

J86634A DIESEL ENGINE-ALTERNATOR CONTROL MODULE

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1. DESCRIPTION

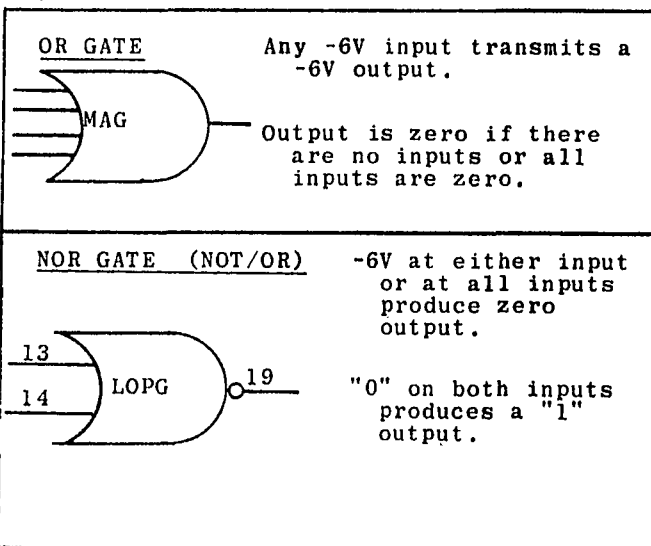
1.1 The J86634A module consists of a box which contains 39 circuit packs. Circuit packs plug into sockets arranged in five rows as shown in Figure 1. The module is mounted on slides in the diesel engine-alternator floor-mounted control cabinet. The slides allow the module to be pulled out to work on or to inspect after removing the grill from the lower portion of the control cabinet.

1.2 The cover of the module is hinged on the front (outer) edge and folds down. A layout of the circuit packs is pasted on the inside of the cover. Circuit packs with a definite adjustment will have the Equipment Location marked on the pack itself.

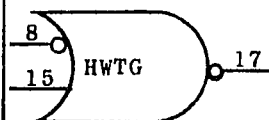
1.3 The schematic diagram for the module is SD-81692-01. Modules are presently wired to Issue 10AR. Issue 6B of the module (Y Option) required a change in TEST ALARM button connection on the engine set.

1.4 Issue 9B of CD-81692-01 includes useful trouble-shooting information on the module.

1.5 Pages B1 and B2 of SD-81692-01 present the logic flow diagram for the module. The following logic symbols are used on these pages:



MODIFIED NOR GATE



-6V on 8 gives -6V out on 17. 0 can be applied to 15 without changing the output.

-6V on 15 gives 0 out on 17. 0 can be applied to 8 without changing the output.

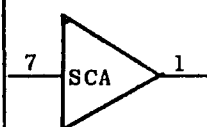
NAND GATE (NOT/AND)



Gives 0 output with -6V on 3, 5 and 6.

Loss of an input gives -6V out.

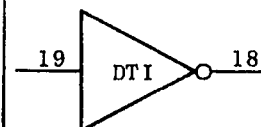
AMPLIFIER



0 input gives 0 output.

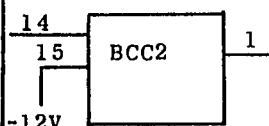
-6V on 7 gives -(6 to 12V) out on 1.

INVERTER



Signal in is inverted. -6V in on 19 gives 0 out on 18. 0 in on 19 gives -6V out on 18.

CLAMP



A continuous "1" is applied to 15 and output terminal 1 is at "0".

If a "0" signal is now applied to 14 the clamping action is removed and output terminal 1 is at a potential determined by the external load.

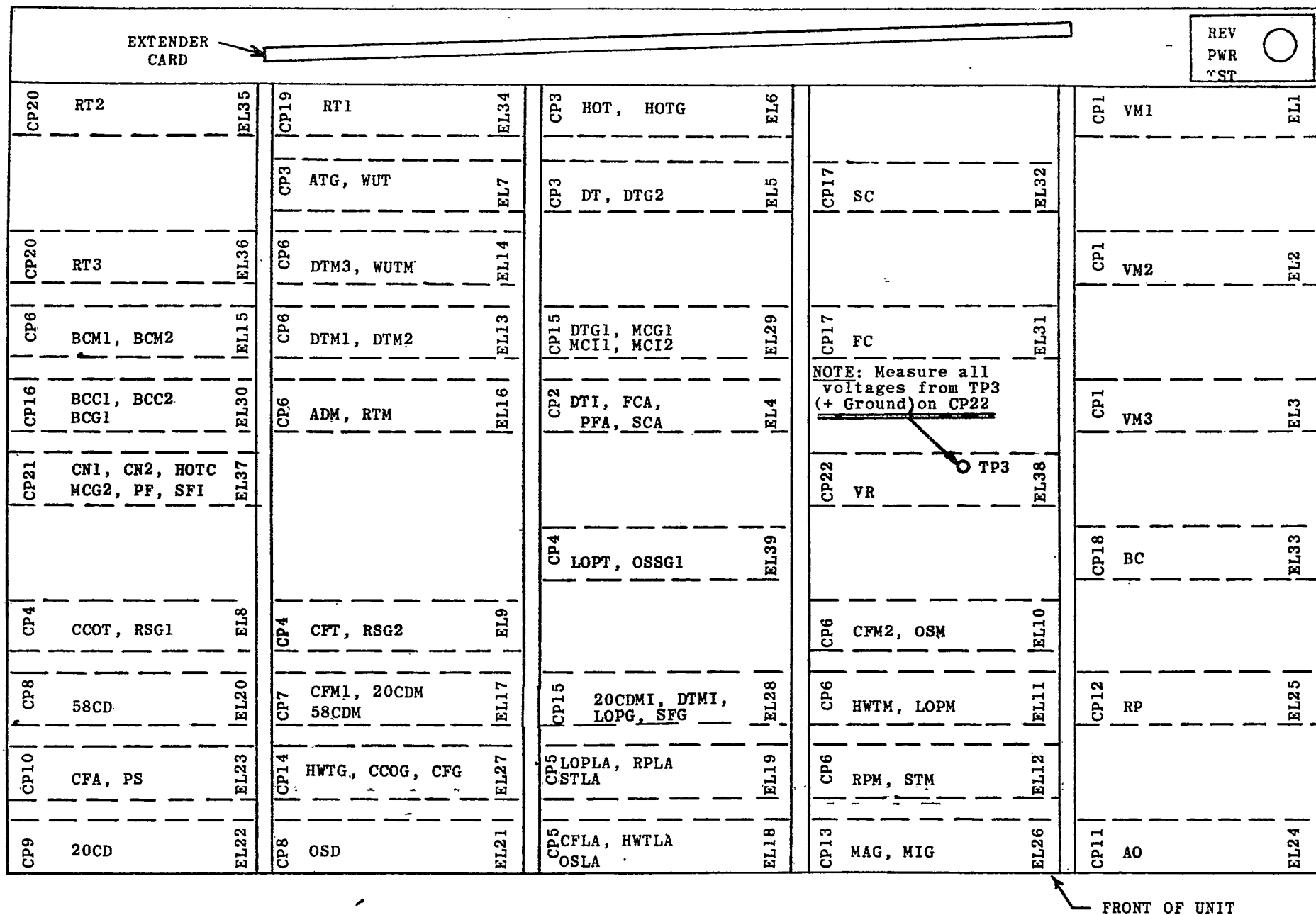
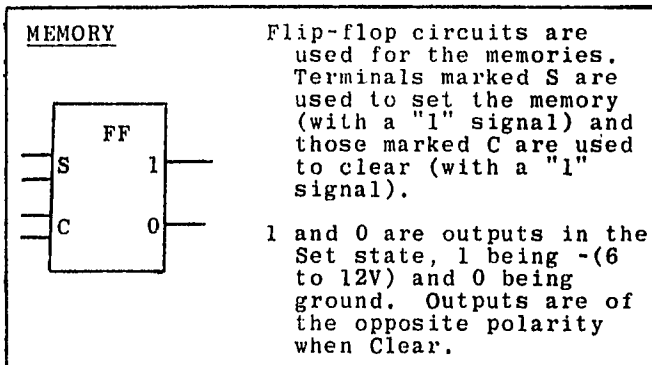


FIGURE 1: J86634A SOLID-STATE CONTROL LAYOUT



2. PRECAUTIONS

2.1 Be sure that polarity of the control battery is correct (+ on GG terminal and - on N terminal) on the plug before inserting the plug into the rear of the module. Incorrect polarity will damage components in the module.

NOTE 1: It will be necessary to turn the OPERATION SELECTOR Switch to MANUAL before battery is present on the N lead. After this check restore OPERATION SELECTOR Switch to OFF before inserting the plug.

NOTE 2: If the engine-alternator circuit is Issue 3B or later, a diode was inserted in the N lead to prevent damage due to incorrect polarity. The module will not work if polarity of control battery is incorrect.

2.2 Do not pull out or insert circuit packs in the module without first turning the OPERATION SELECTOR to OFF to disconnect the battery from the module.

2.3 A number of duplicate circuit packs have specific adjustments such as various timers. To prevent a mixup observe that these circuit packs are marked with the proper Equipment Location before removing more than one of these packs at a time.

3. TEST SETS

Quan	Code	Description
1	ITE-1000	AC Voltmeter
1	ITE-4297	Auto-Transformer
1	ITE-4442	Volt-Ohmmeter
2	ITE-9501	Test Cord

4. RECORDS

4.1 Use SD-4-1313 Test Trouble Record and SD-4-1315 Summary of Tests forms. The forms may be combined with the associated engine-alternator test forms.

4.2 Record trouble-shooting information for the module on SD-4-1313 forms.

5. ADJUSTMENT OF TIMERS

5.1 The timers shown in TABLE A are adjustable. Timing is accomplished by allowing a capacitor, which is charged to -12 volts, to discharge through a variable resistor.

NOTE: The customer may request a DT of 5 seconds and a WUT of 15 seconds. The R4 potentiometer will be turned almost all the way out (full CCW) for these times.

5.2 Run Timers RT1, RT2 and RT3 are not adjustable. RT1 has an OUT/IN Switch so that the Run-Time period may be cut out, if desired. RT2 and RT3 are the actual timing circuits, each with a timing period of 23-32 minutes, giving a total Run-Time of 46-64 minutes.

5.3 Check DT and WUT Timers as follows:

5.31 These timers can be checked during the test of automatic operation in Section 251 or 252.

5.32 If specific tests are to be made on these timers proceed as follows:

5.321 Have commercial ac available on CA, CB and CC leads (Leads V, W and X into the module).

TABLE A: TIMER ADJUSTMENTS

Desig.	CP	Loc.	Available Range	Setting	Adjustment
DT	3	5	3 Seconds to 12 Minutes	*5-15 Seconds	R4 potentiometer CCW decreases time and CW increases time.
HOT	3	6		9-11 Minutes	
WUT	3	7		*3-5 Minutes	
CCOT	4	8	15-40 Seconds	27-33 Seconds	R3 potentiometer CCW decreases time and CW increases time.
CFT	4	9		2-1/2 to 3 Seconds	
LOPT	4	39		10-12 Seconds	

NOTE: The customer may request a DT of 5 seconds and a WUT of 15 seconds. The R4 potentiometer will be turned almost all of the way out (full CCW) for these times.

5.322 If load is already connected to the set where On-Set Transfer Breaker is furnished, or to the Remote Breaker Circuit and it is desired to prevent the alternator breaker from operating open the 2-pole CKT BKR CONT Breaker or CB1 and CB2 Breakers in the engine control cabinet.

5.323 If the alternator breaker will not be allowed to operate plug ITE-4442 VOM (30 volt dc scale) into TP2 of WUT (- lead) and TP3 of VR (+ lead). If the alternator breaker will be allowed to operate this will not be necessary.

5.324 Turn OPERATION SELECTOR Switch to AUTO, if it is not already in this position. When turning this switch from OFF position to AUTO stop about 10 seconds on MANUAL position in order to charge the capacitors in the timers.

5.325 Pull a voltage monitor fuse in the cabinet. This can be the CA, CB or CC fuse or F14, F15 or F16 according to the engine-alternator furnished.

5.326 Observe that the engine starts after the DT timer times out. If the alternator breaker is allowed to close observe that it closes after the WUT times out. If the breaker will not be allowed to close look for the change in signal from 0 to -12 volts on the VOM. WUT is measured from the time the engine reaches 58 hertz to when the breaker closes or the "1" signal is available.

5.327 Adjust R4 potentiometer on DT or WUT for the desired time.

5.4 Check HOT Timer as follows:

5.41 This timer can be checked during the test of automatic operation in Section 251 or 252.

5.42 If a specific test is to be made on this timer replace the voltage monitor fuse that was removed in Paragraph 5.325. Observe the timing period until the engine shuts down, which is the Hold-Over Time. Adjust R4 as necessary for the desired time.

5.43 If the alternator breaker had been allowed to close it will open at the end of the HOT before the engine shuts down.

5.5 CFT: With OPERATION SELECTOR Switch at OFF, disconnect a start battery lead. (CAUTION: Remove an ac input fuse from J87249 Rectifier before disconnecting this lead). Turn OPERATION SELECTOR Switch to MANUAL, wait about 10 seconds and press START button. In about 3 seconds the CFT

timer times out and CRANK FAILURE alarm comes in. Push ALARM RESET button and turn OPERATION SELECTOR Switch to OFF.

5.6 LOPT: Remove CFT from Equip. Loc. 9. Remove LOPT from Equip Loc. 39 and substitute it for the CFT timer in Equip. Loc. 9. Turn OPERATION SELECTOR Switch to MANUAL, wait about 10 seconds and press START button. In about 10 seconds the CRANK FAILURE alarm comes in when LOPT times out. Push ALARM RESET button and turn OPERATION SELECTOR Switch to OFF.

5.7 CCOT: Remove LOPT from the test location (Equip. Loc. 9). Do not reinstall LOPT or CFT until CCOT is checked. Turn OPERATION SELECTOR Switch to MANUAL, wait about 10 seconds and press START button. In about 30 seconds CCOT times out and CRANK FAILURE alarm comes in. Push ALARM RESET button and turn OPERATION SELECTOR Switch to OFF.

5.8 Final: Install LOPT and CFT timers in their correct locations. Reconnect the start battery lead. Reinstall the input fuse in the J87249 Rectifier.

6. TEST AND ADJUSTMENT OF VOLTAGE MONITORS

6.1 Preliminary

6.11 With the set shut down turn OPERATION SELECTOR Switch to OFF. Remove the fuses feeding commercial ac on leads V, W and X into the module. The fuses are inside the engine control cabinet and designated F14, F15 and F16 for KS-19587 and CA, CB and CC for KS-19583 through KS-19586 engine-alternators.

CAUTION: For the KS-19587 engine-alternator a fuse puller should be used.

6.12 Remove the grill from the lower front of the control cabinet. Pull out the J86634A Control Module on its slides and open the cover.

6.13 Pull out VM1, VM2 and VM3 cards (Equip. Loc. 1, 2 and 3). Put the Card Extender into VM1 position (Equip. Loc. 1) and insert VM1 into the socket on top of the Extender Card.

6.14 Make the following connections to VM1 and the Card Extender:

6.141 Connect the output of the ITE-4297 Auto-Transformer to terminals 6 and 8 on the Extender Card. Use one ITE-9114 Cord and one ITE-9115 Cord for the connection. Connect the

4B 19

5

alligator clips on the cords to the pins on the card and put the plug ends on the cords into the output jacks on the ITE-4297. Set dial pointer to 0.

6.142 Connect the ITE-1000 Voltmeter (300 volt scale) across the 6 and 8 terminals on the Extender Card, using ITE-9501 Cords.

6.143 Connect the ITE-4442 Volt-Ohmmeter (60 volt dc scale) to TP2 (-) of the Voltage Monitor under test and TP3 (+) of CP22, Equip. Loc. 28. The VOM should indicate between -0.7 and 0 volts.

6.2 Test and Requirements

6.21 Turn on the ITE-4297 and slowly increase the ac voltage applied to the Voltage Monitor until the VOM indication changes from 0 to about -12 volts ("1" signal). At that time observe the ITE-1000. The change shall occur in the appropriate ac voltage range shown below.

208 Volt Set: 199-201 Volts
230-240 Volt Set: 223-225 Volts

If the above requirement is not met use the adjustment procedure shown in Paragraph 6.3.

6.22 Decrease the ac voltage applied to the Voltage Monitor until the VOM indication changes from -12 volts to 0. At that time observe the ITE-1000. The change shall occur in the appropriate ac voltage range shown below.

208 Volt Set: 190-192 Volts
230-240 Volt Set: 214-216 Volts

If the above requirement is not met use the entire adjustment procedure shown in Paragraph 6.3.

6.3 Adjustment

NOTE: The R2 and R7 adjustments are interdependent and this procedure should be followed exactly.

6.31 Make the test setup shown in Paragraph 6.1.

6.32 Break the seals on R2 and R7 potentiometers and turn them full

CW.

6.33 Turn on the ITE-4297 and increase voltage to the following value. The output voltage from the Voltage Monitor should be 0 at this time.

208 Volt Set: 200 Volts
230-240 Volt Set: 224 Volts

6.34 After the voltage has been applied for about 2 minutes slowly turn R2 CCW and stop when a "1" signal (-12V) appears at the output.

6.35 Reduce ac voltage applied to the Voltage Monitor until the output signal drops to 0. Then slowly increase voltage to the required range below, where the signal should change to "1".

208 Volt Set: 199-201 Volts
230-240 Volt Set: 223-225 Volts

6.351 If the output signal changes to "1" before the beginning of the range hold voltage at the center of the range and carefully adjust R2 potentiometer CCW until the output signal changes to "1".

6.352 If the output signal does not change in the required range hold voltage at the center of the range and carefully adjust R2 potentiometer CCW until the output signal changes to "1".

6.353 If R2 is readjusted repeat Paragraph 6.35 as a check.

6.36 When the pick up voltage point has been adjusted slowly reduce ac voltage on the Voltage Monitor to the value indicated below. Then slowly turn R7 potentiometer CCW and stop when the output signal changes to 0.

208 Volt Set: 191 Volts
230-240 Volt Set: 215 Volts

6.37 Increase input voltage applied to the Voltage Monitor until the output signal changes to "1". Then slowly decrease voltage to the required range below, where the signal should change to 0.

208 Volt Set: 190-192 Volts
230-240 Volt Set: 214-216 Volts

6.371 If output signal changes before the high end of the range hold voltage at the center of the range and carefully adjust R7 potentiometer CW until the output signal changes to 1.

6.372 If output signal does not change in the required range hold voltage at the center of the range and carefully adjust R7 potentiometer CCW until the output signal changes to 0.

6.373 If R7 is readjusted repeat Paragraph 6.37 as a check.

6.38 After R2 and R7 settings are correct for VM1 reduce ITF-4297 voltage to zero and turn it off. Disconnect the Volt-Ohmmeter. Remove VM1 from the Extender Card and place VM2 in the card. Connect the VOM to TP2 of VM2, turn on the ITE-4297 and repeat Paragraphs 6.32 through 6.37. After checking VM2 disconnect the VOM and turn off ITE-4297. Then place VM3 in the Extender Card and repeat Paragraphs 6.32 through 6.37.

6.39 After VM3 has been checked turn off the ITE-4297 and disconnect the VOM and ITE-1000 as well as the ITE-4297. Remove VM3 from the Extender Card and remove the Extender Card from Equip. Loc. 1.

6.4 Final Operations

6.41 Restore VM1, VM2 and VM3 cards to Equip. LOC. 1, 2 and 3.

6.42 Restore F14, F15 and F16 or CA, CB and CC fuses in the control cabinet. When applicable, also restore the ac fuses in the ac service cabinet feeding leads CA, CB and CC.

6.43 If no further tests or adjustments are required on the J86634A Control Module, close the cover and push the module into position.

6.44 Restore the grill to the lower front of the control cabinet.

7. ADJUSTMENT OF FREQUENCY MONITORS

7.1 The Overspeed Detector (CP8, Equip. Loc. 21) is checked as part of the engine-alternator test. The overspeed point is about 70 hertz (2100 rpm). Operation of 20CD and 58CD can be checked as the engine accelerates.

7.2 The 20CD (CP9, Equip. Loc. 22) gives a "1" signal out on TP1 at about 600 rpm. This release ASC relay and stops the cranking motor. ASC is released by clearing DTM3 and resultant signals from DTM3 to DTM1, to SCA and to SC.

7.3 The 58CD (CP8, Equip. Loc. 20) gives a "1" signal out on TP1 at about 1740 rpm to set 58CDM, which in turn starts the WUT.

7.4 The R4 potentiometer controls the operate point of these monitors. Turn R4 CW to raise operating frequency, or CCW to lower operating frequency.

8. REVERSE POWER DETECTOR

NOTE 1: The Reverse Power Detector (RPD) will normally not be checked nor adjusted unless the engine-alternator is to be paralleled with another set.

NOTE 2: Adjustment of RPD, when applicable, will be done during the test of the engine-alternator. An additional test for RPD will also be required in parallel with another set, as covered in Section 130 in this handbook.

8.1 The purpose of RPD is to sense when the engine-alternator is motorized from a parallel set, or, when the engine-alternator is actually drawing power from another source.

8.2 Nominal settings for RPD are 20KW for KS-19583 through KS-19586 engine-alternators and 25KW for KS-19587 engine-alternators.

8.3 On Issue 6B of SD-81692-01 a change was made in RPD circuit pack that may result in tripping of the engine-alternator circuit breaker when load is transferred from commercial power to the engine-alternator. This problem is presently under study. To prevent this nuisance tripping for a solo engine-alternator the RPD circuit pack may be temporarily removed.

9. TROUBLE-SHOOTING

9.1 Table B lists voltages or signals from test points on the circuit packs. Use these voltages to check correct operation of various circuit packs.

9.2 Identical circuit packs may be interchanged. In this case the Logic Flow Diagrams on SD-81692-01 Pages B1 and B2 should be studied with reference to the CD sheet.

9.3 Refer to Table C. This lists the various circuit packs, quantity, etc., to illustrate what packs are required for automatic operation and manual operation. It also indicates what packs may be removed for manual operation.

9.4 Trouble-shooting may also be done by the "substitution method". For example, CP3's may be interchanged except that timing differs on each card. CP4's may be interchanged except that timing differs on each card. CP5's may be interchanged and the unit can operate without the CP5's but alarms will not come in. CP6's may be interchanged and the set can be run without OSM/CFM2, HWTM/LOPM and RPM/STM but engine shutdown will not occur with the associated failures.

TABLE B: CIRCUIT PACKS IN J86634 SOLID-STATE CONTROL

DESIGNATION	MEANING	CP	LOC	OUTPUT	ADJUST (Par.)	DIRECT FUNCTION
ADM	Alarm Delay Memory	6	16	TP3 to LOPG ("1"); ["0"]	X	Inhibits LOPG & HWTG during starting.
AO	Alarm Output	11	24	TP2 to horn ("0"); ["1"] for MA & MI Alarm	X	Sounds horn for MA & MI Alarm.
				TP1 to operate FSD or ESDR relay ("0"); ["1"] for MA Alarm		Shuts down the set on MA Alarm.
ATG	Alarm Test Gate	3	7	TP3 to CFM2, HWTM, LOPM, OSM, RPM, STM ("0") engine stopped; ["1"]	X	Sets these memories when ALARM TEST button is depressed.
BC	Breaker Control	18	33	12 to CBC relay (-26V); ["0"]	X	Operates CBC relay.
BCC1	Breaker Control Clamp One	16	30	TP3 to BCM2 ("0") on MANUAL	X	Clamps BCM2 with MANUAL position of OSS Switch.
BCC2	Breaker Control Clamp Two	16	30	TP2 to BCM1 ("0") on MANUAL	X	Clamps BCM1 with MANUAL position of OSS Switch.
BCG1	Breaker Control Gate One	16	30	TP1 to BCM1 ("0"); ["1" pulse]	X	Sets BCM1.
BCM1	Breaker Control Memory One	6	15	TP1 to BC ("0"); ["1"]	X	Signals BC.
BCM2	Breaker Control Memory Two	6	15	TP4 to BCG1 ("0"); ["1"] BCM2 also set by BKR OPEN button.	X	Signals BCG1
CCOG	Crank Cut-Out Gate	14	27	TP1 to CFM2 ("0"); ["1"]	X	Sets CFM2.
CCOT	Crank Cut-Out Timer	4	8	TP3 to CCOG ("0"); ["1" pulse] on failure	5.7	Times crank effort (30 secs) before engine reaches 600 rpm.
CFA	Crank Fail Amplifier	10	23	TP4 to CFM1 ("0"); ["1" pulse]	X	Sets CFM1 at 100 rpm.
CFG	Crank Fail Gate	14	27	TP2 to CFM2 ("0"); ["1"] on failure	X	Sets CFM2 on engine fail to start.
CFLA	Crank Fail Lamp Amplifier	5	18	TP1 to CRANKING FAILURE lamp (-26V)[0]	X	CRANKING FAILURE lamp.
CFM1	Crank Fail Memory One	7	17	TP2 to MCG2 and CFG ("0"); ["1"]	X	Signals MCG2 and CFG.

TABLE B: (Continued)

DESIGNATION	MEANING	CP	LOC	OUTPUT		ADJUST (Par.)	DIRECT FUNCTION
CFM2	Crank Fail Memory Two	6	10	TP2 to CFLA ("1") ["0"]	TP1 to MAG ("0") ["1"]	X	Signals CFLA and MAG.
CFT	Crank Fail Timer	4	9	TP3 to CFG ("0"); ["1" delayed pulse]		5.5	Crank Fail Timer.
CN1, CN2	Coupling Networks	21	37	-		X	-
DT	Delay Timer	3	5	TP2 to DTM1 ("0") [Pulse Delayed "1"]		5.3	Start Delay Timer; sets DTM1.
DTG1	Delay Timer Gate One	15	29	TP1 to DT and DTI ("0") with Comm. ["1" w/o Comm.		X	Starts DT; signals DTI.
DTG2	Delay Timer Gate Two	3	5	TP3 to DTM1 ("0") on MANUAL		X	Clamps DTM1 with MANUAL position of OSS Switch.
DTI	Delay Timer Inverter	2	4	TP4 to PFA ("1") with Comm. ["0" w/o Comm.		X	Signals PFA.
DTM1	Delay Timer Memory One	6	13	TP1 to DTM2 and DTM3 ("0"); ["1"] TP2 to CFM1 and 58CDM ("1"); ["0"]		X	Sets DTM2 and DTM3; clears CFM1 and 58CDM.
DTM2	Delay Timer Memory Two	6	13	TP3 to FCA and BCM2 ("1"); ["0"]		X	Signals FCA; clears BCM2.
DTM3	Delay Timer Memory Three	6	14	TP1 to DTM1 ("0"); ["1"]		X	Signals DTM1.
DTMI	Delay Timer Memory Inverter	15	28	TP4 to SCA ("1"); ["0"]		X	Signals SCA.
FC	Fuel Control	17	31	TP2 to FRS Solenoid, ATG, MCG2, SFG ("Q"); [-26V]		X	Operates throttle solenoid; Signals ATG, MCG2 and SFG.
FCA	Fuel Control Amplifier	2	4	TP3 to FC ("1"); ["0"]		X	Signals FC.
HOT	Hold Over Timer	3	6	TP2 to MCG1 ("0"); ["1" pulse delayed]		5.4	Hold Over Time.
HOTC	Hold Over Timer Clamp	21	37	TP1 to MCG1 ("0") on MANUAL		X	Clamps MCG1 on MANUAL position of OSS Switch.
HOTG	Hold Over Timer Gate	3	6	TP3 to HOT ("0"); ["1"] with 2- "0" input		X	Starts HOT.

TABLE B: (Continued)

DESIG- NATION	MEANING	CP	LOC	OUTPUT	ADJUST (Par.)	DIRECT FUNCTION
HWTG	High Water Temperature Gate	14	27	TP3 to HWTM ("0"); ["1"] with "0" on 18 and "1" on 17.	X	Sets HWTM.
HWTLA	High Water Temperature Lamp Amplifier	5	18	TP2 to HIGH COOLANT TEMP lamp (-26V) [0]	X	Lights HIGH COOLANT TEMP lamp.
HWTM	High Water Temperature Memory	6	11	TP2 to HWTLA ("1") ["0"] TP1 to MAG ("0") ["1"]	X	Signals MAG and HWTLA
LOPG	Low Oil Pressure Gate	15	28	TP3 to LOPM ("0"); ["1"]	X	Sets LOPM on low lube oil pressure.
LOPLA	Low Oil Pressure Lamp Amplifier	5	19	TP2 to LOW OIL PRESSURE lamp (-26V) [0]	X	Lights LOW OIL PRESSURE lamp.
LOPM	Low Oil Pressure Memory	6	11	TP3 to LOPLA ("1") ["0"] TP4 to MAG ("0") ["1"]	X	Signals LOPLA and MAG.
LOPT	Low Oil Pressure Timer	4	39	TP3 to ADM ("0"); ["1" delayed pulse]	5.6	Sets ADM after timing out.
MAG	Major Alarm Gate	13	26	TP1 to AO ("0") ["1"]	X	Signals AO for Major Alarm.
MCG1	Memory Clear Gate 1	15	29	TP2 to MC11, MC12 ("0"); ["1"]	X	Signals MC11 and MC12 after HOT times out.
MCG2	Memory Clear Gate 2	21	37	TP3 to 20CDM, CCOT, CFT ("0"); ["1"] after shutdown	X	Clears 20CDM, resets CCOT and CFT.
MC11	Memory Clear Inverter 1	15	29	TP3 to DTM1, DTM2, DTM3 ("0") ["1"]	X	Clears DTM1, DTM2, DTM3.
MC12	Memory Clear Inverter 2	15	29	TP4 to BCM1, RTM, WUTM ("0") ["1"]	X	Clears BCM1, RTM, WUTM.
MIG	Minor Alarm Gate	13	26	TP3 to AO ("1") ["0"]	X	Signals AO for Minor Alarm.
OSD	Over Speed Detector	8	21	TP2 to OSM ("0") [- pulse]	(4)	Sets OSM.
OSLA	Over Speed Lamp Amplifier	5	18	TP3 to OVERSPEED lamp (-26V) [0]	X	Lights OVERSPEED lamp.
OSM	Over Speed Memory	6	10	TP3 to OSLA ("1") ["0"] TP4 to MAG ("0") ["1"]	X	Signals OSLA and MAG.
OSSG1	Operation Selector Switch Gate 1 (Used as Clamp)	4	39	TP1 to DTM1 ("1"); ["C"] on Manual position of CSS Switch	X	Clears DTM1 with MANUAL position of OSS Switch.

TABLE B: (Continued)

DESIG- NATION	MEANING	CP	LOC	OUTPUT	ADJUST (Para.)	DIRECT FUNCTION
PF	Power Failure Switch	21	37	15 to POWER FAILURE lamp (-26V) [0] 8 to PF terminal(SD-81692-01 ISS.10AR)	X	Lights POWER FAILURE lamp. Remote PF signal.
PFA	Power Failure Amplifier	2	4	TP2 to PF (-12V) [0]	X	Signals PF.
PS	Pulse Separator	10	23	TP1 to 20CD, 58CD and OSD (+ pulse) TP2 to 20CD, 58CD and OSD (- pulse)	X	Provides + and - pulses with engine running.
RP	Reverse Power Detector	12	25	TP1 to RPM ("0"); ["1"] with reverse power	(4)	Senses reverse power. Sets RPM.
RPLA	Reverse Power Lamp Amplifier	5	19	TP3 to REVERSE POWER lamp (-26V); [0]	X	Lights REVERSE POWER lamp.
RPM	Reverse Power Memory	6	12	TP3 to RPLA ("1"); "0" TP4 to MAG ("0"); ["1"]	X	Signals RPLA and MAG.
RSG1	Remote Start Gate 1	4	8	TP1 to DTM1 ("0"); ["1"] with RS sig.	X	Receives RS signal and sets DTM1.
RSG2	Remote Start Gate 2	4	9	TP1 to DTM1 ("0") on MANUAL	X	Clamps DTM1 with MANUAL position of OSS Switch.
RT1	Run Timer 1	19	34	TP2 to RTM ("0"); ["1"] when timed out	X	Sets RTM after about 50-60 min.
RT2	Run Timer 2	20	35	TP1 to RT3 ("0"); ["1"] delayed	X	Timing Circuit: 23-32 min.
RT3	Run Timer 3	20	36	TP1 to RT1 ("0"); ["1"] delayed	X	Timing Circuit: 23-32 min.
RTM	Run Timer Memory	6	16	TP2 to HOTG ("1"); ["0"]	X	Signals HOTG.
SC	Start Control	17	32	TP2 to engine ("0"); [-26V] TP2 to SFG	X	Operates ASC relay to start engine and signals SFG.
SCA	Start Control Amplifier	2	4	TP1 to SC ("1"); ["0"]	X	Signals SC.
SFG	Start Fail Gate	15	28	TP1 to SFI ("0"); ["1"] with failure	X	Signals SFI on start failure.
SFI	Start Fail Inverter	21	37	TP2 to CFM2 ("0"); ["1"] with failure	X	Sets CFM2.
STLA	Shunt Trip Lamp Amplifier	5	19	TP1 to BREAKER TRIPPED lamp (-26V); [0]	X	Lights BREAKER TRIPPED lamp.

TABLE B: (Continued)

DESIG- NATION	MEANING	CP	LOC	OUTPUT		ADJUST (par.)	DIRECT FUNCTION
STM	Shunt Trip Memory	6	12	TP2 to STLA ("1"); ["0"]	TP1 to MAG ("0") ["1"]	X	Signals STLA and MAG.
VM1	Voltage Monitor 1	1	1	TP2 to DTG1	("1") with comm. ["0"] w/o comm.	5	Senses CA-CE commercial.
VM2	Voltage Monitor 2	1	2	TP2 to DTG1	("1") with comm. ["0"] w/o comm.	6	Senses CA-CC commercial.
VM3	Voltage Monitor 3	1	3	TP2 to DTG1	("1") with comm. ["0"] w/o comm.	6	Senses CB-CC commercial.
VR	Voltage Regulator	22	38			X	Provides bias voltages.
WUT	Warm-Up Timer	3	7	TP2 to WUTM	("0") [delayed "1" pulse]	5.3	Warm-Up Time. Sets WUTM.
WUTM	Warm-Up Timer Memory	6	14	TP3 to RT1, BCG1 TP4 to RT1 ("0")	("1") ["0"] ["1"]	X	Signals 9CG1, starts RT1.
20CD	20 Cycle Detector	9	22	TP1 to 20CDM ("0")	[- pulse]	7.2	Senses 600 rpm. Sets 20CDM.
20CDM	20 Cycle Detector Memory	7	17	TP4 to 20CDMI, LOPT, ADM ("0")	[- pulse]	X	Signals 20CDMI. Clears ADM. Clamps LOPT until 600 rpm.
20CDMI	20 Cycle Detector Memory Inverter	15	28	TP2 to DTM3 ("0")	["1"]	X	Clears DTM3.
58CD	58 Cycle Detector	8	20	TP2 to 58CDM ("0")	[- pulse] TP4 to BCG1 (-12V) [+ pulse]	7.3	Senses 1740 rpm. Sets 58CDM.
58CDM	58 Cycle Detector Memory	7	17	TP1 to WUT ("0")	["1"]	X	Starts WUT.

- NOTES: (1) Voltages measured to Ground, TP3 on CP22, Equipment Location 38.
 (2) Values in parentheses () are normal, inhibited or clear values; values in brackets [] are activated, timed-out or set values.
 (3) "1" means -6 to -12 volts; "0" means -0.7 to 0 volts.
 (4) See engine-alternator test section.

TABLE C: Circuit Packs in J86634A Control Module

CP	Quan.	Circuits per Card	Functional Designation	Reqd. Auto Sets	Reqd. All Sets	Reqd. Parallel	Can Run w/o
CP1	3	Voltage Monitor	VM1; VM2; VM3	X			X
CP2	1	Amp/Amp/Amp/Inv	FCA/PFA/SCA/DTI		X		-
CP3	3	Timer/NOR G.	DT/DTG2; HOT/HOTG; WUT/ATG	X			X
CP4	3	Timer/NOR G.	CCOT/RSG1; CFT/RSG2; LOPT/OSSG1		X		-
CP5	2	Amp/Amp/Amp	LOPLA/RPLA/STLA; CFLA/HWTLA/OSLA		X		X
CP6	7	Memory/Memory	BCM1/BCM2; ADM/RTM; DTM1/DTM2; DTM3/WUTM; RPM/STM; HWTM/LOPM; CFM2/OSM		X	RPM	X
CP7	1	Memory/Memory/Memory	CFM1/20CDM/58CDM		X		-
CP8	2	Frequency Monitor	58CD; OSD		X		OSD
CP9	1	Frequency Monitor	20CD		X		-
CP10	1	Pulse Separator/Amp	PS/CFA		X		-
CP11	1	Alarm Output	AO		X		X
CP12	1	Reverse Power Detector	RP			X	X
CP13	1	OR G./NOR G.	MAG/MIG		X		X
CP14	1	3 Mod. NOR Gates	HWTG/CFG/CCOG		X		X
CP15	2	NAND G. & 3 NOR G. or Inv	SFG/LOPG/DTM1/20 CDMI; DTG1/MCG1/MCI1/MCI2		X		-
CP16	1	NOR G./Clamp/Clamp	BCG1/BCC1/BCC2	X			-
CP17	2	Control Switch	FC; CS		X		-
CP18	1	Breaker Control	BC	X			
CP19	1	Timing Circuit	RT1	X			X
CP20	2	Timing Circuit	RT2; RT3	X			X
CP21	1	Switch/NOR G./Clamp/CN/CN/Inv	PF/MCG2/HOTC/CN1/CN2/SFI		X		-
CP22	1	Voltage Regulator	VR		X		-

10. ALARM TEST FEATURE

NOTE: On 6B Issue of SD-81692-01 a change was made in the module that required a change in the polarity of the signals from the ALARM TEST Button on the engine-alternator. For example, the diesel engine-alternator should be wired per SD-81738-01 or SD-81739-01, Issue 3B or later, to match a module wired per Issue 6B.

10.1 An ALARM TEST button is furnished on the engine control cabinet. This button provides a signal to the input of ATG (Alarm Test Gate). ATG sets the various major alarm memories and the memories, in turn, signal the associated amplifiers to light major alarm lamps. The horn will also sound, if ATTENDED/UNATTENDED Switch is at ATTENDED. Ground is placed on MA lead to alarm circuit.

10.2 The ALARM TEST button also signals the MIG (Minor Alarm Gate) and minor alarm lamps light. Ground is placed on MI lead to alarm circuit.

10.3 With OPERATION SELECTOR Switch at any position but OFF, and with the set not running, depress the ALARM TEST button. Observe that the following lamps are lighted and that the horn sounds:

Major Alarm Lamps

LOW OIL PRESSURE
OVERSPEED
BREAKER TRIPPED
REVERSE POWER
HIGHWATER TEMP
CRANK FAIL

Minor Alarm Lamps

PREL WATERTEMP
RECT FAILURE
JACKET HEATERFAIL

Other Lamps

EMERGENCY STOP
SWITCH OFF NORMAL

10.4 Release the TEST ALARM button and the minor alarm lamps go out. Ground is removed from MI terminal.

10.5 Depress ALARM SILENCE Button and observe that the horn stops. The ALARM SILENCE Button is lighted.

10.6 Depress ALARM RESET Button on the engine control cabinet and observe that the lighted lamps go out as well as ALARM SILENCE lamp (except for Detroit Diesel sets, where SWITCH OFF NORMAL lamp remains lighted). Ground is removed from MA terminal.

CAUTION: On Detroit Diesel engine-alternators the SWITCH OFF NORMAL lamp remains lighted until the Air Damper Solenoid is reset. If this is not reset the engine-alternator will not start. Pull down the air damper linkage and operate the toggle switch to the position that removes SWITCH OFF NORMAL lamp.

→ Arrow lines indicate new or changed information.

Manager, Product Engineering

Reason for Reissue:

1. To change voltage monitor adjustments.
2. To make minor changes.