



OPERATOR'S MANUAL FOR
GASOLINE ENGINE

212CC

280CC

300CC

420CC



CAUTION

RISK OF INJURY! READ ENTIRE MANUAL BEFORE OPERATING!
THIS MANUAL MUST REMAIN WITH THIS ENGINE!

CONTENTS

INTRODUCTION	2
CONTENTS.....	3
SAFETY.....	4-6
CONTROLS AND FEATURES	7
PRE-OPERATION.....	8
OPERATION.....	9
MAINTENANCE	10-14
STORAGE	15
SPECIFICATIONS	16
MANUFACTURERS WARRANTY INFORMATION	17
CALIFORNIA EMISSIONS STATEMENT	18

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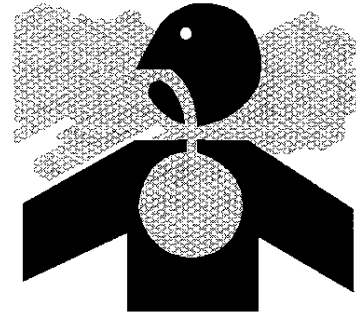
SAFETY

CARBON MONOXIDE HAZARD

NEVER use engine inside homes, garages, crawl spaces, or other partially enclosed areas. Poisonous gases that can be harmful or fatal can build up in these areas. Using a fan and opening doors or windows does NOT provide enough fresh air.

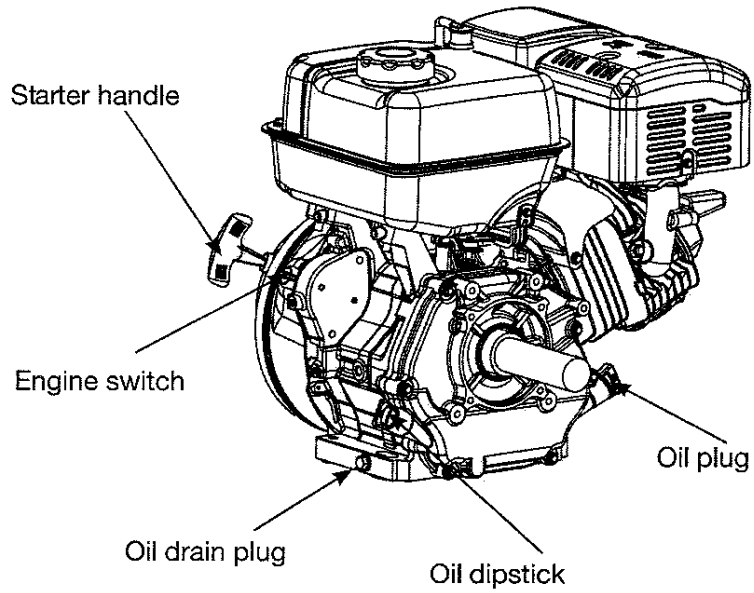
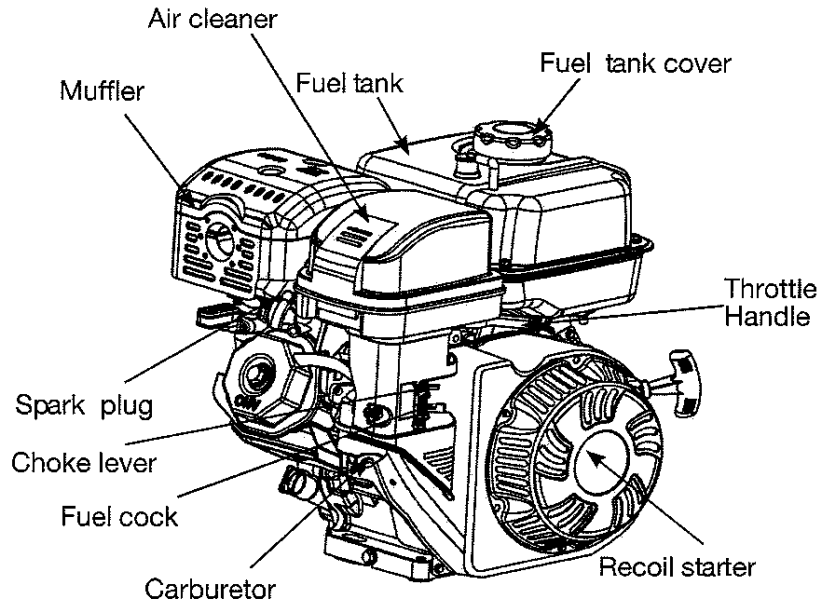
Engine exhaust contains carbon monoxide - a poisonous gas that can be harmful or fatal. You CANNOT see or smell this gas.

If you start to feel sick, dizzy, or weak while using an engine, shut it off and get to fresh air RIGHT AWAY. See a doctor. You may have carbon monoxide poisoning.



⚠ DANGER	⚠ DANGER	⚠ PELIGRO
<p>Using a generator indoors CAN KILL YOU IN MINUTES. Generator exhaust contains carbon monoxide. This is a poison you cannot see or smell.</p>	<p>L'utilisation d'un groupe électrogène à l'intérieur PEUT VOUS TUER EN QUELQUES MINUTES.</p>	<p>Utilizando un generador adentro PUEDA MATARLE EN MINUTOS.</p>
	<p>Le gaz d'échappement du groupe électrogène contient de l'oxyde de carbone. C'est un gaz toxique que l'on ne peut pas voir ou sentir.</p>	<p>El escape de generador contiene monóxido de carbono. Este es un gas tóxico que usted no puede ver ni puede oler.</p>
<p>NEVER use inside a home or garage, EVEN IF doors and windows are open.</p>	<p>Ne JAMAIS utiliser à l'intérieur d'une maison ou d'un garage, MÊME SI les portes et fenêtres s'ont ouvertes.</p>	<p>Nunca utilice dentro de un hogar ni el garaje, INCLUSO SI puertas y ventanas estén abiertas.</p>
<p>Only use OUTSIDE and far away from windows, doors, and vents.</p>	<p>N'utiliser qu'à l'EXTÉRIEUR et bien éloigné des fenêtres, portes, et conduits d'aération.</p>	<p>Solo utilice AFUERAS y lejos de ventanas abiertas, las puertas, y descargas.</p>
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CONTROLS AND FEATURES



OPERATION

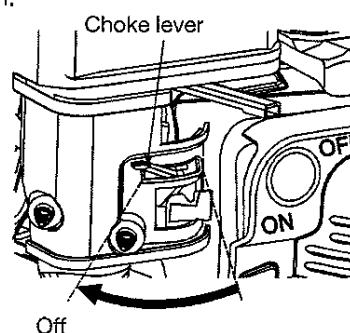
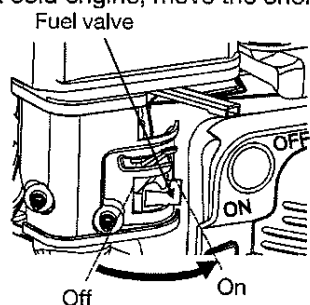
⚠ WARNING: CARBON MONOXIDE GAS IS TOXIC. BREATHING IT CAN CAUSE UNCONSCIOUSNESS AND/OR DEATH. AVOID ANY AREAS OR ACTIONS THAT EXPOSE YOU TO CARBON MONOXIDE.

⚠ WARNING: DO NOT PLACE HANDS ON OR NEAR THE EXHAUST SYSTEM WHILE STARTING.

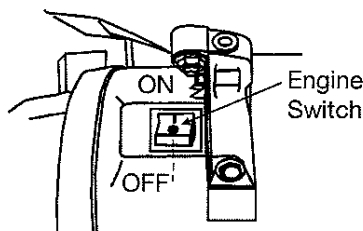
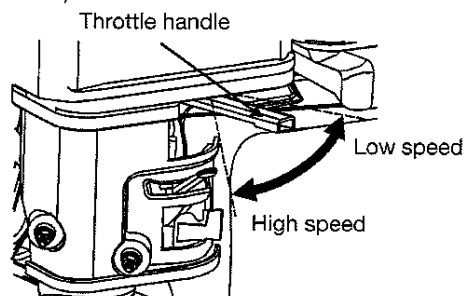
Review the instructions provided with the equipment powered by this engine for any safety precautions that should be observed in conjunction with starting, shutting down, or operating the engine.

RECOIL START

1. Place the fuel valve to the ON position (if applicable).
2. To start a cold engine, move the choke lever to the ON position.



3. Move the throttle lever away from the SLOW position, about 1/3 of the way toward the FAST position. (Non-generator applications.)



4. Turn the engine switch to the ON position.
5. Pull the recoil handle.
6. If the choke lever has been moved to the ON position to start the engine, gradually move it to the OFF position as the engine warms up.

STOPPING THE ENGINE

To stop the engine in an emergency, turn the engine switch to the OFF position. Under normal conditions, use the following procedure.

1. Move the throttle lever to the SLOW position and allow the engine to run slowly for cool down. This reduces the chance of backfire. (Non-generator applications.)
2. Turn the engine switch to the OFF position.
3. Turn the fuel valve lever to the OFF position.

MAINTENANCE

THE IMPORTANCE OF MAINTENANCE

Protect yourself and your equipment by properly maintaining your engine. Proper engine maintenance is necessary for safe, economical, and trouble-free operation.

⚠ WARNING: IMPROPERLY MAINTAINING THIS ENGINE, OR FAILURE TO CORRECT A PROBLEM BEFORE OPERATION, CAN CAUSE A MALFUNCTION IN WHICH YOU CAN BE SERIOUSLY HURT OR KILLED.

ALWAYS FOLLOW THE INSPECTION AND MAINTENANCE RECOMMENDATIONS AND SCHEDULES IN THIS OWNER'S MANUAL.

To assist you in properly caring for your engine, the following pages include routine inspection procedures and simple maintenance procedures using basic hand tools. Service tasks that are more difficult or which require special tools should be handled by professionals and are normally performed by a service technician or qualified mechanic.

If you operate your engine under stressful conditions such as sustained high-load or high-temperature operation, or use your engine in unusually wet or dusty conditions, servicing should be more frequent. Consult your service technician for recommendations applicable to your individual needs and use.

Note: See Maintenance Schedule for normal and extreme operation condition differences.

MAINTENANCE SAFETY INSTRUCTIONS

This manual contains very important safety precautions. However, we cannot warn you of every conceivable hazard that can arise while performing maintenance. You must decide whether or not you should perform a given task and always be safety conscious.

⚠ WARNING: FAILURE TO PROPERLY FOLLOW MAINTENANCE INSTRUCTIONS AND PRECAUTIONS CAN CAUSE YOU TO BE SERIOUSLY HURT OR KILLED.

ALWAYS FOLLOW THE PROCEDURES AND PRECAUTIONS IN THE OWNER'S MANUAL.

SAFETY PRECAUTIONS

1. Make sure the engine is not running, is turned OFF, spark plug cap is removed from spark plug, and engine is cooled off before you begin any maintenance or repairs. This can prevent several potential hazards, such as the following:

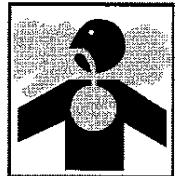
⚠ WARNING: CARBON MONOXIDE POISONING FROM ENGINE EXHAUST. RUN ENGINE IN A WELL-VENTILATED AREA.

⚠ WARNING: BURNS FROM HOT PARTS. LET THE ENGINE AND EXHAUST SYSTEM COOL-OFF BEFORE TOUCHING.

⚠ WARNING: INJURY FROM MOVING PARTS. DO NOT RUN THE ENGINE UNLESS INSTRUCTED TO DO SO.

2. Before you begin maintenance, read all instructions and make sure you have the tools and skills required.
3. To reduce the possibility of fire or explosion, be alert when working around gasoline. Use only a nonflammable solvent, not gasoline, to clean parts. Keep cigarettes, sparks and flames away from all fuel-related parts.
4. It is suggested to keep a fire extinguisher close by when performing maintenance.

Your servicing dealer knows your engine best and is equipped to maintain and repair it.

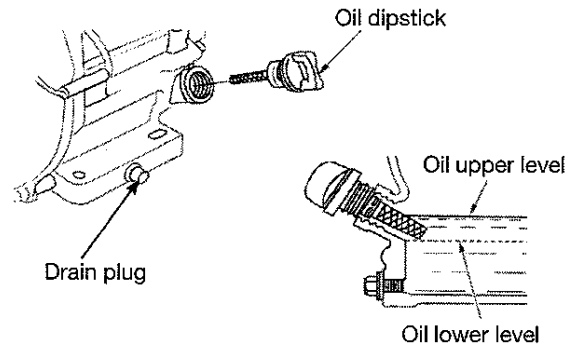


MAINTENANCE

ENGINE OIL LEVEL CHECK

Check the engine oil level with the engine stopped and with the engine in a level position.

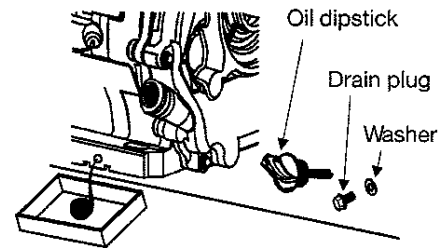
1. Remove dipstick and wipe it clean.
2. Insert and remove the dipstick without screwing it into the filler neck. Check the oil level shown on the dipstick.
3. If the oil level is low, fill to the upper mark of the dipstick.
4. Securely screw in the filler cap/dipstick. Running the engine with a low oil level can cause engine damage. Always check the engine oil before start up.



ENGINE OIL CHANGE

Drain the used oil while the engine is warm. Warm oil drains quickly and completely. Avoid contact with hot oil.

1. Place a suitable container below the engine to catch the used oil then remove the filler cap/dipstick and the drain plug. Fill if oil is below letter "L" on the filler cap. Fill if oil is below "Add" on the dipstick.
2. Allow the used oil to drain completely, then reinstall the drain plug, and tighten it securely. Do not over tighten. Dispose of used motor oil in a manner that is compatible with the environment. We suggest you take used oil in a sealed container to your local recycling center or service station for reclamation. Do not throw used oil in the trash, pour it on the ground, or pour down a drain.
3. With the engine in a level position, fill to the outer edge of the oil filler hole with the recommended oil.



CAUTION: RUNNING THE ENGINE WITH A LOW OIL LEVEL CAN CAUSE ENGINE DAMAGE.

4. Securely screw in the filler cap/dipstick.

ENGINE OIL RECOMMENDATIONS

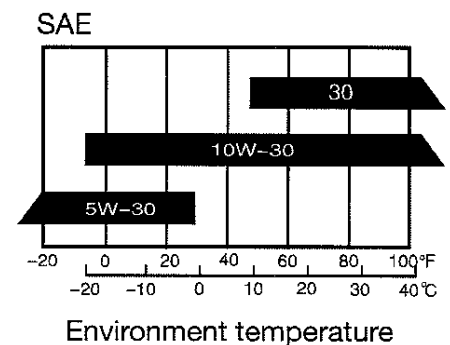
Engine oil affects performance and service life. Use 4-stroke automotive detergent oil.

SAE 10W-30 is recommended for general use. Other viscosities shown in the chart may be used when the average temperature in your area warrants.

The SAE oil viscosity and service classification are in the API label on the oil container. Use API SERVICE category SJ engine oil, or better.

Engine Oil Capacity:

280cc/300cc/420cc	37.1 oz.	1.1 L
212cc	20.2 oz.	0.6 L



MAINTENANCE

SPARK PLUG SERVICE

Recommended spark plugs:

- NGK: BP6ES/BPR6ES
- DENSO: W16EPR-U/W16EP-U
- CHAMPION: RN9YC4
- NHSP: F6RTC/F7RTC
- TORCH: F7TC/F7RTC

Note: Using an incorrect spark plug may cause engine damage.

1. When engine is cool, disconnect the spark plug cap and remove any debris from the spark plug area with high pressure air.
2. Remove the spark plug with a 13/16-inch spark plug wrench.
3. Inspect the spark plug. Replace it if the electrodes are worn or if the insulator is cracked or chipped. Spark plug gap should be set to 0.027 - 0.030 inches (0.7mm - 0.8mm).
4. Install the spark plug carefully to avoid cross threading. Screw in spark plug by hand until it stops turning.
5. Tighten the spark plug with a 13/16-inch spark plug wrench. Tighten 1/4 turn after the spark plug seats.

0.7-0.8mm



Note: A loose spark plug can overheat and damage the engine. Over-tightening the spark plug can damage the threads in the cylinder head.

6. Attach the spark plug cap. Ensure spark plug cap snaps into place securely.

MAINTENANCE SCHEDULE

NORMAL OPERATING CONDITIONS

	Each Use	First Month	Every 6 Months	Once a year
Engine Oil Level	Check			
Engine Oil		Replace	Replace	
Air Filter	Check			Clean/Replace
Spark Plug*			Clean	Replace
Cylinder/Head Fins				Clean
Oil Leaks	Check			
Bolts	Check			
Fuel Hose Clamps	Check			

SPECIFICATIONS

SPECIFICATIONS	MODEL 280	MODEL 300	MODEL 420	MODEL 212
L x W x H (mm)	415 x 392 x 425	415 x 392 x 425	465 x 413 x 440	390 x 320 x 345
Dry Weight (kg)	26	26	32.5	16
Engine Type	Single Cylinder, 4-stroke (OHV)	Single Cylinder, 4-stroke (OHV)	Single Cylinder, 4-stroke (OHV)	Single Cylinder, 4-stroke (OHV)
Displacement (mL)	277	300	420	212
Compression Ratio	8.2:1	8.2:1	8.0:1	8.5:1
Bore x Stroke (mm)	78 x 58	78 x 58	90 x 66	70 x 55
Maximum Power	5.8 kW/3,600r/min	5.8 kW/3,600r/min	8.5 kW/3,600r/min	4.2 kW/3,600r/min
Maximum Torque	17Nm/2,500r/min	17Nm/2,500r/min	25Nm/2,500r/min	12Nm/2,500r/min
Cooling System	Forced Air	Forced Air	Forced Air	Forced Air
Ignition System	Transistorized Magneto Ignition (TCI)	Transistorized Magneto Ignition (TCI)	Transistorized Magneto Ignition (TCI)	Transistorized Magneto Ignition (TCI)
Spark Plug	BP6ES (NGK) / F6RTC (NHSP)	BP6ES (NGK) / F6RTC (NHSP)	BP6ES (NGK) / F6RTC (NHSP)	BP6ES (NGK) / F6RTC (NHSP)
Lubrication System	Forced Splash	Forced Splash	Forced Splash	Forced Splash
PTO Shaft Rotation	Counterclockwise	Counterclockwise	Counterclockwise	Counterclockwise

CALIFORNIA EMISSIONS STATEMENT

CALIFORNIA EMISSIONS CONTROL WARRANTY STATEMENT YOUR WARRANTY RIGHTS AND OBLIGATIONS

The California Air Resources Board and Mi-T-M are pleased to explain the emission control system warranty on your 2018 small off-road engine/equipment (SORE). In California, new SOREs must be designed, built and equipped to meet the State's stringent anti-smog standards. Mi-T-M must warrant the evaporative emissions control system (EECS) on your SOREs for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your SOREs.

Your EECS may include parts such as the carburetor, fuel-injection system, the ignition system, catalytic converter, fuel tanks, fuel lines, fuel caps, valves, canisters, filters, vapor hoses, clamps, connectors, belts and other associated emission-related components. Where a warrantable condition exist, Mi-T-M will repair your small off-road engine at no cost to you including diagnosis, parts and labor.

MANUFACTURER'S WARRANTY COVERAGE:

This EECS is warranted for two years. If any evaporative emissions-related part on your small off-road engine/equipment is defective, the part will be repaired or replaced by Mi-T-M.

OWNER'S WARRANTY RESPONSIBILITIES:

-As the SORE owner, you are responsible for performance of the required maintenance listed in your owner's manual. Mi-T-M recommends that you retain all receipts covering maintenance on your SORE, but Mi-T-M cannot deny warranty solely for the lack of receipts.

-As the SORE owner, you should however be aware that Mi-T-M may deny you warranty coverage if your SORE or a part has failed due to abuse, neglect, or improper maintenance or unapproved modifications.

-You are responsible for presenting your SORE to distribution center or service center authorized by Mi-T-M Corporation, 50 Mi-T-M Drive, Peosta, IA 52068 (herein Mi-T-M) as soon as the problem exists. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days.

If you have a question regarding your warranty coverage, you should contact Mi-T-M Customer Service Department at 1-800-553-9053 or by emailing us at corp@mitm.com.

GENERAL EMISSIONS WARRANTY COVERAGE - CALIFORNIA ONLY -

Mi-T-M warrants to the ultimate purchaser and each subsequent purchaser that the SORE (1) has been designed, built and equipped so as to conform with all applicable regulations; and (2) is free from defects in materials and workmanship that cause the failure of a warranted part to conform with those regulations as may be applicable to the terms and conditions stated below.

- (a) The warranty period begins on the date the engine is delivered to an ultimate purchaser or first placed into service. The warranty period is two years.
- (b) Subject to certain conditions and exclusions as stated below, the warranty on emissions related parts is as follows:
 - (1) Any warranted part that is not scheduled for replacement as required maintenance in your owner's manual is warranted for the warranty period stated above. If the part fails during the period of warranty coverage, the part will be repaired or replaced by Mi-T-M according to subsection (4) below. Any such part repaired or replaced under warranty will be warranted for the remainder of the period.
 - (2) Any warranted part that is scheduled only for regular inspection in your owner's manual is warranted for the warranty period stated above. Any such part repaired or replaced under warranty will be warranted for the remaining warranty period.
 - (3) Any warranted part that is scheduled for replacement as required maintenance in your owner's manual is warranted for the period of time before the first scheduled replacement date for that part. If the part fails before the first scheduled replacement, the part will be repaired or replaced by Mi-T-M according to subsection (4) below. Any such part repaired or replaced under warranty will be warranted for the remainder of the period prior to the first scheduled replacement point for the part.
 - (4) Repair or replacement of any warranted part under the warranty provisions herein must be performed at a warranty station at no charge to the owner.
 - (5) Notwithstanding the provisions herein, warranty services or repair will be provided at all of our distribution centers that are franchised to service the subject engines.
 - (6) The owner must not be charged for diagnostic labor that leads to the determination that a warranted part is in fact defective, provided that such diagnostic work is performed at a warranty station.
 - (7) Mi-T-M is liable for damages to other engine components proximity caused by a failure under warranty of any warranted part.
 - (8) Throughout the engine warranty period stated above, Mi-T-M will maintain a supply of warranted parts sufficient to meet the expected demand for such parts.

