



Guidebook for Operating the BCS Model 749 Walk-Behind Tractor



This guide was prepared for the Cheshire County Conservation District (CCCD) by:

The National Center for Appropriate Technology (NCAT)
ATTRA: Sustainable Agriculture Program



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WARNING: Always make sure it is safe to use equipment and that no buried utility lines are in the area. When in doubt, please call *Dig Safe* at 811.

For the official BCS University Operations Video, head to:

<https://www.youtube.com/watch?v=j1fshawn178>

Unloading BCS Tractor

*We recommended moving the BCS tractor in and out of trailer in neutral gear without running the engine. If you do need to start the BCS in the trailer for convenience, especially when moving implements, make sure that the cargo door to the trailer is fully open.

1. Unsecure tractor
2. Make sure parking brake is disengaged and *not* pulled back in the locked position (see left)
3. Move tractor out of trailer



Note that that the black parking brake is in the forward position.

Starting Operation

1. Turn on/off switch on left handlebar to on position. (Figure 1)
2. Adjust throttle lever on right handlebar to $\frac{3}{4}$ position (down is idle and up is full speed). (Figure 2)
3. Open fuel valve by moving lever to the right. (Figure 3)
4. Set choke all the way to the left to open position. (Figure 4)
5. Turn key to start engine. (Figure 5)
6. Once running, turn choke to the right to the closed position. (Figure 6)
7. Lower throttle lever down to idle. (Figure 7)
8. Select forward or reverse on handlebar directional control lever; keeping in mind that directional position is relative to a) the handlebar orientation and b) whether or not the implement is front or is rear mounted. (Figure 8)
9. Depress clutch by squeezing clutch control lever up and operator presence control lever down always in this order! (Figure 9)
10. Select gear for wheel speed (Most implements should be used in 1st or 2nd gear. 3rd gear on this model is designed for mowing). There is a neutral in between each gear. If it is difficult to move the shifting lever in to gear, slowly release the clutch lever while moving the shifting lever in place until it locks in to gear. (Figure 10)



Figure 1: Red on/off switch to on (green).

Figure 2: Throttle to 3/4 (away from user).



Figure 3: Black fuel switch to right/open position.

Figure 4: Grey choke switch to left/open position.



Figure 5: Turn key to start BCS. Figure 6: Close choke.



Figure 7: Throttle to idle.



Figure 8: Select forward or reverse.



Figure 9: Clutch up than red level down.



Figure 10: Gear selection. Neutral between gears.

11. Once wheels are engaged, you are ready to begin. For implements that run off of the power-take-off (PTO), make sure clutch lever is squeezed up and operator presence control lever is down and then engage PTO by pushing PTO selector in (or out) depending on handlebar orientation. (Figure 11)
12. To stop operation, squeeze clutch control lever, which interrupts power between engine and PTO, or let go of clutch control lever and operator presence control lever. Both methods will stop the tractor without killing the engine.



Figure 11: Engage PTO in or out depending on handlebar orientation.

Operational Features

1. The vertical height of the handlebars can be adjusted by pushing down the handlebar release lever and selecting the appropriate height. When turning the tractor at the end of a row or when loading, it is easiest to have the handle bars in a low position in order to gain more leverage. (Figure 12)
2. The handlebars can be offset 15 degrees from center in either direction as well as rotated 180 degrees depending on whether the implement is front or rear mounted. To rotate, squeeze handlebar orientation control handle and rotate to proper position. When rotating 180 degrees, remove the gear and PTO selector rods from their plastic holders and rotate the handlebars away from the fuel tank until you reach the opposite side of the tractor. (Figure 13)
3. The differential lock can be used to either lock the wheel axels in place or unlocked in order to allow the wheels to turn independently of one another. Locking the differentials provides maximum traction but makes it more difficult to turn or pivot the tractor. (Figure 14)
4. The outermost levers on both sides of the handlebars are independent steering brakes. (Figure 15)



Figure 12: Adjust handlebar height with handlebar release lever.



Figure 13: Handlebar orientation control handle. Note throttle above and to the left.



Figure 14: Differential lock. Note forward-reverse selector to the right



Figure 15: Steering brakes, left and right.

5. The parking break can be locked by pulling the lever back. Locking the parking break is good for parking the tractor on hillsides or for transport. (Figure 16)

Attaching Implements

Implements that require power from the PTO to operate include the **flail mower, seeder, fertilizer spreader, and power harrow**. This BCS is equipped with a *quick hitch* attachment that allows for easier coupling and uncoupling of attachments to the BCS tractor. (Figure 17)

It is recommended to attach all implements in the rear-mount position, so that you are backing the tractor up to the implement with the PTO lined up with the handlebars. This provides counter balance to the engine while also allowing you to utilize one foot to hold the implement in place. Note: the fertilizer spreader will not attach in the rear-mount position as it is too tall to clear the handlebars; it must be attached and used in the front-mount position.

Watch a video from Earth Tools on how to attach an implement with the *Quick Hitch* attachment:

<https://www.youtube.com/watch?v=it9lqR5o7l0>

Coupling/Hitching an Attachment

1. Line up female bushing on tractor with the male tang on implement.
2. Lift pin up on female bushing of *quick hitch* so that it is in the unlock position.

*If necessary, line up the PTO teeth on the bushing and tang so that they slide together easily. It is usually easier to hand-rotate the teeth on the tractor rather than those on the implement.



Figure 16: Pull back parking lever to engage.



Figure 17: BCS PTO attachment point with flail mower attached.

**Make sure that the couplings and teeth are kept clean and lubricated with a Teflon-based lube or a light white grease. We prefer to use *Fluid Film* which is a Lanolin-based product that sprays on as a liquid but congeals to a light grease. It repels moisture and is more environmentally friendly.

3. Back tractor up to implement until the bushing and tang slide together.
4. Lower the lock pin until it securely locks in place. The pin handle will not have slack in it if the pin is locked correctly. If there is slack in the handle, the pin has not dropped fully in to the hole on the tang of the implement. Wiggle the tractor until you see the pin lock in to place.
5. Turn handlebars 180 degrees for front-mounted implements and secure gear shift and PTO levers in clips.

Attaching a PTO Non-Powered Implement

Non-PTO powered implements, such as the **disk** and **crimper-roller**, attach to the BCS tractor using a clevis hitch, located about six inches above the PTO. The clevis hitch and pin are designed to attach tightly and may be challenging to hitch properly. The tow coupler bar connects these implements to the tractor. Make sure that the angle of the tow coupler lines up correctly with the tractor and implement as they are different for each implement. In other words, if the angle of the tow coupler does not line up correctly with the clevis hitch, turn the tow coupler upside-down.



Figure 17: Use PTO cover when not using PTO-driven implements.

When using implements that are not connected to the PTO, such as the crimper-roller and disk, please connect the plastic PTO cover located in the crate in the trailer to the PTO shaft to protect it from dirt and debris. (Figure 17)

Loading BCS in to Trailer

1. Properly clean off any debris from the tractor and implements that you have used. This will help maintain the equipment and also prevent the spread of weed seeds and/or diseases from one farm to another. **Do not spray water on a hot engine.**
2. Always make sure that the engine is cool before loading it on to the trailer.
3. Slowly walk BCS tractor in to trailer, either in 1st gear or in neutral
4. Release clutch lever and operator presence control lever when tractor is in proper place for transport
5. Shift the on/off switch up to shut off the engine
6. Apply Parking Brake
7. **Turn electric start key to off position**
8. Turn fuel valve to close by shifting it all the way to the left
9. Properly secure tractor and implements

IMPORTANT REMINDERS

1. Let the tractor do the work!
2. Adjust the handlebars to make loading, unloading, and use of the tractor easy on your body.
3. Use, don't abuse the equipment.