HHN Ride-On Trowel

Clutch Retrofit Kit Installation Instructions

The following instructions are intended to assist the user in the installation of a Hilliard CVT clutch system. The Hilliard clutch system replaces the Comet CVT system. Please read all assembly instructions before installing the kit.

REQUIRED TOOLS

- Hammer
- Torque Wrench
- 3/8 Ratchet
- 3/8, 7/16, 1/2, 3/4, 9/16, 5/8, 15/16, 13mm Sockets
- 3/16 and 1/4 Allen sockets
- Open/box-end wrenches
- Misc. Pry-Bars
- CV Joint Grease
- Grease Gun w/Multi-purpose grease
- 2x4 wood block
- Forklift/Hoist
- Clutch Puller
- Heavy Duty Jack Stands
- Scotch-brite Pad
- Brake Cleaner

PARTS

Verify that all parts are accounted for. See Figure 1, Figure 2 and Table 1.

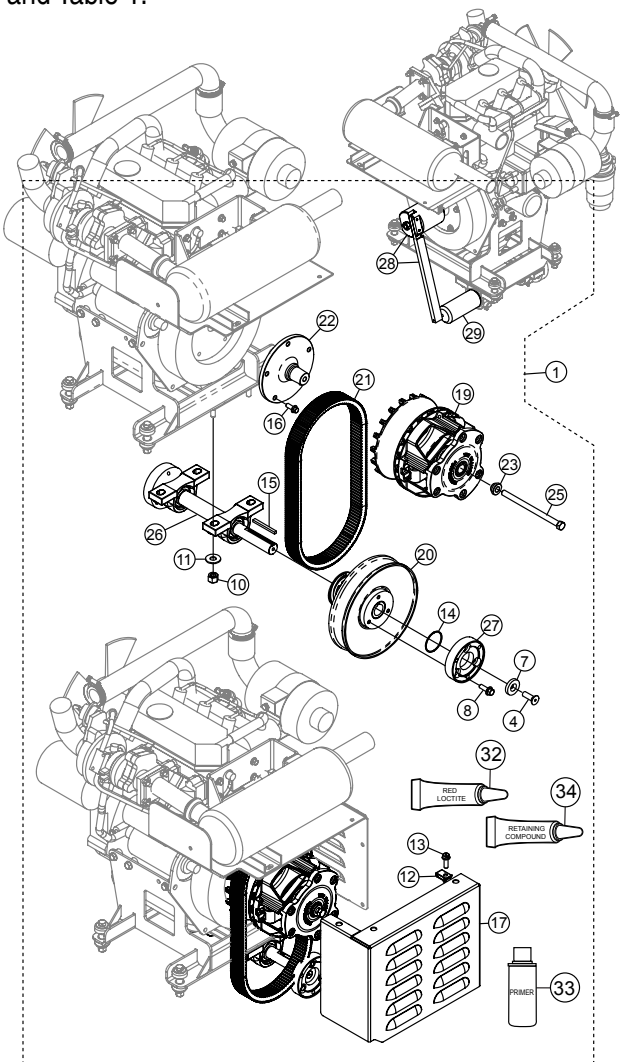

Figure 1. Clutch Retrofit Kit

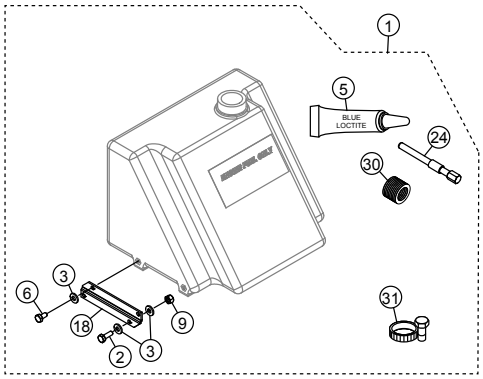

Table 1. HHN CVT Kit Parts

Item	Qty.	Part No.	Description	Remarks
1	1	22581	Kit, HHN CVT Replacement	Includes items 2 thru 34
2	4	0131 A	Screw, HHC 1/4-20 X 3/4	
3	14	0948	Washer, Flat SAE 1/4	
4	1	30107	Screw, FHCS, 3/8-16 X 1.25 LH Thread	
5	1	1477	Loctite™ #242	Blue
6	6	1579	Screw, HHC 1/4-20 X .5	
7	1	30110	Spacer, CSK Ø1.375 Ø.391x.281	
8	3	9165	Screw, HHFS 1/4-28 X 3/4	
9	4	10024	Nut, Nyloc 1/4-20	
10	4	10133	Nut, Nyloc 3/8-16	
11	4	13351	Washer, Flat 3/8"	
12	5	11534	Nut, U-Type 1/4-20	
13	5	11819	Screw, HHWS 1/4-20 X 3/4	
14	1	20116	O-Ring	
15	1	20363	Key, Cross Shaft	
16	5	22021	Screw, Hex Flange M8	
17	1	22579	Shroud, Clutch	
18	2	22588	Mount, Fuel Tank	
19	1	23363-1	Clutch, Upper	Hilliard
20	1	23363-2	Pulley, Lower	
21	1	23365	Belt, CVT Clutch	
22	1	23368	Stub Shaft	
23	1	23369	Washer, Step 7/16	Hilliard
24	1	23678	Puller	Hilliard
25	1	23377	Screw, HHC 7/16-20 X 6.5	
26	1	30103	Cross Shaft Assy, LH Shaft	
27	1	23433	Coupler CV-Joint	
28	1	23436	Alignment Gauge	
29	1	23415	Sleeve, Alignment Gauge	
30	10	11773	Shims	.031 Thickness
31	2	22068	Fuel Hose Clamps	
32	1	19379-014	Loctite™ 271	Red
33	1	32441	Primer, Loctite™ 7649	
34	1	32434	Retaining Compound, Loctite™ 609	

WORK SAFELY!

Only a ***qualified service technician*** with proper training should perform this installation. Follow all shop safety rules when performing this installation.

LIFTING THE TROWEL

1. Attach one end of a lifting strap or chain around the lift loops on each side of the trowel. Attach the other end of the lifting strap or chain to the lifting device (Figure 3).

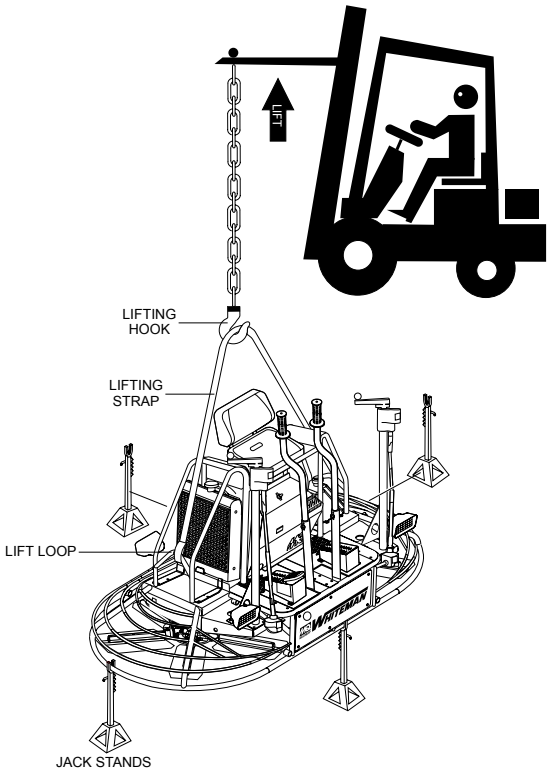

Figure 3. Lifting the Trowel

2. Next, place the trowel on heavy duty jack stands.

⚠ CAUTION

Trowel blades are sharp. Keep clear of blades while performing procedure. It is recommended that trowel blades are removed to prevent injury.

BATTERY REMOVAL (HHN-34TVD ONLY)

Reference Figure 4.

1. Disconnect both battery cables from the battery. Remove splash pan from battery tray and trowel frame. Set pan aside in a clean, safe place.

NOTICE

If trowel blades have not been removed, they must be pitched flat in order to allow removal of splash pan.

2. Remove battery tray from frame. Set battery tray and mounting hardware aside in a clean, safe place.

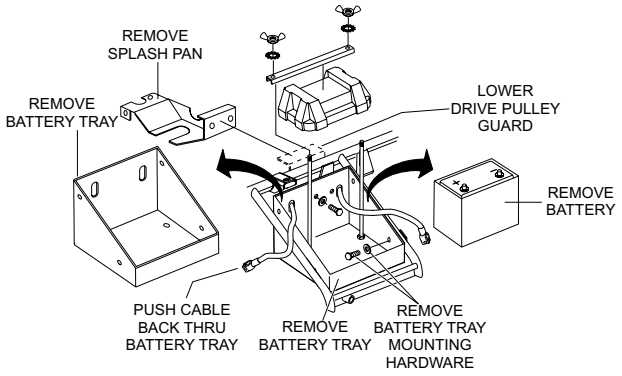

Figure 4. Battery Removal (HHN 34TVD)

BATTERY REMOVAL (HHN-31V ONLY)

Refer to Figure 5.

1. Disconnect both battery cables from the battery.
2. Locate fuel pump attached to the backside of the battery box. Disconnect the fuel line from the fuel tank. Remove fuel pump from battery box. Set pump aside in a clean, safe place.
3. Remove battery tray and splash pan from frame. Set battery tray, splash pan, and mounting hardware aside in a clean safe place.

NOTICE

If trowel blades have not been removed, they must be pitched flat in order to allow removal of splash pan.

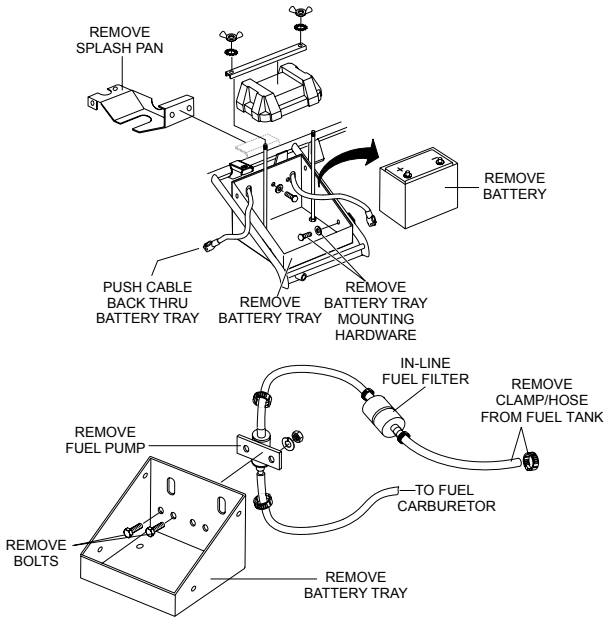

Figure 5. Battery Removal (HHN 31V)

FUEL TANK REMOVAL

Refer to Figure 6.

1. Remove the 2 bolts that secure the spare CVT belt holder (Figure 6) to the fuel tank. Remove and discard spare belt holder and spare belt.
2. Place fuel shut-off valve on fuel tank to the OFF position.
3. Disconnect fuel lines from the fuel tank.
4. On HHN-34TVD models, either plug return port (to prevent leaking) on fuel tank or pour fuel into a fuel safety container.
5. Remove fuel tank from frame. Set fuel tank aside in a clean safe place.
6. Retain mounting hardware for later use.

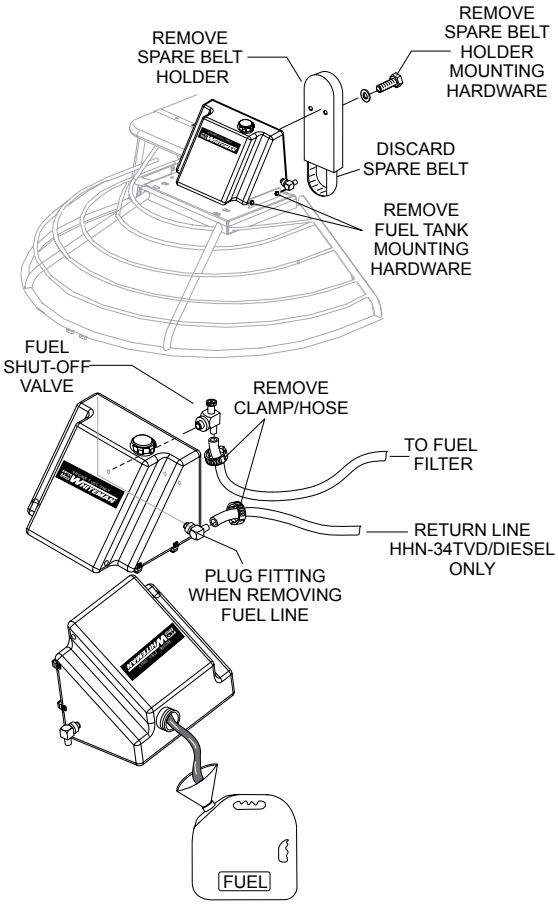

Figure 6. Fuel Tank Removal

BELT GUARD REMOVAL

> ***NOTICE***
>
> The front panel of the trowel can be removed to allow easier access for the removal of the belt guard.

1. Remove the retaining hardware that secures the left belt guard panel. Remove panel and discard. This item will not be used in the reassembly. Reference Figure 7
2. Remove rear belt guard panel. Set rear belt guard panel and mounting hardware aside in a clean safe place.

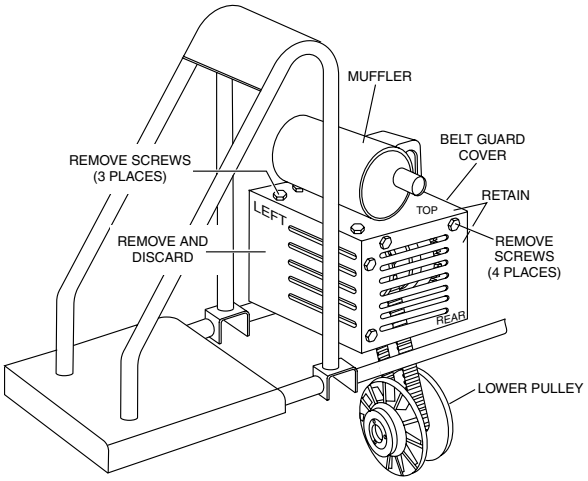

Figure 7. Belt Guard Removal

DRIVE ASSEMBLY REMOVAL

Upper CVT Pulley Removal

Refer to Figure 8.

NOTICE

Figure 8 shows the view from the rear of the trowel.

1. Using a 15/16" socket, remove the center bolt and washer that secure the existing upper Comet clutch/pulley assembly to the engine shaft
2. Pull clutch assembly off engine shaft. Puller may be required to remove clutch.
3. Discard Comet clutch. This item will not be used in the reassembly.

CV Axle Assembly (Left-Side) Removal

Refer to Figure 8.

NOTICE

Spider assemblies must be locked to the frame with a chain in order to prevent clutch rotation.

1. Starting at the left-side gearbox, use a 1/4" Allen wrench to remove the 3 bolts that secure the CV axle to the left-side gearbox.
2. Next, use a 1/4" Allen wrench to remove the 3 bolts that secure the CV axle to the lower drive pulley coupler.

NOTICE

Note that the 3 bolts securing the CV axle to the coupler are shorter than those securing the CV axle to the gearbox. Remember bolt orientation for reassembly.

3. Remove CV axle assembly. Set CV axle assembly and mounting hardware aside in a clean safe place.
4. Remove and discard CVT belt. It will not be used in the reassembly.

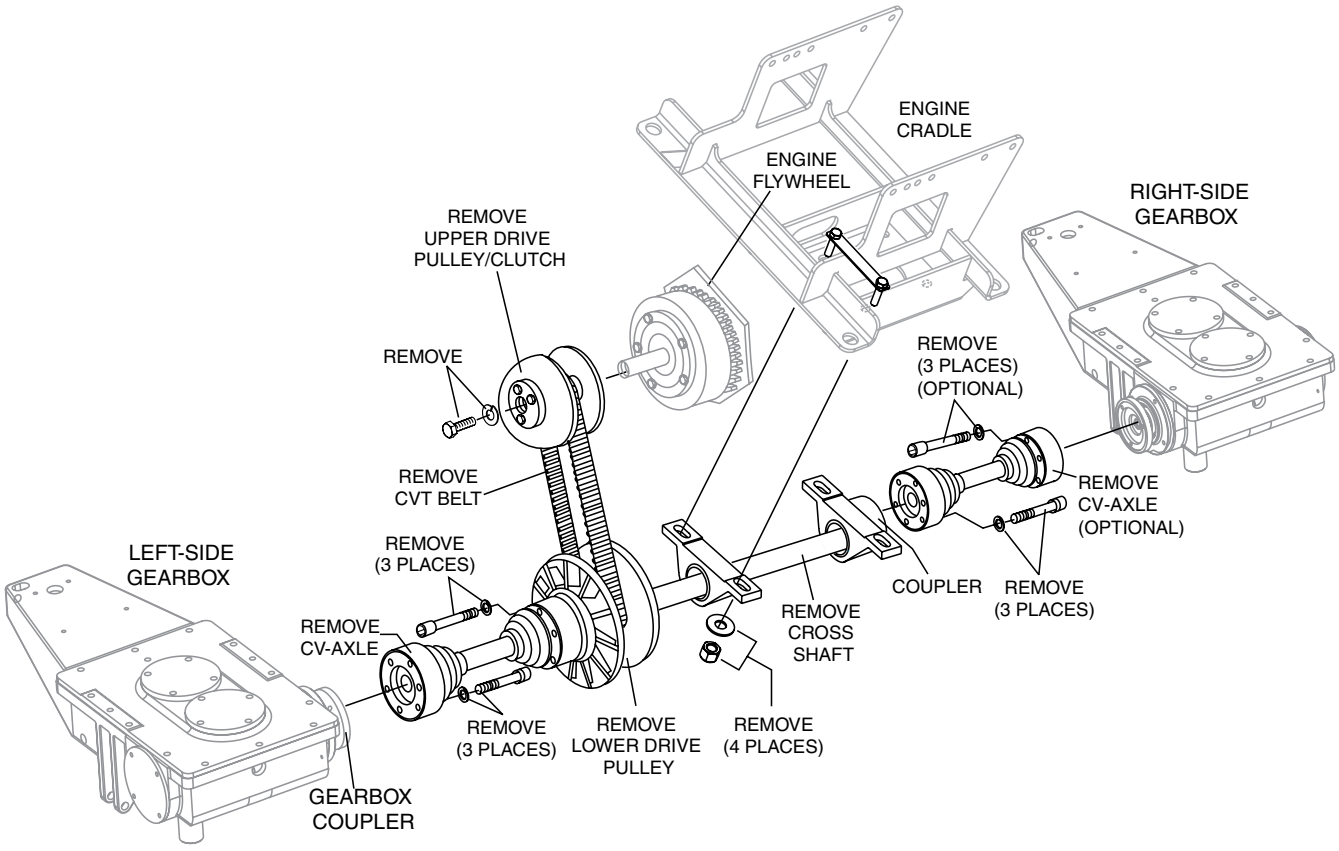

Figure 8. Drive Assembly Removal

Disconnect/Remove CV Axle Assembly (Right-Side)

NOTICE

Disconnecting the Right-Side CV Axle Assembly from the gearbox is optional. Inspect rubber boots for damage or dirt. If CV Axle is in good condition, it is not necessary to remove it from the gearbox. **Removal of the bolts securing CV Axle to the cross shaft coupler is mandatory.**

Refer to Figure 8.

1. Remove the 3 bolts that secure the CV axle to the right-side gearbox (optional).
2. Remove the 3 bolts that secure the CV axle to the cross shaft coupler.
3. Remove CV axle assembly (optional). Set CV axle assembly and mounting hardware aside in a clean safe place.

Cross Shaft/Lower Pulley Removal

1. Using a 3/8" ratchet with a 9/16" socket, remove the 4 nuts and washers that secure the cross shaft bearing blocks to the engine cradle.
2. Remove and discard cross shaft and lower pulley assemblies. These items will not be used in the reassembly.

Stub Shaft Removal

Reference Figure 9.

1. Using a 13mm socket, remove the 5 bolts and washers that secure the stub shaft to the engine coupler.

NOTICE

Wedge a 2x4 block of wood between flywheel and trowel frame to prevent flywheel rotation.

2. Remove and discard stub shaft and mounting hardware. These items will not be used in the reassembly.

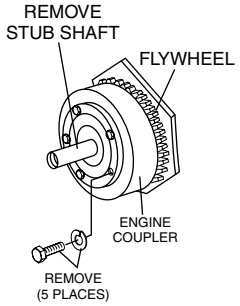

Figure 9. Stub Shaft Removal

STUB SHAFT INSTALLATION

1. Remove paint from flywheel mounting surface using Scotch-brite pad (no sanding). See Figure 10.

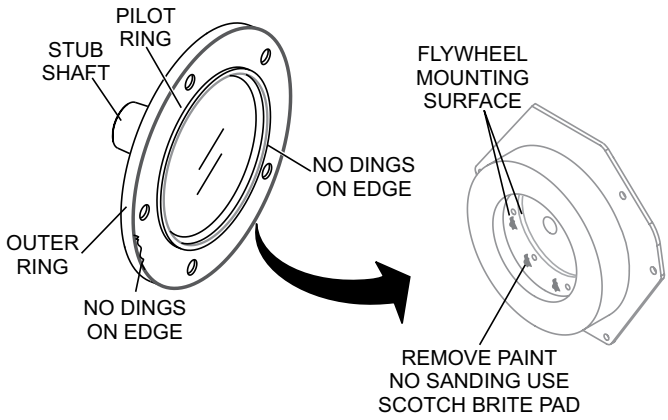

Figure 10. Flywheel Mounting Surface

2. Ensure that there are no dings on the edges of the stub shaft pilot ring and the outer ring (See Figure 10). Use a flat abrasive stone to remove burrs from around any dings.
3. Using a 13mm socket, install ***new*** stub shaft, P/N 23368, with M8-1.25 x 20 mm hex flange screws (5), P/N 22021, onto engine coupler. **DO NOT** apply anti-seize compound to stub shaft. See Figure 11.

NOTICE

Blue Loctite™ or Loctite™ patch is required. Reapply Loctite™ if reinstalling screws.

NOTICE

Wedge a 2x4 block of wood between flywheel and trowel frame to prevent flywheel rotation so screws can be fully tightened.

4. Torque stub shaft mounting screws to 34 ft-lbs (46 N·m) in a ***star pattern***. See Figure 11.

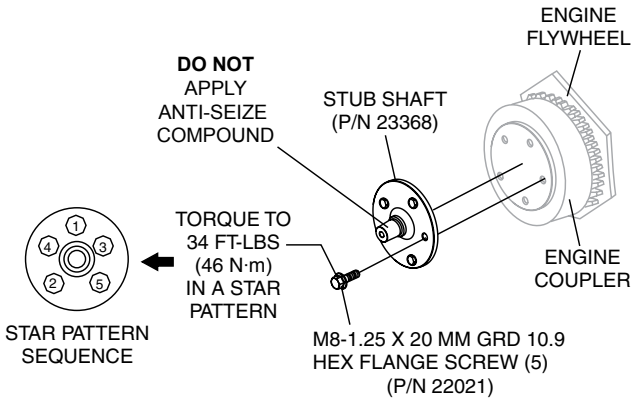

Figure 11. Stub Shaft Installation

CROSS SHAFT INSTALLATION

1. Remove dust cap located on top of bearing (Figure 12).
2. Using a grease gun, grease both bearings. Use multi-purpose grade grease.
3. Reinstall dust cap to prevent contamination of the bearing.

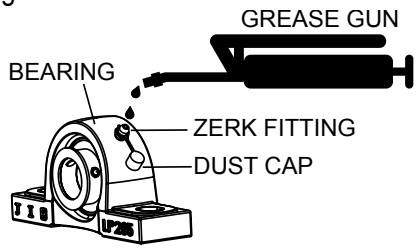

Figure 12. Bearing Lubrication

4. Using a 3/8" ratchet with a 9/16" socket, install ***new*** cross shaft assembly (Figure 13), P/N 30103, with 3/8-16 nyloc nuts (4), P/N 10133, and 3/8 flat washers (4), P/N 13351, onto engine cradle.
5. Torque cross shaft mounting screws to 30 ft-lbs (40 N·m).

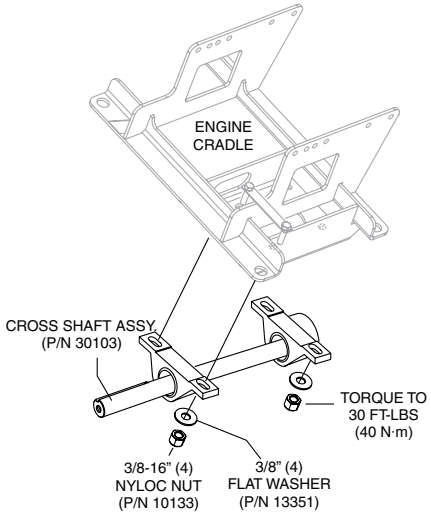

Figure 13. Cross Shaft Installation

CROSS SHAFT ALIGNMENT

See Figure 14.

1. Install gauge sleeve onto cross shaft.
2. Install gauge body onto stub shaft. Torque alignment bolt to 20 ft-lbs (27.1 N·m).
3. Measure the distance between the gauge pin and gauge sleeve with feeler gauge. This distance is an indication of the number of shims that will be required.

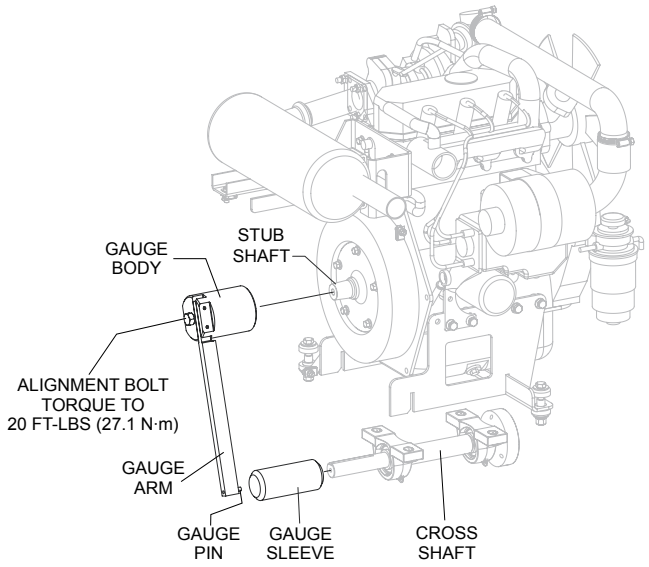

Figure 14. Cross Shaft Alignment

4. Rotate gauge arm and remove gauge sleeve. Install shims as required.
5. Reinstall gauge sleeve onto cross shaft. Insert .032" feeler gauge (Figure 15) between gauge pin and gauge sleeve.

> ***NOTICE***
>
> The gauge sleeve must be held and pressed firmly against the cross shaft bearing when using a feeler gauge to provide the most accurate measurement.

6. If .032" feeler gauge fits between gauge pin and gauge sleeve, re-shim until feeler gauge will not pass between gauge pin and gauge sleeve.

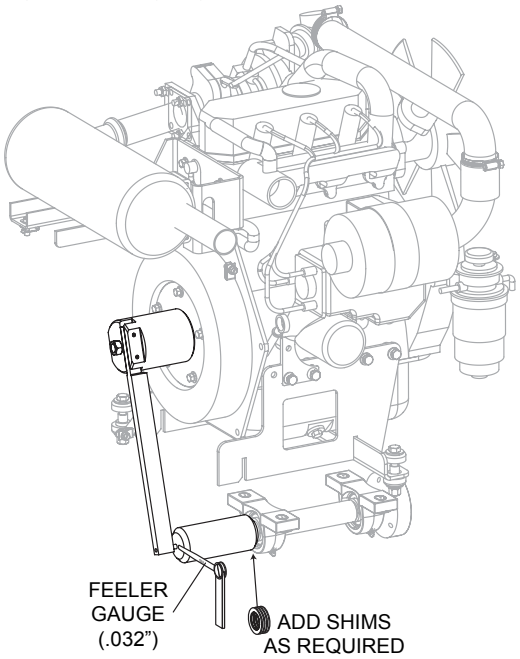

Figure 15. Shimming

LOWER PULLEY (CVT) INSTALLATION

Reference Figure 16.

1. Apply primer (Loctite 7649, P/N 32441) to the cross shaft and key way in the shaded area shown in Figure 16.

1. Using retaining compound (P/N 32434), apply to cross shaft and key way until coverage is complete with a minimum coating thickness of 1/16 of an inch.

2. Mount lower pulley (P/N 23363-2) and key (20363) onto cross shaft.

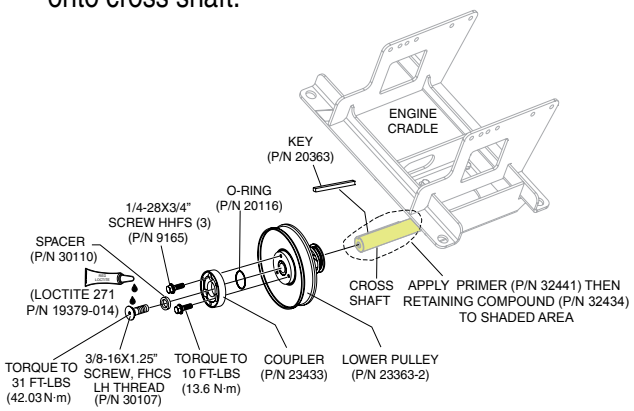

Figure 16. Lower Pulley Installation

3. Next, mount coupler (23433) onto lower pulley with O-ring (P/N 20116) placed between lower pulley and coupler.

4. Secure coupler with 1/4-28 x 3/4" screws (P/N 9165).

5. Clean the threads of 3/8-16 x1.25 LH thread retaining screw (P/N 30107) with brake cleaner. Apply red loctite (P/N 19379-014) to the threads.

6. Insert 3/8-16 x 1.25" LH thread retaining screw (P/N 30107) and spacer (P/N 30110) into cross shaft.

7. Once lower pulley has been mounted to shaft, wipeaway any and all retaining compound.

NOTICE

It is extremely important that this unit **must not** be run for a period of at least 24 hours. The retaining compound needs to cross link and become completely cured during this time period.

NOTICE

Before mounting screws can be torqued, the Right-Side CV Axle Assembly must be reinstalled (if applicable)/reconnected. See “CV Axle Reinstallation/Reconnection” section.

8. Torque 1/4-28 x 3/4" screws (3) to 10 ft-lbs (13.6 N·m).

9. Torque 3/8-16 x 1.25" LH thread retaining screw to 31ft-lbs (42.03 N·m).

10. Place the new CVT belt (P/N 23365) over the lower pulley. Do not attempt to squeeze the belt into the pulley groove yet.

11. Reconnect left-side CV Axle Assembly. See “CV Axle Reinstallation/Reconnection” section.

CV Axle Reinstallation/Reconnection

Before installing the CV axle assembly, ensure rubber boots are not cracked or worn (Figure 17). If boots are damaged, replace immediately.

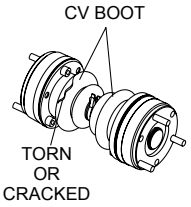

Figure 17. CV Boot Inspection

12. If CV axle assembly is dirty or covered with debris, clean with a mild soap or solvent.

13. If necessary, grease CV axle as required.

14. Apply a thin coat of RTV silicone (Figure 18) to mating surfaces of CV axle assembly.

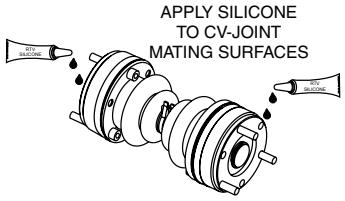

Figure 18. Applying RTV Silicone

15. Connect right-side CV axle assembly to right-side gearbox coupler (if applicable) and cross shaft coupler. Connect left-side CV axle assembly to lower pulley coupler and left-side gearbox coupler Reference Figure 22.

16. Torque all coupler mounting hardware to 12 ft-lbs.

PARTIAL REASSEMBLY / LOWERING TROWEL

The trowel must be lowered back to the ground prior to fully installing the belt and upper pulley assembly.

1. Before lowering trowel back onto the ground, reinstall splash pan, battery tray, and battery. For HHN-31V models, be sure to install fuel pump. Reference Figure 4 and Figure 5.

2. Lower trowel onto the ground. Follow all heavy lifting safety precautions.

LOWER PULLEY BELT INSTALLATION

1. With the CVT belt placed over the lower pulley, squeeze the belt (Figure 19) and pull the belt upwards and towards the rear of the trowel. This will spread open the faces of the lower drive pulley.

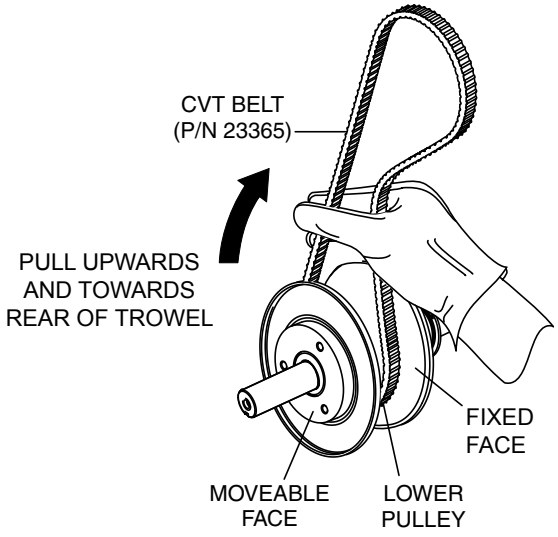

Figure 19. Holding Lower Pulley Open

UPPER PULLEY BELT INSTALLATION

1. While holding the new Hilliard clutch (P/N 23363-1), place free end of CVT belt into upper pulley groves.

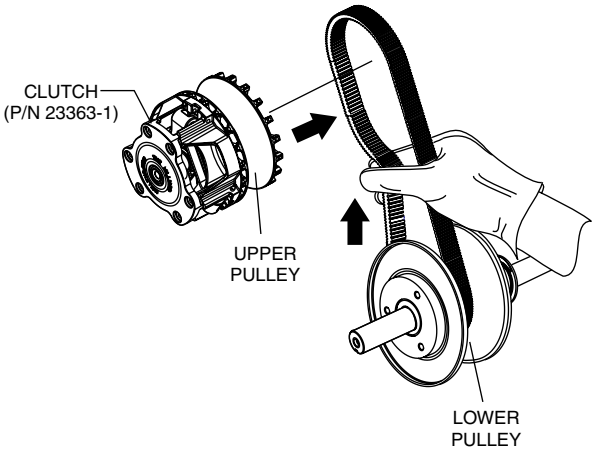

Figure 20. Upper Pulley Belt Installation

2. Once CVT belt has been placed into upper pulley grooves, mount Hilliard clutch assembly onto stub shaft using 7/16-20 x 6.5" clutch retaining screw (P/N 23377) and 7/16" step washer. See Figure 21.

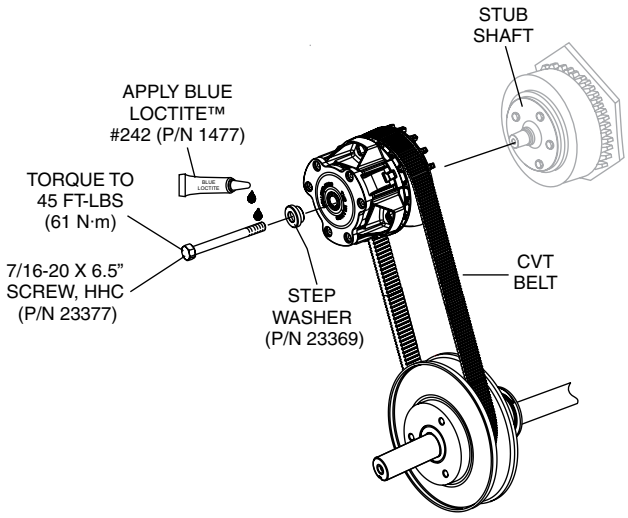

Figure 21. Installing Clutch Assembly

> ***NOTICE***
>
> Wedge a 2x4 block of wood between flywheel and trowel frame to prevent flywheel rotation so clutch retaining screw can be fully tightened.

3. Apply Blue Loctite™ #242 (P/N 1477) to clutch retaining screw and torque to 45 ft-lbs (61 N·m).

PRE-TEST ASSEMBLY

> ***NOTICE***
>
> **DO NOT** fully reassemble trowel until testing is complete.

1. Temporarily reinstall fuel tank onto trowel frame using existing mounting hardware.
2. Reconnect fuel lines as referenced in Figure 6. Turn fuel shut-off valve to the ON position.
3. Reinstall front panel of trowel if previously removed.
4. Unlock spider assemblies.
5. Reconnect both battery cables to the battery. RED to the positive terminal, BLACK to the negative terminal.

Figure 22 illustrates the new, fully-installed drive assembly.

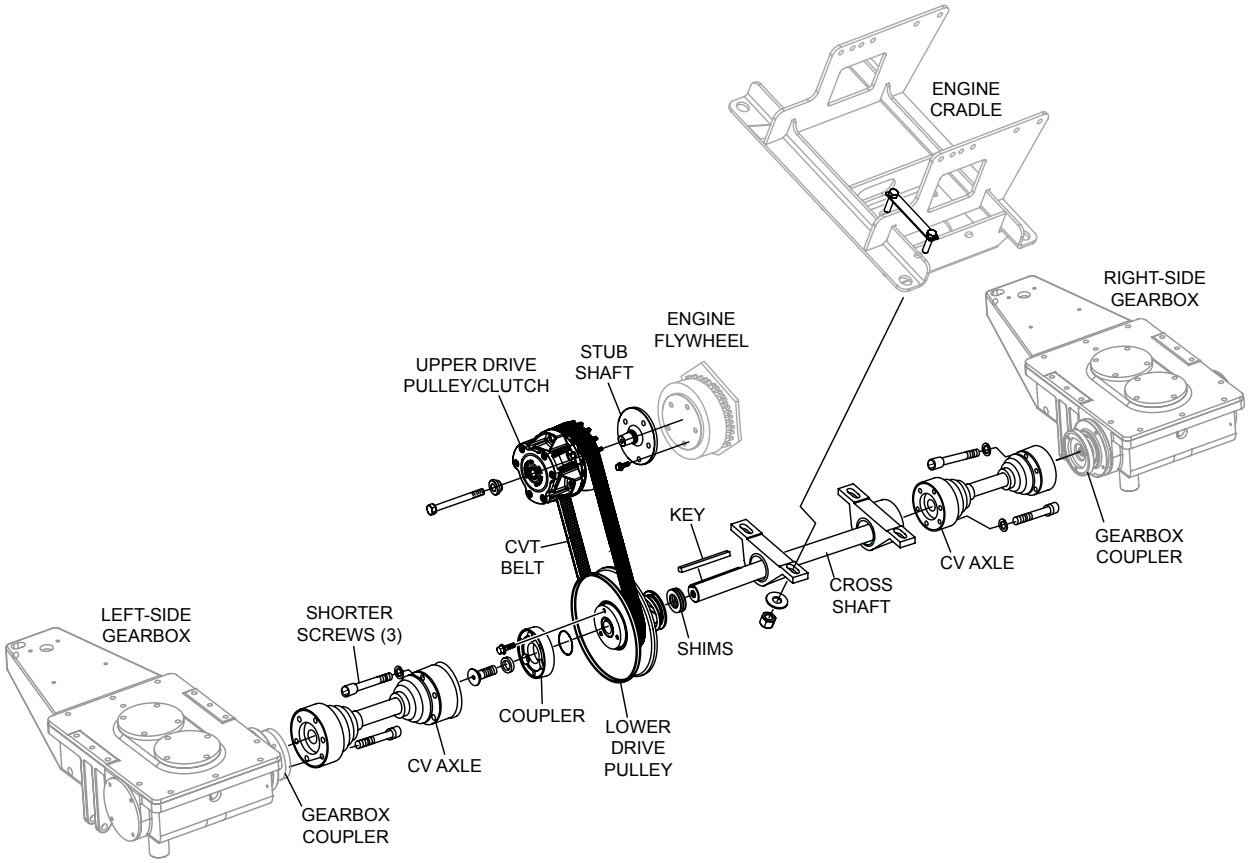

Figure 22. New Drive Assembly

STARTING THE TROWEL/TESTING

1. While sitting in the operator's position, start the trowel as referenced in the Operator's Manual. Be sure to check the engine oil level prior to starting the engine.

⚠ CAUTION

The engine's exhaust contains harmful emissions. **ALWAYS have adequate ventilation when operating.** Direct exhaust away from nearby personnel.

⚠ WARNING

DO NOT stand in rotation plane of clutch system. Possibility exists of flying objects which could strike personnel and cause injury.

2. Run machine, bringing throttle up so clutch engages. Cycle the engine from idle to 3/4 throttle twice. Reduce throttle slowly and shut off engine. Remove key.
3. Check for axial sheave movement (see Figure 23) in the drive clutch in one direction by pushing the upper sheave face **toward the engine**. You should notice slight movement of the sheave in the direction you are pushing.
4. Repeat procedure and check for axial sheave movement **away from the engine**.

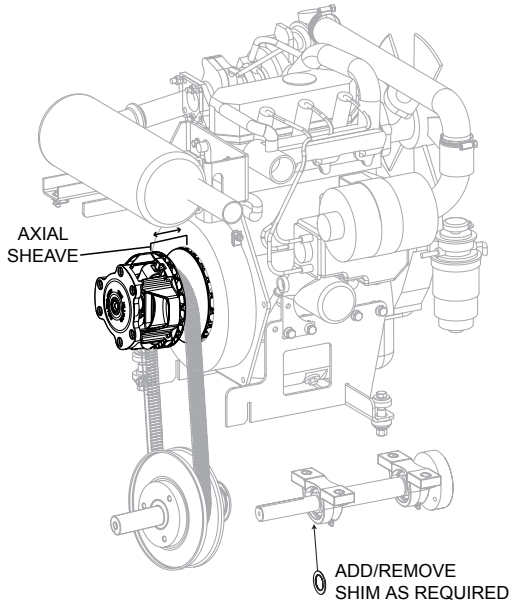

Figure 23. Axial Sheave Movement

5. If axial movement is in one direction only, remove clutch using the clutch puller tool, P/N 23678. See Figure 24.

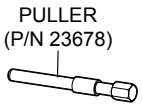

Figure 24. Puller

6. If axial sheave **will not move toward the engine**, remove a shim from next to the cross shaft bearing. If axial sheave **will not move away from the engine**, add a shim next to the cross shaft bearing. See Figure 23. Re-shim as required until axial movement is present in both directions. Refer to Figure 14 and Figure 15.
7. Retest for correct axial sheave movement in both directions.
8. Disconnect the BLACK (negative) battery cable.
9. Remove and discard fuel tank mounting hardware. Move fuel tank out of the way in order to make room for new belt guard installation.

TROWEL REASSEMBLY

New Belt Guard Installation

1. Install new left-side belt guard panel, P/N 22579, to upper belt guard panel, using 1/4-20 x 3/4" screws, P/N 11819, and U-Type nut, P/N 11534.
2. Reinstall existing rear belt guard panel to upper and left guard panels using existing hardware. Tighten all screws securely.

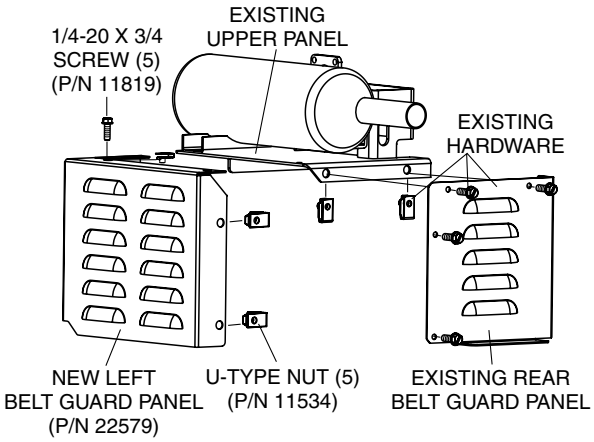

Figure 25. Installing New Belt Guard Cover

Fuel Tank Reassembly

1. Reinstall fuel tank onto trowel frame using new fuel tank mounting brackets (P/N 22588), 1/4-20 x 1/2 screws (P/N 1579), 1/4-20 x 3/4 screws (P/N 0131 A), 1/4" flat washers (P/N 0948) and 1/4-20 nuts (P/N 10024). See Figure 26.

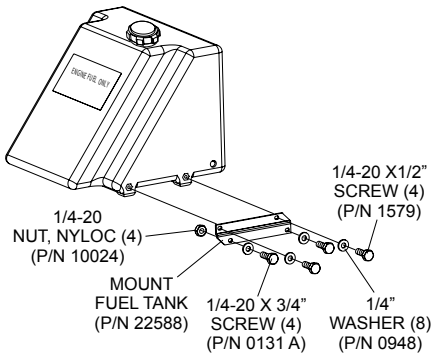

Figure 26. Fuel Tank Mounting Bracket

2. Reconnect fuel lines as referenced in Figure 6. Use new fuel hose clamps (P/N 22068).
3. Reconnect negative battery cable.

BREAK IN PROCEDURE

NOTICE

A proper break-in period is required to obtain consistent performance. The clutches will eventually break-in on their own, but a noticeable decrease in performance is likely to occur. Therefore, an accelerated break-in period is recommended.

Accelerated Break-in

1. After proper installation and alignment has been completed, the new CVT system is ready for an accelerated break-in.
2. Repeated shift-out cycles from idle to full operating speed under load for a minimum of 30 minutes is required.
3. As soon as the trowel reaches full speed, the cycle can start over again in order to run as many cycles as possible in a 30 minute period.

BELT MEASUREMENT

Long life can be expected with this new drive assembly as long as the belt is kept properly aligned.

The clutch will not shift correctly if the belt width is below 1.14". Measure the CVT belt every 100 hours of use to make sure it is within the specified tolerance. See Figure 27.

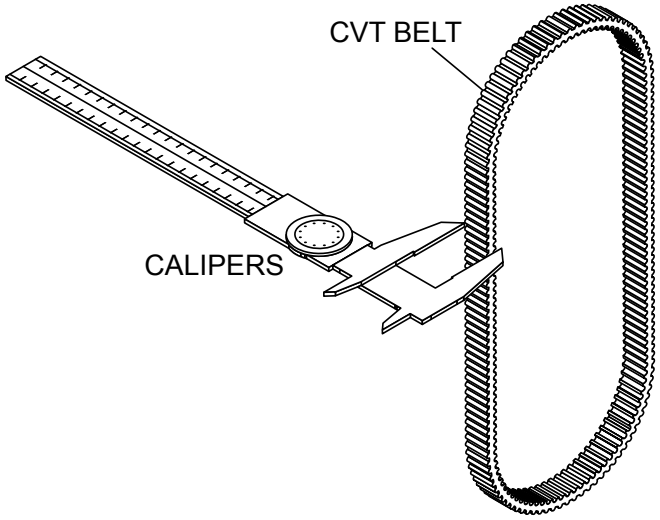

Figure 27. Belt Measurement

ENGINE SPEED

NOTICE

Multiquip recommends that the trowel's engine speed be reduced from 3950 to 3600 RPM.

Diesel units only: contact your local Briggs & Stratton 3/LC engine dealer to correctly make adjustments.

HHN CLUTCH RETROFIT KIT INSTALLATION INSTRUCTIONS

HERE'S HOW TO GET HELP

PLEASE HAVE THE MODEL AND SERIAL NUMBER ON-HAND WHEN CALLING

UNITED STATES

Multiquip Corporate Office

18910 Wilmington Ave.
Carson, CA 90746
Contact: mq@multiquip.com

Tel. (800) 421-1244
Fax (310) 537-3927

MQ Parts Department

800-427-1244
310-537-3700

Fax: 800-672-7877
Fax: 310-637-3284

Service Department

800-421-1244
310-537-3700

Fax: 310-537-4259

Warranty Department

800-421-1244
310-537-3700

Fax: 310-943-2249

Technical Assistance

800-478-1244

Fax: 310-943-2238

CANADA

Multiquip

4110 Industriel Boul.
Laval, Quebec, Canada H7L 6V3
Contact: jmartin@multiquip.com

Tel: (450) 625-2244
Tel: (877) 963-4411
Fax: (450) 625-8664

UNITED KINGDOM

Multiquip (UK) Limited Head Office

Unit 2, Northpoint Industrial Estate,
Globe Lane,
Dukinfield, Cheshire SK16 4UJ
Contact: sales@multiquip.co.uk

Tel: 0161 339 2223
Fax: 0161 339 3226

This manual MUST accompany the equipment at all times. This manual is considered a permanent part of the equipment and should remain with the unit if resold.

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