OPERATION MANUAL

MULTIQUIP®

WHITEMAN SERIES

MODELS
JWN24HTCSL
JWN24HSCSL

RIDE-ON POWER TROWELS
(HONDA GX690RTAF GASOLINE ENGINE)

STARTING S/N VB0206952

Revision #1 (05/12/12)

To find the latest revision of this publication, visit our website at: www.multiquip.com

THIS MANUAL MUST ACCOMPANY THE EQUIPMENT AT ALL TIMES.

PN: 23624

⚠ WARNING ⚠

CALIFORNIA — Proposition 65 Warning

Engine exhaust and some of its constituents, and some dust created by power sanding, sawing, grinding, drilling and other construction activities contains chemicals known to the State of California to cause cancer, birth defects and other reproductive harm. Some examples of these chemicals are:

- Lead from lead-based paints.
- Crystalline silica from bricks.
- Cement and other masonry products.
- Arsenic and chromium from chemically treated lumber.

Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals: ALWAYS work in a well ventilated area, and work with approved safety equipment, such as dust masks that are specially designed to filter out microscopic particles.

WARNING

SILICOSIS WARNING

Grinding/cutting/drilling of masonry, concrete, metal and other materials with silica in their composition may give off dust or mists containing crystalline silica. Silica is a basic component of sand, quartz, brick clay, granite and numerous other minerals and rocks. Repeated and/or substantial inhalation of airborne crystalline silica can cause serious or fatal respiratory diseases, including silicosis. In addition, California and some other authorities have listed respirable crystalline silica as a substance known to cause cancer. When cutting such materials, always follow the respiratory precautions mentioned above.

WARNING

RESPIRATORY HAZARDS

Grinding/cutting/drilling of masonry, concrete, metal and other materials can generate dust, mists and fumes containing chemicals known to cause serious or fatal injury or illness, such as respiratory disease, cancer, birth defects or other reproductive harm. If you are unfamiliar with the risks associated with the particular process and/or material being cut or the composition of the tool being used, review the material safety data sheet and/or consult your employer, the material manufacturer/supplier, governmental agencies such as OSHA and NIOSH and other sources on hazardous materials. California and some other authorities, for instance, have published lists of substances known to cause cancer, reproductive toxicity, or other harmful effects.

Control dust, mist and fumes at the source where possible. In this regard use good work practices and follow the recommendations of the manufacturers or suppliers, OSHA/NIOSH, and occupational and trade associations. Water should be used for dust suppression when wet cutting is feasible. When the hazards from inhalation of dust, mists and fumes cannot be eliminated, the operator and any bystanders should always wear a respirator approved by NIOSH/MSHA for the materials being used.

JWN24 Series Ride-On Power Trowel

NOTICE

Specifications are subject to change without notice.

Training Checklist			
No,	**Description**	**OK?**	**Date**
1	Read operation manual completely.		
2	Machine layout, location of components, checking of engine oil levels.		
3	Fuel system, refueling procedure.		
4	Operation of spray and lights.		
5	Operation of controls (machine not running).		
6	Safety controls, safety stop switch operation.		
7	Emergency stop procedures.		
8	Startup of machine, pre-heat, engine choke.		
9	Maintaining a hover.		
10	Maneuvering.		
11	Pitching.		
12	Matching blade pitch. Twin-Pitch™		
13	Concrete finishing techniques.		
14	Shutdown of machine.		
15	Lifting of machine (lift loops).		
16	Machine transport and storage.		

DAILY PRE-OPERATION CHECKLIST

Daily Pre-Operation Checklist		✓	✓	✓	✓	✓	✓
1	Engine oil level						
2	Condition of blades						
3	Blade pitch operation						
4	Safety stop switch operation						
5	Steering control operation						

Do not operate or service the equipment before reading the entire manual. Safety precautions should be followed at all times when operating this equipment. Failure to read and understand the safety messages and operating instructions could result in injury to yourself and others.

SAFETY MESSAGES

The four safety messages shown below will inform you about potential hazards that could injure you or others. The safety messages specifically address the level of exposure to the operator and are preceded by one of four words: **DANGER, WARNING, CAUTION** or **NOTICE.**

SAFETY SYMBOLS

DANGER

Indicates a hazardous situation which, if not avoided, **WILL** result in **DEATH** or **SERIOUS INJURY.**

WARNING

Indicates a hazardous situation which, if not avoided, **COULD** result in **DEATH** or **SERIOUS INJURY.**

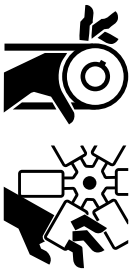
CAUTION

Indicates a hazardous situation which, if not avoided, **COULD** result in **MINOR** or **MODERATE INJURY.**

NOTICE

Addresses practices not related to personal injury.

Potential hazards associated with the operation of this equipment will be referenced with hazard symbols which may appear throughout this manual in conjunction with safety messages.

Symbol	Safety Hazard
	Lethal exhaust gas hazards
	Explosive fuel hazards
	Burn hazards
	Rotating parts hazards
	Pressurized fluid hazards
	Hydraulic fluid hazards

GENERAL SAFETY

⚠ CAUTION

- **NEVER** operate this equipment without proper protective clothing, shatterproof glasses, respiratory protection, hearing protection, steel-toed boots and other protective devices required by the job or city and state regulations.

- Avoid wearing jewelry or loose fitting clothes that may snag on the controls or moving parts as this can cause serious injury.
- **NEVER** operate this equipment when not feeling well due to fatigue, illness or when under medication.

- **NEVER** operate this equipment under the influence of drugs or alcohol.

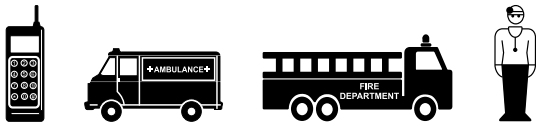
- **ALWAYS** clear the work area of any debris, tools, etc. that would constitute a hazard while the equipment is in operation.
- No one other than the operator is to be in the working area when the equipment is in operation.
- **DO NOT** use the equipment for any purpose other than its intended purposes or applications.

NOTICE

- This equipment should only be operated by trained and qualified personnel 18 years of age and older.
- Whenever necessary, replace nameplate, operation and safety decals when they become difficult read.
- Manufacturer does not assume responsibility for any accident due to equipment modifications. Unauthorized equipment modification will void all warranties.
- **NEVER** use accessories or attachments that are not recommended by Multiquip for this equipment. Damage to the equipment and/or injury to user may result.
- **ALWAYS** know the location of the nearest **fire extinguisher.**

- **ALWAYS** know the location of the nearest **first aid kit.**

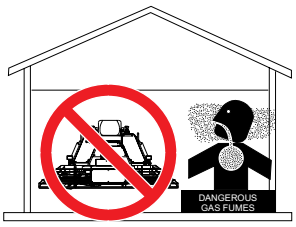
- **ALWAYS** know the location of the nearest phone or **keep a phone on the job site.** Also, know the phone numbers of the nearest **ambulance, doctor** and **fire department.** This information will be invaluable in the case of an emergency.



TROWEL SAFETY

DANGER

- Engine fuel exhaust gases contain poisonous carbon monoxide. This gas is colorless and odorless, and can cause death if inhaled.
- The engine of this equipment requires an adequate free flow of cooling air. **NEVER** operate this equipment in any enclosed or narrow area where free flow of the air is restricted. If the air flow is restricted it will cause injury to people and property and serious damage to the equipment or engine.



- **NEVER** operate the equipment in an explosive atmosphere or near combustible materials. An explosion or fire could result causing severe **bodily harm or even death.**

WARNING

- If applicable, **NEVER** use your hand to find hydraulic leaks. Use a piece of wood or cardboard. Hydraulic fluid injected into the skin must be treated by a knowledgable physician immediately or severe injury or death can occur.

- **ALWAYS** keep clear of rotating or moving parts while operating the trowel.

- **NEVER** disconnect any **emergency or safety devices.** These devices are intended for operator safety. Disconnection of these devices can cause severe injury, bodily harm or even death. Disconnection of any of these devices will void all warranties.

CAUTION

- **NEVER** allow passengers or riders on the trowel during operation.
- **NEVER** lubricate components or attempt service on a running machine.
- **NEVER** place your feet or hands inside the guard rings while starting or operating this equipment.

NOTICE

- **ALWAYS** keep the machine in proper running condition.
- Fix damage to machine and replace any broken parts immediately.
- **ALWAYS** store equipment properly when it is not being used. Equipment should be stored in a clean, dry location out of the reach of children and unauthorized personnel.
- A safety manual for operating and maintenance personnel of concrete power trowels produced by the Association of Equipment Manufacturers (AEM) can be obtained for a fee by ordering through their website at www.aem.org.

  Order FORM PT-160

ENGINE SAFETY

WARNING

- **DO NOT** place hands or fingers inside engine compartment when engine is running.
- **NEVER** operate the engine with heat shields or guards removed.
- Keep fingers, hands hair and clothing away from all moving parts to prevent injury.

- **DO NOT** remove the engine oil drain plug while the engine is hot. Hot oil will gush out of the oil tank and severely scald any persons in the general area of the trowel.

CAUTION

- **NEVER** touch the hot exhaust manifold, muffler or cylinder. Allow these parts to cool before servicing equipment.

NOTICE

- **NEVER** run engine without an air filter or with a dirty air filter. Severe engine damage may occur. Service air filter frequently to prevent engine malfunction.
- **NEVER** tamper with the factory settings of the engine or engine governor. Damage to the engine or equipment can result if operating in speed ranges above the maximum allowable.

FUEL SAFETY

⚠ DANGER

- **DO NOT** start the engine near spilled fuel or combustible fluids. Fuel is extremely flammable and its vapors can cause an explosion if ignited.
- **ALWAYS** refuel in a well-ventilated area, away from sparks and open flames.
- **ALWAYS** use extreme caution when working with **flammable** liquids.
- **DO NOT** fill the fuel tank while the engine is running or hot.
- **DO NOT** overfill tank, since spilled fuel could ignite if it comes into contact with hot engine parts or sparks from the ignition system.
- Store fuel in appropriate containers, in well-ventilated areas and away from sparks and flames.
- **NEVER** use fuel as a cleaning agent.
- **DO NOT** smoke around or near the equipment. Fire or explosion could result from fuel vapors or if fuel is spilled on a hot engine.

BATTERY SAFETY

⚠ DANGER

- **DO NOT** drop the battery. There is a possibility that the battery will explode.
- **DO NOT** expose the battery to open flames, sparks, cigarettes, etc. The battery contains combustible gases and liquids. If these gases and liquids come into contact with a flame or spark, an explosion could occur.

⚠ WARNING

- **ALWAYS** wear safety glasses when handling the battery to avoid eye irritation. The battery contains acids that can cause injury to the eyes and skin.

- Use well-insulated gloves when picking up the battery.
- **ALWAYS** keep the battery charged. If the battery is not charged, combustible gas will build up.
- **DO NOT** charge battery if frozen. Battery can explode. When frozen, warm the battery to at least 61°F (16°C).
- **ALWAYS** recharge the battery in a well-ventilated environment to avoid the risk of a dangerous concentration of combustible gases.
- If the battery liquid (dilute sulfuric acid) comes into contact with **clothing or skin**, rinse skin or clothing immediately with plenty of water.

- If the battery liquid (dilute sulfuric acid) comes into contact with **eyes**, rinse eyes immediately with plenty of water and contact the nearest doctor or hospital to seek medical attention.

⚠ CAUTION

- **ALWAYS** disconnect the **NEGATIVE battery terminal** before performing service on the equipment.
- **ALWAYS** keep battery cables in good working condition. Repair or replace all worn cables.

TRANSPORTING SAFETY

⚠ CAUTION

- **NEVER** allow any person or animal to stand underneath the equipment while lifting.

- Ride-on trowels are very heavy and awkward to move around. Use proper heavy lifting procedures and **DO NOT** attempt to lift the trowel by the guard rings.

NOTICE

- The easiest way to lift the trowel is to utilize the lift loops that are welded to the frame. These lift loops are located to the left and right sides of the operator's seat.

  A strap or chain can be attached to these lift loops, allowing a forklift or crane to lift the trowel up onto and off of a slab of concrete. The strap or chain should have a minimum of 2,000 pounds (1,000 kg) lifting capacity and the lifting gear must be capable of lifting at least this amount.

- **NEVER** transport trowel with float pans attached unless safety catches are used and are specifically cleared for such transport by the manufacturer.
- **NEVER** hoist the trowel more than three feet off the ground with float pans attached.
- Before lifting, make sure that the lift loops are not damaged.
- Always make sure crane or lifting device has been properly secured to the lift loops of the equipment.
- **ALWAYS** shutdown engine before transporting.
- **NEVER** lift the equipment while the engine is running.
- Tighten fuel tank cap securely and close fuel cock to prevent fuel from spilling.
- Use adequate lifting cable (wire or rope) of sufficient strength.
- **DO NOT** lift machine to unnecessary heights.
- **ALWAYS** tie down equipment during transport by securing the equipment with rope.

TOWING SAFETY

⚠ CAUTION

- Check with your local county or state safety towing regulations, in addition to meeting ***Department of Transportation (DOT) Safety Towing Regulations,*** before towing your trowel.

- In order to reduce the possibility of an accident while transporting the trowel on public roads, **ALWAYS** make sure the trailer that supports the trowel and the towing vehicle are mechanically sound and in good operating condition.
- **ALWAYS** shutdown engine before transporting
- Make sure the hitch and coupling of the towing vehicle are rated equal to, or greater than the trailer "gross vehicle weight rating."
- **ALWAYS** inspect the hitch and coupling for wear. **NEVER** tow a trailer with defective hitches, couplings, chains, etc.
- Check the tire air pressure on both towing vehicle and trailer. ***Trailer tires should be inflated to 50 psi cold***. Also check the tire tread wear on both vehicles.
- **ALWAYS** make sure the trailer is equipped with a **safety chain.**
- **ALWAYS** properly attach trailer's safety chains to towing vehicle.
- **ALWAYS** make sure the vehicle and trailer directional, backup, brake and trailer lights are connected and working properly.
- DOT Requirements include the following:
  - Connect and test electric brake operation.
  - Secure portable power cables in cable tray with tie wraps.
- The maximum speed for highway towing is 55 MPH unless posted otherwise. Recommended off-road towing is not to exceed 15 MPH or less depending on type of terrain.
- Avoid sudden stops and starts. This can cause skidding, or jack-knifing. Smooth, gradual starts and stops will improve towing.
- Avoid sharp turns to prevent rolling.

- Trailer should be adjusted to a level position at all times when towing.
- Raise and lock trailer wheel stand in up position when towing.
- Place ***chock blocks*** underneath wheel to prevent rolling while parked.
- Place support blocks underneath the trailer's bumper to prevent tipping while parked.
- Use the trailer's swivel jack to adjust the trailer height to a level position while parked.

ENVIRONMENTAL SAFETY

NOTICE

- Dispose of hazardous waste properly. Examples of potentially hazardous waste are used motor oil, fuel and fuel filters.

- **DO NOT** use food or plastic containers to dispose of hazardous waste.
- **DO NOT** pour waste, oil or fuel directly onto the ground, down a drain or into any water source.

EMISSIONS INFORMATION

NOTICE

The gasoline engine used in this equipment has been designed to reduce harmful levels of carbon monoxide (CO), hydrocarbons (HC) and nitrogen oxides (NOx) contained in gasoline exhaust emissions.

This engine has been certified to meet US EPA Evaporative emissions requirements in the installed configuration.

Attempting to modify or make adjustments to the engine emmission system by unauthorized personnel without proper training could damage the equipment or create an unsafe condition.

Additionally, modifying the fuel system may adversely affect evaporative emissions, resulting in fines or other penalties.

Emission Control Label

The emission control label is an integral part of the emission system and is strictly controlled by regulation(s).

The label must remain with the engine for its entire life.

If a replacement emission label is needed, please contact your authorized Honda Engine Distributor.

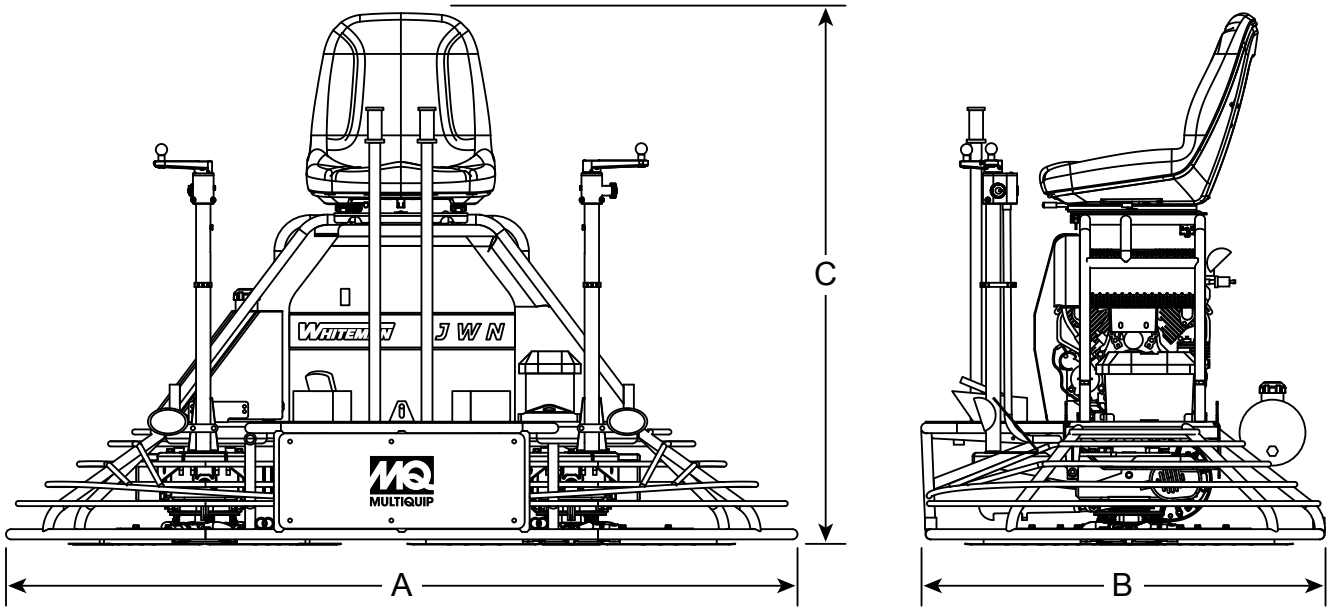


Figure 1. Dimensions

Table 1. Trowel Specifications	
A–Length – in. (cm)	77.0 (195.6)
B–Width – in. (cm)	39 (99)
C–Height – in. (cm)1	46.75 (118.7)
Weight – lbs. (kgs.) Operating	685 (311.3)
Weight – lbs. (kgs.) Shipping	885 (402.27)
Engine – H.P.	24 (HONDA)
Fuel Tank – gallons (liters)	5 (19.23)
Rotor – RPM (Dry Concrete)	180 Min
Path Width – in. (cm)	75 (191)
Engine Oil Capacity (w/new filter)	2 Quarts (1.9 Liters)
Gear Box Oil Capacity	69 oz. Mobil SCH 634 Iso VG640

Table 2. Noise and Vibration Emissions for Model JWN24HTCSL	
Guaranteed ISO 11201:2010 Based Sound Pressure Level at Operator Station in dB(A)	92
Guaranteed ISO 3744:2010 Based Sound Power Level in dB(A)	112
Whole Body Vibration Per ISO 2631-1:1997 +A1:2010 in m/s^2 $\sum A(8)$	0.15

NOTES:

1. *Sound Pressure and Power Levels are "A" weighted Measures per ISO 226:2003 (ANSI S1.4-1981). They are measured with the operating condition of the machine which generates the most repeatable but highest values of the sound levels. Under normal circumstances, the sound level will vary depending on the condition of the material being worked upon.*
2. *The vibration level indicated is the vector sum of the RMS (Root Mean Square) Values of amplitudes on each axis, standardized to an 8 hour exposure period, and obtained using operating condition of the machine that generates the most repeatable but highest values in accordance with the applicable standards for the machine.*
3. *Per EU Directive 2002/44/EC, the daily exposure action value for whole body vibration is 0.5 m/s^2 $\sum A(8)$. The daily exposure limit value is 1.15 m/s^2 $\sum A(8)$.*

Table 3. Engine Specifications/Dimensions	
Model	**Honda GX690RTAF Engine**
Type	4 Stroke, Overhead Valve, 90 degree V-Twin 2 cylinder gasoline engine.
Piston Displacement	40.9 cu.in. (670 cc)
Max. Output	22.1 bhp/3,600 rpm (16.5 KW)
Max. Torque	35.6 lbf-ft at 2,500 rpm
Cooling System	Forced Air
Engine Oil Capacity	1.6 qt. (1.50 liters) 1.8 qt. (1.7 liters w/oil filter replacement)
Fuel	Unleaded gasoline Octane rating of 86 or higher. Maximum 10% ethanol. See engine manual for further details.
Fuel Consumption	1.71 gph
Starting System	Electric Start/CDI Type Magneto Ignition
Spark Plug Type	ZFR5F NGK
Spark Plug Gap	0.028-0.031 in. (0.70 - 0.80 mm)
Length	16.9 in. (42.9 cm)
Height	17.2 in. (43.8 cm)
Width	17.7 in. (45.0 cm)
Weight (dry)	99.9 lbs (45.3 kg)

JWN SERIES RIDE-ON POWER TROWEL FAMILIARIZATION

The JWN Series Ride-On Power Trowel is designed for the floating and finishing of concrete slabs.

Take a walk around your trowel. Take notice of all the major components like the engine, blades, air cleaner, fuel system, fuel shut-off valve, ignition switch etc. Check that there is always oil in the engine, and gear oil in the gearbox assembly.

Read all the safety instructions carefully. Safety instructions will be found throughout this manual and on the machine. Keep all safety information in good, readable condition. Operators should be well trained on the operation and maintenance of the trowel.

Look at the operator control levers. Grab the control levers and move them around a bit. Notice how moving the control levers causes the gearboxes and frame to move.

Notice the foot pedal which controls the engine speed. Also take a look at the main drive line of the trowel. Take note and reference how the belts look, this is the way the belts should look when adjusted properly.

Before using your trowel, test it on a flat watered down section of finished concrete. This trial test run will increase your confidence in using the trowel and at the same time it will familiarize you with the trowel's controls and indicators. In addition you will understand how the trowel will handle under actual conditions.

ENGINE

This trowel is equipped with an air cooled 24 HP Honda gasoline engine. Refer to the engine owner's manual for specific instructions regarding engine operation. This manual is included with the trowel at the time of shipping. Please contact your nearest Multiquip Dealer for a replacement should the original manual disappear.

BLADES

The blades of the trowel finish the concrete as they are swirled around the surface. Blades are classified as combination (10 or 8 inches wide) and finish (6 inches wide). This trowel is equipped with four blades per rotor equally spaced in a radial pattern and attached to a vertical rotating shaft by means of a spider assembly.

Figure 2 and Figure 3 show the location and functions of the controls, indicators and general maintenance parts. Each control may perform more than one function.

GEARBOXES

The JWN Series Ride-On Power Trowel uses two separate gearbox assemblies that are enclosed in rugged cast aluminum gear cases.

The gearbox casing has a large oil capacity allowing optimum lubrication to critical points.

STEERING ASSIST

Dual control levers located in front of the operator's seat are provided for steering the trowel. The control levers are linked to two spring loaded cylinders.

Push the left control lever forward and pull the right control lever backward and the trowel will rotate clockwise on approximately a center axis. Pull the left control lever backward and push the right control lever forward and the trowel will rotate counterclockwise. See Table 4 for a complete description on the control levers directional positioning.

CONSTANT VELOCITY JOINTS (CV-JOINTS)

Constant velocity joints insure the efficient transfer of power to the drive shaft and maintain the timing of the gearboxes without any chance of slippage.

TRAINING

For training, please use the ""Training Checklist"" located in the front of this manual. This checklist is not intended to be a substitute for proper training but will provide an outline for an experienced operator to provide training to a new operator.

1. **Seat** — Engine will not start unless operator is seated.
2. **Steering Control Levers** — Directs the unit forward, reverse, left, or right.
3. **Retardant Spray Control Button** — Sprays retardant through the nozzle at the front of the machine.
4. **Twin Pitch Control** — Both pitch towers are linked together. One crank may be turned to adjust the blade pitch simultaneously or individually controlled for each set of blades. Turn the crank as marked on its top surface to increase or decrease blade pitch.
5. **Light Switch** — Turns on three halogen lights. Two in front, one in rear.
6. **Ignition Switch** — With key inserted, turn clockwise to start engine.
7. **Hour Meter** — Indicates number of hours the engine has run.
8. **Choke Control Lever** — In cold weather pull this lever to start engine. After engine warms push knob all the way in.
9. **Fuel Gauge/Filler Cap** — Indicates the amount of fuel in the fuel tank. Remove this cap to add fuel.

DANGER

Add fuel to the tank only when the engine is stopped and has had an opportunity to cool down. In the event of a fuel spill, **DO NOT** attempt to start the engine until the fuel residue has been completely wiped up and the area surrounding the engine is dry.

10. **Fuel Tank** — Holds 5 gallons of unleaded gasoline.
11. **Left Foot Riser** — Operator foot rest pedal.
12. **Spray Nozzle** — Spray nozzle for retardant.
13. **Right Foot Pedal** — Controls blade speed. Slow blade speed is accomplished by slightly depressing the foot pedal. Maximum blade speed is accomplished by fully depressing the foot pedal.
14. **EZ- Mover Boss** — Front attachment point for EZ Mover. Used to move the trowel.
15. **Right Front Light** — 12 volt halogen lights, used for night operations.
16. **Left Front Light** — 12 volt halogen lights, used for night operations.

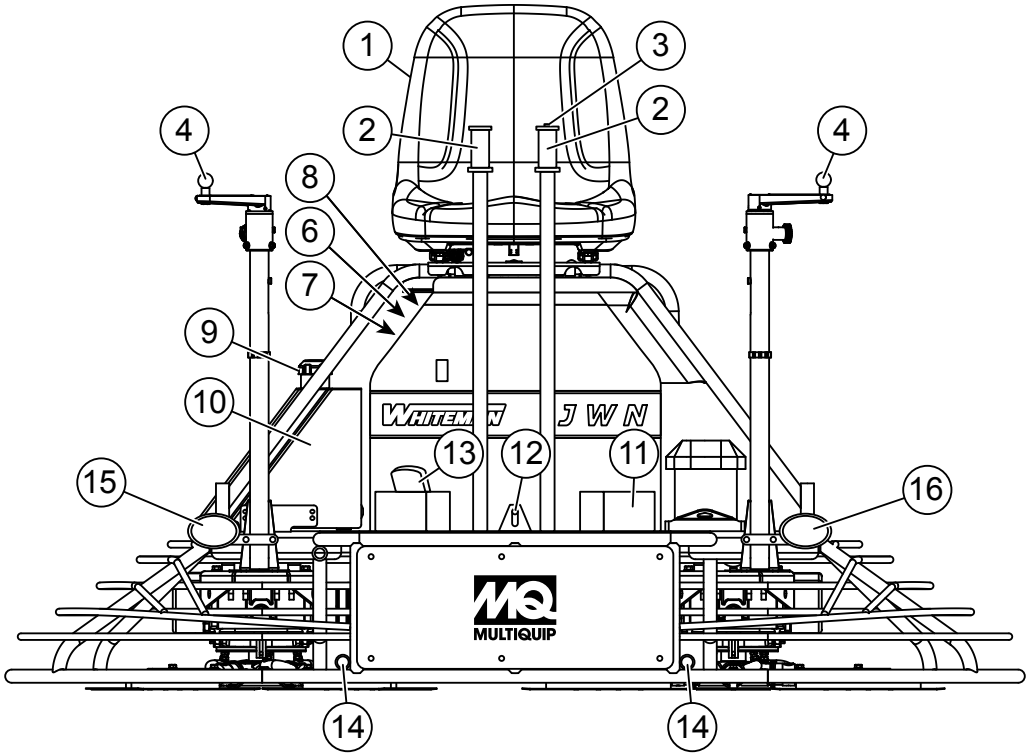


Figure 2. Components – Front

17. **Rear Light** — The JWN-Series Ride-On Power Trowel has three 12 volt halogen lights.
18. **Lift Loops** — Located on both sides of the main frame. Used to lift the trowel.
19. **Retardant Spray Tank** — Holds 5 gallons of retardant.
20. **Retardant Spray Pump** — Delivers retardant to the spray nozzle.
21. **EZ-Mover Boss** — Rear attachment point for EZ Mover. Used to transport the trowel.
22. **Right-Side Spider** — Consists of trowel arms, blades, wear plate, and thrust collar.
23. **Left-Side Spider** — Consists of trowel arms, blades, wear plate, and thrust collar.
24. **Document Box** — Contains all product documentation.
25. **Battery** — Provides +12V DC power to the electrical system.
26. **Belt Guard** — Encloses drive belt used in conjunction with clutch.
27. **Charcoal Canister** — Charcoal activated system that absorbs or traps fuel vapors. Basic component of evaporative emissions control systems
28. **Safety Kill Switch** — Shuts down engine when seat is not occupied by operator.

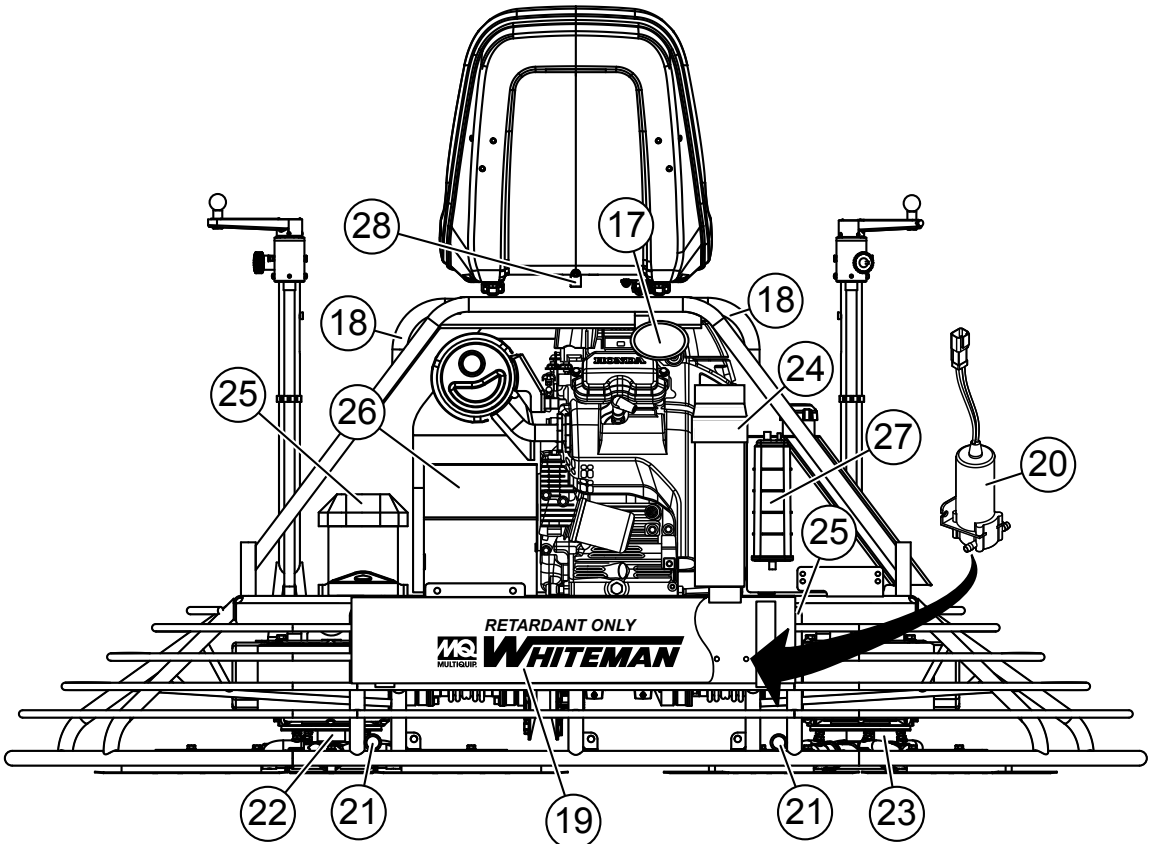


Figure 3. Components – Rear

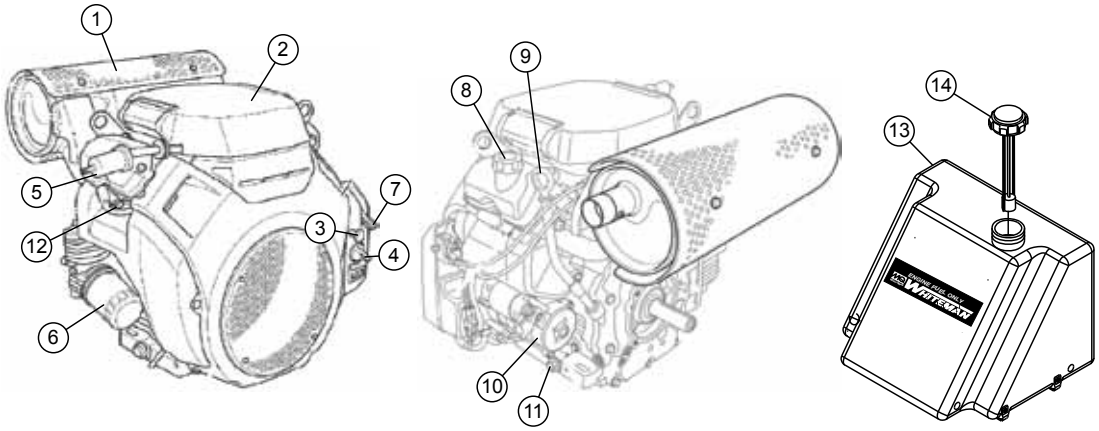


Figure 4. Engine Components

INITIAL SERVICING

The engine (Figure 4) must be checked for proper lubrication and filled with fuel prior to operation. Refer to the manufacturer's engine manual for instructions and details of operation and servicing.

1. **Muffler** — Used to reduce noise and emissions.

WARNING

Engine components can generate extreme heat. To prevent burns, **DO NOT** touch these areas while the engine is running or immediately after operating. **NEVER** operate the engine with the muffler removed.

2. **Air Cleaner** — Prevents dirt and other debris from entering the fuel system. Unsnap air filter cover to gain access to filter element.
3. **Choke Knob** — Used in the starting of a cold engine or in cold weather conditions. The choke enriches the fuel mixture.
4. **Engine ON/OFF Switch** — "ON" position permits engine starting, "OFF" position stops engine operations.
5. **Fuel Filter** — Filters fuel for contaminants.
6. **Oil Filter** — Spin-on type, filters oil for contaminants.
7. **Throttle Lever** — Controlled by accelerator pedal, increases or decreases engine RPM.
8. **Oil Filler Cap** — Remove to add engine oil.
9. **Oil Dip Stick** — Remove to check amount and condition of oil in crankcase.
10. **Starter** — Starts engine when ignition key is rotated to the "ON" position.
11. **Oil Drain Plug** — Remove to drain crankcase oil.
12. **Spark Plug** — Provides spark to the ignition system. Set spark plug gap to 0.6 - 0.7 mm (0.028 - 0.031 inch) Clean spark plug once a week.
13. **Fuel Tank** — Five gallon capacity; use unleaded gasoline.
14. **Fuel Filler Cap** — Remove this cap to add unleaded gasoline to the fuel tank. Make sure cap is tightened securely. **DO NOT** overfill.

DANGER

Add fuel to the tank only when the engine is stopped and has had an opportunity to cool down. In the event of a fuel spill, **DO NOT** attempt to start the engine until the fuel residue has been completely wiped up and the area surrounding the engine is dry.

The purpose of this section is to assist the user in setting up a **NEW** trowel. If your trowel is already assembled, (seat, handles, knobs and battery), this section can be skipped.

NOTICE

The new trowel cannot be placed into service until the setup installation instructions are completed.

Before packaging and shipping, this JWN SERIES Ride-On Power Trowel was run and tested at the factory. If there are problems, please let us know.

CONTROL HANDLE ASSEMBLY

The steering control handles are not attached to the trowel's two lower handles at the time of shipment. To attach the steering control handles to the two lower handle assemblies, perform the following:

1. Remove the bolts from the plastic bag tied to the control towers.
2. Remove all protective wrapping and straps from the control handles.
3. Slip the top (loose) piece into the base of the corresponding handle, making sure to line up the holes.
4. Install the bolt through the lined up holes and tighten the acorn nut onto the threaded end.

NOTICE

Some models are equipped with adjustable height handles. Adjust the height by placing the bolt through the set of holes that corresponds to the most comfortable height.

5. Pay close attention to any wires that may be inside the control handles. **DO NOT** pinch or cut any wires during installation.
6. Inside the plastic bag of parts are two knobs for the pitch control tower cranks. Install these two knobs onto the tower crank levers.

SEAT ASSEMBLY

The seat is not installed on the trowel for shipping purposes. To attach the seat perform the following:

1. Remove the seat from the protective wrapping.
2. Insert studs on bottom of seat through holes in the mounting plate.
3. Install and tighten the provided nuts.

BATTERY SETUP

This trowel was shipped with a wet charged battery. This battery may need to be charged for a brief period of time as per the manufacturer instructions.

⚠ CAUTION

Use all safety precautions specified by the battery manufacturer when working with the battery. Reference the safety section of this manual for additional information.

To install the battery on the trowel, make sure that the battery is well seated in the battery box. Connect the positive cable to the positive terminal on the battery first, then connect the negative cable to the negative terminal. Close the plastic battery box cover and secure the battery box.

The following section is intended as a basic guide to the ride-on trowel operation, and is not to be considered a complete guide to concrete finishing. It is strongly suggested that all operators (experienced and novice) read "Slabs on Grade" published by the American Concrete Institute, Detroit Michigan.

DO NOT use your ride-on power trowel until this section is thoroughly understood.

⚠ CAUTION

Failure to understand the operation of the trowel could result in severe damage to the machine or personal injury.

ENGINE OIL LEVEL

ALWAYS check engine oil before each use.

1. Pull the engine oil dipstick (Item 2, Figure 5) from its holder.
2. Determine if engine oil is low.

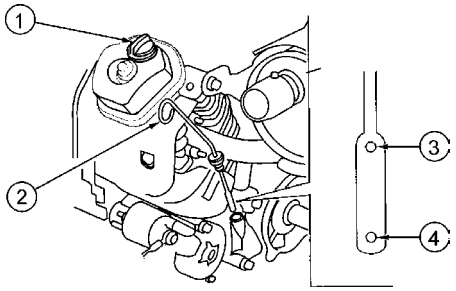


Figure 5. Engine Oil Dipstick

NOTICE

To prevent extensive engine wear or damage, always maintain the proper oil level in the crankcase. Never operate the engine with the oil level outside of marks on dipstick, (Items 3 and 4 in Figure 5.)

3. If engine oil is low, remove oil filler cap (Item 1, Figure 5), and add correct amount of engine oil to bring oil level to a normal safe level. Use oil as recommended in Figure 6

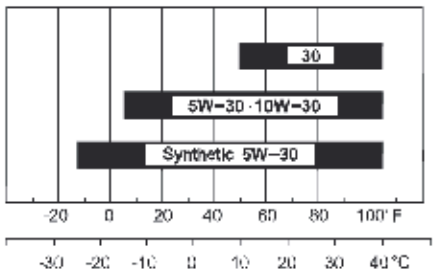


Figure 6. Recommended Viscosity Grades

GEARBOX OIL LEVEL

1. Check the gearbox oil level in both gearboxes by removing the level plug and ensuring that the oil is at the correct level. See Figure 6.
2. Fill the gear box just to the level of the fill plug. (Figure 6) with Mobil ISO VG 640 SCH 634 oil if necessary..

NOTICE

Gearbox oil capacity is approximately 69 oz when empty.

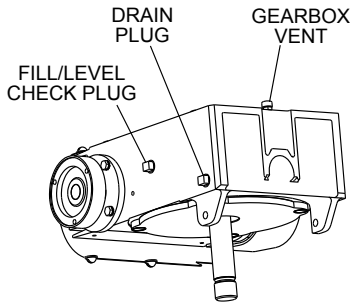


Figure 7. Gearbox Oil Plugs/Sight Glass

FUEL

Determine if the engine fuel is low (Figure 8). If fuel level is low, remove the fuel filler cap and fill with unleaded gasoline.

⚠ DANGER

Handle fuel safely. Motor fuels are highly flammable and can be dangerous if mishandled. **DO NOT** smoke while refueling. **DO NOT** attempt to refuel the ride-on trowel if the engine is hot or running. **DO NOT** attempt to start the engine until the fuel residue has been completely wiped up and the area surrounding the engine is dry.

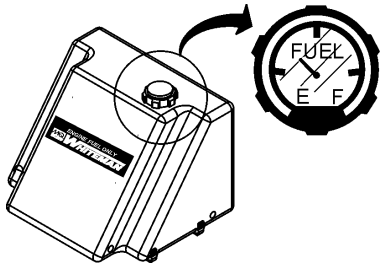


Figure 8. Fuel Gauge

IMPORTANT INFORMATION BEFORE YOU START

1. This ride-on trowel is equipped with a safety stop switch. This switch is located beneath the seat assembly. Remember the engine will not start unless an operator is sitting in the operator's seat. The weight of an operator depresses an electrical switch which will allow the engine to start.

⚠ WARNING

NEVER disable or disconnect the safety stop switch. It is provided for the operator's safety and injury or death may result if it is disabled, disconnected or improperly maintained.

2. The safety stop switch should be used to stop the engine after every use. Doing this will verify the switch is working properly thus providing safety for the operator. Remember to turn the key to the "OFF" position after stopping the machine. Not doing so will drain the battery.
3. The right foot pedal (Figure 9) controls blade and engine speed. The position of the foot pedal determines the blade speed. Slow blade speed is obtained by slightly depressing the pedal. Maximum blade speed is obtained by fully depressing the pedal.

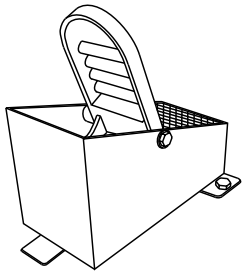


Figure 9. Blade Speed Control Foot Pedal

STARTING THE ENGINE

1. With one foot on the ground and the other foot placed on the trowel's platform, grab the frame near the seat and lift yourself onto the trowel. Sit in the operator's seat and ensure the control handles, foot pedal and control panel items can be comfortably accessed.
2. When starting a cold engine, pull the choke knob, (Figure 10) out to the closed position. In warm weather or when the engine is warm, the unit can be started with choke halfway or completely open.

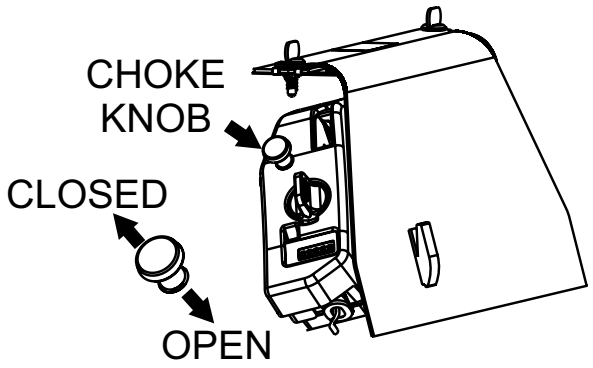


Figure 10. Choke Knob

3. Keep your foot OFF the blade speed control pedal and in all circumstances, start the engine at idle (without touching the pedal).
4. Insert the ignition key into the ignition switch.
5. Turn the ignition key (Figure 11) clockwise and listen for the engine to start. Once the engine starts release ignition key.
6. If the engine fails to start in this manner, consult the engine owner's manual supplied with the trowel.
7. Test the safety stop switch by standing up briefly. The switch under the seat should cause the engine to stop. If the switch fails to shut down the engine, turn off the engine with the key switch and repair the safety stop switch. See the Troubleshooting section for possible causes.

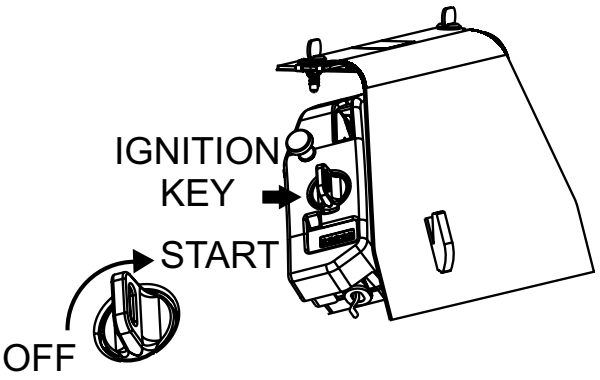


Figure 11. Ignition Key

8. Let the engine idle for 3-5 minutes. If choke is applied, push the choke to the open position as soon as the engine will run smoothly.

Steering

Two control levers located in front of the operator's seat provide directional control for the JWN-SERIES Ride-On Power Trowel. Table 4 illustrates the various directional positions of the joysticks and their effect on the ride-on trowel.

1. Push both the left and right control levers forward. See Figure 12.

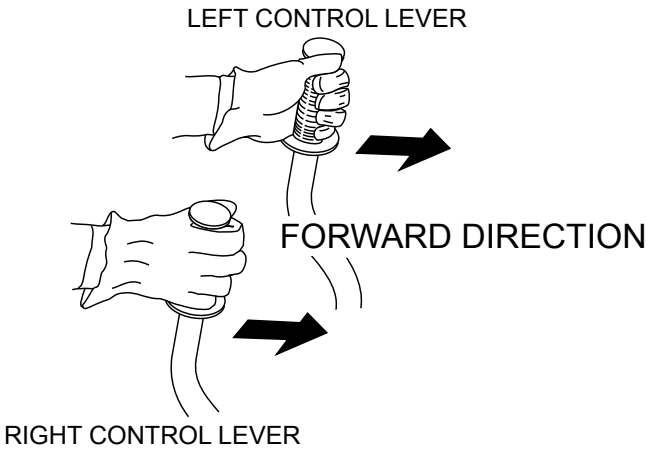


Figure 12. Left and Right Control Levers

2. With your right foot quickly depress the right foot pedal halfway. Notice that the ride-on power trowel begins to move in a forward direction. Return both joystick controls to their neutral position to stop forward movement, then remove your right foot from the right foot pedal.

3. Practice holding the machine in one place as you increase blade speed. When about 75% of maximum blade speed has been reached, the blades will be moving at proper finishing speed. The machine may be difficult to keep in one place. Trying to keep the ride-on trowel stationary is a good practice for operation.

4. Practice maneuvering the ride-on trowel using the information listed in Table 4. Try to practice controlled motions as if you were finishing a slab of concrete. Practice edging and covering a large area.

5. Try adjusting the pitch of the blades. This can be done with the ride-on trowel stopped or while the trowel is moving, whatever feels comfortable. Test the operation of optional equipment like retardant spray and lights if equipped.

6. Pull both the left and right joysticks backward and repeat steps 3 through 5 while substituting the word reverse for forward.

Table 4. Control Lever Directional Positioning

CONTROL JOYSTICK & DIRECTION	RESULT
Move **LEFT** Joystick FORWARD	Causes only the left side of the ride-on trowel to move forward.
Move **LEFT** Joystick BACKWARD	Causes only the left side of the ride-on trowel to move backward.
Move **RIGHT** Joystick FORWARD	Causes only the right side of the ride-on trowel to move forward.
Move **RIGHT** Joystick BACWARD	Causes only the right side of the ride-on trowel to move backward.
Move **BOTH** Joysticks FORWARD	Causes the ride-on trowel to move forward in a straight line.
Move **BOTH** Joysticks BACKWARD	Causes the ride-on trowel to move backard in a straight line.
Move **BOTH** Joysticks to the RIGHT	Causes the ride-on trowel to move to the right.
Move **BOTH** Joysticks to the LEFT	Causes the ride-on trowel to move to the left.

⚠ CAUTION

Trowel arms can be damaged by rough handling or by striking exposed plumbing or forms while in operation. **ALWAYS** look out for objects which might cause damage to the trowel arms.

When performing any maintenance on the trowel or engine, follow all safety messages and rules for safe operation stated at the beginning of this manual.

At the front of this manual there is a “Daily Pre-Operation Checklist”. Make copies of this checklist and use it on a daily basis.

⚠ WARNING

Accidental starts can cause severe injury or death.

ALWAYS place the ON/OFF switch in the OFF position.

Disconnect and ground spark plug leads and disconnect negative battery cable from battery before servicing.

MAINTENANCE SCHEDULE

1. Check and retighten all fasteners as necessary.

Daily (8-10 Hours)

1. Check the fluid levels in the engine and gearboxes, fill as necessary. Check air cleaner. See section on Air Cleaner servicing.

Weekly (30-40 Hours)

1. Relube arms, thrust collar and steering links.
2. Replace blades if necessary.
3. Check and clean or replace the engine air filter as necessary. (See following section on Air Filter Maintenance.)
4. Replace engine oil and filter as necessary. (See following section on Oil and Filter.)

Monthly (100-125 Hours)

1. Remove, clean, reinstall and relube the arms and thrust collar. Adjust the blade arms.
2. Replace gearbox lubricant after the first 100 hours of operation. Replace every 500-600 hours thereafter.
3. Check drive belt for excessive wear. (Refer to following section on Drive Belt maintenance.)

Yearly (500-600 Hours)

1. Check and replace if necessary the arm bushings, and thrust collar bushings, shaft seals and belts.
2. Check pitch control cables for wear.
3. Replace gearbox lubricant.

Air Cleaner (Daily)

Thoroughly remove dirt and oil from the engine and control area. Clean or replace the air cleaner elements as necessary. Check and retighten all fasteners as necessary.

1. Release the four latch tabs (Figure 13) from the air cleaner cover, and remove the cover.

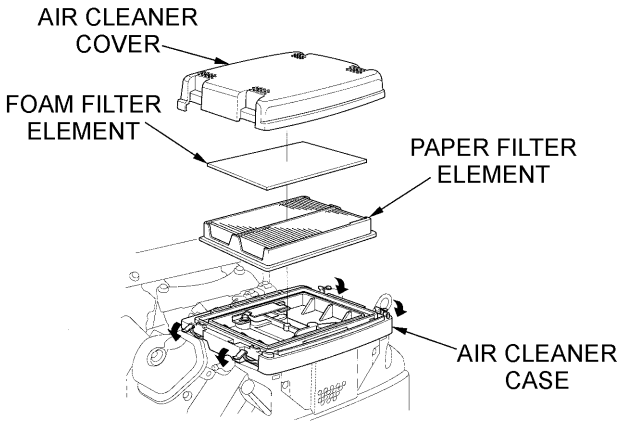


Figure 13. Air Cleaner Components

2. Remove the foam filter from the cover.
3. Remove the paper filter from the air cleaner case.
4. Inspect both air filter elements, replace them if necessary.
5. To clean the paper air filter, tap the filter element several times on a hard surface to remove dirt, or blow compressed air (not to exceed 30 psi (207 kPa, 2.1 kgf/cm2) through the filter element from the air cleaner case side.
6. **NEVER** try to brush off dirt; brushing will force dirt into the fibers. If the paper element is excessively dirt, replace element.
7. Clean the foam air filter element in warm soapy water, rinse and allow to dry thoroughly. Or clean with a nonflammable solvent and allow to dry. **DO NOT** pour any type of oil into the foam element.
8. Wipe dirt from the inside of the air cleaner body and cover, using a moist cloth. Be careful not to let any dirt or debris enter the air chamber that leads to the carburetor.

9. Reinstall the foam air filter element in the air cleaner cover, then reinstall the paper air filter element and cover to the air cleaner case. Securely latch the four hook tabs on the air cleaner cover.

⚠ CAUTION

Operating the engine with a blocked grass screen, dirty or plugged cooling fins, and/or cooling shrouds removed will cause engine damage due to overheating.

Changing Engine Oil (100 Hours)

1. Change the engine oil after the first 20 hours of use, then change every 6 months or 100 hours.
2. Remove the oil filler cap (Figure 5, Item 1), and fill engine crankcase with recommended type oil as listed in Figure 6. Fill to the upper limit of dipstick.
3. Crankcase oil capacity is 1.6 qts. (1.50 liters) without oil filter replacement, with oil filter replacement 1.8 qts. (1.7 liters).

Oil Filter (200 Hours)

1. Replace the engine oil filter (Figure 14) every 200 hours.

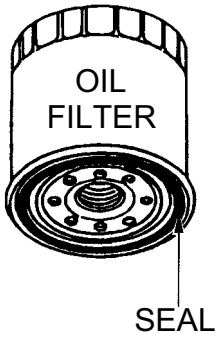


Figure 14. Oil Filter

2. Be sure to coat the seal of the new oil filter with clean engine oil.

Fuel Filter (200 Hours)

1. Replace the engine fuel filter (Figure 15) every 200 hours.

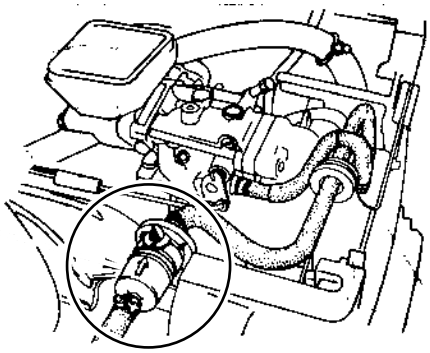


Figure 15. Honda Fuel Filter

Oil And Fuel Lines

- Check the oil and fuel lines and connections regularly for leaks or damage. Repair or replace as necessary.
- Replace the oil and fuel lines every two years to maintain the line's performance and flexibility.

ENGINE TUNE-UP

- See your engine manual for specific information on tuning up your engine, checking and gaping the spark plugs, etc.

NOTICE

See the engine manual supplied with your machine for appropriate engine maintenance schedule and troubleshooting guide for problems.

LONG TERM STORAGE

- Remove the battery.
- Drain fuel from fuel tank, fuel line and carburetor.
- Remove spark plug and pour a few drops of motor oil into cylinder. Crank engine 3 to 4 times so that oil reaches all internal parts.
- Clean exterior with a cloth soaked in clean oil.
- Store unit covered with plastic sheet in moisture and dust-free location out of direct sunlight.

⚠ CAUTION

NEVER store the ride-on trowel with fuel in the tank for any extended period of time. Always clean up spilled fuel immediately.

NOTICE

This section is intended to aid users in the maintenance of drive assemblies with the new style Multi-Clutch.

CHECKING THE DRIVE BELT

The drive belt needs to be replaced as soon as it starts to show signs of wear. **NEVER** use a defective drive belt under any circumstances. Indications of excessive belt wear are fraying, squealing when in use, a belt that emit smoke or a burning rubber smell when in use.

Under normal operating conditions, a drive belt may last approximately 150 hours. If your trowel is not reaching this kind of life span for drive belt wear, check the drive belt for proper pulley alignment and spacing.

To gain access to the drive belt, remove the drive belt guard cover (Figure 16), then visually inspect the drive belt for signs of damage or excessive wear. If the drive belt is worn or damaged, replace the drive belt.

WARNING

DO NOT attempt to insert hands or tools into the belt area while the engine is running. **NEVER** run the engine with the safety guards removed. Keep fingers, hands, hair and clothing away from all moving parts to prevent bodily injury.

WARNING

DO NOT remove the drive belt guard cover until the muffler has cooled. Allow the entire trowel to cool down before performing this procedure.

BELT GUARD REMOVAL

1. To gain access to the drive belt, remove Drive Belt Guard (Figure 16).

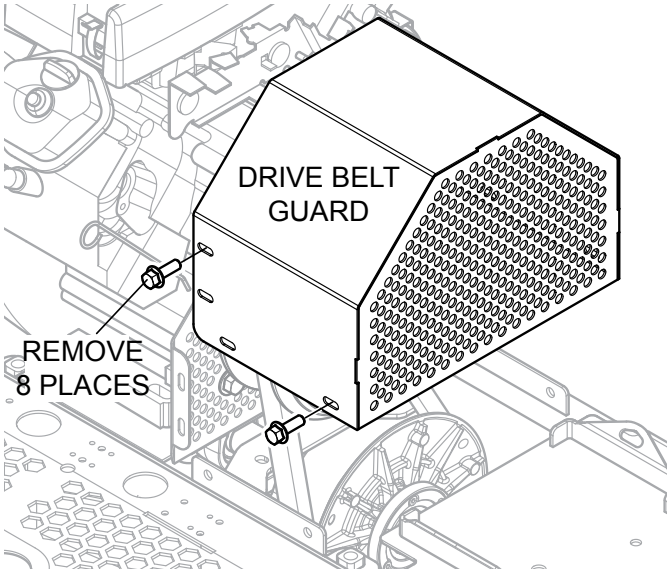


Figure 16. Drive Belt Gurad Removal

SPARE DRIVE BELT REMOVAL (USING REPLACEMENT DRIVE BELT)

The JWN-SERIES Ride-On Power Trowel is equipped with a replacement drive belt (spare) carrier, which is mounted on the inboard side of the left-side gearbox . Make sure that there is **ALWAYS** a spare drive belt in the drive belt carrier before the trowel is placed on a slab to finish concrete.

In the event of a drive belt failure, the spare (replacement) drive belt can be used for quick replacement at the job site for continued trowel operation.

1. To replace an existing drive belt with the spare drive belt, remove the 2 bolts that secure the spare belt holder to the left-side gearbox adapter plate. (Figure 17) Take care not to contaminate the replacement drive belt with grease or dirt.

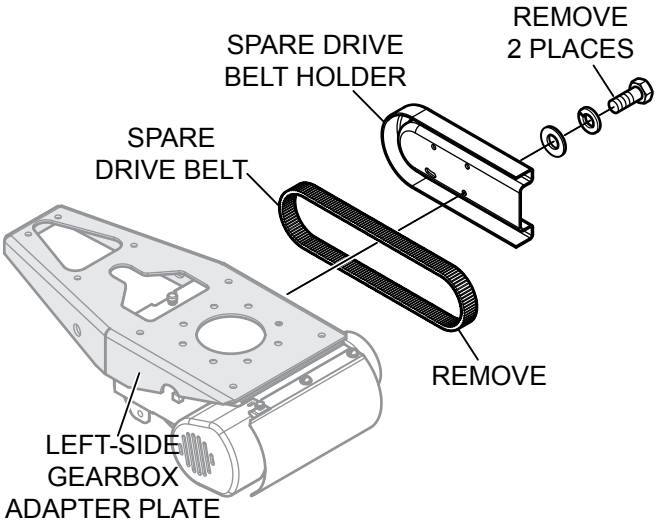


Figure 17. Spare Belt Removal

2. Remove existing drive belt from clutch and lower drive pulley, by cutting belt.
3. Ensure all remnants of old drive belt have been removed from the sheaves/grooves of the clutch and lower pulley
4. Slide spare drive belt over the CV-joint (Figure 18) an onto the lower drive pulley.

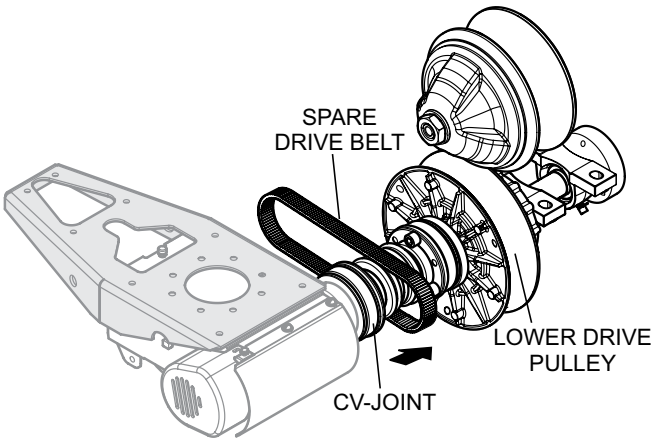


Figure 18. Spare Drive Belt Routing

5. Next, squeeze the drive belt (Figure 19) and pull upwards and towards the rear of the trowel. This will spread open the faces of the lower drive pulley.

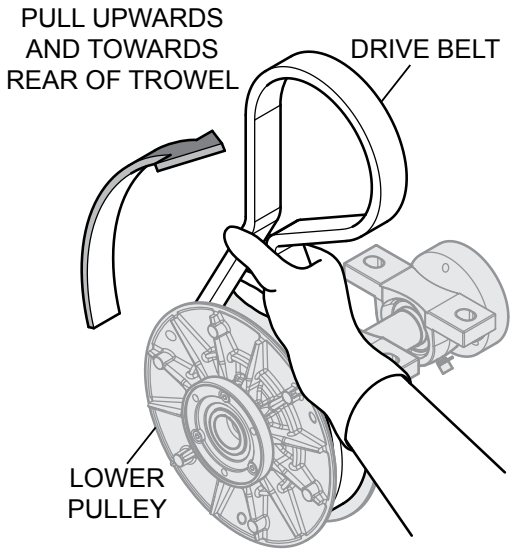


Figure 19. Spare Drive Belt Placement (Lower Pulley)

6. Place spare drive belt onto clutch as shown in Figure 20

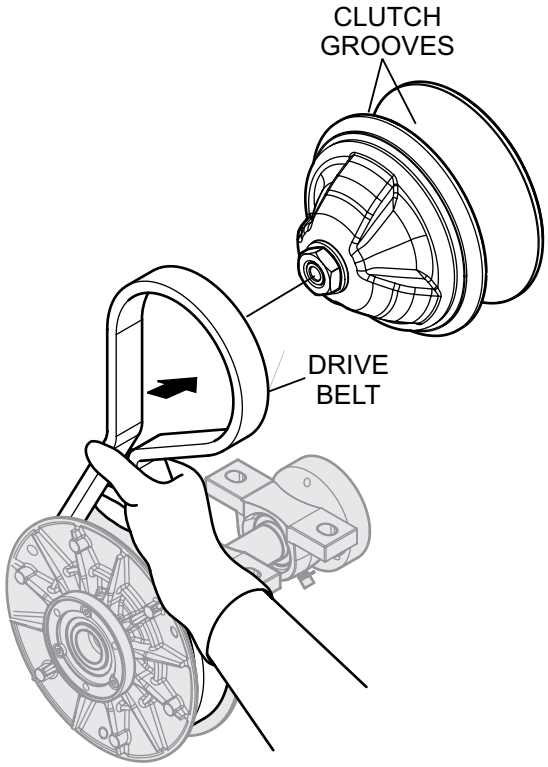


Figure 20. Spare Drive Belt Placement (Clutch)

7. Reinstall belt guard assembly.

STARTING THE TROWEL/TESTING

1. While sitting in the operator's position, start the trowel as referenced in the Operator's Manual. Be sure to check the engine oil level prior to starting the engine.

⚠ CAUTION

The engine's exhaust contains harmful emissions. **ALWAYS have adequate ventilation when operating.** Direct exhaust away from nearby personnel.

2. Run machine, bringing throttle up so clutch engages. Cycle the engine from idle to full throttle twice, and shut off engine. Remove key.

SPARE DRIVE BELT INSTALLATION

CV-joint Assembly Removal (left-side)

1. If necessary, place the trowel on suitable supports (jack-stands) and observe all safety precautions.

2. Starting at the left-side gearbox, use a 1/4" allen wrench and remove the 3 bolts and lock washers that secure the CV-joint (Figure 21) to the left-side gearbox. Retain mounting hardware for later use.

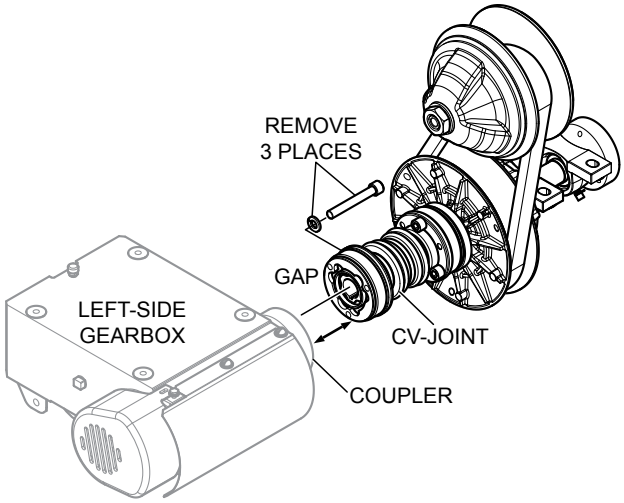


Figure 21. CV-Joint Removal

3. Once the CV-joint has been separated from the left-side gearbox coupler, push the CV-joint inward so that a gap (Figure 21) exists between the gearbox coupler and CV-joint.

4. Slide new spare drive belt between gearbox coupler and CV-joint.

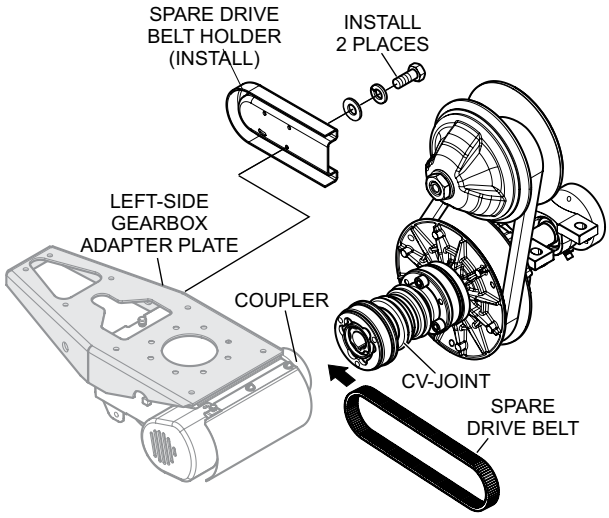


Figure 22. Spare Drive Belt Routing

5. Mount new spare drive belt and cover (Figure 22) onto left-side gearbox. Reinstall the 2 bolts that secure the spare belt holder to the left-side gearbox adapter plate.

CV-JOINT ASSEMBLY INSTALLATION (LEFT-SIDE)

1. Apply a thin coat of RVT silicone to mating surfaces of the CV-joint (Figure 23) and left-side gearbox coupler.

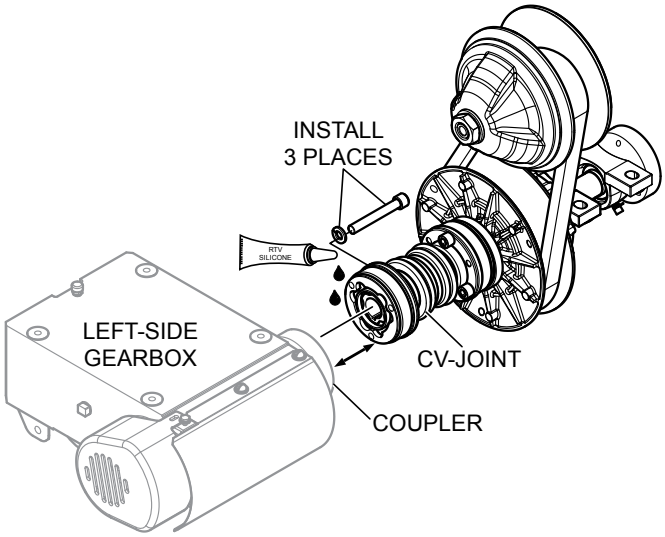


Figure 23. CV-Joint Installation

2. Using a 1/4" allen wrench install the 3 bolts and lock washers that secure the CV-joint (Figure 23) to the left-side gearbox.

HOW IT WORKS

The Multi-Clutch functions much like a standard CVT system. As the engine RPM's increase, the drive or primary clutch closes, forcing the belt to ride outwards on the drive sheaves. The closing of the drive clutch also forces the belt to open the driven or secondary sheaves. The opening and closing of these sheaves creates a ratio variation… hence CVT or Continuously Variable Transmission.

Belt protection is achieved within the Multi-Clutch through the use of a series of centrifugal clutches. While most CVT systems have a loose or slack belt while the engine idles, the sheaves of those systems are constantly rotating and wearing on the belt.

Those systems also require the stationary belt to be pinched by the constantly rotating sheaves during startup. The relative rotation of the sheaves to the belt causes unnecessary wear on the belt. With traditional CVT systems, wear on the belt happens any time the engine is idling and at every start up of the driven equipment. This is where the Multi-Clutch differs from the other CVT's.

The Multi-Clutch utilizes two centrifugal clutches (the starter clutch system) to drive the sheaves of the drive (primary) clutch. What that means is that the belt can remain tight in the sheaves, and that both the sheaves and the belt are stationary while the vehicle is idling. This eliminates the belt wear at an idle, and during start up, while also providing one additional form of belt protection.

The centrifugal clutches (starter clutch) can act as overload protection as well. In cases where too much torque is trying to be transmitted to the belt, the centrifugals can slip before the maximum load on the belt is achieved. What this means is that instead of the belt slipping on the sheaves during an overload, the centrifugals will first slip further protecting the belt from damage.

Blade Pitch

Matching Blade Pitch for Both Sets of Blades

Sometimes it may be necessary to match blade pitch between the two sets of blades. There are some signs that this may be necessary. For example, the differences in pitch could cause a noticeable difference in finish quality between the two sets of blades, or, the difference in blade pitch could make the machine difficult to control. This is due to the surface area in contact with the concrete (the blade set with the greater contact area tends to stick to the concrete more).

Single Pitch

On a Single Pitch trowel each spider assembly can be pitched individually, forcing the operator to constantly make adjustments on each pitch tower.

Twin Pitch™

Trowels equipped with Twin Pitch™ Controls may need to have blade pitch between the two sets of blades "syncronized". If the blades need to be syncronized this is easily accomplished by performing the following. Refer to Figure 24.

1. Lift the pitch adjustment handle on either side. Once lifted, that side is now disconnected from the Twin Pitch system.
2. Adjust to match the opposite side.
3. When adjusted, lower the handle to Twin Pitch operating position.

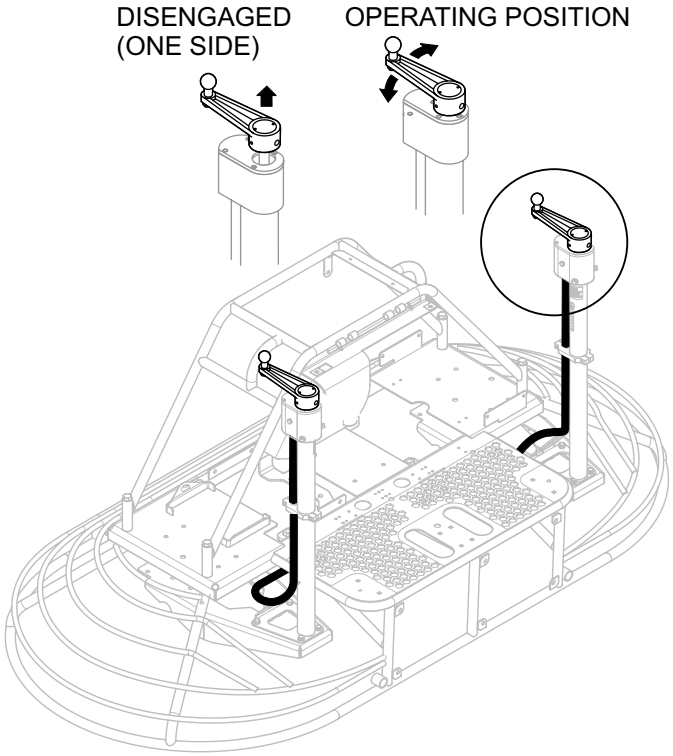


Figure 24. Pitch Towers

Blade Pitch Adjustment Procedure

Maintenance adjustment of blade pitch is made by adjusting a bolt (Figure 25) on the arm of the trowel blade finger. This bolt is the contact point of the trowel arm to the lower wear plate on the thrust collar. The goal of adjustment is to promote consistent blade pitch and finishing quality.

Look for the following indications if blades are wearing unevenly. If so, adjustment may be necessary.

- Is one blade is completely worn out while the others look new?
- Does the machine have a perceptible rolling or bouncing motion when in use?
- Look at the machine while it is running, does the trowel guard ring "rock up and down" relative to the ground?
- Do the pitch control towers rock back and forth?

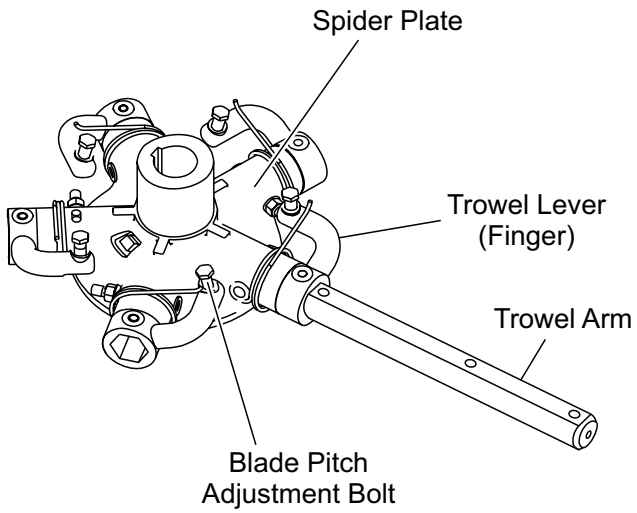


Figure 25. Blade Pitch Adjustment Bolt

The easiest and most consistent way to make adjustments on the trowel arm fingers is to use the Trowel Arm Adjustment Fixture (P/N 9177). It comes with all the hardware necessary to properly accomplish this maintenance and instructions on how to utilize this tool.

If a trowel arm adjustment fixture is not available and immediate adjustment is necessary, temporary field adjustment can be made if you can see or feel which blade is pulling harder by adjusting the bolt that corresponds to that blade.

A better way to determine which blades need adjustment is to place the machine on a known FLAT surface (steel metal plate) and pitch the blades as flat as possible. Look at the adjustment bolts. They should all barely make contact with the lower wear plate on the spider. If you can see that one of them is not making contact, some adjustment will be necessary.

Adjust the "high" bolts down to the level of the one that is not touching, or adjust the "low" bolt up to the level of the higher ones. If possible, adjust the low bolt up to the level of the rest of the bolts. This is the fastest way, but may not always work. Verify after adjustment the blades pitch correctly.

Blades that are incorrectly adjusted often will not be able to pitch flat. This can occur if the adjusting bolts are raised too high. Conversely, adjusting bolts that are too low will not allow the blades to be pitched high enough for finishing operations.

If, after making Blade Pitch adjustments the machine is still finishing poorly, blades, trowel arms, and trowel arm bushings may be suspect and should be looked at for adjustment, wear, or damage. See the following sections.

Changing Blades

It is recommended that ALL the blades on the entire machine are changed at the same time. If only one or some of the blades are changed, the machine will not finish concrete consistently and the machine may wobble or bounce.

1. Place the machine on a flat, level surface. Adjust the blade pitch control to make the blades as flat as possible. Note the blade orientation on the trowel arm. This is important for ride-on trowels as the two sets of blades counter-rotate. Lift the machine up, placing blocks under the main guard ring to support it.
2. Remove the bolts and lock washers on the trowel arm, and then remove the blade.
3. Scrape all concrete and debris from the trowel arm. This is important to properly seat the new blade.
4. Install the new blade, maintaining the proper orientation for direction of rotation.
5. Reinstall the bolts and lock washers.
6. Repeat steps 2-5 for all remaining blades.

Clean-Up

Never allow concrete to harden on the power trowel. Immediately after use wash any concrete off the trowel with water, be careful not to spray a hot engine or muffler. An old paint brush or broom may help loosen any concrete that has started to harden.

Trowel Arm Adjustment Procedure

NOTICE

The following procedure should be followed to adjust trowel arms when it becomes apparent that the trowel is finishing poorly or in need of routine maintenance.

A level, clean area to test the trowel prior to and after adjustment is essential. Any unlevel spots in the floor or debris under the trowel blades will give an incorrect perception of adjustment. Ideally, a 5' x 5' three-quarter inch thick flat steel plate should be used for testing.

1. To determine which blades need adjustment, place the trowel in the test area (three-quarter inch thick plate) and look for the following conditions:

   • Pitch the blades as flat as possible and look at the adjustment bolts. They should all barely make contact with the lower wear plate on the spider. If you can see that one of them is not making contact, some adjustment will be necessary.

   • Is the machine wearing out blades unevenly (i.e. one blade is completely worn out while the others look new)?

Figure 26 illustrates "worn spider bushings or bent trowel arms". Check to see that adjustment bolt is barely touching (0.10" max. clearance) lower wear plate. All alignment bolts should be spaced the same distance from the lower wear plate.

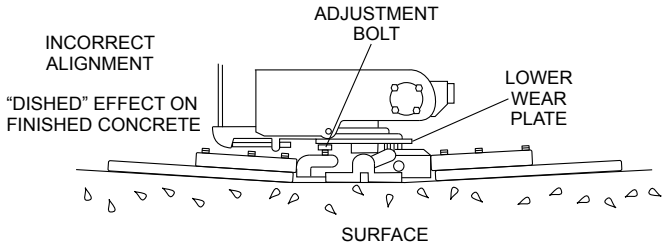


Figure 26. Worn Arm Bushings

Figure 27 illustrates the "correct alignment " for a spider plate (as shipped from the factory).

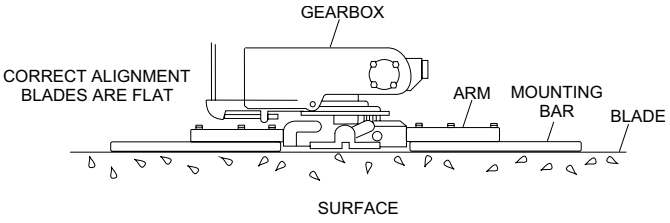


Figure 27. Correct Spider Plate Alignment

2. Start engine, and bring trowel blades up to full speed and look for the following conditions:

   • Does the trowel have a perceived rolling or bouncing motion?

   • Does the guard ring “rock up and down” relative to the ground?

Trowel Arm Removal

1. Each trowel arm is held in place at the spider plate by a hex head bolt (with zerk grease fitting). Remove the hex head bolt/zerk grease fitting from the spider plate. (Figure 28)
2. Remove the trowel arm from the spider plate.

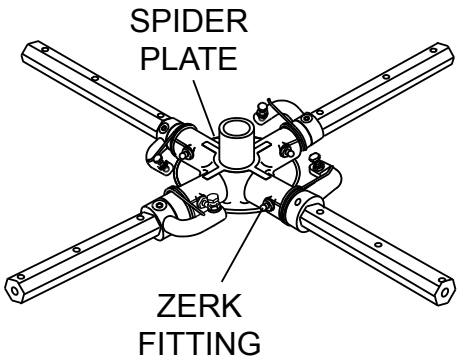


Figure 28. Removing Zerk Grease Fitting

3. Should the trowel arm inserts (bronze bushing) come out with the trowel arm, remove the bushing from the trowel arm and set aside in a safe place. If the bushing is retained inside the spider plate, carefully remove the bushing.
4. Examine the bronze trowel arm bushing insert (Figure 29), clean if necessary. Replace bushing if out-of-round or worn.

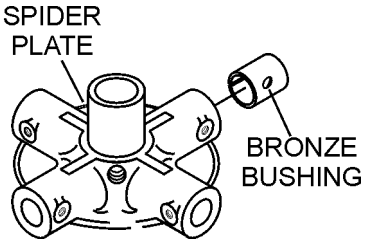


Figure 29. Bronze Bushings

Trowel Blade Removal

1. Remove the trowel blades from the trowel arm by removing the three hex head bolts (Figure 30) from the trowel arm. Set blades aside.

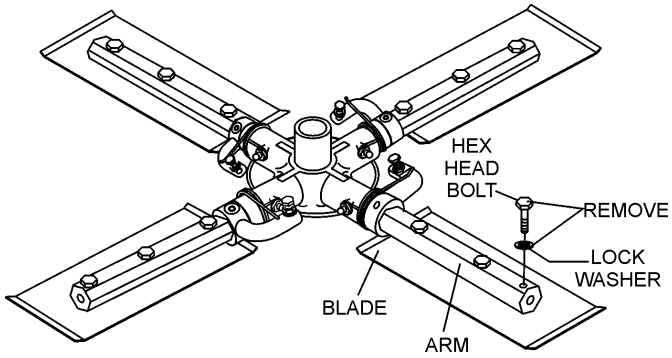


Figure 30. Trowel Blades

2. Wire brush any build-up of concrete from all six sides of the trowel arm. Repeat this for the remaining three arms.

Checking Trowel Arm Straightness

Trowel arms can be damaged by rough handling, (such as dropping the trowel on the pad), or by striking exposed plumbing, forms, or rebar while in operation. A bent trowel arm will not allow the trowel to operate in a smooth fluid rotation. If bent trowel arms are suspect, check for flatness as follows, refer to Figure 31 and Figure 32.

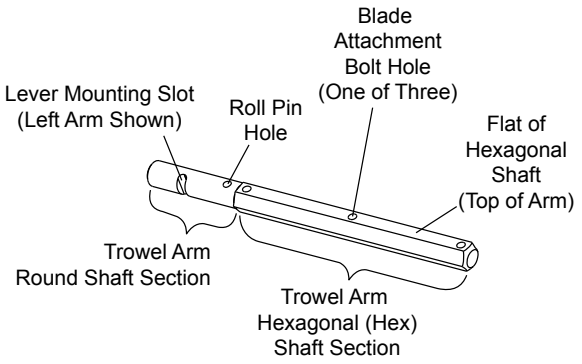


Figure 31. Trowel Arm

1. Use a thick steel plate, granite slab or any surface which is true and flat, to check all six sides of each trowel arm for flatness.
2. Check each of the six sides of the trowel arm (hex section). A feeler gauge of .004" (0.10 mm) should not pass between the flat of the trowel arm and the test surface along its length on the test surface. (Figure 32) .

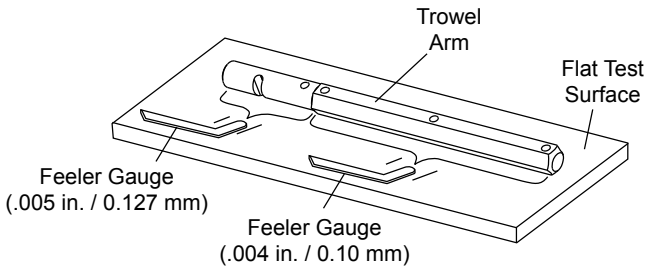


Figure 32. Checking Trowel Arm Flatness

3. Next, check the clearance between the round shaft and the test surface as one of the flat hex sections of the arm rests on the test surface. Rotate the arm to each of the flat hex sections and check the clearance of the round shaft. Use a feeler gauge of .005" (0.127 mm). Each section should have the same clearance between the round of the trowel arm shaft and the test surface.
4. If the trowel arm is found to be uneven or bent, replace the trowel arm.

Trowel Arm Adjustment

1. Locate the trowel arm adjustment tool (Figure 33) P/N 9177.

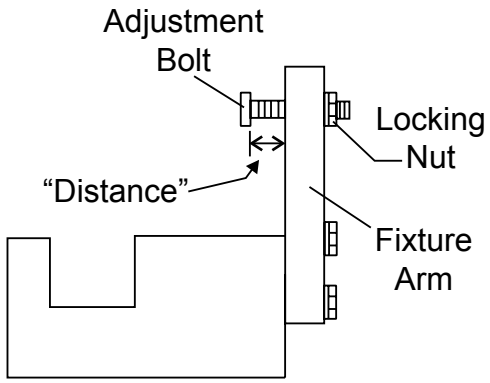


Figure 33. Trowel Arm Adjustment Tool (Side View)

2. Ensure the fixture arm is in the proper setting (up or down) for your trowel arm rotation as shown in Figure 34.

NOTICE

Arms with **clock-wise** blade rotation use the fixture arm in the UP position (A in Figure 34). Arms with **counter clock-wise** blade rotation use the fixture with the fixture arm in the DOWN position. (B in Figure 34).

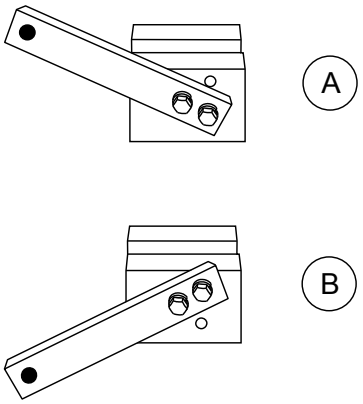


Figure 34. Trowel Arm Adjustment Setup

3. Shown in Figure 35 is the adjustment fixture with a trowel arm inserted. As each trowel arm is locked into the fixture, the arm bolt is adjusted to where it contacts a stop on the fixture. This will consistently adjust all of the trowel arms, keeping the finisher as flat and evenly pitched as possible.
4. Unscrew the locking bolts on the adjustment tool and place the trowel arm into the fixture channel as shown in Figure 35. A thin shim may be required to cover the blade holes on the trowel arm. Make sure to align the trowel adjustment bolt with the fixture adjustment bolt.

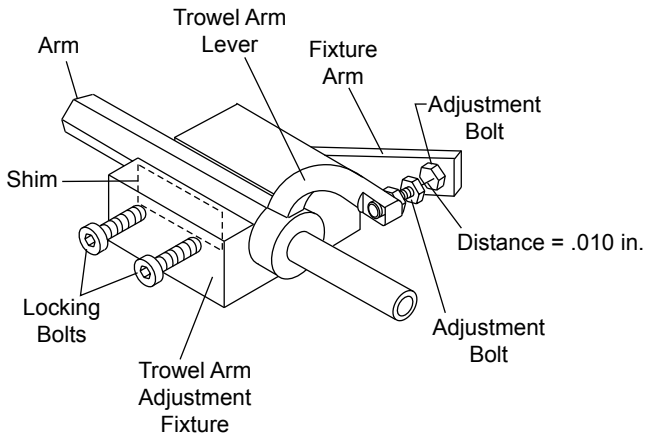


Figure 35. Trowel Arm Adjustment Fixture Components

5. Use an allen wrench to tighten the locking bolts securing the trowel arm in place.
6. Adjust the bolt "distance" shown in Figure 35 to match one of the arms. The other arms will be adjusted to match this distance.
7. Loosen the locking nut on the trowel arm lever, then turn the trowel arm adjusting bolt until it barely touches (.010") the fixture adjusting bolt.
8. Once the correct adjustment is made, tighten the lock nut on the trowel arm to lock in place.
9. Loosen locking nuts on the adjustment fixture, and remove trowel arm.
10. Repeat steps for the remaining trowel arms

Reassembly

1. Clean and examine the upper/lower wear plates and thrust collar. Examine the entire spider assembly. Wire brush any concrete or rust build-up. If any of the spider components are found to be damaged or out of round, replace them.
2. Make sure that the bronze trowel arm bushing is not damage or out of round. Clean the bushing if necessary. If the bronze bushing is damaged or worn, replace it.
3. Reinstall bronze bushing onto trowel arm.
4. Repeat steps 2 -3 for each trowel arm.
5. Make sure that the spring tensioner is in the correct position to exert tension on the trowel arm.
6. Insert all trowel arms with levers into spider plate (with bronze bushing already installed) using care to align grease hole on bronze bushing with grease hole fitting on spider plate.
7. Lock trowel arms in place by tightening the hex head bolt with zerk grease fitting and jam nut.
8. Re-install the blades onto the trowel arms.
9. Install stabilizer ring onto spider assembly.
10. Lubricate all grease points (zerk fittings) with premium "Lithium 12" based grease, conforming to NLG1 Grade #2 consistency.

INSTALLING PANS ONTO FINISHER BLADES

These round discs sometimes referred to as “pans” attach to the spiders arms and allow early floating on wet concrete and easy movement from wet to dry areas. They are also very effective in embedding large aggregates and surface hardeners.

WARNING

Lifting/Crush Hazard. **DO NOT** lift trowel with pans attached.

WARNING

ALWAYS install pans either on the work area or on an area that is next to and level with the work area. **DO NOT** lift the trowel when the pans are attached.

Refer to Figure 36 when installing pans onto finisher blades.

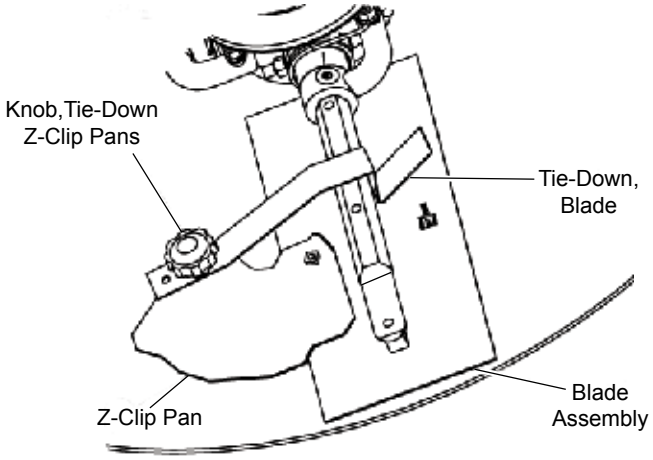


Figure 36. Z-Clip Finisher Pan Instructions

1. Lift trowel just enough to slide pan under blades. Lower finisher onto pan with blades adjacent to Z-Clips.
2. Rotate blades into position under Z-Clips. Ensure that the blades are rotated in the direction of travel when the machine is in operation or use the engine to rotate the blades into position.
3. Attach the blade tie-downs to the far side of the Z-Clip brackets with tie-down knobs as shown in Figure 36.
4. Check to make certain that the blade edges are secured under the Z-Clips and the tie-downs are secured completely over the edges of the blade bar before the machine is put back into operation.

DECOMMISSIONING TROWEL/COMPONENTS

Decommissioning is a controlled process used to safely retire a piece of equipment that is no longer serviceable. If the equipment poses an unacceptable and unrepairable safety risk due to wear or damage or is no longer cost effective to maintain, (beyond life-cycle reliability) and is to be decommissioned, (demolition and dismantlement), the following procedure must take place:

1. Drain all fluids completely. These may include oil, gasoline, hydraulic oil and antifreeze. Dispose of properly in accordance with local and governmental regulations. Never pour on ground or dump down drains or sewers.
2. Remove battery and bring to appropriate facility for lead reclamation. Use safety precautions when handling batteries that contain sulfuric acid, (Reference Setup Section).
3. The remainder can be brought to a salvage yard or metal reclamation facility for further dismantling.

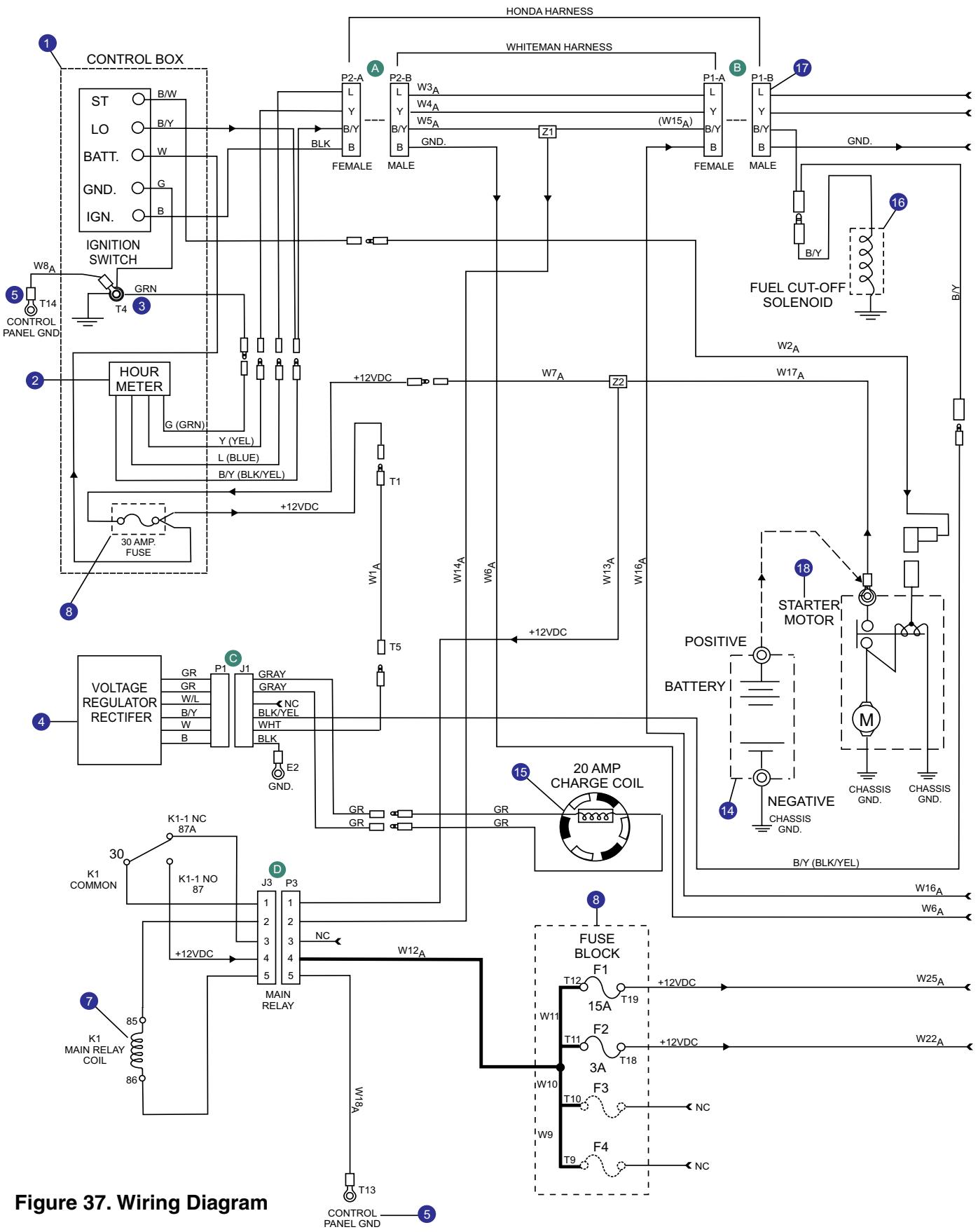
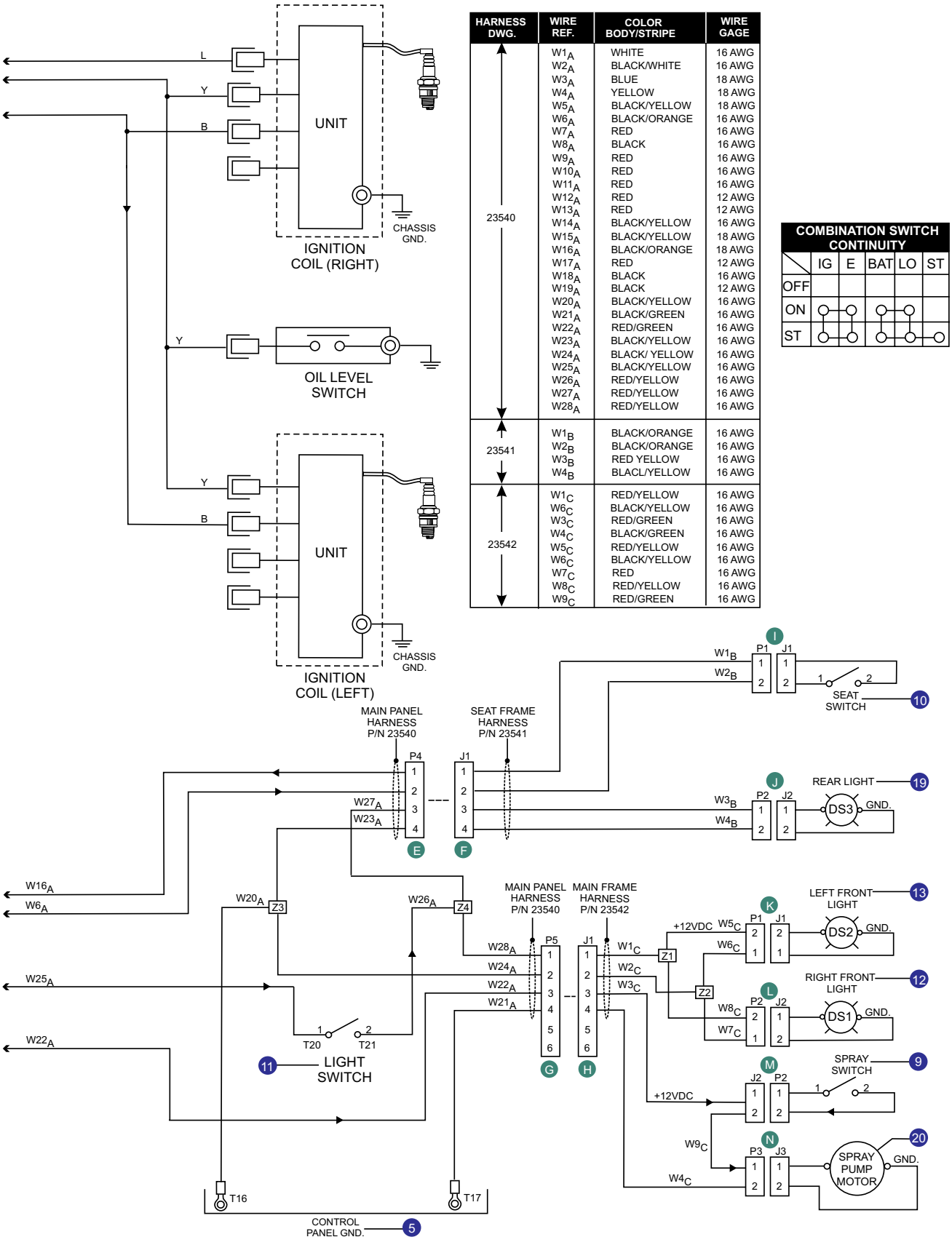


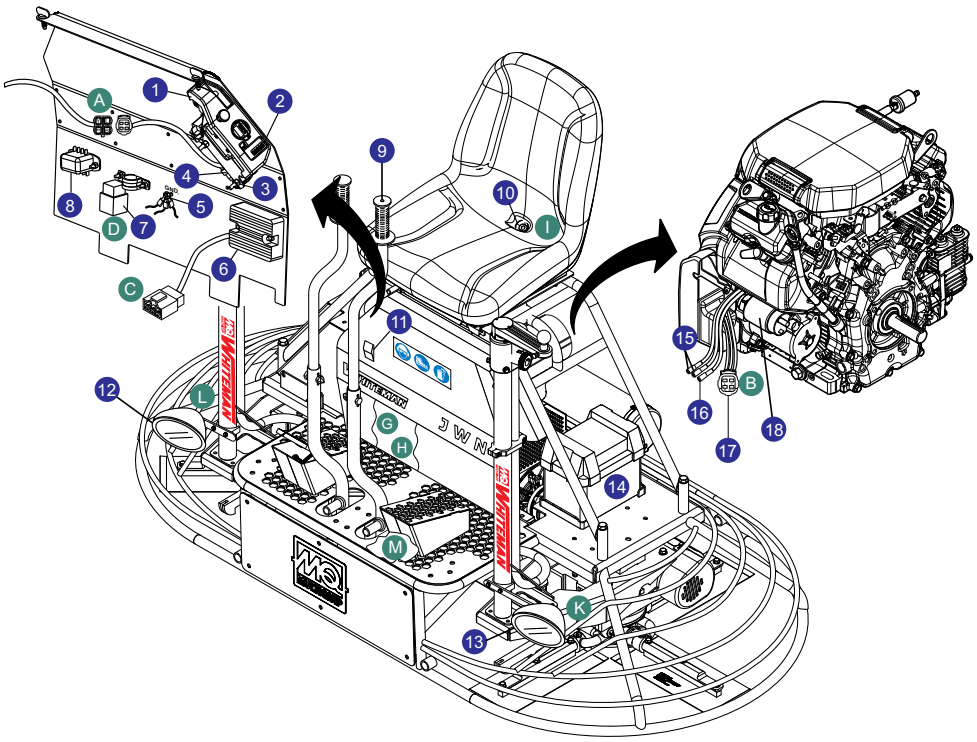
Figure 37. Wiring Diagram

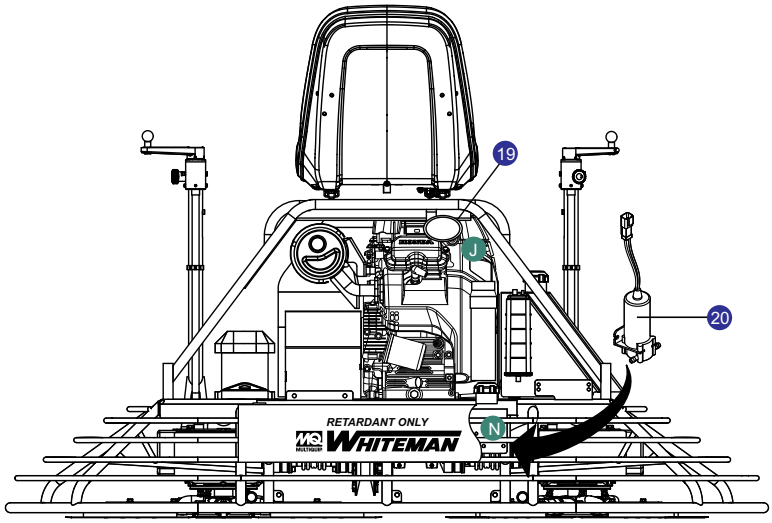


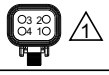
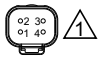
HARNESS DWG.	WIRE REF.	COLOR BODY/STRIPE	WIRE GAGE
23540	$W1_A$	WHITE	16 AWG
	$W2_A$	BLACK/WHITE	16 AWG
	$W3_A$	BLUE	16 AWG
	$W4_A$	YELLOW	18 AWG
	$W5_A$	BLACK/YELLOW	18 AWG
	$W6_A$	BLACK/ORANGE	16 AWG
	$W7_A$	RED	16 AWG
	$W8_A$	BLACK	16 AWG
	$W9_A$	RED	16 AWG
	$W10_A$	RED	16 AWG
	$W11_A$	RED	16 AWG
	$W12_A$	RED	12 AWG
	$W13_A$	RED	12 AWG
	$W14_A$	BLACK/YELLOW	16 AWG
	$W15_A$	BLACK/YELLOW	18 AWG
	$W16_A$	BLACK/ORANGE	18 AWG
	$W17_A$	RED	12 AWG
	$W18_A$	BLACK	16 AWG
	$W19_A$	BLACK	12 AWG
	$W20_A$	BLACK/YELLOW	16 AWG
	$W21_A$	BLACK/GREEN	16 AWG
	$W22_A$	RED/GREEN	16 AWG
	$W23_A$	BLACK/YELLOW	16 AWG
	$W24_A$	BLACK/ YELLOW	16 AWG
	$W25_A$	BLACK/YELLOW	16 AWG
	$W26_A$	RED/YELLOW	16 AWG
	$W27_A$	RED/YELLOW	16 AWG
	$W28_A$	RED/YELLOW	16 AWG
23541	$W1_B$	BLACK/ORANGE	16 AWG
	$W2_B$	BLACK/ORANGE	16 AWG
	$W3_B$	RED YELLOW	16 AWG
	$W4_B$	BLACL/YELLOW	16 AWG
23542	$W1_C$	RED/YELLOW	16 AWG
	$W6_C$	BLACK/YELLOW	16 AWG
	$W3_C$	RED/GREEN	16 AWG
	$W4_C$	BLACK/GREEN	16 AWG
	$W5_C$	RED/YELLOW	16 AWG
	$W6_C$	BLACK/YELLOW	16 AWG
	$W7_C$	RED	16 AWG
	$W8_C$	RED/YELLOW	16 AWG
	$W9_C$	RED/GREEN	16 AWG

COMBINATION SWITCH CONTINUITY

	IG	E	BAT	LO	ST
OFF					
ON	●	●	●	●	
ST	●	●	●	●	●





REF. DES.	CONNECTOR	FUNCTION
A		ENGINE INTERFACE CTRL. B0X SIDE
B		ENGINE INTERFACE ENGINE SIDE
C		VOLTAGE REGULATOR/RECTIFIER
D		MAIN RELAY
E		MAIN PANEL HARNESS P/N 23540 (P4) MATES WITH SEAT FRAME HARNESS P/N 23541 (J1)
F		SEAT FRAME HARNESS P/N 23541 (J1) MATES WITH MAIN PANEL HARNESS P/N 23540 (P4)
G		MAIN PANEL HARNESS P/N 23540 (P5) MATES WITH MAIN FRAME HARNESS P/N 23542 (J1)
H		MAIN FRAME HARNESS P/N 23542 (J1) MATES WITH MAIN PANEL HARNESS P/N 23540 (P5)
I		SEAT SWITCH
J		REAR LIGHT
K		LEFT FRONT LIGHT
L		RIGHT FRONT LIGHT
M		SPRAY SWITCH
N		SPRAY PUMP MOTOR

NOTES:

⚠1 REFERENCE DESIGNATORS E THRU F NOT SHOWN. LOCATION MUST BE TRACED THROUGH HARNESS.

Figure 38. Wiring Component Locator

Troubleshooting (Engine)		
Symptom	**Possible Problem**	**Solution**
Difficult to start, fuel is available, but no spark at spark plug.	Spark plug bridging?	Check gap, insulation or replace spark plug.
	Carbon deposit on spark plug?	Clean or replace spark plug.
	Short circuit due to deficient spark plug insulation?	Check spark plug insulation, replace if worn.
	Improper spark plug gap?	Set to proper gap.
	Fuel reaching carburetor?	Check fuel line.
	Water in fuel tank?	Flush or replace fuel tank.
	Fuel filter clogged?	Replace fuel filter.
	Stuck carburetor?	Check float mechanism.
	Spark plug is red?	Check transistor ignition unit.
	Spark plug is bluish white?	If insufficient compression, repair or replace engine. If injected air leaking, correct leak. If carburetor jets clogged, clean carburetor.
	No spark present at tip of spark plug?	Check transistor ignition unit is broken, and replace defective unit. Check if voltage cord cracked or broken and replace. Check if spark plug if fouled and replace.
	No oil?	Add oil as required.
	Oil pressure alarm lamp blinks upon starting? (if applicable)	Check automatic shutdown circuit, "oil sensor". (if applicable)
Difficult to start, fuel is available, and spark is present at the spark plug.	ON/OFF switch is shorted?	Check switch wiring, replace switch.
	Ignition coil defective?	Replace ignition coil.
	Improper spark gap, points dirty?	Set correct spark gap and clean points.
	Condenser insulation worn or short circuiting?	Replace condenser.
	Spark plug wire broken or short circuiting?	Replace defective spark plug wiring.
Difficult to start, fuel is available, spark is present and compression is normal.	Wrong fuel type?	Flush fuel system, and replace with correct type of fuel.
	Water or dust in fuel system?	Flush fuel system.
	Air cleaner dirty?	Clean or replace air cleaner.
	Choke open?	Close choke.
Difficult to start, fuel is available, spark is present and compression is low.	Suction/exhaust valve stuck or protruded?	Reseat valves.
	Piston ring and/or cylinder worn?	Replace piston rings and/or piston.
	Cylinder head and/or spark plug not tightened properly?	Torque cylinder head bolts and spark plug.
	Head gasket and/or spark plug gasket damaged?	Replace head and spark plug gaskets.
No fuel present at carburetor.	No fuel in fuel tank?	Fill with correct type of fuel.
	Fuel cock does not open properly?	Apply lubricant to loosen fuel cock lever, replace if necessary.
	Fuel filter/lines clogged?	Replace fuel filter.
	Fuel tank cap breather hole clogged?	Clean or replace fuel tank cap.
	Air in fuel line?	Bleed fuel line.

Troubleshooting (Engine) - continued		
Symptom	**Possible Problem**	**Solution**
Weak in power, compression is proper and does not misfire.	Air cleaner dirty?	Clean or replace air cleaner.
	Improper level in carburetor?	Check float adjustment, rebuild carburetor.
	Defective spark plug?	Clean or replace spark plug.
	Improper spark plug?	Set to proper gap.
Weak in power, compression is proper but misfires.	Water in fuel system?	Flush fuel system and replace with correct type of fuel.
	Dirty spark plug?	Clean or replace spark plug.
	Ignition coil defective?	Replace ignition coil.
Engine overheats.	Spark plug heat value incorrect?	Replace with correct type of spark plug.
	Wrong type of fuel?	Replace with correct type of fuel.
	Cooling fins dirty?	Clean cooling fins.
	Intake air restricted?	Clear intake of dirt and debris. Replace air cleaner elements as necessary.
	Oil level too low or too high?	Adjust oil to proper level.
Rotational speed fluctuates.	Governor adjusted incorrectly?	Adjust governor.
	Governor spring defective?	Replace governor spring.
	Fuel flow restricted?	Check entire fuel system for leaks or clogs.
Recoil starter malfunctions. (if applicable)	Recoil mechanism clogged with dust and dirt?	Clean recoil assembly with soap and water.
	Spiral spring loose?	Replace spiral spring.
Starter malfunctions.	Loose, damaged wiring?	Ensure tight, clean connections on battery and starter.
	Battery insufficiently charged?	Recharge or replace battery.
	Starter damaged or internally shorted?	Replace starter.
Burns too much fuel.	Over-accumulation of exhaust products?	Check and clean valves. Check muffler and replace if necessary.
	Wrong spark plug?	Replace spark plug with manufacturer's suggested type.
Exhaust color is continuously "white".	Lubricating oil is wrong viscosity?	Replace lubricating oil with correct viscosity.
	Worn rings?	Replace rings.
Exhaust color is continuously "black".	Air cleaner clogged?	Clean or replace air cleaner.
	Choke valve set to incorrect position?	Adjust choke valve to correct position.
	Carburetor defective, seal on carburetor broken?	Replace carburetor or seal.
	Poor carburetor adjustment, engine runs too rich?	Adjust carburetor.
Will not start, no power with key "ON". (if applicable)	ON/OFF device not activated ON?	Turn on ON/OFF device.
	Battery disconnected or discharged?	Check cable connections. Charge or replace battery
	Ignition switch/wiring defective?	Replace ignition switch. Check wiring.

Troubleshooting (Ride-On Mechanical Trowel)		
Symptom	**Possible Problem**	**Solution**
Engine running rough or not at all.	Stop switch malfunction?	Make sure that the stop switch is functioning when the operator is seated. Replace switch if necessary.
	Fuel?	Look at the fuel system. Make sure there is fuel being supplied to the engine. Check to ensure that the fuel filter is not clogged.
	Ignition?	Check to ensure that the ignition switch has power and is functioning correctly.
Safety stop switch not functioning.	Bad contacts?	Replace switch.
	Loose wire connections?	Check wiring. Replace as necessary.
	Other problems?	Consult engine manufacturer's manual.
Trowel bounces, rolls concrete, or makes uneven swirls in concrete.	Blades?	Make sure blades are in good condition, not excessively worn. Finish blades should measure no less than 2 inches (50mm) from the blade bar to the trailing edge, combo blades should measure no less that 3.5 inches (89mm). Trailing edge of blade should be straight and parallel to the blade bar.
	Pitch Adjustment?	Check that all blades are set at the same pitch angle as measured at the spider. A field adjustment tool is available for height adjustment of the trowel arms (contact Parts Department).
	Bent trowel arms?	Check the spider assembly for bent trowel arms. If one of the arms is even slightly bent, replace it immediately.
	Trowel arm bushings?	Check the trowel arm bushings for tightness. This can be done by moving the trowel arms up and down. If there is more than 1/8 inch (3.2 mm) of travel at the tip of the arm, the bushings should be replaced. All bushings should be replaced at the same time.
	Thrust collar?	Check the flatness of the thrust collar by rotating it on the spider. If it varies by more than 0.02 inch (0.5 mm) replace the thrust collar.
	Thrust collar bushing?	Check the thrust collar by rocking it on the spider. If it can tilt more than 1/16 inch (1.6 mm) - as measured at the thrust collar O.D., replace the bushing in the thrust collar.
	Thrust bearing worn?	Check the thrust bearing to see that it is spinning freely. Replace if necessary.
Machine has a perceptible rolling motion while running.	Main shaft?	The main output shaft of the gearbox assembly should be checked for straightness. The main shaft must run straight and cannot be more than 0.003 inch (0.08 mm) out of round at the spider attachment point.
	Yoke?	Check to make sure that both fingers of the yoke press evenly on the wear cap. Replace yoke as necessary.
	Blade Pitch?	Check to ensure that each blade is adjusted to have the same pitch as all other blades. Adjust per maintenance section in manual.

Troubleshooting (Ride-On Mechanical Trowel) - continued		
Symptom	**Possible Problem**	**Solution**
Lights (optional) not working.	Wiring?	Check all electrical connections in the lighting circuit. Verify wiring is in good condition with no shorts. Replace defective wiring or components immediately.
	Lights?	If +12VDC is present at light fixture connector when light switch is activated and light does not turn on, replace light bulb.
	Bad switch?	Check the continuity of light switch. Replace light switch if defective.
	Bad fuse?	Check fuse. Replace fuse if defective.
Retardant spray (optional) not working.	Retardant?	Check retardant level in tank. Fill tank as required.
	Wiring?	Check all electrical connections in the spray pump circuit. Verify wiring is in good condition with no shorts. Replace defective wiring or components immediately.
	Bad switch?	Check the continuity of both left and right spray switches (palm handles). Replace spray switch if defective..
	Bad spray pump?	If +12VDC is present at pump connector when spray switch is activated and pump does not operate, replace spray pump.
	Bad fuse?	Check fuse. Replace fuse if defective.
Steering is unresponsive.	Blade speed out of adjustment?	See section on blade speed adjustment.
	Steering linkage out of adjustment?	Adjust the connecting linkage found at the base of the handle. Contact your MQ field service manager for instructions.
	Worn components?	Check for wear of steering bearings and linkage components. Replace if necessary.
Operating position is uncomfortable.	Seat adjusted for operator?	Adjust seat with lever located on the front of the seat.
Power head on Electric Pitch (optional) not working.	Broken or loose parts?	If the motor runs and the pitch is not affected, parts inside the power head may be loose or broken. Return power head to dealer for service.
	Wiring?	Check all electrical connections and wiring. Check the continuity at the power head unit. Verify that there is voltage present at the power head switch with the key switch in the “on” position.
	Switch?	Check the continuity of the switch. If switch is malfunctioning, replace immediately.
Linkage on Twin Pitch not working.	Crank handles?	Make sure that both crank handles are pushed down as far as possible to ensure that the linkage is engaged.
	Broken part?	Replace all broken parts immediately.
Clutch slipping or sluggish response to engine speed change.	Worn belts?	Replace belt.
	Clutch out of adjustment?	Adjust per instructions in maintenance section of this manual.
	Worn or defective clutch parts?	Replace parts as necessary.
	Worn bearings in gearbox?	Rotate input shaft by hand. If shaft rotates with difficulty, check the input and output shaft bearings. Replace as necessary.
	Worn or broken gears in gearbox?	Verify that the gearbox shaft rotates when the input shaft is rotated. Replace both the worm and worm gear as a

NOTES

OPERATION MANUAL

HERE'S HOW TO GET HELP

PLEASE HAVE THE MODEL AND SERIAL NUMBER ON-HAND WHEN CALLING

UNITED STATES

Multiquip Corporate Office

18910 Wilmington Ave.
Carson, CA 90746
Contact: mq@multiquip.com

Tel. (800) 421-1244
Fax (800) 537-3927

MQ Parts Department

800-427-1244
310-537-3700

Fax: 800-672-7877
Fax: 310-637-3284

Service Department

800-421-1244
310-537-3700

Fax: 310-537-4259

Warranty Department

800-421-1244
310-537-3700

Fax: 310-943-2249

Technical Assistance

800-478-1244

Fax: 310-943-2238

MEXICO

MQ Cipsa

Carr. Fed. Mexico-Puebla KM 126.5
Momoxpan, Cholula, Puebla 72760 Mexico
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This manual MUST accompany the equipment at all times. This manual is considered a permanent part of the equipment and should remain with the unit if resold.

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