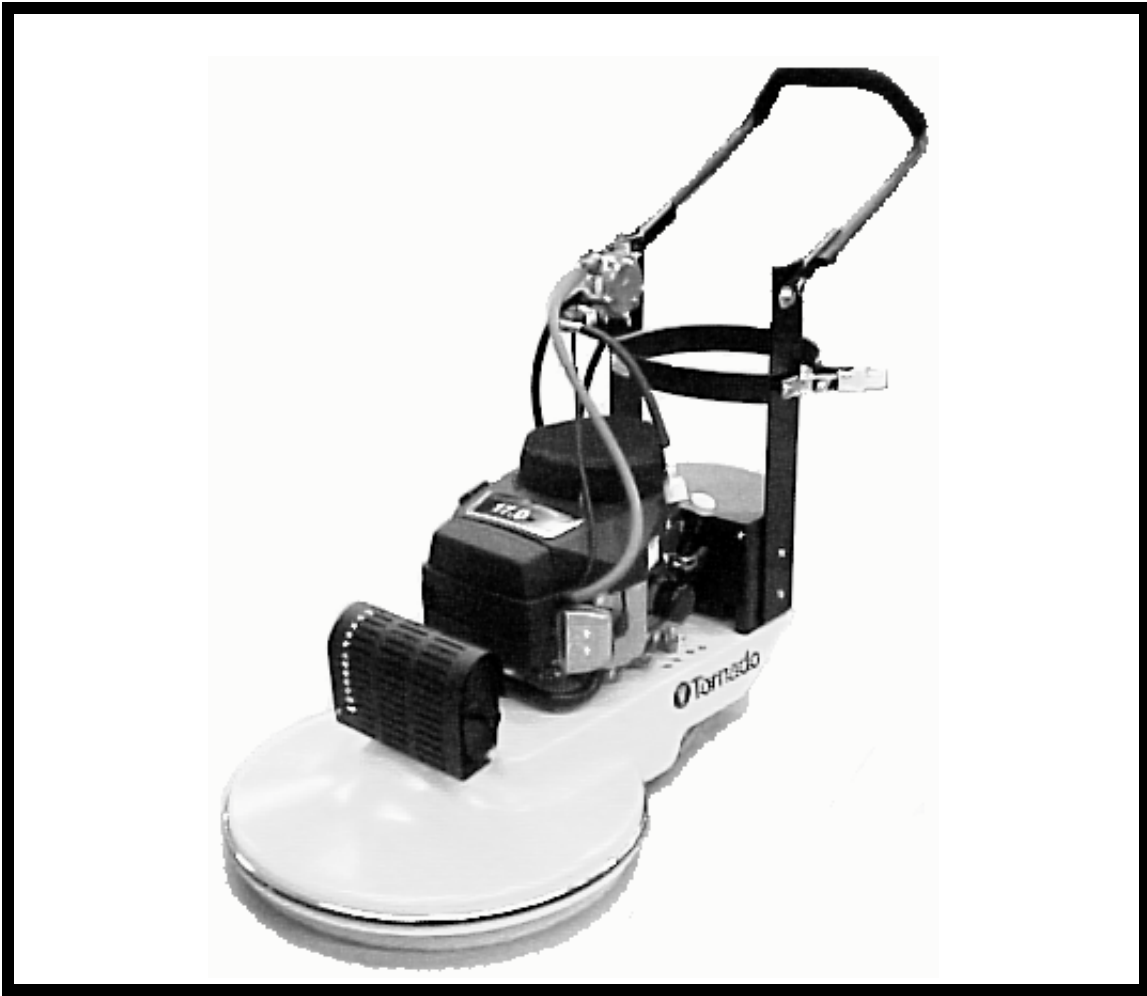


TORNADO® INDUSTRIES
7401 W. LAWRENCE AVENUE
CHICAGO, IL 60706
(708) 867-5100 FAX (708) 867-6968
www.tornadovac.com



Operation and Maintenance Manual

For Commercial Use Only



Pro-Glazer Model PG K17-28

Catalog No.
97575

For Parts List see L7575JDP
Effective 1/16/06

This illustrated instruction book covers:

MODEL	Pro-Glazer PG K17-28
PAD SIZE	28"
CATALOG NO.	97575
SERIES	D
ENG. TYPE	KAWASAKI
CLUTCH	NONE
ENGINE SIZE (CC)	585
ENGINE (HP)	17

All specifications are subject to change without notice.

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Long-term buyer protection warranties

Tornado® Standard Warranty Program*	
<p>Warranties do not cover components subject to normal wear or abuse and misuse, and have other limitations not specified here. For full details, contact your Authorized Tornado Distributor, Service Center, or the Tornado Technical Service Department.</p> <p>Tornado sales and service representatives are not authorized to waive or alter the terms of this warranty, or to increase the obligations of Tornado under the warranty.</p>	<p>10 Years: <i>All plastic tanks and rotationally-molded bodies^{1) 2)}</i></p>
	<p>2 Year: <i>Parts on all Tornado and Tornado/Karcher cleaning equipment^{1) 2) 3)}</i></p>
	<p>1 Year: <i>Labor on all Tornado and Tornado/Karcher cleaning equipment²⁾</i></p>
	<p>1 Year: <i>Warranty on batteries and chargers, one year pro-rated.</i></p> <p>** 6 Month Warranty on Gel Batteries</p> <p>All battery warranties are handled by the battery manufacturer, please call customer service for more information.</p>

Thank you for choosing Tornado products. We are proud to offer the most complete line of commercial and industrial cleaning equipment in the industry. Our reputation for quality, innovation and durability is unsurpassed.

Effective January 1st, 2005. Terms subject to change without notice.

Windshear™ Blower-Dryer, Insulation Blowers, T191, T201, T12/1, CV 30, CV 38, CW 50, CW 100, Pro PAC Vacs, Duo-Upright Carpetkeepers™, Gas & Electric Pressure Washers, and all chargers are warranted for 1 (one) year for both parts and labor.

Warranties on all riding sweepers including the ICC1, KM 100/100 R, KMR 1250, and KMR 1700 are 24 months parts/6 months labor OR 1000 hours of operation, whichever comes first. Warranties on the 75/140 & 90/140 are 24 months parts/12 months' labor OR 1,000 hours of operation whichever comes first.

All non-wear item parts purchased after warranty expiration are warranted for 90 days. Warranty starts from the date of sale to the consumer or, at Tornado's discretion, 6 months after dealer purchased the unit from Tornado, whichever comes first.

Note: Tornado, The Latest Dirt, Floorkeeper, Carpetkeeper, Carpetrinser, Carpetrinser/Dryer, Headmaster, Taskforce, PAC-VAC, T-Lite, Glazer, Windshear, Max-Vac, CV 30, CV 38, and Trot-Mop are trademarks of Tornado Industries.

1-800-VACUUMS
Chicago area: (708) 867-5100
Fax: (708) 867-6968
7401 W. Lawrence Avenue
Chicago, IL

**BREUER ELECTRIC MFG., dba TORNADO INDUSTRIES, INC.
LIMITED WARRANTY FOR KAWASAKI MODIFIED ENGINES
CALIFORNIA AND FEDERAL
EMISSION CONTROL SYSTEMS
SMALL OFF-ROAD ENGINES**

YOUR WARRANTY RIGHTS AND OBLIGATIONS:

The California Air Resources Board (CARB), the Environmental Protection Agency (EPA), and Breuer Manufacturing Company, dba Tornado Industries, Inc. (hereinafter "Tornado Industries, Inc.") are pleased to explain the emissions control systems warranty on your Tornado Industries, Inc. small off-road engine.

In California and other states, new small off-road engines must be designed, built and equipped to meet the State's stringent anti-smog standards. Tornado Industries, Inc. must warrant the emission control system on your small off-road engine for a period time listed below provided that there has been no abuse, neglect or improper maintenance of your small off-road engine.

Your emission control system may include parts such as the carburetor or fuel-injection system, the ignition system, and catalytic converter. Also included may be hoses, connectors and other related assemblies.

Where a warrantable condition exist, Tornado Industries, Inc. will repair your small off-road engine at no cost to you including diagnosis, parts, and labor.

OWNER'S WARRANTY RESPONSIBILITIES:

The following obligations must be fulfilled by the owner to maintain the validity of the Tornado Industries, Inc., California Air Resources Board (CARB)/ Environmental Protection Agency (EPA) Emissions Systems Warranty:

- a.) As the small off-road engine owner, you are responsible for the performance of the required maintenance listed in your owner's manual. Tornado Industries, Inc. recommends that you retain all receipts covering the maintenance on your small off-road engine, but Tornado Industries, Inc. cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.
- b.) You are responsible for presenting your small off-road engine emissions related warranties to an authorized Tornado Industries, Inc. small off-road engine dealer as soon as a problem exists. The warranty repair should be completed in a reasonable amount of time, not to exceed 30 days.
- c.) As a small off-road engine owner, you should also be aware that Tornado Industries, Inc. may deny you warranty coverage if your small off-road engine or a part failed due to abuse, neglect, improper maintenance or unapproved modifications.
- d.) If you have any questions regarding your warranty rights and responsibilities, you should contact Tornado Industries, Inc., 7401 West Lawrence Avenue, Harwood Heights, Illinois 60706 at 1-708-867-5100.

MANUFACTURER'S WARRANTY COVERAGE:

Tornado Industries warrants to the initial owner and each subsequent purchaser that the emissions control system of that small off-road engine is free of defects in materials and workmanship which cause a failure of a warranted part for a period of two years. If any emissions related part in your engine is defective, the part will be repaired or replaced by Tornado Industries, Inc. This warranty time period shall begin on the date the small off-road engine is delivered to the initial purchaser, or on the date the small off-road engine is first placed into service.

Warranty defects shall be remedied during customary business hours at any authorized Tornado Industries, Inc. small off-road engine dealer located in the United States of America. Any manufacturer-approved replacement part may be used in the performance of any warranty or repairs on emission-rated parts, and must be provided without charge to the owner if the part is still under warranty. Any part or parts replaced under this warranty shall become property of Tornado Industries, Inc.

GENERAL EMISSIONS WARRANTY COVERAGE:

Tornado Industries, Inc. warrants to the ultimate purchaser and each subsequent purchaser that the engine is:

- (1) Designed, built and equipped so as to conform with all applicable regulations adopted by the Air Resources Board pursuant to its authority in Chapters 1 and 2, Part 5, Division 26 of the Health and Safety Code; and,**

- (2) Free from defects in materials and workmanship that cause the failure of a warranted part to be identical in all material respects to that part as described in the engine manufacturer's application for certification.

The warranty period begins on the date the engine or equipment is delivered to an ultimate purchaser or first placed into service.

- (3) Any warranted part that is not scheduled for replacement as required maintenance in the written instructions supplied, is warranted for the warranty period stated above. If any such part fails during the period of warranty coverage, the part will be repaired or replaced by Tornado Industries, Inc. according to Subsection (6) below. Any such part repaired or replaced under warranty will be warranted for the remaining warranty period.
- (4) Any warranted part that is scheduled only for regular inspection in the written instructions supplied is warranted for the warranty period stated above. Any such part repaired or replaced under warranty will be warranted for the remaining warranty period.
- (5) Any warranted part that is scheduled for replacement as required maintenance in the written instructions supplied 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 Tornado Industries, Inc. according to Subsection (6) 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.
- (6) Repair or replacement of any warranted part under the warranty provisions herein must be performed at a Tornado Industries, Inc. warranty station at no charge to the owner.
- (7) Notwithstanding the provisions herein, warranty services or repairs will be provided at all Tornado Industries, Inc.'s distribution centers that are franchised to service the subject engines.
- (8) The equipment or engine owner will not be charged for diagnostic labor that is directly associated with diagnosis of a defective, emission-related warranted part, provided that such diagnostic work is performed at a Tornado Industries, Inc. warranty station.
- (9) Tornado Industries, Inc. is liable for damages to other engine components proximately caused by a failure under warranty of any warranted part.
- (10) Throughout the engine's warranty period defined above Tornado Industries, Inc. must maintain a supply of warranted parts sufficient to meet the expected demand for such parts.
- (11) Any replacement part may be used in the performance of any warranty maintenance or repairs and must be provided without charge to the owner. Such use will not reduce the warranty obligations of Tornado Industries, Inc.
- (12) Add-on or modified parts, as defined in Section 1900(b)(1) and (b)(10), Title 13, that are not exempted by the Air Resources Board may not be used. The use of any non-exempted add-on or modified parts by the ultimate purchaser will be grounds for disallowing a warranty claim made in accordance with this article. Tornado Industries, Inc. will not be liable under this article to warrant failures of warranted parts caused by the use of a non-exempted add-on or modified part.

WARRANTED PARTS LIST:

The following is Tornado Industries, Inc.'s emission warranty parts list for your engine or equipment:

- (i) Fuel Metering System
 - (A) Carburetor and internal parts (and/or pressure regulator or fuel injection system)
 - (B) Intake valve(s)
- (ii) Air Induction System
 - (A) Air filter

(iii) Ignition System

- (A) Spark plugs**
- (B) Ignition coil**
- (C) Ignition wires**

(iv) Exhaust System

(v) Catalyst or Thermal Reactor System

- (A) Catalytic converter**

(vi) Miscellaneous Items Used in Above Systems

- (A) Hoses, clamps, fittings, tubing, sealing gaskets or devices, and mounting hardware**

(vii) Exclusions.

- (1) The repair or replacement of any warranted part otherwise eligible for warranty coverage above, may be excluded from such warranty coverage if Tornado Industries, Inc. demonstrates that the engine has been abused, neglected, or improperly maintained, and that such abuse, neglect, or improper maintenance was the direct cause of the need for repair or replacement of the part.**
- (2) Tornado Industries, Inc. warrants your engine only for the yearly warranty period specified above.**
- (3) Except as provided above, any adjustment of a component that has a factory installed, and properly operating, adjustment limiting device (such as an idle limiter cap or plug) is eligible for warranty coverage as stated above.**

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code.

Reference: Sections 43013, 43017, 43018, 43101, 43102, 43104, 43105, 43150-43154, 43205.5 and 43210-43212, Health and Safety Code.

LIMITED LIABILITY:

- a.) The liability of Tornado Industries, Inc. under this emissions control systems warranty is limited solely to the remedying of defects in material and workmanship by an authorized Tornado Industries, Inc. small off-road engine dealer at its place of business during customary business hours. This warranty does not cover inconvenience or loss of use of the small off-road engine or transportation of the small off-road engine to or from the Tornado Industries, Inc. dealer. TORNADO INDUSTRIES, INC. SHALL NOT BE LIABLE FOR ANY OTHER EXPENSE, LOSS OR DAMAGE, WHETHER DIRECT, INCIDENTAL, CONSEQUENTIAL (EXCEPTION LISTED UNDER COVERAGE) OR EXEMPLARY ARISING IN CONNECTION WITH THE SALE OR USE OF OR INABILITY TO USE THE TORNADO INDUSTRIES, INC. SMALL OFF ROAD ENGINE FOR ANY OTHER PURPOSE.
- b.) NO EXPRESS EMISSION CONTROL SYSTEMS WARRANTY IS GIVEN BY TORNADO INDUSTRIES, INC. WITH RESPECT TO THE TORNADO INDUSTRIES, INC. SMALL OFF-ROAD ENGINE EXCEPT AS SPECIFICALLY SET FORTH HEREIN. ANY EMISSION CONTROL SYSTEMS WARRANTY IMPLIED BY LAW, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, IS EXPRESSLY LIMITED TO THE EMISSION CONTROL SYSTEMS WARRANTY TERMS SET FORTH HEREIN. THE FORGOING STATEMENT OF WARRANTY ARE EXCLUSIVE AND IN LIEU OF ALL OTHER REMEDIES.
- c.) No dealer is authorized to modify this Tornado Industries, Inc. Limited Emission Control Systems Warranty.
- d.) Tornado Industries, Inc. is not liable for parts that are not genuine Tornado Industries, Inc parts except when genuine Tornado Industries, Inc. parts cause damage to non-Tornado Industries, Inc. parts.

LEGAL RIGHTS:

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS.

IMPORTANT SAFETY INSTRUCTIONS

READ ALL INSTRUCTIONS BEFORE USING THIS APPLIANCE

WARNING:

Keep hands, feet, shoestrings, and neckties away from all moving parts while the machine is in operation. The exhaust system gets very hot, so keep hands, clothing and any combustible items away from the engine while it is hot.

Tornado machines are built tough and durable, but do not abuse the machine or mechanical damage and/or personal injury could result. With proper care and maintenance this unit will give you trouble-free operation for years to come.

WARNING:

LETHAL EXHAUST GASES

Engine exhaust gases contain poisonous carbon monoxide. Carbon monoxide is odorless, colorless, tasteless, and can cause death if inhaled. Although NFPA 588-4.5 says..." these machines shall be permitted to be used in buildings frequented by the public", the Tornado Co. suggests you avoid inhaling exhaust flames, and never run the engine in a closed building or confined area without proper ventilation.

Although LPG burns more efficiently and emits less carbon monoxide than gasoline, some carbon monoxide is produced. Avoid inhaling exhaust gases - especially over prolonged periods of time. Do not allow engine to run unattended.

WARNING:

TO REDUCE THE RISK OF FIRE OR INJURY

If the handle throttle lever is moved suddenly, high starting torque will cause the machine to move, and may cause damage or injury. Don't wear loose-fitting clothing while near the machine, and take care not to accidentally move the throttle lever.

The machine must not be running while:

- Leaving machine unattended
- Changing pads
- Attempting any maintenance or adjustment

These machines should not:

- Be used by unqualified or untrained personnel
- Be used unless they are properly maintained and adjusted
- Be used in areas with obstructions such as thresholds, etc.
- Be used in areas with loose tiles
- Be used in rooms without proper ventilation

WARNING:

Do not put hands under base - rotating parts could cause injury. Always keep hands, feet, and loose fitting clothing away from moving parts to prevent possible injuries. Use care to keep any electrical supply from contacting moving parts such as floor brushes or pads.

- Do not use machine in areas where flammable and/or explosive vapors or dust are present.
- Never use a device to lock the switch lever in the "ON" position.
- Do not add weight to this machine - this will upset the balance and may cause motor overload.
- Pad holders and brushes must be properly maintained to insure maximum cleaning results.
- To avoid fire, do not use with a flammable or combustible liquid to clean a floor.
- Risk of explosion. Floor sanding can result in explosive mixture of fine dust and air. Use this machine only in a well-ventilated area, free from any flame or match.
- Do not store with brush, pad holder or pad on floor.
- Refer to this manual for additional instructions.

SAVE THESE INSTRUCTIONS

Machine Specifications:

Pad Size	28"
Pad Speed	1850 RPM
Width	26.4"
Length	46"
Engine	Kawasaki FH 541V-B06
Starter Voltage	12 Volts
Deck Material	Cast Aluminum Alloy

OPERATING AND MAINTENANCE INSTRUCTIONS

OPERATION OF THE MACHINE

Your Tornado® Floor Machine is ready for operation as soon as it is unpacked. Remove the machine from the pallet and discard bolts.

Before beginning any operation, please read your Kawasaki Owners Manual.

The unit comes shipped without fuel in the tank. Be careful not to overfill the tank. The best method for filling the tank is to have the full tank weighed at the filling station. The steel tank should weigh no more than 43 pounds. Also, adjust the handle to a comfortable position and insert the locking pins. Then, with two 3/4" wrenches tighten the two main bolts in the handle support to 40-50 ft/lbs.

Check the engine oil level. The unit will come shipped with oil. Always keep the engine oil level between the full and add marks on the dipstick. Replace the oil by performing the following steps :

- Park your Pro-Glazer on a level surface and make sure the engine is stopped.
- Turn the oil cap counter clockwise and then lift from the fill tube.
- Wipe the dip stick clean and push it back into the oil fill tube until the cap seats, and then withdraw it to check the oil level. (Do *not* screw in to check level.) Oil level should be between the "ADD" and "FILL" marks. Add oil if necessary.
- Replace oil cap and tighten.
- If the oil is low, add API Service Classification SF, SG, SH, or SJ oil having a SAE viscosity grade appropriate for the expected temperatures as indicated in the *Kawasaki Owners Manual*.

The machine is shipped with the battery connected.

Inspect all fuel hoses and fittings for leaks. Repair any leaks immediately.

Check the carb filter and air filter for debris. Clean and replace if necessary.

Connect fuel hose to tank by (hand tightening) the hose fitting to the tank. Make sure the connection is tight to prevent leaks.

PRO-GLAZER STARTING PROCEDURE

The Pro-Glazer PG K17-28 is equipped with a 12-volt starter and key switch.

1. Tilt machine back so the floor pad is off the floor.
2. Turn the fuel tank knob slowly until you hear the flow of the fuel into the fuel system.
3. Turn the key switch fully counterclockwise to the "Start" position and hold it there until the engine starts. Do not crank more than 5 seconds at a time, and wait at least 15 seconds between tries when cranking. See Trouble Shooting Table if the engine does not start after several tries.
4. After the engine starts, move the throttle to the slow position. Do not operate buffer until the engine has warmed up sufficiently, recommended as 3-5 minutes at idle.
5. Lower pad to floor slowly, and operate at full throttle.

STOPPING ENGINE

1. Lower the engine speed to an idle, and allow the engine to idle for about one minute.
2. Turn fuel valve on tank to the closed position and allow the engine to continue running until it runs out of fuel.
3. Turn the key to the off position.

Caution:

In an emergency, turn the key to the off position, and close the fuel valve. Backfiring may occur when using this method.

MOUNTING PAD AND OTHER ATTACHMENTS

(WARNING: TURN OFF UNIT BEFORE STARTING PAD INSTALL)
(WARNING: REMOVE LP TANK BEFORE TURNING OVER THE MACHINE)

To mount or remove a pad, tilt the machine back until it rests on the back wheels. Unscrew the pad-lock nut while gripping the pad and pad driver. Position a new pad concentric with the pad driver and retighten with the pad-lock nut.

To remove the pad driver, first make sure the oil cap is tightly sealed.



To remove the pad driver, tilt the machine on its side. NOTE: Look for the, "THIS SIDE UP" decal on the side of the machine.



Use a 3/4" wrench to hold the main shaft which is located between the four bolts in the front and on the top of

the machine. Then, rotate the pad driver counterclockwise to unscrew it from the main shaft.

For long life and best results always use genuine TORNADO® accessories.

MAINTENANCE OF THE PAD HOLDER

Remove the pad holder when the machine is not in use, and hang on wall peg or similar holder.

POLISHING

Use 3/4" to 1" thick BEIGE high speed burnishing pads. Floors should be dry mopped to remove grit.

SPRAY BUFFING

Use 3/4" to 1" thick HOG HAIR high speed burnishing pad. The spray buff solution should be applied to the floor ahead of the machine. Do not run the machine into the spray or mist of the spray buff solution.

DAMP BUFFING

Use 3/4" to 1" thick BEIGE high speed burnishing pad. Use a well wrung out mop to apply damp buffing solution. Go over dampened surface with machine until surface is dry and has a high glaze.

STORING

Store with pad off the floor by tilting machine back on the support wheels.

BELT MAINTENANCE

(WARNING: REMOVE LP TANK BEFORE TURNING OVER THE MACHINE)

To change a broken or worn belt, turn the machine on its side and remove the pad and pad driver. Using a wrench, loosen the hex bolt for the pulley tensioner. Once the tensioner is loose, the belt can be easily removed. Slip the old belt off the pulleys and reattach the new belt. Attach the pulley tensioner back into position and retighten its bolt. The tensioner should provide the belt with a 0.16 inch belt deflection when a force of 2 pounds is applied against outside of belt. Turn machine upright immediately after service is completed.

Maintenance Table:

These are typical service intervals. Service more frequently under more severe operating conditions.

Type of Service	Daily	First 8 Hrs.	Every 25 Hrs.	Every 50 Hrs.	Every 100 Hrs.	Every 200 Hrs.	Every 300 Hrs.	Every 500 Hrs.
Check Oil for Proper Fill Level	•++							
Check Bonnet Air Filter for Obstruction	•							
Check Cleaning Pad for Wear	•							
Check Drive Belt Tension	•							
Inspect for Loose Bolts & Connections	•							
Change Engine Oil ++		•		•				
Clean Air Cleaner Foam Element			•					
Clean Air Cleaner Paper Element				•				
Tighten Nuts, Screws, & Brackets			•					
Clean and Adjust or Replace Spark Plug					•			
Clean Engine Cooling Fins					•			
Change Oil Filter						•		
Replace Air Cleaner Paper Element						•		
Adjust Engine Valve Clearance							KD	
Clean and Lap Valve Seats							KD	
Clean Cylinder Heads of Deposits							KD	
Recertify Emission Control System								•^^

KD = Have an authorized Kawasaki Engine Dealer perform these services.

^^ = Machine must be recertified at Tornado

++ MOTOR OIL: Consult the Kawasaki Owners Manual for oil viscosity recommendations.

General capacity of engine oil is 1.9 US quarts. Oil level must be checked when engine is tilted forward.

Replacement Items

Description	Catalog #
Bonnet Filter	99552
Pre-Carburetor Sponge Filter	99551
Carburetor Filter	99550
Oil Filter	99553
Steel Propane Tank w/Gauge	30396

Troubleshooting Table:

SYMPTOM	POSSIBLE CAUSES
Will Not Start/Hard to Start	Empty fuel tank. Faulty carburetor, ignition coil, or valves. Faulty battery or ignition key switch. Faulty head gasket, piston, cylinder, valves, or piston ring. Loose cylinder head bolts. Clogged air filter elements. Faulty fuel pressure regulator. Defective, poorly gapped, or loose spark plug.
Engine Lacks Power	Faulty carburetor, ignition coil. Faulty head gasket, piston, cylinder, valves, or piston ring. Loose cylinder head bolts. Clogged air filter elements. Faulty fuel pressure regulator. Defective, poorly gapped, or loose spark plug. Clogged cooling air (bonnet) element. (Overheat) Dirty cooling fins. (Overheat) Low engine oil level. (Overheat) Excessive carbon deposits in combustion chambers. (Overheat)
Engine Speed Won't Increase	Faulty cable connection, or engine governor.
Engine Stops Running	Out of fuel. Severe condition causing engine overheat.
Smell of Burned Rubber	Drive belt out of adjustment.
Machine Vibrates	Loose bolts. Pad not centered.
Machine "Digs In" While Running	Operator is bearing down too hard.

Daily Inspection Checklist:

ITEM	CHECK BOX
- Check condition of pad (Replace if torn or dirty)	
- Wipe entire unit down with cleaning solution (engine must be cool)	
- Verify pad retainer is still in place	
- Store Propane tank outside of building	
- Store Pro-Glazer back on casters, so the pad is off the floor	
- Store the Pro-Glazer in a clean dry place	
- Report any problems with unit	