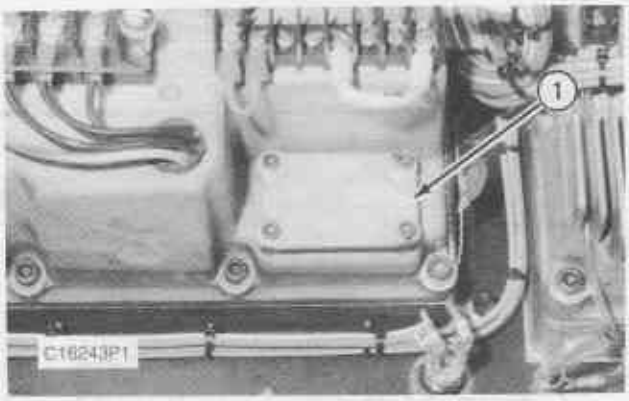
Service Procedure C – Programming The ACM

S1 CURRENT				
Meter	Program Switch Position	Input (RMS)	Transformer Ratios	Full Scale
AMP	0	0-5 AMPS	75:5	75 AMPS
AMP	1	0-5 AMPS	100:5	100 AMPS
AMP	2	0-5 AMPS	150:5	150 AMPS
AMP	3	0-5 AMPS	200:5	200 AMPS
AMP	4	0-5 AMPS	300:5	300 AMPS
AMP	5	0-5 AMPS	400:5	400 AMPS
AMP	6	0-5 AMPS	600:5	600 AMPS
AMP	7	0-5 AMPS	800:5	800 AMPS
AMP	8	0-5 AMPS	1000:5	1000 AMPS
AMP	9	0-5 AMPS	1200:5	1200 AMPS
AMP	10	0-5 AMPS	1500:5	1500 AMPS
AMP	11	0-5 AMPS	2000:5	2000 AMPS
AMP	12	0-5 AMPS	2500:5	2500 AMPS
AMP	13	0-5 AMPS	3000:5	3000 AMPS
AMP	14	0-5 AMPS	4000:5	4000 AMPS
AMP	15	NOT USED	-	-
FREQ	NONE	Same As Voltmeter	Same As Voltmeter	45.0 To 99.9 Hz

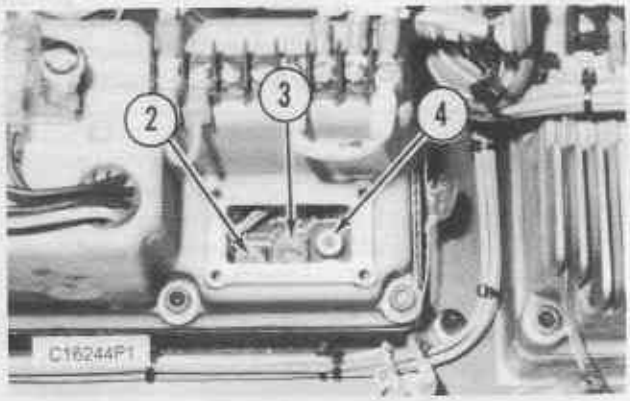
S2 VOLTAGE		
Meter Range	Program Switch S1 Position	Jumper ACM Terminals
0-700V	0	5 to 6
0-350V	2	5 to 7

The AC meter module (ACM) is factory set to display AC voltages and AC currents as specified by the customer. If the current transformers (CT's) are replaced with CT's having another ratio or if the generator is reconnected for a different voltage, reprogram the ACM.

If the generator set is a rental unit that is frequently reconnected from high to low voltage, use the CT's needed for the high current connection and set the voltage range for the highest voltage expected. This avoids reprogramming the ACM every time the generator is reconnected.



ACM Programming Cover Location
(1) Cover.



ACM Programming Components Location (Typical Example)
(2) S2 switch. (3) S1 switch. (4) R6.

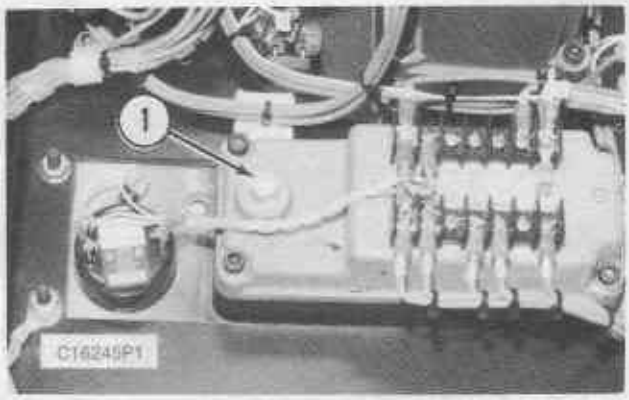
The ACM is programmed using two 16 position switches, S2 (2) for voltage and S1 (3) for current, to accommodate various voltmeter ranges and CT ratios. These switches are located under the access cover (1) in the rear of the ACM. The charts show the switch positions that correspond to the different voltmeter ranges and current transformer (CT) ratios used.

It is possible for moisture to enter the ACM when the access cover is removed. Remove the cover in a dry environment. Open this cover in an air conditioned area if relative humidity exceeds 60%. If necessary, remove the ACM from the panel for programming.

To program, remove cover and turn S1 and S2 to the positions indicated in the table. Make sure that the external jumper is also connected to the terminals indicated in the table. Do NOT adjust the two calibration potentiometers to the right of S1 and S2. These are factory set to calibrate the ACM against an accurate standard. When paralleling two generator sets, it is possible the voltage readings are different. In this case the upper potentiometer R6(4) is adjusted so that both voltage displays read the same.

After programming the ACM, replace cover (1). Use a continuous bead of 6V6640 Sealant to seal the cover.

Service Procedure D – Alarm Module (DC Voltage Alarm Setpoint Adjustment)



Alarm Module Plug Location (Typical Example)
(1) Plug.

For all alarm applications, the low DC volts alarm setpoint is adjusted by a potentiometer located under access plug (1) on the rear of the module. The adjustment range is 8 to 38 volts. The setpoint is factory set at 24 DCV. To adjust the low DCV alarm setpoint:

1. Remove plug (1) which covers the adjustment pot on the rear of the alarm module. It is possible for moisture to enter the ACM when the plug is removed. Remove the plug in a dry environment. Remove the plug in an air conditioned area if relative humidity exceeds 60%.
2. Disconnect wires on terminals 1 and 7. Connect a variable DC power supply to the alarm module (+ voltage to terminal 1, - voltage to terminal 7). Set the power supply voltage to the desired low DCV alarm setpoint (between 8 and 38 volts).
3. Turn the adjustment pot fully clockwise.
4. After one minute, the low DC volts LED flashes. Press the acknowledge/silence switch to get a steady low voltage light.
5. Turn the adjustment pot counterclockwise slowly until the LED goes out.
6. Replace the plug.
7. Disconnect the variable DC power supply and connect wires removed in Step 2.

Service Procedure E – Magnetic Switch Test (24V)

Magnetic Switches Location

1. Disconnect jumper wire between terminals 4 and 5 in the generator mounted terminal strip (TS1). Measure resistance between terminal 5 and terminal 2. The correct resistance is 26 to 33 ohms. On dual starting motor (dual magnetic switch) systems, the resistance is 13 to 17 ohms. If resistance is incorrect, replace the defective magnetic switch. If okay, go to Step 2.

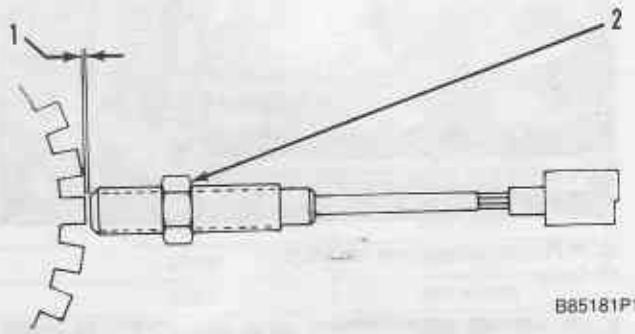
2. Disconnect cable going from the pinion solenoid to the starting motor. Do this on both starting motors of a two starting motor system.

3. Connect a DC voltmeter: positive to terminal 24 and negative to terminal 25 in generator mounted terminal strip (TS1) (connect negative to terminal 26 if second magnetic switch is tested in a two switch system).

4. Connect a wire from terminal 1 to terminal 5 on generator mounted terminal strip (TS1). The correct voltmeter reading changes from approximately 24 DCV to approximately 2 DCV. If voltage exceeds 2 volts, replace magnetic switch. Disconnect this wire immediately after the voltage is measured (no more than 10 seconds).

5. If the switch passes the requirements of Step 1 and 4, it is okay. Reconnect wires and cables that were removed in this procedure.

Service Procedure F – Speed Sensor Adjustment



Magnetic Pickup
(1) Clearance dimension. (2) Locknut

1. Remove the magnetic pickup from the engine flywheel housing and turn the flywheel until a gear tooth is directly in the center of the threaded opening for the magnet pickup. Install the magnetic pickup again in the threads of the flywheel housing.

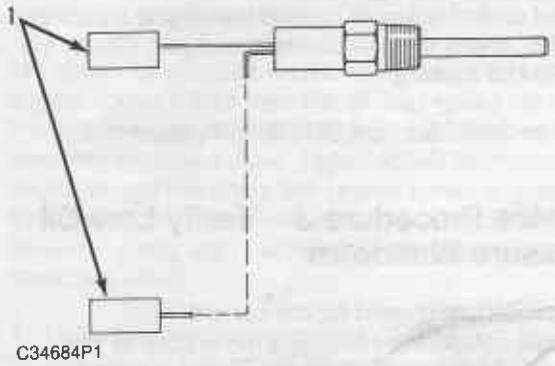
2. Turn (by hand) in a clockwise direction until the end of the magnetic pickup just makes contact with the gear tooth. Now turn the magnetic pickup back out ½ turn (180° in the counterclockwise direction) to get the correct air gap [clearance dimension (1)]. Now tighten locknut (2) to a torque of 45 ± 7 N•m (33 ± 5 lb ft).

NOTE: Do NOT let the magnetic pickup turn while locknut (2) is tightened.

Service Procedure G – Temperature Sensor Resistance

Tools Needed		
6V7070	Digital Multimeter or Equivalent	1

Room Temp.	Resistance
°C (°F)	ohms
20 (68)	12 215 to 12 780
21 (70)	11 680 to 12 215
22 (72)	11 170 to 11 680
23 (74)	10 685 to 11 170



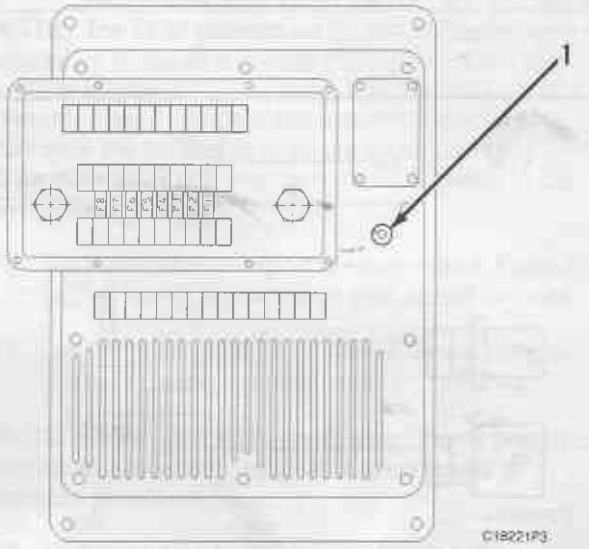
Coolant Temperature Sensor
(1) Connectors to pressure/temperature module.

The resistance value of the sensor corresponds to the surrounding temperature. This test requires that the sensor is at room temperature.

1. Disconnect connectors (1).
2. There is one electrical connection in each connector (1). Measure the resistance between connectors (1). Make sure to make good contact to the connector pins.
3. Compare the measured resistance with that listed in the above chart.

- If the resistance values do NOT agree, check connectors (1) and repair any bad connections. If connectors are okay, replace the coolant temperature sensor.
- If the resistance values do agree, check the mating connectors at the pressure/temperature module. If connectors are okay, replace the pressure/temperature module.

C Service Procedure H – Verify Overspeed Shutdown



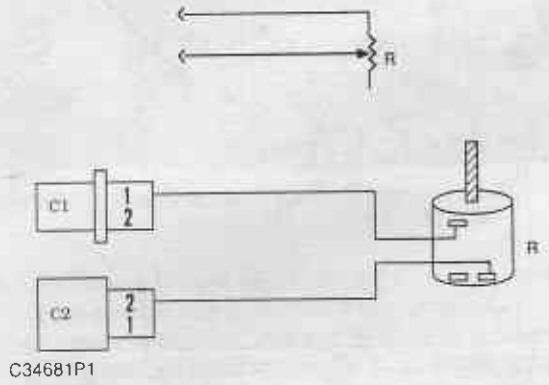
Back Of ECM
(1) Overspeed verify switch.

The ECM allows the service personnel to verify (check) that the engine overspeed protection is functioning. Actual overspeeding of the engine is NOT required. Activation of the overspeed verify switch reduces the overspeed setpoint to 75% of the value programmed in the ECM. Therefore the overspeed verify speed is less than rated engine speed.

1. Operate the engine at rated speed. Monitor the fuel control solenoid (and the air shutoff solenoid, if equipped).
2. Press and hold overspeed verify switch (1). Release the switch after the engine stops.
3. Check that the fuel control solenoid (and the air shutoff solenoid, if equipped) cause the engine to shutdown. Also, check that the overspeed LED, on the ECM, is flashing.
4. Turn the ECS to the OFF/RESET position.

C Service Procedure I – Verify High Coolant Temperature Shutdown

Tools Needed	
High Coolant Temperature Test Harness	1



C34681P1

High Coolant Temperature Test Harness
C1 = Connector Housing 7N9737. C2 = Connector Housing 7N9738. R = 1000 ohm ten turn potentiometer.

This procedure enables service personnel to verify (check) that the engine high coolant temperature protection is functioning. Substituting a variable resistor (potentiometer) for the temperature sensor, allows testing of the circuit without overheating the engine.

NOTE: The low coolant temperature alarm on the alarm module is tested in a similar procedure. However, R is replaced with a 20 000 ohm potentiometer.

1. Determine the setpoint for high coolant temperature shutdown. See Service Procedure A.
2. Turn the ECS to the OFF/RESET position.
3. Disconnect the two harness connectors at the temperature probe. Set R to 1000 ohms. Connect the test harness to the disconnected vehicle harness connectors.
4. Start the engine. Depress the display hold switch when the engine coolant temperature is displayed. The correct displayed temperature is approximately 88°C (189°F).

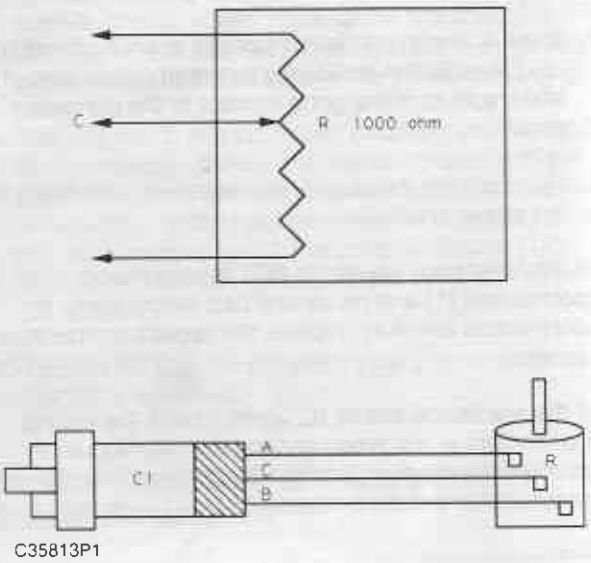
NOTE: If equipped with an alarm module, the high coolant temperature LED and horn on the alarm module are activated prior to engine shutdown.

5. Slowly adjust R until the displayed temperature is the same as the setpoint temperature (of step 1).
6. When the displayed and setpoint temperature are the same, the engine shuts down. Check that the fuel control solenoid caused the engine shutdown. Also, check that the overtemperature LED, on the ECM, is flashing.
7. Turn the ECS to the OFF/RESET position.

C Service Procedure J – Verify Low Oil Pressure Shutdown

This procedure is used for the current pressure/temperature modules (no engine oil line connects to the module, wires connect the engine oil pressure sensor to the pressure/temperature module).

Tools Needed	
Low Oil Pressure Test Harness	1



C35813P1

Low Oil Pressure Test Harness
A = Socket A 8T8730. B = Socket B 8T8730. C = Socket C 8T8730. C1 = Connector 8T8731. R = Potentiometer, 1000 ohm, ten turn. NOTE: Socket C connects to the wiper of potentiometer R.

This procedure enables service personnel to verify (check) that the low engine oil pressure protection is functioning. This procedure controls the oil pressure signal to the pressure/temperature module without affecting the engine lubrication system. Engine shutdown and alarm are verified at idle speed and rated speed.

NOTE: The low oil pressure LED and horn on an alarm module, if equipped, activate 34 kPa (4.9 psi) above the engine shutdown value.

Idle speed oil pressure shutdown occurs when: the engine speed is less than the oil step speed value and the engine oil pressure is less than the idle speed oil pressure shutdown value. Rated speed oil pressure shutdown occurs when: the engine speed is greater than the oil step speed value and the engine oil pressure is less than the rated speed oil pressure shutdown value.

1. Determine the programmed ECM setpoint for: oil step speed, idle speed oil pressure shutdown and rated speed oil pressure shutdown. See Service Procedure A.

2. Turn the ECS to the OFF/RESET position.

3. Disconnect the engine oil pressure sensor connector from the pressure/temperature module. Connect the test harness to the pressure/temperature module connector.

4. Turn the ECS to the AUTO position. Monitor the engine oil pressure on the ECM display. Adjust potentiometer R until the pressure displayed is greater than the idle speed oil pressure shutdown value, but less than 345 kPa (50 psi).

NOTE: The ECM displays an 09 dIAG code, when the sensed oil pressure is greater than 345 kPa (50 psi) and the engine is NOT running. If an 09 dIAG code is present, clear it. To clear the diagnostic code, decrease the sensed oil pressure by adjusting potentiometer R and then turn the ECS switch to the OFF/RESET position.

5. Start and run the engine at idle speed. Keep the engine speed below the oil step speed setpoint.

6. Lower the oil pressure displayed on the ECM by slowly adjusting potentiometer R.

NOTE: The engine shuts down when the oil pressure decreases below the setpoint for idle speed oil pressure shutdown.

7. Verify that shutdown occurs when the displayed engine oil pressure is the same as (or slightly less than) the setpoint for idle speed oil pressure shutdown. Verify that the low oil pressure LED, on the ECM, is flashing.

NOTE: The low oil pressure LED and horn on an alarm module, if equipped, activate prior to engine shutdown.

8. Turn the ECS to the OFF/RESET position.

9. Turn the ECS to the AUTO position. Monitor the engine oil pressure on the ECM display. Adjust potentiometer R until the pressure displayed is greater than the rated speed oil pressure shutdown value, but less than 345 kPa (50 psi).

NOTE: The ECM displays an 09 dIAG code, when the sensed oil pressure is greater than 345 kPa (50 psi) and the engine is NOT running. If an 09 dIAG code is present, clear it. To clear the diagnostic code, decrease the sensed oil pressure by adjusting potentiometer R and then turn the ECS switch to the OFF/RESET position.

10. Start and run the engine at rated speed. Keep the engine speed above the oil step speed setpoint.

11. Lower the oil pressure displayed on the ECM by slowly adjusting potentiometer R.

NOTE: The engine shuts down when the oil pressure decreases below the setpoint for rated speed oil pressure shutdown.

12. Verify that shutdown occurs when the displayed engine oil pressure is the same as (or slightly less than) the setpoint for rated speed oil pressure shutdown. Verify that the low oil pressure LED, on the ECM, is flashing.

13. Turn the ECS to the OFF/RESET position to clear the ECM.

14. Remove the test harness. Reconnect the engine oil pressure sensor to the pressure/temperature module.

Schematics & Wiring Diagrams

Index

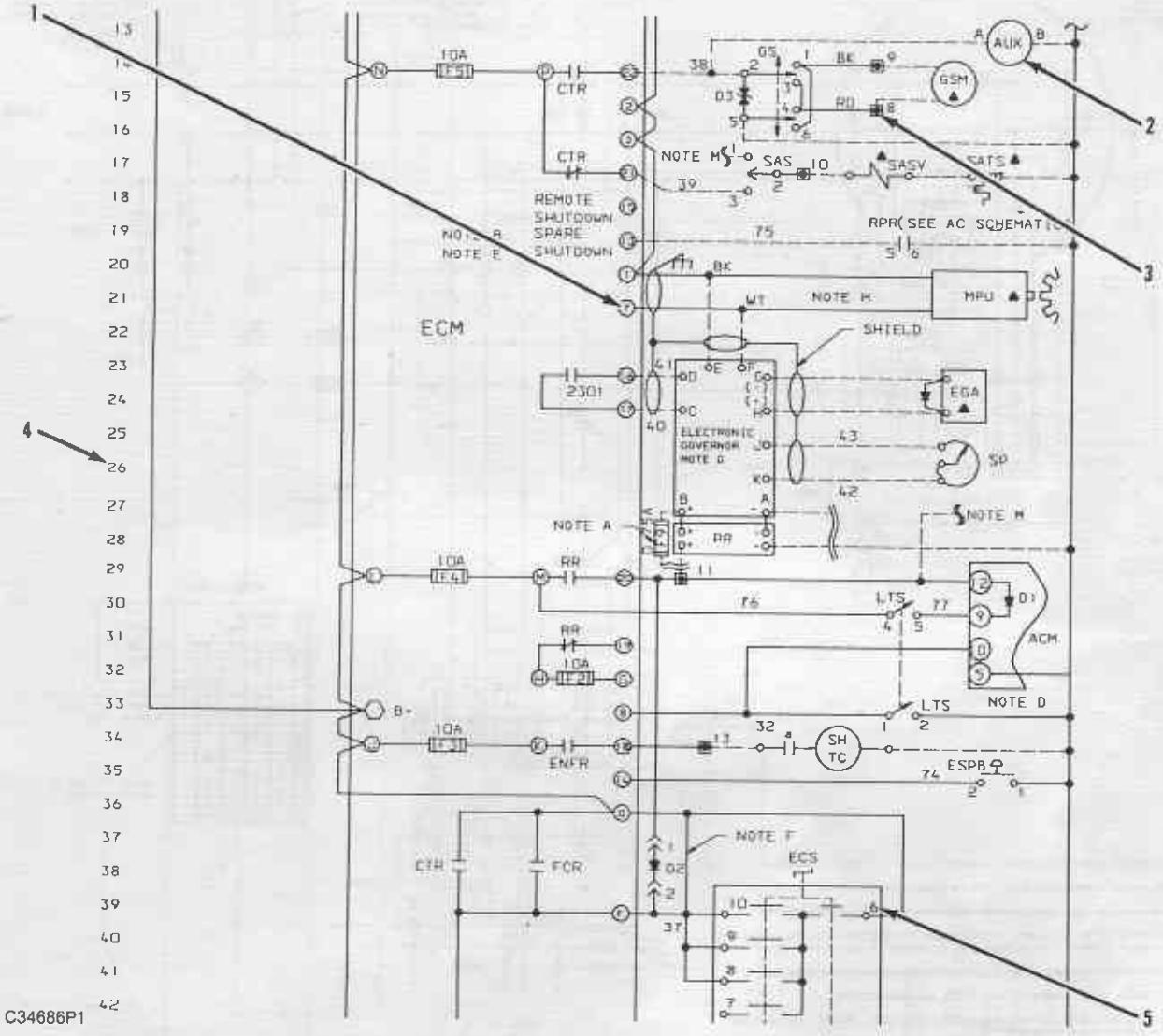
Abbreviations

A	Ammeter
ACM	AC Metering Module
ADS	Engine Combustion Air Damper Position Switch
AFCR	Auxiliary Fuel Control Relay
ALM	Alarm Module
ALS	Alarm Silence Push Button
ALT	Alternator
AR	Arming Relay
ASOS	Air Shut-Off Solenoid
ASR	Air Shut-Off Relay
ASSV	Air Start Solenoid Valve
AUX	Auxiliary Relay (Crank Termination)
AVS	Ammeter Voltmeter Phase Selector Switch
AWG	American Wire Gage
BATT	Battery
BCF	Battery Charger Failure Switch
C	Common
CB	Circuit Breaker
CCM	Cycle Crank Module
CDM	Engine Cooldown Timer Module
CIM	Customer Interface Module
CT	Current Transformer
CTR	Crank Termination Relay
D	Diode
DCV	DC Voltmeter
ECM	Engine Control Module
ECS	Engine Control Switch
EFL	Engine Failure Light
EGA	Electronic Governor Actuator
ENFR	Engine Failure Relay
ESPB	Emergency Stop Push Button
ESL	Emergency Stop Light
F	Fuse
FCR	Fuel Control Relay
FS	Fuel Solenoid
FSOS	Fuel Shut-Off Solenoid
GOV	Governor
GS	Governor Switch
GSM	Governor Synchronizing Motor
GSOV	Gas Shut-Off Valve
HZ	Frequency Meter
IC	Remote Start/Stop Initiate Contact
L	Load Leads
LFL	Low Fuel Level Light
LFLAS	Low Fuel Level Alarm Switch
LFS	Latching Fuel Control Solenoid
LOLAS	Low Oil Level Alarm Switch
LTS	Lamp Test Switch
LWLAS	Low Water Level Alarm Switch
LWTL	Low Water Temperature Light
MAN	Manual
MPU	Magnetic Speed Pickup
MSP	Manual Speed Adjust Potentiometer
NC	Normally Closed
OCL	Overcrank Light
OCT	Overcrank Timer
OP	Oil Pressure
OPG	Oil Pressure Gage
OPL	Oil Pressure Light
OSL	Overspeed Light
PEEC	Caterpillar Programmable Electronic Engine Control
PL	Panel Illumination Light
PLS	Panel Light Switch
POT	Potentiometer
PP	Prelube Pump
PPMS	Prelube Pump Magnetic Switch
PPPS	Prelube Pump Oil Pressure Switch
PR	Pre-Regulator
PS	Pinion Solenoid
PWM	Analog To PWM Converter
RAN	Remote Annuciator
RPL	Reverse Power Light
RPR	Reverse Power Relay
RPSR	Reverse Power Slave Relay
RR	Run Relay
SASV	Start Aid Solenoid Valve
SATS	Start Aid Temperature Switch
SAS	Start Aid Switch
SEC	Second
SHTC	Circuit Breaker Shunt Trip Coil
SIG	Signal
SL	Synchronizing Light
SLM	Synchronizing Light Module
SLR	Synchronizing Light Resistor
SM	Starting Motor
SMMS	Starting Motor Magnetic Switch
SMPS	24VDC To 12VDC Switchmode Power Supply
SMR	Starting Motor Relay
SOR	Peec Shut-Off Relay
SP	Speed Adjust Potentiometer
SR	Slave Relay
SS	Synchronizing Switch
T	Generator Line Leads
TD	Time Delay Relay
TSC	Transfer Switch Position Indicating Contact
V	AC Voltmeter
VAR	Voltage Adjust Rheostat
WT	Water Temperature
WTG	Water Temperature Gage
WTL	Water Temperature Light
XDUCER	Transducer
Z	Zener Diode
2301	Electronic Governor (Speed Sensing)

Symbols

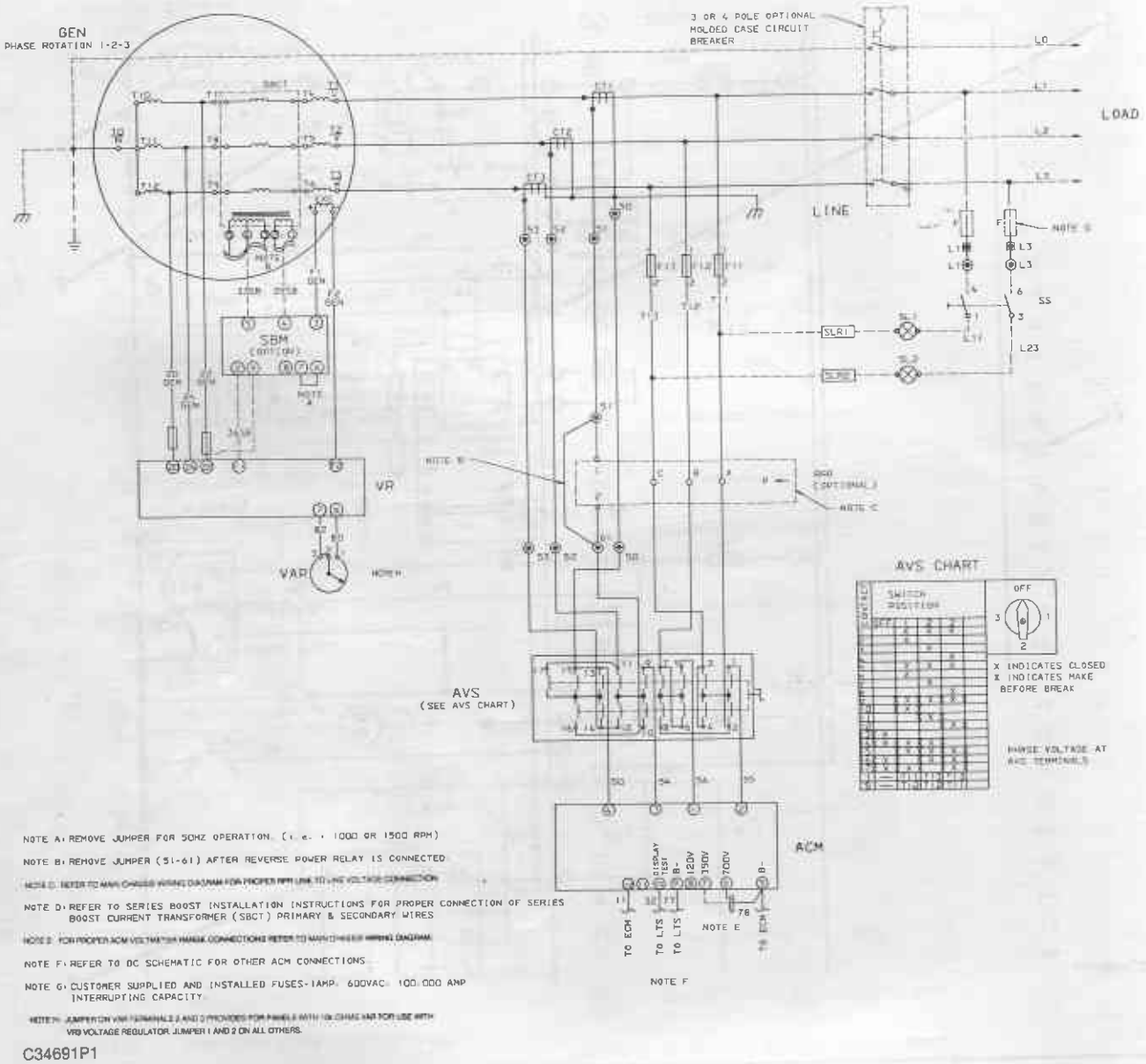
C34698P1

How To Read Control Panel DC Schematics



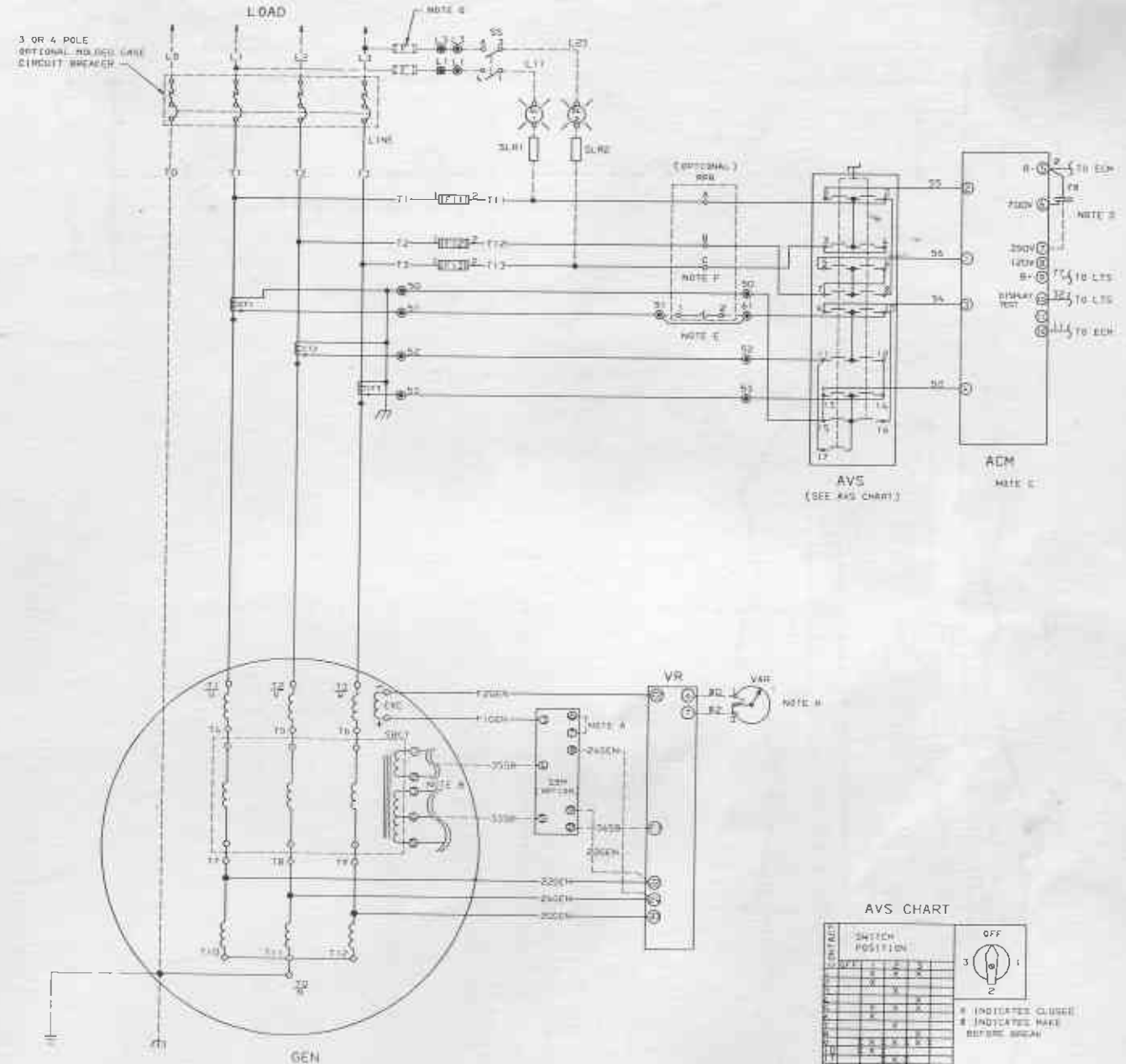
Typical DC Schematic
(1) Symbol for terminal on control panel. (2) Pin identification on components. (3) Symbol for terminal on generator terminal strip. (4) Line numbers used for component location: for example SP is on line 26. (5) Pin identification on ECS switch.

AC Schematic (IEC)

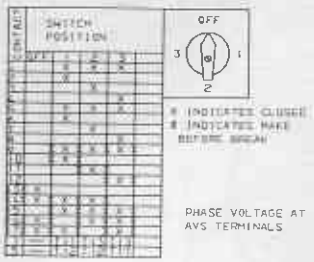


C34691P1

AC Schematic (JIC)



AVS CHART



PHASE VOLTAGE AT AVS TERMINALS

NOTE A REMOVE JUMPER FOR 50 HZ OPERATION (i e 1000 OR 1500 RPM OPERATION)

NOTE B REFERENCE SERIES BOOST INSTALLATION INSTRUCTIONS FOR PROPER CONNECTION OF SERIES BOOST CURRENT TRANSFORMER (SBCT) PRIMARY & SECONDARY WIRES

NOTE C REFER TO DC SCHEMATIC FOR OTHER ACM CONNECTIONS

NOTE D FOR PROPER ACM VOLTMETER RANGE CONNECTIONS REFER TO MAIN CHASSIS WIRING DIAGRAM

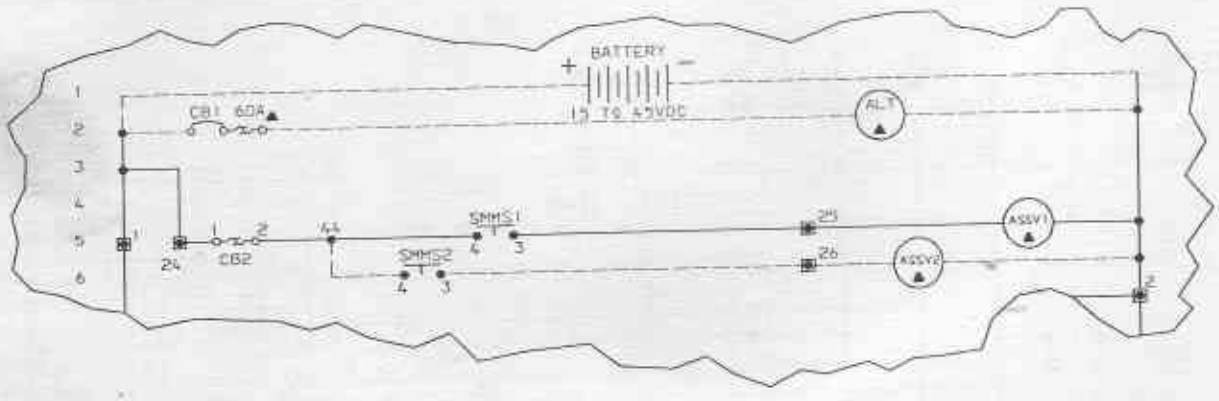
NOTE E REMOVE JUMPER (51-61) AFTER REVERSE POWER RELAY IS CONNECTED

NOTE F REFER TO MAIN CHASSIS WIRING DIAGRAM FOR PROPER RPR LINE TO LINE VOLTAGE CONNECTION

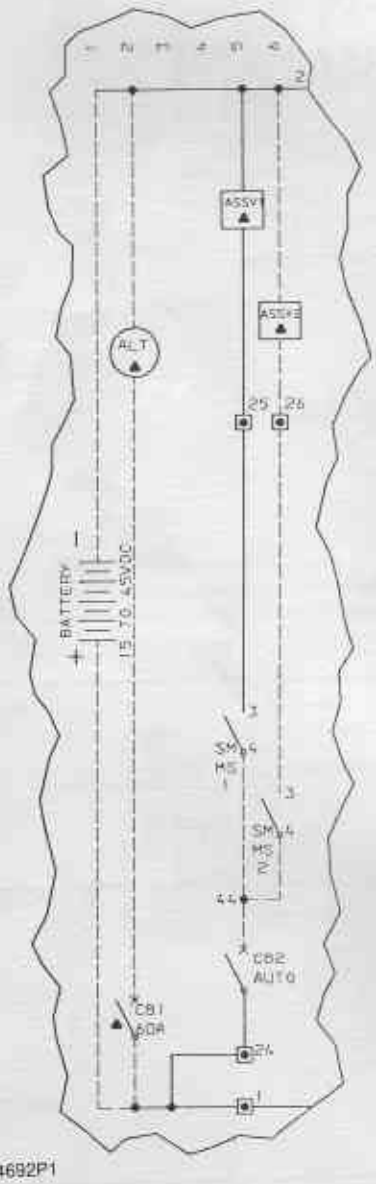
NOTE G CUSTOMER SUPPLIED AND INSTALLED FUSES 1AMP, 600VAC, 100,000 AMP INTERRUPTING CAPACITY

NOTE H JUMPER ON VAR TERMINALS 2 AND 3 PROVIDED FOR PANELS WITH 10K OHMS VAR FOR USE WITH VR3 VOLTAGE REGULATOR JUMPER 1 AND 2 ON ALL OTHERS

C34690P1



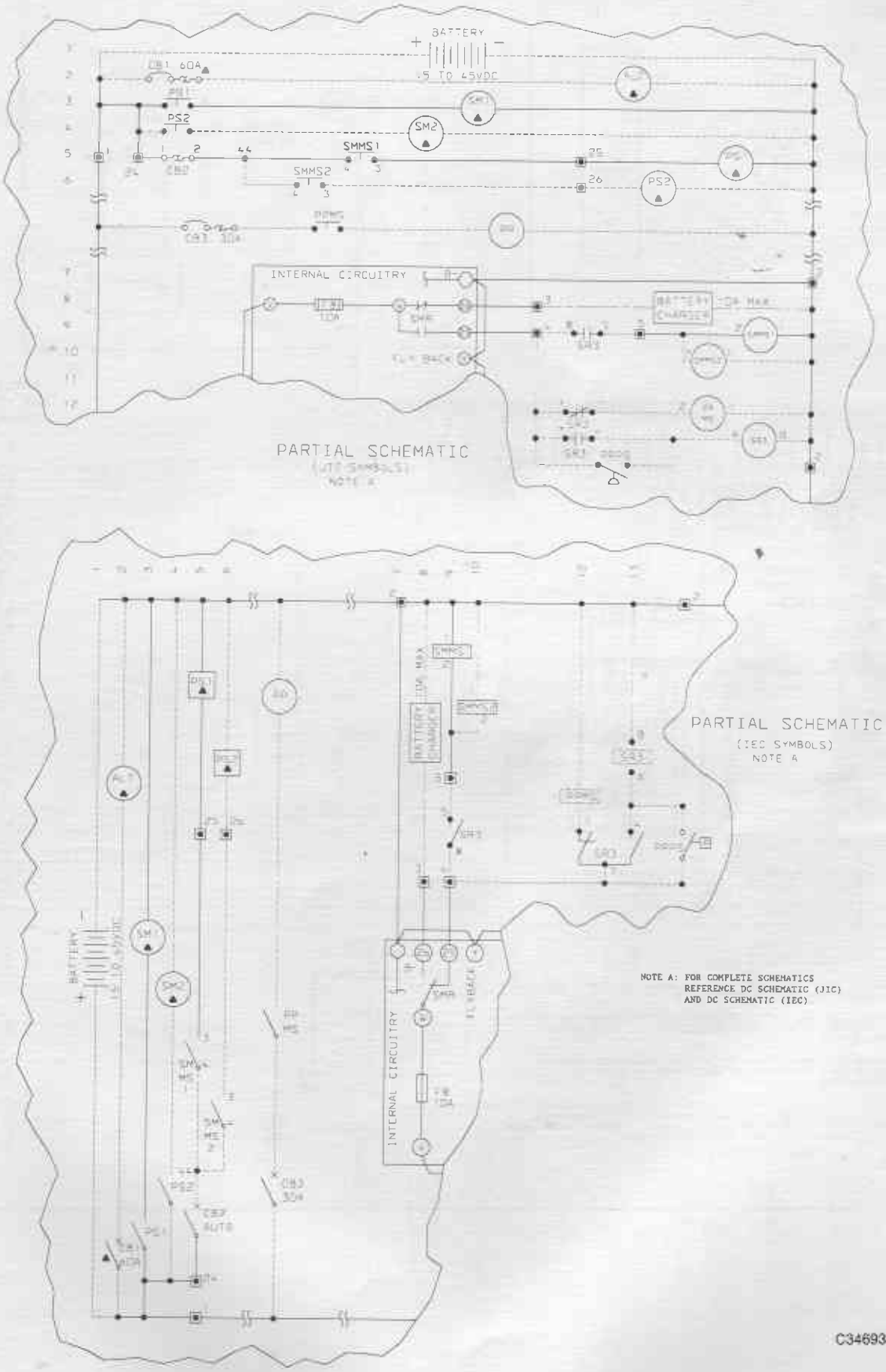
PARTIAL SCHEMATIC
(JIC SYMBOLS)
NOTE A

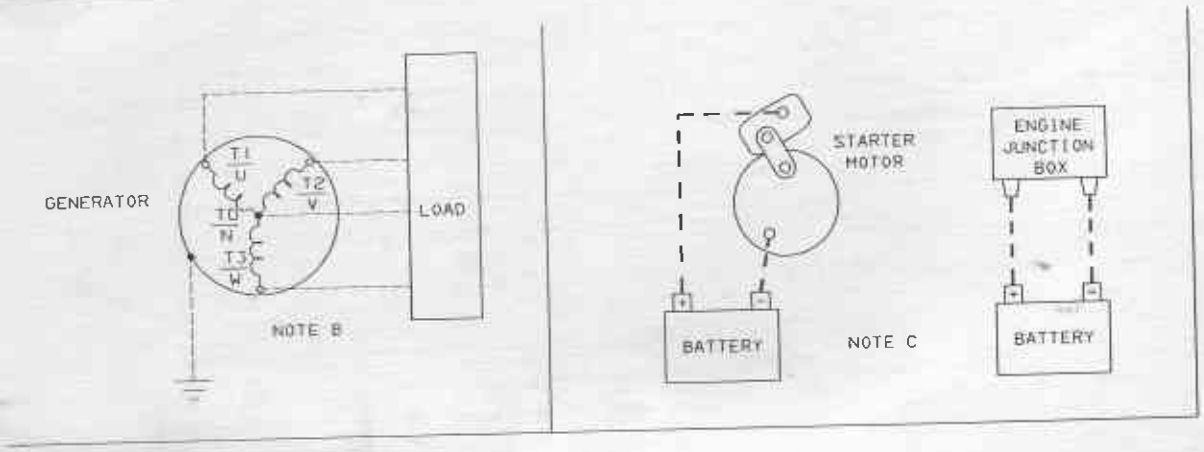


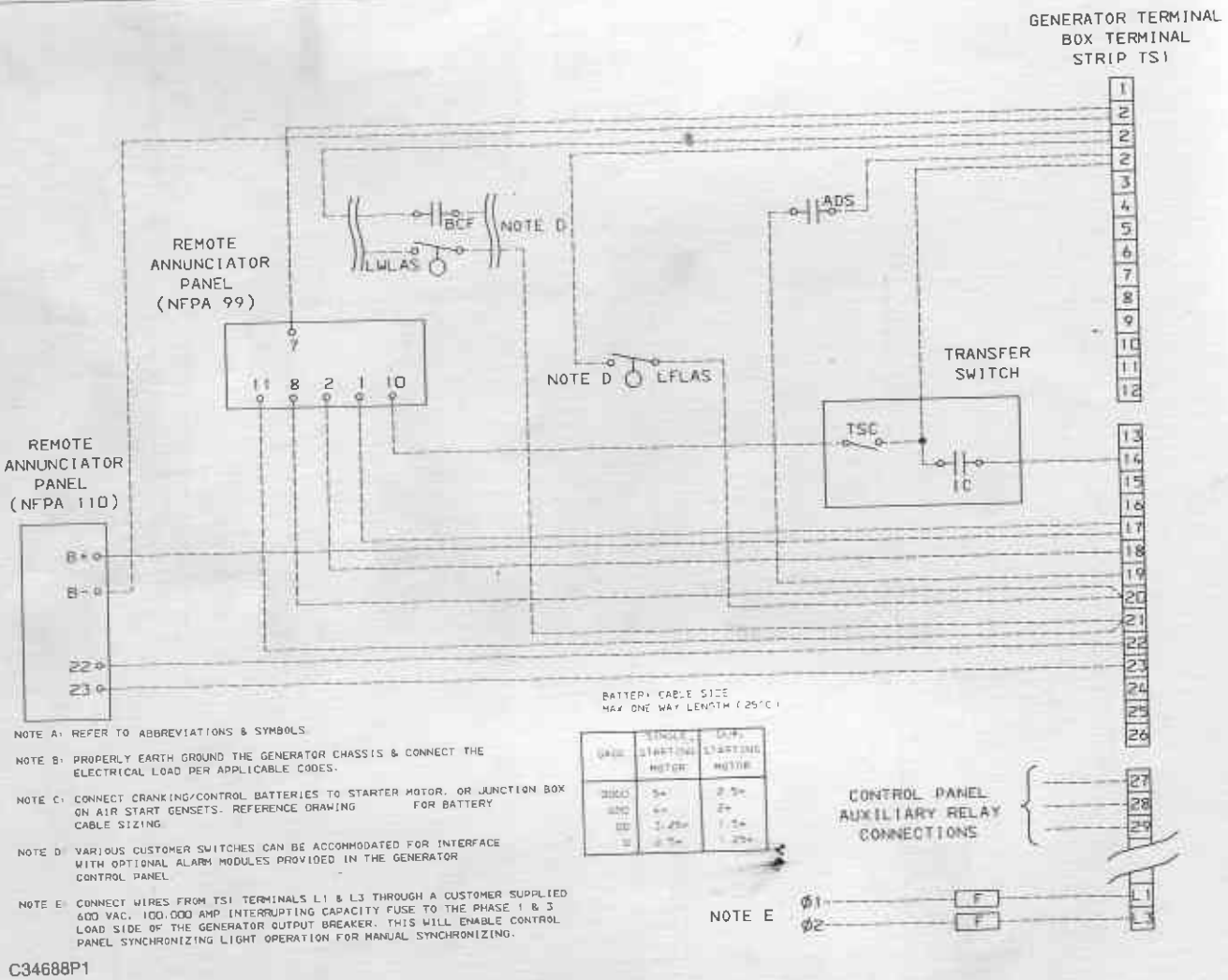
PARTIAL SCHEMATIC
(IEC SYMBOLS)
NOTE A

NOTE A: FOR COMPLETE SCHEMATICS
REFERENCE DC SCHEMATIC (JIC)
AND DC SCHEMATIC (IEC)

DC Schematic - Prelube Pump







NOTE A: REFER TO ABBREVIATIONS & SYMBOLS.

NOTE B: PROPERLY EARTH GROUND THE GENERATOR CHASSIS & CONNECT THE ELECTRICAL LOAD PER APPLICABLE CODES.

NOTE C: CONNECT CRANKING/CONTROL BATTERIES TO STARTER MOTOR, OR JUNCTION BOX ON AIR START GENSETS. REFERENCE DRAWING FOR BATTERY CABLE SIZING.

NOTE D: VARIOUS CUSTOMER SWITCHES CAN BE ACCOMMODATED FOR INTERFACE WITH OPTIONAL ALARM MODULES PROVIDED IN THE GENERATOR CONTROL PANEL.

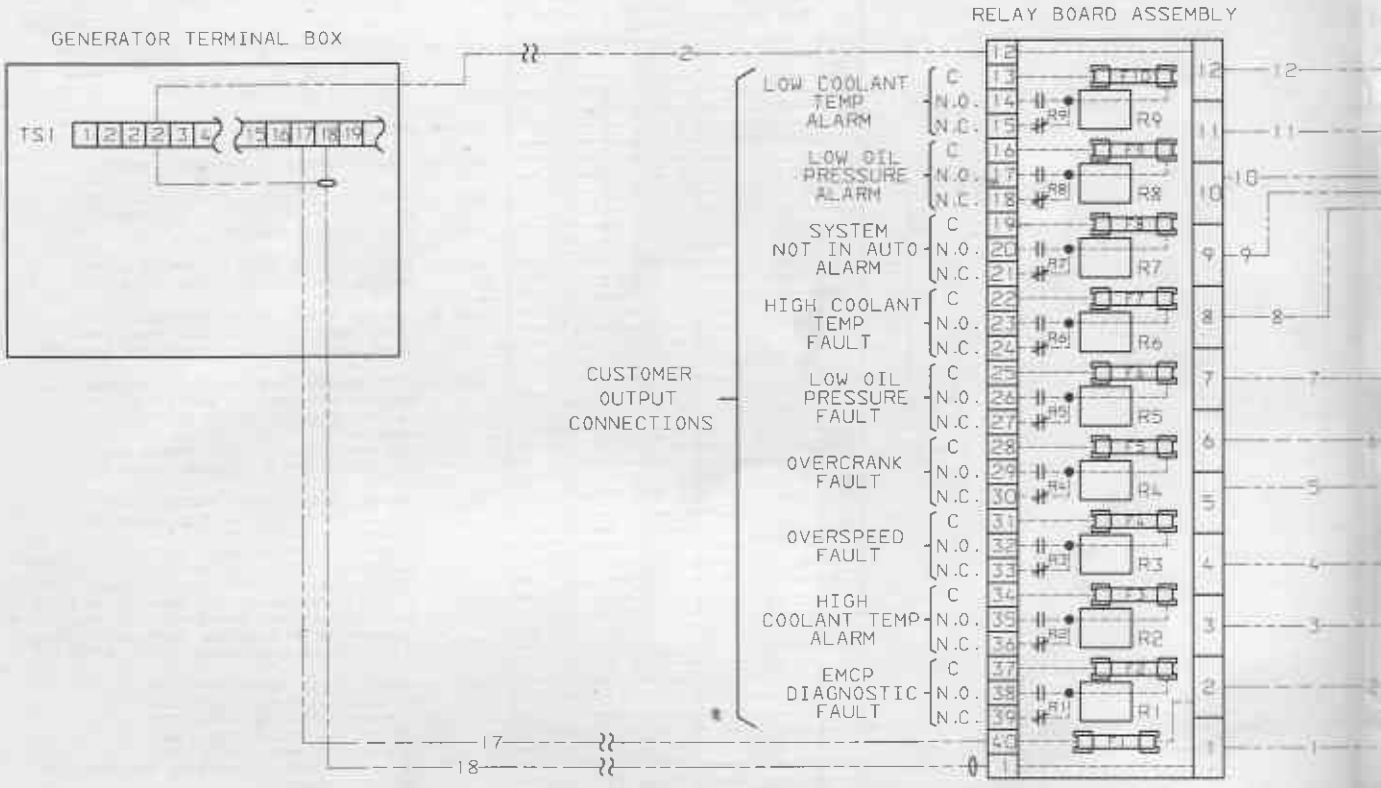
NOTE E: CONNECT WIRES FROM TS1 TERMINALS L1 & L3 THROUGH A CUSTOMER SUPPLIED 600 VAC, 100,000 AMP INTERRUPTING CAPACITY FUSE TO THE PHASE 1 & 3 LOAD SIDE OF THE GENERATOR OUTPUT BREAKER. THIS WILL ENABLE CONTROL PANEL SYNCHRONIZING LIGHT OPERATION FOR MANUAL SYNCHRONIZING.

BATTERY CABLE SIZE
MAX ONE WAY LENGTH (25°C)

GAUGE	SINGLE STARTING MOTOR	DUAL STARTING MOTOR
2000	5+	2.5+
4/0	4+	2+
00	3.25+	1.5+
0	2.5+	1.25+

C34688P1

C Wiring Diagram - Customer Interface Module (CIM)



APPLICATION INFORMATION

1. MOUNTING: THE RELAY BOARD ASSEMBLY AND THE ELECTRONIC CONTROL GROUP SHALL BE MOUNTED ON A SOLID, NON-VIBRATING SURFACE. A VERTICAL MOUNTING SURFACE IS RECOMMENDED. TO PREVENT OBJECTS FROM FALLING ON THE TERMINALS.

2. ENVIRONMENT: THE RELAY BOARD & ELECTRONIC CONTROL GROUP MUST BE MOUNTED IN A CLEAN, DRY, VIBRATION FREE ENVIRONMENT; WHERE THE AMBIENT TEMPERATURE IS BETWEEN -30 TO +65 °C (-22 TO 149 °F).

3. OPERATING VOLTAGE: 24 VOLTS DC, NOMINAL

4. RELAY CONTACTS: GOLD PLATED, RATED 1 AMP AT 24 VOLTS DC

5. FUSES: FUSES F1 THRU F10 ARE RATED 1 AMP.

6. DIAGNOSTICS: THIS SYSTEM IS EQUIPPED WITH A LOSS OF SERIAL DATA LINK DIAGNOSTICS. THE DIGITAL SERIAL DATA LINK SIGNAL IS COMMUNICATED FROM THE GENERATOR TERMINAL BOX TERMINAL STRIP TS1 TO THE RELAY BOARD ASSEMBLY VIA WIRE #18. THE SIGNAL IS THEN CONNECTED FROM THE RELAY ASSEMBLY TO THE ELECTRONIC CONTROL GROUP VIA WIRE #1. IF THE ELECTRONIC CONTROL GROUP DOES NOT RECEIVE THE SIGNAL IT WILL RESPOND BY TURNING ALL THE RELAYS ON & OFF EVERY TWO (2) SECONDS.

7. TEST MODE: THE RELAYS CAN BE ENERGIZED VIA THE SERIAL DATA LINK, BY ACTUATING THE LAMP TEST SWITCH ON THE EMCP. THIS FEATURE CAN BE DISABLED BY ADDING A JUMPER ON THE ELECTRONIC CONTROL GROUP BETWEEN TERMINALS 6 & 7.

THE RELAYS CAN ALSO BE ENERGIZED FOR TESTING, BY TEMPORARILY PLACING A JUMPER BETWEEN TERMINALS 5 & 7 ON THE ELECTRONIC CONTROL.

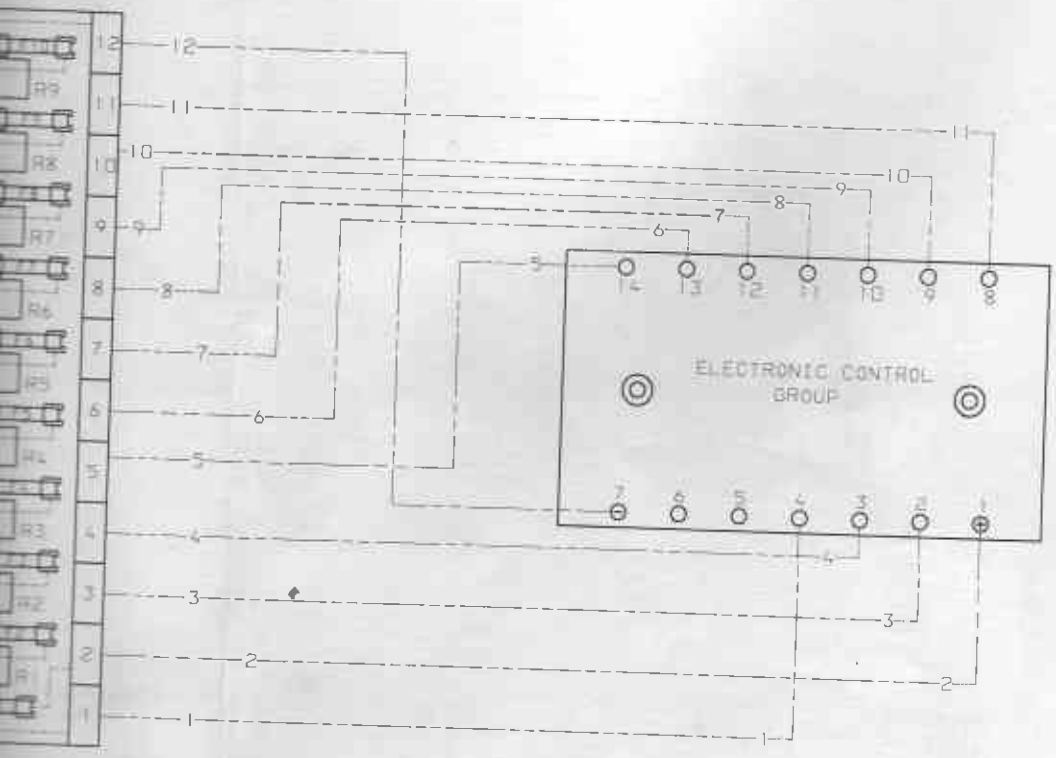
C42643P1

8. WIRING: WIRING BETWEEN THE GENERATOR TERMINAL BOX TERMINAL STRIP TS1 AND THE RELAY BOARD ASSEMBLY SHALL BE STRANDED CONDUCTOR TYPE WITH A MAXIMUM LENGTH OF WIRES #2 & 17 SHALL BE A MINIMUM SIZE OF 12 AWG. SERIAL DATA LINK WIRE #18 IS RECOMMENDED TO BE TYPE, 18 AWG MINIMUM. IT IS RECOMMENDED THAT ROUTING OF THESE WIRES AVOID SOURCES OF ELECTRI (i.e.: MOTORS, POWER CABLES, ETC.) WHERE POSSIB

9. ELECTRONIC CONTROL GROUP TERMINAL DESCRIPTION

TERMINAL NO.	DESCRIPTION
1	+ BATTERY INPUT
2	EMCP DIAGNOSTIC FAULT OUTPUT
3	HIGH COOLANT TEMPERATURE ALARM OUTPUT
4	SERIAL DATA LINK SIGNAL INPUT
5	RELAY TEST
6	RELAY TEST VIA DATA LINK
7	- BATTERY INPUT
8	LOW COOLANT TEMPERATURE ALARM OUTPUT
9	LOW OIL PRESSURE ALARM OUTPUT
10	SYSTEM NOT IN AUTO ALARM OUTPUT
11	HIGH COOLANT TEMPERATURE FAULT OUTPUT
12	LOW OIL PRESSURE FAULT OUTPUT
13	OVERCRANK FAULT OUTPUT
14	ENGINE OVERSPEED FAULT OUTPUT

ASSEMBLY



ATOR TERMINAL BOX TERMINAL
BOARD ASSEMBLY SHALL BE
WITH A MAXIMUM LENGTH OF 1000 FEET
MINIMUM SIZE OF 12 AWG. THE
IS RECOMMENDED TO BE A SHIELDED
IS RECOMMENDED THAT THE
SOURCES OF ELECTRICAL NOISE
ETC.) WHERE POSSIBLE.

TERMINAL DESCRIPTION

FAULT OUTPUT
ALARM OUTPUT
INPUT
DATA LINK
ALARM OUTPUT
ALARM OUTPUT
ALARM OUTPUT
FAULT OUTPUT
FAULT OUTPUT
FAULT OUTPUT

ABBREVIATIONS & SYMBOLS

——— CUSTOMER WIRING

- - - - - - - RELAY BOARD ASSEMBLY (PARTIAL) INTERNAL WIRING

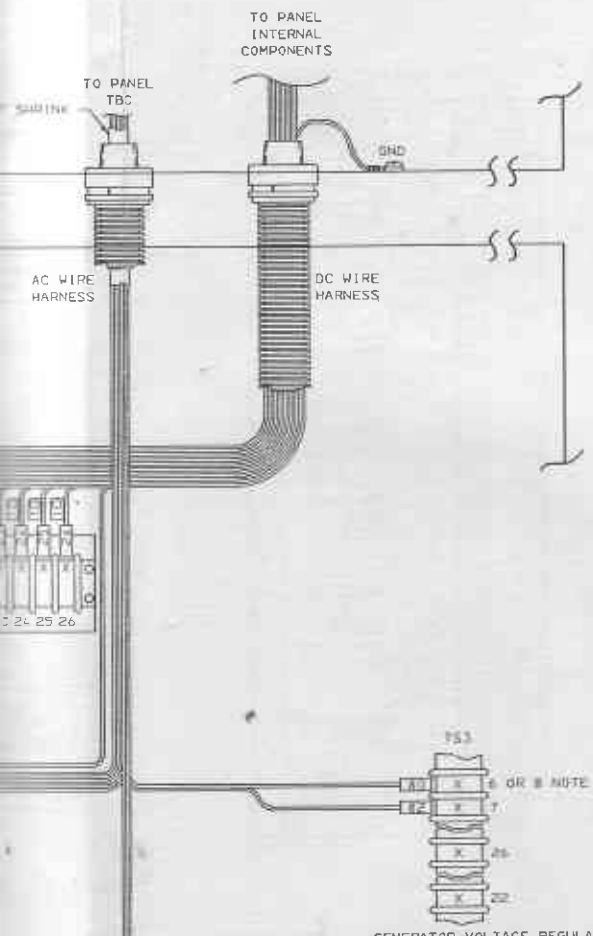
—0— SHIELDED WIRING

—| |— NORMALLY OPEN CONTACT

—|/|— NORMALLY CLOSED CONTACT

C	COMMON CONNECTION
N.C.	NORMALLY CLOSED CONTACT
N.O.	NORMALLY OPEN CONTACT
R	RELAY
F	FUSE

Wiring Diagram - Harness



NOTE F&H
HARNESS WIRE LENGTH CHART

WIRE NO	TOP MOUNTED PANELS ON 3500 GEN SET	ALL OTHER TOP MOUNTED PANELS	ALL PANELS MOUNTED WITHIN GEN TERMINAL BOX
1	2185	1067	1367
2	2090	1057	1357
2	2075	1047	1347
2	2060	1037	1337
3	2045	1027	1327
4	2030	1017	1317
5	2015	1007	1307
6	2000	997	1297
7	1985	987	1287
8	1970	977	1277
9	1955	967	1267
10	1940	957	1257
11	1925	947	1247
12	1910	937	1237
13	1895	927	1227
14	1880	917	1217
15	1865	907	1207
16	1850	897	1197
17	1835	1331	1631
18	1820	877	1177
19	1805	867	1167
20	1790	857	1157
21	1775	847	1147
22	1760	837	1137
23	1745	827	1127
24	1730	817	1117
25	1715	807	1107
26	1700	797	1097
27	2355	1331	1631
28	2377	1341	1641
29	2392	1351	65
30	2407	1371	67
31	1580	1260	560
32	1580	1250	550
33	1580	1240	540
34	1580	1230	530
80	3550	1220	1520
82	3550	1220	1520
L1	1580	1220	1520
L3	1580	1210	1510
T1	1570	1265	1565
T2	1570	1265	1565
T3	1570	1265	1565
GND	1680	1280	1580

NOTE A: NUMBER CT WIRES AT BOTH ENDS.

NOTE B: ALL HARNESS SHALL BE NO. 16 AWG, STRANDED WIRE, 90°C 600 VAC INSULATION, UL& CSA LISTED UNLESS OTHERWISE INDICATED
[10] = 10 AWG WIRE

NOTE C: USE TIES AT BRANCHES AND EVERY 76.2.

NOTE D: IDENTIFY WIRES BY TERMINAL NUMBERS.

NOTE E: WIRE IDENTIFICATION TO BE LOCATED ON WIRE 6.35 FROM TERMINAL. HOT STAMPED &/OR ADHESIVE MARKER.

NOTE F: DIMENSIONS ARE FROM THE BOTTOM OF THE CONTROL PANEL TO THE BREAK OUT POINT.

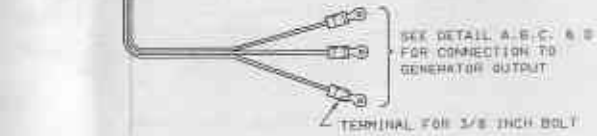
NOTE G: CONTROL PANEL DOOR TO TERMINAL STRIP INTERCONNECT WIRE ROUTING. SHALL AVOID SHARP EDGES THAT MAY DAMAGE WIRE INSULATION.

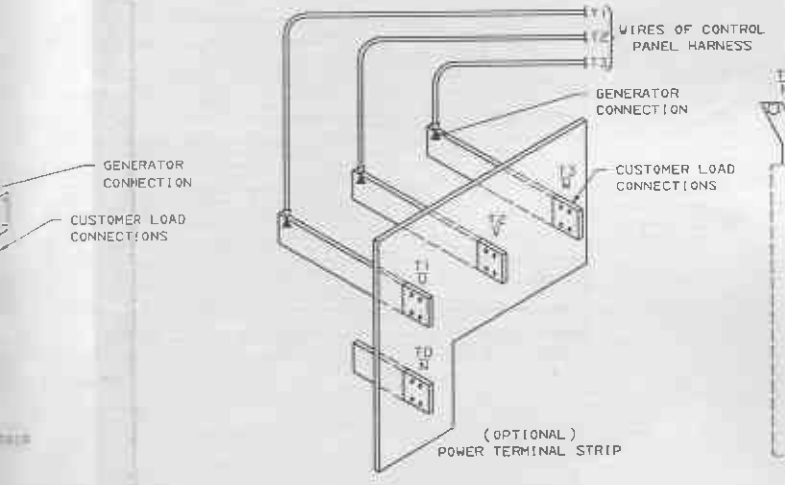
NOTE H: WIRE NUMBERS 80, 82, 50, 51, 52, 53, L1&L3 REQUIRE BREAKOUT OF 100mm & WIRES T1, T2 & T3 BREAKOUT LENGTH OF 280mm. WIRE BREAKOUT LENGTH IS DEFINED AS THE DIMENSION FROM THE HARNESS EDGE TO THE CENTER OF THE TERMINAL SCREW HOLE.

NOTE J: CONNECT CONTROL PANEL HARNESS WIRE #80 TO ONE OF THE FOLLOWING GENERATOR VOLTAGE REGULATOR TERMINALS:
TERMINAL #8 ON THE LARGE SR4 VOLTAGE REGULATOR THAT HAS MULTIPLE CIRCUIT BOARD CARDS. ACCOMPANIED BY A CONTROL PANEL WITH A 15TH CHARACTER OF "B". TERMINAL #6 ON THE SMALL SR4 VOLTAGE REGULATOR (A1/A2 OR VR3 TYPE). ACCOMPANIED BY A CONTROL PANEL WITH A MODEL NUMBER WITH A 15TH CHARACTER OF "A" OR "Y".

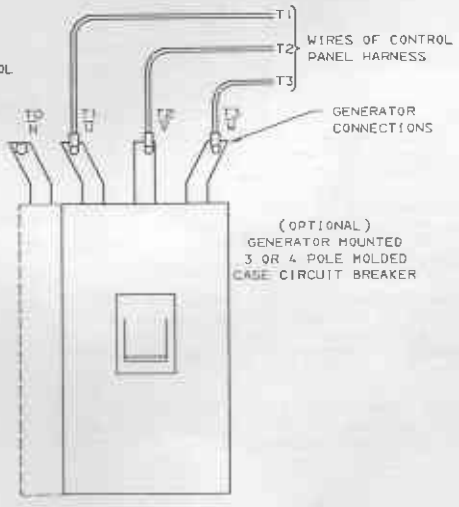
NOTE K: CONTROL PANEL GROUND WIRE SHALL BE 12 AWG WITH GREEN & YELLOW STRIPED INSULATION RATED 90°C. 600 VAC. UL & CSA. WIRE SHALL BE LABELED "GND" & SHALL HAVE AN APPROPRIATELY SIZED RING TERMINAL FOR AN 10-32 SCREW.

NOTE L: CONTROL PANEL AC AND DC WIRING HARNESS SHALL BE ROUTED WITHIN A PROTECTIVE CONVOLUTED TUBING JACKET AS SPECIFIED ON SHEET 2.





DETAIL C

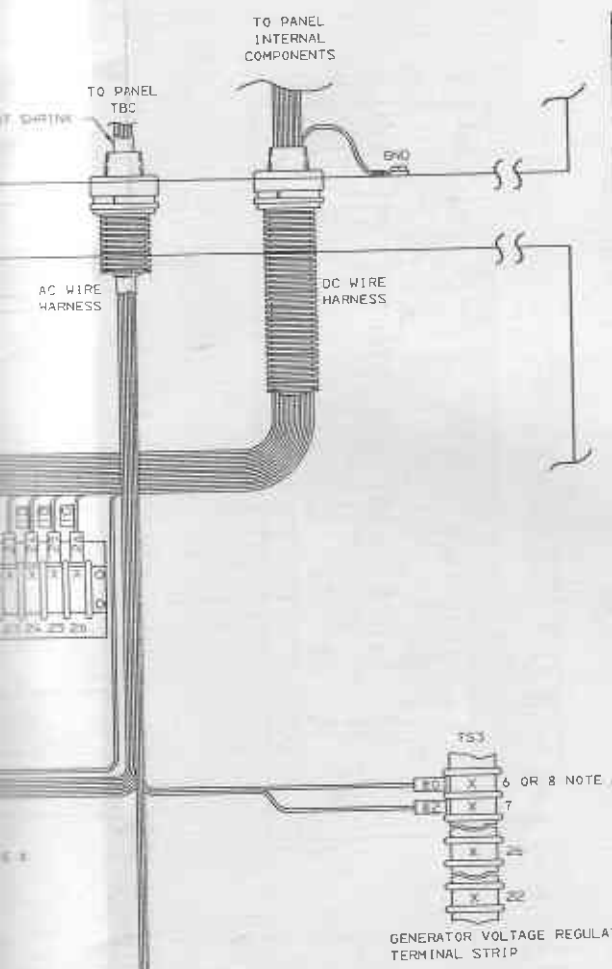


DETAIL D

C34689P1


TO PANEL
TBC
HEAT SHRINK
CONTROL PANEL
GENERATOR
AC WIRE
HARNESS

Wiring Diagram - Harness



NOTE F&H
HARNESS WIRE LENGTH CHART

WIRE NO	TOP MOUNTED PANELS ON 3500 GEN SET	ALL OTHER TOP MOUNTED PANELS	ALL PANELS MOUNTED WITHIN GEN TERMINAL BOX
1	2105	1067	1367
2	2090	1057	1357
2	2075	1047	1347
2	2060	1037	1337
3	2045	1027	1327
4	2030	1017	1317
5	2015	1007	1307
6	2000	997	1297
7	1985	987	1287
8	1970	977	1277
9	1955	967	1267
10	1940	957	1257
11	1925	947	1247
12	1910	937	1237
13	1895	927	1227
14	1880	917	1217
15	1865	907	1207
16	1850	897	1197
17	1835	1331	1631
18	1820	871	1177
19	1805	861	1167
20	1790	851	1157
21	1775	842	1147
22	1760	831	1137
23	1745	821	1127
24	1730	811	1117
25	1715	801	1107
26	1700	791	1097
27	2353	1331	1631
28	2377	1341	1641
29	2392	1351	1651
30	2429	1371	1671
50	1580	1260	1560
51	1580	1250	1550
52	1580	1240	1540
53	1580	1230	1530
80	3350	1220	1520
82	3350	1220	1520
L1	1580	1220	1520
L3	1580	1210	1510
T1	1570	1265	1565
T2	1570	1265	1565
T3	1570	1265	1565
GND	1680	1280	1580

NOTE A: NUMBER CT WIRES AT BOTH ENDS.

NOTE B: ALL HARNESS SHALL BE NO. 16 AWG. STRANDED WIRE, 90°C 600 VAC INSULATION. UL& CSA LISTED. UNLESS OTHERWISE INDICATED [10] = 10 AWG WIRE

NOTE C: USE TIES AT BRANCHES AND EVERY 76.2.

NOTE D: IDENTIFY WIRES BY TERMINAL NUMBERS.

NOTE E: WIRE IDENTIFICATION TO BE LOCATED ON WIRE 6.35 FROM TERMINAL. HOT STAMPED &/OR ADHESIVE MARKER.

NOTE F: DIMENSIONS ARE FROM THE BOTTOM OF THE CONTROL PANEL TO THE BREAK OUT POINT.

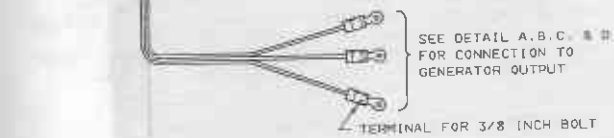
NOTE G: CONTROL PANEL DOOR TO TERMINAL STRIP INTERCONNECT WIRE ROUTING, SHALL AVOID SHARP EDGES THAT MAY DAMAGE WIRE INSULATION.

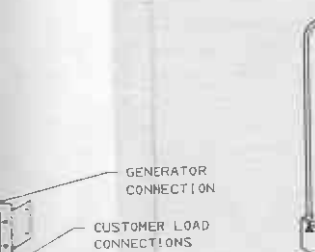
NOTE H: WIRE NUMBERS 80,82,50,51,52,53,L1&L3 REQUIRE BREAKOUT OF 100mm & WIRES T1, T2 & T3 BREAKOUT LENGTH OF 280mm. WIRE BREAKOUT LENGTH IS DEFINED AS THE DIMENSION FROM THE HARNESS EDGE TO THE CENTER OF THE TERMINAL SCREW HOLE.

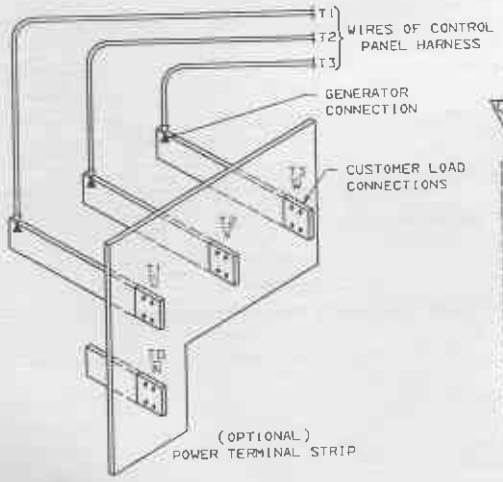
NOTE J: CONNECT CONTROL PANEL HARNESS WIRE #80 TO ONE OF THE FOLLOWING GENERATOR VOLTAGE REGULATOR TERMINALS: TERMINAL #8 ON THE LARGE SR4 VOLTAGE REGULATOR THAT HAS MULTIPLE CIRCUIT BOARD CARDS, ACCOMPANIED BY A CONTROL PANEL WITH A 15TH CHARACTER OF "B". TERMINAL #6 ON THE SMALL SR4 VOLTAGE REGULATOR(A1/A2 OR VR3 TYPE), ACCOMPANIED BY A CONTROL PANEL WITH A MODEL NUMBER WITH A 15TH CHARACTER OF "A" OR "V".

NOTE K: CONTROL PANEL GROUND WIRE SHALL BE 12 AWG WITH GREEN & YELLOW STRIPED INSULATION RATED 90°C, 600 VAC, UL & CSA. WIRE SHALL BE LABELED "GND" & SHALL HAVE AN APPROPRIATELY SIZED RING TERMINAL FOR AN 10-32 SCREW.

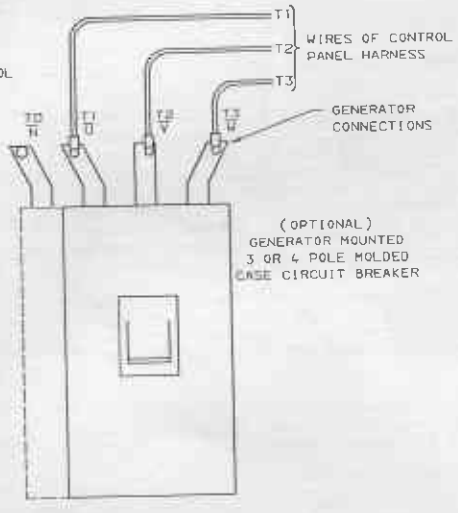
NOTE L: CONTROL PANEL AC AND DC WIRING HARNESS SHALL BE ROUTED WITHIN A PROTECTIVE CONVOLUTED TUBING JACKET AS SPECIFIED ON SHEET 2.





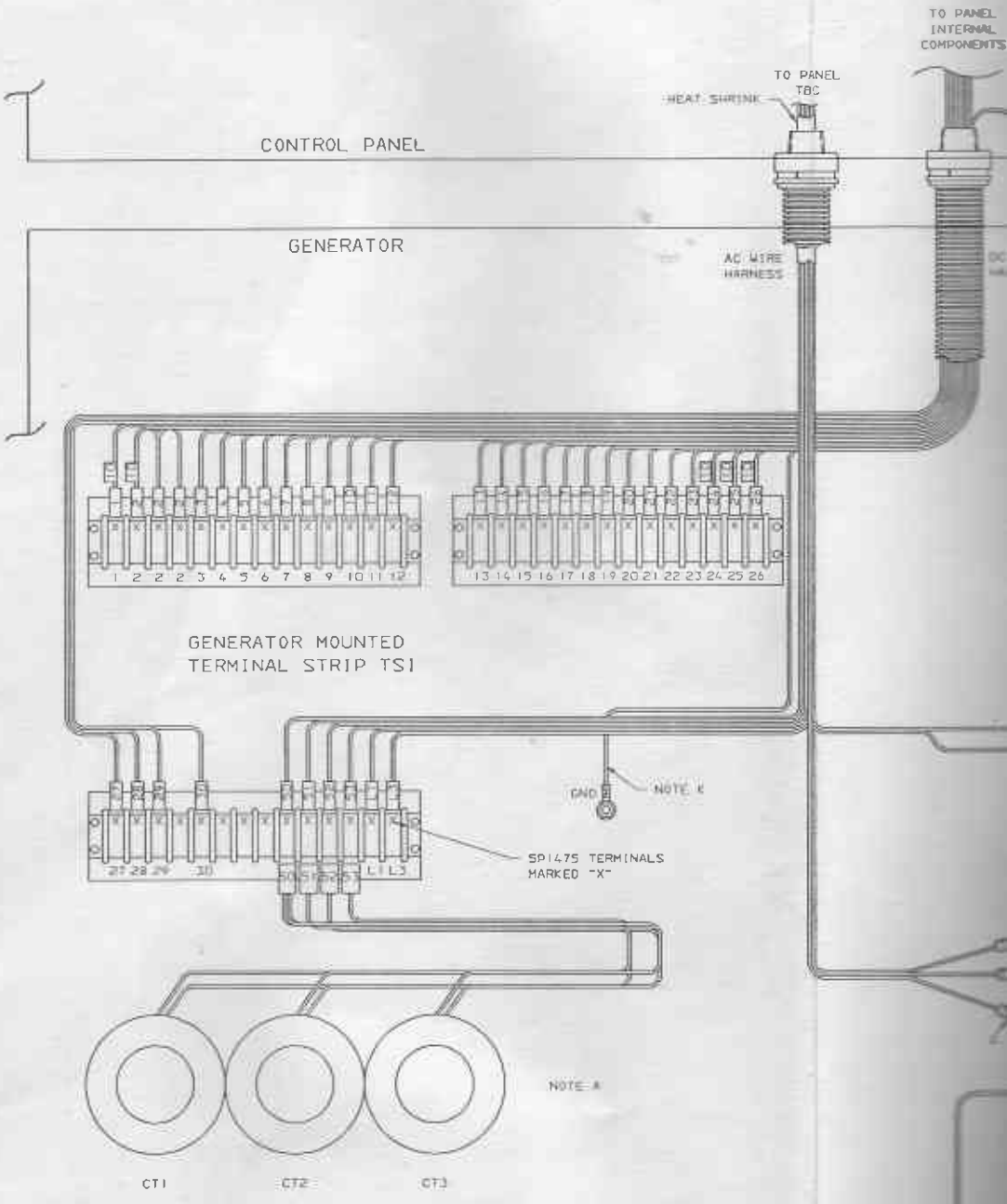


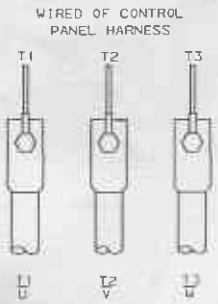
DETAIL C



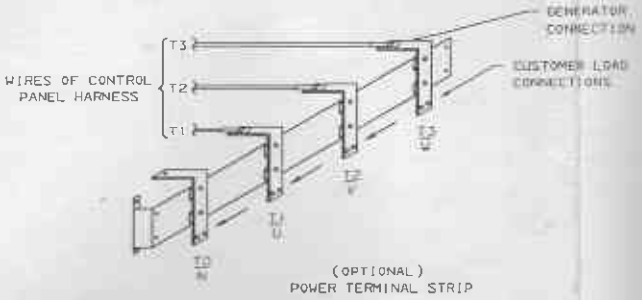
DETAIL D

C34689P1



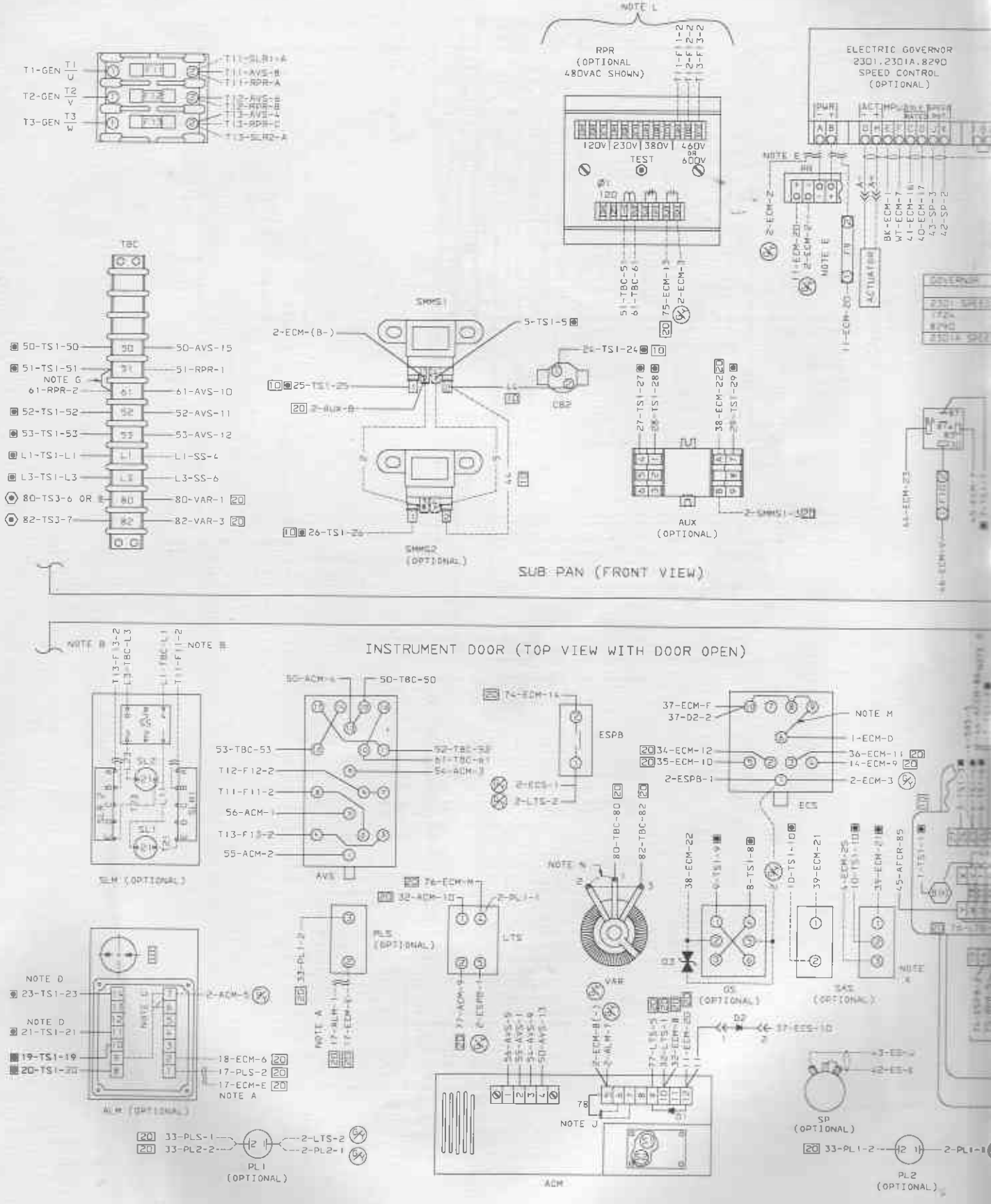


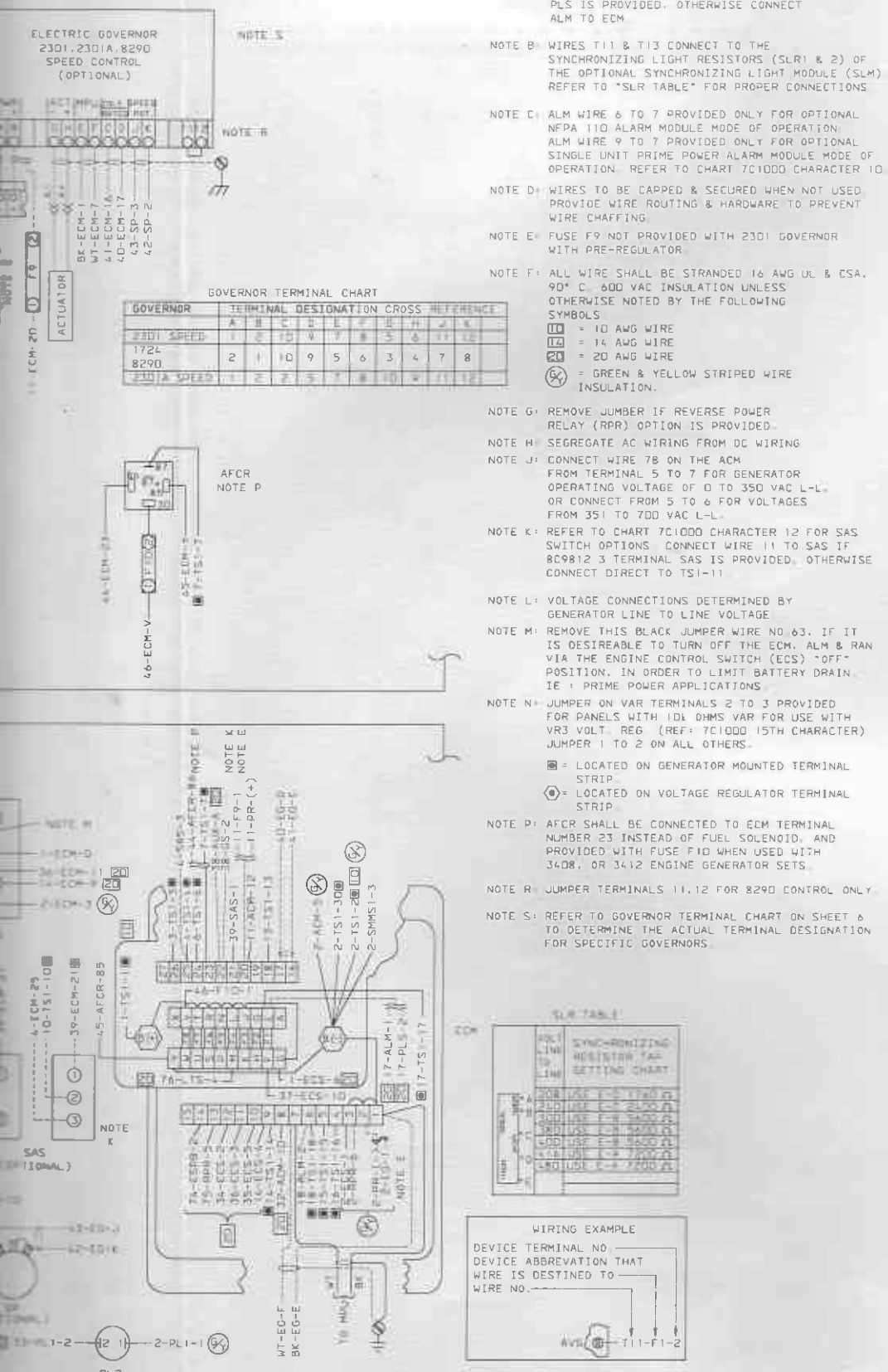
DETAIL A



DETAIL B

Wiring Diagram - Main Chassis





GOVERNOR TERMINAL CHART

GOVERNOR	TERMINAL DESIGNATION CROSS REFERENCE									
	A	B	C	D	E	F	G	H	J	K
2301 SPEED	1	2	10	9	5	6	3	4	7	8
1724 8290	2	1	10	9	5	6	3	4	7	8
2301A SPEED	1	2	3	5	7	8	10	9	11	12

NOTE A: CONNECT WIRE 17 FROM ALM TO PLS IF PLS IS PROVIDED. OTHERWISE CONNECT ALM TO ECM.

NOTE B: WIRES T11 & T13 CONNECT TO THE SYNCHRONIZING LIGHT RESISTORS (SLR1 & 2) OF THE OPTIONAL SYNCHRONIZING LIGHT MODULE (SLM) REFER TO "SLR TABLE" FOR PROPER CONNECTIONS.

NOTE C: ALM WIRE 6 TO 7 PROVIDED ONLY FOR OPTIONAL NFPA 110 ALARM MODULE MODE OF OPERATION. ALM WIRE 9 TO 7 PROVIDED ONLY FOR OPTIONAL SINGLE UNIT PRIME POWER ALARM MODULE MODE OF OPERATION. REFER TO CHART 7C1000 CHARACTER 10.

NOTE D: WIRES TO BE CAPPED & SECURED WHEN NOT USED. PROVIDE WIRE ROUTING & HARDWARE TO PREVENT WIRE CHAFFING.

NOTE E: FUSE F9 NOT PROVIDED WITH 2301 GOVERNOR WITH PRE-REGULATOR.

NOTE F: ALL WIRE SHALL BE STRANDED 16 AWG UL & CSA, 90° C., 600 VAC INSULATION UNLESS OTHERWISE NOTED BY THE FOLLOWING SYMBOLS.
- 10 = 10 AWG WIRE
- 14 = 14 AWG WIRE
- 20 = 20 AWG WIRE
- (GY) = GREEN & YELLOW STRIPED WIRE INSULATION.

NOTE G: REMOVE JUMBER IF REVERSE POWER RELAY (RPR) OPTION IS PROVIDED.

NOTE H: SEGREGATE AC WIRING FROM DC WIRING.

NOTE J: CONNECT WIRE 78 ON THE ACM FROM TERMINAL 5 TO 7 FOR GENERATOR OPERATING VOLTAGE OF 0 TO 350 VAC L-L. OR CONNECT FROM 5 TO 6 FOR VOLTAGES FROM 351 TO 700 VAC L-L.

NOTE K: REFER TO CHART 7C1000 CHARACTER 12 FOR SAS SWITCH OPTIONS. CONNECT WIRE 11 TO SAS IF BC9812 3 TERMINAL SAS IS PROVIDED. OTHERWISE CONNECT DIRECT TO TS1-11.

NOTE L: VOLTAGE CONNECTIONS DETERMINED BY GENERATOR LINE TO LINE VOLTAGE.

NOTE M: REMOVE THIS BLACK JUMPER WIRE NO. 63. IF IT IS DESIREABLE TO TURN OFF THE ECM, ALM & RAN VIA THE ENGINE CONTROL SWITCH (ECS) "OFF" POSITION. IN ORDER TO LIMIT BATTERY DRAIN. IE : PRIME POWER APPLICATIONS.

NOTE N: JUMPER ON VAR TERMINALS 2 TO 3 PROVIDED FOR PANELS WITH 100 OHMS VAR FOR USE WITH VR3 VOLT. REG. (REF: 7C1000 15TH CHARACTER) JUMPER 1 TO 2 ON ALL OTHERS.

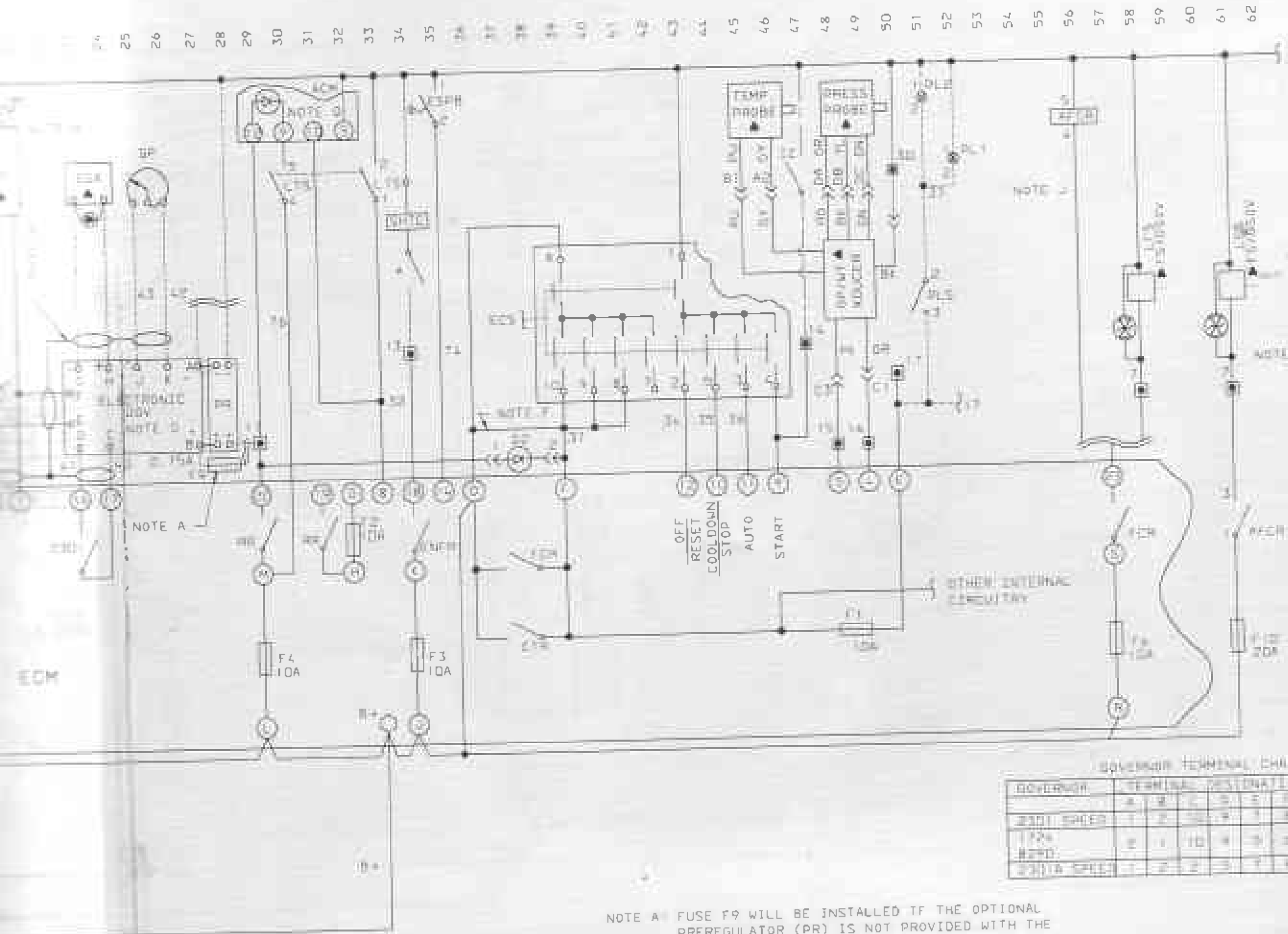
- ▣ = LOCATED ON GENERATOR MOUNTED TERMINAL STRIP.
- ⬡ = LOCATED ON VOLTAGE REGULATOR TERMINAL STRIP.

NOTE P: AFCR SHALL BE CONNECTED TO ECM TERMINAL NUMBER 23 INSTEAD OF FUEL SOLENOID, AND PROVIDED WITH FUSE F10 WHEN USED WITH 3408, OR 3412 ENGINE GENERATOR SETS.

NOTE R: JUMPER TERMINALS 11,12 FOR 8290 CONTROL ONLY.

NOTE S: REFER TO GOVERNOR TERMINAL CHART ON SHEET 6 TO DETERMINE THE ACTUAL TERMINAL DESIGNATION FOR SPECIFIC GOVERNORS.

C34687P1



GOVERNOR TERMINAL CHART

GOVERNOR	TERMINAL DESIGNATION CROSS REFERENCE									
	A	B	C	D	E	F	G	H	J	K
2301 SPEED	1	2	10	9	7	8	5	6	11	12
1724 8290	2	1	10	4	3	3	7	6	7	8
2301A SPEED	1	2	2	3	7	8	10	9	11	12

NOTE A: FUSE F9 WILL BE INSTALLED IF THE OPTIONAL PREREGULATOR (PR) IS NOT PROVIDED WITH THE OPTIONAL 2301 GOVERNOR

NOTE B: THE INPUT TO THE ECM REMOTE & SPARE SHUTDOWN INPUT MUST BE A B- SIGNAL APPLIED FOR 250mSEC OR LONGER TO ASSURE PROPER OPERATION

NOTE C: CONNECT ALM TERMINAL POINT 7 TO POINT 6 FOR NFPA110 ALARM MODULE OPERATING MODE. NO CONNECTION REQUIRED FOR NFPA99 OPERATION

NOTE D: REFER TO AC SCHEMATIC FOR ADDITIONAL ACM CONNECTIONS

NOTE E: SPARE INPUT FOR CUSTOMER DEFINED USE, WITH CUSTOMER PROVIDED SWITCH (RATED FOR 4ma, 12VDC OPERATION)

NOTE F: REMOVE THIS BLACK JUMPER WIRE NO 63. IF IT IS DESIRABLE TO TURN OFF THE ECM, ALM & RAN VIA THE ENGINE CONTROL SWITCH (ECS) "OFF" POSITION. IN ORDER TO LIMIT BATTERY DRAIN. IE - PRIME POWER APPLICATIONS

NOTE G: REFER TO GOVERNOR TERMINAL CHART TO DETERMINE THE ACTUAL TERMINAL DESIGNATION FOR SPECIFIC GOVERNORS

NOTE H: ROUTE SHIELDED MPU JUMPER CABLE FROM ECM TO ELECTRONIC GOVERNOR, IF PROVIDED. GROUND SHIELD AT ECM ONLY

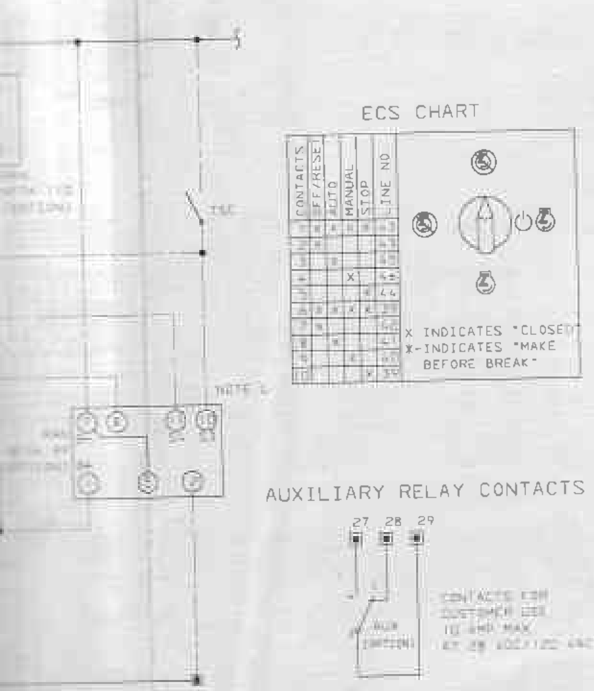
NOTE J: AFCR SHALL BE CONNECTED TO ECM TERMINAL NUMBER 23 INSTEAD OF FUEL SOLENOID, AND PROVIDED WITH FUSE F10 WHEN USED WITH 3408, OR 3412 ENGINE GENERATOR SETS.

NOTE K: UP TO 3 ALARM MODULES WITH A COMBINED WIRE LENGTH OF 300 METERS MAY BE DRIVEN FROM THE DATA LINK

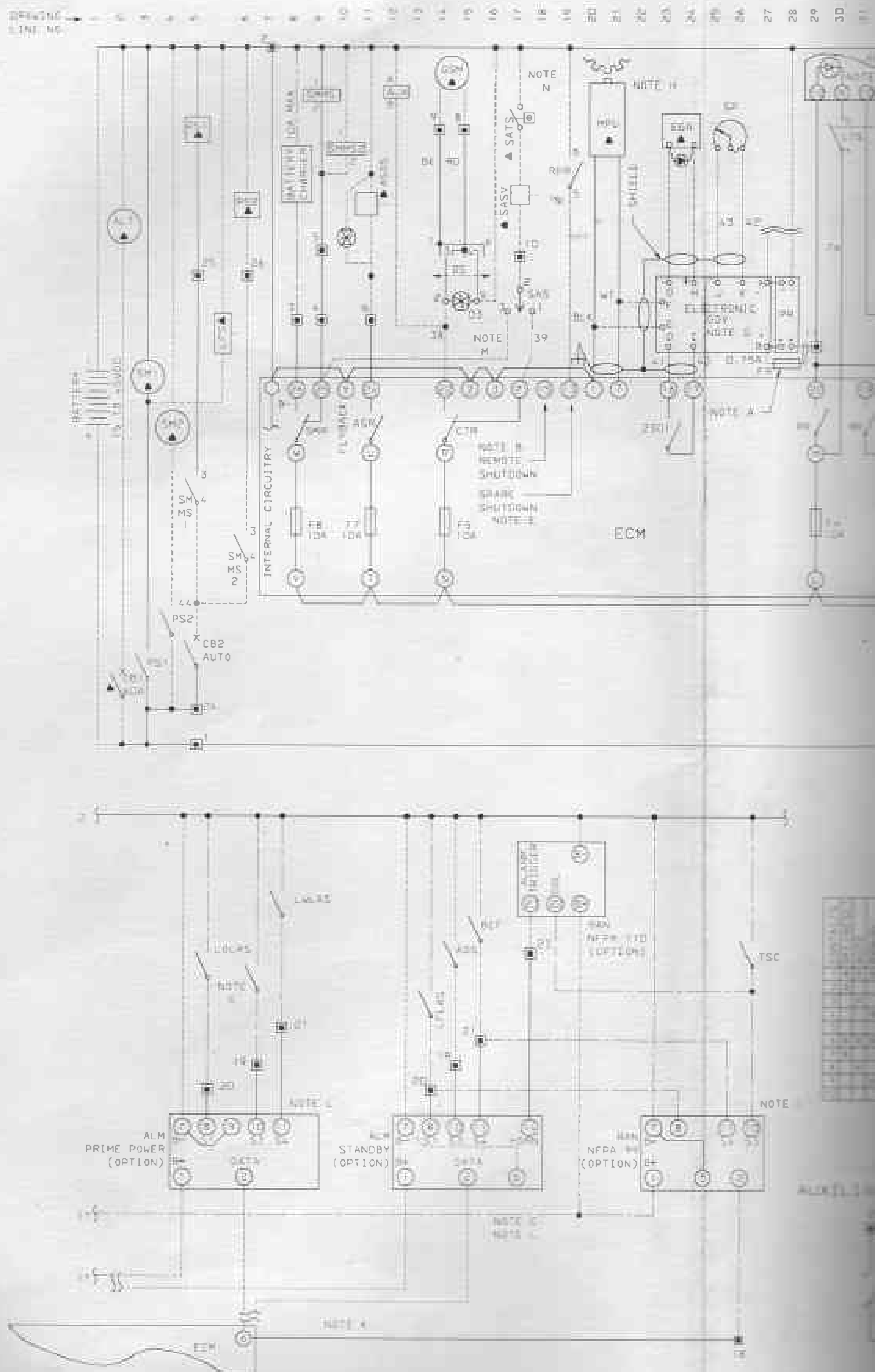
NOTE L: SWITCHED INPUT TERMINALS 10 AND 11 ON THE ALARM MODULES MUST BE JUMPERED TO TERMINALS 3 AND 4, RESPECTIVELY. IF IT IS DESIRED TO SOUND HORN IN CONJUNCTION WITH FLASHING LAMP

NOTE M: 3 POSITION SAS PROVIDED WITH SEMIAUTOMATIC ETHER INJECTION CONNECT SAS TERM NO 3 TO ECM TERM. NO 25 AND SAS TERM NO 1 TO ECM TERM. NO.21, IF PROVIDED 2 POSITION SAS PROVIDED WITH MANUAL ETHER INJECTION. CONNECT SAS TERM. NO 1 TO ECM TERM NO.21. NO CONNECTION TO ECM TERM NO.25.

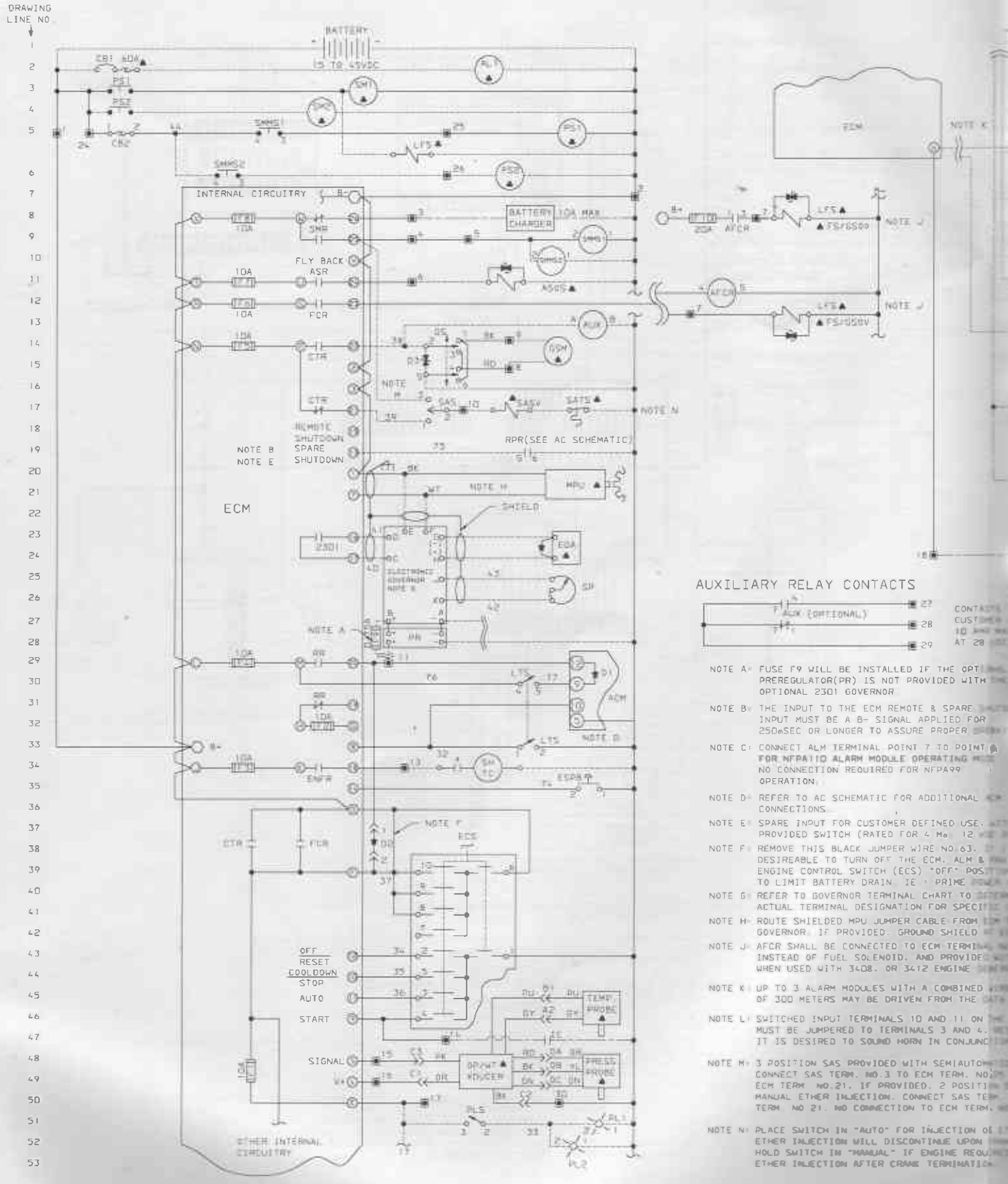
NOTE N: PLACE SWITCH IN "AUTO" FOR INJECTION OF ETHER DURING CRANKING ETHER INJECTION WILL DISCONTINUE UPON CRANK TERMINATION. HOLD SWITCH IN "MANUAL" IF ENGINE REQUIRES ADDITIONAL ETHER INJECTION AFTER CRANK TERMINATION.



C34695P1


DRAWING LINE NO.
BATTERY
ALT
SM1
SM2
PS1
PS2
CB2 AUTO
SM MS 1
SM MS 2
BATTERY CHARGER
INTERNAL CIRCUITRY
FB 10A
F7 10A
F5 10A
ECM
AGK
CTR
NOTE B REMOTE SHUTDOWN
SPARE SHUTDOWN
NOTE N
NOTE M
SATS
SASV
MPU
SHIELD
ELECTRONIC GOV
NOTE A
LWLAS
LOCAS
BCF
TSC
LFLAS
ALARM
BAN NFPA STD (OPTION)
ALM PRIME POWER (OPTION)
DATA
ALM STANDBY (OPTION)
BAN NFPA (OPTION)
NOTE L
ECM

DC Schematic (JIC)



NOTE A: FUSE F9 WILL BE INSTALLED IF THE OPTIONAL PREREGULATOR(PR) IS NOT PROVIDED WITH OPTIONAL 2301 GOVERNOR

NOTE B: THE INPUT TO THE ECM REMOTE & SPARE INPUT MUST BE A B- SIGNAL APPLIED FOR 250mSEC OR LONGER TO ASSURE PROPER

NOTE C: CONNECT ALM TERMINAL POINT 7 TO POINT FOR NFPA110 ALARM MODULE OPERATING NO CONNECTION REQUIRED FOR NFPA99 OPERATION.

NOTE D: REFER TO AC SCHEMATIC FOR ADDITIONAL CONNECTIONS.

NOTE E: SPARE INPUT FOR CUSTOMER DEFINED USE. PROVIDED SWITCH (RATED FOR 4 Ma. 12

NOTE F: REMOVE THIS BLACK JUMPER WIRE NO.63. DESIREABLE TO TURN OFF THE ECM, ALM & ENGINE CONTROL SWITCH (ECS) "OFF" POS TO LIMIT BATTERY DRAIN. IE : PRIME

NOTE G: REFER TO GOVERNOR TERMINAL CHART TO ACTUAL TERMINAL DESIGNATION FOR SPECI

NOTE H: ROUTE SHIELDED MPU JUMPER CABLE FROM GOVERNOR. IF PROVIDED. GROUND SHIELD

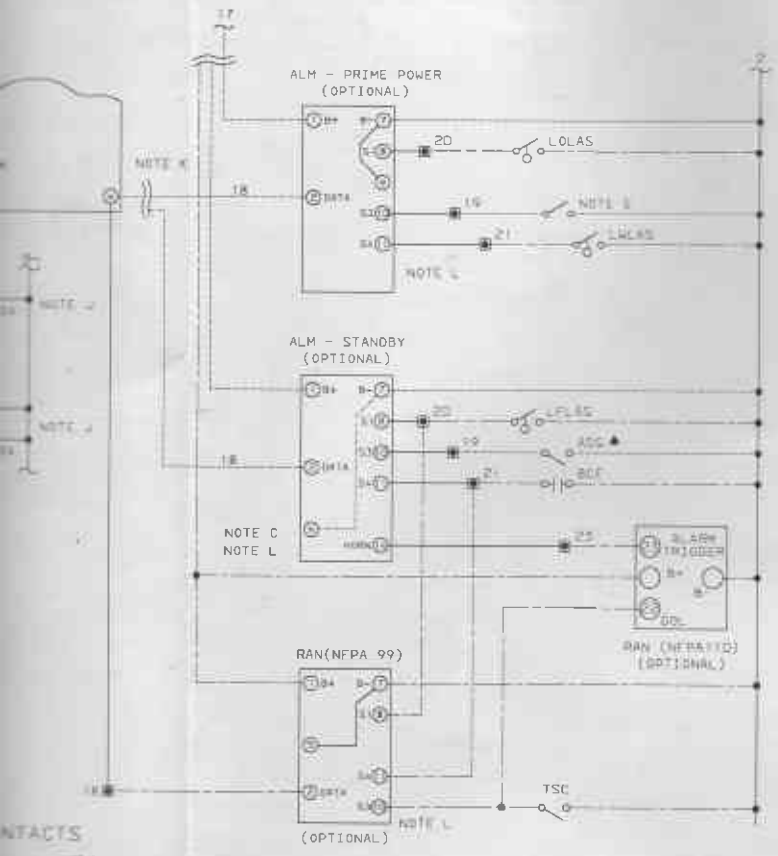
NOTE J: AFCR SHALL BE CONNECTED TO ECM TERMI INSTEAD OF FUEL SOLENOID. AND PROVIDE WHEN USED WITH 3408. OR 3412 ENGINE

NOTE K: UP TO 3 ALARM MODULES WITH A COMBINED OF 300 METERS MAY BE DRIVEN FROM THE

NOTE L: SWITCHED INPUT TERMINALS 10 AND 11 ON MUST BE JUMPERED TO TERMINALS 3 AND 4. IT IS DESIRED TO SOUND HORN IN CONJUNC

NOTE M: 3 POSITION SAS PROVIDED WITH SEMI AUTO CONNECT SAS TERM. NO.3 TO ECM TERM. NO. ECM TERM NO.21. IF PROVIDED. 2 POSITI MANUAL ETHER INJECTION. CONNECT SAS TE TERM. NO 21. NO CONNECTION TO ECM TERM.

NOTE N: PLACE SWITCH IN "AUTO" FOR INJECTION O ETHER INJECTION WILL DISCONTINUE UPON HOLD SWITCH IN "MANUAL." IF ENGINE REQU ETHER INJECTION AFTER CRANK TERMINATI



NTACTS

27
28
29

CONTACTS FOR
CUSTOMER USE
10 AMP MAX
AT 28 VDC/120 VAC

NSTALLED IF THE OPTIONAL
IS NOT PROVIDED WITH THE

ION REMOTE & SPARE SHUTDOWN
SIGNAL APPLIED FOR
ASSURE PROPER OPERATION

POINT 7 TO POINT 6
OPERATING MODE
FOR NFPA99

FOR ADDITIONAL ACM

DEFINED USE. WITH CUSTOMER
FOR 4 Ma. 12 VDC OPERATION)
WIRE NO 63. IF IT IS
THE ECM. ALM & RAN VIA THE
(ECS) "OFF" POSITION IN ORDER
IE : PRIME POWER APPLICATIONS.
CHART TO DETERMINE THE
FOR SPECIFIC GOVERNORS
CABLE FROM ECM TO ELECTRONIC
GROUND SHIELD AT ECM ONLY.
TO ECM TERMINAL NUMBER 23
10. AND PROVIDED WITH FUSE F10
OR 3412 ENGINE GENERATOR SETS

WITH A COMBINED WIRE LENGTH
DRIVEN FROM THE DATA LINK

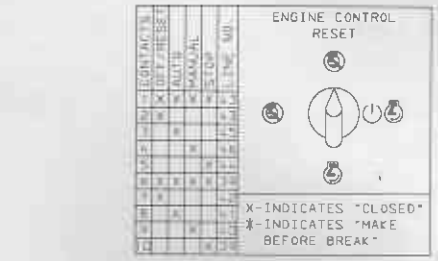
10 AND 11 ON THE ALARM MODULES
MINALS 3 AND 4. RESPECTIVELY. IF
HORN IN CONJUNCTION WITH FLASHING LAMP

WITH SEMIAUTOMATIC ETHER INJECTION
TO ECM TERM. NO 25 AND SAS TERM. NO 1 TO
2 POSITION SAS PROVIDED WITH
CONNECT SAS TERM. NO 1 TO ECM
TO ECM TERM. NO 25

FOR INJECTION OF ETHER DURING CRANKING
DISCONTINUE UPON CRANK TERMINATION.
IF ENGINE REQUIRES ADDITIONAL
CRANK TERMINATION

ECS CHART

CONTACTS	OFF/RESET	AUTO	MANUAL	START	STOP
1		X	X	X	
2	X				
3					X
4		X	X	X	
5					X
6		X	X	X	
7					X
8	X	X	X	X	
9					X
10	X				
11					X
12		X	X	X	

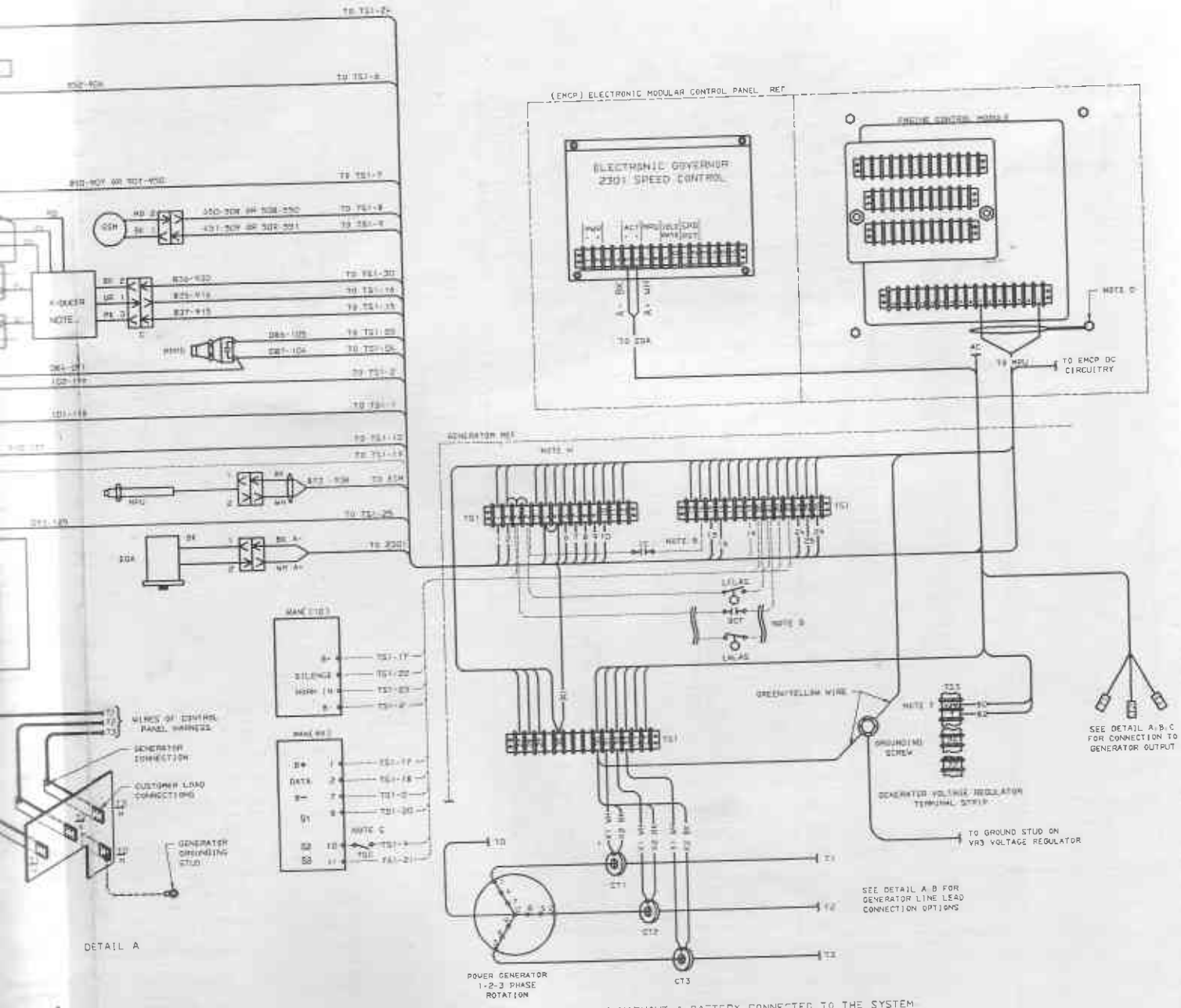


GOVERNOR TERMINAL CHART

GOVERNOR	TERMINAL DESIGNATION CROSS REFERENCE											
	A	B	C	D	E	F	G	H	J	K	L	
2301 SPEED	1	2	10	9	7	8	3	6	11	12		
172-4240	2	1	10	9	5	6	3	4	7	8		
2301A SPEED	1	2	3	5	7	8	10	9	11	12		

C34694P1

Wiring Diagram - 3500 Engines (With Air Starting)



NOTE A: DO NOT OPERATE ALTERNATOR WITHOUT A BATTERY CONNECTED TO THE SYSTEM. DO NOT POLARIZE ALTERNATOR. DO NOT OPERATE ALTERNATOR SIMULTANEOUSLY WITH A DC GENERATOR TO CHARGE A COMMON BATTERY.

NOTE B: TO BE WIRED TO ENGINE STARTING CONTACT (N.O.) IN AUTO TRANSFER SWITCH BY CUSTOMER.

NOTE C: AUXILLIARY CONTACT (N.O.) ON EMERGENCY SIDE OF TRANSFER SWITCH REQUIRED ONLY WHEN OPTIONAL GENERATOR SET ANNUNCIATOR PANEL (REMOTE) IS PROVIDED (FOR GENERATING INDICATION).

NOTE D: GROUND SHIELDED CABLES AT 2301 ELECTRONIC GOVERNOR CONTROL OR ENGINE CONTROL MODULE ONLY.

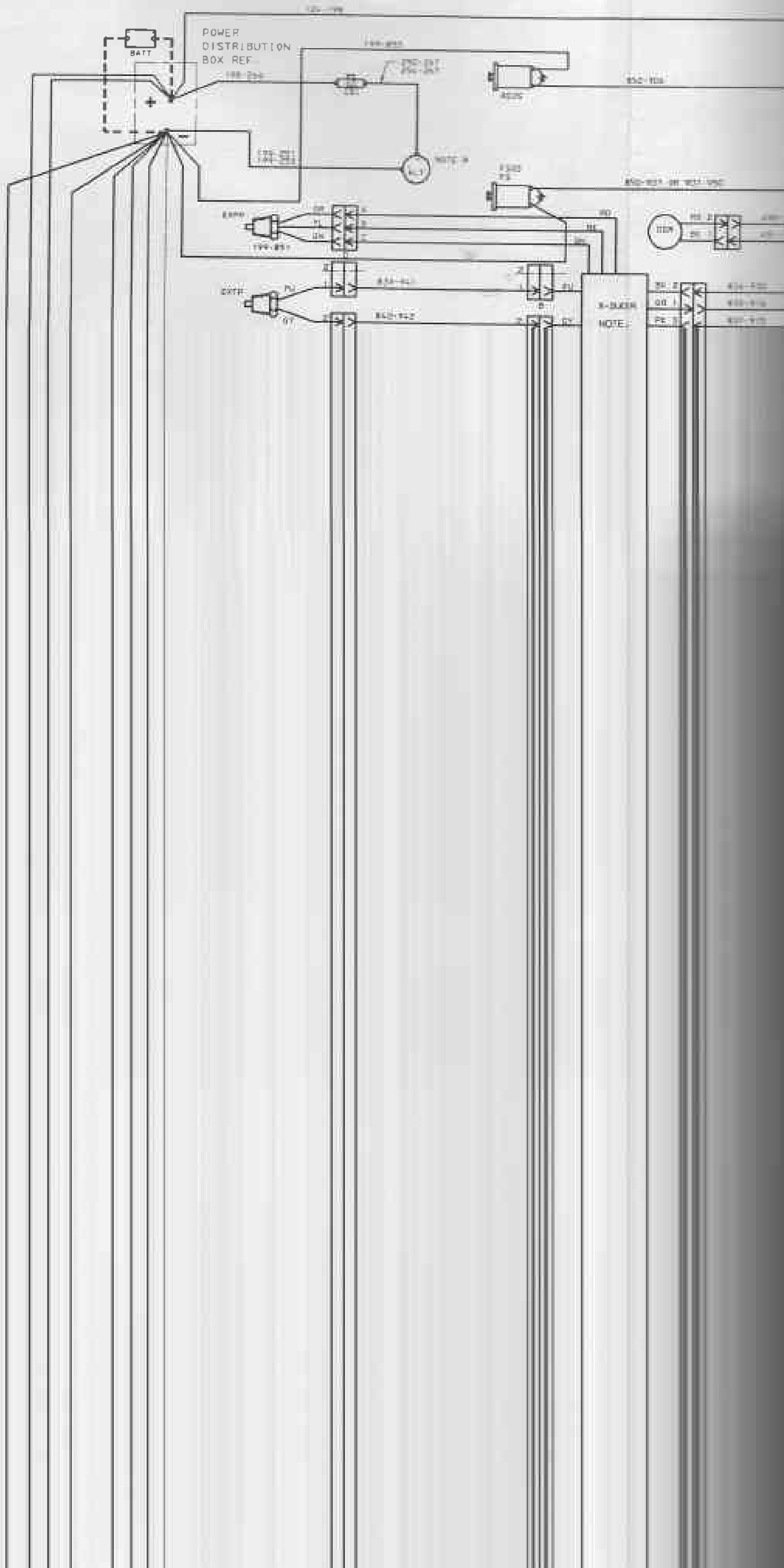
NOTE F: WHEN THE LARGE SR4 VOLTAGE REGULATOR, THAT HAS MULTIPLE CIRCUIT BOARDS, IS PROVIDED
1. DISCONNECT THE WHITE WIRE FROM TERMINAL NO. 7 ON THE TERMINAL STRIP OF THE REGULATOR ASSEMBLY, AND INSULATE IT FOR PROTECTION.
2. CONNECT THE CONTROL PANEL HARNESS WIRE NO. 80 TO THE TERMINAL NO. 8.
WHEN THE SMALL SR4 VOLTAGE REGULATOR (KIT/AS TYPE) IS PROVIDED
1. DISCONNECT THE WHITE WIRE FROM TERMINAL NO. 7 ON THE TERMINAL STRIP OF THE REGULATOR ASSEMBLY, AND INSULATE IT FOR PROTECTION.
2. CONNECT CONTROL PANEL HARNESS WIRE NO. 80 TO TERMINAL NO. 8.
WHEN THE VR3 (COMPLETELY ENCLOSED) VOLTAGE REGULATOR IS PROVIDED
REMOVE THE JUMPER BETWEEN VR3 TERMINALS 6 & 7, AND CONNECT CONTROL PANEL WIRE NO. 80 TO TERMINAL NO. 6.

...MODATED FOR INTERFACE WITH
...VIDED IN THE GENERATOR CONTROL PANEL.

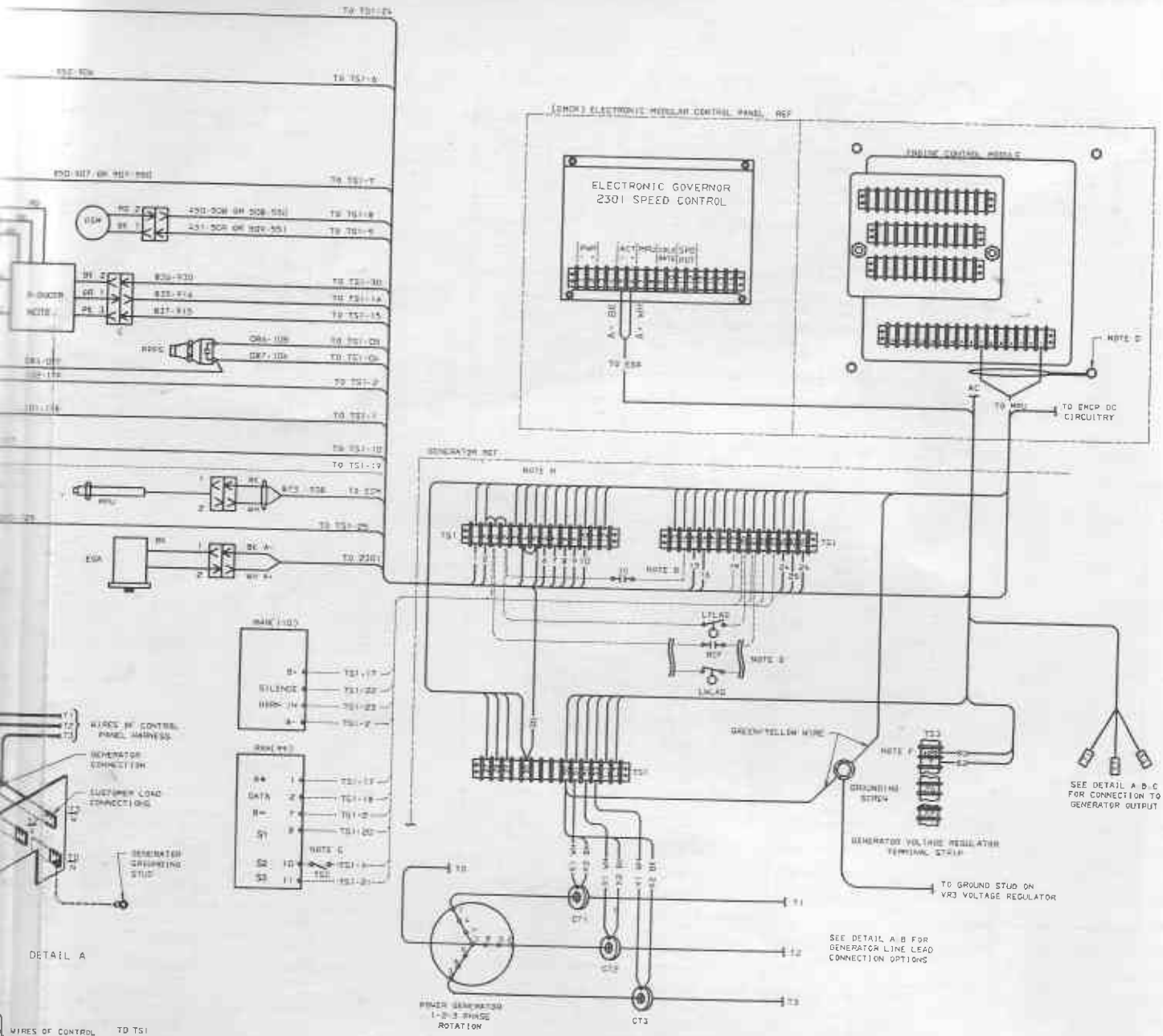
...T-05 WHEN A PRELUBE PUMP IS USED.

...ER GENERATOR SETS HAVE THE OIL
... DUCER (PRESSURE/TEMPERATUR MODULE)

Wiring



Wiring Diagram - 3500 Engines (With Air Starting)



NOTE A: DO NOT OPERATE ALTERNATOR WITHOUT A BATTERY CONNECTED TO THE SYSTEM. DO NOT POLARIZE ALTERNATOR. DO NOT OPERATE ALTERNATOR SIMULTANEOUSLY WITH A DC GENERATOR TO CHARGE A COMMON BATTERY.

NOTE B: TO BE WIRED TO ENGINE STARTING CONTACT (N.C.) IN AUTO TRANSFER SWITCH BY CUSTOMER.

NOTE C: AUXILLIARY CONTACT (N.O.) ON EMERGENCY SIDE OF TRANSFER SWITCH REQUIRED ONLY WHEN OPTIONAL GENERATOR SET ANNUNCIATOR PANEL (REMOTE) IS PROVIDED (FOR GENERATING INDICATION).

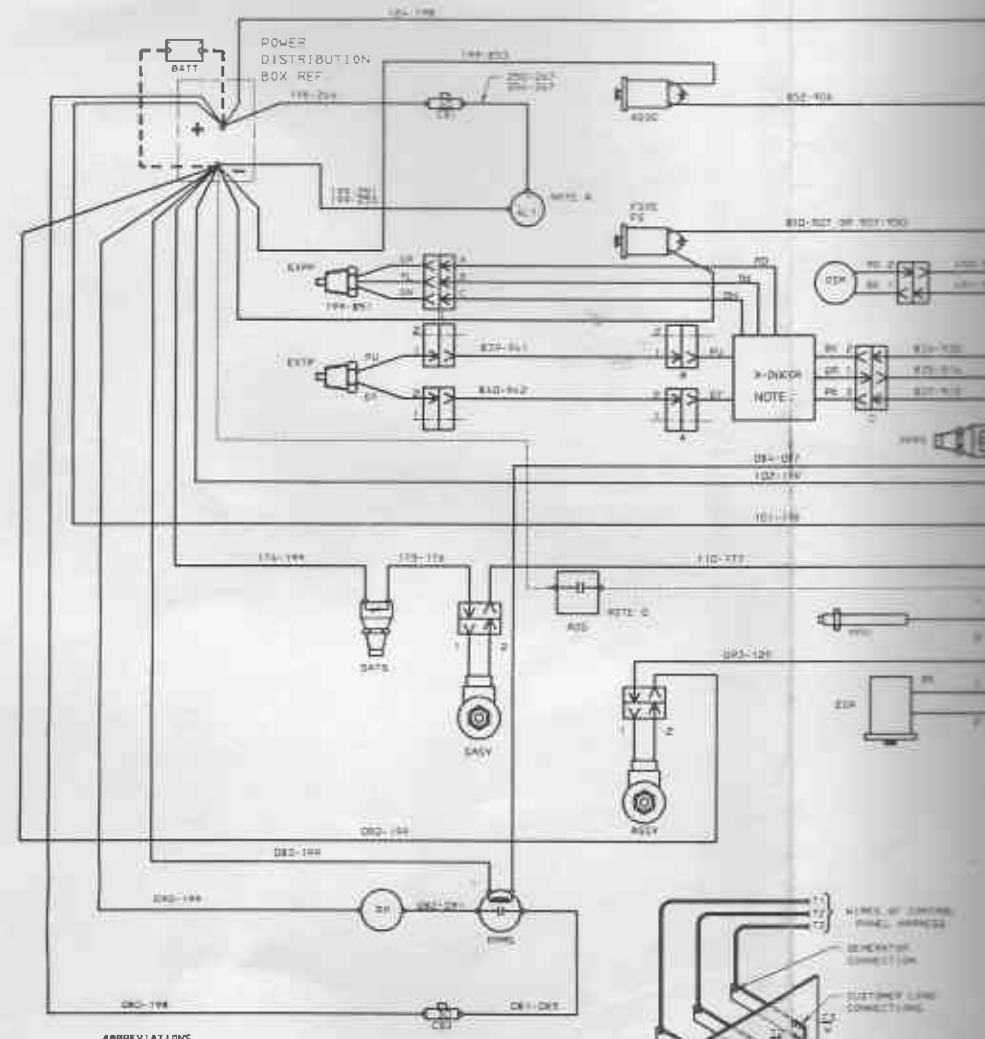
NOTE D: GROUND SHIELDED CABLES AT 2301 ELECTRONIC GOVERNOR CONTROL OR ENGINE CONTROL MODULE ONLY.

NOTE F: WHEN THE LARGE SR4 VOLTAGE REGULATOR, THAT HAS MULTIPLE CIRCUIT BOARDS, IS PROVIDED:
1. DISCONNECT THE WHITE WIRE FROM TERMINAL NO. 7 ON THE TERMINAL STRIP OF THE REGULATOR ASSEMBLY, AND INSULATE IT FOR PROTECTION.
2. CONNECT THE CONTROL PANEL HARNESS WIRE NO. 80 TO THE TERMINAL NO. 8.
WHEN THE SMALL SR4 VOLTAGE REGULATOR (A1/A2 TYPE) IS PROVIDED:
1. DISCONNECT THE WHITE WIRE FROM TERMINAL NO. 7 ON THE TERMINAL STRIP OF THE REGULATOR ASSEMBLY, AND INSULATE IT FOR PROTECTION.
2. CONNECT CONTROL PANEL HARNESS WIRE NO. 80 TO TERMINAL NO. 6.
WHEN THE VR3 (COMPLETELY ENCLOSED) VOLTAGE REGULATOR IS PROVIDED:
REMOVE THE JUMPER BETWEEN VR3 TERMINALS 4 & 7, AND CONNECT CONTROL PANEL WIRE NO. 80 TO TERMINAL NO. 6.

TED FOR INTERFACE WITH
THE GENERATOR CONTROL PANEL.

EN A PRELUBE PUMP IS USED

R SETS HAVE THE OIL
SURE/TEMPERATUR MODULE).

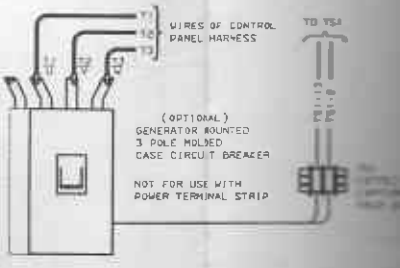


ABBREVIATIONS

AC	ALTERNATING CURRENT
ACT	ACTUATOR
ADS	AIR DAMPER POSITION SWITCH
ALT	ALTERNATOR
ASOS	AIR SHUT-OFF SOLENOID
ASSV	AIR START SOLENOID VALVE
BATT	BATTERY
BCF	BATTERY CHARGER MALFUNCTION
CB	CIRCUIT BREAKER
CT	CURRENT TRANSFORMER
EGA	ELECTRIC GOVERNOR ACTUATOR
EXPP	ENGR TRANSDUCER OIL PRESSURE PROBE
EXTP	ENGR TRANSDUCER COOLANT TEMPERATURE PROBE
FS	FUEL SOLENOID
FSOS	FUEL SHUT-OFF SOLENOID
GSM	GOVERNOR STMC MOTOR
LWLAS	LOW WATER LEVEL ALARM SWITCH
LFLAS	LOW FUEL LEVEL ALARM SWITCH
IC	REMOTE START INITIATE CONTACT
MPU	MAGNETIC PICKUP
NEG	NEGATIVE
POS	POSITIVE
PP	PRELUBE PUMPS
PPMS	PRELUBE PUMP MAS SWITCH
PPPS	PRELUBE PUMP PRESSURE SWITCH
RAN	REMOTE ANNUNCIATOR MODULE (FOR NFPA 110 OR NFPA 99)
SASV	START AID SOLENOID VALVE
SATS	START AID TEMPERATURE SWITCH
SM	STARTING MOTOR
STTS	SHUNT TRIP TERMINAL STRIP
TSC	TRANSFER SWITCH POSITION CONTACT
X DUCER	COOLANT TEMP/OIL PRESSURE TRANSDUCER
------	CUSTOMER WIRING

BATTERY CABLE SIZE
MAX ONE WAY LENGTH (25°C)

GAGE	SINGLE STARTING MOTOR	DUAL STARTING MOTOR
0000	5.0m	2.5m
000	4.0m	2.0m
00	3.25m	1.5m
0	2.5m	1.25m



DETAIL B

NOTE G: VARIOUS CUSTOMER SWITCHES CAN BE ACCOMMODATED FOR INTERFACE WITH VARIOUS OPTIONAL ALARM MODULES PROVIDED IN THE GENERATOR CONTROL PANEL.

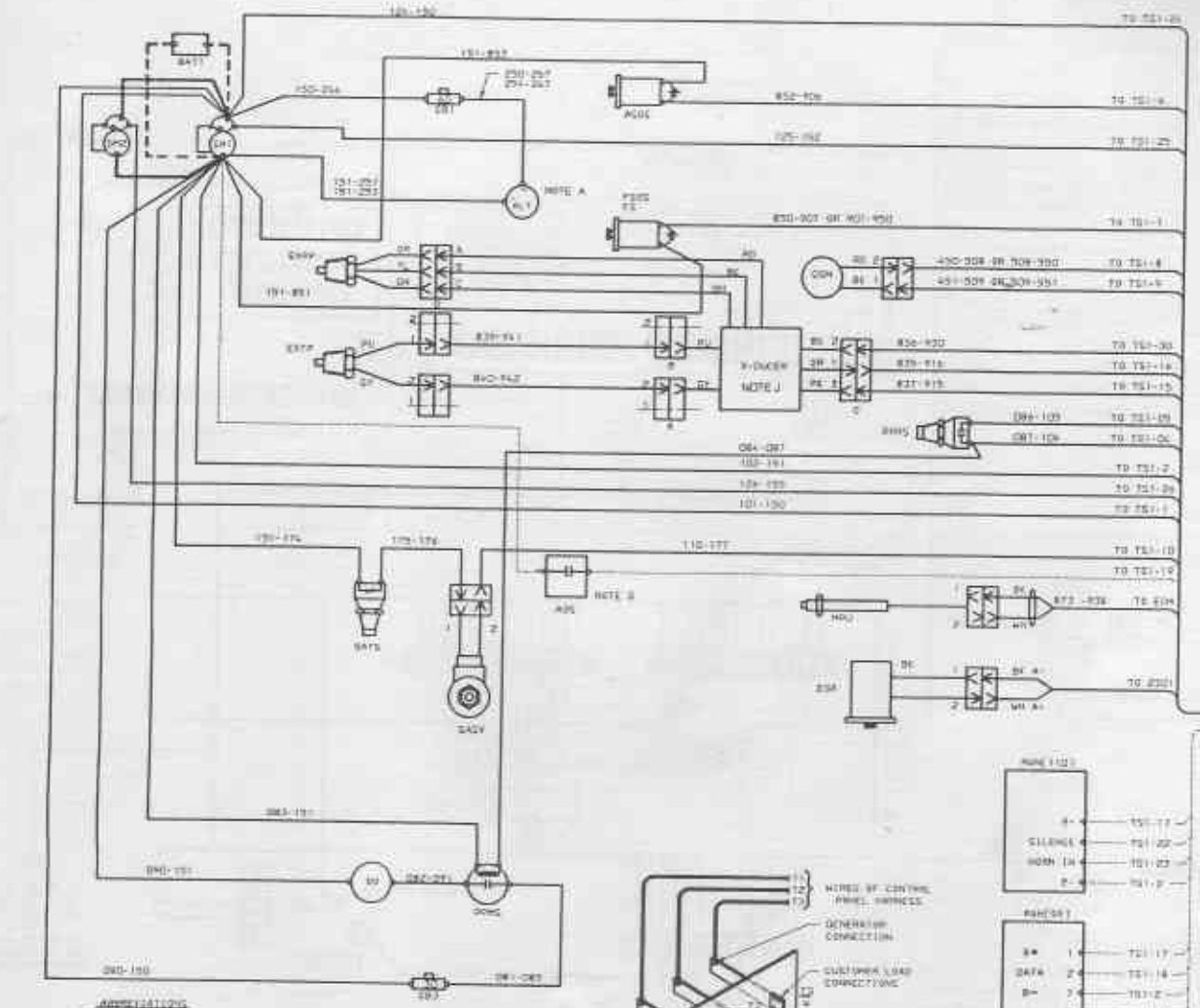
NOTE H: REMOVE JUMPER BETWEEN TS1-04 AND TS1-05 WHEN A PRELUBE PUMP IS USED.

NOTE I: FOR USE WITH AIR START ONLY

NOTE J: EXPP USED ONLY ON CURRENT GENERATOR SETS EARLIER GENERATOR SETS HAVE THE OIL PRESSURE TRANSDUCER (EXPP) MOUNTED WITHIN THE X-DUCER (PRESSURE/TEMPERATURE MODULE).

C35811P1

Wiring Diagram - 3500 Engines (With Electric Starting)



ABBREVIATIONS

AC	ALTERNATING CURRENT
ACT	ACTUATOR
ADS	AIR DAMPER POSITION SWITCH
ALT	ALTERNATOR
ASOS	AIR SHUT-OFF SOLENOID
ASSV	AIR START SOLENOID VALVE
BATT	BATTERY
BCF	BATTERY CHARGER MALFUNCTION
CB	CIRCUIT BREAKER
CT	CURRENT TRANSFORMER
EGA	ELECTRIC GOVERNOR ACTUATOR
EXPP	ENGINE TRANSDUCER OIL PRESSURE PROBE
EXTP	ENGINE TRANSDUCER COOLANT TEMPERATURE PROBE
FS	FUEL SOLENOID
FSOS	FUEL SHUT-OFF SOLENOID
GSM	GENERATOR SYNC MOTOR
LWLAS	LOW WATER LEVEL ALARM SWITCH
LFLAS	LOW FUEL LEVEL ALARM SWITCH
RC	REMOTE START INITIATE CONTACT
MPU	MAGNETIC PICKUP
NEG	NEGATIVE
POS	POSITIVE
PP	PRELUBE PUMP
PPMS	PRELUBE PUMP MAG SWITCH
PPPS	PRELUBE PUMP PRESSURE SWITCH
RAN	REMOTE ANNUNCIATOR MODULE (CAN OPTION (ID 08 NEMA 4X))
SASV	START AID SOLENOID VALVE
SATS	START AID TEMPERATURE SWITCH
SM	STARTING MOTOR
STTS	SHUNT TRIP TERMINAL STRIP
TSC	TRANSFER SWITCH POSITION CONTACT
X DUCER	COOLANT TEMP/OIL PRESSURE TRANSDUCER
------	CUSTOMER WIRING

BATTERY CABLE SIZE
MAX ONE WAY LENGTH (25°C)

GAGE	SINGLE STARTING MOTOR	DUAL STARTING MOTOR
0000	5.0m	2.5m
000	4.0m	2.0m
00	3.25m	1.5m
0	2.5m	1.25m

NOTE G: VARIOUS CUSTOMER SWITCHES CAN BE ACCOMMODATED FOR INTERFACE WITH VARIOUS OPTIONAL ALARM MODULES PROVIDED IN THE GENERATOR CONTROL PANEL.

NOTE H: REMOVE JUMPER BETWEEN TS1-04 AND TS1-05 WHEN A PRELUBE PUMP IS USED.

NOTE I: FOR USE WITH AIR START ONLY.

NOTE J: EXPP USED ONLY ON CURRENT GENERATOR SETS. EARLIER GENERATOR SETS HAVE THE OIL PRESSURE TRANSDUCER (EXPP) MOUNTED WITHIN THE X-DUCER (PRESSURE/TEMPERATUR MODULE).

NOTE A: DO NOT OPERATE ALTERNATOR... DO NOT POLARIZE ALTERNATOR... WITH A DC GENERATOR TO CHA...

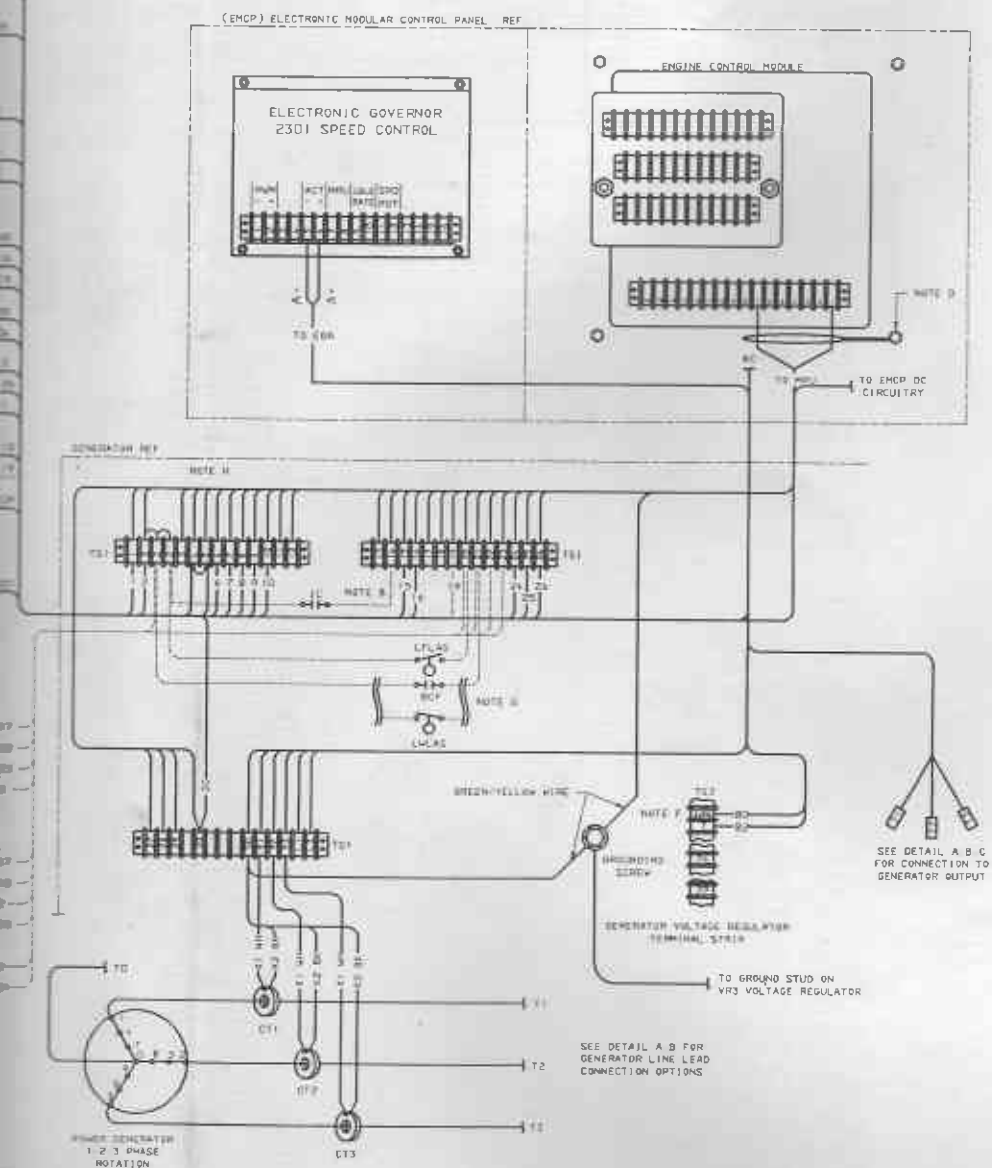
NOTE B: TO BE WIRED TO ENGINE START... SWITCH BY CUSTOMER.

NOTE C: AUXILIARY CONTACTS (N.O.)... ONLY WHEN OPTIONAL GENERATOR... (FOR GENERATING INDICATION...

NOTE D: GROUND SHIELDED CABLES AT... ENGINE CONTROL MODULE ONLY...

NOTE E: WHEN THE LARGE SPN VOLTAGE... 1. DISCONNECT THE WHITE WIRE... REGULATOR ASSEMBLY, AND... 2. CONNECT THE CONTROL PANEL... WHEN THE SMALL SPN VOLTAGE... 1. DISCONNECT THE WHITE WIRE... REGULATOR ASSEMBLY, AND... 2. CONNECT CONTROL PANEL... WHEN THE SPN (COMPLETES)... REMOVE THE JUMPER BETWEEN... CONTROL PANEL WIRE NO. 81...

C35810P1



DO NOT OPERATE ALTERNATOR WITHOUT A BATTERY CONNECTED TO THE SYSTEM.
DO NOT POLARIZE ALTERNATOR. DO NOT OPERATE ALTERNATOR SIMULTANEOUSLY
A DC GENERATOR TO CHARGE A COMMON BATTERY.

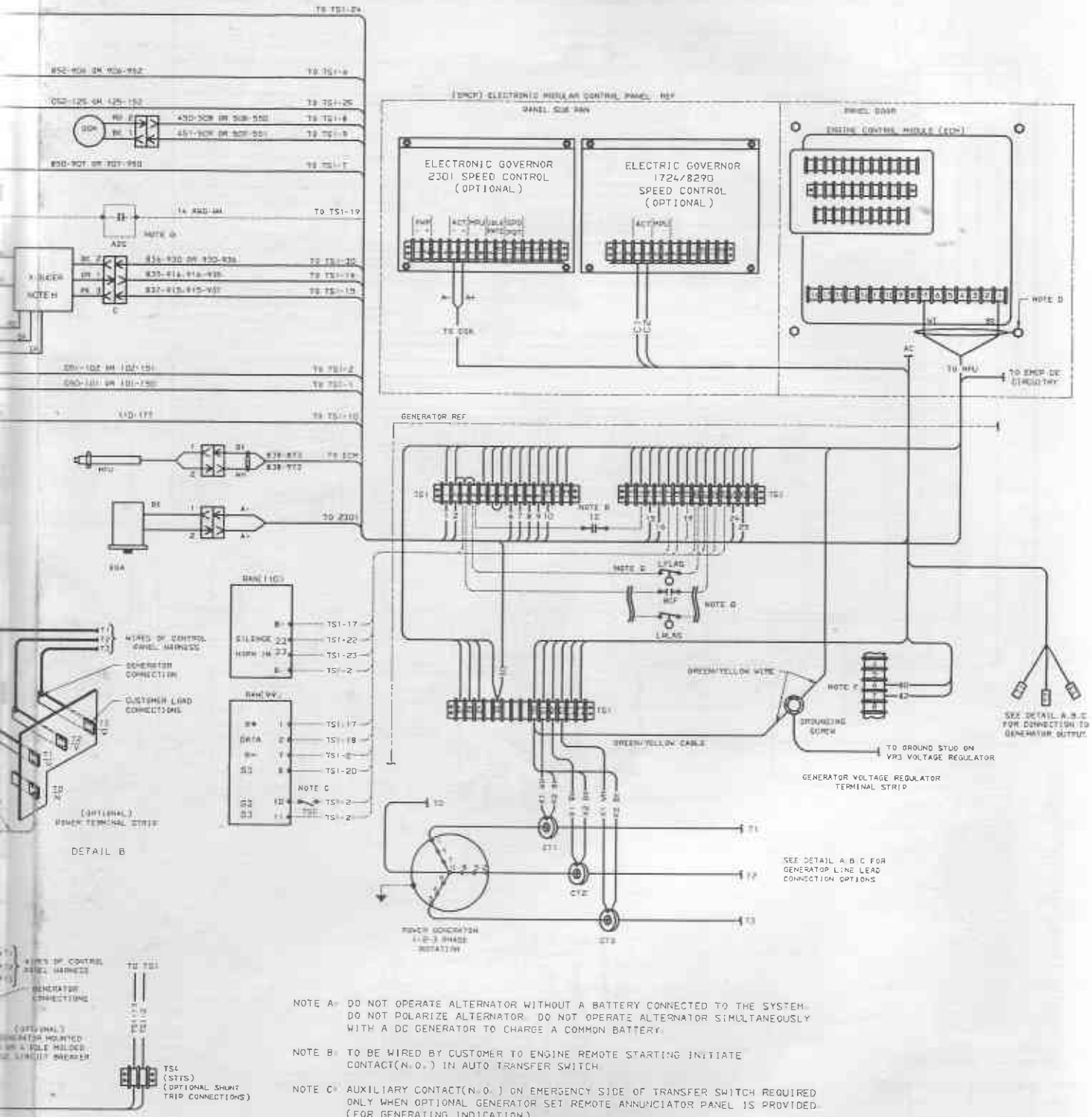
BE WIRED TO ENGINE STARTING CONTACT (N.O.) IN AUTO TRANSFER
TCM BY CUSTOMER.

CONTACT (N.O.) ON EMERGENCY SIDE OF TRANSFER SWITCH REQUIRED
WHEN OPTIONAL GENERATOR SET ANNUNCIATOR PANEL (REMOTE) IS PROVIDED.
FOR GENERATING INDICATION)

SHIELDED CABLES AT 2301 ELECTRONIC GOVERNOR CONTROL OR
CONTROL MODULE ONLY.

THE LARGE SR4 VOLTAGE REGULATOR, THAT HAS MULTIPLE CIRCUIT BOARDS, IS PROVIDED:
DISCONNECT THE WHITE WIRE FROM TERMINAL NO. 7 ON THE TERMINAL STRIP OF THE
REGULATOR ASSEMBLY, AND INSULATE IT FOR PROTECTION.
CONNECT THE CONTROL PANEL HARNESS WIRE NO. 80 TO THE TERMINAL NO. 8.
THE SMALL SR4 VOLTAGE REGULATOR (A1/A2 TYPE) IS PROVIDED:
DISCONNECT THE WHITE WIRE FROM TERMINAL NO. 7 ON THE TERMINAL STRIP OF THE
REGULATOR ASSEMBLY, AND INSULATE IT FOR PROTECTION.
CONNECT CONTROL PANEL HARNESS WIRE NO. 80 TO TERMINAL NO. 6.
THE VR3 (COMPLETELY ENCLOSED) VOLTAGE REGULATOR IS PROVIDED.
REMOVE THE JUMPER BETWEEN VR3 TERMINALS 6 & 7, AND CONNECT
CONTROL PANEL WIRE NO. 80 TO TERMINAL NO. 6.

Wiring Diagram - All Generator Sets (Except 3500 Engines)



NOTE A: DO NOT OPERATE ALTERNATOR WITHOUT A BATTERY CONNECTED TO THE SYSTEM. DO NOT POLARIZE ALTERNATOR. DO NOT OPERATE ALTERNATOR SIMULTANEOUSLY WITH A DC GENERATOR TO CHARGE A COMMON BATTERY.

NOTE B: TO BE WIRED BY CUSTOMER TO ENGINE REMOTE STARTING INITIATE CONTACT(N.O.) IN AUTO TRANSFER SWITCH.

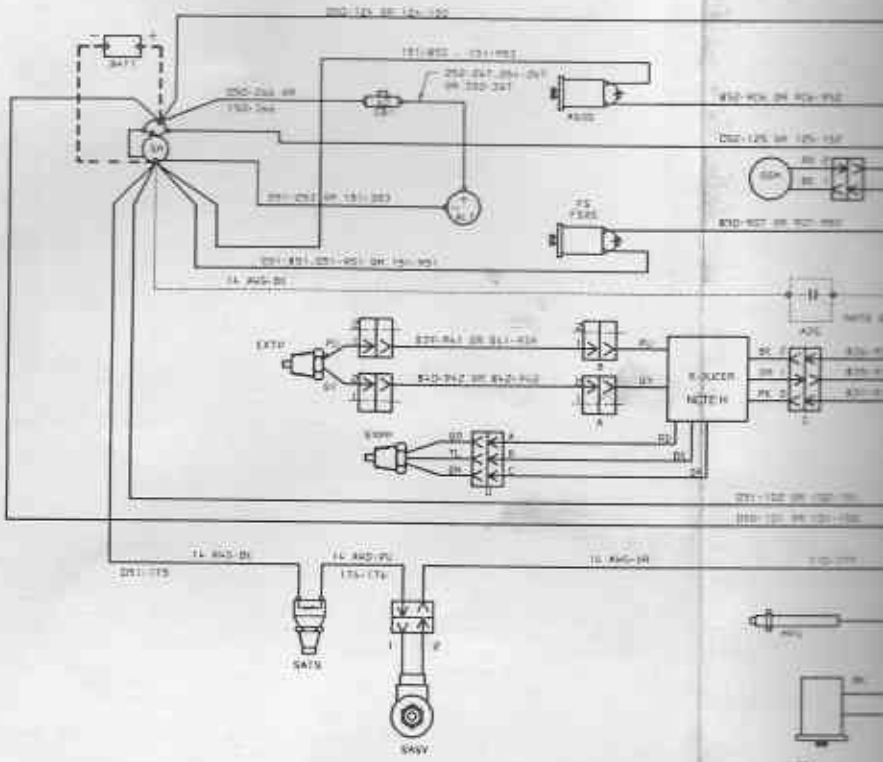
NOTE C: AUXILIARY CONTACT(N.O.) ON EMERGENCY SIDE OF TRANSFER SWITCH REQUIRED ONLY WHEN OPTIONAL GENERATOR SET REMOTE ANNUNCIATOR PANEL IS PROVIDED. (FOR GENERATING INDICATION)

NOTE D: GROUND MPU SHIELDED CABLE AT ENGINE CONTROL MODULE MOUNTING STUD ONLY.

NOTE F: CONNECT CONTROL PANEL HARNESS WIRE NO. 80 TO TERMINAL NO. 6 WHEN THE VR3 (COMPLETELY ENCLOSED) OR VR4 VOLTAGE REGULATOR IS PROVIDED. REMOVE THE JUMPER BETWEEN VOLTAGE REGULATOR TERMINALS 4 AND 7. CONNECT CONTROL PANEL HARNESS WIRE NO. 82 TO TERMINAL NO. 7.

NOTE G: VARIOUS CUSTOMER SWITCHES CAN BE ACCOMMODATED FOR INTERFACE WITH VARIOUS OPTIONAL ALARM MODULES PROVIDED IN THE GENERATOR CONTROL PANEL.

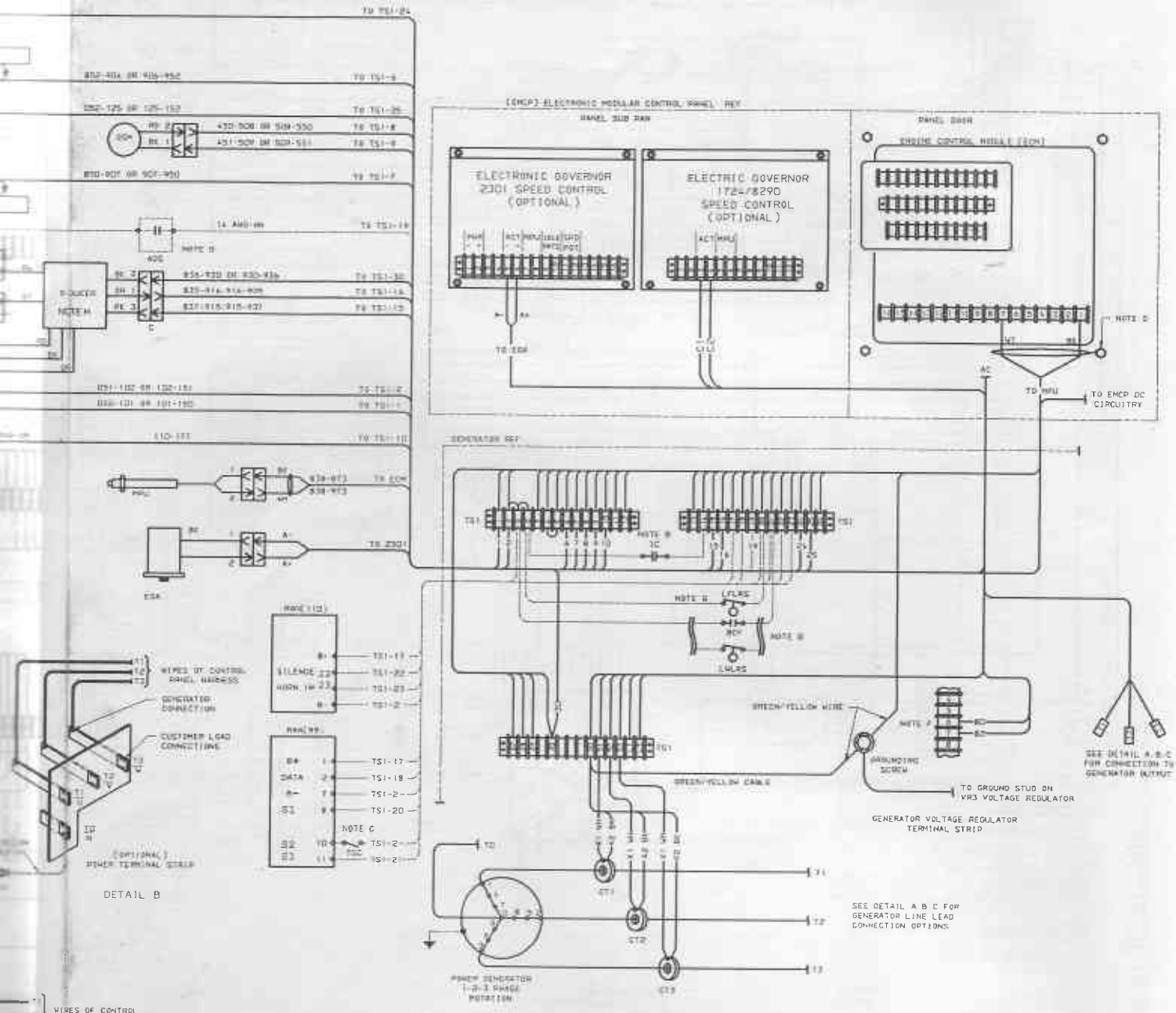
SETS EARLIER GENERATOR SETS
TED WITHIN THE X-DUCER



ABBREVIATIONS

AC	ALTERNATING CURRENT
ACT	ACTUATOR
ADS	AIR DAMPER POSITION SWITCH
ALT	ALTERNATOR
ASOS	AIR SHUT-OFF SOLENOID

Wiring Diagram - All Generator Sets (Except 3500 Engines)



NOTE A: DO NOT OPERATE ALTERNATOR WITHOUT A BATTERY CONNECTED TO THE SYSTEM. DO NOT POLARIZE ALTERNATOR. DO NOT OPERATE ALTERNATOR SIMULTANEOUSLY WITH A DC GENERATOR TO CHARGE A COMMON BATTERY.

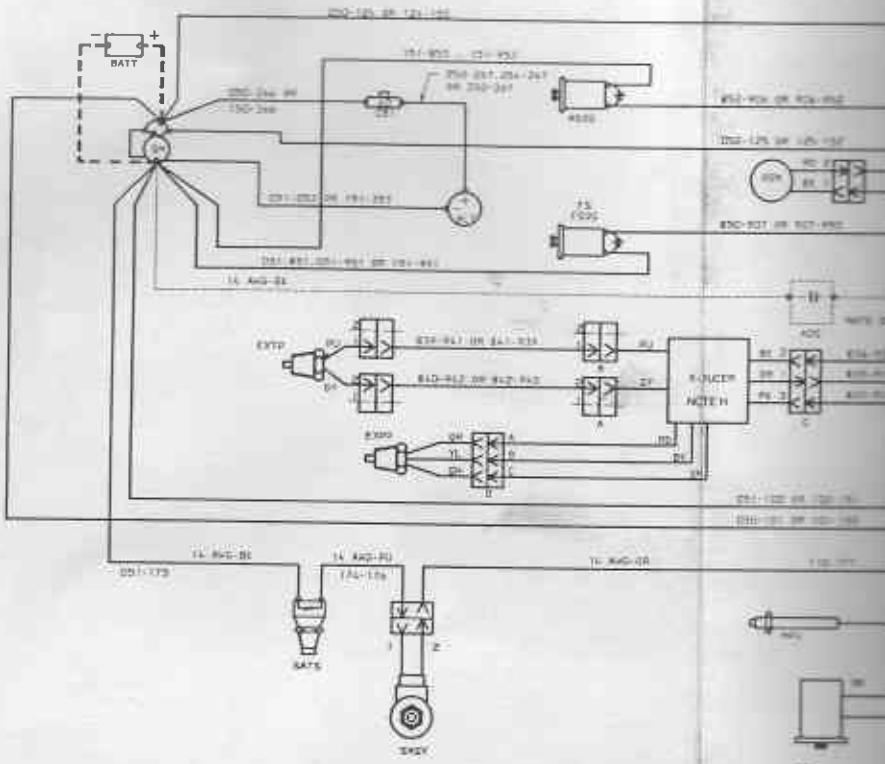
NOTE B: TO BE WIRED BY CUSTOMER TO ENGINE REMOTE STARTING INITIATE CONTACT(N.O.) IN AUTO TRANSFER SWITCH.

NOTE C: AUXILIARY CONTACT(N.O.) ON EMERGENCY SIDE OF TRANSFER SWITCH REQUIRED ONLY WHEN OPTIONAL GENERATOR SET REMOTE ANNUNCIATOR PANEL IS PROVIDED. (FOR GENERATING INDICATION)

NOTE D: GROUND MPU SHIELDED CABLE AT ENGINE CONTROL MODULE MOUNTING STUD ONLY.

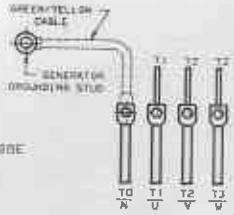
NOTE F: CONNECT CONTROL PANEL HARNESS WIRE NO. 80 TO TERMINAL NO. 6 WHEN THE VR3 (COMPLETELY ENCLOSED) OR VR4 VOLTAGE REGULATOR IS PROVIDED. REMOVE THE JUMPER BETWEEN VOLTAGE REGULATOR TERMINALS 6 AND 7. CONNECT CONTROL PANEL HARNESS WIRE NO. 82 TO TERMINAL NO. 7.

NOTE G: VARIOUS CUSTOMER SWITCHES CAN BE ACCOMMODATED FOR INTERFACE WITH VARIOUS OPTIONAL ALARM MODULES PROVIDED IN THE GENERATOR CONTROL PANEL.

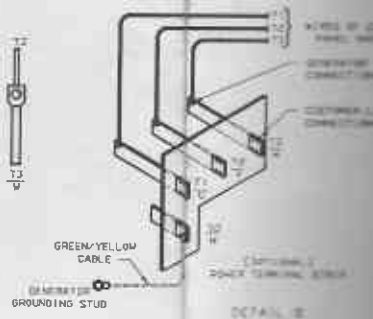


ABBREVIATIONS

AC	ALTERNATING CURRENT
ACT	ACTUATOR
ADS	AIR DAMPER POSITION SWITCH
ALT	ALTERNATOR
ASOS	AIR SHUT-OFF SOLENOID
BATT	BATTERY
BCF	BATTERY CHARGER MALFUNCTION
CB	CIRCUIT BREAKER
CT	CURRENT TRANSFORMER
EGA	ELECTRONIC GOVERNOR ACTUATOR
EXPP	EMCP TRANSDUCER OIL PRESSURE PROBE
EXTP	EMCP TRANSDUCER COOLANT TEMPERATURE PROBE
FS	FUEL SOLENOID
FSOS	FUEL SHUT-OFF SOLENOID
GSM	GOVERNOR SYNC MOTOR
IC	REMOTE START INITIATE CONTACT
LWLAS	LOW WATER LEVEL ALARM SWITCH
LFLAS	LOW FUEL LEVEL ALARM SWITCH
MPU	MAGNETIC PICKUP
NEG	NEGATIVE
POS	POSITIVE
PWR	POWER
RAN	REMOTE ANNUNCIATOR (FOR NFPA 110 OR NFPA 99)
SASV	START AID SOLENOID VALVE
SATS	START AID TEMPERATURE SWITCH
SM	STARTING MOTOR
STTS	SHUNT TRIP TERMINAL STRIP
SPD POT	SPEED SETTING POTENTIOMETER
TSC	TRANSFER SWITCH POSITION CONTACT
WTP	WATER TEMPERATURE PROBE
X DUCER	COOLANT TEMP/OIL PRESSURE TRANSDUCER
———	CUSTOMER WIRING



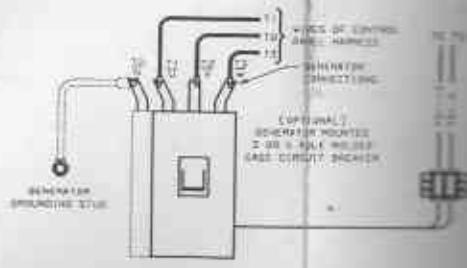
DETAIL A



DETAIL B

BATTERY CABLE SIZE
MAX ONE WAY LENGTH (25°C)

GAGE	SINGLE STARTING MOTOR	DUAL STARTING MOTOR
0000	5m	2.5m
000	4m	2m
00	3.25m	1.5m
0	2.5m	1.25m



DETAIL C

NOTE H: EXPP USED ONLY ON CURRENT GENERATOR SETS. EARLIER GENERATOR SETS HAVE THE OIL PRESSURE TRANSDUCER MOUNTED WITHIN THE X-DUCER (PRESSURE/TEMPERATUR MODULE).

C35809P1

CATERPILLAR®

SENR3535-01