

OPERATION MANUAL



HDA SERIES WALK-BEHIND TROWEL

HONDA GX340K1QA2/GX390K1QA2 GASOLINE ENGINES

Revision #2 (05/05/20)



THIS MANUAL MUST ACCOMPANY THE EQUIPMENT AT ALL TIMES.

PN: 13411

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PROPOSITION 65 WARNING



SILICOSIS/RESPIRATORY WARNINGS

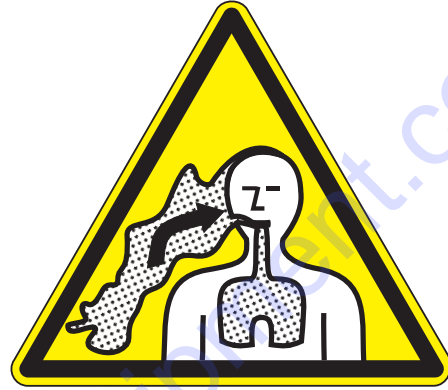
⚠️ WARNING



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.

**HDA Series
Walk-Behind 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 controls (machine not running).		
5	Safety controls, safety stop switch operation.		
6	Emergency stop procedures.		
7	Startup of machine, engine choke.		
8	Maintaining a hover.		
9	Maneuvering.		
10	Pitching.		
11	Concrete finishing techniques.		
12	Shutdown of machine.		
13	Lifting of machine (lifting bail).		
14	Machine transport and storage.		

DAILY PRE-OPERATION CHECKLIST

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

SAFETY INFORMATION


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 hazard 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
	<p>WARNING Lethal Exhaust Gas Hazard</p> <ul style="list-style-type: none"> Inhaling exhaust fumes can result in severe injury or death. Only operate equipment in well ventilated areas. DO NOT inhale exhaust gases/fumes.
	<p>WARNING Explosive Fuel Hazard</p> <ul style="list-style-type: none"> Gasoline fuel can cause fire or explosion. Stop engine before refueling. Keep cigarettes, sparks and flames away from hot surfaces.
	<p>CAUTION Burn Hazard</p> <ul style="list-style-type: none"> HOT PARTS can burn skin. DO NOT touch hot parts. Allow machine a sufficient amount of time to cool before performing maintenance.

Warning decals associated with the operation of this equipment are defined below:

DECAL	SAFETY HAZARD
	<p>WARNING Rotating Blade Hazard</p> <ul style="list-style-type: none"> Keep hands and feet clear of guard rings. Stop engine before servicing.
	<p>WARNING Read Manual</p> <p>To avoid injury you must read and understand operator's manual before using this machine.</p>
	<p>WARNING Lifting Crush Hazard</p> <ul style="list-style-type: none"> NEVER allow any person to stand underneath the trowel while lifting. DO NOT lift trowel with pans attached. ALWAYS make sure handle is securely attached. On Quick Pitch™ models make sure T-Handle latch is locked (engaged).
	<p>ALWAYS wear protective clothing when operating this equipment</p>
	<p>WARNING Training</p> <p>This machine to be operated by qualified personnel. Ask for training as needed.</p>
	<p>WARNING Guard Hazard</p> <p>NEVER operate this equipment with guards removed. Keep hands clear.</p>

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 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.

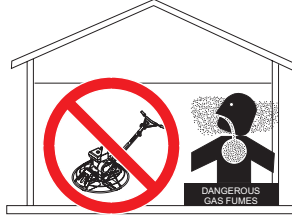


SAFETY INFORMATION

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.**



WARNING

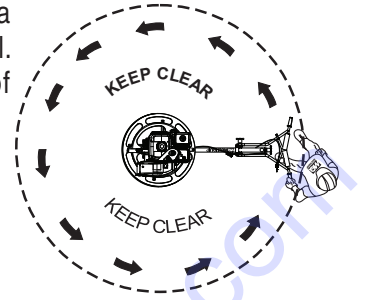
- **ALWAYS** keep clear of rotating or moving parts while operating the trowel.
- **DO NOT** start or operate the trowel if the drive train will not disengage. Centrifugal force between the trowel and surface when starting can cause uncontrolled handle movement that can cause serious injury. The handle must not move while pulling the engine recoil starter.
- **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** stand on 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.

- **ALWAYS** keep work area clear around the trowel. Make sure it is free of debris and objects.



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. Allow the oil to cool before performing maintenance. This will prevent scalding of personnel.



CAUTION

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



SAFETY INFORMATION

NOTICE

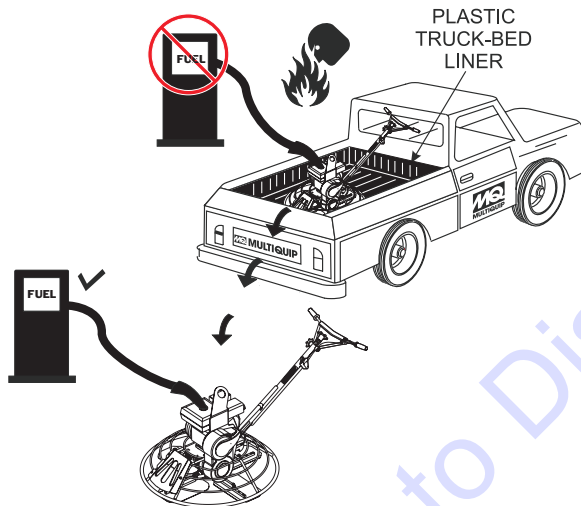
- **NEVER** run engine without an air filter or with a dirty air filter. Severe engine damage may occur. Service air filter frequently to prevent engine malfunction.
- **NEVER** tamper with the factory settings of the engine or engine governor. Damage to the engine or equipment can result if operating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



FUEL SAFETY

! DANGER

- **DO NOT** add fuel to equipment if it is placed inside truck bed with plastic liner. Possibility exists of explosion or fire due to static electricity.



- **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.



TRANSPORTING SAFETY

! CAUTION

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



NOTICE

- Some walk-behind trowels can be lifted or moved by two people utilizing lifting tubes or other special attachments. Generally, however, they must be lifted using lifting bales and cranes, hoists, or forklifts.
- **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 lifting bales are not damaged.
- Always make sure crane or lifting device has been properly secured to the lifting bales 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.

SAFETY INFORMATION

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 rules below.

- **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 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 battery and bring to 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 a new product.

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

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 emission 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 Discount-equipment.

TROWEL TRANSPORTATION

LIFTING THE TROWEL

The lifting bail (Figure 1) provides an optimal lifting point for the trowel. Using a crane or forklift to lift the trowel is **highly recommended**. When lifting the trowel, attach a chain or rope to the lifting bail.

⚠ WARNING

ALWAYS use extra care when lifting the trowel off the ground. **MAKE SURE** the lifting capacity of the crane or forklift is sufficient for the weight of the trowel.

⚠ WARNING

The trowel is heavy and awkward to move around. **NEVER** attempt to lift the trowel alone. **ALWAYS** use proper heavy lifting procedures.

⚠ WARNING

BE CAREFUL while lifting the trowel. A dropped trowel can cause **serious personal injury** and damage to the trowel. **NEVER** lift the trowel to unnecessary heights. **NEVER** stand underneath the trowel while it is being lifted.

ALWAYS make sure the handle is secure, and **only** use the manufacturer's approved lifting point. The trowel can be lifted by the **lifting bail**, using a crane or other lifting device of adequate capacity. **NEVER** lift the trowel by the guard ring, as it may rotate and cause injury.

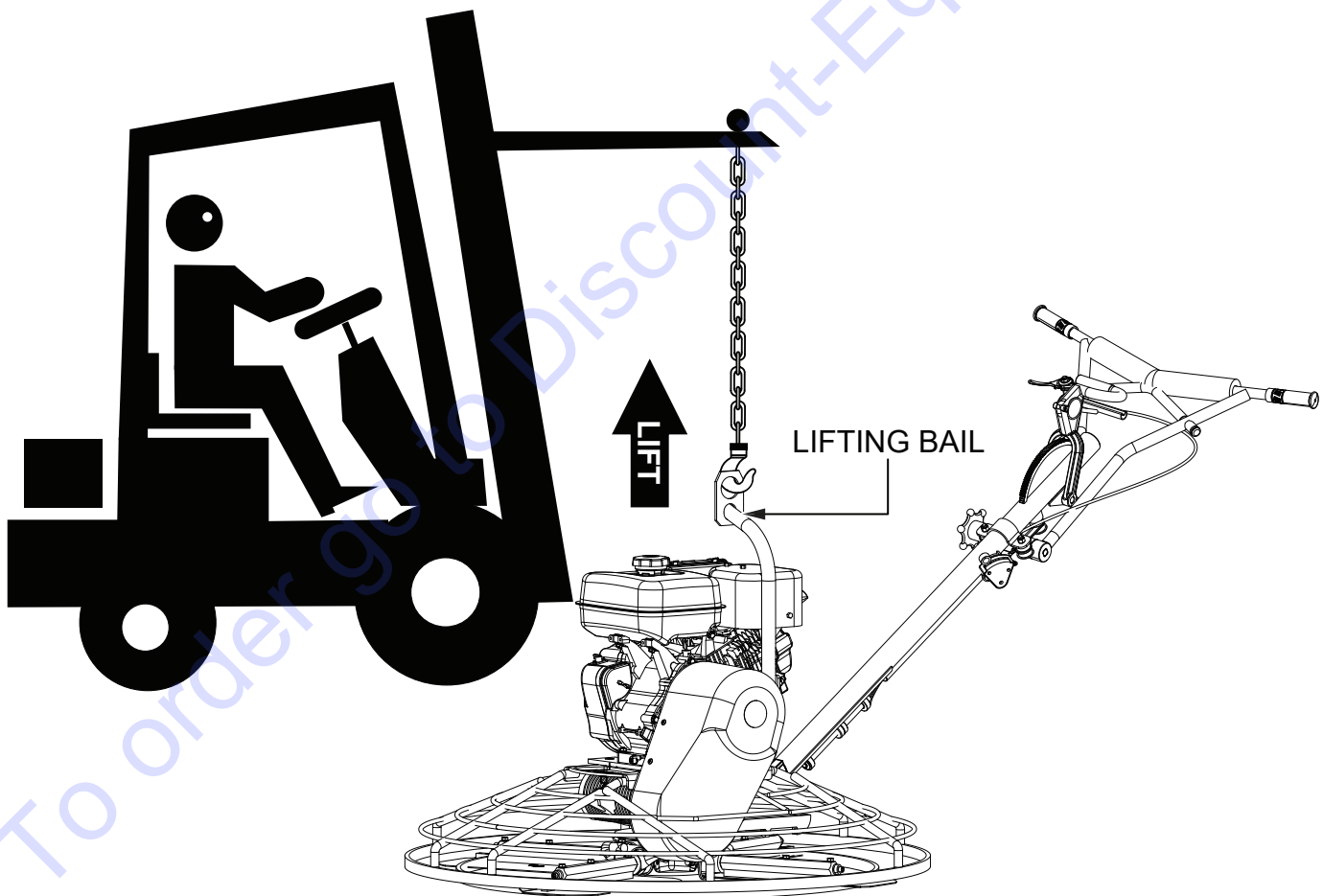


Figure 1. Lifting the Trowel

SPECIFICATIONS

Table 1. HDA Series Trowel Specifications

Shipping Weight	335 lb. (152 kg)
Operating Weight	327 lb. (148 kg)
Number of Blades	4
Rotor Speed	35–225 rpm
Path Width	46 in. (1,168 mm)
Ring Diameter	48 in. (1,219 mm)

Table 2. Honda Engine Specifications

Model	GX340K1QA2	GX390K1QA2
Type	Air-cooled, 4-stroke, single-cylinder, OHV, horizontal shaft, gasoline engine	
Bore x Stroke	3.2 in. x 2.5 in. (82 mm x 64 mm)	3.5 in. x 2.5 in. (88 mm x 64 mm)
Displacement	20.6 in ³ (337 cm ³)	23.7 in ³ (389 cm ³)
Max. Output	11 hp (8.2 kW) @ 3,600 rpm	13 hp (9.7 kW) @ 3,600 rpm
Fuel Tank Capacity	Approx. 1.72 gallons (6.5 liters)	
Fuel	Unleaded gasoline	
Oil Capacity	1.16 quarts (1.1 liters)	
Speed Control Method	Centrifugal flyweight type	
Starting Method	Recoil start	
Dimensions (L x W x H)	15.0 x 17.7 x 17.4 in. (380 x 450 x 443 mm)	15.0 x 17.7 x 17.4 in. (380 x 450 x 443 mm)
Dry Net Weight	68.4 lb. (31 kg)	68.4 lb. (31 kg)

Table 3. HDA Series Noise And Vibration Emissions

Handle Type	Standard	Quick Pitch™
Guaranteed ISO 11201:2010 Based Sound Pressure Level at Operator Station in dB(A)	97	97
Guaranteed ISO 3744:2010 Based Sound Power Level in dB(A)	126	126
Hand-Arm Vibration per ISO 5349-1:2001 in m/s ² ΣA(8)	1.84	1.87

NOTES:

1. Sound pressure and power levels are “A” weighted measures per ISO 3744:2010. 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 hand/arm vibration is 2.5 m/s² ΣA(8). The daily exposure limit value is 5 m/s² ΣA(8).

DIMENSIONS

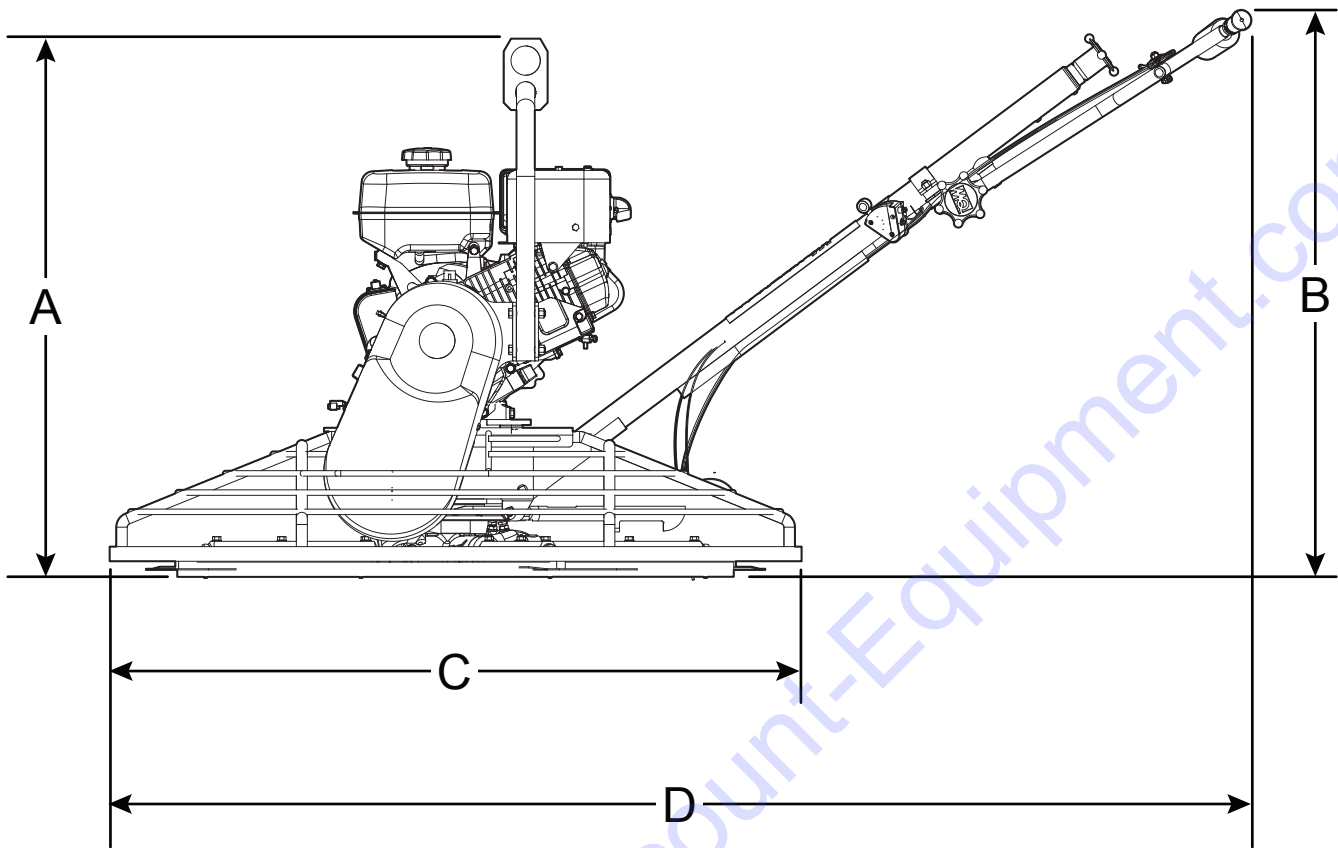


Figure 2. HDA Series Trowel Dimensions

Table 4. HDA Series Trowel Dimensions	
(A) Height (Lifting Bale)	34.5 in. (876 mm)
(B) Height (Engagement Lever)	41.1 in. (1,044 mm)
(C) Width	48.0 in. (1,219 mm)
(D) Length	75.2 in. (1,910 mm)

INTENDED USE

Operate this trowel and all associated tools and components in accordance with the manufacturer's instructions. Use of any other tools for stated operation is considered contrary to designated use. The risk of such use lies entirely with the user. The manufacturer cannot be held liable for damages as a result of misuse.

TROWEL FAMILIARIZATION

The HDA Series walk-behind trowel is designed for the floating and finishing of concrete slabs.

Safety instructions are found on the trowel and throughout this manual. **Read all safety instructions carefully.** Maintain all safety information in legible condition. Operators should be well trained on operation and maintenance of the unit.

Walk around the trowel and observe all of the major components (Figure 3)—engine, blades, handle (standard or Quick Pitch™), air cleaner, centrifugal stop switch, etc. Make sure there is always oil in the engine.

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

Engine

The trowel is powered by an 11-hp or 13-hp gasoline engine. Refer to the engine owner's manual for engine operation and maintenance instructions. If the original manual becomes lost or damaged, please contact Discount-equipment for a replacement.

Continuously Variable Transmission (CVT)

The trowel is equipped with a continuously variable transmission (CVT) to obtain maximum drive torque. Power is transferred from the engine to the gearbox input shaft via a V-belt, or pulley drive, system. The pulley is engaged by a centrifugal clutch.

Gearbox

Located beneath the engine, the gearbox transfers power to the rotor and governs the rotational speed of the trowel. It is equipped with two shafts (input and output).

Blades

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

Spider

The vertical output shaft of the gearbox connects to a cast hub called the **spider**. The spider assembly has four arms that extend outward, to which the trowel blades or other accessories attach. As the gearbox output shaft rotates, so does the spider assembly.

Guard Ring

The trowel is equipped with a safety guard ring which prevents objects from making contact with the rotating blades during operation.

Centrifugal Safety Stop Switch

The trowel is equipped with a **centrifugal safety stop switch**, which will stop the engine and bring the trowel to a halt in the event of a runaway trowel condition (the operator releases the handle).

TRAINING

For proper training, please use the "**Training Checklist**" located in the front of this manual. This checklist provides an outline for an experienced operator to provide training to a new operator.

TROWEL COMPONENTS

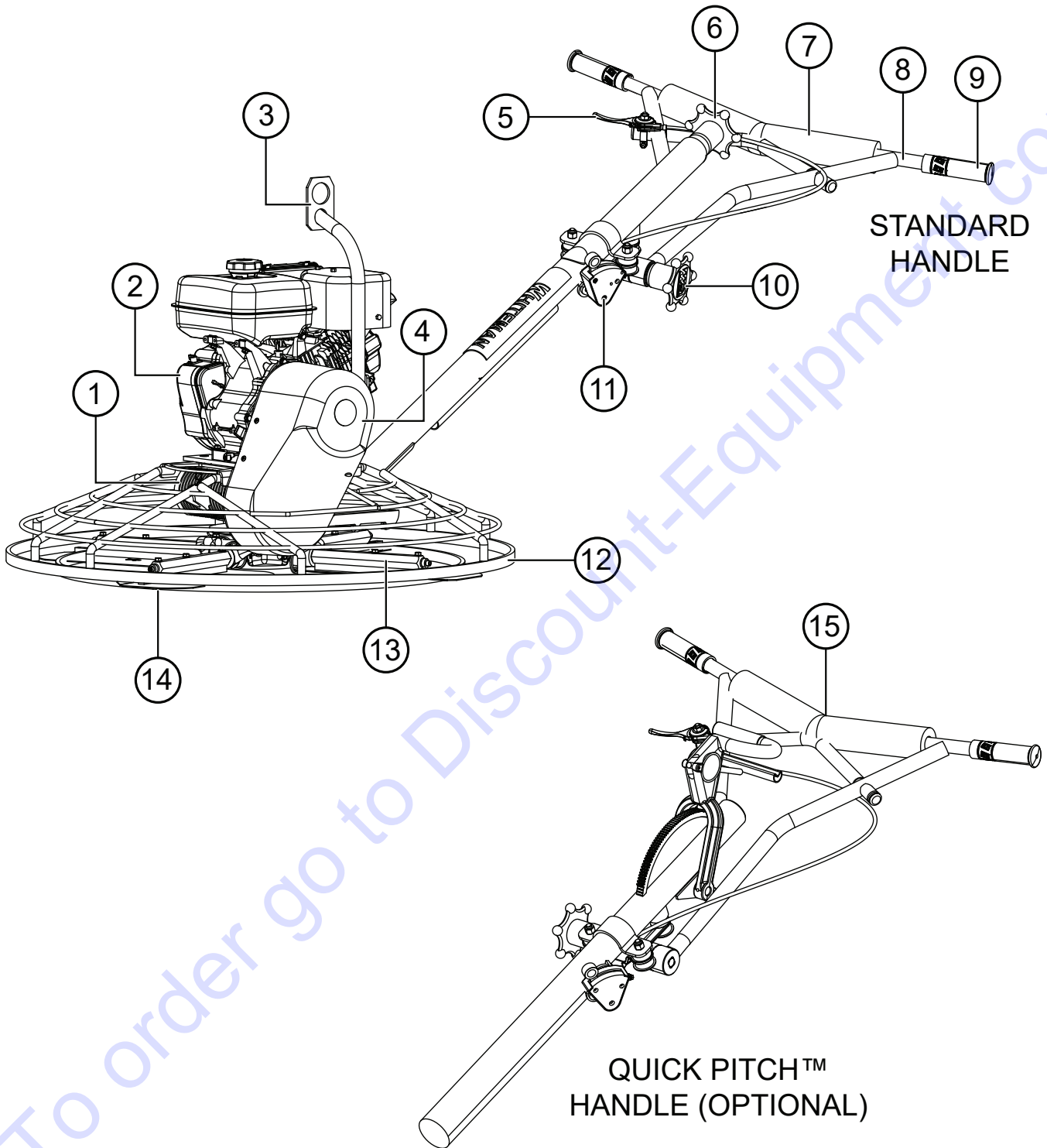


Figure 3. HDA Series Trowel Components

TROWEL COMPONENTS

Figure 3 shows the location of the trowel's basic components. Listed below is a brief explanation of each component.

1. **Gearbox** — A helical worm gear drive gearbox rotates the blades via the engine interface. **ALWAYS** check the gearbox oil level prior to each use. Fill with Mobil SHC™ 634 or equivalent industrial synthetic gear oil.
2. **Engine** — An air-cooled, 4-stroke, single-cylinder, OHV, horizontal shaft, gasoline engine. Refer to the engine owner's manual for engine operation and maintenance instructions.
3. **Lifting Bail** — Attach the lifting bail to a suitable lifting device whenever lifting of the trowel is required.
4. **V-Belt Cover** — Remove this cover to gain access to the V-belt. **NEVER** operate the trowel with this cover removed.
5. **Throttle Lever** — Controls engine speed. Returns the engine to **idle** when released.
6. **Pitch Control Star Wheel** — With the standard handle installed, rotate the star wheel clockwise to pitch the blades upwards. Rotate the star wheel counterclockwise to pitch the blades flat (no pitch).
7. **Handlebar Pad** — A foam rubber pad protects the operator when making contact with the handlebar.
8. **Vibratory Handlebar** — T-handle with rubber shock mounts/isolators to reduce vibration during operation.
9. **Hand Grips (2)** — **ALWAYS** place both hands on the hand grips when maneuvering the trowel. Replace the hand grips when they become worn or damaged.
10. **Handlebar Adjuster** — Loosen the star wheel to adjust the height and angle of the handlebar as desired, then tighten the star wheel firmly to secure the handlebar in position.
11. **Centrifugal Safety Stop Switch** — Stops the engine and brings the trowel to a halt in the event of a runaway trowel condition (the operator releases the handle).
12. **Guard Ring** — Prevents objects from making contact with the rotating blades during operation. **NEVER** place hands or feet inside the guard ring while the machine is running.
13. **Trowel Arms (4)** — **NEVER** operate the trowel with a bent, broken, or out-of-adjustment trowel arm. If the blades show uneven wear patterns, or some blades wear out faster than others, the trowel arms may need to be adjusted. Refer to the "**Maintenance**" section for more information.
14. **Blades (4)** — Versatile combination blades will satisfy most troweling needs.
15. **Quick Pitch™ Handle (Optional)** — With the Quick Pitch™ handle installed, pull the T-handle backwards while squeezing the trigger to pitch the blades upwards. Push the T-handle forward to pitch the blades flat (no pitch). Contact Discount-equipment to purchase this option.

ENGINE COMPONENTS

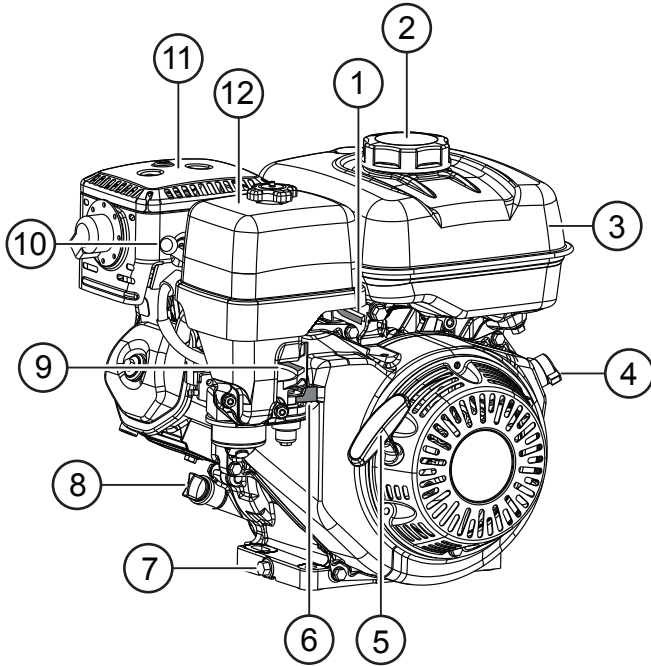



Figure 4. Honda Engine Components

CAUTION
NEVER disable or disconnect the engine **ON/OFF** switch. It is provided for operator safety. **Injury can result** if the switch is disabled, disconnected, or improperly maintained.

- Recoil Starter** — Manual starting mechanism. Slowly pull the starter grip until resistance is felt, then pull briskly and smoothly to start the engine.
- Fuel Valve Lever** — Open to allow the flow of fuel, and close to prevent the flow of fuel.
- Oil Drain Bolt** — Remove to drain oil from the engine crankcase.
- Dipstick/Oil Filler Cap** — Remove to determine if engine oil is low. Add oil through this port as recommended in .
- Choke Lever** — Aids in starting a cold engine, or starting in cold weather conditions. The choke enriches the fuel mixture.
- Spark Plug** — Provides spark to the ignition system. Set the spark plug gap according to the engine manufacturer's instructions, and clean the spark plug once a week.
- Muffler** — Reduces noise and emissions. **NEVER** touch the muffler while it is hot.

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.


- Air Cleaner** — Prevents dirt and other debris from entering the fuel system. Remove the wing nut on top of the air cleaner to gain access to the filter elements.

NOTICE
Operating the engine without an air filter, or with a filter that is damaged or excessively dirty, will allow dirt to enter the engine, causing **rapid engine wear**.

INITIAL SERVICING

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

- Throttle Lever** — Adjusts engine RPM speed.
- Fuel Filler Cap** — Remove to add unleaded gasoline to the fuel tank. Make sure cap is tightened securely. **DO NOT** overfill.

DANGER
 **DO NOT** fill the fuel tank while the engine is running or hot. In the event of a fuel spill, **DO NOT** start the engine until all fuel residue has been wiped up and the area surrounding the engine is dry. Fuel is **extremely flammable** and can ignite if it comes into contact with hot engine parts or sparks from the ignition system.

- Fuel Tank** — Holds unleaded gasoline. Refer to the engine owner's manual for additional information.
- Engine ON/OFF Switch** — **ON** position permits engine starting, **OFF** position stops engine operation.

UNPACKING THE HANDLE

The trowel handle (Figure 5) is shipped in the folded, or stowed, position.

1. To place the folding upper handle in the operational position, turn the star wheel **counterclockwise** to release it from its folded/stowed position.
2. Pull back on the upper handle to place the handle in the operational position. Turn the star wheel **clockwise** to secure the handle firmly in place.

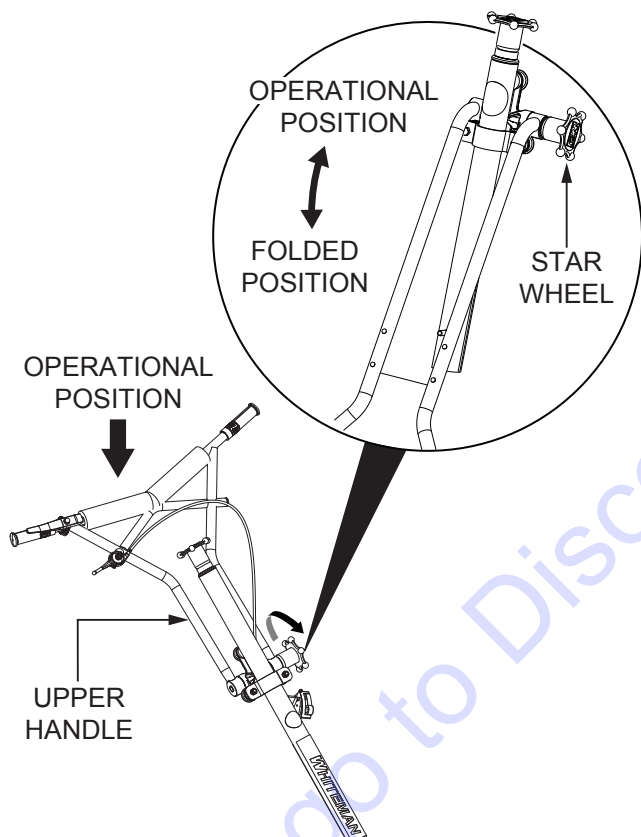


Figure 5. Unpacking the Handle

ASSEMBLY AND INSTALLATION

Some assembly and installation is required before the trowel can be operated. This section provides general assembly instructions.

For detailed handle assembly instructions, contact Multiquip and request the Walk-Behind Trowel Handle Installation Instructions (P/N 20485).

Handle Tube Installation

Attach the main handle tube to the gearbox using the mounting hardware contained in the shipping container (Figure 6).

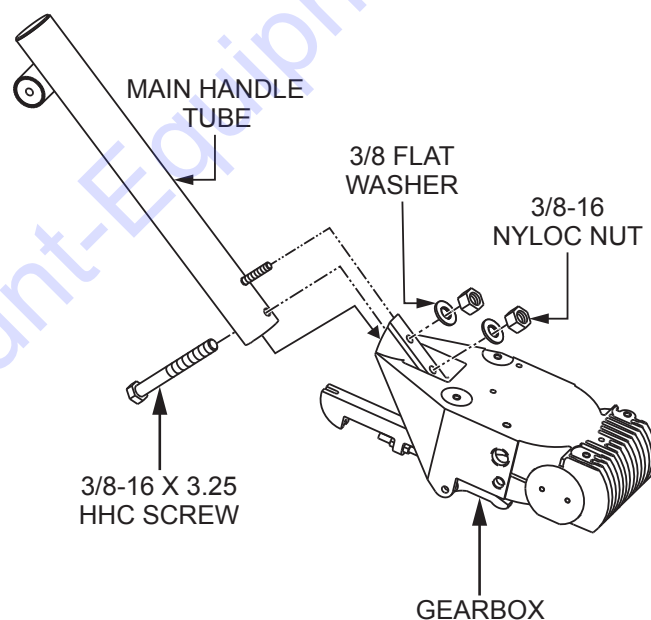


Figure 6. Handle Tube Installation

Vibratory Handlebar Adjustment

The vibratory handlebar is attached to the main handle tube. To adjust the height of the handlebar, loosen the star wheel and move the handlebar to the desired position (Figure 7). Tighten the star wheel securely when finished.

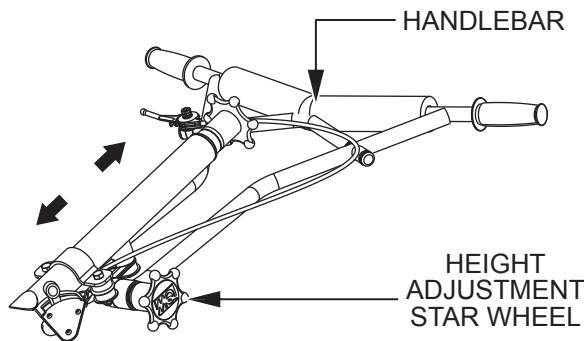


Figure 7. Handlebar Adjustment

NOTICE

If additional handle adjustment is desired, a trowel handle wedge kit (P/N 2576) can be purchased from Discount-equipment.

Place the wedges between the handle and the gearbox to move your handle operating position approximately 3 inches (76 mm) up or down. The kit comes complete with wedges, bolts, and installation instructions.

Throttle Cable Installation

1. Uncoil the throttle cable and housing.
2. Make sure the throttle cable is fed through the tube on the underside of the handle and secured to the upper handle and main tube with zip ties.
3. Place the throttle lever (Figure 8) in the **RUN** position.

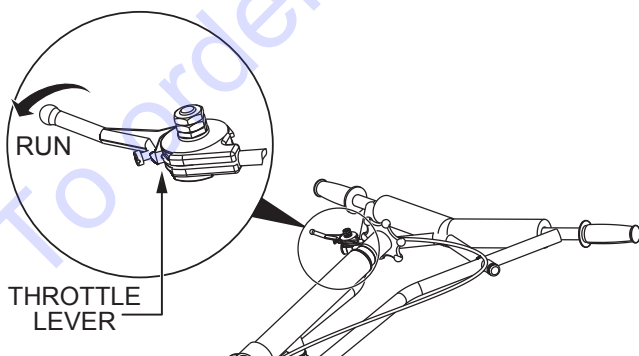


Figure 8. Throttle Lever (Run)

4. Loosen the cable housing clamp screw and the swivel stop screw (Figure 9).

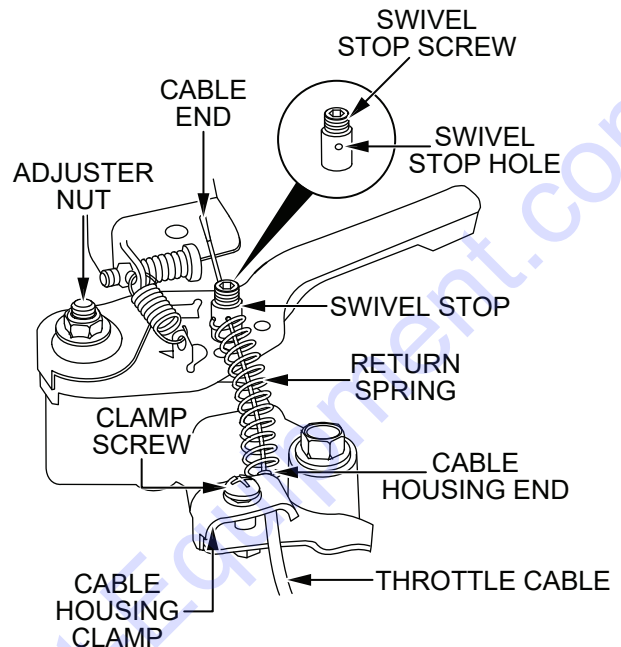


Figure 9. Throttle Cable Installation

5. Place the return spring between the cable housing clamp and the swivel stop screw (Figure 9).
6. Feed the cable assembly through the cable housing clamp, return spring, and swivel stop hole, until the cable housing extends under the housing clamp to its far edge (Figure 9).
7. Slightly loosen the locking nut and cable retaining screw on the throttle lever (Figure 10).

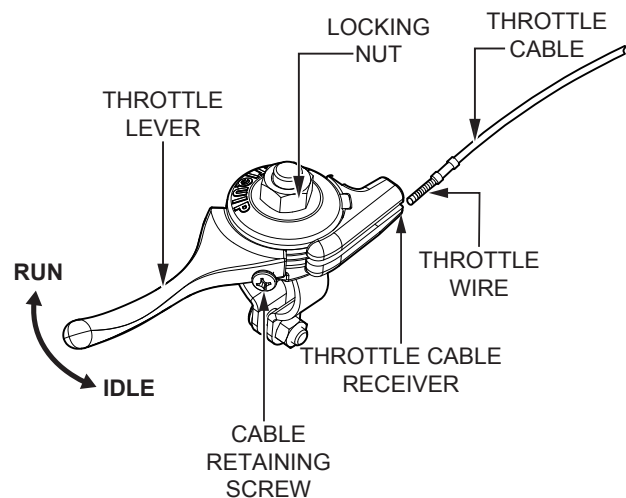


Figure 10. Adjusting Cable Tension

8. Make sure the throttle cable is seated in the throttle cable receiver (Figure 10).
9. Route the throttle wire approximately ½ inch past the cable retaining screw (Figure 10). Tighten the cable retaining screw to secure the throttle wire.
10. Adjust cable tension as needed by loosening or tightening the locking nut and cable retaining screw on the throttle lever (Figure 10).

NOTICE

If the throttle lever does not return to the **neutral** position with the throttle backed off, loosen the adjusting nut ½ turn at a time, tighten, and recheck. Readjust throttle tension as necessary.

Centrifugal Safety Stop Switch Connection

Connect the black engine tail wire to the black centrifugal safety stop switch wire (Figure 11).

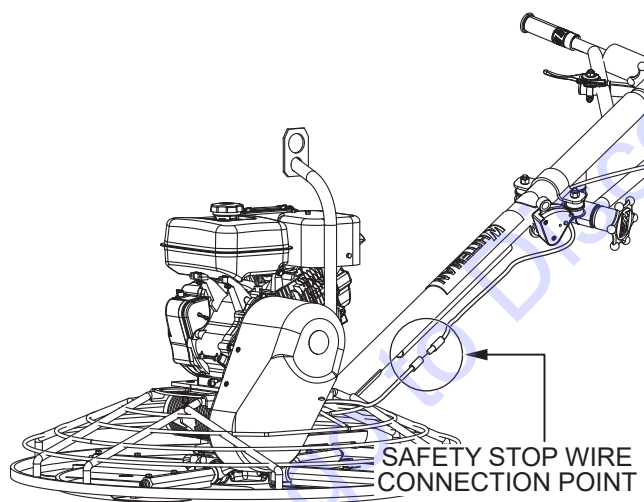


Figure 11. Centrifugal Safety Stop Switch Connection

Blade Pitch Cable Installation

1. For trowels equipped with a **standard** handle (SXHD), turn the star wheel **counterclockwise** to release tension on the blade pitch cable. See Figure 12.

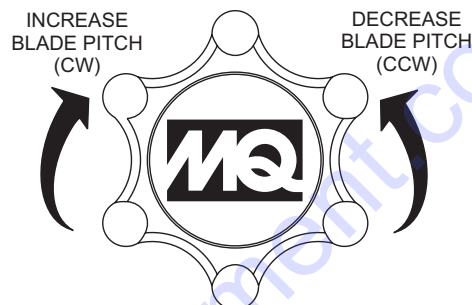


Figure 12. Blade Pitch Cable Adjustment (Standard Handle)

2. For trowels equipped with a **Quick Pitch™** handle (QXHD), squeeze the trigger lock and push the T-handle toward the engine to release tension on the blade pitch cable. See Figure 13.

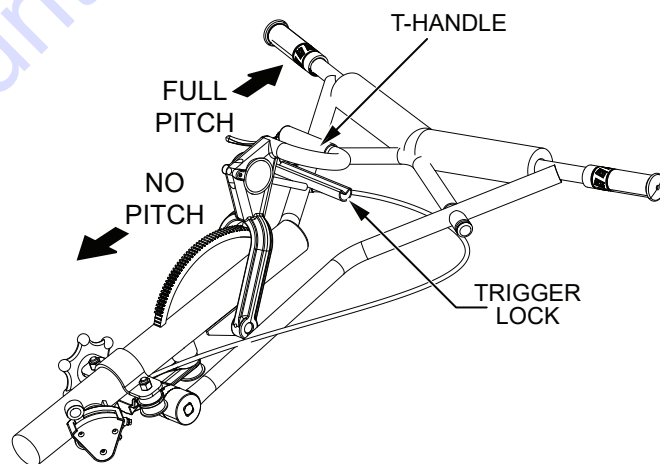


Figure 13. Blade Pitch Cable Adjustment (Quick Pitch™ Handle)

WARNING

The Quick Pitch™ T-handle is under spring tension and can snap in the direction of force (toward the user) if not firmly grasped, which can cause bodily injury.

- Remove brass set nut #1 from the end of the blade pitch cable (Figure 14).

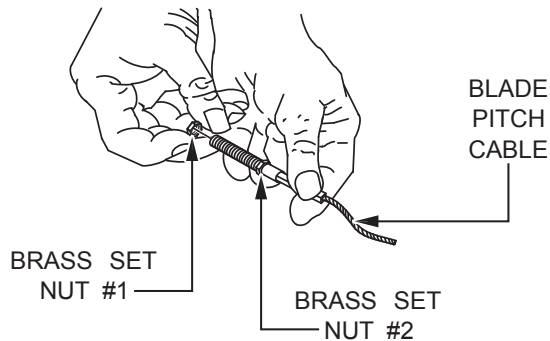


Figure 14. Blade Pitch Cable

- Thread brass set nut #2 as far as possible toward the blade pitch cable (Figure 14).
- Insert the blade pitch cable end through the yoke eyelet (Figure 15). Tighten brass set nut #1 by hand to remove all slack from the cable.

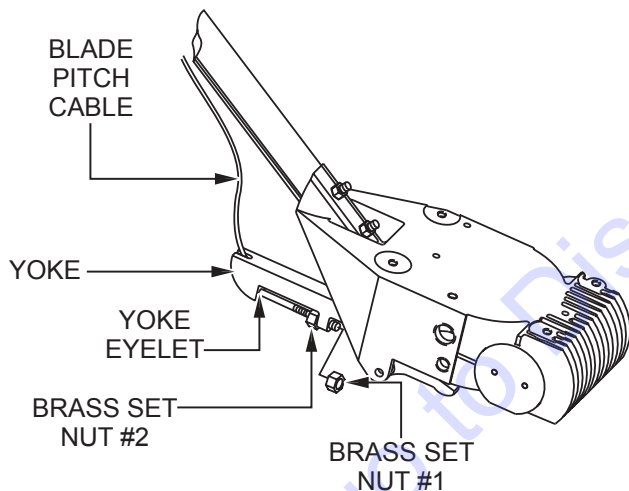


Figure 15. Cable Yoke Attachment

- Tighten brass set nut #2 against the yoke boss to secure the cable in place.
- Tighten brass set nut #1 against the yoke boss.

Pre-Load Adjustment (Quick Pitch™ Handle Only)

WARNING

The Quick Pitch™ handle is spring-loaded. **Serious personal injury or damage to the equipment can result** from improper handling, installation, or adjustment. **ALWAYS** use extreme caution when handling this component.

After the Quick-Pitch™ handle has been installed, spring pre-load adjustment is required.

- Locate the spring pre-load adjustment screw (Figure 16) on the underside of the handle tube.

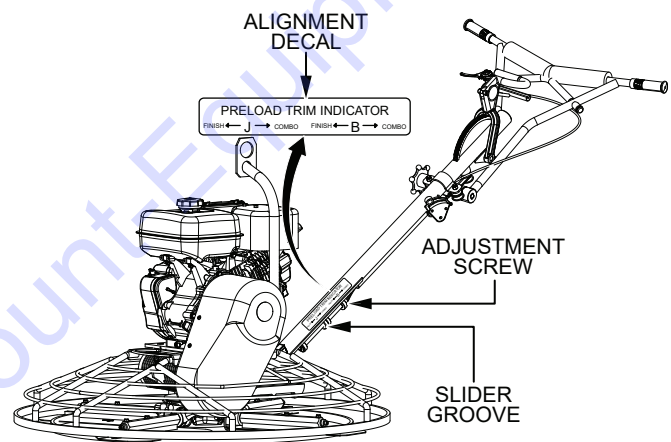


Figure 16. Spring Pre-Load Adjustment

- An alignment decal (Figure 16) is located on the side of the handle tube. Turn the adjustment screw until the slider groove aligns with the letter "B" on the decal.

Float Pan Installation (Optional)

Float pans attach to the trowel blades and allow the trowel to 'float' on wet concrete. The disc design facilitates early floating and easy movement from wet to dry areas. Float pans are also very effective at embedding large aggregates and surface hardeners.

Installing Pans with Z-Clips

1. Lift the trowel just enough to slide the float pan under the blades. Lower the trowel onto the pan with the blades adjacent to the Z-clips (Figure 17).

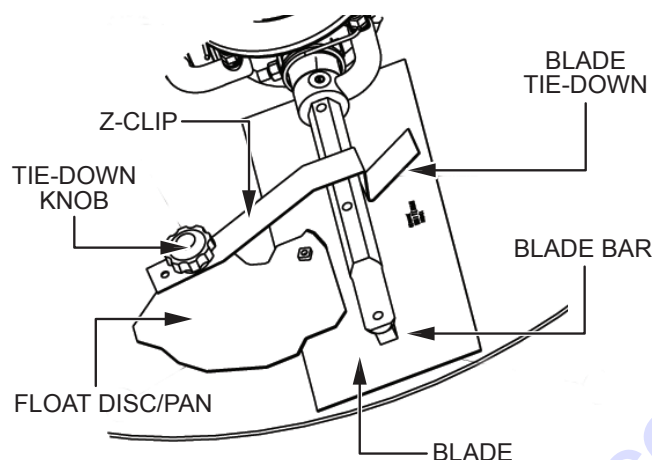


Figure 17. Float Pan Installation (Z-Clips)

2. Rotate the blades into position beneath the Z-clips (Figure 17). Be sure to rotate the blades in the same direction as during operation, or use the engine to rotate the blades into position.
3. Secure the blade tie-downs to the far side of the Z-clip brackets with the tie-down knobs (Figure 17).
4. Make sure the blade edges are secured under the Z-clips, and the tie-downs are secured completely over the edges of the blade bar (Figure 17).

Installing Pans with Latch Pins

1. Lift the trowel just enough to slide the float pan under the blades. Lower the trowel onto the pan with the blades between the blade stops (Figure 18).

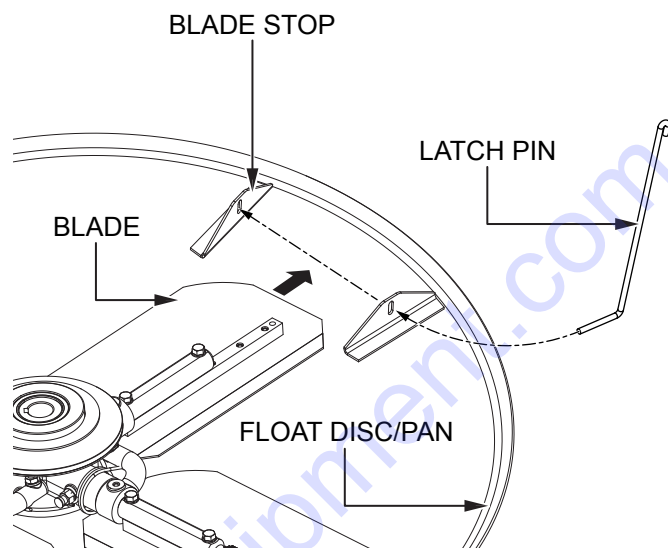


Figure 18. Float Pan Installation (Latch Pins)

2. Rotate the blades so that the blades fit between the blade stops (Figure 18). Be sure to rotate the blades in the same direction as during operation, or use the engine to rotate the blades into position.
3. Route the latch pins through the holes in the blade stops as shown in Figure 18.
4. After it has been routed through the blade stop holes, rotate each latch pin so the end that is bent approximately 90 degrees lays flat on the surface of the float pan. See Figure 19.

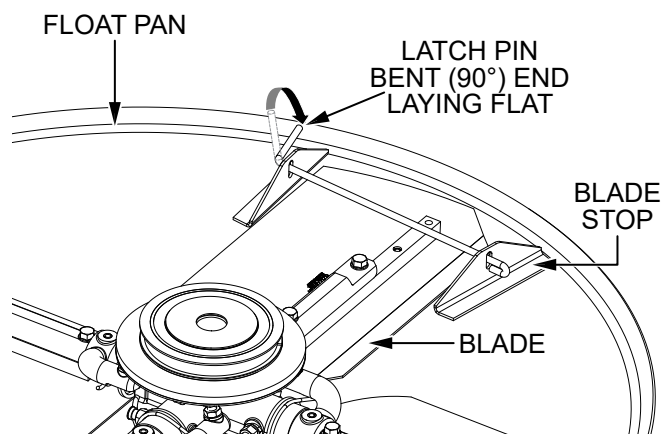


Figure 19. Latch Pin Placement

5. Make sure the blade edges are secured between the blade stops, and the latch pins are secured completely over the blades, locking them in place.
6. Periodically check the latch pins during normal operation to ensure they are still in the correct position.

ENGINE OIL

1. Place the trowel on secure, level ground with the engine **OFF**.
2. Remove the dipstick (Figure 20) from the engine oil filler hole and wipe it clean.

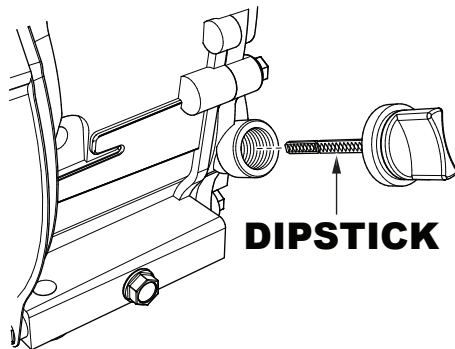


Figure 20. Engine Oil Dipstick

3. Reinsert the dipstick into the filler hole, then remove it again without screwing it in. Check the oil level shown on the dipstick.
4. If the oil level is low (Figure 21), fill to the edge of the oil filler hole with the recommended oil type listed in Table 5. Refer to Table 2 for maximum engine oil capacity.

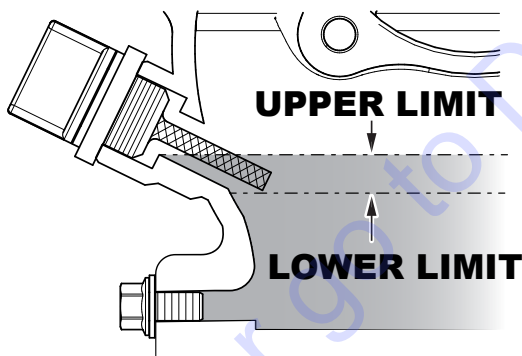


Figure 21. Engine Oil Level

Table 5. Engine Oil Type

Season	Temperature	Oil Type
Summer	25°C or Higher	SAE 10W-30
Spring/Fall	25°C–10°C	SAE 10W-30/20
Winter	0°C or Lower	SAE 10W-10

FUEL

Remove the fuel filler cap and check the level of fuel in the fuel tank. If the fuel level is low, replenish with unleaded gasoline.

! DANGER



Motor fuels are **highly flammable** and can be dangerous if mishandled. **NEVER** smoke while refueling. **NEVER** attempt to refuel while the engine is **running** or **hot!**

! WARNING

ALWAYS use a strainer for filtration while refueling. **NEVER** top off fuel. **ALWAYS** wipe up any spilled fuel immediately.

GEARBOX OIL

1. Remove the fill plug on the side of the gearbox (Figure 22) to determine the gearbox oil level. The correct oil level is to the bottom of the fill plug. There is a sufficient amount of oil inside the gearbox if oil seeps out when the fill plug is removed.

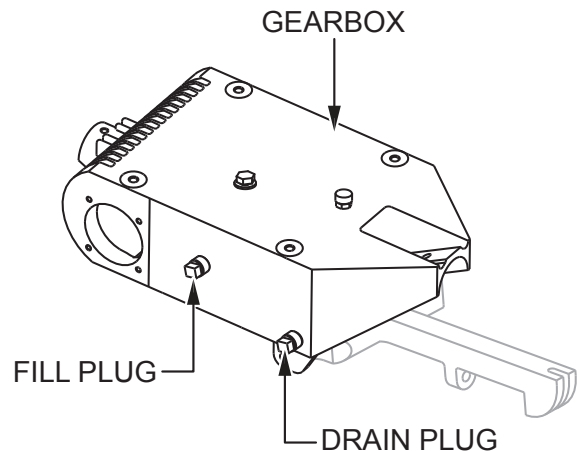


Figure 22. Gearbox Oil

2. If oil does not seep out when the fill plug is removed, fill the gearbox with Mobil SHC™ 634 or equivalent industrial synthetic gear oil until the fill hole overflows.

V-BELT

1. Inspect the V-belt (Figure 23) to determine if it is frayed, peeling, full of tiny cracks, has pieces of rubber missing, or is otherwise damaged.

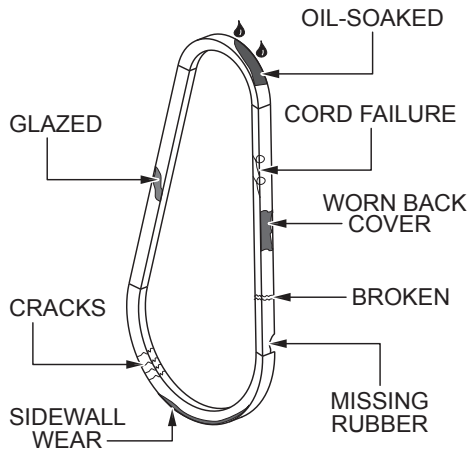


Figure 23. V-Belt Inspection

2. Inspect the V-belt (Figure 23) to determine if it is oil-soaked or glazed (a hard, shiny appearance on the sides of the belt). Either of these conditions can cause overheating of the belt, which weakens the belt and increases the danger of it breaking.
3. Replace the V-belt immediately if any of the aforementioned wear conditions are observed.

BELT GUARD

Inspect the belt guard (Figure 24) for damage, and for loose or missing hardware.

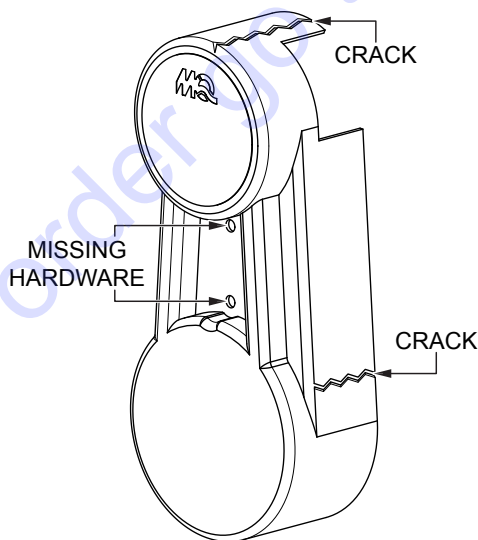


Figure 24. Belt Guard Inspection

BLADES

Inspect the trowel blades and replace any worn or damaged blades immediately (Figure 25). If one blade is worn out while the others look new, blade pitch adjustment may be necessary. Refer to the **Maintenance** section of this manual for the blade pitch adjustment procedure.

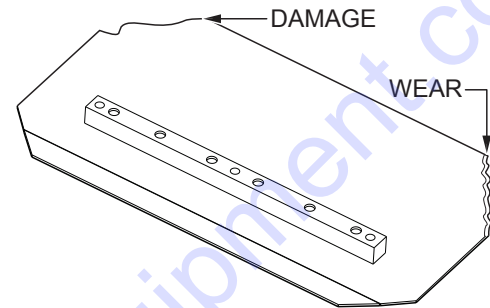


Figure 25. Blade Inspection

CENTRIFUGAL SAFETY STOP SWITCH

The HDA series trowel is equipped with a centrifugal safety stop switch (Figure 26). In a runaway situation (i.e. the operator releases the handle during operation), the switch will shut down the engine. The switching mechanism should operate freely, and should always be kept in this condition. With the switch in the **OFF** position, the engine should not start or run.

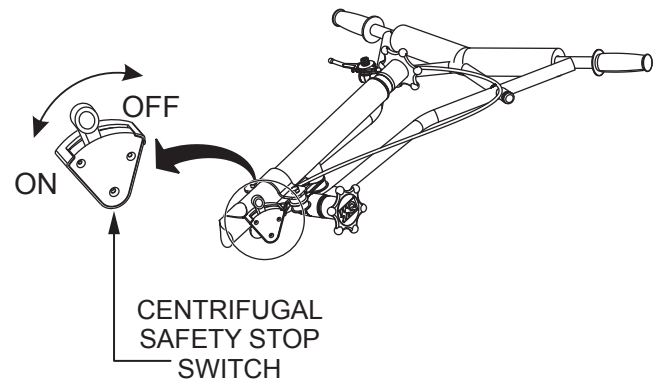


Figure 26. Centrifugal Safety Stop Switch

The centrifugal safety stop switch must be tested each time the engine is started. See the **Operation** section of this manual for the test procedure.

WARNING

Never disable or disconnect the safety stop switch. It is provided for operator safety. **Serious injury can result** if it is disabled, disconnected, or improperly maintained.

OPERATION

This section is intended to assist the operator with the initial start-up of the walk-behind trowel. It is extremely important that this section be read carefully before attempting to use the trowel in the field. **DO NOT** operate the trowel until this section is thoroughly understood.

BEFORE STARTING

NOTICE

DO NOT attempt to operate the trowel until the **Safety**, **General Information** and **Inspection** sections of this manual have been read and thoroughly understood.

1. Clean the trowel, particularly the engine cooling air inlet. Remove all dirt and dust.
2. Inspect the engine air cleaner for dirt and dust. Replace the air cleaner if it is excessively dirty.
3. Inspect the carburetor for external dirt and dust. Clean with dry compressed air as needed.
4. Inspect all fastening nuts and bolts for tightness.

STARTING THE ENGINE

1. Place the engine fuel valve lever in the **ON** position (Figure 27).

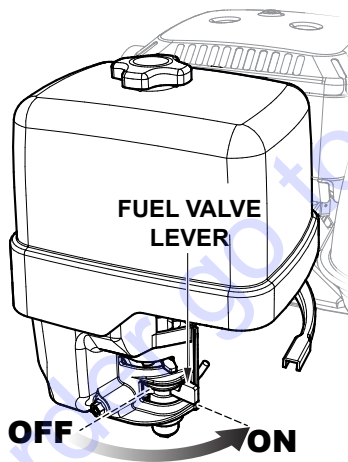


Figure 27. Engine Fuel Valve Lever (ON)

2. Place the engine ON/OFF switch in the **ON** position (Figure 28).

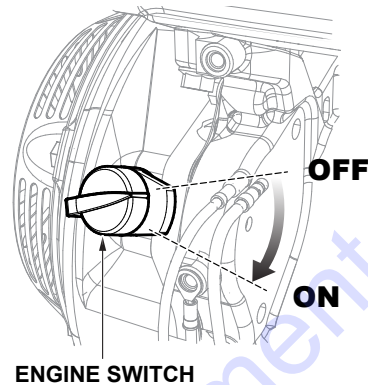


Figure 28. Engine ON/OFF Switch (ON)

3. Place the throttle lever in the **IDLE** position (Figure 29).

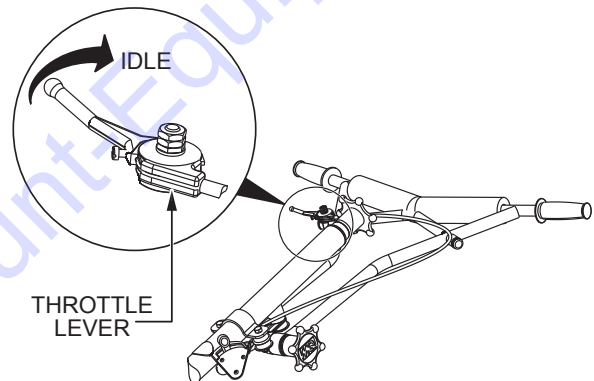


Figure 29. Throttle Lever (IDLE)

4. Place the centrifugal safety stop switch in the **ON** position (Figure 30).

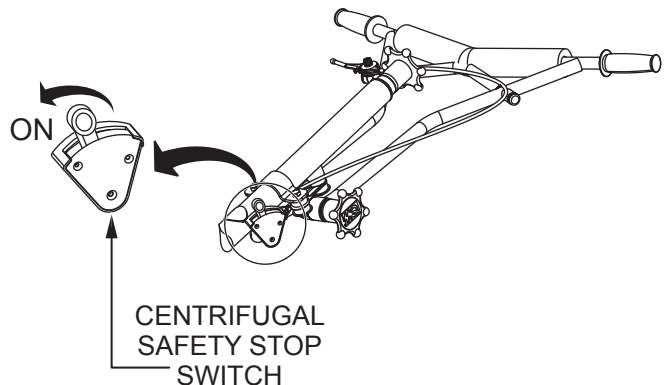


Figure 30. Centrifugal Safety Stop Switch (ON)

5. If starting a cold engine, place the choke lever in the **CLOSED** position (Figure 31).

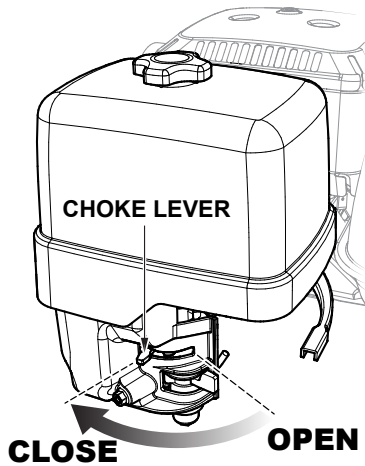


Figure 31. Choke Lever (CLOSED)

6. If starting a warm engine, place the choke lever in the **OPEN** position (Figure 32).

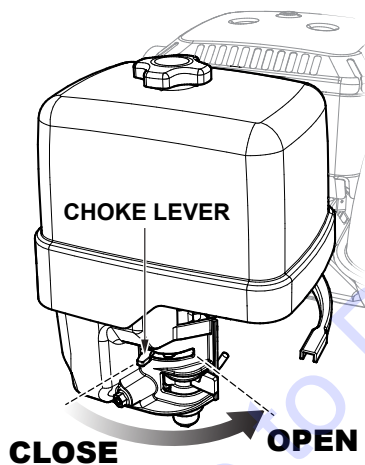


Figure 32. Choke Lever (OPEN)

7. Slowly pull the starter grip (Figure 33) until resistance is felt, then pull briskly and smoothly to start the engine. Once the engine has started, gently return the starter grip to its original position.

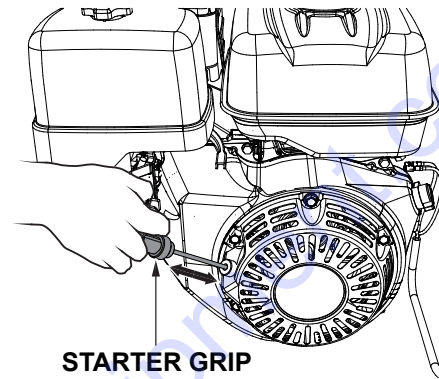


Figure 33. Starter Grip

8. If the engine has started, slowly return the choke lever to the **CLOSED** position (Figure 31). If the engine has not started, repeat steps 1 through 6.
9. Run the engine for several minutes and check for fuel leaks and loose components before operating the trowel.

CENTRIFUGAL SAFETY STOP SWITCH TEST

1. Clear the area around the trowel. Make sure it is free of objects and debris.
2. With the engine running at idle, place the safety stop switch lever in the **OFF** position (Figure 34) and verify that the engine shuts off. If the engine continues to run, replace the centrifugal safety stop switch.

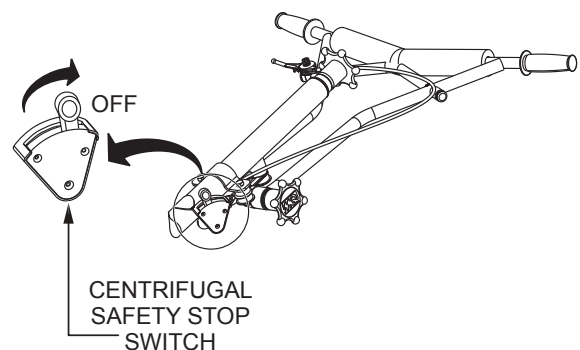


Figure 34. Centrifugal Safety Stop Switch (OFF)

3. Place the safety stop switch lever in the **ON** position, restart the engine, and let it idle.

- Stand in the operator's position behind the handle (Figure 35) and spin the handle to the right, simulating a runaway condition. Centrifugal force should throw the safety switch outward to the **OFF** position, thus shutting off the engine.

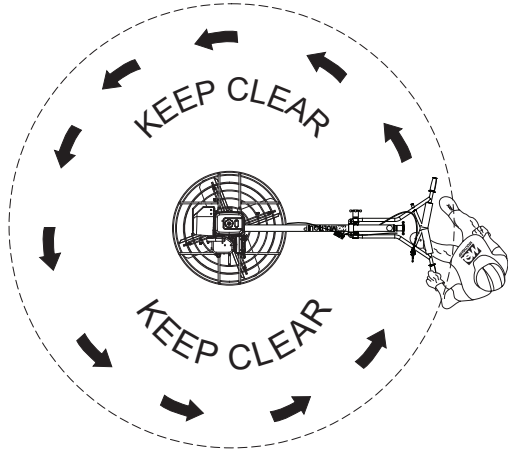


Figure 35. Centrifugal Safety Stop Switch Test

TROWEL OPERATION

With the engine running at idle, place the throttle lever (Figure 36) in the **RUN** position.

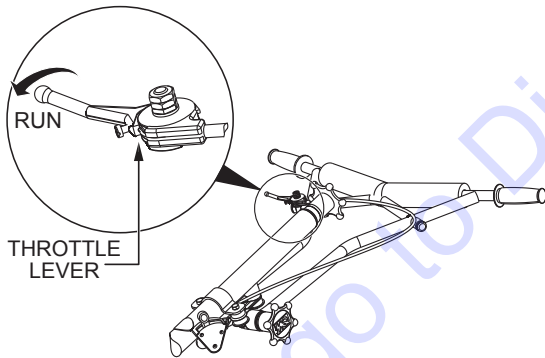


Figure 36. Throttle Lever (RUN)

Pitching the Blades (Standard Handle)

To pitch the blades **upward** with the standard handle (Figure 37), turn the star wheel **clockwise**. Turn the star wheel **counterclockwise** to pitch the blades **flat** (no pitch).

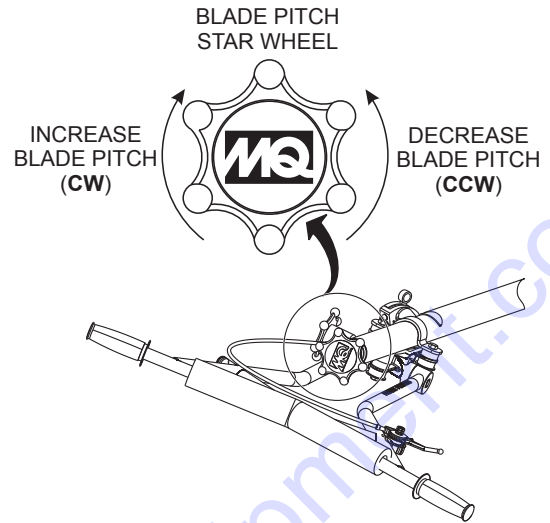


Figure 37. Pitching the Blades (Standard Handle)

Pitching the Blades (Quick Pitch™ Handle)

To pitch the blades **upward** with the Quick Pitch™ handle (Figure 38), pull the T-handle **backward** while squeezing the trigger lock. Push the T-handle **forward** to pitch the blades **flat** (no pitch).

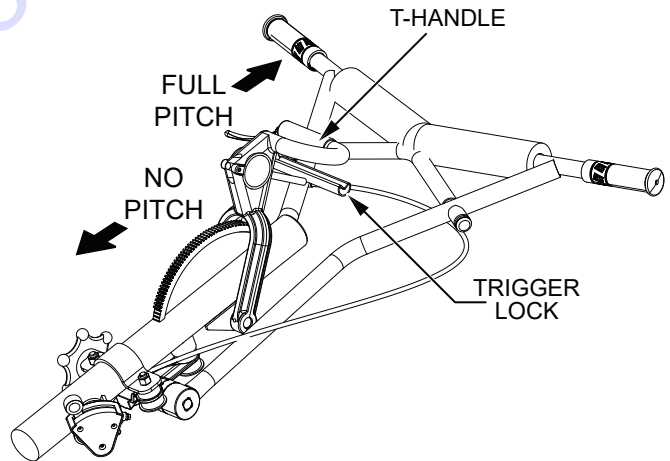


Figure 38. Pitching the Blades (Quick Pitch™ Handle)

CONCRETE FINISHING TECHNIQUES

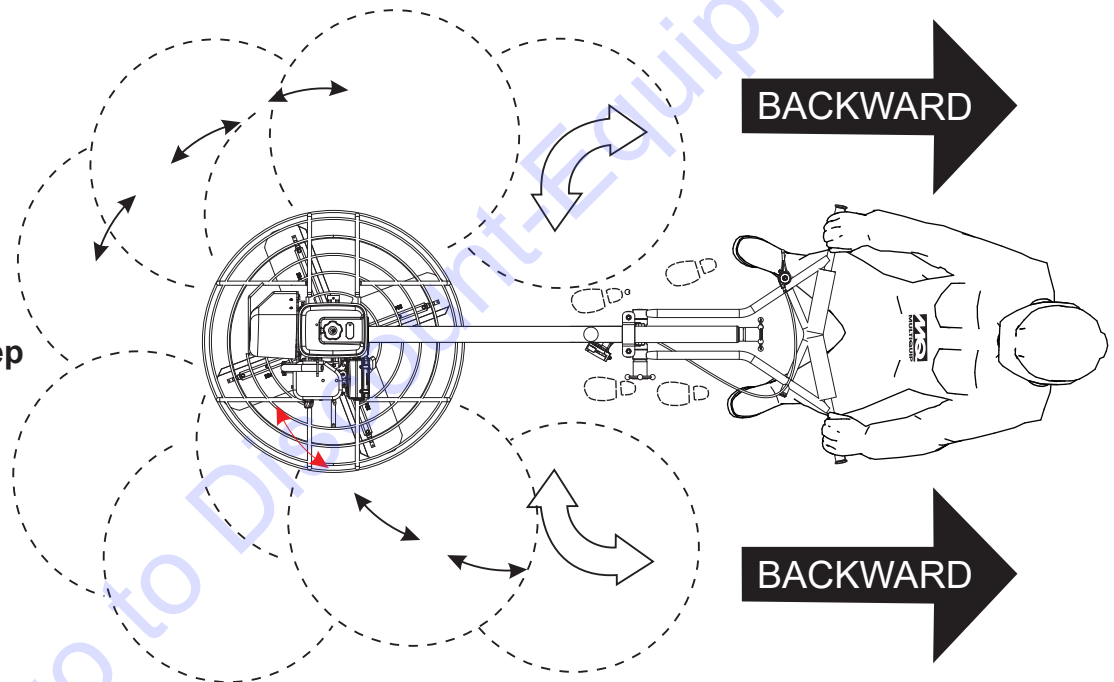
The instructions in this manual are provided as a basic guide to trowel operation, **not** a complete guide to concrete finishing. We suggest that all operators (experienced and novice) read *Slabs on Ground* published by the American Concrete Institute.

Maneuvering the Trowel

1. Stand in the operator's position behind the handle. With secure footing and a firm grasp on the handle, slowly increase the engine speed until the desired blade speed is obtained.
2. Figure 39 illustrates a typical walk-behind trowel application. Practice maneuvering the trowel. The trick is to let the trowel do the work.
3. Continue to practice maneuvering the trowel as if finishing a slab of concrete. Practice edging and covering a large area. Repeated use is the best way to get accustomed to the trowel.
4. An effective finishing technique is to work **backward**. **Be careful when moving backward** to avoid hazards.

To move the trowel to the operator's **left**, **lift up** on the handle. To move the trowel to the **right**, **push down** on the handle.

REMEMBER! If you let go of the trowel, simply **step away** and let the trowel come to a complete **STOP** before trying to recover it.



The best method for finishing concrete is to slowly walk **backward** with the trowel, guiding it from side to side. This will cover any footprints in the wet concrete.

Figure 39. Maneuvering the Trowel

CAUTION

NEVER place your **hands** or **feet** inside the guard rings while starting or operating this equipment.

CAUTION

ALWAYS stay clear of **rotating** or **moving** parts while operating this equipment.

STOPPING THE TROWEL

1. Return the throttle lever to the **IDLE** position (Figure 40) and let the engine run for three minutes at low speed.

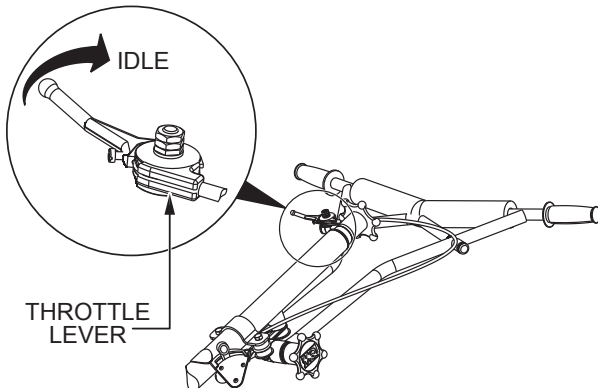


Figure 40. Throttle Lever (IDLE)

2. Release the handle and place the engine ON/OFF switch in the **OFF** position (Figure 41).

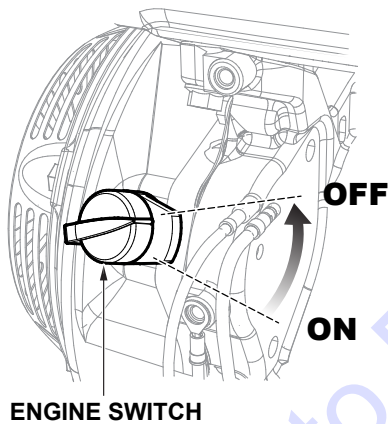


Figure 41. Engine ON/OFF Switch (OFF)

3. Place the centrifugal safety stop switch (Figure 42) in the **OFF** position.

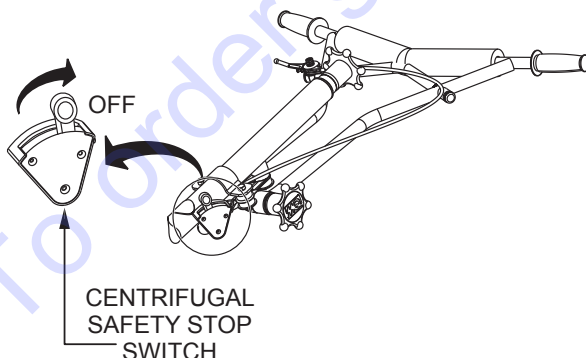


Figure 42. Centrifugal Safety Stop Switch (OFF)

4. Place the fuel valve lever in the **OFF** position (Figure 43).

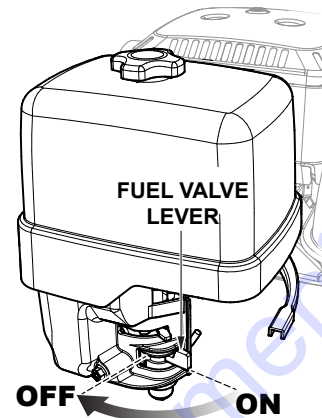


Figure 43. Fuel Valve Lever (OFF)

HANDLES

Standard Handle

The standard walk-behind trowel handle (Figure 44) is equipped with a star wheel for blade pitch adjustment. Refer to the **Operation** section of this manual for more information.

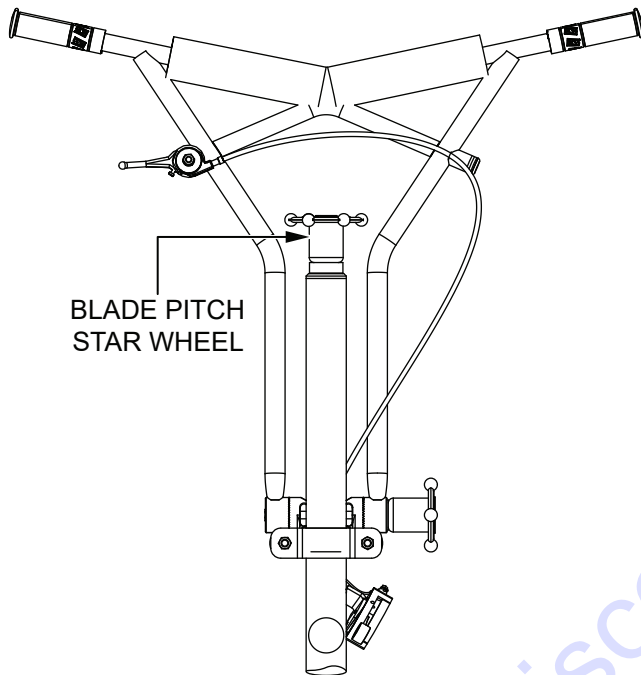


Figure 44. Standard Handle

Quick Pitch™ Handle (Optional)

The optional Quick Pitch™ handle (Figure 45) allows the operator to quickly and easily adjust blade pitch. Refer to the **Operation** section of this manual for more information. Please contact Discount-equipment to order this option.

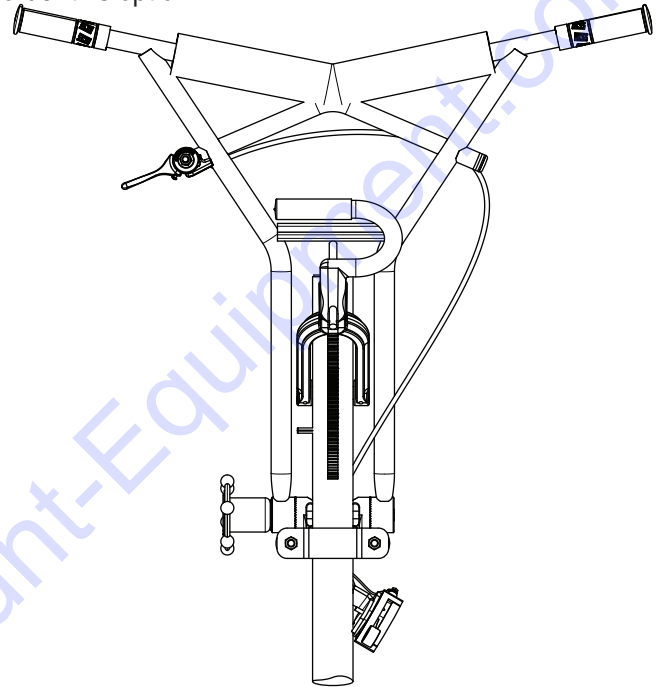


Figure 45. Quick Pitch™ Handle

BLADES AND PANS

Trowel blades are essential for finishing concrete. The blades of this trowel were built to stringent quality standards from the finest steel. Trowel blades should be replaced when they fail to finish concrete in a satisfactory manner.

If replacement blades are needed, refer to the parts manual included with your trowel for part numbers, and order from Discount-equipment.

Combo Blades (Standard)

This trowel is equipped with combination float/finish blades (Figure 46), which provide optimal performance for both floating and finishing operations. These blades are versatile and should accommodate most troweling needs.

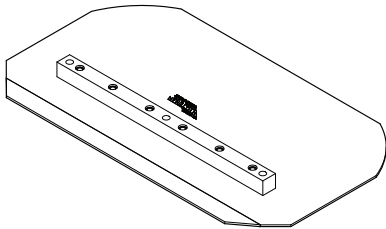


Figure 46. Combination Blade

Finish Blades (Optional)

Finish blades (Figure 47) are specifically designed for trowel finishing operations, and provide premium surface finishing capability. Finish blades should **only** be used after the concrete has partially dried enough to prevent the trowel from sinking into the concrete when placed on it.

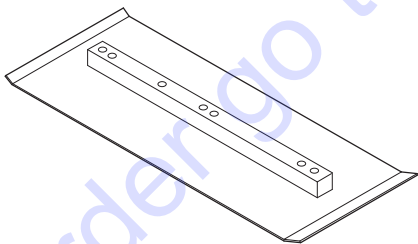


Figure 47. Finish Blade

Clip-On Float Blades (Optional)

Clip-on float blades (Figure 48) are easily installed onto existing finish blades for floating purposes. They are easily removed once floating is complete so that finishing can be started immediately.

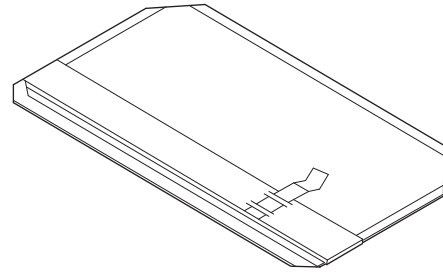


Figure 48. Clip-On Float Blade

Float Discs (Optional)

Float discs, or pans (Figure 49), attach to the spider assembly and allow the trowel to float on wet concrete. The disc design allows early floating and easy movement from wet to dry areas. Float discs are also very effective for embedding large aggregates and surface hardeners.

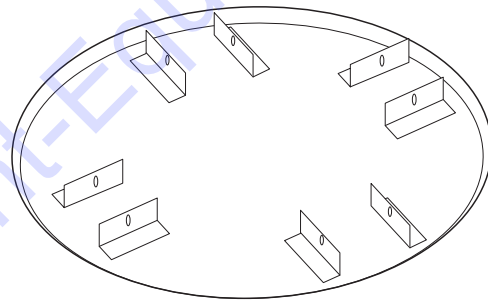


Figure 49. Float Disc/Pan

NOTICE

For optimal pan performance, blade speed must be lowered using the Low Speed Kit (P/N 22587). Refer to the **Engine and Clutch Assembly** section of the trowel parts manual for more information.

TROWEL ARM ADJUSTMENT TOOL

If the trowel blades show uneven wear patterns, or some blades wear out faster than others, the trowel arms may need to be adjusted. A trowel arm adjustment tool (P/N 9177) is available for consistent adjustment of all trowel arms. See Figure 50.

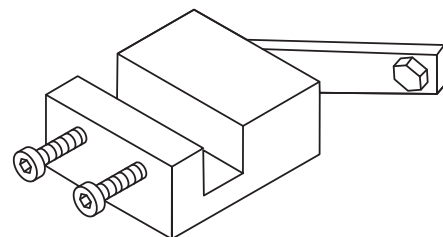


Figure 50. Trowel Arm Adjustment Tool

Table 6. Engine Maintenance Schedule						
Description (3)	Operation	Maintenance Interval				
		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		
Air Cleaner	Check	X				
	Clean			X (1)		
	Change					X (*)
Spark Plugs	Check/Adjust			X		
	Replace				X	
Spark Arrester	Clean			X		
Fuel Filter	Replace				X (2)	
Fuel Tube	Check	Every 2 years (replace if necessary) (2)				

* Replace the paper filter element only.

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

(2) These components should be serviced by your service dealer unless you have the proper tools and are mechanically proficient. Refer to your engine shop manual for service procedures.


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

Table 7. Trowel Maintenance Schedule					
Item	Operation	Maintenance Interval			
		Daily	Every 50–60 Hrs.	Every 200–300 Hrs.	Every 2000–2500 Hrs.
V-Belt	Check/Replace		X		
Trowel Arms	Grease	X			
Blades	Check/Replace		X		
Trowel Arms	Remove/Clean			X	
Thrust Collar/Bushing	Remove/Clean			X	
Blade Arms	Adjust			X	
Arm Bushing	Remove/Replace				X
Wear Ring	Remove/Replace				X
Thrust Collar Bearing	Remove/Replace				X
Pitch Control Cable	Check				X
Clutch	Remove/Clean			X	

General maintenance practices are crucial for the performance and longevity of your trowel. This equipment requires routine cleaning, lubrication, and inspection of components for wear or damage.


Refer to Table 6 and Table 7 for engine and trowel maintenance schedules. The following maintenance procedures can prevent serious trowel malfunction or damage.

! DANGER




NEVER use gasoline or low flash point solvents to clean the engine or any of its components. **Fire or explosion** may result which can damage equipment and cause **severe bodily harm** or even **DEATH**.

! WARNING



Some maintenance operations require a running engine. **ALWAYS** make sure the maintenance area is well ventilated. Engine exhaust contains **poisonous carbon monoxide gas** that, when inhaled, can cause **unconsciousness and/or DEATH**.

! CAUTION



ALWAYS allow the engine to cool before servicing. **NEVER** attempt to service a hot engine.

! CAUTION

ALWAYS disconnect the spark plug wire and secure it **away from the engine** before performing maintenance or adjustments.

ENGINE MAINTENANCE

Inspect the engine daily for cleanliness. **MAKE SURE** there are no oil or fuel leaks and that all fasteners are tightened securely.

Air Cleaner

The engine air cleaner is equipped with a replaceable, high-density, paper element. Refer to Figure 51 for air cleaner maintenance procedures.

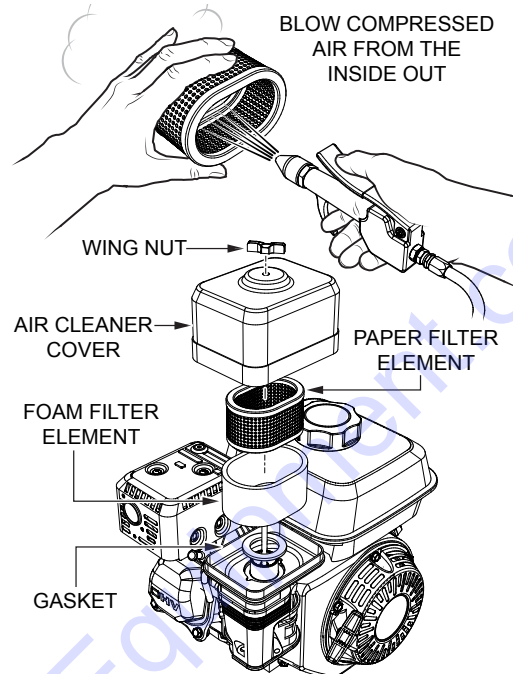



Figure 51. Air Cleaner Maintenance

1. Remove the air cleaner cover and foam filter element.
2. To remove dirt, tap the paper filter element several times on a hard surface, or blow compressed air [not exceeding 30 psi (207 kPa, 2.1 kgf/cm²)] through the filter element from the inside out. **NEVER** brush off dirt. Brushing will force dirt into the fibers. Replace the paper filter element if it is excessively dirty.

! CAUTION



ALWAYS wear personal protective equipment such as safety glasses, face shields, dust masks, and/or respirators when cleaning air filters with compressed air.

3. Clean the foam filter element in warm, soapy water or a **nonflammable** solvent. Rinse and dry the element thoroughly. Dip the element in clean engine oil, then completely wring all excess oil out of the element before reinstalling it.

NOTICE

Operating the engine with loose or damaged air cleaner components can allow unfiltered air into the engine, causing premature wear and failure.

Engine Oil

1. Remove the drain bolt and sealing washer, and allow the oil to drain into a suitable container (Figure 52).

NOTICE

ALWAYS drain the engine oil while the oil is **warm**.

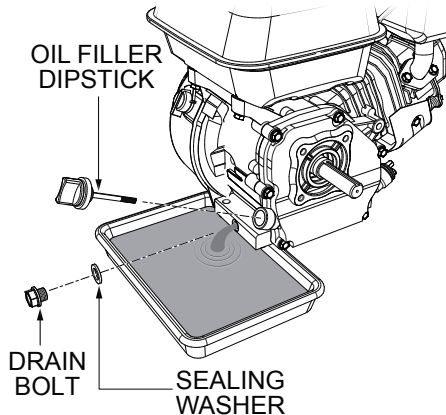
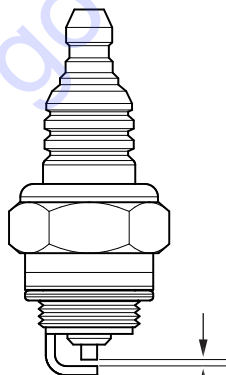


Figure 52. Draining Engine Oil

2. Replace the engine oil with the recommended oil type listed in Table 5. For engine oil capacity, see Table 2. **DO NOT** overfill.
3. Reinstall the drain bolt with sealing washer and tighten securely.

Spark Plug

1. Remove the spark plug (Figure 53) and clean it with a wire brush if it is to be reused. Replace the spark plug if the insulator is cracked or chipped.



GAP: 0.028 – 0.031 in.
(0.7 – 0.8 mm)

Figure 53. Spark Plug

2. Using a feeler gauge, adjust the spark plug gap (Figure 53). The gap should measure 0.028–0.031 inch (0.7–0.8 mm).
3. To prevent cross-threading, thread the spark plug into the cylinder hole by hand, then tighten securely.

V-Belt

1. Inspect the V-belt (Figure 54) to determine if it is frayed, peeling, full of tiny cracks, has pieces of rubber missing, or is otherwise damaged.

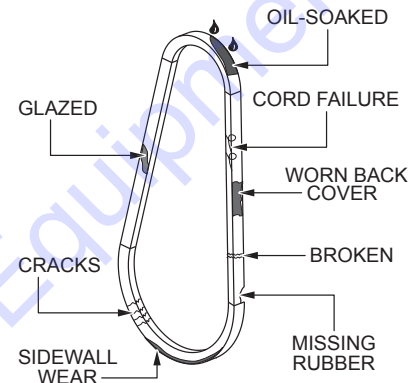


Figure 54. V-Belt Inspection

2. Inspect the V-belt (Figure 54) to determine if it is oil-soaked or glazed (a hard, shiny appearance on the sides of the belt). Either of these conditions can cause overheating of the belt, which can weaken the belt and increase the possibility of it breaking.
3. Replace the V-belt immediately if any of the above wear conditions are observed.

Spark Arrester

1. Remove the screws that secure the exhaust deflector to the muffler protector, then remove the exhaust deflector (Figure 55).

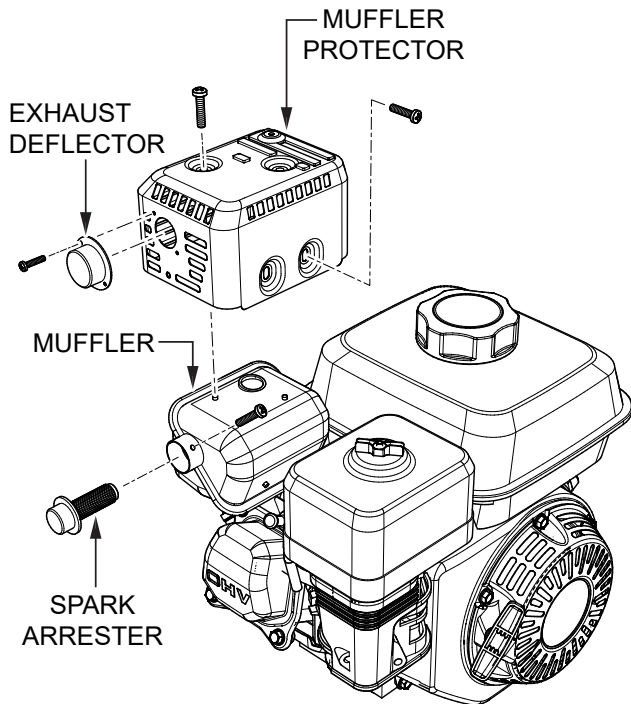


Figure 55. Spark Arrester Removal

2. Remove the screws that secure the muffler protector to the muffler, then remove the muffler protector (Figure 55).
3. Remove the screw securing the spark arrester to the muffler, then remove the spark arrester (Figure 55).
4. Carefully remove carbon deposits from the spark arrester screen (Figure 56) with a wire brush.

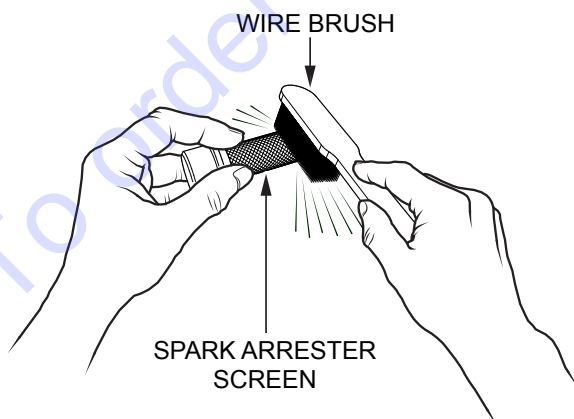


Figure 56. Cleaning the Spark Arrester

5. Replace the spark arrester if it is damaged (has breaks or holes).
6. Reinstall the spark arrester, muffler protector, and exhaust deflector in reverse order of disassembly.

NOTICE

Refer to the manufacturer's engine manual supplied with your trowel for more detailed information regarding engine maintenance and troubleshooting.

TROWEL MAINTENANCE

Clean the trowel daily. Remove all dust and slurry buildup. Make sure lubrication is performed after any steam-cleaning.

Trowel Lubrication (Every 8 Hours)

Regular lubrication is required to maintain your trowel in optimal working condition. Perform the following lubrication procedure after **every 8 hours of use**.

1. Locate one of the Zerk grease fittings on the spider assembly (Figure 57). Remove the Zerk fitting cap and set it aside.

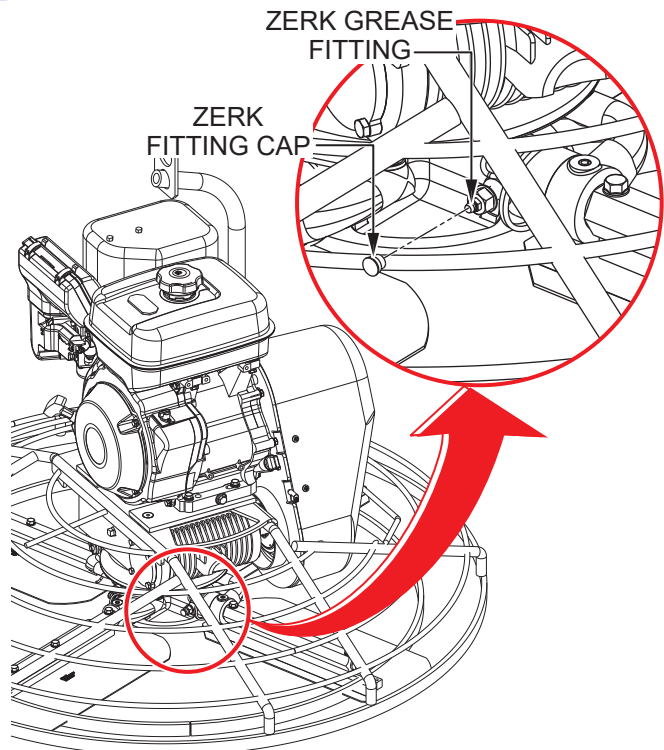


Figure 57. Spider Lubrication

- Wipe the Zerk grease fitting clean to prevent abrasive material from entering the fitting during lubrication.
- Lubricate the Zerk grease fitting with 1–1½ shots of multipurpose grade grease. **DO NOT** overgrease. Replace the Zerk fitting cap when finished.
- Repeat steps 1–3 for the remaining grease fittings on the spider assembly.

Blade Pitch Adjustment

Perform maintenance adjustment of blade pitch using a bolt on the trowel arm lever (Figure 58). 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.

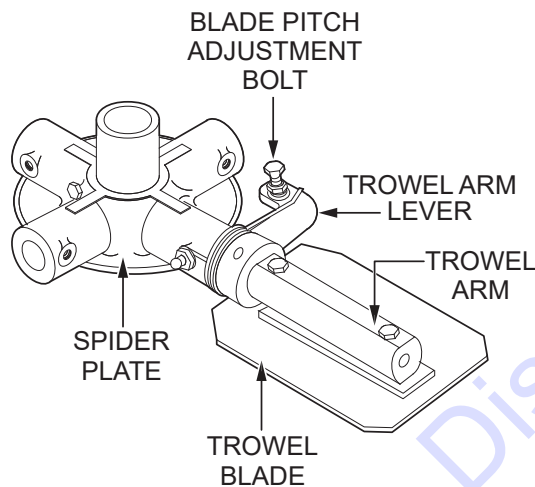


Figure 58. Blade Pitch Adjustment Bolt

Look for the following indications when determining if blade pitch adjustment is necessary:

- Are blades wearing out unevenly (i.e. one blade is completely worn out while the others look new)?
- Does the machine have a perceptible rolling or bouncing motion while in use?
- Does the guard ring rock up and down relative to the ground while the machine is in use?

Once it has been determined that blade pitch adjustment is necessary, do the following:

- Place the trowel on a flat, level surface, with blocks under the main guard ring for support. Any uneven spots in the floor or debris under the trowel blades will cause an incorrect perception of adjustment. A 5 ft. x 5 ft. (1.5 m x 1.5 m), 3/4-inch-thick, **flat** steel plate is ideal.
- Pitch the blades as flat as possible (Figure 59). The pitch adjustment bolts should barely contact the lower wear plate (0.1-inch maximum clearance). All adjustment bolts should be spaced the same distance from the lower wear plate. If any one of the bolts does not make contact, adjustment is necessary.

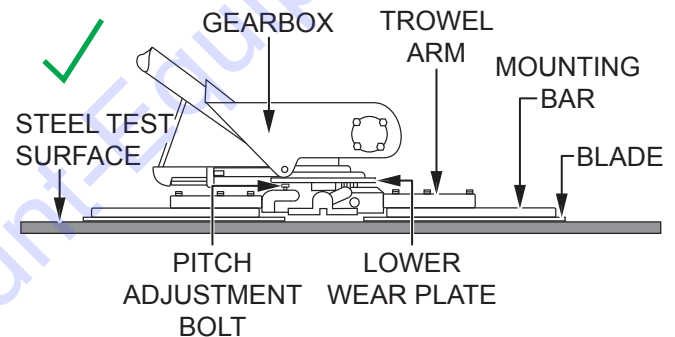


Figure 59. Blades Pitched Flat (Correct)

- Adjust the “high” bolts down to the level of the bolt that is not touching, or adjust the “low” bolt up to the level of the higher ones. Whenever possible, adjust the “low” bolt up to the level of the rest of the bolts. This is the fastest method, but it may not always work. After adjustment, verify that the blades pitch correctly.

NOTICE

Incorrectly adjusted blades will often be unable to pitch flat. This can occur if the adjustment bolts are raised too high. Conversely, adjustment bolts that are too low will prevent the blades from being pitched high enough for finishing operations.

- If the trowel still finishes poorly after blade pitch adjustment has been performed, blades, trowel arms, and trowel arm bushings should be inspected for improper adjustment, wear, or damage.

Figure 60 illustrates incorrect spider plate alignment due to improper adjustment, worn spider bushings, or bent trowel arms.

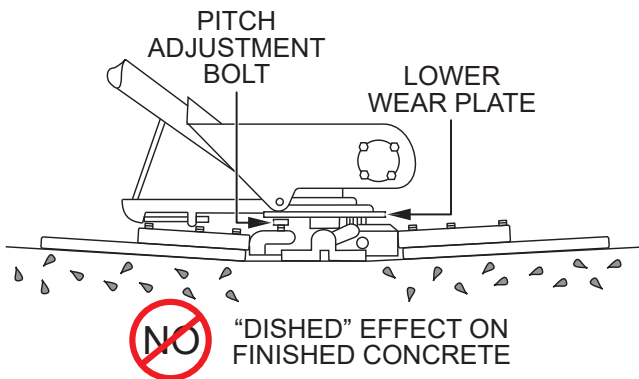


Figure 60. Blades Pitched Flat (Incorrect)

Spider Removal

1. Locate and loosen the cone point square head set screw and attached jam nut on the side of the spider assembly (Figure 61).

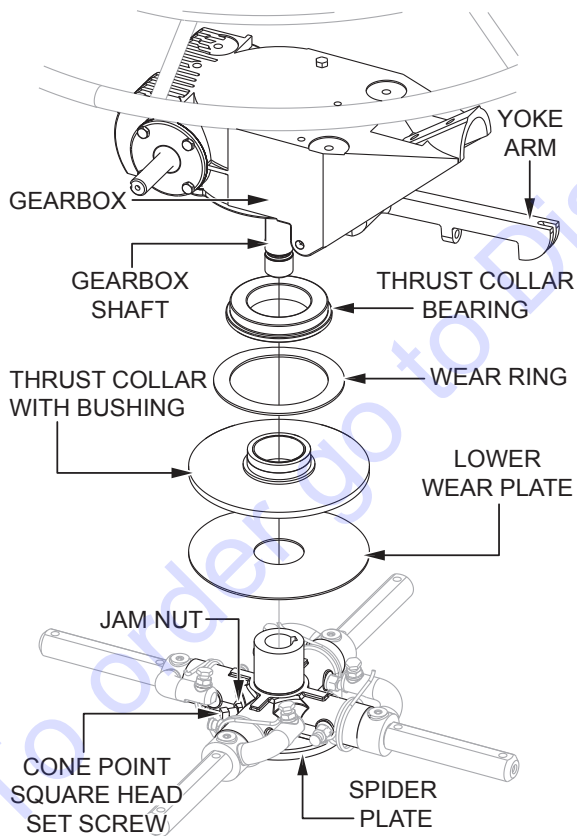


Figure 61. Spider Removal

2. Carefully lift the upper trowel/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.

Blade Replacement

It is recommended to replace **all** of the trowel blades at the same time. If only one or some of the blades are changed, the machine may wobble or bounce and will not finish concrete consistently.

NOTICE

Please note the orientation of each blade on the trowel arm before removal.

1. Place the trowel on a flat, level surface, with blocks under the main guard ring for support.
2. Remove the bolts and lock washers securing the blades to the trowel arms, then remove the blades (Figure 62).

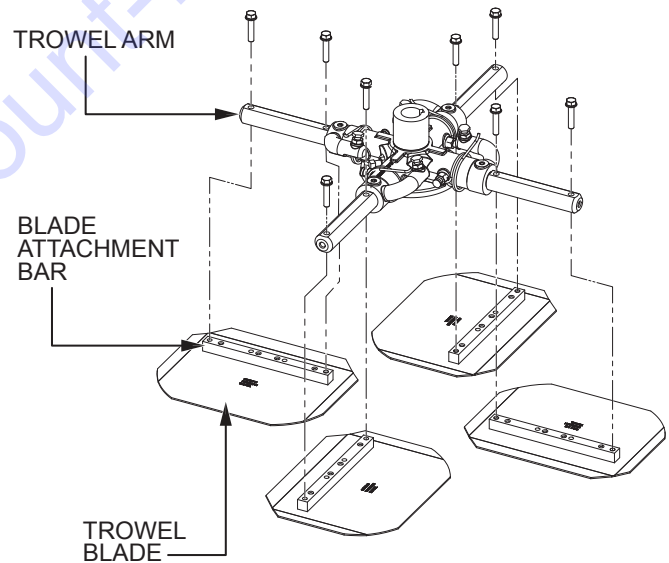


Figure 62. Blade Removal

3. To ensure proper seating of the new blades, use a wire brush to remove concrete and debris from all six sides of each of the four trowel arms.
4. Install the new blades, maintaining proper blade orientation as noted during blade removal. Secure the blades to the trowel arms with the bolts and washers that were removed earlier.

Trowel Arm Removal

1. Each trowel arm is held in place at the spider plate by a Zerk grease fitting (hex head bolt) and a roll pin (Figure 63). Remove the Zerk grease fitting and the roll pin from the spider plate.

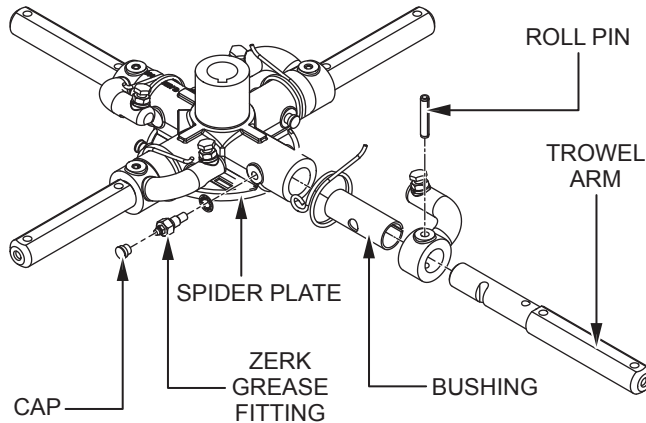


Figure 63. Trowel Arm Removal

2. Remove the trowel arm from the spider plate (Figure 63).
3. Carefully remove the trowel arm bushing (Figure 63) and set it aside.
4. Examine the trowel arm bushing, and clean it if necessary. Replace the bushing if it is worn or out-of-round.

Trowel Arm Inspection

Trowel arms (Figure 64) can be damaged by rough handling (i.e. dropping the trowel), or by striking exposed plumbing, rebar, or other objects during operation. A bent trowel arm will prevent smooth, fluid rotation of the blades. If bent trowel arms are suspected, examine them for straightness as follows.

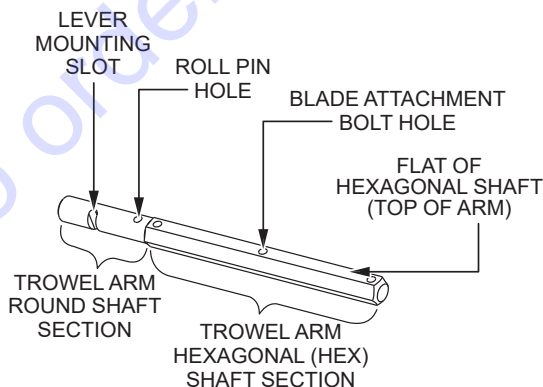


Figure 64. Trowel Arm

1. Place the trowel arm on a thick, steel plate, granite slab, or any other surface which is **true** and **flat** (Figure 65).

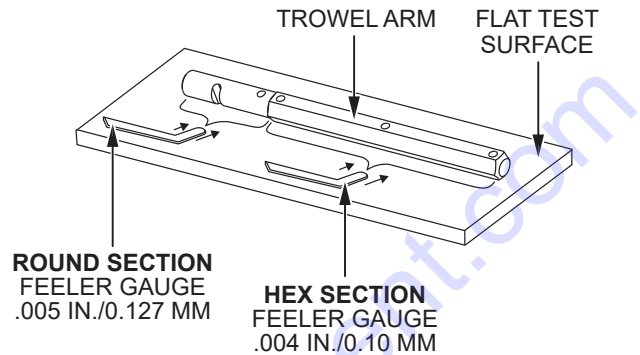


Figure 65. Trowel Arm Inspection

2. Check each of the six sides of the trowel arm hex section (Figure 65). A feeler gauge of .004 inch (0.10 mm) should not pass between the test surface and the flat of the trowel arm at any point along its length on the test surface.
3. As the flat hex section rests on the test surface, use a feeler gauge of .005 inch (0.127 mm) to check the clearance between the round shaft section and the test surface. Rotate the arm to each of the flat hex sections and check the clearance between the round shaft and the test surface. The clearance between the round shaft and the test surface should be identical for each hex section. See Figure 65.
4. Replace any bent or uneven trowel arms.

Trowel Arm Adjustment

The easiest and most consistent way to adjust a trowel arm is with the trowel arm adjustment tool (P/N 9177).

Once locked into the adjustment tool, each trowel arm bolt is adjusted until 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.

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

1. Unscrew the locking bolts on the adjustment tool and place a trowel arm (with lever attached) into the fixture channel as shown in Figure 66. A thin shim may be needed to cover the blade holes on the trowel arm.

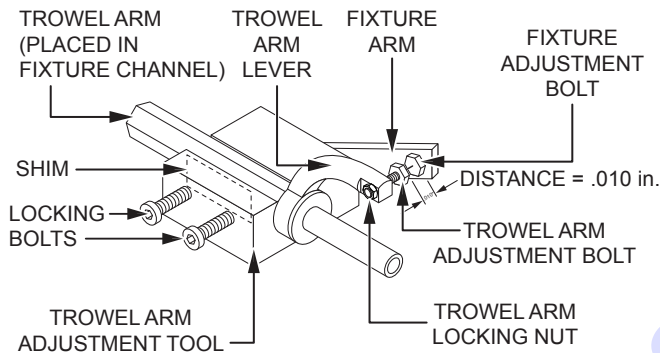


Figure 66. Trowel Arm Adjustment

2. Make sure the fixture arm is in the **UP** position (Figure 67).

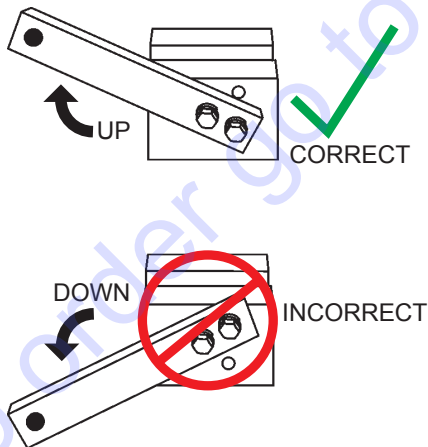


Figure 67. Fixture Arm Position (UP)

3. Align the trowel arm adjustment bolt with the fixture adjustment bolt (Figure 66).

4. Tighten the locking bolts (Figure 66) to secure the trowel arm in place.
5. Loosen the locking nut on the trowel arm lever, then turn the trowel arm adjusting bolt until it barely touches (.010") the fixture adjustment bolt.
6. Tighten the trowel arm locking nut to lock the trowel arm lever in place.
7. Loosen the locking bolts on the adjustment tool, and remove the trowel arm.
8. Repeat steps 1–7 for the remaining trowel arms.

REASSEMBLY

1. Examine the entire spider assembly. Clean the wear plates and thrust collar. Use a wire brush to remove any concrete or rust buildup. Replace any spider components that are damaged or out-of-round.
2. Inspect the bronze trowel arm bushing, and clean it if necessary. Replace the bushing if it is damaged, worn, or out-of-round.
3. Reinstall the trowel arm bushing onto the trowel arm.
4. Repeat steps 2–3 for each trowel arm.
5. Make sure the spring tensioner is in the correct position to exert tension on the trowel arm.
6. Insert all trowel arms with levers (and bronze bushings already installed) into the spider plate. Align the grease holes on the bushings with the grease hole fittings on the spider plate.
7. Lock the trowel arms in place by tightening the Zerk grease fitting hex head bolts and jam nuts.
8. Reinstall the blades onto the trowel arms.
9. Reinstall the stabilizer ring onto the spider assembly.
10. Reinstall the lower wear plate, thrust collar, and wear ring onto the spider shaft in the reverse order of disassembly. **MAKE SURE there is little or no lateral movement** between the thrust collar and the spider shaft.
11. Carefully lift the upper trowel/gearbox assembly, align it with the keyway on the spider shaft, and insert it into the spider assembly.

12. Reinstall the cone point square head set screw and jam nut, and tighten securely. Make sure the point of the set screw engages the groove in the gearbox main shaft.
13. Lubricate all grease points (Zerk fittings) with premium Lithium 12-based grease, conforming to NLG1 grade #2 consistency.

LONG-TERM STORAGE

Prepare the trowel for long-term storage (more than 30 days) as follows.

- Drain the fuel tank completely, or add STA-BIL® to the fuel.
- Run the engine until all gasoline in the carburetor is completely consumed.
- Completely drain the oil from the crankcase and refill with fresh oil.
- Remove the spark plug. Pour 5–10 cm³ of SAE 30 oil into the cylinder. Turn the engine ON/OFF switch to the **ON** position for a few seconds to distribute the oil. Return the engine ON/OFF switch to the **OFF** position, and reinstall the spark plug.
- Clean off all external trowel components with a cloth.
- Cover the trowel and store it away from direct sunlight in a clean, dry location.

ENGINE TROUBLESHOOTING

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.
	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 if 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, 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.

ENGINE TROUBLESHOOTING

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	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.

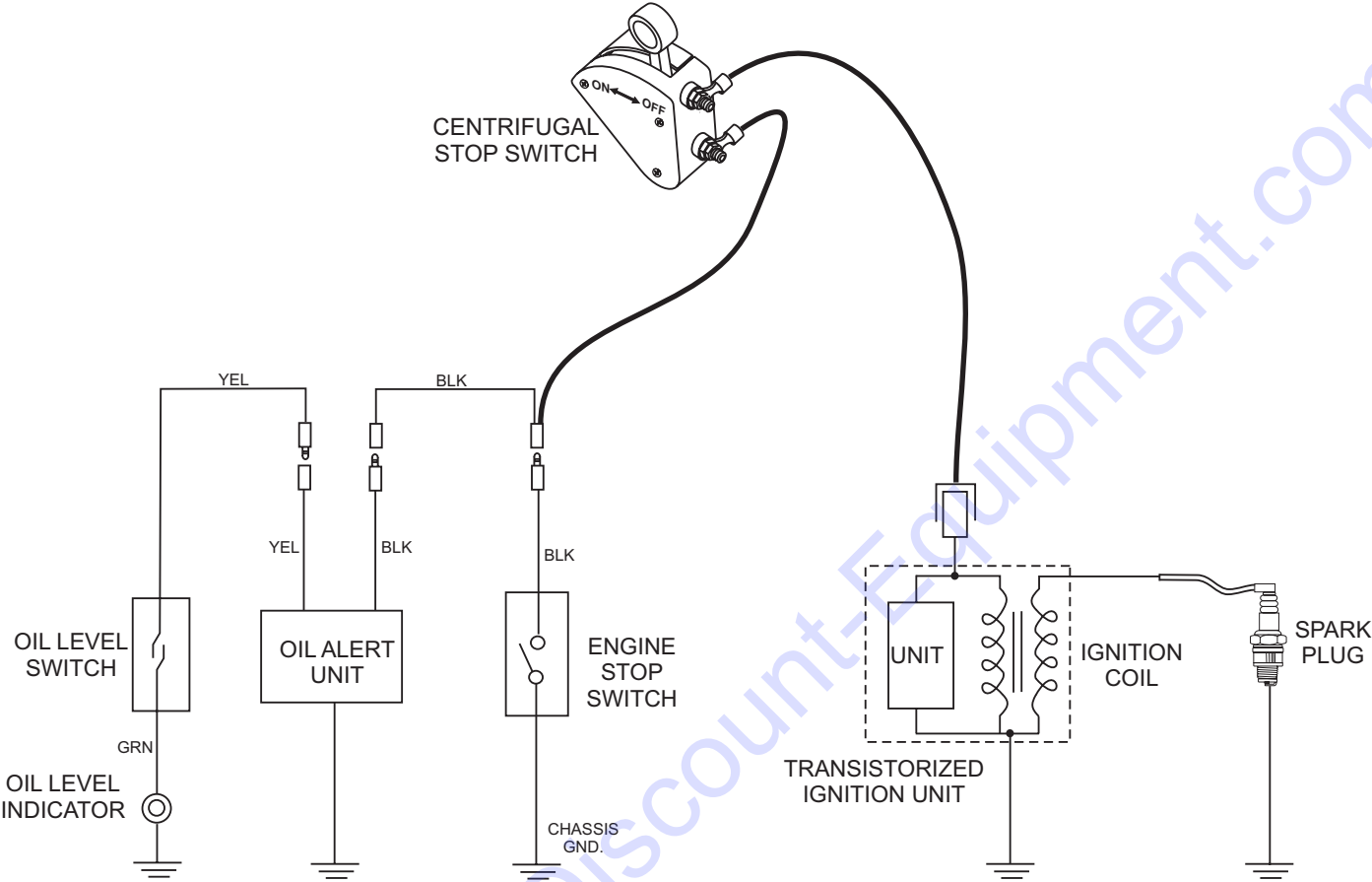
TROWEL TROUBLESHOOTING

Troubleshooting (Walk-Behind Trowel)		
Symptom	Possible Problem	Solution
Engine running rough or not at all.	Engine ON/OFF Switch in "OFF" position or malfunctioning?	Make sure that the Engine ON/OFF Switch is ON or replace switch if necessary.
	Centrifugal ON/OFF Switch in "OFF" position or malfunctioning?	Place centrifugal stop switch in "ON" position. Check wiring. 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.
	Loose wire connections	Check wiring. Replace or repair as necessary.
	Bad contacts in ON/OFF switch?	Replace ON/OFF switch.
Trowel bounces, rolls concrete, or makes uneven swirls in concrete.	Blades?	Make certain blades are in good condition, not excessively worn. Finish blades should measure no less than 2" (50mm) from the blade bar to the trailing edge, combo blades should measure no less than 3.5" (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 Discount-equipment)
	Bent trowel arms?	Check the spider assembly for bent trowel arms. If one of the arms is even slightly bent, replace it immediately.
	Spider?	Check fit of arms in spider. 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 spider and arms should be replaced.
	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 3/32 inch (2.4 mm) - as measured at the thrust collar O.D., replace the thrust collar.
	Thrust bearing worn?	Check the thrust bearing to see that it is spinning freely. Replace if necessary.

TROWEL TROUBLESHOOTING

Troubleshooting (Walk-Behind Trowel) - continued		
Symptom	Possible Problem	Solution
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" (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.
Clutch slipping or sluggish response to engine speed change.	Worn V-belts?	Replace V-belt.
	Hand clutch out of adjustment?	Adjust per instructions in maintenance section of this manual.
	Worn or defective hand 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.
Trowel blades do not rotate.	Defective clutch?	Replace clutch.
	Broken V-belt?	Replace V-belt.
	Defective ON/OFF switch?	Check and replace ON/OFF switch if necessary.
	Defective centrifugal ON/OFF switch?	Check and replace centrifugal ON/OFF switch if necessary.

WIRING DIAGRAM



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