



INSTALLATION INSTRUCTIONS

ELECTRIC START KIT NO. 979178

ROCKWELL 290-340-400-440 MODELS

1. Check parts list and take inventory of parts to familiarize yourself with the entire kit. Read the instructions thoroughly once to understand the overall picture.
2. The following tools will be required to mount the Electric Start Kit: (See Figure A)
 - a. Clutch removal tool.
 - b. $\frac{1}{4}$ inch drill motor with $\frac{5}{32}$ and $\frac{9}{32}$ dia. drills.
 - c. Open end wrenches, 10 mm, $\frac{3}{8}$ ", $\frac{7}{16}$ ".
 - d. Rockwell ring gear installation tool.
 - e. $\frac{3}{16}$ " Allen wrench.
 - f. $\frac{1}{4}$ " Allen socket ($\frac{3}{8}$ " drive), 6" extension and $\frac{3}{8}$ " drive ratchet handle.
 - g. Pop rivet gun.
 - h. Two (2) - 12" crescent wrenches.



Fig. A



Figure 1



Figure 2

3. Open the hood, loosen and move engine cover rearward, remove the clutch guard. (Figure 1)
4. Remove the clutch bolts. (Figure 2) using clutch removal tool (Figure 3), remove clutch stationary sheave.
5. Secure front motor mounting bracket (979161) to the mounting pad on engine crankcase, PTO end of the engine using 6 mm x 20 mm socket head cap screws (979148) and 6 mm lock washers (979152).



Figure 3



Fig. 4

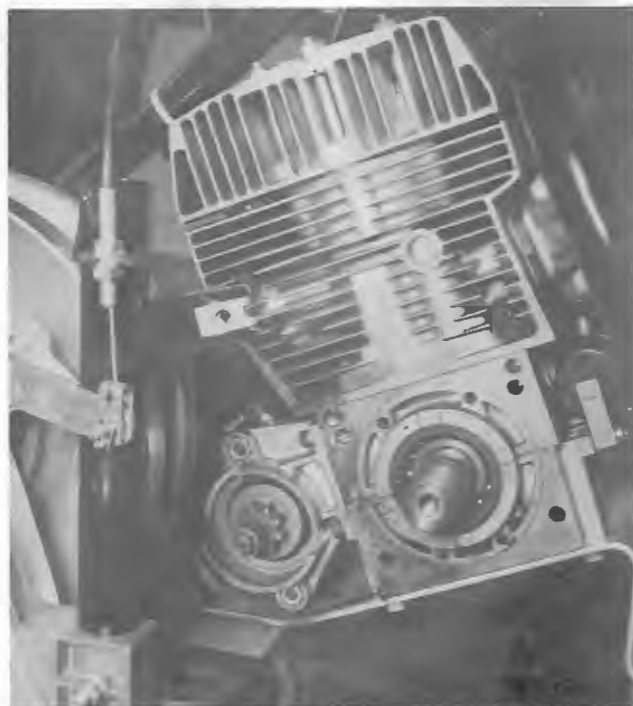


Fig. 5

6. Attach rear motor mounting bracket (979162) to starter motor (979144) using No. 10 hex nuts (102015) and No. 10 lock washers (105103). **Do not tighten!** Attach 21" battery cable (979166) to stud on side of starter motor, tighten.
7. Mount starter motor (979144) to front bracket using 5/16-18 x 1 cap screws (100028), 5/16-18 hex nuts (103405) and 5/16

lock washers (105105). The 28" battery ground cable (979165) is to be mounted to the 5/16 inch mounting bolt on the starter motor. Nuts must be placed in hex socket of front bracket. Lock washers go under bolt head. Use a $\frac{1}{4}$ hex socket and 6" ratchet extension to tighten cap screws (See Figure 4 & 5). Route battery cable under front motor mount strap and towards the left side of the tunnel. (See Figures 6 & 7.)



Fig. 6

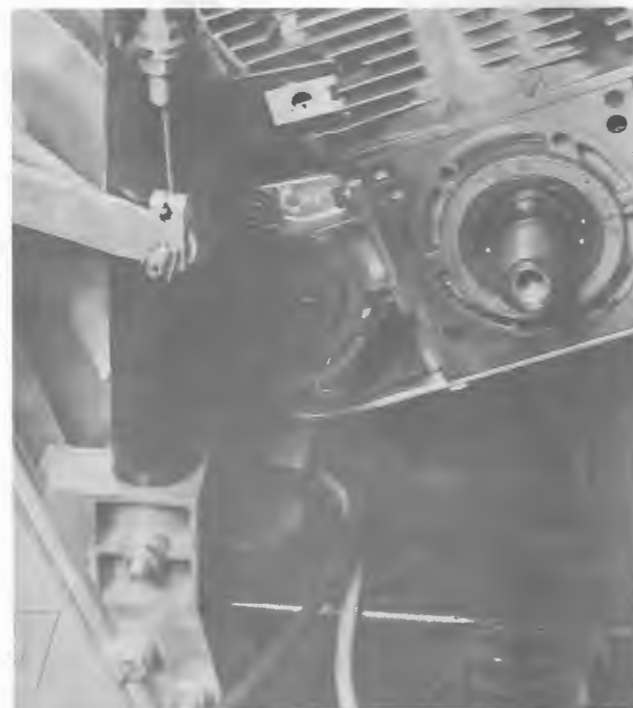


Fig. 7



Fig. 8

8. Attach rear motor mounting bracket to engine using 6 mm x 16 mm hex head screws (979149) and 6 mm lock washers (979152). Tighten No. 10 nuts (See Figure 8).

9. INSTRUCTIONS — Ring Gear Installation:

- A. Remove the PTO side oil seal by using an L-shaped hook, (Figure 9) inserting it on the inner lip of the oil seal. Be careful not to damage crankshaft sealing surface. Apply pulling pressure on the tool until oil seal begins to come out of crankcase. Rotate tool to various positions around the oil seal lip, perform pulling operation until oil seal is removed.
- B. Lubricate inner groove of oil seal (600-42-319-45) with light grease and position on crankcase. Using a small ball peen hammer, (Figure 10) gently tap oil seal on front face in various locations until oil seal outer face is flush with crankcase.
- C. Place ring gear (291-11-801-001) onto crankshaft and install ring gear installation tool. Squirt a few drops of light machine oil on crankshaft in oil seal area. Push the ring gear into position with the installation tool. Be sure ring gear makes contact with the inner bearing race. Remove installation tool and oil from crankshaft.



Fig. 9



Fig. 10



Fig 12



Fig. 13

10. Place stationary sheave, spring, retainer and belt (Figure 12) on PTO crank end. Install moveable sheave (See Figure 13) clutch bell, nut and bolt. (See Figure 14) Torque both nut and bolt 75 ft/lbs.



Fig. 14



Fig. 15

11. Install cable guide on clutch guard. Position cable guide (979167) as shown (See Figure 15) on clutch guard. Be sure edge of guide is flush with edge of clutch guard. Transfer drill two (2) 5/32 diameter holes into clutch guard (See Figure 16). Using two (2) pop rivets (155003), fasten guide to outside of clutch guard.



Fig. 16



Fig. 17

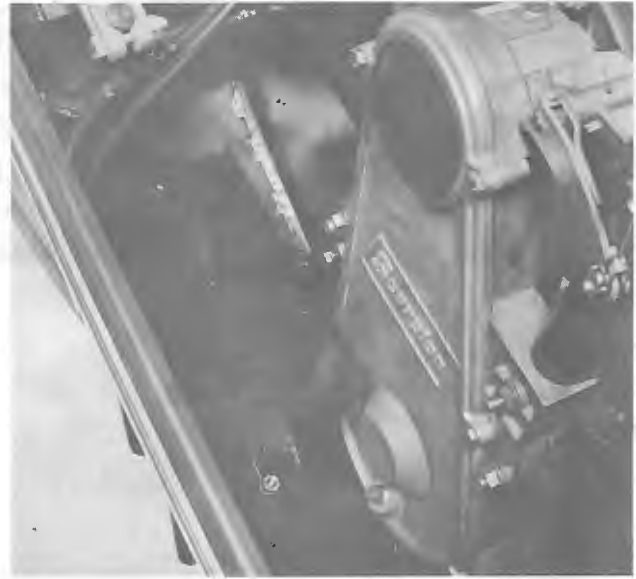


Fig. 18

12. Mount circuit breaker (979170) to battery pan (979173) using one (1) pop rivet (155003). Remove chaincase cover bolt shown in Figure 17. Install battery pan by inserting bolt from chaincase cover through battery pan ear, installing bolt back into chaincase. Square up battery box and transfer drill two (2) 9/32 diameter holes through mounting ears of battery box to nose cone. Bolt down battery box, using two (2) 1/4-20 x 3/4 thuss head screws (132004). Insert screws from the bottom of nose cone so heads are outside. Secure using two (2) 1/4-20 nuts (103404), two (2) 1/4 lock washers (105104). NOTE! Four (4) 1/4 flat washers (105004) are provided as shims between battery box and nose cone if needed. (Figure 18 shows battery pan installed).
13. Mount starter solenoid (979134) to left hand foot rest in holes provided. Use two (2) 1/4-20 x 1/2 thuss head screws (132035), two (2) 1/4-20 hex nuts (103404), two (2) 1/4 lock washers (105104) (See Figure 19).
14. Remove manual start voltage regulator from the right hand air baffle. Mount in its place, the battery regulator (979181) (See Figure 20). Mount, using two (2) No. 10-24 x 1/2 screws (132063) and two (2) No. 10-24 lock nuts (102603).
15. Replace manual start ignition switch with electric start ignition switch (979137). This switch is equipped with a safety lockout device to prevent accidental reengagement of the starter motor.

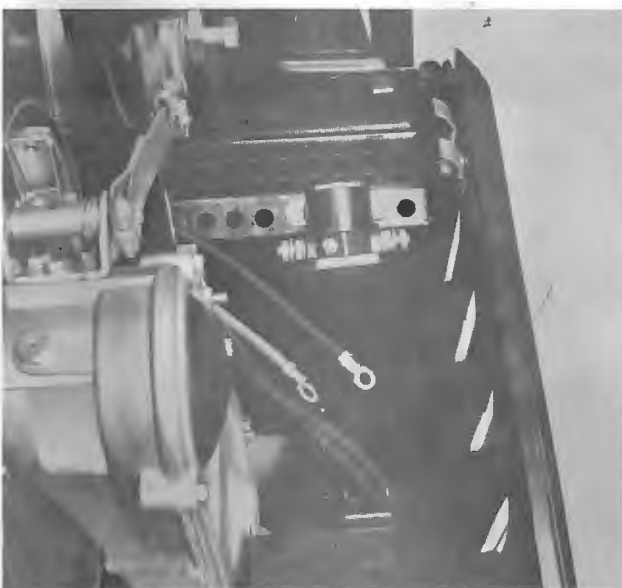


Fig. 19



Fig. 20

16. Fill battery with electrolyte and charge. Battery electrolyte acid of the correct specific gravity (1.260) must be added to the dry-charged battery in the field by the dealer.

HERE IS THE ACCEPTED METHOD FOR ACTIVATING DRY-CHARGED BATTERIES

1. Fill each cell of the battery to the top of the separators with battery electrolyte acid. Filling each cell to top of separators, permits expansion of electrolyte as battery is boost charged.
 2. The manufacturer recommends a boost charge of 10 amps. until the specific gravity of the electrolyte is 1.240 or higher and electrolyte temperature is at least 80 degrees F. **BOTH CONDITIONS MUST BE MET.** If electrolyte bubbles violently while charging, reduce charging rate until excessive bubbling action subsides, then continue charging until 1.240 and 80 degrees F. are reached.
 3. Check level of electrolyte in all cells and adjust to proper level with additional electrolyte as required.
 4. Install battery. Request customer to return in one week for battery check. After battery is in service, add only water. **DO NOT ADD ACID!**
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17. Install battery using two (2) J-Bolts (979168) and battery hold-down (979169). **NOTE:** Battery terminals are to be toward chaincase. Be sure battery hold-down J-Bolt clears steering arm. Bend forward, J-Bolt if necessary, for proper clearance between steering arm.
 18. Install electric start wire harness (979164) by:
 - A. Connecting to main harness where manual start regulator was connected.
 - B. Connect battery regulator.
 - C. Running harness under engine. **NOTCH** air baffle where harness passes under edge.
 - D. Connect green wire with ring terminal to No. 10 stud on starter solenoid.
 - E. Connect red wire to either female terminal of circuit breaker.
 - F. Attach 12" red wire to other terminal of circuit breaker, then connect the red ring terminal to positive (+ Red) terminal of battery using one (1) $\frac{1}{4}$ -20 x $\frac{3}{4}$ long hex head screw (100412), one (1) $\frac{1}{4}$ -20 nut (103404), and one (1) $\frac{1}{4}$ lock washer (105104). **DO NOT TIGHTEN.**
 - G. Connect 21" cable from starter motor to right hand terminal of starter solenoid.
 - H. Install 12" battery cable (979138) to left side terminal of starter solenoid.
 - I. Loosen $\frac{1}{4}$ -20 nut from Step 17 and mount loose end of 12" battery cable to battery.
 - J. Mount 28" battery cable from starter ground to battery negative post. (- Black or Green), using one (1) $\frac{1}{4}$ -20 x $\frac{3}{4}$ long hex head screw (100412), one (1) $\frac{1}{4}$ -20 nut (103404), and one (1) $\frac{1}{4}$ lock washer (105104). (See Figure 21.)

19. Tape battery cable and wire harness together in area they pass under the clutch guard. Now install the clutch guard with cable guide attached. **Make sure cable guide prevents cables from coming into contact with the belt!**
20. The electric start unit is now operable.

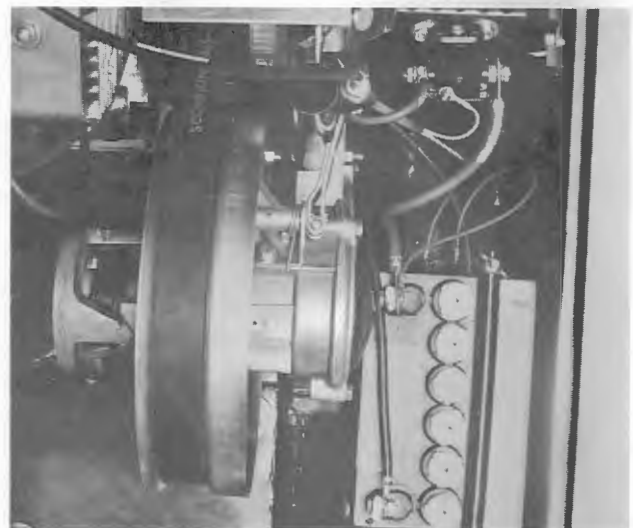


Figure 21

PARTS LIST

Part Number	Quantity	Description
100028	2	5/16 - 18 x 1" long cap screws
105105	2	5/16 Lock washers, spring type
103405	2	5/16 - 18 Hex nuts
105103	2	No. 10 Lock washers, spring type
102015	2	No. 10 - 32 Hex nuts
979149	2	6 mm x 16 mm Hex head screws, grade 8
979148	2	6 mm x 20 mm Cap screws, grade 8
979152	4	6 mm Lock washers, spring type
132035	2	1/4 - 20 x 1/2 Thru head screws
132004	2	1/4 - 20 x 3/4 Thru head screws
103404	4	1/4 - 20 Hex nuts
105104	6	1/4 Lock washers, spring type
105004	4	1/4 Flat washers (shims)
103004	2	1/4 - 20 Wing nuts
100412	2	1/4 - 20 x 3/4 Long hex head screws
103404	2	1/4 - 20 Hex nuts
979144	1	Starter motor 69-5801
979161	1	Front Mounting Bracket
979162	1	Rear Mounting Bracket
979173	1	Battery Pan
979134	1	Solenoid with cable fasteners
979181 New	1	Battery regulator
979164	1	Wiring Harness
979137	1	Ignition switch
979165	1	28" Cable, ground battery to starter motor
979138	1	12" Cable, battery to solenoid
979166	1	21" Cable, solenoid to starter motor
979180 291-11-801-00	1	Ring gear — TK style
979167	1	Cable Guide
979168	2	J-Bolts
979169	1	Battery hold down
979170	1	Circuit breaker - 10 amp
979179 000-42-319-45	1	Engine crankcase seal
132063	2	No. 10 - 24 x 1/2 screw
102603	2	No. 10 - 24 Nut, self locking
155003	3	Pop rivet - 5/32 x .125/.250 grip

