MQ WHITEMAN

OPERATING INSTRUCTIONS

MQ WHITEMAN RIDE-ON TROWEL MODEL HTX6H AND STX6H

U.S. Revision #3 (05/11/20)
AUS Version 1.0 (July 2021)

FOR MORE INFORMATION
CONTACT US ON 1300 353 986 OR VISIT flextool.com.au

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OPERATION MANUAL

MULTIQUIP®

WHITEMAN

MODELS
HTX6H
STX6H
HYDROSTATIC RIDE-ON TROWEL
(HATZ 4H50TIC DIESEL ENGINE)

Revision #3 (05/11/20)

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

THIS MANUAL MUST ACCOMPANY THE EQUIPMENT AT ALL TIMES.

PN: 42913


WARNING
CANCER &
REPRODUCTIVE HARM
www.P65Warnings.ca.gov
P/N 38707

⚠ 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.

HTX6H/STX6H
Hydrostatic Ride-On Trowel

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NOTICE

Specifications are subject to change without notice.

NOTES

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

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

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

SAFETY MESSAGES

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

SAFETY SYMBOLS

DANGER

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

WARNING

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

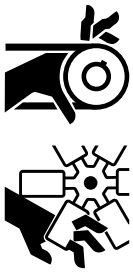
CAUTION

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

NOTICE

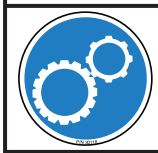
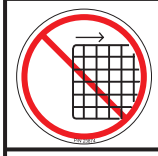
Addresses practices not related to personal injury.

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

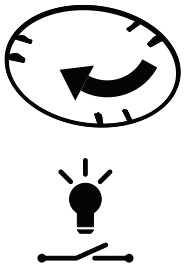
Symbol	Safety Hazard
	Lethal exhaust gas hazards
	Explosive fuel hazards
	Burn hazards
	Rotating parts hazards
	Pressurized fluid hazards
	Hydraulic fluid hazards

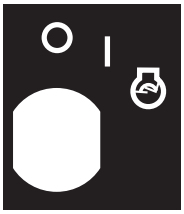
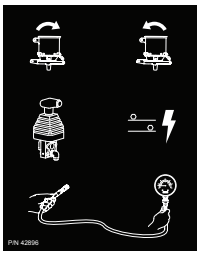
DECALS

Decals associated with the operation of this equipment are defined below.

DECAL	DEFINITION
	**WARNING** Read Manual To avoid injury you must read and understand operator's manual before using this machine.
	**NOTICE** Lift Point Attach lifting strap to this point.
	**NOTICE** Protective Clothing Wear appropriate clothing before operating trowel.
	**WARNING** Entanglement/Crush Hazard. **DO NOT** operate equipment with guards removed. Keep hands and fingers clear of gears. Serious bodily injury could result.
	**DANGER** Guard Hazard **DO NOT** operate equipment with guards removed. Serious bodily injury could result.
	**DANGER** Rotating Blade Hazard Keep hands and fingers clear from engine fan blades. Moving parts can cut. **DO NOT** remove guards.
	**DANGER** Lifting/Crush Hazard Keep persons clear from a lifted trowel. **DO NOT** stand below the trowel. **DO NOT** lift trowel with pans attached.
	**NOTICE** Fuel Type The engine used in this equipment requires ***Ultra-Low Sulphur Diesel Fuel.***
	**DANGER** Fire Hazard **DO NOT** light matches around or near this equipment. This equipment contains highly flammable fuel. If ignited, could start a ***fire*** causing equipment damage and severe bodily harm even death!

DECAL	DEFINITION
	**CAUTION** Cold Weather Conditions Run the engine until hydraulic oil temperature has reached a minimum of 100°F before pressing the blade control pedal.
	**NOTICE** Noise Level Indicates value of sound pressure of equipment. Measured at operator's seat.
	**DANGER** Hydraulic Pump Trowel rotor speeds are factory set. Tampering with settings can lead to damage and void machine warranty.
	**DANGER** Explosion Hazard Hot steam or coolant may escape when radiator cap is removed, causing severe burns. Allow radiator to cool before removing cap/
	**DANGER** Inhalation Hazard **DO NOT** use this equipment in an ***enclosed area***. The engine used with this equipment emits harmful levels of carbon monoxide which can cause severe bodily harm — even ***death!***
	**DANGER** Fire Hazard **DO NOT** smoke around or near this equipment. This equipment contains highly flammable fuel. If ignited, could start a ***fire*** causing equipment damage and severe bodily harm — even ***death!***

DECAL	DEFINITION
	**NOTICE** Drive Bypass Switch When drive bypass switch is activated, equipment working lights will flash indicating that float pans may be attached to blades.
	**NOTICE** Lock Smart Pitch™ Selection Mode Indicates the set position of the pitch mode rocker switch when Smart Pitch™ is engaged.
	**NOTICE** Unlock Smart Pitch™ Selection Mode Indicates the set position of the pitch mode rocker switch when Smart Pitch™ is not engaged.
	**NOTICE** Blade Pitch Ruler/Indicator Indicates the amount of pitch the left and right blades are set to with either the Twin Pitch or Left Pitch Blade Control Switches.
	**NOTICE** Twin Pitch Indicates the Twin Pitch Blade Control Switch control. Adjusts the pitch on both rotor simultaneously.
	**NOTICE** Left Pitch Indicates the Left Pitch Blade Control Switch control. Adjusts the left side blade pitch independently of the right side.
	**NOTICE** Light Switch When pressed, turns on equipment lights. Lights offer better visibility when working indoors.

DECAL	DEFINITION
	**NOTICE** Ignition Switch Insert key and turn clockwise to start engine.
	**NOTICE** Cold Start Lamp Lights ***AMBER*** when hydraulic oil temperature is low. Additional warm-up time may be needed before operation.
	**NOTICE** Increase Throttle Control Rabbit indicates the position of the engine speed rocker switch in order to increase engine throttle speed for proper operation.
	**NOTICE** Decrease Throttle Control Turtle indicates the position of the engine speed rocker switch in order to decrease engine throttle speed for proper operation.
	**NOTICE** Pump Stroke Position Holder Press cruise control switch to maintain consistent pump stroke position.
	**NOTICE** Motor Service/Test Port Steering/Charge/Pitch Service/Test Port Indicates service/test port locations to accurately measure equipment motor pressure, equipment steering, charge, and/or pitch pressure for correct equipment operation.
	**NOTICE** Glow Plug Lamp Glow Plug Lamp activates when ignition is turned to the **ON** position. Engine should not be started until lamp has turned off. This indicates that glow plugs are warm and ready to go.
	**NOTICE** Service Tool & Set-Up Jumper Connect a laptop to the set-up jumpers for electronic service 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.

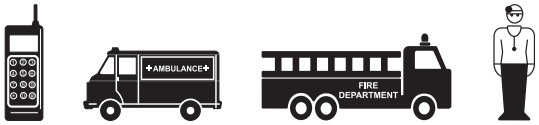
- **ALWAYS** clear the work area of any debris, tools, etc. that would constitute a hazard while the equipment is in operation.
- No one other than the operator is to be in the working area when the equipment is in operation.
- **DO NOT** use the equipment for any purpose other than its intended purposes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

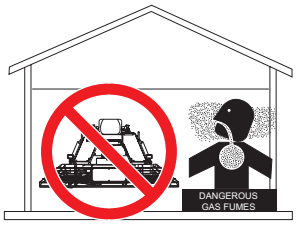
- **ALWAYS** know the location of the nearest phone or **keep a phone on the job site.** Also, know the phone numbers of the nearest **ambulance, doctor** and **fire department.** This information will be invaluable in the case of an emergency.



TROWEL SAFETY

DANGER

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



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

⚠ WARNING

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

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

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

⚠ CAUTION

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

NOTICE

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

  Order FORM PT-160

ENGINE SAFETY

⚠ WARNING

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

- **DO NOT** remove the 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.

NOTICE

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

FUEL SAFETY

DANGER

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

BATTERY SAFETY

DANGER

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

WARNING

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

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

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

CAUTION

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

TRANSPORTING SAFETY

CAUTION

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

- Ride-on trowels are very heavy and awkward to move around. Use proper heavy lifting procedures and **DO NOT** attempt to lift the trowel by the guard rings.
- **NEVER** lift trowel with the operator on the machine.

NOTICE

- The easiest way to lift the trowel is to use two lifting straps and the lift points indicated by the tie-down strap symbol on the left and right guard rings. Lifting at another point may result in machine or bodily injury.

  Lifting straps can be routed over the tie-down strap location, allowing a forklift or crane to lift the trowel up onto and off of a slab of concrete. Two straps should have a minimum of 2,700 pounds (1,225 kg) total lifting capacity and the lifting gear must be capable of lifting at least this amount.

- **NEVER** transport trowel with float pans attached unless safety catches are used and are specifically cleared for such transport by the manufacturer.
- **NEVER** hoist the trowel more than three feet off the ground with float pans attached.
- Before lifting, make sure that the lift loops are not damaged.
- Always make sure crane or lifting device has been properly secured to the lift loops of the equipment.
- **ALWAYS** shutdown engine before transporting.
- **NEVER** lift the equipment while the engine is running.
- 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 trailer that supports the trowel and the towing vehicle are mechanically sound and in good operating condition.
- **ALWAYS** shutdown engine before transporting
- Make sure the hitch and coupling of the towing vehicle are rated equal to, or greater than the trailer "gross vehicle weight rating."
- **ALWAYS** inspect the hitch and coupling for wear. **NEVER** tow a trailer with defective hitches, couplings, chains, etc.
- Check the tire air pressure on both towing vehicle and trailer. Check trailer information, or tire side wall for recommended tire pressure. Also check the tire tread wear on both vehicles.
- **ALWAYS** make sure the trailer is equipped with a **safety chain.**
- **ALWAYS** properly attach trailer's safety chains to towing vehicle.
- **ALWAYS** make sure the vehicle and trailer directional, backup, brake and trailer lights are connected and working properly.
- DOT Requirements include the following:
  - Connect and test electric brake operation.
  - Secure portable power cables in cable tray with tie wraps.
- The maximum speed for highway towing is 55 MPH unless posted otherwise. Recommended off-road towing is not to exceed 15 MPH or less depending on type of terrain.
- Avoid sudden stops and starts. This can cause skidding, or jack-knifing. Smooth, gradual starts and stops will improve towing.
- Avoid sharp turns to prevent rolling.
- Trailer should be adjusted to a level position at all times when towing.
- Raise and lock trailer wheel stand in up position when towing.
- Place ***chock blocks*** underneath wheel to prevent rolling while parked.
- Place support blocks underneath the trailer's bumper to prevent tipping while parked.
- Use the trailer's swivel jack to adjust the trailer height to a level position while parked.

ENVIRONMENTAL SAFETY/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 (DIESEL)

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.

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

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

WORK SAFELY!

⚠ WARNING

Failure to comply with these lifting instructions may result in **sling failure** and **severe personal injury or death**.

Only **qualified personnel** with proper training should perform this procedure. Follow all rigging and lifting safety rules when performing this procedure.

LIFTING SAFETY

⚠ CAUTION

- **NEVER** allow any person 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

- **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 lifting device has been properly secured to the lift loops of the trowel.
- **DO NOT** lift the trowel to unnecessary heights.
- **ALWAYS** shut down the engine before transporting.
- **NEVER** lift the trowel while the engine is running.
- Tighten the fuel tank cap securely and close the fuel cock to prevent fuel from spilling.

SLING INSPECTION

Inspect the lifting slings provided with your trowel (Figure 1) **before each use**. If replacement slings are needed, refer to the parts manual included with your trowel for part numbers, and order from your Multiquip parts dealer or importer.

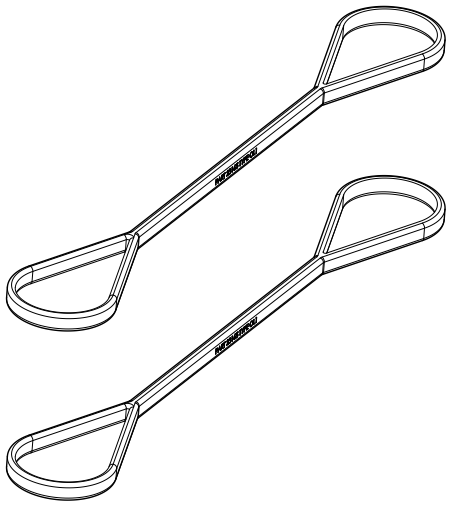
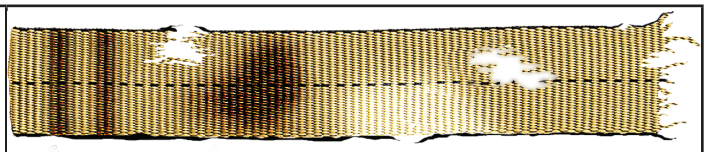
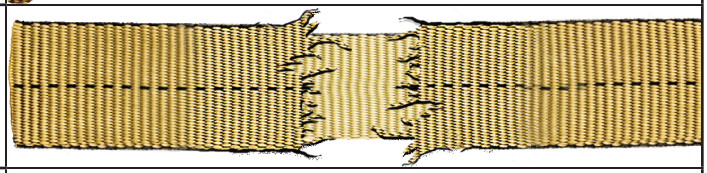
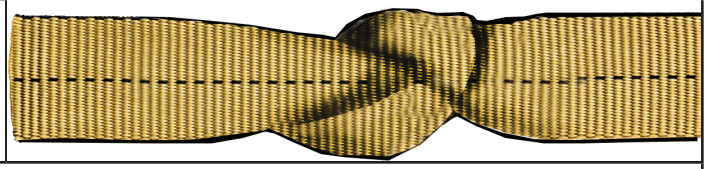


Figure 1. Lifting Slings

The Occupational Safety and Health Administration (OSHA) Regulation 29 CFR Part 1926.251 (e)(8)—*Removal from service* requires that the slings be inspected prior to each use, and **removed from service immediately** if any of the following conditions are found:

■ Holes, tears, cuts, or snags ■ Embedded particles ■ Abrasive wear that exposes core fibers	
■ Missing or unreadable Rated Capacity tags ■ Melting, charring, weld spatter, or chemical burns	
■ Broken or worn stitching that exposes the core fibers	
■ Knots	
■ Any other condition which may cause doubt as to the strength of the sling	

LIFTING PROCEDURE

The correct lifting slings (Figure 1) have been supplied with your trowel, in accordance to its weight per Occupational Safety and Health Administration (OSHA) Regulation 29 CFR Part 1926.251—*Rigging equipment for material handling*.

⚠ WARNING

ALWAYS inspect the lifting slings **before each use**.

NOTICE

MAKE SURE the forklift has adequate lifting capacity to lift the trowel.

The proper sling hitch method for connecting the lifting slings to the ride-on trowel is the **choker hitch**. The rated capacity of the slings for this method is indicated on the sling labels. **DO NOT** use any other type of sling hitch!

1. Secure the two lifting slings to the lift loops located on the left and right side of the trowel (Figure 2).

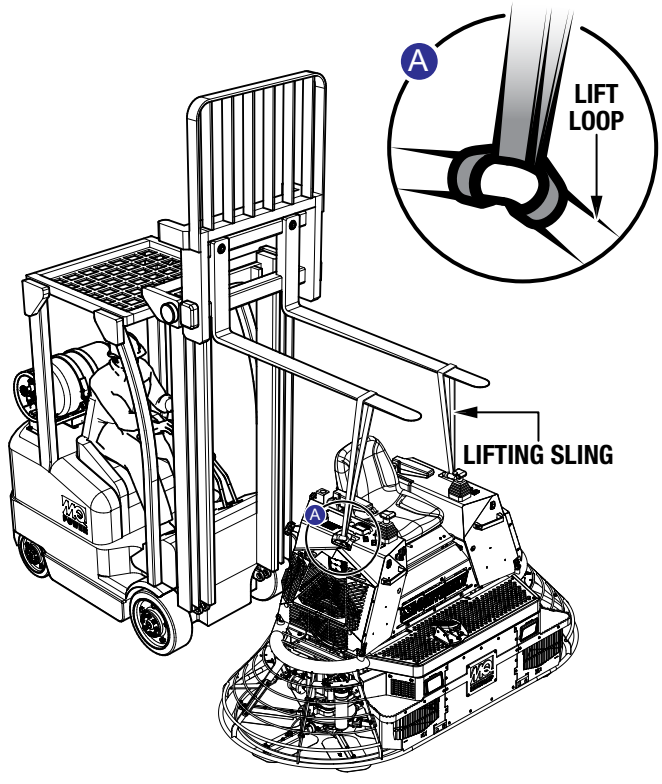


Figure 2. Lifting the Trowel

2. Insert forklift forks through the loops at the ends of the lifting slings (Figure 2). Keep the slings as close to vertical as possible. If the choke angle (Figure 3) is 120 degrees or less, the lifting strength of the slings must be de-rated as shown in Table 1, in accordance with ASME Standard B30.9.

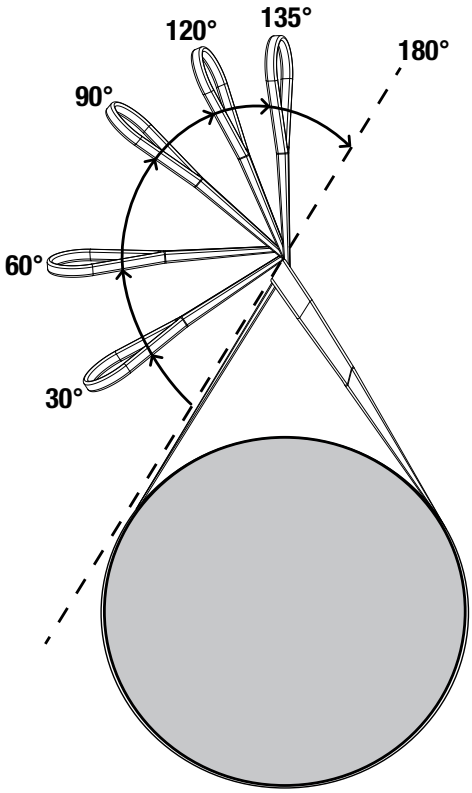


Figure 3. Choke Angle

Table 1. Choker Hitch Sling Capacity

Choke Angle (°)	Rated Capacity (%)
Over 120	100
90–120	87
60–89	74
30–59	62
0–29	49

TRANSPORTING THE TROWEL

After the trowel has been lifted onto a flatbed truck, do the following:

1. Locate the tie-down strap symbols (Figure 4) on the top left and right trowel guard rings.

Figure 4. Tie-Down Strap Symbol

2. Attach suitable tie-down straps to the trowel. Route tie-down straps on both sides as shown in Figure 5.

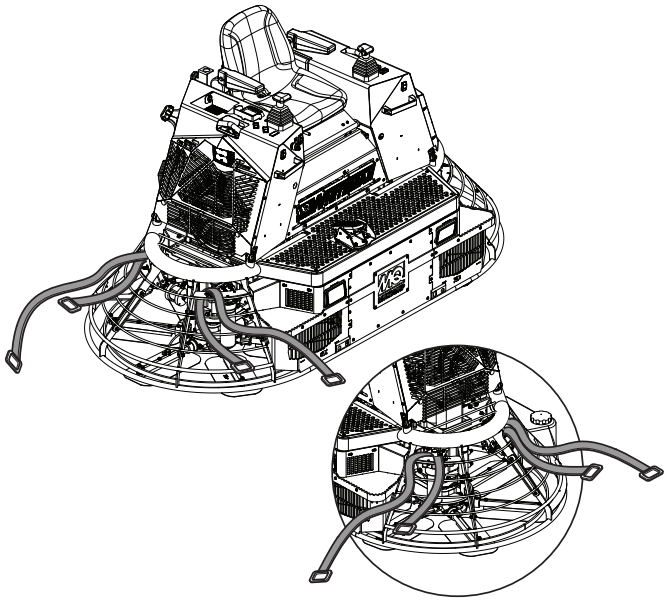


Figure 5. Routing Tie-down Straps

3. Secure the trowel to the flatbed with the two straps, making sure they are properly tied to prevent movement of the trowel during transport.

Table 2. Trowel Specifications		
Model	HTX6H	STX6H
Weight (Operating) – lb. (kg)	2,446.5 (1,110)	2,544 (1,153)
Weight (Shipping) – lb. (kg)	2,910 (1,320)	3,190 (1,447)
Blade Tip Speed – ft./min. (m/s)	2,010 (612)	2,042 (622)
Fuel Tank – gallons (liters)	10 (37.85)	20 (75.70)
Blades per Rotor	6	
Rotor Speed – RPM	0 – 160	0 – 130
Path Width – in. (cm)	92 (233)	117 (297)
Hydraulic Oil Capacity – gallons (liters)	8 (30)	
Hydraulic Oil Type	Parker DuraClean™ ISO 46	

Table 3. Engine Specifications	
Model	Hatz 4H50TIC
Type	Liquid-cooled, four-stroke diesel engine
Combustion System	Direct injection, turbocharger with charge air-cooling, cooled exhaust-gas recirculation
Injection System	Bosch common rail
No. of Cylinders	4
Bore × Stroke – in. (mm)	3.3 × 3.5 (84 × 88)
Displacement – in^3 (liters)	119.1 (1.952)
Compression Ratio	17.5:1
Max Output @ 2,050 RPM – HP (kW)	70
Cooling System	Water-cooled
Lube Oil Capacity – quarts (liters)	≈ 6.62 (7)
Ignition System	Compression ignition
Engine Rotation (Flywheel End)	CCW
Recommended Battery Capacity	12 V — 110 Ah/450 A according to DIN
Engine Coolant Capacity – quarts (liters)	≈ 9.6 (9.1)
Dimensions (L × W × H) – in. (mm)	26.3 × 26.9 × 23.4 (667 × 682 × 595)
Weight – lb. (kg)	381 (173)

Table 4. Noise and Vibration Emissions		
Model	HTX6H	STX6H
Guaranteed ISO 11201:2010 Based Sound Pressure Level at Operator Station in dB(A)	91	94
Guaranteed ISO 3744:2010 Based Sound Power Level in dB(A)	121	128
Whole Body Vibration per ISO 2631-1:1997+A1:2010 in m/s^2 $\Sigma A(8)$	0.04	0.09

NOTES:

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

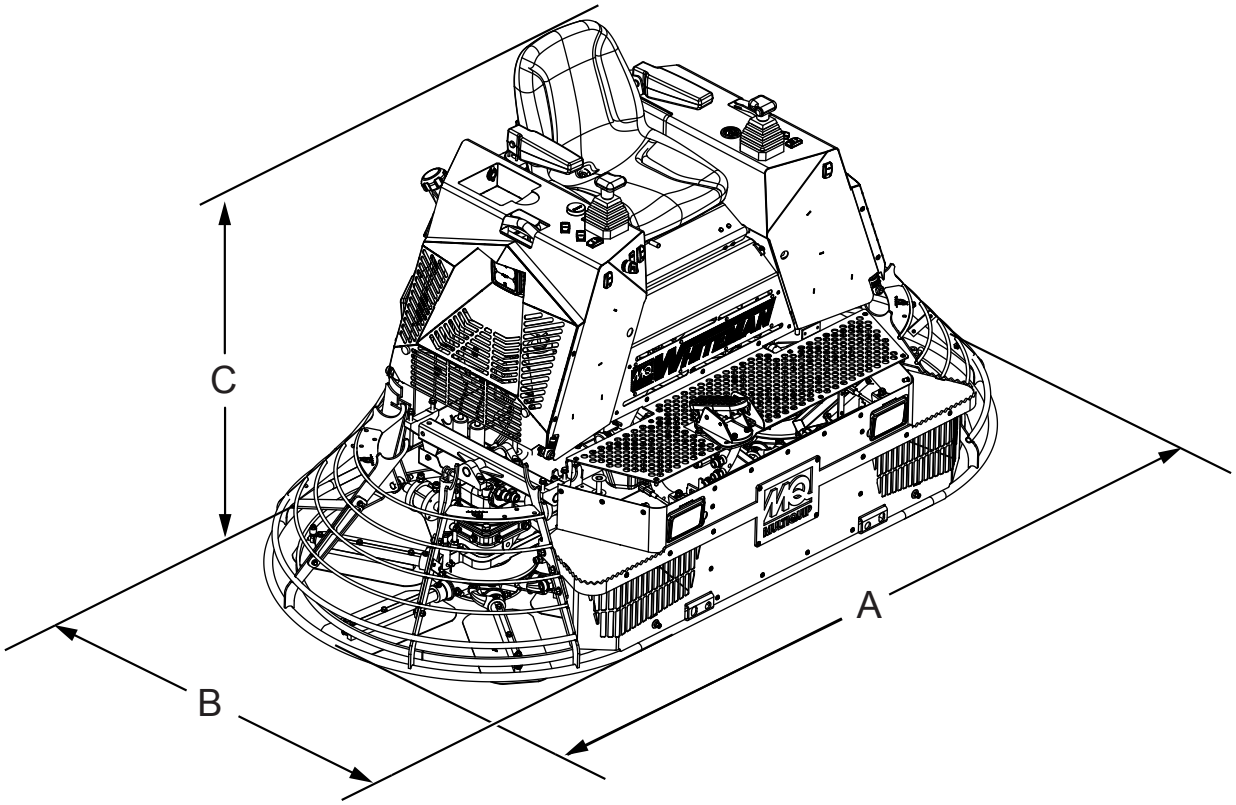


Figure 6. Dimensions

Table 5. Trowel Dimensions		
Model	HTX6H	STX6H
A – Length – in. (mm)	95 (241.3)	125 (317.5)
B – Width – in. (mm)	48 (121.92)	65 (165.1)
C – Height – in. (mm)	59 (149.86)	57 (144.78)

INTENDED USE

Operate the HTX6H and STX6H hydrostatic ride-on trowel, 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.

FAMILIARIZATION

The HTX6H and STX6H are designed for the floating and finishing of concrete slabs.

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

Read all the safety information 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.

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

ENGINE

This trowel is equipped with a Hatz 4H50TIC diesel engine. Refer to the engine owner's manual for specific instructions regarding engine operation.

BLADES

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

Independent hydrostatic drive motors are coupled to the engine-powered hydrostatic pump. Each motor drives a spider assembly.

HYDRAULIC STEERING

Dual palm grip joystick controls located to the left and right of the operator are provided for steering the trowel. The joysticks are linked to three hydraulic steering cylinders located within the frame of the machine.

HYDRAULIC PUMP

The hydraulic pump delivers controlled flow of hydraulic fluid to the hydraulic motors.

TRAINING

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

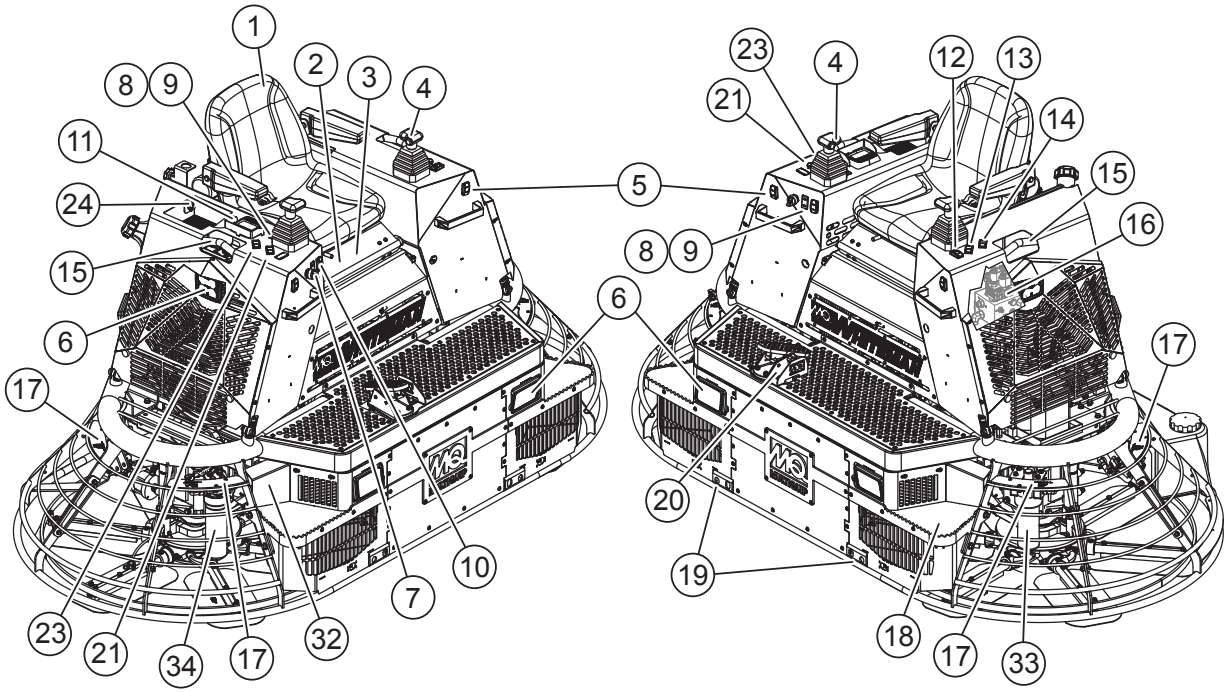


Figure 7. Components (Front)

1. **Seat** — Place for operator to sit. Trowel blades will not rotate unless operator is seated. Seat is adjustable.
2. **Fuse Box** — Contains fuses for electronic controls.
3. **Relays** — Relays for lights and hydraulic fans.
4. **Retardant Spray Control Buttons (Left and Right)** — When pressed, allows retardant spray to flow through the spray nozzle located at the front of the machine.
5. **Drive Bypass Switch** — Allows slow rotor rotation while the operator is out of the seat during removal from the concrete pad.
6. **Lights** — Six low-voltage LED lights are provided with this unit. Two lights (4-LED lights) and four lights (6-LED lights) illuminate the working area.
7. **Ignition Switch** — Turn key clockwise to start engine.
8. **Cold Start Lamp** — Illuminates to indicate hydraulic or engine coolant temperatures are below the MCU's parameters. Lamp blinks software version number immediately after key **ON** and ten second lamp.
9. **Glow Plug Lamps** — Illuminated when glow plugs are warming up. Turns off when engine is ready to start. **DO NOT** crank the engine until the lamps are **OFF**.
10. **Light Switch** — When activated, turns on six LED lights. Lights offer better visibility when working indoors.
11. **Diagnostic System Display Indicators:**
    - **Stop Lamp (RED)** — When lit **(RED)**, a major fault has occurred. The operator should immediately shut down the machine and correct the fault.
    - **Warning Lamp (AMBER) —** When lit **(AMBER)**, a minor fault has occurred. The operator should shut down the machine and correct the fault as soon as possible.
12. **Pitch Mode Switch** — Sets the mode of operation for the blade pitch system to either Smart Pitch™ or manual mode.
13. **Blade Pitch Control Switch (Twin Pitch)** — Adjusts the pitch on both rotors simultaneously.
14. **Blade Pitch Control Switch (Left Pitch)** — Adjusts the left-side blade pitch independently of the right side.
15. **Lift Loops** — Located on both the left and right sides of the main frame. Used when the trowel must be lifted onto a concrete slab.
16. **Pitch Block** — Aluminum block that controls the flow of hydraulic oil to the pitch cylinders to pitch the blades.

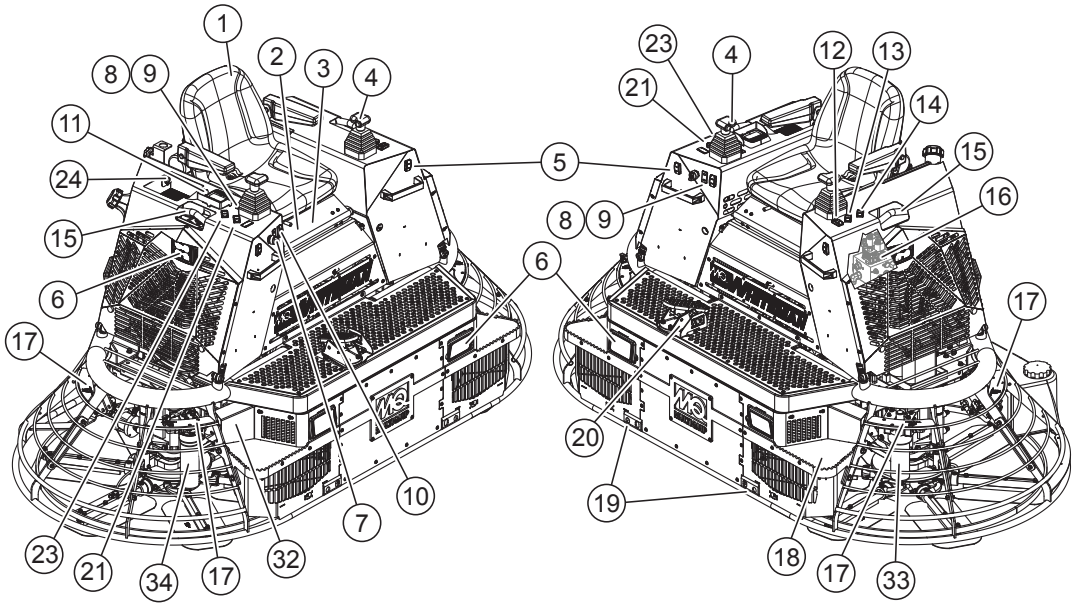


Figure 8. Components (Front)

17. **Tie Down Strap Locations** — Used to secure the trowel for safe transportation.

18. **Steps (Left and Right)** — Used for mounting and dismounting the trowel.

19. **Spray Nozzles** — Two retardant spray nozzles are used with the trowel.

20. **Foot Pedal** — Controls blade speed. Slow blade speed is obtained by slightly pressing the foot pedal. Maximum blade speed is obtained by fully pressing the pedal.

21. **Engine Speed Switch** — Controls the speed of the engine. Press up to increase engine speed (high) and down to decrease engine speed (low). The operator must be seated for correct position.

22. **Overflow Bottle** — Supplies coolant to the radiator when the radiator coolant level is low. Fill to the indicated level as shown on the bottle.

23. **Cruise Control Switch** — Press this switch to engage the cruise control. Press again to disengage.

24. **USB Charging Port** — Accessory power port used to charge personal electronic devices.

25. **Documentation Canister** — Storage for documentation and other information regarding the trowel.

26. **Seat Switch** — Recognizes when the operator is seated. Trowel blades will not turn and engine speed will not rise above idle unless an operator is present, or a drive bypass switch is pressed.

27. **Steering Control (Right Side)** — Allows the right rotor to move forward or reverse. Allows the trowel to move left or right.

28. **Fuel Tank (Diesel)** — Holds 10 gallons (37.85 liters) of diesel fuel. Use either No. 1D S15 or No. 2D S15 rated ultra-low sulfur diesel fuel.

29. **Grill Guards (Left and Right)** — Protects the operator from moving machine components. Remove for maintenance access. **DO NOT** operate the trowel with guards removed.

30. **Hydraulic Reservoir** — Part of the frame. Holds 8 gallons (30 liters) of hydraulic oil necessary for pump operation.

31. **Retardant Spray Tank** — Holds 5 gallons (18.9 liters) of retardant.

32. **Charge Air Cooler** — Intercooler is used to cool air exiting the turbocharger prior to injection into the intake.

33. **High Pressue Hydraulic Filter** — Filters hydraulic fluid after entering the system. Located on the front of the guard ring, left side. 10-Micron Absolute Synthetic Media.

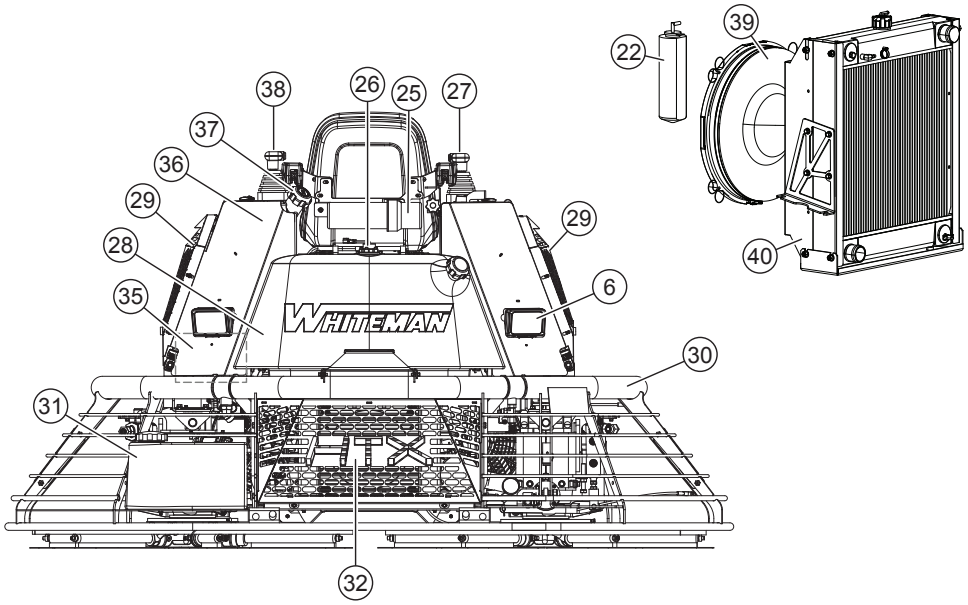


Figure 9. Components (Rear)

34. **Medium Pressure Hydraulic Filter** — Filters hydraulic fluid after entering the system. Located on the front of the guard ring, right side. 10-Micron Absolute Synthetic Media.

35. **Battery** — Provides +12VDC to the electrical system.

36. **Hydraulic Oil Tank** — Allows for quick visual inspection.

37. **Hydraulic Oil Filler Cap** — Remove this cap to add hydraulic oil. Open **ONLY** when the system is cooled down and all oil has returned to the reservoir.

38. **Steering Control (Left Side)** — Allows the left rotor to move in a forward or reverse direction only.

39. **Engine Fan** — The hydraulically driven cooling fan pumps air through the radiator to remove the heat from the engine.

40. **Radiator** — Holds coolant/water necessary to keep the engine at a safe operating temperature. Remove this cap when cool to add water/antifreeze.

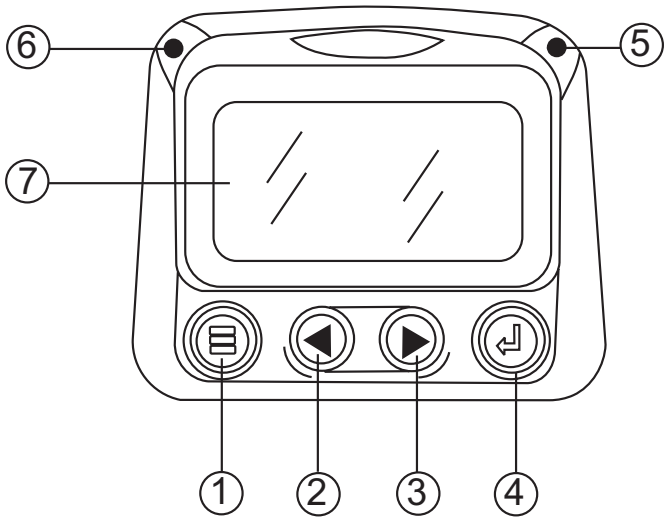


Figure 10. Diagnostic Display Components

The diagnostic display panel located on the right trowel console (Figure 10) is designed to communicate using the SAE J1939 Controller Area Network (CAN). This diagnostic display enables equipment operators to view different parameters and service codes.

The keypad on the diagnostic display panel is a capacitive touch sensing system. There are no mechanical switches to wear or stick. This keypad (display unit) will operate in extreme hot or cold weather conditions.

Two lamps show warning and shutdown states.

The Engine Control Unit (ECU) and the Machine Control Unit (MCU) used with this trowel diagnose faults that arise with the machine and the engine itself. Faults can be investigated with the Diagnostic Trouble Codes displayed on the Diagnostic Display Panel. See the Operator's Manual or electronic service tool for a complete listing of fault codes and countermeasures.

The following definitions describe the controls and functions of the Diagnostic Display Panel (Figure 10).

1. **Menu Button** — Press this button to enter or exit menu screens.
2. **Left Arrow Button** — Press this button to scroll through the screen moving the parameter selection either to the left or upward.
3. **Right Arrow Button** — Press this button to scroll through the screen moving the parameter selection either to the right or downward.
4. **Enter Key Button** — Press this button to select the parameter that is highlighted on the screen.
5. **Emergency Stop LED** — When lit (RED), indicates that a major fault has occurred. The operator should shut down the trowel as soon as possible.
6. **Warning LED** — When lit (AMBER), indicates a machine parameter has exceeded its limits (minor fault). The trowel will still run in this condition, but should be checked soon.
7. **Display Screen** — Graphical backlight LCD screen. Backlighting is controlled via the menu. The display can show either a single parameter or a quadrant display showing four parameters simultaneously.

Display Parameters

The following are some of the engine and machine parameters displayed on the diagnostic display panel.

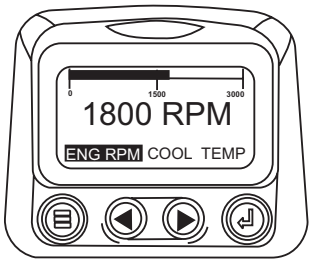
- Engine RPM
- Engine Torque
- Engine Hours
- Engine Oil Temperature
- Fuel Temperature
- Fuel Pressure
- Fuel Level
- System Voltage
- Coolant Temperature
- Oil Pressure
- Active Service Codes
- Stored Fault Codes
- Hydraulic Temperatures

First Time Start Up

1. When power is first applied to the diagnostic display, the **"Logo"** is displayed.

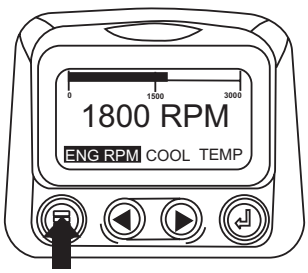
2. The **"Wait to Start"** message will be displayed for engines with a pre-startup sequence. Once the **"Wait to Start"** message is no longer displayed the operator may start the engine. **Note:** This message only displays when the engine is cold.

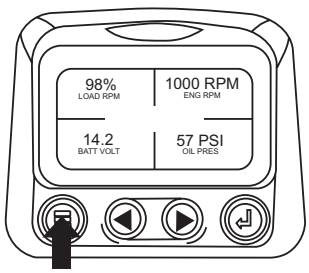
3. Once the engine has started the single engine parameter is displayed.



Main Menu Navigation

1. Starting at the single or four engine parameter display, touch **"Menu."**

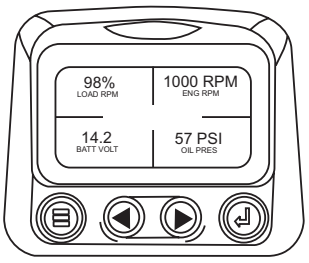




2. The first seven items of the **"Main Menu"** will be displayed. Touching the **"Arrow Buttons"** will scroll through the menu selection.

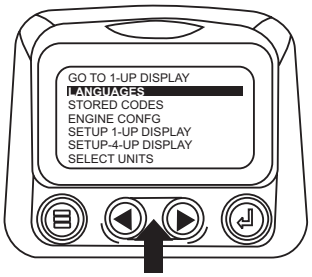
3. Touching the right arrow button will scroll down to reveal the last items of **"Main Menu"** screen highlighting the next item down.

4. Touch the **"Arrows"** to scroll to the desired menu item or touch **"Menu"** to exit the main menu and return to the engine parameter display.



Selecting a Language

1. Starting at the main menu display use the **"Arrows"** to scroll to the **"Language"** menu and once highlighted touch the **"Enter"** button.



2. The language choices will be displayed. Use the **"Arrow"** buttons to scroll through the selections and touch **"Enter"** to make a selection.

3. Now that you have selected the language, touch the **"Menu"** button to return to the main menu display.

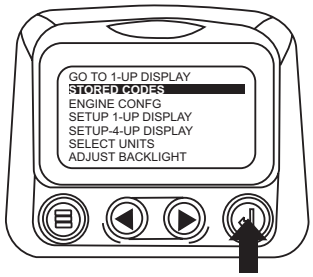
Stored Fault Codes

1. Starting at the single or the four engine parameter display touch the **"Menu Button."**

.

2. The main menu will pop up on the display. Use the **"Arrow Buttons"** to scroll through the menu until the **"Stored Fault Codes"** menu item is highlighted.

3. Once the **"Stored Fault Codes"** menu item has been highlighted touch the **"Enter Button"** to view the **"Stored Fault Codes."**



4. If the word **"MORE"** appears above the **"Arrow Buttons"** there are more stored fault codes that may be viewed. Use the **"Arrow Buttons"** to scroll to the next Stored Diagnostic Code.

5. Touch the **"Menu Button"** to exit the main menu and return to the engine parameter display.

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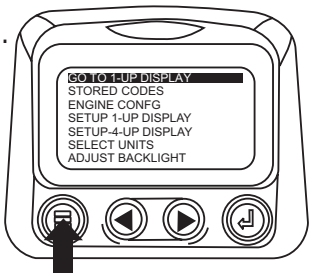
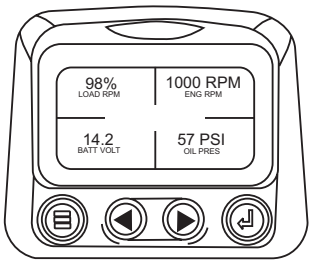
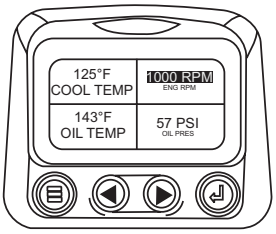
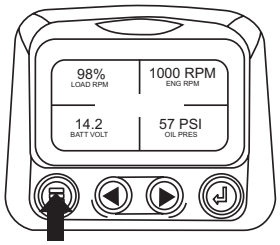




Active Fault Codes

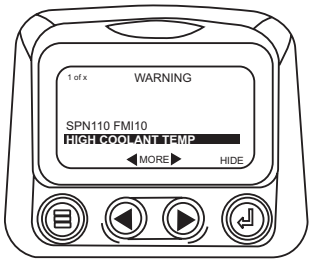
1. During normal operation the single or four parameter screen will be displayed.





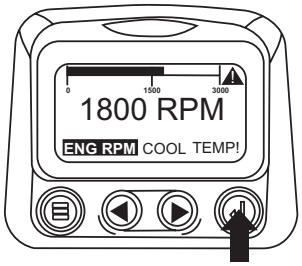
2. When the PowerView receives a fault code from a control unit the single or four parameter screen will be replaced with the **"Active Fault Codes"** message.

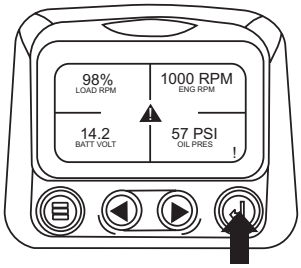
3. If the word **"MORE"** appears above the **"Arrow Buttons,"** there are more active fault codes that may be viewed. Use the **"Arrow Buttons"** to scroll to the next **"Active Fault Code."**



4. To acknowledge and **"Hide"** the fault and return to the single or four parameter display touch the **"Enter Button."**

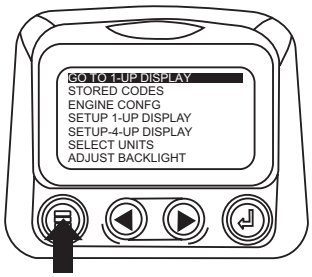
5. The display will return to the single or four parameter display but the display will contain the **"Active Fault"** warning icon. Touching the **"Enter Button"** will redisplay the hidden fault.





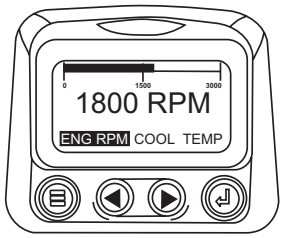
6. Touching the **"Enter Button"** once again will hide the fault and return the screen to the single or four parameter display.

7. The single or four parameter screen will display the fault icon until the fault condition is corrected. **NOTE:** Ignoring active fault codes could result in severe engine or machine damage.



Shutdown Codes

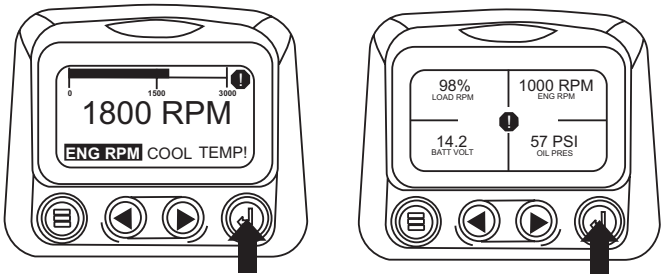
1. During normal operation the single or four parameter screen will be displayed.



2. When the diagnostic display receives a severe fault code from an engine control unit the single or four parameter screen will be replaced with the **"Shutdown"** message.

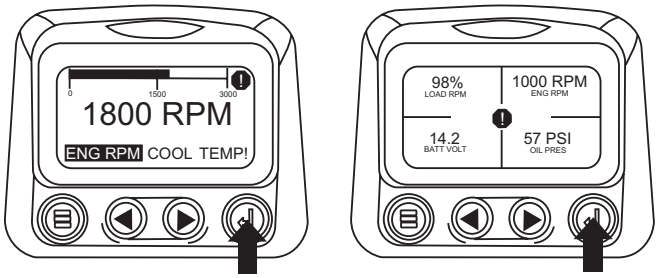
3. To acknowledge and **"Hide"** the fault and return to the single or four parameter display touch the **"Enter Button."**

4. The display will return to the single or four parameter display, but the display will contain the **"Shut Down"** icon. Touching the **"Enter Button"** will redisplay the hidden fault.



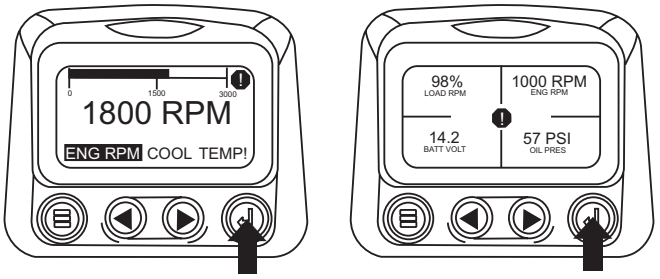
5. Touching the **"Enter Button"** once again will hide the fault and return the screen to the single or four parameter display.

6. The Single or Four parameter screen will display the fault icon until the fault condition is corrected. **NOTE:** Ignoring active fault codes could result in severe engine or machine damage.

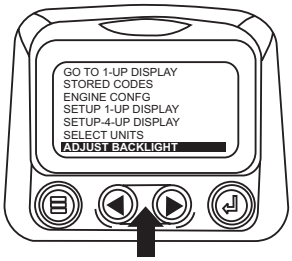


Backlight Adjustment

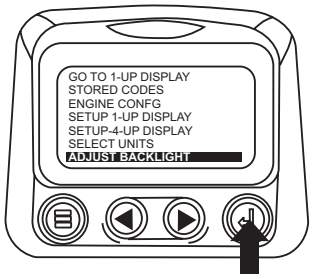
1. Starting at the single or four engine parameter display touch the **"Menu Button."**



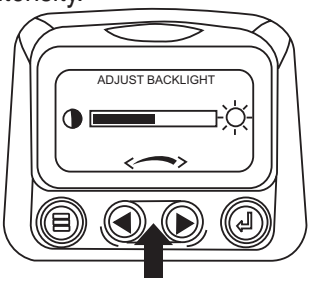
2. The main menu will pop up on the display. Use the **"Arrow Buttons"** to scroll through the menu until the **"Adjust Backlight"** is highlighted.



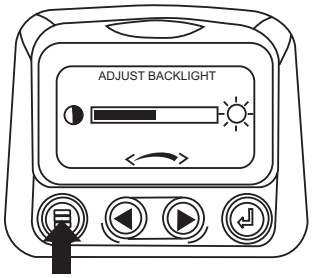
3. Once the **"Adjust Backlight"** menu item has been highlighted touch the **"Enter Button"** to activate the **"Adjust Backlight"** function.



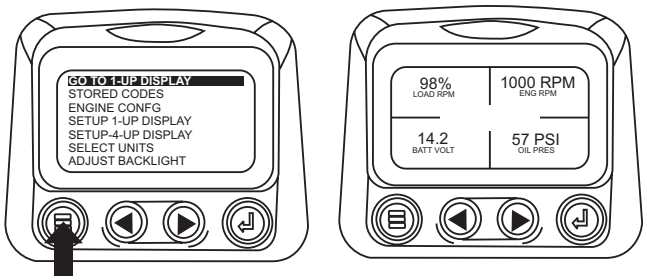
4. Use the **"Arrow Buttons"** to select the desired backlight intensity.



5. Touch the **"Menu Button"** to return to the main menu.

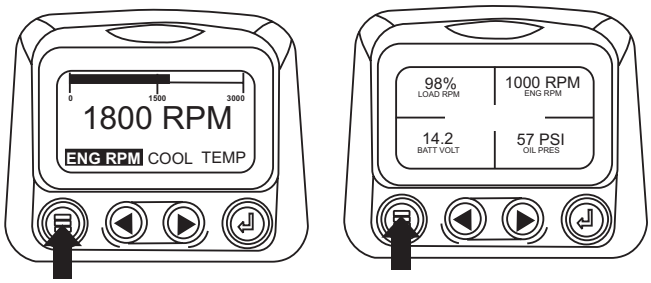


6. Touch the **"Menu Button"** to exit the main menu and return to the parameter display.



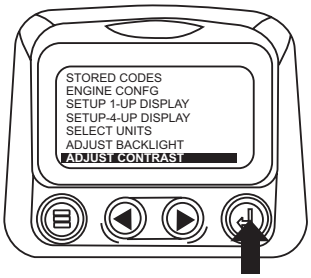
CONTRAST ADJUSTMENT

1. Starting at the single or four engine parameter display, touch the **"Menu Button."**

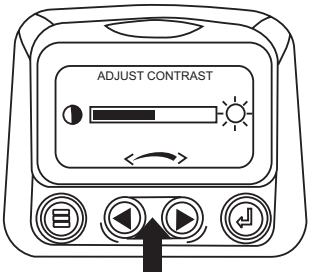


2. The main menu will pop up on the display. Use the **"Arrow Buttons"** to scroll through the menu until **"Adjust Contrast"** is highlighted.

3. Once the **"Adjust Contrast"** menu item has been highlighted touch the **"Enter Button"** to activate the **"Adjust Contrast"** function.



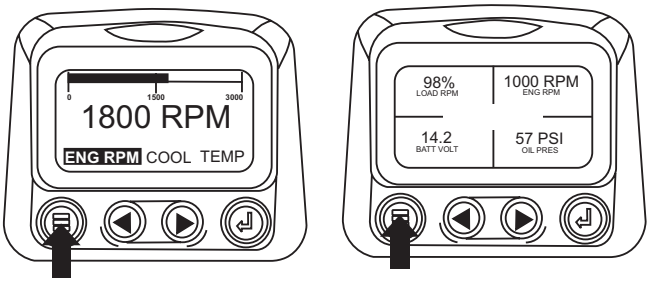
4. Use the **"Arrow Buttons"** to select the desired contrast intensity.



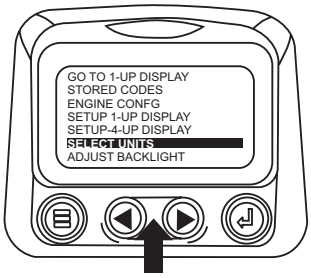
5. Touching the **"Menu Button"** will take you back through the menus.

Select Units

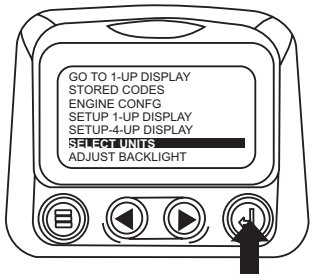
1. Starting at the single or four engine parameter display touch the **"Menu Button."**



2. The main menu will pop up on the display. Use the arrow buttons to scroll through the menu until the **"Select Units"** menu item is highlighted.



3. Once the **"Select Units"** menu item has been highlighted touch the **"Enter Button"** to access the **"Select Units"** function.

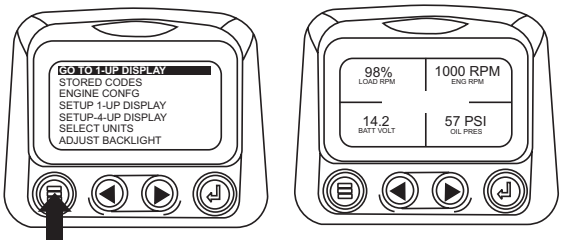


4. Use the arrows to highlight the desired units. **"English"** for imperial units (e.g. PSI,°F) or Metric kPa, Metric Bar for SI units (e.g. kPa, Bar, °C).

5. Touch the **"Enter Button"** to select the highlighted units.

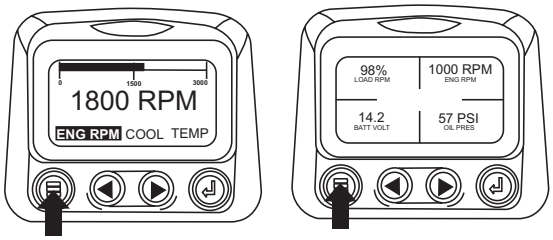
6. Touch the **"Menu Button"** to return to the **"Main Menu."**

7. Touch the **"Menu Button"** to exit the main menu and return to the parameter display.

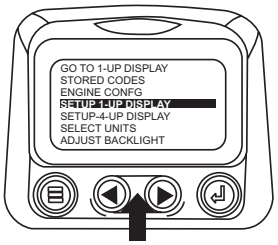


SETUP 1-UP DISPLAY

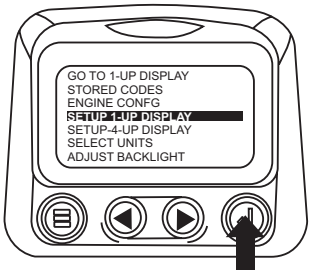
1. Starting at the single engine parameter display, touch the **"Menu Button."**



2. The main menu will pop up on the display. Use the **"Arrow Buttons"** to scroll through the menu until the **"Setup 1-Up Display"** menu item is highlighted.



3. Once the **"Setup 1-Up Display"** menu item has been highlighted touch the **"Enter Button"** to access the **"Setup 1-Up Display"** function.



4. Three options are available for modification of the 1-Up display.

   a. **Use Defaults** — This option contains a set of engine parameters: Fuel Level, Engine Hours, Engine RPM, Engine Torque, Battery Voltage, Coolant Temperature, Oil Pressure, Oil Temperature, Fuel Pressure, Fuel Temperature Left and Right, Hydraulic Temperatures.

   b. **Custom Setup** — This option allows for the modification of what parameters, the number of parameters, and the order in which the parameters are being displayed.

   c. **Automatic Scan** — Selecting the scan function will cause the 1-Up Display to scroll through the selected set of parameters one at a time, momentarily pausing at each.

5. **Use Defaults** — To select **"Use Defaults"** use the arrow buttons to scroll to and highlight **"Use Defaults"** in the menu display.

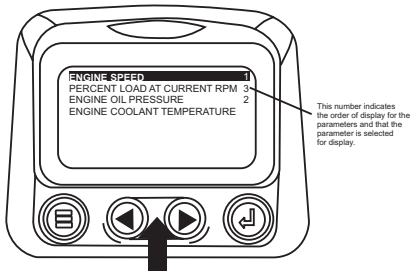
6. Touch the **"Enter Button"** to activate the **"Use Defaults"** function.

7. A message indicating the **"Single Engine"** parameter display parameters are reset to the factory defaults will be displayed, then the display will return to the **"Custom Setup"** menu.

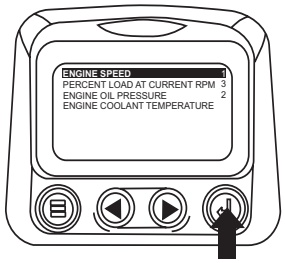
8. **Custom Setup** — To perform a custom setup of the 1-Up Display, use the arrow buttons to scroll to and highlight **"Custom Setup"** on the display.

9. Touching the **"Enter Button"** will display a list of parameters.

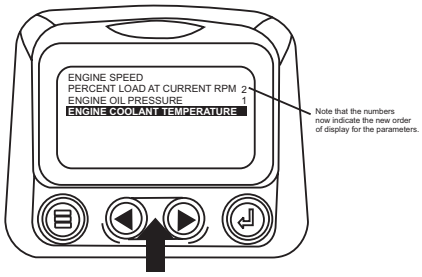
10. Use the **"Arrow Buttons"** to scroll to and highlight a selected parameter (parameter with a **#** symbol to right of it).



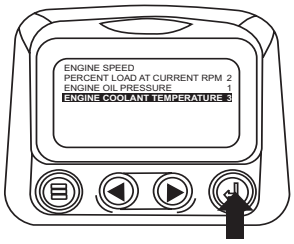
11. Touch the **"Enter Button"** to deselect the selected parameter removing it from the list of parameters being displayed on the 1-Up Display.



12. Use the **"Arrow Button"** to scroll and highlight the desired parameter that has not been selected for display.

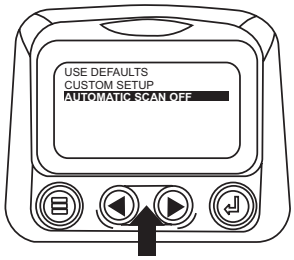


13. Touch the **"Enter Button"** to select the highlighted parameter for inclusion in the Single Engine Parameter Display.

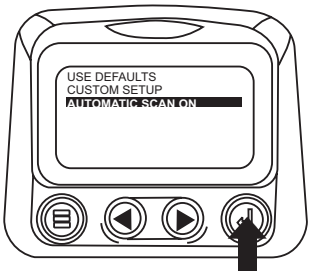


14. Continue to scroll and select additional parameters for the custom 1-Up Display. Touch the **"Menu Button"** at any time to return to the **"Custom Setup"** menu.

15. **Automatic Scan** — Selecting the scan function will cause the 1-Up Display to scroll through the selected set of parameters one at a time. Use the **"Arrow Buttons"** to scroll to the **"Automatic Scan"** function.

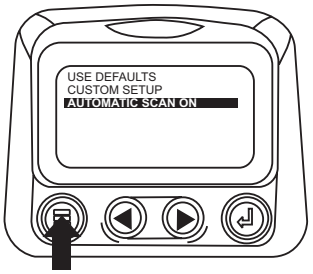


16. Touching the **"Enter Button"** toggles the **"Automatic Scan"** function on.

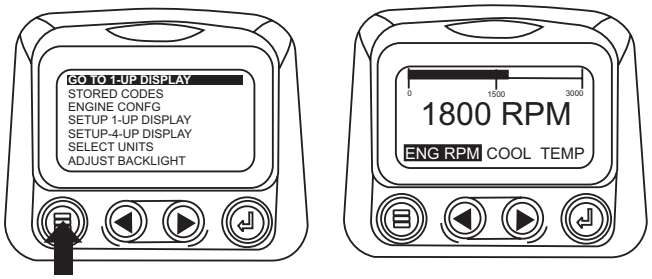


17. Touching the **"Enter Button"** again toggles the **"Automatic Scan"** function off.

18. Once the **"Use Defaults," "Custom Setup,"** and **"Automatic Scan"** functions have been set touch the **"Menu Button"** to return to the main menu.

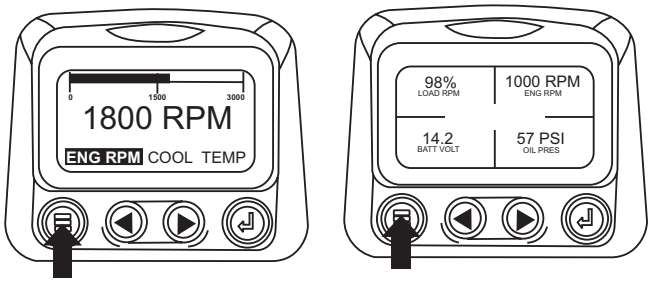


19. Touch the **"Menu Button"** to exit the main menu and return to the engine parameter display.



Setup 4-Up Display

1. From the single or four engine parameter display touch the **"Menu Button."**



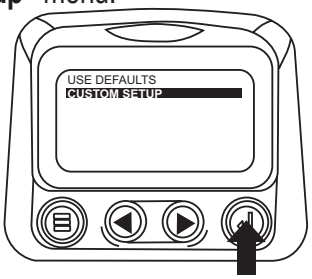
2. The main menu will pop up on the display. Use the **"Arrow Buttons"** to scroll through the menu until the **"Setup 4-Up Display"** is highlighted.

3. Once the **"Setup 4-Up Display"** menu item has been highlighted touch the **"Enter Button"** to activate the **"Setup 4-Up Display"** menu.

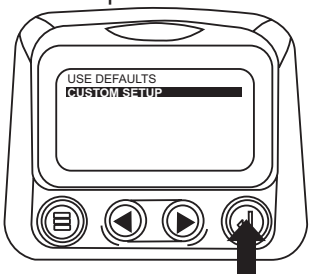
4. Touch the **"Enter Button"** to activate the **"Use Defaults"** function. This action will reset the unit to the factory default.

5. The **"Use Defaults"** screen will be displayed during the resetting period then will automatically return to the **"Setup 4-Up Display"** menu.

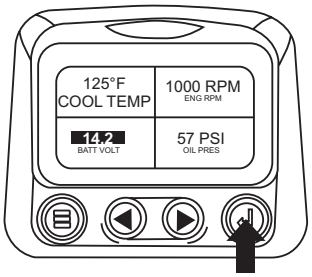
6. Select the **"4-Up Custom Setup"** from the **"4-Up Setup"** menu.



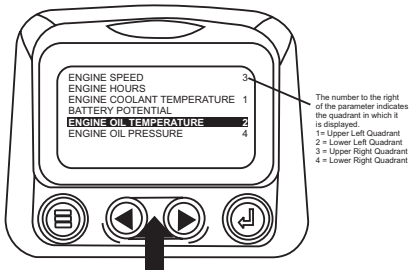
7. The quadrant with the backlit parameter value is the current selected parameter. Use the **"Arrow Buttons"** to highlight the parameter value in the quadrant you wish to place a new parameter.



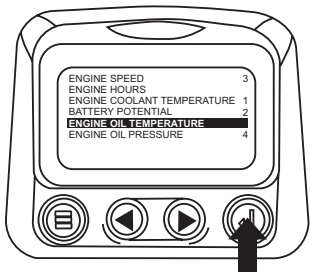
8. Touch the **"Enter Button"** and a list of parameters will appear.



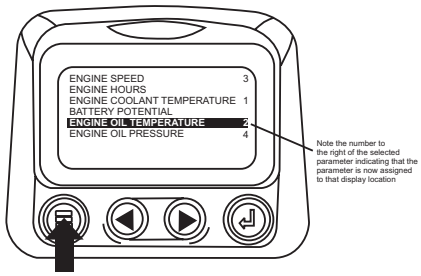
9. The parameter that is highlighted is the selected parameter for the screen. Use the **"Arrow Buttons"** to highlight the new parameter to be placed in the quadrant selected in the previous screen.



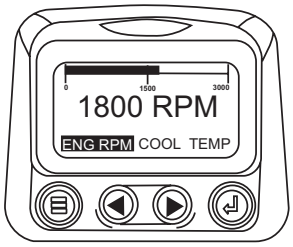
10. Touch the **"Enter Button"** to change the selected parameter in the quadrant to the new parameter.



11. Use the **"Menu Button"** to return to the **"4-Up Custom Setup"** screen.

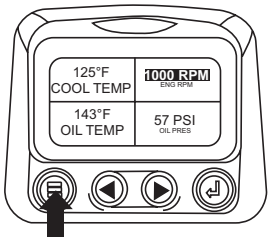


12. The parameter in the selected quadrant has changed to the parameter selected in the previous screen.

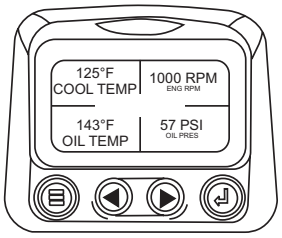


13. Repeat the parameter selection process until all spaces are filled.

14. Touch the **"Menu Button"** to return to the main menu.

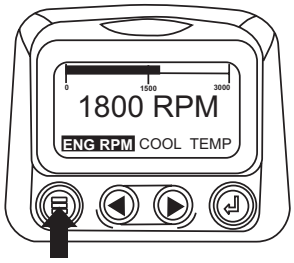


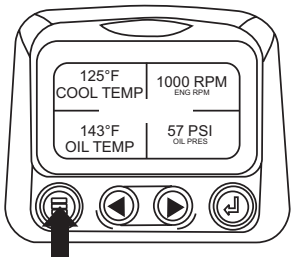
15. Touch the **"Menu Button"** to exit the main menu and return to the engine parameter display.



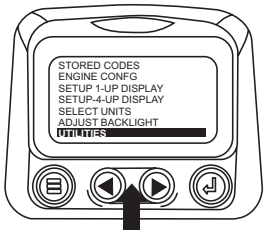
Utilities (Information and Troubleshooting)

1. Starting at the single or four engine parameter display, touch the **"Menu Button."**

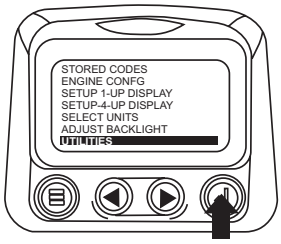




2. The main menu will be displayed. Use the **"Arrow Buttons"** to scroll through the menu until the **"Utilities"** menu item is highlighted.



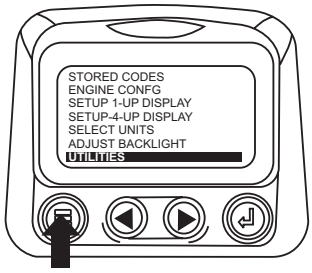
3. Once the **"Utilities"** menu item has been highlighted, touch the **"Enter Button"** to activate the **"Utilities"** functions.



4. **Gauge Data** and **Removal All Gauges** are not applicable as there are no auxiliary gauges on the trowel.

5. Scroll to **"Software Version."** Touch **"Select"** to view the software version currently in the diagnostic display.

6. Touch the **"Menu"** button to return to **"Utilities"** menu. Touch the "Menu button again to return to the **"Main"** menu.



NOTICE

Analog Input is not used on this trowel.

GLOSSARY (Troubleshooting Information)

CANBUS FAILURE

Diagnostic Display has not received any CAN messages for at least 30 seconds.

NO DATA

Diagnostic Display has not received the particular message being displayed for at least 5 seconds.

NOT SUPPORTED

Diagnostic Display has received a message from the ECU stating the displayed message is not supported.

DATA ERROR

Diagnostic Display has received an error message from the ECU for the displayed message.

EMPTY

No parameter selected for this 4-UP quadrant.

WAIT TO START PREHEATING

This is a message from the engine indicating it is in a preheating cycle.

Wait until this message clears before starting the engine.

TIMEOUT ECU NOT RESPONDING

The ECU did not respond to the PowerView request.

DISPLAY NOT VISIBLE

Press and hold the "Menu" button for approximately 3 seconds.

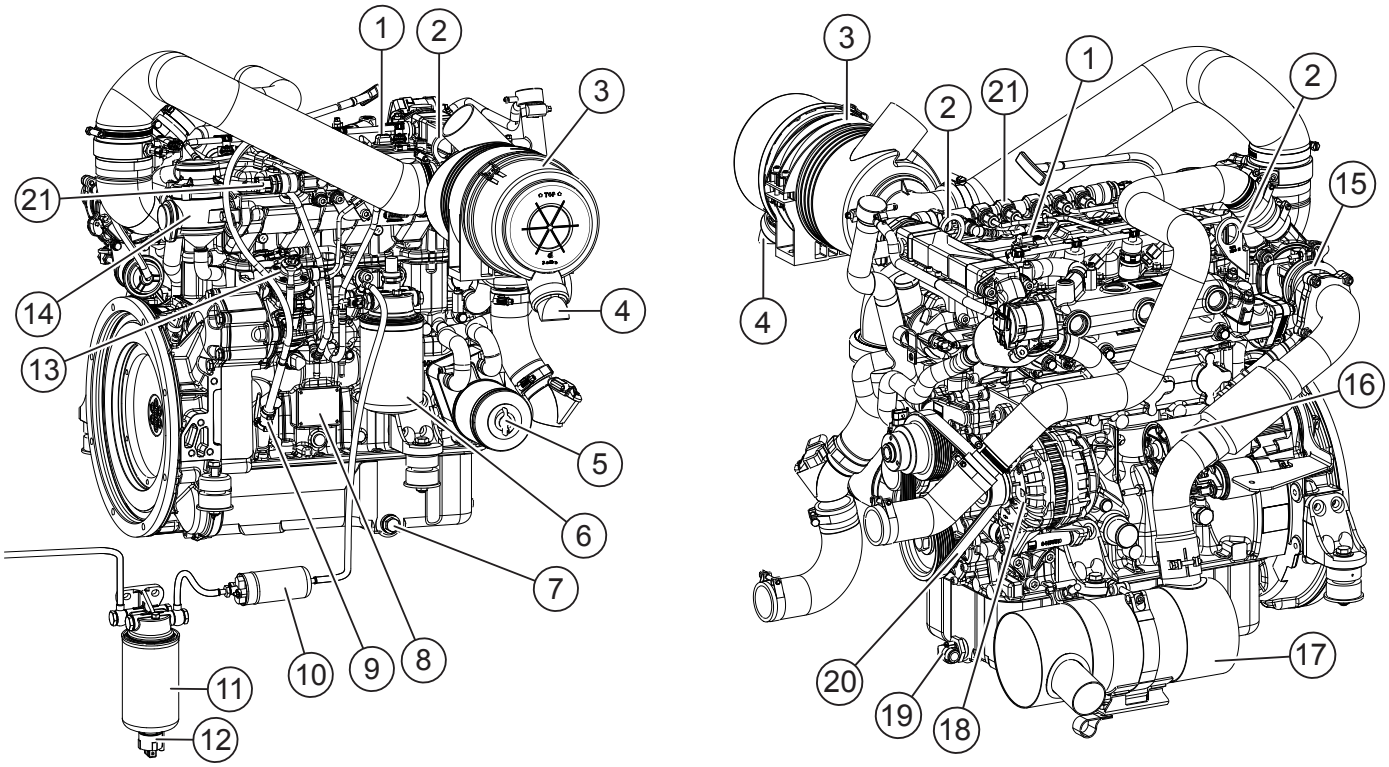


Figure 11. Hatz 4H50TIC Engine

1. **Oil Filler Plug, Top** — Remove plug to add fresh crankcase oil.
2. **Lifting Eyes** — Located on either side of the engine. Used when the engine must be lifted for service.
3. **Air Filter** — Helps provide clean source of air flow to the engine.
4. **Dust Discharge Valve** — Prevents larger particles of dust and debris from being drawn back into the air cleaner and discharges dust and debris to the outside.
5. **Oil Filter** — Spin-on type, filters out oil contaminants.
6. **Fuel Fine Filter** — Cleans fuel of smaller harmful contaminants and water not captured by the filtration system, thereby protecting the lift pump and diesel injection systems.
7. **Side Oil Drain Screw** — Remove this screw to drain the crankcase of engine oil. Fill with the recommended type oil as specified in the ***Maintenance*** section of this manual.
8. **Engine Type Plate** — Identifies engine make, model, serial numbers, and other pertinent information.
9. **Dipstick** — Remove to check the amount and condition of oil in the crankcase.
10. **Electric Fuel Pump** — Pumps fuel to the fuel system.
11. **Fuel Prefilter** — Separates and cleans fuel of any harmful contaminants and water, thereby protecting the lift pump and diesel injection systems. Filters fluids before further filtration by the main fuel filter and fuel fine filter.
12. **Drain Plug on Fuel Prefilter** — Retains dirty fuel inside the filter until the fuel prefilter is ready to be changed. Also acts as the water-in-fuel sensor.
13. **High Pressure Fuel Pump** — Pumps fuel to the high-pressure common rail direct fuel injectors. Uses a large amount of pressure to force diesel fuel into the injection system.

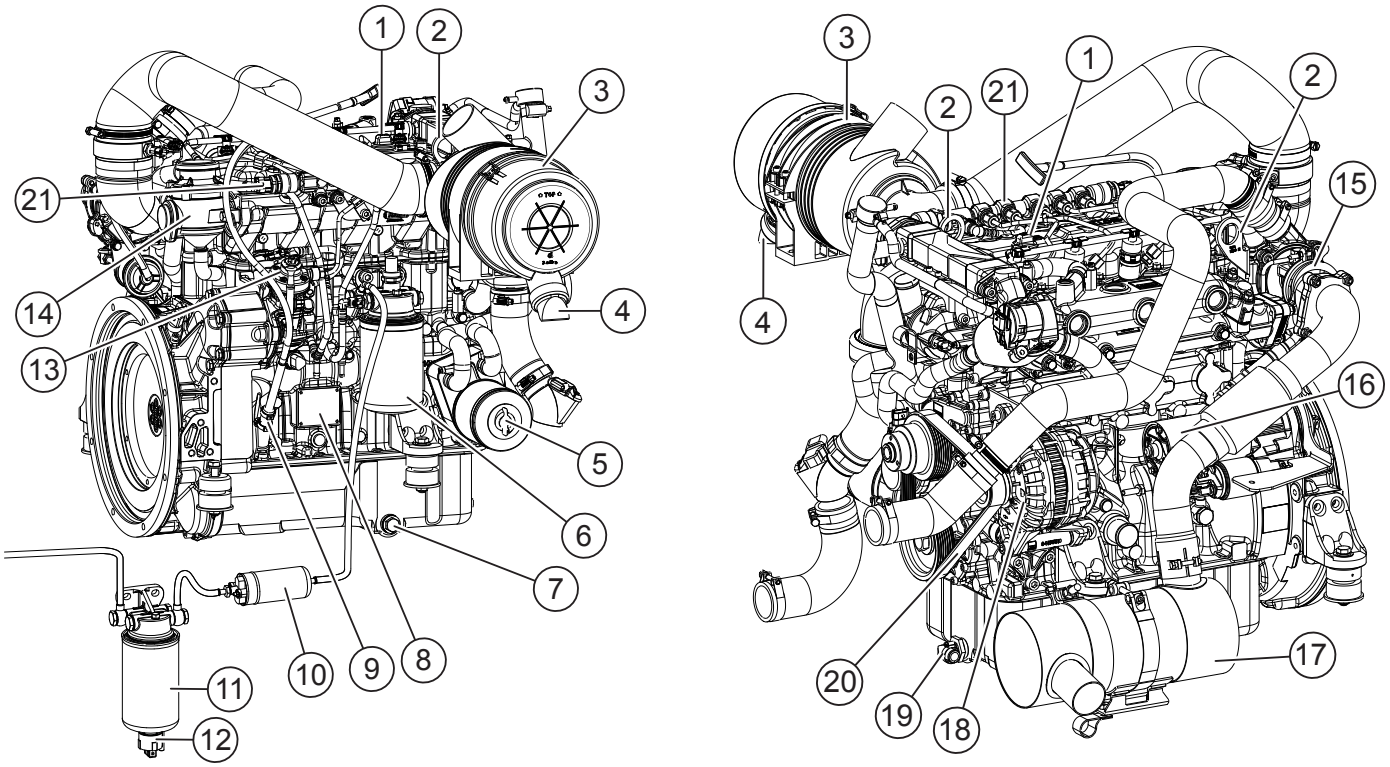


Figure 12. HATZ 4H50TIC Engine

14. **Crankcase Ventilation** — One-way passage for gases to escape in a controlled manner from the engine crankcase.

15. **Turbocharger** — Provides pressurized intake air to the cylinder by means of a turbine energized by exhaust gas that rotates the blower.

16. **Starter (High Mounting Position)** — Starts the engine when the ignition key is rotated to the **START** position.

17. **Diesel Oxidation Catalyst (D.O.C.)** — Used to reduce noise and emissions. **DO NOT** touch the muffler while the engine is running.

18. **Alternator** — Provides current to the electrical system and charges the battery.

19. **Oil Drain Screw, Front —** Remove this screw to drain crankcase engine oil. Fill with the recommended type of oil as specified in the ***Maintenance*** section of this manual.

20. **Poly V-Belt** — Driven by the engine crank during operation, drives the water pump/fan as well as the alternator.

21. **High Pressure Common Rail** — The high pressure pump feeds the diesel fuel to the fuel injector system via the high pressure common rail. Rail pressure and the start and end signals that activate individual fuel injectors are electronically controlled. Provides flexibility in controlling both injection timing and injection rate.

NOTICE

The following sections are intended to assist the operator with inspection of the trowel. It is extremely important that these sections are read carefully before attempting to use the trowel in the field. **DO NOT** use your trowel until these sections are thoroughly understood.

⚠ WARNING

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

ENGINE OIL

1. When checking or adding oil, place the machine so the engine is level.
2. Pull the engine oil dipstick from its holder (Figure 13).

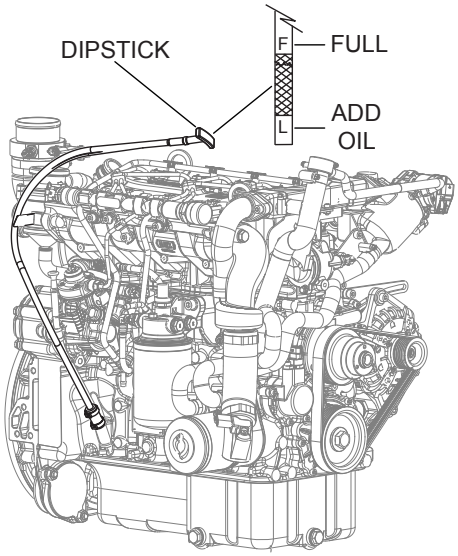


Figure 13. Engine Oil Check and Fill

3. Determine if engine oil is low. Oil should be between the upper limit and lower limit (add oil) lines.
4. If oil is below the **"Add Engine Oil"** line, add oil up to the upper limit on the dipstick. Allow enough time for any added oil to make its way to the oil pan before rechecking.

⚠ CAUTION

DO NOT overfill the oil pan with engine oil. Always keep the engine oil level between the upper and lower limit lines on the dipstick.

HYDRAULIC OIL

1. To check the hydraulic oil level, place the trowel on a secure, flat surface with the engine stopped.
2. Visually inspect the hydraulic oil tank (Figure 14). For normal operation the fluid level should be visible when the filler cap is removed.

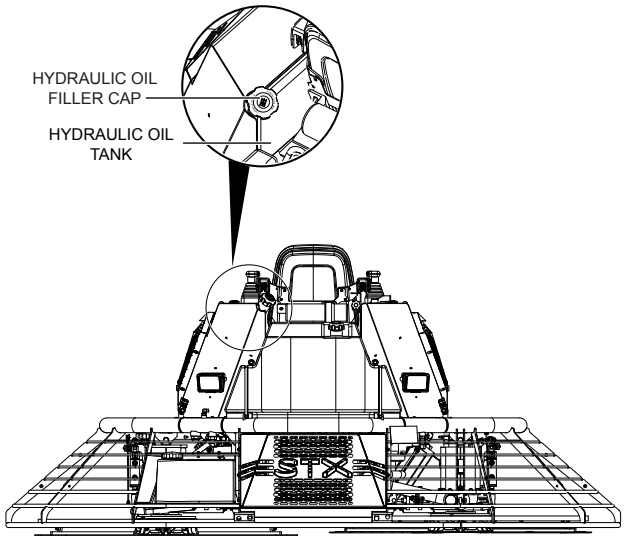


Figure 14. Hydraulic Oil Check and Fill

3. Determine if the hydraulic oil is low. The hydraulic tank has an elevated overflow bottle. **DO NOT** remove the fill cap when the oil is hot or spillage will occur.

⚠ CAUTION

Hydraulic oil can get **HOT! ALWAYS** allow hydraulic oil to cool before removing the fill cap.

⚠ CAUTION

Removal of the fill cap during operation will cause hydraulic oil to spill. Clean up hydraulic oil spills immediately.

4. To add hydraulic oil, remove the fill cap on the hydraulic tank. Fill to overflow with hydraulic system cool. Use Parker DuraClean™ Premium ISO 46 or equivalent.

FUEL CHECK (DIESEL)

CAUTION

DO NOT smoke while refueling. **DO NOT** attempt to refuel the ride-on trowel when the engine is hot or running.

WARNING

Fuel spillage on a **hot** engine can cause a **fire** or **explosion**. If fuel spillage occurs, wipe up the spilled fuel completely to prevent fire hazards. **NEVER** smoke around or near the trowel.

1. To check the engine fuel level, place the trowel on a secure, flat surface with the engine stopped.
2. Turn ignition key to the start position and read the fuel gauge to determine if the engine fuel level is low (Figure 15).

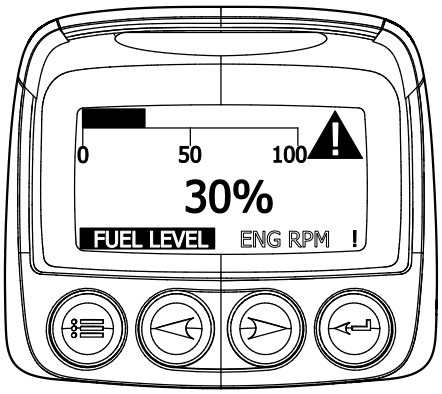


Figure 15. Fuel Gauge

3. If fuel level is low, remove the fuel filler cap (**YELLOW**), located at the top of the fuel tank (**BLACK**) behind the operator's seat, and fill with Ultra Low Sulfur Diesel fuel compliant with ASTM D975-09a No. 1D, S15, or No. 2D, S15.

WARNING

Handle fuel safely. Ultra-low sulfur fuels, if not used with an anti-static additive, are very sensitive to electrostatic discharge, and can cause a fire hazard. Motor fuels are **highly flammable** and can be dangerous if mishandled. Wipe up any spilled fuel immediately.

4. Below are additional technical fuel requirements:

- The fuel cetane number should be equal to 45 or higher.
- The sulfur content must not exceed 15 parts per million.

  In general, using a high-sulfur fuel may possible result in corrosion inside the cylinder. Ultra-low sulfur fuel should be used.
- Never mix kerosene, used engine oil, or residual fuels with the diesel fuel.
- The water and sediment in the fuel should not exceed 0.05% by volume.
- Keep the fuel tank and fuel-handling equipment clean at all times.
- Poor quality fuel can reduce engine performance and/or cause engine damage.
- Fuel additives are not recommended. Some fuel additives may cause poor engine performance.
- The ash content must not exceed 0.01% by volume.
- The carbon residue content must not exceed 0.1% by volume. Less than 0.01% is preferred.
- The total aromatics content should not exceed 35% by volume. Less than 30% is preferred.
- The PAH (polycyclic aromatic hydrocarbons) content should be below 10% by volume.
- The metal content of Na, Mg, Si, and Al should be equal or lower than 1 mass ppm.
- Lubricity: The wear mark of WS1.4 should be Max 0.018 in (µm) at HFRR test.

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 put into service until the setup instructions are completed. These instructions only need to be performed at the time of unpacking a new trowel.

BATTERY SETUP

⚠ CAUTION

Use all safety precautions specified by the battery manufacturer when working with the battery. See the ***Safety Information*** section of this manual for more details on battery safety.

1. This trowel was shipped with a wet charged battery. This battery may need to be charged for a brief period of time as per manufacturer's instructions.
2. Remove the left grill guard to gain access to the battery, and set the guard aside in a safe location.
3. To install the battery on the trowel, make sure that the battery is well seated in the battery box (Figure 16).

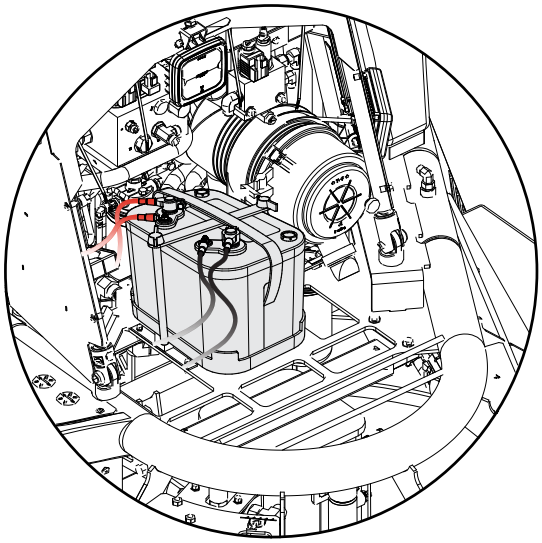


Figure 16. Battery Box

4. Connect the two positive cables to the positive terminal on the battery first, then connect the two negative cables to the negative terminal.
5. Reinstall the left grill guard.

STARTING THE ENGINE

WARNING

NEVER operate the trowel in a confined area or enclosed area structure that does not provide an ample free flow of air.

CAUTION

ALWAYS wear approved eye and hearing protection while operating the ride-on power trowel.

NOTICE

This trowel is equipped with a seat switch. The trowel will not operate unless an operator is sitting in the seat. The engine can be started and will continue to run with the operator off the seat, but the rotors will not rotate. The weight of an operator activates a switch within the seat, allowing the rotors to turn.

WARNING

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

WARNING

It is recommended that the operation of the seat switch be checked prior to performing any troweling operations. Doing this will verify that the switch is working properly contributing to safe operation of the machine.

NOTICE

DO NOT grab the joysticks to lift yourself onto the trowel. Pulling on the joysticks repeatedly will weaken the units. **ALWAYS** use the grab handles to lift yourself on the trowel.

1. With one foot on the ground and the other foot placed on the trowel's platform, grasp the grab handles, lift yourself onto the trowel, and sit down in the operator's seat.
2. Insert the ignition key into the ignition switch (Figure 17).

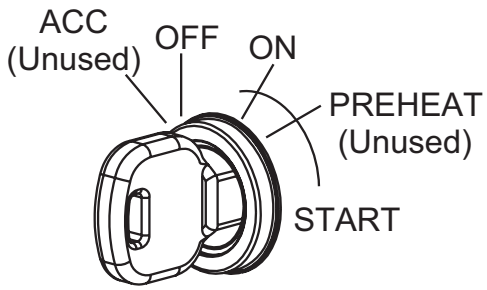


Figure 17. Ignition Switch and Key

3. Turn the ignition key clockwise to the **ON** position. The system lamps and fans, including the red and amber LEDs (Figure 18), will turn on briefly to verify functions.

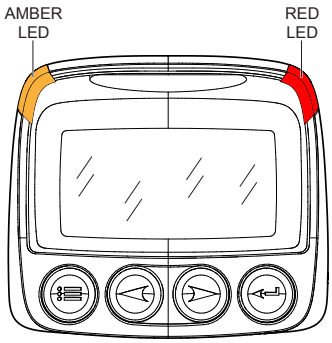


Figure 18. Indicator Lights

4. The display menu will run through the preset parameters until the engine is started.

NOTICE

If the "**Wait To Start**" message is displayed, wait until the message disappears before attempting to start the engine.

5. Turn the ignition key fully clockwise to the **START** position and listen for the engine to start. Once the engine has started, release the ignition key. The throttle speed defaults to idle. Let the engine warm to operating temperature.

NOTICE

The throttle will default to full speed when the foot pedal is depressed and the operator's presence is detected.

6. Let the engine idle for 2 to 3 minutes. Listen for any abnormal sounds.
7. The **AMBER** and **RED** LEDs are **OFF** if no engine or machine faults are present.

8. If the **AMBER** or **RED** LEDs are **ON**, shut down the engine and correct the problem. The diagnostic display will show the fault code, description, and corrective action (see Table 17).
9. Repeat this section a few times to get fully acquainted with the engine starting procedure.

Cold Start Lamp

- If the hydraulic oil is below 100°F, or if the engine coolant is below 160°F, the engine will rise to 1,500 rpm to warm the system.
- If the hydraulic oil is below 100°F oil will be forced over the pitch relief valve to raise the oil temperature.
- The cold start lamp indicator will remain on **(AMBER)** until the hydraulic oil reaches 100°F as shown in Figure 19 in the hydraulic system or at a 30-minute default time.

NOTICE

The cold start lamp indicator is found in two locations on the right control console. One indicator is above the powerview display, and the other is between the ignition key and the light control rocker switch.

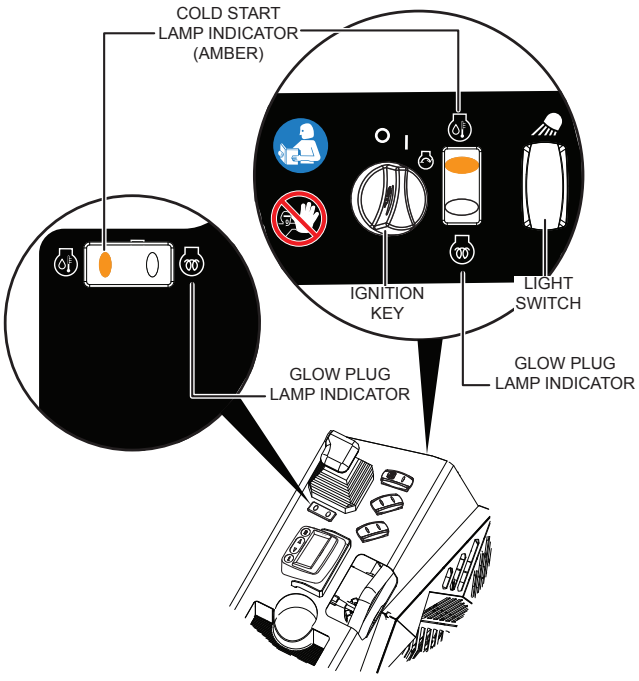


Figure 19. Cold Start Lamp Locations

TESTING THE SEAT SWITCH

WARNING

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

1. With the engine running, press the foot pedal to begin blade rotation. Observe that the blades are rotating.
2. Rise from the operator's seat.
3. Verify that blade rotation stops and the engine is still running.
4. If blade rotation has stopped, the seat switch is working.
5. If blade rotation continues, the seat switch is not working. Stop the machine immediately and correct the problem.

ENGINE THROTTLE

The engine throttle has three primary speed settings: Idle, High Idle, and Operating RPM.

1. Each press of the engine speed rocker switch (Figure 20) steps it from idle to operating speed if operator presence is detected.

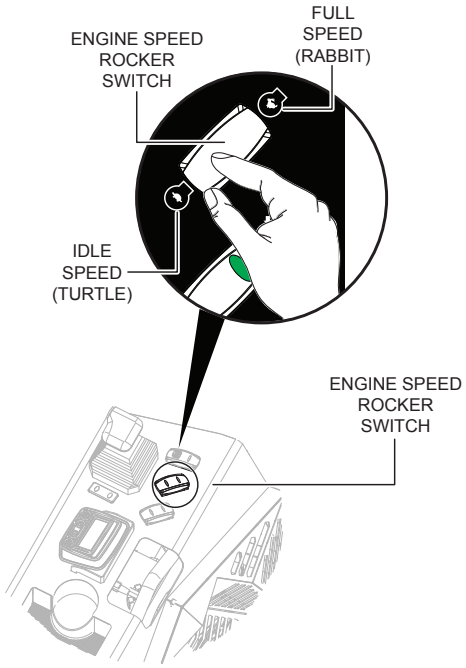


Figure 20. Throttle Switch

2. The speed defaults to idle at startup, when no operator presence is detected, or the foot pedal is released for more than a set period of time.
3. The speed defaults to full speed when the foot pedal is pressed and operator presence is detected.

Battery Management

Idle speed is raised automatically to prevent battery drain when:

- Hydraulic oil cooler fan is running.
- Lights are on.
- Battery voltage drops below preset voltage.

Battery Cold Start

1. Idle speed is raised automatically to expedite bringing the machine to operating temperature when:
   - Hydraulic oil is below preset temperature (oil forces across relief valve to raise oil temperature).
   - Engine coolant temperature is below preset temperature.
2. Cold Start Lamps will light when the machine is in cold start mode.

Safety Interlocks

1. Full engine throttle is allowed only when operator presence detected.
2. Engine speed changes to idle when the operator leaves the seat or the foot pedal is released for more than a set period of time.

PUMP STROKE

Stroke is proportionally controlled by the foot pedal input position via feedback from the stroke position sensor.

Pump Stroke Safety Interlock

1. The pump is automatically de-stroked if operator presence is not detected.
2. Upon startup, the foot pedal will not control pump stroke if the pedal is pressed unless it has been released after startup. This prevents the machine from unintentionally moving when started.
3. The pump is automatically de-stroked if an error is detected from the foot pedal sensor.
4. Stroke position is directly controlled by the foot pedal if an error is detected from the stroke sensor.

CRUISE CONTROL

Setting the Cruise Control will set and maintain a set pump stroke position command.

1. Press the cruise control switch (Figure 21) to engage the cruise control. The cruise control switch LED indicator lights when cruise control is engaged.

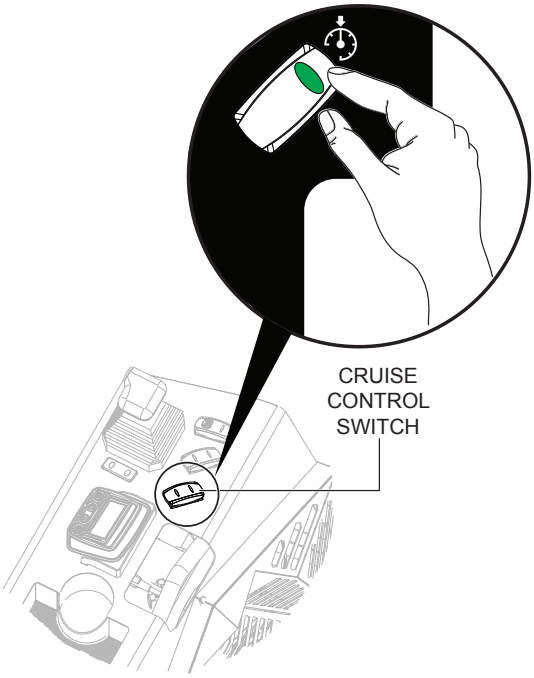


Figure 21. Cruise Control Switch

2. Press the cruise control switch again to disengage the cruise control. The cruise control switch LED indicator will turn off when cruise control is disengaged.
3. The cruise control can also be disengaged by the operator pressing the foot pedal after releasing it to resume control of pump stroke.
4. Cruise control can be disengaged by:
   - Pressing the foot pedal after releasing it.
   - Standing up from the operator's seat.
   - Pressing the cruise control switch again.
   - Pressing either the left or right drive bypass switch.
   - Changing engine speed with the engine speed switch.

Safety Interlocks

1. An error is detected in any machine system.
2. Operator presence is not detected (not sitting in seat).
3. An error code is received from the engine.

POWER MANAGEMENT

1. Pump stroke command is scaled when engine load reaches a threshold capacity, maintaining maximum rotor speed and preventing the engine from stalling.
2. The pedal will not be able to stroke the pump until the engine is at full RPM.

HYDRAULIC OIL COOLER FAN CONTROL

The hydraulic oil cooler fan is controlled based on oil temperature. The fan turns on and off at preset temperatures.

HYDRAULIC OIL FILTER MONITORING

The operator is alerted via a fault message on the Diagnostic Display if one of the filters needs service when the filter switch is activated and the oil is at operating temperature.

FAULT ALERTING

Red Stop Lamp

This lamp is used to relay trouble code information that is severe enough to warrant stopping the trowel due to a detected fault code (J1939) from the engine, foot pedal sensor, stroke valve, or very high hydraulic temperatures.

Amber Warning Lamp

This lamp is used to relay trouble code information that reports a problem but does not need to be immediately addressed due to a detected fault code (J1939) from the engine, foot pedal sensor, stroke valve, or very high hydraulic temperatures.

STEERING

Two joysticks (Figure 22 and Figure 23) located to the left and right of the operator's seat provide directional control for the ride-on trowel. Table 8 illustrates the various directional positions of the joysticks and their effect on the ride-on trowel.

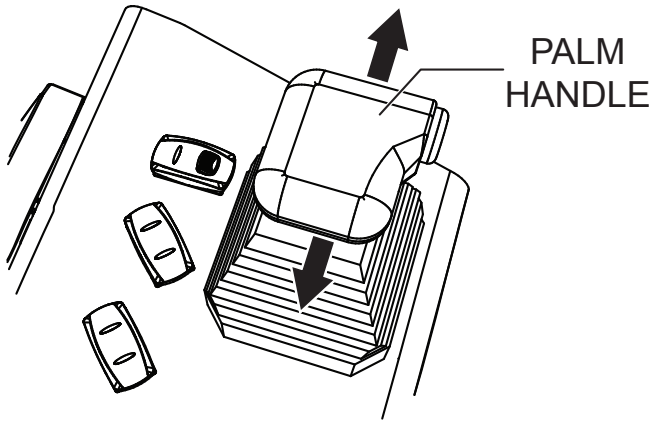


Figure 22. Left Joystick Control

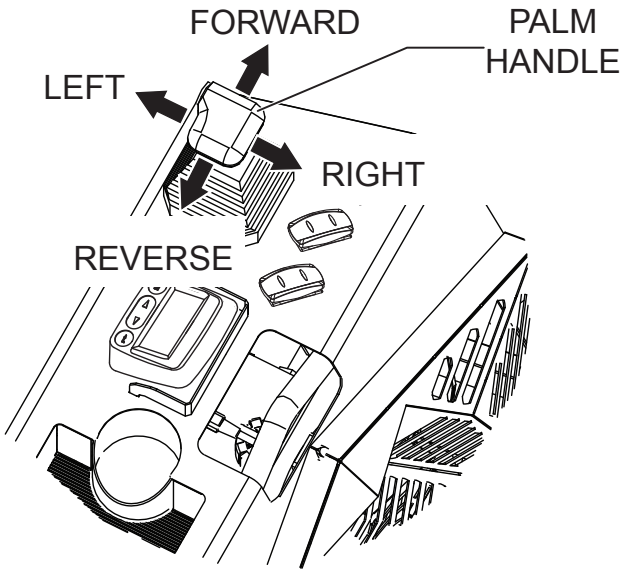


Figure 23. Right Joystick Control

See Table 8 for steering and directional relationship to joystick control movement.

NOTICE

All directional references with respect to the joysticks are from the operator's seat position.

Table 8. Joystick Directional Positioning

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

1. The foot pedal (Figure 24) solely controls blade speed. The position of the foot pedal determines the blade speed. Slow blade speed is obtained by slightly pressing the pedal. Maximum blade speed is obtained by fully pressing the pedal.

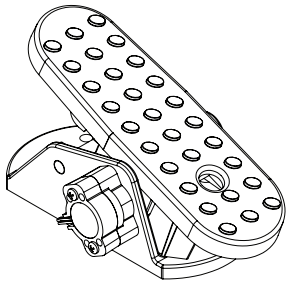


Figure 24. Blade Speed Control Foot Pedal

2. Push both the left and right joysticks forward (Figure 25).

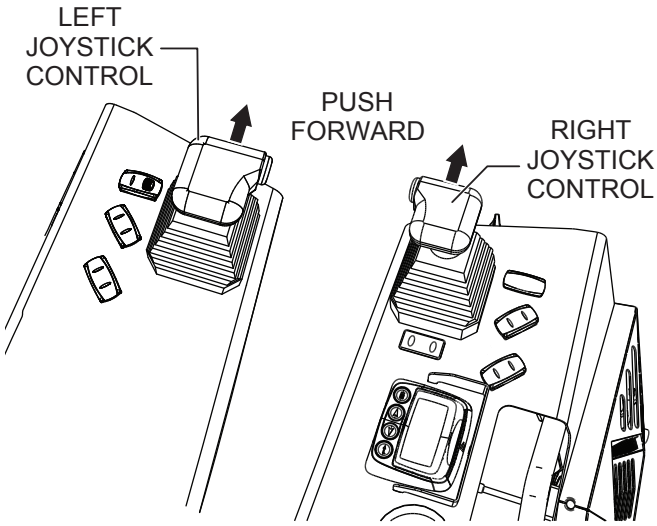


Figure 25. Joystick Control Forward Direction

3. With your right foot, slowly press the foot pedal halfway. Notice that the trowel begins to move in a forward direction. Release both joystick controls to stop forward movement, then remove your right foot from the foot pedal.

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

5. Practice maneuvering the trowel using the information listed in Table 8. Practice controlled motions as if you were finishing a slab of concrete. Practice edging and covering a large area.
6. Try adjusting the pitch of the blades. This can be done with the trowel stopped or while the trowel is moving. Test the operation of optional equipment like retardant spray and lights.
7. Pull both the left and right joysticks backward (Figure 26) and repeat steps 3 through 6 while substituting the word 'reverse' for 'forward'.

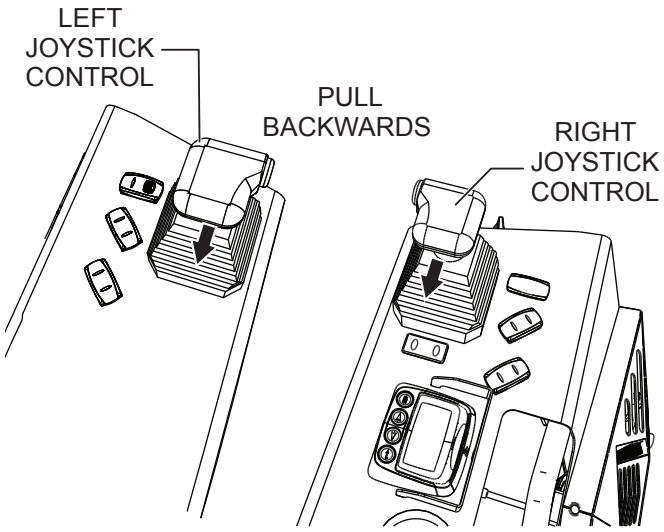


Figure 26. Joystick Control Reverse Direction

BLADE PITCH CONTROL

There are three modes of operation of the blade pitch system that can be set by the Pitch Mode Switch (Figure 27):

- Smart Pitch™
- Manual
- Panning Mode

The trowel blades can be pitched for various finishing operations using the two rocker switches located on the left control panel next to the left joystick control (Figure 27).

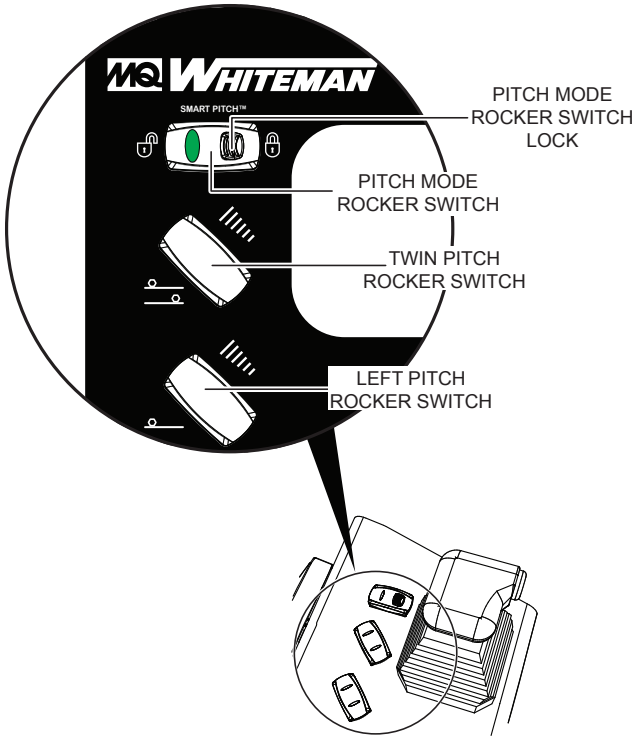


Figure 27. Blade Pitch Control

NOTICE

The ***pitch mode rocker switch*** must be unlocked before ***Smart Pitch™*** or **Manual Pitch** mode can be selected. Slide the ***switch lock*** to the left and hold, then select the desired pitch mode. Once the mode has been selected release the ***pitch mode rocker switch***.

Refer to Table 9 for a basic understanding of the **GREEN** status LED that is located on the pitch mode switch.

Table 9. Pitch Mode Light Function

Operator Action	Green Status LED	Trowel Action
N/A	Blinking	Pitch Calibration Error, Calibration Cycle Underway, Not Yet Calibrated
Panning Mode[1]	Blinking	Left and Right Rotors/Blades are flat .9s on, .1s off
Manual Pitch Mode Active (Left, Unlocked Position)	OFF	Pitch is manually controlled by Left Pitch Switches
Smart Pitch™ Mode Active (Right, Locked Position)	ON	Left and Right rotors are synchronized.
	OFF	Left and Right rotors are not synchronized.
	Blinking	Left and Right rotor synchronization process is underway. .1s on, .1s off

[1] The position of the pitch mode switch does not affect the panning mode. Panning mode is terminated by pressing either the Left or Twin Pitch Switch in the upward direction.

Smart Pitch™ Mode

Smart Pitch™ is activated by pressing the switch to the right, locked position.

When the Twin Pitch Switch is pressed (up or down), the right and left rotor pitch changes. When the operator achieves the desired pitch on the right blades and releases the Twin Pitch Switch, the left pitch will synchronize with the right blades. The Pitch Mode Light will flash (0.1s **ON**, 0.1s **OFF**) during synchronization.

The Pitch Mode Light will remain **ON** when both rotors are synchronized.

Left Pitch Switch activation changes the left rotor pitch while the right rotor pitch remains constant. The Pitch Mode Light turns off during desynchronization. Momentary Twin Pitch Switch activation resynchronizes pitch.

Smart Pitch™ is disabled to prevent the pitch system from hunting and the Pitch Mode Light will remain **ON** when the left and right pitch positions are above the calibration points.

NOTICE

Moving the switches forward increases the pitch while moving them backward decreases the pitch.

NOTICE

Momentarily pressing the Twin Pitch Switch will resynchronize the pitch.

NOTICE

If a pitch sensor fails during operation, the system will revert to manual mode.

Manual Mode (Pitch Mode Light Is Off)

Manual Pitch is activated by pressing the switch to the left, unlocked position.

The Pitch Mode Light will remain **OFF**.

Twin Pitch Switch activation changes left and right rotor pitch simultaneously, but non-synchronously.

Left Pitch Switch activation changes left rotor pitch while right rotor pitch remains constant.

NOTICE

IMPORTANT! To get blades absolutely flat for using float pans, pitch them as follows:

Press and hold down both pitch switches until Mode light blinks before installing float pans.

Panning Mode

Panning Mode is activated by pressing and holding the Twin Pitch Switch and Left Pitch Switch in the down position for 10 seconds. Deactivate by pressing and holding the switches in the up direction.

Pitch systems are retracted. This deactivates the pitch system and allows the blades to float.

The Pitch Mode Light will flash (0.9s **ON**, 0.1s **OFF**).

NOTICE

For installation of float discs (pans), refer to the ***Maintenance*** section, "Installing Float Discs."

REMOVING THE TROWEL FROM A CONCRETE PAD

Care should be taken to not damage a concrete pad surface while removing the trowel from the pad. This will require at least two people—one to operate the forklift and one to carefully rotate the blades.

⚠ WARNING

Removal of the trowel from concrete **requires two people**. **NEVER** attempt to perform this procedure alone!

⚠ WARNING

DO NOT place any part of your body between the forklift and the trowel. **SERIOUS INJURY OR DEATH** may result.

1. Carefully attach a forklift to the trowel as shown in the ***Lifting and Transporting*** section of this manual.
2. **Without sitting in the operator's seat**, press and hold either drive bypass rocker switch (Figure 28) and press the foot pedal (by hand) to slowly rotate the trowel blades.

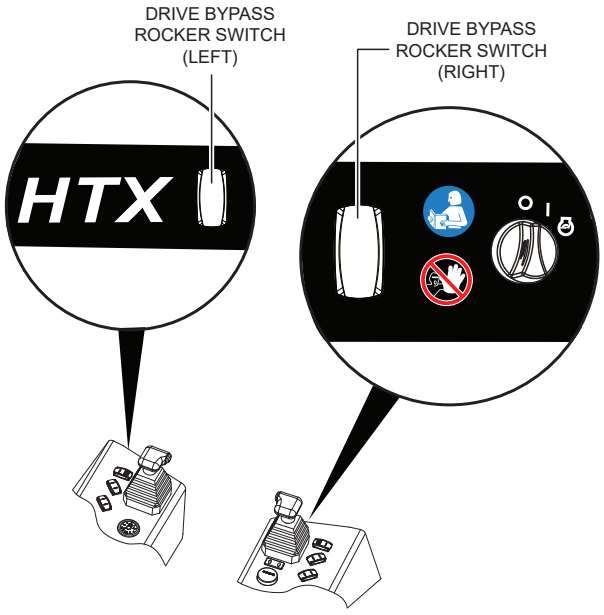


Figure 28. Drive Bypass Rocker Switches

NOTICE

DO NOT engage the seat switch by sitting in the operator's seat. The blades will not turn if an operator is in the seat while the drive bypass switch is pressed. In drive bypass mode, the rotors are only turned via drive bypass rocker switch and foot pedal engagement.

3. With the blades slowly spinning, use the forklift to slowly lift the trowel until all trowel blades are clear of the concrete pad surface. **REMEMBER** to keep all personnel out of the area between the forklift and the trowel.
4. Release the drive bypass switch and foot pedal, and stand clear of the forklift and trowel.

ENGINE SHUTDOWN

1. Return the engine speed rocker switch (Figure 29) to idle and allow the engine to idle for 5 minutes.

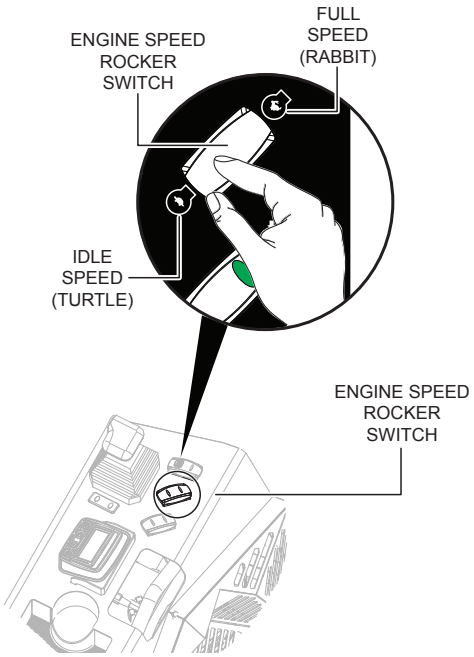


Figure 29. Engine Shutdown

NOTICE

Failure to allow the engine to idle for 5 minutes before shutting the engine **OFF** may cause turbocharger damage.

2. Turn the ignition key counterclockwise to the **OFF** position, then remove the key.
3. Clean and remove any foreign debris from the trowel.

Table 10. Maintenance Schedule		
Service Interval Symbol	**Maintenance Interval**	**Maintenance Activity/Check**
	Every 8–15 operating hours or every day before starting.	Check the oil level.
		Check the intake area of the combustion air.
		Check the radiator fins for dirt accumulation.
		Check the cooling system.
	Every 500 operating hours or every 2 years	Change the engine oil and oil filter[1]
		Change the fuel prefilter[1]
		Change the fuel prefilter[1]
		Check the poly V-belt[1]
		Change the oil separator of the crankcase ventilation[1]
		Check the screw connections[1]
		Check the radiator fins[1]
	Every 500 operating hours or when indicated, at least every 2 years	Change the air filter cartridges
	When indicated	Drain the water separator[1]
	If necessary, every 3,000 operating hours at the latest	Replace the poly V-belts
	Every 4,000 operating hours	Clean the entire EGR section (EGR precooler, EGR valve, EGR main cooler, and EGR mixing nozzle) (To be carried out by a trained specialist)

Notes:

[1] Service according to service interval or after 2 years, depending on which criteria is first.

In new and generally overhauled engines, after 50 operating hours:

- Change the engine oil and oil filter.
- Check the screw connections (do not retighten the screws for attaching the cylinder head).

⚠ CAUTION

Certain maintenance operations or machine adjustments require specialized knowledge and skill. Attempting to perform maintenance operations or adjustments without the proper knowledge, skills or training could result in equipment damage or injury to personnel. If in doubt, consult your dealer.

AIR FILTER

Change or clean filters every 500 operating hours, when indicated, or at least every 2 years.

To replace filters:

1. Locate the air filter on the service side of the engine.
2. Release the metal harness strap that holds the air filter in place (Figure 30).

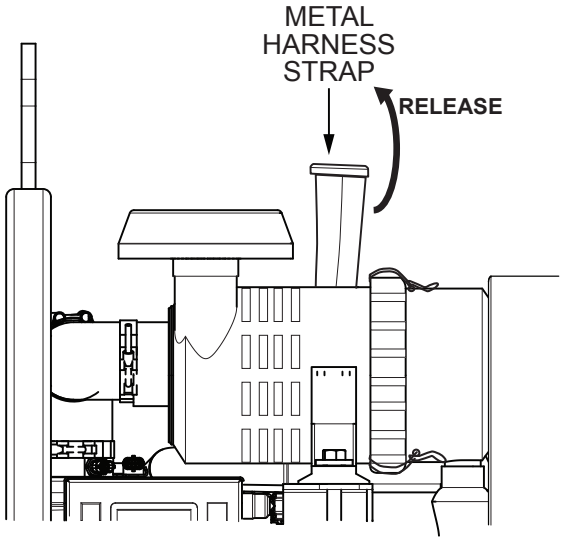


Figure 30. Releasing Metal Harness Strap

3. Raise the main canister, unlatch the three end fasteners and remove the canister cap (Figure 45).

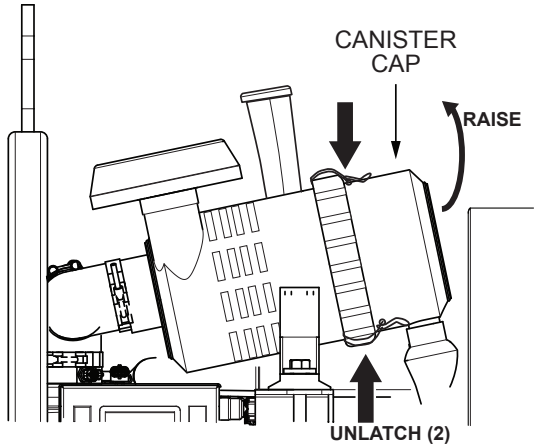


Figure 31. Raising the Main Canister

4. Pull out the primary filter from the main canister (Figure 32).

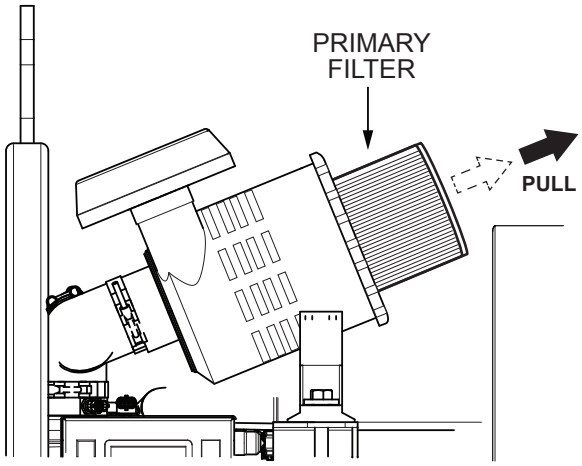


Figure 32. Primary Filter

5. If there are tears, damage, or oily or damp dirt contamination, the filter needs to be replaced.
6. Carefully insert new filter elements and replace the cover.

To clean the primary filter:

1. Blow out the primary filter from the inside to the outside with dry compressed air until dust no longer emerges.
2. Make sure to not touch the filter paper.

NOTICE

The primary filter may only be cleaned once, then it must be replaced.

RADIATOR/COOLING SYSTEM

CAUTION

HOT coolant can cause severe burns. **DO NOT** remove cap if radiator is **HOT**.

1. Check the radiator for leaks that would indicate corrosion or damage.
2. Check the cooling water level daily. Top off as necessary. Always use clean, soft water and add a long-life coolant antifreeze. Use the mixing ratios specified by the antifreeze manufacturer. Replace the cooling water at least once a year.
3. Check the radiator hoses for fatigue or cracking. Replace if in doubt of the integrity of the hoses.
4. Check the radiator cap seal and replace as necessary.

Refer to your engine manual for additional information:

Table 11. Hatz 4H50TIC Coolant Mixture Ratios

Radiator Protection Fluid	Water	Frost-Resistant To Approx.
min. 40 vol %	60 vol %	–27°C
max. 50 vol %	50 vol %	–38°C

RADIATOR CLEANING

1. Blow off dirt and dust from fins and radiator with 28 psi (0.19 MPa) or less of compressed air (Figure 33). Be careful to not damage the fins with the compressed air.

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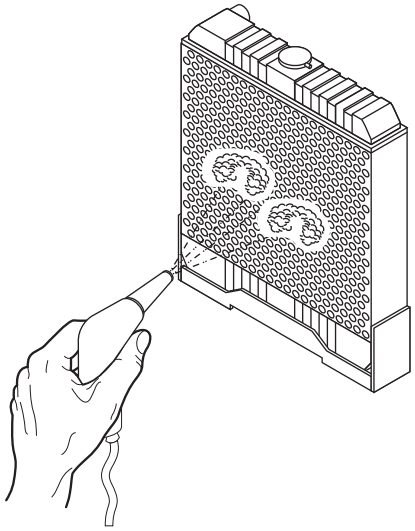


Figure 33. Radiator Cleaning

2. If there is a large amount of contamination on the fins, use detergent to clean and rinse them thoroughly with tap water.

CAUTION

NEVER use high-pressure water, compressed air at greater than 28 psi (193 kPa), or a wire brush to clean the radiator fins. Radiator fins damage easily.

CHECKING THE POLY-V BELT

The drive belt needs to 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, belts that emit smoke, or a burning rubber smell when in use.

To gain access to the drive belt, remove the drive belt guard cover, then visually inspect the drive belt for signs of damage or excessive wear. Replace the drive belt if it is worn or damaged.

POLY V-BELT TENSIONING AND REPLACEMENT

1. Check the tension of the poly V-belt and tighten as needed (Figure 34).

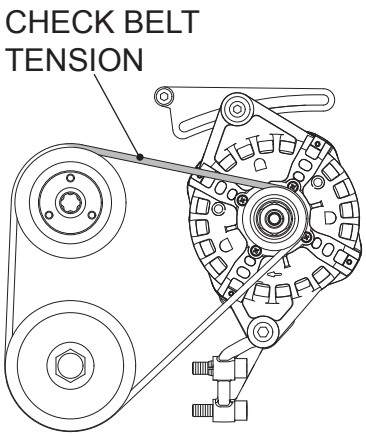


Figure 34. V-Belt Tensioning

2. Regularly check the poly V-belt for wear. If wear is detected (Figure 35), the belt must be replaced immediately.

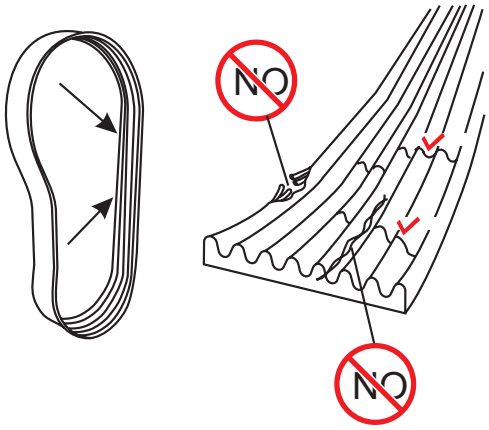


Figure 35. Wear and Tear Check

WARNING

DO NOT attempt to 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.

ACCESSORY BELT TENSION

A slack accessory belt may contribute to overheating, or to insufficient charging of the battery. Inspect the belt for damage and wear and adjust it in accordance with the Engine Owner's Manual.

The belt tension is proper if the fan belt tension matches Table 12.

Table 12. Proper Belt Tension Guide Lines

	Pretension Force (belt)	Torque (belt tensioner)	Frequency (frequency meter)
New Belt	480 N (+50 N)	80 N·m (+10 N·m)	210 Hz (+10 Hz)
Belt after service	250 N (+30 N)	70 N·m (+10 N·m)	150 Hz (+10 Hz)
Minimum Tension	170 N	—	125 Hz

ENGINE OIL

NOTICE

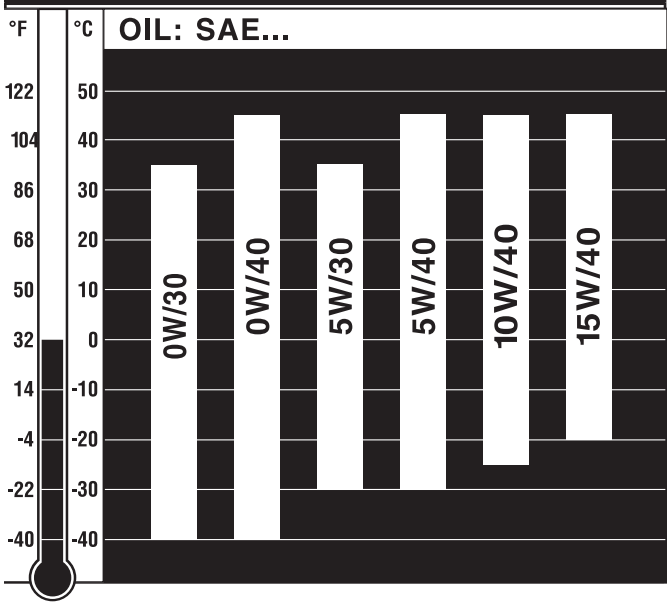
To achieve proper engine performance and durability, only use engine oils that have an API rating of CJ-4 or CI-4 or newer.

1. When checking or adding oil, place the machine so the engine is level.
2. Pull the engine oil dipstick from its holder.
3. Determine if engine oil is low. Oil should be between the upper limit and lower limit (add oil) lines.
4. If oil is below the "**Add Engine Oil**" line add oil up to upper limit on the dipstick. Allow enough time for any added oil to make its way to the oil pan before rechecking.

Changing Engine Oil And Filter

Change the engine oil and filter after the first 50 hours of use, then every 500 hours. Refer to Table 13 for recommended oil viscosity.

Table 13. Recommended Viscosity Grades



1. Drain used oil into a suitable container while the engine is still warm. Use the side or front drain plug, whichever is more accessible.

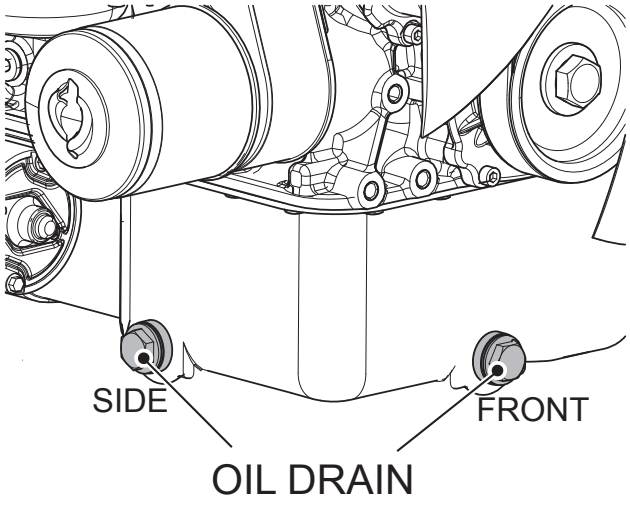


Figure 36. Oil Drain

2. Replace the drain plug tightly when done.
3. Add oil through the filler hole.

CHANGING THE OIL FILTER

Change the engine oil filter every 500 hours or every 2 years of operation.

1. Loosen the oil filter (Figure 37) with a strap wrench or similar tool and unscrew it.

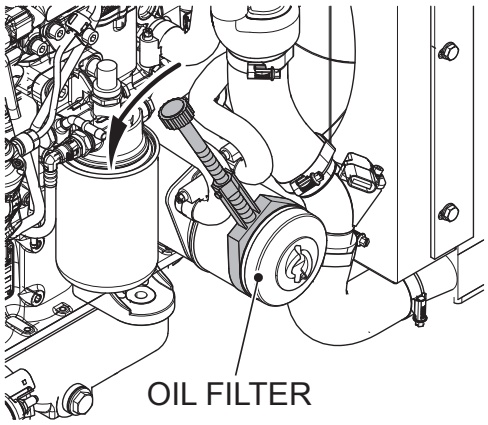


Figure 37. Removing Oil Filter

2. Dispose of the old filter in accordance with local environmental regulations.
3. Thoroughly clean the sealing surface (Figure 38).

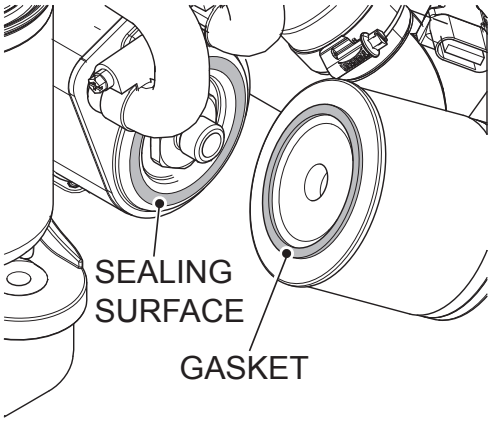


Figure 38. Changing Oil Filter

4. Lightly oil the gasket of the new oil filter.
5. Screw in the oil filter and tighten by hand.

FUEL PREFILTER

Replace the in-line fuel filter every 500 hours or every 2 years.

1. Block the fuel feed line with a hose clip (Figure 39) between the fuel tank and fuel prefilter.

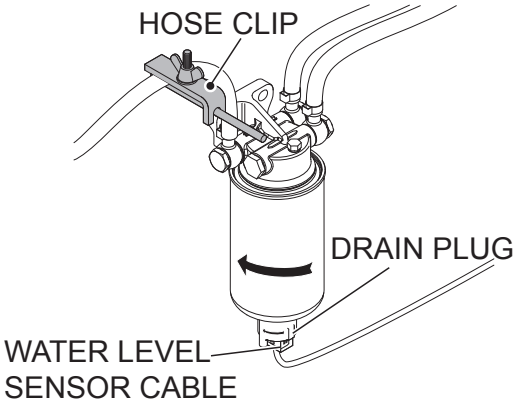


Figure 39. Fuel Prefilter

2. Place a suitable container under the filter to collect emerging fuel.
3. Disconnect the water level sensor cable from the drain plug.
4. Release the drain screw and drain the fuel.
5. Unscrew the fuel prefilter. Fully unscrew the drain plug with integrated water level sensor.
6. Dispose of the used fuel prefilter according to local environmental regulations.
7. Clean the drain plug with integrated water level sensor and lightly oil the sealing surfaces. Screw the drain plug into the new fuel prefilter.
8. Lightly oil the gasket of the new fuel prefilter, fit the filter and tighten it by hand.
9. Release the fuel feed line and connect the water level sensor cable.

FUEL PREFILTER WATER SEPARATOR

The fuel prefilter has a water separator. An electronic water level sensor signals when the maximum permissible water level is reached in the water separator. To drain the water separator, perform the following procedure.

1. Place a suitable container under the drain socket of the drain plug (Figure 40).

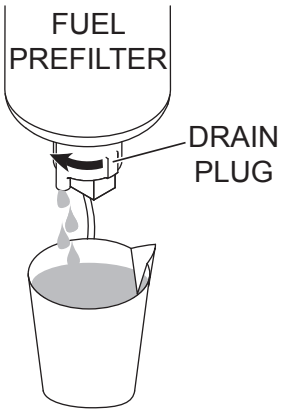


Figure 40. Fuel Water Separator Filter

2. Open the drain plug to drain water into the container.
3. As soon as fuel escapes, close the drain plug.
4. Dispose of the water-fuel mixture in an environmentally compatible manner.

FUEL FINE FILTER

Replace the fuel fine filter every 500 hours or every 2 years.

1. Block the fuel feed line using a hose clip (Figure 41).

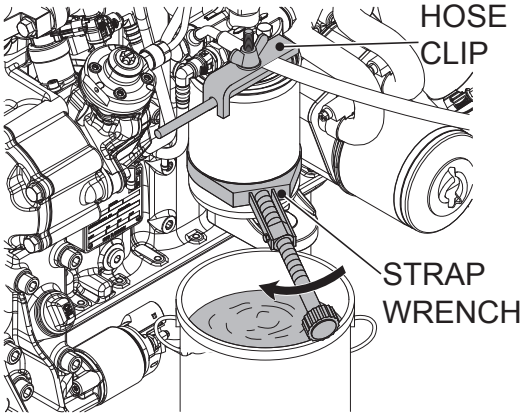


Figure 41. Fuel Fine Filter

2. Place a suitable container under the filter to collect emerging fuel.

3. Unscrew the fuel fine filter with a strap wrench and dispose of the filter according to local environmental regulations.
4. Lightly oil the gasket of the new fuel fine filter, fit the filter, and tighten it by hand.
5. Release the fuel feed line.

CRANKCASE BREATHER FILTER

Replace the crankcase breather filter every 500 hours or every 2 years.

1. Release the four mounting bolts on the breather cap (Figure 42).

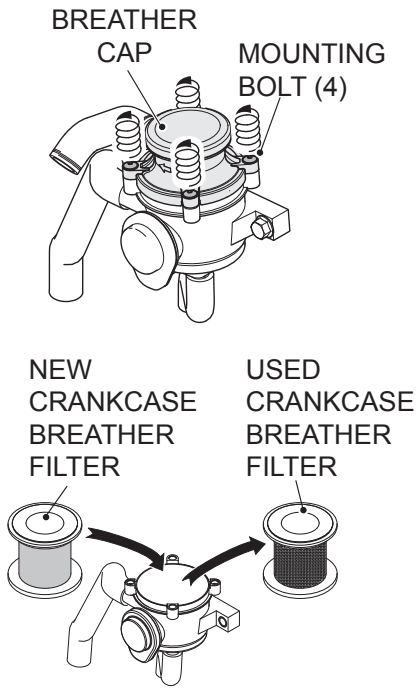


Figure 42. Replacing Crankcase Breather Filter

2. Remove the old crankcase breather filter and dispose of properly.
3. Wipe the breather housing clean and install the new crankcase breather filter.
4. Reinstall the breather cap and tighten the four mounting bolts to 3 ft.-lb. (4 N·m maximum torque).

FUEL TANK

⚠ CAUTION

DO NOT store the trowel with fuel in the tank for an extended period of time. Completely drain the fuel system (tank, lines, etc.) if the unit is to be put into long-term storage.

For shorter or intermediate periods of time, the tank should be filled to avoid condensation that could cause contamination of the fuel.

Removing Water from the Fuel Tank

After prolonged use, water and other impurities accumulate in the bottom of the tank. Occasionally inspect the fuel tank for water contamination and drain the contents if required.

During cold weather, the more empty volume inside the tank, the easier it is for water to condense. This can be reduced by keeping the tank full with unleaded fuel.

Cleaning Inside the Fuel Tank

If necessary, drain the fuel inside the fuel tank completely. Use a spray washer to wash out any deposits or debris that have accumulated inside the fuel tank.

Adding Fuel

When adding fuel, always use clean, fresh ASTM D975 No. 1D S15 or No. 2D S15 ultra-low sulfur diesel fuel.

FUEL TANK INSPECTION

In addition to cleaning the fuel tank, the following components should be inspected for wear:

- **Fuel Hoses —** Inspect nylon and rubber hoses for signs of wear, deterioration and hardening.
- **Fuel Tank Lining —** Inspect the fuel tank lining for signs of excessive amounts of oil or other foreign matter.
- **Fuel Tank Grounding —** Inspect the ground wire connecting the Fuel Tank sending unit to the Chassis Ground to make sure that it is not damaged, and connected properly at both ends (to the fuel tank sending unit, and chassis ground).

OIL AND FUEL LINES

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

⚠ CAUTION

NEVER place hands near the belts or fan while the trowel is running.

ENGINE TUNE-UP

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

NOTICE

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

ALWAYS disconnect battery cables before attempting any service or maintenance on the ride-on trowel.

HYDRAULIC OIL FILTERS

1. Change the medium and high hydraulic filters and oil (Figure 43) after the first 100 hours of use, then every 250 hours. Use 10-micron absolute synthetic media filters.

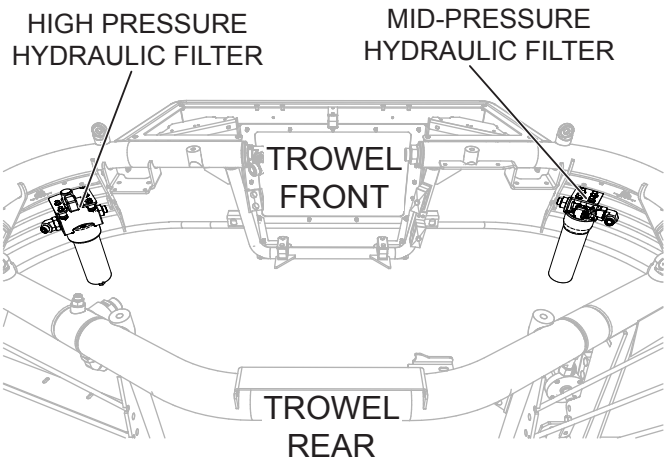


Figure 43. Hydraulic Oil Filters

BATTERY/CHARGING SYSTEM

1. Check and clean the battery terminals for corrosion.
2. Never attempt to charge a battery that is frozen. The battery can explode unless first allowed to thaw.
3. Disconnect the negative (–) battery terminal during storage. If the unit will be stored where the ambient temperature will drop to –15°C or less, remove and store the battery in a warm, dry place.
4. Check the manufacturer's recommendations for maintaining and charging the battery.

TROWEL LUBRICATION

Regular lubrication is required to maintain your trowel in optimal working condition. Schedule maintenance lubrication according to Table 14 below.

Table 14. Trowel Lubrication Schedule

Location	# of Shots	Interval
Spiders	1 to 1½	Every day
Thrust collars	1	Every day

Spiders (Daily)

Perform the following lubrication procedure after **every 8 hours of use**.

1. Locate one of the Zerk grease fittings on either spider assembly (Figure 44). Remove the Zerk fitting cap and set it aside.

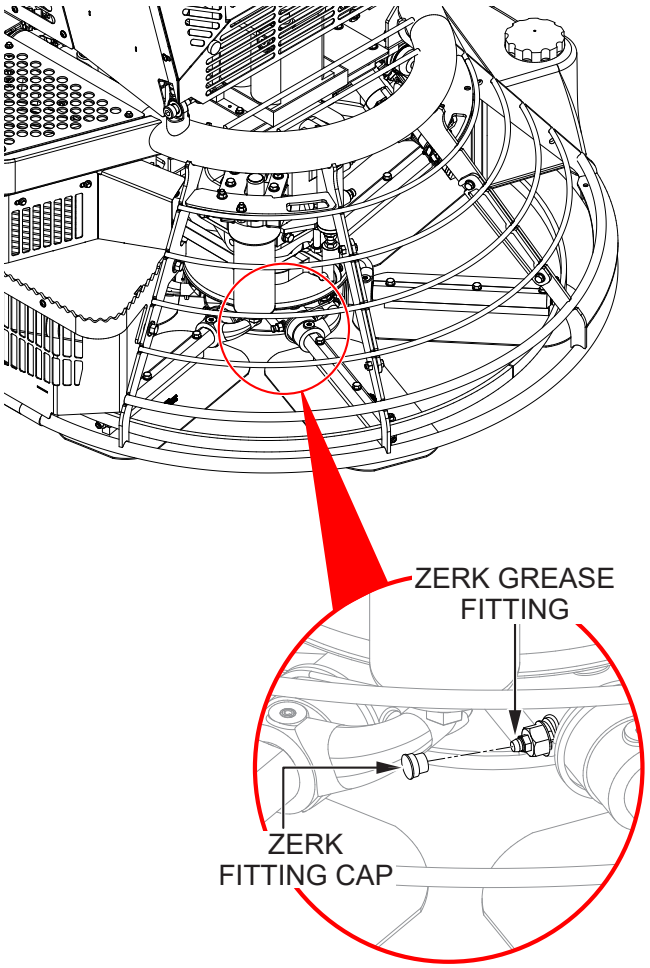


Figure 44. Spider Lubrication

2. Wipe the Zerk grease fitting clean to prevent abrasive material from entering the fitting during lubrication.
3. Lubricate the Zerk grease fitting with 1–1½ shots of multipurpose grade grease. Replace the Zerk grease fitting cap when finished.
4. Repeat steps 1–3 for the remaining grease fittings on both spider assemblies.

Thrust Collars (Daily)

Perform the following lubrication procedure after **every 8 hours of use**.

1. Locate the Zerk grease fitting on either thrust collar (Figure 45). Remove the Zerk grease fitting cap and set it aside.

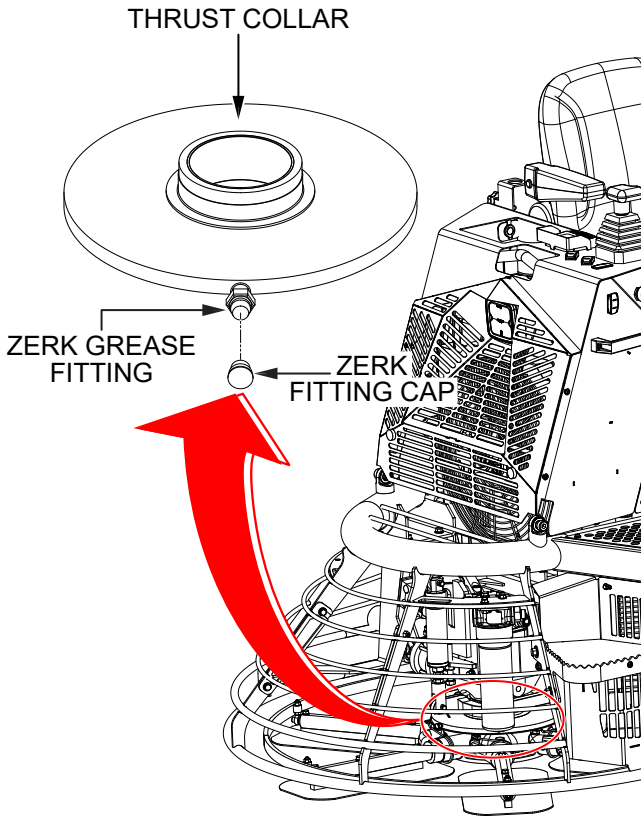


Figure 45. Thrust Collar Lubrication

2. Wipe the Zerk grease fitting clean to prevent abrasive material from entering the fitting during lubrication.
3. Lubricate the Zerk grease fitting with one shot of multipurpose grade grease. Replace the Zerk grease fitting cap when finished.
4. Repeat steps 1–3 for the grease fitting on the remaining thrust collar.

BLADE PITCH ADJUSTMENT PROCEDURE

Maintenance adjustment of blade pitch is made by adjusting a bolt (Figure 46) on the arm of the trowel blade finger. This bolt is the contact point of the trowel arm to the lower wear plate on the thrust collar. The goal of adjustment is to promote consistent blade pitch and finishing quality.

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

- Is one blade completely worn out while the others look new?
- Does the machine have a perceptible rolling or bouncing motion when in use?
- Do the guard rings rock up and down while the machine is running?

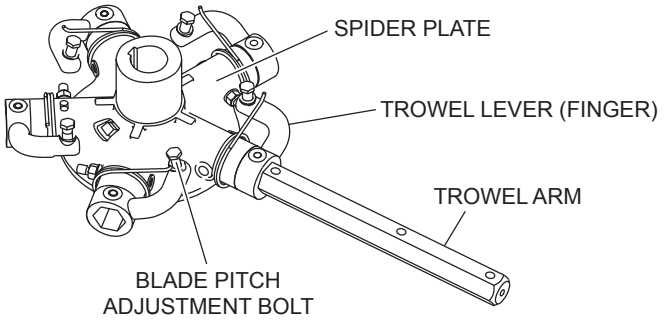


Figure 46. Blade Pitch Adjustment Bolt

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

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

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

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

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

If, after making blade pitch adjustments, the machine is still finishing poorly, blades, trowel arms, and trowel arm bushings should be checked for adjustment, wear, or damage. See the following sections.

Changing Blades

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

1. Place the machine on a flat, level surface. Adjust the blade pitch control to make the blades as flat as possible. Note the blade orientation on the trowel arm. This is important for ride-on trowels as the two sets of blades counter-rotate. Lift the machine up, placing blocks under the main guard ring to support it.
2. Remove the bolts and lock washers on the trowel arm, then remove the blade.
3. Scrape all concrete and debris from the trowel arm. This is important to properly seat the new blade.
4. Install the new blade, maintaining the proper orientation for direction of rotation.
5. Reinstall the bolts. Torque to 17 ft.-lb. (9.5 N·m).
6. Repeat steps 2–5 for all remaining blades.

Clean-Up

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

Trowel Arm Adjustment

NOTICE

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

A level, clean area to test the trowel prior to and after is essential. Any unlevel spots in the floor or debris under the trowel blades will give an incorrect perception of adjustment. Ideally, a 5' × 5', 3/4 inch-thick, flat steel plate should be used for testing.

Some indications of poor concrete finishing are incorrect trowel arm alignment, worn spider bushings, or bent trowel arms:

Does your trowel exhibit the following?

- Are blades wearing unevenly? Is one blade completely worn out while the others look new?
- Do the guard rings rock up and down while the machine is running?
- Does the machine have a perceptible rolling or bouncing motion when in use?

1. To determine which blades need adjustment, place the trowel in the test area (3/4 inch-thick plate):
2. 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 is not making contact (Figure 48), adjustment will be necessary.

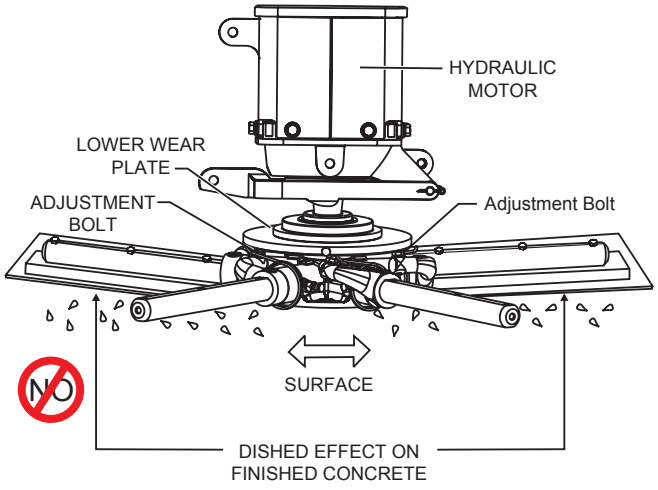


Figure 47. Incorrect Spider Plate Adjustment

Figure 47 illustrates the correct alignment for a spider plate (as shipped from the factory).

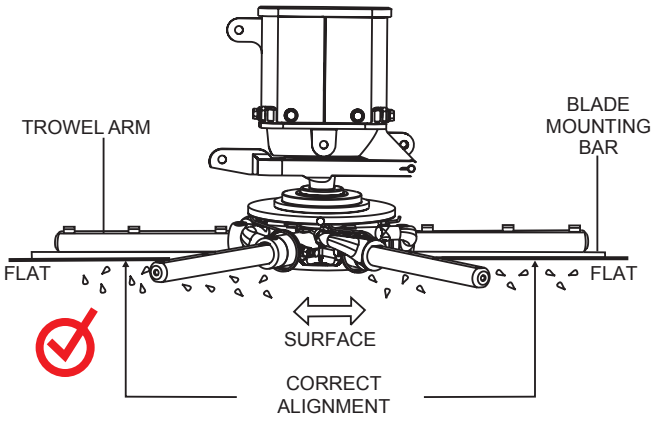


Figure 48. Correct Spider Plate Alignment

Remove the spider assembly from the gearbox shaft as follows:

1. Using the removal tool or equivalent, remove the dust cover plug (Figure 49) on the underside of the spider plate. This plug has been provided to protect the spider threads from contaminants.

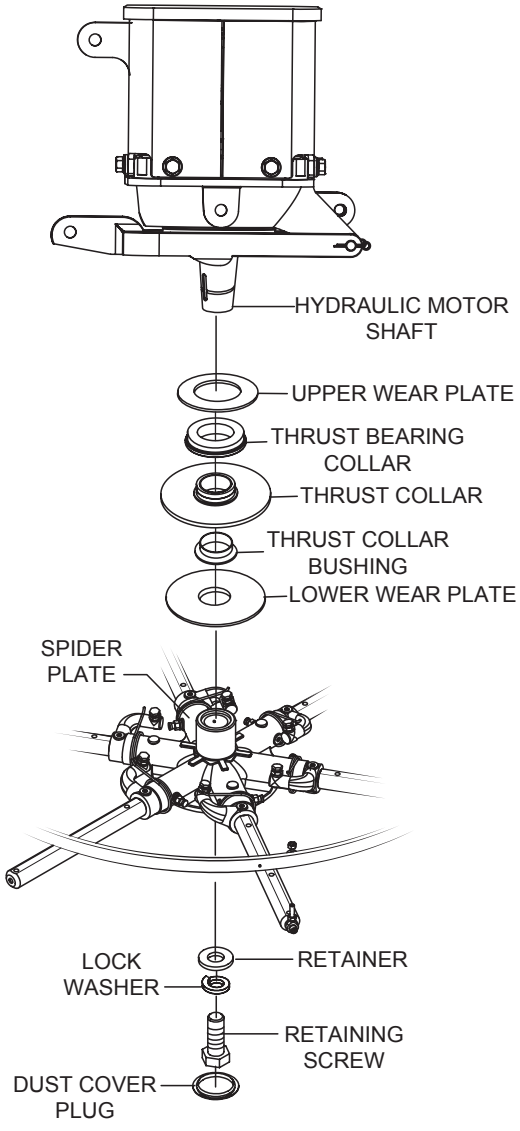


Figure 49. Spider Removal

2. Remove the existing spider retaining bolt and retaining washer.

3. Carefully lift the upper trowel assembly off of the spider assembly. A slight tap with a rubber mallet may be necessary to dislodge the spider from the main shaft of the gearbox.

4. For reassembly, apply Red Loctite #262 to the spider retaining screw and torque to 350 ft.-lb. (474.5 N·m).

TROWEL BLADE REMOVAL

Remove the trowel blades by removing the three hex head bolts (Figure 50) from the trowel arm. Set blades aside.

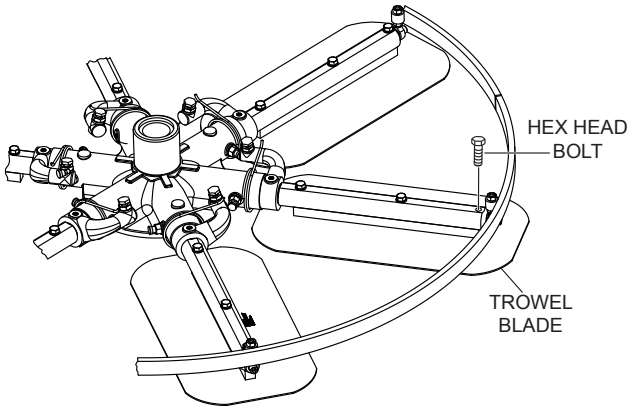


Figure 50. Trowel Blade Removal

TROWEL ARM REMOVAL

1. Remove the hardware securing the stabilizer ring to the trowel arm (Figure 51).

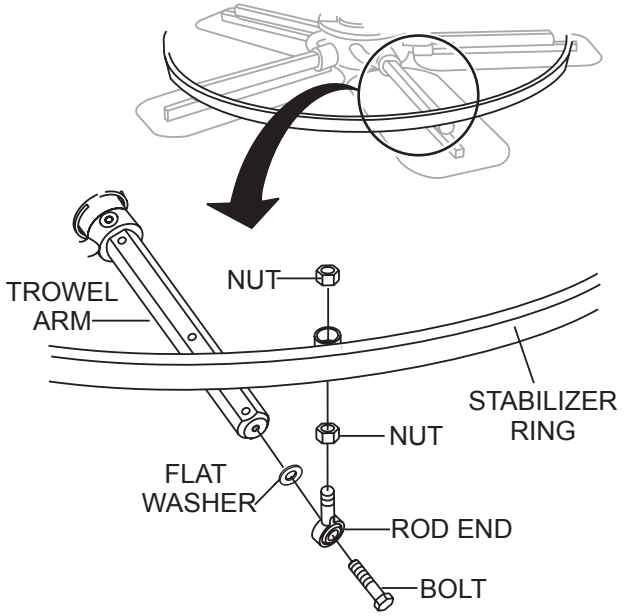


Figure 51. Stabilizer Ring

2. Each trowel arm is held in place at the spider plate (Figure 52) by a hex head bolt (zerk grease fitting) and a roll pin. Remove both the hex head bolt and the roll pin from the spider plate.

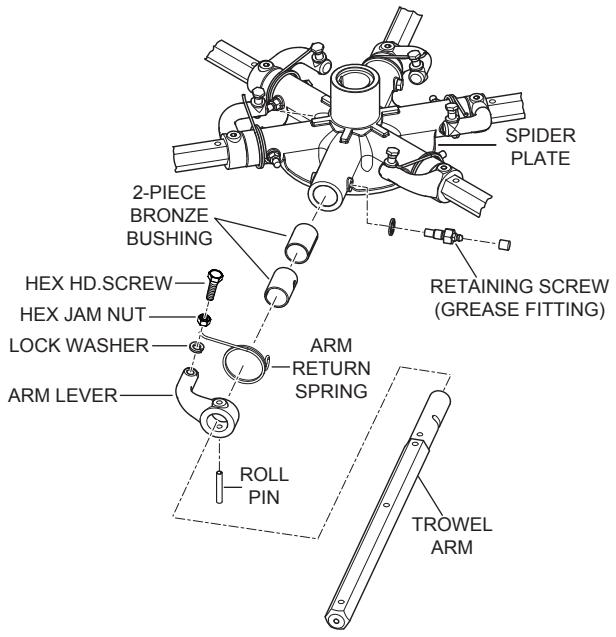


Figure 52. Remove Roll Pin and Zerk Fitting

3. Remove the trowel arm from the spider plate.

4. Should the trowel arm insert (bronze bushing) come out with the trowel arm, remove the bushing from the trowel arm and set aside in a safe place. If the bushing is retained inside the spider plate, carefully remove the bushing.

5. Examine the bronze trowel arm bushings (Figure 53), and clean if necessary. Replace a bushing if it is out-of-round or worn.

Figure 53. Bronze Bushings

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

CHECKING TROWEL ARM STRAIGHTNESS

Trowel arms can be damaged by rough handling, (such as dropping the trowel on the pad), or by striking exposed plumbing, forms, or rebar while in operation. A bent trowel arm will prevent the trowel from operating in a smooth, fluid rotation. If bent trowel arms are suspected, check for flatness as shown below. Refer to Figure 54.

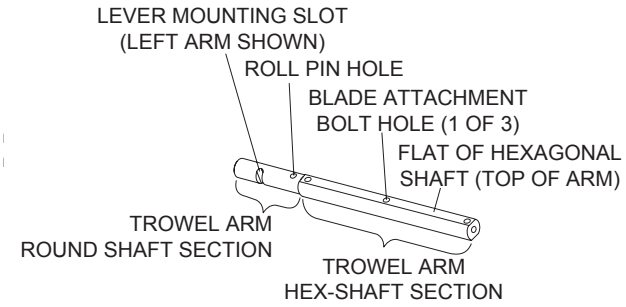


Figure 54. Trowel Arm

1. Use a thick steel plate, granite slab, or any surface which is true and flat, to check all six sides of each trowel arm for flatness.

2. Check each of the six sides of the trowel arm (hex section). A feeler gauge of .004 in. (0.10 mm) should not pass between the flat of the trowel arm and the test surface along its length on the test surface (Figure 55).

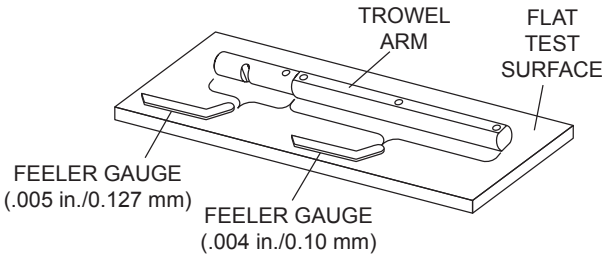


Figure 55. Checking Trowel Arm Flatness

3. Check the clearance between the round shaft and the test surface as one of the flat hex sections of the arm rests on the test surface. Rotate the arm to each of the flat hex sections and check the clearance of the round shaft. Use a feeler gauge of .005 in. (0.127 mm). Each section should have the same clearance between the round of the trowel arm shaft and the test surface.

4. Replace the trowel arm if it is found to be uneven or bent.

TROWEL ARM ADJUSTMENT

Figure 56 illustrates the adjustment fixture with a trowel arm inserted. As each trowel arm is locked into the fixture, the arm bolt is adjusted to where it contacts a stop on the fixture. This will consistently adjust all of the trowel arms, keeping the finisher as flat and evenly pitched as possible.

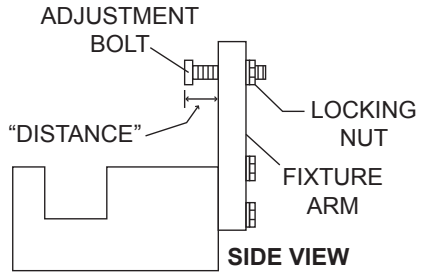


Figure 56. Trowel Arm Adjustment Tool Side View

1. Locate the trowel arm adjustment tool P/N 9177.
2. Ensure the fixture arm is in the proper setting (up or down) for your trowel arm rotation as shown in Figure 57.

NOTICE

Arms with **CLOCKWISE** blade rotation use the fixture arm in the **UP** position (Figure 57A). Arms with **COUNTERCLOCKWISE** blade rotation use the fixture with the fixture arm in the **DOWN** position (Figure 57B).

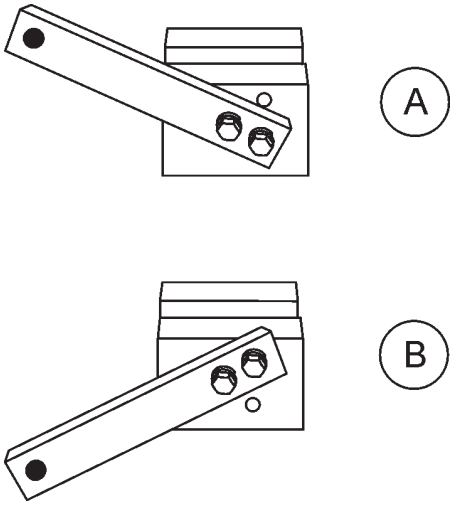


Figure 57. Trowel Arm Adjustments

3. Unscrew the locking bolts on the adjustment tool and place the trowel arm into the fixture channel as shown in Figure 58. A thin shim may be required to cover the blade holes on the trowel arm. Make sure to align the trowel adjustment bolt with the fixture adjustment bolt.

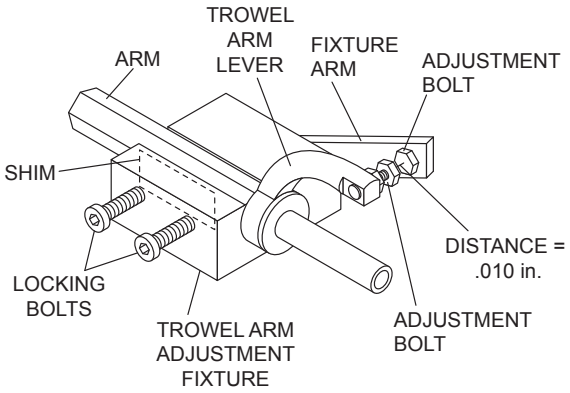


Figure 58. Trowel Arm Adjustment Fixture Components

4. Use an Allen wrench to tighten the locking bolts securing the trowel arm in place.
5. Adjust the bolt "distance" shown in Figure 58 to match one of the arms. The other arms will be adjusted to match this distance.
6. Loosen the locking nut on the trowel arm lever, then turn the trowel arm adjusting bolt until it barely touches (.010") the fixture adjusting bolt.
7. Once the correct adjustment is made, tighten the lock nut on the trowel arm to lock in place.
8. Loosen the locking nuts on the adjustment fixture, and remove the trowel arm.
9. Repeat steps for the remaining trowel arms.

REASSEMBLY

1. Clean and examine the upper/lower wear plates and thrust collar. Examine the entire spider assembly. Wire brush any concrete or rust buildup. Replace any spider components that are found to be damaged or out-of-round.
2. Make sure the bronze trowel arm bushing is not damaged or out-of-round. Clean the bushing if necessary. Replace the bronze bushing if it is damaged or worn.
3. Reinstall the bronze bushing onto the trowel arm.
4. Repeat steps 2–3 for each trowel arm.
5. Make sure that the spring tensioner is in the correct position to exert tension on the trowel arm.

6. Insert all trowel arms with levers into the spider plate (with bronze bushing already installed), using care to align the grease hole on the bronze bushing with the grease hole fitting on the spider plate.
7. Lock the trowel arms in place by tightening the hex head bolt with zerk grease fitting and jam nut.
8. Reinstall the blades onto the trowel arms.
9. Lubricate all grease points (zerk fittings) with premium Lithum 12-based grease, conforming to NLG1 Grade #2 consistency.

FLOAT PAN INSTALLATION

Float pans attach to the trowel arms 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. There are two methods for installing pans: Z-clips or latch pins.

⚠ WARNING

ALWAYS install float pans either in the work area or in an area that is next to and level with the work area.

NEVER lift the trowel with float pans attached.

NOTICE

IMPORTANT! To get blades absolutely flat for using float pans, pitch them as follows:

Press and hold down both pitch switches until the mode light blinks before installing float pans.

NOTICE

The rotors must be turned in order to install and secure float pans to the trowel blades. Rotors are only turned via drive bypass switch and foot pedal engagement. **DO NOT** engage the seat switch by sitting in the operator's seat.

Installing Float Pans with Z-Clips

1. Lift the trowel just enough to slide float pans with Z-clips under the blades (Figure 59). Slowly lower the trowel onto the pans with the blades adjacent to the Z-clips.

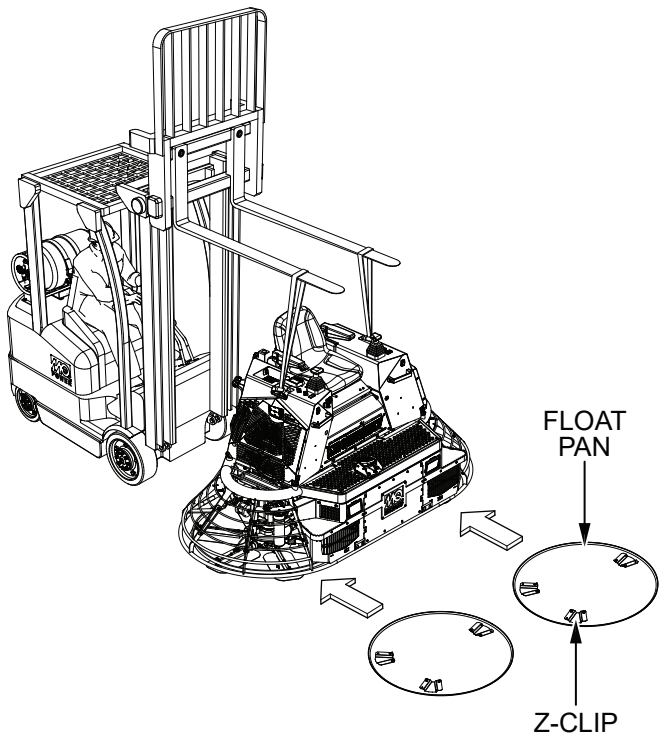


Figure 59. Float Pan Positioning

2. Rotate the blades into position under the Z-clips (Figure 60). Make sure the blades are rotated in the same direction as when the machine is in operation, or use the engine to rotate the blades into position.

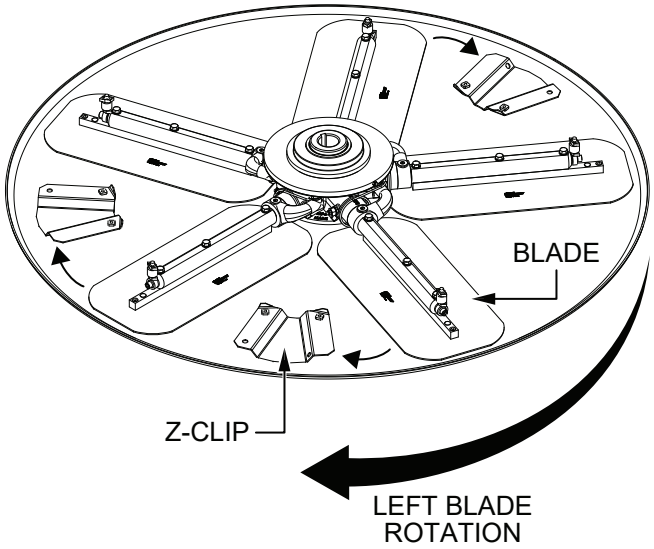


Figure 60. Blade Rotation

3. Attach the blade tie-downs to the far side of the Z-clips using the tie-down knobs as shown in Figure 61.

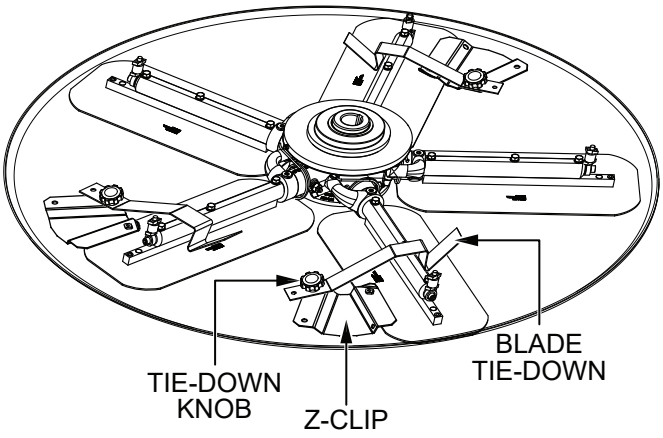


Figure 61. Float Pan Installation (Z-Clips)

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 before the machine is put back into operation.

Installing Float Pans with Latch Pins

1. Lift the trowel just enough to slide a float pan under the blades. Lower the finisher onto the pan with the blades between the blade stops (Figure 62).

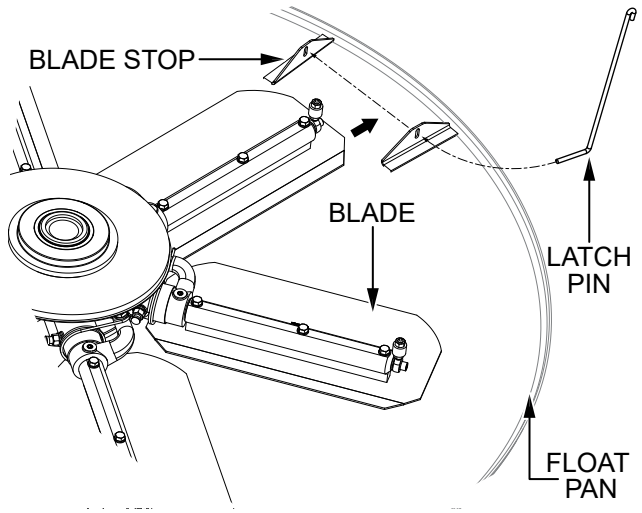


Figure 62. Float Disc Installation (Latch Pins)

2. Route a latch pin through the holes in the blade stops as shown in Figure 62.

3. After it has been routed through the blade stop holes, rotate the latch pin so the end that is bent approximately 90 degrees lays flat on the surface of the float pan. See Figure 63.

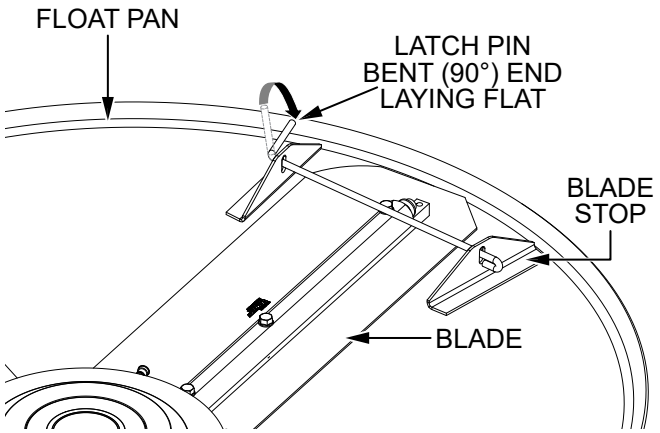


Figure 63. Latch Pin Placement

4. Make sure the blade edges are secured between the blade stops, and the latch pin is secured completely over the blade, locking it in place.

5. To finish installing the float pan onto the remaining finisher blades, turn the rotors by pressing and holding the left or right drive bypass switch (Figure 64) and the foot pedal.

NOTICE

A second person may be needed to help turn the rotors by hand and to secure the latch pins in the blade stops.

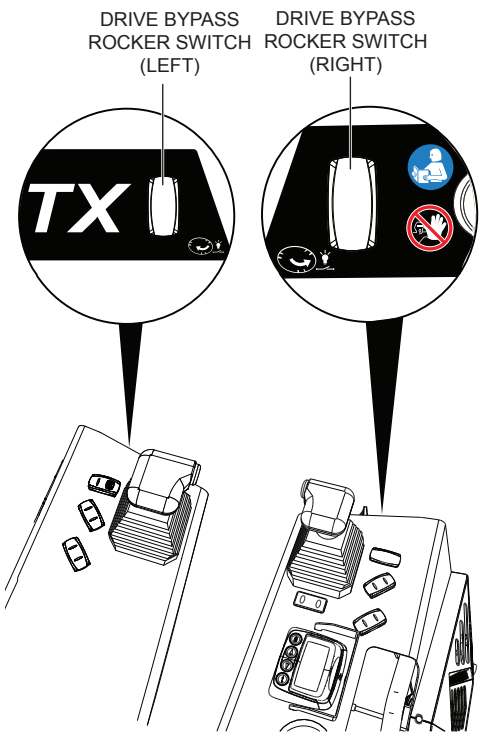


Figure 64. Drive Bypass Rocker Switch

6. Repeat steps 2–4 for the remaining finisher blades.
7. Make sure the float pans are well secured to the blades before the trowel is put back into operation.
8. Periodically check the latch pins during normal operation to ensure they are still in the correct position.

REMOVING FLOAT PANS

1. Position the trowel to the side of the troweling surface.
2. Using a forklift, lift the trowel enough for easy access to the float pans.

> ***NOTICE***
>
> Float pans may stick to the finisher blades unless the rotors are turned via drive bypass rocker switch and foot pedal engagement. **DO NOT** engage the safety bypass switch by sitting in the operator's seat.

3. Do the opposite of the **Float Pan Installation** instructions to remove the pans.

LONG-TERM STORAGE

1. Remove the battery.
2. Drain fuel from the fuel tank.
3. Clean the trowel exterior with a cloth soaked in clean oil.
4. Cover the unit in a plastic sheet and store it in a moisture- and dust-free location out of direct sunlight

> ***NOTICE***
>
> **NEVER** store the ride-on trowel with fuel in the tank for an extended period of time. Completely drain the fuel system (tank, lines, etc.) if the unit is to be put into long-term storage. For shorter or intermediate periods of time, the tank should be filled to avoid condensation that could cause contamination of the fuel.

DECOMMISSIONING TROWEL/COMPONENTS

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

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

Table 15. Maintenance Schedule												
System	Check Item	DAILY	Periodic Maintenance Interval									
			Every 200 Hrs	Every 400 Hrs	Every 800 Hrs	Every 1000 Hrs	Every 1250 Hrs	Every 1500 Hrs	Every 1750 Hrs	Every 2000 Hrs	Every 3000 Hrs	Every 5000 Hrs
	General Maintenance											
	Visual check for fluid leaks	X										
	Check engine oil level	X										
	Check coolant level	X										
	Change engine oil and filter (Severe duty)[5]	**First, initial oil and filter change at or after 50 hours, then every 500 hours of operation**										
	Change engine oil and filter (Standard duty)[5]	**First, initial oil and filter change at or after 50 hours, then every 500 hours of operation**										
	Inspect accessory drive belts for cracks, breaks, splits or glazing[1]					X						
	Inspect electrical system wiring for cuts, abrasions or corrosion									X		
	Inspect electrical system wiring for cuts, abrasions or corrosion									X		
	Engine Coolant Section											
	Clean debris from radiator core	**Every 100 hours or 60 days of operation**										
	Change Coolant[4]											X
	Inspect coolant hoses for cracks, swelling or deterioration[1]					X						
	Engine Ignition System											
	Inspect battery case for damage					X						

Table 16. Maintenance Schedule (Continued)												
System	Check Item	DAILY	Periodic Maintenance Interval									
			Every 200 Hrs	Every 400 Hrs	Every 800 Hrs	Every 1000 Hrs	Every 1250 Hrs	Every 1500 Hrs	Every 1750 Hrs	Every 2000 Hrs	Every 3000 Hrs	Every 5000 Hrs
	Fuel System Maintenance											
	Inspect air cleaner	**Every 200 hours, or every 100 hours in dusty environment**										
	Replace filter element	**Every 400 hours, or every 200 hours in dusty environment**										
	Replace fuel filter			X								
	Leak check fuel lines									X		
	Check air induction for leaks									X		
	Engine Exhaust System											
	Inspect exhaust manifold for leaks									X		
	Inspect exhaust piping for leaks									X		
	Inspect catalyst for mechanical damage									X		

The maintenance schedule represents the manufacturer's recommended maintenance intervals to maintain proper engine/equipment function. Specified state and federal regulations may require equipment operators to conduct comprehensive engine/equipment inspections at more periodic intervals than those specified above.

Note 1 = Item should be checked yearly, replace as needed.

Note 3 = Severe duty applications are units that receive high-load, full-throttle operation for the majority of their operational life.

Note 4 = 5,000 hours or 5 years, whichever occurs first.

Note 5 = Oil life is highly dependent on oil quality, operating environment, and engine use.

DIAGNOSTIC SYSTEM DISPLAY

Table 17. Engine Fault Codes

SPN	FMI	Description	Corrective Action
95	3	High Fuel Pressure	Check engine harness or fuel pressure sensor.
95	4	Low Fuel Pressure	Check engine harness or fuel pressure sensor.
95	17	Low Fuel Pressure	Check empty tank, fuel filter, engine harness or fuel pump.
96	17	Fuel Level Low	Fill fuel tank with correct fuel.
97	0	Water in Fuel Detected	Remove water from fuel. Check fuel filter or engine harness.
97	4	Water in Fuel Sensor Fault	Check fuel filter or engine harness.
97	15	Water in Fuel Detected	Remove water from fuel. Check fuel filter or engine harness.
97	17	Water in Fuel Sensor Fault	Check fuel filter or engine harness.
97	31	Water in Fuel Detected	Remove water from fuel. Check fuel filter or engine harness.
100	0	Engine Oil Pressure High	Check engine harness or oil pressure sensor.
100	1	Engine Oil Pressure Low	Check harness, oil pressure sensor, oil pump or oil level.
100	3	Engine Oil Press Volt Above Norm Or Short High Source	Voltage > 4.772 V. Check harness or sensor.
100	4	Engine Oil Press Volt Below Norm Or Short Low Source	Voltage < 0.234 V. Check harness or sensor.
102	0	Intake Manifold Pressure High	Over boost condition, waste gate may be blocked.
102	1	Intake Manifold Pressure Low	Under boost, turbocharger may be defective.
102	3	Intake Manifold Pressure Signal High	Sensor voltage is high. Check engine harness or sensor.
102	4	Intake Manifold Pressure Signal Low	Sensor voltage is low. Check engine harness or sensor.
105	0	Intake Manifold Air Temperature High	
105	1	Intake Manifold Air Temperature Low	
105	3	Intake Man1 Temp Volt Above Norm Or Short High Source	Sensor voltage > 4.803 V. Check engine harness or sensor.
105	4	Intake Man1 Temp Volt Below Norm Or Short Low Source	Sensor voltage < 0.318 V. Check engine harness or sensor.
107	0	Plugged Air Filter	Clean or replace air filter. Check differential air sensor harness or sensor.
107	3	Air Filter Sensor Fault High	Check engine harness or air filter sensor.
107	4	Air Filter Sensor Fault Low	Check engine harness or air filter sensor.
107	14	Air Filter Clogged	Change filter or check engine harness.
107	31	Plugged Air Filter	Clean or replace air filter. Check differential air sensor harness or sensor.
108	0	Atmospheric Pressure Sensor Fault High	Check engine harness or atmospheric pressure sensor.
108	1	Atmospheric Pressure Sensor Fault Low	Check engine harness or atmospheric pressure sensor.
108	3	Atmospheric Pressure Sensor Fault High	Check engine harness or atmospheric pressure sensor.
108	4	Atmospheric Pressure Sensor Fault Low	Check engine harness or atmospheric pressure sensor.
110	0	Engine Coolant Temperature High	Check sensor, coolant level, water pump or blocked cooler.
110	1	Eng Cool Temp Signal Out of Range Low	Check engine harness or coolant temp sensor.

Table 17. Engine Fault Codes			
SPN	**FMI**	**Description**	**Corrective Action**
110	3	ENG COOL TEMP VOLT ABOVE NORM OR SHORT HIGH SOURCE	Voltage > 4.957 V. Check harness or sensor.
110	4	ENG COOL TEMP VOLT BELOW NORM OR SHORT LOW SOURCE	Voltage < 0.359 V. Check harness or sensor.
110	15	ENG COOL TEMP HIGH	Check sensor, coolant level, water pump or blocked cooler.
110	17	Eng Coolant Temperature Low	Check engine harness or coolant temp sensor.
110	18	Eng Coolant Temp Sensor Fault	Check engine harness or coolant temp sensor.
157	3	Rail Pressure Sensor Fault High	Voltage > 4.662 V. Check harness or sensor.
157	4	Rail Pressure Sensor Fault Low	Voltage < 0.25 V. Check harness or sensor.
168	0	System Voltage High	Alternator defective or jump starting with voltage > 12 V
168	1	System Voltage Low	Battery discharged or defective, alternator defective
168	3	Sensor Supply Voltage High	Sensor supply >4.521 V. Check battery voltage or replace ECU.
168	4	Sensor Supply Voltage Low	Sensor supply > 0.95 V. Check battery voltage or replace ECU.
174	0	Fuel Temp High	High engine load with low fuel level and high ambient temperature
174	1	Low Fuel Temperature	Very cold ambient temperature
174	3	Fuel Temp Volt Above Norm Or Short High Source	Voltage > 4.933 V. Check harness or sensor.
174	4	Fuel Temp Volt Below Norm Or Short Low Source	Voltage < 0.31 V. Check harness or sensor.
174	15	Fuel Temperature High	Contact Multiquip Technical Support.
174	16	Fuel Temperature High	Contact Multiquip Technical Support.
175	0	High Engine Oil Temperature	High load on engine, sensor misadjusted, or wiring harness
175	1	Low Engine Oil Temperature	Check sensor adjustment or wiring harness.
175	3	Engine Oil Temp Signal High	Signal is > 5.2 V. Check engine harness or oil temp sensor.
175	4	Engine Oil Temp Signal Low	Signal is < 0 V. Check engine harness or oil temp sensor.
175	15	High Engine Oil Temperature	Oil extremely hot, may be misuse of engine (tuning)
190	2	Eng Spd Data Erratic, Intermittent Or Incorrect	Engine harness, camshaft sensor, or tone wheel fault
190	8	Camshaft Signal Implausible Or Erratic Crank Shaft Signal	Check harness, sensor, sensor adjust or camshaft tone wheel.
190	12	Camshaft Or Crankshaft Signal Missing	Check engine harness, camshaft or crankshaft sensors.
190	16	Engine Over Speed	Contact Multiquip Technical Support.
651	3	Short Circuit On Injector 1	Check engine wiring harness or injector cylinder.
651	5	Inj Cylinder1 Current Less Than Expected	Check engine wiring harness or injector load drop cylinder.
652	3	Short Circuit On Injector 2	Check engine wiring harness or injector cylinder.
652	5	Inj Cylinder2 Current Less Than Expected	Check engine wiring harness or injector load drop cylinder.
653	3	Short Circuit On Injector 3	Check engine wiring harness or injector cylinder.
653	5	Inj Cylinder3 Current Less Than Expected	Check engine wiring harness or injector load drop cylinder.
654	3	Short Circuit On Injector 4	Check engine wiring harness or injector cylinder.
654	5	Inj Cylinder4 Current Less Than Expected	Check engine wiring harness or injector load drop cylinder.
677	3	Starter Relay Short Circuit To Battery Power	Check engine wiring harness or starter relay.
677	4	Starter Relay Short Circuit To Ground	Check engine wiring harness or starter relay.
677	5	Starter Relay Open Circuit	Check engine wiring harness or starter relay.

Table 17. Engine Fault Codes			
SPN	**FMI**	**Description**	**Corrective Action**
677	6	Starter Relay Over Temperature Fault	Check engine harness or starter relay. Cool or replace ECU.
898	2	Error CAN Set Point 1	Contact Multiquip Technical Support.
1076	5	Fuel Injector Pump Control Valve Error	Check engine wiring harness or fuel metering unit.
1076	12	Fuel Metering Unit Over Temperature	Check engine harness or metering unit. Cool or replace ECU.
1076	15	Fuel Metering Unit Short Circuit to Battery	Check engine wiring harness or fuel metering unit.
1076	16	Fuel Metering Unit Short Circuit to Battery	Check low side engine wiring harness or fuel metering unit.
1076	17	Fuel Metering Unit Short Circuit to Ground	Check engine wiring harness or fuel metering unit.
1076	18	Fuel Metering Unit Short Circuit to Ground	Check low side engine wiring harness or fuel metering unit.
1108	15	Engine Control Unit Fault	Contact Multiquip Technical Support.
1108	16	Engine Control Unit Fault	Contact Multiquip Technical Support.
1109	11	Engine Control Unit Fault	Contact Multiquip Technical Support.
1110	31	Engine Protection System Shut Engine Down	Contact Multiquip Technical Support.
1136	3	Engine Control Unit Fault	Contact Multiquip Technical Support.
1136	4	Engine Control Unit Fault	Contact Multiquip Technical Support.
1244	3	Fuel Pressure Control Valve Signal Low	Check engine wiring harness or fuel pressure control valve.
1244	4	Fuel Pressure Control Valve Signal High	Check engine wiring harness or fuel pressure control valve.
1244	5	Fuel Pressure Control Valve Output Open Circuit	Check engine wiring harness or fuel pressure control valve.
1244	12	Fuel Pressure Control Valve Over Temperature	Check ECU, engine harness or fuel pressure control valve.
1244	15	Fuel Pressure Control Valve Power Short to Battery	Check engine wiring harness or fuel pressure control valve.
1244	16	Fuel Pressure Control Valve Output Short to Battery	Check engine wiring harness or fuel pressure control valve.
1244	17	Fuel Pressure Control Valve Power Short to Ground Fault	Check engine wiring harness or fuel pressure control valve.
1244	18	Fuel Pressure Control Valve Output Short to Ground	Check engine wiring harness or fuel pressure control valve.
1347	5	Fuel Pump Assy 1 CKT Open, Shorted Ground or Overload	
1347	7	Fuel Pump Assy 1 Rail Pressure Cont.	
1347	10	Fuel Pump Assy, 1 Low Fuel Flow	
1348	5	Fuel Pump Assy 2 CKT Open, Shorted Ground or Overload	
1348	10	Fuel Pump Assy, 2 Low Fuel Flow	
1569	31	Eng. Prot. Torq. Fuel Derate Limit Condition Exist	
1769	11	Engine Over speed	Engine over speed caused by operator
2791	13	EGR Valve Position Signal Out of Range High	EGR valve signal > 4.622 V. Check engine harness or valve.
2791	14	EGR Valve Position Signal Out of Range Low	EGR valve signal < 0.384 V. Check engine harness or valve.
2791	16	Exhaust Gas Recirculation (EGR) Valve Fault	Clean or replace the EGR valve.
2791	18	Exhaust Gas Recirculation (EGR) Valve Fault	Clean or replace the EGR valve.
2791	20	EGR Valve Position High	Adjust, clean or replace the EGR valve.
2791	21	EGR Valve Position Low	Adjust, clean or replace the EGR valve.
2802	11	Engine Control Unit Fault	Contact Multiquip Technical Support.
2802	12	Engine Control Unit Fault	Contact Multiquip Technical Support.

Table 17. Engine Fault Codes			
SPN	**FMI**	**Description**	**Corrective Action**
2802	14	Engine Control Unit Fault	Contact Multiquip Technical Support.
3509	2	Engine Sensor Supply #1 Fault	Contact Multiquip Technical Support.
3510	2	Engine Sensor Supply #2 Fault	Contact Multiquip Technical Support.
3511	2	Engine Sensor Supply #3 Fault	Contact Multiquip Technical Support.
3597	3	Engine Control Unit Fault	Contact Multiquip Technical Support.
3597	4	Engine Control Unit Fault	Contact Multiquip Technical Support.
3598	3	Engine Control Unit Fault	Contact Multiquip Technical Support.
3598	4	Engine Control Unit Fault	Contact Multiquip Technical Support.
5324	4	Glow Plug #1 Short Circuit	Check engine wiring harness or glow plug.
5324	11	Glow Plug #1 Fault	Check engine wiring harness or glow plug.
5325	4	Glow Plug #2 Short Circuit	Check engine wiring harness or glow plug.
5325	11	Glow Plug #2 Fault	Check engine wiring harness or glow plug.
5326	4	Glow Plug #3 Short Circuit	Check engine wiring harness or glow plug.
5326	11	Glow Plug #3 Fault	Check engine wiring harness or glow plug.
5327	4	Glow Plug #4 Short Circuit	Check engine wiring harness or glow plug.
5327	11	Glow Plug #4 Fault	Check engine wiring harness or glow plug.
20201	19	Engine Control Unit Fault	Contact Multiquip Technical Support.
20220	2	Engine Control Unit Fault	Contact Multiquip Technical Support.
20220	11	Engine Control Unit Fault	Contact Multiquip Technical Support.
20220	14	Engine Control Unit Fault	Contact Multiquip Technical Support.
20221	11	Engine Control Unit Fault	Contact Multiquip Technical Support.
20222	11	Engine Control Unit Fault	Contact Multiquip Technical Support.
20223	11	Engine Control Unit Fault	Contact Multiquip Technical Support.
20224	11	Engine Control Unit Fault	Contact Multiquip Technical Support.
20225	11	Engine Control Unit Fault	Contact Multiquip Technical Support.
20226	11	Engine Control Unit Fault	Contact Multiquip Technical Support.
20227	11	Engine Control Unit Fault	Contact Multiquip Technical Support.
20228	11	Engine Control Unit Fault	Contact Multiquip Technical Support.
20229	11	Engine Control Unit Fault	Contact Multiquip Technical Support.
20229	14	Engine Control Unit Fault	Contact Multiquip Technical Support.
20230	11	Engine Control Unit Fault	Contact Multiquip Technical Support.
20231	11	Engine Control Unit Fault	Contact Multiquip Technical Support.
20232	11	Engine Control Unit Fault	Contact Multiquip Technical Support.
20233	11	Engine Control Unit Fault	Contact Multiquip Technical Support.
20234	11	Engine Control Unit Fault	Contact Multiquip Technical Support.
20234	20	Engine Control Unit Fault	Contact Multiquip Technical Support.
20234	21	Engine Control Unit Fault	Contact Multiquip Technical Support.
20238	3	Engine Control Unit Fault	Contact Multiquip Technical Support.
20238	4	Engine Control Unit Fault	Contact Multiquip Technical Support.

Table 17. Engine Fault Codes			
SPN	**FMI**	**Description**	**Corrective Action**
20238	11	Engine Control Unit Fault	Contact Multiquip Technical Support.
20238	14	Engine Control Unit Fault	Contact Multiquip Technical Support.
20251	11	Engine Control Unit Fault	Contact Multiquip Technical Support.
20251	20	Engine Control Unit Fault	Contact Multiquip Technical Support.
20251	21	Engine Control Unit Fault	Contact Multiquip Technical Support.
20276	11	Engine Control Unit Fault	Contact Multiquip Technical Support.
20282	3	EGR Valve Fault. Short to Battery	Check EGR valve, ECU or engine harness.
20282	4	EGR Valve Fault. Short to Ground	Check EGR valve, ECU or engine harness.
20282	5	EGR Valve Fault. Open Circuit	Check EGR valve, ECU or engine harness.
20282	12	Engine Control Unit Fault. High Temperature	Check EGR valve, ECU or engine harness
20288	2	Glow Plug System Fault	Check ECU, Glow Control Unit and engine wiring harness.
20288	3	Glow Plug System Fault	Check ECU, Glow Control Unit and engine wiring harness.
20288	4	Glow Plug System Fault	Check ECU, Glow Control Unit and engine wiring harness.
20288	5	Glow Plug System Fault	Check ECU, Glow Control Unit and engine wiring harness.
20288	14	Glow Plug System Fault	Check ECU, Glow Control Unit and engine wiring harness.
20288	21	Glow Plug System Fault	Check ECU, Glow Control Unit and engine wiring harness.
20288	22	Glow Plug System Fault	Check ECU, Glow Control Unit and engine wiring harness.
20288	23	Glow Plug System Fault	Check ECU, Glow Control Unit and engine wiring harness.
20290	3	Engine Control Unit Fault	Contact Multiquip Technical Support.
20290	11	Engine Control Unit Fault	Contact Multiquip Technical Support.
20290	20	Engine Control Unit Fault	Contact Multiquip Technical Support.
20290	21	Engine Control Unit Fault	Contact Multiquip Technical Support.
20290	22	Engine Control Unit Fault	Contact Multiquip Technical Support.
20290	23	Engine Control Unit Fault	Contact Multiquip Technical Support.
20290	25	Engine Control Unit Fault	Contact Multiquip Technical Support.
22040	19	Communication Fault	Shut off the key for 30 seconds and then restart.
22058	19	Engine Control Unit Fault	Contact Multiquip Technical Support.
23350	4	Short Circuit on Injector Bank 0	Check engine wiring harness or fuel injectors.
23352	4	Short Circuit on Injector Bank 1	Check engine wiring harness or fuel injectors.
23354	12	Engine Control Unit Fault	Contact Multiquip Technical Support.
23550	12	Engine Start Signal On	Key switch defective or held at Start for a long time
23613	0	Fuel System Fault	Contact Multiquip Technical Support.
23613	1	Fuel System Fault	Contact Multiquip Technical Support.
23613	2	Fuel System Fault	Contact Multiquip Technical Support.
23613	24	Fuel System Fault	Contact Multiquip Technical Support.
23614	0	Fuel System Fault	Contact Multiquip Technical Support.
23614	1	Fuel System Fault	Contact Multiquip Technical Support.
23614	20	Fuel System Fault	Contact Multiquip Technical Support.
23614	22	Fuel System Fault	Contact Multiquip Technical Support.

Table 17. Engine Fault Codes			
SPN	**FMI**	**Description**	**Corrective Action**
23895	13	Fuel System Fault	Contact Multiquip Technical Support.
23896	13	Fuel System Fault	Contact Multiquip Technical Support.
23897	13	Fuel System Fault	Contact Multiquip Technical Support.
23898	13	Fuel System Fault	Contact Multiquip Technical Support.
23906	3	Fuel Pump Short to Battery	Check engine wiring harness or fuel pump.
23906	4	Fuel Pump Short to Ground	Check engine wiring harness or fuel pump.
23906	5	Fuel Pump Open Circuit	Check engine wiring harness or fuel pump.
23906	12	Engine Control Unit Fault	Contact Multiquip Technical Support.
24000	0	Communication Fault	Contact Multiquip Support.
24000	11	Engine Control Unit Fault	Contact Multiquip Support.

Table 18. Machine Fault Codes			
SPN	**FMI**	**Description**	**Corrective Action**
521100	0	Left Hyd Temp Sensor Fault	Open, short to pwr or high resistance in sensor or harness
521100	1	Left Hyd Temp Fault	Short to gnd or temperature above shutdown limit
521100	17	Left Hyd Temp Overheating	Temperature in warning range. Allow system to cool.
521101	0	Right Hyd Temp Sensor Fault	Open, short to pwr or high resistance in sensor or harness
521101	1	Right Hyd Temp Fault	Short to gnd or temperature above shutdown limit
521101	17	Right Hyd Temp Overheating	Temperature in warning range. Allow system to cool.
521106	31	Left Hyd Oil Filter Restricted	Verify visual indicator. Replace left high pressure filter.
521107	31	Right Hyd Oil Filter Restricted	Replace right mid pressure filter or check harness.
521118	0	Pump Stroke Position Out of Calibration High	Recalibrate, check harness or replace stroke cylinder.
521118	1	Pump Stroke Position Out of Calibration Low	Recalibrate, check harness or replace stroke cylinder.
521118	3	Pump Stroke Sensor Voltage High	Voltage > 4.96 V. Check harness or replace stroke cylinder.
521118	5	Pump Stroke Sensor Voltage Low	Voltage < 0.05 V. Check harness or replace stroke cylinder.
521118	13	Pump Stroke Sensor Needs Calibration	Recalibrate stroke sensor.
521122	0	Left Pitch Sensor Out of Calibration High	Recalibrate, check harness or replace pitch cylinder.
521122	1	Left Pitch Sensor Out of Calibration Low	Recalibrate, check harness or replace pitch cylinder.
521122	3	Left Pitch Sensor Voltage High	Voltage > 4.90 V. Check harness or replace pitch cylinder.
521122	5	Left Pitch Sensor Voltage Low	Voltage < 0.10 V. Check harness or replace pitch cylinder.
521122	13	Left Pitch Sensor Needs Calibration	Recalibrate pitch sensors.
521123	0	Right Pitch Sensor Out of Calibration High	Recalibrate, check harness or replace pitch cylinder.
521123	1	Right Pitch Sensor Out of Calibration Low	Recalibrate, check harness or replace pitch cylinder.
521123	3	Right Pitch Sensor Voltage High	Voltage > 4.90 V. Check harness or replace pitch cylinder.
521123	5	Right Pitch Sensor Voltage Low	Voltage < 0.10 V. Check harness or replace pitch cylinder.
521123	13	Right Pitch Sensor Needs Calibration	Recalibrate pitch sensors.
521131	0	Pedal Signal 1 Out of Calibration High	Recalibrate, check harness or replace pedal sensor.
521131	1	Pedal Signal 1 Out of Calibration Low	Recalibrate, check harness or replace pedal sensor.
521131	3	Foot Pedal Signal 1 Voltage High	Voltage is > 4.96 V. Check harness or replace pedal sensor.
521131	5	Foot Pedal Signal 1 Voltage Low	Voltage is < 0.05 V. Check harness or replace pedal sensor.
521131	13	Pedal Sensor Needs Calibration	Recalibrate pedal sensor.
521147	31	Left Pitch UP Solenoid Fault	Check for harness fault.
521148	31	Left Pitch DOWN Solenoid Fault	Check for harness fault.
521149	31	Right Pitch UP Solenoid Fault	Check for harness fault.
521150	31	Right Pitch DOWN Solenoid Fault	Check for harness fault.
521151	31	Pitch Dump Solenoid Fault	Check for harness fault.
521152	0	Pump Stroke Valve Current High	Check for harness or solenoid fault.
521152	1	Pump Stroke Valve Current Low	Check for harness or solenoid fault.
521152	3	Pump Stroke Valve Short Circuit	Check harness or solenoid for short circuit.
521152	5	Pump Stroke Valve Open Circuit	Check harness or solenoid for open circuit.

Table 18. Machine Fault Codes			
SPN	**FMI**	**Description**	**Corrective Action**
521152	31	Pump Stroke Valve Software Fault	Contact Multiquip Technical Support.
521156	0	Pedal Signal 2 Out of Calibration High	Recalibrate, check harness or replace pedal sensor.
521156	1	Pedal Signal 2 Out of Calibration Low	Recalibrate, check harness or replace pedal sensor.
521156	3	Foot Pedal Signal 2 Voltage High	Voltage is > 4.96 V. Check harness or replace pedal sensor.
521156	5	Foot Pedal Signal 2 Voltage Low	Voltage is < 0.05 V. Check harness or replace pedal sensor.
521156	13	Pedal Sensor Needs Calibration	Recalibrate pedal sensor.
521156	31	Pedal Sensor Sync Fault	Recalibrate, check harness or replace pedal sensor.
521198	5	Blown Fuse(s)	Check all fuses in the large fuse/relay box under the seat.
521199	31	Relay(s) Problem	Check all relays in the large fuse/relay box under the seat.

Troubleshooting (Ride-On Hydraulic Trowel)		
Symptom	**Possible Problem**	**Solution**
Safety stop switch not functioning.	Other problems?	Consult laptop computer based electronic service tool.
	Loose wire connections?	Check wiring. Replace as necessary.
	Bad contacts?	Replace seat cushion (contains the switch).
If 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 that 3.5"" (89mm). Trailing edge of blade should be straight and parallel to the blade bar.
	Spider?	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 (see Optional Equipment)..
	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"" (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"" (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"" (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.
	Blade pitch?	Check blades for consistent pitch. Adjust per Maintenance Section instructions if necessary.
Machine has a perceptible rolling motion while running.	Spider Finger Screws?	Adjust per procedure in Maintenance Section.
	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.

NOTICE

Refer to the MQ Setup/Inspection/Test Procedures Manual for troubleshooting details.

Troubleshooting (Ride-On Hydraulic Trowel) - continued		
Symptom	**Possible Problem**	**Solution**
Work Lights (optional) not working.	Wiring?	Check fuses.Check all electrical connections, including the master on/off switch and check to see if wiring is in good condition with no shorts. Replace as necessary.
	Lights?	Check to see if light bulbs are still good. Replace if broken.
Retardant spray (optional) not working.	Retardant?	Check retardant level in tank. Fill tank as required.
	Wiring?	Check all electrical connections, including master on/off switch connections. Replace components and wiring as necessary.
	Bad switch?	Check the continuity of master on/off switch. Replace if broken.
	Bad spray pump?	If pump has a voltage present when the switch is turned on, but does not operate and electrical connections to the pump are good, replace the pump..
	Bad fuse?	Check fuse. Replace fuse if defective.
Steering is unresponsive.	Blade speed out of adjustment?	See section on blade speed adjustment.
	Worn components?	Check for wear of steering bearings and linkage components replace if necessary.
	Pivots?	Check to ensure free movement of hydraulic drive motors.
	Hydraulic pressure?	Check to ensure that hydraulic steering pressure is adequate. See section on checking hydraulic steering pressure.
Operating position is uncomfortable.	Seat adjusted for operator?	Adjust seat with lever located on the front of the seat.
Pitch system not working.	Wiring?	Check and repair wiring and connectors as necessary.
	Spool stuck in solenoid valve?	Replace solenoid valve.

Troubleshooting (Diesel 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 a 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 (Diesel 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.
Engine oil pressure indicator stays on.	Faulty engine oil pressure switch?	Contact your nearest MQ service center.
	No or low level of engine oil?	Check and adjust oil level as necessary.
	Clogged engine oil filter	Replace engine oil filter.
Engine coolant indicator turns on.	Low engine coolant level?	Add engine coolant.
	Dirty radiator fins?	Clean radiator fins.
	Engine coolant leaking?	Contact your nearest MQ service center.
	V-Belt loose or damaged?	Adjust or replace V-belt.
	Contaminated engine coolant?	Contact your nearest MQ service center.
	Faulty engine coolant pump?	Contact your nearest MQ service center.
Battery indicator turns on.	V-belt loose or damaged?	Adjust or replace V-belt.
	Battery Failure?	Check battery condition.
	Faulty Alternator?	Contact your nearest MQ service center.

OPERATION MANUAL

HERE'S HOW TO GET HELP

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

UNITED STATES

Multiquip Inc.

(310) 537- 3700
6141 Katella Avenue Suite 200
Cypress, CA 90630
E-MAIL: mq@multiquip.com
WEBSITE: www.multiquip.com

CANADA

Multiquip

(450) 625-2244
4110 Industriel Boul.
Laval, Quebec, Canada H7L 6V3
E-MAIL: infocanada@multiquip.com

UNITED KINGDOM

Multiquip (UK) Limited Head Office

0161 339 2223
Unit 2, Northpoint Industrial Estate,
Globe Lane,
Dukinfield, Cheshire SK16 4UJ
E-MAIL: sales@multiquip.co.uk

This manual MUST accompany the equipment at all times. This manual is considered a permanent part of the equipment and should remain with the unit if resold.

The information and specifications included in this publication were in effect at the time of approval for printing. Illustrations, descriptions, references and technical data contained in this manual are for guidance only and may not be considered as binding. Multiquip Inc. reserves the right to discontinue or change specifications, design or the information published in this publication at any time without notice and without incurring any obligations.

Your Local Dealer is:

MULTIQUIP®

PN: 42913

Parchem Construction Supplies Pty Ltd

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Phone: 1300 353 986
flextool.com.au
ABN 80 069 961 968

This manual summarises our best knowledge of the product based on the information available at the time of publication. You should read this manual carefully and consider the information in the context of how the product will be used. Our responsibility for products sold is subject to our standard terms and conditions of sale.

DISCLAIMER:

Any advice, recommendation, information, assistance or service provided by us in this manual is given in good faith and is believed by us to be appropriate and reliable. However, any advice, recommendation, information, assistance or service provided by us is provided without liability or responsibility PROVIDED THAT the foregoing shall not exclude, limit, restrict or modify the right entitlements and remedies conferred upon any person or the liabilities imposed upon us by any condition or warranty implied by Commonwealth, State or Territory Act or ordinance void or prohibiting such exclusion limitation or modification. The product can be expected to perform as indicated in this manual so long as operation and operational procedures of the individual products are followed as recommended in this manual.

Design and technical specifications may be subject to changes.