

OPERATION MANUAL



***WHITEMAN* SERIES** **MODEL EHHNK5** **RIDE-ON TROWEL** **(KOHLER 35HP DIESEL ENGINE)**

Revision #1 (04/13/17)

Original Version

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



THIS MANUAL MUST ACCOMPANY THE EQUIPMENT AT ALL TIMES.

P/N 40010



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.

SILICOSIS/RESPIRATORY WARNINGS

! 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.

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EHHNK5 Ride-On Trowel

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TRAINING CHECKLIST

Training Checklist			
No.	Description	OK?	Date
1	Read operation manual completely.		
2	Machine layout, location of components, checking of engine oil level.		
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.		
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	Radiator coolant level						
3	Condition of blades						
4	Blade pitch operation						
5	Safety stop switch operation						
6	Steering control operation						

SAFETY INFORMATION

Do not operate or service the equipment before reading the entire manual. Safety precautions should be followed at all times while 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**.

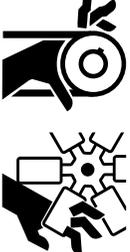
 **CAUTION**

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

SAFETY INFORMATION

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 taking 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 while 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 for this equipment that are not recommended by Multiquip. Damage to 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.



SAFETY INFORMATION

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**.
- 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 knowledgeable physician immediately or **severe injury or death** can occur.
- **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.



WARNING

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



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 the 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 while 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 radiator cap while the engine is hot. High pressure boiling water will gush out of the radiator and severely scald any persons in the general area of the trowel.
- **DO NOT** remove the coolant drain plug while the engine is hot. Hot coolant will gush out of the coolant tank and severely scald any persons in the general area of the trowel.
- **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.



SAFETY INFORMATION

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 above the maximum allowable speed range.



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 the fuel tank. Spilled fuel can 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 can 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 if dropped.
- **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 can 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 the battery if frozen. The battery can explode. When frozen, warm the battery to at least 61°F (16°C).
- **ALWAYS** recharge the battery in a well-ventilated area 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 seek medical attention from the nearest doctor or hospital.



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.

SAFETY INFORMATION

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.
- **NEVER** lift the trowel with the operator on the machine.



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/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 the 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 of the ground with float pans attached.
- Before lifting, make sure that the lift loops are not damaged.
- Always make sure any 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 straps. Inspect straps to make sure they are not frayed or damaged.

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 towing vehicle and the trailer that supports the trowel are mechanically sound and in good operating condition.
- **ALWAYS** shutdown the engine before transporting.
- Make sure the hitch and coupling of the towing vehicle are rated equal to or greater than the trailer's 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. **The manufacturer recommends that trailer tires 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 the trailer's safety chains to the 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 jackknifing. Smooth, gradual starts and stops will improve towing.



SAFETY INFORMATION

- 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 wheels 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/DECOMMISSIONING

NOTICE

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), be sure to follow the following rules:

- **DO NOT** pour waste or oil directly onto the ground, down a drain or into any water source.
- Contact your country's Department of Public Works or a recycling agency in your area and arrange for proper disposal of any electrical components, waste, or oil associated with this equipment.
- When the life cycle of this equipment is over, remove the battery and bring it to an appropriate facility for lead reclamation. Use safety precautions when handling batteries that contain sulfuric acid.
- When the life cycle of this equipment is over, it is recommended that the trowel frame and all other metal parts be sent to a recycling center.



Metal recycling involves the collection of metal from discarded products and its transformation into raw materials to use in manufacturing new products.

Recyclers and manufacturers alike promote the process of recycling metal. Using a metal recycling center promotes energy cost savings.

EMISSIONS INFORMATION

NOTICE

The diesel engine used in this equipment has been designed to reduce harmful levels of carbon monoxide (CO), hydrocarbons (HC) and nitrogen oxides (NOx) contained in diesel 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 emission system by unauthorized personnel without proper training can 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 regulations.

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

If a replacement emission label is needed, please contact your authorized engine distributor.

LIFTING AND TRANSPORTING

LIFTING THE TROWEL

Perform the following procedure when lifting the trowel for moving or transporting. Refer to Figure 1.

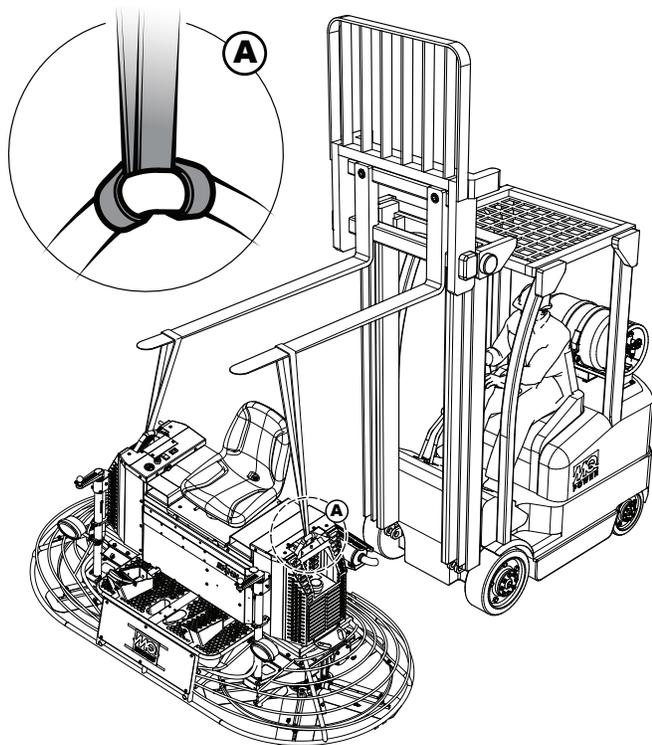


Figure 1. Lifting the Trowel

1. Secure two lifting straps to the lift loops located on the left and right side of the trowel.
2. Insert forklift forks through the loops at the end of lifting straps.

NOTICE

Make sure forklift has adequate lifting capacity for the trowel.

TRANSPORTING THE TROWEL

After the trowel has been lifted onto a flatbed truck, perform the following procedure to secure the trowel for transport:

1. Locate the tie-down strap symbol (Figure 2) on top of the left and right trowel guard rings.

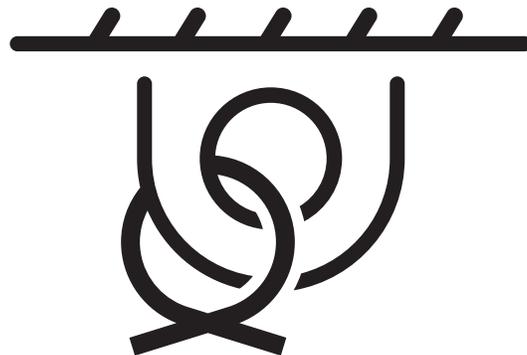


Figure 2. Tie-Down Strap Symbol

2. Attach suitable tie-down straps to the trowel. Route the tie-down straps on both sides as shown in Figure 3.

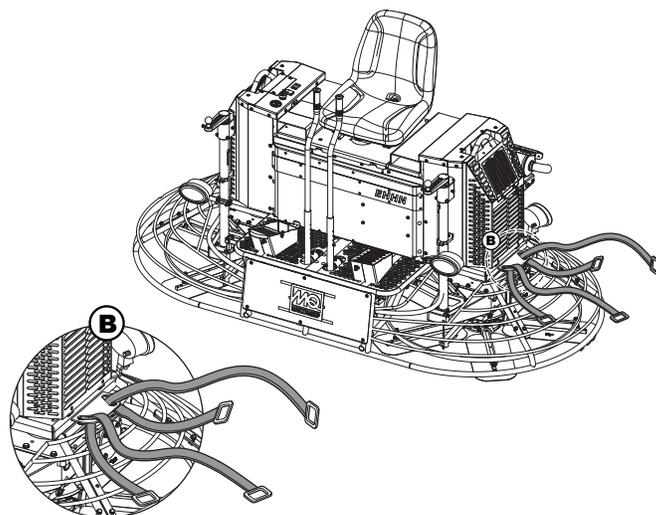


Figure 3. Routing Tie-Down Straps

3. Secure the trowel to the flatbed with the four straps. Make sure they are properly tied to prevent movement of the trowel during transport.

DIMENSIONS AND SPECIFICATIONS

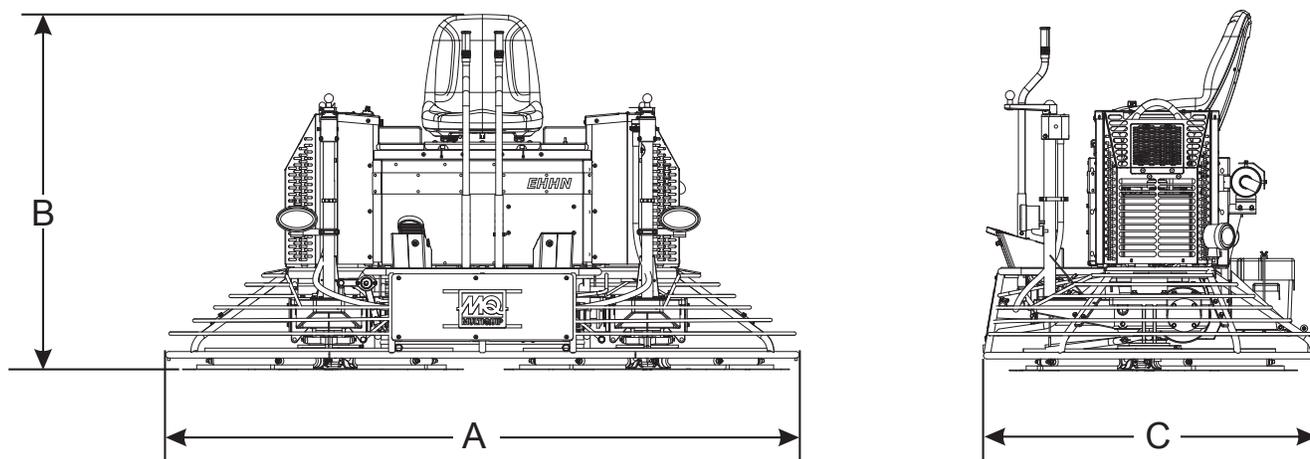


Figure 4. EHHNK5 Dimensions

Table 1. EHHNK5 Specifications	
A — Length — cm (in.)	241.3 (95)
B — Height — cm (in.)	149.9 (59)
C — Width — cm (in.)	121.9 (48)
Weight — kg (lb.) Operating	636.4 (1,403)
Weight — kg (lb.) Shipping	578 (1,274)
Fuel Tank — liters (gallons)	28.4 (7.5)
Rotor RPM	0–180
Path Width — cm (in.)	233 (92)
Gear Box Oil Capacity — liters (oz.)	4.26 (144)

Table 2. Engine Specifications	
Model	Kohler KDW1404
Type	Liquid-Cooled, Diesel Engine
Cylinders	4
Piston Displacement	1372 cm ³ (83.72 cu.in.)
Bore and Stroke	75 mm x 77.6 mm (2.95 in. x 3.1 in.)
Max. Output	26 kW (35.2 hp) @ 3600 rpm
Max. Torque	8.57 kg/84 N·m (62 ft-lbs.) @ 2000 rpm
Engine Oil Type	SAE 15W-40 API Service CD, CH, CI-4/SL
Engine Oil Capacity	3.3 liters (3.5 qt.)
Lubricating System	Full Pressure with Full-Flow Filter
Fuel Type	Diesel — ASTM D-975 1D or 2D, EN590, or Equivalent
Starting System	12 VDC Electric Start
Dimensions (L x W x H)	508 mm x 483 mm x 711 mm (23.4 in. x 17.3 in. x 20.3 in.)
Shipping Weight	98 kg (216 lbs.)

NOISE AND VIBRATION EMISSIONS

Table 3. Noise and Vibration Emissions

Model	EHHNK5
Guaranteed ISO 11201:2010 Based Sound Pressure Level at Operator Station in dB(A)	94
Guaranteed ISO 3744:2010 Based Sound Power Level in dB(A)	122
Whole Body Vibration Per ISO 2631-1:1997+A1:2010 in $m/s^2 \Sigma A(8)$	0.03

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 conditions of the machine that generate 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 $0.5 m/s^2 \Sigma A(8)$. The daily exposure limit value is $1.15 m/s^2 \Sigma A(8)$.*

EHHNK5 RIDE-ON POWER TROWEL FAMILIARIZATION

The EHHNK5 ride-on power trowel is designed for the floating and finishing of concrete slabs.

Walk around your trowel. Take notice of all the major components (see Figure 5 and Figure 6)—engine, blades, air cleaner, fuel system, fuel shut-off valve, ignition switch, etc. Ensure engine and gearbox lubricant levels are within proper operating range.

Read all 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. Grasp the control levers and move them around a bit. Observe how moving the control levers causes the gearboxes and frame to move.

Notice the foot pedal, which controls the engine and blade speed. Look also at the main drive of the trowel. Take note of the drive belt alignment, as this is the way the belt should be aligned when adjusted properly.

Before using your trowel, test it on a flat, watered-down section of finished concrete. This test run will increase your confidence in using the trowel, and will familiarize you with the trowel's controls and indicators. You will also learn how the trowel handles under actual conditions.

Engine

This trowel is equipped with a Kohler KDW1404 liquid-cooled, 4-cylinder, 35-hp diesel engine. Refer to the engine owner's manual, included with the trowel at shipping, for specific instructions regarding engine operation. Please contact your nearest Multiquip dealer if a replacement manual is required.

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). The trowel is equipped with five blades per rotor, equally spaced in a radial pattern and attached to a vertical rotating shaft by means of a spider assembly.

Twin Pitch Control™

The Twin Pitch™ control feature allows the operator to simultaneously control the pitch of both rotors with minimal effort, while still allowing individual pitch control as needed.

Helical Gearboxes

This trowel is designed with two separate helical gearbox assemblies enclosed in rugged, cast-aluminum gear cases.

Steering

Dual control levers located in front of the operator's seat are provided for steering this trowel. The control levers are linked to two spring-loaded cylinders. A *steering assist* feature has been provided to make control of the trowel easier, especially when float pans are installed.

Simultaneously push the left control lever forward and pull the right control lever backward to rotate the trowel clockwise on an approximate center axis. Simultaneously pull the left control lever backward and push the right control lever forward to rotate the trowel counterclockwise. See Table 5 for a complete description of the control levers' directional positioning.

Constant Velocity Joints (CV-Joints)

Constant velocity joints ensure the efficient transfer of power to the drive shaft, and maintain the timing of the gearboxes without slippage.

Continuously Variable Transmission (CVT)

A continuously variable transmission (CVT) has been installed to obtain maximum drive torque. This is accomplished by continually adjusting the drive ratio to obtain optimum torque and speed during all phases of finishing, from low-speed, high-torque to high-speed burnishing.

HOW IT WORKS

The Multi-Clutch functions much like a standard CVT system. As engine RPMs increase, the drive or primary clutch closes, forcing the belt to ride outwards on the drive sheaves and open the driven or secondary sheaves. The opening and closing of these sheaves creates a continuous drive ratio variation.

Most traditional CVT systems have a loose or slack belt as the engine idles, and the sheaves of those systems are constantly rotating. The rotation of the sheaves relative to the belt causes unnecessary wear on the belt. The stationary belt is also pinched by the constantly rotating sheaves during startup. Therefore, wear on the belt occurs any time the engine idles, as well as at every start-up of the driven equipment. This is where the Multi-Clutch differs from other CVTs.

The Multi-Clutch provides belt protection through the use of a series of centrifugal clutches. The starter clutch system consists of two centrifugal clutches that drive the sheaves of the drive (primary) clutch. The belt remains tight in the sheaves, and both sheaves and the belt remain stationary as the engine idles, reducing belt wear.

The starter clutch system also provides overload protection. When too much torque is applied to the belt, the centrifugal clutches will slip before the maximum load on the belt is reached. This prevents belt slippage on the sheaves during an overload, further protecting the belt from damage.

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.

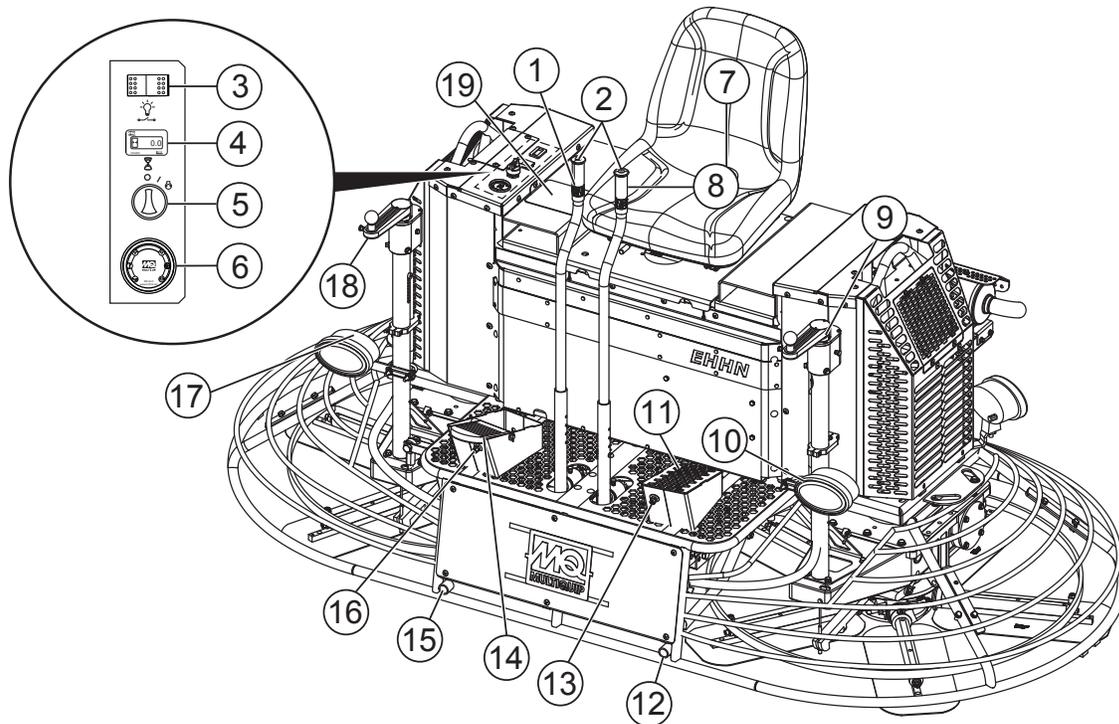


Figure 5. EHHNK5 Components (Front)

1. **Steering Control Lever (Right Side)** — Moves the unit forward, reverse, left and right.
2. **Retardant Spray Control Buttons** — Spray retardant through the spray nozzle located at the front of the machine.
3. **Light Switch** — Activates four halogen lights, providing better visibility when working indoors.
4. **Hour Meter** — Indicates the number of hours ignition switch is in the "ON" position.
5. **Ignition Switch** — With key inserted, turn *clockwise* to start engine.
6. **Oil, Temperature and Charge Indicator Display** — Illuminates when oil pressure is low, water temperature is high, or electrical system is not charging properly.
7. **Safety Stop Switch** — Shuts down engine when operator leaves seat.
8. **Steering Control Lever (Left Side)** — Moves the unit forward, reverse, left and right.
9. **Twin Pitch Control (Left Side)** — Adjusts the left-side blade pitch. Turn the crank as marked on its top surface to increase or decrease blade pitch.
10. **Left Front Light** — 20 watt LED light allows for nighttime and indoor work.
11. **Left Foot Riser** — Operator foot rest.
12. **EZ Mover Boss (Left Front)** — Insertion point for EZ Mover. Used for transporting the trowel.
13. **Spray Nozzle (Left Side)** — Spray nozzle for retardant.
14. **Right Foot Pedal** — Controls blade speed. Slightly depress the foot pedal for slow blade speed. Fully depress the pedal for maximum blade speed.
15. **EZ Mover Boss (Right Front)** — Insertion point for EZ Mover. Used for transporting the trowel.
16. **Spray Nozzle (Right Side)** — Spray nozzle for retardant.
17. **Right Front Light** — 20 watt LED light allows for nighttime and indoor work.
18. **Twin Pitch Control (Right Side)** — Adjusts the right-side blade pitch. Turn the crank as marked on its top surface to increase or decrease blade pitch.
19. **Oil Fill Access Cover** — Provides easy access to the oil fill cap.

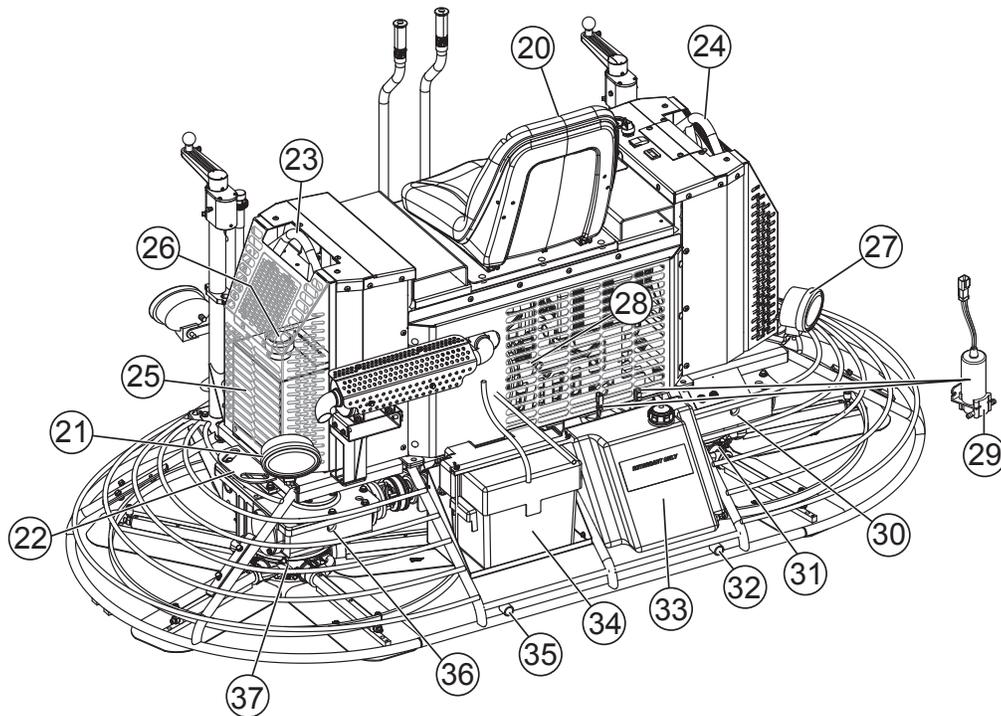


Figure 6. EHHNK5 Components (Rear)

- 20. **Seat** — Provides comfortable position for operation of trowel. Engine will not start until operator is seated. Seat is adjustable in front and back for operator comfort.
- 21. **Left Rear Light** — 20 watt LED light allows for nighttime and indoor work.
- 22. **Tie-Down Plate (2)** — Tie-down point for transporting the trowel. Located on left and right side of trowel.
- 23. **Lift Loop (Left Side)** — To lift the trowel, attach a strap of adequate lifting capacity here.
- 24. **Lift Loop (Right Side)** — To lift the trowel, attach a strap of adequate lifting capacity here.
- 25. **Fuel Tank** — Holds 7.5 gallons of diesel fuel.
- 26. **Fuel Tank Cap with Gauge** — Indicates the amount of fuel in the fuel tank. Remove to add fuel.
- 27. **Right Rear Light** — 20 watt LED light allows for nighttime and indoor work.
- 28. **Engine** — A Kohler 35-hp diesel engine.
- 29. **Retardant Spray Pumps** — Deliver retardant to the spray nozzles.
- 30. **Gearbox Sight Glass (Right Side)** — Indicates the level of gear oil in the right-side gearbox.
- 31. **Spider (Right Side)** — Consists of trowel arms, blades, wear plate, and thrust collar.
- 32. **EZ Mover Boss (Right Rear)** — Insertion point for EZ Mover. Used for transporting the trowel.
- 33. **Retardant Spray Tank** — Holds 5 gallons of retardant.
- 34. **Battery** — Provides +12V DC power to the electrical system.
- 35. **EZ Mover Boss (Left Rear)** — Insertion point for EZ Mover. Used for transporting the trowel.
- 36. **Gearbox Sight Glass (Left Side)** — Indicates the level of gear oil in the left-side gearbox.
- 37. **Spider (Left Side)** — Consists of trowel arms, blades, wear plate, and thrust collar.

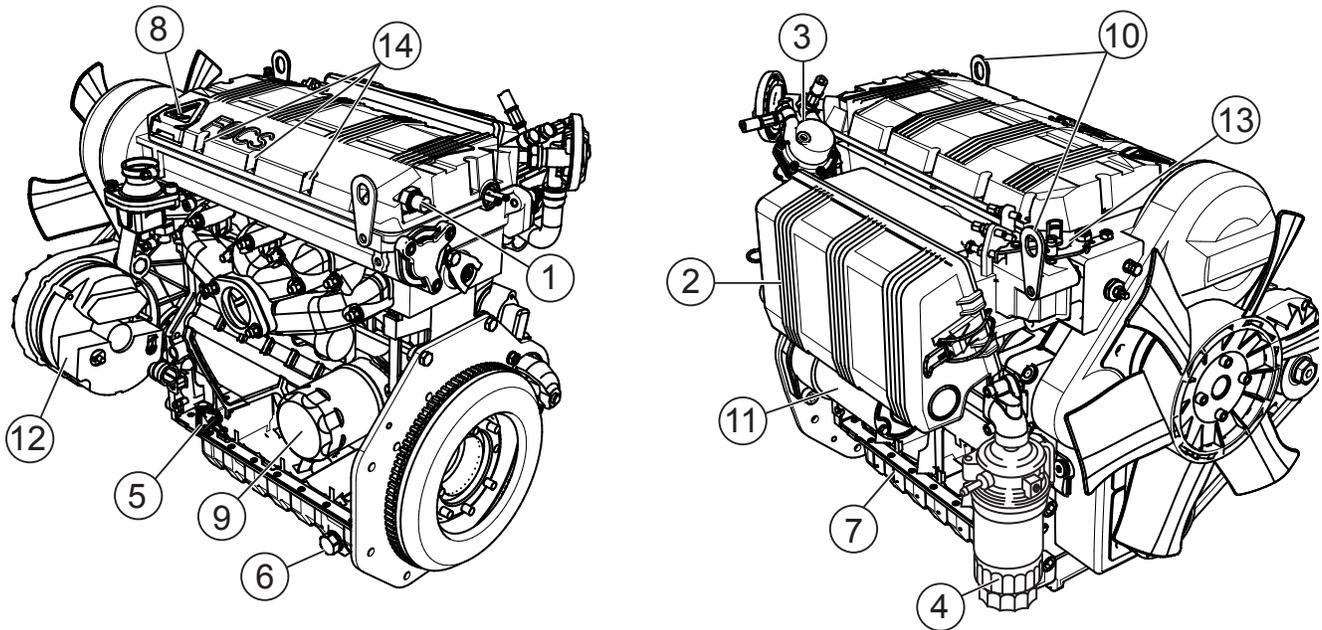


Figure 7. Basic Engine Components

INITIAL SERVICING

The diesel engine (Figure 7) must be checked for proper lubrication and filled with fuel prior to operation. Refer to the manufacturer's engine manual for instructions and details for operation and servicing.

1. **Oil Pressure Gauge** — Monitors engine oil pressure. Will stop the engine in the event of low oil pressure.
2. **Air Cleaner** — Prevents dirt and debris from entering the fuel system. Open air cleaner cover to access filter element.
3. **Fuel Feed Pump** — Delivers fuel from fuel tank to fuel injectors.
4. **Fuel Filter** — Filters fuel for contaminants.
5. **Oil Dipstick** — Remove to check amount and condition of oil in crankcase.
6. **Oil Drain Plugs** — Remove to drain crankcase oil. Always dispose of used oil and oil filters in an environmentally safe manner. **DO NOT** allow used oil to drain onto the ground or into a water runoff drain.
7. **Oil Pan** — Holds a maximum of 3.5 quarts (3.3 liters) of motor oil.
8. **Oil Fill Plug** — Remove to add engine oil. Refer to Table 2 and Table 4 when adding engine oil.
9. **Oil Filter** — Spin-on type, filters oil for contaminants.
10. **Lifting Brackets** — When lifting of the engine is required, attach a strap or chain of adequate lifting capacity to these lifting points.
11. **Starter** — Starts engine when ignition key is rotated to the **START** position.
12. **Alternator** — Provides charge for the battery.
13. **Speed Governor** — Regulates engine speed.
14. **Glow Plugs** — Energize to aid in cold starting.

WARNING



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

INITIAL SET-UP

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 set-up installation instructions are completed.

CONTROL HANDLE ASSEMBLY

The steering control handles are not attached to the trowel's 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. There are two knobs for the pitch control tower cranks inside the plastic bag of parts. Install these 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 its protective wrapping.
2. Insert studs on bottom of seat through holes in the mounting plate.
3. Install and tighten the provided nuts.

4. Connect the engine stop switch (seat) cable to the mating plug as shown in Figure 8.

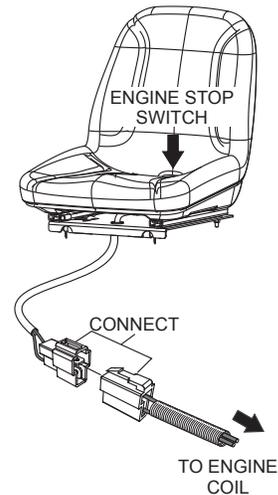


Figure 8. Engine Stop Switch (Seat)

BATTERY SETUP

CAUTION

Use all safety precautions specified by the battery manufacturer when working with the battery.

This trowel was shipped with a wet charged battery. The battery may need to be charged for a brief period of time, as per the manufacturer's instructions. To install the battery, perform the following:

1. Make sure the battery is well seated in the battery box.
2. Connect the positive cable (**RED**) to the positive (+) terminal on the battery, then connect the negative cable (**BLACK**) to the negative (-) terminal on the battery. See Figure 9.

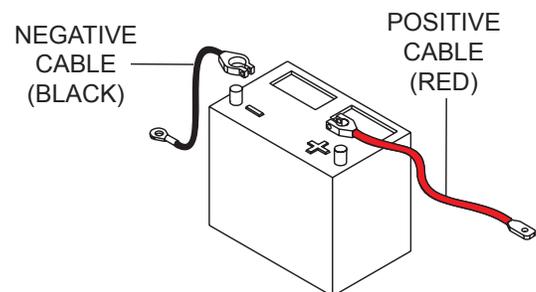


Figure 9. Battery Cable Connection

3. Close the plastic battery box cover and secure battery box with battery bolts.

This section is intended to assist the operator with the initial inspection of the trowel. ***It is extremely important that this section be read carefully*** before the trowel is placed into operation.

CAUTION

DO NOT use this trowel until the “*Inspection*” section is thoroughly understood. Failure to understand the operation of the trowel could result in severe damage to the trowel or personal injury.

ENGINE OIL LEVEL

1. Pull the engine oil dipstick from its holder (Figure 10).

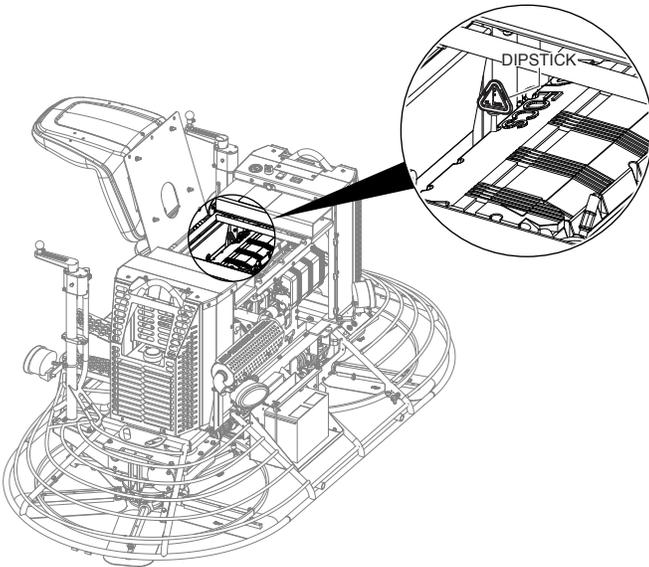


Figure 10. Dipstick Location

2. Check the oil level shown on the dipstick to determine if engine oil is low (Figure 11).

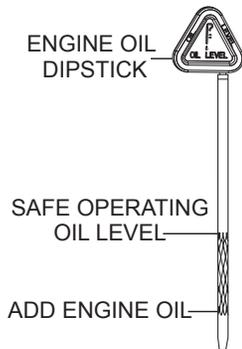


Figure 11. Checking Engine Oil

3. If engine oil is low, add the correct amount of oil to bring it to a normal, safe operating level. See Table 4.

Table 4. Recommended Viscosity Grades

	SAE 10W									
			SAE 20W							
					SAE 30					
							SAE 40			
									SAE 10W-30	
									SAE 10W-40	
									SAE 10W-60	
									SAE 15W-40	
									SAE 15W-40	
									SAE 20W-60	
									SAE 10W-30	
									SAE 5W-30	
°F	-20	0	20	32	40	60	80	100		
°C	-30	-20	-10	0	10	20	30	40		
TEMPERATURE RANGE EXPECTED BEFORE NEXT OIL CHANGE										

GEARBOX OIL LEVEL

1. Look into the sight glass at the rear of each gearbox to check the gearbox oil level (Figure 12). The oil level should be at the halfway point of the sight glass.

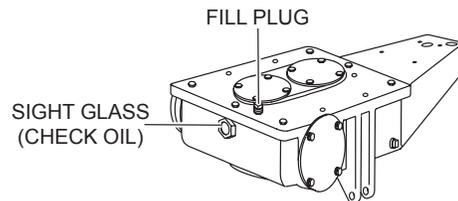


Figure 12. Checking and Refilling Gearbox Oil

2. If gearbox oil is low, unscrew the oil fill plug located on top of the gearbox (Figure 12), and refill the gearbox with ISO 220 A GMA GR 5 EP oil. The gearbox oil capacity is 4.26 liters (144 oz).

FUEL LEVEL

Read the gauge on the fuel tank cap to determine if fuel is low (Figure 13). If fuel is low, remove the fuel tank cap and fill tank with diesel fuel.

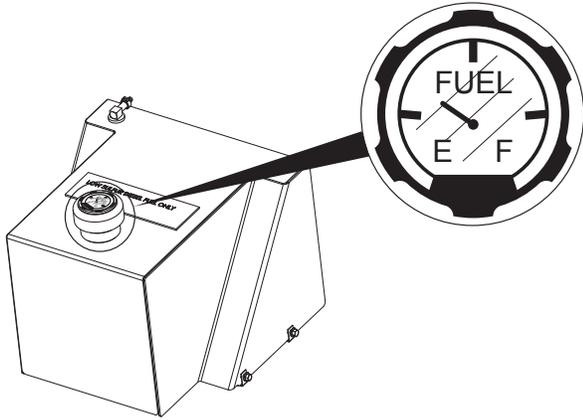


Figure 13. Fuel Gauge

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 when the engine is hot or running.

CAUTION

NEVER store the trowel with fuel in the tank for any extended period of time. **ALWAYS** clean up any spilled fuel immediately.

STARTING THE ENGINE

NOTICE

This trowel is equipped with a safety stop switch that will prevent the engine from starting unless an operator is sitting in the operator's seat. The weight of the operator depresses an electrical switch, which allows the engine to start.

WARNING

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

NOTICE

After each use, stop the engine using the safety stop switch to verify that the switch is working properly. Remember to turn the key to the **OFF** position after stopping the trowel to prevent battery drain.

1. Place one foot on the trowel's platform, grab any part of the frame, lift yourself onto the trowel, and sit down in the operator's seat.
2. Insert the ignition key into the ignition switch (Figure 14).

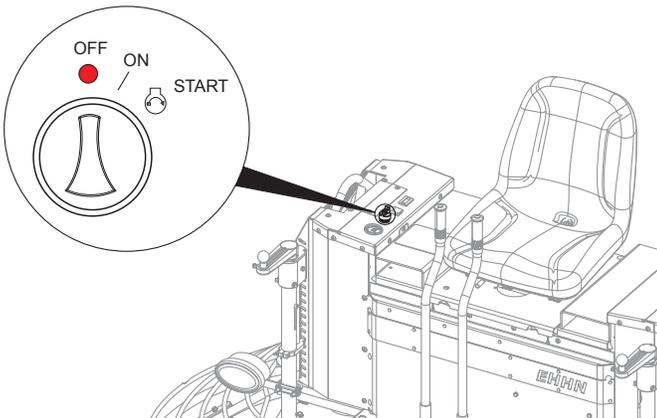


Figure 14. Ignition Switch

3. Turn the ignition key **clockwise** to the **ON** position (Figure 14).
4. The **AUX 1**, **AUX 2**, **TEMPERATURE** and **OIL** indicator lamps will light for 10 seconds (Figure 15). The **BATTERY CHARGE** indicator lamp will remain lit until the engine starts.

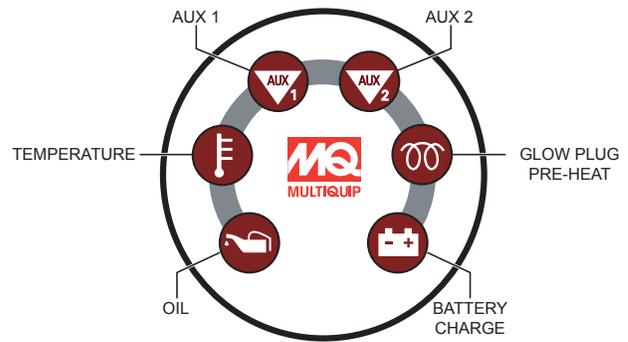


Figure 15. Indicator Lights

5. Keeping your foot **off** the right foot pedal (the throttle pedal), turn the ignition key fully **clockwise**, and listen for the engine to start. Once the engine has started, release the ignition key. The throttle speed will default to **idle**. Let the engine warm up for a few minutes.

NOTICE

If the engine fails to start in this manner, consult the engine owner's manual supplied with the trowel.

6. The right foot pedal is the *throttle pedal* (Figure 16). The position of the throttle pedal determines blade speed. Slow blade speed is obtained by slightly depressing the pedal. Maximum blade speed is obtained by fully depressing the pedal.

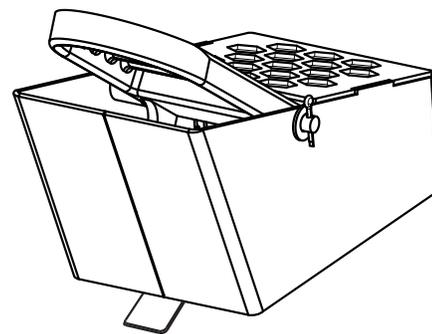


Figure 16. Throttle Pedal

7. Test the safety stop switch by standing up. The switch under the seat should stop the engine. If the switch fails to stop the engine, turn off the engine with the ignition switch and fix the safety stop switch. See "*Troubleshooting*" tables for possible problems.
8. Repeat this section a few times to familiarize yourself with the engine starting procedure.

STEERING

Two control levers located in front of the operator's seat provide directional control for the trowel. Table 5 illustrates the various directional positions of the joysticks and their effect on the trowel.

NOTICE

All directional references in relation to the steering control levers are from the operator's seated position.

1. Push both the left and right control levers forward. See Figure 17.

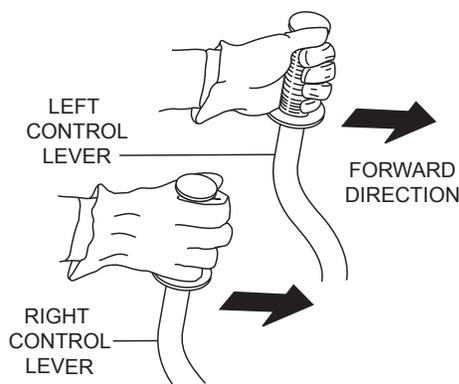


Figure 17. Control Levers (FORWARD)

2. With your right foot, quickly depress the throttle pedal halfway. Notice that the 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 trowel in place as you increase blade speed. The blades will rotate at proper finishing speed when approximately 75% of maximum blade speed has been reached. The trowel may be difficult to keep in place. Trying to keep the trowel stationary is good practice for operation.

4. Pull both the left and right joysticks backward and repeat steps 1 and 2 while substituting the word “backward” for “forward”.
5. Practice maneuvering the trowel using the information listed in Table 5. Practice using controlled motions as if finishing a slab of concrete. Practice edging and covering a large area.

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.

Table 5. Control Lever Directional Positioning

Control Lever	Direction	Results
Left	Move Control Lever Forward	Moves the trowel forward and to the right.
Left	Move Control Lever Backward	Moves the trowel backward and to the left.
Right	Move Control Lever Forward	Moves the trowel forward and to the left.
Right	Move Control Lever Backward	Moves the trowel backward and to the right.
Left and Right	Move Both Control Levers Forward	Moves the trowel forward in a straight line.
Left and Right	Move Both Control Levers Backward	Moves the trowel backward in a straight line.
Left and Right	Move Both Control Levers to the Right	Moves the trowel to the right.
Left and Right	Move Both Control Levers to the Left	Moves the trowel to the left.

6. Test the operation of optional equipment like retardant spray and lights if equipped.
7. Adjust the pitch of the blades. This can be done while the trowel is stopped or moving—whichever feels comfortable.

Blade Pitch

Sometimes it may be necessary to match blade pitch between the two sets of blades. There are indications that this may be necessary—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 trowel 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.

Matching Blade Pitch for Both Sets of Blades

On trowels equipped with Twin Pitch™ controls, blade pitch may be synchronized between the two sets of blades. This is easily accomplished by performing the following procedure. Refer to Figure 18.

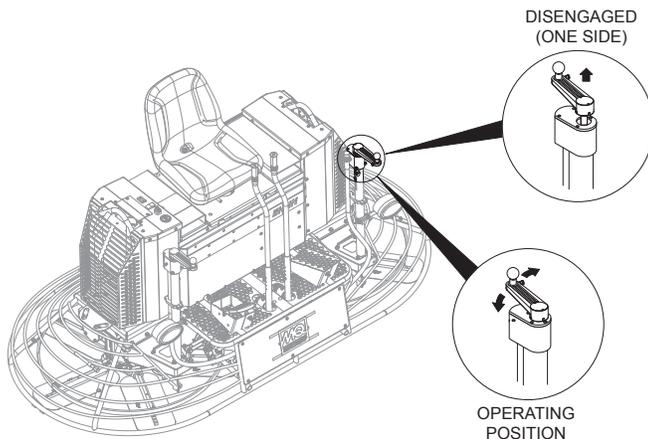


Figure 18. Twin Pitch™ Handle Adjustment

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

! CAUTION

DO NOT force an adjustment handle to turn or damage to the cable may occur. The cable starting to noticeably twist is a good indication that one side is either already at full pitch, or is bound up due to concrete, debris, or corrosion.

MAINTENANCE (ENGINE)

Use the following table as a general maintenance guideline when servicing your engine. For more detailed engine maintenance information, refer to the engine owner's manual supplied with your engine.

Engine Maintenance Schedule						
DESCRIPTION (3)	OPERATION	BEFORE EACH USE	FIRST MONTH OR 20 HRS.	EVERY 6 MONTHS OR 100 HRS.	EVERY YEAR OR 300 HRS.	EVERY 2 YEARS OR 500 HRS.
Engine Oil	Check	X				
	Change		X	X		
Oil Filter	Replace	Every 200 hours				
Air Cleaner	Check	X				
	Clean			X (1)		
	Change					X (*)
Spark Arrester	Clean			X		
Fuel Filter	Replace				X (2)	
Fuel Hose	Check	Every 2 years (replace if necessary) (2)				

(*) Replace paper filter element only.

(1) Service more frequently when used in **dusty** areas.

(2) These items should be serviced by your service dealer unless you have the proper tools and are mechanically proficient. Refer to the Kohler Engine Shop Manual for service procedures.

(3) For commercial use, log hours of operation to determine proper maintenance intervals.

MAINTENANCE (ENGINE)

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 negative battery cable from battery before servicing.

WARNING

 Some maintenance operations may require the engine to be run. Ensure that the maintenance area is well ventilated. Exhaust contains poisonous carbon monoxide gas that can cause unconsciousness and may result in **DEATH**.

CAUTION

 **ALWAYS** allow the engine to cool before servicing. **NEVER** attempt any maintenance work on a hot engine.

ENGINE MAINTENANCE

Engine Oil (100 Hours)

Refer to Figure 19.

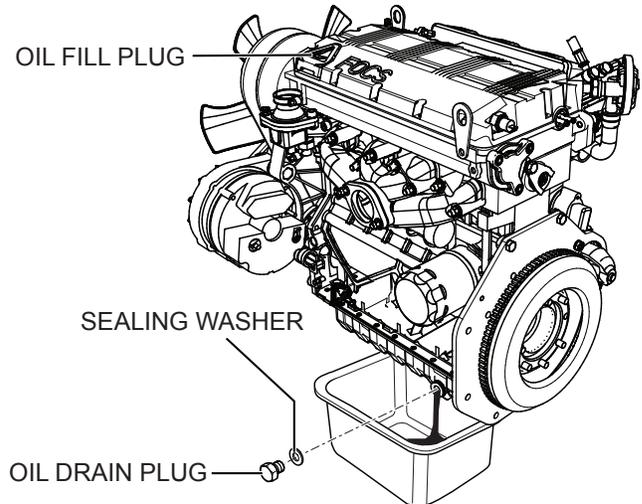


Figure 19. Replacing Engine Oil

WARNING

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.

NOTICE

Always drain engine oil while the oil is warm.

NOTICE

DO NOT pour waste or oil directly onto the ground, down a drain, or into any water source.

1. Remove oil drain plug and sealing washer, and allow oil to drain into a suitable container.
2. Reinsert oil drain plug with sealing washer and tighten securely.
3. Remove oil fill plug and refill engine oil with recommended type oil as listed in Table 2. **DO NOT** overfill. See Table 2 for engine oil capacity.

MAINTENANCE (ENGINE)

Oil Filter (200 Hours)

1. Replace the engine oil filter (Figure 20) every 200 hours.

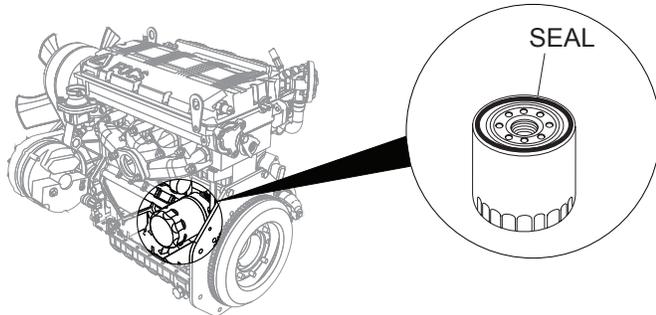


Figure 20. Oil Filter Replacement

2. Always coat the seal of a new oil filter with clean engine oil (Figure 20).

Air Cleaner (Daily)

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

1. Release the locking latch and remove the air filter paper element as shown in Figure 21.

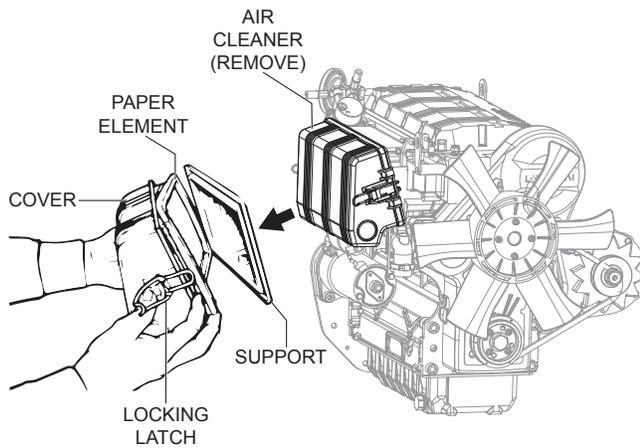


Figure 21. Air Cleaner Removal

2. Clean the inside of the cover using a damp cloth.
3. Tap paper filter element gently to dislodge debris. **DO NOT** wash paper filter element or use pressurized air to clean, as this will damage the element.
4. Inspect paper filter element, and replace if necessary.

5. Inspect air filter cover for cracks, heat damage, or warping. Replace if necessary.
6. Reinstall air filter paper element and support. Attach cover and secure with locking latch.

Fuel Filter (200 Hours)

Replace the fuel filter (Figure 22) every 200 hours.

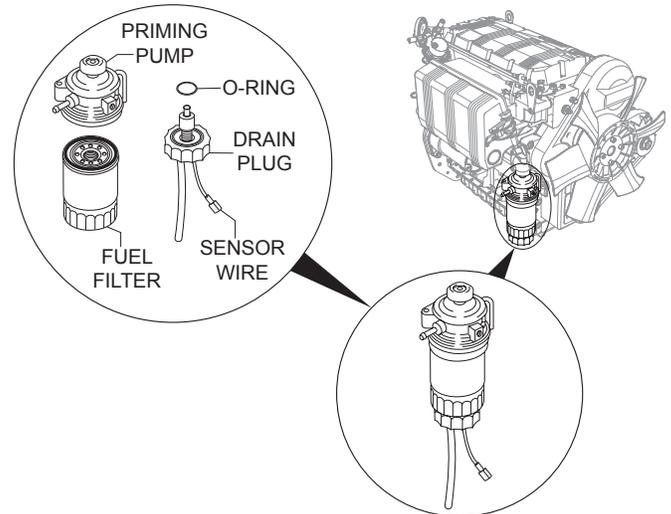


Figure 22. Fuel Filter

Engine Tune-Up

Refer to the engine manual for engine maintenance schedule, troubleshooting guide, and specific information on tuning up your engine.

MAINTENANCE (TROWEL)

Trowel Maintenance Schedule						
Check Item	OPERATION	DAILY	Periodic Maintenance Interval			
			Every 25 Hrs	Every 50 Hrs	Every 100–125 Hrs	Every 500 Hrs
Relube arms, thrust collar, steering linkage	Grease	X				
Remove, clean, reinstall, and relube arms and thrust collar	Clean				X	
Check, and replace if necessary, arm bushings and thrust collar bushings	Check			X		
Check blades for excessive wear or damage, and replace if necessary	Check	X				
Adjust blade speed if necessary	Check					X
Gearbox lubricant	Replace				1st time	X
Drive belt	Check		X			
Fasteners	Check	X				

MAINTENANCE (TROWEL)

TROWEL MAINTENANCE

Cleaning

Never allow concrete to harden on the trowel. Wash any concrete off the trowel with water immediately after use. 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.

Drive Belt

The drive belt should be changed as soon as it begins to show signs of wear. **DO NOT** reuse a belt under any circumstances. Indications of excessive belt wear are fraying, squealing when in use, a belt that emits smoke, or a burning rubber smell when in use.

Drive Belt Inspection (25 Hours)

WARNING



DO NOT insert hands or tools into the drive belt area while the engine is running and the safety guard has been 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.

Remove splash pan to gain access to the drive belt, then visually inspect the drive belt for signs of damage or excessive wear (Figure 23). Replace the drive belt if it is worn or damaged.

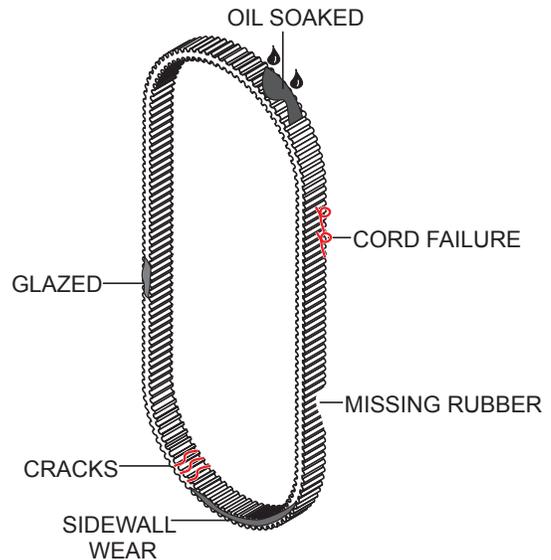


Figure 23. Drive Belt Inspection

Drive Belt Measurement (100 Hours)

The clutch will not shift correctly if the drive belt width is less than 1.14". Measure the drive belt (Figure 24) every 100 hours, and replace if necessary.

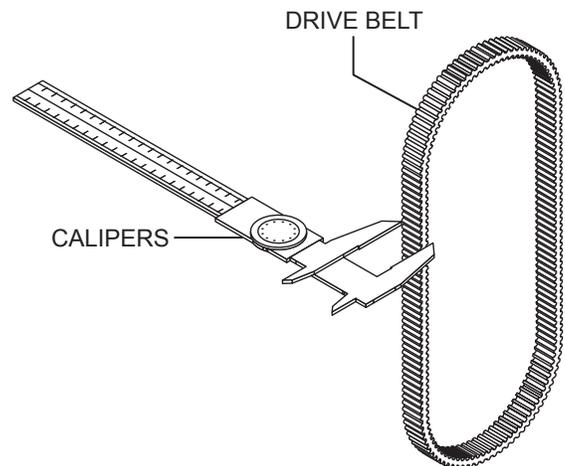


Figure 24. Drive Belt Measurement

MAINTENANCE (TROWEL)

Drive Belt Replacement

Drive Belt Removal

1. Remove and retain the 4 screws that secure the rear panel to the trowel frame (Figure 25).

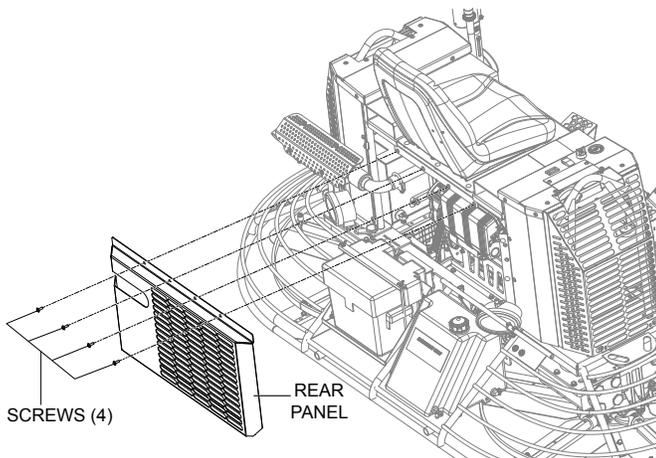


Figure 25. Rear Panel Removal

2. Remove and set aside the rear panel (Figure 25).
3. Remove and retain the 3 screws that connect the left-side CV joint assembly to the left-side gearbox coupler (Figure 26).

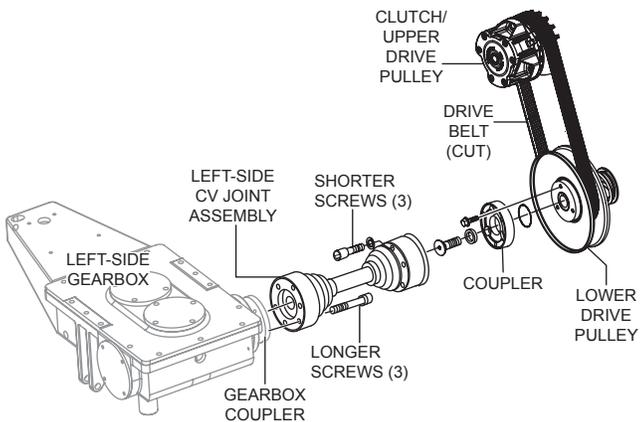


Figure 26. Drive Belt Removal

4. Remove and retain the 3 screws that connect the left-side CV joint assembly to the lower drive pulley coupler (Figure 26). Slide the CV joint away from the couplers to disconnect.

NOTICE

The screws securing the CV joint to the lower drive pulley coupler are shorter than those securing the CV joint to the gearbox coupler. Remember screw orientation for reassembly.

5. Cut and remove the existing drive belt. Ensure all belt remnants are removed from the pulleys (Figure 26).

Drive Belt Installation

1. Place a new drive belt over the lower pulley (Figure 27).

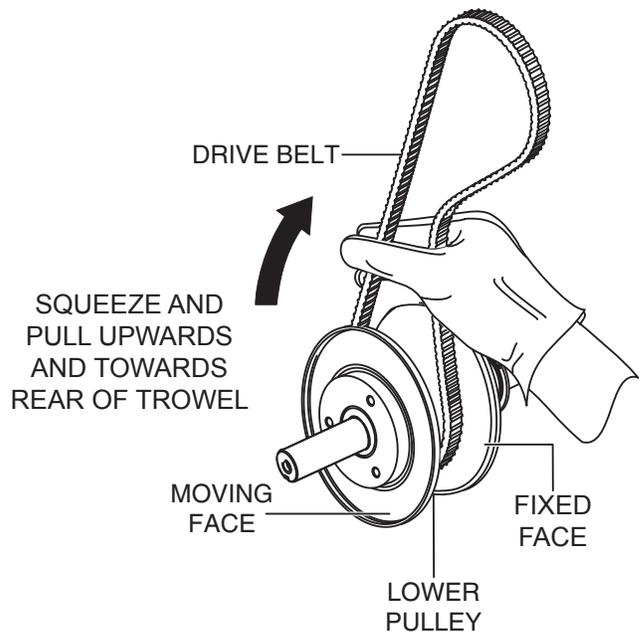


Figure 27. Drive Belt Installation (Lower Pulley)

2. Squeeze the drive belt and pull upwards and towards the rear of the trowel (Figure 27). This will spread apart the faces of the lower drive pulley.

MAINTENANCE (TROWEL)

- Place the free end of the drive belt over the clutch, and into the upper pulley groove (Figure 28).

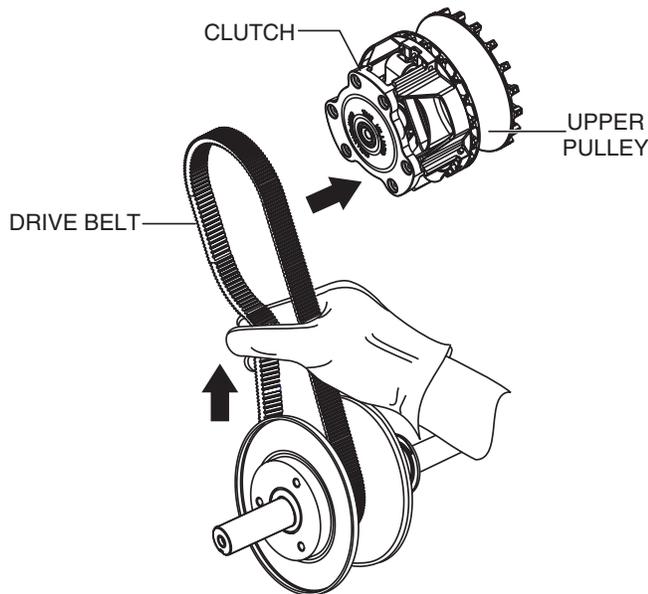


Figure 28. Drive Belt Installation (Upper Pulley)

- Apply a thin coat of RTV silicone to the mating surfaces of the CV joint and left-side gearbox coupler (Figure 29).

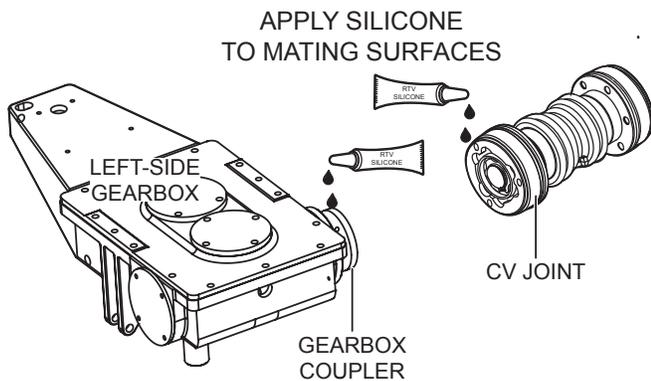


Figure 29. RTV Silicone Application

- Reconnect the CV joint to the left-side gearbox coupler and lower drive pulley coupler. Secure with hardware that was removed earlier.
- Reinstall rear panel onto frame. Secure with hardware that was removed earlier.

Trowel Blades

Blade Pitch Adjustment

Perform maintenance adjustment of blade pitch using a bolt on the trowel arm lever (Figure 30). This bolt is the contact point of the trowel arm with the lower wear plate on the thrust collar. The goal of adjustment is consistent blade pitch and finishing quality.

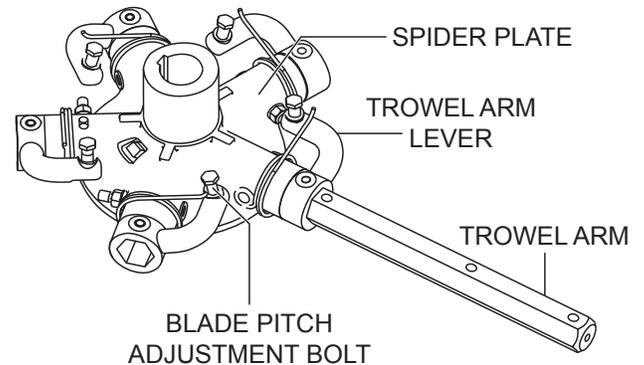


Figure 30. Blade Pitch Adjustment Bolt

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

- Is one blade completely worn out while the others look new?
- Does the machine have a perceptible rolling or bouncing motion while in use?
- Do the guard rings rock up and down relative to the ground while the machine is in use?
- Do the pitch control towers rock back and forth while the machine is in use?

The easiest and most consistent way to make adjustments to the trowel arm fingers is with the trowel arm adjustment tool (P/N 9177). It comes with all the hardware necessary to perform this maintenance and instructions on how to use this tool.

If a trowel arm adjustment tool is not available and immediate adjustment is necessary, temporary field adjustment can be made by adjusting whichever bolt corresponds to the blade that is pulling harder.

MAINTENANCE (TROWEL)

To determine which blades need adjustment, place the trowel on a clean, **flat** surface. Ideally, a 5' x 5', 3/4" thick, flat, steel plate should be used for testing. Pitch the blades as flat as possible. The adjustment bolts should all barely make contact with the lower wear plate on the spider. If one of them does not make visible contact, adjustment is necessary.

If possible, adjust the "low" bolt to match the level of the higher bolts. This is the fastest method of adjustment, but may not always work. If it doesn't, instead adjust the "high" bolts to match the level of the bolt that is not making contact with the wear plate. Verify the blades pitch correctly after adjustment.

Blades with adjusting bolts that are raised too high often will not pitch flat. Conversely, blades with adjusting bolts that are too low will not pitch high enough for finishing operations.

If the trowel still finishes poorly after blade pitch adjustments have been made, blades, trowel arms, and trowel arm bushings may be suspect, and should be inspected for improper adjustment, wear, or damage. Refer to the following sections.

Blade Replacement

It is recommended to change **ALL** trowel blades at the same time. If only one or some of the blades are changed, the trowel will not finish concrete consistently and may wobble or bounce while in use.

1. Place the trowel on a flat, level surface, with blocks under the main guard ring for support. Pitch the blades as flat as possible. It is important to note the blade orientation on the trowel arms, as the two sets of blades counter-rotate.
2. Remove the bolts and lock washers on the trowel arm, 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, properly oriented for direction of rotation.
5. Reinstall bolts and lock washers.
6. Repeat steps 2–5 for all remaining blades.

Trowel Arms

Spider Plate Inspection

NOTICE

The following adjustment procedure should be performed when the trowel is finishing poorly or in need of routine maintenance.

A clean, **flat** surface (e.g. a 5' x 5', 3/4" thick, flat, steel plate) is essential for testing the trowel prior to and after adjustment. Uneven spots in the floor or debris under the trowel blades will cause errors in adjustment.

Poor concrete finishing may indicate incorrect spider plate alignment, worn spider bushings, or bent trowel arms.

Figure 31 illustrates incorrect spider plate alignment. The adjustment bolt should barely touch the lower wear plate (0.10" maximum clearance). All alignment bolts should be spaced the same distance from the lower wear plate.

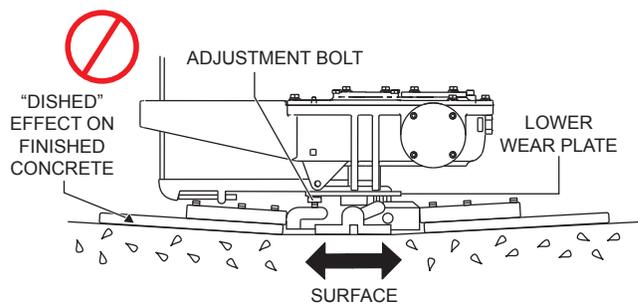


Figure 31. Incorrect Spider Plate Alignment

Figure 32 illustrates correct spider plate alignment as shipped from the factory.

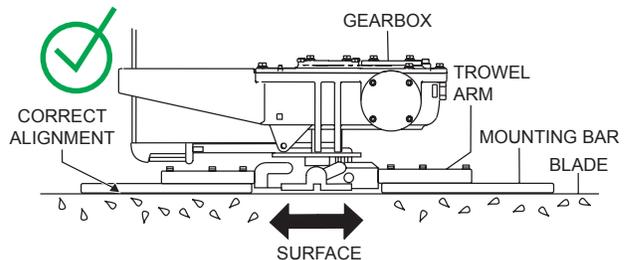


Figure 32. Correct Spider Plate Alignment

MAINTENANCE (TROWEL)

Spider Removal

Perform the following procedure to remove the spider assembly from the gearbox shaft. Refer to Figure 33.

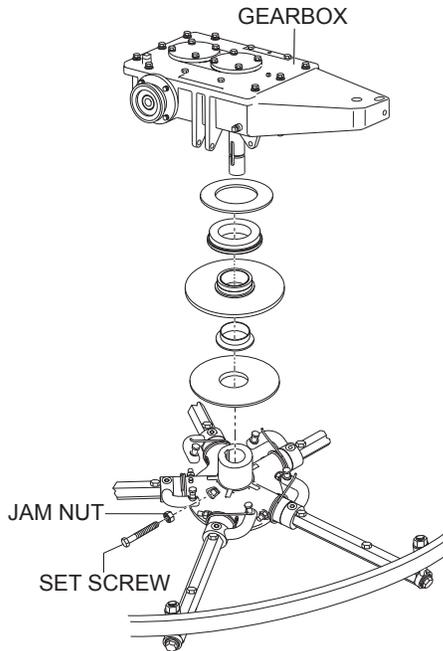


Figure 33. Spider Removal

1. Remove and set aside the attached set screw and jam nut from the side of the spider assembly.
2. Carefully lift the gearbox assembly off of the spider assembly. A light tap with a rubber mallet may be necessary to dislodge the spider from the main shaft of the gearbox.
3. During reassembly, apply Loctite® 242™ to the set screw and torque to 176 N·m (130 ft-lbs).

Trowel Blade Removal

Remove three hex head bolts from the trowel arm, then remove the trowel blade and set aside (Figure 34). Repeat for each trowel blade.

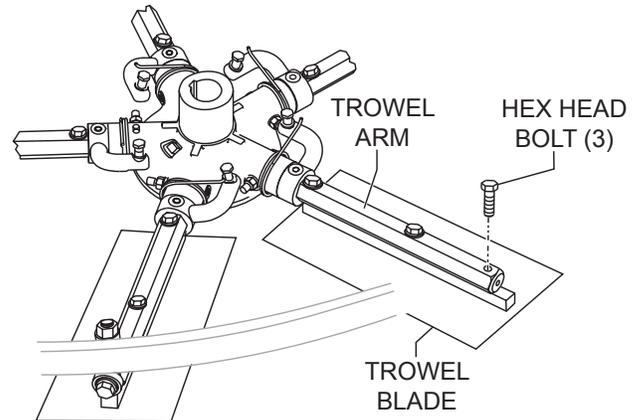


Figure 34. Trowel Blade Removal

Trowel Arm Removal

1. Remove and retain the hardware securing the stabilizer ring to the trowel arms (Figure 35).

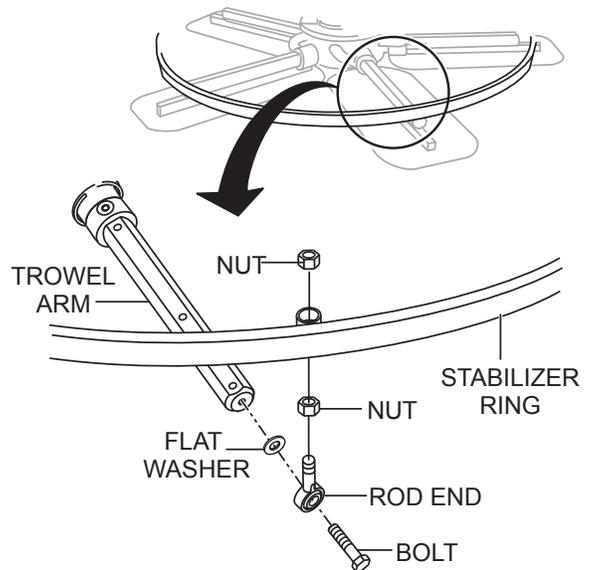


Figure 35. Stabilizer Ring Removal

MAINTENANCE (TROWEL)

2. Remove and set aside the hex head bolt (Zerk fitting) and roll pin securing the trowel arm to the spider plate. See Figure 36.

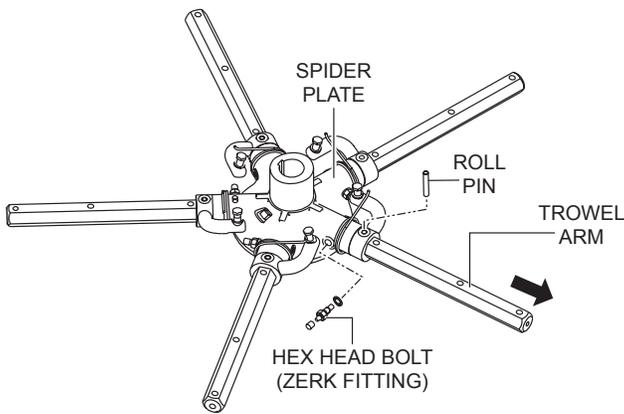


Figure 36. Zerk Fitting and Roll Pin Removal

3. Remove the trowel arm from the spider plate and set aside (Figure 36).
4. If the trowel arm inserts (bronze bushings) come out with the trowel arm, remove the bushings from the trowel arm and set aside. If the bushings remain inside the spider plate, carefully remove the bushings.
5. Examine the bronze trowel arm bushings (Figure 37), and clean if necessary. Replace bushings if out-of-round or worn.

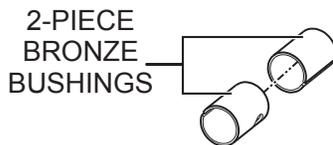


Figure 37. Bronze Bushings

6. Wire brush any buildup of concrete from all six sides of the trowel arm. Repeat steps 2–6 for the remaining arms.

Trowel Arm Inspection

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 prevent the blades from rotating in a smooth, fluid motion. If bent trowel arms are suspected, examine for straightness as shown below. Refer to Figure 38.

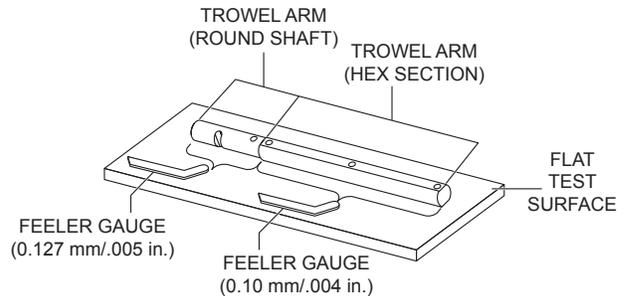


Figure 38. Trowel Arm Inspection

1. Place the trowel arm on a thick, steel plate, granite slab, or any other clean surface which is true and flat.
2. Check each of the six sides of the trowel arm (hex section). A feeler gauge of 0.10 mm (.004") should not pass between the flat of the trowel arm and the test surface along its length.
3. Use a feeler gauge of 0.127 mm (.005") to check the clearance between the round shaft of the trowel arm and the test surface as one of the flat hex sections of the arm rests on the test surface. Continue to check the clearance of the round shaft while rotating the arm to each of the flat hex sections. The clearance between the round shaft and the test surface should be identical each time the hex section is rotated.
4. Replace trowel arm if uneven or bent.

Trowel Arm Adjustment

Perform the following procedure to adjust trowel arms using the trowel arm adjustment tool.

1. Locate a trowel arm adjustment tool (P/N 9177). See Figure 39.

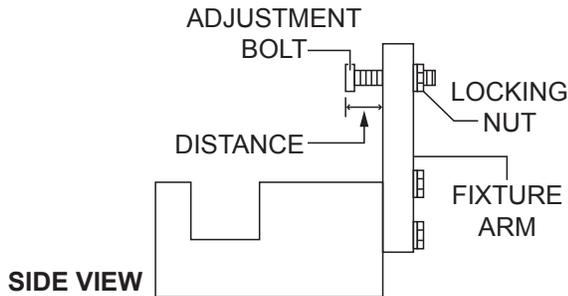


Figure 39. Trowel Arm Adjustment Tool (Side View)

2. Place the fixture arm in the **UP** position (Figure 40A) for a trowel arm with **clockwise** blade rotation. Place the fixture arm in the **DOWN** position for a trowel arm with **counterclockwise** blade rotation (Figure 40B).

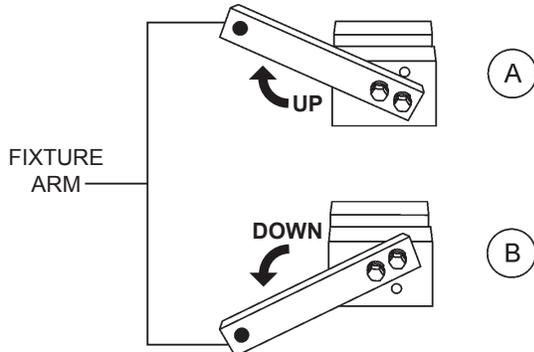


Figure 40. Fixture Arm Positioning

3. Loosen the two locking bolts on the adjustment tool and place the trowel arm into the fixture channel (Figure 41). A thin shim may be required to cover the blade holes on the trowel arm. Be sure to align the trowel arm adjustment bolt with the fixture adjustment bolt.

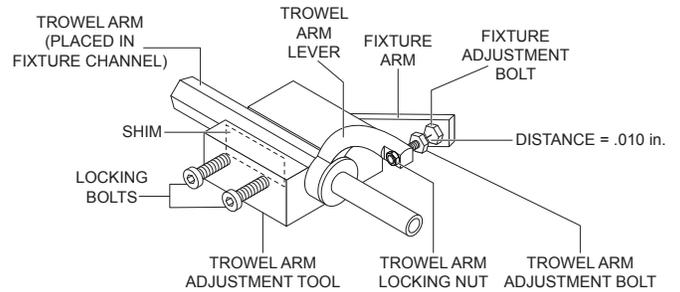


Figure 41. Trowel Arm Adjustment

4. Secure the trowel arm in place by tightening the adjustment tool locking bolts (Figure 41).
5. Loosen the locking nut on the trowel arm lever and turn the trowel arm adjustment bolt until it barely touches (.010") the fixture adjustment bolt. See Figure 41.
6. Tighten the locking nut to secure the adjustment bolt in place (Figure 41).
7. Loosen the locking bolts on the adjustment tool, and remove the trowel arm.
8. Repeat steps 2–7 for the remaining trowel arms.

Reassembly

1. Examine and clean the entire spider assembly including the upper and lower wear plates and thrust collar. Wire brush any concrete or rust buildup. Replace any damaged or out-of-round spider components.
2. Examine bronze trowel arm bushings and clean if necessary. Replace bronze bushings if damaged or out-of-round.
3. Reinstall bronze bushings onto trowel arms.
4. Make sure the spring tensioner is in the correct position to exert tension on the trowel arm.
5. Insert all trowel arms with levers into spider plate (with bronze bushings already installed). Align grease holes in bronze bushings with grease hole fittings on spider plate.
6. Tighten hex head bolts with Zerk grease fittings and jam nuts to lock trowel arms in place.
7. Reinstall blades onto trowel arms.
8. Install stabilizer rings onto spider assemblies.

MAINTENANCE (TROWEL)

9. Lubricate all grease points (Zerk fittings) with premium Lithium 12-based grease, conforming to NLGI Grade 2 consistency.

Pan Installation

“Pans” are discs that attach to the trowel blades and allow early floating on wet concrete and easy movement from wet to dry areas. They are also very effective at embedding large aggregates and surface hardeners. Refer to Figure 42 when installing pans onto finisher blades.

WARNING



Lifting/crush hazard. **DO NOT** lift trowel with pans attached. **ALWAYS** install pans in the work area or in an area next to and level with the work area.

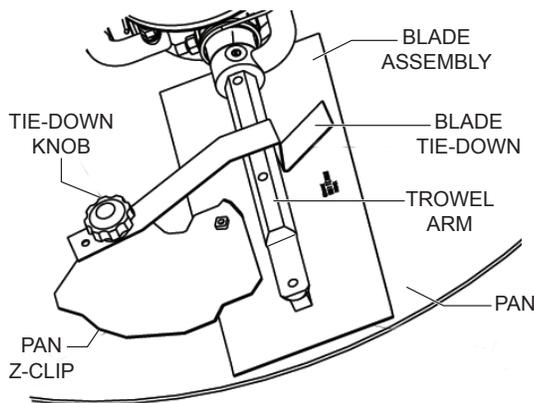


Figure 42. Pan Installation

1. Lift trowel just enough to slide pan under blades. Lower trowel onto pan with blades adjacent to Z-clips.
2. Rotate blades into position under Z-clips. Make sure blades rotate in the same direction of travel as when the machine is in operation, or use the engine to rotate blades into position.
3. Attach blade tie-downs to Z-clips with tie-down knobs.
4. Make sure blade edges are secured under Z-clips and tie-downs are secured completely over the edges of the trowel arms before operating the trowel.

LONG-TERM STORAGE

- Drain the fuel tank completely, or add STA-BIL® to the fuel.
- Pour a few drops of motor oil into the cylinder. Crank engine 3–4 times so that oil reaches all internal parts.
- Clean exterior with a cloth soaked in clean oil.
- Remove the battery.
- Cover unit with plastic sheet and store in moisture-free and dust-free location, out of direct sunlight.

CAUTION

NEVER store the trowel with fuel in the tank for any extended period of time. **ALWAYS** clean up spilled fuel immediately.

DECOMMISSIONING

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 unreparable safety risk due to wear or damage, or is beyond life-cycle reliability (no longer cost effective to maintain), and is to be decommissioned (demolition and dismantlement), the following procedure must be performed.

1. Drain all fluids completely, including engine oil, diesel fuel, gearbox oil, and antifreeze. Dispose of fluids properly, in accordance with local and governmental regulations. **NEVER** dump fluids on ground or pour down drains or sewers.
2. Remove battery and bring to an appropriate facility for lead reclamation. Use safety precautions when handling batteries that contain sulfuric acid.
3. The remainder of the trowel can be brought to a salvage yard or metal reclamation facility for further dismantling.

TROUBLESHOOTING (ENGINE)

Troubleshooting (Engine)		
Symptom	Possible Problem	Solution
Engine will not start or start is delayed, although engine can be turned over.	No Fuel reaching injection pump?	Add fuel. Check entire fuel system.
	Defective fuel pump?	Replace fuel pump.
	Fuel filter clogged?	Replace fuel filter and clean tank.
	Faulty fuel supply line?	Replace or repair fuel line.
	Compression too low?	Check piston, cylinder and valves. Adjust or repair per engine repair manual.
	Fuel pump not working correctly?	Repair or replace fuel pump.
	Oil pressure too low?	Check engine oil pressure.
	Low starting temperature limit exceeded?	Comply with cold starting instructions and proper oil viscosity.
	Defective battery?	Charge or replace battery.
	Air or water mixed in fuel system?	Check carefully for loosened fuel line coupling, loose cap nut, etc.
At low temperatures engine will not start.	Engine oil too thick?	Refill engine crankcase with correct type of oil for winter environment.
	Defective battery?	Replace battery.
Engine fires but stops soon as starter is switched off.	Fuel filter blocked?	Replace fuel filter.
	Fuel supply blocked?	Check the entire fuel system.
	Defective fuel pump?	Replace fuel pump.
Engine stops by itself during normal operation.	Fuel tank empty?	Add fuel.
	Fuel filter blocked?	Replace fuel filter.
	Defective fuel pump?	Replace fuel pump.
	Mechanical oil pressure shutdown sensor stops the engine due to low oil?	Add oil. Replace low oil shutdown sensor if necessary.
Low engine power, output and speed.	Fuel tank empty?	Replace fuel filter.
	Fuel filter clogged?	Replace fuel filter.
	Fuel tank venting is inadequate?	Ensure that tank is adequately vented.
	Leaks at pipe unions?	Check threaded pipe unions tape and tighten unions as required.
	Speed control lever does not remain in selected position?	See engine manual for corrective action.
	Engine oil level too full?	Correct engine oil level.
	Injection pump wear?	Use No. 2-D diesel fuel only. Check the fuel injection pump element and delivery valve assembly and replace as necessary.

TROUBLESHOOTING (ENGINE)

Troubleshooting (Engine) - continued		
Symptom	Possible Problem	Solution
Low engine power output and low speed, black exhaust smoke.	Air filter blocked?	Clean or replace air filter.
	Incorrect valve clearances?	Adjust valves per engine specification.
	Malfunction at injector?	See engine manual.
Engine overheats.	Too much oil in engine crankcase?	Drain off engine oil down to uppermark on dipstick.
	Entire cooling air system contaminated/ blocked?	Clean cooling air system and cooling fin areas.
	Fan belt broken or elongated?	Change belt or adjust belt tension.
	Coolant insufficient?	Replenish coolant.
	Radiator net or radiator fin clogged with dust?	Clean net or fin carefully.
	Fan, radiator, or radiator cap defective?	Replace defective part.
	Thermostat defective?	Check thermostat and replace if necessary.
Head gasket defective or water leakage?	Replace parts.	

TROUBLESHOOTING (TROWEL)

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 than 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 (TROWEL)

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.
Steering is unresponsive.	Bad fuse?	Check fuse. Replace fuse if defective.
	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?	Worn components?	Check for wear of steering bearings and linkage components. Replace if necessary.
	Operating position is uncomfortable.	Seat adjusted for operator?
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 set.

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 (310) 537-3927

MQ Parts Department

800-427-1244
310-537-3700

Fax: 800-672-7877

Service Department

800-421-1244
310-537-3700

Warranty Department

800-421-1244
310-537-3700

Fax: 310-943-2249

Technical Assistance

800-478-1244

Fax: 310-943-2238

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