

## **Proper Clutch Engagement & Use on Walk-Behind Tractors (For Standard Type Clutches—NOT for PowerSafe or “Active” clutches)**

Before shifting your walk-behind tractor into a wheel-speed, engaging the PTO (implement drive), or shifting between forward and reverse, the clutch handle (on bottom of left-hand handlebar grip) must first be squeezed all the way, to disengage engine power from the machine during shifting (the same way you would on any standard-transmission tractor, car, motorcycle, or truck when shifting gears).

Sometimes, when shifting gears OR trying to engage the PTO, you may find that the shift lever does not want to engage fully. This is because the gears in the transmission are not aligned properly. To get the gearshift or PTO lever to engage fully, put firm pressure (NOT shoving or jerking...just firm pressure) on whichever lever you are having difficulty with, and release the clutch lever *very slowly*, and as soon as the gears begin to rotate, the pressure you have on the gears will pop the gear into place as soon as it aligns. (The technical term for this type of operation is “Feathering” the clutch).

Once your shift levers are fully engaged, when then letting out the clutch lever to engage power to your tractor & implement, you should **never** exceed about 1 to 1.5 seconds to **fully** release the handle. On lighter loads, such as tillers, sickle bars, power harrows, rotary plows, etc.: the clutch handle can be released virtually instantly (1/2 second or less, basically just dropping the handle), but when operating heavier loads (implements) that operate at a high RPM (Revolutions Per Minute), more care must be taken to not overload the engine OR damage the clutch. As a rule, you are better off bogging the engine down by letting out the clutch quicker, rather than letting it out too slowly and wearing the clutch lining prematurely through excessive heat/friction.

**Here are some tips when engaging heavy-load implements which need to operate at FULL engine throttle (such as Flail mowers, larger Brush & Finish [lawn] mowers, Chipper/shredders, etc.):**

---Have the engine at 1/3 to 1/2 throttle (rather than full throttle) during let-out of the clutch, then, after the clutch handle is fully released, accelerate the engine to maximum throttle.

---During initial start-up of the implement (that is, whenever the implement is at a dead stop), DO NOT have the implement "under load" (that is, a rotary mower should not be starting up while in high grass...the mower needs to come up to speed, and THEN encounter the high grass/weeds/etc.) If you are starting the mower up from a dead stop in the middle of a field of tall material and there is no “mowed” place to “get started” in, you can always push down on the handlebars to lift the mower off the ground during the first few seconds of the mower getting up to speed.

---You can even do a "double-clutch"...that is, let the clutch out pretty quickly, and let the engine pull waaaay down for a second (nearly stalling it), while it starts getting the implement up to speed, then squeeze the clutch handle in for a second or two and let the engine "recover"...the implement is still spinning, so when you release the clutch a second time, the engine hardly bogs at all. It's the INITIAL start (from a dead stop) on high-RPM implements that is the hardest on the clutch. (This trick works best for implements with HEAVY rotating “flywheels” that have to come up to speed...BIO-90, 100 & 150 chippers, 32” brush mowers)

When mowing, and maneuvering the tractor between forward and reverse (or when shifting between wheel speeds) the same care does not have to be taken as above, as long as the mower blades are still rotating somewhat. If they are, you can pretty much drop the clutch handle instantly in between shifting, and leave the engine at full throttle.

Excessive “slipping” of the clutch (taking too much time to release the handle, OR squeezing the clutch handle partially when the engine is “bogging down”, OR trying to use the clutch as a “speed control” by squeezing the clutch handle partially to slow the machine down) when the machine is under load WILL result in clutch overheating, which causes premature clutch wear and possible complete clutch failure if the clutch is severely overheated. \*\*\*This is no different than what will happen if slipping the clutch excessively in a car or truck.\*\*\* (PLEASE NOTE: “Feathering” the clutch to engage gears [as described on the first page] is not a problem, since the machine is not “under load” at the time.)

As the clutch lining is worn away during use, the clutch linkage/cable actually "tightens up", meaning that you may notice that you actually have to reach further down now the grasp the clutch handle...what "free play" was in the linkage/cable has been used up by the lining wearing away. If the wear to the clutch lining EXCEEDS the amount of “free play” available in the clutch cable & linkage, the cable/linkage becomes TIGHT, and the clutch will begin to slip under load, therefore not transferring power to the tractor and implement. Attempting to operate the machine in this condition will further damage the clutch, for the same reason: it is slipping, so it will quickly overheat. To get a clutch that will “hold” (transfer power) again, all you may have to do is loosen up the clutch cable, to get more slack.

If the “slipping” is experienced in the “front-PTO (mowing) mode”, you may notice that the clutch does NOT slip when the tractor is in the “rear-PTO (soilworking) mode”....this is because when the handlebars are in the soil-working mode, there is more slack in the cables, because the cable sheathings are not being "bent" so much. Please see our video for adjusting a clutch (I recommend watching all 10 minutes of it):

<http://www.youtube.com/watch?v=SAv8eE7ytiY&list=UUnEPLYReFF1UIPuQmJIqGow&index=1&feature=plcp>

If the clutch is severely overheated, the clutch lining will wear very quickly due to "crumbling" of the burnt lining. Usually, if this has occurred, there will be a very nasty burned clutch smell (like overheated brakes). The only fix for this is a new clutch (or clutch lining, if it is available separately).

The typical service life of a clutch in this equipment is anywhere from 1000 to 2000 hours of use. I have a BCS 850 tractor with 12hp engine on it; I got about 1800 service hours out of the original clutch lining... and I don't “baby” it; I use it hard. However, when "slipped" excessively and overheated, I have seen some folks ruin a brand-new clutch lining in less than half an hour. Hopefully, your reading, understanding, and implementing the above info will keep you OUT of the latter category!!

One final bit of advice **regarding BCS tractors with standard clutches**: PLEASE MAKE SURE TO LOCK THE CLUTCH LEVER ON THE HANDLEBARS IN THE “SQUEEZED” POSITION WHEN YOU ARE NOT USING THE TRACTOR!! This keeps the clutch lining & plate from “sticking” together during periods of storage, particularly in humid environments.

After reading the above thoroughly, if you have further questions, please contact us.

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