

RT45

Tier 4

Operator's Manual



Overview

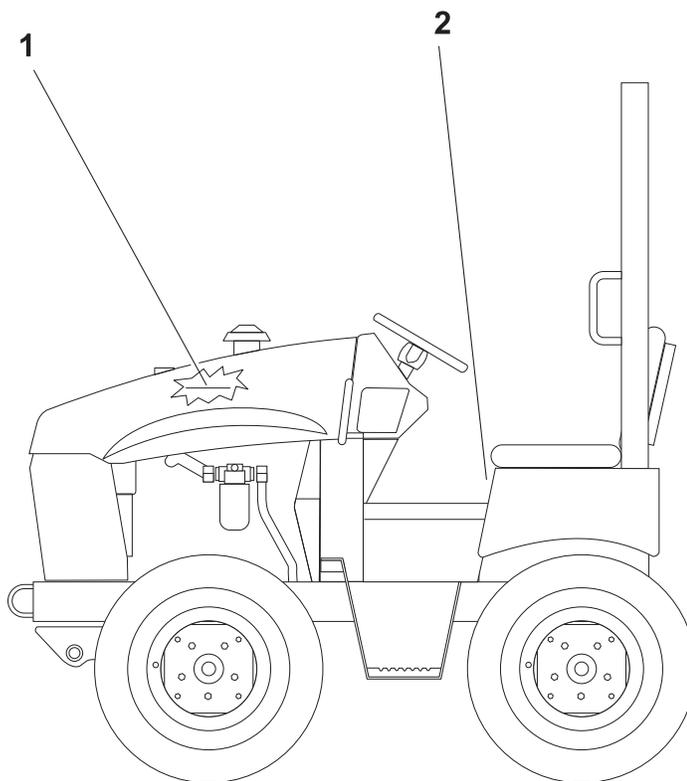


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Serial Number Location

Record serial numbers and date of purchase in spaces provided. RT45 (2) and engine (1) serial numbers are located as shown.



t42om017h.eps

| | |
|--------------------------------|--|
| Date of manufacture | |
| Date of purchase | |
| RT45 serial number | |
| Engine serial number | |
| Front attachment serial number | |
| Rear attachment serial number | |
| Trailer serial number | |

Intended Use



The RT45 is a riding trencher designed to install buried service lines of various sizes using a variety of Ditch Witch® attachments.

| Attachment | Max. width/diameter | Max. depth |
|-----------------------|-------------------------|------------------------|
| A323 backhoe | 18 in (460 mm) | 93.2 in (2.4 m) |
| H313 trencher | 12 in (305 mm) | 63 in (1.6 m) |
| H314 trencher, center | 12 in (305 mm) | 52 in (1.3 m) |
| H314 trencher, offset | 8 in (200 mm) | 52 in (1.3 m) |
| H350 combo | | |
| trencher | 8 in (200 mm) | 42 in (1.1 m) |
| plow | 3 in (76 mm) | 24 in (610 mm) |
| H342 saw | 5 in (130 mm) | 18 in (455 mm) |
| H331 plow | 3 in (76 mm) | 24 in (610 mm) |
| MT12 MicroTrencher | 0.75-1.25 in (19-32 mm) | 6-12.5 in (165-318 mm) |

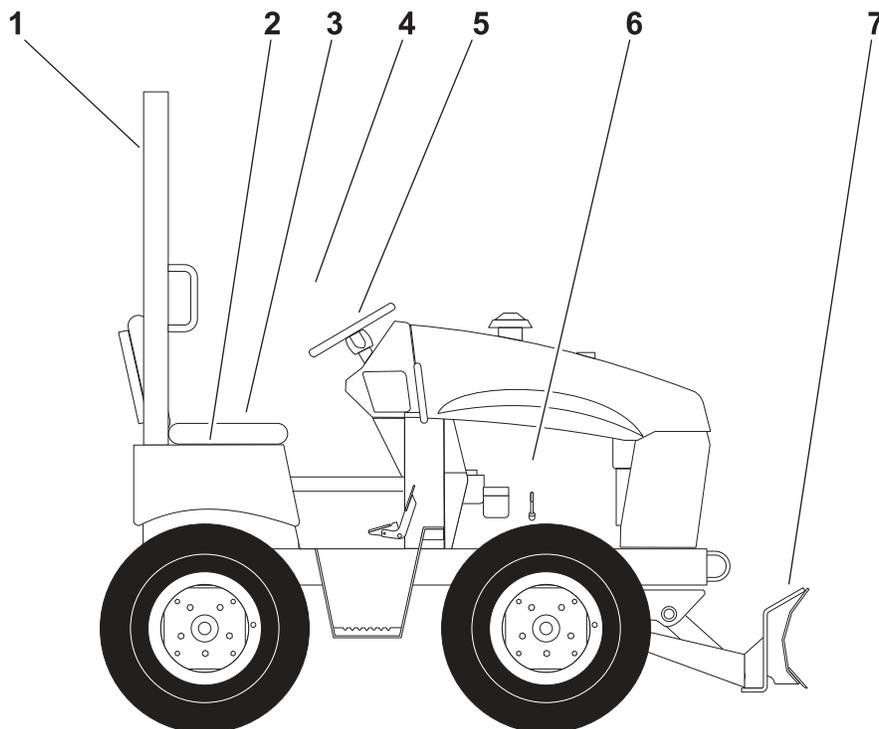
The unit is designed for operation in temperatures typically experienced in earth moving and construction work environments. Provisions may be required to operate in extreme temperatures. Contact your Ditch Witch dealer. Use in any other way is considered contrary to the intended use.

The RT45 should be used with genuine Ditch Witch chain, teeth, and sprockets. It should be operated, serviced, and repaired only by persons familiar with its particular characteristics and acquainted with the relevant safety procedures.

Equipment Modification

This equipment was designed and built in accordance with applicable standards and regulations. Modification of equipment could mean that it will no longer meet regulations and may not function properly or in accordance with the operating instructions. Modification of equipment should only be made by competent personnel possessing knowledge of applicable standards, regulations, equipment design functionality/requirements and any required specialized testing.

Unit Components



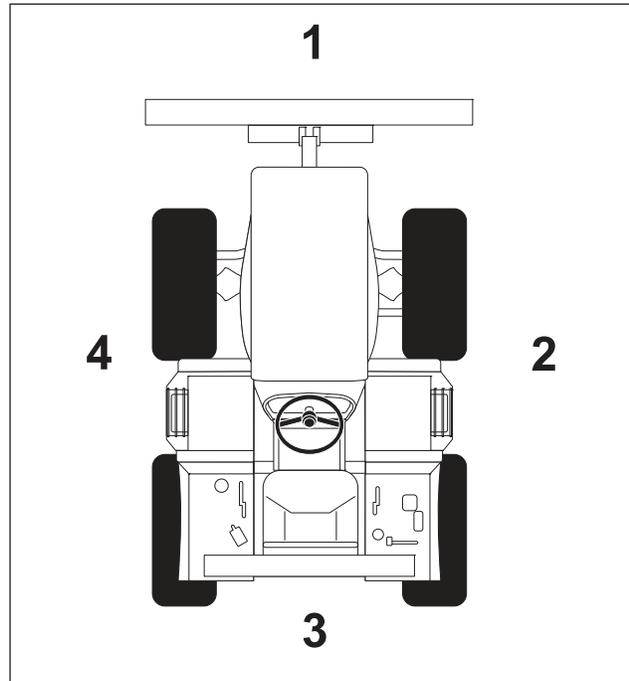
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- | | |
|---|-----------------------|
| 1. Rollover Protective Structure (ROPS) | 5. Center console |
| 2. Right console | 6. Engine compartment |
| 3. Left console | 7. Backfill blade |
| 4. Operator's station | |

Operator Orientation

- | | |
|------------------|-----------------|
| 1. Front of unit | 3. Rear of unit |
| 2. Right of unit | 4. Left of unit |

Right and left sides of machine are determined by facing front of unit while seated at the controls.



About This Manual

This manual contains information for the proper use of this machine. See **Operation Overview** for basic operating procedures. Cross references such as “See page 50” will direct you to detailed procedures.

Bulleted Lists

Bulleted lists provide helpful or important information or contain procedures that do not have to be performed in a specific order.

Numbered Lists

Numbered lists contain illustration callouts or list steps that must be performed in order.

Foreword



This manual is an important part of your equipment. It provides safety information and operation instructions to help you use and maintain your Ditch Witch® equipment.

Read this manual before using your equipment. Keep it with the equipment at all times for future reference. If you sell your equipment, be sure to give this manual to the new owner.

If you need a replacement copy, contact your Ditch Witch dealer. If you need assistance in locating a dealer, visit our website at www.ditchwitch.com or write to the following address:

The Charles Machine Works, Inc.
Attn: Marketing Department
PO Box 66
Perry, OK 73077-0066
USA

The descriptions and specifications in this manual are subject to change without notice. The Charles Machine Works, Inc. reserves the right to improve equipment. Some product improvements may have taken place after this manual was published. For the latest information on Ditch Witch equipment, see your Ditch Witch dealer.

Thank you for buying and using Ditch Witch equipment.



RT45 Operator's Manual

This manual covers the following model: RT45 Tier 4.

Issue number 3.0/OM-06/16

Part number 053-2746

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This product and its use may be covered by one or more patents at <http://patents.charlesmachine.works>.

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Safety

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Guidelines



When you see this safety alert sign, carefully read and follow all instructions. **YOUR SAFETY IS AT STAKE.** Read this entire section before using your equipment.

Follow these guidelines before operating any jobsite equipment:

- Complete proper training and read operator's manual before using equipment.
- Mark proposed path with white paint and have underground utilities located before working. In the US or Canada, call 811 (US) or 888-258-0808 (US and Canada). Also contact any local utilities that do not participate in the One-Call service. In countries that do not have a One-Call service, contact all local utility companies to have underground utilities located.
- Classify jobsite based on its hazards and use correct tools and machinery, safety equipment, and work methods for jobsite.
- Mark jobsite clearly and keep spectators away.
- Wear personal protective equipment.
- Review jobsite hazards, safety and emergency procedures, and individual responsibilities with all personnel before work begins. Safety videos are available from your Ditch Witch® dealer or at www.ditchwitch.com/safe.
- Fully inspect equipment before operating. Repair or replace any worn or damaged parts. Replace missing or damaged safety shields and safety signs. Contact your Ditch Witch dealer for assistance.
- Use equipment carefully. Stop operation and investigate anything that does not look or feel right.
- Do not operate unit where flammable gas may be present.
- Only operate equipment in well-ventilated areas.
- Contact your Ditch Witch dealer if you have any question about operation, maintenance, or equipment use.
- Complete the equipment checklist located at www.ditchwitch.com/safe.

California Proposition 65 Warning

This product may contain chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

- battery posts, terminals and related accessories
- engine exhaust
- ethylene glycol

Emergency Procedures



WARNING

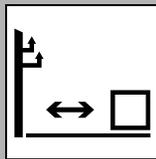
Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.



Before operating any equipment, review emergency procedures and check that all safety precautions have been taken.

EMERGENCY SHUTDOWN - Turn ignition switch to stop position or push remote engine stop button (if equipped).

Electric Strike Description



DANGER

Electric shock. Contacting electric lines will cause death or serious injury. Know location of lines and stay away.

When working near electric cables, remember the following:

- Electricity follows all paths to ground, not just path of least resistance.
- Pipes, hoses, and cables will conduct electricity back to all equipment.
- Low voltage current can injure or kill. Many work-related electrocutions result from contact with less than 440 volts.

Most electric strikes are not noticeable, but indications of a strike include:

- power outage
- smoke
- explosion
- popping noises
- arcing electricity

If any of these occur, assume an electric strike has occurred.

If an Electric Line is Damaged

If you suspect an electric line has been damaged and you are on tractor, **DO NOT MOVE**. Remain on tractor and take the following actions. The order and degree of action will depend upon the situation.

- Warn people nearby that an electric strike has occurred. Instruct them to leave the area and contact utility.
- Raise attachments and drive from immediate area.
- Contact utility company to shut off power.
- Do not return to jobsite or allow anyone into area until given permission by utility company.

If you suspect an electric line has been damaged and you are **off tractor**, **DO NOT TOUCH TRACTOR**. Take the following actions. The order and degree of action will depend upon the situation.

- **LEAVE AREA**. The ground surface may be electrified, so take small steps with feet close together to reduce the hazard of being shocked from one foot to the other. For more information, contact your Ditch Witch[®] dealer.
- Contact utility company to shut off power.
- Do not return to jobsite or allow anyone into area until given permission by utility company.

If a Gas Line is Damaged



⚠ WARNING Fire or explosion possible. Fumes could ignite and cause burns. No smoking, no flame, no spark. 275-419 (2P)



⚠ WARNING Explosion possible. Serious injury or equipment damage could occur. Follow directions carefully.

If you suspect a gas line has been damaged, take the following actions. The orders and degree of action will depend on the situation.

- Immediately shut off engine(s), if this can be done safely and quickly.
- Remove any ignition source(s), if this can be done safely and quickly.
- Warn others that a gas line has been cut and that they should leave the area.
- Leave jobsite as quickly as possible.
- Immediately call your local emergency phone number and utility company.
- If jobsite is along street, stop traffic from driving near jobsite.
- Do not return to jobsite until given permission by emergency personnel and utility company.

If a Fiber Optic Cable is Damaged

Do not look into cut ends of fiber optic or unidentified cable. Vision damage can occur. Contact utility company.

If Machine Catches on Fire

Perform emergency shutdown procedure and then take the following actions. The order and degree of action will depend on the situation.

- Immediately move battery disconnect switch (if equipped and accessible) to disconnect position.
- If fire is small and fire extinguisher is available, attempt to extinguish fire.
- If fire cannot be extinguished, leave area as quickly as possible and contact emergency personnel.

Safety Alert Classifications

These classifications and the icons defined on the following pages work together to alert you to situations which could be harmful to you, jobsite bystanders or your equipment. When you see these words and icons in the book or on the machine, carefully read and follow all instructions. **YOUR SAFETY IS AT STAKE.**



Watch for the three safety alert levels: **DANGER**, **WARNING** and **CAUTION**. Learn what each level means.

 **DANGER** indicates a hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

 **WARNING** indicates a hazardous situation that, if not avoided, could result in death or serious injury.

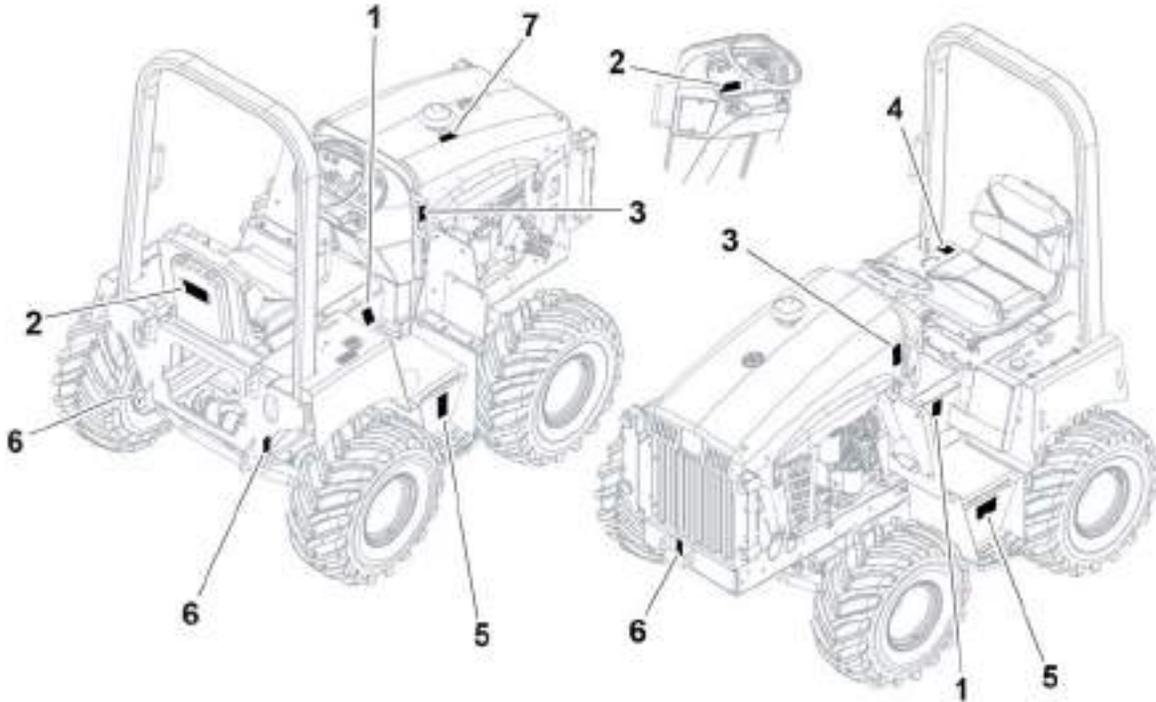
 **CAUTION** indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

Watch for two other words: **NOTICE** and **IMPORTANT**.

NOTICE indicates information considered important, but not hazard-related (e.g., messages relating to property damage).

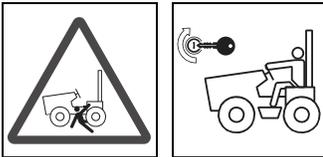
IMPORTANT can help you do a better job or make your job easier in some way.

Machine Safety Alerts



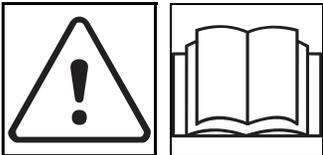
Decal_RT45.png

1



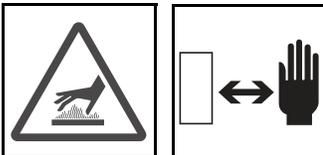
⚠ WARNING Runaway possible. Start from operator's position only. 275-070

2



⚠ WARNING Read operator's manual. Know how to use all controls. Your safety is at stake. 273-475

3



⚠ CAUTION Hot parts may cause burns. Do not touch until cool or wear gloves. 273-423

4



⚠ WARNING Rollover could kill or crush. Wear seat belt. 275-303

5



⚠ WARNING Fall possible. Riders can fall from machine and be injured or killed. Only operator is allowed on machine. 273-487

6



Tiedown location. See Transport chapter for more information.
274-318

7

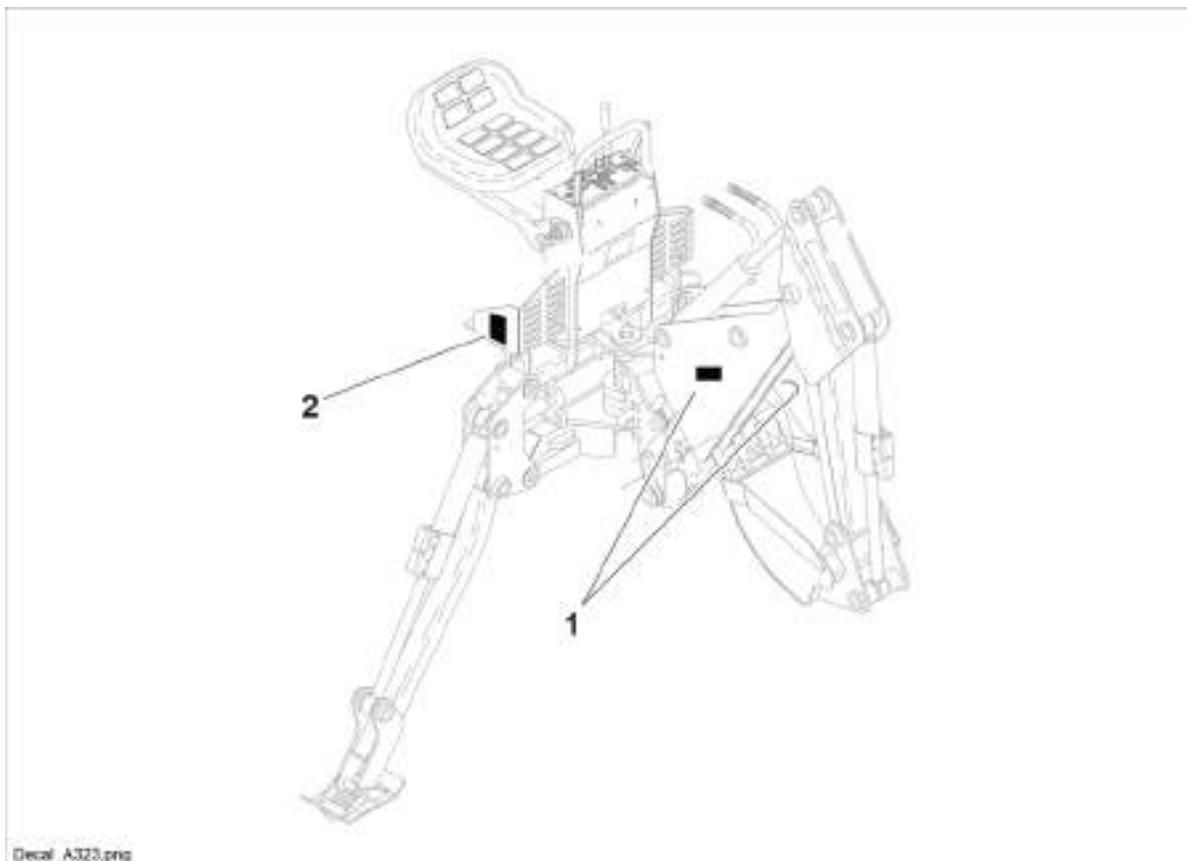


⚠ WARNING Fire or explosion possible. Do not use starter fluid.
273-459



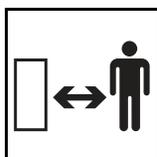
Attachment Safety Alerts

A323



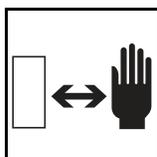
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1



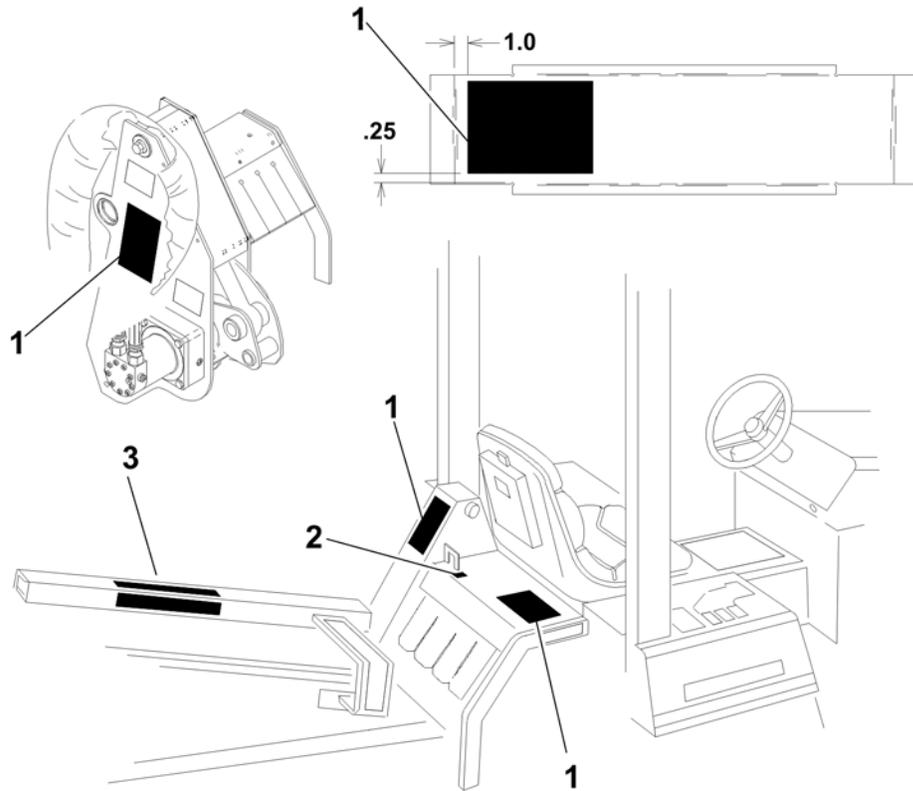
⚠ WARNING Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.

2

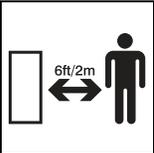


⚠ WARNING Moving parts could cut off hand. Keep hands away.

H313



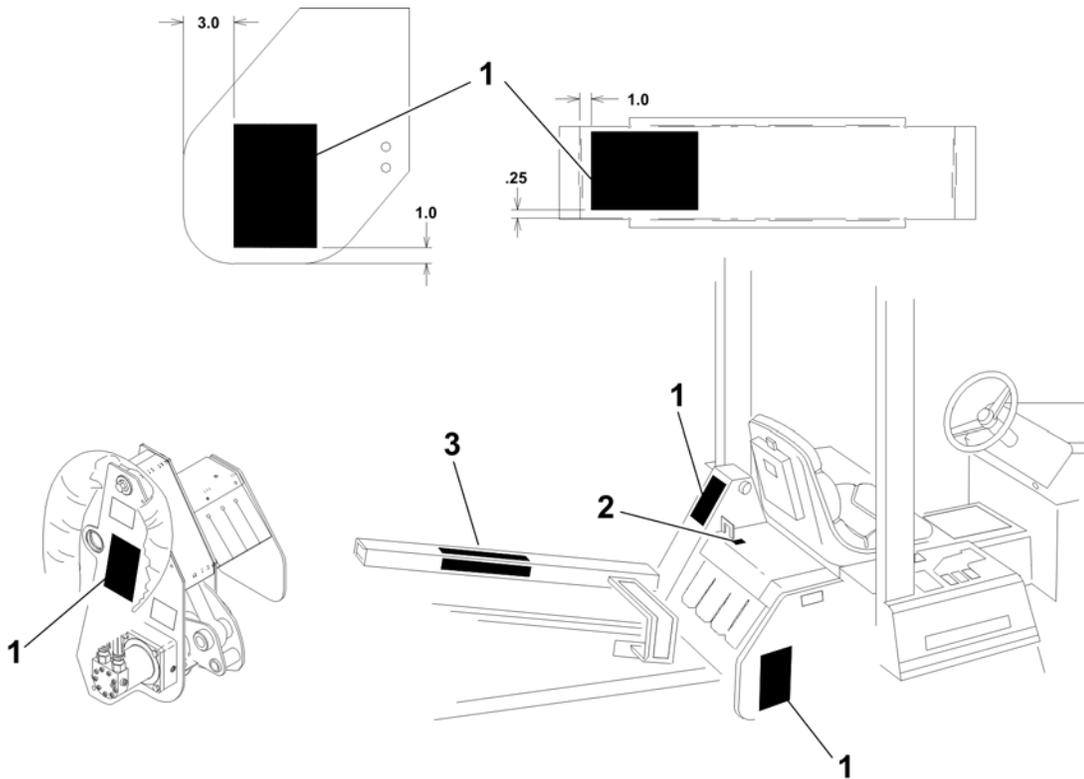
Decal H313 3D

1   **⚠ DANGER** Moving digging teeth will cause death or serious injury. Trench cave-in can cause you to fall. Stay away. 274-002

2  Lift point. See Transport chapter for more information. 274-442

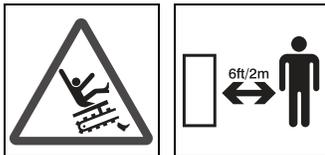
3 **⚠ DANGER** Moving digging teeth will cause death or serious injury. Trench cave-in can cause you to fall. Stay away.

H314



Decal_H314_3D

1



⚠ DANGER Moving digging teeth will cause death or serious injury. Trench cave-in can cause you to fall. Stay away. 274-002

2

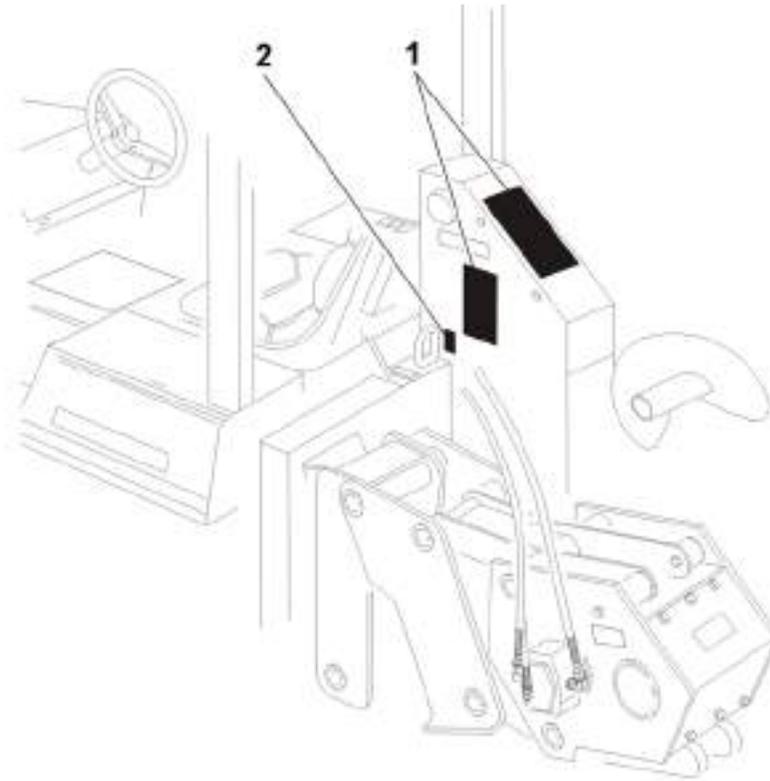


Lift point. See Transport chapter for more information. 274-442

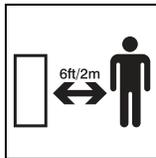
3

⚠ DANGER Moving digging teeth will cause death or serious injury. Trench cave-in can cause you to fall. Stay away.

H350



1



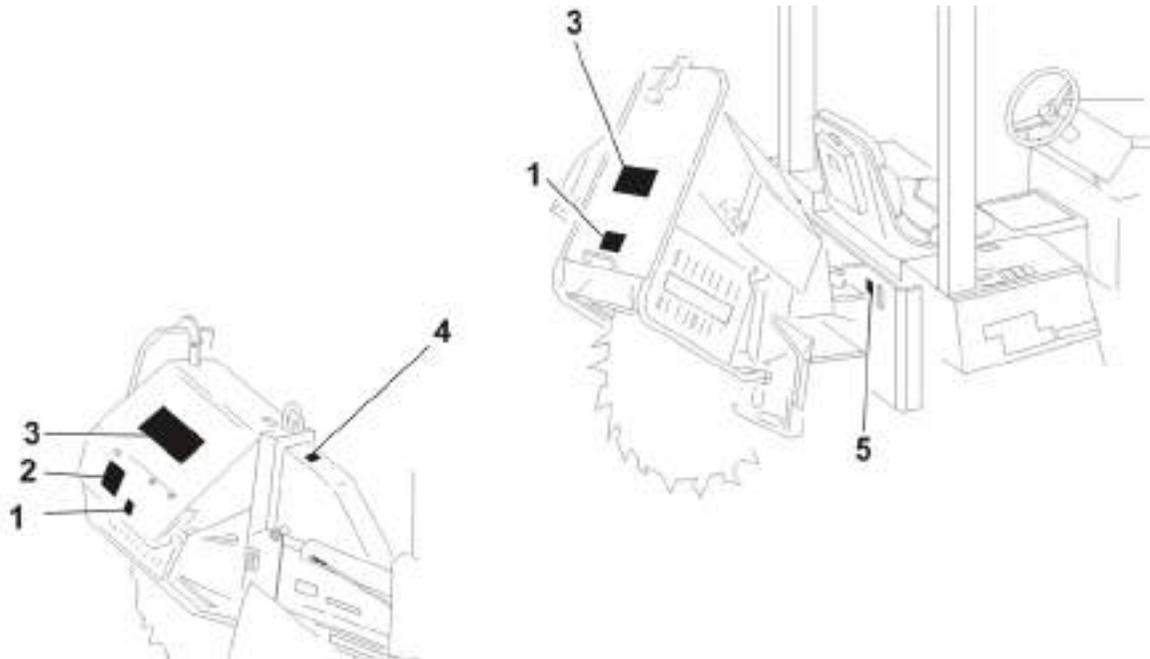
⚠ DANGER Moving digging teeth will cause death or serious injury. Trench cave-in can cause you to fall. Stay away. 274-002

2

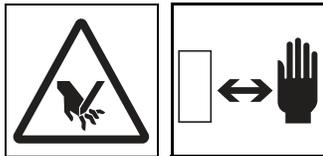


Lift point. See Transport chapter for more information. 274-442

H342



1



⚠ WARNING

Moving parts could cut off hand. Keep hands away.

275-184

2

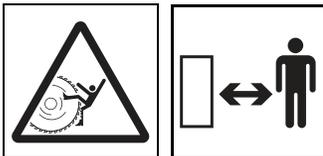


⚠ CAUTION

Flying objects thrown by machine may strike people. Wear safety glasses and hard hat.

275-193

3

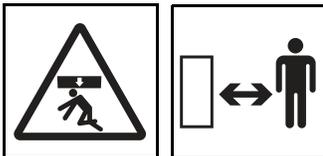


⚠ DANGER

Moving digging teeth will cause serious injury or death. Stay away.

275-443

4



⚠ WARNING

Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.

275-326

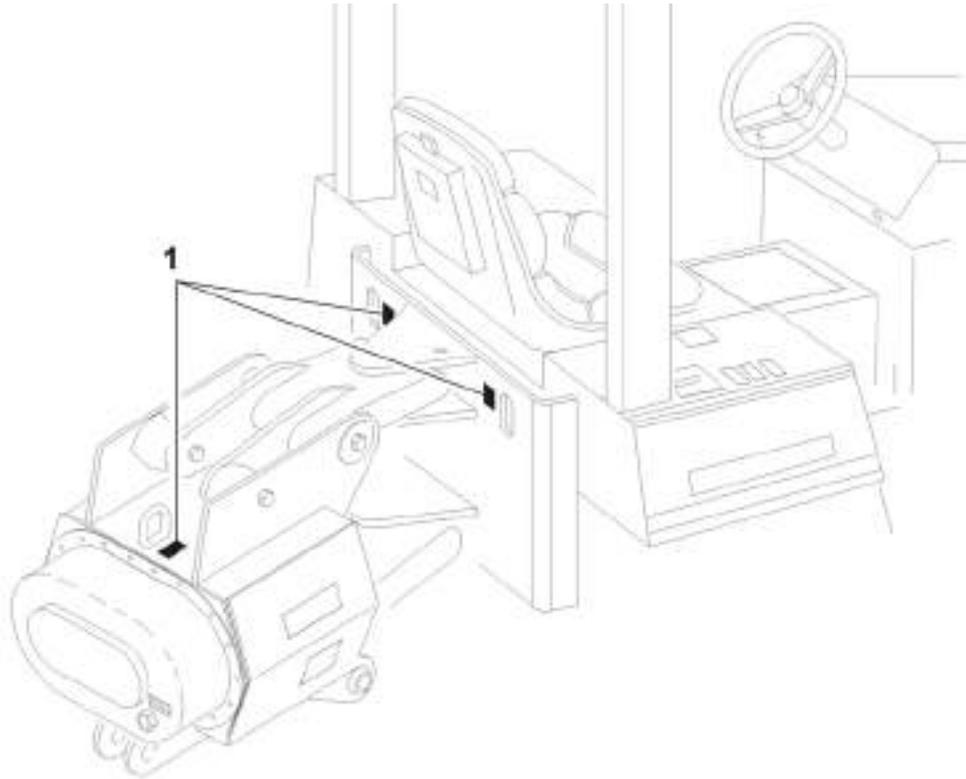
5



Lift point. See Transport chapter for more information.

274-442

H331

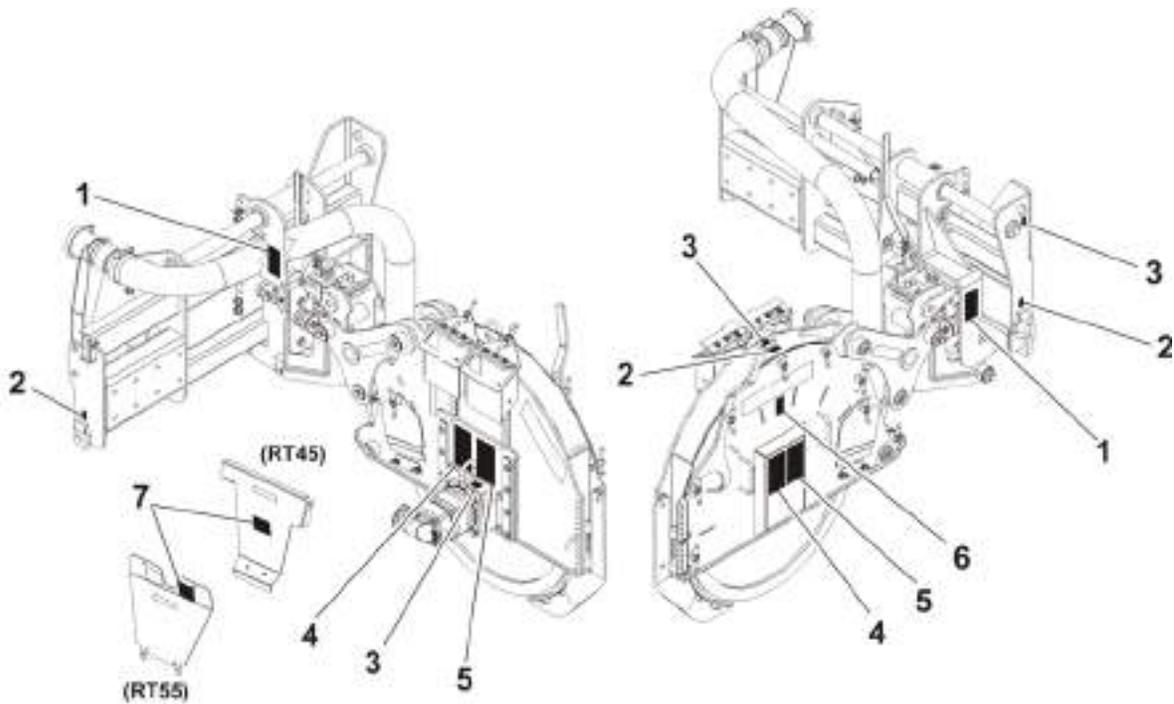


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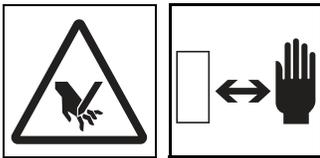


Lift point. See Transport chapter for more information. 274-442

MT12



1



WARNING

Moving parts could cut off hand. Keep hands away.

275-184

2



Tiedown location. See Transport chapter for more information.

274-318

3



Lift point. See Transport chapter for more information.

274-442

4

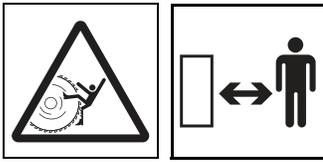


CAUTION

Flying objects thrown by machine may strike people. Wear safety glasses and hard hat.

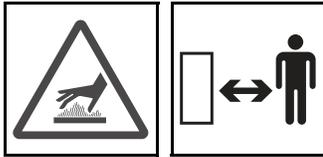
275-193

5



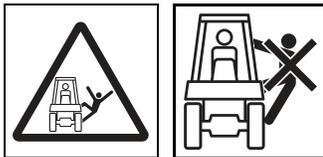
⚠ DANGER Moving digging teeth will cause serious injury or death. Stay away. 275-443

6



⚠ CAUTION Hot parts may cause burns. Do not touch until cool or wear gloves. 275-355

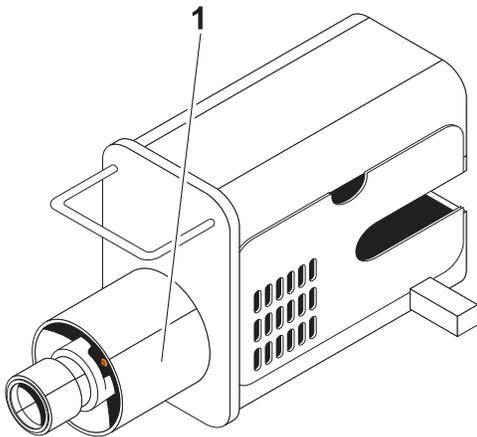
7



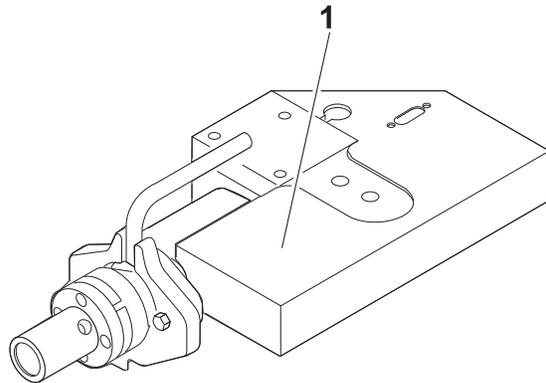
⚠ WARNING Fall possible. Riders can fall from machine and be injured or killed. Only operator is allowed on machine. 273-487



RWIII/RWIV

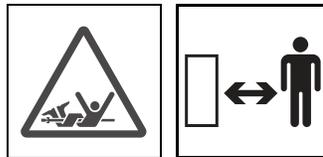


Decal_RW_III



Decal_RW_IV

1



⚠ DANGER Turning shaft will kill you or crush arm or leg. Stay away. 275-197

Controls

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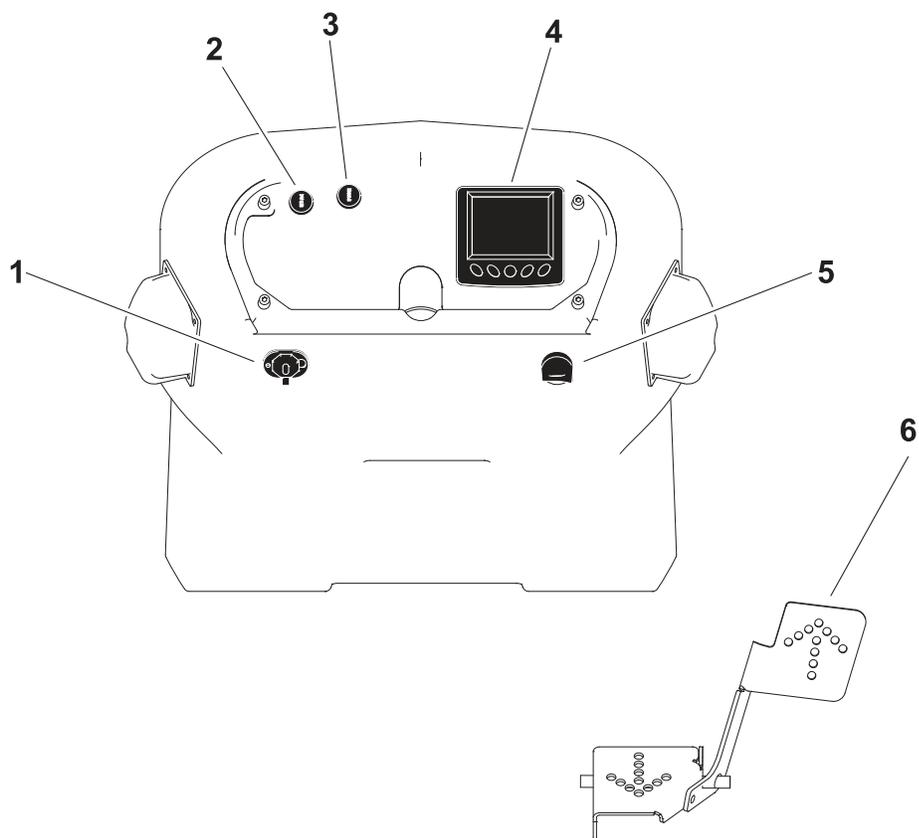
Seat 58

Battery Disconnect 59



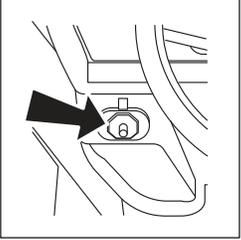
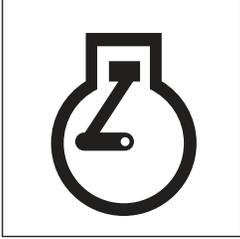
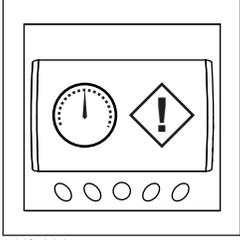
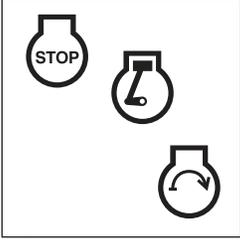
Center Console

Controls

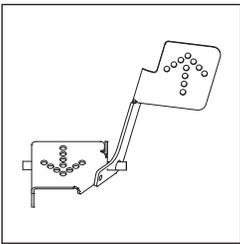


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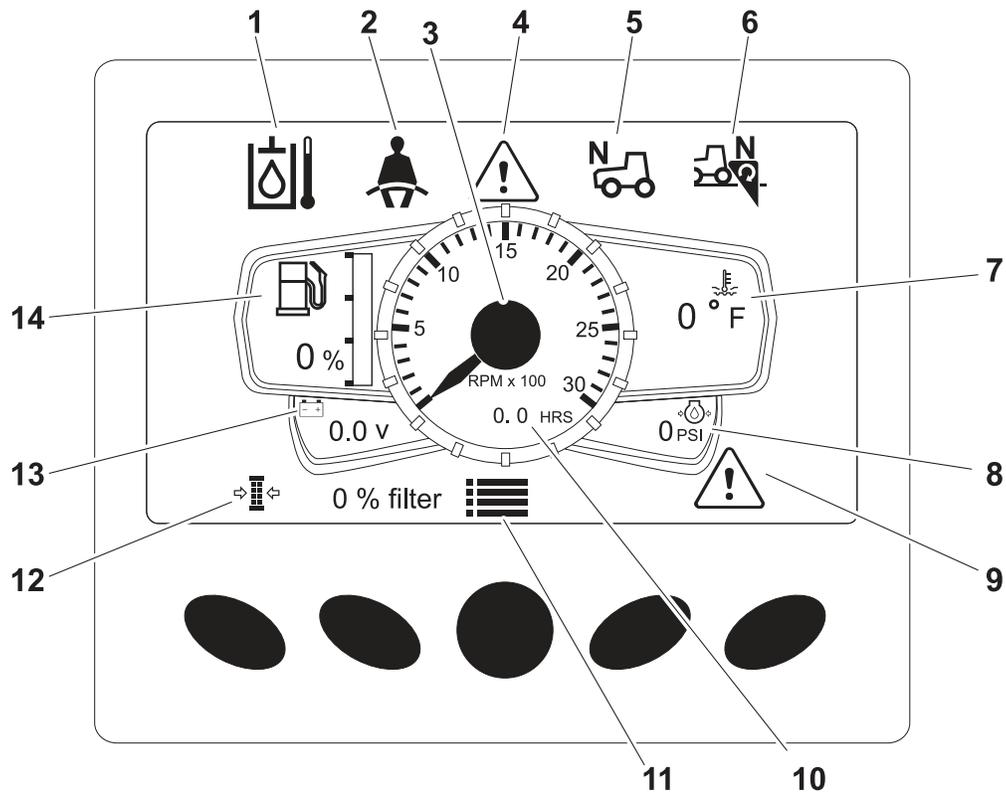
- | | |
|---------------------------|------------------------------|
| 1. Auxiliary power outlet | 4. Graphic display |
| 2. Engine override switch | 5. Ignition switch |
| 3. Horn | 6. Ground drive foot control |

| Item | Description | Notes |
|--|--|--|
| <p>1. Auxiliary power outlet</p>  <p>c00ic075c.eps</p> | <p>Provides power for other equipment.</p> | <p>Power output is 12V, 5A.</p> |
| <p>2. Engine override switch</p>  <p>c00ic024w.eps</p> | <p>If engine shutdown indicator comes on, press to delay engine shutdown for 30 seconds.</p> | <p>This control allows a temporary override of engine shutdown.</p> <p>NOTICE: After 30 seconds, engine will again shut down unless fault condition has been cleared on diagnostic gauge.</p> |
| <p>3. Horn</p>  <p>c00ic044h.eps</p> | <p>To sound horn, press.</p> | |
| <p>4. Graphic display</p>  <p>c00ic604w.eps</p> | <p>Graphic symbols are displayed for indicators and conditions previously shown with gauges.</p> | <p>IMPORTANT: If error code SPN 190 FMI 8 appears, clear and reset display. Restart engine.</p> |
| <p>5. Ignition switch</p>  <p>c00ic686h.eps</p> | <p>To start engine, insert key and turn clockwise.</p> <p>To stop engine, turn counterclockwise.</p> | <p>IMPORTANT: If engine does not start on first attempt, check that all interlock requirements have been met, return switch to STOP, and try again.</p> |



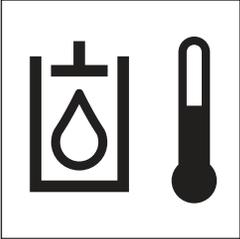
| Item | Description | Notes |
|---|--|--|
| <p>6. Ground drive foot control</p>  <p>c00ic676h.eps</p> | <p>To move tractor forward, push top of pedal.</p> <p>To move tractor backward, push bottom of pedal.</p> <p>To increase speed in either direction, push pedal farther from center.</p> <p>To reduce speed in either direction, release pedal.</p> | <p>Pedal should automatically return to neutral when released.</p> |

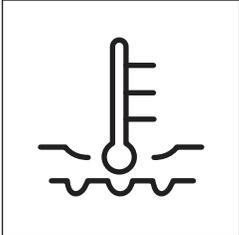
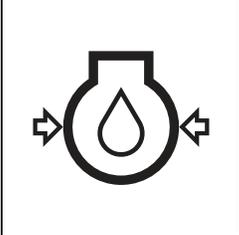
Graphic Display



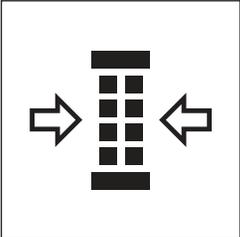
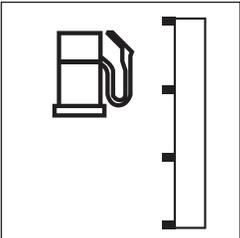
t42om014h.eps

- | | |
|--|--------------------------------------|
| 1. Hydraulic fluid temperature indicator | 8. Engine oil pressure indicator |
| 2. Operator presence indicator | 9. Diagnostic menu button |
| 3. Engine speed (RPM) | 10. Hourmeter |
| 4. Diagnostic message indicator | 11. Settings menu button |
| 5. Ground drive neutral indicator | 12. Air filter restriction indicator |
| 6. Attachment drive neutral indicator | 13. Electrical system voltage |
| 7. Engine coolant temperature | 14. Fuel level indicator |

| Item | Description | Notes |
|---|--|---|
| <p>1. Hydraulic fluid temperature indicator</p>  <p>c00ic037t.eps</p> | <p>Lights if hydraulic fluid overheats. Light will come on briefly when engine is started.</p> | <p>If light remains on:</p> <ul style="list-style-type: none"> • Check that engine fan is turning when engine is running. • Turn off engine and let it cool. • Check hydraulic fluid level. • Check front of hydraulic fluid cooler for debris. |
| <p>2. Operator presence indicator</p>  <p>c00ic001w.eps</p> | <p>Lights when operator is in seat.</p> | <p>Part of the start interlock system. To start engine,</p> <ul style="list-style-type: none"> • operator must be in seat, • attachment drive control must be in neutral, and • ground drive control must be in neutral. |
| <p>3. Engine speed (RPM)</p> | <p>Displays engine RPM.</p> | |
| <p>4. Diagnostic message indicator</p> | <p> indicates a warning code</p> <p> indicates a stop code</p> | |
| <p>5. Ground drive neutral indicator</p>  <p>c00ic022w.eps</p> | <p>Lights when ground drive control is in neutral.</p> | <p>Part of the start interlock system. To start engine,</p> <ul style="list-style-type: none"> • operator must be in seat, • attachment drive control must be in neutral, and • ground drive control must be in neutral. |

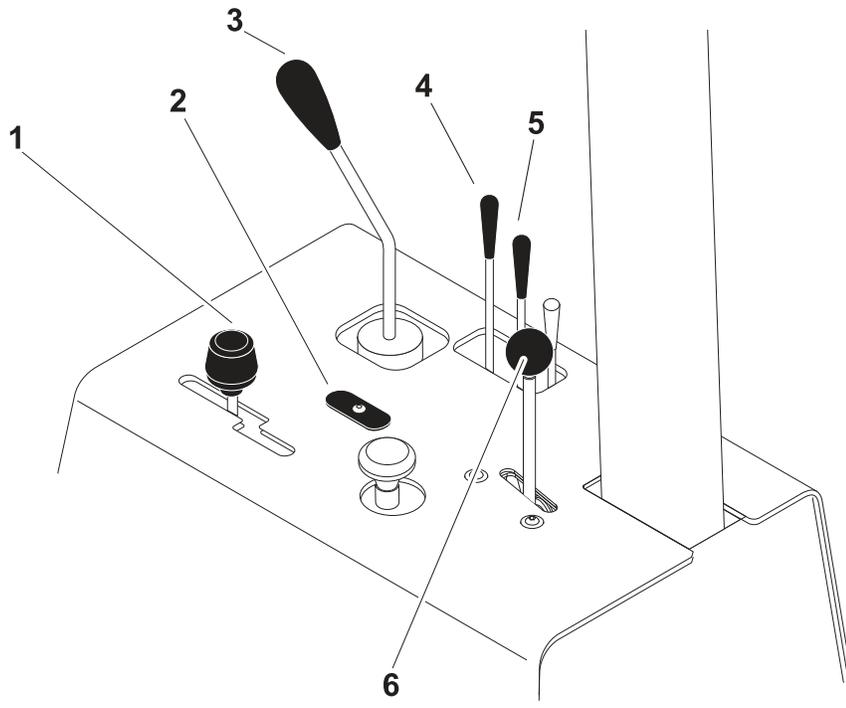
| Item | Description | Notes |
|--|---|---|
| <p>6. Attachment drive neutral indicator</p>  <p>c00ic021w.eps</p> | <p>Lights when attachment drive/direction control is in neutral.</p> | <p>Part of the start interlock system. To start engine,</p> <ul style="list-style-type: none"> • operator must be in seat, • attachment drive control must be in neutral, and • ground drive control must be in neutral. |
| <p>7. Engine coolant temperature</p>  <p>c00ic004w.eps</p> | <p>Will flash if engine coolant temperature rises above 230°F(110°C).</p> | |
| <p>8. Engine oil pressure indicator</p>  <p>c00ic096a.eps</p> | <p>Will flash if oil pressure falls below 20 psi (1.38 bar). Light will come on briefly when engine is started.</p> | <p>If light remains on:</p> <ul style="list-style-type: none"> • Turn off engine. • Check oil level. • If pressure is still low, consult engine manual. |
| <p>9. Diagnostics menu button</p> | <p>Press button below icon to go to the Diagnostics menu.</p> | |
| <p>10. Hourmeter</p> | <p>Records engine operating time.</p> | <p>Use engine operating times to schedule service.</p> |
| <p>11. Settings menu button</p> | <p>Press button below icon to go to the Settings menu.</p> | |



| Item | Description | Notes |
|---|---|--|
| <p>12. Air filter restriction indicator</p>  <p>c00ic684h.eps</p> | <p>Indicator will begin flashing once the air filter is 25% unrestricted. Percentage will decrease as air filter becomes more restricted.</p> <p>For best results, replace filter between 25% and 0%. Reset after replacing air filter.</p> | <p>To view the air filter percentage before 25% unrestricted, press the diagnostics menu button at any time.</p> |
| <p>13. Electrical system voltage</p> | <p>Displays system voltage.</p> | <p>Should show 12-14V with engine running.</p> |
| <p>14. Fuel level indicator</p>  <p>c00ic677h.eps</p> | <p>Displays fuel level in tank.</p> <p>Will flash if fuel level is below 10%.</p> | <p>Fuel tank holds 13 gal (49 L).</p> <p>NOTICE: Use ultra low sulfur fuel only.</p> |

Right Fender

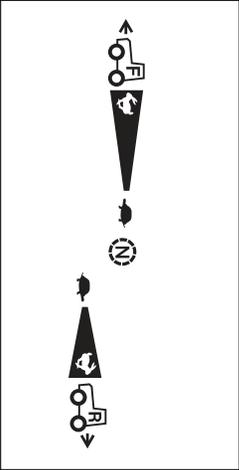
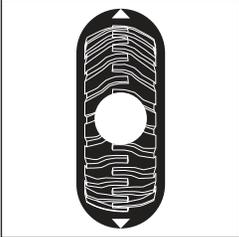
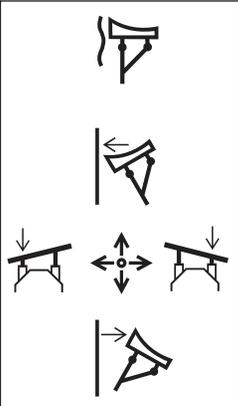
Tractor Controls

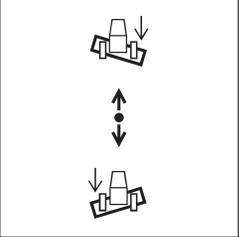
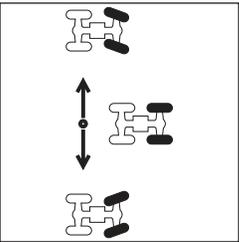
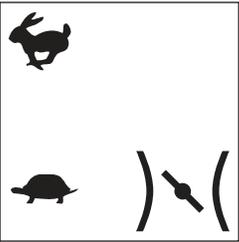


t42om002h.eps

- | | |
|---|----------------------------------|
| 1. Ground drive speed/direction control | 4. Backfill blade tilt control * |
| 2. Rear steer indicator* | 5. Rear steer control* |
| 3. Backfill blade control | 6. Throttle |

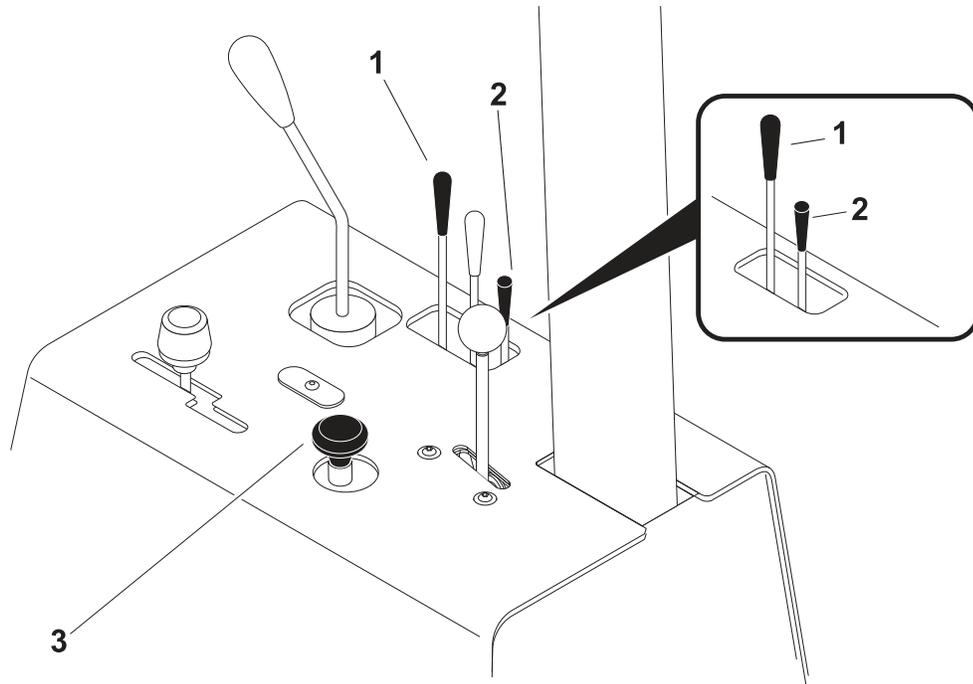
*optional

| Item | Description | Notes |
|---|---|---|
| <p>1. Ground drive speed/ direction control</p>  <p>c00ic251h.eps</p> | <p>To go forward, push.</p> <p>To go backward, pull.</p> <p>To go faster in either direction, move farther from center.</p> <p>To stop, move to neutral.</p> | <p>Control does not automatically return to neutral position when released.</p> |
| <p>2. Rear steer indicator</p>  <p>c00ic687h.eps</p> | <p>Rotates to displays position of rear tires.</p> | |
| <p>3. Backfill blade control</p>  <p>c00ic252h.eps</p> | <p>To lower blade, push.</p> <p>To put blade in float, push fully forward.</p> <p>To raise blade, pull.</p> <p>To swing blade to right, move right.</p> <p>To swing blade to left, move left.</p> | |

| Item | Description | Notes |
|---|--|-------|
| <p>4. Backfill blade tilt control</p>  <p>c00ic253h.eps</p> | <p>To tilt right side of blade down, push.</p> <p>To tilt left side of blade down, pull.</p> | |
| <p>5. Rear steer control</p>  <p>c00ic080c.eps</p> | <p>To turn rear tires right, push until tires reach desired position, then release.</p> <p>To turn rear tires left, pull until tires reach desired position, then release.</p> | |
| <p>6. Throttle</p>  <p>c00ic081c.eps</p> | <p>To increase engine speed, push.</p> <p>To decrease engine speed, pull.</p> | |



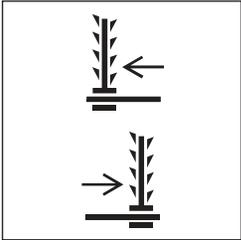
Trencher Controls



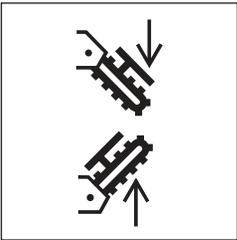
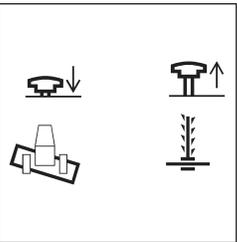
Note: Control configuration with rear steer option is shown in main illustration. Control configuration without rear steer is shown in balloon.

t42om003h.eps

- | | |
|----------------------------|---|
| 1. Trencher slide control* | 3. Backfill blade tilt/trencher slide selector* |
| 2. Boom lift control | *H314 only |

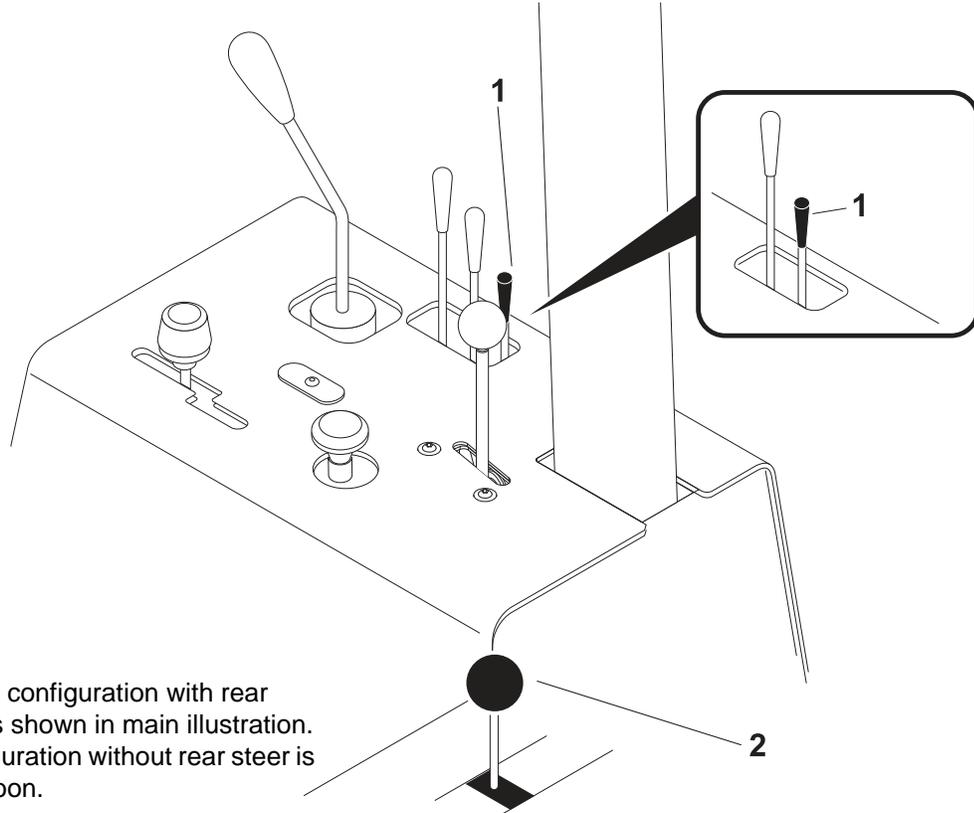
| Item | Description | Notes |
|---|---|-------|
| 1. Trencher slide control  | To slide trencher right, push. To slide trencher left, pull. | |

c00ic198h.eps

| Item | Description | Notes |
|--|--|-------|
| <p>2. Boom lift control</p>  <p>c001c200h.eps</p> | <p>To lower, push.</p> <p>To raise, pull.</p> | |
| <p>3. Backfill blade tilt/ trencher slide selector</p>  <p>c001c263h.eps</p> | <p>To control backfill blade tilt, push.</p> <p>To control trencher slide, pull.</p> | |



Combo Controls

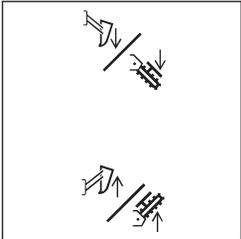


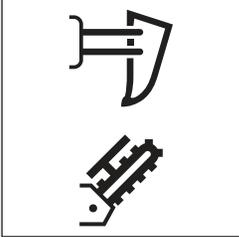
Note: Control configuration with rear steer option is shown in main illustration. Control configuration without rear steer is shown in balloon.

t42om024h.eps

1. Trencher/Plow lift control

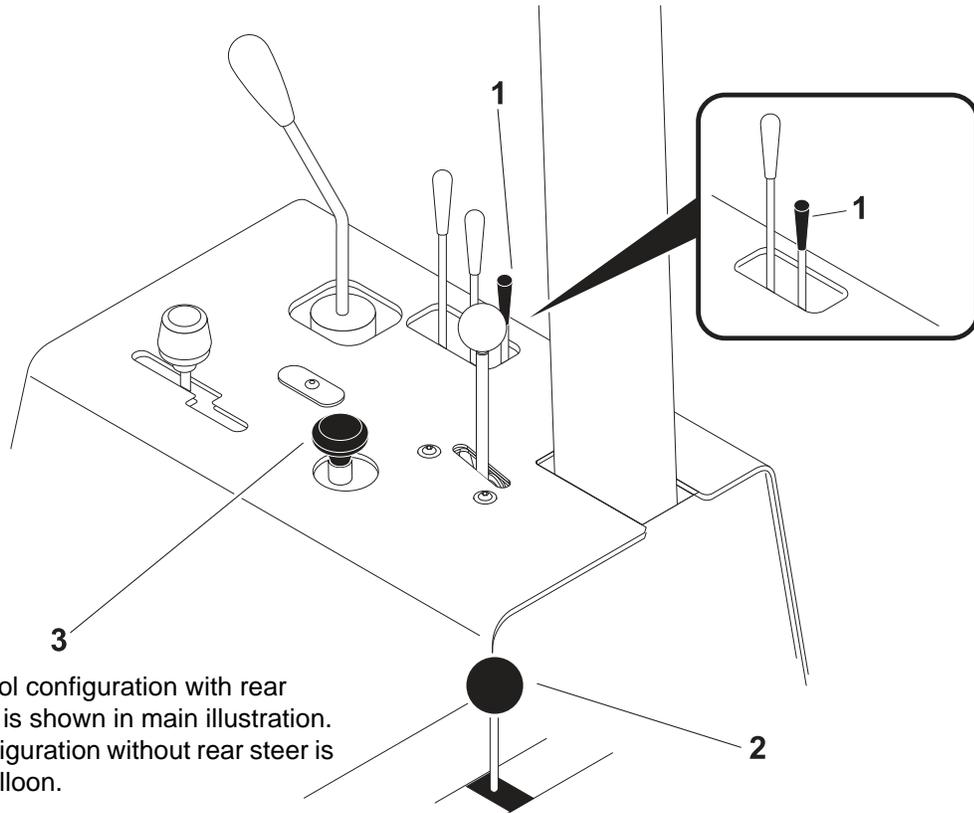
2. Trencher/plow select control

| Item | Description | Notes |
|--|---|-------|
| <p>1. Trencher/Plow lift control</p>  <p>c00ic265h.eps</p> | <p>To raise selected attachment, pull.</p> <p>To lower selected attachment, push.</p> | |

| Item | Description | Notes |
|--|---|-------|
| <p>2. Trencher/plow select control</p> <div></div> <p>c00ic090c.eps</p> | <p>To select plow, push.</p> <p>To select trencher, pull.</p> | |



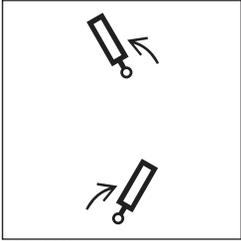
Saw Controls

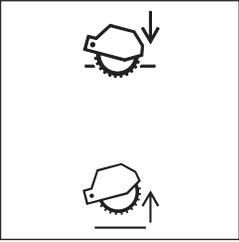
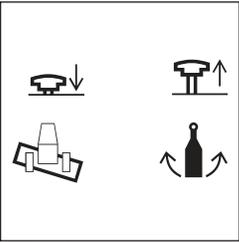


Note: Control configuration with rear steer option is shown in main illustration. Control configuration without rear steer is shown in balloon.

t42om005h.eps

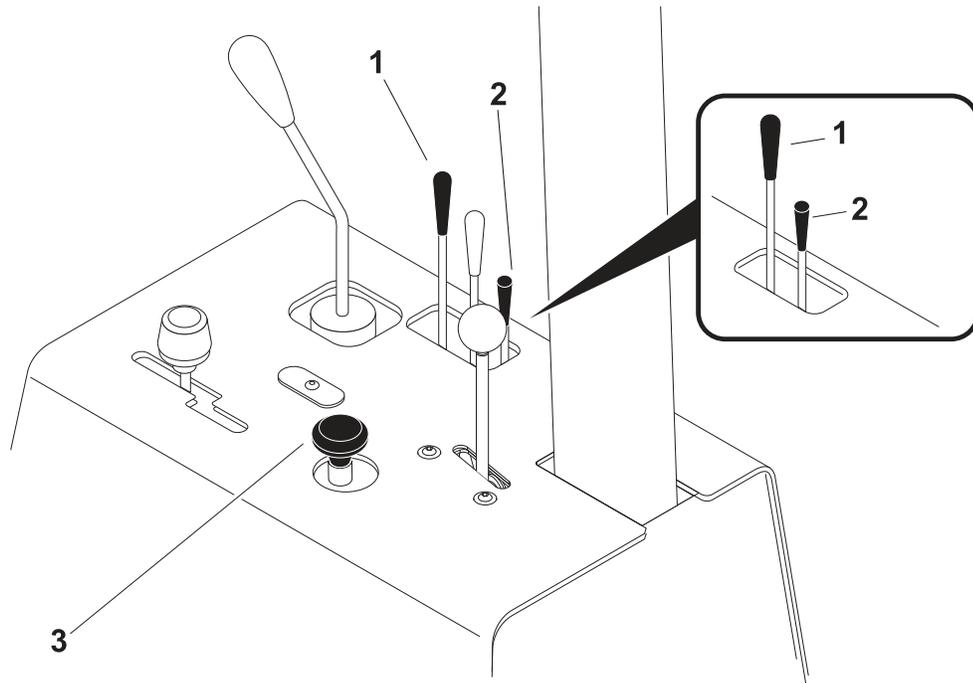
- 1. Saw swing control
- 2. Saw lift control
- 3. Backfill blade tilt/saw swing selector

| Item | Description | Notes |
|---|--|-------|
| <p>1. Saw swing control</p>  <p>c00ic266h.eps</p> | <p>To swing saw to left, pull.</p> <p>To swing saw to right, push.</p> | |

| Item | Description | Notes |
|--|---|-------|
| <p>2. Saw lift control</p>  <p>c001c267h.eps</p> | <p>To lower, push.</p> <p>To raise, pull.</p> | |
| <p>3. Backfill blade tilt/saw swing selector</p>  <p>c001c264h.eps</p> | <p>To control backfill blade tilt, push.</p> <p>To control saw swing, pull.</p> | |



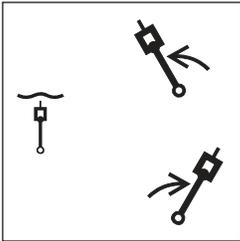
Plow Controls

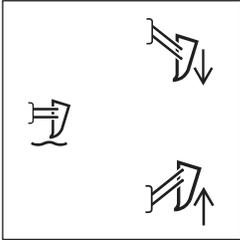
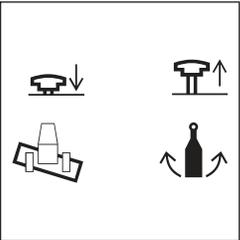


Note: Control configuration with rear steer option is shown in main illustration. Control configuration without rear steer is shown in balloon.

t42om003h.eps

- 1. Plow swing control
- 2. Plow lift control
- 3. Backfill blade tilt/plow swing selector

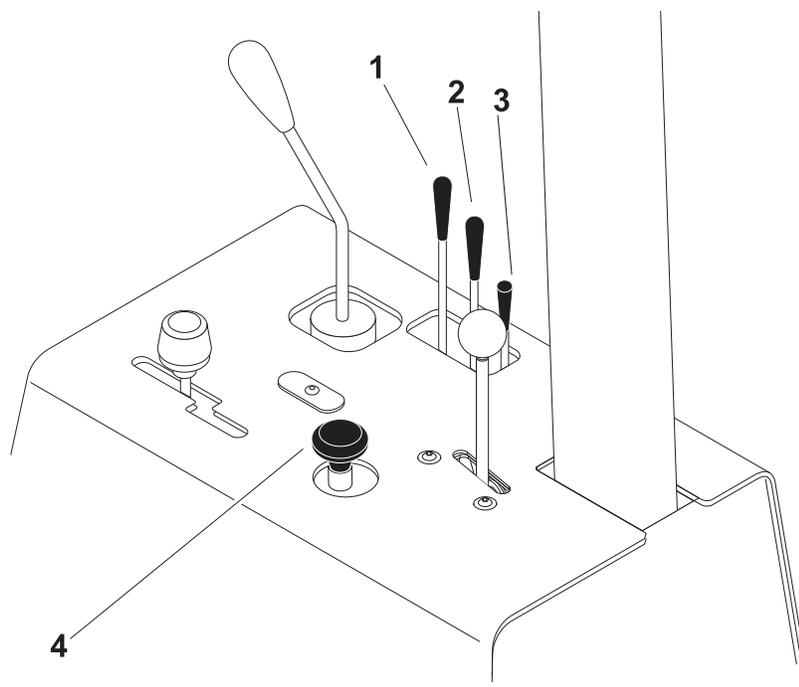
| Item | Description | Notes |
|--|--|-------|
| <p>1. Plow swing control</p>  <p>c00ic202h.eps</p> | <p>To swing left, pull.</p> <p>To swing right, push.</p> | |

| Item | Description | Notes |
|---|--|---|
| <p>2. Plow lift control</p>  <p>c001c204h.eps</p> | <p>To raise, pull.</p> <p>To lower, push.</p> | |
| <p>3. Backfill blade tilt/plow swing selector</p>  <p>c001c264h.eps</p> | <p>To control backfill blade tilt, push.</p> <p>To control plow swing, pull.</p> | <p>Use when optional 6-way backfill blade is installed.</p> |



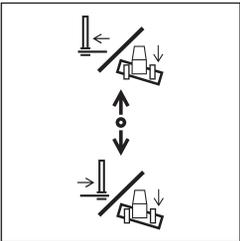
Microtrencher Controls

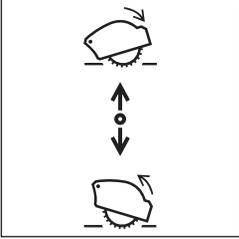
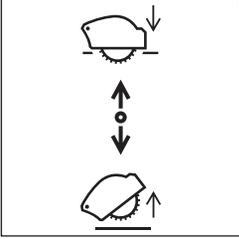
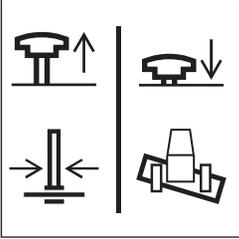
Tractor



t42om006h.eps

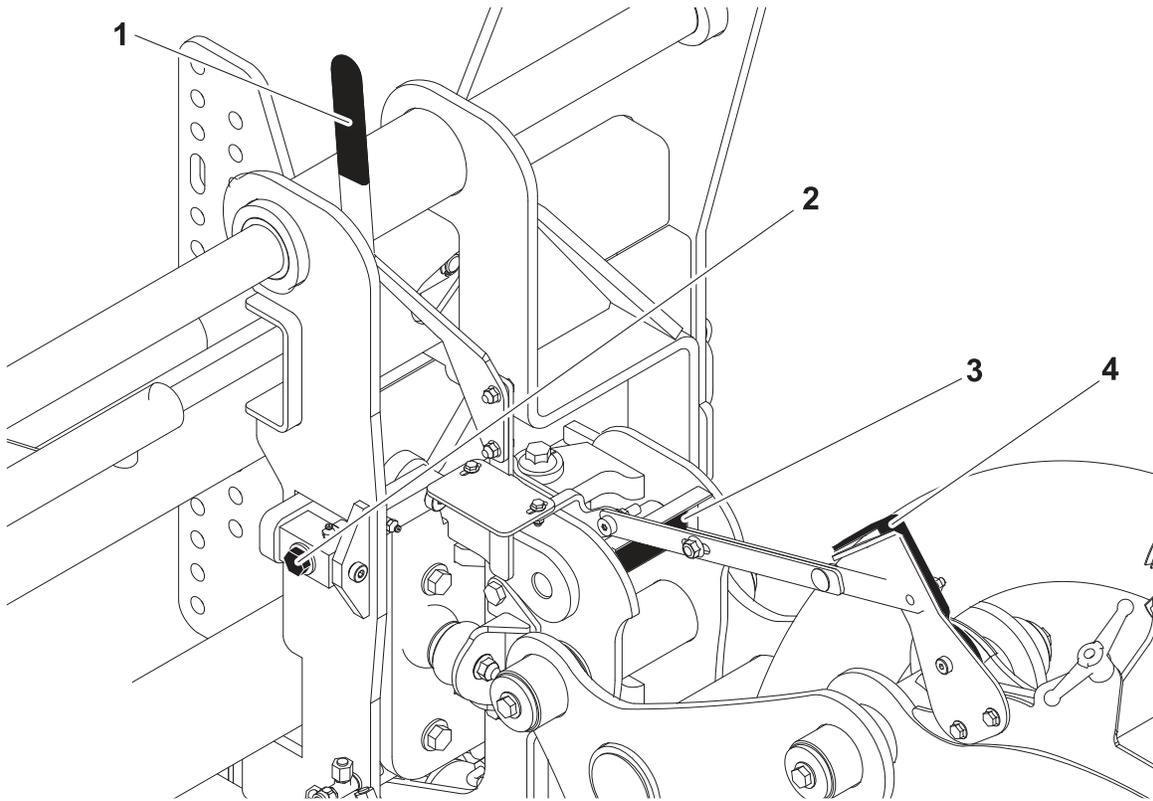
- 1. Traverse (slide) control
- 2. Level control
- 3. Lift control
- 4. Backfill blade tilt / Traverse selector

| Item | Description | Notes |
|--|--|-------|
| <p>1. Traverse (slide) control</p>  <p>c00ic589h.eps</p> | <p>To slide microtrencher right, push.</p> <p>To slide microtrencher left, pull.</p> | |

| Item | Description | Notes |
|--|--|---|
| <p>2. Level control</p>  <p>c00ic590h.eps</p> | <p>To lower rear of microtrencher, push.</p> <p>To raise rear of microtrencher, pull.</p> | |
| <p>3. Lift control</p>  <p>c00ic591h.eps</p> | <p>To lower, push.</p> <p>To raise, pull.</p> | |
| <p>4. Backfill blade tilt / Traverse selector</p>  <p>c00ic593h.eps</p> | <p>To control backfill blade tilt, push.</p> <p>To control microtrencher traverse, pull.</p> | <p>Use when optional 6-way backfill blade is installed.</p> |



MT12 MicroTrencher Attachment



t28om064h.eps

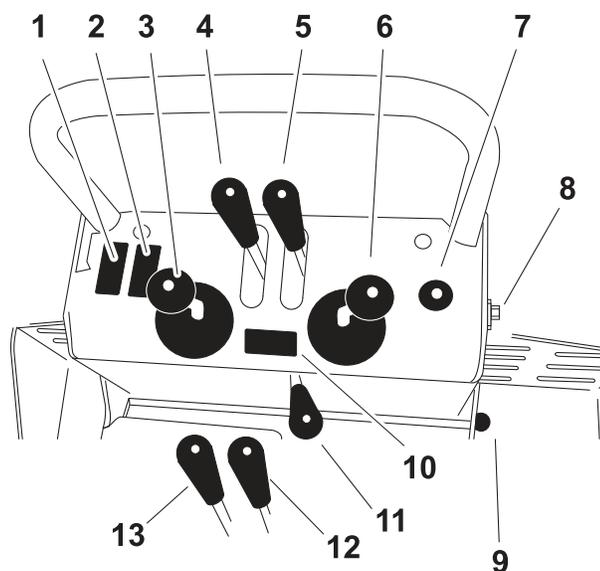
- | | |
|---|---|
| <ul style="list-style-type: none"> 1. Swing lock handle 2. Manual tilt adjustment | <ul style="list-style-type: none"> 3. Bubble level 4. Level indicator |
|---|---|

| Item | Description | Notes |
|---|---|--|
| <p>1. Saw swing lock handle</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> </div> <p style="font-size: small; margin-top: 5px;">c00ic592h.eps</p> | <p>To lock, move handle toward tractor.</p> <p>To unlock, move handle toward microtrencher.</p> | <p>Operate with microtrencher locked in most situations.</p> |
| <p>2. Manual tilt adjustment</p> | <p>Turn screw in to adjust angle left.</p> <p>Turn screw out to adjust angle right.</p> | <p>Use manual tilt adjustment and bubble level together to adjust microtrencher to match jobsite conditions.</p> <p>See "Adjust Tilt" on page 126.</p> |

| Item | Description | Notes |
|---------------------------|--|--|
| 3. Bubble level | Displays left-to-right microtrencher angle. | Use manual tilt adjustment and bubble level together to adjust microtrencher to match jobsite conditions. See "Adjust Tilt" on page |
| 4. Level indicator | Indicates when base of microtrencher is level with pavement. | Use lift and level controls together to adjust microtrencher base until it is flat on pavement. |



Backhoe Console

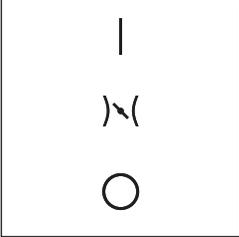
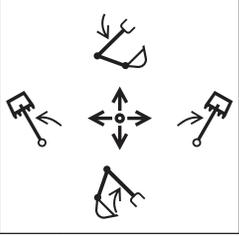
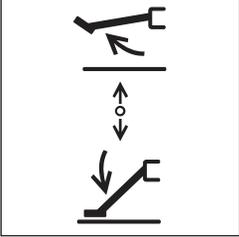
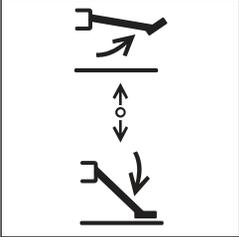


t42om013h.eps

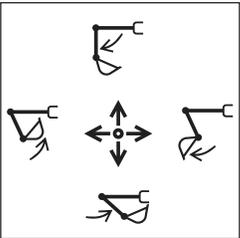
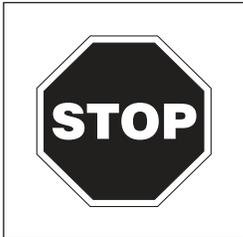
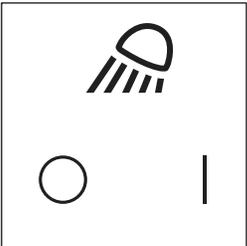
- | | |
|--------------------------------------|----------------------------------|
| 1. Remote throttle on/off | 7. Remote engine stop switch |
| 2. Remote throttle increase/decrease | 8. Seat latch |
| 3. Boom/Swing control | 9. Neutral switch* |
| 4. Left stabilizer control | 10. Mechanical stow lock control |
| 5. Right stabilizer control | 11. Work light switch* |
| 6. Bucket/Dipper control | 12. Backfill blade control* |
| | 13. Remote ground drive control* |

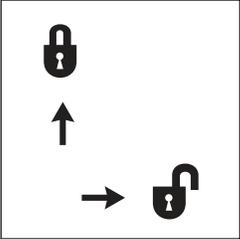
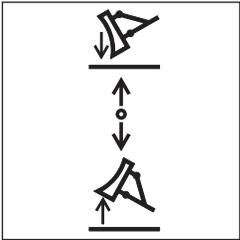
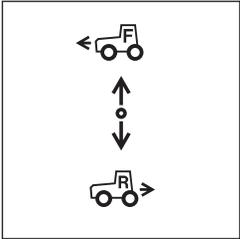
*optional

NOTICE: Hydraulic functions will be disconnected if operator leaves the backhoe seat.

| Item | Description | Notes |
|---|---|---|
| <p>1. Remote throttle on/off</p>  <p>c00ic652h.eps</p> | <p>To turn on, press top.</p> <p>To turn off, press bottom.</p> | |
| <p>2. Remote throttle increase/decrease</p>  <p>c00ic116h.eps</p> | <p>To increase engine speed, press top.</p> <p>To decrease engine speed, press bottom.</p> | |
| <p>3. Boom/Swing control</p>  <p>c00ic212h.eps</p> | <p>To swing boom left, move left.</p> <p>To swing boom right, move right.</p> <p>To raise boom, pull.</p> <p>To lower boom, push.</p> | <p>Control can perform more than one action at a time. By "feathering" the control, operator can combine backhoe operations.</p> <p>NOTICE: Do not operate with backhoe in the stowed (upright) position. Component failure could occur.</p> |
| <p>4. Left stabilizer control</p>  <p>c00ic030h.eps</p> | <p>To lower, pull.</p> <p>To raise, push.</p> | |
| <p>5. Right stabilizer control</p>  <p>c00ic029h.eps</p> | <p>To lower, pull.</p> <p>To raise, push.</p> | |

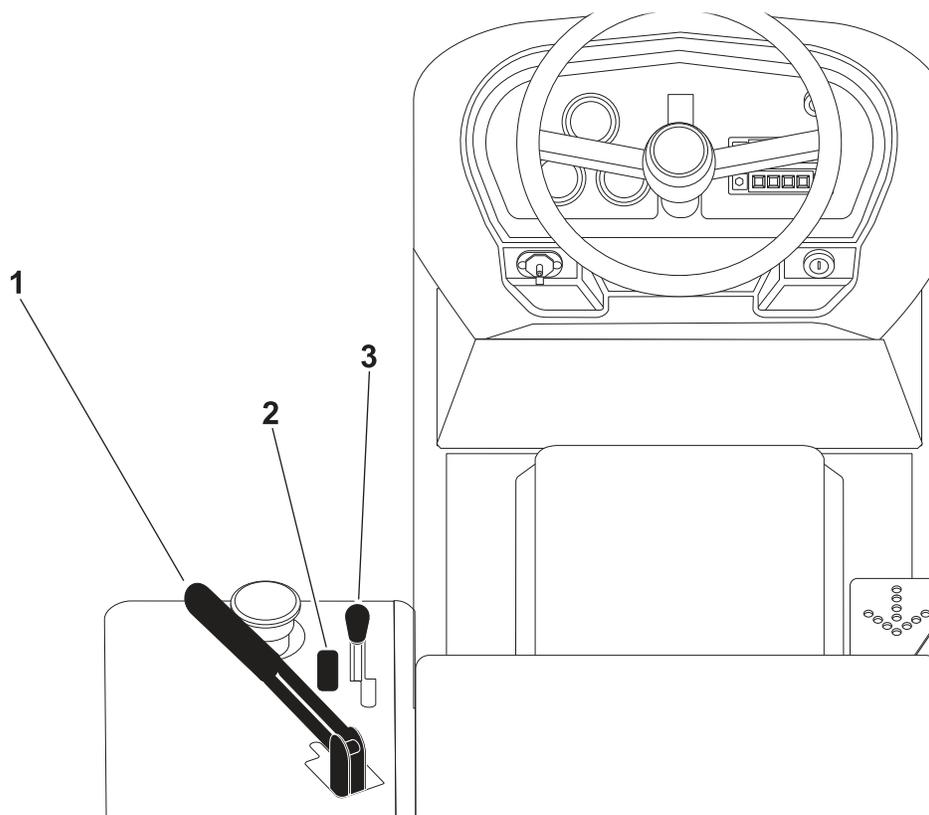


| Item | Description | Notes |
|---|--|---|
| <p>6. Bucket/Dipper control</p>  <p>c00ic213h.eps</p> | <p>To open bucket, move right.</p> <p>To close bucket, move left.</p> <p>To move dipper in, pull.</p> <p>To move dipper out, push.</p> | <p>Control can perform more than one action at a time. By "feathering" the control, operator can combine backhoe operations.</p> |
| <p>7. Remote engine stop switch</p>  <p>c00ic085c.eps</p> | <p>Stops engine immediately.</p> | <p>IMPORTANT:</p> <ul style="list-style-type: none"> • Except in an emergency, move throttle to idle before using stop switch. • For normal engine shutdown, use ignition switch. <p>After pressing down to stop engine, the switch must be pulled back up into the run position before the unit can be started.</p> |
| <p>8. Seat latch</p> | <p>To release backhoe seat, disengage lock by moving hole in latch clear of bolt.</p> | <p>IMPORTANT: Ensure seat is latched before driving unit.</p> <p>See "Backhoe" on page 88 for more information.</p> |
| <p>9. Neutral switch</p> | <p>To move tractor, press switch, use bucket/dipper control to move tractor, and release switch.</p> | |
| <p>10. Work light switch</p>  <p>c00ic086c.eps</p> | <p>To turn on, press right.</p> <p>To turn off, press left.</p> | |

| Item | Description | Notes |
|--|--|---|
| <p>11. Mechanical stow lock control</p>  <p>c00ic269h.eps</p> | <p>To lock, push stow lock handle.</p> <p>To unlock, move stow lock handle to right.</p> | <p>Use this control to lock boom in the stowed position.</p> <p>NOTICE: Always lock boom during transport.</p> |
| <p>12. Backfill blade control</p>  <p>c00ic650w.eps</p> | <p>To lower, push.</p> <p>To raise, push.</p> | |
| <p>13. Remote ground drive control</p>  <p>c00ic652w.eps</p> | <p>To move forward, push.</p> <p>To move in reverse, pull.</p> | |



Left Fender

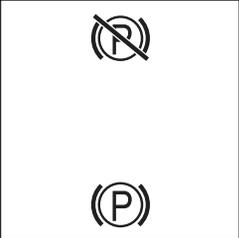


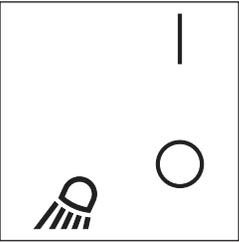
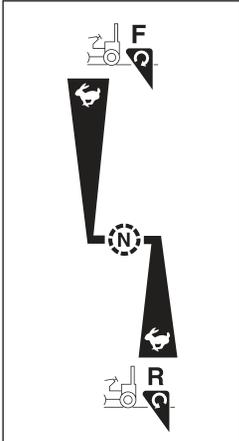
t28om004h.eps

- 1. Parking brake
- 2. Work light switch*

- 3. Attachment speed/direction control

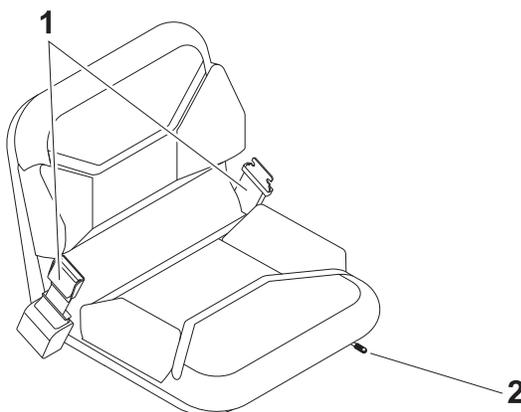
* optional

| Item | Description | Notes |
|--|---|-------|
| <p>1. Parking brake</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">  </div> <p style="font-size: small; margin-top: 5px;">c00ic268h.eps</p> | <p>To set, pull.</p> <p>To release, push.</p> | |

| Item | Description | Notes |
|---|---|--|
| <p>2. Work light switch</p>  <p>c00ic077c.eps</p> | <p>To turn on, press top.</p> <p>To turn off, press bottom.</p> | |
| <p>3. Attachment speed/direction control</p>  <p>c00ic254h.eps</p> | <p>To rotate attachment forward or to start plow vibrator box, push.</p> <p>To rotate attachment backward, pull.</p> <p>To go faster in either direction, move farther from center.</p> <p>To stop attachment rotation or plow vibrator box, move to neutral.</p> | <p>Control does not return to neutral when released.</p> <p>NOTICE: When operating plow, do not pull control to reverse. Operating plow in reverse could cause damage to equipment.</p> |



Seat



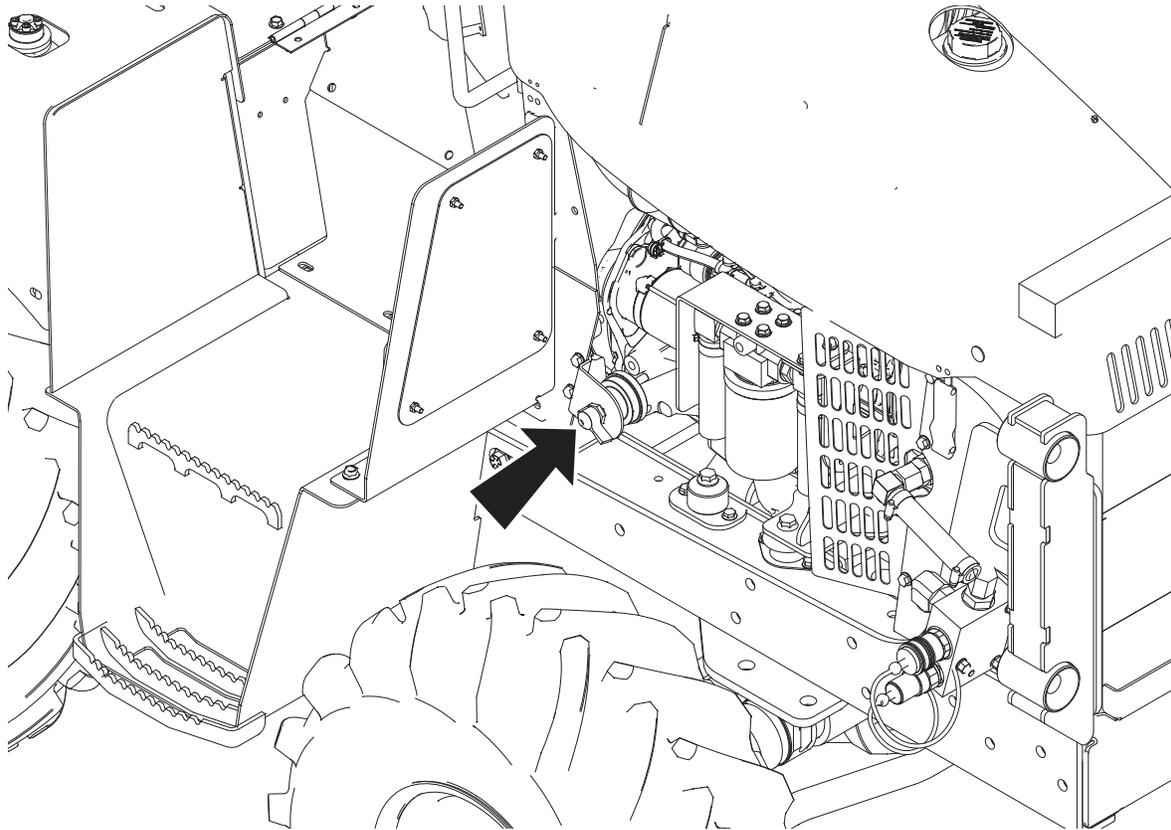
t14om053h.eps

1. Seat belt

2. Seat slide control

| Item | Description | Notes |
|-------------------------------------|---|-------|
| <p>1. Seat belt</p> | <p>To fasten, insert latch into buckle. Adjust until seat belt is low and tight.</p> <p>To release, lift top of buckle.</p> | |
| <p>2. Seat slide control</p> | <p>To slide seat forward or backward, pull or push left, then adjust seat.</p> <p>To lock seat in place, release.</p> | |

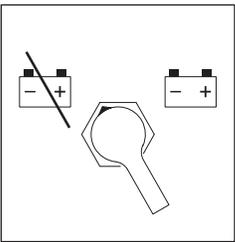
Battery Disconnect



t42om007h.eps



1. Battery disconnect switch

| Item | Description | Notes |
|---|---|-------|
| <p>2. Battery disconnect switch</p>  <p>c00ic097h.eps</p> | <p>To disconnect, move switch so that indicator points left.</p> <p>To connect, move switch so that indicator points right.</p> | |

Operation Overview

Chapter Contents

Planning..... 62

Digging with Backhoe 62

Trenching..... 62

Sawing 63

Plowing 63

Drilling 63

Microtrenching 64

Leaving Jobsite..... 64



Planning

1. Gather information about jobsite. See page 66.
2. Inspect jobsite. See page 67.
3. Classify jobsite. See page 68.
4. Select chain and teeth to match your soil type, if necessary. See page 134.
5. Check supplies and prepare equipment. See page 70.
6. Haul equipment to jobsite. See page 83.

Digging with Backhoe

1. Start unit. See page 72.
2. Set stabilizers and unstow backhoe. See page 88.
3. Excavate. See page 90.
4. Stow backhoe properly. See page 92.
5. Shut down tractor. See page 75.

Trenching

1. Start unit. See page 72.
2. Position tractor and controls. See page 96.
3. Begin trenching. See page 98.
4. Complete the installation. See page 98.
5. Backfill the trench. See page 140.
6. Shut down tractor. See page 75.

Sawing

1. Start unit. See page 72.
2. Position tractor and controls. See page 102.
3. Begin sawing. See page 103.
4. Complete the installation. See page 104.
5. Backfill the trench. See page 140.
6. Shut down tractor. See page 75.

Plowing

1. Start unit. See page 72.
2. Position tractor and controls. See page 107.
3. Attach product. See page 107.
4. Begin plowing. See page 109.
5. Complete the installation. See page 110.
6. Shut down tractor. See page 75.

Drilling

1. Start unit. See page 72.
2. Dig approach trench and target trench. See page 112.
3. Assemble drill string and position tractor. See page 112.
4. Begin drilling. See page 115.
5. Use drill string guide as needed. See page 116.
6. Add rod. See page 117.
7. Backream. See page 118.
8. Shut down tractor. See page 75.
9. Disassemble joints. See page 122.



Microtrenching

1. Start unit. See page 72.
2. Position tractor and controls. See page 124.
3. Begin trenching. See page 128.
4. Complete the installation. See page 131.
5. Backfill the trench. See page 140.
6. Shut down tractor. See page 75.

Leaving Jobsite

1. Backfill if necessary. See page 140.
2. Rinse equipment. See page 140.
3. Stow tools. See page 140.
4. Haul equipment away from jobsite. See page 83.

Prepare

Chapter Contents

- Gather Information 66**
 - Review Job Plan66
 - Notify One-Call Services66
 - Arrange for Traffic Control66
 - Plan for Emergency Services66
- Inspect Site 67**
 - Identify Hazards67
- Classify Jobsite 68**
 - Select a Classification68
 - Apply Precautions69
- Check Supplies and Prepare Equipment 70**
 - Supplies70
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 - Accessories70



Gather Information

A successful job begins before you dig. The first step in planning is reviewing information already available about the job and jobsite.

Review Job Plan

Review blueprints or other plans. Check for information about existing or planned structures, elevations, or proposed work that may be taking place at the same time.

Notify One-Call Services

Mark proposed path with white paint and have underground utilities located before working.

- In the US or Canada, call 811 (US) or 888-258-0808 (US and Canada). Also contact any local utilities that do not participate in the One-Call service.
- In countries that do not have a One-Call service, contact all local utility companies to have underground utilities located.

Arrange for Traffic Control

If working near a road or other traffic area, contact local authorities about safety procedures and regulations.

Plan for Emergency Services

Have the telephone numbers for local emergency and medical facilities on hand. Check that you will have access to a telephone.

Inspect Site

Identify Hazards

Inspect jobsite before transporting equipment. Check for the following:

- overall grade or slope
- changes in elevation such as hills or other open trenches
- obstacles such as buildings, railroad crossings, or streams
- signs of utilities on jobsite and perimeter, such as:
 - “buried utility” notices
 - utility facilities without overhead lines
 - gas or water meters
 - junction boxes
 - drop boxes
 - light poles
 - manhole covers
 - sunken ground
- traffic
- access
- soil type and condition

Have an experienced locating equipment operator sweep area within 20' (6 m) to each side of bore path to verify previously marked line and cable locations. Mark location of all buried utilities and obstructions.



Classify Jobsite



⚠ WARNING

Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.

To help avoid injury:

- Wear personal protective equipment including hard hat, safety eye wear, and hearing protection.
- Do not wear jewelry or loose clothing.
- Notify One-Call and companies which do not subscribe to One-Call.
- Comply with all utility notification regulations before digging or drilling.
- Verify location of previously marked underground hazards.
- Mark jobsite clearly and keep spectators away.

Remember, jobsite is classified by hazards in place -- not by line being installed.

Select a Classification

Jobsites are classified according to underground hazards present.

| If working . . . | then classify jobsite as . . . |
|--|---------------------------------------|
| within 10' (3 m) of a buried electric line | electric |
| within 10' (3 m) of a natural gas line | natural gas |
| in sand, granite, or concrete which is capable of producing crystalline silica (quartz) dust | crystalline silica (quartz) dust |
| within 10' (3 m) of any other hazard | other |

IMPORTANT: If you have any doubt about jobsite classification, or if jobsite might contain unmarked hazards, take steps outlined previously to identify hazards and classify jobsite before working.

Apply Precautions

Once classified, precautions appropriate for jobsite must be taken. Follow U.S. Department of Labor regulations on excavating and trenching (Part 1926, Subpart P) and other similar regulations.

Electric Jobsite Precautions

Use one or both of these methods.

- Expose line by careful hand digging or soft excavation.
- Have service shut down while work is in progress. Have electric company test lines before returning them to service.

Natural Gas Jobsite Precautions

In addition to positioning equipment upwind from gas lines, use one or both of these methods.

- Expose lines by careful hand digging or soft excavation.
- Have gas shut off while work is in progress. Have gas company test lines before returning them to service.



Crystalline Silica (Quartz) Dust Precautions

Crystalline silica dust is a naturally occurring substance found in soil, sand, concrete, granite, and quartz. Breathing silica dust particles while cutting, drilling, or working materials may cause lung disease or cancer. To reduce exposure:

- Use water spray or other means to control dust.
- Refer to U.S. Department of Labor Occupational Safety and Health Administration guidelines to learn more about appropriate breathing protection and permissible exposure limits.

Other Jobsite Precautions

You may need to use different methods to safely avoid other underground hazards. Talk with those knowledgeable about hazards present at each site to determine which precautions should be taken or if job should be attempted.

Check Supplies and Prepare Equipment

Supplies

- fuel
- keys
- personal protective equipment, such as hard hat and safety glasses

Fluid Levels

- fuel
- hydraulic fluid
- battery charge
- engine oil
- engine coolant

Condition and Function

- digging chain and teeth
- fan belts
- light bulbs
- filters (air, oil, hydraulic)
- tires
- pumps and motors
- hoses and valves
- signs, guards, and shields

Accessories

Fire Extinguisher

If required, mount a fire extinguisher near the power unit but away from possible points of ignition. The fire extinguisher should always be classified for both oil and electric fires. It should meet legal and regulatory requirements.

Drive

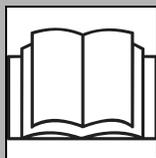
Chapter Contents

| | |
|------------------------------|-----------|
| Start Unit | 72 |
| Drive | 74 |
| • Safe Slope Operation | 75 |
| Shut Down | 75 |



Start Unit

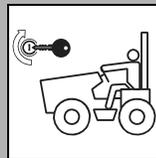
Before operating tractor, read engine manufacturer's starting and operating instructions. Follow instructions for new engine break-in.



⚠ WARNING Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

To help avoid injury:

- Read operator's manual before operating equipment. Follow instructions carefully. Contact Ditch Witch® dealership for operation information or demonstration.
- Wear hard hat, safety glasses, and other protective equipment required by job. Do not wear jewelry or loose clothing that can catch on controls.



⚠ WARNING Runaway possible. Machine could run over you or others. Learn how to use all controls. Start and operate only from operator's position. 275-070



⚠ WARNING Rollover possible. If machine rolls over, you could be thrown from seat and killed or crushed. Wear seat belt. 275-303

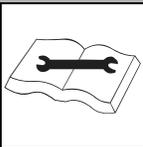
1. Fasten and adjust seat belt.
2. Check that ground drive control and attachment speed/direction control are in neutral.
3. Move throttle to low.
4. Verify that parking brake is set.
5. Turn ignition switch to the run position (key on, engine off). Cold start wait indicator will appear.



WARNING Explosion possible. Serious injury or equipment damage could occur. Follow directions carefully.

To help avoid injury: Do not use ether or any other type of aerosol starting fluid when unit is equipped with cold start option.

6. When cold start wait indicator goes off, turn ignition switch all the way clockwise to start tractor. Warning alarm will sound. Indicators will light.
 - If engine does not crank, check start interlock display. See page 34 for start interlock information.
 - If engine turns but does not start within 10 seconds, allow starter to cool before trying to start again.



WARNING Improper control function could cause death or serious injury.

To help avoid injury: Stop machine and have it serviced if control does not work as described in instructions.

IMPORTANT: Machine will not start if start interlock requirements are not met. See page 34 for start interlock information.

7. Run engine at half-throttle or less for five minutes before operating tractor. During warmup, check that all controls work properly.



Drive



WARNING Moving traffic – hazardous situation. Death or serious injury could result. Avoid moving vehicles, wear high visibility clothing, post appropriate warning signs.

To help avoid injury:

- Drive carefully in congested areas. Know machine's clearance and turning radius.
- Keep attachments low when operating on slope. Drive slowly and cautiously.

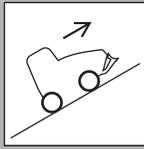
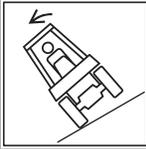
EMERGENCY SHUTDOWN: Turn ignition switch to STOP.

1. Turn on lights as needed.
2. Raise backfill blade and all attachments.
3. Release parking brake.
4. Adjust throttle.
5. Move ground drive control to forward or reverse or press upper or lower part of foot pedal.

The ground drive foot pedal and the ground drive speed/direction control lever can override each other. Use the override feature when trenching, plowing or sawing.

- When driving or backfilling, use only the foot pedal to control speed and direction.
- When trenching, sawing, or plowing, use hand lever to set travel speed and use the foot pedal to adjust speed temporarily when digging conditions change. For example, if digging conditions become tough, press the lower part of foot pedal to slow digging speed. When original digging condition resumes, release foot pedal to return to original speed.

Safe Slope Operation



WARNING Tipover possible. Machine can tip over and crush you.

To help avoid injury:

- Always operate with heavy end uphill.
- Drive cautiously at all times.
- Never jerk control levers. Use a steady even motion.
- Do not park unit on slope without lowering digging attachment to the ground, returning all controls to neutral position, shutting down unit, and set parking brake.

Operating safely on a slope depends upon many factors including:

- Distribution of machine weight, including front loading and absence of load
- Height of load
- Even or rough ground conditions
- Potential for ground giving way causing unplanned tilt forward, reverse or sideways
- Nearness of ditches, ruts, stumps or other obstructions and sudden changes in slope
- Speed
- Turning
- Braking performance
- Operator skill



These varying factors make it impractical to specify a maximum safe operating angle in this manual. It is therefore important for the operator to be aware of these conditions and adjust operation accordingly. Maximum engine angle and braking performance are two absolute limits which must never be exceeded. These maximums are stated below since they are design limits. These design limits usually exceed the operating limits and must never be used alone to establish safe operating angle for variable conditions.

Maximum engine lubrication angle – 30°

Maximum service brake retarding force – equal to traction of both tires.

Maximum secondary brake retarding force – equal to traction of one tire.

Maximum park brake holding force – equal to traction of both tires.

Shut Down

1. When job is complete, move ground drive control to neutral.
2. Set parking brake.
3. Lower all attachments to ground.
4. Move throttle to low for 3 minutes to cool engine.
5. Turn ignition switch to STOP. If leaving machine unattended, remove key.
6. For maintenance or long-term storage, turn battery disconnect switch, if equipped, to the disconnect position.

Transport

Chapter Contents

- Lift** **78**
 - Points78
 - Procedure79

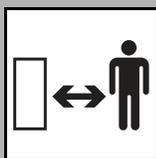
- Tie Down** **82**
 - Points82
 - Procedure82

- Haul** **83**
 - Procedure83

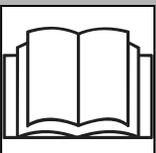
- Tow** **86**
 - Procedure86



Lift



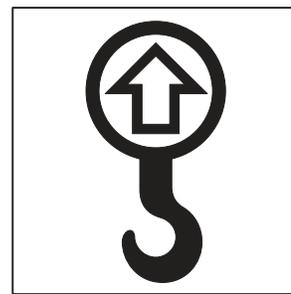
WARNING Crushing weight. If load falls or moves it could kill or crush you. Use proper procedures and equipment or stay away.



WARNING Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

Points

Lifting points are identified by lifting decals. Lifting at other points is unsafe and can damage machinery.



ic1319a.eps

Procedure

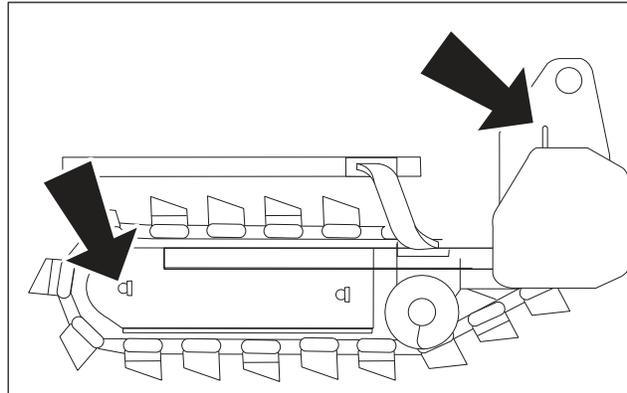
Tractor

This machine is not configured for lifting. If the machine must be lifted, load machine into a container or onto a platform appropriate for lifting. See "Specifications" on page 187 for size and weight of machine.

H313/H314 Trenchers

Use crane capable of supporting the equipment's size and weight. See page 192 or measure and weigh equipment before lifting.

NOTICE: Do not lift tractor with installed attachment.

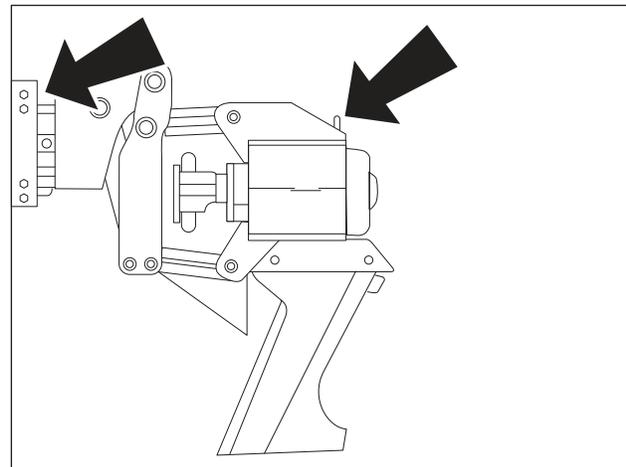


t28om010h.eps

H331 Plow

Use crane capable of supporting the equipment's size and weight. See page 196 or measure and weigh equipment before lifting.

NOTICE: Do not lift tractor with installed attachment.



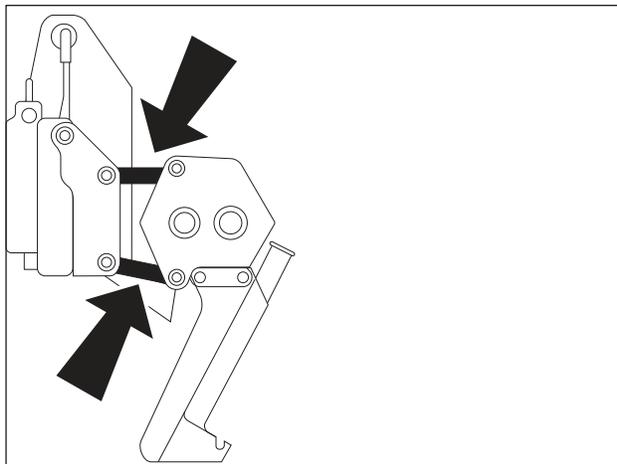
t28om011h.eps



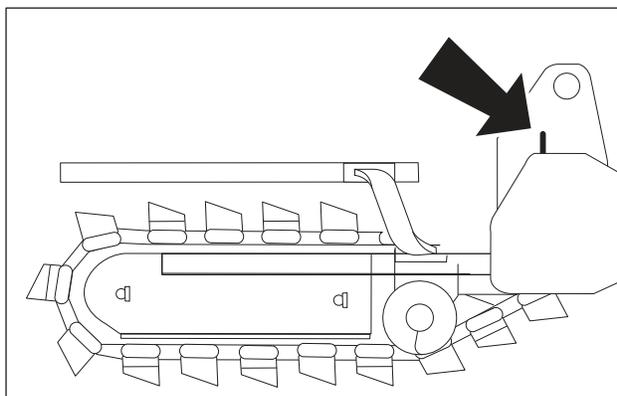
H350 Combo

Use crane capable of supporting the equipment's size and weight. See page 202 or measure and weigh equipment before lifting.

NOTICE: Do not lift tractor with installed attachment.



t28m089h.eps



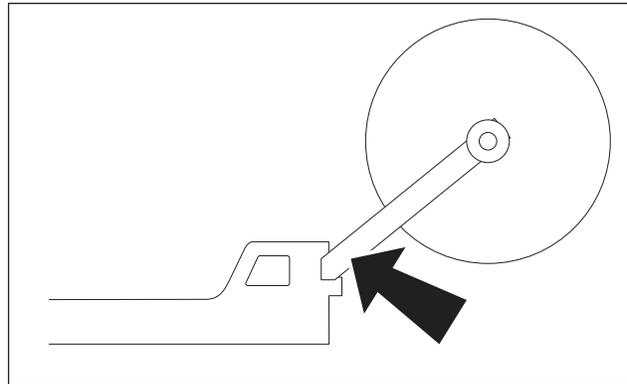
t28m090h.eps

Reel Carrier

Use crane capable of supporting the equipment's size and weight. See page 187 or measure and weigh equipment before lifting.

NOTICE:

- Do not lift reel carrier with reel installed.
- Do not lift tractor with installed attachment.

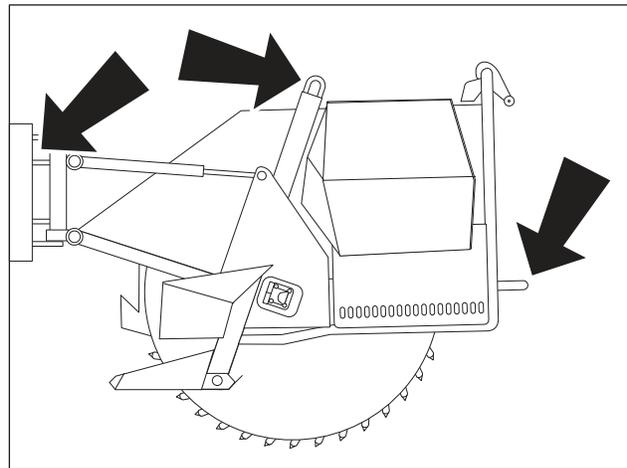


t28om013h.eps

H342 Saw

Use crane capable of supporting the equipment's size and weight. See page 198 or measure and weigh equipment before lifting.

NOTICE: Do not lift tractor with installed attachment.

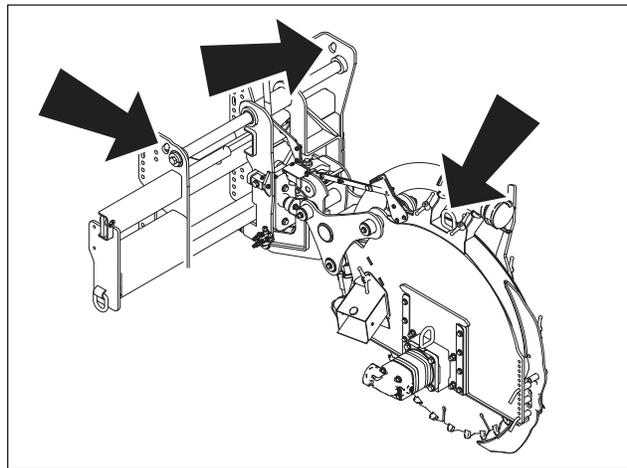


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MT12 MicroTrencher

Use crane capable of supporting the equipment's size and weight. See page 202 or measure and weigh equipment before lifting.

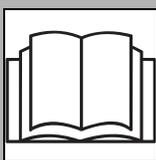
NOTICE: Do not lift tractor with installed attachment.



t28om083h.eps



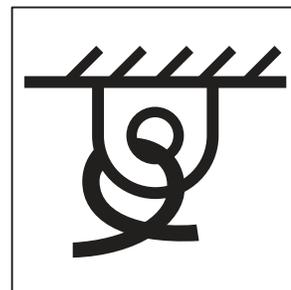
Tie Down



WARNING Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

Points

Tiedown points are identified by tiedown decals. Securing to trailer at other points is unsafe and can damage machinery.

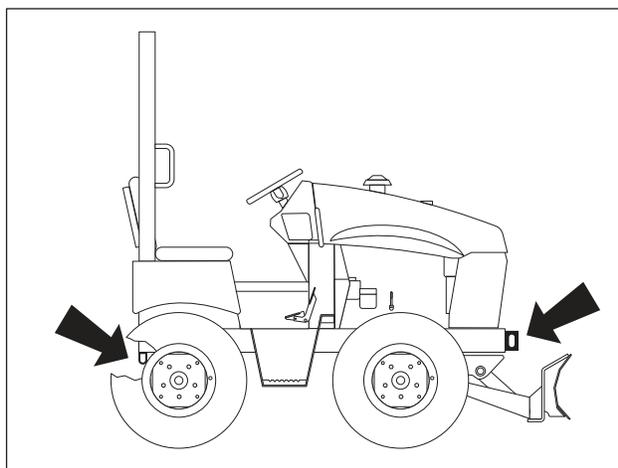


ic1320a.eps

Procedure

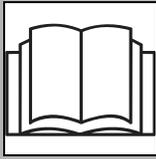
Tractor

Attach chains at front and rear tiedown points. Make sure chains are tight before transporting unit.



t42om023h.eps

Haul



⚠ WARNING

Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

To help avoid injury:

- Read trailer operator's manual before loading or transporting your machine. Incorrectly loaded machine can slip or cause trailer sway.
- Ensure that tow vehicle has proper tow capacity rating.
- Attach trailer to tow vehicle before loading or unloading.
- Park, load, and unload trailer on level ground.
- Check that unit and trailer do not exceed size or weight regulations.
- Load trailer correctly to avoid trailer swaying. Ten to fifteen percent of total vehicle weight (equipment plus trailer) must be on tongue to help prevent trailer sway.
- Connect safety chains to tow vehicle. Attach left chain to right side of tow vehicle and vice versa to cradle hitch. Do not connect to pintle hook or hitch ball.
- Connect breakaway switch cable to tow vehicle. Do not connect to pintle hook or hitch ball.



Procedure

Inspect Trailer

1. Check hitch for wear and cracks. Lubricate if needed.
2. Check battery for 12V charge.
3. Inspect lights for cleanliness and correct operation. Inspect reflectors and replace if needed.
4. Check tire pressure. Check lug nut torque with a torque wrench. Adjust if needed.
5. Ensure trailer brakes are adjusted to come on in synchronization with tow vehicle brakes.
6. Check ramps and trailer bed for cracks.

Load

WARNING Crushing weight. If load falls or moves it could kill or crush you. Use proper procedures and equipment or stay away.

To help avoid injury:

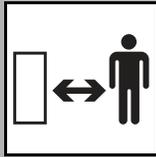
- Attach trailer to tow vehicle before loading or unloading.
- Load and unload trailer on level ground.
- Block trailer wheels.



WARNING Rollover possible. If machine rolls over, you could be thrown from seat and killed or crushed. Wear seat belt. 275-303

1. Fasten and adjust seat belt.
2. Start tractor. See page 72 for proper start-up procedures.
3. Raise attachments, but keep them low.
4. Move attachments to center position.
5. Release parking brake.
6. Slowly drive tractor onto trailer.
7. Position tractor on trailer deck for proper weight distribution.
8. Set parking brake.
9. Lower attachments to trailer bed and turn tractor off. See page 75 for proper shutdown procedures.
10. Attach chains to tractor and attachments where tiedown decals are located. See page 82.

Unload



WARNING Crushing weight. If load falls or moves it could kill or crush you. Use proper procedures and equipment or stay away.

To help avoid injury:

- Attach trailer to tow vehicle before loading or unloading.
- Load and unload trailer on level ground.
- Block trailer wheels.

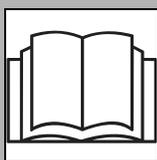


WARNING Rollover possible. If machine rolls over, you could be thrown from seat and killed or crushed. Wear seat belt. 275-303

1. Lower trailer or ramps.
2. Remove chains from tiedowns.
3. Fasten and adjust seat belt.
4. Start tractor. See page 72 for proper start-up procedures.
5. Raise attachments, but keep them low and centered.
6. Release parking brake.
7. Slowly back unit down trailer or ramps.



Retrieve



WARNING Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

Under normal conditions, tractor should not be towed. If tractor becomes disabled and retrieval is necessary:

- tow for no more than 200 yd (180 m) at less than 1 mph (1.6 km/h),
- use towing chains appropriately rated for maximum towing force,
- steering will be difficult.

Procedure

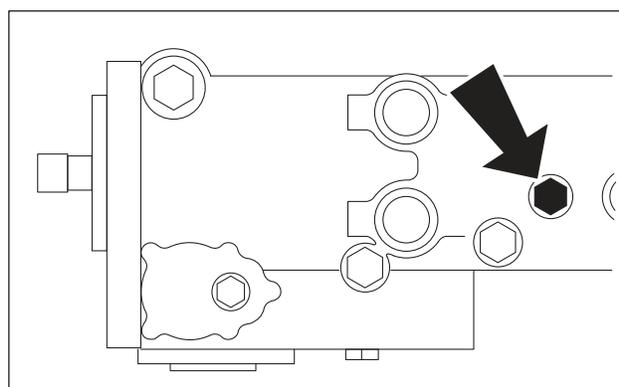
1. Set parking brake.
2. Block front and rear tires to prevent unit from rolling.
3. Attach tow line to all available tiedown points facing towing vehicle.

4. Bypass hydraulic system.

Remove tunnel cover and loosen bypass valve two turns. Valve is on right rear of front pump.

5. Remove blocks.
6. Fasten seat belt.
7. Release parking brake.

NOTICE: While towing, unit will not have brakes.



t280m017h.eps

8. Check that ground drive and attachment speed/direction controls are in neutral position.

Backhoe

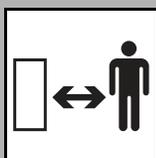
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Set Up

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.



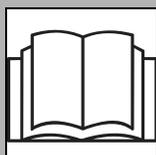
WARNING Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.

To help avoid injury: Use attachments or counterweights to make front and rear loads balance when all attachments are raised. Contact your Ditch Witch[®] dealer about counterweighting for your equipment.



WARNING Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.

To help avoid injury: Comply with all utility notification regulations before digging or drilling.



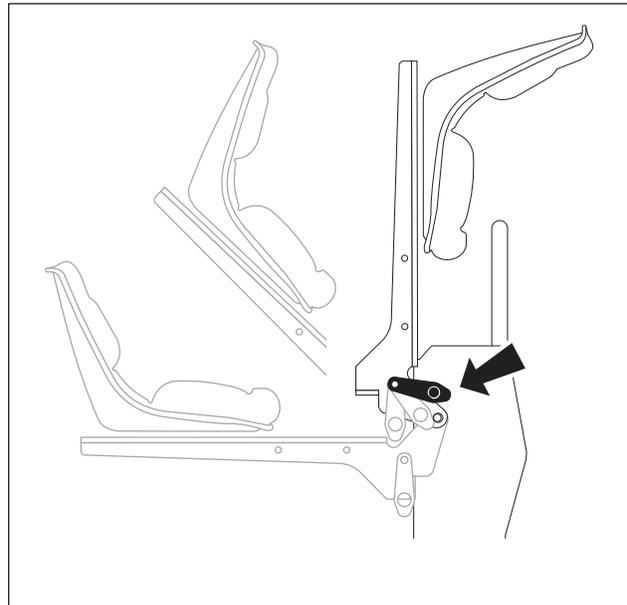
WARNING Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

Position Tractor

1. Fasten and adjust seatbelt.
2. Start tractor. See page 72 for start-up procedures.
3. Drive to starting point. Move in line with planned job. See page 74 for driving procedures.
4. Ensure ground drive control is in neutral.
5. Move attachment speed/direction control to neutral position.
6. Lower rear attachment to 6" (150 mm) above ground.
7. Lower backfill blade, if equipped.
8. Decrease engine speed to low throttle.
9. Move to backhoe operator's station.

Prepare Backhoe

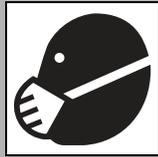
1. Disengage seat lock (shown) and rotate seat out of stowed position.
2. Raise boom to release tension on stow lock.
3. Release stow lock by pushing handle forward. For more information about stow lock, see page 55.



Backhoe_Seat.eps



Operate

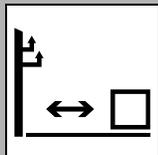


CAUTION

Breathing crystalline silica dust may cause lung disease. Cutting, drilling, or working materials such as concrete, sand, or rock containing quartz may result in exposure to silica dust. Use dust control methods or appropriate breathing protection when exposed to silica dust.

To help avoid injury:

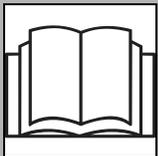
- Use water spray or other means to control dust.
- Refer to U.S. Department of Labor Occupational Safety and Health Administration guidelines to learn more about appropriate breathing protection and permissible exposure limits.



DANGER

Electric shock will cause death or serious injury. Stay away. 274-049

To help avoid injury: Expose lines by hand before digging. Cutting high voltage cable can cause electrocution.



WARNING

Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

NOTICE: Hydraulic functions will be disconnected if operator leaves the backhoe seat.

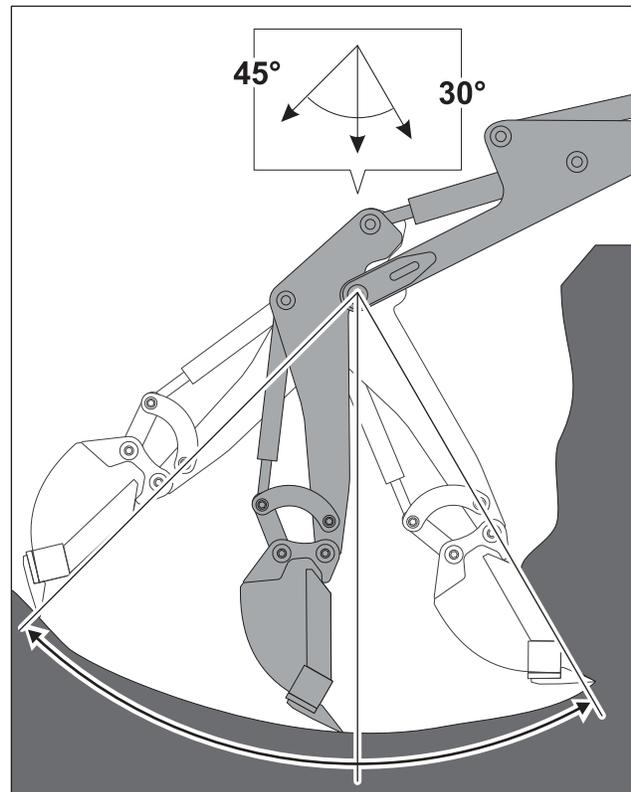
1. Clear the area around the machine of all bystanders.
2. Lower stabilizers until they touch the ground.
3. Adjust throttle to desired speed.

4. Use boom/swing control and bucket/dipper control to dig hole or trench. For more information about backhoe controls, see "Backhoe Console" on page 52.
- Keep dipper and boom at right angles as much as possible for maximum power.
 - Keep bucket in line with dipper as much as possible.
 - Position bucket so teeth cut soil. As soil is cut, curl bucket under dipper.
 - Move dipper and bucket together. Increasing engine speed will not increase backhoe force.

Move Unit

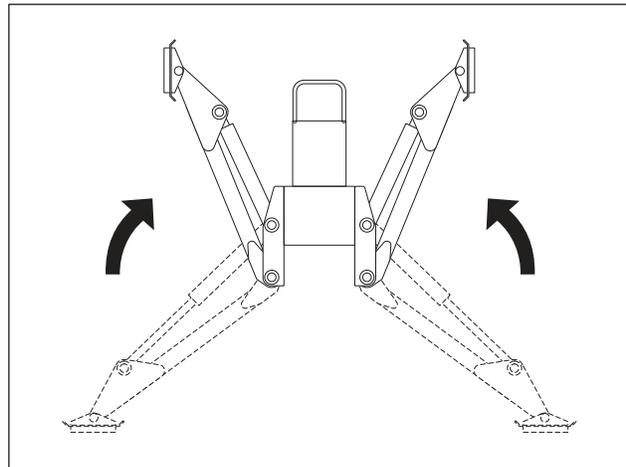
NOTICE: Only use this method to move unit less than 30' (10 m) at one time.

1. Clear the area around the machine of all bystanders.
2. Raise stabilizers enough to clear ground.
3. Ensure ground drive direction control is in neutral.
4. Move attachment speed/direction control to neutral position.
5. Move ground drive control to neutral position.
6. Use remote ground drive switch to move unit.
7. Lower stabilizers.



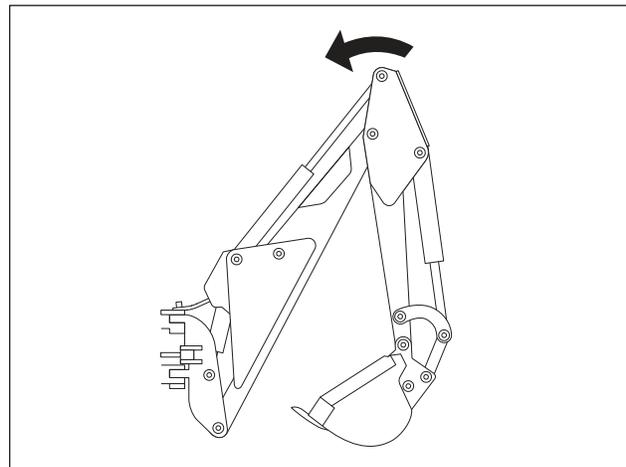
Finish Job

1. Raise stabilizers to fully engage latch.
2. Return remote throttle to low.



Backhoe_Stow_Stabilizers.eps

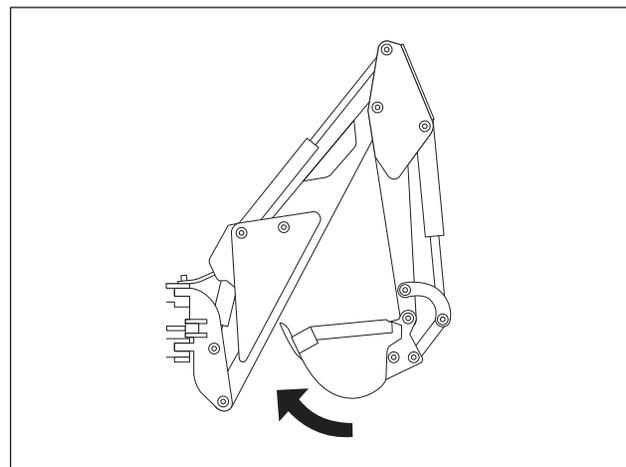
3. Lift boom while keeping dipper pointed at ground (shown).



Backhoe_Stow_Boom.eps

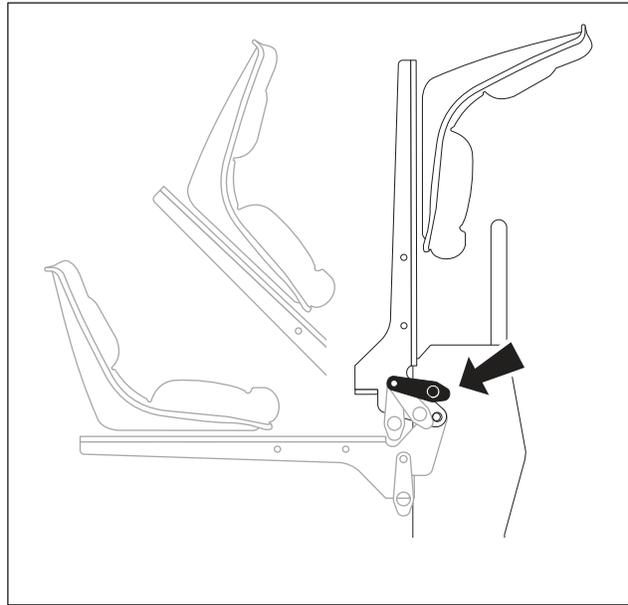
4. Curl bucket closed and move dipper fully toward boom (shown).
5. Lift boom to highest position and engage stow lock.
6. Lower boom slightly to engage lock.

IMPORTANT: For tractor to function once operator has returned to operator station, stabilizers must be raised, remote throttle must be set at low, and boom must be stowed and locked.



Backhoe_Stow_Bucket.eps

7. Rotate seat into stowed position and engage seat lock (shown).
8. Drive a short distance away from work site.
9. Shut down tractor. See page 76 for proper shutdown procedures.



Backhoe_Seat.eps



Trench



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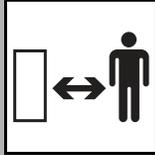
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Set Up

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.



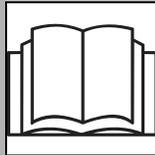
WARNING Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.

To help avoid injury: Use attachments or counterweights to make front and rear loads balance when all attachments are raised. Contact your Ditch Witch® dealer about counterweighting for your equipment.



WARNING Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.

To help avoid injury: Comply with all utility notification regulations before digging or drilling.

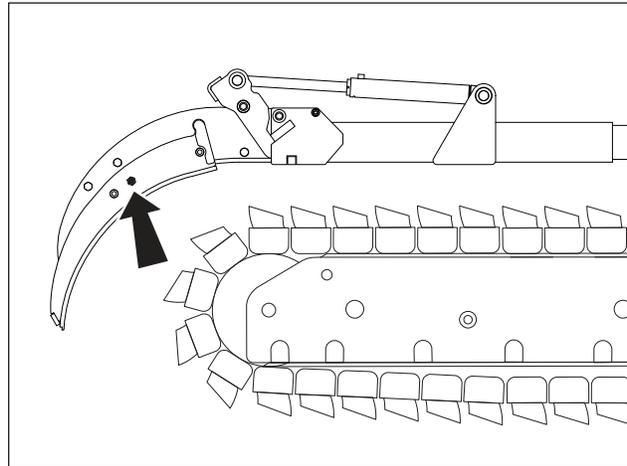


WARNING Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

1. If using optional trench cleaner, remove bolt installed for transport (shown).
2. Fasten and adjust seat belt.
3. Start tractor. See page 72 for start-up procedures.
4. Drive to starting point. Move in line with planned trench. See page 74 for operating procedures.

IMPORTANT:

- When cutting asphalt, start trench in soil at edge of road and use shortest possible boom at full depth.
- Sight along center of hood to a stake driven beyond end of trench line for straight trench.
- For optimal spoils delivery, adjust the auger positions forward or backward to accommodate terrain and digging depth.



t33om080w.eps

5. Set parking brake.
6. Lower boom to just above ground.
7. Check that attachment speed/direction control and ground drive controls are in neutral.
8. Check that boom is in line with planned trench.
9. Lower backfill blade, if equipped, to reduce shock when trenching begins.

Operate

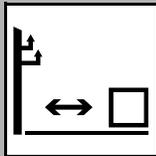


CAUTION

Breathing crystalline silica dust may cause lung disease. Cutting, drilling, or working materials such as concrete, sand, or rock containing quartz may result in exposure to silica dust. Use dust control methods or appropriate breathing protection when exposed to silica dust.

To help avoid injury:

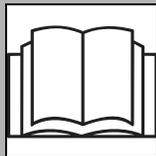
- Use water spray or other means to control dust.
- Refer to U.S. Department of Labor Occupational Safety and Health Administration guidelines to learn more about appropriate breathing protection and permissible exposure limits.



DANGER

Electric shock will cause death or serious injury. Stay away. 274-049

To help avoid injury: Expose lines by hand before digging. Cutting high voltage cable can cause electrocution.



WARNING

Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

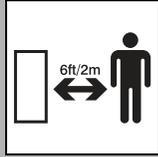


CAUTION

Flying objects thrown by machine may strike people. Wear hard hat and safety glasses. 275-193

1. If equipped with combo, set trench/plow switch to the trench position.
2. If equipped with traversing trencher, set at desired offset position.

3. Move attachment speed/direction control to desired speed. DIGGING CHAIN WILL MOVE.



⚠ DANGER

Moving digging teeth will cause death or serious injury.
Stay away. 275-443

To help avoid injury:

- Ensure parking brake is set.
- Allow 3' (1 m) between digging teeth and obstacle. Machine might jerk when digging starts.
- Keep everyone at least 6' (2 m) from machine, attachments, and their range of movement.

4. Set throttle to full engine speed.
5. Lift trench cleaner, if equipped.
6. Slowly lower digging boom to desired trench depth.
7. Raise backfill blade, if equipped
8. Release parking brake.
9. If using trench cleaner:
 - Use ground drive foot control to move forward about 1' (30 cm), or until there is enough room for trench cleaner to enter trench.
 - Return ground drive control to neutral to stop forward movement.
 - Raise boom slightly, then fully lower trench cleaner to lock it in place.
 - Lower boom to desired trench depth.

NOTICE:

- Do not have trench cleaner in working position when starting a trench.
- Do not back up with trench cleaner in working position.

10. Move ground drive hand control to desired speed. Always start trenching with ground drive speed set at low. Increase ground drive speed only as soil conditions permit.

IMPORTANT: Ground drive speed/direction can be controlled with foot pedal or hand lever. When trenching, set ground drive speed with hand lever. Use foot pedal to temporarily adjust speed if digging conditions change for a short distance.



11. Operate engine at full throttle when working.

NOTICE:

- Do not make sharp turns. Lower boom to full depth when turning.
- If an object becomes lodged in chain, move attachment speed/direction control to neutral and raise boom slightly. Reverse chain direction. If object must be removed manually, turn engine off and set parking brake.

Finish Job

1. When trench is complete, move ground drive hand control to neutral.
2. Adjust throttle to low.
3. Raise boom.
4. As boom clears top of trench, move attachment speed/direction control to neutral.
5. If equipped with traversing trencher, return trencher to center position.
6. Raise trench cleaner, if equipped.
7. Drive a short distance away from work site.
8. Shut down tractor. See page 75 for proper shutdown procedures.
9. Return trench cleaner to the stowed position, if equipped.

Saw

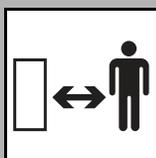
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Setup

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.



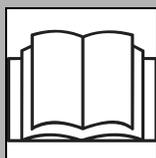
WARNING Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.

To help avoid injury: Use attachments or counterweights to make front and rear loads balance when all attachments are raised. Contact your Ditch Witch® dealer about counterweighting for your equipment.



WARNING Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.

To help avoid injury: Comply with all utility notification regulations before digging or drilling.



WARNING Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

1. Fasten and adjust seatbelt.
2. Start tractor. See page 72 for start-up procedures.
3. Drive to starting point. Move in line with planned job. See page 74 for driving procedures.
4. Set parking brake.
5. Move ground drive control to low.
6. Lower saw to just above ground. See "Saw Controls" on page 44 for information on operating saw.
7. If equipped with traversing saw, set at desired offset position.

Operate

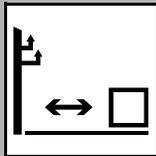


CAUTION

Breathing crystalline silica dust may cause lung disease. Cutting, drilling, or working materials such as concrete, sand, or rock containing quartz may result in exposure to silica dust. Use dust control methods or appropriate breathing protection when exposed to silica dust.

To help avoid injury:

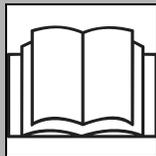
- Use water spray or other means to control dust.
- Refer to U.S. Department of Labor Occupational Safety and Health Administration guidelines to learn more about appropriate breathing protection and permissible exposure limits.



DANGER

Electric shock will cause death or serious injury. Stay away. 274-049

To help avoid injury: Expose lines by hand before digging. Cutting high voltage cable can cause electrocution.



WARNING

Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

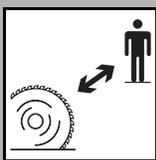


CAUTION

Flying objects thrown by machine may strike people. Wear hard hat and safety glasses.

1. Lower stabilizer until distance from bottom of skid shoe to bottom of saw bits equals desired trench depth.
2. Ensure that saw is aligned with planned trench and that tires are pointing straight ahead.
3. Adjust throttle to low.

4. Move attachment speed/direction control to desired speed. SAW WILL TURN.



⚠ DANGER Moving digging teeth will kill you or cut off arm or leg. Stay away.

To help avoid injury:

- Allow 3' (1 m) between digging teeth and obstacle. Machine might jerk when digging starts.
- Keep everyone at least 10' (3 m) from machine, attachments, and their range of movement.

5. Slowly lower saw to trench depth.
6. Release parking brake.
7. Increase engine speed to full throttle.
8. Move ground drive hand control to desired trenching speed.

NOTICE:

- Lower saw into softer material then move into harder or abrasive material. For example, lower saw into dirt at shoulder before cutting across road.
- If a curved trench must be cut, make a series of straight cuts.

IMPORTANT: If a curved trench must be cut, make a series of straight cuts.

Finish Job

1. When trench is complete, adjust throttle to low.
2. Raise saw.
3. As saw clears top of trench, move attachment speed/direction control to neutral.
4. If equipped with traversing saw, return to center position.
5. Drive a short distance away from work site.
6. Shut down tractor. See page 75 for correct shutdown procedures.
7. Wash bits and mounting blocks with high pressure water before parking unit overnight.

Plow

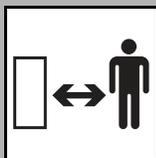
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Setup

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.



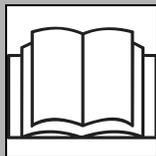
WARNING Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.

To help avoid injury: Keep everyone at least 10' (3 m) from machine, attachments, and their range of movement.



WARNING Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.

To help avoid injury: Comply with all utility notification regulations before digging or drilling.



WARNING Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

To help avoid injury: Use attachments or counterweights to make front and rear loads balance when all attachments are raised. Contact your Ditch Witch® dealer about counterweighting for your equipment.

Position Tractor

IMPORTANT: If material must be at a constant depth, dig starting and target trenches.

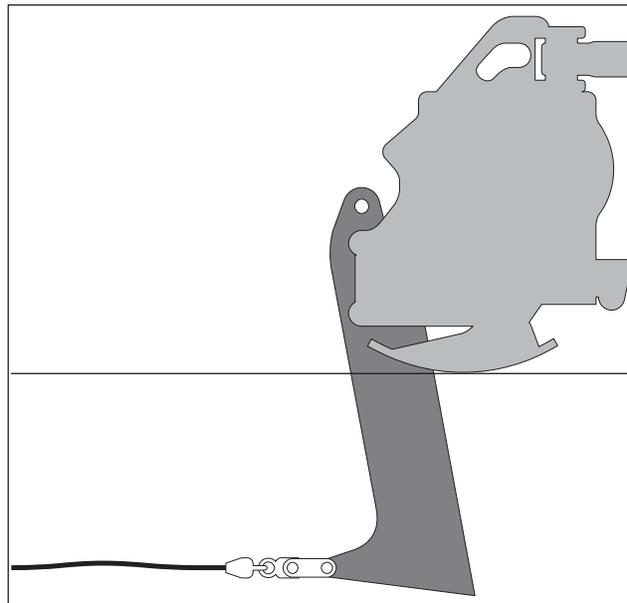
1. Fasten and adjust seat belt.
2. Start tractor. See page 72 for start-up procedures.
3. Drive to starting point. Move in line with planned trench. See page 74 for driving procedures.
4. Set parking brake.
5. Lower backfill blade, if equipped.
6. Lower plow to starting point of trench.
7. Turn ignition switch to STOP.



Attach Product

Pull Product

1. Insert material into pulling grip.
2. Tape grip with duct tape.



Plow_Pull.eps

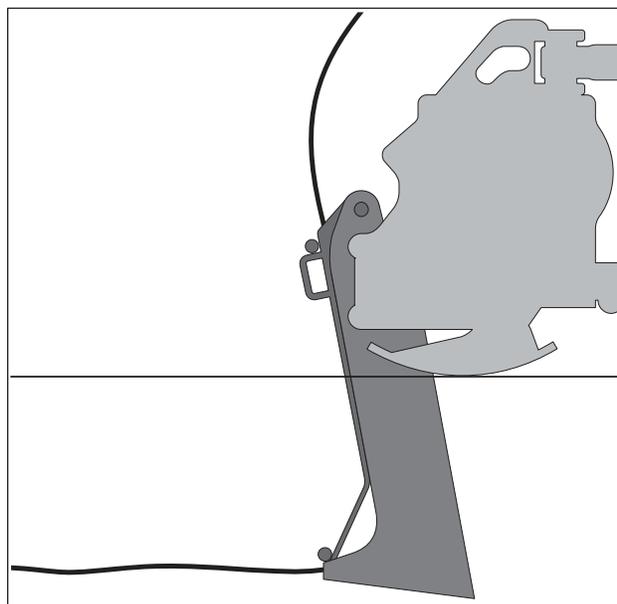
Feed Product

NOTICE: Use only genuine Ditch Witch® cable guide.

1. Remove cable guide.
2. Feed cable through tube from top to bottom.
3. Replace cable guide and tighten fasteners.
4. Secure cable.

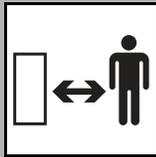
Prepare Tractor

1. Fasten and adjust seat belt.
2. Start tractor.
3. Adjust to low throttle.
4. Release parking brake.
5. Move ground drive control to low.
6. Raise backfill blade, if equipped.

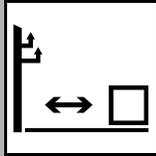


Plow_Feed.eps

Operate

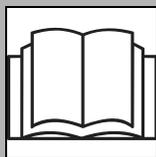


⚠ WARNING Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.



⚠ DANGER Electric shock will cause death or serious injury. Stay away. 274-049

To help avoid injury: Expose lines by hand before digging. Cutting high voltage cable can cause electrocution



⚠ WARNING Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

1. If equipped with combo, ensure that the trench/plow switch is in the plow position.
2. Move ground drive hand control forward to plowing speed and lower plow blade into ground.

NOTICE: Do not drive in reverse with plow blade in the ground.

3. Increase engine speed to full throttle.
4. Move attachment speed/direction control forward to start plow vibration. PLOW WILL VIBRATE.

NOTICE: Do not operate vibrator unless plow is in the ground.

5. Reduce attachment speed to a point with the least tractor vibration and the highest ground drive speed possible without track slippage. Adjust vibrator speed if ROPS vibrates excessively.
6. Check cable for damage during plowing.



Finish Job

1. When installation is complete with vibrator running, raise plow to ground level while reducing vibrator speed.

NOTICE: Do not operate vibrator when plow is out of the ground.

2. Move attachment speed/direction control to neutral.
3. Set parking brake.
4. Lower backfill blade, if equipped.
5. Turn ignition switch to STOP and remove product from plow.
6. Turn ignition switch to ON.
7. Swing plow to center position and engage swing lock and stow lock.
8. Release parking brake.
9. Drive a short distance away from work site.
10. Shut down tractor. See page 75 for proper shutdown procedures.

Drill

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Set Up

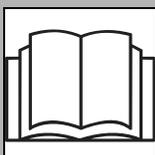
EMERGENCY SHUTDOWN - Turn ignition switch to STOP.



⚠ WARNING Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.

To help avoid injury:

- Comply with all utility notification regulations before digging or drilling.
- Set up warning barriers and keep people away from machine and jobsite.
- Do not operate drilling attachment if bore path is less than 10' (3 m) from any underground hazard.



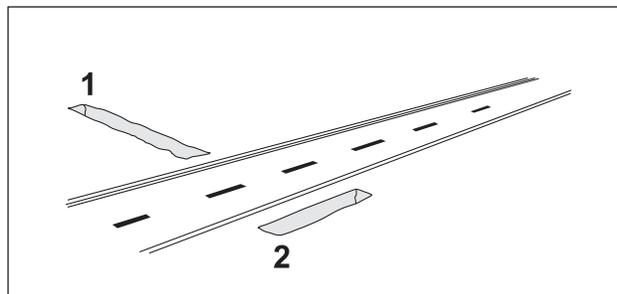
⚠ WARNING Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

Dig Approach Trench

1. Mark path where you intend to drill.
2. Dig an approach trench (1) along the intended bore path.

IMPORTANT: Ensure that approach trench is:

- deep enough for pipe to lay flat and enter soil at correct angle,
- at least 20' (6 m) long, and
- at least 4" (100 mm) wide.



Drill_Atchmnt_Prep_Job.eps

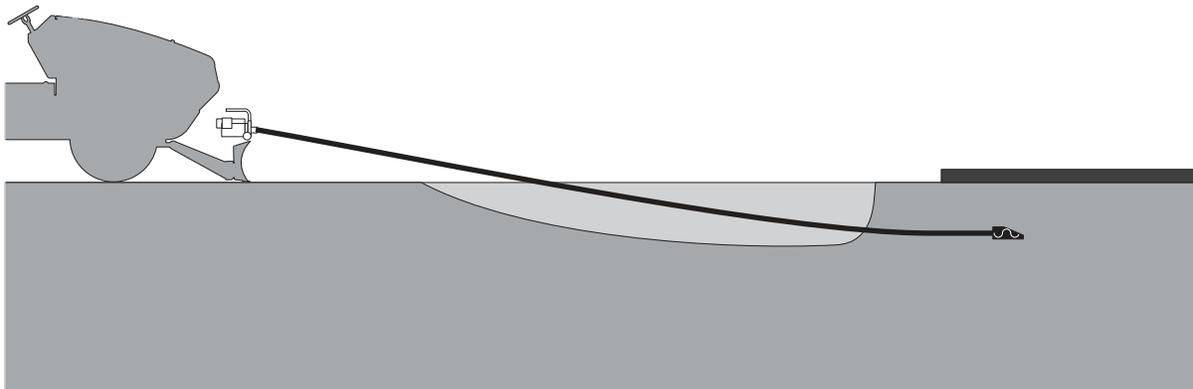
Dig Target Trench

1. Select a completion point for the bore.
2. Dig a target trench (2) **across** the anticipated completion point.

IMPORTANT: Ensure that target trench is:

- deep enough for drill bit to enter slightly above the trench floor, and
- long enough to allow for drift of unguided drill string. Accuracy of bore decreases with length and varies with soil conditions.

Install Drill String



DrillRod_Trencher

1. Assemble at least 20' (6 m), but not more than 30' (9 m), of drill rod sections.
2. Install drill bit to the cutting end of the drill string.
3. Put drill string in approach trench and align with intended bore path.

NOTICE: Incorrect installation can cause rod sections to bend.

- Have more than half of drill string length inside trench.
- If necessary, remove rod sections or increase length of trench.

4. Start engine and set to low throttle. See "Start Unit" on page 72.
5. Lower boom in parallel position to ground.
6. Move machine toward approach trench. See "Drive" on page 74.
7. Show down engine. See "Shut Down" on page 76.
8. Install drilling attachment to backfill blade.
9. Connect hydraulic lines.

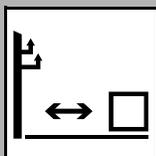
Operate



CAUTION Breathing crystalline silica dust may cause lung disease. Cutting, drilling, or working materials such as concrete, sand, or rock containing quartz may result in exposure to silica dust. Use dust control methods or appropriate breathing protection when exposed to silica dust.

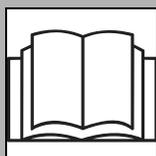
To help avoid injury:

- Use water spray or other means to control dust.
- Refer to U.S. Department of Labor Occupational Safety and Health Administration guidelines to learn more about appropriate breathing protection and permissible exposure limits.



DANGER Electric shock will cause death or serious injury. Stay away. 274-049

To help avoid injury: Expose lines by hand before digging. Cutting high voltage cable can cause electrocution.

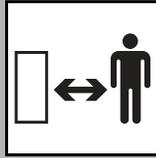


WARNING Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475



CAUTION Flying objects thrown by machine may strike people. Wear hard hat and safety glasses.

Drill



DANGER Rotating shaft will cause death or serious injury. Stay away. 270-1506, 275-197

To help avoid injury:

- Keep everyone at least 10' (3 m) away from drill string and machine.
- If a person enters the danger zone, use emergency shutdown.
- Wear close-fitting clothing and the applicable personal protective equipment.

1. Evaluate jobsite conditions. If you determine it is necessary, have helper use drill string guide to align drill string as it enters the soil. See "Start Bore with Drill String Guide" on page 116.
2. Start engine and set to low throttle.
3. Operate drilling attachment controls to start clockwise rotation.
4. Slowly move machine forward while maintaining rotation.
 - When length of bore is more than 5' (1.5 m), you may carefully and slowly increase speed.
 - Always use lowest speed necessary.
5. Carefully monitor progress of bore:
 - If rod section starts to bow, stop forward movement of machine and back machine slightly until rod straightens.
 - If drill string becomes blocked, rotate drill string counterclockwise to back up slightly.

NOTICE: Incorrect drilling will damage drilling equipment.

- Do not drill too quickly. Drilling bit will drift off course and rod sections may bow or break.
 - Do not drill with bent rod section.
- When drill bit enters target trench, stop rotation immediately.

IMPORTANT: After initial bore is complete, choose the next task:

- Backream to enlarge bore. See "Backream" on page 118.
- Pull drill string to install product. See "Install Product" on page 119.



Start Bore with Drill String Guide

If jobsite conditions make it necessary, ask a helper to follow the instructions below to operate the drill string guide at start of bore.

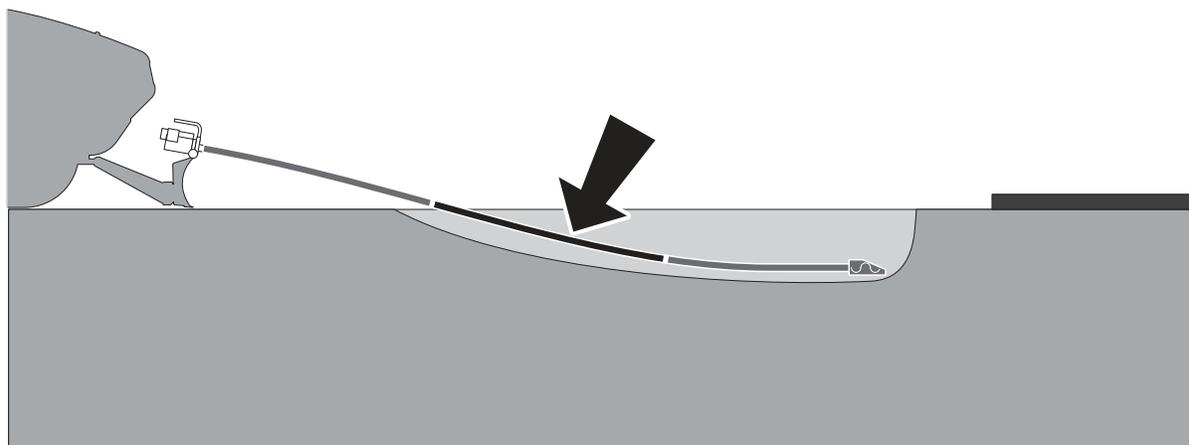


⚠ DANGER

Rotating shaft will cause death or serious injury. Stay away.

To help avoid injury:

- Use only the approved Ditch Witch[®] drill string guide (p/n 118-079).
- Do not straddle trench or drill string. Do not enter trench.
- Keep hands and feet away from drill string and drilling attachment.
- Do not use drill string guide during backreaming or when drill string is being pulled back.
- Only use drill string guide on left side of approach trench.

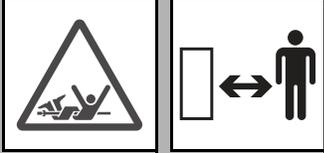


DrillRod_RemoveRod.eps

1. Stand on **left** side of approach trench.
2. Put drill string guide in correct position:
 - at least 3' (1 m) behind drill bit
 - hook side toward bore
 - cradle side toward machine
3. When drill string guide is in correct position, signal machine operator to start bore.
4. Use drill string guide to control the first 5' (1.5 m) of the bore path.
5. When length of bore is 5' (1.5 m), have machine operator stop machine.
6. When drill string has stopped, remove drill string guide and leave danger area.

Add Rod

If more length is needed, ask a helper to add a rod section.



⚠ DANGER Rotating shaft will cause death or serious injury. Stay away.

To help avoid injury: Only access drilling attachment with hands when engine is shut down.

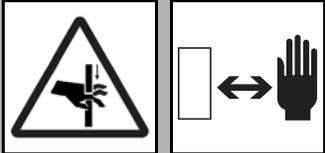
Disconnect Drill String from Drilling Attachment

1. Operate controls to stop rotation of drilling attachment.
2. To loosen drill string in ground, operate ground drive controls to move machine rearward 6" (15 cm).
3. Shut down engine.
4. Disconnect drill string from drilling attachment with applicable special tool (p/n 351-272). See "Disassemble Drill String" on page 122.
5. Start engine.
6. Operate ground drive controls to move unit rearward, slightly more than length of rod section.



Add Rod Section

1. Shut down engine.
2. Have helper connect new rod section to drilling attachment.
3. Start engine and set to low throttle.
4. Slowly move machine forward until new rod section and drill string are about 1' (30 cm) apart.
5. Have helper lightly hold new rod section and drill string so that they are aligned.



⚠ WARNING Pinch point. Crushing will cause serious injury.

To help avoid injury:

- Keep hands at least 6" (15 cm) from ends of rod section and drill string.
- Support rods from underneath with open palms. Do not grip rods.

6. Rotate drilling attachment to align slip latches of new rod section and drill string.
7. Move unit forward slowly. As soon as new rod section engages drill string, have helper move hands clear.
8. Slightly move forward until the slip latch connection is correctly latched.

Backream

After drill bit enters target trench, the bore hole may be enlarged by changing the drill bit to a reamer and pulling it back through the initial bore.

NOTICE: Incorrect use may damage components and increase wear.

- Do not try to increase hole size too much in one pass. Make several passes using successively larger reamers.
- Keep drill string straight and aligned with drilling attachment. Sharp bends can cause rod failure.
- Never have more than 30' (9 m) of exposed rod outside the bore. Remove rods as necessary.

Single Pass

1. Shut down engine.
2. Remove drill bit and install applicable reamer.
3. Start engine and begin clockwise rotation.

IMPORTANT: Always rotate clockwise during backreaming. Rotate counterclockwise only if drill bit or reamer is blocked in bore.

4. Slowly back up machine while maintaining rotation.

IMPORTANT: If length of rod outside the bore reaches 30' (9 m), remove rod section. See "Remove Rod" on page 120.

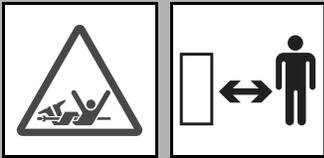
5. When reamer exits the approach trench, stop rotation immediately.

Multiple Passes

1. Do a single pass.
2. Install drill bit.
3. Push drill string through bore. Do not rotate.
4. Do a single pass. At final pass, install product. See "Install Product" on page 119.

Install Product

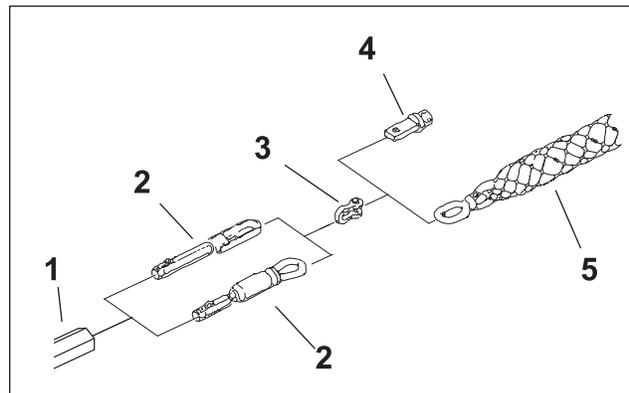
To install product, pull it through the bore after drilling or final pass of backreaming.



⚠ DANGER Rotating shaft will cause death or serious injury. Stay away.

To help avoid injury: Ensure no one is in target trench or near product being installed. If swivel malfunctions, material can rotate.

1. Install applicable swivel (2) to drill string (1) or reamer. Ensure swivel functions correctly.
2. Use shackle (3) to attach pipe pulling adapter (4) or pulling grip (5) to swivel.
3. Attach material to pipe pulling adapter or pulling grip.
4. Set engine to low throttle.
5. Slowly back up machine. If there is a blockage, begin counterclockwise rotation.



RW_PullingTools.eps

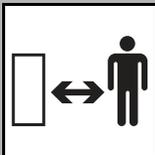
IMPORTANT: If length of rod outside the bore reaches 30' (9 m), remove rod section. See "Remove Rod" on page 120.

6. When product exits approach trench, stop machine immediately.



Remove Rod

If the length of rod outside the bore reaches 30' (9 m), ask a helper to remove rod sections as needed.

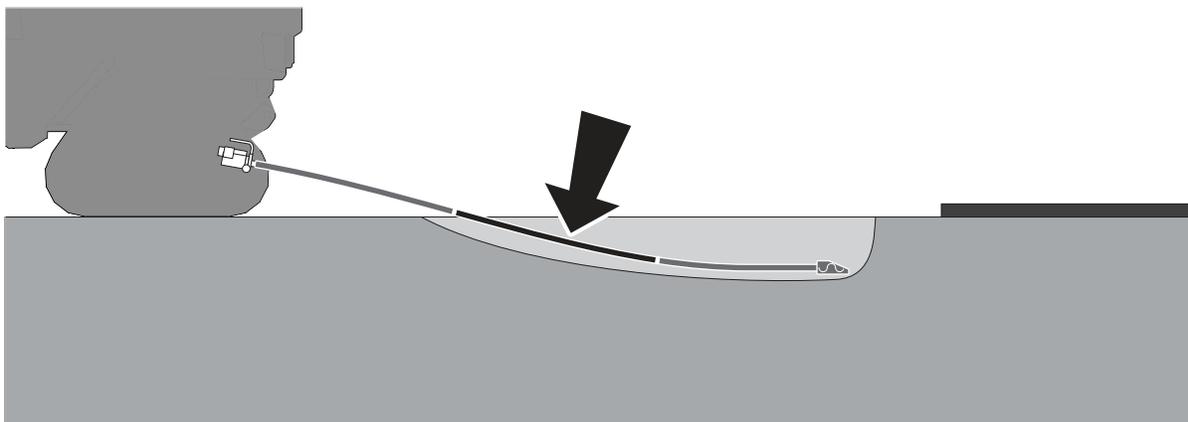


⚠ DANGER

Rotating shaft will cause death or serious injury. Stay away.

To help avoid injury:

- Only access drill string with hands when engine is shut down.
- Always remove second rod (as shown). Leave first rod section attached to drilling attachment.



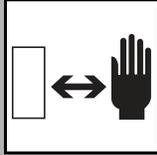
t480m060w.eps

Remove Rod Section

1. Operate controls to stop rotation of drilling attachment.
2. Shut down engine.
3. Disconnect and remove applicable rod section with applicable special tool (p/n 351-272). See "Disassemble Drill String" on page 122.

Reconnect Drill String

1. Start engine and set to low throttle.
2. Slowly move machine forward until attached rod section and drill string are about 1' (30 cm) apart.
3. Have helper lightly hold attached rod section and drill string so that they are aligned.



Pinch point. Crushing will cause serious injury.

To help avoid injury:

- Keep hands at least 6" (15 cm) from ends of rod section and drill string.
- Support rods from underneath with open palms. Do not grip rods.

4. Rotate drilling attachment to align slip latches of new rod section and drill string.
5. Move unit forward slowly. As soon as new rod section engages drill string, have helper move hands clear.
6. Slightly move forward until the slip latch connection is correctly latched.



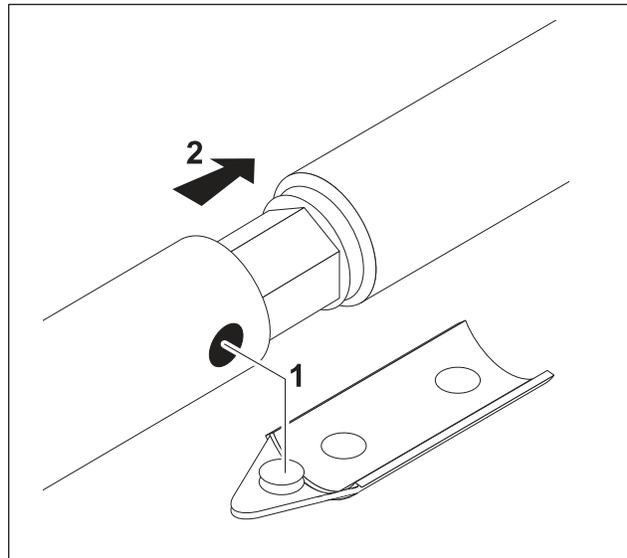
Finish Job

Disassemble Drill String

1. Shut down engine.
2. Disconnect drill string from drilling attachment.
3. Remove drill bit.
4. Disconnect sections:
 - Press tab through hole in female side of joint (1) using special tool (p/n 351-272).
 - Pull rod sections apart (2).

Remove Drilling Attachment

1. Disconnect hydraulic hoses if necessary.
2. If desired, remove drilling attachment from backfill blade.



Drill_Attchmnt_RodJoints.eps

Microtrenching

Chapter Contents

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- Adjust Trench Depth126
- Adjust Tilt126
- Adjust Level Indicator126
- Position Alignment Guide126
- Prepare Spoils Removal127

Operate 128

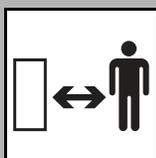
- Use Trench Cleaner130

Finish Job 131



Set Up

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.



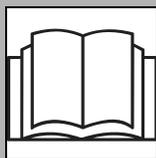
WARNING Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.

NOTICE: Use attachments or counterweights to make front and rear loads balance when all attachments are raised. Contact your Ditch Witch® dealer about counterweighting for your equipment.



WARNING Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.

To help avoid injury: Comply with all utility notification regulations before digging or drilling.



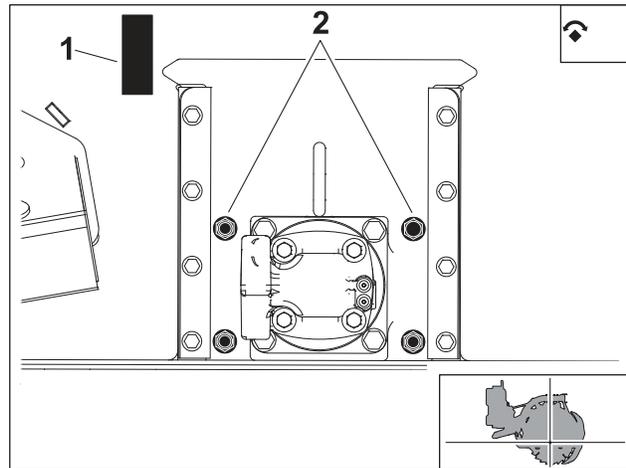
WARNING Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

1. Fasten and adjust seat belt.
2. Start tractor. See page 72 for start-up procedures.
3. Drive to starting point. Move in line with planned trench. See page 74 for correct driving procedures.
4. Lower backfill blade, if equipped.
5. Set parking brake.
6. Lower microtrencher to just above ground. See "Microtrencher Controls" on page 48 for information on operating microtrencher.

Adjust Trench Depth

Blade

1. Shut down tractor and remove blade (see page 184.)
2. Remove 4 bolts (2).
3. Lift or lower blade motor to desired depth. Use the depth decal (1) as a guide.
4. Install bolts and tighten nuts to 200 ft-lb (271 N-m).



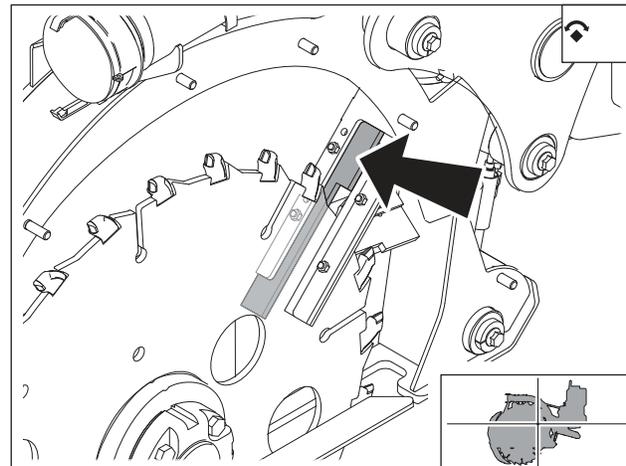
Spoils Deflector

1. Remove blade cover.
2. Remove bolts and nuts that retain the inside spoils deflector.
3. Position spoils deflector.

IMPORTANT: For best spoils removal, set the spoils deflector as close to the blade as possible.

4. Install bolts and tighten nuts firmly.

NOTICE: Overtightening nuts will damage deflector.



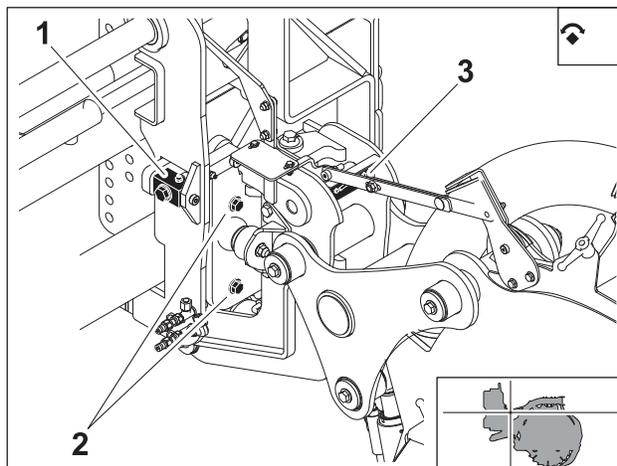
t28om066h.eps



Adjust Tilt

IMPORTANT: Microtrenching requires good contact between the microtrencher frame and the surface being cut. Use lift control, level control, and manual tilt to adjust microtrencher to match jobsite conditions.

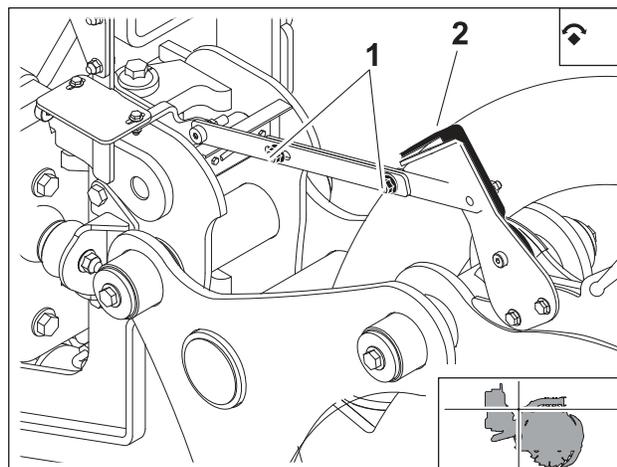
1. Lower microtrencher and turn off tractor.
2. Loosen 4 clamp bolts (2, and two on other side of mount).
3. Adjust manual adjustment turn screw (1) and watch bubble level (3) until desired tilt is achieved.
4. Install and tighten clamp bolts.



t28om068h.eps

Adjust Level Indicator

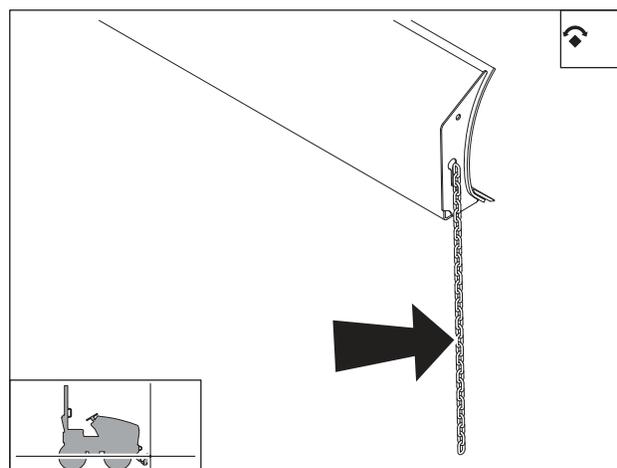
1. Shut down tractor and remove blade. (See page 184.)
2. Using lift control and level control, position base of microtrencher flat on pavement.
3. Loosen bolts (1) in adjustable link and align moving pointer (2) with fixed pointer.
4. Tighten bolts.



t28om088h.eps

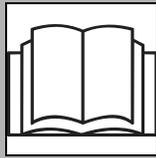
Position Alignment Guide

1. Mark intended trench path with paint.
2. Attach chain to backfill blade.
3. Adjust backfill blade until chain is in line with microtrencher blade.
4. Monitor chain periodically while trenching to ensure chain follows paint line during operation.
5. Remove chain from backfill blade before transporting tractor.



t28om070h.eps

Prepare Spoils Removal



WARNING Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

To help avoid injury: Do not operate without blade cover and chutes or chute plates installed.

The MT12 MicroTrencher is designed to operate optimally with an 800 cfm vacuum excavator unit to remove spoils. If vacuum excavator is not available, set up unit to operate without it.

With Vacuum Excavator

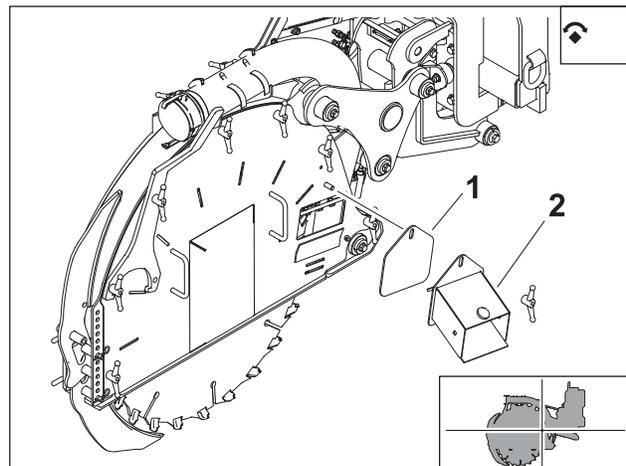
1. Connect vacuum hose on excavator to vacuum hose on tractor.
2. Operate vacuum unit at full speed for best results. Full vacuum flow to the microtrencher is necessary for best spoils removal.

IMPORTANT: Ensure that vacuum hoses are clear, vacuum filters are clean, and separator canister is empty prior to operation.

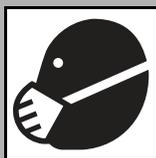
Without Vacuum Excavator

1. Cap vacuum hose on tractor.
2. Remove chute plates (1).
3. Install spoils chutes (2).

IMPORTANT: Note orientation of spoils chute as indicated by decal on chute.



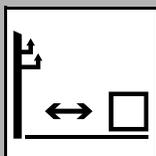
Operate



CAUTION Breathing crystalline silica dust may cause lung disease. Cutting, drilling, or working materials such as concrete, sand, or rock containing quartz may result in exposure to silica dust. Use dust control methods or appropriate breathing protection when exposed to silica dust.

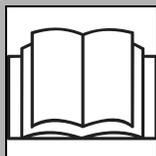
To help avoid injury:

- Use water spray or other means to control dust.
- Refer to U.S. Department of Labor Occupational Safety and Health Administration guidelines to learn more about appropriate breathing protection and permissible exposure limits.



DANGER Electric shock will cause death or serious injury. Stay away. 274-049

To help avoid injury: Expose lines by hand before digging. Cutting high voltage cable can cause electrocution.



WARNING Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

To help avoid injury: Use attachments or counterweights to make front and rear loads balance when all attachments are raised. Contact your Ditch Witch® dealer about counterweighting for your equipment.

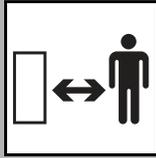


CAUTION Flying objects thrown by machine may strike people. Wear hard hat and safety glasses. 275-193

To help avoid injury: Never operate microtrencher without blade cover installed.

1. Ensure that microtrencher is in line with planned trench and that tires are pointing straight ahead.
2. Adjust throttle to low.

3. Move attachment speed/direction control to desired speed. **BLADE WILL TURN.**

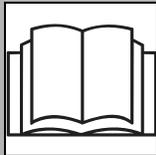


⚠ DANGER Moving digging teeth will cause serious injury or death.
Stay away.

To help avoid injury:

- Allow 3' (1 m) between digging teeth and obstacle. Machine may jerk when digging starts.
- Keep everyone at least 10' (3 m) from machine, attachments, and their range of movement.

4. Slowly lower microtrencher to full depth.



⚠ WARNING Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

5. Release parking brake.
6. Increase engine speed to full throttle.
7. Move ground drive hand control to desired trenching speed.



NOTICE:

- Lower microtrencher into softer material then move into harder or abrasive material. For example, lower microtrencher into dirt at shoulder before cutting across road.
- Microtrencher is not recommended for soft, wet, or sticky soil conditions.

IMPORTANT: If a curved trench must be cut:

- Release swing lock.
- Make a series of straight cuts for a curved trench smaller than a 40' (12.2 m) radius. .