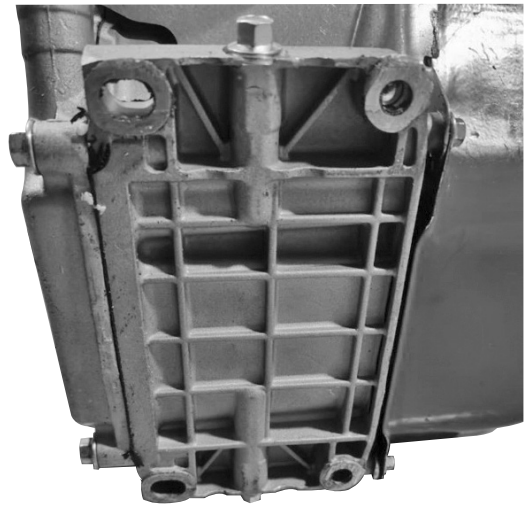
Engine and Component Installation

Inspect Engine and components (components not included) which will be installed on Engine looking for damaged, loose, and missing parts before installation, set up and starting. If any problems are found, do not use equipment until fixed properly.

Note: For additional information regarding the parts listed in the following pages, refer to *Parts List and Diagrams* on page 16.

Install Engine

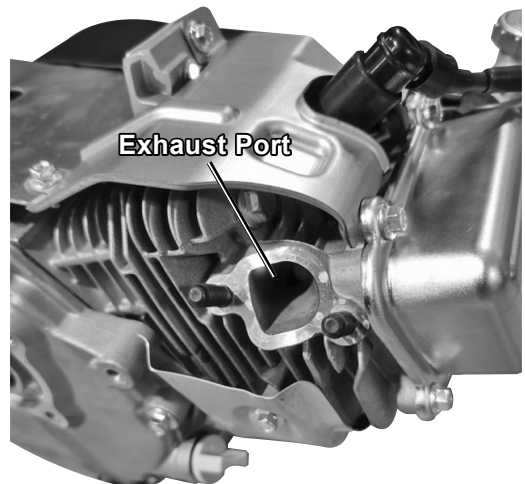
1. Using a motor mount plate specifically designed for the go-kart frame to be used (both not included), install the motor mount onto the frame. Secure in place using hardware supplied with the motor mount (not included).
2. Align the mounting holes on the Engine Installation Plate with the four mounting bolts on the motor mount plate.
3. Lower Engine onto motor mount and secure in place with hardware supplied with the motor mount (not included). Refer to motor mount installation instructions for torque specifications.



Engine Installation Plate

Install Exhaust Pipe/Muffler

1. Install the Exhaust Port Gasket onto the exhaust port studs.
2. Attach the exhaust pipe/muffler (not included) to the studs using two spring washers and two M8 nuts.

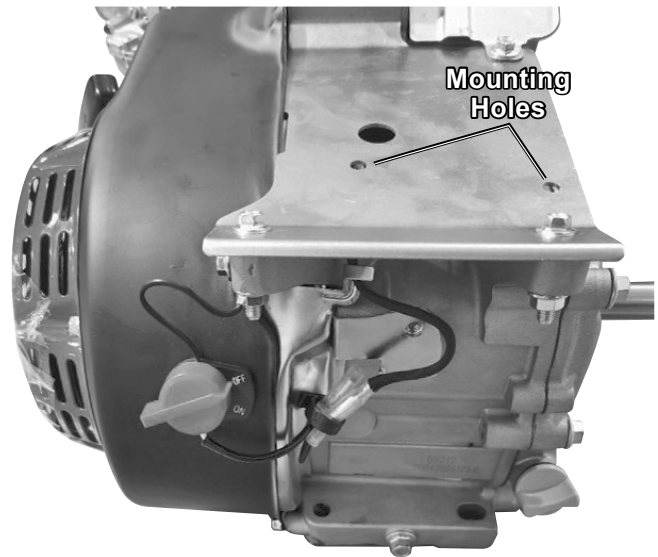


Exhaust Port

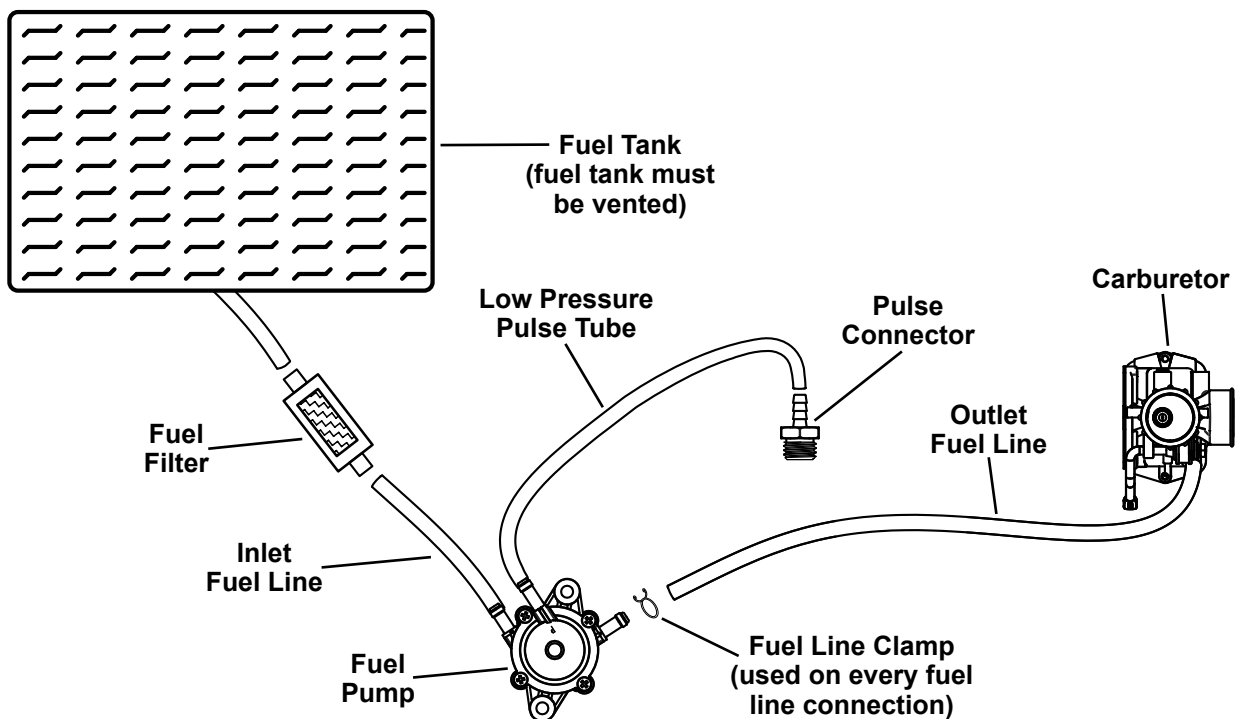
Install Fuel Pump

1. Mount the fuel pump (not included) onto the Fuel Pump Installation Plate located on top of the Engine. Secure pump in place using two M6x16 bolts.
2. There are three tubes (not included) that attach to the fuel pump:
 - a. Inlet fuel line from fuel tank (tank not included).
 - b. Outlet fuel line to Carburetor.
 - c. Low pressure pulse tube that is attached to the Pulse Connector (not included).

When installing ensure that these tubes are routed to avoid heat and sharp edges.



Fuel Pump Installation Plate



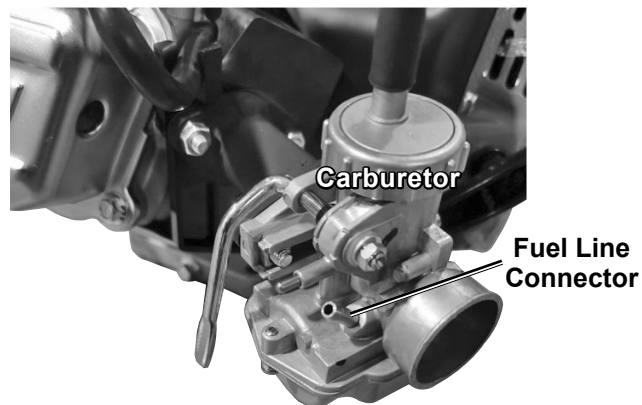
Fuel Pump Connections

Fuel Line

SAFETY

1. Locate the fuel line connector on the Carburetor.
2. Attach the outlet fuel line from the fuel pump (not included, see 2.b. under *Install Fuel Pump*) to the connector on the Carburetor. Route Carburetor drain hose to safe drain area.

Note: Ensure that the drain hose is routed to avoid heat and abrasion.



Outlet Fuel Line Connection

Install Air Filter, Throttle Cable, Oil Breather Tube

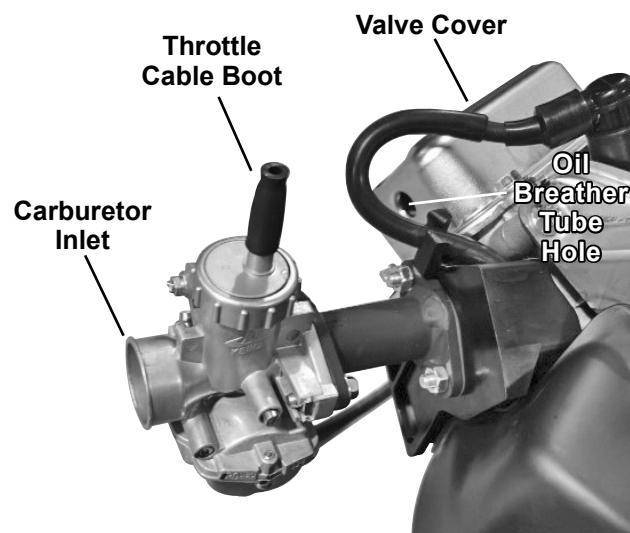
SETUP

1. Install an air filter using a filter clamp (both not included) to the Carburetor inlet.
2. Connect one end of a throttle cable (not included) to the Carburetor slide. Connect the other end to the throttle on the go-kart frame.

Note: This engine is not equipped with a governor. Install a throttle return spring before use.

3. Insert one end of an oil breather tube (not included) into the hole on the Valve Cover. Route the other end of the tube to an overflow can (not included). If necessary, attach an extension tube (not included) to the end of the oil breather tube to reach the overflow can.

Note: Ensure that oil breather flow is not restricted by tubing or overflow can, which must be vented to atmosphere.



Air Filter/Throttle Cable/Oil Breather Tube

INSTALLATION

MAINTENANCE

⚠ WARNING**TO PREVENT SERIOUS INJURY FROM ACCIDENTAL STARTING:**

Turn the Engine Switch to its "OFF" position, wait for the Engine to cool, and disconnect the spark plug cap before performing any inspection, maintenance, or cleaning procedures.

TO PREVENT SERIOUS INJURY FROM EQUIPMENT FAILURE:

Do not use damaged equipment. If abnormal noise, vibration, or excess smoking occurs, have the problem corrected before further use.

Follow all service instructions in this manual. The Engine may fail critically if not serviced properly.



Many maintenance procedures, including any not detailed in this manual, will need to be performed by a qualified technician for safety. If you have any doubts about your ability to safely service the equipment or Engine, have a qualified technician service the equipment instead.

Cleaning, Maintenance, and Lubrication Schedule

Note: This maintenance schedule is intended solely as a general guide. If performance decreases or if equipment operates unusually, check systems immediately. The maintenance needs of each piece of equipment will differ depending on factors such as duty cycle, temperature, air quality, fuel quality, and other factors.

Note: The following procedures are in addition to the regular checks and maintenance explained as part of the regular operation of the Engine and equipment.

Break-in Period:

- Breaking-in the engine will help to ensure proper equipment and engine operation.
- The operational break-in period will last about 10 hours of use.
Do not operate the engine at its maximum speed during this period.
- Change the engine oil after the initial break-in period.
- Check/adjust valve clearance after the initial break-in period.

Under normal operating conditions subsequent maintenance follows the schedule explained below.

Procedure	Before Each Use	Monthly or every 20 hr. of use	Every 3 mo. or 50 hr. of use	Every 6 mo. or 100 hr. of use	Yearly or every 300 hr. of use	Every 2 Years
Brush off outside of engine	✓	✓	✓	✓	✓	✓
Check engine oil level	✓	✓	✓	✓	✓	✓
Check air cleaner			✓	✓	✓	✓
Check sediment cup				✓	✓	✓
Change engine oil		✓		✓	✓	✓
Clean air filter			✓*	✓	✓	✓
Check and clean spark plug				✓	✓	✓
1. Check/adjust idle speed 2. Check/adjust valve clearance 3. Clean fuel tank, strainer and carburetor 4. Clean carbon build-up from combustion chamber					✓**	✓**
Replace fuel line if necessary						✓**

*Service more frequently when used in dusty areas.

**These items should be serviced by a qualified technician.

Checking and Filling Fuel



⚠️WARNING! TO PREVENT SERIOUS INJURY FROM FIRE:

Fill the fuel tank in a well-ventilated area away from ignition sources. If the Engine is hot from use, shut the Engine off and wait for it to cool before adding fuel. Do not smoke.

1. Clean the Fuel Cap and the area around it.
2. Unscrew and remove the Fuel Cap.
3. Remove the Strainer and remove any dirt and debris. Then replace the Strainer.

Note: Do not use gasoline containing more than 10% ethanol (E10). Do not use E85 ethanol. Add fuel stabilizer to the gasoline or the Warranty is VOID.

Note: Do not use gasoline that has been stored in a metal fuel container or a dirty fuel container. It can cause particles to enter the carburetor, affecting engine performance and/or causing damage.

4. If needed, fill the Fuel Tank to about 1 inch under the fill neck of the Fuel Tank with 91 octane or higher unleaded gasoline that has been treated with a fuel stabilizer additive. Follow fuel stabilizer manufacturer's recommendations for use.
5. Then replace the Fuel Cap.
6. Wipe up any spilled fuel and allow excess to evaporate before starting Engine. To prevent FIRE, do not start the Engine while the smell of fuel hangs in the air.

Air Filter Maintenance

1. Remove the Air Cleaner Cover and the air filter(s) and check for dirt. Clean as described below.

2. **Cleaning:**

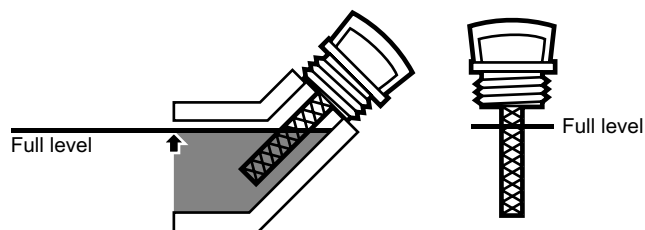
- For paper filters:
To prevent injury from dust and debris, wear ANSI-approved safety goggles, NIOSH-approved dust mask/respirator, and heavy-duty work gloves. In a well-ventilated area away from bystanders, use pressurized air to blow dust out of the filter.
- For foam filters:
Wash the filter in warm water and mild detergent several times. Rinse. Squeeze out excess water and allow it to dry completely. Soak the filter in lightweight oil briefly, then squeeze out the excess oil.

3. Install the cleaned filter(s). Secure the Air Cleaner Cover before use.

Engine Oil Change

⚠️CAUTION! Oil is very hot during operation and can cause burns. Wait for Engine to cool before changing oil.

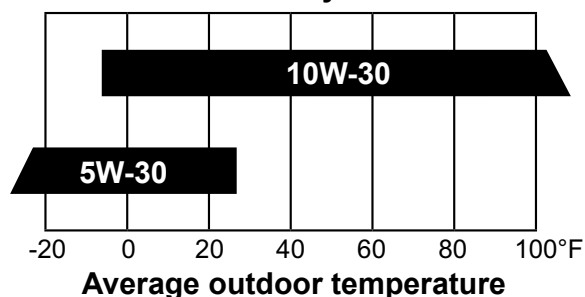
1. Make sure the Engine is stopped and is level.
2. Close the Fuel Valve.
3. Place a drain pan (not included) underneath the crankcase's drain plug.
4. Remove the drain plug and, if possible, tilt the crankcase slightly to help drain the oil out. Recycle used oil.
5. Replace the drain plug and tighten it.
6. Clean the top of the Dipstick and the area around it. Remove the Dipstick by turning it counterclockwise, and wipe it off with a clean, lint free rag.



7. Add the appropriate type of oil until the oil level is at the full level. SAE 10W-30 synthetic oil is recommended.

The SAE Viscosity Grade chart shows other viscosities to use in different average temperatures.

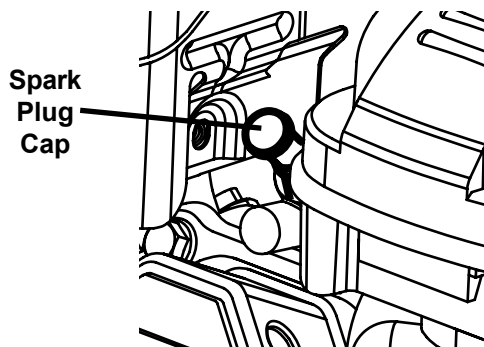
SAE Viscosity Grades



8. Thread the dipstick back in clockwise.

NOTICE: Do not run the Engine with too little oil. The Engine will be permanently damaged.

Spark plug Maintenance



1. Disconnect spark plug cap from end of plug. Clean out debris from around spark plug.
2. Using a spark plug wrench, remove the spark plug.
3. Inspect the spark plug:
If the electrode is oily, clean it using a clean, dry rag.
If the electrode has deposits on it, polish it using emery paper. If the white insulator is cracked or chipped, the spark plug needs to be replaced.

Recommended Spark Plug	
TORCH®	F7TC

NOTICE: Using an incorrect spark plug may damage the Engine.

Long-Term Storage


When the equipment is to remain idle for longer than 20 days, prepare the Engine for storage as follows:

1. CLEANING:

Wait for Engine to cool, then clean Engine with dry cloth. **NOTICE:** Do not clean using water. The water will gradually enter the Engine and cause rust damage. Apply a thin coat of rust preventive oil to all metal parts.

2. FUEL:

To protect the fuel tank during storage, fill the tank with gasoline that has been treated with a fuel stabilizer additive. Follow fuel stabilizer manufacturer's recommendations for use. Refer to *Checking and Filling Fuel* on page 12.

 **WARNING! TO PREVENT SERIOUS INJURY FROM FIRE:**
Fill tank in a well-ventilated area away from ignition sources. If the Engine is hot from use, shut the Engine off and wait for it to cool before adding fuel. Do not smoke.

3. LUBRICATION:

- a. Change engine oil.
- b. Clean out area around spark plug.
Remove spark plug and pour one tablespoon of engine oil into cylinder through spark plug hole.

4. When installing a new spark plug, adjust the plug's gap to the specification on the Specifications chart. Do not pry against the electrode, the spark plug can be damaged.
5. Install the new spark plug or the cleaned spark plug into the Engine.

• Gasket-style:

Finger-tighten until the gasket contacts the cylinder head, then tighten about 1/2-2/3 turn more.

• Non-gasket-style:

Finger-tighten until the plug contacts the cylinder head, then tighten about 1/16 turn more.

NOTICE: Tighten the spark plug properly.

If loose, the spark plug will cause the Engine to overheat.

If overtightened, the threads in the engine block will be damaged.

6. Apply dielectric spark plug boot protector (not included) to the end of the spark plug and reattach the cap securely.

- c. Replace spark plug, but leave spark plug cap disconnected.
- d. Pull Starter Handle to distribute oil in cylinder. Stop after one or two revolutions when you feel the piston start the compression stroke (when you start to feel resistance).

4. STORAGE AREA:

Cover and store in a dry, level, well-ventilated area out of reach of children. Storage area should also be away from ignition sources, such as water heaters, clothes dryers, and furnaces.

NOTICE: During extended storage periods the Engine must be started every 3 months and allowed to run for 15–20 minutes or the Warranty is VOID.

5. AFTER STORAGE:

Before starting the Engine during or after storage, keep in mind that untreated gasoline will deteriorate quickly. Drain the fuel tank and change to fresh fuel if untreated gasoline has been sitting for a month, if treated gasoline has been sitting beyond the fuel stabilizer's recommended time period, or if the Engine does not start.

Troubleshooting

SAFETY

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Problem	Possible Causes	Probable Solutions
Engine will not start	FUEL RELATED: <ol style="list-style-type: none"> 1. No fuel in tank or fuel valve closed. 2. Choke not in START position, cold engine. 3. Gasoline with more than 10% ethanol used. (E15, E20, E85, etc.) 4. Low quality or deteriorated, old gasoline. 5. Carburetor not primed. 6. Dirty fuel passageways. 7. Carburetor needle stuck. Fuel can be smelled in the air. 8. Too much fuel in chamber. This can be caused by the carburetor needle sticking. 9. Clogged Fuel Filter. 	FUEL RELATED: <ol style="list-style-type: none"> 1. Fill fuel tank with fresh 91+ octane stabilizer-treated unleaded gasoline and open fuel valve. Do not use gasoline with more than 10% ethanol (E15, E20, E85, etc.). 2. Move Choke to START position. 3. Clean out ethanol rich gasoline from fuel system. Replace components damaged by ethanol. Use fresh 91+ octane stabilizer-treated unleaded gasoline only. Do not use gasoline with more than 10% ethanol (E15, E20, E85, etc.). 4. Use fresh 91+ octane stabilizer-treated unleaded gasoline. Do not use gasoline with more than 10% ethanol (E15, E20, E85, etc.). 5. Pull on Starter Handle to prime. 6. Clean out passageways using fuel additive. Heavy deposits may require further cleaning. 7. Gently tap side of carburetor float chamber with screwdriver handle. 8. Turn Choke to RUN position. Remove spark plug and pull the start handle several times to air out the chamber. Reinstall spark plug and set Choke to START position. 9. Replace Fuel Filter.
	IGNITION (SPARK) RELATED: <ol style="list-style-type: none"> 1. Spark plug cap not connected securely. 2. Spark plug electrode wet or dirty. 3. Incorrect spark plug gap. 4. Spark plug cap broken. 5. Incorrect spark timing or faulty ignition system. 	IGNITION (SPARK) RELATED: <ol style="list-style-type: none"> 1. Connect spark plug cap properly. 2. Clean spark plug. 3. Correct spark plug gap. 4. Replace spark plug cap. 5. Have qualified technician diagnose/repair ignition system.
	COMPRESSION RELATED: <ol style="list-style-type: none"> 1. Cylinder not lubricated. Problem after long storage periods. 2. Loose or broken spark plug. (Hissing noise will occur when trying to start.) 3. Loose cylinder head or damaged head gasket. (Hissing noise will occur when trying to start.) 4. Engine valves or tappets mis-adjusted or stuck. 	COMPRESSION RELATED: <ol style="list-style-type: none"> 1. Pour tablespoon of oil into spark plug hole. Crank engine a few times and try to start again. 2. Tighten spark plug. If that does not work, replace spark plug. If problem persists, may have head gasket problem, see #3. 3. Tighten head. If that does not remedy problem, replace head gasket. 4. Have qualified technician adjust/repair valves and tappets.



Follow all safety precautions whenever diagnosing or servicing the equipment or engine.

Problem	Possible Causes	Probable Solutions
Engine misfires	<ol style="list-style-type: none"> 1. Spark plug cap loose. 2. Incorrect spark plug gap or damaged spark plug. 3. Defective spark plug cap. 4. Old or low quality gasoline. 5. Incorrect compression. 	<ol style="list-style-type: none"> 1. Check cap and wire connections. 2. Re-gap or replace spark plug. 3. Replace spark plug cap. 4. Use only fresh 91+ octane stabilizer-treated unleaded gasoline. Do not use gasoline with more than 10% ethanol (E15, E20, E85, etc.). 5. Diagnose and repair compression. (Use Engine will not start: COMPRESSION RELATED section.)
Engine stops suddenly	<ol style="list-style-type: none"> 1. Fuel tank empty or full of impure or low quality gasoline. 2. Defective fuel tank cap creating vacuum, preventing proper fuel flow. 3. Faulty magneto. 4. Disconnected or improperly connected spark plug cap. 	<ol style="list-style-type: none"> 1. Fill fuel tank with fresh 91+ octane stabilizer-treated unleaded gasoline. Do not use gasoline with more than 10% ethanol (E15, E20, E85, etc.). 2. Test/replace fuel tank cap. 3. Have qualified technician service magneto. 4. Secure spark plug cap.
Engine stops when under heavy load	<ol style="list-style-type: none"> 1. Dirty air filter 2. Engine running cold. 	<ol style="list-style-type: none"> 1. Clean element. 2. Allow engine to warm up prior to operating equipment.
Engine knocks	<ol style="list-style-type: none"> 1. Old or low quality gasoline. 2. Engine overloaded. 3. Incorrect spark timing, deposit buildup, worn engine, or other mechanical problems. 	<ol style="list-style-type: none"> 1. Fill fuel tank with fresh 91+ octane stabilizer-treated unleaded gasoline. Do not use gasoline with more than 10% ethanol (E15, E20, E85, etc.). 2. Do not exceed equipment's load rating. 3. Have qualified technician diagnose and service engine.
Engine backfires	<ol style="list-style-type: none"> 1. Impure or low quality gasoline. 2. Engine too cold. 3. Intake valve stuck or overheated engine. 4. Incorrect timing. 	<ol style="list-style-type: none"> 1. Fill fuel tank with fresh 91+ octane stabilizer-treated unleaded gasoline. Do not use gasoline with more than 10% ethanol (E15, E20, E85, etc.). 2. Use cold weather fuel and oil additives to prevent backfiring. 3. Have qualified technician diagnose and service engine. 4. Check engine timing.
After sudden impact, engine will run, but equipment will not operate	Shaft key or other shear pin broken by impact to disconnect engine and limit damage.	Have qualified technician check and replace broken shaft key or other shear pins.



Follow all safety precautions whenever diagnosing or servicing the equipment or engine.

PLEASE READ THE FOLLOWING CAREFULLY

THE MANUFACTURER AND/OR DISTRIBUTOR HAS PROVIDED THE PARTS LIST AND ASSEMBLY DIAGRAM IN THIS MANUAL AS A REFERENCE TOOL ONLY. NEITHER THE MANUFACTURER OR DISTRIBUTOR MAKES ANY REPRESENTATION OR WARRANTY OF ANY KIND TO THE BUYER THAT HE OR SHE IS QUALIFIED TO MAKE ANY REPAIRS TO THE PRODUCT, OR THAT HE OR SHE IS QUALIFIED TO REPLACE ANY PARTS OF THE PRODUCT. IN FACT, THE MANUFACTURER AND/OR DISTRIBUTOR EXPRESSLY STATES THAT ALL REPAIRS AND PARTS REPLACEMENTS SHOULD BE UNDERTAKEN BY CERTIFIED AND LICENSED TECHNICIANS, AND NOT BY THE BUYER. THE BUYER ASSUMES ALL RISK AND LIABILITY ARISING OUT OF HIS OR HER REPAIRS TO THE ORIGINAL PRODUCT OR REPLACEMENT PARTS THERETO, OR ARISING OUT OF HIS OR HER INSTALLATION OF REPLACEMENT PARTS THERETO.

Parts List

Part	Description	Qty.
1	Crankcase	1
2	Ball Bearing	2
3	Oil Seal	2
4	Recoil Starter Fan	1
5	Flywheel Assembly	1
6	Bolt M6x16	4
7	Intake Manifold	1
8	Drain Plug Bolt	2
9	Drain Plug Washer	2
10	Crankcase Cover Dowel Pin	2
11	Piston	1
12	Piston Ring Set	1
13	Connecting Rod Assembly	1
14	Piston Pin	1
15	Piston Clip	2
16	Crankcase Cover Assembly	1
17	Oil Plug	1
18	Dipstick	1
19	Cylinder Head	1
20	Intake Valve	1
21	Exhaust Valve	1
22	Valve Seal	1
23	Valve Spring	2
24	Air Deflector	1
25	Valve Spring Seat	2
26	Oil Cap	1
27	Clip	1
28	Stop	1
29	Rocker Arm	2
30	Bolt	2
31	Carburetor Assembly	1
32	Locking Clip	4
33	Air Deflector	1
34	Fuel Pump Installation Plate	1
35	Nut M6	2
36	Pin	2

Part	Description	Qty.
37	Crankshaft Assembly	1
38	Valve Lifter	2
39	Crankcase Cover Gasket	1
40	Camshaft Assembly	1
41	Dowel Pin	2
42	Bolt M8x30	6
43	Cylinder Head Gasket	1
44	Bolt M8x60	4
45	Spark Plug	1
46	Push Rod	2
47	Rocker Shaft	2
48	Bolt M6x12	13
49	Cylinder Head Cover Gasket	1
50	Cylinder Head Cover	1
51	Air Shield	1
52	Bolt M6x20	1
53	Bolt M6x30	3
54	Bolt M6x8	1
55	Starter Pulley	1
56	Nut	1
57	Ignition Coil Assembly	1
58	Bolt M6x25	2
59	Intake Port Gasket	1
60	Switch Assembly	1
61	Recoil Starter Assembly	1
62	Bolt M6x36	2
63	Carburetor Spacer	1
64	Nut M6	2
65	Intake Manifold Gasket	1
66	Screen	1
67	Bolt 5/16-24 UNF	1
68	Flat Key	1
69	Crankshaft Washer	1
70	Nut M8	2
71	Spring Washer M8	2
72	Exhaust Port Gasket	1

Record Product's Serial Number Here: _____

Note: If product has no serial number, record month and year of purchase instead.

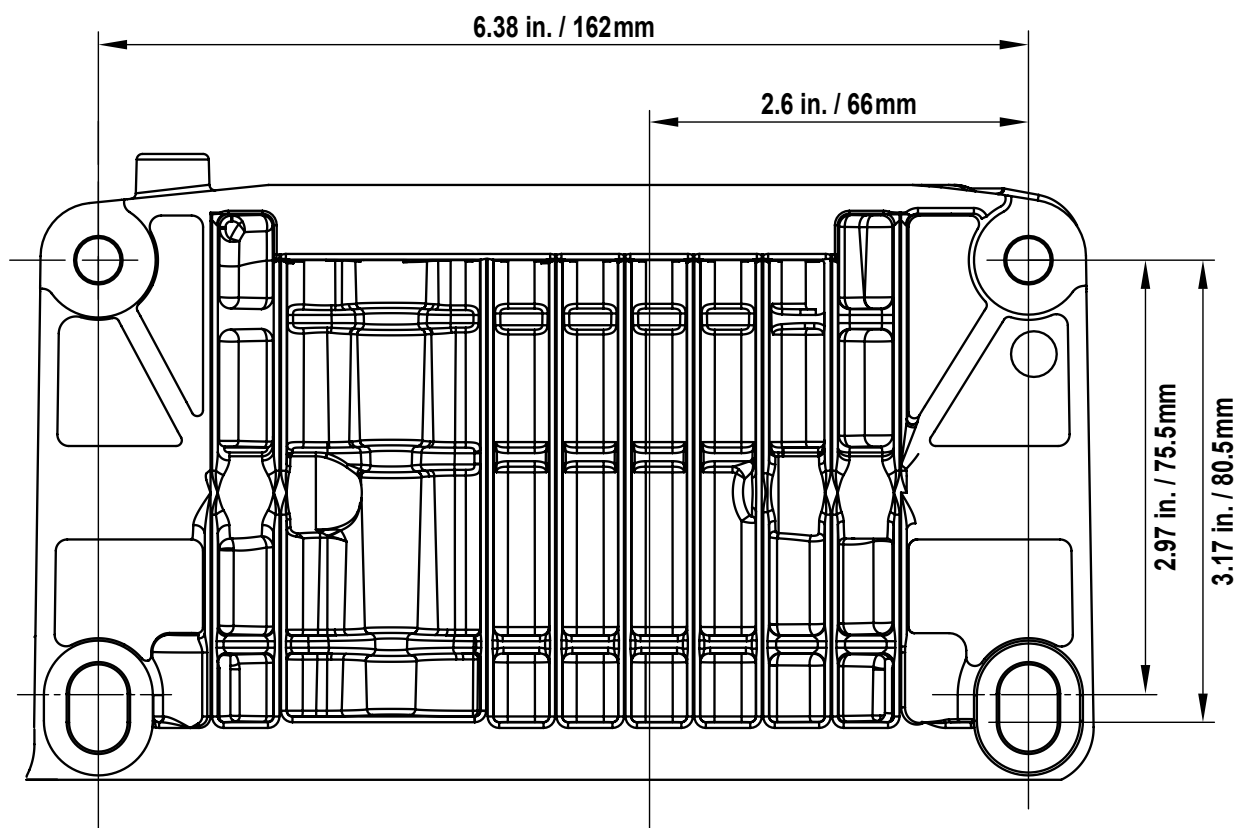
Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts. Specify UPC 193175416902 when ordering parts.

MAINTENANCE



Mounting Hole Diagram

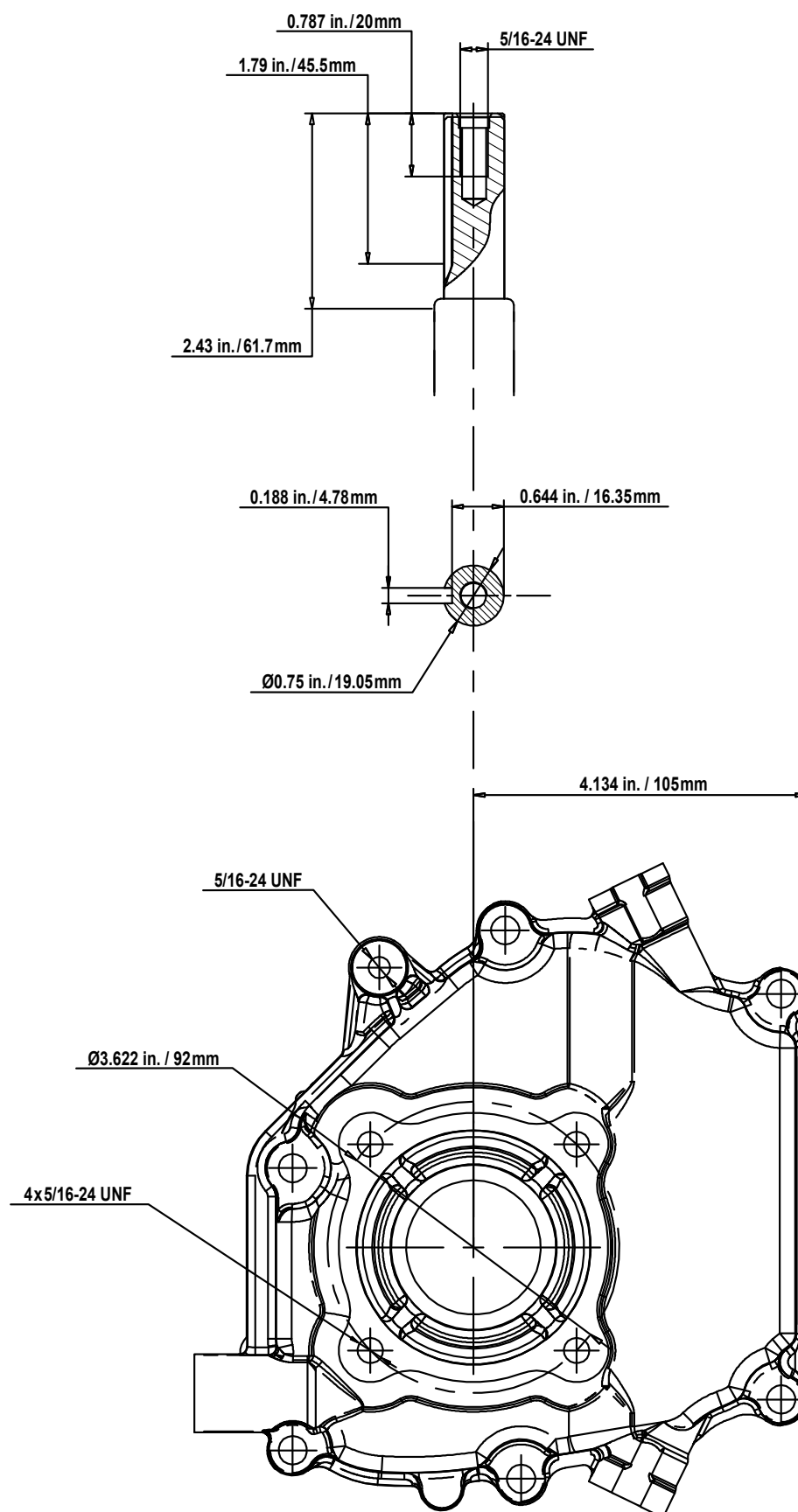
Note: Not to scale.



PREDATOR™

Power Take-Off Diagram

Note: Not to scale.



SAFETY

SETUP

INSTALLATION

MAINTENANCE

Limited 90 Day Warranty

Harbor Freight Tools Co. makes every effort to assure that its products meet high quality and durability standards, and warrants to the original purchaser that this product is free from defects in materials and workmanship for the period of 90 days from the date of purchase. This warranty does not apply to damage due directly or indirectly, to misuse, abuse, negligence or accidents, repairs or alterations outside our facilities, criminal activity, improper installation, normal wear and tear, or to lack of maintenance. We shall in no event be liable for death, injuries to persons or property, or for incidental, contingent, special or consequential damages arising from the use of our product. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation of exclusion may not apply to you. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS

To take advantage of this warranty, the product or part must be returned to us with transportation charges prepaid. Proof of purchase date and an explanation of the complaint must accompany the merchandise. If our inspection verifies the defect, we will either repair or replace the product at our election or we may elect to refund the purchase price if we cannot readily and quickly provide you with a replacement. We will return repaired products at our expense, but if we determine there is no defect, or that the defect resulted from causes not within the scope of our warranty, then you must bear the cost of returning the product.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

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26677 Agoura Road • Calabasas, CA 91302 • 1-888-866-5797