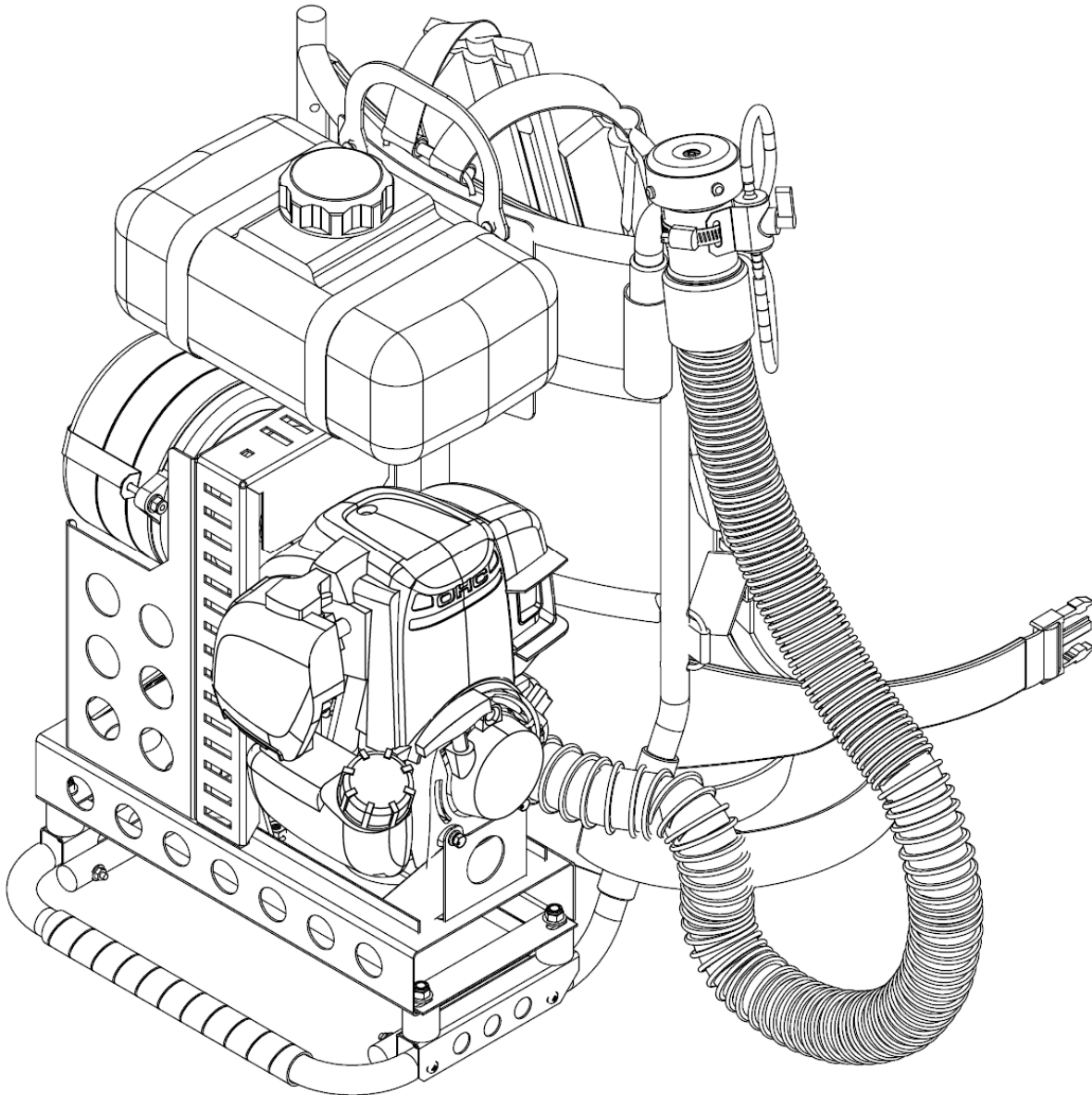


TWISTERTM XL 3

MODEL 3950 SERIES 4 MOTORIZED KNAPSACK ULV SPRAYER



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Westfield, Indiana, U.S.A.
www.dynafog.com

Instruction Manual For Installation, Operation and Maintenance

Manufactured by Curtis Dyna-Fog[®], Ltd.

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To the New Owner

Dear Valued Customer,

Congratulations on selecting **Dyna-Fog®** and one of the finest Ultra-Low-Volume (ULV), machines in the world. The **TWISTER™XL 3** is the newest in the **Dyna-Fog®** family of professional spraying equipment, and represents the latest in portable spray technology. The **TWISTER™XL 3** was developed to provide a powerful yet affordable multi-purpose machine in a portable, lightweight package. Trials have proven the **TWISTER's** effectiveness, and that operator fatigue caused by the “gyroscopic effect” associated with other types of hand-held gasoline powered sprayers is virtually eliminated. Its simple operation and portable design, combined with the ability to produce variable flow rates make the **TWISTER™XL 3** is the most powerful machine of its type for dispensing liquids in the 20 micron range. Backed by our *Quality, Workmanship* and more than *60 years of service*, we are confident that the **TWISTER™XL 3** will be a valuable addition to any spraying program.

Thank you for choosing Dyna-Fog®.

Forward

The application of insecticides is the predominant method by which man attempts to control the size of insect populations. Due to environmental and economical reasons, it is desirable to treat a given area with the least amount of insecticide that can be made effective. The most efficient method is to break up the liquids into aerosols and distribute these fine droplets over the target area. The small droplets stay suspended for longer periods of time due to their size and are distributed more evenly, remaining effective longer.

The term ULV is an abbreviation for Ultra-Low-Volume, the technology used to treat areas with small amounts of chemical in an aerosol form. These chemicals are usually in a more concentrated state than chemicals used in other methods of application.

For best results, the Dyna-Fog ULV aerosol generator model 3950 should be operated and maintained in compliance with this manual. Insecticides must be applied in compliance with their label instructions.

WARNING

Read and thoroughly understand all information, cautions and warnings on the formulation label which may affect personal safety. Know any dangers of the solution used and know what to do in case of an accident involving the solution. Always use the appropriate safety equipment and dress accordingly to the chemical formulation which is being used.

Machine Specifications

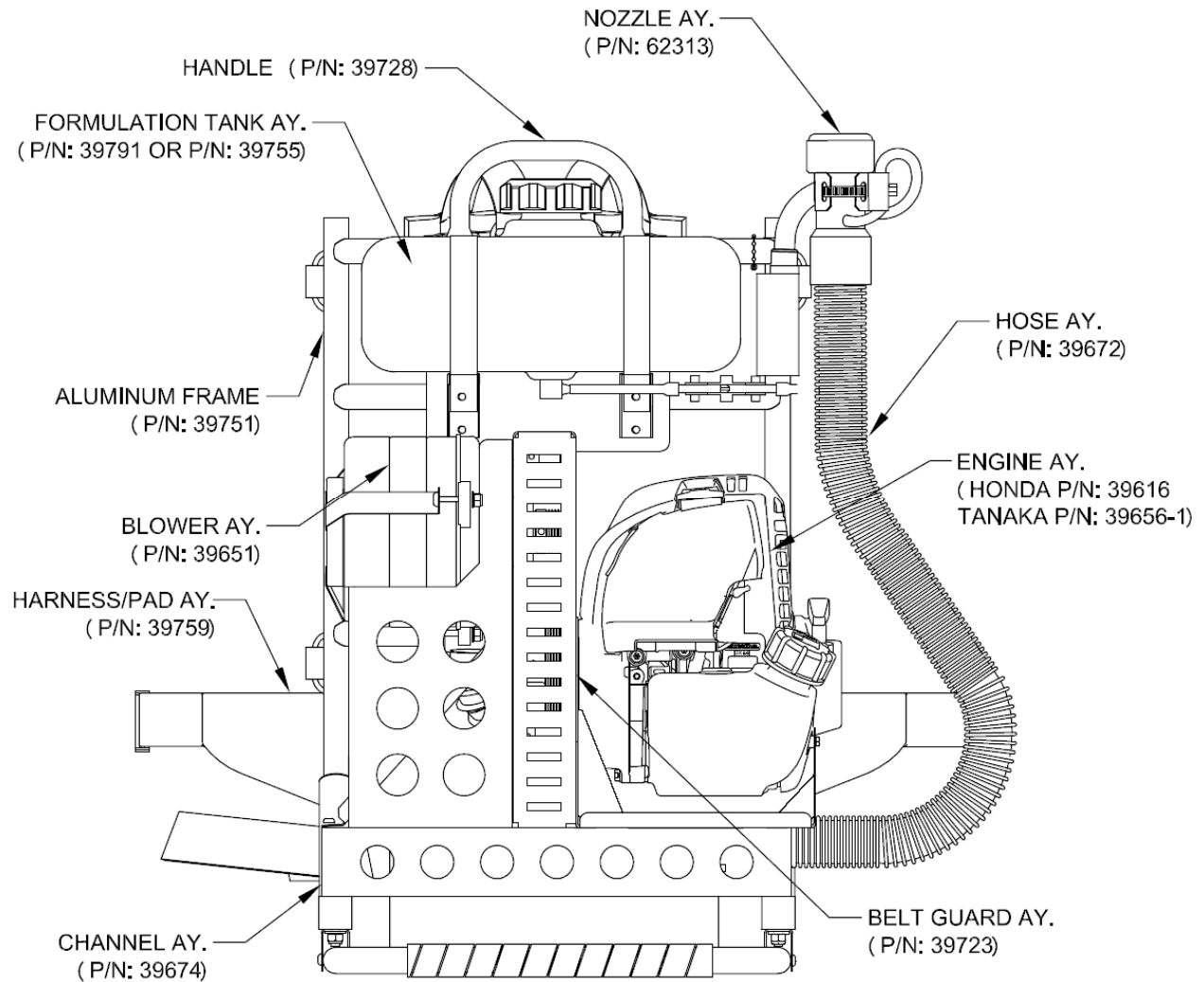
TWISTER™XL, MODEL 3950 SERIES 4

Type:	Aerosol Generator, Non Thermal, Insecticide, Ultra-Low-Volume (ULV). Using adequate orifice will produce larger droplets.
Engine:	<u>Honda GX-35</u> 4-stroke, overhead camshaft, single cylinder. Gasoline consumption: 25.7 oz/hour (760 ml/hour) approximate. Oil Type: 10 W-30. Oil Capacity: 100 cc (3.4 fl. oz.) Operating Speed: 7,500 RPM, single Microtec™ nozzle. 8,500 RPM, optional two Microtec™ nozzles. <u>Tanaka, Purefire™</u> , 2-cycle, 40 cc, low emission engine. Gasoline consumption: 26.7 oz/hour (800 ml/hour) approx. Operating Speed: 7,500 RPM, single Microtec™ nozzle. 8,500 RPM, optional two Microtec™ nozzles. Mix Gasoline: Oil 50:1 (refer to label on the Engine).
Blower:	High speed Rotary type, 3-Stage, Belt driven, 95 cfm (2.68 m ³ /min) unrestricted, pressure 3 psi. (.2 bar) max., tangential discharge, steel shaft with two ball bearings.
Flow Control:	Interchangeable restricting orifice to produce different flow rates, from 1.5 oz/min (45 ml/min) to 17 oz/min (500 ml/min).
Nozzle:	Single high output Microtec™ nozzle. Optional extra twin nozzle kit for higher output.
Tanks:	Corrosion resistant, high density Polyethylene. Formulation: 1 U.S. Gallons (3.78 liters). Gasoline: 33.3 oz (1 Lt)
Frame:	High Strength Aluminum Tube
Droplet Size:	90% of all droplets under 20 Microns (ULV) Mass Media Diameter (VMD) depending on flow rate and viscosity. When the high flow rate is discharged through the single nozzle, the machine will produce larger droplets for residual deposit.
Accessories:	Visual warning flag with flexible telescopic mast, Flowmeter to determine the formulation viscosity, 2-cycle oil beaker, funnel.
Weight:	27 lbs (12.2 Kg)
Dimensions:	14.75 in (37.5 cm) L, 12 in (30.5 cm) W, 22.5 in (57.2 cm) H

Shipping Information (Boxed)

Dimensions:	22.5" L x 19" W x 18" H (57.2 x 48.3 x 45.7 cm)
Volume:	5.62 cu.ft. (.159 cu. meter)
Weight:	37 lbs (16.8 Kg)

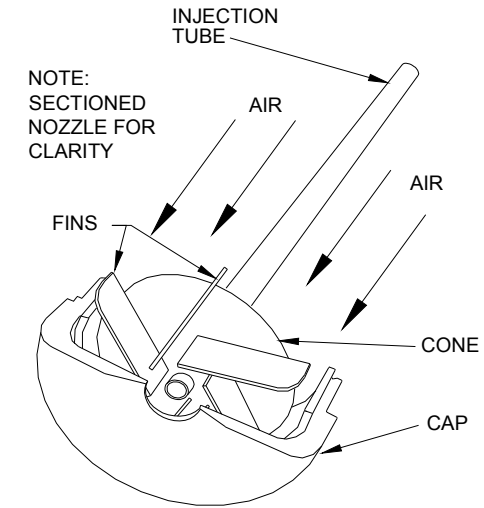
Twister XL-3 Main Components Diagram



Working Principles

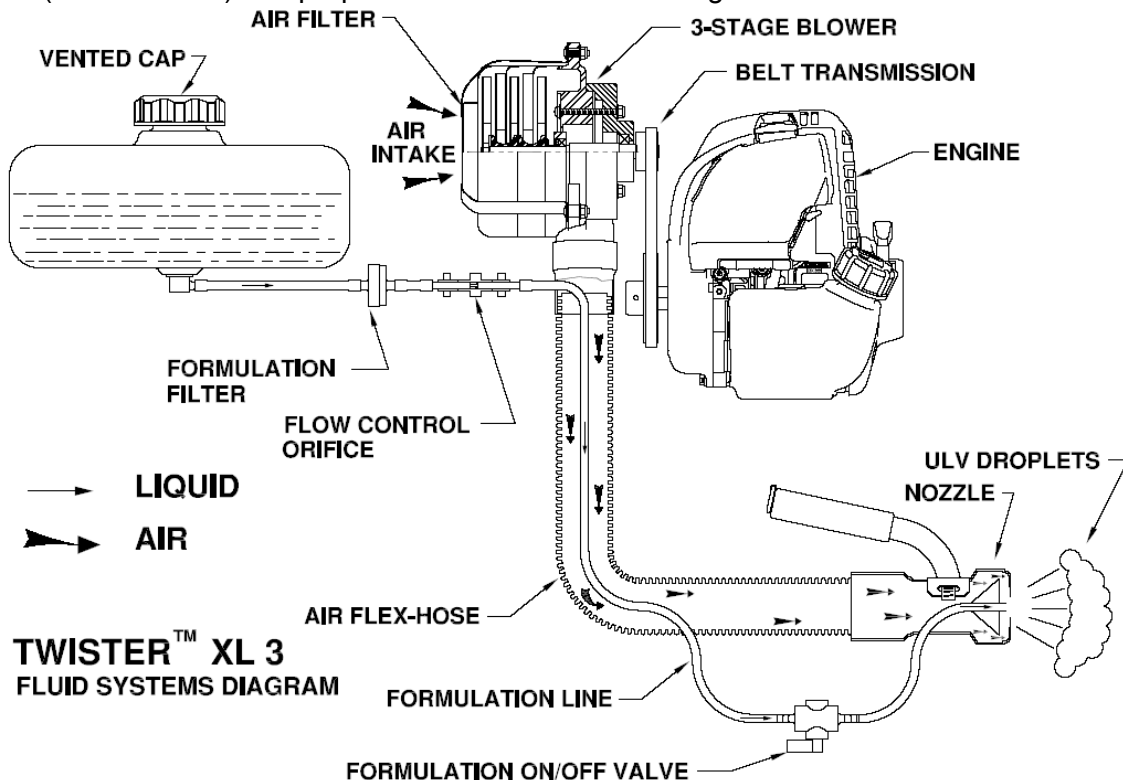
The **TWISTER™XL** is powered by a 35cc 4-stroke GX-35 Honda or a 40cc 2-cycle Tanaka PF-4000 gasoline engine. The **TWISTER™XL** is designed to take the weight and stress off the operators hand and wrist to ensure ease and comfort when working. The engine and blower assembly are mounted on a lightweight, padded frame that is worn on the operator's back.

The Engine is used to belt drive a 3-stage High-Volume Blower. The engine has a "lever type" throttle control that allows both idle and working engine operating speeds. The blower supplies air thru a flexible hose to the nozzle where the air creates "suction" on the formulation supply tube. The suction in the formulation supply tube causes liquid to be drawn from the formulation tank, thru a restricting orifice, into a shutoff valve and to the nozzle. The nozzles have six stationary fins that create a swirling effect of the air mass as it leaves each nozzle. In the center of this swirling air mass is a liquid supply spray tube.



HOW THE MICROTEC NOZZLE WORKS

The spray tube directs the formulation into the air mass where it is sheared into billions of tiny droplets (10-20 micron) and propelled thru the air to their target.



Machine Operation

CAUTION

READ THIS COMPLETE OPERATION SECTION AND THE SECTION ON SAFETY PRECAUTIONS BEFORE STARTING THE MACHINE FOR THE FIRST TIME.

When operating this machine for the first time, move to an uncongested and well-vented work area away from flammable materials.

WARNING

READ THE SECTION ON SAFETY PRECAUTIONS BEFORE PREPARING TO DISPENSE FORMULATION.

READ AND THOROUGHLY UNDERSTAND ALL INFORMATION, CAUTIONS AND WARNINGS ON THE FORMULATION LABEL WHICH MAY AFFECT PERSONAL SAFETY. KNOW ANY DANGERS OF THE SOLUTION USED AND KNOW WHAT TO DO IN CASE OF AN ACCIDENT INVOLVING THE SOLUTION.

ALWAYS USE THE APPROPRIATE SAFETY EQUIPMENT AND DRESS ACCORDING TO THE CHEMICAL FORMULATION WHICH IS BEING USED.

WARNING

- **DO NOT USE ANY SUBSTANCES FROM UNMARKED CONTAINERS OR FROM CONTAINERS WITH OBVIOUSLY ALTERED LABELS.**
- **READ AND FOLLOW THE INSTRUCTIONS ON THE CHEMICAL SOLUTION LABEL FOR ULV SPRAYING OF THE SOLUTION.**
- **DO NOT SPRAY NEAR AN OPEN FLAME OR HOT MATERIALS.**
- **DO NOT LEAVE THE MACHINE UNATTENDED.**

Pre-Spray Checklist

1. Verify that the operator can easily find and operate the engine kill switch, to stop the machine, or allow it run.
2. Verify that the steam of the formulation (spray) ON/OFF valve is easy to rotate, to open and close the valve, remaining in off position.
3. Verify that the engine has sufficient gasoline. If your Twister unit came with Tanaka engine make sure the gasoline was properly mixed with 2-cycle oil.
4. Verify that the air inlet filter of the blower is clean and unrestricted.
5. Inspect all hoses for abnormal conditions.
6. Verify that no foreign objects and tools have been left in or about the machine.
7. Verify that the sufficient amount of formulation is in the tank and that the tank filling cap is tight and air vent hole is not restricted.
8. Verify that the formulation line at the machine includes the appropriate flow control orifice for the viscosity and recommended flow rate of the formulation intended to dispense, in accordance with the manufacturer's label requirements.
9. Verify that the belt is in the right position on the sheave,
10. Verify the sight position of straps and belts on the frame before use the machine.
11. Verify that all safety equipment is in place and is in proper working order.

CAUTION

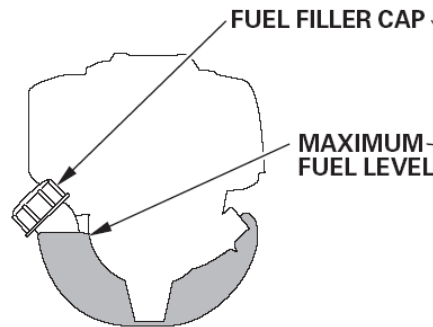
BEFORE PROCEEDING WITH ANY SPRAYING OPERATION, THE OPERATOR SHOULD BE THOROUGHLY FAMILIAR WITH STARTING AND STOPPING THE MACHINE WITH ALL THE OPERATING CONTROLS. IF YOU ARE OPERATING THE MACHINE FOR THE FIRST TIME, EXERCISE THE MACHINE THROUGH ITS FULL OPERATIONAL SEQUENCES FROM A POSITION OF FULL VISIBILITY OF THE MACHINE BEFORE OPERATING THE MACHINE ON YOUR BACK. THIS IS ALSO A GOOD IDEA FOR EXPERIENCED OPERATORS WHO MAY BE OPERATING A NEW MACHINE OR WHO MAY BE REACTIVATING A MACHINE AFTER REPAIRS OR A PERIOD INACTIVITY. REFER TO THE ENGINE SECTION FOR STARTING AND STOPPING INSTRUCTIONS.

Honda GX-35 Engine Operation Instructions

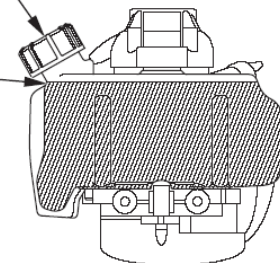
FUEL

Check the fuel level by looking through the translucent fuel tank. If the fuel level is low, refuel in a well-ventilated area with the engine stopped. If the engine has been running, allow it to cool.

Standard/Pump type:



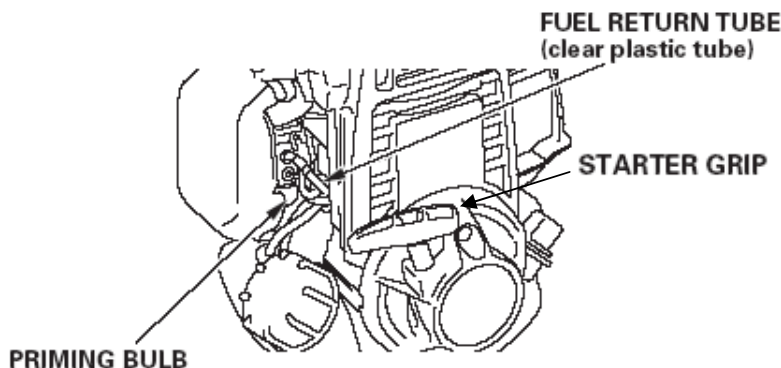
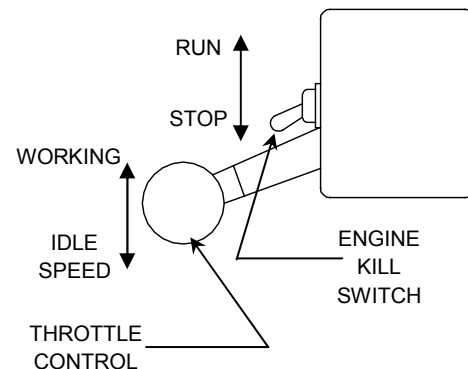
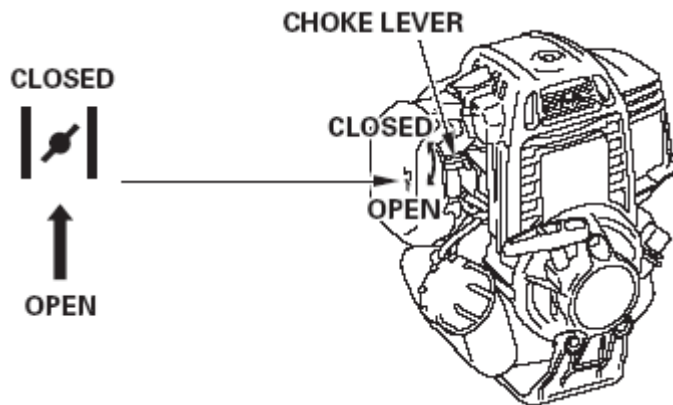
Tiller type:



STARTING INSTRUCTIONS

Read and understand operation manual before attempting to operate machine.

1. Set throttle lever to idle speed. (bottom right diagram)
2. Set ignition switch (engine kill switch) to ON (Run) position (bottom right).
3. Depress priming bulb several times to purge air in the carburetor, until the flows trough return pipe (bottom left diagram).
4. Pull choke lever upward to choke position/closed (bottom center diagram).
5. Pull recoil starter briskly, taking care to keep the handle in your grasp and not allowing it to snap back.
6. When you hear the engine want to start, return the choke lever to the run position (open). Then pull recoil starter briskly again.



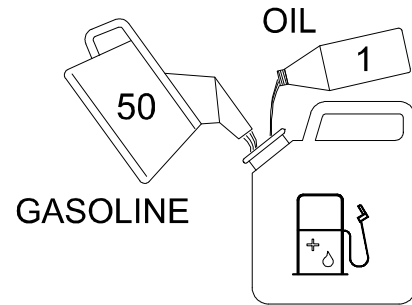
Note: If engine does not start, repeat procedures 4 to 6.

7. After starting, allow the engine to warm-up 2 to 3 minutes (at idle speed) before operating at higher speeds for fogging operations.

Tanaka PF-4000 Engine Operation Instructions

WARNING

The Twister™ XL is equipped with a two-stroke engine. Always run the engine on gasoline, which is properly mixed with oil.



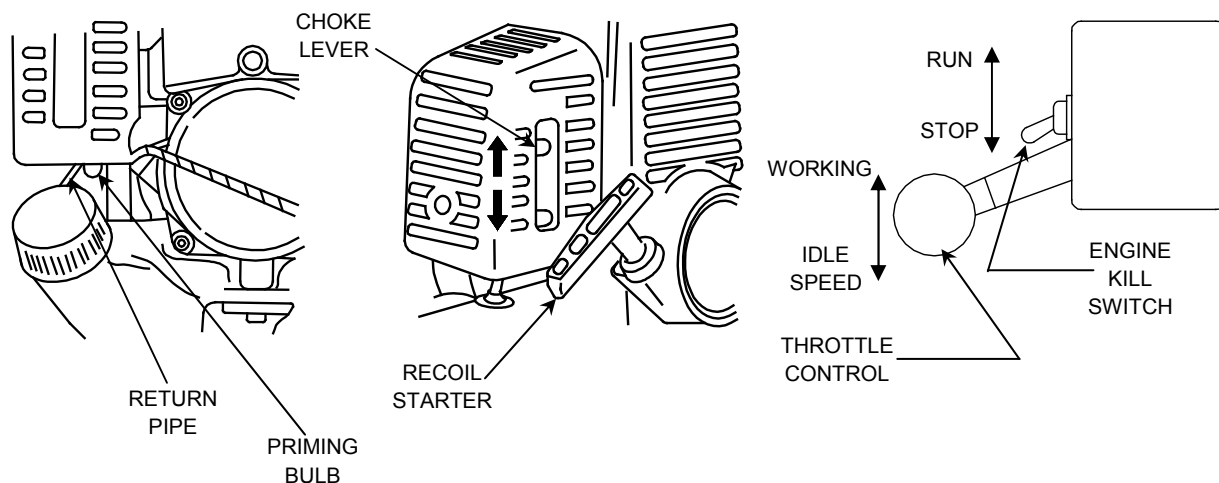
FUEL

Use unleaded gasoline with an 89 octane or higher rating. Use a quality two-cycle oil at mixing ratio of 50:1 (right diagram). Always mix gas and oil in a separate clean container. Mix the gasoline thoroughly before filling the engine fuel tank.

STARTING INSTRUCTIONS

Read and understand operation manual before attempting to operate machine.

1. Set throttle lever to idle speed. (bottom right diagram)
2. Set ignition switch (engine kill switch) to ON (Run) position (bottom right).
3. Depress priming bulb several times to purge air in the carburetor, until the flows through return pipe (bottom left diagram).
4. Pull choke lever upward to choke position/closed (bottom center diagram).
5. Pull recoil starter briskly, taking care to keep the handle in your grasp and not allowing it to snap back.
6. When you hear the engine want to start, return the choke lever to the run position (open). Then pull recoil starter briskly again.



Note: If engine does not start, repeat procedures 4 to 6.

7. After starting, allow the engine to warm-up 2 to 3 minutes (at idle speed) before operating at higher speeds for fogging operations.

WARNING

As recommended for any machine driven by an internal combustion engine, this equipment is intended to use outdoor and in a well ventilated area, in order to preventing Carbon Monoxide poisoning.

CAUTION

Keep the flexible air hose far away from the engine exhaust to avoid damage to the hose. The nozzle holder is intended to use when the machine is OFF (for transportation purposes), and for a short period of time when the engine is at idle speed, for easy installation on the back operator.

TO STOP THE MACHINE

1. If the *formulation valve* is open (ON position), turn it close (OFF) position.
2. Return the *throttle control* lever to the *idle speed* (down) position.
3. Move the *engine kill* switch to the *stop* (down) position.

OPERATOR SAFETY

Keep all loose items (i.e. Clothing, hair, jewelry, etc.) away from all moving parts.

Many of the formulations which can be dispensed with this machine are highly toxic and require special safety equipment. Read and observe the formulation label safety precautions, warnings and procedures before operating machine.

Always wear hearing protection.

Never let an inexperienced person operate machine.

Do not operate the machine if you are ill, or under the influence of alcohol, drugs or medication.

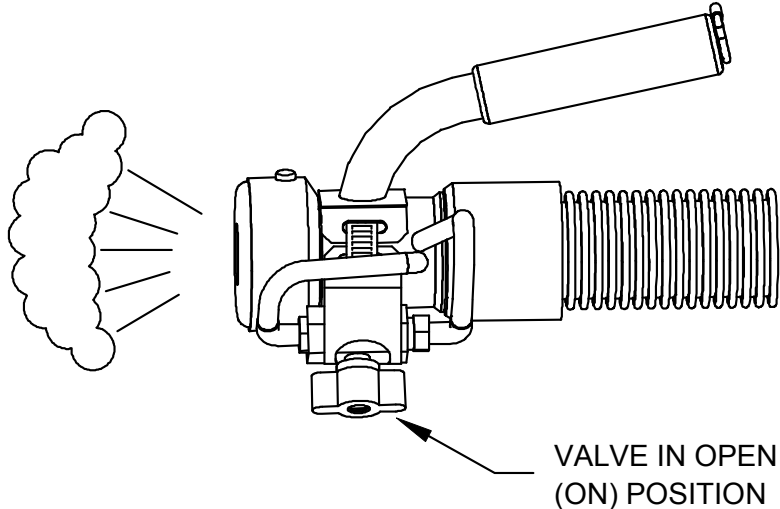
CAUTION

Do not start the machine without the belt guard and the heat shield cover installed.

Using the Spray On/Off Control Valve

The flow of formulation to the nozzle is controlled by the Spray ON/OFF Valve. The valve is located between the nozzle and the carrying handle.

The upper drawing shows the Spray ON/OFF control valve in open (ON) position, allowing the flow of formulation from the formulation tank to the nozzle. It is recommended to move this valve to the ON position only if the machine is running.

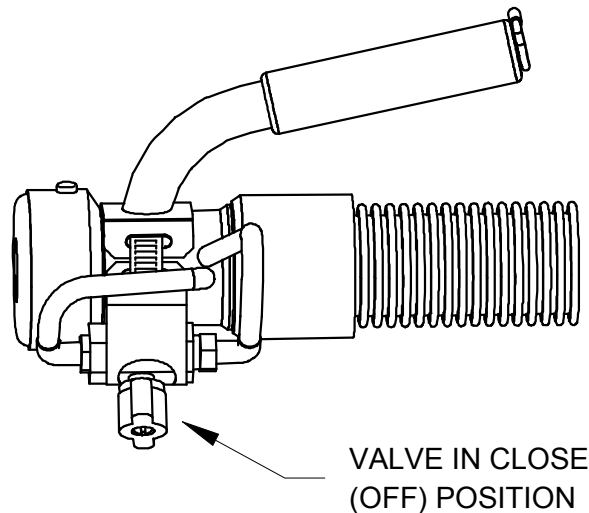


The lower drawing shows the Spray ON/OFF control valve in close (OFF) position, stopping the flow of formulation.

Flow rate can be changed by partially opening the valve to the desired position. Flow rates shown in Table 1 are based on the ON/OFF valve in the maximum open position.

IMPORTANT:

To prevent dripping from the nozzle, turn the spray valve to close (OFF) before turning power off.



The Spray ON/OFF valve will provide many hours of service. With the time, and depending of the corrosive action of the formulation used, the steam of the valve could begin to be harder to rotate. If the steam is too hard to rotate, change the valve before it breaks and gets inoperative.

Measuring Liquid Flowability (Viscosity)

In order to achieve consistent results in generating aerosols with a mass median diameter (MMD) in the sub 20 micron range, several variables must be kept under control at the same time. The ability of an aerosol generator to consistently break up a liquid into appropriate sized droplets depends on 3 key elements:

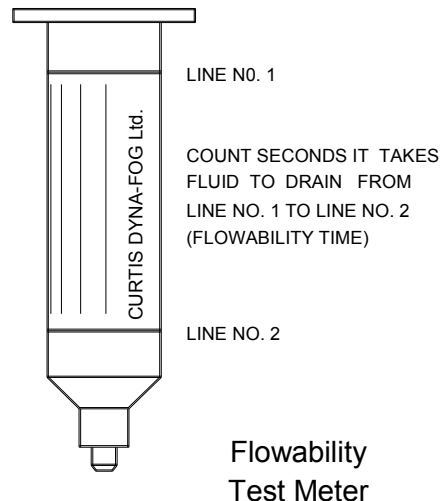
1. The available energy flow (air flow) through the nozzle is governed by the blower speed. As the air mass and its velocity through the nozzle decreases, the droplet size (MMD) will increase assuming that the liquids viscosity and flow rate remains constant.
2. The flow rate of the liquid governed by the diameter of the flow control orifice.
3. The viscosity of the liquid.

Various liquids have different viscosities. Viscosity is defined as a fluids resistance to flow commonly measured in units of centipoises (CP). Generally, the thicker the liquid, the greater the viscosity and the higher the CP number. Examples of some liquid viscosities are:

<u>LIQUID</u>	<u>VISCOSITY (CP)</u>
Water	1
Dibrom	3-4
Dow MFC	3-4
Pyrethrin, Resmethrin	6-7
Dursban 1.5 ULV	12-14
Technical Malathion	28

To Measure the Flowability (Viscosity) of Your Formulation

1. Place a sample of the formulation liquid to be dispensed in the relative flowability meter provided with the machine such that the liquid level is above the top line.
2. Hold the meter vertical and allow the liquid to flow through the brass orifice at the outlet end of the meter into an appropriate container.
3. Using a stopwatch or a watch with a sweep second hand, determine the flowability time in seconds that it takes for the liquid level to fall from the top line to the bottom line.



NOTE: Periodically calibrate the flowability meter using plain water. Water should flow through the orifice such that the time between the top line and the bottom line is 32 ± 2 seconds.

Once the flowability of the liquid has been measured, Tables 1 and 2 can be used as an approximate guide for setting the Flow Control Orifice size for your spray application.

Flow Rate Chart

TABLE 1

SINGLE MICROTEC NOZZLE		
32 SECONDS FORMULATION		
ORIFICE NUMBER	FLOW RATE	
	OZ/MIN	ML/MIN
19	1.5	45
28	3.3	100
36	5.3	160
NONE	17.0	500
70 SECONDS FORMULATION		
19	1.23	37
88 SECONDS FORMULATION		
19	1.2	36

TABLE 2

DOUBLE MICROTEC NOZZLE*		
32 SECONDS FORMULATION		
ORIFICE NUMBER	FLOW RATE	
	OZ/MIN	ML/MIN
54	12	360
NONE	19.0	570
* OPTIONAL TWO NOZZLE VERSION		

NOTE: THE FLOW RATES SHOWN HIGHLIGHTED WILL PRODUCE DROPLETS OF 20 MICRONS (VMD) OR LESS (ULV). USING FORMULATIONS WITH HIGHER VISCOSITY THAN 32 SECONDS WILL REDUCE THE FLOW RATE BY APPROXIMATELY 20% OR MORE.

WARNING

ALWAYS APPLY FORMULATIONS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

The flow rate in the Tables 1 and 2 are the average value of several machines tested, with the nozzle located at the level of the machine base.

The Dyna-Fog® Microtec™ Nozzle will produce 90% of the droplets below 20 microns (ULV) when used at the recommended flow rates. This meets the requirements of all current chemical labels for controlling flying insects.

When the high flow rate is discharged through a single nozzle the Twister™ XL will produce larger droplets of 50 microns suitable for applying a residual deposit to vegetation and any other surface.

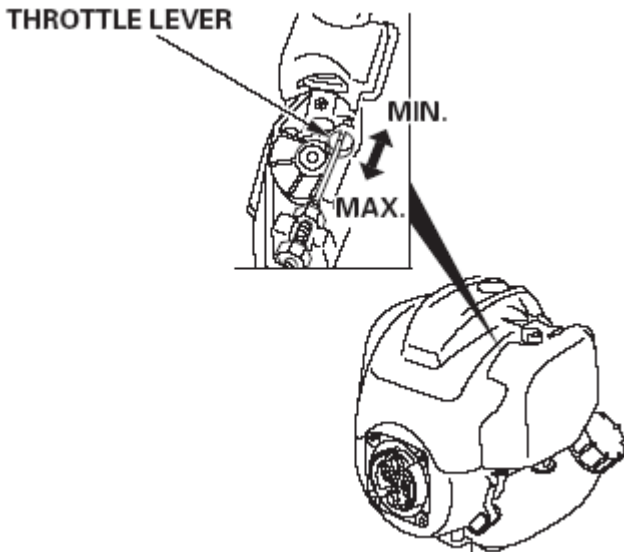
NOTE: Always handle and dispose of all chemicals in accordance with the manufacturers' instructions and the material safety sheet for the chemical being used.

Honda GX-35 Engine Maintenance

Maintenance, replacement, or repair of the emission control devices and systems may be performed by any non-road engine repair establishment or individual.

In the carburetor, fuel is mixed with air. When the engine is tested at the factory, the carburetor is pre-set.

Speed Adjustment



When the Twister™ XL is tested at the factory, the engine working and minimum speed is basically adjusted. The working speed for the engine is 7150 rpm (+/- 50 rpm) for single nozzle. A further adjustment may be required according to climate or altitude existing at the place to work with the machine. To adjust the engine speed, remove the plastic air cleaner cover from the engine, loosen the jam nut from the perforated adjuster screw; to increase the speed, unscrew the adjuster screw, to decrease the speed screw in the adjuster screw, check the speed with a tach meter after 5 or 7 minutes of operation, readjust if

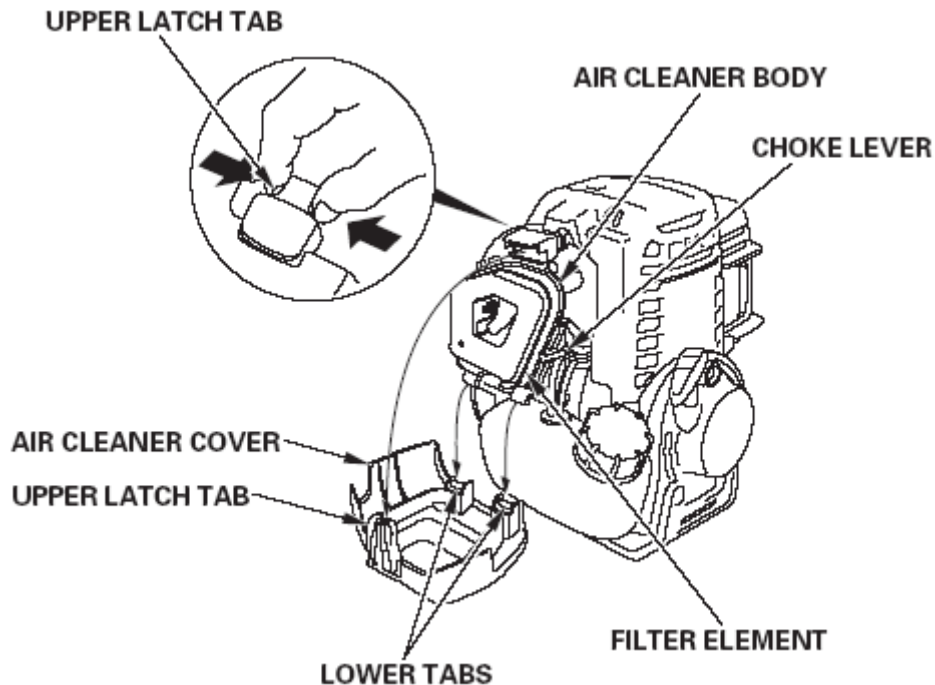
required. Reinstall the plastic air cleaner cover.

Air Filter

The air filter must be cleaned periodically from dust and dirt in order to avoid: Carburetor malfunctions, Starting problems, Engine power reductions, Unnecessary wear on the engine parts and/or abnormal fuel consumption.

Clean the air filter daily or more often if working in exceptionally dusty areas. To clean the air filter, Press the latch tab on the top of the air cleaner cover, and remove the cover. Always replace damaged filter elements.

1. Clean the filter element in warm soapy water, rinse, and allow to dry thoroughly. Or clean in nonflammable solvent and allow to dry.
2. Dip the filter element in clean engine oil, then squeeze out all excess oil. The engine will smoke when started if too much oil is left in the foam.
3. Wipe dirt from the air cleaner body and cover, using a moist rag. Be careful to prevent dirt from entering the carburetor.

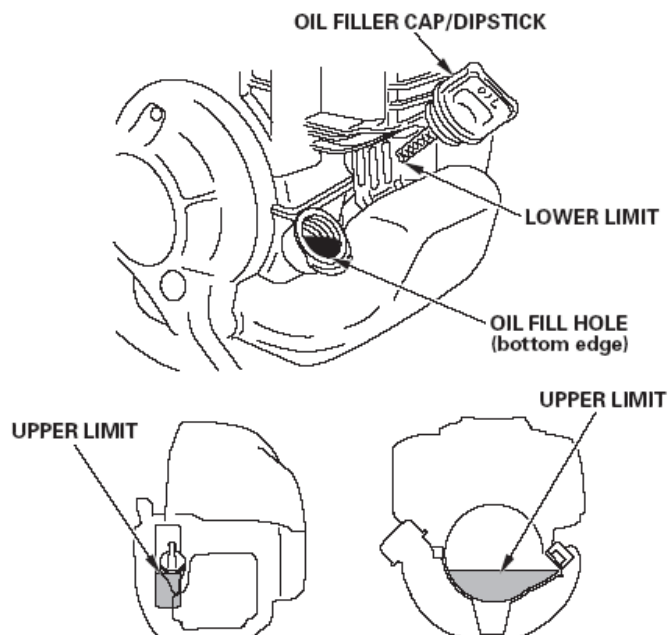


4. Wipe dirt from the air cleaner body and cover, using a moist rag. Be careful to prevent dirt from entering the carburetor.

Oil Level Check

Check the engine oil level before each use, or every 10 hours if operated continuously. Check the engine oil level with the engine stopped and in a level position.

1. Remove the oil filler cap/dipstick and wipe it clean.
2. Insert and remove the oil filler cap/dipstick without screwing it into the oil filler neck, then remove it to check the oil level shown on the dipstick.
3. If the oil level is near or below the lower limit mark on the dipstick, fill to the bottom edge of the oil fill hole with the oil. To avoid overfilling or under filling, be sure the engine is in a level position, as shown, while adding oil.



4. Reinstall the oil filler cap/dipstick and tighten securely.

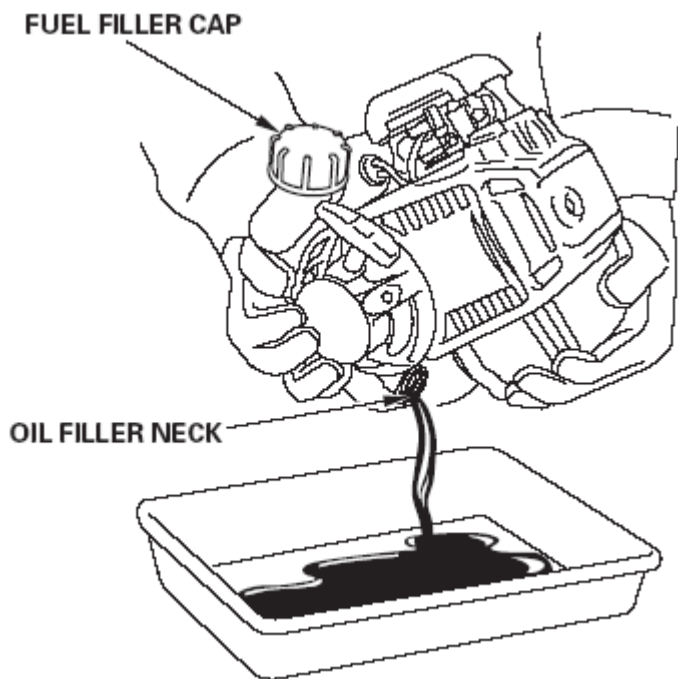
Oil Change

Drain the used oil when the engine is warm. Warm oil drains quickly and completely.

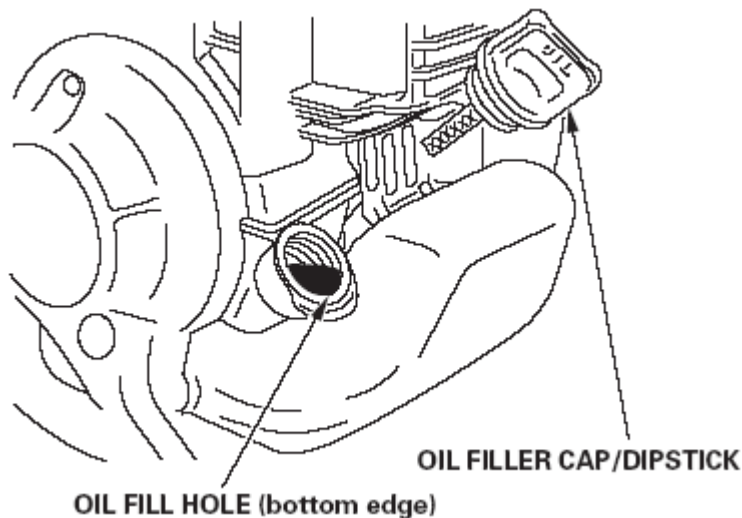
1. Check that the fuel filler cap is tightened securely.
2. Place a suitable container below the engine to catch the used oil.
3. Remove the oil filler cap/dipstick and drain the oil into the container by tipping the engine toward the oil filler neck.

Please 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 it in the trash, pour it on the ground, or down a drain.

4. Drain the used oil when the engine is warm. Warm oil drains quickly and completely.



Some oil will remain in the engine after draining. When refilling with fresh oil, start with less than 2.7 oz (80 cm). Slowly add enough oil to fill to the bottom edge of the oil fill hole as shown below.



CAUTION

Running the engine with a low or excessive oil level can cause engine damage.

Reinstall the oil filler cap/dipstick securely. If any oil is spilled, make sure to wipe it up.

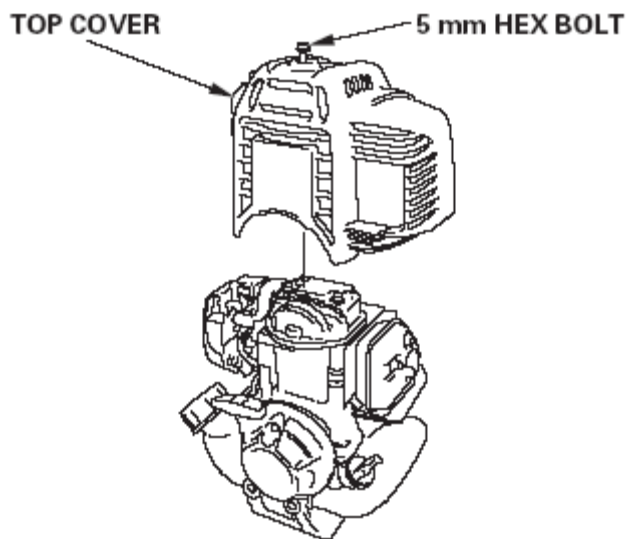
Spark Plug

Recommended Spark Plug: CM5H (NGK), CMR5H (NGK).

The recommended spark plug is the correct heat range for normal engine operating temperatures.

For good performance, the spark plug must be properly gapped and free of deposits.

1. Remove the top cover. Loosen the 5 mm hex bolt with a hexagon wrench, then remove the top cover.

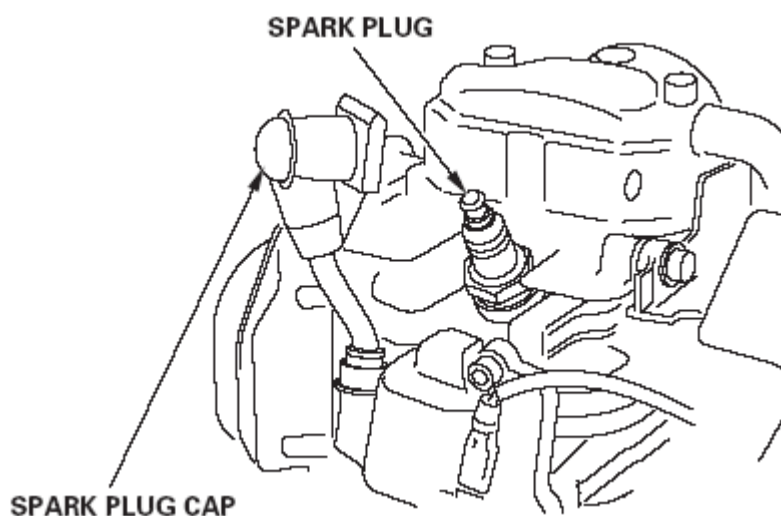


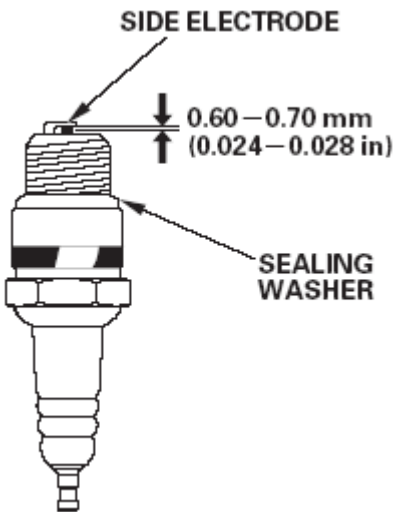
CAUTION

Do not operate the engine when the top cover is removed. Do not pull the recoil starter handle when the top cover is removed. You may be injured from the rotating parts or burned by the muffler.

2. Disconnect the spark plug cap, and remove any dirt from around the spark plug area.
3. Remove the spark plug with a 5/8-inch spark plug wrench.

4. Inspect the spark plug. Replace it if damaged or badly fouled, if the sealing washer is in poor condition, or if the electrode is worn.
5. Measure the spark plug electrode gap with a wire type feeler gauge. Correct the gap, if necessary, by carefully bending the side electrode. The gap should be: 0.60 0.70 mm(0.024 0.028 in)





6. Install the spark plug carefully, by hand, to avoid cross threading.
7. After the spark plug is seated, tighten with a 5/8-inch spark plug wrench to compress the sealing washer.
8. When installing a new spark plug, tighten 1/2 turn after the spark plug seats to compress the washer.
9. When reinstalling the original spark plug, tighten 1/8 1/4 turn after the spark plug seats to compress the washer.

CAUTION

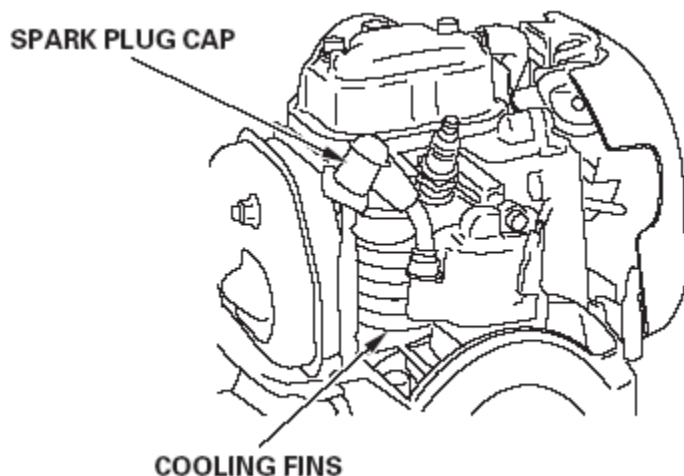
A loose spark plug can overheat and damage the engine. Overtightening the spark plug can damage the threads in the cylinder head.

10. Attach the spark plug cap to the spark plug.
11. Install the top cover, and tighten the 5 mm hex bolt securely with a hexagon wrench.

Engine Fins

Inspection:

1. Loosen the 5 mm hex bolt, then remove the top cover.
2. Disconnect the spark plug cap.
3. Inspect the engine cooling fins, and clean out debris if necessary.
4. Reconnect the spark plug cap.
5. Install the top cover, and tighten the 5 mm hex bolt securely.

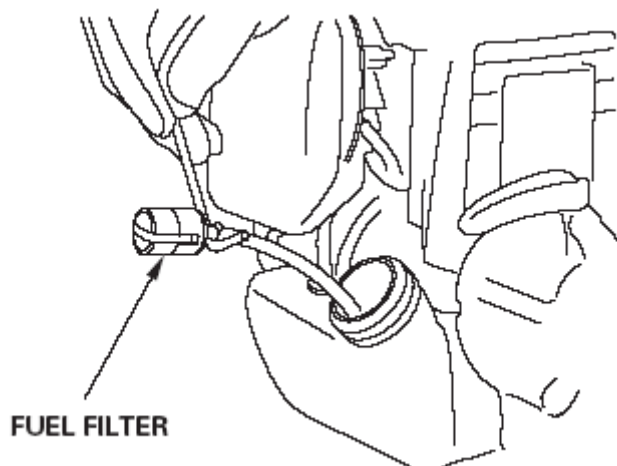
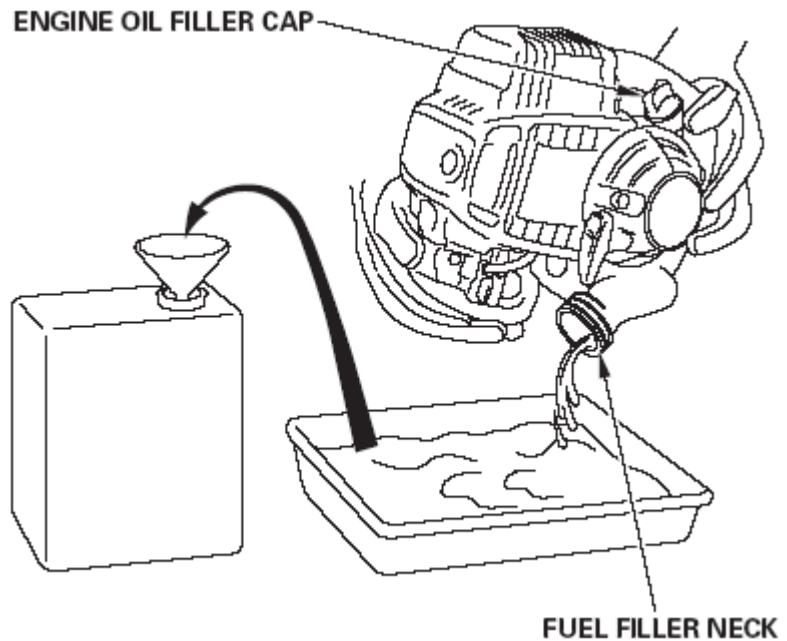


Fuel Filter and Fuel Tank

CAUTION

A loose spark plug can overheat and damage the engine. Overtightening the spark plug can damage the threads in the cylinder head.

1. Check that the engine oil filler cap is tightened securely.
2. Remove the fuel filler cap, and drain the fuel into an approved gasoline container by tipping the engine toward the fuel filler neck.
3. Pull the fuel filter out through the fuel filler neck by hooking the black fuel tube with a piece of wire, such as a partly straightened paper clip.



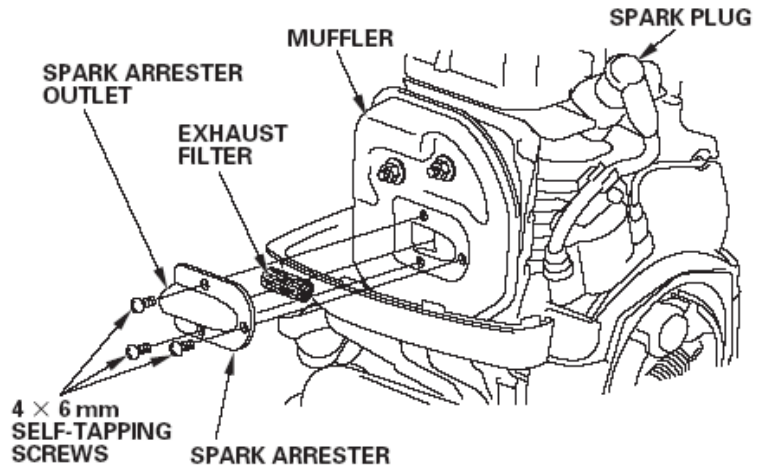
4. Inspect the fuel filter. If the fuel filter is dirty, wash it gently with nonflammable or high flashpoint solvent. If the fuel filter is excessively dirty, replace it.
5. Remove water and dirt from in the fuel tank by rinsing the inside of the fuel tank with nonflammable or high flash point solvent.
6. Insert the fuel filter into the fuel tank and tighten the fuel filler cap securely.

Spark Arrester

The spark arrester may be standard or an optional part, depending on the engine type. In some areas, it is illegal to operate an engine without a spark arrestor. Check local laws and regulations. A spark arrestor is available from authorized Honda servicing dealers. The spark arrestor must be serviced every 100 hours to keep it functioning as designed. If the engine has been running, the muffler will be hot. Allow it to cool before servicing the spark arrestor.

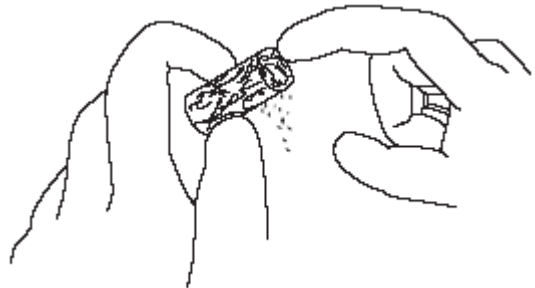
Spark Arrester Removal

1. Loosen the 5 mm hex bolt, then remove the top cover
2. Remove the 4X6 mm self-tapping screws from the spark arrestor, and remove the spark arrestor and exhaust filter from the muffler.



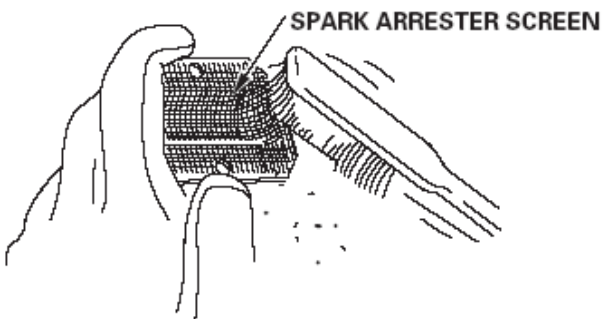
Exhaust Filter Cleaning & Inspection

Pinch the exhaust filter, strike lightly with a finger, and remove carbon deposits. Be careful not to strike strongly. The exhaust filter must be free of breaks and holes. If it is damaged or fouled excessively, have it serviced by your Honda dealer.



Spark Arrester Cleaning & Inspection

1. Use a brush to remove carbon deposits from the spark arrestor screen. Be careful to avoid damaging the screen. The spark arrestor must be free of breaks and holes. Replace the spark arrestor if it is damaged.



2. Install the exhaust filter and spark arrestor in the reverse order of disassembly. When you install the spark arrestor, the spark arrestor's outlet must point to the side opposite the spark plug.
3. Install the top cover, and tighten the 5 mm hex bolt securely.

Tanaka PF-4000 Engine Maintenance

Maintenance, replacement, or repair of the emission control devices and systems may be performed by any non-road engine repair establishment or individual.

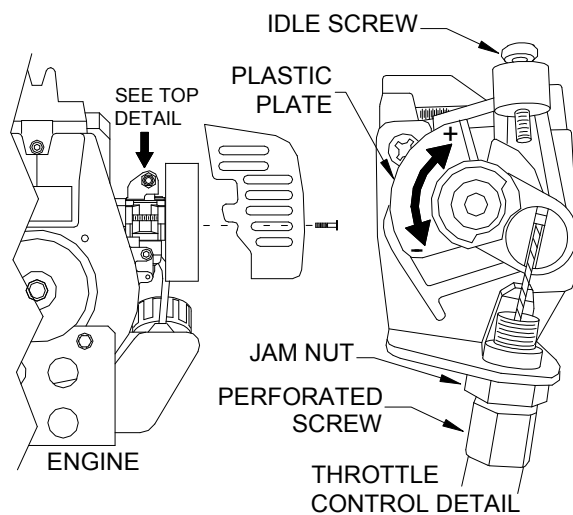
In the carburetor, fuel is mixed with air. When the engine is tested at the factory, the carburetor is pre-set.

Speed Adjustment

When the Twister™ XL is tested at the factory, the engine working and minimum speed is basically adjusted. The working speed for the engine is 7500 rpm (+/- 100 rpm) for single nozzle, and 8500 (+/- 100 rpm) for the optional two nozzle attachment kit. A

further adjustment may be required according to climate or altitude existing at the place to work with the machine.

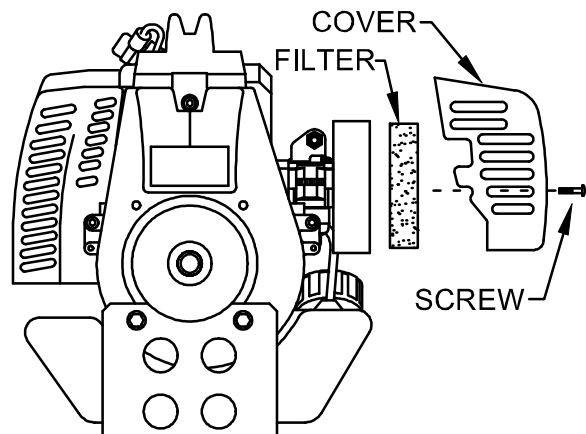
To adjust the engine speed, remove the plastic air cleaner cover from the engine, loosen the jam nut from the perforated adjuster screw; to increase the speed, unscrew the adjuster screw, to decrease the speed screw in the adjuster screw, check the speed with a tach meter after 5 or 7 minutes of operation, readjust if required. Reinstall the plastic air cleaner cover.



Air Filter

The air filter must be cleaned periodically from dust and dirt in order to avoid: Carburetor malfunctions, Starting problems, Engine power reductions, Unnecessary wear on the engine parts and/or abnormal fuel consumption.

Clean the air filter daily or more often if working in exceptionally dusty areas. To clean the air filter, remove the air filter cover and the filter (1) as shown in the right diagram. Rinse the filter in warm soap suds. Check that the filter is dry before reassembly. An air filter that has been used for some time cannot be cleaned completely. Therefore, it must regularly be replaced with a new one. A damaged filter must be replaced.

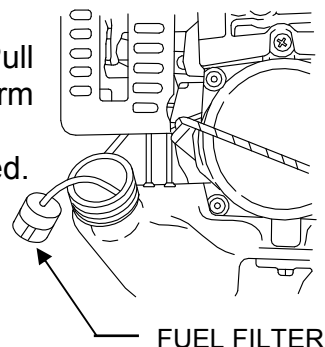


Fuel Filter

Drain all fuel from the fuel tank and pull fuel filter line from tank. Pull filter element out of holder assembly and rinse element in warm water with detergent.

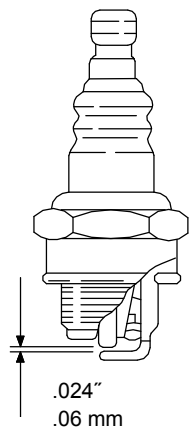
Rinse thoroughly until all traces of detergent are eliminated. Squeeze, do not wring away excess water and allow element to dry.

NOTE: If element is hard due to excessive dirt build up, replace it.



Spark Plug

The spark plug condition is influenced by: an incorrect carburetor setting, wrong fuel mixture (too much oil in the gasoline), a dirty air filter and/or hard running conditions such as cold weather.

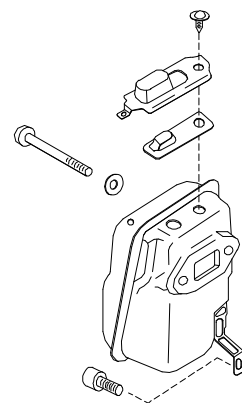


These factors cause deposits the spark plug electrodes, which may result in malfunction and starting difficulties. If the engine is low on power, difficult to start or runs poorly at idle speed, always check the spark plug first. If the spark plug is dirty, clean it and check the electrode gap. Readjust if required. The correct gap is .024" (.6 mm). The spark plug should be replaced after about 100 hours of operation, or early if the electrodes are badly eroded.

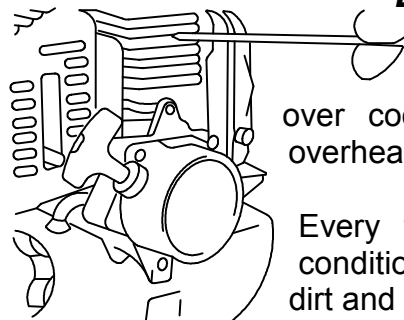
NOTE: In some areas, local laws require using a resistor spark plug to suppress ignition signals. If this machine was originally equipped with resistor spark plug, use the same type of spark plug for replacement.

Muffler

Remove the muffler and clean out any excess carbon from the exhaust port or muffler inlet every 100 hours of operation. If you find corrosion on the muffler, replace it.



Engine Fins



The engine is air cooled, and air must circulate freely around the engine and over cooling fins on cylinder head to prevent overheating.

Every 100 hours of operation, or once a year (more often if conditions require), clean fins and external surfaces of engine dust, dirt and oil deposits which can contribute to improper cooling.

NOTE: Do not operate engine with engine shroud or muffler guard removed as this will cause overheating and engine damage.

Blower Assembly

The **TWISTER™** XL is equipped with a high performance rotary blower, including special features as following:

Three -stage, 5.7" (145 mm) diameter.

Air delivery: 99 CFM Unrestricted.

Steel shaft mounted on double ball bearing.

Thermoset fan end bracket.

Aluminum (anodized) bearing housing.

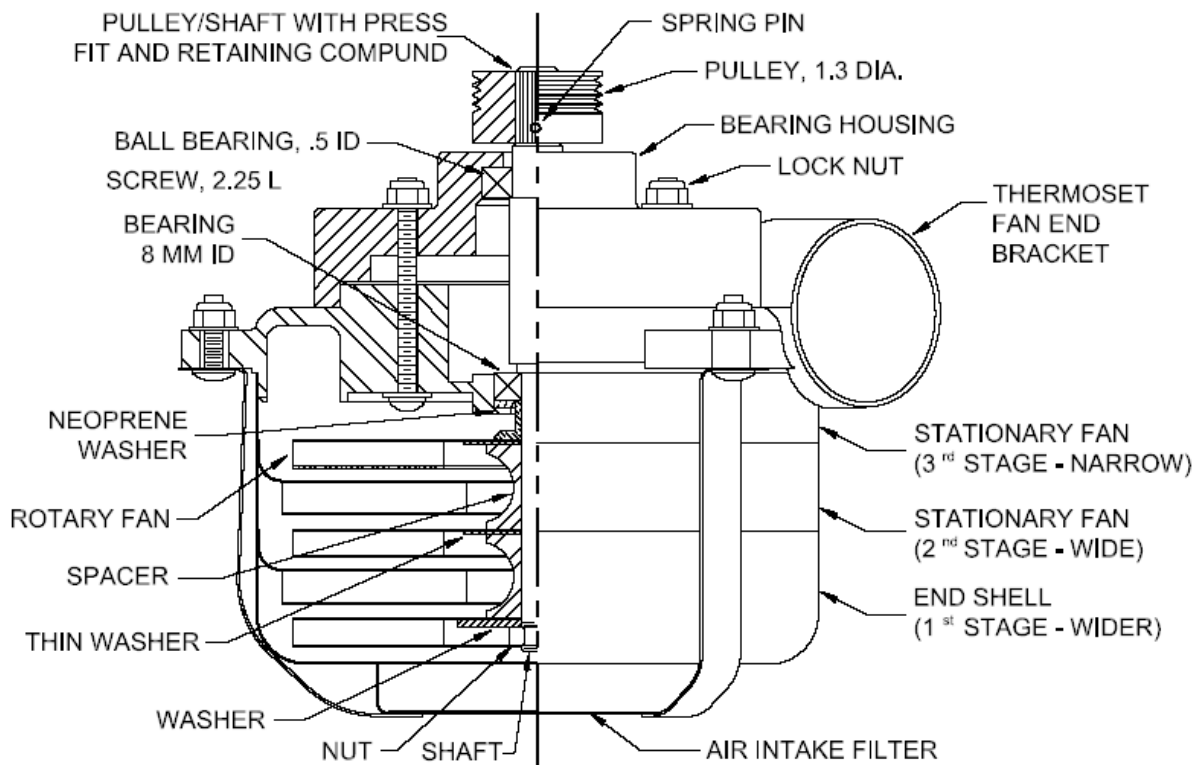
Aluminum commutator bracket.

Belt driven, aluminum Poly-V shave.

Stainless steel air filter/guard assembly.

Working pressure: 2 to 3 psi, depending of number of nozzles and engine speed.

Tangential bypass discharge to separate working air from bearing housing.



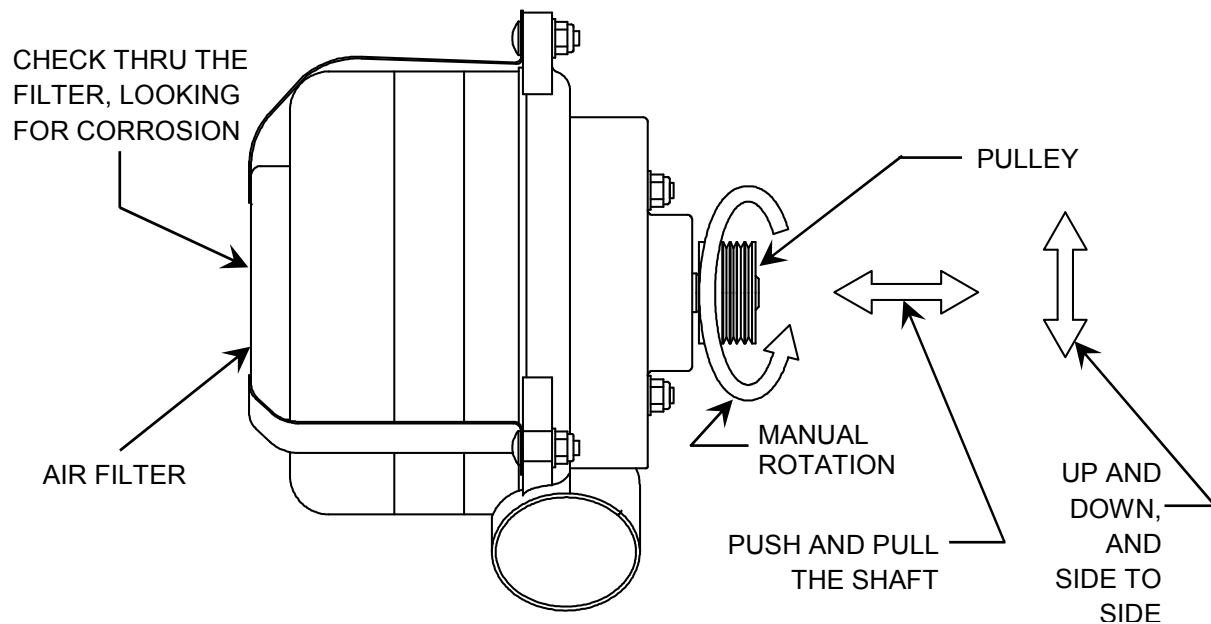
BLOWER ASSEMBLY SHOWING CROSS SECTION

Inspection of the Blower

The Blower should be checked periodically, testing the bearings for abnormal conditions or excessive wear, checking the rotating fans and other components for corrosion, etc. To know if detailed inspection of the blower is required, a preliminary inspection is required.

To perform a preliminary inspection, the machine has to be stopped and cold. Remove the three screws of the Belt Guard Assembly and take the guard off; loosen the four bolts that hold the Blower to the Upright Channel (vertical plate), move the blower down on the sides and remove the belt. You will be able to rotate the blower with your hand at

the pulley side. Also try to move the shaft axially and transversely, looking for bearing play. If the rotation of the shaft is not smooth or if a considerable play is not found, a detailed inspection should be performed. Additionally, at this point, it is convenient to check the fan for high corrosion by using a flashlight and looking thru the air filter, the critical point is around the nut/washer, on the aluminum of the fan. If high corrosion is present, a detailed inspection should be performed also.



PRELIMINARY INSPECTION OF THE BLOWER

After inspection, if the Blower Assembly looks in good condition reassemble the belt, tighten the blower bolts and apply tension to the belt as indicated at the "Belt Transmission" section, reinstall the Guard Assembly and the Heat Shield Assembly.

The Blower Assembly is a very critical component which works at high speed (about 20,000 RPM), then we recommend that the detailed inspection (if needed) will be performed by your nearest Dyna-Fog® distributor.

CAUTION

Do not run the machine if the belt guard is removed in order to prevent possible danger to person(s).

Air Filter Assembly:

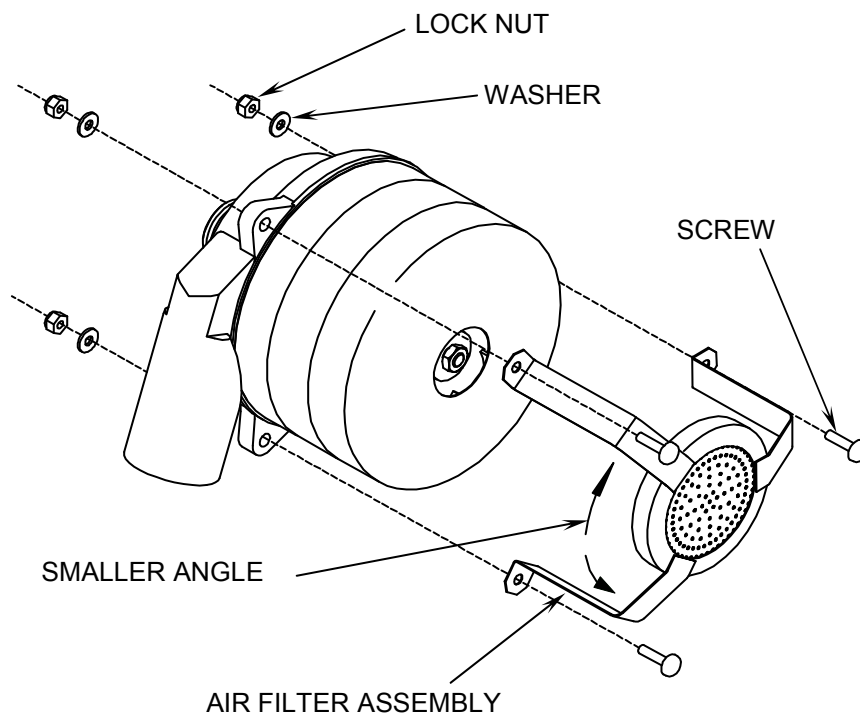
The Intake Filter Assembly is mounted on the blower, and it is performing three main functions:

- Dirt and other foreign particles are filtered from the incoming air by the reusable stainless steel element.
- It works as a safety guard, avoiding the contact of body parts (as fingers) from rotary parts (fan/shaft end).
- It allows positive hold down between the external shells and the thermoset fan end bracket.

Before every operation of the machine, verify that the air filter assembly is in the right place and the screw/nuts that hold it to the thermoset fan and bracket are tight.

CAUTION

Do not run the machine without the Inlet Filter assembly; as this would cause serious damage to the blower unit or personal injury.



Removal and Cleaning

If cleaning procedure is required for the inlet filter, loosen and remove the three nylock nuts/washers/bolts that hold the filter assembly to the thermoset fan end bracket.

Clean the stainless screen in an approved solvent, dry with compressed air, or shake to remove excess solvent and allow drying naturally. Inspect the screen for

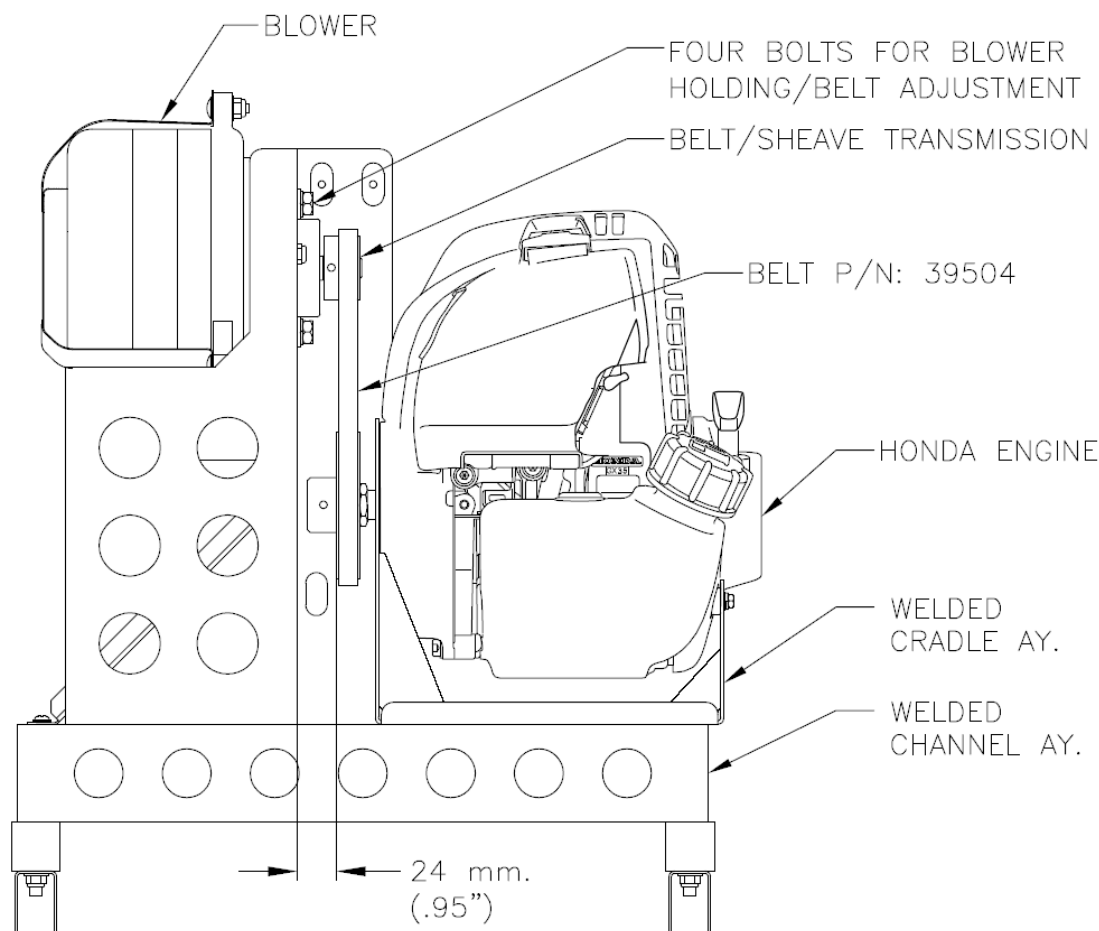
defects that may permit dirt or other foreign particles to enter into the blower, inspect the outer shell and hold down strips for cracks or breaks, and replace if required.

To reassemble the filter, take into account that the hold down strips does not have symmetrical angular distribution. Please see above diagram for reference.

Poly-V Belt and Sheave Drive For Honda GX-35

In order to obtain the appropriated blower speed and use low weight components, the Poly-V drive provide the best of all the power transmission , including the superior driving force of multiple V-belts without the matching problems associated with individual belts.

To obtain the longer life of the belt transmission components, please follow the instructions indicated in this section.



DISTANCE FOR BELT ALIGNMENT

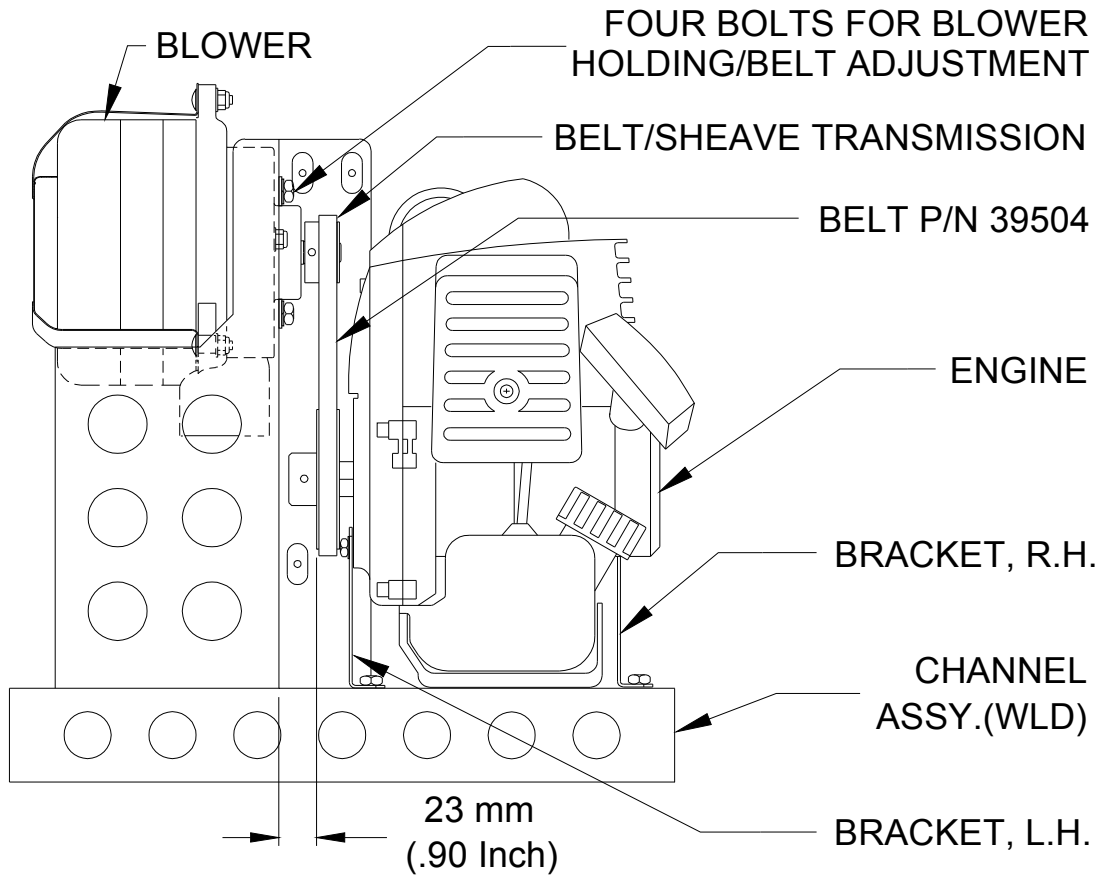
BELT ALIGNMENT

If the engine was removed from the machine for maintenance purposes, use a metal strip (or similar) of .95" (24 mm) wide as spacer to reinstall the engine in the appropriated place. Be sure the surface of the big pulley of the engine makes flat contact with the spacer, and the other edge of the spacer makes full contact with the vertical wall of the channel assembly. The .95" distance should remain after tighten down the bolts to the engine brackets. In that position the belt/sheaves will be aligned.

Poly-V Belt and Sheave Drive For Tanaka PF-4000

In order to obtain the appropriated blower speed and use low weight components, the Poly-V drive provide the best of all the power transmission , including the superior driving force of multiple V-belts without the matching problems associated with individual belts.

To obtain the longer life of the belt transmission components, please follow the instructions indicated in this section.



DISTANCE FOR BELT ALIGNMENT

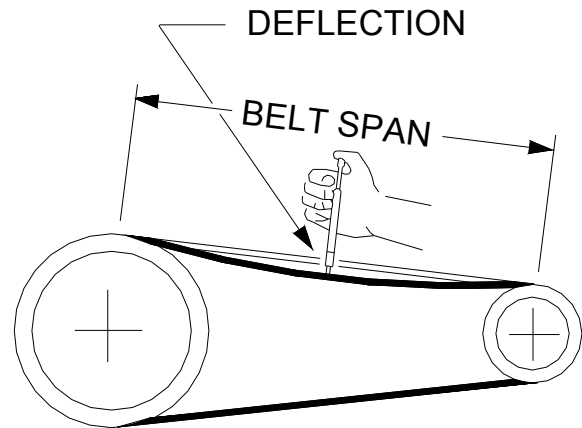
BELT ALIGNMENT

If the engine was removed from the machine for maintenance purposes, use a metal strip (or similar) of .90" (24 mm) wide as spacer to reinstall the engine in the appropriated place. Be sure the surface of the big pulley of the engine makes flat contact with the spacer, and the other edge of the spacer makes full contact with the vertical wall of the channel assembly. The .90" distance should remain after tighten down the bolts to the engine brackets. In that position the belt/sheaves will be aligned.

BELT TENSION

Belt tension is highly important. When in operation both tight and slack strands of the belt should be in a straight line from sheave to sheave; a very small sag or bow could be acceptable at the slack strand. Check belt tension after eight (8) hours operation, followed by periodic inspections to be sure belt is under sufficient tension and that belt is not slipping or jumping from the groove.

Proper Tension is found when a force of one pound is applied to the center of the belt span, and a deflection between .18 (minimum) and .25 (maximum) inches is present. The maximum value is indicated for "New Belt" and new belt should be tensioned at this value to allow for expected tension loss. Used belts should be maintained at the minimum value of deflection. For reference please see right diagram.



An excessive belt tension could produce non desirable effects, as shorter life of bearings (engine and blower), power reduction, higher temperature, etc.

Do not install a new belt on worn sheaves. Such sheaves should be replaced to insure a proper fit of the belt in the grooves and prevent slippage and premature belt wear.

If sheave(s) change is required, they are sold already assembled with the shaft (for the blower) or on the shaft adapter (for the engine). Under normal conditions, the sheaves will last hundreds of hours before a change could be required.

Do not force belt over sheave grooves. Slack off drive for easy mounting of belt. Adjust drive and check that belt operates free and clear of all obstructions.

Keep belt clean. Do not use belt dressing. If belt slips, clean and readjust belt tension.

Keep extra belts stored in a cool, dark and dry place.

CAUTION

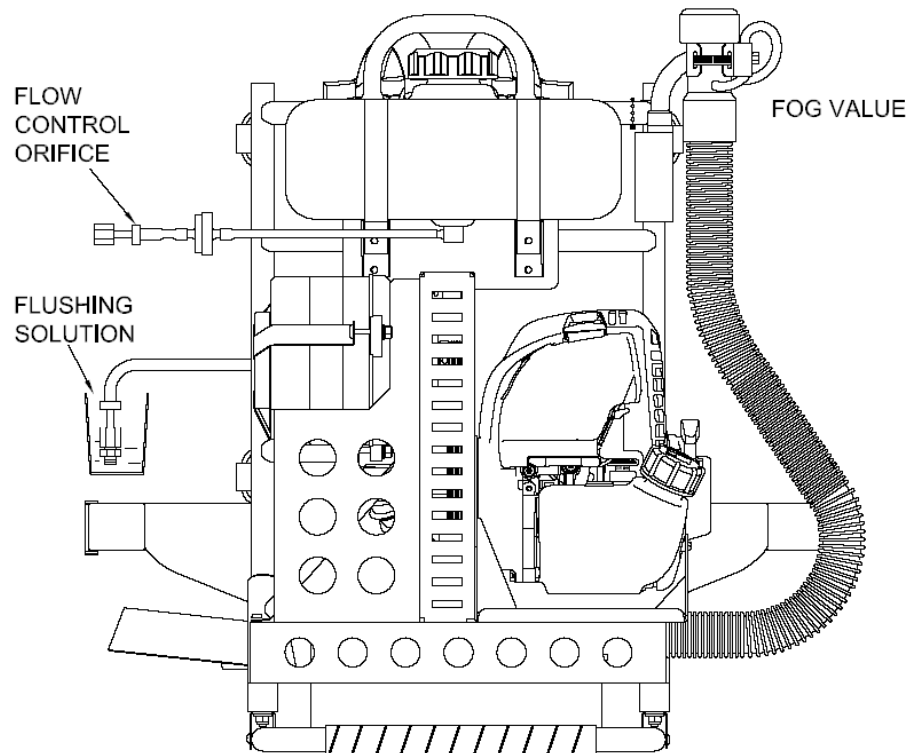
Because of the possible danger to person(s) with accidents which may result in the use of this belt transmission, is important to install the belt guard before to run the engine. Do not use the machine if the belt guard is not installed.

Flushing the System

In order to avoid accumulations of sediment, or premature degradation of hoses, valve and nozzle, it is recommended to flush the fluid system with flushing solution immediately after every use of the machine.

To flush the system, locate the machine in an open and well ventilated place, and perform the following procedure:

1. With the machine OFF (engine stopped), hold the nozzle at the highest possible position and turn "ON" the shut off valve (open). By doing this, most of the formulation will return into the tank by siphon. After about one (1) minute, close the shut off valve (OFF position).



2. Start the engine and allow the machine to run at the working speed.
3. Disconnect the formulation line right after the flow control orifice, as indicated on the diagram, and introduce the end of the hose in about 300 milliliters of flushing solution.
4. Open the "Fog" valve (shut off valve) to position "ON". The flushing solution will pass through the hose, valve and nozzle, flushing the system.
5. When the flushing solution is finished, close the shut off valve ("OFF"), reduce the engine RPM to idle speed, stop the engine with the engine kill switch, and re-connect the formulation line to the flow control orifice.

Preventive Maintenance Schedule for Honda GX-35

<u>Operation</u>	<u>Frequency</u>				
	After Each Use	8 Hours or Daily	25 Hours or New Season	50 Hours or New Season	100 Hours or New Year
Engine					
Clean Air Filter					
Clean Spark Plug Arrestor					
Clean Gasoline Filter					
Change Engine Oil					
Check RPM					
Check or Replace Spark Plug					
Rotary Blower					
Check Air Filter					
Preliminary Inspection					
Belt Transmission					
Check Belt and Pulleys					
Adjust Belt Tension		New Belt			
Check Pulleys					
Others					
Flush Liquid System					
Check Harness					
Check Frame, Guards					
Check Flow Control Orifice					

The intervals shown represent an approximate time period to perform the preventive maintenance. Depending on the actual operating environmental conditions, it may be necessary to perform each operation more or less frequently than what is shown in the above maintenance schedule.

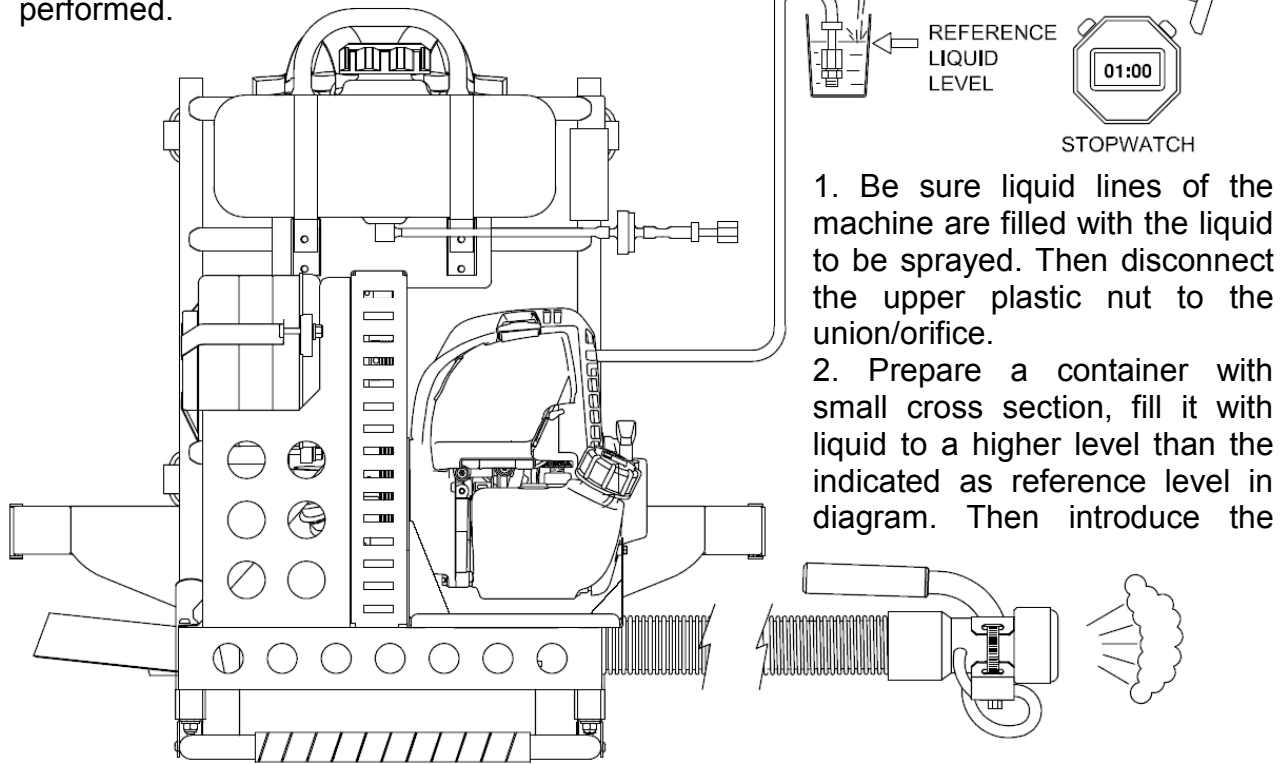
Preventive Maintenance Schedule for Tanaka PF-4000

<u>Operation</u>	<u>Frequency</u>				
	After Each Use	8 Hours or Daily	25 Hours or New Season	50 Hours or New Season	100 Hours or New Year
Engine					
Clean Air Filter					
Check Muffler					
Clean Gasoline Filter					
Clean Cooling Fins					
Check RPM					
Clean or Replace Spark Plug					
Rotary Blower					
Check Air Filter					
Preliminary Inspection					
Belt Transmission					
Check Belt and Pulleys					
Adjust Belt Tension		New Belt			
Check Pulleys					
Others					
Flush Liquid System					
Check Harness					
Check Frame, Guards					
Check Flow Control Orifice					

The intervals shown represent an approximate time period to perform the preventive maintenance. Depending on the actual operating environmental conditions, it may be necessary to perform each operation more or less frequently than what is shown in the above maintenance schedule.

FLOW RATE VERIFICATION

The flow Rate chart supplied with the machine (label and manual) has good accuracy. For verification purposes, this procedure could be performed.



1. Be sure liquid lines of the machine are filled with the liquid to be sprayed. Then disconnect the upper plastic nut to the union/orifice.

2. Prepare a container with small cross section, fill it with liquid to a higher level than the indicated as reference level in diagram. Then introduce the

orifice in the liquid.

3. Prepare a calibrated container (for example 250 ml) with a defined amount of liquid (for example 200 ml).

4. Start the machine, the engine running at working speed, the nozzle at waist level. Then open the shut-off valve. As soon as the liquid in the small container reach the "reference level" start the stopwatch, and begin to pour liquid from the calibrated container to the small container, keeping constant "reference level".

5. After one minute, stop pouring liquid, and close the valve. Check the remaining amount of liquid in the calibrated container (for example 50 ml), the difference between the initial and the final volume is the flow rate in ml/min (160 ml/min for our example).

6. Stop the engine and reinstall orifice in place.

Notes: Smaller flow rates requires longer sample time, for example three minutes for orifice #19, and the difference between the initial volume and the final volume should be divided by three (or sampling time) to obtain the flow rate.

TROUBLE SHOOTING GUIDE

<u>SYMPTOM</u>	<u>POSSIBLE CAUSE</u>	<u>CORRECTIVE ACTION</u>
1) Recoil Starter Fails to Crank the Engine	a) Defective recoil starter b) Belt transmission with obstructions. c) Engine locked up. d) Blower locked up.	a) Check recoil starter. Service it if required. b) Check belt and pulleys for obstructions. c) Check the engine for rotation. Consult the nearest service center. d) Inspect blower for rotation. Consult the nearest service center.
2) Engine Hard to Start or Stops.	a) Start – Stop switch on speed control in stop position. b) Faulty Start – Stop Switch on speed control. c) No fuel or contaminated fuel. d) Clogged fuel filter. e) Spark plug faulty. f) Terminal loose or wiring defective. g) Spark plug wire disconnected. h) Loosen gasoline hose or perforated gasoline hose.	a) Place switch in “ON” or “RUN” position. b) Replace faulty switch. c) Add fuel or clean tank and refuel. d) Clean filter (if possible) or replace it. e) Clean or replace spark plug. f) Tighten loose terminals, replace defective wiring. g) Connect spark plug wire. h) Tighten loose clamps or change the gasoline hose.
3) Engine Misses or Runs Erratically	a) Start – Stop switch on speed control in stop position. b) Faulty Start – Stop Switch on speed control. c) No fuel or contaminated fuel. d) Clogged fuel filter. e) Carburetor mounted gasket leaks. h) Vacuum created inside fuel tank.	a) Place switch in “ON” or “RUN” position. b) Replace faulty switch. c) Add fuel or clean tank and refuel. d) Clean filter (if possible) or replace it. e) Tighten bolts, replace gasket if required. h) Loosen the fuel tank cap, if improves, check or replace tank vent.
4) Engine Knocks or Develops Noise	a) Spark arrestor clogged. b) Flywheel loose. c) Shaft adaptor/pulley loose. d) Broken rotary fan at blower.	a) Clean or replace. b) Consult nearest service center. c) Consult nearest service center. d) Check blower and consult nearest service center.
5) Engine does not Idle Smoothly	a) Carburetor dirty or out of internal adjustment.	a) Clean and check carburetor.
6) Engine Overheats	a) Fuel without 2 cycles oil (Tanaka) b) Exhaust restricted. c) Spark arrestor clogged. d) Dirty cooling fins.	a) Always use gasoline with 2-cycles (Tanaka) oil, proportion of 50:1. b) Clean or replace muffler. c) Clean or replace. d) Clean fins.

7) Engine Does Not Deliver Full Power

- a) Carburetor choke valve partially open.
- b) Air cleaner dirty.
- c) Carburetor defective.
- d) Exhaust restricted.
- e) Spark arrestor clogged.
- f) Rotary blower over loaded.

- a) Adjust choke.
- b) Service air cleaner.
- c) Clean, adjust, or replace.
- d) Clean or replace muffler.
- e) Clean or replace.
- f) check obstructions after blower outlet, like bent air hose or obstructed nozzle air outlet.

8) Blower Will Not Operate While Engine is Running

- a) Defective belt.
- b) Broken rotary fan
- c) Nut loose at the blower shaft.

- a) Check alignment and tension. Replace if required.
- b) Consult nearest service center.
- c) Consult nearest service center.

9) Blower Extremely Noisy

- a) Loosen intake air filter.
- b) Nut loose at the blower shaft.
- c) Bearings wearing out.

- a) Tighten loose screws/nuts.
- b) Consult nearest service center.
- c) Consult nearest service center.

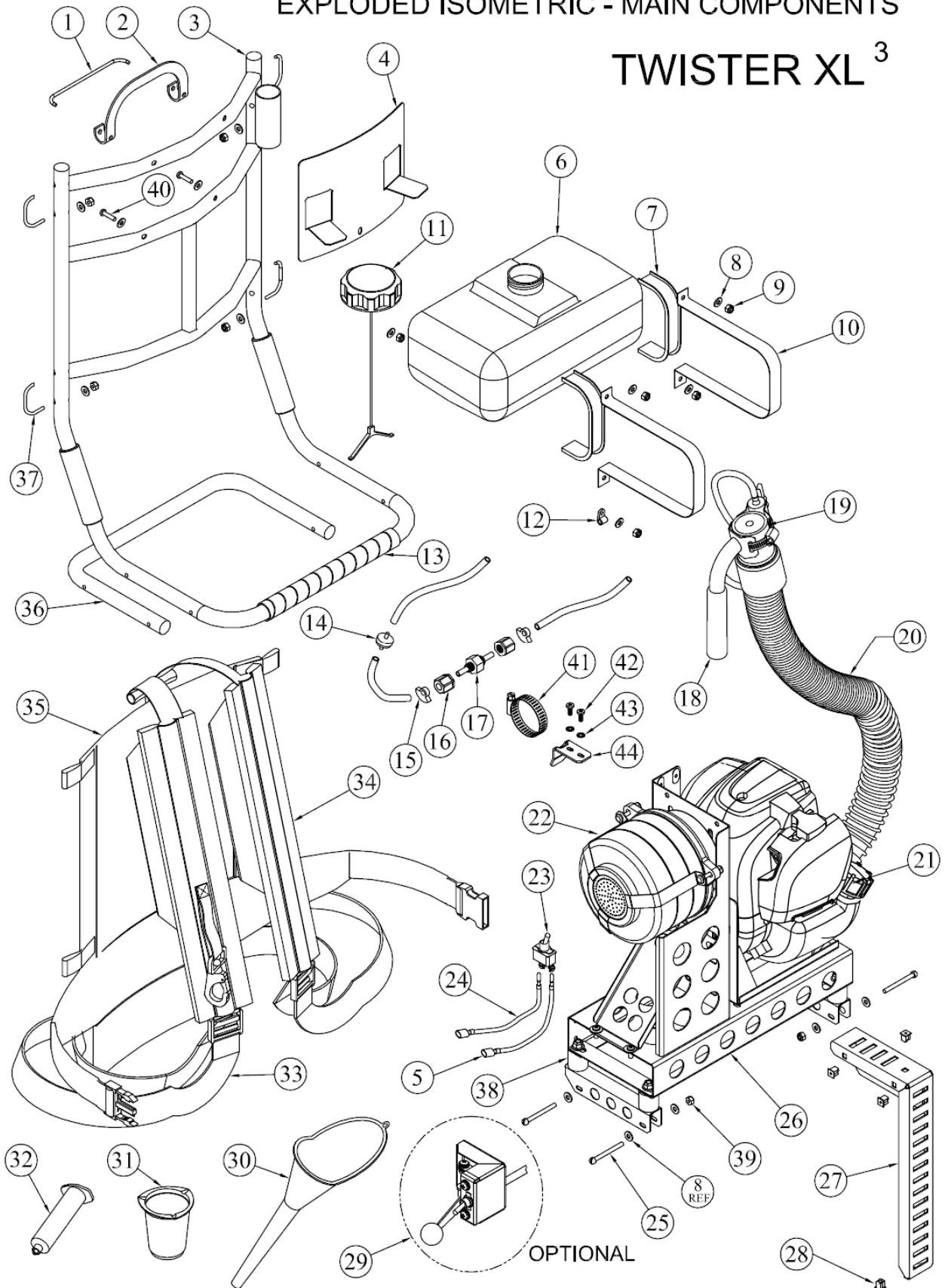
10) Blower Runs But No Flow of Liquid

- a) Air leak in the suction line (hose).
- b) Shut off valve does not open.
- c) Formulation Filter Clogged.
- d) Flow control orifice clogged.
- e) Formulation filter above formulation level.

- a) Check hoses, tighten connectors. Replace hose if required.
- b) Check stem of valve for rotation
- c) Clean or replace filter.
- d) Check orifice and clean if required using liquid or air jet.
- e) Relocate filter to a better position.

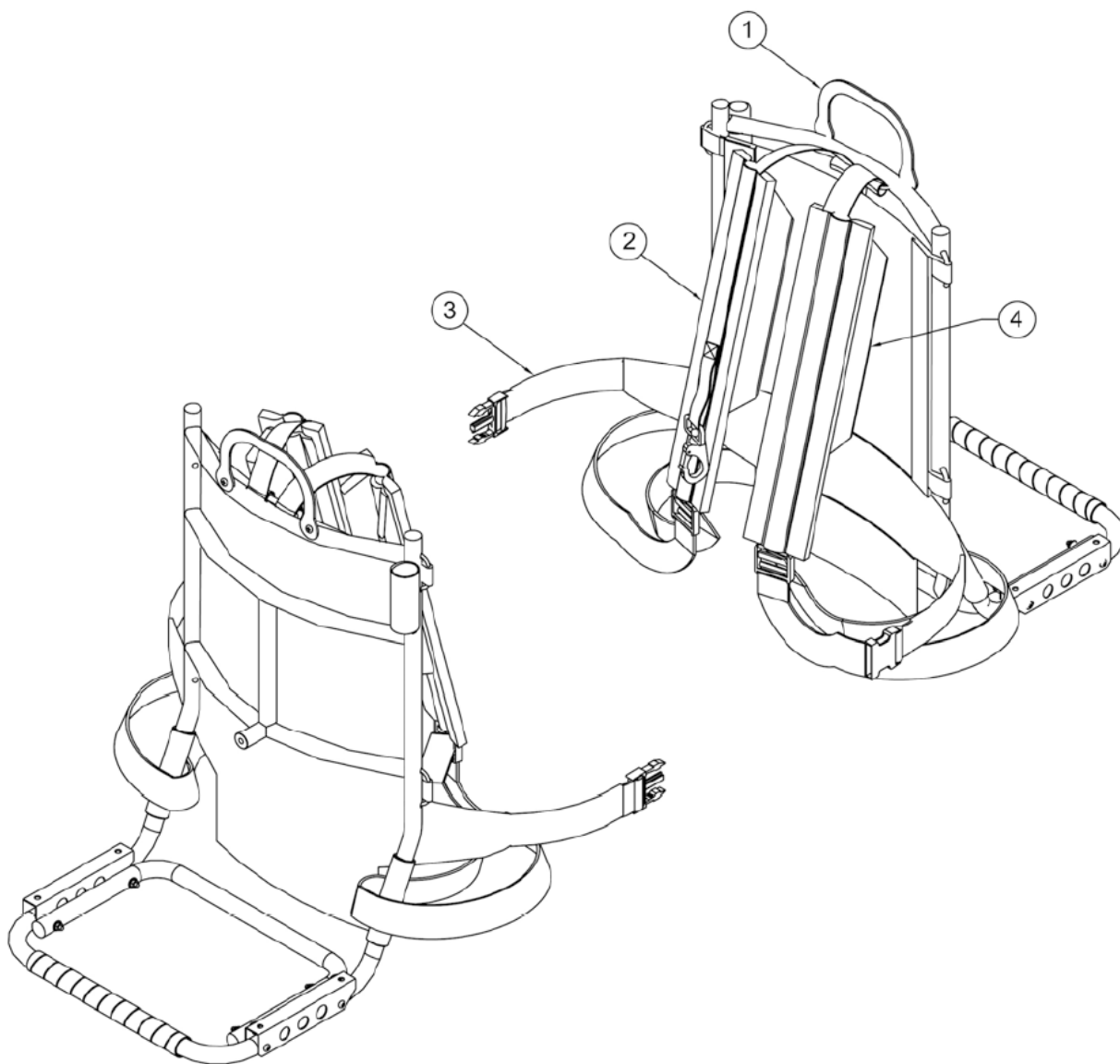
EXPLODED ISOMETRIC - MAIN COMPONENTS

TWISTER XL³



TWISTER XL 3 EXPLODED VIEW DIAGRAM

ITEM	P/N	QTY.	DESCRIPTION
1	39602	1	BAR, STRAP
2	39728	1	HANDLE, TWISTER XL 3
3	39751	1	FRAME AY, TWISTER 3
4	39756	1	PLATE, SUPPORT, TWISTER
5	39657-4	1	WIRE, KILL SWITCH (HONDA)
6	39791-3 39755-3	1	TANK, FORMULATION, LOW PROFILE
7	39809-4	2	INSULATOR, TANK STRAP
8	120391	15	WASHER, FLAT, #10, REG.
9	9419454	2	NUT, NYLOCK, 1/4-20
10	39758	2	STRAP, MOUNTING, TANK
11	39791-1 39755-1	1	CAP, TANK (VENTED)
12	86690	1	CLAMP TUBE
13	39705-1	1	WRAP, 1.0 O.D., 11.00" LONG
14	58316	1	FILTER, 3/16x75 MICRO
15	21158	2	CLAMP, 11/32, PLASTIC
16	62582-1	2	NUT, .250, PLST GRIP
17	64934-19	1	ORIFICE AY.
18	62200	1	HANDLE AY.
19	62313	1	NOZZLE AY.
20	39672	1	HOSE AY.
21	39616 39656-1	1	ENGINE AY. (HONDA) ENGINE AY. (TANAKA)
22	39651	1	BLOWER AY.
23	62369	1	SWITCH, ON/OFF
24	39657	2	WIRE AY, KILL SWITCH
25	132080	4	SCREW, 10-24x2, FLSL
26	39674	1	CHANNEL AY., TWISTER XL
27	39723	1	GUARD AY., BELT
28	85363	4	EXPANSION NUT
29	39699	1	CONTROL AY., THROTTLE, TWISTER XL
30	39725	1	FUNNEL, PLASTIC
31	39596	1	BEAKER, PLASTIC, 100ML
32	62332	1	VISCOSOMETER
33	39765-1	1	STRAP AY., HARNESS, W/HOOK
34	39765	1	STRAP AY., HARNESS
35	39759	1	HARNESS/PAD AY.
36	39692	1	TUBE, STABILIZER
37	39754	4	ROD, RETAINING, HARNESS
38	63148	4	MOUNT, SHOCK (1/4-20)
39	190254	14	NUT, 10-24 LOCK, HEX
40	159967	2	SCREW, 10-24X1-1/2
41	20054-3	1	CLAMP, WORM, 2.50 DIA.
42	159920	2	SCREW, 10-24 X 1/2 PH.
43	138479	2	WASHER, LOCK, #10, EXTO
44	39771	1	BRACKET, HOSE/BLOWER MOUNTING



STRAPS FOR TWISTER XL 3 MODEL #3950

ITEM	QTY	P/N	DESCRIPTION
1	1	39728	HANDLE, TWISTER XL
2	1	39765-1	SHOULDER STRAP W/HOOK
3	1	39759	HARNESS/PAD AY.
4	1	39765	SHOULDER STRAP W/O HOOK

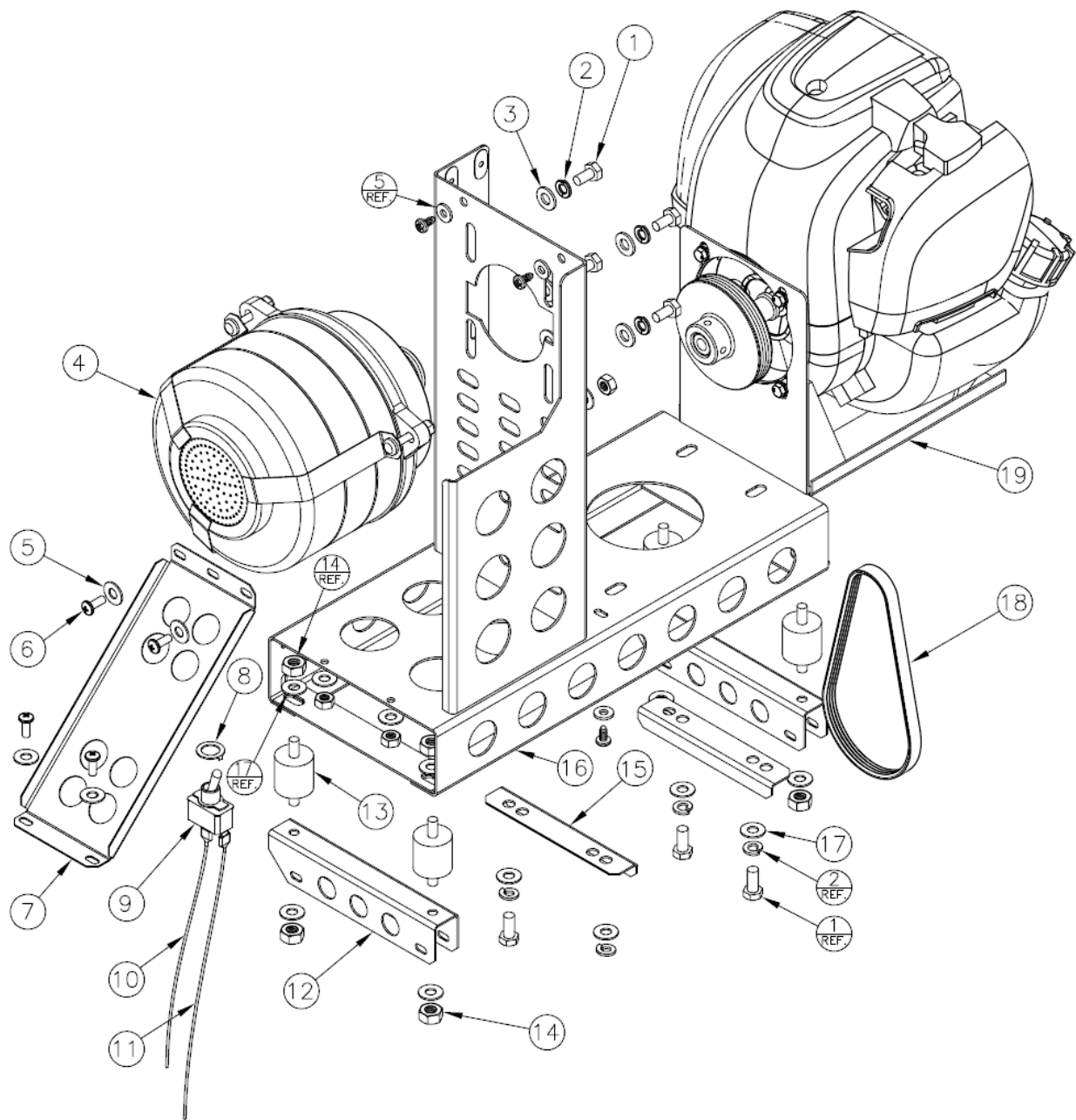
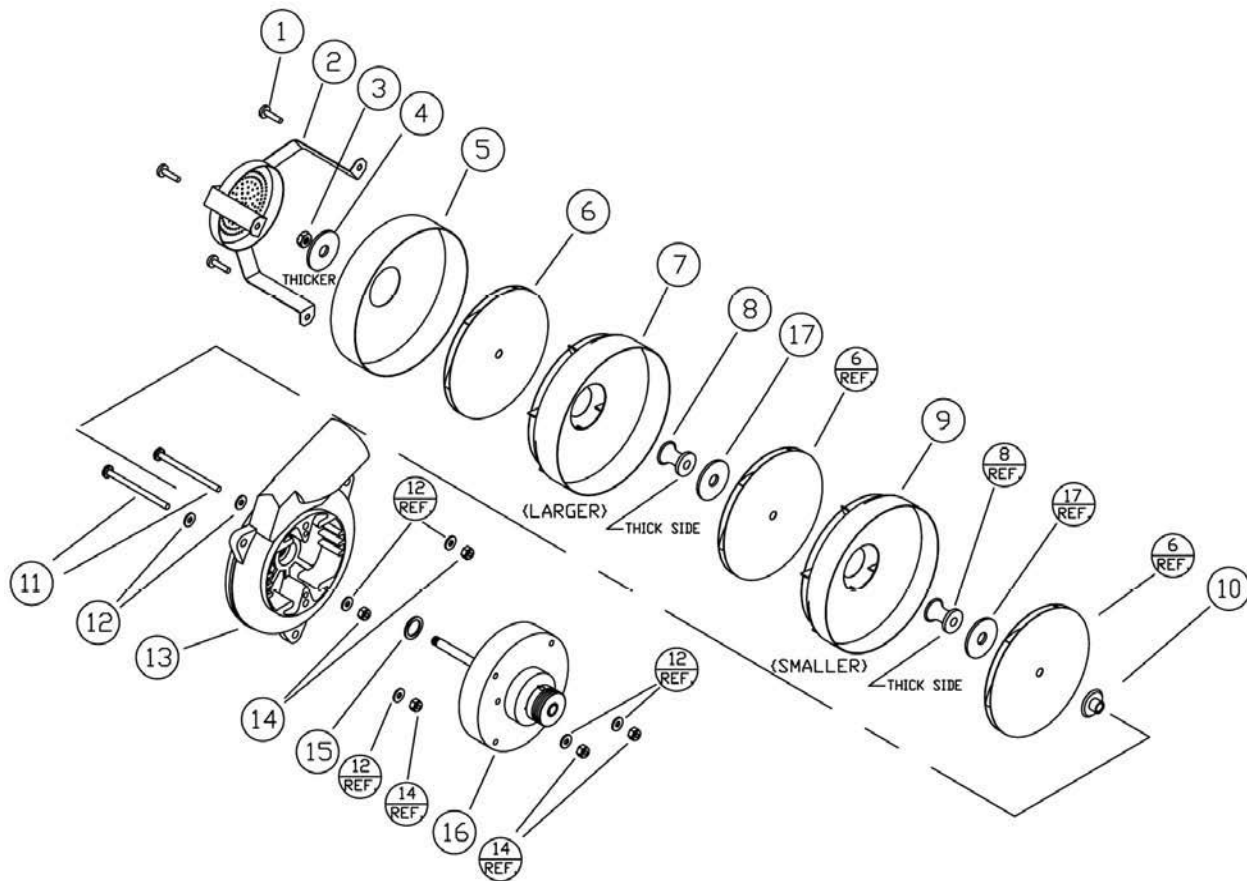


PLATE AY., ENGINE/BLOWER (P/N: 39668)

PLATE AY., ENGINE/BLOWER (P/N: 39668)

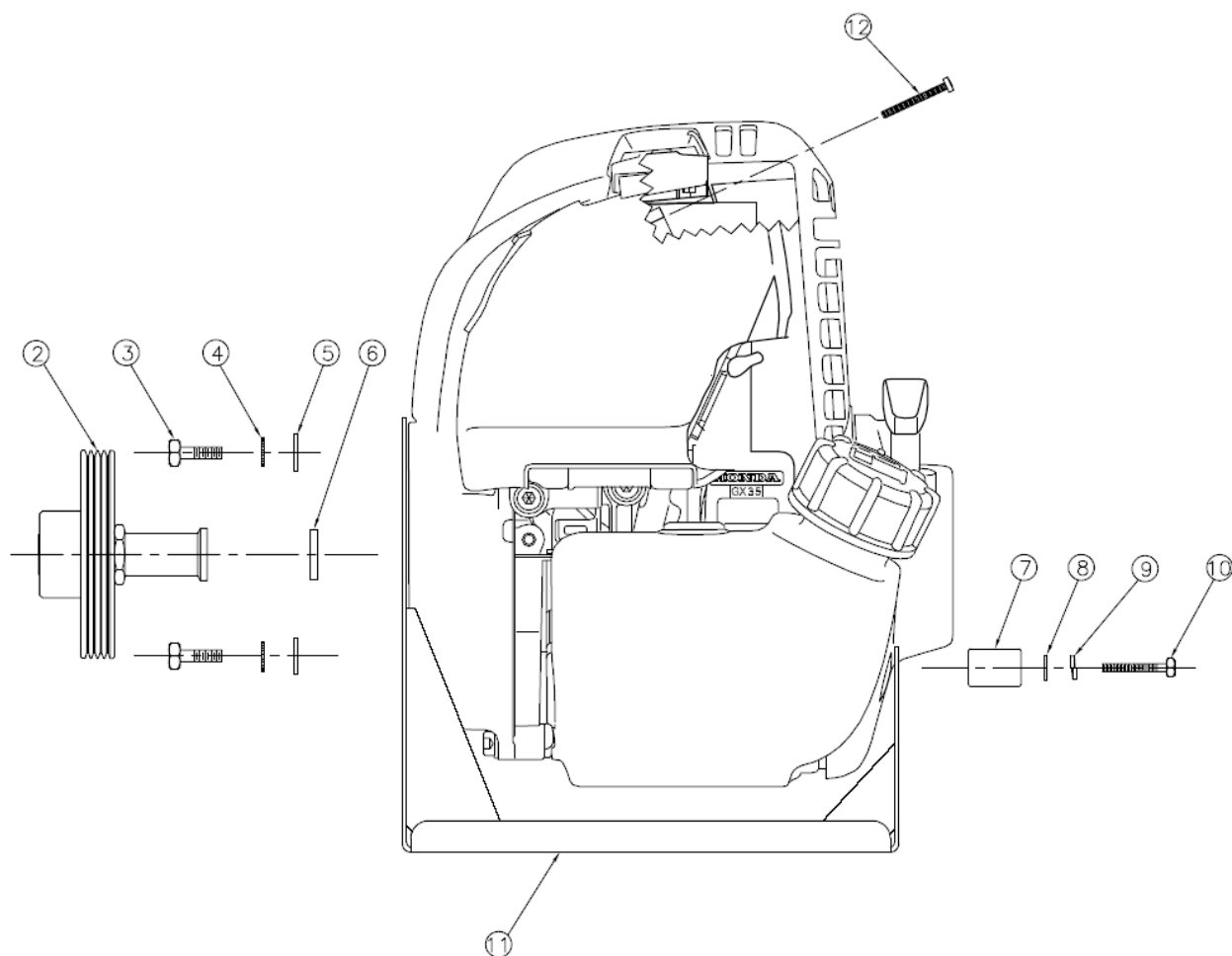
ITEM	QTY	P/N	DESCRIPTION
1	8	121887	BOLT HEX 1/4-20 X 3/4
2	8	120380	WASHER, LOCK 1/4 SPLIT
3	18	120392	WASHER, FLAT, 1/4 REG.
4	1	39651	BLOWER AY., TWISTER
5	8	120391	WASHER, FLAT, #10, REG.
6	4	157684	SCREW, 10-24 X 1/2, TRCR
7	1	63921	BRACKET, SUPPORT
8	1	30024	RING, LOCKING
9	1	62369	SWITCH, ON/OFF SLIDE TERMINAL
10	1	39657-2	WIRE AY., KILL SWITCH
11	1	39657-4	WIRE AY., KILL SWITCH (HONDA)
12	2	39596	BRACKET, ISOLATORS SUPPORT
13	4	63148	MOUNT, SHOCK (1/4-20)
14	8	9419454	NUT, NYLOCK 1/4-20
15	2	39711	STIFFENER, ENGINE MOUNTING
16	1	39674	CHANNEL AY., TWISTER XL
17	18	120392	WASHER, FLAT, 1/4, REG.
18	1	39504	BELT, POLY-V (16.0")
19	1	39616 39656-1	ENGINE AY., HONDA GX-35 ENGINE AY., TANAKA PF-4000



CURTIS DYNA-FOG® Twister™ XL 3

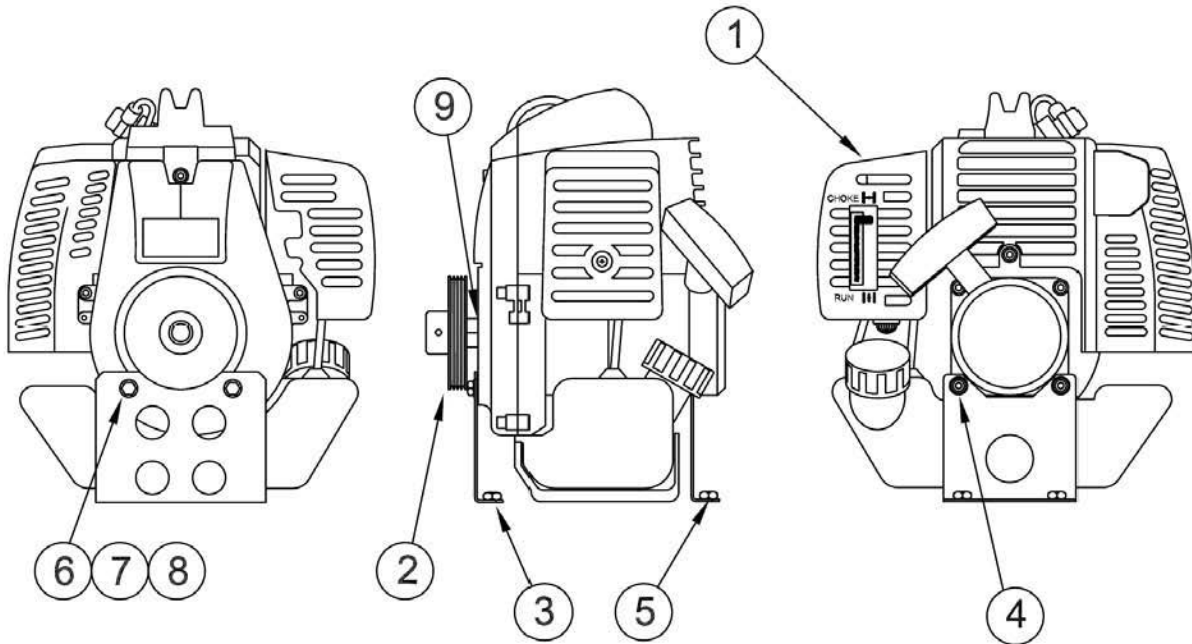
BLOWER ASSEMBLY P/N: 39651

ITEM	QTY.	PART NUMBER	ITEM DESCRIPTION
1	3	A273746	SCREW, 10-24X3/4 TRCR
2	1	B39663	FILTER ASSEMBLY
3	1	A39651-11	NUT AMETEK NO. 7491
4	1	A39651-13	WASHER
5	1	B39651-9	FAN SHELL
6	3	B39651-5	FAN ROTATING
7	1	B39651-8	FAN STATIONARY
8	2	B39651-6	SPACER
9	1	B39651-7	FAN STATIONARY
10	1	A39651-4	SPACER
11	2	A159982	SCREW, 10-24X2.25 PAN H.
12	7	A120391	WASHER, FLAT, #10, REG.
13	1	B39651-31	BRACKET, FAN END, MACHINED
14	5	A190254	NUT, 10-24 LOCK, HEX
15	1	10100-18	WASHER, NEOPRENE
16	1	C39698	SHAFT/BEARING HOUSING AY.
17	2	AC39651-14	WASHER, 1.5" OD



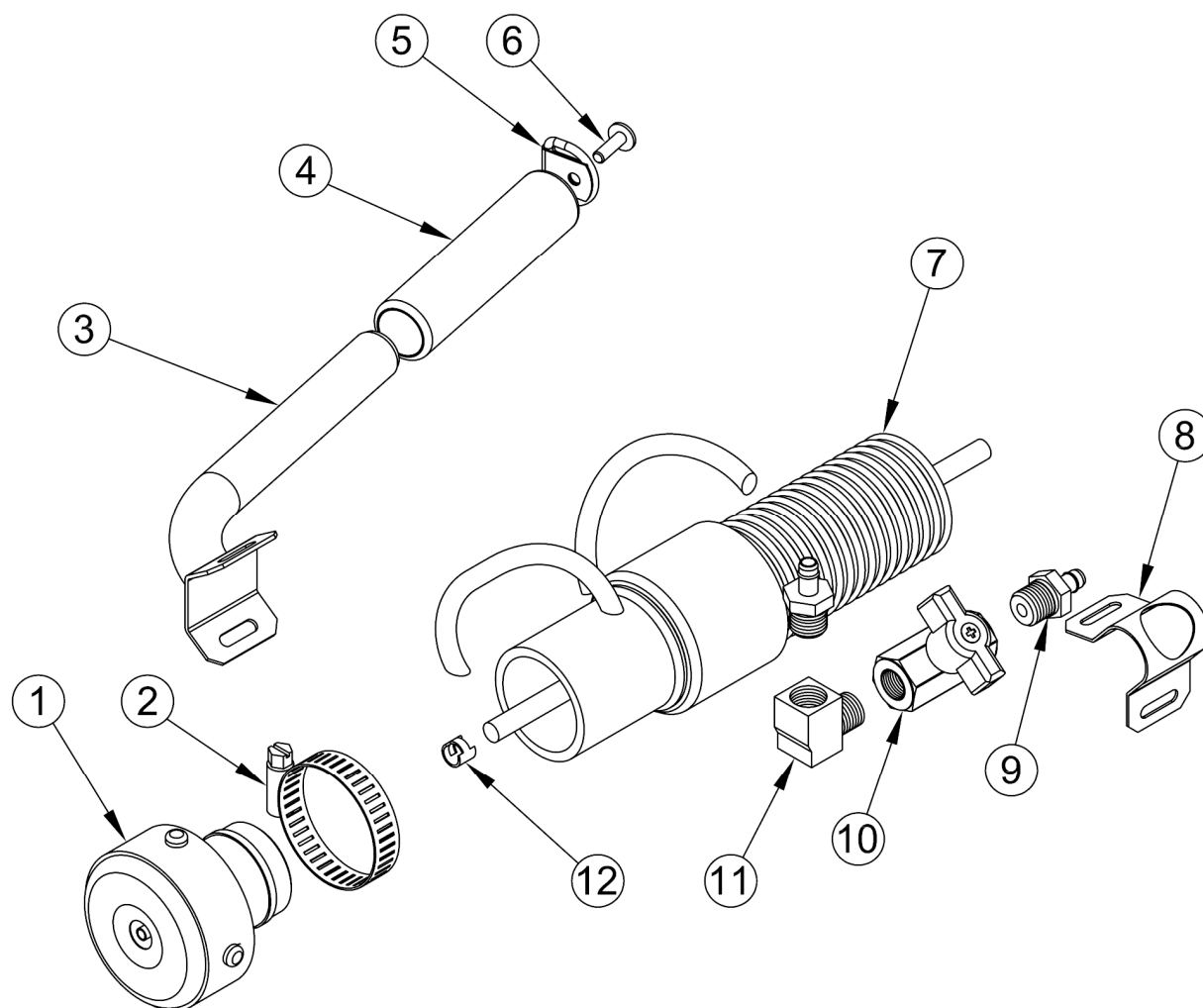
CURTIS DYNA-FOG® Twister™ XL 3
ENGINE ASSEMBLY, HONDA GX-35 (P/N: 39616)

ITEM	QTY.	PART NUMBER	ITEM DESCRIPTION
1	1	39597	ENGINE, 35CC, GX-35 HONDA
2	1	39614	PULLEY AY., HONDA GX-35
3	4	39720	BOLT, 6 MM., - 1.00 MM. HEX
4	4	121753	WASHER, LOCK, 1/4, EXTO
5	4	120392	WASHER, FLAT, 1/4, REG.
6	1	39597-1	WASHER, PULLEY AY., GX-35
7	2	39612	SPACER, ENGINE, HONDA GX-35
8	2	120391	WASHER, FLAT, #10, REGULAR
9	2	120217	WASHER, LOCK, #10, SPLIT
10	2	39615	BOLT, M5-10 MM., HEX
11	1	39611	ENGINE CRADLE WELDED AY.
12	1	65229-2	SCREW, 4-40 X 2.5, PHCR. SST.



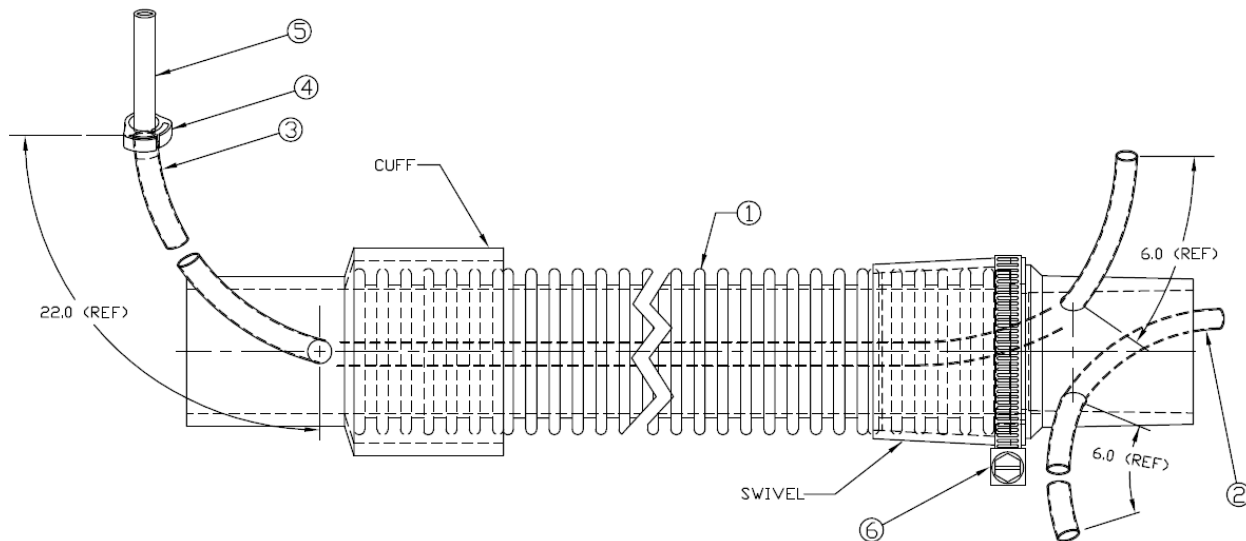
CURTIS DYNA-FOG® Twister™ XL 3
TANAKA PF-4000 ENGINE ASSEMBLY P/N 39656-1

ITEM	QTY.	PART NUMBER	ITEM DESCRIPTION
1	1	39656	ENGINE, 40 CC, TANAKA
2	1	39712	PULLEY/SHAFT ADAPTER AY
3	1	39658	BRACKET, L.H.
4	12	120391	FLAT WASHER, #10
5	11	39659	BRACKET, R.H.
6	2	39720	BOLT 6 MM – 1 MM
7	2	120392	FLAT WASHER, 1/4
8	2	121753	LOCK WASHER, 1/4
9	1	39710	WASHER, LOCK, SPLIT, 10 MM



REMOTE NOZZLE ASSEMBLY

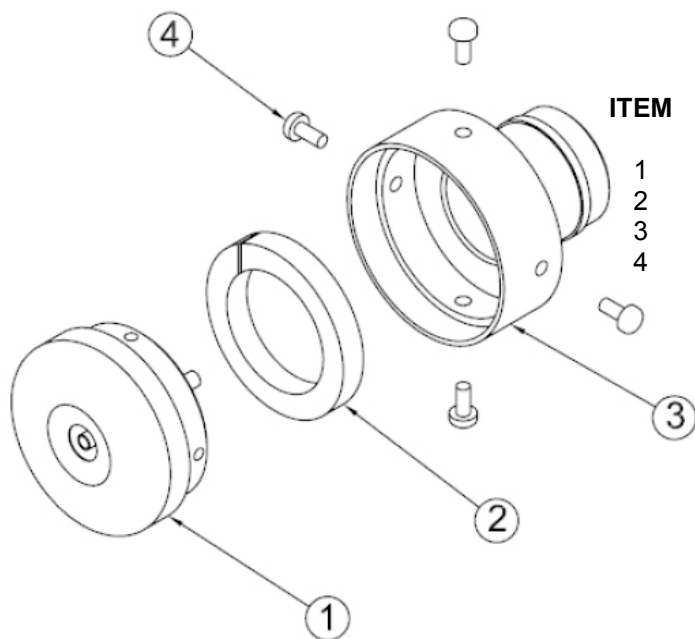
ITEM	QTY.	PART NUMBER	ITEM DESCRIPTION
1	1	39726	NOZZLE/ADAPTER ASSEMBLY
2	1	20054-2	CLAMP, 1.5 DIA
3	1	62200	HANDLE
4	1	59962-1	FOAM GRIP
5	1	11719	D-RING
6	1	449623	SCREW 10-24 X 1/2
7	1	39672	HOSE ASSEMBLY
8	1	39703-1	VALVE BRACKET, S.S.
9	2	39767	FITTING, BRASS, STRAIGHT, 1/4, MPT
10	1	22273	VALVE
11	1	ASC-35	ELBOW, BRASS, 1/4 MP – 1/4 FP
12	1	80296-3	CLAMP, GRAY



HOSE ASSEMBLY P/N 39672

ITEM	QTY.	PART NUMBER	ITEM DESCRIPTION
1	1	39732-51	HOSE AY, ORANGE
2	1	80447-8	TUBING, VINYL, .312 GRES.
3	1	80447-48	TUBING, VINYL, .312 GRES.
4	1	21158	CLAMP, 3/8, PLASTIC
5	1	62584-29	TUBING, 1/4 OD., POLY.
6	1	20054-8	CLAMP, HOSE, WORM DRIVE

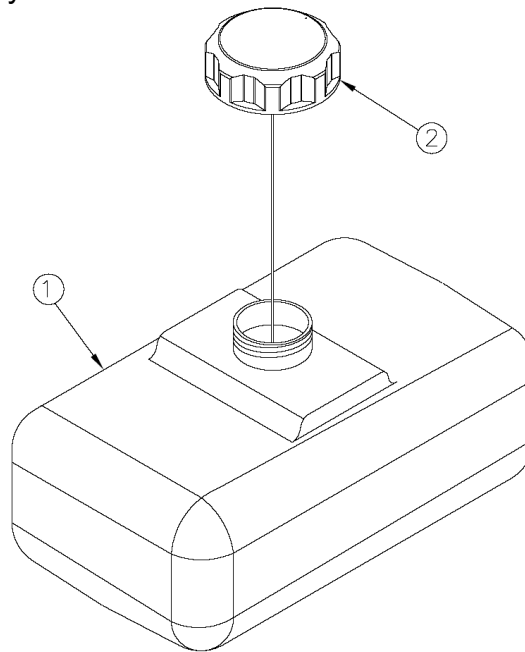
NOZZLE/ADAPTOR AY P/N: 39726



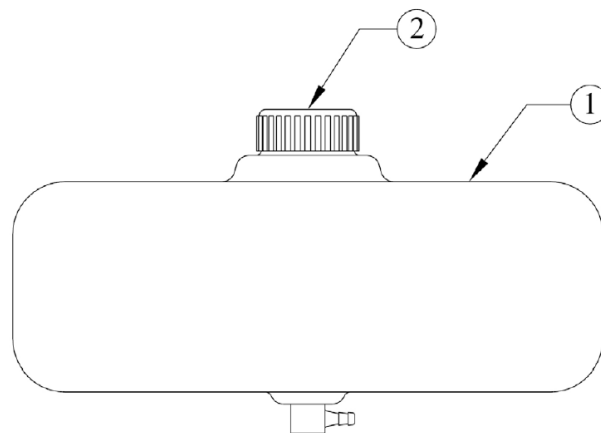
ITEM	QTY.	PART NUMBER	ITEM DESCRIPTION
1	1	62313	NOZZLE ASSEMBLY
2	1	62495	GASKET, .31 THK.
3	1	63503-29	ADAPTOR
4	1	62163	8-32 X .375 TYPE F STAPPING SCREW

NOTE:

Your Twister XL 3 unit will use either P/N: 39791 or P/N: 39755 formulation tank. You can identify which tank you have by inspecting the formulation cap. If the cap has an outside diameter of 3.0", your Twister XL 3 unit came with P/N: 39791 formulation tank.

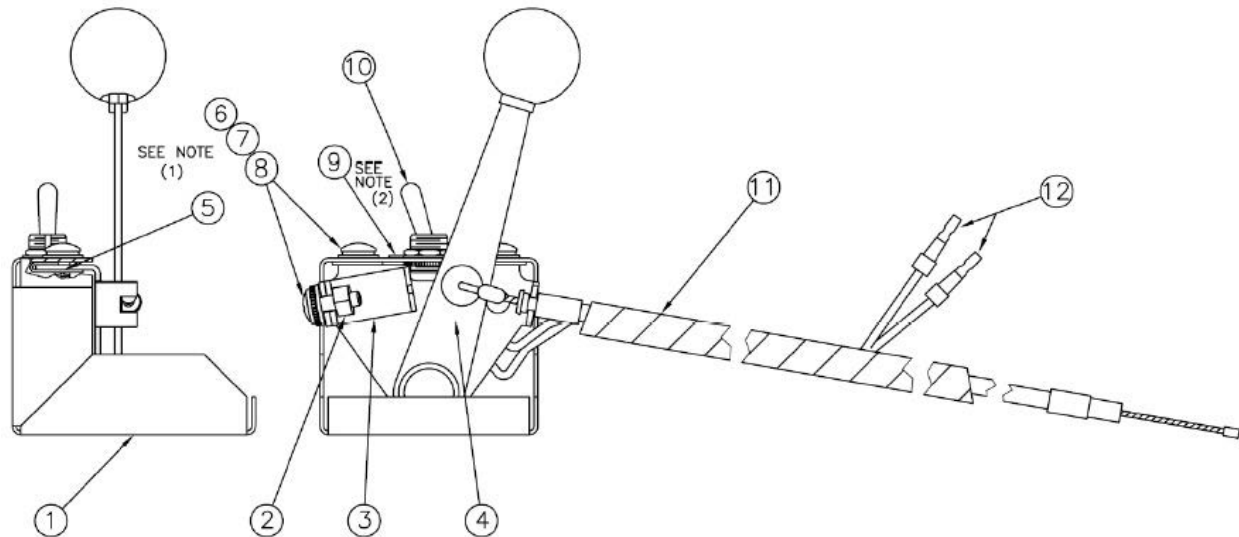
**FORMULATION TANK AY (P/N: 39791)**

ITEM	QTY	P/N	DESCRIPTION
1	1	39791-3	TANK, 1 GALLON
2	1	39791-1	TANK CAP (VENTED)

**FORMULATION TANK AY (P/N: 39755)**

ITEM	QTY	P/N	DESCRIPTION
1	1	39755-3	TANK, 1 GALLON
2	1	39755-1	TANK CAP (VENTED)

OPTIONAL



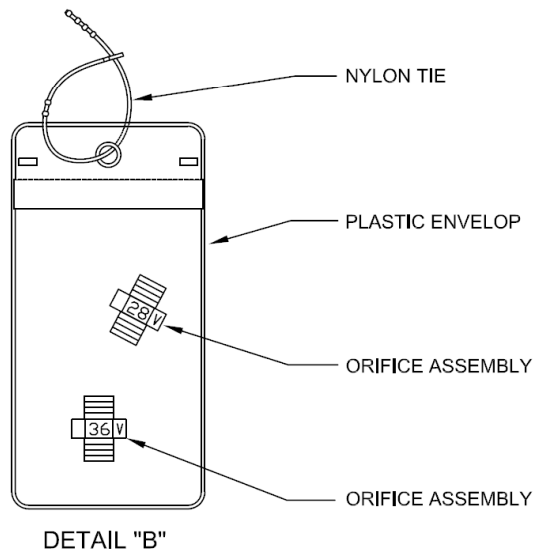
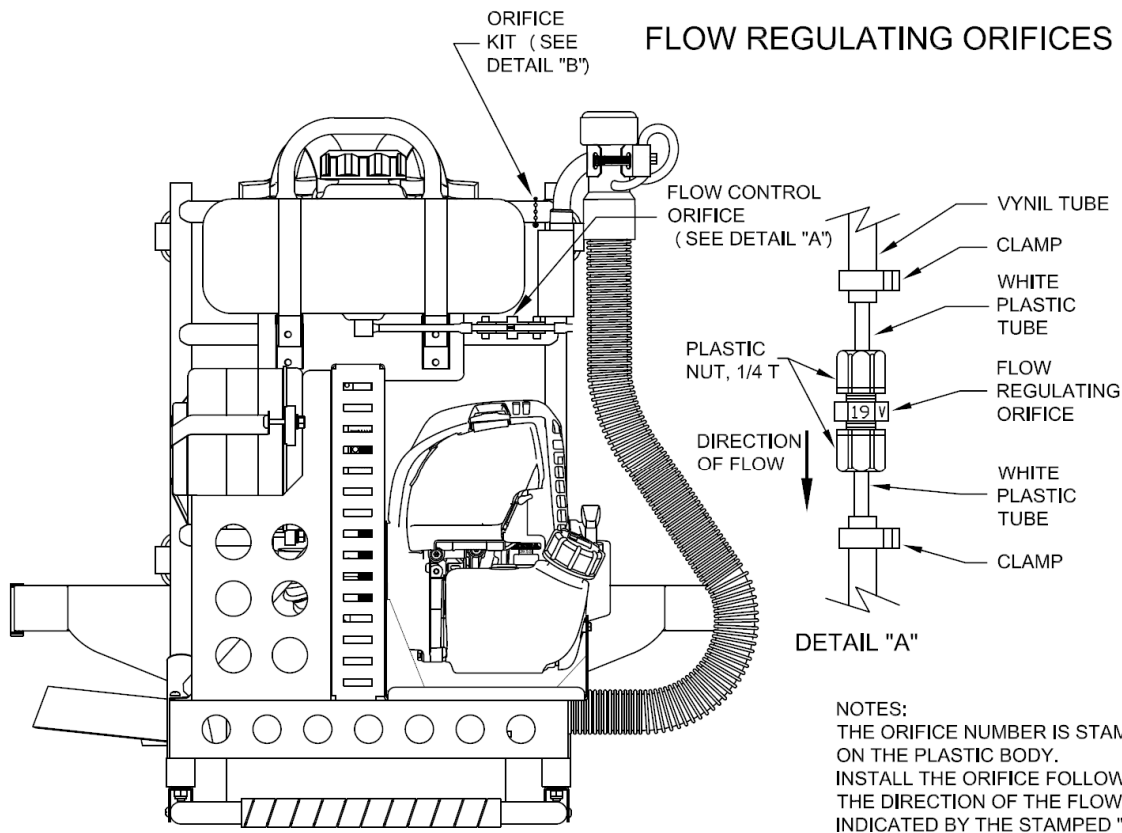
NOTES:

1. Switch with slot in the direction shown.
2. Item (6) does not show ON/OFF.

CONTROL ASSEMBLY, THROTTLE, TWISTER XL 3 P/N: 39699

ITEM	QTY	P/N	DESCRIPTION
1	1	39680	BRACKET, THROTTLE CONTROL
2	1	120361	NUT, #10-24
3	1	39729	STOP
4	1	397679	CONTROL, THROTTLE, TWISTER XL
5	2	58707	NUT, #10-24 J-TYPE
6	3	157684	SCREW, 10-24 X 1/2, TRCR
7	3	120391	WASHER, FLAT, #10 REG.
8	3	138479	WASHER, LOCK, #10 EXT.
9	1	62325	INDICATOR PLATE
10	1	62369	SWITCH, ON/OFF SL. TER.
11	6"	63414-11	HARNESS WRAP
12	2	39657	WIRE ASSEMBLY, KILL SWITCH

FLOW REGULATING ORIFICES



DESCRIPTION	PART NUMBER
NYLON TIE	22321-2
PLASTIC ENVELOP	22321-1
ORIFICE ASSEMBLY # 19	64934-19
ORIFICE ASSEMBLY # 28	64934-28
ORIFICE ASSEMBLY # 36	64934-36
VYNIL TUBE	80447-44
CLAMP, PLASTIC	21158
WHITE PLASTIC TUBE	62584-29
PLASTIC NUT, 1/4 T	62582-1

THE COMPONENTS SHOWN IN DETAIL "B" ARE INCLUDED IN THE KIT P/N 39704.

THE TWISTER XL IS SHIPPED WITH THE ORIFICE #19 INSTALLED.

DYNA-FOG[®] TWISTER[™] XL 3

SINGLE MICROTEC NOZZLE		
32 SECONDS FORMULATION		
ORIFICE NUMBER	FLOW RATE	
	OZ./MIN	ML./MIN
19	1.5	45
28	3.3	100
38	5.3	160
NONE	17.0	500
70 SECONDS FORMULATION		
19	1.23	37
88 SECONDS FORMULATION		
19	1.2	36

DOUBLE MICROTEC NOZZLE(*)		
32 SECONDS FORMULATION		
ORIFICE NUMBER	FLOW RATE	
	OZ./MIN	ML./MIN
54	12	360
NONE	19.0	570

NOTE: THE FLOW RATES SHOWN HIGHLIGHTED WILL PRODUCE DROPLETS OF 20 MICRONS (MMD) OR LESS (ULV).

(*) OPTIONAL TWO NOZZLES VERSION

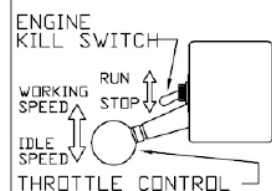
USING FORMULATIONS WITH HIGHER VISCOSITY THAN 32 SECONDS WILL REDUCE THE FLOW RATE BY APPROXIMATELY 20% OR MORE.

WARNING: ALWAYS APPLY FORMULATIONS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.



P/N 39567
SPRAY ON/OFF

P/N 39708, FLOW RATE



IMPORTANT:
TURN FORMULATION VALVE TO CLOSE (OFF) BEFORE TURNING POWER OFF TO PREVENT DRIPPING FROM THE NOZZLE.

P/N 39707
THROTTLE CONTROL
OPTIONAL

STARTING INSTRUCTIONS

READ AND UNDERSTAND OPERATION MANUAL BEFORE ATTEMPTING TO OPERATE MACHINE.

1. SET THROTTLE LEVER TO IDLE SPEED.
2. SET IGNITION SWITCH TO ON POSITION.
3. DEPRESS PRIMING BULB SEVERAL TIMES TO PURGE AIR IN CARBURETOR, UNTIL THE FUEL FLOWS THROUGH RETURN PIPE.
4. PULL CHOKE LEVER UPWARD TO CHOKE POSITION (CLOSED).
5. PULL RECOIL STARTER BRISKLY, TAKING CARE TO KEEP THE HANDLE IN YOUR GRASP AND NOT ALLOWING IT TO SNAP BACK.
6. WHEN YOU HEAR THE ENGINE WANT TO START, RETURN THE CHOKE LEVER TO RUN POSITION (OPEN). THEN PULL RECOIL STARTER BRISKLY AGAIN.

NOTE: IF ENGINE DOES NOT START, REPEAT PROCEDURES 4 TO 6.
7. AFTER STARTING, ALLOW THE ENGINE TO WARM-UP 2-3 MINUTES (AT IDLE SPEED) BEFORE OPERATING AT HIGHER SPEEDS.

OPERATOR SAFETY

KEEP ALL LOOSE ITEMS (I.E. CLOTHING, HAIR, JEWELRY, ETC.) AWAY FROM ALL MOVING PARTS.

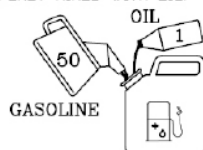
MANY OF THE FORMULATIONS WHICH CAN BE DISPENSED WITH THIS MACHINE ARE HIGHLY TOXIC AND REQUIRE SPECIAL SAFETY EQUIPMENT. READ AND OBSERVE THE FORMULATION LABEL SAFETY PRECAUTIONS, WARNINGS AND PROCEDURES BEFORE OPERATING MACHINE.

ALWAYS WEAR HEARING PROTECTION.

P/N 39706, STARTING INSTRUCTIONS

WARNING

THE TWISTER XL IS EQUIPPED WITH A TWO-STROKE ENGINE. ALWAYS RUN THE ENGINE ON GASOLINE WHICH IS PROPERLY MIXED WITH OIL.



USE UNLEADED GASOLINE WITH AN 89 OCTANES OR HIGHER RATING. USE A QUALITY TWO-CYCLE OIL AT MIXING RATIO OF 50:1. NEVER USE FOUR-STROKE MOTOR OIL. ALWAYS MIX GASOLINE AND OIL IN A SEPARATE CLEAN CONTAINER. MIX THE GASOLINE THOROUGHLY BEFORE FILLING THE ENGINE FUEL TANK.

WARNING

DO NOT OPERATE MACHINE WITH THIS COVER REMOVED

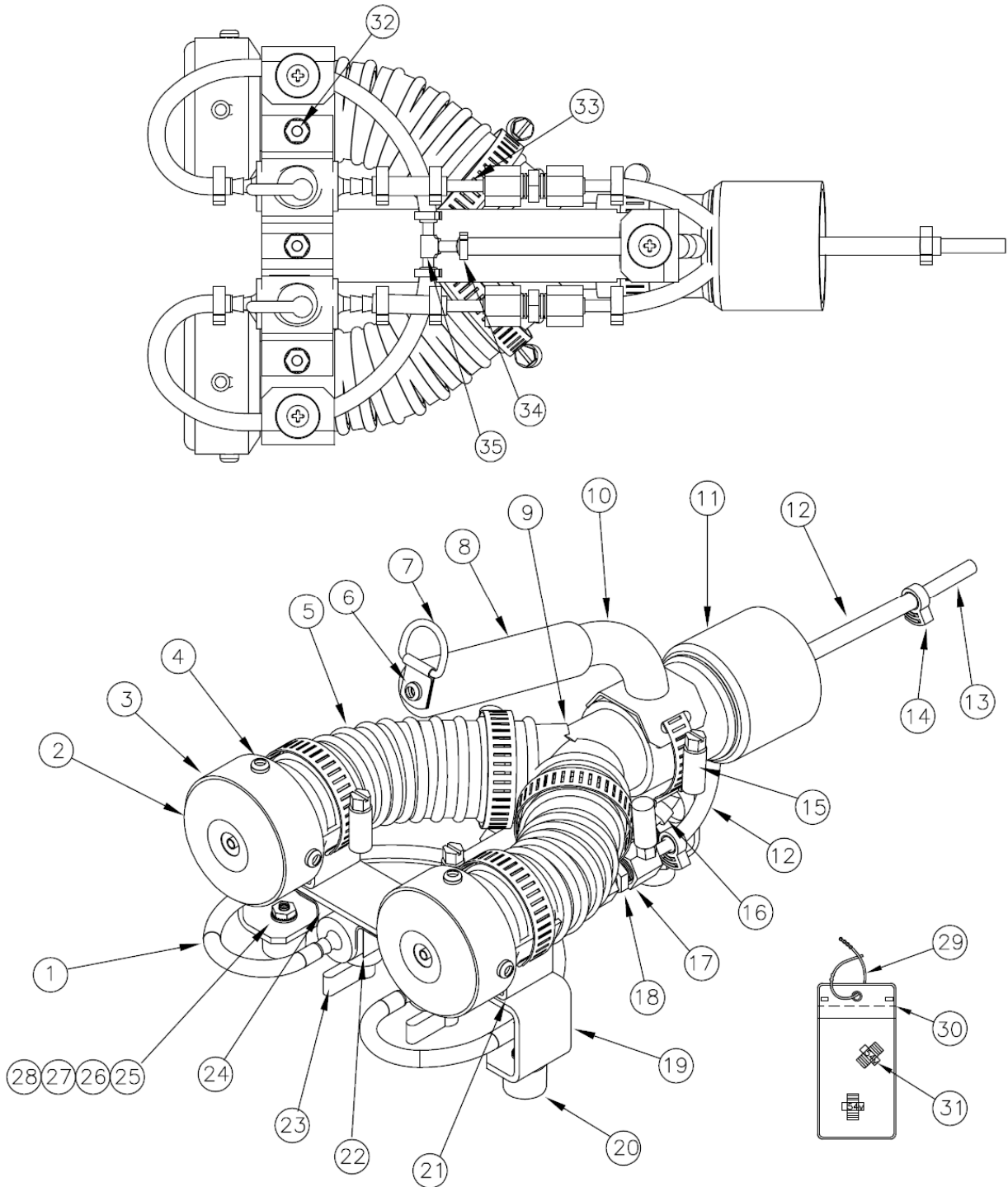
P/N 22325, WARNING

LABELS, TWISTER[™] XL 3

P/N 39709, GASOLINE/OIL

TANAKA PF-4000 ENGINE ONLY

TWISTER XL-3 DUAL NOZZLE ATTACHMENT **P/N: 39716**



TWISTER XL-3 DUAL NOZZLE ATTACHMENT

P/N: 39716

ITEM	QTY	PART NO.	DESCRIPTION
1	2	80447-4	TUBE, VINYL, .312 GRES
2	2	62313	NOZZLE AY.
3	2	63503-29	ADAPTOR, NOZZLE/HOSE
4	8	62163	SCREW, 8-32X3/8 TAP
5	2	62299-6	HOSE, 1.5 I.D., FLEX
6	1	449623	SCREW, 10-24X1/2 TAP
7	1	11719	CLAMP CARRY STRAP
8	1	59962-1	GRIP, HANDLE, MODIFIED
9	1	39713	"Y" AY. (CLEAR ANODIZE)
10	1	62200	HANDLE AY., TUBE, BLK ANODIZE
11	1	39513-22	CUFF, SWIVEL (MOD.) 3 HOLES
12	3	80447-14	TUBE, VINYL, .312 GRES
13	5	62584-29	TUBING, 1/4 O.D. POLY
14	6	21158	CLAMP, 3/8, PLASTIC
15	5	20054-2	CLAMP, WORM DRIVE, 1.5
16	1	63414-4	HARNESS WRAP
17	4	62582-1	NUT, .250, PLASTIC GRIP
18	2	62553-1	CONNECTOR, UNION, 1/4T
19	1	39717	"T" FRAME AY. (CLEAR ANODIZE)
20	3	58284	FOOT RUBBER
21	2	39529-19	BRACKET, NOZZLE
22	2	39567	LABEL, SPRAY (ON/OFF)
23	2	39560	VALVE, SHUT-OFF (BARB)
24	2	63240-3	BRACKET, SHUT-OFF VALVE
25	3	159929	SCREW, 10-24X5/8, PNCR
26	8	120391	WASHER, FLAT, #10, REG.
27	8	138479	WASHER, LOCK, 10, EXTO
28	8	120361	NUT, 10-24, HEX
29	1	22321-2	TIE, NYLON 5"
30	1	22321-1	ENVELOPE, PLASTIC
31	2	64934-55	ORIFICE AY.
32	5	159920	SCREW, 10-24 X 1/2 PH
33	2	80447-35	TUBING, .312 GRES.
34	3	21158-1	CLAMP, 5/16, PLASTIC
35	1	86190	UNION TEE (1/4 TU)

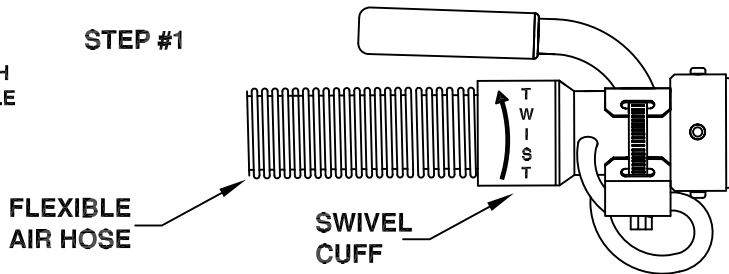
NOT SHOWN

2	62495	GASKET, .31 THK. X .38WD
2	80296-11	CLAMP, HOSE, DOUBLE WIRE
1	39704	ORIFICE KIT

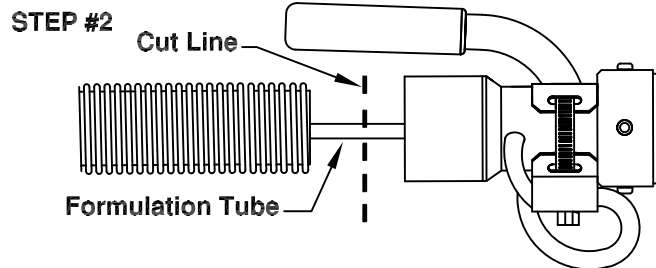
INSTALLATION INSTRUCTIONS FOR DUAL NOZZLE (OPTIONAL)

REMOVING SINGLE NOZZLE

IF YOUR MACHINE WAS PURCHASED WITH A SINGLE NOZZLE, AND THE DUAL NOZZLE ATTACHMENT WAS ORDERED LATER, PROCEED AS SHOWN TO INSTALL THE DUAL NOZZLE

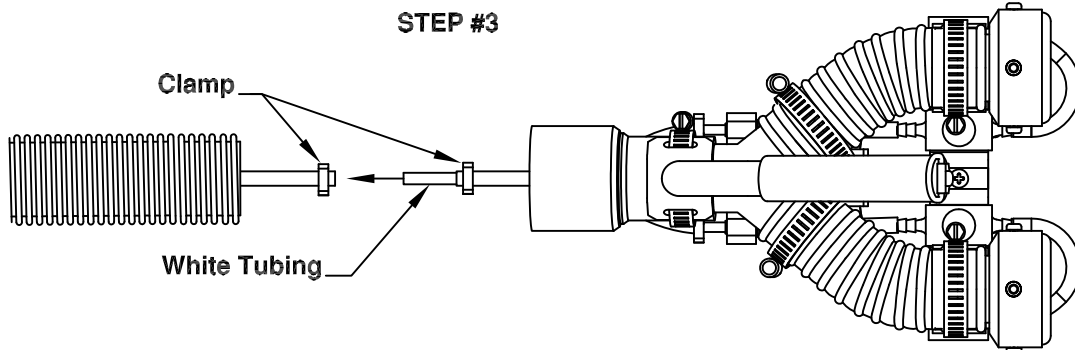


Grip flexible hose and twist swivel cuff to loosen.
Remember that the joint is left hand thread.

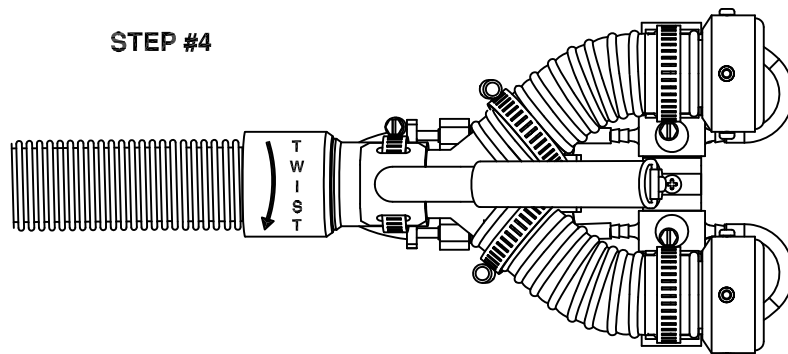


When loose, separate hose from swivel cuff and cut formulation tube.

INSTALLING DUAL NOZZLE

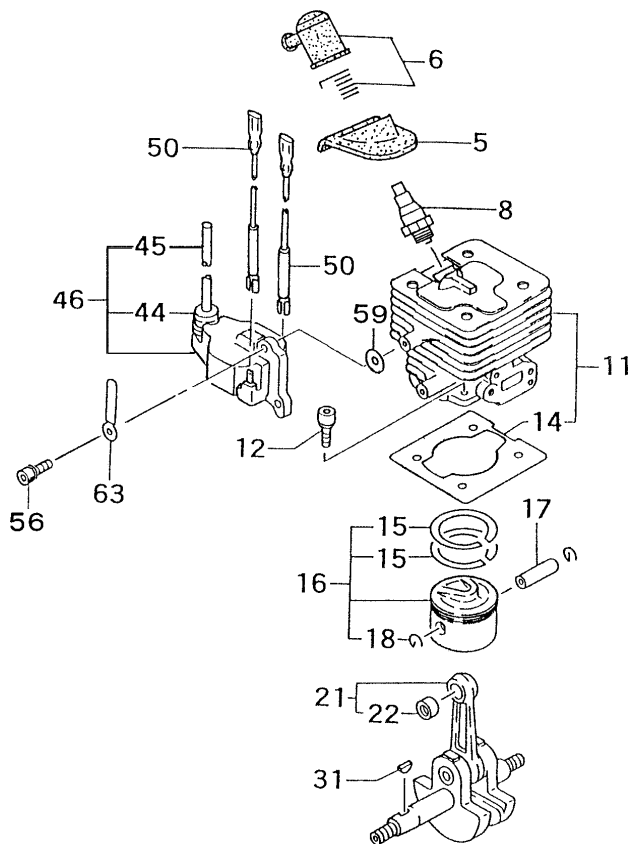


Insert white tubing into formulation tube and apply clamp provided.

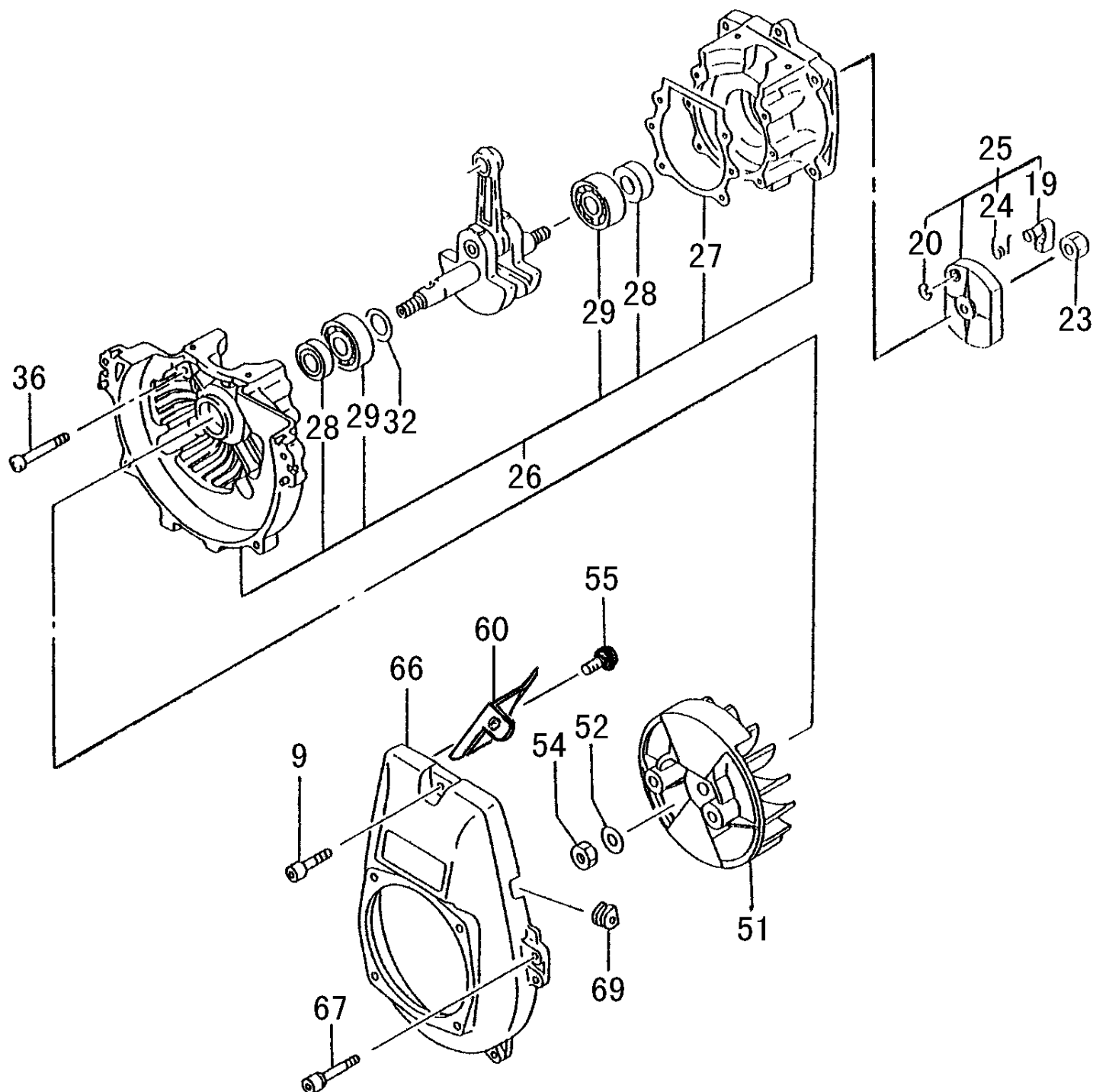


IF REQUIRED, ADJUST THE ENGINE SPEED AS INDICATED IN THE SECTION "SPEED ADJUSTMENT". USUALLY 500 TO 700 RPM HIGHER RPM IS REQUIRED FOR THE DUAL NOZZLE.

Grip flexible hose and twist swivel cuff to tighten.



ITEM	PART NUMBER	DESCRIPTION	QTY	COMMENTS
1-5	25504200200	COVER, SPARK PLUG, RUBBER	1	
1-6	15711666900	CAP, SPARK PLUG ASS'Y	1	
1-8	01804075200	PLUG, SPARK	1	
1-11	0010440590	SET, CYLINDER	1	
1-12	99461050204	BOLT, HEX, HOLE, 5X20, S	4	
1-14	0170440020	GASKET, CYLINDER	1	
1-15	04104050200	RING, PISTON	2	
1-16	0300440090	SET, PISTON	1	
1-17	0370100020	PIN, PISTON	1	
1-18	03905004200	CIRCLIP, PISTON PIN	2	
1-21	0460440080	CRANKSHAFT	1	
1-22	99962101004	BEARING, NEEDLE, F1010B	1	
1-31	06802000200	KEY, WOODRUFF, 3X13X5	1	
1-44	56020517200	CAP, RUBBER	1	
1-45	1782054320	CORD, HIGH TENSION	1	
1-46	1672054390	ASSY, IGNITION COIL	1	
1-50	1790007080	STOP CORD, 220MM	2	
1-56	99011040182	SCREW, 4X18	2	Before S/N U112140
1-56	99416040183	SCREW 4X18/WS	2	S/N U112141 and after
1-59	1820186A201	WASHER, SPECIAL	2	
1-63	19805015800	CLAMP, CORD	1	



CRANKCASE, FLYWHEEL, STARTER PULLEY • FIGURE 2

ITEM	PART NUMBER	DESCRIPTION	QTY	COMMENTS
2-9	99463050204	BOLT, HEX 5X20	1	
2-19	7880162V20	PAWL, STARTER	1	
2-20	99355050000	RING, STOP, 5	1	
2-23	99111100013	NUT, 10	1	
2-24	7900162V200	SPRING, PAWL, STARTER	1	
2-25	7980422090	PAWL, STARTER ASS'Y	1	
2-26	0720440090	CASE, CRANK	1	Before S/N U207704
2-26	0720440091	CASE, CRANK	1	S/N U207705 and after
2-27	0900440020	GASKET, CRANKCASE	1	*Crankcase assy includes bearings, seals and gaskets.
2-28	99966152511	SEAL, OIL, #VE 15X25X7	2	
2-29	99961620200	BEARING, BALL, #6202	2	
2-32	07102007200	SHIM, 15.2X20X.05	V	*Shims are "as needed" to obtain
2-32	07102007210	SHIM, 15.2X20X.10	V	correct side clearance
2-32	07102007220	SHIM, 15.2X20X.15	V	
2-32	07111600230	SHIM, 16X21X.20	V	
2-32	07111600240	SHIM, 16X21X.30	V	
2-36	99461050304	BOLT, HEX, 5X30S	4	
2-51	1552053880	ROTOR, MAGNETO	1	
2-52	99201100011	WASHER, 10	1	
2-54	99101100011	NUT, 10	1	
2-55	99414050101	SCREW, S, 5X10	1	
2-60	1320440020	DEFLECTOR, AIR	1	
2-66	1120440021	CASE, FAN (ORANGE)	1	
2-66	1120441321	CASE, FAN (POLISHED)	1	
2-67	99461050204	BOLT, HEX, HOLE, 5X20, S	4	
2-69	20311660200	GROMMET, PRIMARY CORD	1	

MUFFLER, MUFFLER COVER • FIGURE 3

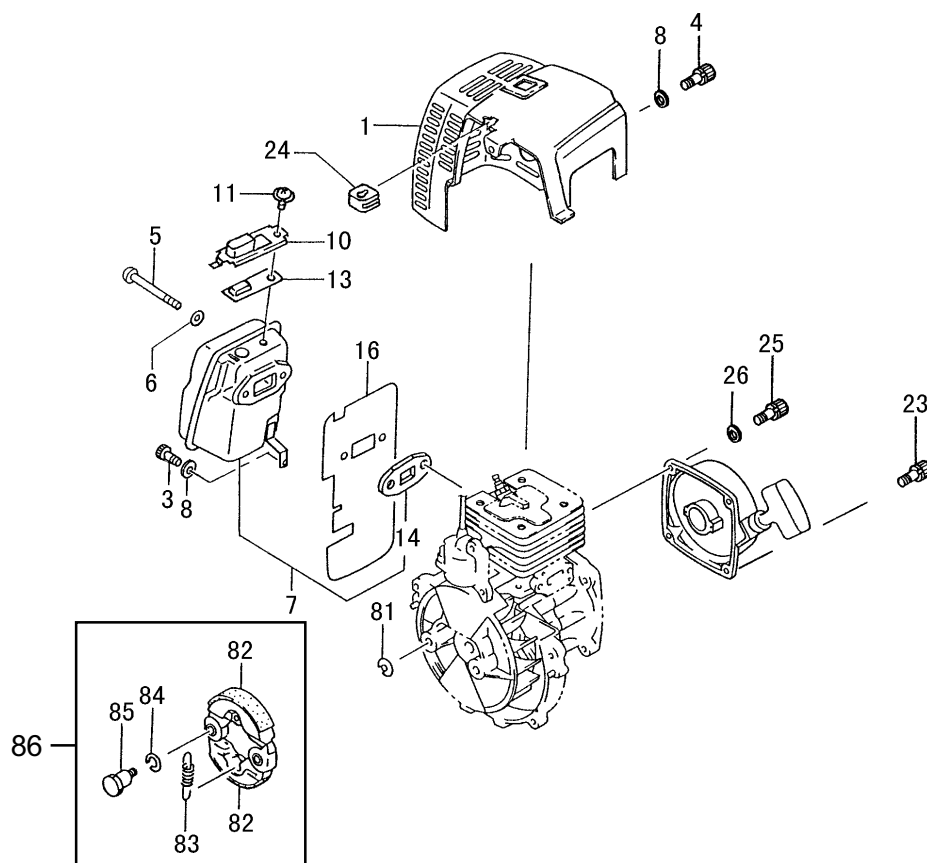


40cc Tanaka Power Pipe
Part #: 31879

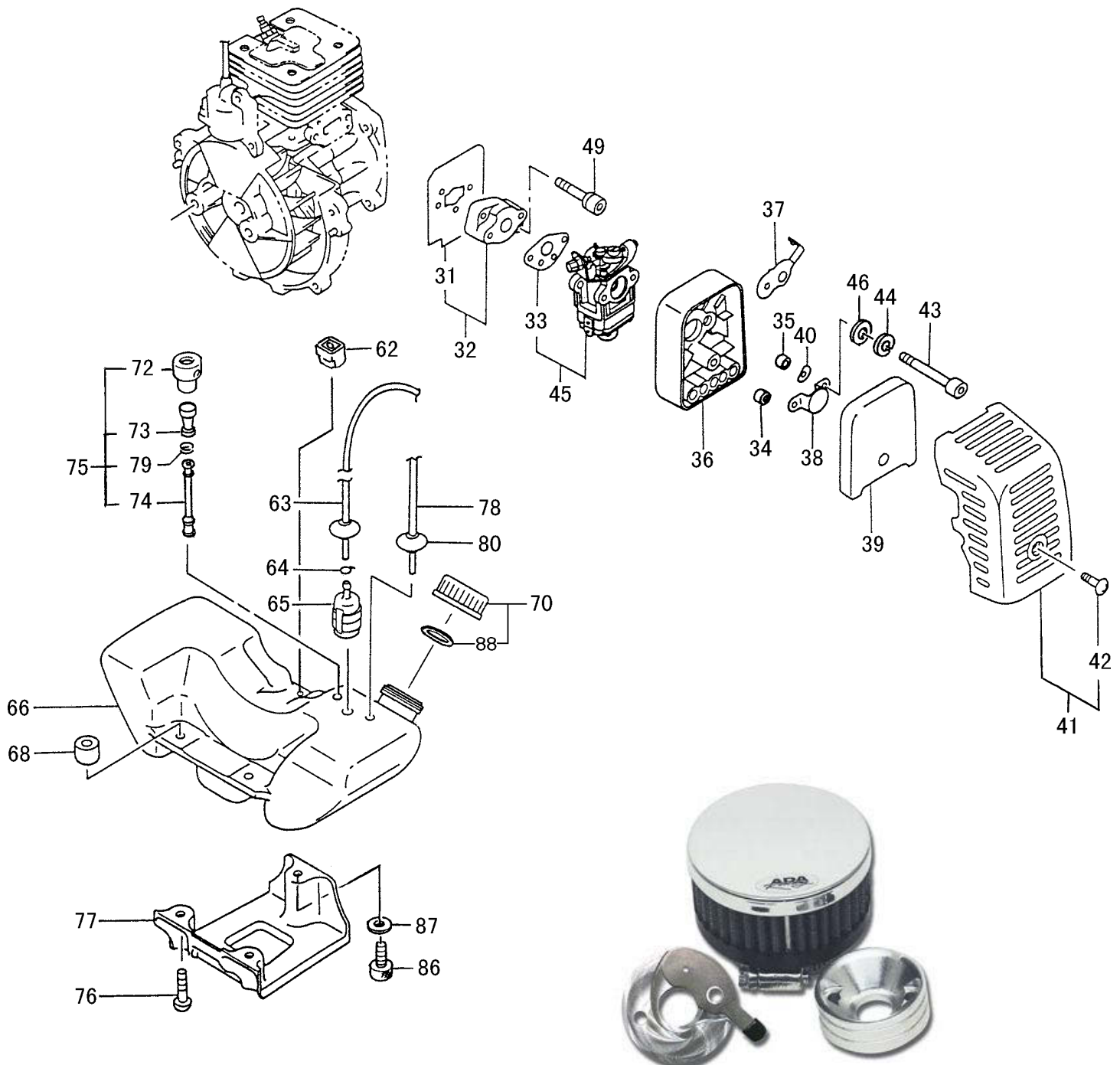
Click on the pipe for
more information !!



Nickel Plated Racing Pipe
Part#: 31275



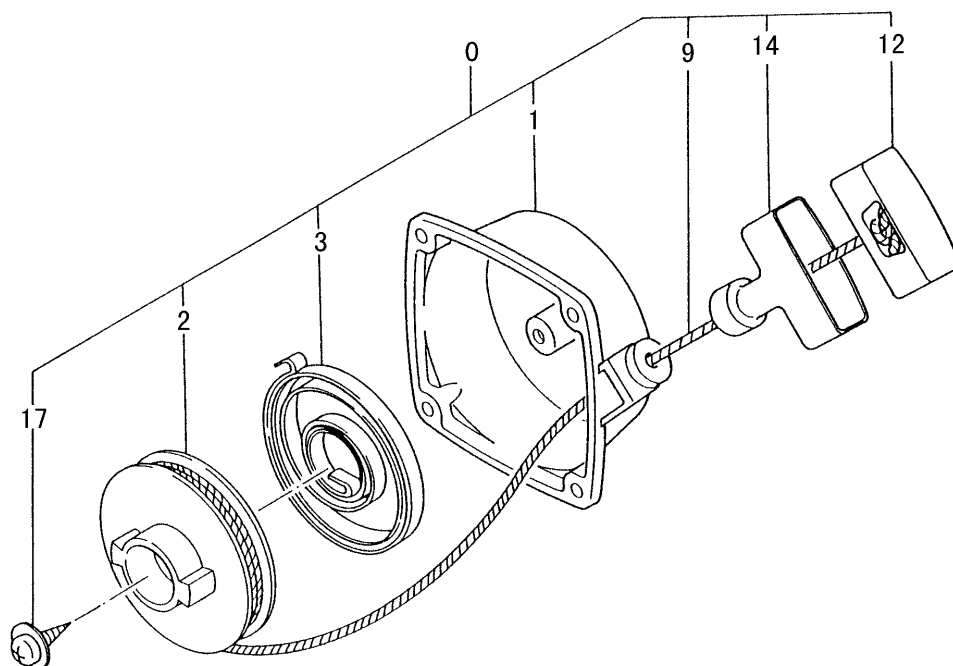
ITEM	PART NUMBER	DESCRIPTION	QTY	COMMENTS
3-1	7380440A21	PROTECTOR,MUFFLER	1	
3-3	99461050124	BOLT,HEX,5X12S	1	
3-4	99461050164	BOLT,HEX,5X16,S	1	Before S/N U207704
3-5	99053060653	SCREW,HEX,6X65	2	
3-6	99201060011	WASHER,6	2	
3-7	7040440090	SET,MUFFLER	1	
3-8	99201050061	WASHER,5	2	Before S/N U207704
3-8	99201050061	WASHER,5	1	S/N U207705 and after
3-10	7210440020	PIPE,TAIL	1	
3-11	99434040081	SCREW,4X8/S	1	
3-13	7320440020	ARRESTER,SPARK	1	
3-14	73704230200	GASKET,MUFFLER	1	
3-16	1330440020	SHIELD,HEAT	1	
3-23	99463050204	BOLT, HEX 5X20	4	Before S/N U207704
3-23	99463050204	BOLT, HEX 5X20	2	S/N U207705 and after
3-24	2030604A202	GROMMET	1	
3-25	99461050254	BOLT,HEX HOLE,5X25S	2	S/N U207705 and after
3-26	99201050061	WASHER,5	2	S/N U207705 and after
3-81	35910112203	WASHER,CLUTCH B	2	
3-82	2900420081	SHOE,CLUTCH	2	
3-83	34204200200	SPRING,CLUTCH	1	
3-84	99204100030	WASHER,WAVE,10	2	
3-85	35704201200	BOLT,CLUTCH STEP	2	
3-86	30790	CLUTCH ASS'Y	1	



MOBY XL Air Filter Kit

Part#: 30941

ITEM	PART NUMBER	DESCRIPTION	QTY	COMMENTS
4-31	4030430020	GASKET, INLET MANIFOLD	1	
4-32	4040430090	SET, CARB INSULATOR	1	
4-33	4020430020	GASKET, CARBURETOR	1	
4-34	4530637C200	COLLAR	1	
4-35	4700138020	COLLAR, CLEANER	1	
4-36	4230138082	BODY, CLEANER	1	
4-37	5280138021	VALVE, CHOKE	1	
4-38	47601700200	BOARD, BLOW OVER CHECK	1	
4-39	4460138020	ELEMENT, CLEANER	1	
4-40	99204080030	WASHER, 8	1	
4-41	4520138091	COVER, CLEANER, ASSY	1	
4-42	3800637C200	BOLT, CLEANER COVER	1	
4-43	99011050602	SCREW, 5X60	2	
4-44	99210050012	WASHER, S, 5	2	
4-45	4550440090	CARBURETOR	1	
4-46	78600601200	WASHER, RECOIL STARTER	2	
4-49	99416050253	BOLT, HEX HOLE, 5X25WS	2	
4-62	6490168020	COLLAR, TANK FIXING	1	S/N U207705 and after
4-63	22301251901	PIPE, FUEL, 3X5X230	1	
4-64	68000731201	CLIP 6.3	1	
4-65	67501630900	FILTER, FUEL	1	
4-66	5910440021	TANK, FUEL (ORANGE)	1	
4-66	5910441321	TANK, FUEL (WHITE)	1	
4-68	6590430020	COLLAR C	3	
4-70	5950656B90	CAP, FUEL BLACK, NON VENT	1	
4-73	6463252L90	AIR VENT VALVE ASSY	1	
4-74	5650440020	PIPE, AIR VENT	1	
4-75	5640661190	VENT, AIR ASSY	1	
4-76	99463050204	BOLT, HEX 5X20	3	Before S/N U207704
4-76	99463050204	BOLT, HEX 5X20	2	S/N U207705 and after
4-77	9400430020	STAND, ENGINE	1	
4-78	70003005100	PIPE, FUEL, 3X5X100	1	
4-79	68000206200	CLIP, 5.5	1	
4-80	22206300200	GROMMET, FUEL PIPE	1	
4-86	99461050304	BOLT, HEX, 5X30S	1	S/N U207705 and after
4-87	99201050061	WASHER, 5	1	S/N U207705 and after
4-88	6420608A200	GASKET, TANK CAP	1	

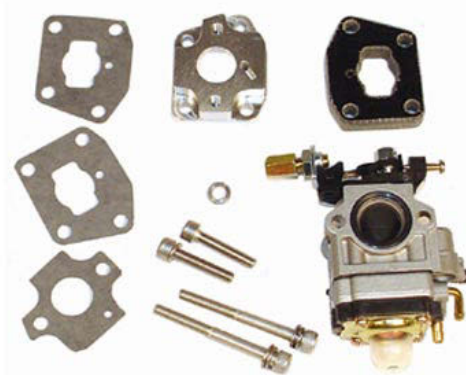
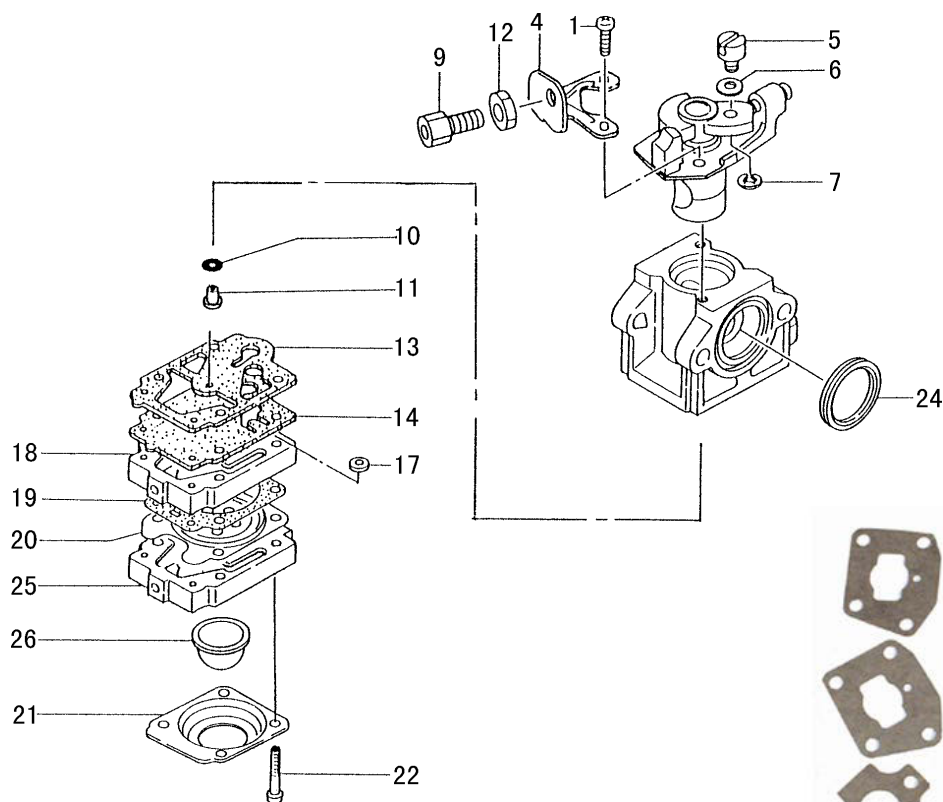


Billet Starter Handles

Part#: **Blue** - 31352 / **Black** - 31358

Polished - 31357 / **Red** - 31356

ITEM	PART NUMBER	DESCRIPTION	QTY	COMMENTS
5-0	7620422090	STARTER,RECOIL ASS'Y	1	
5-1	7720422080	BODY,RECOIL STARTER	1	
5-2	7690422020	REEL,STARTER ROPE	1	
5-3	7790422020	SPRING,RECOIL	1	
5-9	7830422020	ROPE,STARTER	1	
5-12	8350422020	CAP,HANDLE	1	
5-14	7850422020	HANDLE,STARTER	1	
5-17	8390422020	SCREW,SET	1	

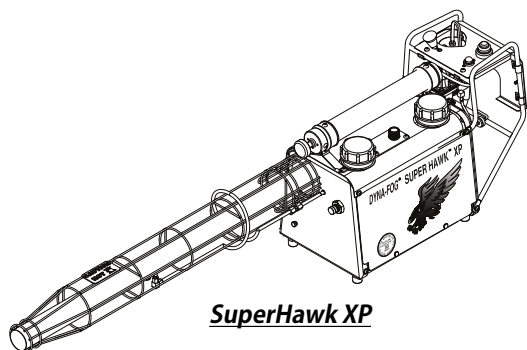


40cc HP Carburetor Kit

Part#: 31283

ITEM	PART NUMBER	DESCRIPTION	QTY	COMMENTS
6-0	4550440090	SET,CARBURETOR	1	Includes carburetor gasket
6-1	51425100200	SCREW,THROTTLE SET	2	
6-4	54425164200	STAY,ADJUST,CABLE	1	~ Contained in Carb Repair Kit P/N 650-25124-900
6-5	53925120200	SWIVEL	1	
6-6	5492516520	WASHER,THRUST	1	
6-7	48925100200	RING,STOP	1	
6-9	61425137200	ADJUSTER,CABLE	1	(Not available individually)
6-10	55025100200	O-RING	1	
6-11	5992001W44	JET,MAIN,LONG,#44	1	
6-12	99101060013	NUT,6	1	
6-13	~ ~ ~	GASKET,PUMP	1	
6-14	~ ~ ~	DIAPHRAGM,PUMP	1	
6-17	57825007200	SCREEN,INLET	1	
6-18	5752515380	BODY,PUMP	1	
6-19	~ ~ ~	GASKET,DIAPHRAGM	1	
6-20	~ ~ ~	DIAPHRAGM,METERING	1	
6-21	4762515120	COVER,DIAPHRAGM	1	
6-22	5482515120	SCREW,SET	4	
6-24	4310634C200	GASKET,CLEANER	1	
6-25	4422515180	PUMP,PRIMING	1	
6-26	44725108200	BULB,PRIMING	1	

Dyna-Fog Offers a Complete Assortment of Sprayers and Foggers



SuperHawk XP

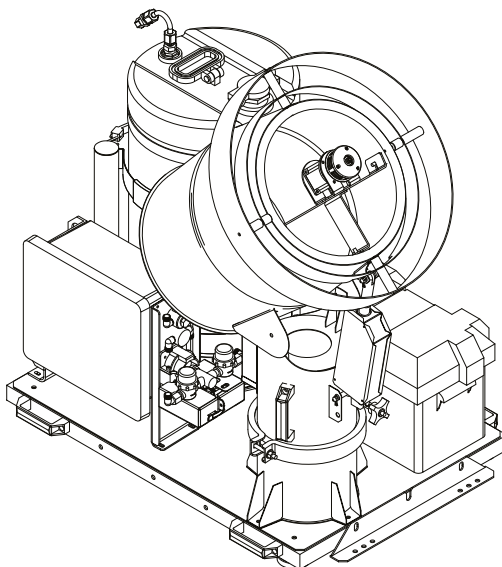
PULSE-JET POWERED THERMAL FOGGERS:

From 0-120 GPH (0-453 LPH) output. Our complete line include different models like the Superhawk, Golden Eagle, Trailblazer, Falcon, Patriot, Blackhawk, Mister III, SilverCloud and Model 1200. Portable or Truck mounted machines. Different models are available for Oil base or Water base formulations.

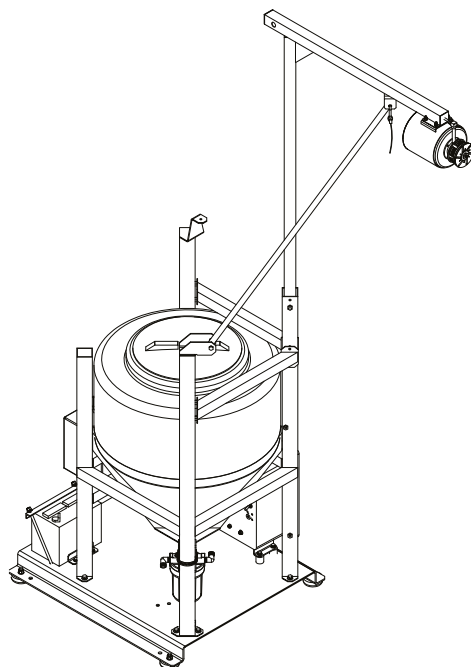
ELECTRIC ROTARY ATOMIZERS:

DYNA-JET L30: State-of-the-Art, Electric Rotary Atomizer ULV Aerosol Generator. 12 VDC, Light Weight, Truck mounted Machine with FMI pump. Optional Syncroflow Available.

DYNA-JET L15: Drift Sprayer for migratory pest control like Locust. Flow Rate from 0 to 2 L/min. Optional Radar Syncroflow.



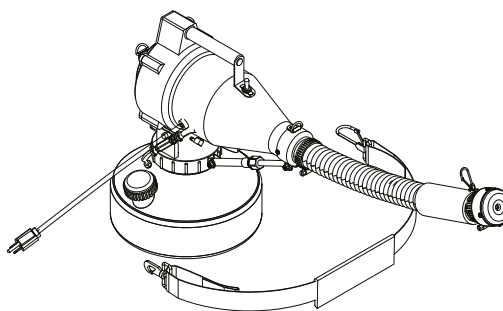
Dyna-Jet L-30



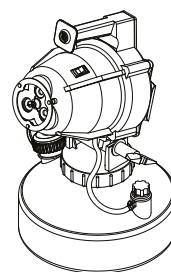
Dyna-Jet L-15

ELECTRIC HAND-HELD ULV/MIST GENERATORS:

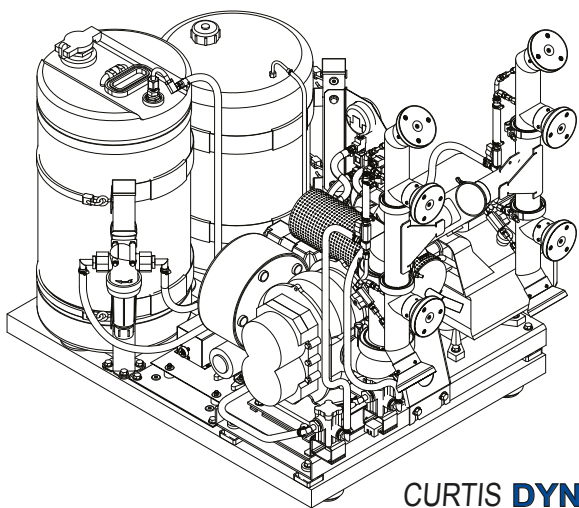
A Full line of electric cold fog applicators with 1-3 gallon tanks, available in 115 and 230 VAC.



Cyclone Ultra-Flex



Hurricane ES



LV-8

COMBUSTION ENGINE DRIVEN ULV AEROSOL GENERATORS:

Truck mounted Units powered by 8, 9, 11, 18 and 20 HP four cycle, OHV Gasoline Engines. Diesel versions also available. One, two, four and eight nozzle configurations. Patented full remote control of boom functions (rotation of turntable and angle of nozzles) available on certain models. Your choice of Gear, Piston or Diaphragm pumping system. Pressurized system versions available for specific international markets. Optional Automatic flow control "Syncroflow" also available with Radar or GPS speed sensing. 25 cc and 40 cc two cycle portable models are also available.

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