

OPERATOR'S MANUAL

3-POINT MOUNTED, VERTICAL FOLD TOOLBARS

&

TC CENTRAL COMMODITY SYSTEMS

TOOLBAR & CCS MANUFACTURED BY:

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PROUDLY MADE IN THE USA

BASIC TOOLBAR OPERATION AND FUNCTIONS

TOPICS COVERED:

Initial Wing Unfolding

Wing Folding

Electrical Harness Functionality

Wing Fold Valve Functionality

Troubleshooting & Diagnostics

INITIAL WING OPERATION

Please carefully review the following instructions, as adjustments may be necessary to ensure a successful initial operation.

Warning: Avoid crushing hazards. Failure to adhere to this warning could result in severe injury or fatality. Ensure that all personnel remain clear of the toolbar during folding sequence and/or operation.

Caution: To prevent implement damage, remove the wing fold lock pin from its ridge position before folding the wings.

UNFOLDING

1. Connect the folding hoses to the tractor using the quick-connect fittings. Take note that the valve block is labeled to indicate the function of each hose for your convenience. Pressurizing the hoses labeled with a "B" will activate the *Base* of the wing fold cylinders, facilitating the folding of the implement. Similarly, pressurizing the hoses marked with an "R" will activate the *Rod* side of the cylinders, allowing the implement to unfold.
2. Connect the implement wiring harness to the tractor using the standard 7-way implement plug. It is imperative that the harness receives power to initiate the unfolding sequence. Prior to connection, thoroughly inspect the harness plug to ensure the pins are clean and free of any debris. Likewise, examine the plug receptacle located on the back side of the tractor to ensure cleanliness.
3. Identify the proximity sensors positioned near each fold hinge. With the implement folded, ensure the sensors are properly aligned. Each sensor is equipped with an orange LED light that will illuminate when it is within sensing range of the folded wing. Note that the LED light may be challenging to discern under broad daylight. You may need to shield the sensor with your hands to conduct a thorough inspection. If the LED light fails to illuminate, use a 15/16" wrench to loosen the jam nuts and adjust the sensor towards the wing until the light activates. Once the correct position is achieved, securely tighten the jam nuts. **Caution:** *Avoid over-tightening the jam nuts, as this may lead to thread stripping on the sensors.*
4. You are prepared to conduct the final inspection before initiating the initial wing unfold operation. It is good practice to follow this checklist when servicing the toolbar indoors, or before field operation.
 - 1.) Confirm that the hinge lock pins are secured in their stored position above the toolbar hinge.
 - 2.) Examine the harness plugs connected to the valve block solenoids. Ensure all Deutsch connectors are firmly seated inside the female receptacle.



- 3.) Check for any loose hydraulic hoses by firmly grasping and wiggling them near their connection points. If any movement is detected within the fitting, tighten with a wrench.
 - 4.) Verify that all wiring, hoses, air lines, etc. are clear of any crush points around the hinge.
 - 5.) Ensure that all personnel, objects, and belongings are clear of the wings before proceeding.
5. Please make note of which SCVs (Selective Control Valves) the fold hoses are connected to. With the tractor running and in park, pressurize the hoses that are connected to the "R" or Rod side of the block to initiate the unfolding of the wings. It may be necessary to increase the flow in the tractor to initiate the unfolding sequence.
6. Before servicing the implement, it is imperative to reinstall the hinge lock pins. It is recommended to have a second person assist the operator outside the cab while installing and removing the pin. Together, align the pin slot on the wing with the corresponding slot in the hinge sides. Once aligned, slide the pin through the slot and ensure the retaining pin is promptly reinstalled.

NOTE: *The hinge lock pins are intended for service only. They are not designed or suitable for field use.*

Warning: Avoid crushing hazards. Failure to adhere to this warning could result in severe injury or fatality. Ensure that all personnel remain clear of the toolbar during folding sequence and/or operation.

Caution: To prevent implement damage, remove the wing fold lock pin from its ridge position before folding the wings.

FOLDING

1. Review and repeat the steps outlined in both Step 1 and Step 4 of the initial unfolding instructions. It is important to note that the toolbar will not require 12v power for the folding process.
2. Confirm that the hinge lock pins are positioned in their designated storage slot above the toolbar hinge. Refer to Step 5 in the unfolding instructions for guidance. To initiate the folding process of the toolbar, it is essential to apply pressure to the “B” or base side of the block.

FIELD – READY SET UP

TOPICS COVERED:

No Downward Flex Configuration

Floating Wing Configuration

Toolbar leveling

Straddle Gauge Wheels

Configuring Wing Down Force



HYDRAULIC WING DOWN FORCE SET UP AND OPERATION

The hydraulic wing down force feature is adaptable for use in both flat and rolling field conditions. Navigate directly to the section that aligns best with the field conditions you commonly encounter. For operators facing a variety of conditions, we advise familiarizing yourself with both sections to optimize your implements performance based on geographical differences to maximize the effectiveness of your implement.

TOOLBAR SET UP

Warning: Perform the following on soft, level ground. It is good practice to allow the tractor to creep forward while raising and lowering the implement to prevent backward movement on the row unit components. If soft ground is inaccessible, a gravel lot can serve as a last resort for set-up operations. Lowering the implement on concrete will result in damage to Keeton's, Smart Firmers, fertilizer knives, applicator tubes, and any other in-ground or in-furrow attachments.

FLAT GROUND – NO DOWNWARD FLEX

NOTE: The hinge lock pins are NOT intended for field use and should NOT be used for rigid bar planting.

1. Start with the toolbar raised and in the unfold position. Use the 3-point hitch controls to adjust the toolbar to a comfortable working height. Ensure the row units remain off the ground.
2. Locate the wing stop bolts underneath the fold hinges. Loosen the jam nut to allow the bolt to spin freely. Manipulate the SCV until the wings are level to the naked eye. If your implement is equipped with a single input valve block, it may be necessary to pin one wing in the rigid position to prevent settling. Use a bubble level to accurately gauge the position of the wing and perform fine adjustments. Once both wings are level, loosen all wing stop bolts until the head of the bolt contacts the underside of the wing. Use a wrench to turn the bolt 3 revolutions after the bolt head contacts the wing to remove any slack. Double check with a level and readjust the wing stop bolts as needed.
3. Lower the implement to planting height. Planting height is gauged by the position of the row unit link arms. Most operators set the height of the implement so that the link arms are parallel to the ground or slightly past for optimal vertical travel. Adjust the top link so the implement is level front to back. Failure to do so will result in uneven weight distribution and may result in damage to the toolbar. Double check the height of the link arms after any top link adjustment and raise/lower the implement as needed.
4. Loosen the Jam nuts on the straddle gauge wheels. Lower the gauge wheels until they contact the ground. Tighten the top jam nut until it contacts the square nut. Using a



1 ¼” wrench, turn the nut two revolutions to take slack out of the frame. Once the wheels are set, tighten the lower jam nut to lock the adjusting rod into place.

5. Use a level, perform a final inspection of the given metrics. Inspect all adjustment bolts and nuts to ensure they are properly torqued for field operation.

ROLLING GROUND – TOOLBAR IN FLOATING POSITION

1. Start with the toolbar raised in the unfold position. Manipulate the 3-point hitch until the toolbar is at a comfortable working height, the row units must remain off of the ground.
2. Refer to and repeat steps 2-4 in the previous section which covers the rigid position.
3. Raise the implement back in the air. Manipulate the wings so that each is smiled slightly upwards to relieve pressure off the wing stop bolts.
4. Loosen the wing stop jam nuts. Tighten the wing stop bolts to your preference. The intention of the stop bolts is to set a limit of downward flex. Lower the wings downward against the bolts to check the flex height and repeat as necessary until the wings flex to your preferences. **NOTE:** Keep the flex of your cultivator bar in mind if it is applicable. If you have cultivator bar manufactured by someone other than TC, check the limits of flex on that toolbar. It is poor practice to run the planter bar in a manner your cultivator bar cannot conform to. Following this guidance will help prevent crop destruction during the cultivating process.
5. Conduct a final field-ready inspection pertaining to all the information covered to this point. Properly setting your toolbar is imperative to your success this planting season.



CONFIGURING HYDRAULIC WING DOWN FORCE

The following section originates from our preferences and experiences in the field with down force wing operation. It is meant to be a starting point. Field conditions and environment will be the ultimate factor in determining the metrics that work best for you.

SETTING INITIAL PRESSURE

1. Start by ensuring that the toolbar is unfolded and lowered to planting height. **CAUTION:** Prior to operating the wing downforce system, all preceding steps regarding toolbar setup must be completed. Failure to comply may result in damage to row unit components.
2. Verify that the 7-way ag plug is securely connected to the female receptacle on the back side of the tractor.
3. Inside the tractor cab, locate the flow controls. Depending on the model of your tractor, the flow controls will either be manual or electronic. Refer to your tractor's manual if necessary. Adjust the settings for the remotes corresponding to the fold hoses to a range between 1.5 and 2.0. A minimal flow setting is sufficient to operate the wing downforce system.
4. Keep the Selective Control Valve (SCV) running on the constant setting to maintain pressure in the hose or hoses connected to the "R" or *Rod* ports on the valve block. Continuous pressure is needed for proper operation.
5. Identify the hand valves located on the upper side of the valve block. Use the hand valves to adjust and achieve a pressure reading of 600 psi on the corresponding pressure gauges. Turn the hand valve clockwise to increase pressure and counterclockwise to decrease pressure as needed. 600 psi is a safe starting point for further calibration. Refer to the next section on initial field operation. Common operating pressures range from 0 to 1400 psi. Wing downforce is ultimately dictated by operating conditions and environment.

INITIAL FIELD OPERATION & FIRST PASS PREP

TOPICS COVERED

Wing Down Force

Central Commodity System Overview

Talc-Graphic Usage

Fluency Agent Usage

Tank Seeding Pressures

Seed Flow Trouble Shooting



WARNING: *Activate the wing downforce system only when the implement gauge wheels are in contact with the ground. If your toolbar is configured to not allow downward flex, it is acceptable to maintain constant hydraulic pressure throughout the entirety of field operation, regardless of whether the implement is raised or lowered.*

WING DOWNFORCE

1. Lower the implement and activate wing down force via the remotes assigned to the fold hoses. It is good practice to activate the hydraulics approx. two seconds before the planter starts planting if the headland space allows.
2. Monitor the wings closely during the initial pass. If you notice the wings starting to lift or ride upwards, adjust the hand valves to increase the system pressure. It is recommended to make incremental adjustments to the valves for optimal results, rather than making drastic changes.
3. Be attentive to the center section of the toolbar. If you observe the wings pushing the center section upwards, promptly decrease the system pressure using the hand valves. In rare cases, smaller configurations may necessitate adding weight to the center section to counterbalance the downforce on the wings, especially when the bulk fill tank is empty. If this issue persists, please contact us at 402-886-4665 to inquire about our raised weight brackets for potential solutions.
4. Disengaging the downforce system can be done in two ways:
 - a. Option 1: Prior to raising the implement at the end of a pass, shift the SCV to the float position.
 - b. Option 2: Configure a timer on the remote(s) to automatically raise the wings when the flow is reversed and activated on continuous. Adjust the timer settings to achieve a wing tip-up height that suits your preference.

WARNING: Be extremely cautious mounting and dismounting the ladder. Always use three points of contact while navigating the catwalk. Avoid exposure to airborne chemicals. Stop the blower before opening the lid. The lid may fly upward if it is opened while the blower is operating.

TC CENTRAL COMMODITY SYSTEM

NOTE: It is imperative that first-time central fill users read and follow all written instructions pertaining to CCS operation. Failure to do so may lead to field complications and compromised seed flow.

SEED TENDER TANK FILLING AND LUBRICATING


1. Maneuver the implement beneath the central fill tank. Be mindful of low hanging row unit components such as Keeton's and drop tubes while backing up. Position the tank opening directly below the seed tender spout.
2. Once the implement is in position, raise the three-point to minimize the distance between the tank opening and the spout. In windy conditions, use available flexible material to fasten a cone around the spout. This will help prevent unintentional seed loss while filling.
3. Uneven seed lubrication is the leading cause of problematic seed flow on central fill systems. To achieve optimal lubrication, sprinkle the lubricant on top of the seed after it drops onto the seed tender conveyor. Reference the Seed Lubricant Chart to determine the appropriate application rate.


PRO-BOX TANK FILLING AND LUBRICATING

1. Using a forklift or front-end loader, position the pro box overhead the tank opening. Pay attention to the slide gate and crank handle location, as these will need to be accessible from the catwalk. Ensure the pro-box gate is centered over the tank opening. Properly aligning the gate opening will ensure minimal seed loss during filling.
2. Applying the lubricant can be done in two ways:
 - a. Use a sheet of plywood, a 2 x 4 and a couple of bungee cords to fasten a ramp that the seed will fall onto and slide into the tank. Sprinkle the talc onto the seed as it is sliding down the plywood. The gate should be opened conservatively. If too much seed is deposited onto the plywood at once, it may lead to seed loss off the sides.
 - b. Deposit the seed directly into the tank. Periodically close the gate and sprinkle the lubricant into the tank. Use a stir stick to evenly coat the seeds inside the tank. Use the lubricant application rate chart to determine how often the gate should be closed during the filling process and how much lubricant should be applied at each interval.

NOTE: Lubricant application rates are fluid. The charts below are meant to serve as a base line. Read through the factors that affect application rates and adjust the numbers on the chart according to your environment, seed size, chemical treatment, and humidity factors.

SEED LUBRICANT APPLICATION

 TALC-GRAPHITE APPLICATION RATE TC CCS	
TC STANDARD 55 BU TANK	11 CUPS
TC CUSTOM WIDE BOTTOM TANK (MANIFOLD LARGER THAN 16 ROWS)	13 CUPS
TC 110BU TANK	22 CUPS

 FLUENCY AGENTS IN CCS		
TC STANDARD 55 BU TANK	WAX BASED AGENT	GRAPHITE AGENT
	4 3/4 CUPS	1 1/8 CUPS
TC CUSTOM WIDE BOTTOM TANK (MANIFOLD LARGER THAN 16 ROWS)	WAX BASED AGENT	GRAPHITE AGENT
	5 2/3 CUPS	1 1/3 CUPS
TC 110BU TANK	WAX BASED AGENT	GRAPHITE AGENT
	9 1/3 CUPS	2 1/2 CUPS

LUBRICANT APPLICATION RATE FACTORS

NOTE: Always yield to the recommended application rates of your selected seed company. If no guidance is given, refer to the chart variables below. If at all possible, avoid farmer – treated seed at all costs.

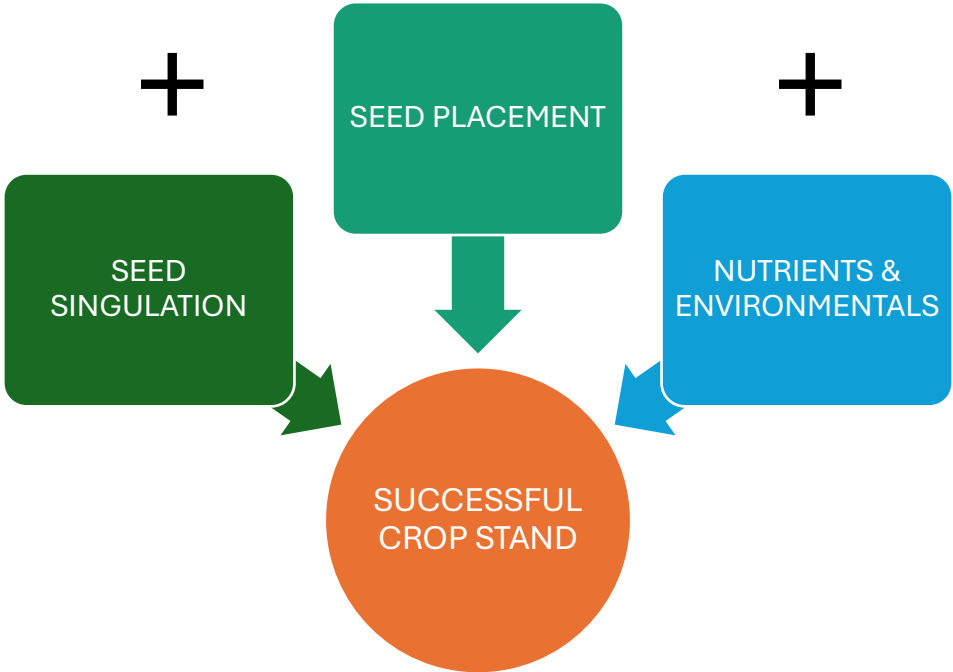
TALC-GRAPHIC AND FLUENCY AGENT USAGE GUIDELINES

1. Only use the given chart with seed that is untreated, or seed that is commercially treated.
2. Frequently adjust lubricant rates based on accumulation at the bottom of the tank as well as accumulation in the mini hoppers.
3. Double the lubricant rate if you encounter abnormally large or small seeds. Defer to your seed supplier with any questions on classifying such extremities.
4. Double the lubricant rate if the seed treatment is abnormally heavy or sticky.
5. Double the lubricant rate if relative humidity is high.
6. Always meter the talc-graphic or fluency agent into the tanks while filling with seed in accordance with the methods described in the filling procedures.
7. To verify or trouble shoot potential lubricant issues, occasionally inspect seeds in the ground behind the planter.
8. It is good practice to run a small amount of talc-graphic or wax based formula through the system before filling it with seed. *This is **required** for new planters or new CCS systems. Doing so will purge the system of any residual lubricants or moisture incurred during the assembly process.*

CCS TANK PRESSURES

***NOTE:** Set the tank pressure according to the row configuration and crop when hoppers are full, and the machine is not moving. If your planter configuration is not listed, locate a configuration that is similar in row spacing and implement size.*

TC CCS	12R30, 16R30, 12R38	23R19, 24R15, 24R20, 24R22	16R36, 16R38, 18R30, 18R38, 24R30
PRODUCT	PRESSURE (INCHES H20)	PRESSURE (INCHES H20)	PRESSURE (INCHES H20)
Soybeans	11	12	13
Small Corn (over 2000 seeds/lb)	9	10	12
Medium Corn (Between 2000 and 1200 seeds/lb)	11	12	13
Large Corn (less than 1200 seeds/lb)	13	14	15
Cotton	9	10	11
Sorghum	7	8	9
Sunflowers	5	6	5
Small Popcorn > 4500 seeds/lb	9	10	11
Large Popcorn < 4500 seeds/lb	9	10	11
Sweet Corn	9	10	11



COMMON SEED FLOW DIAGNOSTICS

NOTE: Most CCS system issues occur during the first few days of use. If you are experiencing an issue that is not covered in the quick start guide, or if you have recurring issues, call TC Machine at 402-886-4665 for product support.

TANK BRIDGING

1. Symptoms:
 - a. No seed in several mini hoppers.
 - b. **Lots of airflow** at the hoppers with no seed.
2. Possible ways to resolve:
 - a. Verify the CCS gauge is reading a pressure which is sufficient for the type of crop and configuration of your implement, based off the chart provided.
 - b. Inspect the hydraulic agitator, linkage, and couplers. Ensure everything is functioning properly and the agitator shaft is rocking.
 - c. Increase system pressure by 1" until seed flows properly from the CCS tanks to each row.

SEED PLUGGING IN HOSE

1. Symptoms
 - a. No seed mini hopper(s). Plugging issues are most often sporadic amongst rows.
 - b. Little airflow at the mini hoppers with no seed.
 - c. Seed is stuck in the CCS hose between the hose and delivery tubes, or between the delivery tubes and the row units.
2. Possible ways to resolve:
 - a. Check the tank lid seal for any cuts, gashes, or abnormal wear.
 - b. Ensure the tank lid is firmly latched in place. Grasp the sides of the lid firmly with both hands and check for any play that would potentially cause air loss.
 - c. If you are planting small popcorn or sorghum, nozzle inserts may be needed to lessen the seed flowing into the tank nozzle outlets. Call TC Machine at 402-886-4665 for assistance in sourcing and purchasing these inserts.

- d. Vigorously shake the seed hose to free the plug and attempt to plant again. If the issue persists, inspect a few planted seeds at random to ensure the lubricant is adequately applied.
- e. If the seed plugs in an area where the seed hose droops or loops, it may be necessary to reroute the hose and lessen the slack.
- f. If the seed plugs around a clamp, remove the clamp, and inspect the hose to ensure it has not been crushed. If you encounter this, use a set of channel locks to squeeze the hose back into its factory shape and carefully reinstall the clamp. If possible, install the clamp slightly before or after the initial kink to keep pressure off the compromised section of hose.
- g. Decrease the tank pressure by 1". Continue to drop pressure in increments of 1" if plugging persists. Seed that is constantly flowing in the hose is less likely to plug than seed that reaches near the mini hopper and becomes stagnant.
- h. For small seeds, remove the agitator motor linkage to reduce the number of seeds displaced by the pins.

