ELEC - TRAK
PRODUCT SERVICE MANUAL
MODEL E20

	GRID
MASTER INDEX	A-2
E20	
THEORY OF OPERATION	A-3/A-12
FOOT PEDAL SPEED CONTROL	A-4,A-5
PTO	A-5,A-6
FOOT PEDAL SPEED CONTROL START	A-6/A-8
1A, 2A, 3A	A-8,A-9
FW 1, 2, 3, 4	A-9
CRUISE CONTROL	A-9
CHARGER, LIFTS, LIGHTS	A-10
FORWARD/REVERSE	A-10,A-11
CIRCUIT BREAKER CB-3	A-11,A-12
E20 DRIVE MOTOR	A-12
USE OF THE TROUBLESHOOTING GUIDE	A-13
TROUBLESHOOTING GUIDE	A-14
TROUBLESHOOTING SKETCH - FIG 4-1	B-2/B-4
NO DRIVE MOTOR TORQUE IN FORWARD OR REVERSE	B-5
NO DRIVE MOTOR TORQUE IN REVERSE	B-6
SPEED CONTROL POSITIONS 2, 3, OR 4 GIVE NO MOTOR SPEED CHANGES	B-7
SPEED CONTROL POSITION 5 DOES NOT PROVIDE THE 5th DRIVE MOTOR SPEED CHANGE IN FORWARD	B-8
LAST 3 SPEED CONTROL POSITIONS GIVE NO DRIVE MOTOR SPEED CHANGES BUT MOTOR DOES NOT OVERSPEED	B-9
DRIVE MOTOR HAS NO TORQUE OR OVERSPEEDS	B-10
CRUISE CONTROL INOPERATIVE	B-11
LACK OF POWER OR SPEED IN CRUISE CONTROL	B-12
REDUCED POWER	B-13
POWER PACK DOES NOT CHARGE FULLY	B-14
CHARGER DOES NOT SHUT OFF	C-1
SHARP REDUCTION OF TRACTOR RANGE	C-2
ATTACHMENTS PLUGGED IN PTO INOPERATIVE	C-3
BRAKE SERVICE	C-5/C-8
TROUBLESHOOTING SKETCH - FIG 5-1	C-9,C-10
CONNECTION DIAGRAM - FIG 5-1.1	C-11,C-12
CARD NO. 4 - FIG 5-2	C-13,C-14
TRACTOR WIRING - FIG 5-3	D-1,D-2
CONTROL PANEL WIRING - FIG 5-4	D-3,D-4
FOOT PEDAL SPEED CONTROL WIRING - FIG 5-5	D-5
CRUISE CONTROL WIRING - FIG 5-6	D-7,D-8
TIMER ASSEMBLY WIRING - FIG 4-6	D-9,D-10
BATTERY CHARGER SUB - ASSEMBLY - FIG 4-8.1	D-12/D-14
DASH ASSEMBLY - FIG 4-9	E-2/E-4
CONTROL PANEL ASSEMBLY - FIG 5-7	E-6/E-8
CRUISE CONTROL ASSEMBLY - FIG 5-8	E-10/E-12
CONTROL CABINET ASSEMBLY - FIG 5-9	F-2/F-4
FOOT PEDAL SPEED CONTROL ASSEMBLY - FIG 5-10	F-6/F-8
CHARGER COVER ASSEMBLY - FIG 5-11	F-10/F-12
FRONT BODY ASSEMBLY - FIG 5-12	F-13,F-14
BATTERY BOX COVER ASSEMBLY - FIG 5-13	G-2/G-4
REAR BODY ASSEMBLY - FIG 5-14	G-6/G-8
POWER UNIT ASSEMBLY - FIG 5-15	G-10/G-12

ELEC - TRAK
PRODUCT SERVICE MANUAL

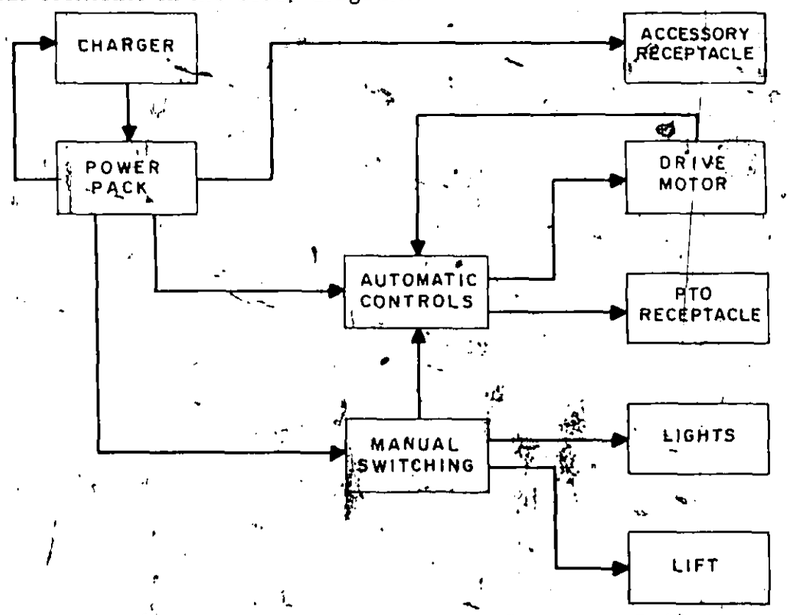
MASTER INDEX

	FICHE	GRID
GENERAL INFORMATION	1	A-3
MOWER MOTOR REPAIR (ACCESSORIES)	1	D-1
MODEL E8M, E10M (SMALL FRAME UNITS)	2	A-3
MODEL ER8 36	3	A-3
MODEL E12	4/5	A-3
MODEL E12M	5	B-1
MODEL E12S	6/7	A-3
MODEL E15	6/7	A-3
MODEL E20	8/9	A-3
MODEL E20EA & LATER	9	F-1
MODEL E12JA	10	A-3
MODEL E14	10	C-1
MODEL E15HA	10	A-3
MODEL E16	10	D-1
MODEL I5	11	A-3
MAJOR COMPONENTS	12	A-3
REAR BATTERY COMPARTMENT, L.F.	12	A-3
LIFTS	12	A-9
BRAKES	12	B-1
MOWERS	12	B-9
MISCELLANEOUS & HARDWARE	12	D-9
STEERING	12	D-11
UNDERCARRIAGE, L.F.	12	E-1
FRONT BATTERY COMPARTMENT, L.F.	12	E-7
MOTORS	12	E-11
TERMINALS	12	F-8
CROSS REFERENCE	12	F-11
ACCESSORY COMPONENTS	13/14	A-3

5.1 THEORY OF OPERATION

A block diagram showing the major functional areas of the E20 will make the detailed information easier to understand. The interconnecting lines between the blocks show dependency of one area on another and also show the direction of control. Notice that house voltage is fed into the charger, changed to an appropriate d-c voltage and is then fed to the power pack to recharge the cells. The connecting line returning to the charger indicates that battery condition is sampled by the charger to properly meter the charging rate. This sampling results in a high charging rate when the power pack is deeply discharged and a low charging rate when the fully charged state is attained. This rate change is fully automatic.

The accessory receptacle is wired directly to the power pack and is shown that way in Figure 5-A. Actually, the power disconnect, fuse FU1, two circuit breakers, and a shunt wire, MS-1, are in this circuit, but are not considered essential elements in the block diagram.



Note: This drawing not for Troubleshooting. See pages 5-13 through 5-26 and Figures 5-1 through 5-17 for Troubleshooting.

Figure 5-A. E20 Block Diagram

Light and lift circuits are also powered by the power pack, but manual switching must be performed to operate these devices. The line drawn from the manual switching block to the automatic control block represents the control of all other manual switches. These include the key, PTO, seat, brake, reverse, cruise control, and the eight switches of the foot pedal speed control. All of these switches control functions of the E20. Detailed operation of these switches is covered in the following pages.

Successful troubleshooting of the E20 Elec-Trak tractor requires an understanding of the performance involved in normal operation. Areas that the service man should become completely familiar with are: 1) foot pedal speed control, 2) armature current sensing circuitry, and 3) the cruise control. These areas will be examined individually, but with attention directed to the overall tractor response.

Foot Pedal Speed Control

The foot pedal speed control is basically a mechanical device which actuates switches in an orderly sequence. The switches are actuated as the pedal is depressed which causes the cam (wedge plate) to slide across the switch buttons. When the pedal is released the spring loaded cam returns to its neutral position.

The speed control contains three types of switches:

Single pole-double throw. Used as the start switch. It has two current carrying positions.

Single pole-single throw - Normally open. Used as 1A, 2A, and 3A switches. When actuated the switch closes.

Single pole-single throw - Normally closed. Used as FW1, FW2, FW3, and FW4 switches. When actuated the switch opens.

Locate each of these switches in the schematics and note that they are shown in their unactuated position.

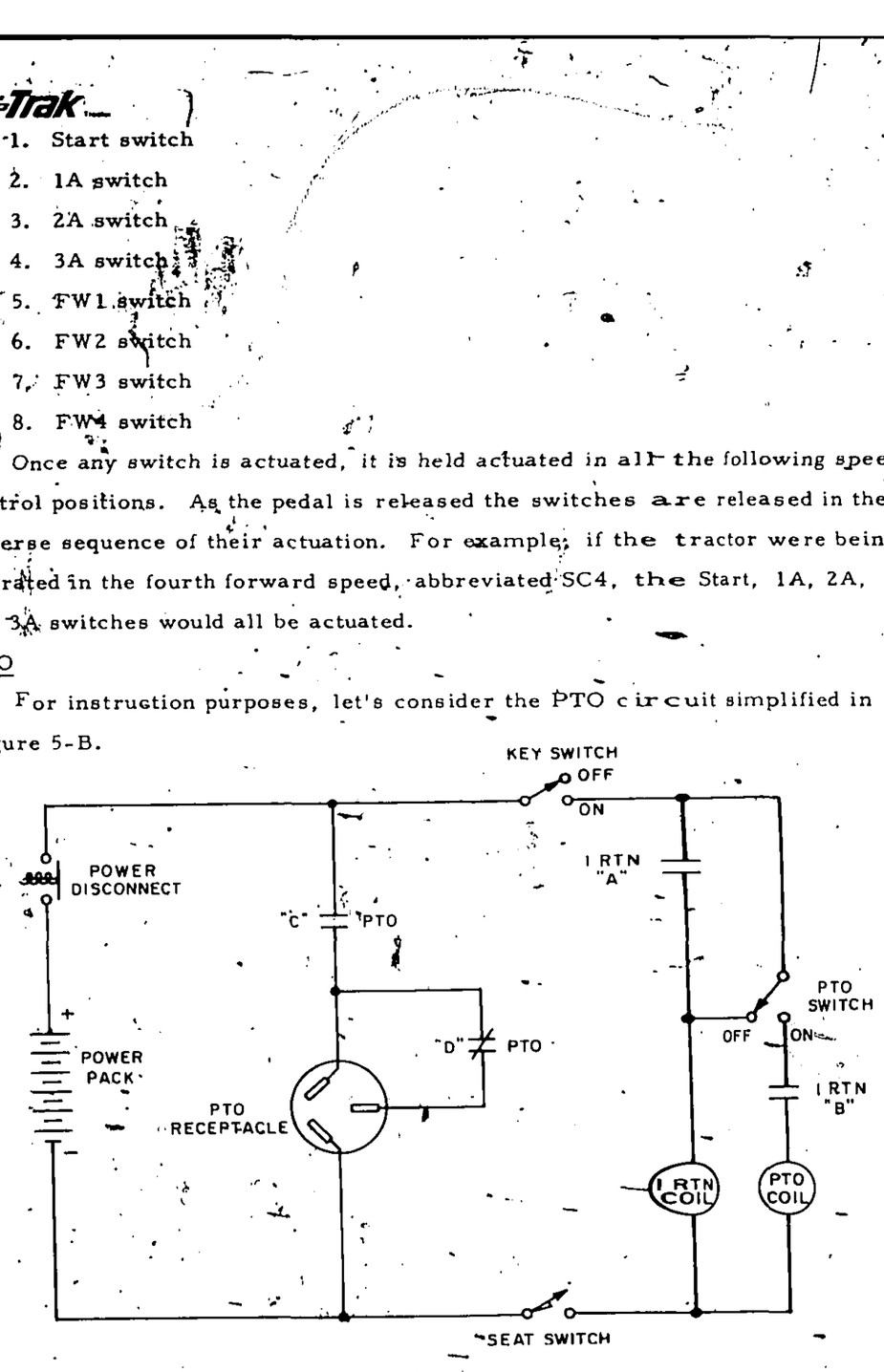
As the speed control pedal is depressed the switches are actuated in the following order:

1. Start switch
2. 1A switch
3. 2A switch
4. 3A switch
5. FW1 switch
6. FW2 switch
7. FW3 switch
8. FW4 switch

Once any switch is actuated, it is held actuated in all the following speed control positions. As the pedal is released the switches are released in the reverse sequence of their actuation. For example; if the tractor were being operated in the fourth forward speed, abbreviated SC4, the Start, 1A, 2A, and 3A switches would all be actuated.

PTO

For instruction purposes, let's consider the PTO circuit simplified in Figure 5-B.



Note: This drawing not for troubleshooting. See pages 5-13 through 5-26 and Figures 5-1 through 5-17 for troubleshooting.

Figure 5-B. E20 PTO Circuit

Assume the power disconnect is engaged (closed), an operator is on the seat, and the PTO switch is in the "Off" position. When the key switch is turned "On", a circuit is completed carrying current through the key switch, the PTO switch, the 1RTN coil, the seat switch, and back to the power pack. Notice that this current through 1RTN coil energizes or actuates it which closes its normally open contacts "A" and "B". With the pair of contacts labeled "A" closed, the PTO switch can be moved to "On" and the 1RTN coil will still be supplied with current. This action is referred to as, "sealing in."

With the 1RTN coil sealed in the PTO switch can now be placed in the "On" position and another closed current path is produced through 1RTN "B" and the PTO coil. Current through this coil closes contacts "C" and opens contacts "D". These contacts supply the PTO operated attachment with power and dynamic braking respectively.

Should the operator get off the seat, with the mower running, the seat switch opens and interrupts the 1RTN coil and PTO coil current. Both coils are de-energized and the mower is dynamically braked. To restart the mower, the PTO switch must be turned to "Off" to seal in the 1RTN coil and then to "On" to energize the PTO coil.

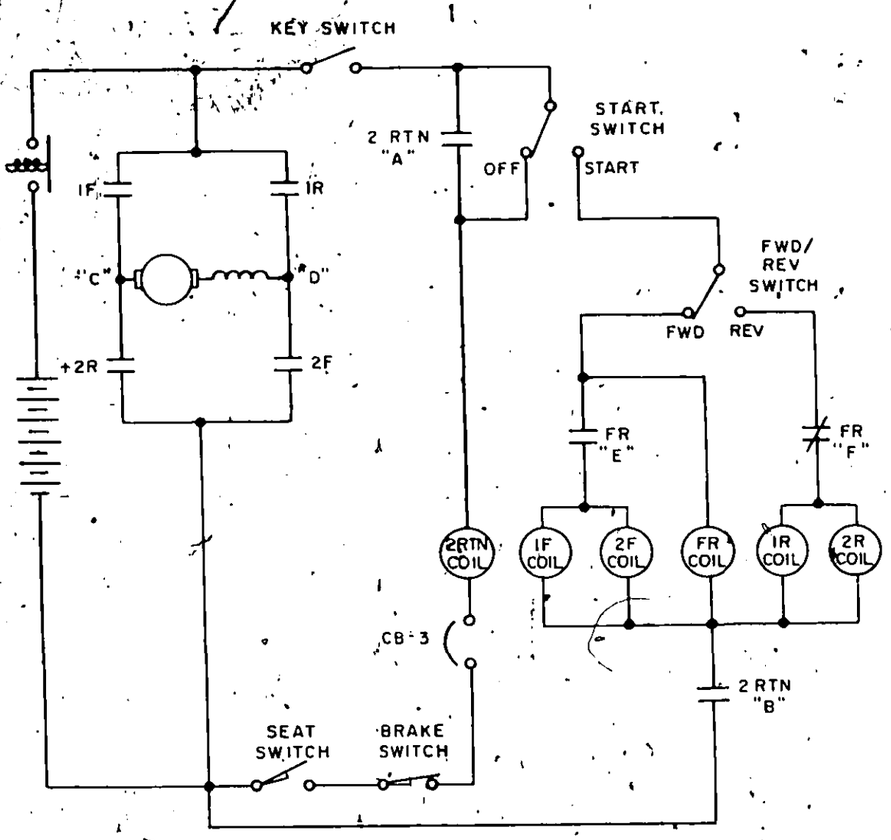
Foot Speed Control

Start

In examining the "Start" circuit, it is seen the sealing-in circuit is repeated, but there are three coils to be actuated in the "On" position when the forward-reverse switch is in forward; namely, 1F, 2F, and FR. Coils 1F and 2F energize only after FR coil energizes when its normally open contact "E" close. This relay (FR) is a safety relay that gives a time delay to switching, assures positive control of direction, and 1F, 2F coil pick-up and drop-out (i.e., actuation and release).

In Figure 5-C it is seen that when 1F and 2F are energized, a closed "path" is made for the drive motor armature which causes current to flow from point "C" to "D". If the control panel is examined it will be found that 1F and 2R, and 2F and 1R are mechanically interlocked. That is, if 1F coil is energized its contacts close and 2R contacts are open and cannot be closed.

The opposite occurs if 2R coil is energized. The same is true for 2F and 1R. This guarantees a closed circuit through the armature and prevents short circuiting in forward-reverse switching.



Note: This drawing not for troubleshooting. See pages 5-13 through 5-26 and Figures 5-1 through 5-17 for troubleshooting.

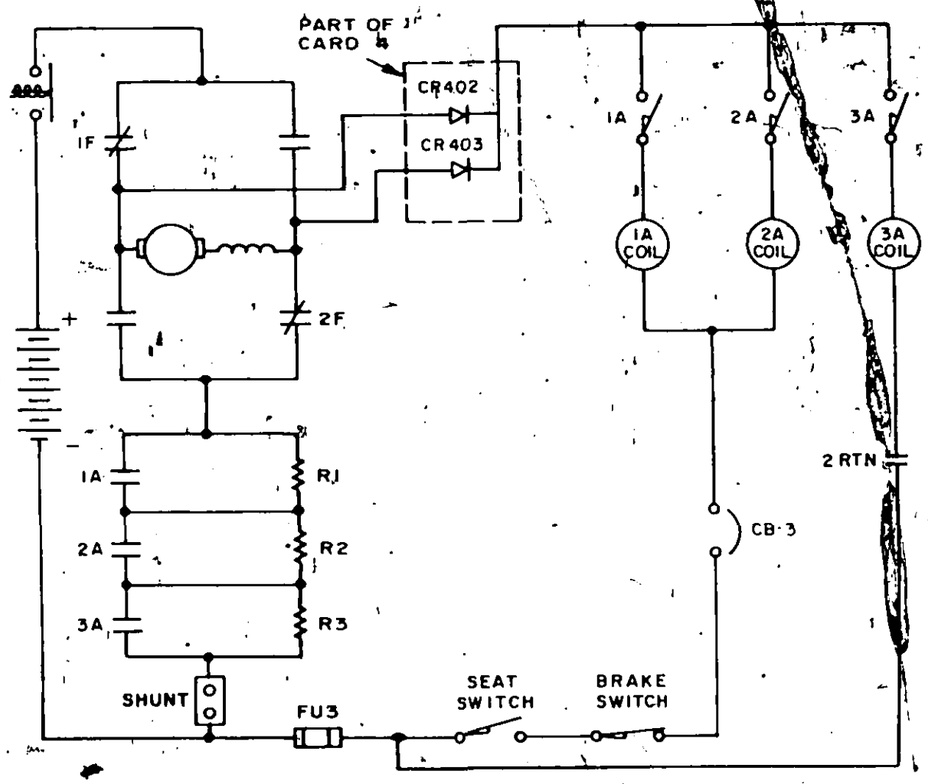
Figure 5-C. E20 Drive Motor Armature Circuit and Control

When the forward-reverse switch is moved to reverse, FR contacts "E" are open and "F" are closed, which allow coils 1R and 2R to energize. Their corresponding contacts 1R and 2R close forcing contacts 1F and 2F open. Now armature current flows from "D" to "C" resulting in reversing drive motor rotation. Observe that if the seat or brake switch opens, the sealed-in 2RTN coil de-energizes and interrupts current to 1F, 2F, and FR, or 1R and 2R which

removes power from the drive motor, since the double solenoids seek a neutral or center position when no voltage is applied to either of its coils.

1A, 2A, 3A

Developing the circuitry further, let's investigate speeds 2, 3 and 4. Assume the drive motor has been started and is running forward in Figure 5-D, so 1F and 2F contacts are closed.



Note: This drawing not for troubleshooting. See pages 5-13 through 5-26 and Figures 5-1 through 5-17 for troubleshooting.

Figure 5-D. Drive Motor Armature Speed Control

Further depression of the foot speed control pedal closes switch 1A which energizes 1A coil. This causes 1A contacts to close and by-pass R1 which increases armature voltage and so increases motor speed. Similar action occurs when switches 2A or 3A are closed. (Note that 1A and 2A can be de-energized

by opening CB-3, FU3, brake or seat switch.)

FW1, 2, 3, 4

Speeds 5, 6, 7 and 8 are obtained in much the same way as the last four speeds are obtained in the E15. Figure 5-E illustrates the circuitry, again with the motor running forward. When switch FW1 is actuated with the speed control pedal, it opens and removes the by-pass from R4, allowing it to be in series with the drive motor field. Operation of the other FW switches is exactly the same as FW1, but relay FW contacts must open before speed changes can occur in speed control positions 6, 7, and 8. This coil will not energize if armature current, as sensed by the shunt, exceeds a predetermined limit. The sensed current is acted on by portions of Card-4. When shunt current is low, the voltage at pads 20 and 13 energizes the FW coil opening FW contacts. When the shunt current is high due to unusual loading of the drive motor, the FW contacts remain closed and prevent operation of the 6th, 7th, and 8th speeds.

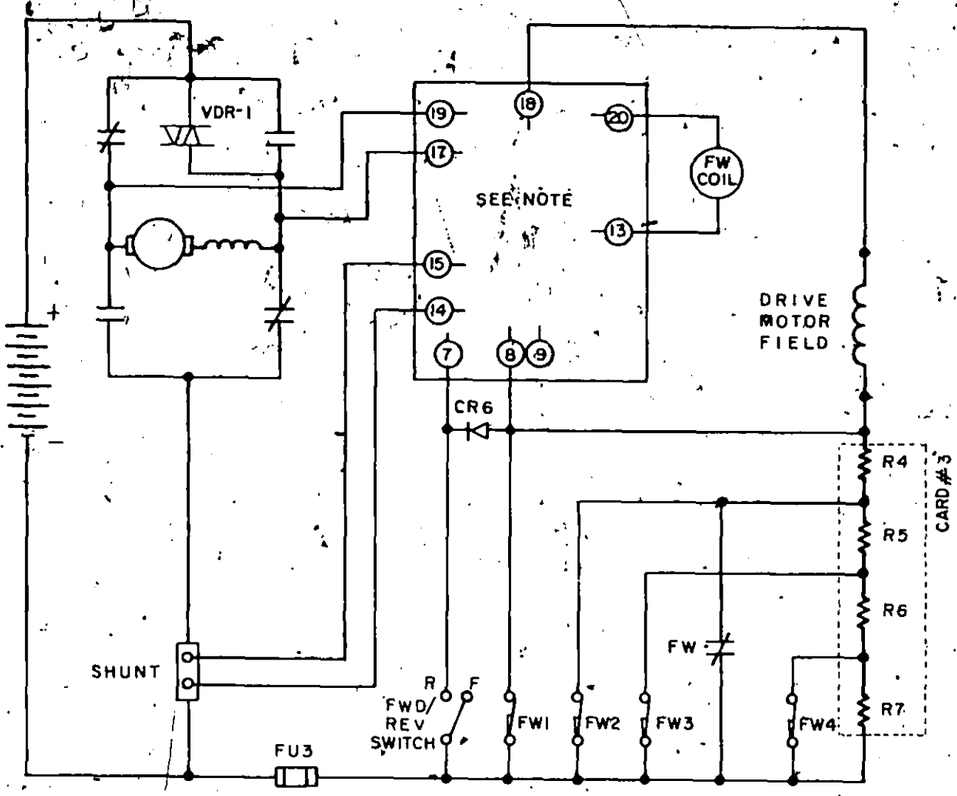
Cruise Control

The cruise control circuit seals in the 4th speed forward when activated. The circuitry involved is shown in Figure 5-F.

This circuitry demands that 3A switch and FW1 switch be closed before it can be activated. The only speed control pedal position that meets this requirement is the 4th speed forward or reverse. In this position, + 36 volts are available at point "A" and the -36 volt circuit is established through the closed FW1 switch. The current path is through CR411 diode and the 270 ohm resistor to the CC light causing it to illuminate which indicates the circuit is ready for activation.

While the CC light is on, the CC switch can be pushed which causes current to flow through the CC coil closing both CC contacts. Contacts "C" seal in the CC coil the same as previously mentioned sealed in processes occurred: Contacts "B" seal in coils 1A, 2A, and 3A. The same voltage available to the CC coil is available through diode CR407 (Card 4) to 1F, 2F, and FR coils, or 1R and 2R coils depending on the position of the forward/reverse switch. Now the CC switch button and the foot speed control can be released and the tractor continues to operate in the 4th forward speed until the speed control is depressed past the 4th forward speed position, or the seat, brake, or key switch are opened.

ElecTrak



NOTES: PAD 18 HAS 36 VDC AVAILABLE FOR THE FIELD WHEN THE MOTOR STARTS.
FW COIL VOLTAGE: 36 VDC UNLESS HIGH CURRENT FLOWS THROUGH SHUNT.

Note: This drawing not for troubleshooting. See pages 5-13 through 5-26 and Figures 5-1 through 5-17 for troubleshooting.

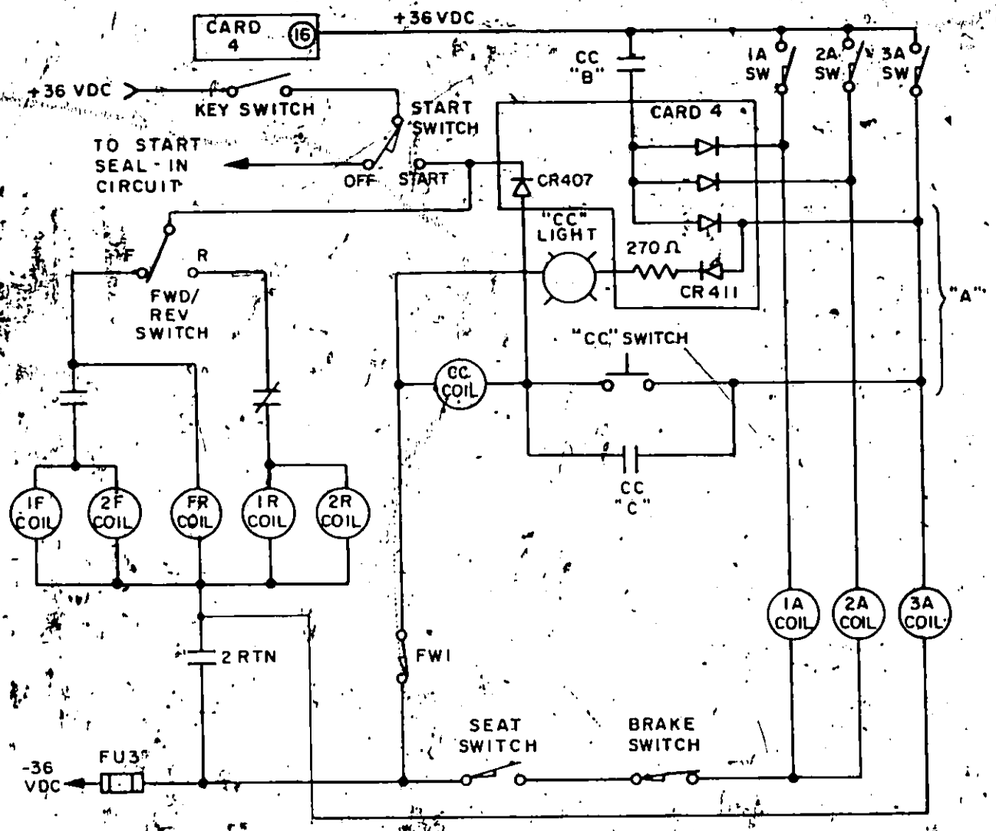
Figure 5-E. Drive Motor Field Control

Charger, Lift, Lights

The charger, lift, and light circuits are identical to those of the E15 except for wire numbering and some of the physical wire connection points. Refer to the E15 section for operation information and the E20 section for troubleshooting information.

Forward/Reverse

In addition to the operation of the forward/reverse switch already discussed, another function is illustrated in Figure 5-E. This half of the



Note: This drawing not for troubleshooting. See pages 5-13 through 5-26 and Figures 5-1 through 5-17 for troubleshooting.

Figure 5-F. Cruise Control Circuit

switch is open in the forward position and allows full control in forward. When the switch is in the reverse position, R4, 5, 6 and 7 are by-passed and the field weakening positions are not accessible. Diode CR6 is in this circuit for control of the reverse light and serves no function in the reverse by-pass circuit except to complete the circuit.

Circuit Breaker CB-3

Circuit breaker protection for the drive motor is provided in the armature circuit by circuit breaker CB-1, but the E20 motor also contains an automatic

circuit breaker, CB-3, that senses internal motor temperature (See Figures 5-C and 5-D). If the drive motor is overloaded for a long period of time, so that its temperature exceeds a certain value, CB-3 opens resulting in 2RTN, 1A and 2A dropping out (de-energizing). This interrupts all drive motor power. After a short time the circuit breaker will automatically reset and the drive motor power can be restored by releasing the foot speed control and then depressing it. The circuit breaker leads are accessible in plug P6.

E20 Drive Motor

The E20 drive motor is similar to that of the E15. Major differences are: physical size, available torque, the heat sensing circuit breaker, and field connection plug. The open circuit field resistance is approximately 15 ohms as is the E15's. Other servicing procedures for this motor are the same as for the E15.

5.2 USE OF THE TROUBLESHOOTING GUIDE

For those who have had relatively little experience in the troubleshooting of the Elec-Trak tractor, additional information is offered to clarify some of the terminology and procedures used.

The abbreviation NOC is used often in the guide. This stands for "Normal Operating Conditions" and means that the power disconnect should be engaged, the key switch closed, and the range selector (transaxle) in neutral unless directed otherwise.

Indirect or automatic switching is done with relays and contactors. Generally, contactors handle the high-current switching and relays are for much lower currents. Both can be energized or activated by applying voltage to their coil terminals. Contact pairs, found on the relays, are usually combinations of normally-open and normally-closed contacts.

The troubleshooting guide suggests a systematic voltage measurement approach. For example, refer to the troubleshooting section entitled "No drive. motor torque in forward. Reverse operation OK." The first step requires the service man to visually determine if the FR relay energizes in forward. If the relay does not energize, a quick voltage measurement at the FR coil (wires 13 and 11) when it should be energized will establish whether there is continuity in the circuit. If 36-volts d-c is present, the coil must be defective so the relay should be replaced. If no voltage is present, systematically move one of the voltmeter probes to new test points closer to the power pack. One such point might be wire 13 on the FR normally open contact while maintaining the negative probe on wire 11 at the FR coil. If 36-volts d-c is available at these points, but not at the FR coil, the fault must be in wire 13 between the FR contact and the FR coil.

Elec-Trak

5.3 TROUBLESHOOTING GUIDE

This troubleshooting guide is intended to cover the more common problems that may be encountered with the E20. If a specific problem is not listed, problems listed with similar symptoms may give some insight into possible areas to examine or the procedure to use.

Always charge the power pack and check all fuses before beginning troubleshooting procedures.

Many of the tests to be performed and the steps to be taken must be taken in the sequence given to produce reliable results. If intermediate steps are omitted, much time can be wasted and results can be very misleading.

If open wiring is suspected, don't ignore the plug and jack connections involved. These connections may become unlatched from the housing and cause an open connection. Whenever a test involves opening any connections, close the connections before proceeding to the next step.

As a final word of caution, if any component is replaced or rewired and failures are experienced, carefully recheck the wire coding for correct location.

4.2 E15 TROUBLESHOOTING SKETCH See Grid B-3,B-4

The E15 Troubleshooting Sketch is a combination schematic drawing and wiring diagram. It shows not only the electric-electronic circuits of the E15, but the location of wire connections, plug and jack pin identifications, wire number coding, and notes in various areas that aid troubleshooting.

For example, locate fuse FU2 in the lift circuit on the sketch. Immediately, it is determined that the fuse is a 30 amp slo-blow with three wires connected to one end and one wire to the other. In following the wires, it is shown that the single wire is coded "17" and is terminated in P1 pin 1 (P1-1). The three wires at the other end are coded "6". They are terminated at the L contactor, P1-4, and the Fuel Level Gage. Inspection of that fuse in an E15 will verify this information.

Areas of the sketch that are enclosed with either solid or dotted lines are modules or portions of modules; i.e., R-1 across the drive motor field is a component which is mounted on Card 3.

Knowledge of the currents involved in various circuits will often help in identifying wiring if the same code number occurs on several wires. For instance, 1A contactor contacts terminate three number 6 wires. Since two of these wires supply armature current to the drive motor it is necessary that they be of a heavy gage. The third wire supplies field current so may be a much lighter gage. The PTO and drive motor armature circuits are drawn as heavy lines to represent high current circuits.

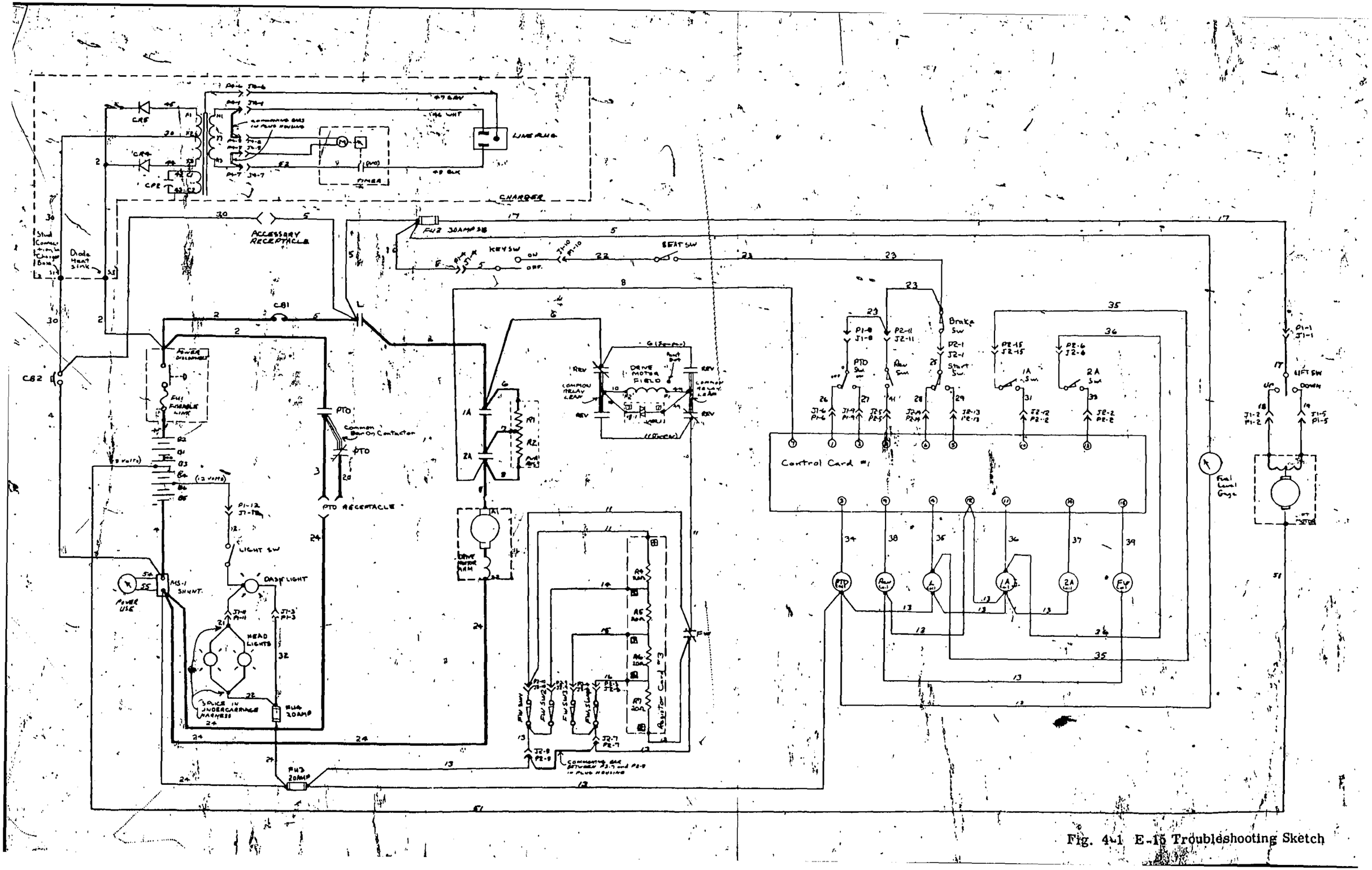


Fig. 4-1 E-15 Troubleshooting Sketch

No drive motor torque in forward or reverse.

See Grid A-7,A-8

Does 2RTN relay energize, NOC, with foot speed control released?

If no, check positive and negative voltage circuitry which supplies the 2RTN coil.

If OK, check 2RTN coil resistance vs. an identical coil.

If not OK, repair faulty wiring or replace defective component.

If yes, does 2RTN remain energized as the foot speed control is depressed, NOC?

If no, check 2RTN contacts "A" and "B" for proper closure.

If OK, check each contacts wiring for continuity. Repair as required.

If not OK, replace relay or adjust contacts.

If yes, does FR relay energize in forward when the foot speed control is depressed?

If yes, check FR normally open contacts for proper closure when relay is energized.

If OK, check wiring to FR contacts, and 1F and 2F coil wiring for continuity.

If not OK, repair faulty wiring or replace defective component.

If not OK, replace relay or adjust contacts.

If no, check start switch, fwd./rev. switch, and their circuitry for continuity and the negative return for 1F, 2F, 1R and 2R coils.

If not OK, repair faulty wiring.

If OK, suspect faulty FW relay, replace as required.

If not OK, replace component.

If OK, check 1F and 2F coil resistance vs. an identical coil.

If OK, check drive motor armature circuit for continuity.

No drive motor torque in reverse. Forward operation OK.

See Grid A-7

Do coils 1R and 2R energize in reverse, NOC, when the speed control is depressed? (Measure coil voltage to be 36 VDC when energized.)

If yes, check contacts 1R and 2R for closure when energized.

If OK, check wiring to 1R and 2R contacts for continuity and repair as required.

If not OK, replace defective component.

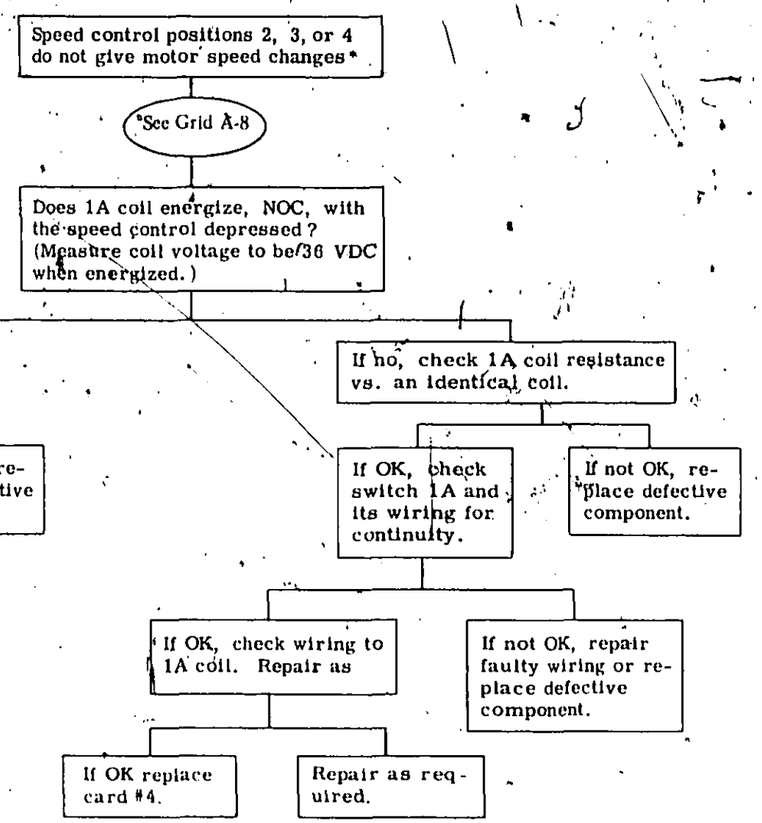
If no, check FR normally closed contacts for proper closure.

If OK, check the forward/reverse switch.

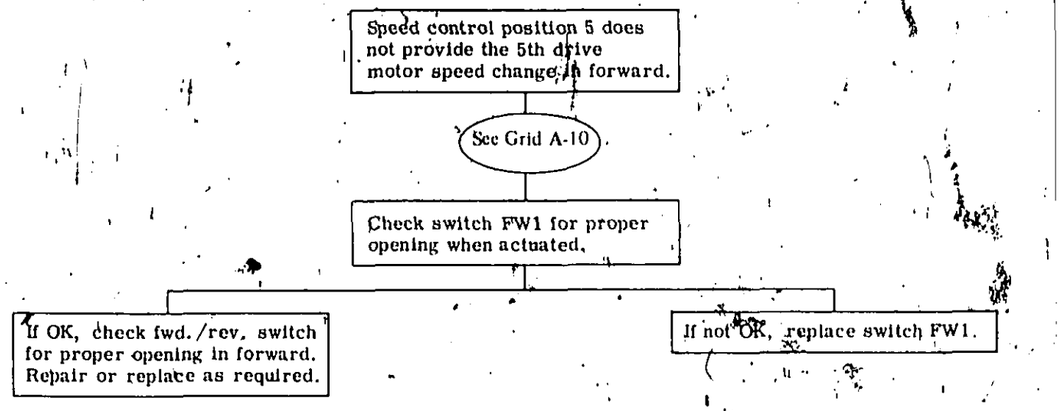
If not OK, replace relay or adjust contacts.

If not OK, replace switch.

If OK, check all wiring to FR normally closed contacts and 1R and 2R coil. Repair as required.



*Contactor 1A is active in position 2, 2A in position 3, and 3A in position 4. This troubleshooting section is written for contactor 1A circuitry, but is similar in technique for 2A and 3A.



None of the last three speed control positions give drive motor speed changes, but motor does not overspeed.

See Grid A-10

Does FW relay energize, NOC, with the speed control in the first forward position?

If yes, check switch FW2 for opening when actuated.

If OK, check FW contacts for opening when energized and repair or replace as required.

If not OK, replace defective switches.

If no, measure 24 VDC or more at FW coil, NOC, with speed control in the first speed forward.

If OK, replace FW relay.

If not OK, substitute card #4 and measure for 24 VDC at FW coil again.

If OK, install new card #4 permanently.

If not OK, check wires 40 and 49 for continuity and repair as required.

Drive motor has poor torque in speed control positions 1, 2, and 3.

Drive motor overspeeds in one or more speed control positions.

See Grid A-10

Measure field voltage in plug P6 with P6-J6 joined in, speed control position that produces the abnormal operation in accordance with the chart on this page.

If OK, or 36 VDC in all positions, check drive motor field resistance to be 16 ohms. Replace motor if required.

If not OK, check field circuit for an "open" in lowest speed control position which gives the zero voltage reading. This includes card #3, the drive motor field and all associated series wiring.

Field Voltage Chart

Speed Control Position	Approximate DC Field Voltage Measured at P6. P6-J6 Connected
1	36
2	36
3	36
4	36
5	22
6	15
7	10
8	6

Cruise control inoperative. All other control functions OK.

See Grid A-14

Does CC relay energize normally when the cruise light is on and the CC switch is pressed?

If yes, check CC contacts for proper closure.

If OK, check contacts wiring for continuity.

If not OK, replace relay or adjust contacts.

If OK, substitute card #4 and retest. If OK, install card permanently.

If not OK, repair as required.

If no, check CC relay coil resistance vs. an identical coil.

If OK, check coil and CC switch wiring for continuity. Repair faulty wiring or replace defective component as required.

If not OK, replace CC relay.

Lack of power or speed when operating in cruise control.

See Grid A-11

Substitute card #4. Retest.

If OK, install card #4 permanently.

If not OK, check wiring from card #4 to 1A coil, 2A coil, and to 3A coil for continuity.

If OK, retest drive motor for proper speed changes and refer to the trouble-shooting section giving those symptoms.

If not OK, repair faulty wiring as required.

Reduced power.

Refer to troubleshooting section entitled "Speed control positions 2, 3, or 4 do not give motor speed changes."

Power pack does not charge fully as indicated by low SPG readings of each cell after charging.

See Grid C-9,C-10

Does the manual reset circuit breaker, CB-2, open whenever the power disconnect is engaged?

If yes, check each heat sink diode for a "short" in each direction as opposed the normal short in one direction only.

Replace heat sink assembly if one or both diodes are shorted.

If no, measure for 40 VDC output of charger with power disconnect disengaged.

If OK, check positive and negative wiring from charger to power pack.

Repair faulty wiring or replace defective component.

If not OK, check heat sink diodes for "opens" in each direction as opposed to the normal open in one direction only.*

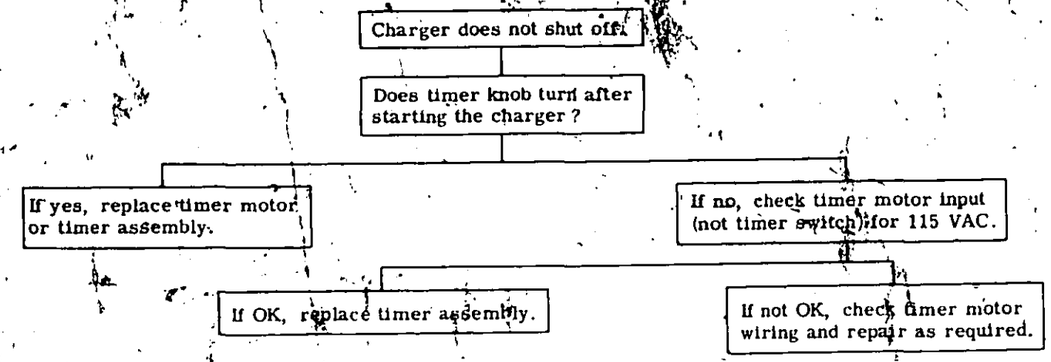
If OK, check input of transformer for 110 VAC.

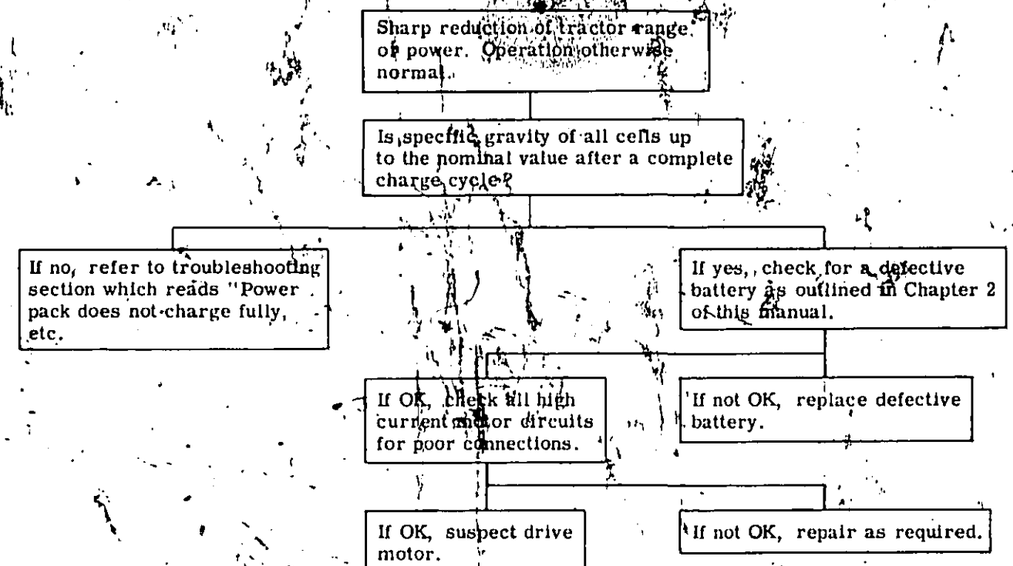
If not OK, replace heat sink assembly.

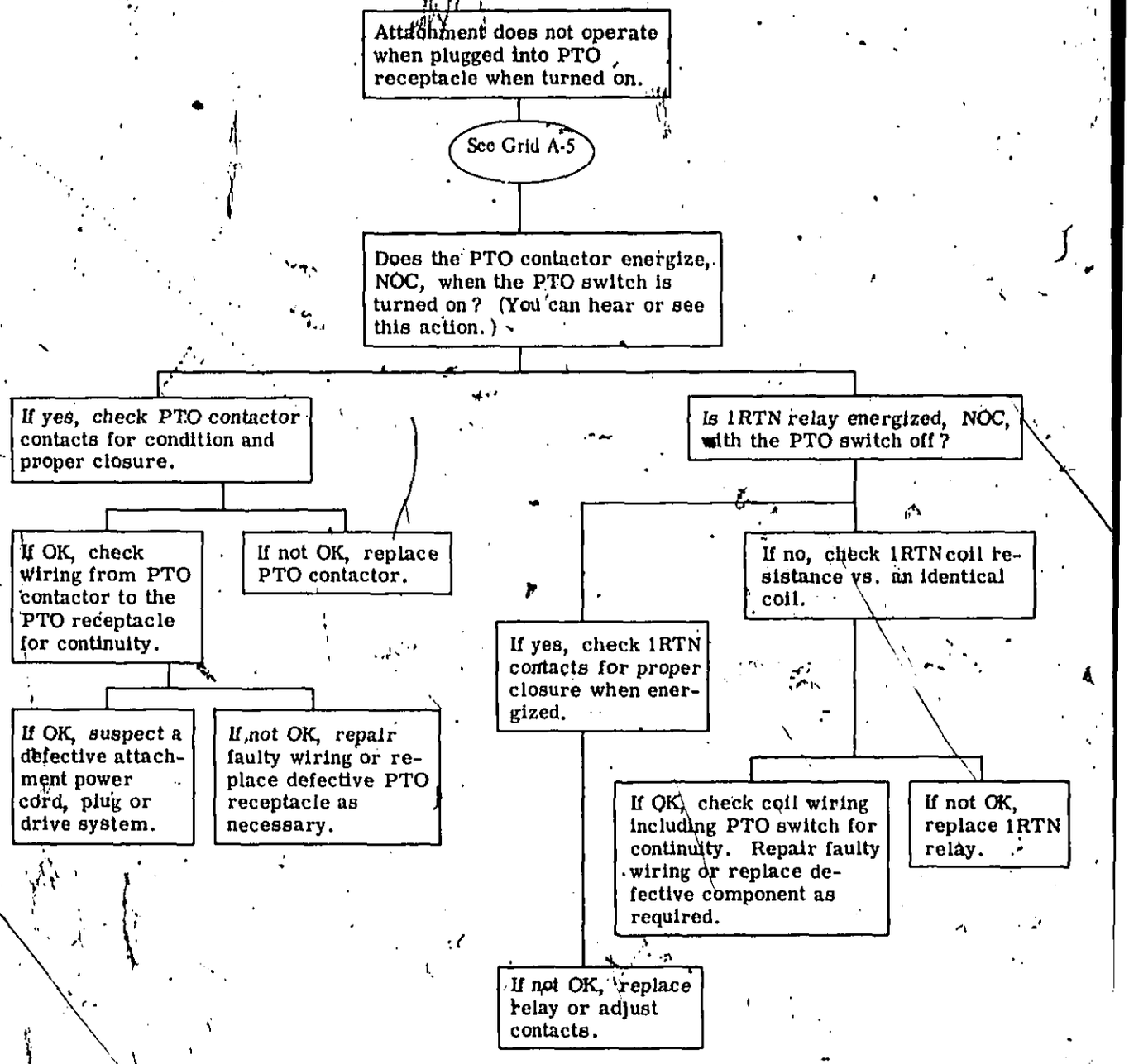
If OK, replace charger assembly.

If not OK, check timer switch, line cord and associated wiring for continuity and repair as required.

*Since both diodes are in parallel, one of the diode wires must be removed before either diode can be checked for an "open". Removing a wire is not necessary to check for a short.


Charger does not shut off.
Does timer knob turn after starting the charger ?
If yes, replace timer motor or timer assembly.
If no, check timer motor input (not timer switch) for 115 VAC.
If OK, replace timer assembly.
If not OK, check timer motor wiring and repair as required.


Sharp reduction of tractor range of power. Operation otherwise normal.
Is specific gravity of all cells up to the nominal value after a complete charge cycle?
If no, refer to troubleshooting section which reads "Power pack does not charge fully, etc.
If yes, check for a defective battery as outlined in Chapter 2 of this manual.
If OK, check all high current motor circuits for poor connections.
If not OK, replace defective battery.
If OK, suspect drive motor.
If not OK, repair as required.


Attachment does not operate when plugged into PTO receptacle when turned on.
See Grid A-5
Does the PTO contactor energize, NOC, when the PTO switch is turned on? (You can hear or see this action.)
If yes, check PTO contactor contacts for condition and proper closure.
If OK, check wiring from PTO contactor to the PTO receptacle for continuity.
If OK, suspect a defective attachment power cord, plug or drive system.
If not OK, repair faulty wiring or replace defective PTO receptacle as necessary.
If not OK, replace PTO contactor.
Is 1RTN relay energized, NOC, with the PTO switch off?
If yes, check 1RTN contacts for proper closure when energized.
If not OK, replace relay or adjust contacts.
If no, check 1RTN coil resistance vs. an identical coil.
If OK, check coil wiring including PTO switch for continuity. Repair faulty wiring or replace defective component as required.
If not OK, replace 1RTN relay.

4.5 BRAKE SERVICE

Mechanical Adjustment - Referring to Figure 4-19, adjust the rear caliper unit of the brake as follows:

1. Release parking brake.
2. Remove cotter pin from caliper unit.
3. Tighten caliper castle nut until a clearance of 0.005 inch as measured with a feeler gauge remains between friction pad and disk on either side of the disk.
4. Replace cotter pin. If it is necessary to align the castle nut slot with the hole in the stud, only loosen the castle nut.
5. Test braking.

Brake Switch Adjustment - The brake switch is adjusted properly when approximately 1/4 inch of brake pedal arm travel remains after drive power has been switched off by the actuation of the brake switch. This 1/4 inch should be measured on a perpendicular line from the brake pedal arm to the contact point on the left foot rest.

With the switch and caliper unit properly adjusted, drive power can be restored while maintaining the mechanical braking of the tractor by slightly releasing the brake pedal. This allows the brake switch to return to its unactuated position. Adjustment is made as follows, referring to Figure 4-19:

1. Loosen shoulder screw, reference number 11.
2. Reposition shoulder screw in slotted pawl and tighten in place. Move screw forward to delay actuation of brake switch.
3. Retest brake and measure for 1/4 inch travel as required.
4. Repeat steps 1 through 4 if required.

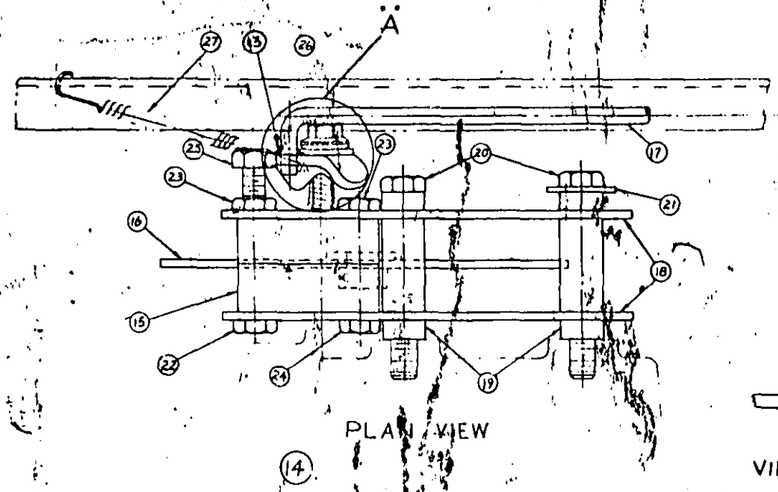
BRAKE ASSEMBLY
Use this list to order replacement parts from Fig. 4-18.

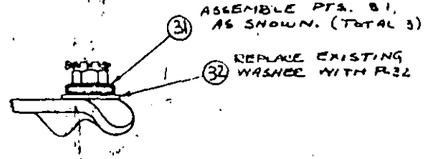
Ref. No.	Description	Part Number	26A						
			E12AA	E12B	E15A	E15B	E15C	E20A	E20B
2	Brake Pedal Assembly	163B9870G1	X	X	X	X	X	-	-
2	Brake Pedal Assembly	163B9870G2	-	-	-	-	-	X	X
3	Lever (Parking Brake)	211A3467P1	X	X	X	X	X	X	X
4	Plain Washer	(1)	X	X	X	X	X	X	X
5	Spring Dowel Pin 5/32 x 1 1/8	N533P1618	X	X	X	X	X	X	X
6	Locking Pan Hd. Phillips Screw	211A3583P1	X	X	X	X	X	-	-
6	Rivet	243A4773P1	-	-	-	-	X	X	X
7	Curved Washer	211A3484P1	X	X	X	X	X	X	X
8	Brake Switch	211A3481P1	X	X	X	X	X	X	X
9	Pan Hd. Screw 10-32 x 3/8	(1)	X	X	X	X	X	X	X
10	Lockwasher #10	(1)	X	X	X	X	X	X	X
11	Shoulder Screw	211A3504P1	X	X	X	X	X	X	X
12	Locking Nut, Hex 1/4-20	N264P2J1B6	X	X	X	X	X	X	X
13	Spring Clip (Push Nut)	211A3488P1	X	X	X	X	X	X	X
15	Disk Brake (Caliper Unit)	211A3153P1	X	X	X	X	X	X	X
16	Disk and Hub	211A3154G1	X	X	X	X	X	X	X
17	Brake Rod	211A3468P1	X	X	X	X	X	X	X
18	Bracket	211A3469P1	X	X	X	X	X	X	X
19	Spacer	211A3470P1	X	X	X	X	X	X	X
20	Cap Screw, Hex Hd. 3/8-16 x 2 3/4	(1)	X	X	X	X	X	X	X
21	Plain Washer 3/8"	(1)	X	X	X	X	X	X	X
22	Cap Screw, Hex Hd. 5/16-18 x 2 3/4	(1)	X	X	X	X	X	X	X
23	Nut, Hex 5/16-18	(1)	X	X	X	X	X	X	X
24	Cap Screw, Hex Hd. 5/16-18 x 1 7/8	(1)	X	X	X	X	X	X	X
25	Locking Nut, Hex 5/16-18	211A3582P1	X	X	X	X	X	X	X
26	Spring Clip (Push Nut)	211A3488P1	X	X	X	X	X	X	X
27	Return Spring	211A3489P1	X	X	X	X	X	X	X
28	Key, Woodruff	N3400P606	X	X	X	X	X	X	X
30	Mounting Base	243A4585P1	X	X	X	X	X	X	X
31	Washer, Belleville (3 Required)	243A4582P3	X	X	X	X	X	X	X
32	Washer (50 mil)	243A4642P1	X	X	X	X	X	X	X

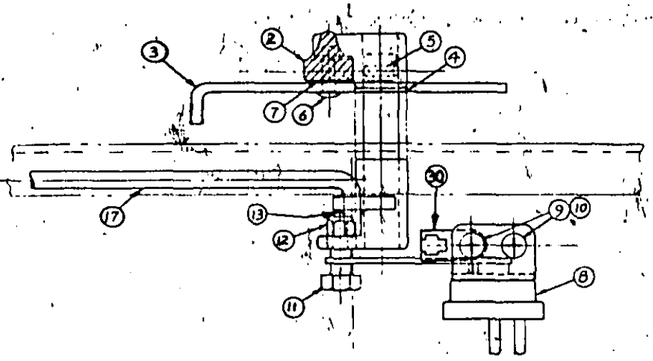
(1) Not stocked, order locally. For bolt and screw replacement use Grade 5 or better.

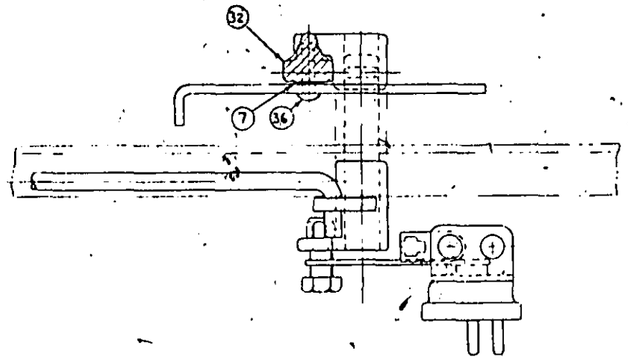
P.L. 423D208, Rev 5

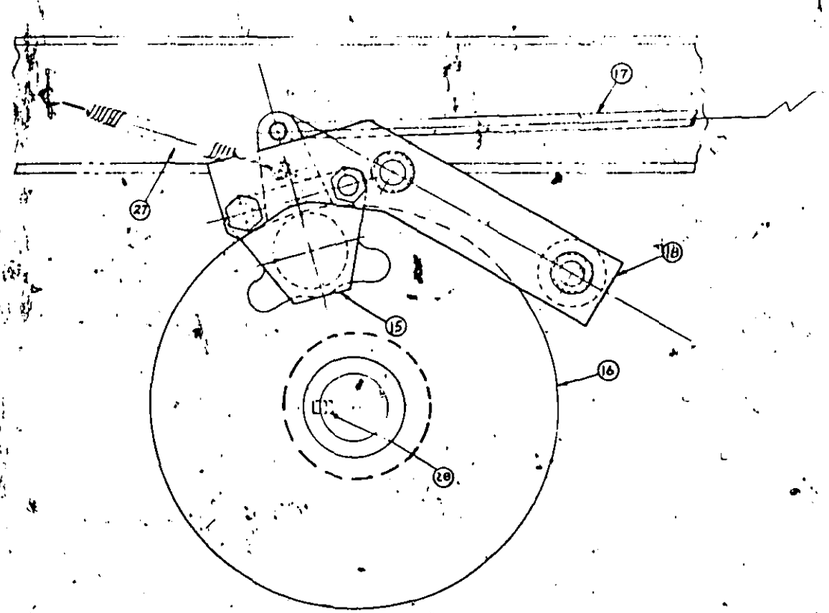
Fig. 4-18, 423D208, Rev 5











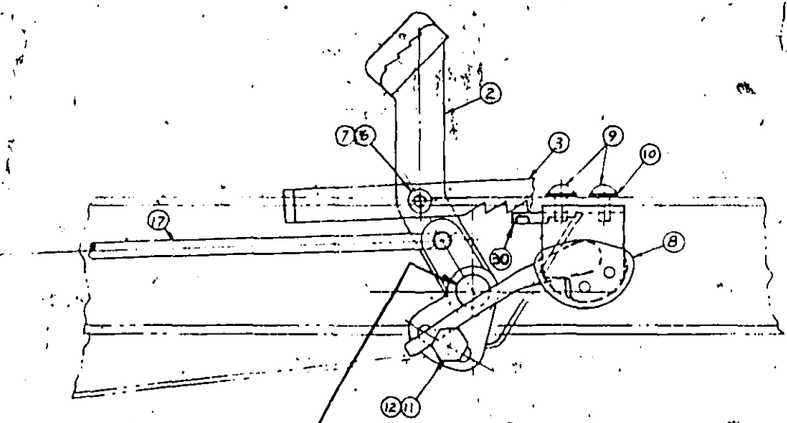
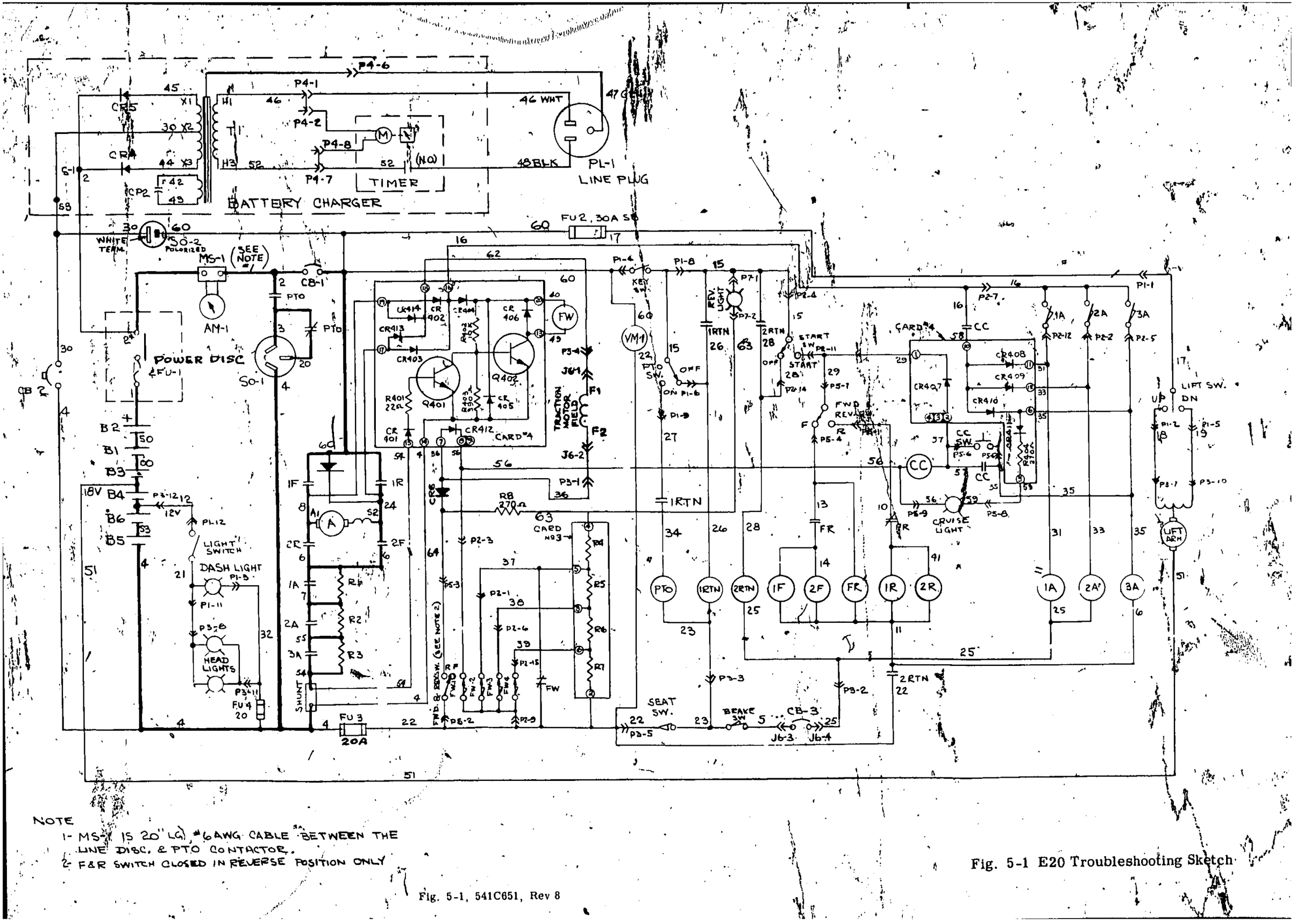


Fig. 4-18 E15 Brake Assembly



NOTE

1- MS-1 IS 20" LG, #6AWG CABLE BETWEEN THE LINE DISC. & PTO CONTACTOR.

2- F&R SWITCH CLOSED IN REVERSE POSITION ONLY

Fig. 5-1 E20 Troubleshooting Sketch

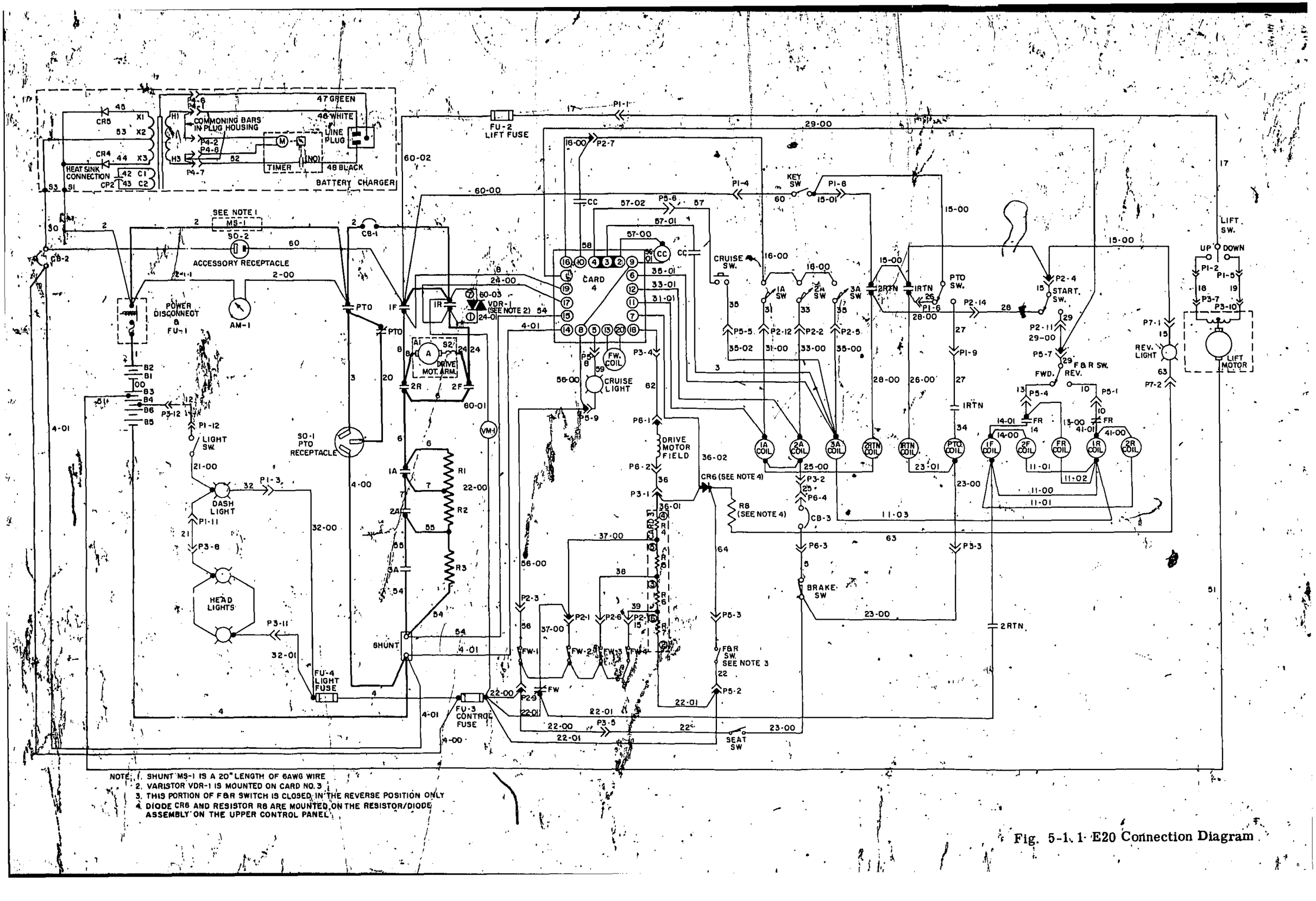
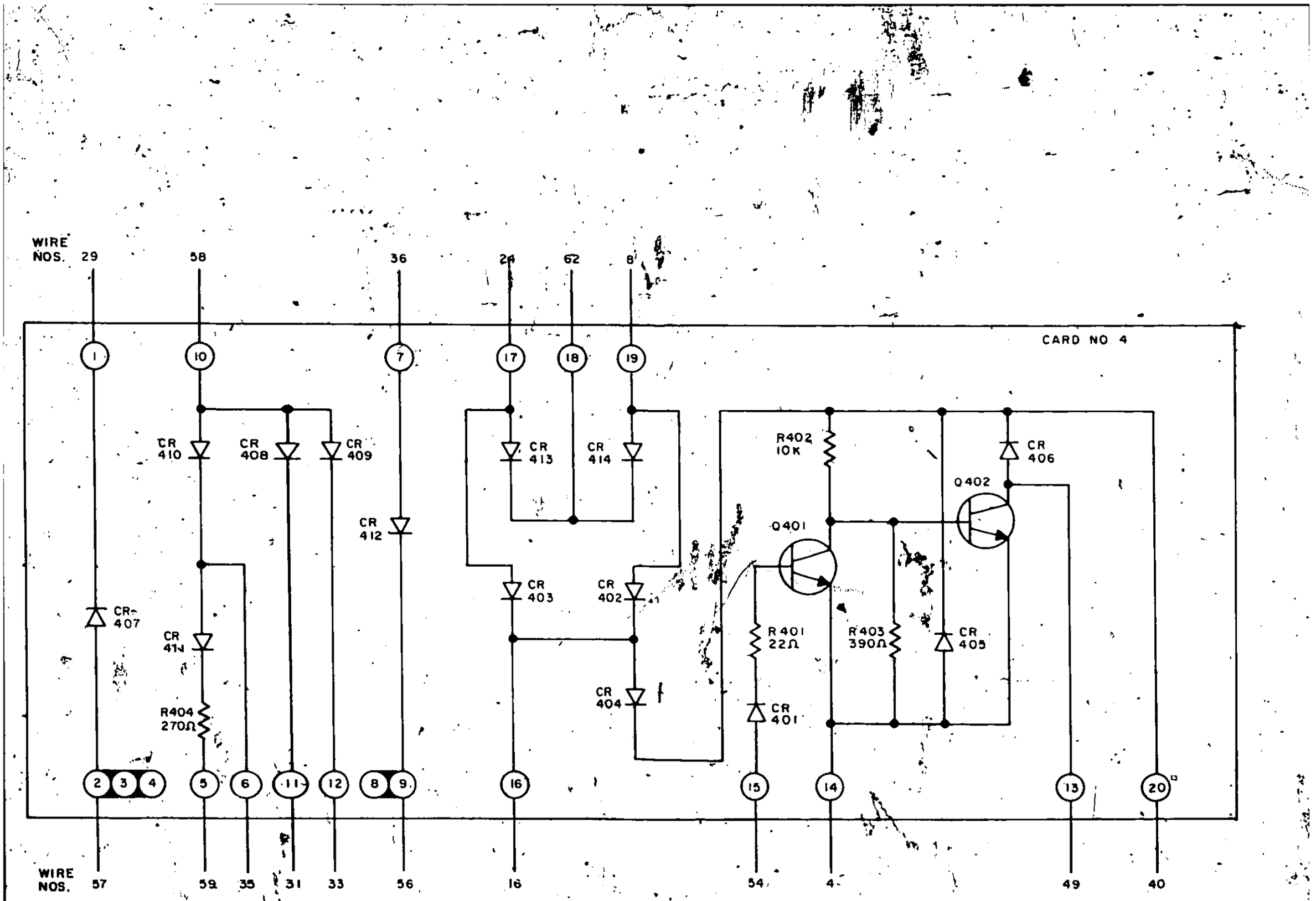


Fig. 5-1.1 E20 Connection Diagram



Circled numbers correspond to pad numbers on printed circuit card.

Fig. 5-2 E20 Card #4

NOTES:

1. CABLE CONNECTION FROM POWER DISCONNECT TO PTO CONTACTOR MUST BE 20 INCHES OF #6AWG.
2. → INDICATES CONNECTIONS TO BE MADE UPON INSTALLATION OF PANEL INTO TRACTOR.
3. WIRES FROM CONTROL PANEL CABLE HARNESS.
4. HEAD LIGHT LEADS 21&32 MUST NOT MAKE CONTACT WITH POWER-RESISTOR. USE CABLE TIES TO FASTEN THESE LEADS TO TIMER COVER, 2 PLACES.
5. THIS FIGURE SHOWS MAJOR WIRE CONNECTIONS ONLY.
6. CALL OUTS ARE WIRE CODE NUMBERS OR WIRE TERMINATION POINTS

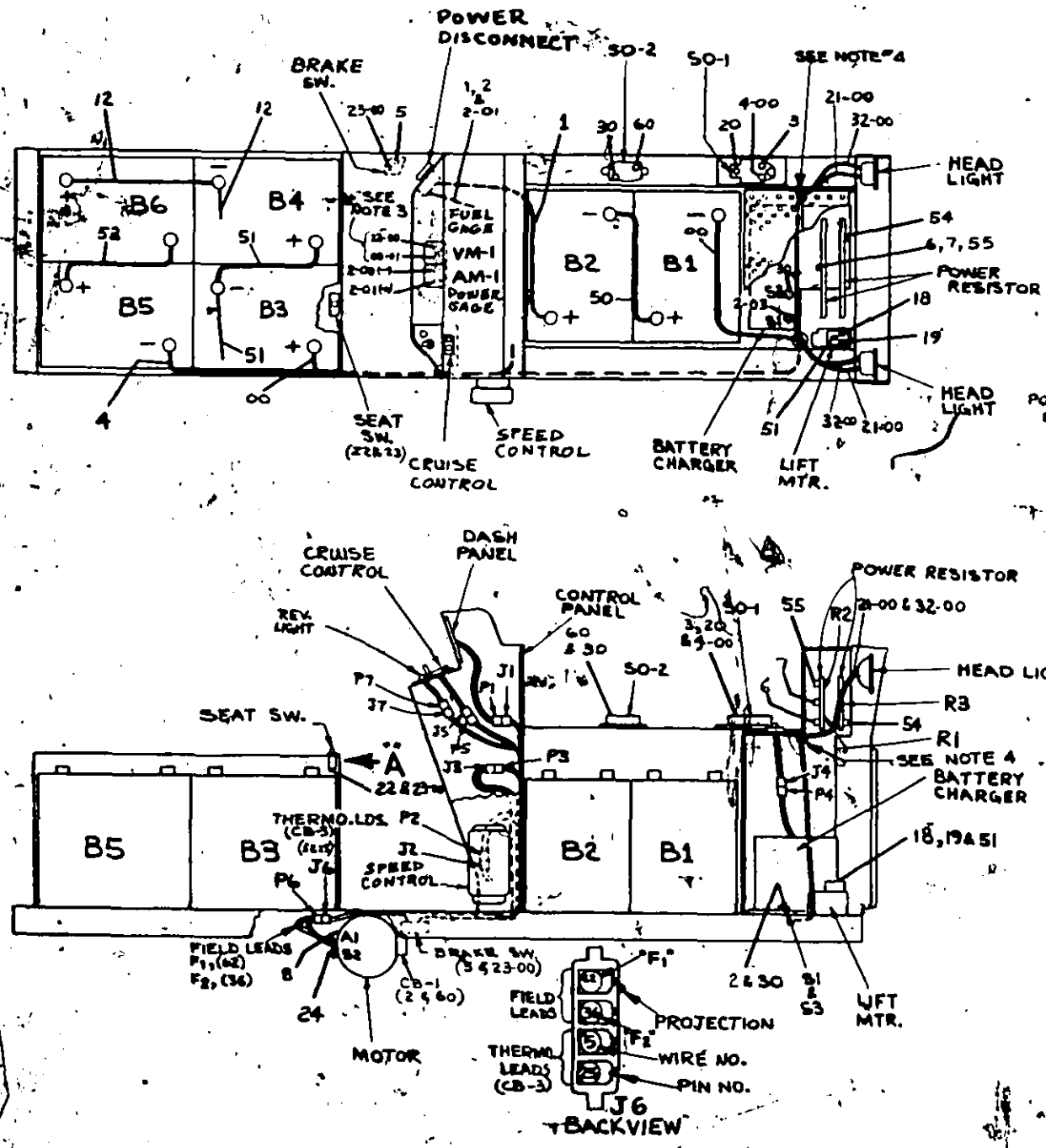
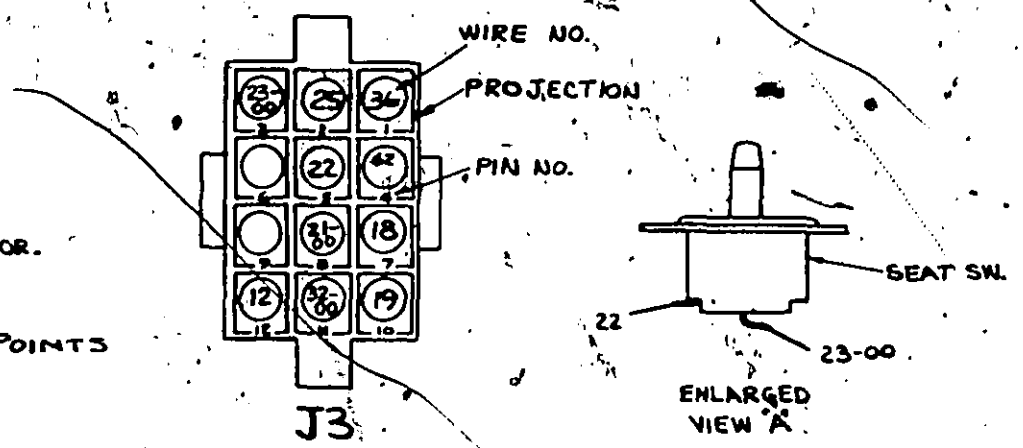


Fig. 5-3, 423D254, Rev 4



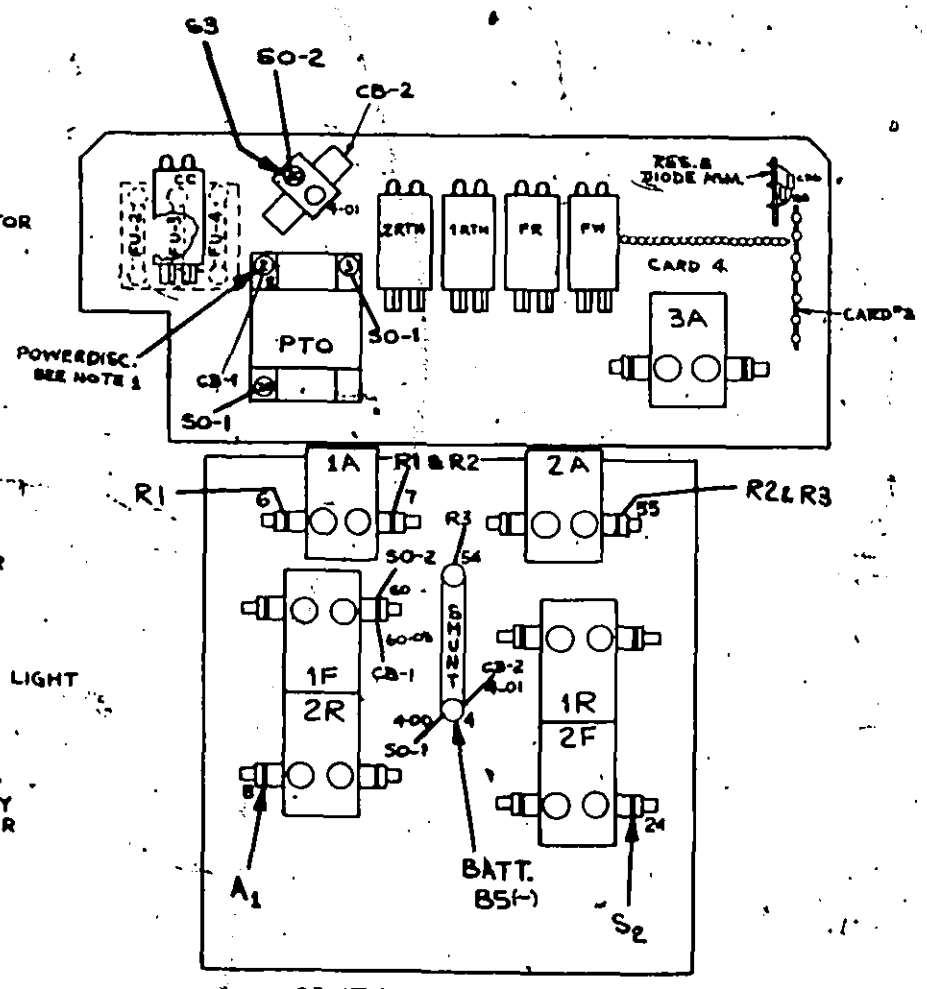
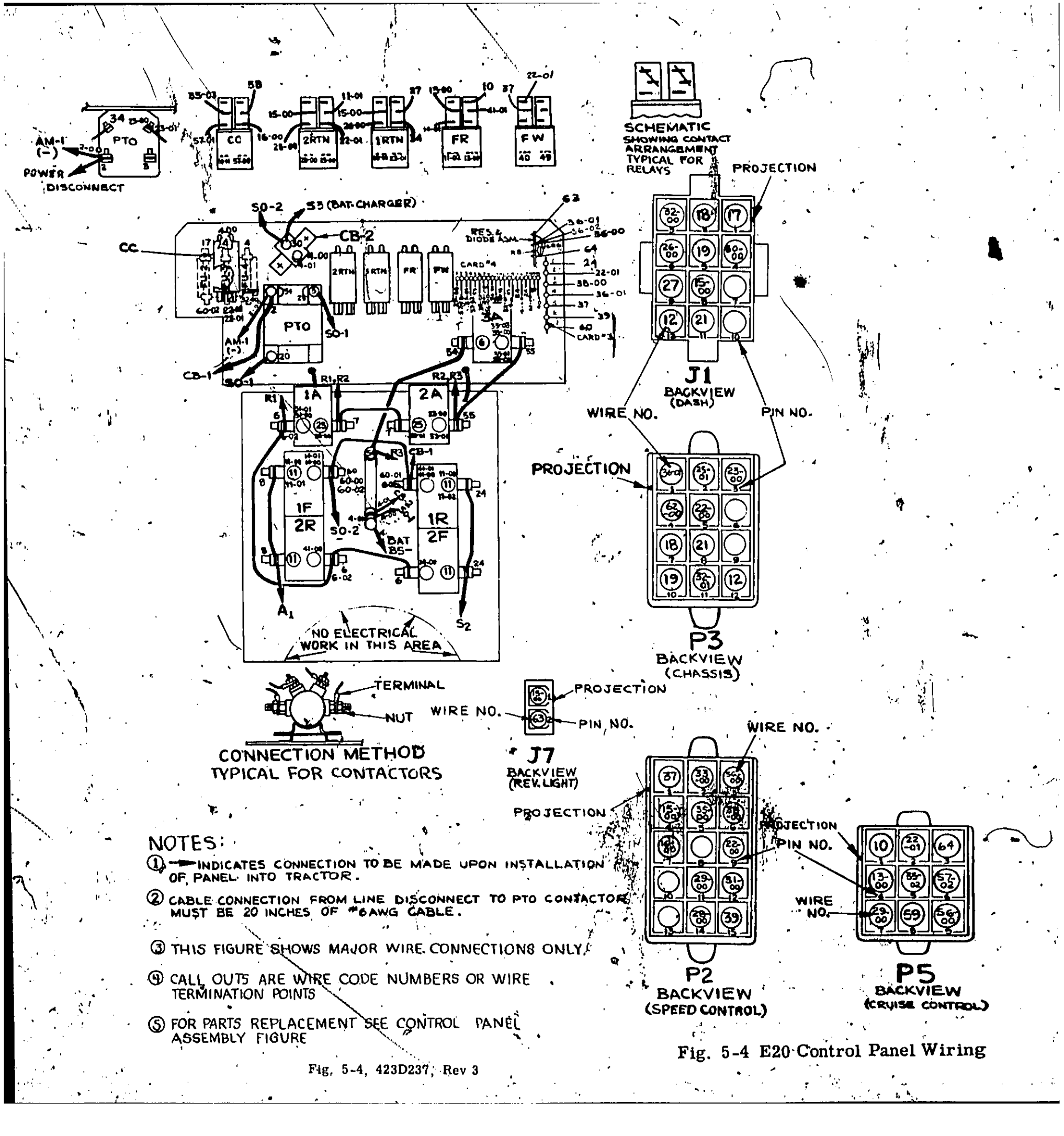


Fig. 5-3 E20 Tractor Wiring



NOTES:

1. → INDICATES CONNECTION TO BE MADE UPON INSTALLATION OF PANEL INTO TRACTOR.
2. CABLE CONNECTION FROM LINE DISCONNECT TO PTO CONTACTOR MUST BE 20 INCHES OF #6 AWG CABLE.
3. THIS FIGURE SHOWS MAJOR WIRE CONNECTIONS ONLY.
4. CALL OUTS ARE WIRE CODE NUMBERS OR WIRE TERMINATION POINTS
5. FOR PARTS REPLACEMENT SEE CONTROL PANEL ASSEMBLY FIGURE

Fig. 5-4 E20 Control Panel Wiring

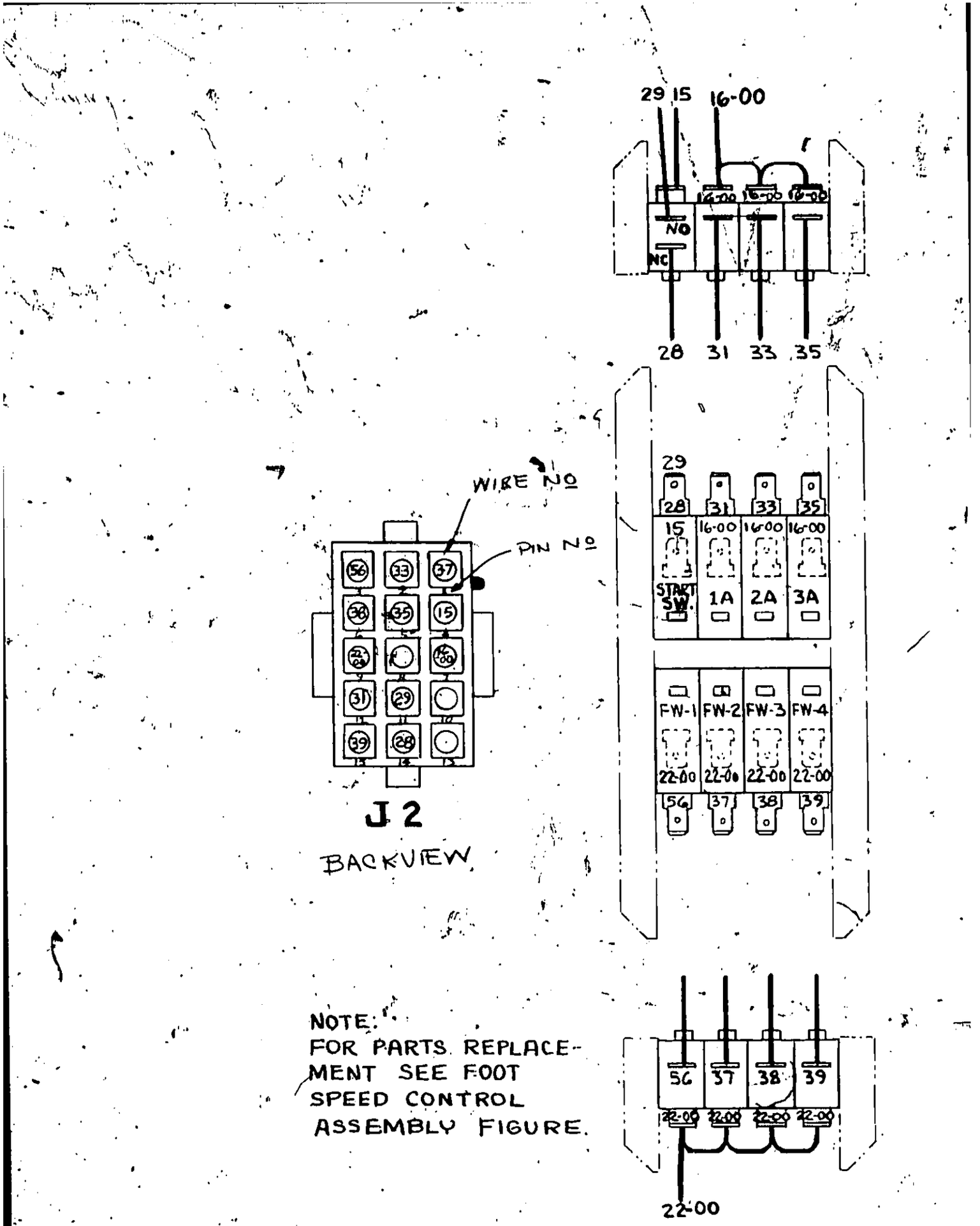
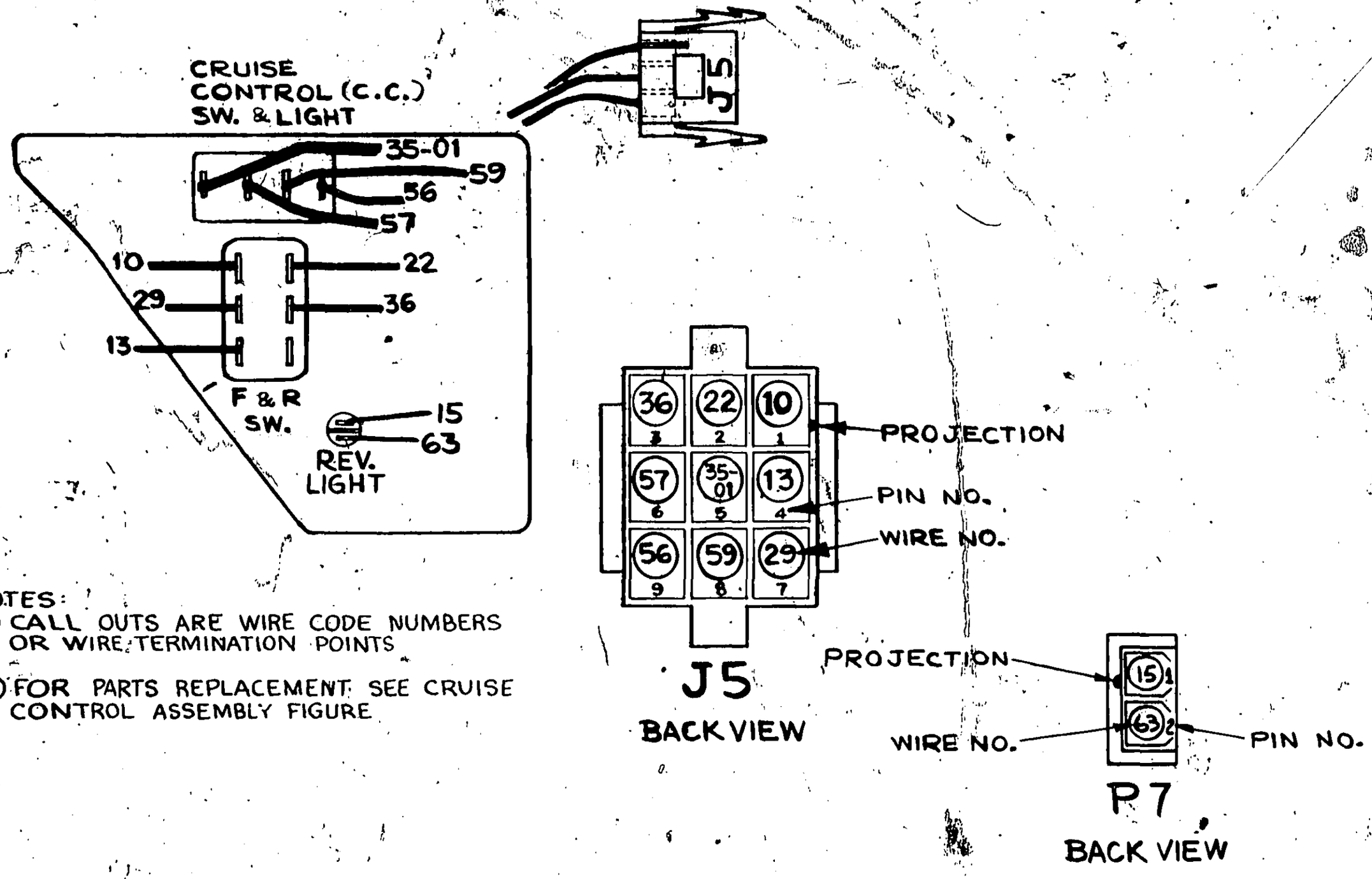


Fig. 5-5 E20 Foot Pedal Speed Control Wiring



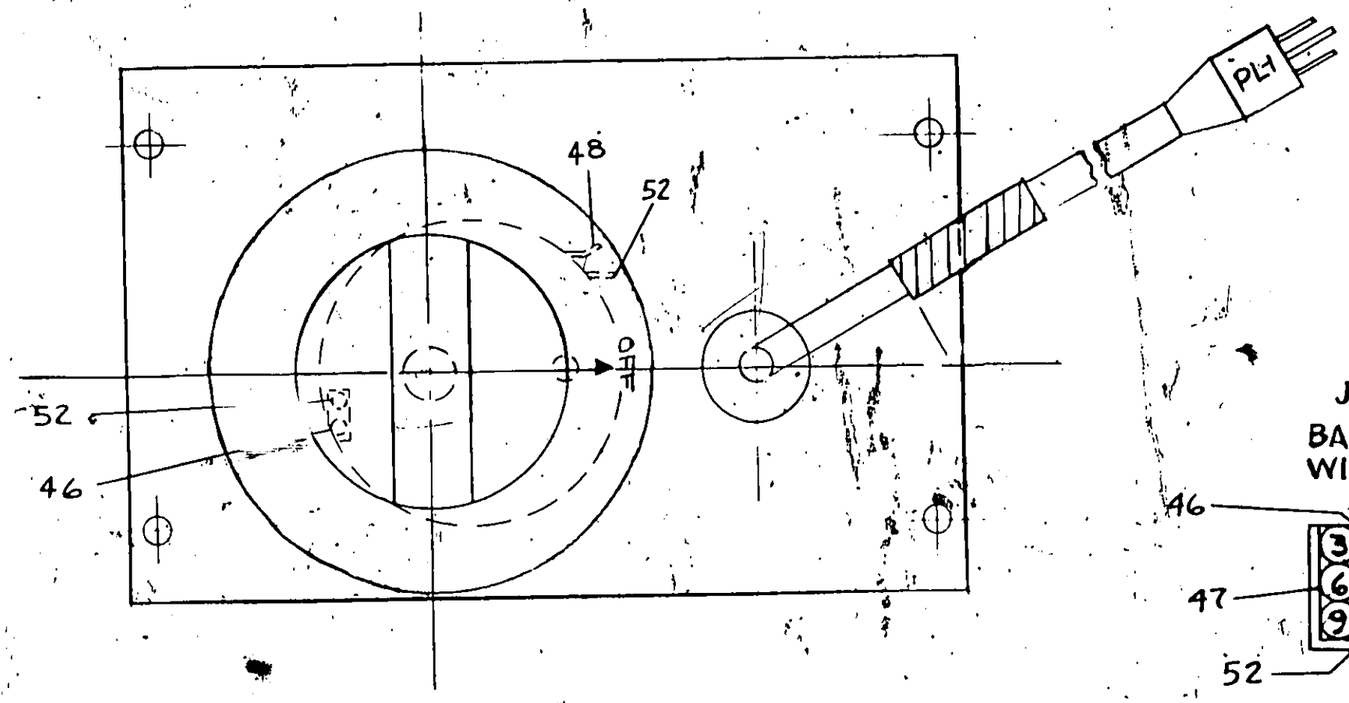
NOTES:

① CALL OUTS ARE WIRE CODE NUMBERS OR WIRE TERMINATION POINTS

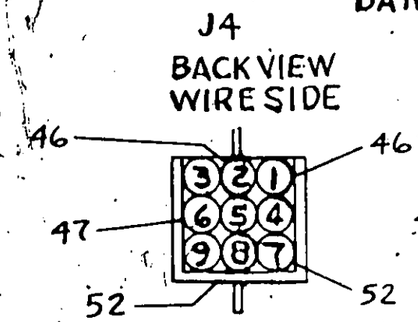
② FOR PARTS REPLACEMENT SEE CRUISE CONTROL ASSEMBLY FIGURE

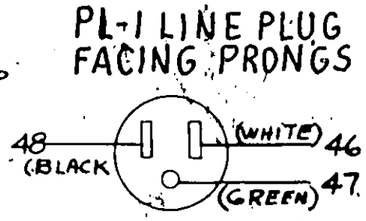
Fig. 5-6 E20 Cruise Control Wiring

Fig. 5-6, 178B8011, Rev 2



NOTES:
1. J4-1 & J4-2 (LEAD 46) USE COMMONING BAR IN MATING PLUG.
2. J4-7 & J4-8 (LEAD 52) USE COMMONING BAR IN MATING PLUG.





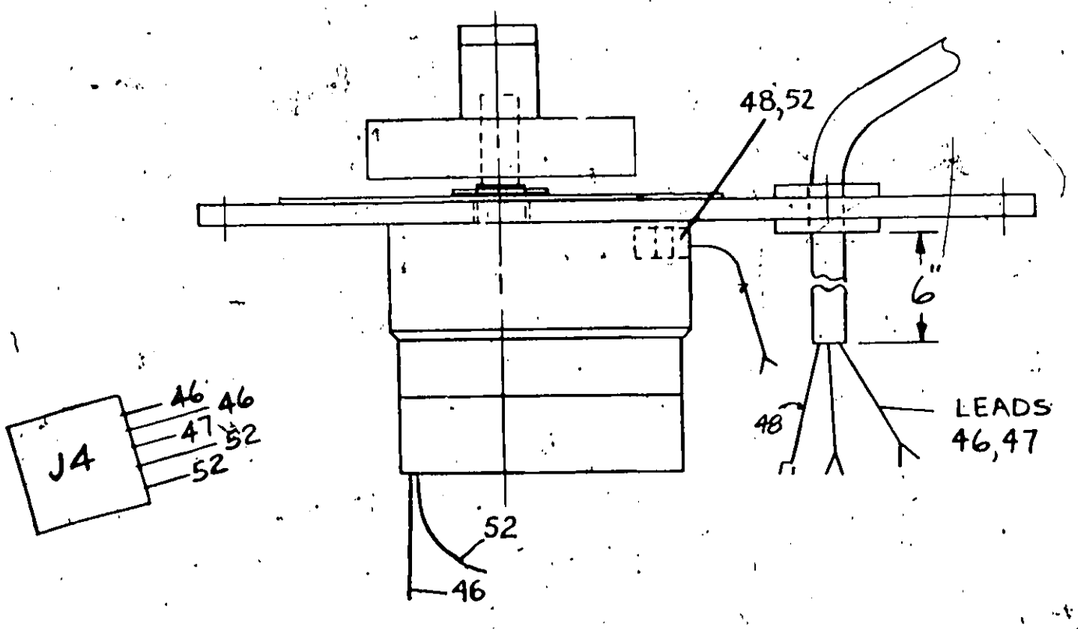


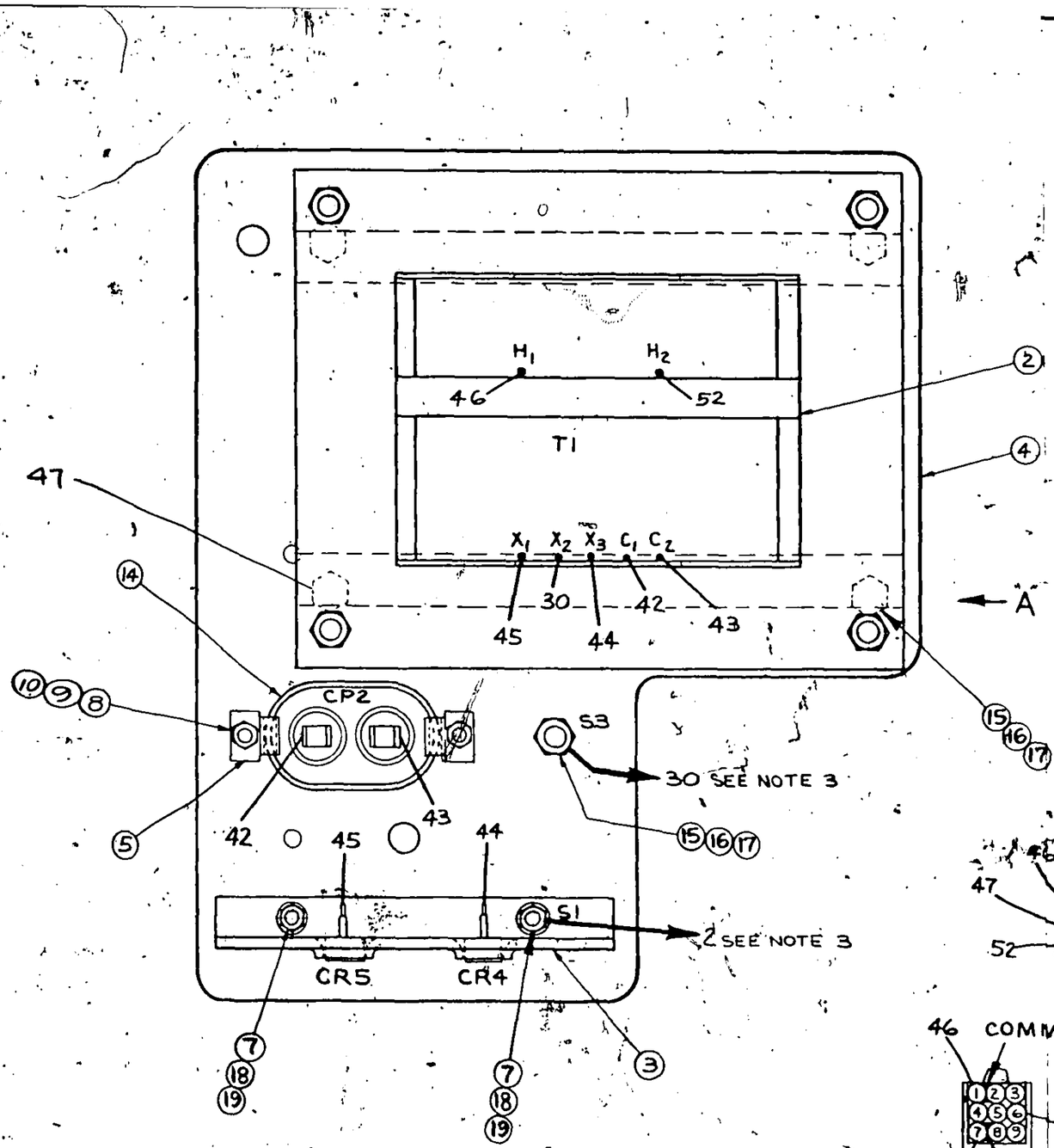
Fig. 4-6 26AE15 Timer Assembly Wiring
Model 26AE15A has alternate methods.
See Fig. 4-7.

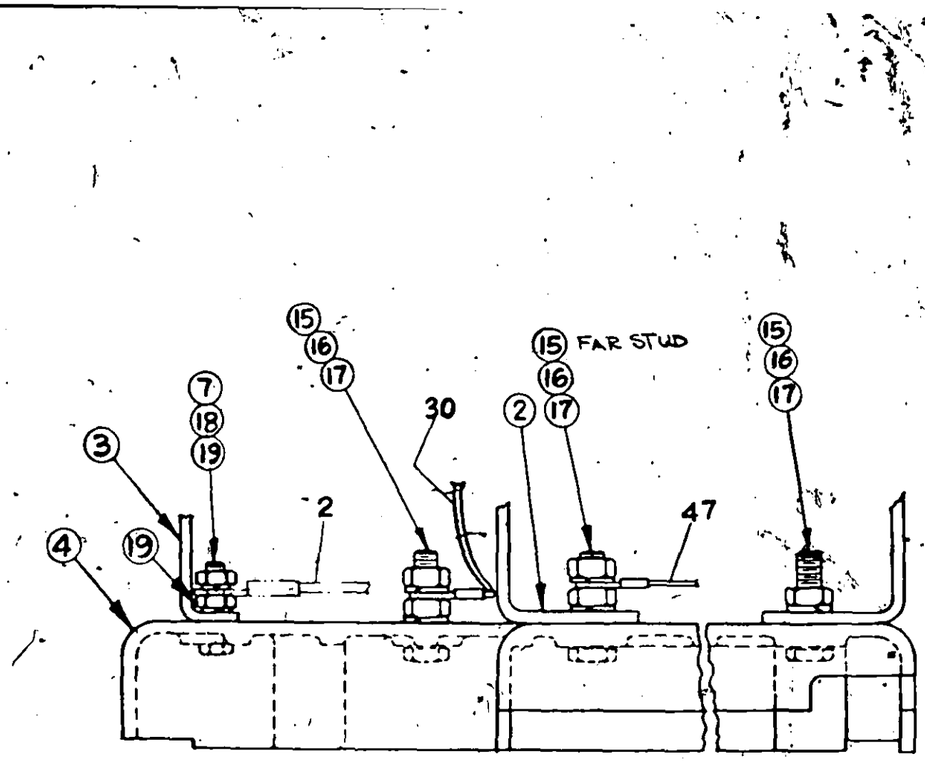
BATTERY CHARGER SUB-ASSEMBLY

Use this list to order replacement parts from Fig. 4-8.1

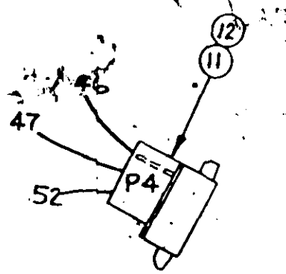
Ref. No.	Description	Part Number	26A						
			E12A	E12B	E15A	E15B	E15C	E20A	E20B
1	Assembly (All parts as shown)	423D225G1	-	X	-	-	X	X	X
2	Transformer	163B9955P1	-	X	-	-	X	X	X
3	Heat Sink Assembly	163B9905G1	-	X	-	-	X	X	X
4	Base	541C932P1	-	X	-	-	X	X	X
5	Bracket	211A3510P2	-	X	-	-	X	X	X
7	Machine Screw Hex Head 10-32 x 7/8	(1)	-	X	-	-	X	X	X
8	Machine Screw Hex Head 8-32 x 3/4	(1)	-	X	-	-	X	X	X
9	Hex Nut 8-32	(1)	-	X	-	-	X	X	X
10	Lock Washer #8	(1)	-	X	-	-	X	X	X
11	Plug P4	243A4564P3	-	X	-	-	X	X	X
14	Capacitor	243A4653P1	-	X	-	-	X	X	X
15	Lock Washer 1/4	(1)	-	X	-	-	X	X	X
16	Bolt, Hex Head 1/4-20 x 1	(1)	-	X	-	-	X	X	X
17	Nut, Hex 1/4-20	(1)	-	X	-	-	X	X	X
18	Lock Washer #10	(1)	-	X	-	-	X	X	X
19	Nut, Hex 10-32	(1)	-	X	-	-	X	X	X

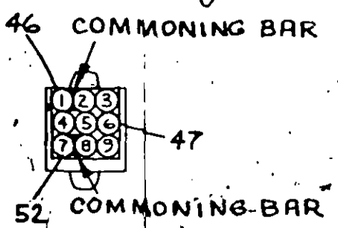
(1) Not stocked, order locally. For bolt and screw replacement, use Grade 5 or better.





VIEW AT "A"





NOTES:

1. WIRES FROM S1 & S3 TO TRACTOR ARE INCLUDED IN TRACTOR WIRE HARNESS.
2. USE LEADS & TERMINALS SUPPLIED WITH TRANSFORMER.
3. PLACE WIRE BETWEEN TWO NUTS.
4. COMMON PINS P4-1 TO P4-2 & P4-7 TO P4-8 IN P4
5. SOLDER WIRE NO'S 44 & 45 FROM TRANSFORMER TO HEAT SINK DIODES.
6. ➡ INDICATES CONNECTION TO BE MADE UPON INSTALLATION OF CHARGER IN TRACTOR.

Fig. 4-8.1 26AE15 Battery Charger Sub-Assembly
Also see Fig. 4-8.

DASH ASSEMBLY

Use this list to order replacement parts from Fig. 4-9.

Ref. No.	Description	Part Number	26A						
			E12A	E12B	E15A	E15B	E15C	E20A	E20B
3	Dash Panel	163B9821P1	X	X	X	X	X	X	X
4	Lift Switch	243A4531P2	X	X	X	X	X	X	X
5	PTO Switch	243A4531P1	X	X	X	X	X	X	X
6	Light	243A4574P1	X	X	X	X	X	X	X
7	Lamp	211A3591P1	X	X	X	X	X	X	X
8	Key Switch	243A4573P1	X	X	X	X	X	X	X
9	Light Switch	243A4531P3	X	X	X	X	X	X	X
10	Dash Harness	541C955G1	X	X	X	X	X	X	-
10	Dash Harness	541C994G1	-	-	-	-	-	X	X
11	Tubing	211A3551P1	X	X	X	X	X	X	X

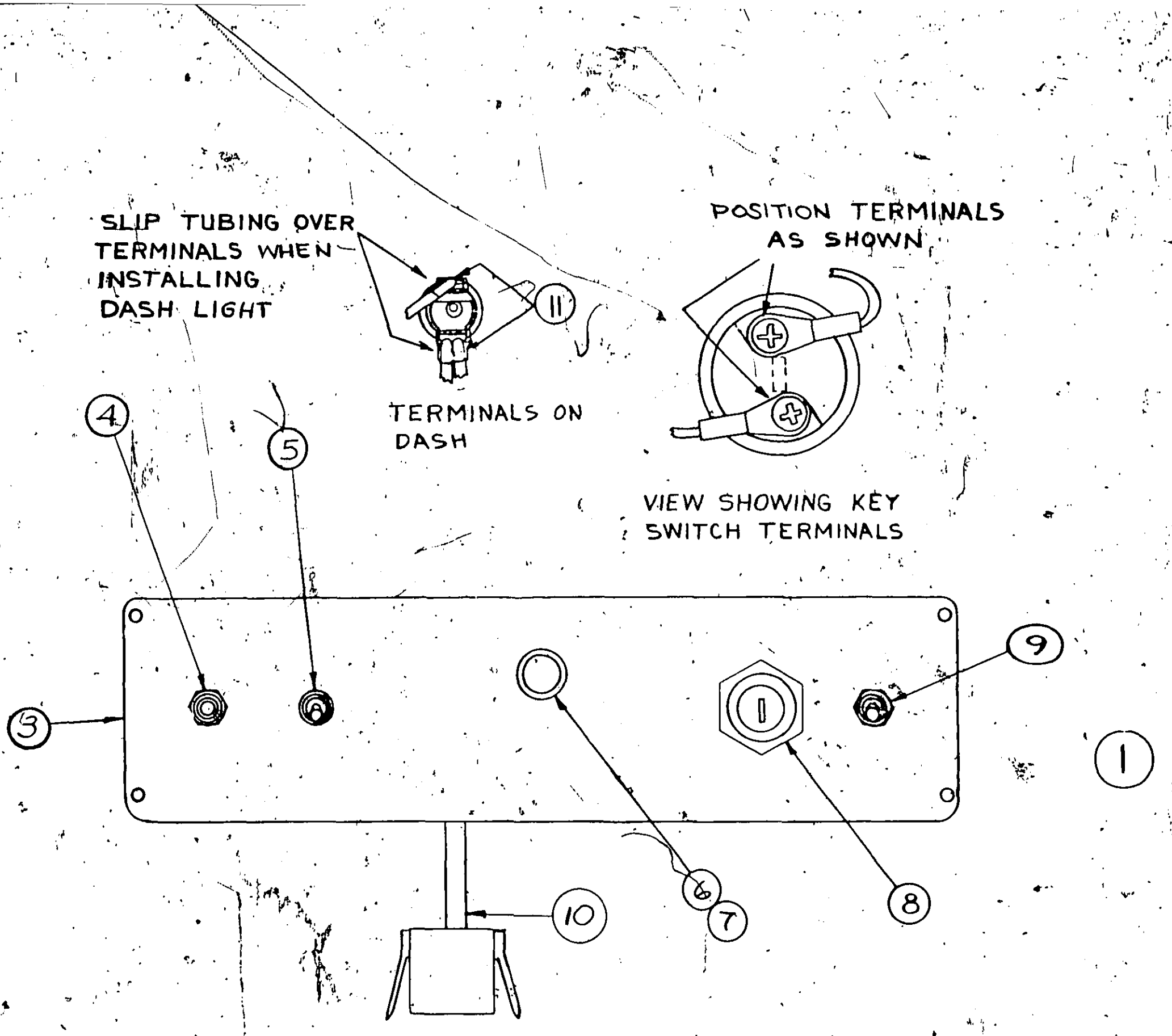


Fig. 4-9 26AE15 Dash Assembly

CONTROL PANEL ASSEMBLY

Use this list to order replacement parts from Fig. 5-7.

Ref. No.	Description	Part Number	26A E20A	26A E20B					
4	Panel (Upper)	178B8005P1	X	X					
5	Panel (Lower)	178B8006P1	X	X					
6	Circuit Breaker (Manual)	243A4719P1	X	X					
7	Relay (CC, 1RTN, 2RTN, FR, FW)	243A4562P1	X	X					
8	PTO Contactor	243A4524P1	X	X					
9	Power Contactor	211A3567P1	X	X					
10	Double Solenoid	178B8009P1	X	X					
11	Fuse Block	243A4807P1	X	X					
12	Fuse (30A SB)	243A4597P1	X	X					
13	Fuse (20A)	243A4657P1	X	X					
14	Card #3 (Resistor)	211A3162G2	X	X					
15	Card #4 (Auxiliary)	163B9977G1	X	X					
16	Cable Tie	243A4540P2	X	X					
18	Control Panel Wire Harness	127D8006G1	X	X					
19	Grill Wire Harness	155C8019G1	X	X					
20	Screw, Hex Hd. (10-32 x 3/8")	(1)	X	X					
21	Screw, Hex Hd. (8-32 x 3/8")	(1)	X	X					
22	Thread Rolling Screw (10-32 x 1/2")	N722AP16008C	X	X					
23	Thread Rolling Screw (10-32 x 3/8")	N722AP16006C	X	X					
25	Thread Rolling Screw (6-32 x 3/8")	N722AP13006C	X	X					
26	Hex Hd. Screw (6-32 x 5/8")	(1)	X	X					
27	Lockwasher (Size 10)	(1)	X	X					
28	Lockwasher (Size 8)	(1)	X	X					
29	Lockwasher (Size 6)	(1)	X	X					
30	Washer (Size 10)	(1)	X	X					
31	Nut, Hex 10-32	(1)	X	X					
32	Screw, Hex Hd.	(1)	X	X					
33	Lockwasher (1/4")	(1)	X	X					
34	Insulator	211A3165P1	X	X					
35	Washer (1/4" x 1" O. D.)	(1)	X	X					
36	Stud	N90P21036	X	X					
37	Shunt Plate	211A3212P3	X	X					
38	Washer (1/4" x 1/2" O. D.)	(1)	X	X					
39	Lockwasher (1/4")	(1)	X	X					
40	Nut, Hex (1/4"-20)	(1)	X	X					
41	Bracket	243A4806P1	X	X					
42	Nut, Hex (6-32)	(1)	X	X					
44	Resistor/Diode Assembly	243A4940G1	X	X					

(1) Not stocked, order locally. For bolt and screw replacement use Grade 5 or better.

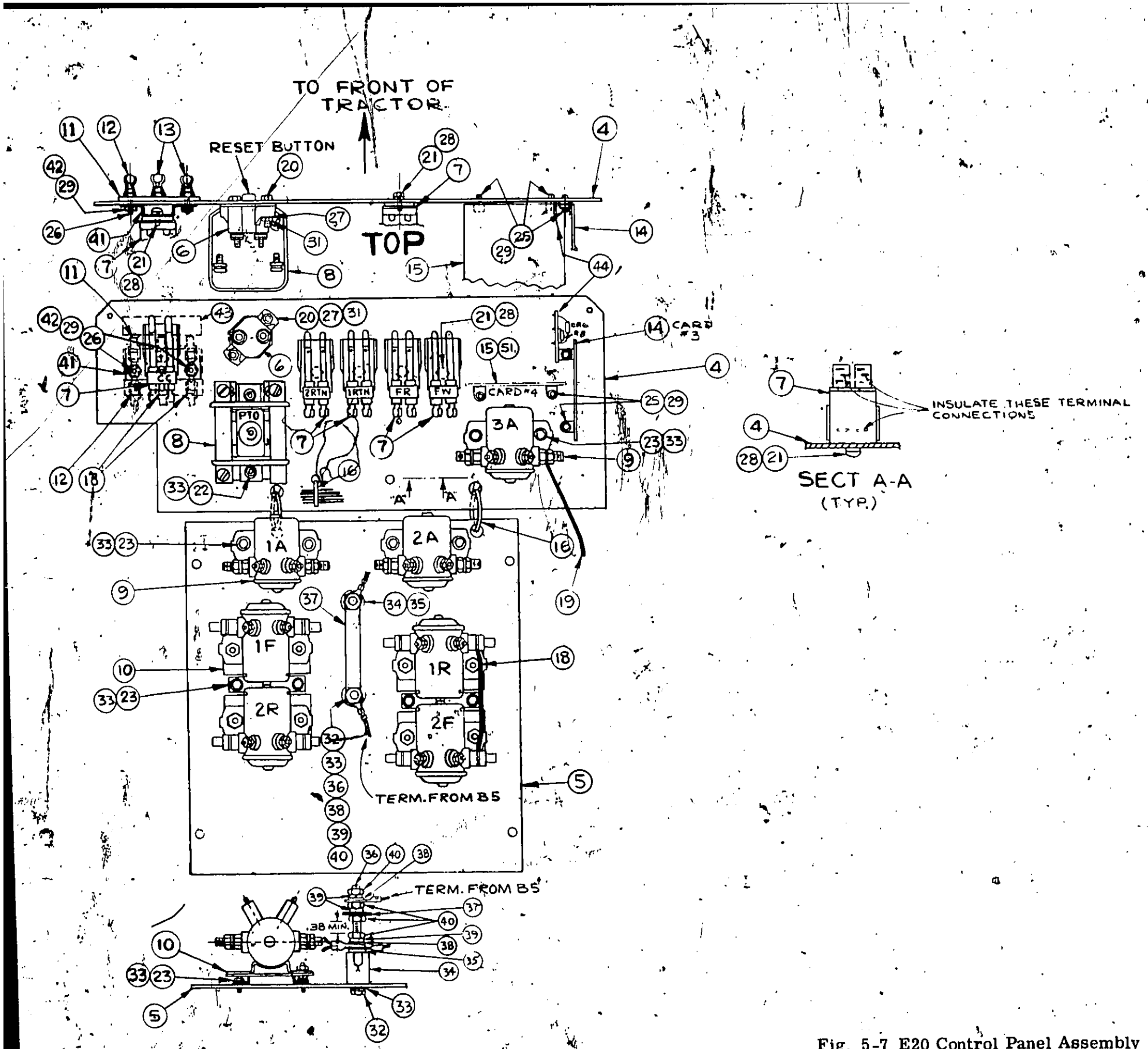


Fig. 5-7 E20 Control Panel Assembly

E20 CRUISE CONTROL ASSEMBLY

Use this list to order replacement parts from Fig. 5-8.

Ref. No.	Description	Part Number	26A					
			E20AA	E20BA				
1	Cruise Control Assembly (All parts as shown)	541C960G1	X	X				
2	Mounting Plate	243A4808P1	X	X				
3	Forward/Reverse Switch	243A4814P1	X	X				
4	Cruise Control Light/Switch	243A4848P1	X	X				
5	Insulation Tubing	211A3551P1	X	X				
6	Cruise Control Harness	178B8095G1	X	X				
8	Cruise Control Decal	243A4815P1	X	X				
9	Fwd./Rev. Decal	243A48151P2	X	X				
11	Reverse Light	243A4979P1	X	X				

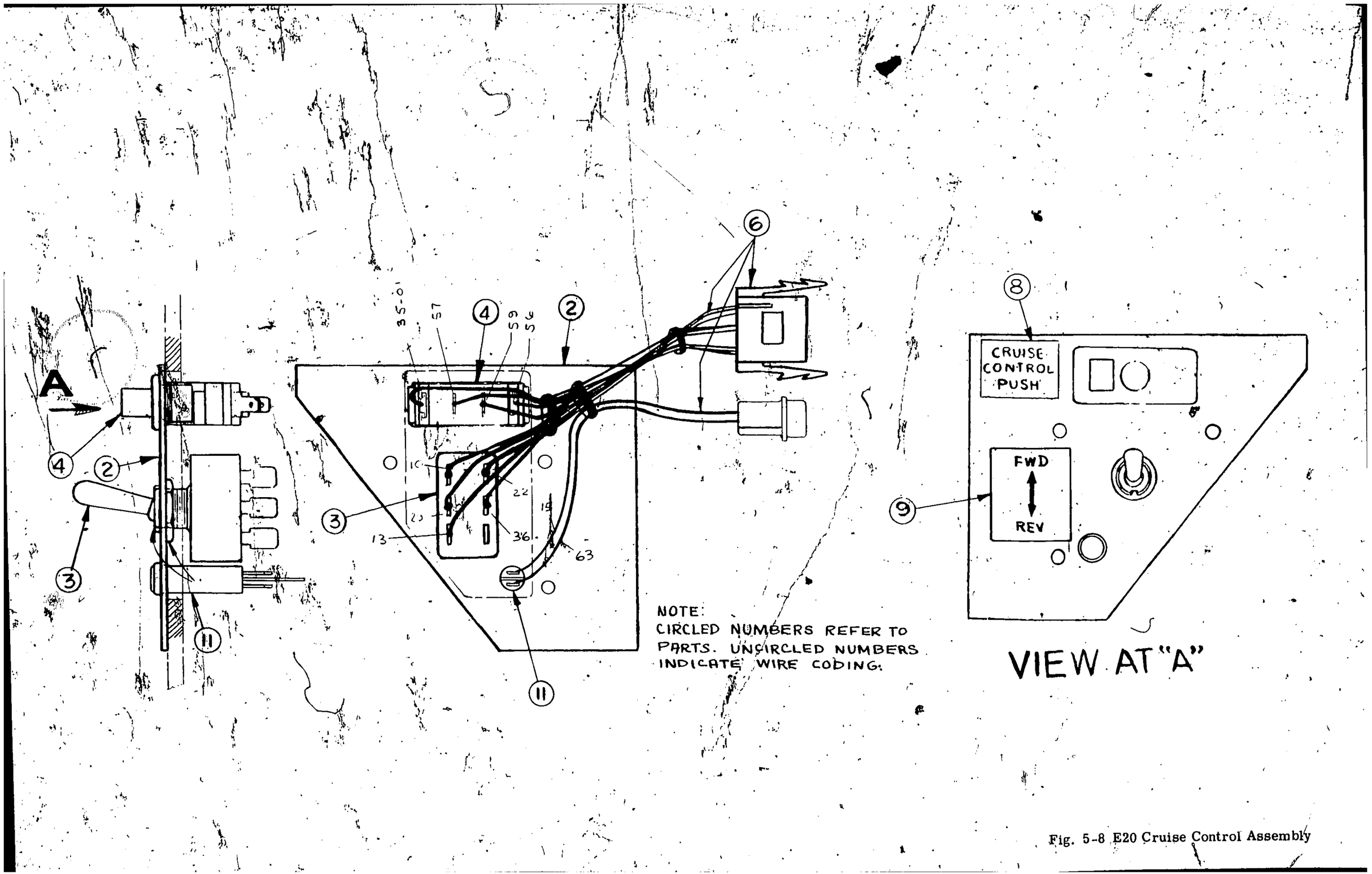


Fig. 5-8 E20 Cruise Control Assembly

E20 CONTROL CABINET ASSEMBLY

Use this list to order replacement parts from Fig. 5-9.

Ref. No.	Description	Part Number	26A					
			E20AA	E20BA				
2	Control Cabinet	587E919P3	X	X				
3	Dash Panel Assembly	See Fig. 4-9	X	X				
4	Control Panel Assembly	See Fig. 5-7	X	X				
5	Cruise Control Assembly	See Fig. 5-8	X	X				
6	Power Disconnect	163B9923G1	X	X				
7	Fuel Level Gage	243A4629G1	X	X				
8	Power Use Gage	243A4630G2	X	X				
9	Bearing	211A3101P2	X	X				
10	Decal	541C68P1	X	X				
11	Thread Rolling Screw (8-32 x 1/2")	N722AP15008	X	X				
12	Thread Rolling Screw, (8-32 x 1/2")	N722AP15008C6	X	X				
13	Screw, Hex Hd. (5/16"-18 x 1/2")	(1)	X	X				
14	Lockwasher (5/16")	(1)	X	X				
15	Cover	542C868P2	X	X				
16	Thread Rolling Screw (8-32 x 3/8")	N722AP15006C6	X	X				
A	Knob (Power Disconnect)	243A4502P1	X	X				

Note 1: Not stocked, order locally. For bolt and screw replacement use Grade 5 or better.

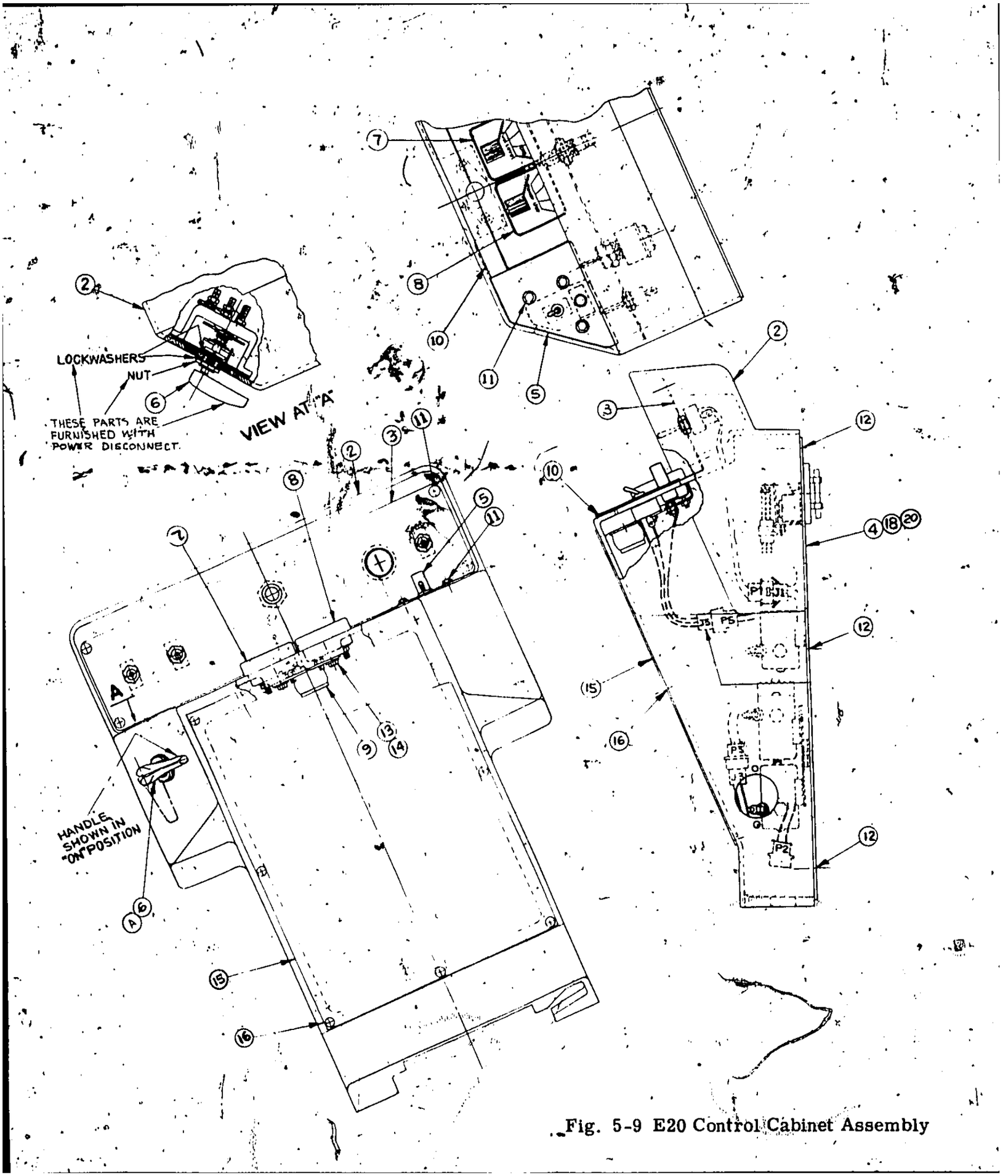


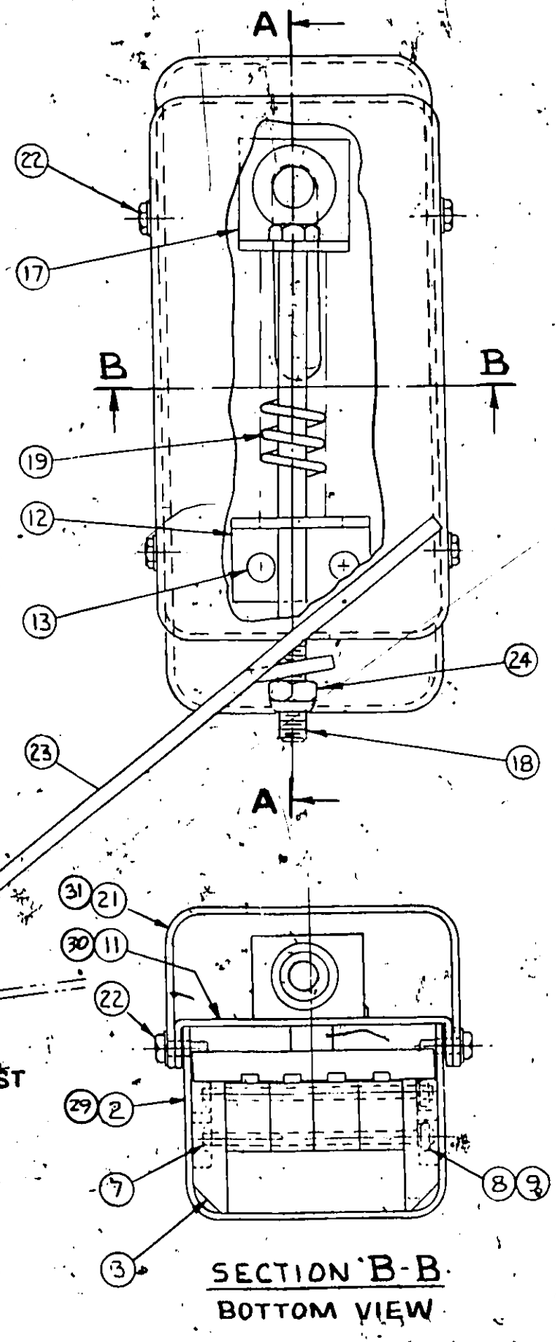
Fig. 5-9 E20 Control Cabinet Assembly

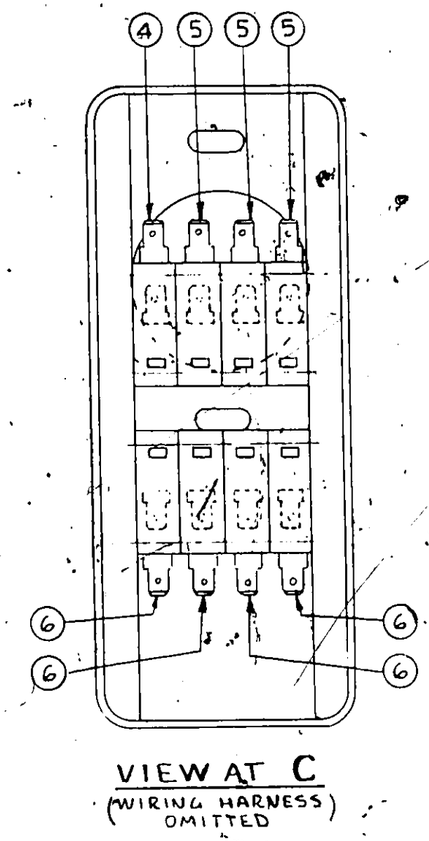
E20 FOOT SPEED CONTROL

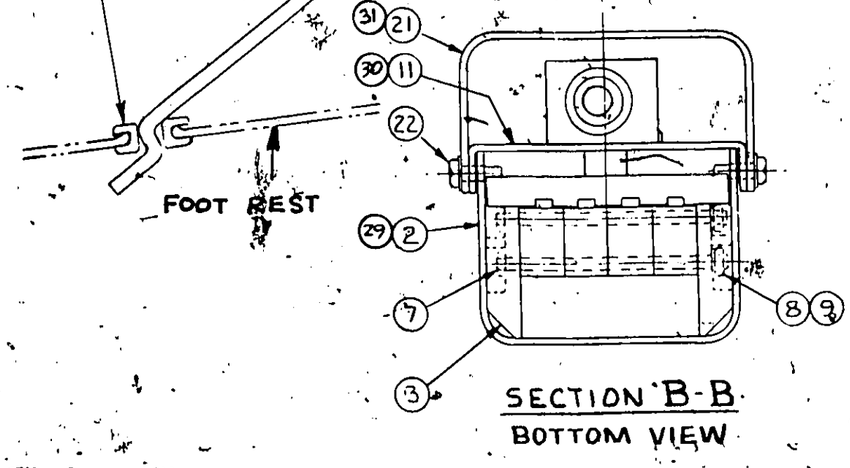
Use this list to order replacement parts from Fig. 5-10.

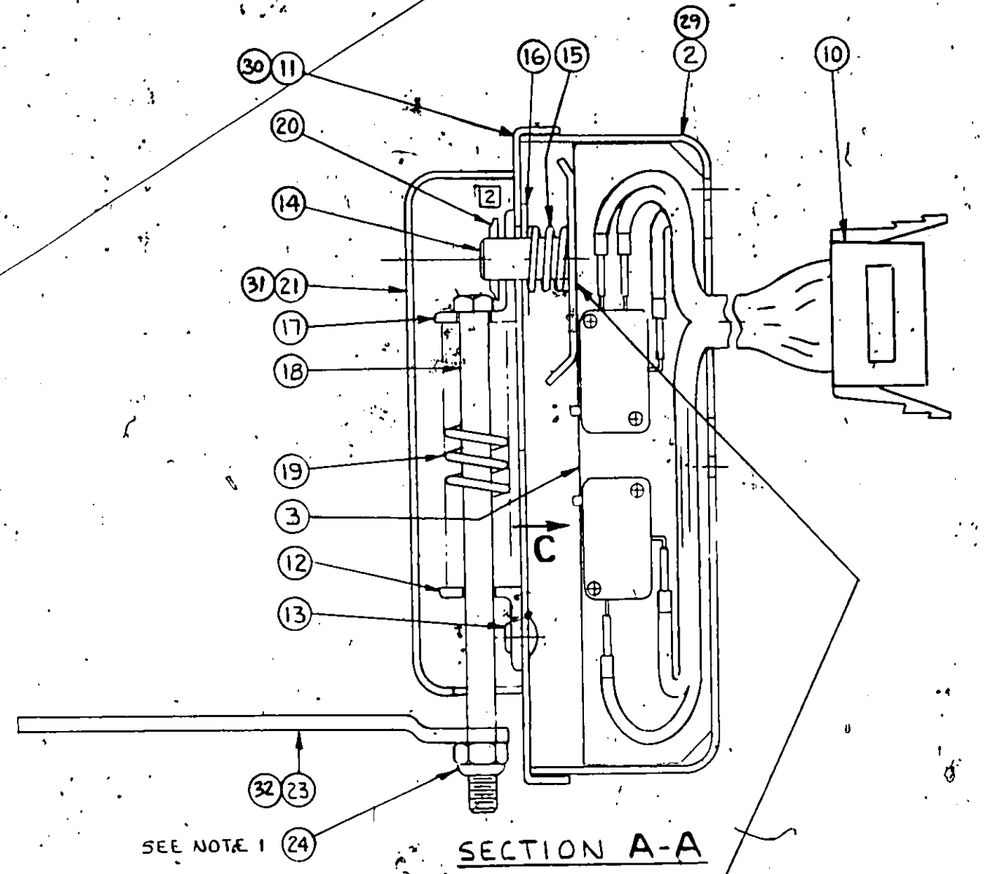
Ref. No.	Description	Part Number	26A					
			E20A	E20B				
1	Foot Speed Control Asm. (All parts as shown)	541C978G1	X	X				
2	Box	163B9997P1	X	X				
3	Rail (2 required per assm.)	178B8000P1	X	X				
4	Switch (Start)	211A3198P1	X	X				
5	Switch (1A, 2A, 3A)	211A3198P2	X	X				
6	Switch (FW1 - 4)	211A3198P3	X	X				
7	Screw, Hex Hd. 4-40 x 2"	(1)	X	X				
8	Lockwasher (Size 4)	(1)	X	X				
9	Nut, Hex (4-40)	(1)	X	X				
10	Foot Speed Control Harness	178B8097G1	X	X				
11	Cover	163B9998P1	X	X				
12	Bracket	243A4791P1	X	X				
13	Rivet	N328P14018B6	X	X				
14	Cam	243A4796G1	X	X				
15	Spring	211A3577P3	X	X				
16	Washer (3/8" Brass)	N401P43	X	X				
17	Angle	243A4792P1	X	X				
18	Screw, Hex Hd. (1/4"-20 x 4-1/2")	N22P21072B6	X	X				
19	Spring	211A3577P12	X	X				
20	Push Nut	243A4554P1	X	X				
21	Cover	163B9999P1	X	X				
22	Screw, Hex Hd. (6-32 x 3/8")	(1)	X	X				
23	Pedal Assembly	243A4824G1	X	X				
24	Lock Nut (1/4"-20)	(1)	X	X				
25	Grommet	211A3589P2	X	X				

(1) Not stocked, order locally. For bolt and screw replacement use Grade 5 or better.









[2] LIGHTLY COAT SURFACE OF CAM P14 WITH GREASE P26. CAUTION: AN EXCESSIVE AMOUNT OF GREASE HERE WOULD BE HARMFUL.

Fig. 5-10 E20 Foot Pedal Speed Control Assembly

E20 CHARGER COVER ASSEMBLY

Use this list to order replacement parts from Fig. 5-11.

Ref. No.	Description	Part Number	26A					
			E20A	E20B				
1	Charger Cover Assembly (All parts as shown)	541C982G1	X	X				
2	Timer Assembly (Plate, motor, cord, knob, etc.)	163B9906G2	X	X				
3	Power Resistor Assembly (R1, R2, and R3)	178B8018G1	X	X				
4	Cover	178B8031G1	X	X				
5	Screw, Pan Hd. Phillips (10-24 x 3/8")	(1)	X	X				
6	Speed Nut	211A3562P1	X	X				
7	Lockwasher (Size 10)	(1)	X	X				
8	Nut, Hex (10-32)	(1)	X	X				
9	Washer, Plain	(1)	X	X				
A	Knob (Timer)	243A4549P1	X	X				
B	Motor (Timer)	211A3507P1	X	X				
C	Charger Cord Assembly	211A3555G1	X	X				

(1) Not stocked, order locally. For bolt and screw replacement use Grade 5 or better.

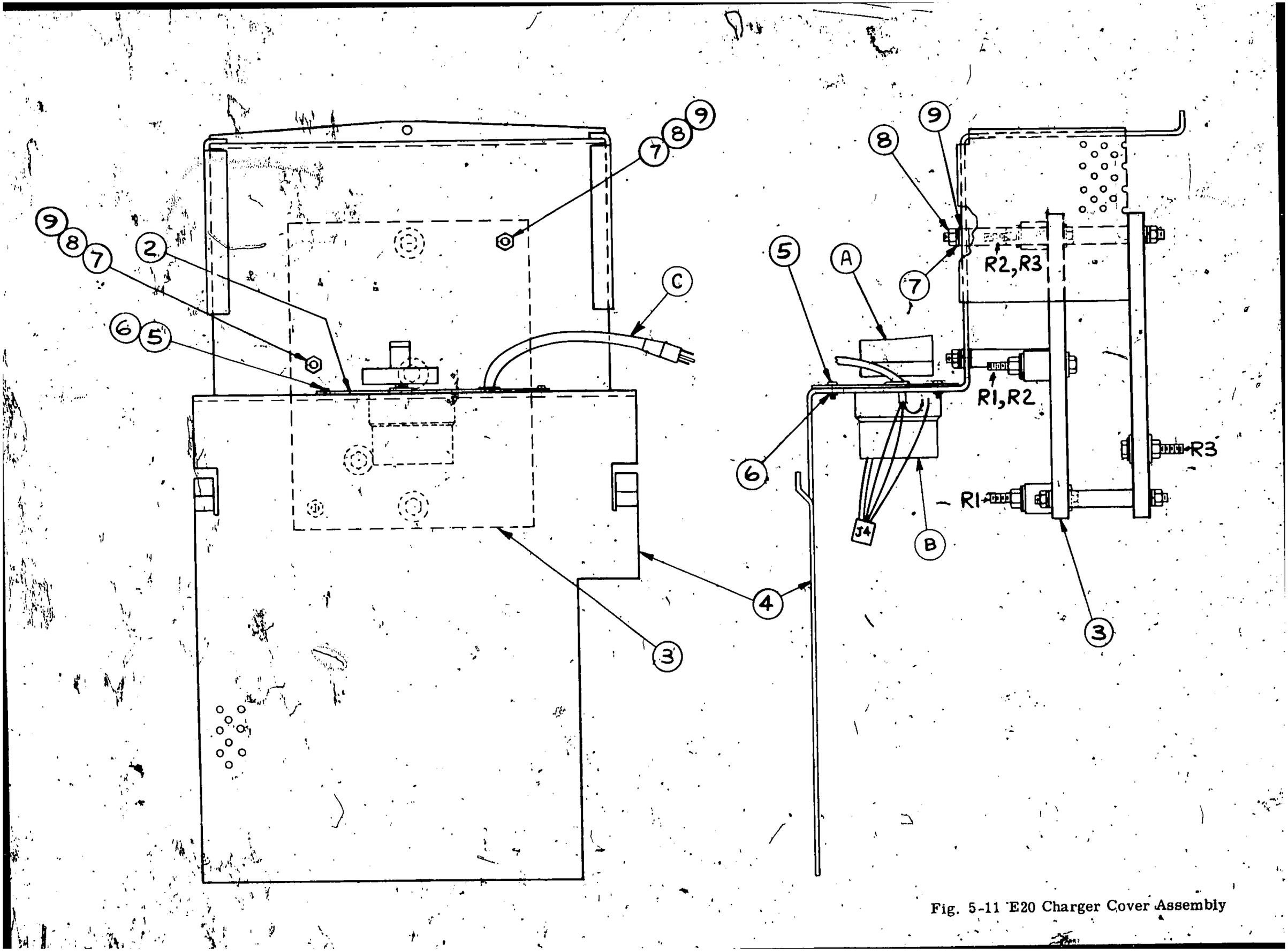


Fig. 5-11 E20 Charger Cover Assembly

FRONT BODY ASSEMBLY

Use this list to order replacement parts from Fig. 5-12.

Ref. No.	Description	Part Number	26A E20A	26A E20B
2	Grille	423D214P2	X	X
3	Control Cabinet Assembly	See Fig. 5-9	X	X
4	Foot Speed Control Assembly	See Fig. 5-10	X	X
5	Side Plate (Right)	422D837P1	X	X
6	Side Plate (Left)	422D838P1	X	X
7	PTO Receptacle	243A4572P1	X	X
8	Accessory Receptacle	243A4542P1	X	X
9	Battery Charger Sub-assembly	See Fig. 4-8.1	X	X
10	Cover Assembly	See Fig. 5-11	X	X
11	Steering Wheel (Minus Cap)	423D255P1	X	X
12	Sleeve	243A4809P1	X	X
14	Hood Assembly	541C940G2	X	X
15	Cover	542C868P2	X	X
16	Shim	See Note 1	X	X
17	Bolt, Hex Hd. (5/16"-18 x 1-1/4")	See Note 1	X	X
18	Bolt, Hex Hd. (5/16"-18 x 1-3/4")	See Note 1	X	X
19	Screw, Pan Hd. Phillips (8-32 x 5/16")	See Note 1	X	X
20	Screw, Pan Hd. Phillips (10-32 x 5/8")	See Note 1	X	X
21	Screw, Thread Rolling (8-32 x 3/8")	N722AP15006C6	X	X
22	Screw, Self-locking	243A4588P1	X	X
23	Rivet	See Note 1	X	X
24	Rivet	See Note 1	X	X
25	Bushing	211A3424P1	X	X
26	Washer	243A4588P1	X	X
27	Washer, Plain (5/16")	See Note 1	X	X
28	Lockwasher (5/16")	See Note 1	X	X
29	Lockwasher (Size 10)	See Note 1	X	X
30	Lockwasher, External (Size 8)	See Note 1	X	X
31	Nut, Hex (5/16"-18)	See Note 1	X	X
32	Nut, Hex (10-32)	See Note 1	X	X
33	Nut, Hex (8-32)	See Note 1	X	X
34	Nut, Hex (1/4"-20)	See Note 1	X	X
35	Lockwasher (1/4")	See Note 1	X	X
36	Spring Dowel Pin (1/4" x 1")	N533P2516	X	X
37	Rivet	See Note 1	X	X
38	Washer (Fiber)	243A4576P3	X	X
A	Cap Assembly	243A4828G1	X	X

(1) Not stocked, order locally. For bolt and screw replacement use Grade 5 or better.

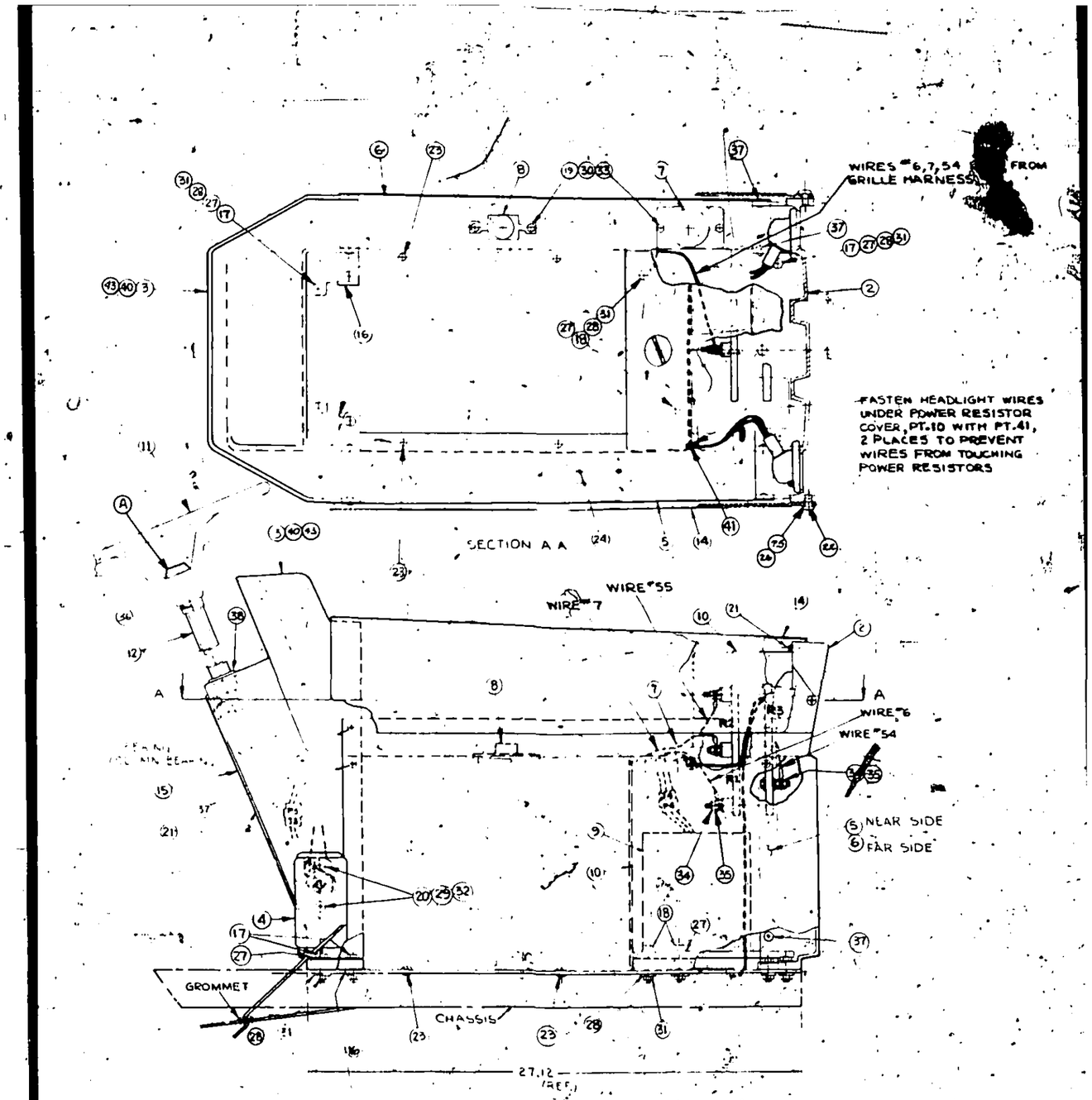


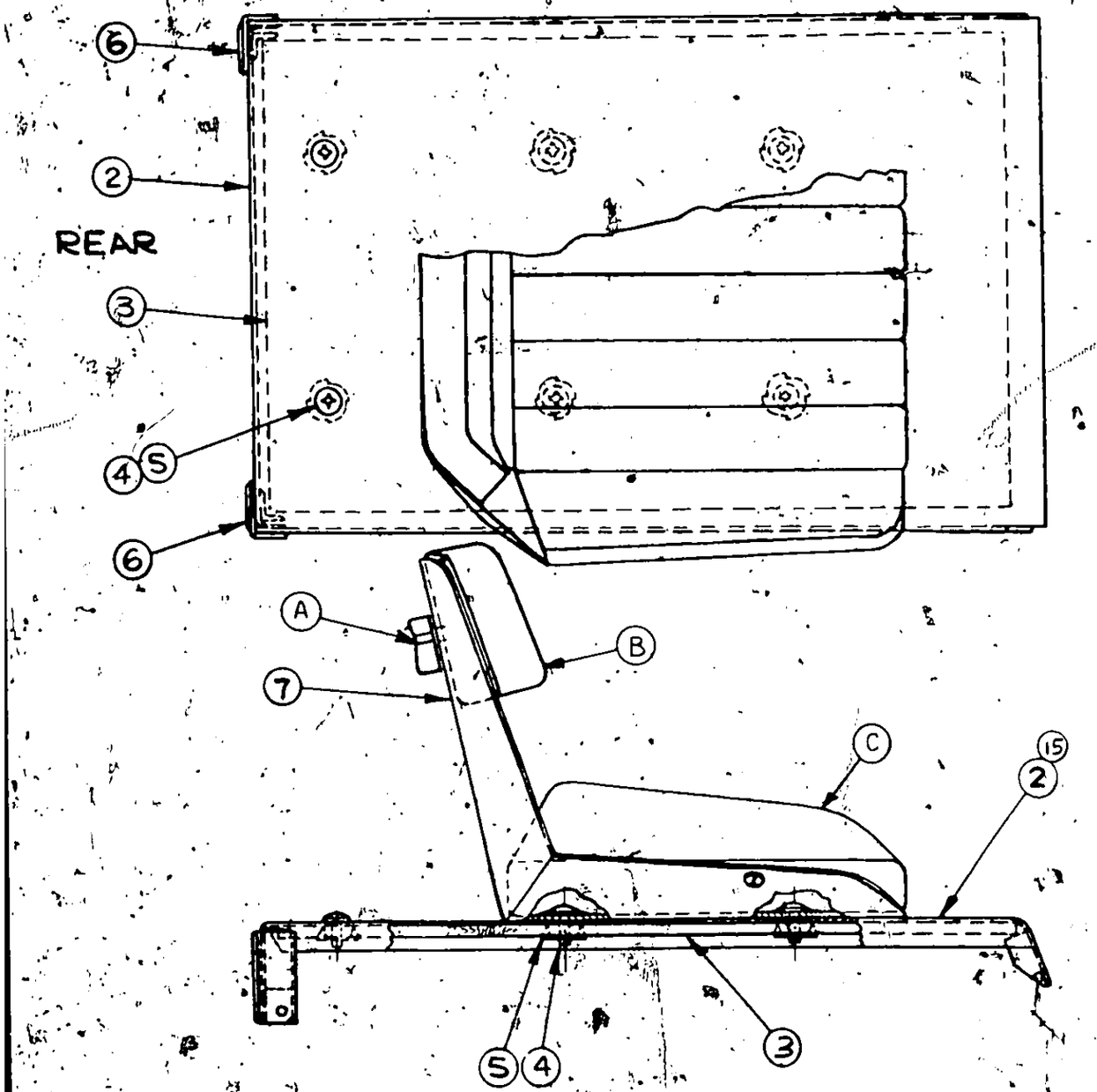
Fig. 5-12 E20 Front Body Assembly

E20 BATTERY BOX ASSEMBLY

Use this list to order replacement parts from Fig. 5-13.

Ref. No.	Description	Part Number	26A E20A	26A E20B
1	Cover Assembly (All parts as shown)	541C974G1	X	X
2	Cover	541C938G1	X	X
3	Stiffener	243A4789P1	X	X
4	Screw, Pan Hd. Phillips (5/16"-18 x 3/4")	(1)	X	X
5	"T" Nut	243A4526P1	X	X
6	Tail Reflector		X	X
7	Seat Pan	243A4799P1	X	X
13	Decal ("Elec-Trak")	178B8024P1	X	X
A	Knob (Seat)	243A4801P1	X	X
B	Back Cushion	243A4800P1	X	X
C	Seat Cushion	178B8003P1	X	X

(1) Not stocked, order locally. For bolt and screw replacement use Grade 5 or better.



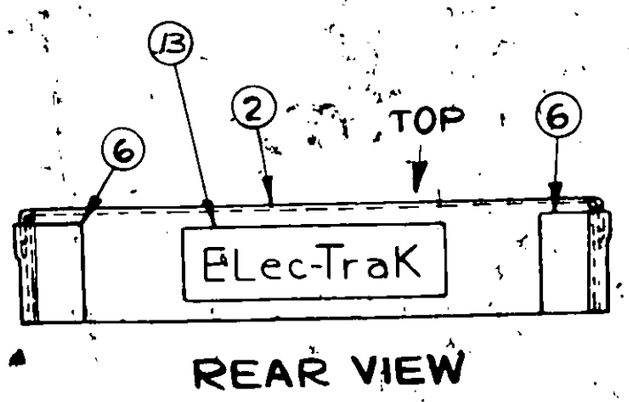


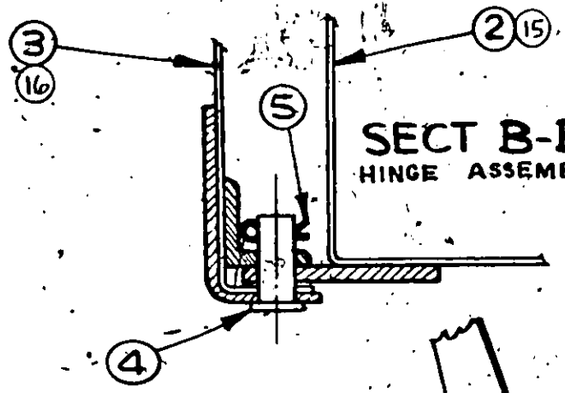
Fig. 5-13 E20 Battery Box Cover Assembly

E20 REAR BODY ASSEMBLY

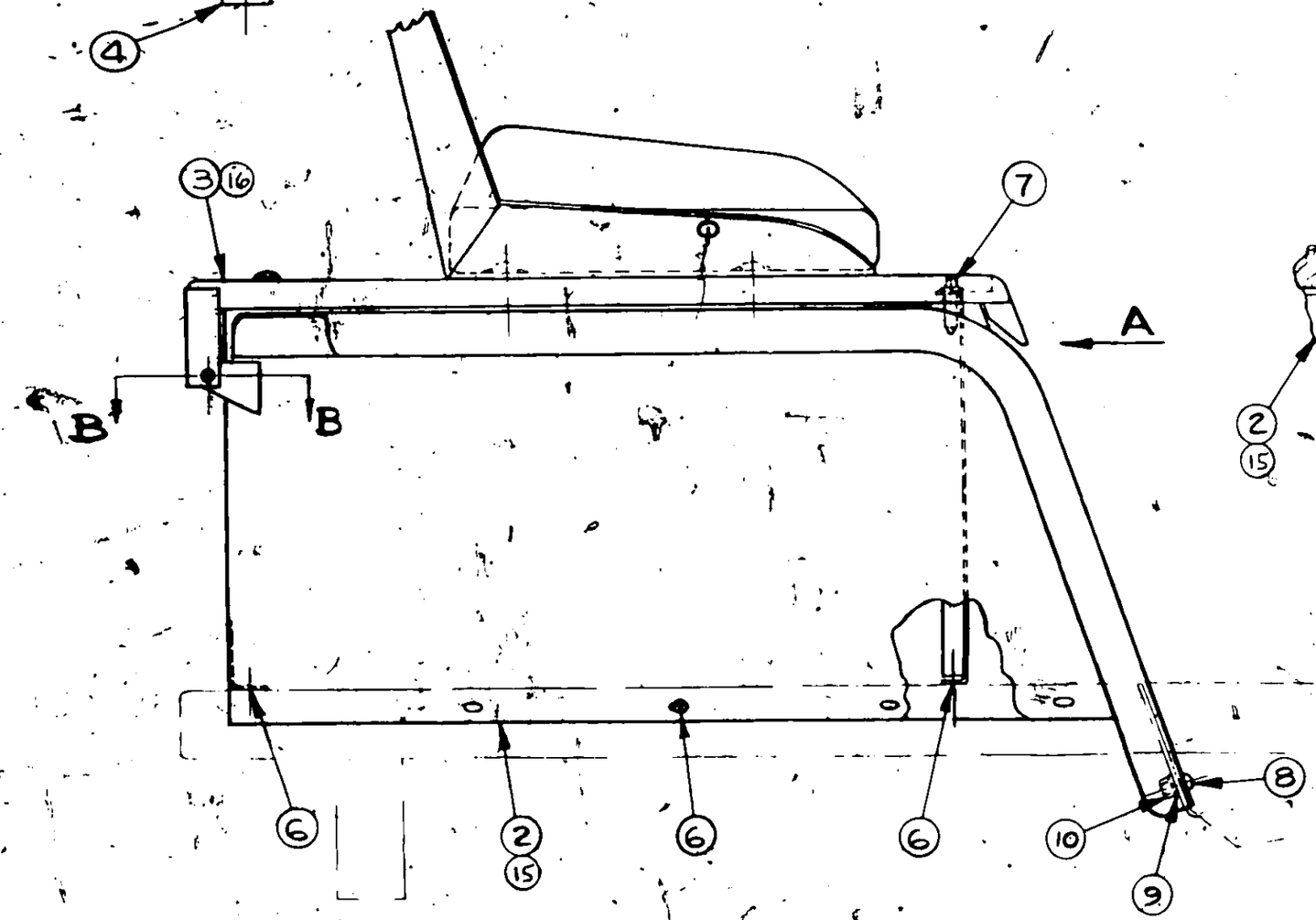
Use this list to order replacement parts from Fig. 5-14.

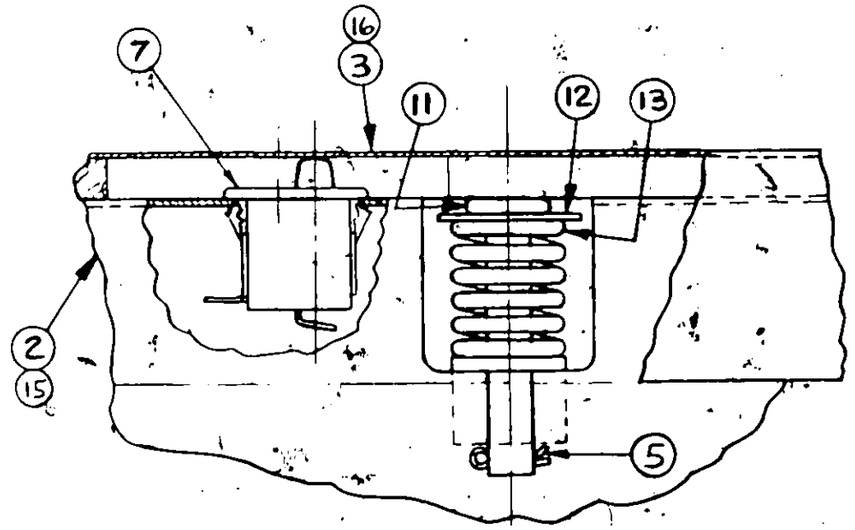
Ref. No.	Description	Part Number	26A E20AA	26A E20BA				
2	Battery Box Assembly (Sheet metal and fenders)	423D221G1	X	X				
3	Cover Assembly	See Fig. 5-13						
4	Clevis Pin (Seat)	211A350P1	X	X				
5	Cotter Pin (1/8" x 3/4")	(1)	X	X				
6	Rivet	(1)	X	X				
7	Seat Switch	243A4790P1	X	X				
8	Screw, Pan Hd. Phillips (1/4"-20 x 1/2")	(1)	X	X				
9	Lockwasher (1/4")	(1)	X	X				
10	Nut, Hex (1/4"-20)	(1)	X	X				
11	Rivet, Seat Spring	211A3191P1	X	X				
12	Washer, Plain (3/8")	See (1)	X	X				
13	Spring, Seat	211A3577P8	X	X				

(1) Not stocked, order locally. For bolt and screw replacement use Grade 5 or better.



SECT B-B
HINGE ASSEMBLY





VIEW AT "A" (ENLARGED)
SEAT SWITCH ASSEMBLY

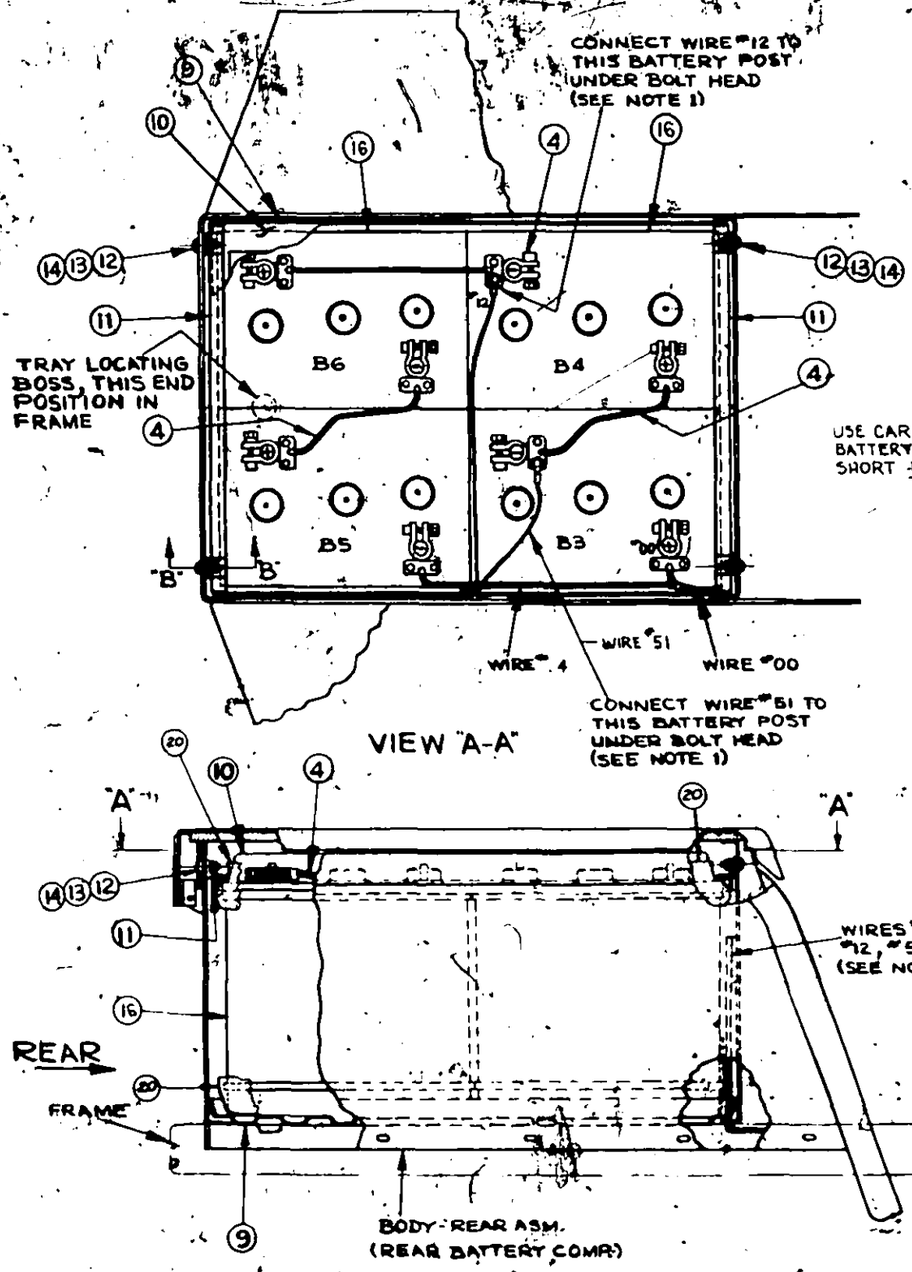
Fig. 5-14 E20 Rear Body Assembly

POWER UNIT ASSEMBLY

Use this list to order replacement parts from Fig. 5-15.

Ref. No.	Description	Part Number	26A					
			E20A	E20B				
4	Cable (Battery)	211A3531G1	X	X				
5	"U" Clamp	211A3440G1	X	X				
6	Battery Tray, Front	541C699P1	X	X				
7	Battery Cover, Front	243A4523G1	X	X				
8	Battery Spacer Block	211A3598P2	X	X				
9	Battery Tray, Rear	541C698P1	X	X				
10	Battery Cover, Rear	243A4522G1	X	X				
11	Angle Clamp, Rear	163B9875G1	X	X				
12	Screw, Pan Hd. Phillips (10-32 x 3/8")	(1)	X	X				
13	Nut, Hex (10-32)	(1)	X	X				
14	Lockwasher (Size 10)	(1)	X	X				
16	Battery (Heavy-Duty)	243A4724P1	X	X				
20	Battery Liner - Rear (Poly Bag)	155C8006P1	X	X				
21	Battery Liner - Front (Poly Bag)	155C8005P1	X	X				
A	Screw, Thumb	243A4571P1	X	X				
B	Plate, Retaining	211A3442P1	X	X				
C	Angle Clamp (Front, Right)	211A3439G1	X	X				
D	Angle Clamp (Front, Left)	211A3439G2	X	X				

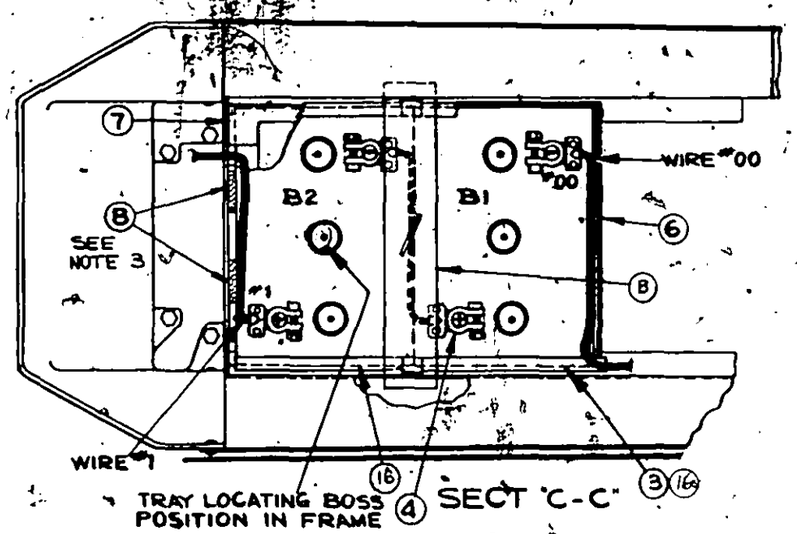
(1) Not stocked, order locally. For bolt and screw replacement use Grade 5 or better.



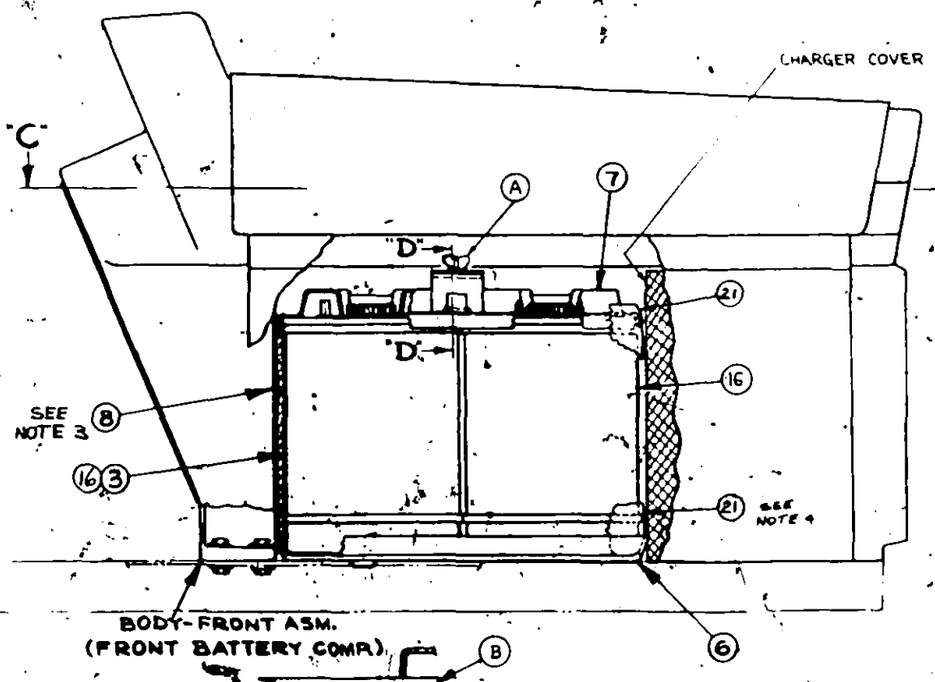
VIEW "A-A"

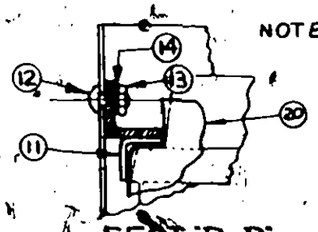
CAUTION

USE CARE WHEN INSTALLING BATTERY CABLES. DO NOT SHORT BATTERIES.



SECT "C-C"

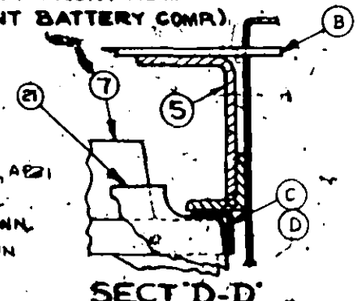




SECT "B-B"
BATTERY CLAMP INSTALLATION

NOTES:

1. WIRE NO'S. 00, 4, 12 & 51 ARE PART OF CHASSIS HARNESS & ARE PREWIRED TO REAR BATTERY COMPARTMENT.
2. COVER BATTERY TERMINALS & POSTS WITH A LIGHT COAT OF GREASE, AP21
3. LOCATE BATTERY PROTECTOR, TO FLUSH AGAINST LOWER CONTROL PANEL & BETWEEN ROWS OF PROTRUDING SCREWS. APPROX. AS SHOWN.
4. LINERS (P20&P21) TO FIT INSIDE TRAYS (P6 & P9), MAKING SURE DRAIN HOLES IN LINER AND TRAY ARE IN-LINE.



SECT "D-D"
BATTERY HOLD-DOWN INSTALLATION

Fig. 5-15 E20 Power Unit Assembly