



OPERATOR'S MANUAL

SERIAL NUMBER

Soil-Max, Inc. 2018
Rev A

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Warranty Policy

Soil-Max, Inc. stands by all new products with a 2-Year Limited Warranty from the warranty start date. Soil-Max will repair or replace at no charge any component of our system that fails during normal service within 2 years from the warranty start date.

The warranty start date is established upon receipt of the registration/warranty card indicating the End User's date of initial purchase of new product from an authorized Soil-Max dealer. Soil-Max reserves the right to request from the dealer proof of the date of purchase stated. If no registration is received, the warranty period will start on the date the product was shipped from Soil-Max.

Repaired, rebuilt, used or exchanged products will be warranted for a period of 90 days beginning the date the product was shipped from Soil-Max, or the remainder of the original warranty period, whichever is longer.

Warranty coverage is NOT provided for damage resulting from abuse, modification, neglect, accidents, vandalism, acts of nature or any cause that is outside of the normal, intended use of the Soil-Max Tile Plow. This includes but is not limited to damage resulting from turning while the plow is in the ground or damage caused by contact of unseen objects in the ground (rocks, gas/oil line, roots, etc.).

Soil-Max shall not be liable for indirect, incidental, or consequential damages to the Dealer, End User, or Third Parties arising from the sale, installation, or use of any Soil-Max product.

Soil-Max does not reimburse or compensate the Dealers or End User for labor, mileage, and loss of incidental expenses associated with service after the sale to perform upgrades, repairs, replacements, warranty claims or similar service related activities.

Soil-Max reserves the right to repair products that fail during the warranty period. Specifically, in the case where a product failure is reported after the product has been installed and used successfully for its intended purpose for any period of time.

CONVENTIONS USED IN THIS MANUAL

CAUTIONS AND WARNINGS

The operator's manual uses the following text formatting schemes to call attention to information related to simplifying system operation and proper operating practices to prevent bodily injury.



DANGER: Indicates an immediate hazardous situation that, if not avoided, will result in death or serious injury.



WARNING: Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.



CAUTION: Indicates a potentially hazardous situation that, if not avoided, may result in injury. It may also be used to alert against unsafe practices.

CAUTION: Indicates specific instructions to avoid accidental loss of data, system configurations settings, or property damage.

IMPORTANT: Indicates specific settings, calibrations, and procedures that must be followed for proper system performance and operation.

Note: Provides informative tips to assist with system setup, calibration, and operation.



Before using the Gold Digger or any other tile plow, call 811.

You need to have a determination made as to whether or not any underground gas lines, electrical lines, fiber optic or normal phone lines, or any other underground object or condition exist in the area you will be running the plow. Have these thoroughly marked and maintain the recommended distance from these areas.

Soil-Max is not liable for any damages or injury which may result from contact with any above ground or underground object.



**Know what's below.
Call 811 before you dig.**

RECOGNIZE SAFETY INFORMATION



- This is a safety-alert symbol. When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.
- Follow recommended precautions and safe operating practices.

FOLLOW SAFETY INSTRUCTIONS



- Carefully read all safety messages in this manual and on your machine safety signs. Keep safety signs in good condition. Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety signs. Replacement safety signs are available from your dealer.
- Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.
- Keep your machine in proper working condition. Unauthorized modifications to the machine may impair the function and/or safety and affect machine life.
- If you do not understand any part of this manual and need assistance, contact your dealer.

USE A SAFETY CHAIN



- A safety tow chain will help control tire plow should it accidentally separate from the vehicle.
- Using the appropriate adapter parts, attach the chain to the anchor location. Provide only enough slack in the chain to permit turning.

AVOID AERIAL POWER LINES



- Serious injury or death can result if tractor, loader, cart or plow contacts electric lines.
- Check height clearance before raising plow.
- Do not leave the operator's seat if any part of the cart or plow contacts power lines.

DIG SAFELY

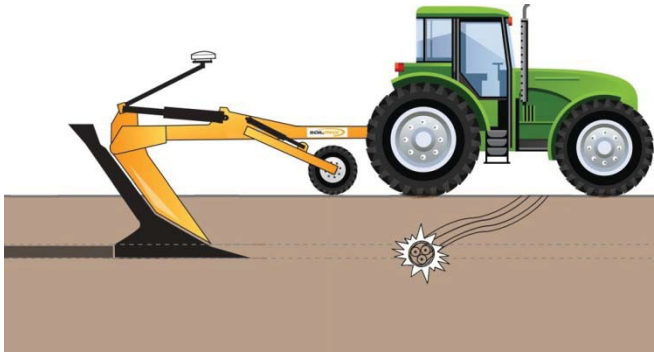
CALL 811 BEFORE YOU DIG!



- Before digging, check location of cables, gas lines, and water mains.
- Do not leave the operator's seat if any part of the plow contacts cables.

AVOID UNDERGROUND POWER LINES

CALL 811 BEFORE YOU DIG!



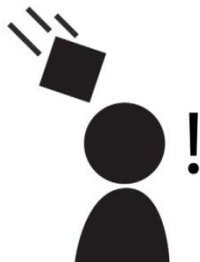
- Running the tile plow through gas, electric, or water lines can cause serious injury or death to you or others. Always contact local utility companies to mark off gas, electric and water lines prior to tiling a field.
- Locate Pipes And Cables Before Tiling.

REMOVE PAINT BEFORE WELDING OR HEATING



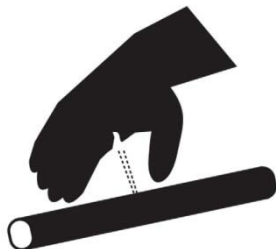
- Avoid potentially toxic fumes and dust.
- Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.
- Remove paint before heating
- Remove paint a minimum of 100 mm (4 in.) from area to be affected by heating. If paint cannot be removed, wear an approved respirator before heating or welding.
- If you sand or grind paint, avoid breathing the dust. Wear an approved respirator.
- If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.
- Do not use a chlorinated solvent in areas where welding will take place.
- Do all work in an area that is well ventilated to carry toxic fumes and dust away.
- Dispose of paint and solvent properly.

STORE ATTACHMENTS SAFELY



- Stored attachments can fall and cause serious injury or death.
- Securely store attachments to prevent falling. Keep playing children and bystanders away from storage area.

AVOID HIGH-PRESSURE FLUIDS



- Escaping fluid under pressure can penetrate the skin causing serious injury.
 - Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.
 - Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.
- If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

CHECK HOSES FOR DAMAGE

- Hydraulic hoses can fail due to physical damage, kinks, age and exposure.
- Check hoses regularly.
- Replace damaged hoses.

OBSERVE MAXIMUM TRANSPORT SPEED



- The maximum transport speed for the tile plow is 48 km/h (30 mph). Some tractors are capable of operating at speeds that exceed the maximum transport speed of the tile plow.
- Regardless of the maximum speed capability of the tractor being used, do not exceed the implement's maximum transport speed.
- Exceeding the plow's maximum transport speed can result in:
- Loss of control of the tractor/implement combination
 - Reduced or no ability to stop during braking
 - Implement tire failure
 - Damage to the plows structure or its components

Use additional caution and reduce speed when towing under adverse surface conditions, while turning and when on inclines.

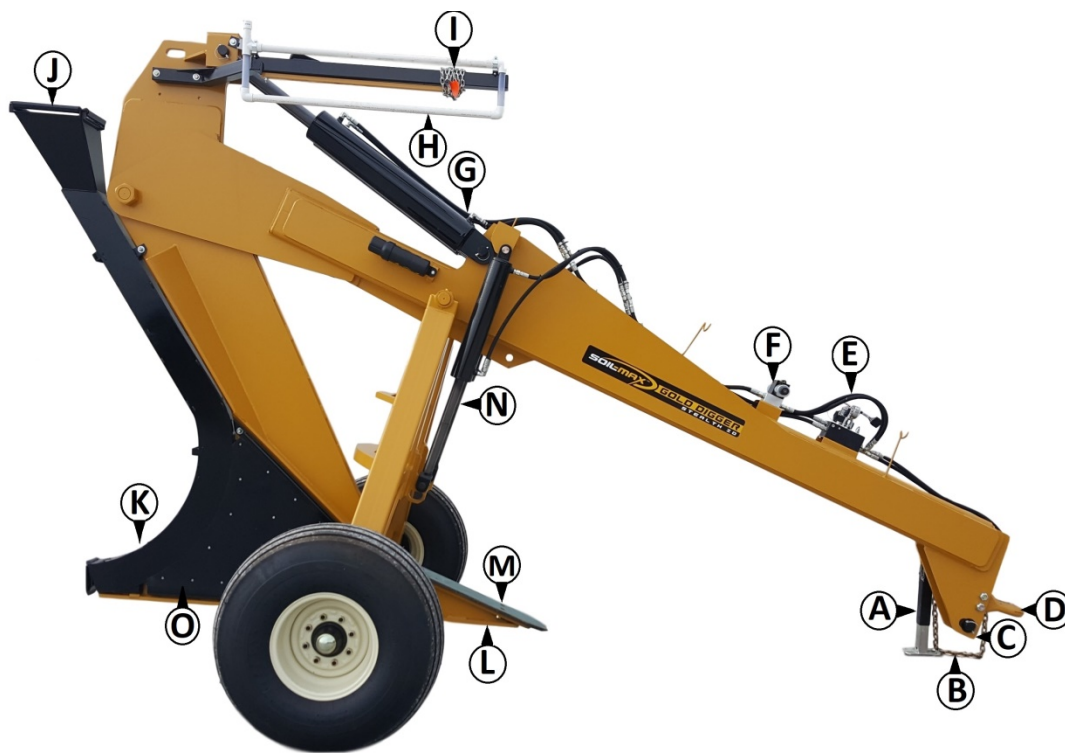
**Do not transport the plow with a vehicle weighing less than 2/3 the weight of the plow.
Only tow with a properly ballasted vehicle.**

USE A SIGNAL PERSON



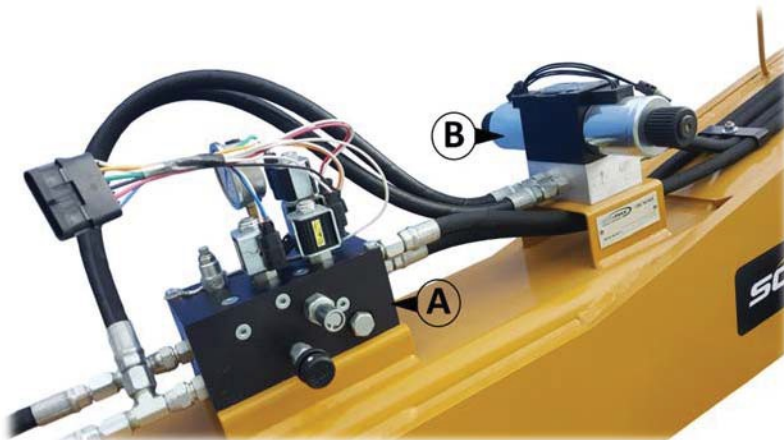
- Use a signal person to direct movement of the tile plow whenever the tractor operator's view is obstructed.
- Designate one individual as the signal person. Always have signal person stand in clear view. Be sure signal person stays a safe distance away from the machine when it is moving.
- Prior to using the tile plow, discuss hand signals and what each signal means to avoid misunderstandings and confusion which could result in a serious injury or fatal accident for someone.
- Keep all bystanders away whenever the machine is moved.

PULL-TYPE ZD PLOW



- A. Jack
- B. Safety Chain
- C. Tow / Pull Pin
- D. Hitch
- E. Down Pressure Manifold
- F. Proportional Valve
- G. Pitch Cylinders
- H. Water Level
- I. Depth Chain
- J. Tile Boot Rollers
- K. Removable Boot
- L. Heel
- M. Shear
- N. Lift Cylinders
- O. Removable Poly Boot Sides

HYDRAULIC VALVES



- A. Down Pressure Manifold
(Pull-Type Only)
Controls Plow Wheels
- B. Proportional Valve
(All Plows)
Controls Plow Shank Pitch

3. POINT ZD PLOW



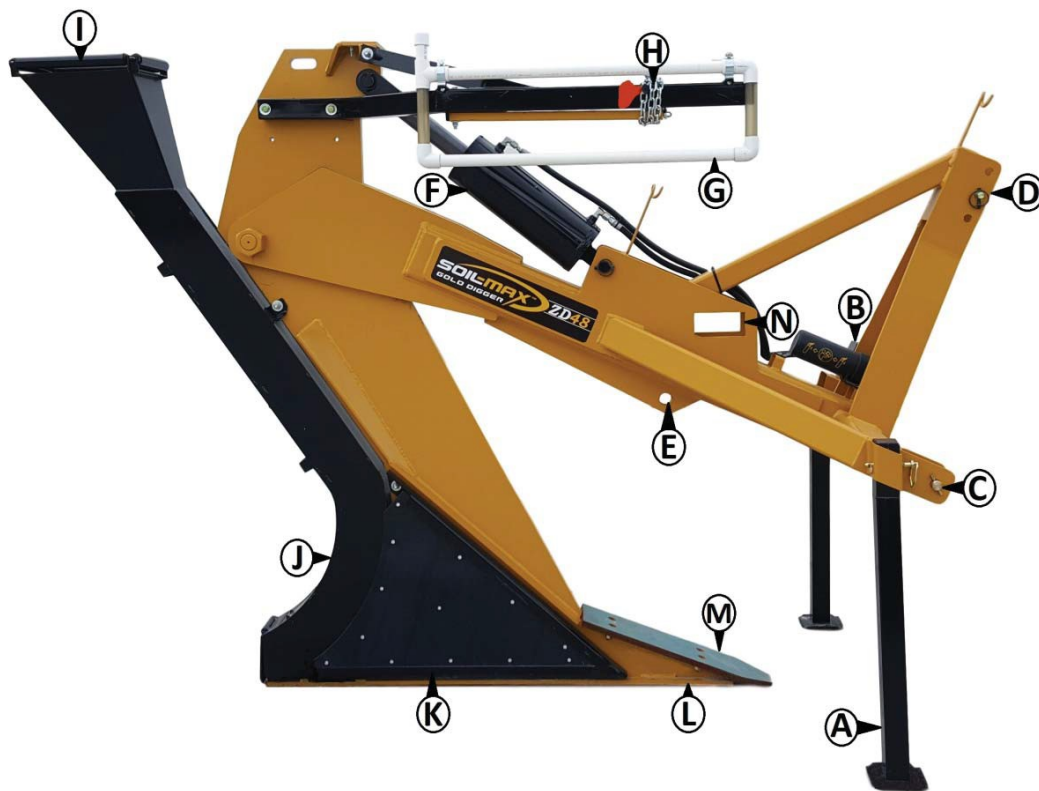
- A. Stands
- B. Proportional Valve
- C. Lower 3-PT Arms
- D. 3-PT Tree
- E. Tow / Pull Point
- F. Pitch Cylinders
- G. Depth Chain
- H. Water Level
- I. Tile Boot Rollers
- J. Removable Boot
- K. Removable Poly Boot Sides
- L. Heel
- M. Shear

Plow Shear Sizes and Dimensions (Pull-Type and 3PT Stealth ZD)

Plow Shear Size	Length (inches)	Width (inches)
4	38	7.5
6	38	9.5
8	38	12
10	38	14

Note: Use 4" Shear to install 3" Tile & 6" Shear to install 5" Tile

ZD48 PLOW



- A. Stands
- B. Proportional Valve
- C. Lower 3-PT Arms
- D. 3-PT Tree
- E. Tow / Pull Point
- F. Pitch Cylinder
- G. Water Level
- H. Depth Chain
- I. Tile Boot Rollers
- J. Removable Boot
- K. Removable Poly Boot Sides
- L. Heel
- M. Shear
- N. Fork Truck Lift Point

ZD48 Plow Shear Sizes and Dimensions

Plow Shear Size	Length (inches)	Width (inches)
2	25.5	4.5
3	25.5	5.5
4	25.5	6.5

SERIAL NUMBER

Locate your plows serial number which is attached to the proportional valve mounting plate as shown below.

Please record the serial number for your records.



My Serial Number: _____

TRACTOR SELECTION

Horsepower is not the only thing to consider when selecting a tractor for the plow.

A lower horsepower tractor that is properly weighted may be able to do the job to your satisfaction.

Things to consider:

- Weight of the tractor – Heavier is better!
- Tire wear
- Type of tire (radial or bias)
- Height of the tires – Taller is better!

ZD PULL-TYPE AND 3-POINT CAT III or IV *

Generally, a tractor weighted to 24,000 lb. or more can pull the plow very well in **good soil conditions**.*

We do not recommend pulling the plow in very muddy conditions as this will probably make your tiling job very frustrating and may cause compaction problems.

The chart below will help you decide what tractor to choose based on the depth you want to pull.

The depths are based on a 4 in boot.

Every boot size increase such as 4 inch to 6 inch will reduce these numbers by roughly 20%.

Tractor Weight (lb)	Plow Depth 1 Pass*	Plow Depth 2 Pass*
20000	3.5 to 4 ft.	4 to 4.5 ft.
24000	4 to 4.5 ft.	4.5 to 5 ft.
30000	4.5 to 5 ft.	5.5 to 6 ft.
36000+	5.5 to 6 ft.	6 to 6.5 ft.
40000	6 to 6.5 ft.	7 ft.

ZD48 CAT II or III Narrow – Max Depth 48" *

The chart below will help you decide what tractor to choose based on the depth you want to pull. The depths are based on a 4 in boot.

Every boot size decrease such as 4 inch to 3 inch will increase these numbers by roughly 20%.

Tractor Weight (lb)	Plow Depth 1 Pass*	Plow Depth 2 Pass*
10,000	2 to 2.5 ft.	3 to 3.5 ft.

14,000 +	3 to 3.5 ft.	3.5 to 4 ft.
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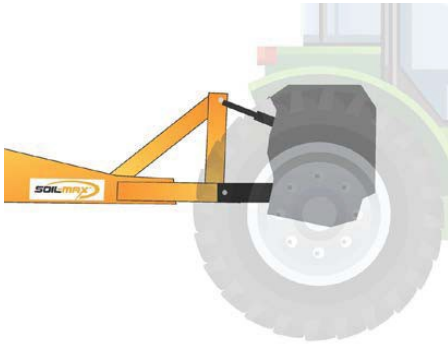
* Results will vary as multiple variables will affect performance including by not limited to soil type, soil moisture, tire size, tire pressure, boot size and traction.

3.POINT PLOW HOOKUP AND GEOMETRY

3.Point plow hookup is a Category III or IV attachment. Attachment to a Category IV 3-Point hitch is possible with the use of CAT III to CAT IV Bushing Set which is sold separately.

Adjusting the top link is very important. The ideal appearance of the 3-point arms should be as shown.

Correct



Incorrect



Attach the top link to the bottom or lowest mounting hole on your tractor and the highest hole you can reach on the plow. Keeping an upward angle on the top link is critical.

Please use the top hole on the plow for attaching the top link if possible.



CAUTION: Be careful when lifting the plow the first time. On some tractors the top link may be too short and may actually hit part of the tractor when the plow is raised.

We offer John Deere Top Link Spacers for John Deere 30 to 60 series tractors that may have this issue. The spacers extend the top link out 3" farther from the tractor. The top link must be adjusted so that the shoe of the plow does not drag the ground when the plow is lifted. Typically you will want the plow to be around 12 inches off of the ground when the plow is completely lifted. This is to prevent contact with the ground while transporting or surveying.

A Top Link Adapter is available and required for Case and New Holland tractors with the large knuckle on the top link. Contact your Soil-Max Dealer for more information.



You may also need to adjust the top link when you drop the plow into the first tiling run if the 3 point arms do not allow the plow to go deep enough. You will want to make sure that the two lower arms are locked so that they do not float side to side within the liftarm.

DRAFT CONTROL SETTINGS

The 3-point hitch needs to float for the plow to work properly. Refer to your tractor's owner's manual or dealer for instructions.

QUICK HITCH

IMPORTANT: DO NOT use a Quick Hitch with the Gold Digger ZD 3PT Tile Plow.

The geometry needed for the plow to be lifted out of the ground and go down far enough to reach the plow's potential is not achievable with a quick hitch

HYDRAULICS

All plows come standard with Closed Center Hydraulics that only need one set of hydraulic outlets from your tractor's primary hydraulic remote.

Open Center Tractor Hydraulics will require an Open Center Manifold and is easily installed for both 3-Point Tile Plows. * Note that this will be able to bypass approximately 12 GPM

***For Tractors or Dozers with incompatible hydraulic systems that want to use a Pull-Type Plow, Soil-Max manufactures a Self-Contained Hydraulic Unit. Please contact your Soil-Max Dealer for more information.**

Recommended Hydraulic Pressure: 2,900-3,000 PSI

Recommended Hydraulic Flow: 12 GPM (Limited by 1/2" Hydraulic Hoses)

FLUID DIRECTION



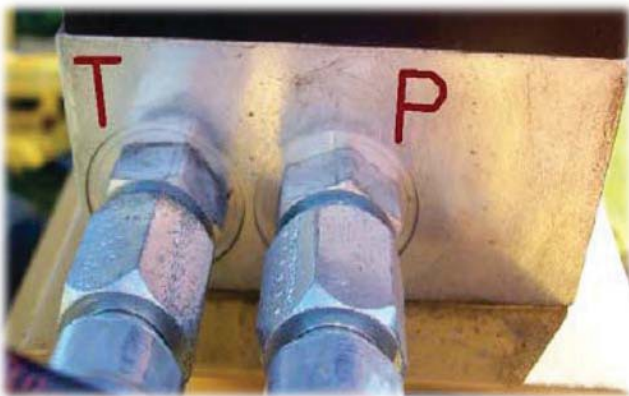
Hydraulic fluid direction is very important. On the front of each hydraulic manifold are the letters "P" and "T".

P = Pressure

T = Tank / Return

The Tank / Return side of the proportional valve is rated at 500 PSI.

Pressurizing the incorrect direction can potentially cause damage to the internal O-rings.



Note: If the fluid is in the wrong direction, the valves will not work correctly and could possibly lock up the system. If this happens you will need to relieve the hydraulic pressure from the system before the plow will function.

Tie up all hydraulic hoses and take care to remove any dirt from tractor remote connections and pioneer couplers prior to connection with tractor remotes. Valve tolerances are very tight and debris can cause malfunction of valves.

GREASE POINTS

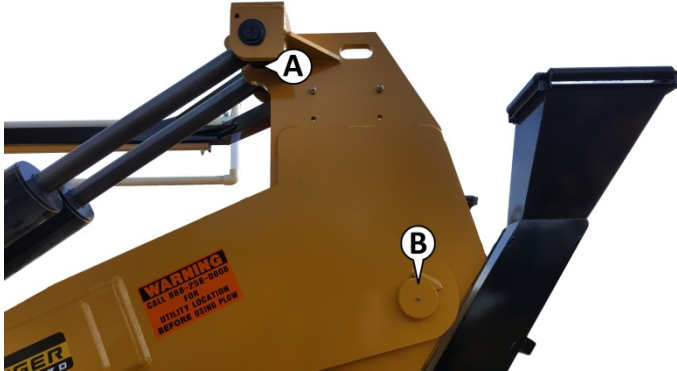
IMPORTANT: INSPECT AND GREASE DAILY BEFORE USE

It is strongly recommended that you grease these points daily to prevent any wear that could potentially cause failure and require repair that is not covered under warranty.

A. Cylinder Rams

B. Main Shank Pivot Pin

Pull-Type Plow Only
C. Wheel Frame Pivot Pin



IMPORTANT: GREASE ANNUALLY

Pull-Type Plow Only
Wheel Bearings
(Requires removal of wheel and hub)



WATER LEVEL & DEPTH CHAIN



With the plow level, fill the Water Level with anti-freeze to where the red and green marks meet. This mark represents the shank being level (0% slope).

With the depth chain arm out and the depth chain hanging you will notice the orange cow tag. This represents a depth of approximately 36" to allow for an easy visual of how deep you are tiling.

You can add more tags for different depths if you would like.

Once you have the plow attached to the tractor, lower the shank onto a flat surface.

Using a level placed alongside the shank of the plow, adjust the pitch/angle of the plow until the bottom of the shank is level.



BOOT REMOVAL

1. Properly support Boot J (B).
2. Remove bolt (A) and remove the Boot J (B).
3. Remove bolt (C) and the Poly Boot Sides (D) on either side of the plow.
4. Each size of boot has a corresponding shear (E). Remove and replace with the proper size shear.

Installation is the reverse of removal.

Tip: To ease the installation of the Tile Boot, install both Poly Boot Sides (D) onto the plow and loosely tighten bolt (C). Next, Install the Boot J (B). You can now finish tightening the bolt (C) to secure the Poly Boot Sides.



SHEAR WEAR



Over time, the shear will wear on the cutting edge. Gauge wear by placing a straight edge on the bottom of the heel (A) of the plow.

The shear (B) should be 1/8-1/4 inch below the heel (A). If it is less, replace the shear. Failure to replace the shear could result in adverse effects to the grading of the plow and excessive wear to the heel/bottom of the plow.

SHEAR LENGTH

Stealth ZD: 38"
ZD48: 25.5"

TILE FEEDER (OPTIONAL)

The optional tile feeder is a great addition. It is not required but is a great reassurance of tile installation quality. The tile feeder simply pushes on the tile to ensure no stretch is occurring.

Hydraulic fluid direction is important for correct operation. Take note of the direction the wheel turns; the wheel should turn toward the plow. If reverse direction, change the direction of the fluid detent.

The tile feeder mounting bracket has three adjustments to adjust the feeder to give just enough tension on the spring to keep the tile between the rim and tire. The hinge points of the tile feeder should be adjusted to an easy entry for the tile. Once adjusted, tighten bolts to restrict movement.

The hydraulic manifold that controls the feeder will limit both hydraulic flow and hydraulic pressure. Just turn on your tractors remote with Flow going the correct direction and from there you can control the wheel speed with the new digital control box. (See Next Page)



PULL-TYPE PLOW

The instructions in this section pertain to how you operate the wheels on a pull-type Gold Digger plow.

The wheels will not operate correctly if the tractor remote is detented (engaged) in the wrong direction. The Down Pressure Manifold is labeled TANK and PUMP on the valve ports facing the tractor. The hose connected to the PUMP port should be stiff with pressure when detented correctly.

Hydraulic Flow Must Be Correct Or Damage Could Occur

If hydraulic flow has been detented in the wrong direction it is possible the system could get locked or damage to the internal O-rings could occur. (See Page 15 For More Information)

If hydraulic lock happens you must relieve the pressure from the system before it will function correctly. You can tell if the system is locked by holding the hose connected to the TANK port. If this hose is very tight and pressurized then it is locked up and pressure will need to be relieved from it before continuing.

CONTROL BOX



The Down Pressure Manifold is operated by the black control box.

The switch marked "PLOW" operates the lift/lowering function of the wheels. This switch is used to lower the plow into the start hole and then pick the plow up at the end of a run after the plow has been pitched up to the top of the ground with the plow control system (e.g. Intellislope).

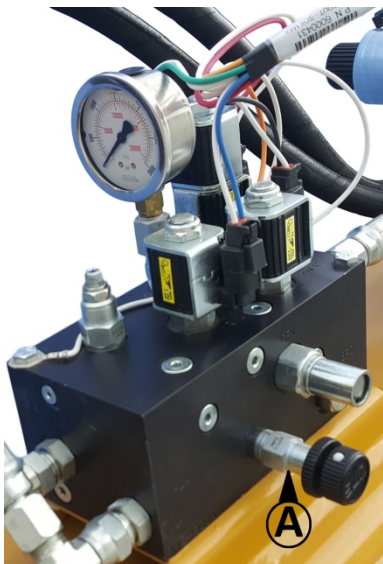
The plow must be pitched to the surface of the ground by pitching it UP with the 6" cylinders BEFORE it can be raised up off the ground with the wheels.



WARNING

Lifting the plow out of the ground while the plow is still buried will result in plow damage that is not covered under warranty.

Down Pressure Manifold



The "Float" switch lowers the hydraulic pressure to the wheels to 250-300 PSI. This allows the wheels to float over the terrain while still keeping the plow upright and balanced.

If you have more than 300 PSI, loosen the lock nut and turn the black knob (A) on the left side of the down pressure manifold as shown in the illustration counter-clockwise to lower the pressure.

The float switch must be ON to adjust the pressure. If you need more pressure on the wheels turn the knob clockwise. The plow must have enough pressure to provide vertical stability for the plow, without so much pressure that the tires pull the plow off grade when going over humps.

PULL-TYPE PLOW (CONTINUED)

STARTING FROM A HOLE (Most Common)



1. With the float switch off on the control box, lower the plow into the start hole with the plow up/down switch.

If using the Intellislope Plow Control System, check the auto-level box on the install screen as you lower into the start hole.

Refer to the Intellislope Operators manual for more instructions.



2. Once you reach the bottom of the start hole and are comfortable with the plow depth, make your connection and then **turn the float switch on**, the hydraulic pressure gauge should drop to 250- 300 psi to stabilize the plow.



3. Pull forward to start your installation.

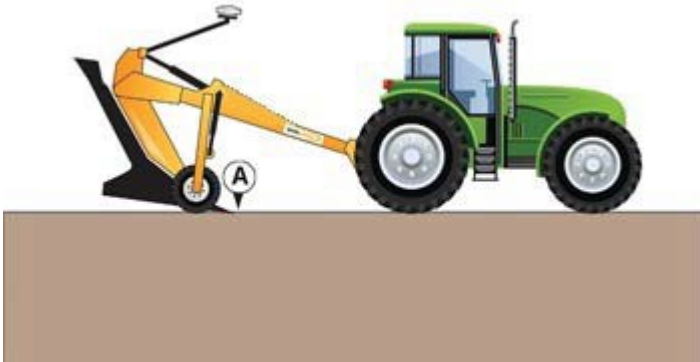
Tip: When starting the install, someone (or something) will need to stand on the end of the tile until the plow has installed 10-15 feet so that the tile stays in place.

Remember to always install tile with the float switch on.

STARTING FROM THE SURFACE

If using the plow in conjunction with the Intellislope Plow Control System, use the manual up/down controls to pitch the plow up or down for the processes below. When at the end of a tile installation, you will need to end the installation to get access to the controls needed.

Refer to the Intellislope Operators manual for more instructions.



1. With the float switch off on the control box, lower the plow to the surface of the soil with the plow up/down switch.

(A) Tip is being lowered to soil surface (wheels still in transport mode)



2. Pull forward while still using the plow down switch to bring the wheels forward, once the shear is into the soil about 1 foot, **turn the float switch on**, the hydraulic pressure gauge should drop to 250-300 psi.

(B) Wheels are being pulled forward to allow the plow to sink into the ground



3. Allow plow to work its way to the desired depth using the pitch/angle of the plow to draw it into the soil. You will be controlling the pitch by the up/down buttons on the plow control system. Once you are to the desired depth, level out the shank and begin your installation.



4. **Tip:** When starting the install, someone (or something) will need to stand on the end of the tile until the plow has installed 10-15 feet so that the tile stays in place.

Remember to always install tile with the float switch on.

RAISING THE PLOW



1. When finished installing, with the Float Switch still turned on, pitch the plow up using the plow control systems Up button.

(A) Plow shank is angled up

Warning!!! DO NOT use the wheels to lift and raise the plow out of the ground until the tip is nearly out of the ground.



1. Pull forward until the plow is almost out of the ground.

2. Turn the Float Switch off and raise the plow with the PLOW UP switch.

(B) Wheels going back to transport position

Caution: If the plow emerges completely and the wheels are still in float, the plow may become unstable. It is recommended as the tip of the plow emerges, to use the wheels to raise the plow the rest of the way out of the ground.



WARNING: Do not attempt to raise plow out of the ground using the wheels. Using the wheels to raise the plow out of the ground creates excessive stress on the frame and can cause damage to the plow. Plow must be raised out of the soil by pitching the plow and allowing the plow to work its way to the surface.

DRAWBAR PLACEMENT

When attaching a Pull-Type plow to your tractor's drawbar, please be sure that the drawbar is pulled in as close to the tractor as possible to avoid breaking or damaging the drawbar. This is especially important on smaller front wheel assist tractors.

3-POINT PLOW

STARTING FROM A HOLE

(Most Common)



1. Lower the plow into the starting hole with the 3-point hitch.

If using the Intellislope Plow Control System, make sure to be in Lowering Mode as this will auto-level the plow as you lower into the start hole.

2. Pull the shear into the soil or let the plow rest on the bottom of the starting hole.

3. Now the 3-point hitch should be set to float.

STARTING FROM THE SURFACE



1. Nose into the ground and slowly pull forward.

2. As you pull forward and the plow engages the soil, place the 3-point arms into "Float" on the tractor to allow the plow to sink into the ground."

Tip: When starting the install, someone (or something) will need to stand on the end of the tile until the plow has installed 10-15 feet so that the tile stays in place.

RAISING THE PLOW



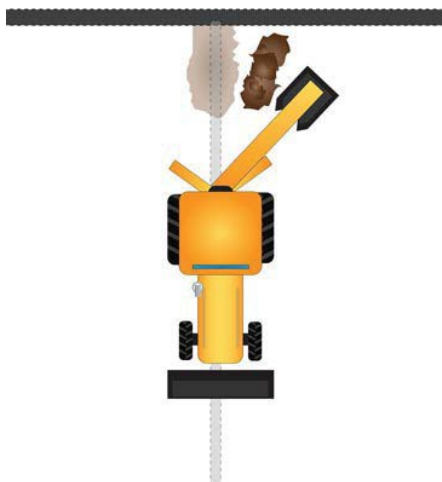
1. After the tile has exited the back of the boot, pitch the plow up to come out of the ground while pulling forward.

2. When the tip of the plow starts to emerge from the ground, take the 3-point arms out of float and raise the 3-point arms to lift the plow to the transport position.



WARNING: DO NOT use the 3-point arms to try to lift plow when in the ground!!! Using the 3- point to raise the plow out of the ground creates excessive stress on the frame and can damage plow or tractor. Plow must be raised out of the soil by pitching the plow and allowing the plow to work its way to the surface.

USING THE PLOW IN THE FIELD



Tile runs will need to be started at the desired tile depth and typically in a “start hole” or if possible from a drainage ditch. You will usually install the tile up slope from the start hole.

The hole must be long enough to accommodate the whole plow shank/boot and make a connection if needed. Be sure not to make the start hole wider than needed as you want to leave enough room for the plow wheels without the dangers of the wheels falling into the start hole or caving in the start hole.

Either lower the 3-point arms all the way down or swing the wheels forward on a pull-type low so that the full weight of the plow is resting on the heel at the bottom of the start hole (again make sure the 3-point draft control is turned off).

Insert the tile into the boot and feed it through and out the exit of the boot. You can make any connection to an existing tile or main now or after the tile has been installed.

When starting the install, someone (or something) will need to stand on the end of the tile until the plow has installed 10-15 feet so that the tile stays in place. In most cases you will want to travel at a speed of 1 - 1.5 MPH when installing tile depending on the depth and soil conditions. You will need to give the ground time to heave up as you are moving forward.

You will actually have better pulling efficiency at slower speeds. Your tractor may only need to be at half or two-thirds (1000- 1500 rpm) throttle in first or second gear.



WARNING: DO NOT TURN WHILE THE PLOW IS IN THE GROUND. THIS CAN CAUSE EXTREME FORCE TO THE PLOW SHANK AND POTENTIALLY TWIST AND DAMAGE THE PLOW.

DO NOT TURN

Turning while the plow shank is still in the ground can potentially damage the plow. When the plow is still in the ground and such a force is introduced, it is possible to bend the shank as a result. This damaged is not covered under warranty.



INCORPORATING A SECOND PULL TRACTOR

At times, due to field conditions, there will be need for a second pull tractor. When using a second tractor, it is important to have the tow rope or cable placed in the correct position.

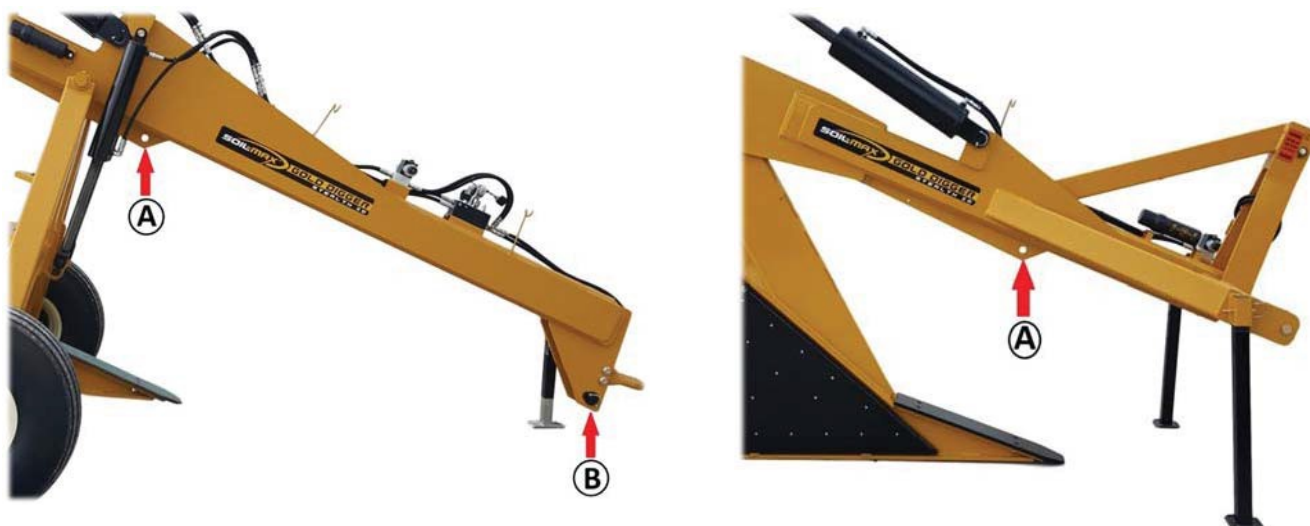
Always pull from the plow using the tow / pull point locations shown below.

The Pull-Type Plow has 2 locations, Mid-Frame (A) to be used with a screw-type clevis or at the Front using the included Pull Pin (B).

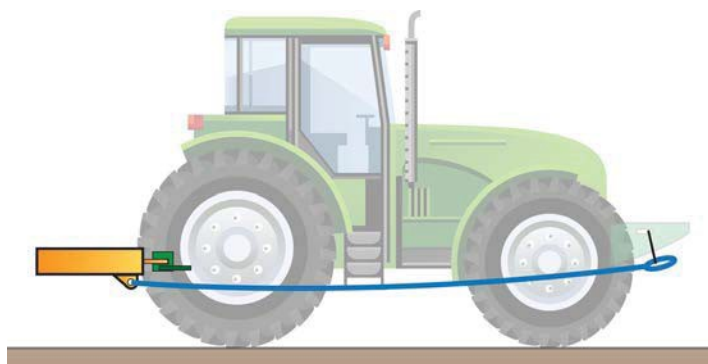
The 3-Point Plow has only 1 location, Mid-Frame (A) to be used with a screw-type clevis.



WARNING: Never pull from the front of the tractor. This can result in significant damage to the pull tractor and possibly damage the hitch, hitch bolts or pins.



ROUTING THE TOW CABLE



To make the process easier, it is suggested to permanently install the tow cable/rope under the tractor and hook to front weights for easy access.

Failure to pull from the correct position could result in tractor and/or plow damage.

PRE-RIPPING

Depending on the soil conditions and tractor weight (traction), you may need to pre-rip once or twice with the plow at approximately one-half to two thirds the desired installation depth. This would be considered a dry run and will loosen up some of the soil so the plow can then be pulled easier when the tile is being installed. That can sometimes eliminate the need for a second pull tractor.

Pre-Ripping is also very helpful in rocky conditions as you may discover and locate rocks before installing tile. Digging the rocks is much easier without tile in the way!

The maximum pre-rip depth should be 12 inches or more above your desired installation depth.

MANUAL GRADE CONTROL

This method is most commonly used where there is sufficient slope (usually >1% and no humps or valleys) and a control system would not necessarily be needed. Once you have started the tile run, you will need to make sure the water level is in the green graduated area. This means you are tiling at a positive slope. At the same time you can determine the depth of the plow by looking at the depth chain. The orange cow tag on the chain is set at approximately 3 ft. (36") of depth. Watch the chain and keep a consistent depth and you will be installing tile at the slope of the land. Between the water level and the depth chain, you should be able to do a satisfactory job on grades with sufficient slope.

Once the tile has run through the boot, extend the cylinders all the way out to pitch the plow to the top of the ground and then lift the plow with the 3-point arms or the wheels of a pull-type plow.

*You may add more cow tags for extra depths.

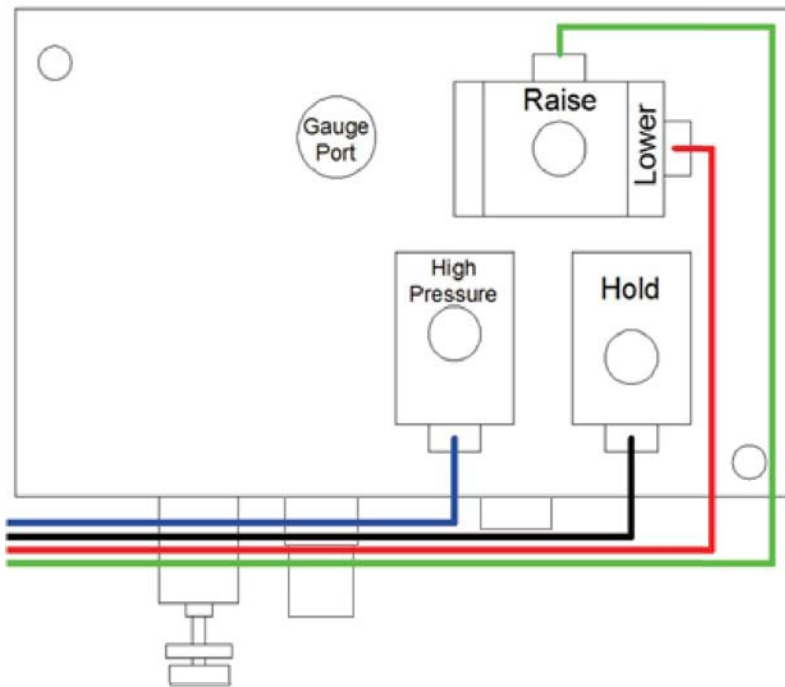
TILE DRAINAGE CHART

Tile Size in Acres Drained (3/8" Coefficient)

Grade (%)	3"	4"	5"	6"	8"	10"
0.0 5	1.1	3	4	8	19	31
0.1	2	3.7	7	12	25	42
0.1 5	2.2	4.7	8.2	14	29	55
0.2	2.5	5.5	9.8	16	35	60
0.2 5	2.7 5	6.5	11	17. 5	37. 5	70
0.3	3.1	7	12. 5	20	41	77
0.4	3.7	7.5	14	23	49	87
0.5	4	8	15. 5	26	54	100
0.6	4.4	9	17. 5	27. 5	59	110
0.7	4.7 5	10	18	31	64	115
0.8	4.9	11	20	33	70	120

0.9	5.2	12	21	34	72	130
1	6	13	23	35	78	140
2	8	17	31	50	110	190
3	9	20	37	60	130	240
4	10	24	41	70	150	270
5	13	26	48	77	160	300

DOWN PRESSURE MANIFOLD ELECTRICAL SCHEMATIC (Pull-Type Plow)



Note: The positions of the wires to the solenoids on the Down Pressure Manifold are very important.

With incorrect wire placement, malfunction of the manifold will occur and potential damage or injury may occur.

Please take care when removing, cleaning, or replacing wire connections.

Valve / Wire Color Code

(Up/Down Valve has stacked coils)

Red = Lower
Green = Raise
Black = Hold
Blue = High Pressure
Orange = Power Feeder

Testing Down Pressure Manifold

Using the Plow Switch Box with all connections secure, back-probe each connection. Each coil must be plugged in to be able to properly test voltage.

FLOAT SHIFT OFF

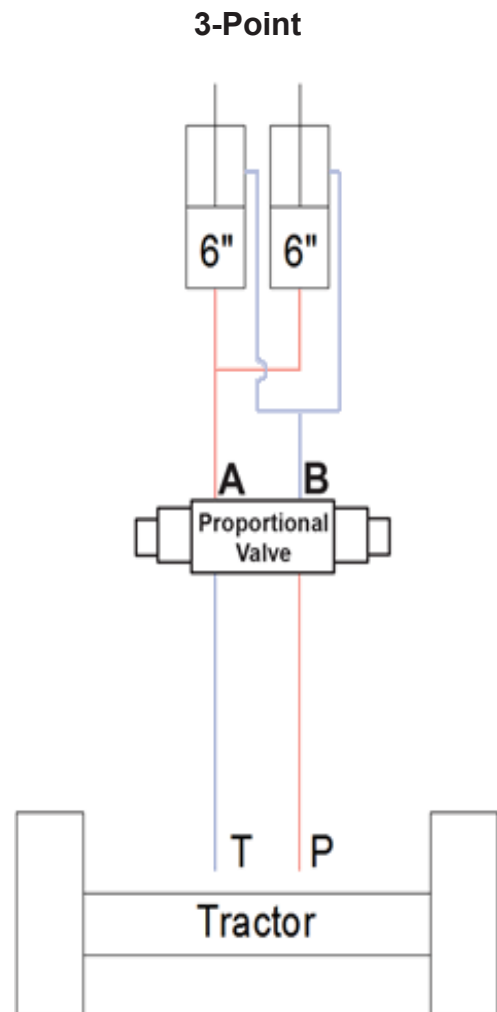
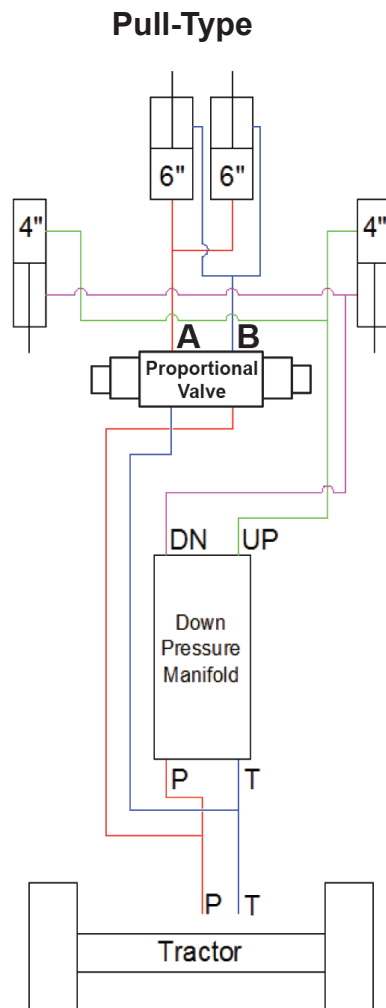
Plow Switch Right/Up = 12v on Blue & Green
Plow Switch Left/Down = 12v on Blue, Black & Red

FLOAT SWITCH ON

Green & Black will always be powered when Float is ON.
This is to keep Float Pressure on the wheels.
(Approx 250-300 psi and is adjusted with the side knob)

Each Valve will magnetize when voltage is applied.

AUTOMATIC GRADE CONTROL PLOW HYDRAULIC SCHEMATICS

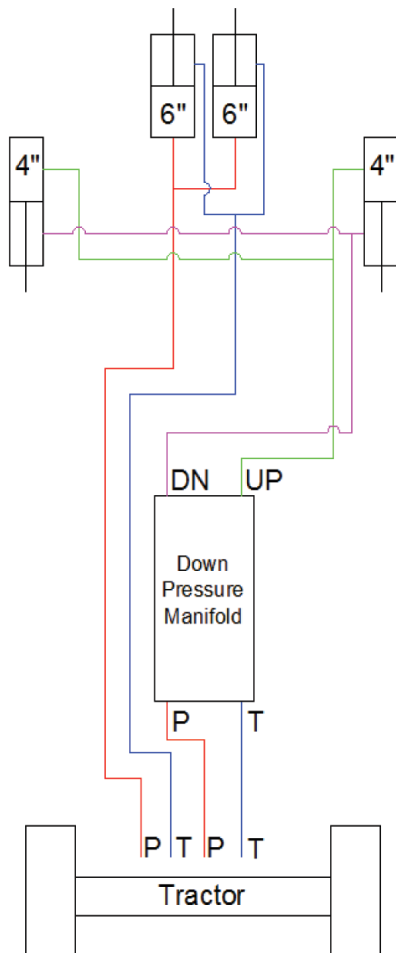


P = PRESSURE - This is the port through which pressurized oil is sent to the plow.

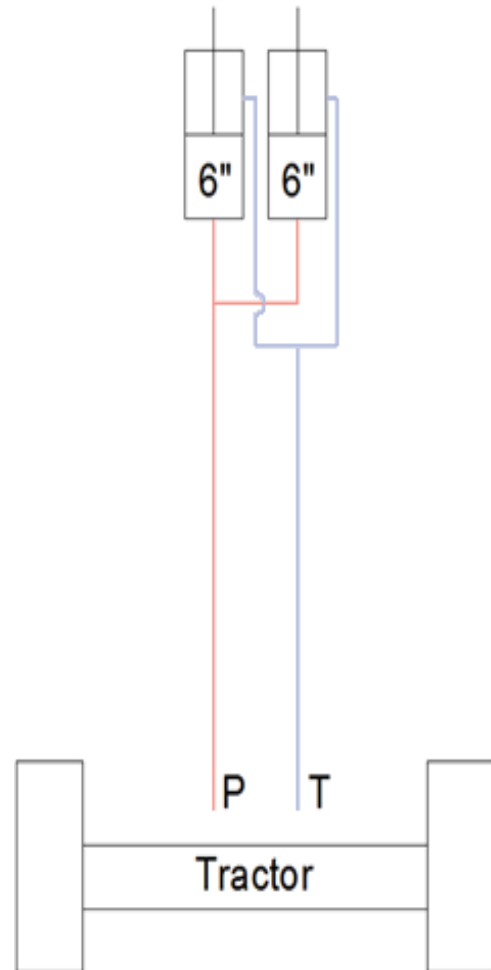
T = TANK - This is the port through which oil returns to the tractor.

MANUAL GRADE CONTROL PLOW HYDRAULIC SCHEMATICS

Pull-Type



3-Point



P = PRESSURE - This is the port thorough which pressurized oil is sent to the plow.

T = TANK - This is the port through which oil returns to the tractor.

FREQUENTLY ASKED QUESTIONS

Question: How do I know when I need to replace my shear?

Solution: To avoid damage or wear to the front of the heel (plow bottom), the shear should be replaced when the shear sticks down below the heel less than an 1/8".

To determine this measurement, hold a straight edge along the bottom of the heel and butt the end up against the shear to determine how far the shear point sticks below the heel.

The plow may start to not hold grade well once the shear is flush with the heel.

See "Shear Wear" on page 14.

Question: When should I replace the heel on my plow?

Solution: The heel should be replaced when there is about 1/4" of thickness left on the back end of the heel.

Question: When should I replace the poly sides on my plow?

Solution: When tiling, it is normal to hit rocks and debris in the ground that can cause damage to the poly sides of the boots. If contact with debris cuts or tears poly completely through, or if the poly becomes so thin that the bolt heads pull through, it should be replaced. Contact your dealer to order a new poly set.

Question: How deep of a frost layer can I tile through with my Gold Digger Stealth ZD tile plow?

Solution: Soil-Max does not recommend tiling in any more than 4" of frozen top soil. When the topsoil is frozen it can damage boots and it decreases the amount of topsoil cover that falls in on top of your tile.

Question: Can I use a "Quick Hitch" with my Gold Digger Stealth ZD?

Solution: **DO NOT Use a Quick Hitch** with the either 3-Point Tile Plows. The geometry needed is not possible when using a quick hitch.

Question: What does the "T" & "P" represent on the hydraulic valves?

Solution: "T" stands for TANK. This is how the oil gets back to the tractors hydraulic oil reservoir and "P" stands for PUMP or PRESSURE. This is how pressurized hydraulic oil gets to the plow. Make sure not to reverse these as the plow will not function correctly and you could possibly damage the internal O-rings of the valves.

Question: What does "detent" mean?

Solution: "Detent" is defined as follows: A spring device which maintains the spool of a directional control valve in position.

Example: Holding a lever in position to keep full hydraulic pressure.

Question: How much tire pressure should I have in my Pull-Type Plow tires?

Solution: 38-40 PSI is normal tire pressure.

Plow Troubleshooting

Plow will not stay on grade (porpoising)

1. Check Shear Wear

Stealth ZD Shears are 38" long when new. PRO Shears are 22" long for newer PRO Plows and 14" long for older PRO Plows. ZD48 Shears are 25.5" long. Once the shear is worn down a couple of inches, plow control will lessen. The shear should slightly protrude past the bottom of the plow. If shear is worn then replace shear with new. (See Page 14)

2. Check Plow Control System for correct calibration and settings.

Possibly the gains and thresholds are too high or too low. If using the Intellislope Plow Control System, check the Pitch Zero to the Suggested Calibration numbers as these should be within 10 digits of each other to maintain on-grade.

3. Verify the plow isn't in a "muck" soil.

This soil possibly has no bottom, thus causing the plow to drop/sink. This will cause the control system to try and compensate and while the plow may be trying to pitch up it could still be dropping because there is not enough firm soil to allow the plow to "bite" and rise up.

If you are in muck soil like described, you can use the following methods to possibly help.

Pull-Type Plow: Slightly increase the Float Pressure on the Down Pressure Manifold. This will put more pressure on the wheels to help keep the plow from sinking. *Once you are out of the muck soil, lower the Float Pressure back to 250-300 PSI.* NOTE: Too much float pressure can cause damage to wheel spindles.

3-Point Plow: Increase the float pressure on the tractors 3-Point arms to help keep the plow from sinking. *Once you are out of the muck soil, lower the float pressure back to normal.*

Muck Wing – Our Muck Wing attachment will give the plow more surface area to help and prevent the plow from dropping/sinking. The Muck Wing will work on PRO and ZD Pull-Type and 3-Point Tile Plows. (Muck Shear Required)

4. Check the GPS system for any issues.

Satellite Count, RTK Signal (Distance from Base Station), HDOP, VDOP, PDOP & Cable Connections

5. Verify the Plow Control System is functioning correctly.

Does pressing UP cause the plow to pitch UP? Does pressing DOWN cause the plow to pitch DOWN? If this is backward, you can either reverse the polarity in the control system or swap the wires that are plugged into the proportional valve on the plow. Note: Always confirm the pressure is going to the pressure port on the hydraulic valves.

6. (Pull-Type) Verify the plow wheels are in float (250-300 PSI)

(3-Point) Verify that the 3-Point arms are in float.

FLOW TROUBLESHOOTING (CONTINUED)

Plow will not pitch

Hydraulic

(Pull-Type Plow)

1. Will the wheels move?

If you cannot move the wheels either, then this is probably a tractor hydraulic issue. Make sure the hydraulics are on and flowing in the correct direction or replace the pioneer couplers (hydraulic fittings) as it is possible that the couplers are not letting the oil back to the tractor, thus locking up the hydraulics.

2. Check the pressure hose connecting to the Proportional Valve Block.

"P" should be pressurized and "T" should not be pressurized. If "T" remains pressurized, relieve the hydraulic pressure on hose. If the wheels move then the problem is likely with the proportional valve, whether it is electrical or hydraulic.

3. Manually activate the plow.

Do this by pushing in on the manual overrides on either end of the proportional valve. Notice the small copper button in the ends of the proportional valve shafts. This is a manual override that if pushed hard will manually slide the internal spool. If the valve moves manually then the problem is not with hydraulics but instead electrical. Use this if you have an electrical failure while tiling to pitch the plow up and out of the ground.

Electrical

Proportional Valve Coils

Disconnect the 2-pin connectors from the coils and use an ohm meter to test for proper resistance.

Resistance: Approx. 4 ohms

Check the coils by activating the coils with the plow control system (up or down button).

Use a metal object such as a screwdriver and verify that the ends of the Proportional Valve are magnetizing when energized. If one magnetizes and the other does not, switch the wires and see if you can get the other coil to magnetize. If not, replace the coil that does not magnetize. If it DOES magnetize by switching the wires, then you will need to replace the cable connected to the proportional valve.



DANGER

Relieve Hydraulic Pressure From Plow Before Disassembly

1. Unscrew shaft from valve body.
2. Inspect internal plunger to ensure that it moves freely.
3. Clean as necessary.
4. Inspect Spool inside valve body by pulling spool out.
5. Clean as necessary.
6. Reinsert spool in reverse order.
7. Attach shaft and tighten.

NOTE: Washer fits onto spool.



PLOW SPECS

	3PT ZD	PULL-TYPE ZD	ZD48
WIDTH (OVERALL)	60"	104"	58.5"
WIDTH (OUTSIDE OF HUB)		91"	
LENGTH (OVERALL)	144"	199"	97"
HEIGHT (WITH TIRES)	116	131"	82"
HEIGHT (WITHOUT TIRES)		123"	
WEIGHT (W/4" BOOT)	4,800 lb	6,300 lb	2,050 lb
HEEL LENGTH	86"	86"	59.5"
LENGTH (HEEL TO SHEAR TIP)	94"	94"	64"
TIRE SIZE		14 X 16.1	

NOTES

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NOTES

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