SATURN V

Laboratory Maintenance Instruction for LTE

Volume II

Test Stand and Temperature Modulator

IBM

Federal Systems Division
Owego, New York

VOLUME II OF V

Laboratory Maintenance Instructions

SATURN V
LAUNCH VEHICLE DIGITAL COMPUTER AND LAUNCH VEHICLE DATA ADAPTER TEST EQUIPMENT

(International Business Machines Corporation)

Contract NAS 8-11561

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VOLUME II

Test Stand (IBM Part No. 6940100 and 6943000)

Temperature Modulator (IBM Part No. 6903900)

5 MARCH 1965

LIST OF EFFECTIVE PAGES

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NOTICE

Sections V and VII of Volume II of this manual include procedures which require the use of the Purging Cart (Tool Number 657900) and the LVDC/LVDA Simulator Controller (Part Number 6903999). As of the publication date of this manual, this equipment has not been delivered; therefore the procedures cannot be performed. Although the procedures have not been verified on the equipment, they have been included in the manual for informational purposes.

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LIST OF ILLUSTRATIONS

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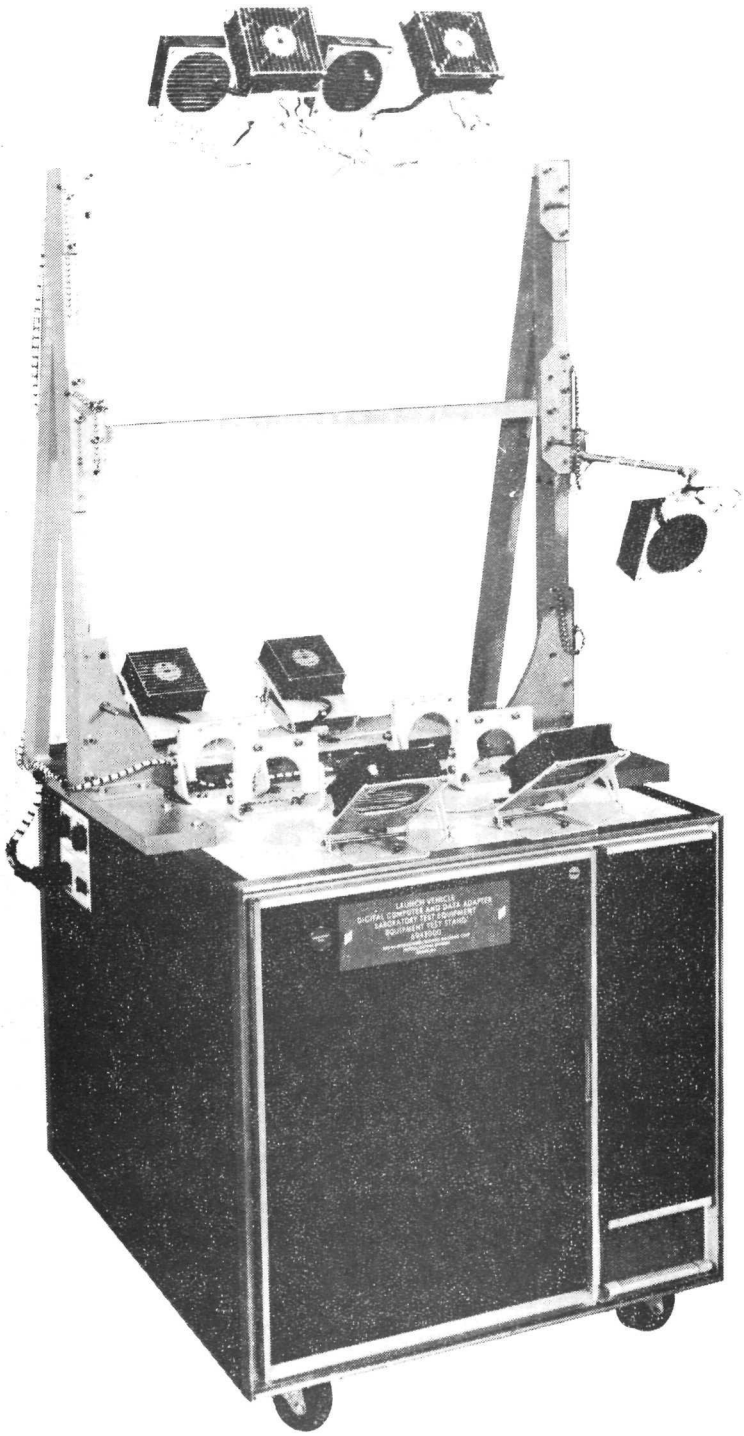
LIST OF RELATED MANUALS

Equipment	Manufacturer	Manual Title
Power Supply Model M15-5-OVS1020	Trygon Electronics Corporation	Trygon Electronics, Inc. Instruction and Maintenance Manual, Model M15-5-OVS1020
Power Supply Model M36-30A-220		Trygon Electronics, Inc. Instruction and Maintenance Manual, Model M36-30A-220
Power Supply Model M36-10A		Trygon Electronics, Inc. Instruction and Maintenance Manual, Model M36-10A
Power Supply Model M36-5		Trygon Electronics, Inc. Instruction and Maintenance Manual, Model M36-5

EQUIPMENT TEST STAND (6940100)

Figure 1-1. Equipment Test Stands and Temperature Modulator (Sheet 1 of 3)



EQUIPMENT TEST STAND (6943000)

Figure 1-1. Equipment Test Stands and Temperature Modulator (Sheet 2)

TEMPERATURE MODULATOR (6903900)

Figure 1-1. Equipment Test Stands and Temperature Modulator (Sheet 3)

SECTION I

INTRODUCTION AND DESCRIPTION

1-1. INTRODUCTION.

1-2. PURPOSE OF MANUAL.

1-3. This volume of the manual provides laboratory maintenance instructions for the Equipment Test Stands (IBM part numbers 6940100 and 6943000) and the Temperature Modulator (IBM part number 6903900). These equipments are manufactured by International Business Machines Corp., Federal Systems Division, Rockville, Maryland. Maintenance instructions for the equipment subassemblies not built by the Federal Systems Division are not included in this manual, but are supplied separately. (Refer to the list of related manuals.)

1-4. PURPOSE OF EQUIPMENT.

1-5. EQUIPMENT TEST STAND 6940100. Equipment Test Stand 6940100 is part of the Aerospace Computer Manual Exerciser (ACME) equipment configuration and supports Launch Vehicle Digital Computer (LVDC) 6109030 during test. This Test Stand also provides forced air cooling for the LVDC.

1-6. EQUIPMENT TEST STAND 6943000. Equipment Test Stand 6943000 is part of both the Aerospace Data Adapter/Programmable Tester (ADAPT) and the Aerospace System Test and Evaluation Complex (ASTEC) equipment configurations and is used to support the computer and/or data adapter under test. (Refer to Volume I for ADAPT and ASTEC configurations.) This test stand furnishes the Launch Vehicle Data Adapter Manual Exerciser (LVDAME) with four voltages: +28 VDC, +6 VDC, -3 VDC, -26.5 VDC. This test stand also provides +28 VDC power for the data adapter under test in addition to forced air cooling for the computer and/or data adapter under test.

1-7. TEMPERATURE MODULATOR. The Temperature Modulator IBM part number 6903900, is part of the ADAPT and ASTEC equipment configurations and is used to provide coolant for the computer and/or data adapter under test. (Refer to Volume I.) The Temperature Modulator circulates liquid coolant through the prime equipment under test at a predetermined circulation rate while controlling the coolant temperature.

1-8. PART SYMBOLS.

1-9. Symbols for standard electrical parts conform with military standard MIL-STD-15-1 or are fully explained.

1-10. DESCRIPTION.

1-11. EQUIPMENT TEST STAND 6940100.

1-12. Equipment Test Stand 6940100 (figure 1-1) is comprised of a mechanical assembly to which is bolted a fixture assembly. The entire unit is approximately 29 inches wide, 36 inches deep and 69 inches high, and weighs approximately 150 pounds.

1-13. The mechanical assembly has removable front and side covers, and two hinged covers at the back. Four casters on the bottom of the mechanical assembly facilitate moving. A brake on each caster permits the caster to be locked in position.

1-14. The fixture assembly consists of an equipment holding frame, four fans and a circuit breaker box. The fans are on hinged arms and may be raised, lowered or tilted to direct air to any part of a computer (LVDC) that is mounted to the holding frame. A power cable, terminated with a three-prong male plug, is connected to the circuit breaker box.

1-15. EQUIPMENT TEST STAND 6943000. Equipment Test Stand 6943000 (figure 1-1), like the 6940100 test stand, consists of a mechanical frame assembly to which is bolted a prime equipment support fixture. The approximate overall dimensions are 29 inches wide, 30. 6 inches deep, and 70. 5 inches high. The weight is approximately 597 pounds.

1-16. The mechanical frame assembly, which houses electrical components, has two interface cable connectors and an external fan power switch located on the left side. The primary power connector is located on the rear side. The front cover of the frame assembly can be swung forward, and the covers on the other three sides are removable to enable access to the internal electrical components. After the right cover is removed a hinged relay gate can be swung outward for maintenance. After removal of the rear cover, an ac power box assembly, which is mounted on slide rails, can be moved outward for maintenance. Four casters with individual brakes are mounted on the bottom of the frame to facilitate moving.

1-17. The prime equipment support fixture consists of a holding frame to which are bolted nine fans and four hinge block assemblies. The holding frame can support a computer or data adapter or both. Four retaining bolts (not shown on figure 1-1) attached to the holding frame by chains are used to secure the computer or data adapter to the holding frame. The hinge block assemblies, together with logic support handles, are used to support data adapter logic sections during maintenance of the data adapter. The four logic support handles are stored in the mechanical frame assembly when not in use. The twenty screws used to attach the hinge block assemblies and logic support handles to a data adapter are mounted in the right support member of the holding frame when not is use.

1-18. TEMPERATURE MODULATOR. The Temperature Modulator (figure 1-1) consists of a mechanical frame assembly to which is mounted an electrical and control assembly. The approximate overall dimensions are 29 inches wide, 30 inches deep, and 40 inches high. The weight is approximately 720 pounds.

1-19. The mechanical frame assembly houses the coolant circulating, control, and sensing devices. The four covers of the frame assembly are removable to enable access to the coolant devices. The frame assembly is mounted on four casters to facilitate moving; a brake on each caster permits the caster to be locked in position.

1-20. The electrical and control assembly, which houses an ac power box assembly has four coolant inlet-outlet quick-disconnects, two interface connectors, and a primary power connector all located on the rear side. A hinged control panel assembly, located on the front side, can be swung forward to enable access to the ac power box connectors and elapsed time indicator. A hinged access door on the rear side of the electrical and control assembly enables access to circuit breakers.

1-21. ASSEMBLIES.

1-22. The two assemblies of Equipment Test Stand 6940100 are described in paragraphs 1-13 and 1-14. The assemblies of Equipment Test Stand 6943000 are listed in figure 1-2 and shown on figures 1-3 through 1-6. The assemblies of the Temperature Modulator are shown on figures 10-8 and 10-9.

1-23. ELECTRICAL DESCRIPTION.

1-24. EQUIPMENT TEST STAND 6940100. The four fans in Equipment Test Stand 6940100 require 110 VAC, 60 cycle, single-phase at 7 amperes.

1-25. EQUIPMENT TEST STAND 6943000. The input power requirements for the Equipment Test Stand 6943000 are 5 wire, 3 phase, 60 cycle, 208 volts line-to-line, 110 volts line-to-ground (or neutral), at approximately 10 amperes per line. The five power supplies, three internal fans, and nine external fans utilize single phase power. The power supplies develop +28 VDC, to be used by the data adapter under test, and +28 VDC, +6 VDC, -3 VDC, and -26.5 VDC to be used by the associated LVDAME. The power supply output voltages and distribution of the +28 VDC supplied to the data adapter are relay controlled; the relays in turn are under LVDAME control.

1-26. The three internal fans of the test stand are energized when excitation voltages are applied to the power supplies. The nine external fans are energized when the power supplies are energized and the fan power switch is in the ON position. The test stand also develops 24 VAC which is used for interlocking purposes, whenever primary power is available.

1-27. TEMPERATURE MODULATOR. The input power requirements for the Temperature Modulator are 5 wire, 3 phase, 60 cycle, 208 volts line-to-line, 120 volts line-to-neutral (or ground), at a maximum steady state current of 11 amperes per line.

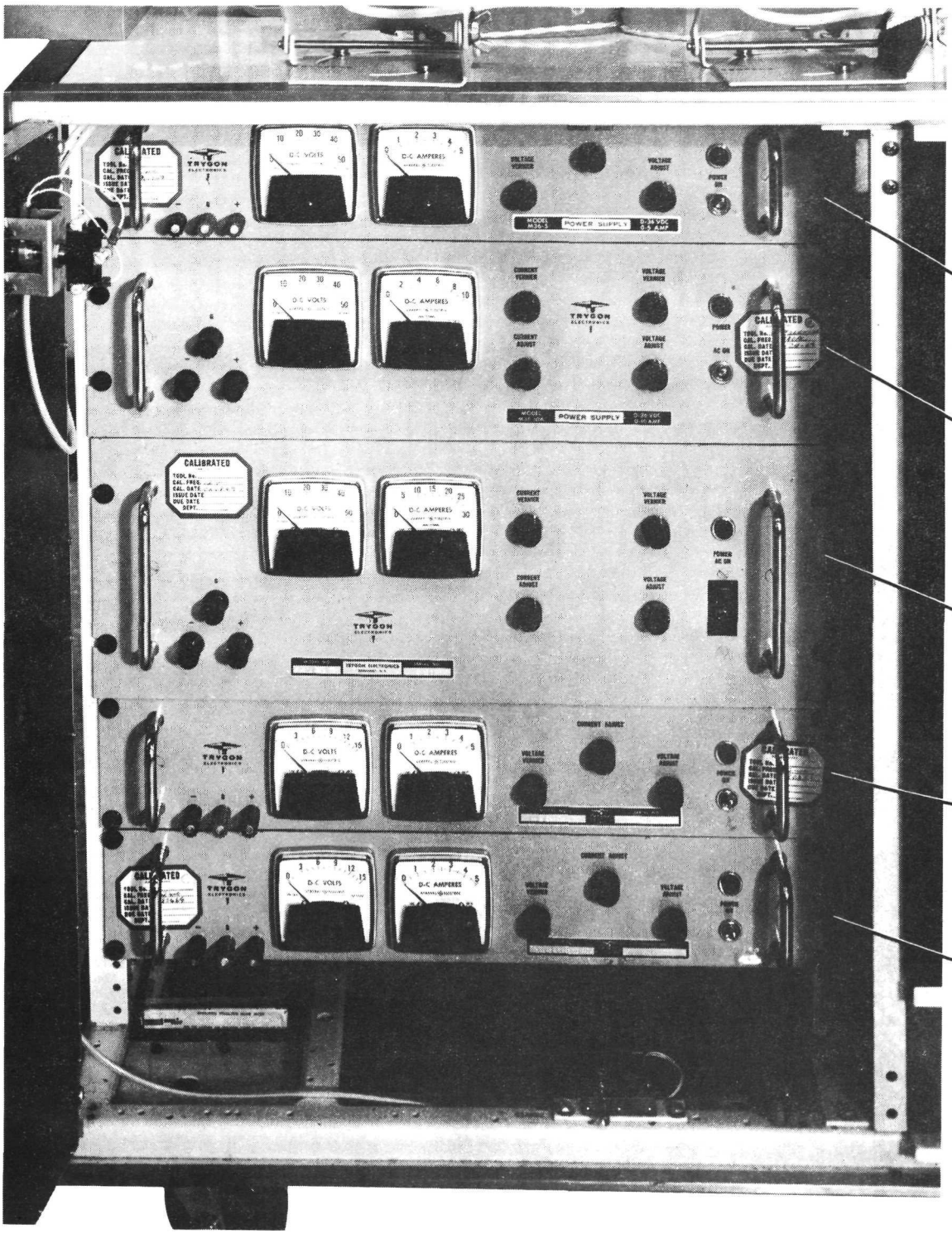
CAUTION

Primary power must be applied to the primary power connector (J1) in the correct sequence or damage may result to the Temperature Modulator when power is applied. The proper power phase sequence as connected to J1 is as follows: phase A to J1-X, phase B to J1-Y, phase C to J1-Z. The incoming primary power is filtered and distributed by the a-c power box.

1-28. The ac power box distributes, under relay control, three phase power to a pump, a compressor, a fan motor, and a heater, and single phase power to a solenoid. A temperature controller and transformer located within the ac power box also utilize one phase of the incoming power. The transformer develops 24 VAC, 60 cycle. The 24 VAC is used to control relays within the ac power box, to illuminate indicating lamps and energize switches on the control panels, and to energize interlock relays.

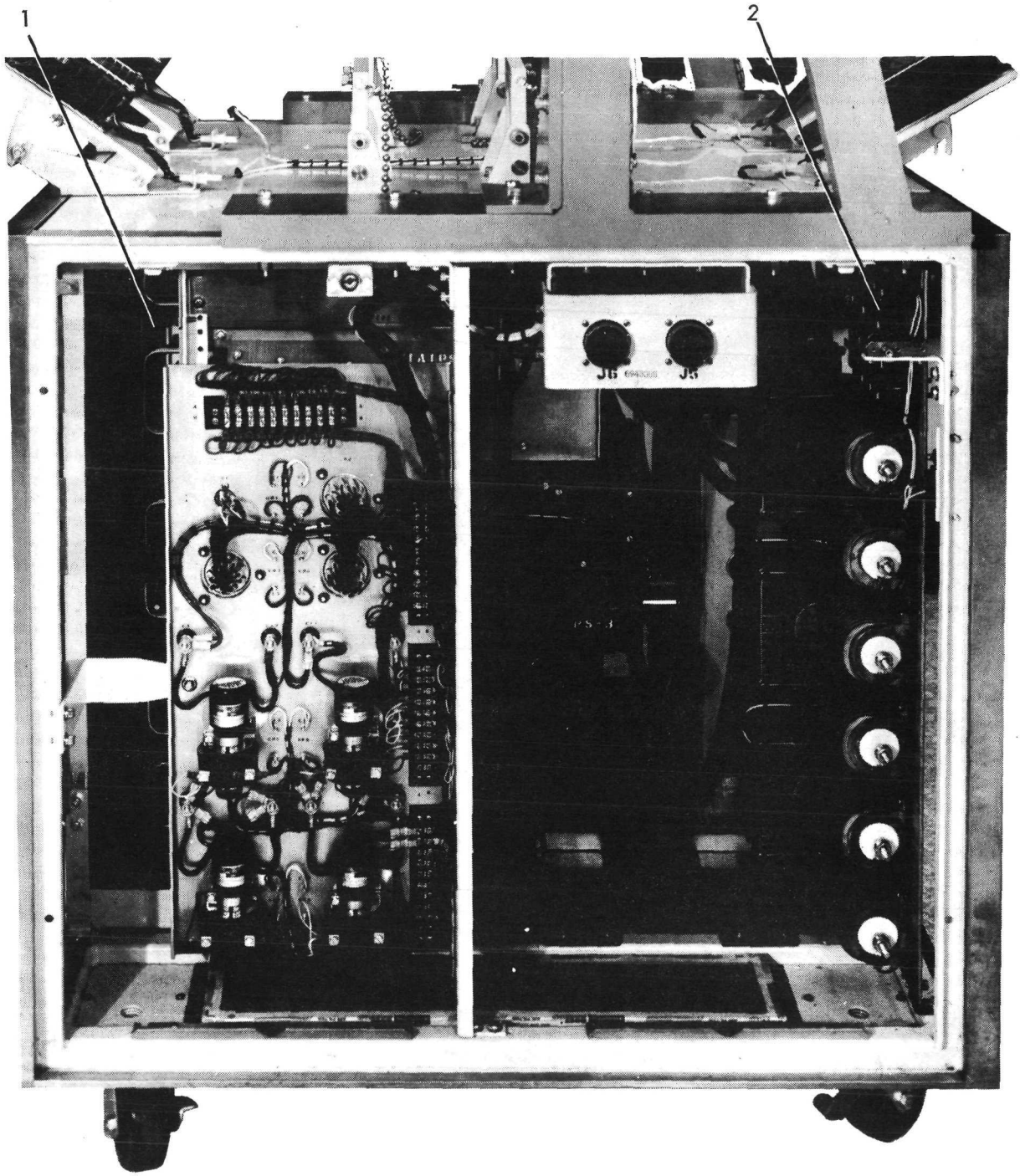
Reference Designation	Figure and Index No.	Name	Part Number or Manufacturer Designation	Manufacturer	Description
01A1PS1	1-3 (1)	Power Supply	Model M36-5 (6081053)	Trygon Electronics Incorporated	Provides +28 VDC for LVDAME circuits. See maintenance instructions for this item. (Refer to list of related manuals.)
01A1PS2	1-3 (2)	Power Supply	Model M36-10A (6081041)	Trygon Electronics Incorporated	Provides -26.5 VDC for LVDAME circuits. See maintenance instructions for this item. (Refer to list of related manuals.)
01A1PS3	1-3 (3)	Power Supply	Model M36-30A202 (6081042)	Trygon Electronics Incorporated	Provides +28 VDC for data adapter circuits. See maintenance instructions for this item. (Refer to list of related manuals.)
01A1PS4	1-3 (4)	Power Supply	Model M15-5-OV (6078122)	Trygon Electronics Incorporated	Provides +6 VDC for LVDAME circuits. See maintenance instructions for this item. (Refer to list of related manuals.)
01A1PS5	1-3 (5)	Power Supply	Model M15-5-OV (6078122)	Trygon Electronics Incorporated	Provides -3 VDC for LVDAME circuits. See maintenance instructions for this item. (Refer to list of related manuals.)
01A2	1-4 (1)	Relay Gate Assembly	6943035	IBM Corporation	Hinged on right side. Contains relays which control the distribution of +28 VDC to data adapter input lines.
01A3	1-4 (2)	Load Resistor Panel Assembly	6943079	IBM Corporation	Contains six 6.04 ohm 250 watt resistors to provide a load for power supply 01A1PS3 during self test. Included are three fans to cool the resistors.
01A4	1-5 (1)	AC Power Box Assembly	6943025	IBM Corporation	Mounted on slides. Contains circuit breakers, power supply excitation receptacles, and power source receptacle (J1).
01A5	1-6 (1)	Chassis Assembly	6943119	IBM Corporation	Contains a receptacle (J17) and a fan power switch to provide excitation to external fan motors.

Figure 1-2. Equipment Test Stand 6943000 Electrical Assemblies



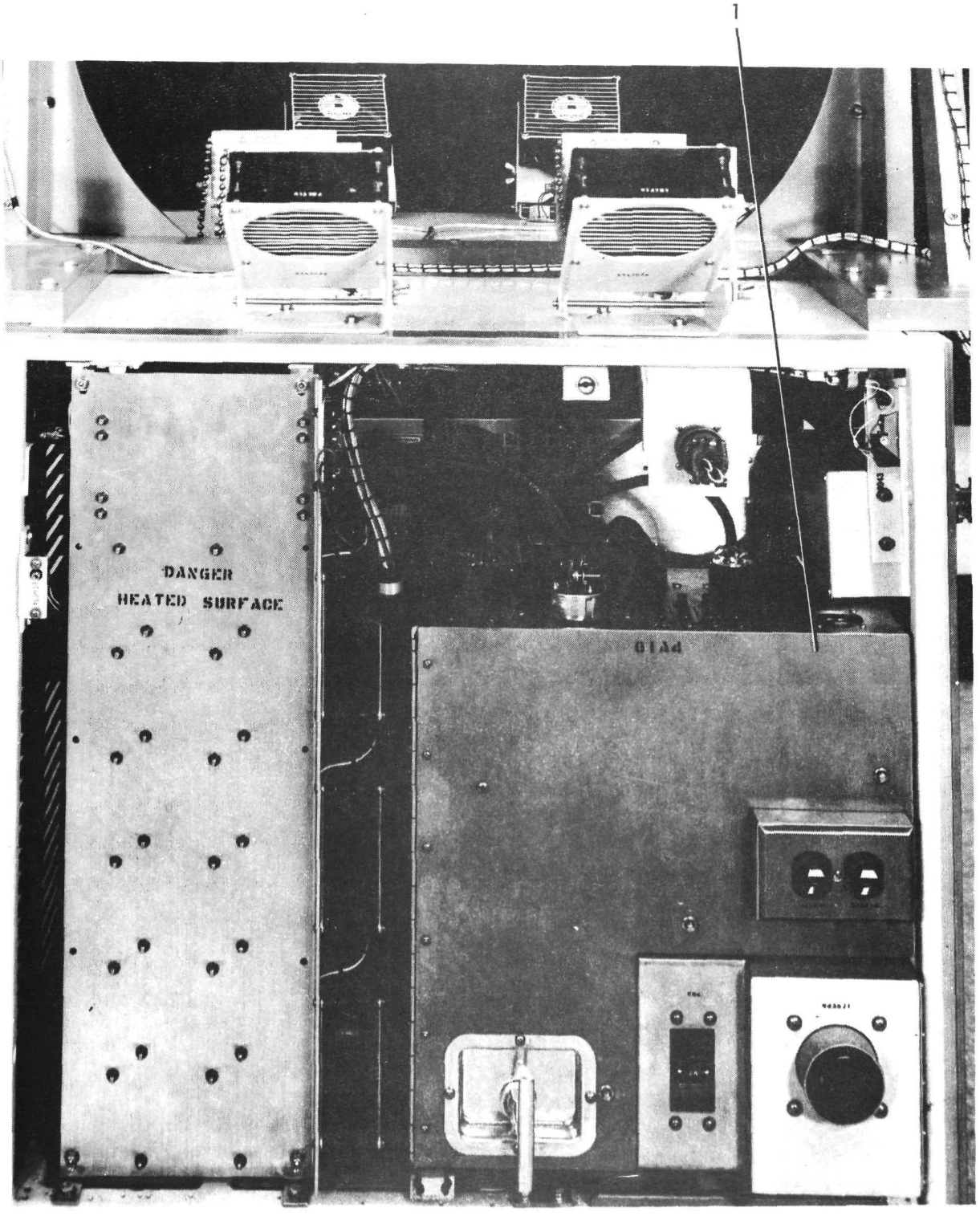
1. Power Supply (+28 VDC)
2. Power Supply (-26.5 VDC)
3. Power Supply (+28 VDC)
4. Power Supply (+6 VDC)
5. Power Supply (-3 VDC)

Figure 1-3. Equipment Test Stand 6943000, Front (Cover Open)



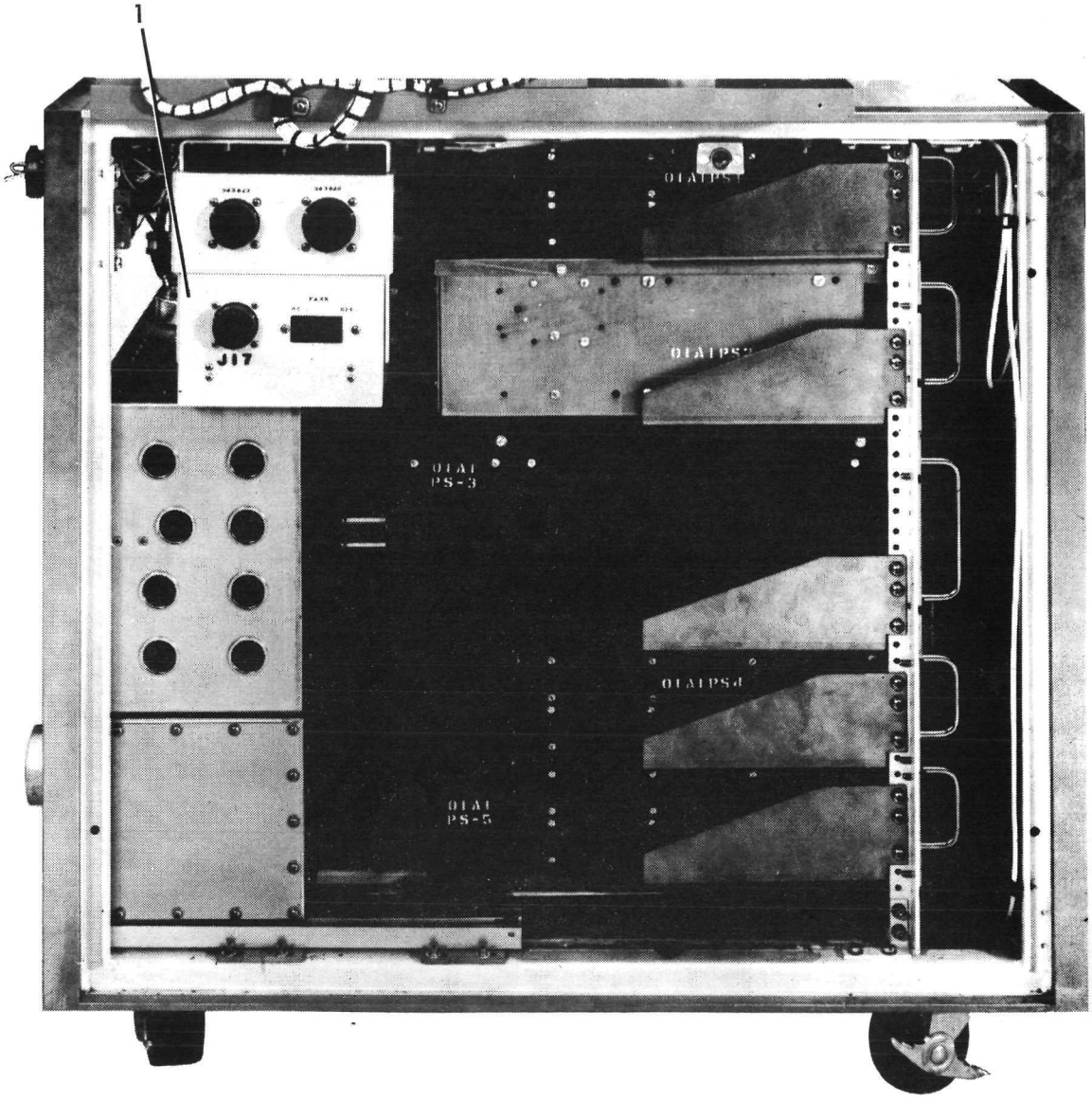
1. Relay Gate Assembly
2. Load Resistor Panel Assembly

Figure 1-4. Equipment Test Stand 6943000, Right Side (Cover Removed)



1. AC Power Box Assembly

Figure 1-5. Equipment Test Stand 6943000, Rear (Cover Removed)



1. Chassis Assembly

Figure 1-6. Equipment Test Stand 6943000, Left Side (Cover Removed)

SECTION II

THEORY OF OPERATION

2-1. SCOPE.

2-2. This section contains a functional description of (1) the electrical circuits of Equipment Test Stands 6940100 and 6943000 and (2) the electrical and piping systems of the Temperature Modulator.

2-3. EQUIPMENT TEST STAND 6940100.

2-4. Equipment Test Stand 6940100 contains only fan excitation circuits controlled by a circuit breaker; because of their simplicity, the Equipment Test Stand circuits are not discussed.

2-5. EQUIPMENT TEST STAND 6943000.

2-6. Equipment Test Stand 6943000 contains five power supplies, nine external and three internal fans, and associated relay control circuits. The outputs of four of the power supplies, +28 VDC, +6 VDC, -3 VDC, and -26.5 VDC, are utilized by the data adapter under test. All power supply excitations and the data adapter +28 VDC distribution are controlled by the associated LVDAME. The description of operation for the individual power supplies is contained in the commercial manuals referenced in the front of this volume. (Refer to the List of Related Manuals.) The power supply and fan control circuits are discussed in the following paragraphs.

2-7. AC POWER DISTRIBUTION. (See figure 10-5, sheet 1.)

2-8. Primary power (115 VAC 3 phase, 60 cycle) is applied through circuit breaker 01A4CB4 and filter 01A4FL1 to movable contacts of relay 01A4K1. Phases B and C are applied to the primary winding of transformer 01A4T1. Transformer 01A4T1 develops 24 VAC which is applied through interface connections to the MAIN POWER switch of the LVDAME. Relay 01A4K1 is energized when the LVDAME MAIN POWER ON pushbutton switch is depressed and all panel interlocks (01A6S2 through S5) are closed. The main power hold signal holds relay 01A4K1 energized through contacts A2 and A4. When energized, relay 01A4K1: (1) connects 3-phase primary power to the movable contacts of relay 01A4K2 and the LVDAME ϕA, ϕB, and ϕC lamp indicators; (2) connects phase C to internal fans (01A3B1 through B3) and the external fans (receptacles 01A4J15 and J16); and (3) connects phase B to receptacle 01A4J12 (-26.5 VDC power supply). The -26.5 VDC power supply is the only power supply energized until relay 01A4K2 is energized. Relay 01A4K1 is deenergized when the LVDAME MAIN POWER OFF pushbutton switch is depressed.

2-9. Relay 01A4K2 is energized and held energized when the LVDAME DC ON pushbutton is depressed. When energized, relay 01A4K2 applies power to power supply receptacles 01A4J10 (+28 DA), 01A4J11 (+6I), 01A4J13 (+28I), and 01A4J14 (-3I). Relay 01A4K2 is deenergized when the LVDAME DC OFF pushbutton switch is depressed.

2-10. DC POWER DISTRIBUTION. (See figure 10-5, sheet 3.)

2-11. The data adapter +28 VDC power supply (01A1PS3) output is distributed under control of the LVDAME. Relay 01A2K7 must be energized before +28 VDC is applied to the data adapter via connector 9430J6. Relay 01A2K7 is energized when the LVDAME master power on signal (MPO 28) is present and the LVDAME DATA ADAPTER POWER UP INITIAL SEQ or FULL SEQ pushbutton is depressed. When energized, relay 01A2K7 applies +28 VDC to the movable contacts of relays 01A2K1, K5, K6, and K8. Relay 01A2K1 supplies a -26.5 VDC return monitoring signal to the LVDAME. When de-energized, relays 01A2K5, K6, and K8 connect +28 VDC to the movable contacts of relays 01A2K2, K3, and K4. Relays 01A2K2, K3, and K4 (when deenergized) connect +28 VDC to 12 pins of connector 9430J6.

2-12. Relays 01A2K2 through K6 and K8 are controlled by the LVDAME DA POWER SUPPLY rotary switch. When the DA POWER SUPPLY switch is in position 1, relays 01A2K2 through K6 and K8 are deenergized and +28 VDC is applied to all twelve +28 VDC pins of connector J6. The LVDAME DA POWER SUPPLY switch can be rotated to positions 2 through 7 to energize relays 01A2K2 through K6 and K8 individually to disconnect +28 VDC from a group of four lines. When relay 01A2K5, K6 or K8 is energized, +28 VDC is disconnected from pins A through D, E through H, and T through W, respectively. Relays 01A2K2, K3 and K4 control the same groups of pins as relays 01A2K5, K6 and K8. However, when relays 01A2K2, K3 and K4 are energized they not only disconnect +28 VDC, but they also connect the +28 VDC return to the data adapter lines.

2-13. TEMPERATURE MODULATOR.

2-14. The Temperature Modulator contains two types of functional systems, a piping system and an electrical system. These functional systems are described in the following paragraphs.

2-15. PIPING SYSTEM. (See figure 10-11.)

2-16. The Temperature Modulator piping system consists of two loops, a coolant circulation loop and a refrigerant circulation loop. The coolant circulation loop absorbs heat from the computer or data adapter under test and transfers the heat to the refrigerant loop. The refrigerant loop dissipates the heat by air convection.

2-17. COOLANT LOOP. The coolant loop supplies coolant at a controlled temperature and at a predetermined rate of flow to the equipment under test. A motorized mixing valve, under control of an electrical temperature controller Z1, mixes chilled and warm coolant to control the temperature of the coolant supplied to the equipment under test. The rate of coolant flow to the computer and data adapter is controlled by manually positioned flow control valves HP32 and HP41.

2-18. The coolant loop has two circulation modes; (1) a bypass circulation mode; and (2) a system circulation mode. In the system circulation mode, solenoid valve HP29 diverts the coolant to the equipment under test. In the bypass circulation mode, solenoid valve HP29 diverts the coolant into a closed path within the coolant loop. In the bypass circulation mode, the coolant can be heated at reservoir HP9 to prewarm the coolant so that a desired coolant temperature can be obtained at the mixing valve prior to diverting the coolant to the equipment under test.

2-19. The coolant flow path in the system circulation mode is also a closed loop. However, the following discussion of the flow path starts at the returns from the equipments under test. The coolant returns from the equipment under test via adapters HP36 and HP45 and flows to reservoir HP9. The reservoir supplies coolant to pump HP8; then the pump forces coolant into chiller HP16 and mixing valve HP25. Note that bypass valve HP17, and valves HP18 and HP39 are closed during normal operation; these valves are opened during filling and purging of the coolant system. Mixing valve HP25 mixes chilled coolant from the chiller and warm coolant from the pump to produce a coolant with the desired temperature for cooling the equipment under test. The coolant then flows through filter HP28 to solenoid valve HP29. During system operation, valve HP29 diverts coolant to the equipment under test via pressure regulating valve HP30, flow control valves HP32 and HP41, flow meters HP34 and HP42, flow sense switches S19 and S20, and adapters HP36 and HP45. During bypass operation solenoid, valve HP29 diverts coolant to valve HP13, which is open during normal operation, to form a closed internal circulation path.

2-20. REFRIGERANT LOOP. The refrigerant loop circulates refrigerant through a closed path. The refrigerant absorbs heat from the coolant at chiller HP16 and dissipates the heat at condenser HP15. The condenser is cooled by forced air from fan HP7.

2-21. The following discussion of the refrigerant loop begins at compressor HP37. Compressor HP37 forces liquefied refrigerant through an orifice which causes the refrigerant to vaporize. In the process, the vaporized refrigerant absorbs heat from the surrounding mediums. Thus the vaporized refrigerant absorbs heat at chiller HP16 and becomes partially liquefied as it flows through thermal expansion valve HP6. The partially liquefied refrigerant flows through sight glass HP3 and drier-strainer HP1 to refrigerant receiver HP5. Refrigerant receiver HP5 supplies the partially liquefied refrigerant to condenser HP15. Condenser HP15 dissipates heat by air convection which further liquefies the refrigerant. The refrigerant then flows to the compressor which completes the flow path. A check valve at the compressor inlet allows only liquefied refrigerant to reach the compressor to be recycled.

2-22. ELECTRICAL SYSTEM. (See figure 10-10.)

2-23. The electrical system provides excitation to the piping system motors, and controls the mixing and solenoid valves. Manually operated switches of the electrical system control these functions in addition to controlling the coolant heater. The electrical system also includes three compressor sensing devices which turn off compressor power if abnormal pressures occur. The electrical system manual and automatic operations are described in paragraphs 2-25 through 2-48.

2-24. MAIN POWER APPLICATION.

2-25. Main power is applied when the MAIN POWER ON pushbutton switch is depressed. Externally provided 24 VAC at connector pin J3-H picks relay K1, through interlock switches S9 through S14. The externally provided 24 VAC holds relay K1 picked through its own contacts. Pump motor B3 is energized directly through relay K1 contacts; the condenser fan motor and compressor motor are energized through relay K1 contacts and the normally picked contacts of compressor control relay K6. Relay K6 is deenergized only if abnormal pressures exist in the compressor. When relay K6 is picked, condenser sense relay K7 is also picked to illuminate the COOLING UNIT ON lamp indicator. Transformer T1 develops 24 VAC for internal relays and external interlock use when circuit breakers CB1, CB2, and CB3 (emergency off) are closed. Thus, 24 VAC is available while main power is off.

2-26. When main power is applied, piping system solenoid bypass valve HP29 will be in the bypass position. The bypass solenoid valve is energized to operate the Temperature Modulator in the system circulation mode. Pump power available relay K10 and heater power available relay K22 are also energized when K1 picks. When picked, relay K10 supplies 24 VAC to the PUMP ON lamp indicator; relay K22, which provides a hold path for relays K11 and K12, reverts excitation from the HEATER ON lamp indicator to the HEATER OFF lamp indicator if circuit breaker CB5 opens.

2-27. SYSTEM OPERATION.

2-28. During system operation, solenoid valve HP29 diverts coolant to the equipment under test. System operation can be initiated if the heater is off, when the SYSTEM pushbutton switch is depressed. Once system operation commences, the Temperature Modulator cannot revert to BYPASS operation until one of the following conditions occurs: (1) main power is turned off and on; (2) circuit breaker CB4 opens; or (3) the compressor fails.

2-29. When SYSTEM pushbutton switch S8 is depressed during normal operation, 24 VAC is applied to the normally open contacts of relay K7, through the normally open contacts of relay K10 (pump on) and the normally closed contacts of relay K12 (heater off). Relays K14 and K15 pick, and perform the following functions: (1) energize bypass solenoid L1; (2) open heater-on circuit; (3) complete prime equipment ready interlock; and (4) control BYPASS and SYSTEM lamp indicators. Relay K7 is normally picked when the compressor is on. The compressor will cycle off and on during normal operation when low pressure conditions occur.

2-30. COMPRESSOR PRESSURE SENSING.

2-31. The compressor contains three pressure sensing switches: (1) S16, a normally closed low-low pressure switch; (2) S17, a normally closed high pressure switch; and (3) S18, a normally open low pressure switch. Switches S16 and S17 are reset manually when tripped.

2-32. The compressor motor excitation and the coolant flow to the equipment under test are disrupted if a low-low pressure or high pressure condition occurs. Switches S16 and S17 are connected in series between 24 VAC and the coil of compressor control relay K6. In the event either switch S16 or S17 opens, relay K6 drops and removes power from compressor motor B1. Compressor sense relay K7 also drops to turn off the COOLING UNIT ON lamp indicator and to revert the circulation mode to BYPASS by dropping relay K14. Contacts of relay K14 then open the equipment under test ready interlocks.

2-33. The compressor motor excitation if removed if a low pressure condition occurs, but coolant flow to the equipment under test is not disrupted. The closing of low pressure switch S18 energizes relays K8 and K9. Contacts of relay K8 close to hold system relay K14 picked. Normally closed contacts of relay K8 open to drop relay K6, thus removing compressor motor power. Compressor sense relay K7 also drops; however, contacts of relay K8 hold the COOLING UNIT ON lamp indicator lit.

2-34. After the low pressure condition has passed, low pressure switch S18 opens to drop relay K8. Time delay relay K9 remains picked for approximately one second to hold system relay K14 picked until relay K6 is energized. When relay K6 picks, it applies power to the compressor motor and picks relay K7. Relay K7 holds system relay K14 energized after relay K9 drops and again holds the COOLING UNIT ON lamp indicator lit.

2-35. COMPUTER AND DATA ADAPTER READY INTERLOCK CIRCUITS.

2-36. The associated LVDCME and LVDAME cannot apply power to a computer and/or data adapter under test until the Temperature Modulator is in the SYSTEM circulation mode and a flow rate of one pound per minute (PPM) is maintained through the computer and/or data adapter. The computer and/or data adapter ready conditions are sensed when the computer and/or data adapter are tested separately or together.

2-37. During testing of a computer, the computer ready interlock circuit connects -26 VDC to interface connector pin J3-L to signal the LVDCME that computer power can be applied. The -26 VDC signal is provided at connector pin J3-L when LVDC flow switch S20 is closed and relays K17 and K14 (system) are picked. Relay K18 also picks to light the LVDC READY lamp indicator.

2-38. The data adapter ready interlock circuit provides a -26 VDC signal at connector pin J2-L when data adapter power can be applied. The -26 VDC signal is present at connector pin J2-L when LVDA flow switch S19 is closed and relays K16 and K14 (system) are picked. Relay K19 also picks to light the LVDA READY lamp indicator.

2-39. When the computer and data adapter are tested together, relays K20 and K21 are picked by externally provided 24 VAC at connector pin J2-M. The picked contacts of relays K20 and K21 connect a -26 VDC signal to connector pin J2-L if flow switches S19 and S20 are closed and relays K16, K17, and K14 are picked. Thus, the -26 VDC signal at connector pin J2-L signals the LVDAME that power can be applied to the equipment under test.

2-40. HEATER OPERATION.

2-41. Coolant heater HR1 can be energized in the BYPASS circulation mode by depressing HEATER ON pushbutton switch S4. When switch S4 is depressed, 24 VAC picks relays K11 and K12 through normally closed contacts of relay K15 (bypass operation) and thermostat S21. Thermostat S21 opens when the coolant temperature reaches 105 degrees. Relays K11 and K12 are held on through the HEATER OFF switch; contacts of relays K12 (heater on), K22 (heater power avail.), and K15 (bypass operation); and thermostat S21. When picked, relay K11 connects 3-phase power to the heater. The HEATER OFF pushbutton switch is depressed to drop relays K11 and K12, thus turning the heater off.

2-42. COOLANT TEMPERATURE CONTROL.

2-43. Temperature controller Z1 controls mixing valve motor B4, thus controlling mixing valve HP25 which mixes chilled and warm coolant to control the temperature of the coolant supplied to the equipment under test. The temperature controller controls the coolant temperature to one of two thermal references, either the ambient room temperature or a manually preset temperature. The temperature controller reference is manually selected by the THERMAL MODE switches, BENCH switch S7 and CHAMBER switch S6. When BENCH switch S7 is energized, ambient sensor A2 controls the temperature controller. Conversely, when CHAMBER switch S6 is energized, temperature potentiometer R4 controls the temperature controller.

2-44. The THERMAL MODE switches control relay K13 which, when dropped, selects ambient sensor A2; and, when picked, selects potentiometer R4. When main power is applied to the Temperature Modulation circuits, relay K13 (dropped) connects 24 VAC to the BENCH lamp indicator through switch S7 and normally closed contacts of

relays K13 and K4. Relay K13 is picked when CHAMBER switch S6 is depressed; then relay K13 holds through its own contacts and switch S7. Relay K13 connects potentiometer R4 to the temperature controller, illuminates the CHAMBER lamp indicator, and extinguishes the BENCH lamp indicator. When BENCH switch S7 is depressed, relay K13 is dropped and ambient sensor A2 is reconnected to the temperature controller.

2-45. LAMP TEST.

2-46. All lamp indicators on the control panel can be tested by energizing the LAMP TEST switch. When energized, LAMP TEST switch S3 picks relays K2, K3, K4, and K5 which connect 24 VAC to all lamp indicators. Alternate action switch S3 remains energized once it is depressed; the switch is deenergized when it is depressed once again.

2-47. EMERGENCY OFF.

2-48. When the EMERGENCY PULL switch is energized, the interlock path between connector pins J2-G and J3-G is opened disrupting the 24 VAC interlock voltage (through interface connections) at connector pin J2-H to drop relay K1. In addition, the EMERGENCY PULL switch shorts the secondary winding of transformer T1 to disrupt the 24 VAC supplied to Temperature Modulator relays.

SECTION III

INTERFACE AND CONTROLS

3-1. SCOPE.

3-2. This section describes the functional interconnections between Equipment Test Stands 6940100 and 6943000, the Temperature Modulator, and associated equipment. The controls and the control functions of the Equipment Test Stands and the Temperature Modulator are also described in this section.

3-3. INTERFACE.

3-4. EQUIPMENT TEST STAND 6940100.

3-5. Equipment Test Stand 6940100 has no interface with other equipment.

3-6. EQUIPMENT TEST STAND 6943000.

3-7. The Equipment Test Stand 6943000 interface is diagrammed in figure 3-1. The interface signals and connectors are shown on the Equipment Test Stand 6943000 Electrical Schematic Diagram (figure 10-5).

3-8. TEMPERATURE MODULATOR.

3-9. The Temperature Modulator interface is diagrammed in figure 3-2. Figure 3-3 lists Temperature Modulator signals by connector and provides a brief description of each signal function.

3-10. CONTROLS AND INDICATORS.

3-11. EQUIPMENT TEST STAND 6940100.

3-12. Except for the circuit breaker that operates the fans, Equipment Test Stand 6940100 has no operating controls or indicators.

3-13. EQUIPMENT TEST STAND 6943000.

3-14. Except for the fan power circuit breaker and the emergency pull switch, Equipment Test Stand 6943000 has no external operating controls or indicators. In addition to the fan circuit breaker, the AC power box assembly (01A4) (accessible after removal of the rear cover) contains circuit breakers for AC power distribution, and an elapsed time meter.

3-15. The controls and indicators on the power supplies (01A1PS1 through 01A1PS5) are described in the commercial manuals for these power supplies. (Refer to the list of related manuals.

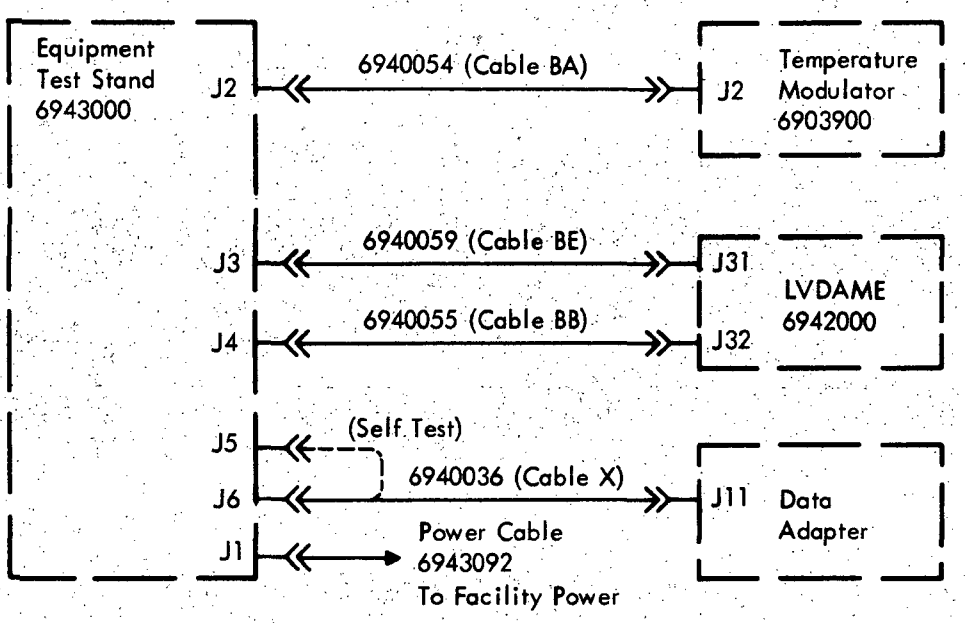


Figure 3-1. Equipment Test Stand 6943000 Interface Diagram

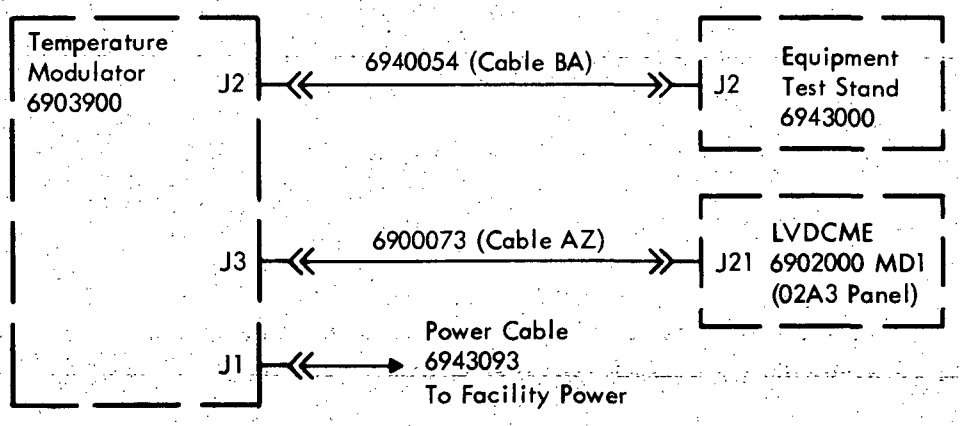


Figure 3-2. Temperature Modulator Interface Diagram

Connector	Pin	Function
J1	X	Phase A, 115 VAC
J1	Y	Phase B, 115 VAC
J1	Z	Phase C, 115 VAC
J1	N	Neutral
J1	GRD	Ground
J2	E	Safety Ground
J2	G	Emergency Off
J2	H	Main Control 24VAC Excitation
J2	J	Interlock 24VAC
J2	K	ADAPT I/O - 26.5, Internal In
J2	L	ADAPT I/O - 26.5, Internal Out
J2	M	ASTEC Mode Switching
J2	N	ASTEC Mode Switching
J2	P	-26.5 DC Return
J2	S	Safety Ground
J3	E	Emergency Off Return
J3	G	Emergency Off Control
J3	H	Emergency Off Hi
J3	J	Emergency Off SWN
J3	K	-26.5 VDC
J3	L	Cooling Stand Internal Return
J3	P	DC Signal Return
J3	S	Safety Ground

Figure 3-3. Temperature Modulator Interface Signals

3-16. TEMPERATURE MODULATOR.

3-17. The Temperature Modulator operating controls and indicators are shown on figure 3-4 and are described in figure 3-5.

3-18. The following definitions are used in figure 3-5:

1. Alternate action pushbutton/lamp. An alternate action pushbutton/lamp is a DPDT pushbutton switch (containing a lamp bulb) whose state is changed by pressing the switch face. The lamp bulb is lit only while a lamp test operation is in progress. When LAMP TEST is pressed while its bulb is lit, the lamp test operation ceases and the bulb is turned off. When LAMP TEST is pressed again, another lamp test operation occurs and the bulb is again lit.

2. Pushbutton/lamp. A pushbutton/lamp is a momentary contact pushbutton switch connected to Temperature Modulator relays so that its lamp remains or becomes lit after the switch face is pressed. The function controlled by the switch remains in operation only while the lamp is lit.

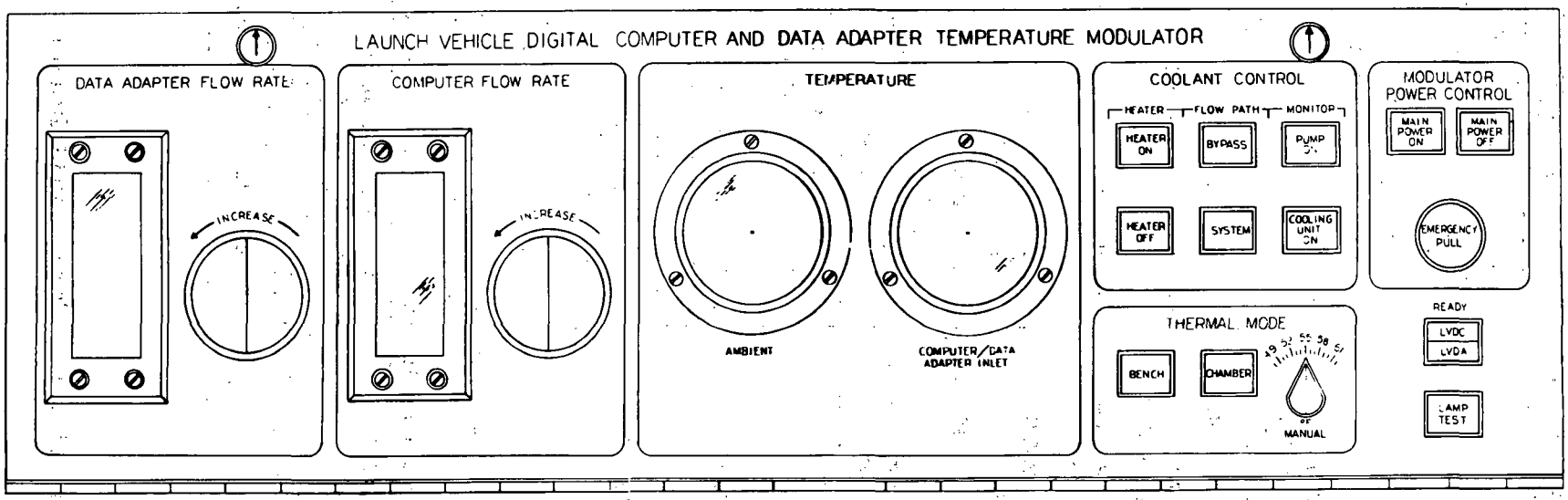


Figure 3-4. Temperature Modulator Control Panel

Area	Control /Indicator	Description and Function
DATA ADAPTER FLOW RATE	None	Monitor of, and manual control for, coolant rate-of-flow in data adapter system flow path.
COMPUTER FLOW RATE	None	Monitor of, and manual control for, coolant rate-of-flow in computer system flow path.
TEMPERATURE	AMBIENT	Dial display of ambient temperature from sensor bulb.
	COMPUTER/DATA ADAPTER INLET	Dial display of coolant temperature from imersion sensor.
COOLANT CONTROL	HEATER-HEATER ON	Pushbutton/lamp which causes cooland to be heated when in BYPASS made only. (Fast warmup.)
	HEATER-HEATER OFF	Pushbutton/lamp which stops heating of the coolant.
	FLOW-PATH-BYPASS	Indicator lamp which indicates that the coolant path is entirely within the temperature modulator unit.
	FLOW-PATH-SYSTEM	Pushbutton/lamp which causes coolant to flow through the prime equipment.
	MONITOR-PUMP ON	Indicator lamp which indicates that power is applied to the pump.
	MONITOR-COOLING UNIT ON	Indicator lamp which indicates that power is applied to the compressor/condensor.
THERMAL MODE	BENCH	Pushbutton/lamp which indicates that the coolant temperature is being controlled by the ambient temperature.
	CHAMBER	Pushbutton/lamp which indicates that the coolant temperature is being controlled with the °F MANUAL control knob.
	°F MANUAL	Control knob which is control for coolant temperature when in CHAMBER mode.
MODULATOR POWER CONTROL	MAIN POWER ON	Pushbutton/lamp which applies AC power to the unit by operating the main contactor.
	MAIN POWER OFF	Pushbutton/lamp which removes AC power to the unit by dropping the main contactor.
	EMERGENCY PULL	Switch that removes all power when pulled.
READY	LVDC/LVDA	Two section indicator lamp which indicates that a flow rate of one pound/minute or greater exists in both the LVDC and LVDA when in System Mode.
None	LAMP TEST	Alternate action pushbutton/lamp used to check all indicator lamps on the panel.

Figure 3-5. Temperature Modulator Controls and Indicators

SECTION IV

TEST EQUIPMENT AND SPECIAL TOOLS

4-1. SCOPE.

4-2. This section describes the test equipment and special tools needed to maintain Equipment Test Stands 6940100 and 6943000 and the Temperature Modulator.

4-3. TEST EQUIPMENT.

4-4. STANDARD TEST EQUIPMENT.

4-5. Figure 4-1 lists the standard test equipment required for maintenance of Equipment Test Stand 6943000. Figure 4-2 lists the standard test equipment required for maintenance of the Temperature Modulator. No standard test equipment is required for Equipment Test Stand 6940100.

4-6. SPECIAL TEST EQUIPMENT.

4-7. Figure 4-3 lists the special test equipment required for calibration of the Temperature Modulator. The method of use of this test equipment is prescribed in the calibration procedures in Section VII. No special test equipment is required for maintenance of Equipment Test Stands 6940100 and 6943000.

4-8. SPECIAL TOOLS.

4-9. There are no special tools required for maintenance of Equipment Test Stands 6940100 and 6943000. However, either Lift Handles (2 required), IBM tool number D-656101, (figure 4-5) or a Transport Dolly, IBM tool number 656360, (figure 4-6) are required for lifting the computer when installing the computer on the Equipment Test Stands. The Transport Dolly is also used for lifting the data adapter when installing the data adapter on the Equipment Test Stands. Figure 4-7 lists the special tools required for maintenance of the Temperature Modulator. The applications of these special tools are briefly described in this section and are further described in the preparation for use procedures in Section V, the maintenance procedures in Section VI, and the repair procedures in Section IX.

Name	Model or Type	Vendor
Multimeter	630A	Triplett Electrical Instrument Co., Boston, Mass.

Figure 4-1. Standard Test Equipment for Equipment Test Stand 6943000.

Name	Model or Type	Vendor
Collection Screen and Holder	Monitor, Cat. No. MABG037P0	Millipore Filter Corp., Bedford, Mass.
Coolant Contamination Sampler	Bomb Sampling Kit, Cat. No. XX6403700	Millipore Filter Corp., Bedford, Mass.
Hydrometer	Cat. No. 11-530	Fisher Scientific Co., New York, N. Y.
Hydrometer Cylinder	Cat. No. 8-530	Fisher Scientific Co., New York, N. Y.
Multimeter	Model 630A	Triplett Electrical Instrument Co., Boston, Mass.
Power Supply (-26VDC)	T50-2	Trygon Electronics Inc., Roosevelt, L. I., N. Y.
pH Meter	Hydrogen Ion Meter, Model 72	Beckman Instruments Inc., Fullerton, California
Resistivity Meter	Distilled Water Purity Meter with B-1 Glass Dip-Cell, Model PM-4	Barnstead Still and Sterilizer Co., Boston, Mass.

Figure 4-2. Standard Test Equipment for Temperature Modulator

Name	Figure	Model or Type	Vendor
Launch Vehicle Digital Computer and Data Adapter Simulation Controller	4-4	6903999	IBM Corp., Owego, N. Y.

Figure 4-3. Special Test Equipment for Temperature Modulator

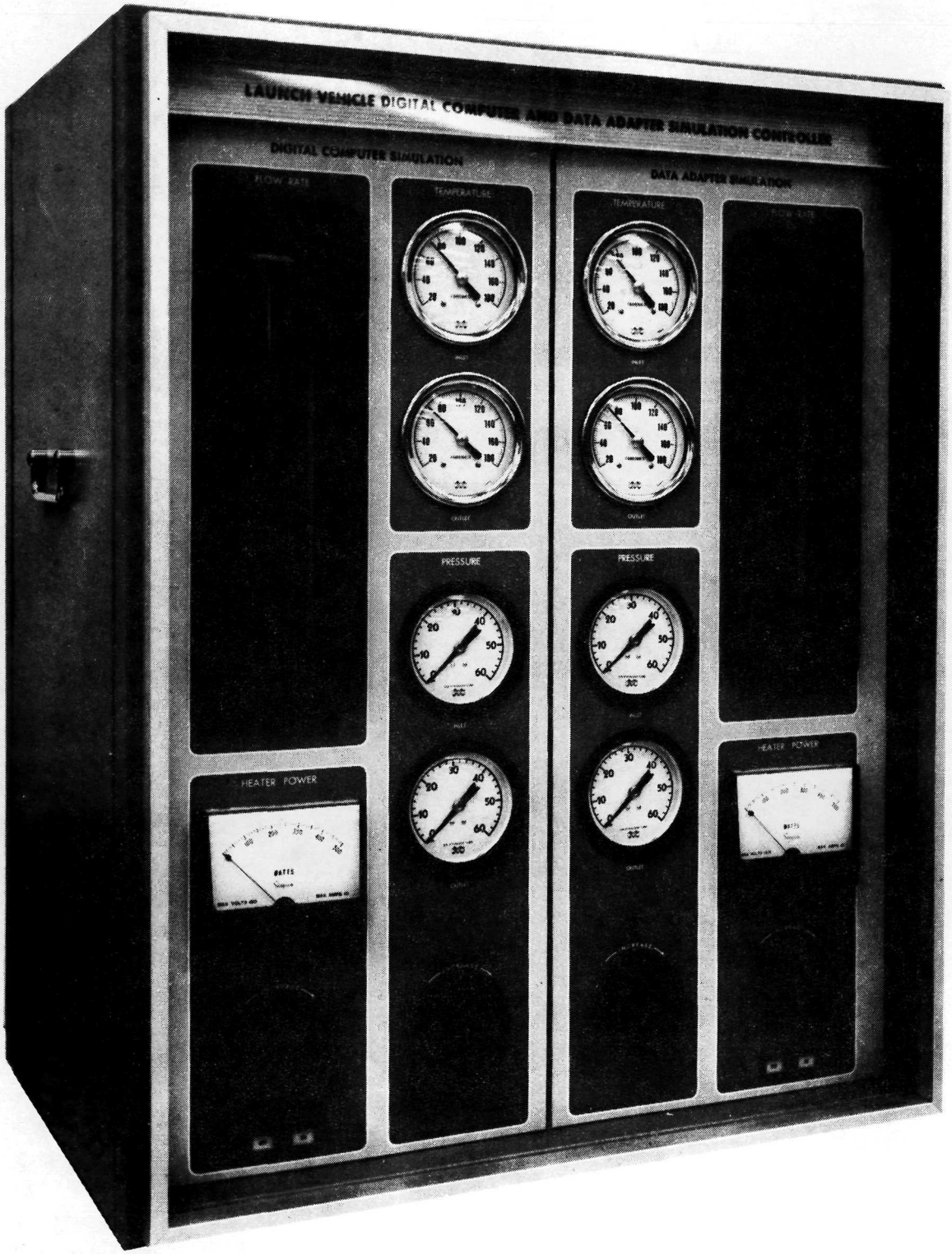


Figure 4-4. Launch Vehicle Digital Computer and Data Adapter Simulation Controller

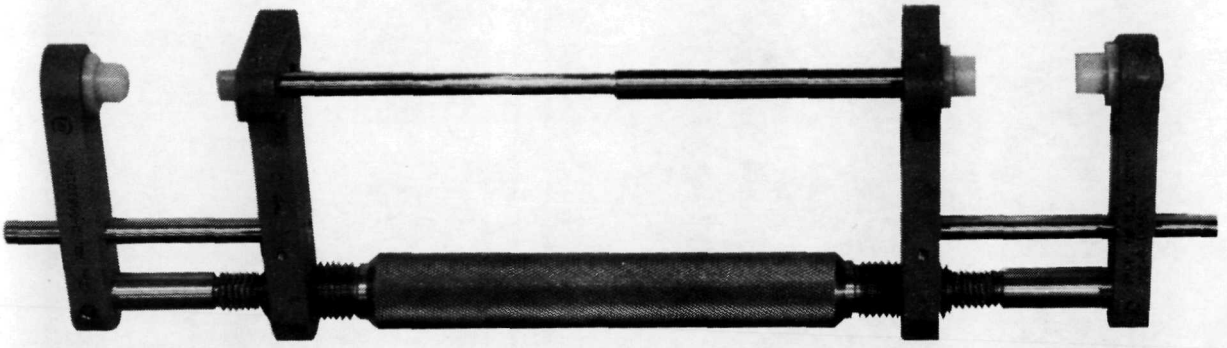


Figure 4-5. Lift Handle

(To Be Supplied)

Figure 4-6. Transport Dolly

Name	Vendor Part Number	Application	Figure
Crimping Tool	Bendix 11-7295	Used to crimp size 12, 16, and 20 type connector contacts	4-8
Purging Cart	IBM Tool No. 657900	Used to purge and fill Temperature Modulator cooling system.	4-9

Figure 4-7. Special Tools for Temperature Modulator

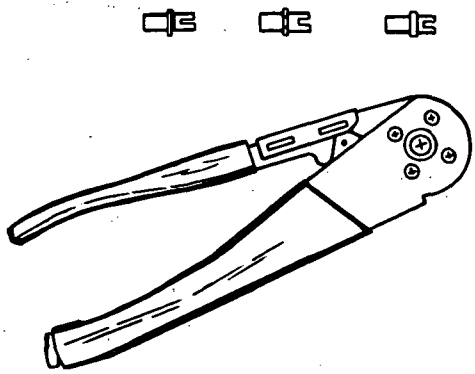


Figure 4-8. Crimping Tool Kit

(To Be Supplied)

Figure 4-9. Purging Cart

SECTION V

PREPARATION FOR USE, STORAGE, AND SHIPMENT

5-1. SCOPE.

5-2. This section describes the unpacking, assembly, inspection and installation methods necessary for preparing the Equipment Test Stands and the Temperature Modulator for use. The methods for preparing the Equipment Test Stands and the Temperature Modulator for storage and shipment are also included in this section.

5-3. PREPARATION FOR USE.

5-4. UNPACKING.

5-5. EQUIPMENT TEST STANDS 6940100 and 6943000. The Equipment Test Stands are not packed for shipment; no unpacking is necessary.

5-6. TEMPERATURE MODULATOR. The Temperature Modulator is not packed for shipment; however, a support block and retaining tape are placed in two areas and must be removed as follows:

a. To remove the support block beneath the right end (viewed from the front) of compressor HP37, loosen retaining nuts on the two shock mounts at the right end of the compressor; then remove the block. (See figure 10-8 for the location of the compressor.)

b. Loosen the retaining nuts on the four compressor shock mounts until the compressor has achieved full freedom of movement on the spring shock mounts.

c. Remove the retaining tape at the upper and lower ends of the liquid level indicator (HP11) guards. (See figure 10-8.)

5-7. ASSEMBLY.

5-8. All equipments covered in this volume are assembled before shipment; no assembly is necessary.

5-9. INSPECTION.

5-10. All equipments covered in this volume should be inspected for evidence of damage during shipment. The Equipment Test Stand 6943000 power cable (IBM part number 6943092) and the Temperature Modulator power cable (IBM part number 6943093) are supplied loose and should be inventoried on receipt of equipment.

5-11. INSTALLATION.

5-12. EQUIPMENT TEST STANDS 6940100 AND 6943000. Refer to Volume I, Section II for installation instructions.

5-13. TEMPERATURE MODULATOR. The Temperature Modulator installation instructions are outlined in Volume I, Section II. However, prior to installing the Temperature Modulator, fill the cooling system as described in figure 5-1.

5-14. TESTS.

5-15. EQUIPMENT TEST STAND 6940100. The Equipment Test Stand 6940100 does not require any tests prior to use.

5-16. EQUIPMENT TEST STAND 6943000. Before using the Equipment Test Stand 6943000, perform the calibration checks described in Volume IV, Section VII.

5-17. TEMPERATURE MODULATOR. Before using the Temperature Modulator perform all the checks described in Section VII of this volume.

5-18. PREPARATION FOR STORAGE.

5-19. EQUIPMENT TEST STAND 6940100.

5-20. Before storing Equipment Test Stand 6940100, coil the power cable and tape it to the equipment holding frame.

5-21. EQUIPMENT TEST STAND 6943000.

5-22. Prepare the Equipment Test Stand 6943000 for storage as follows:

a. Verify that the hinged relay panel is closed, the AC Power Box Assembly is secured in its maximum forward position, and the side covers are secured.

b. Place dust covers on connectors J2 and J3.

c. Cover Equipment Test Stand 6943000 with a dust cover.

d. Store power cable 6943092 in a carton and place the carton near the test stand.

5-23. TEMPERATURE MODULATOR.

5-24. Prepare the Temperature Modulator for storage as follows:

a. Purge the Temperature Modulator cooling system as prescribed in figure 5-2.

b. Cover the LVDC and LVDA INLET and OUTLET adapters with plastic bags. Secure the bags with tape.

c. Remove the front side cover. Cover valve HP26 (refer to figure 10-8) with a plastic bag and secure the bag with tape. Replace the front side cover.

d. Place dust covers on connectors J2 through J6.

e. Cover Temperature Modulator with a dust cover.

f. Store power cable 6943093 in a carton and place the carton near the Temperature Modulator.

5-25. PREPARATION FOR SHIPMENT.

5-26. EQUIPMENT TEST STANDS 6940100 AND 6943000.

5-27. The preparation for shipment of Equipment Test Stands 6940100 and 6943000 is the same as the preparation for storage. Refer to the following paragraphs for instructions.

Equipment	Paragraph
Equipment Test Stand 6940100	5-20
Equipment Test Stand 6943000	5-20

5-28. TEMPERATURE MODULATOR.

5-29. Prepare the Temperature Modulator for shipment as follows:

a. Purge the Temperature Modulator cooling system as prescribed in figure 5-2.

b. Cover LVDC and LVDA INLET and OUTLET adapters with plastic bags. Secure the bags with tape.

c. Remove all side covers. Cover valve HP26 (figure 10-8) with a plastic bag and secure the bag with tape.

d. Place a one-inch wooden block under the right end of compressor HP37, as viewed from the front of the Temperature Modulator; then tighten the retaining nuts on the associated shock mounts.

e. Tighten the retaining nuts of the two shock mounts at the left end of the compressor until the shock mount springs are compressed.

f. Place electrical tape around the upper and lower ends of the liquid level indicator (HP11) guards to prevent the guards from vibrating loose during shipment.

g. Install and secure all side covers.

h. Place dust covers on connectors J2 through J6.

i. Cover Temperature Modulator with a dust cover.

j. Place power cable 6943093 in a carton.

Step	Unit	Operation	Normal Indication
1.	TEMP MOD	Remove front, left, right, and rear side covers	
2.	TEMP MOD	Set (push in) interlock switches located behind front, left, right, and rear side covers.	
		NOTE The (HP) referenced components in this procedure are internal Temperature Modulator components, accessible after cover removal. The location of these HP referenced components is shown in figure 10-8.	
		CAUTION To avoid damaging valves, do not use excessive force in attempting to further close or open valves HP4, HP17, HP18, and HP39 after initial seat or stop contact has been made.	
3.	TEMP MOD	Close (turn fully clockwise) valve HP13, accessible from left side.	
4.	TEMP MOD	Close (turn fully clockwise) valve HP4, accessible from rear side.	
		NOTE The opening of valves HP18 and HP39 allows a bypass path around valves HP29 and HP30. (Refer to figure 10-11.)	
5.	TEMP MOD	Open (turn fully counterclockwise) valves HP18 and HP39, accessible from rear side.	
6.	TEMP MOD CP	Turn DATA ADAPTER FLOW RATE control fully counterclockwise.	
7.	TEMP MOD	Turn COMPUTER FLOW RATE control fully counterclockwise.	

Figure 5-1. Distilled Water Filling Procedure (Sheet 1 of 8)

Step	Unit	Operation	Normal Indication
		CAUTION To avoid possible damage to the Temperature Modulator coolant pump the power phase sequence connected to J1 must be as follows: Phase A - J1-X Phase B - J1-Y Phase C - J1-Z	
8.	TEMP MOD	Connect power cable (part number 6943093) between connector J1 and 115 VAC, 60 cps, three-phase power source.	MAIN POWER OFF lamp is lit.
		NOTE The use of an Equipment Test Stand 6943000 and a Launch Vehicle Digital Computer Manual Exerciser (LVDCME) in steps 9 and 10 is not necessary if the following jumper wires are used: (Refer to figure 7-1 for fabrication of jumpers.) a. From J2 pin F to J3 pin J. b. From J2 pin J to J3 pin G. c. From J2 pin G to J3 pin H. d. From J2 pin C to J2 pin E.	
9.	TEMP MOD	Connect cable BA (part number 6940054) between TEMP MOD connector J2 and Equipment Test Stand 6943000 connector J2.	
10.	TEMP MOD	Connect cable AZ (part number 6900073) between TEMP MOD connector J3 and LVDCME panel 02A3 connector J21.	
		NOTE This procedure requires the use of the Purging Cart, IBM Tool number 657900. If a normal indication cannot be obtained as specified in this procedure, refer to the technical manual, Laboratory Maintenance Instructions, Purging Cart, IBM tool number 657900.	

Figure 5-1. Distilled Water Filling Procedure (Sheet 2)

Step	Unit	Operation	Normal Indication
		CAUTION Unless the Temperature Modulator cooling system is known to be empty, perform purging procedure, figure 5-2.	
11.	PURGE CART	Observe the DISTILLED WATER level indicator on the back of the purging cart.	WATER level is on or between OPERATING RANGE marks.
12.	PURGE CART	Check MOISTURE INDICATOR.	MOISTURE INDICATOR is blue (not pink).
13.	PURGE CART	Make sure FILL WATER and FILL 60-40 valves are closed (fully clockwise).	
14.	PURGE CART	Connect an 80 (±20) psi compressed air source to the adapter hose assembly provided with the cart. Connect adapter hose assembly to AIR coupling.	
15.	PURGE CART	Connect power cable to 115 VAC, 60 cps, single-phase power source.	MAIN POWER OFF lamp is lit.
16.	PURGE CART	Press LAMP TEST switch.	All lamps are lit except MAIN POWER ON.
17.	PURGE CART	Operate the following switches so that their lamps are off: VACUUM PUMP DE-AIR SYSTEM FILL WATER PURGE WATER FILL 60/40 PURGE 60/40	
18.	PURGE CART	Press and release MAIN POWER ON pushbutton/lamp.	MAIN POWER ON lamp is lit.
19.	PURGE CART	Adjust LOW PRESSURE REGULATOR control so that LOW PRESSURE gage indicates 5 psi.	

Figure 5-1. Distilled Water Filling Procedure (Sheet 3)

Step	Unit	Operation	Normal Indication
		CAUTION Do not press FILL 60/40 pushbutton/lamp on the purging cart at any time while performing the remaining steps in this procedure. The Temperature Modulator cooling system is filled with distilled water only.	
20.	PURGE CART	Press and release FILL WATER pushbutton/lamp.	FILL WATER ON lamp is lit.
21.	PURGE CART	Connect fluid sampling adapter provided with cart to the DISTILLED WATER OUTLET adapter.	
22.	PURGE CART	Hold a clean beaker under the fluid sampling adapter and draw off about a quarter-pint (120 ml) of coolant by opening and closing FILL WATER valve.	
23.	PURGE CART	Using a resistivity meter and a pH meter (Refer to Section IV), measure the resistivity and the pH of the coolant sample.	Resistivity $\geq$ 100,000 ohm-cm. pH = 7(±1)
24.	PURGE CART	Connect a coolant contaminant sampler to the fluid sampling adapter. Fill the sampler by opening and closing the FILL WATER valve.	
25.	PURGE CART	Press and release FILL WATER pushbutton/lamp.	FILL WATER lamp is not lit.
		WARNING Look away from coupling when detaching fluid sampling adapter. In case of valve failure, coolant may be deflected into eyes.	
26.	PURGE CART	Remove fluid sampling adapter (with coolant contaminant sampler attached) from DISTILLED WATER OUTLET adapter. Disassemble coolant contaminant sampler, remove collection screen and holder and examine screen under a 300X microscope.	Maximum particle size in any dimension shall be no greater than 175 microns.

Figure 5-1. Distilled Water Filling Procedure (Sheet 4)

Step	Unit	Operation	Normal Indication
27.	PURGE CART	Using flex hoses provided with cart, connect DISTILLED WATER OUTLET adapter to TEMP MOD LVDA OUTLET adapter; connect LIQUID RETURN adapter to TEMP MOD LVDA INLET adapter.	
28.	TEMP MOD	Connect flex hose (part number 6943112) between LVDC INLET and LVDC OUTLET adapters.	
29.	PURGE CART	Press and release VACUUM PUMP pushbutton/lamp.	VACUUM PUMP lamp is lit.
30.	PURGE CART	Press and release DE-AIR SYSTEM pushbutton/lamp.	DE-AIR SYSTEM lamp is lit. VACUUM CONTROLLER gage indicates approximately 750 mm Hg (delayed).
31.	PURGE CART	Wait ten minutes, then press DE-AIR SYSTEM switch.	DE-AIR SYSTEM lamp is not lit.
32.	PURGE CART	Press and release VACUUM PUMP pushbutton/lamp.	VACUUM PUMP lamp is not lit.
33.	PURGE CART	Press and release FILL WATER pushbutton/lamp.	FILL WATER lamp is lit.
34.	PURGE CART	Observe TEMP MOD liquid level indicator (HP11) visible from rear side. Open FILL WATER valve until liquid level reaches 2 inches from top of level indicator (HP11); then close FILL WATER valve.	
35.	TEMP MOD	Press and release LAMP TEST pushbutton/lamp.	All display lamps are lit.
36.	TEMP MOD	Press and release LAMP TEST pushbutton/lamp.	MAIN POWER OFF lamp only is lit.
		CAUTION In the following step, be sure that pump rotation is clockwise as viewed from front of Temperature Modulator. Do not continue with procedure until pump rotation is correct, otherwise pump damage may result.	

Figure 5-1. Distilled Water Filling Procedure (Sheet 5)

Step	Unit	Operation	Normal Indication
37.	TEMP MOD	Press and release MAIN POWER ON pushbutton/lamp, then quickly press and release MAIN POWER OFF pushbutton/lamp and observe pump rotation.	Clockwise rotation.
38.	TEMP MOD	Press and release MAIN POWER ON pushbutton/lamp.	MAIN POWER ON lamp lit.
39.	TEMP MOD	After two minutes, press and release MAIN POWER OFF pushbutton/lamp.	MAIN POWER OFF lamp is lit.
40.	PURGE CART	Observe liquid level indicated on TEMP MOD liquid level indicator (HP11). If the liquid level is below the 2 inch point, open FILL WATER valve until liquid level reaches the 2 inch point; then close FILL WATER valve.	
41.		Repeat steps 38, 39, and 40 until water level on TEMP MOD level indicator (HP11) remains at 2 inch point.	
42.	TEMP MOD	Close (turn fully clockwise) valves HP18 and HP39, accessible from rear side, and valve HP17, accesible from right side.	
		WARNING Look away from couplings when detaching flex hoses. In case of valve failure, coolant may be deflected into eyes.	
43.	TEMP MOD	Remove flex hoses between TEMP MOD and purging cart. Cover ends of flex hoses with dust caps provided. Do not remove flex hose connected between LVDC INLET and LVDC OUTLET connectors.	
44.	TEMP MOD FCP	Press and release MAIN POWER ON pushbutton/lamp.	

Figure 5-1. Distilled Water Filling Procedure (Sheet 6)

Step	Unit	Operation	Normal Indication
45.	TEMP MOD FCP	Observe the following lamps: a. MAIN POWER ON lamp. b. PUMP ON lamp. c. BYPASS lamp. d. COOLING UNIT ON lamp. e. HEATER OFF lamp. f. BENCH lamp.	 Lit Lit Lit Lit Lit Lit
46.	TEMP MOD	Press and release FLOW PATH SYSTEM pushbutton/lamp.	BYPASS lamp not lit. SYSTEM lamp lit.
47.	TEMP MOD	Press and release MAIN POWER OFF pushbutton/lamp.	MAIN POWER OFF lamp lit.
48.	TEMP MOD	Observe liquid level indicated level indicator (HP11). If the liquid level remains at the 2 inch point, proceed to step 52; if the liquid level is below the 2 inch point proceed with the following step.	
49.	PURGE CART	Using flex hoses provided with cart, connect DISTILLED WATER OUTLET adapter to TEMP MOD LVDA OUTLET adapter; connect LIQUID RETURN adapter to TEMP MOD LVDA INLET adapter.	
50.	PURGE CART	Observe TEMP MOD level indicator (HP11) visible from rear side. Open FILL WATER valve until liquid level reaches 2 inches from top of level indicator (HP11); then close FILL WATER valve.	
51.	TEMP MOD	Repeat steps 43 through 50 until liquid level indicated on level indicator (HP11) remains at the 2 inch point.	
52.	TEMP MOD	Open (turn counterclockwise) valve HP4, accessible from rear side.	
53.	TEMP MOD	Install front, left, right, and rear side covers.	
54.	TEMP MOD	Cover quick-disconnect adapters with dust caps provided.	

Figure 5-1. Distilled Water Filling Procedure (Sheet 7)

Step	Unit	Operation	Normal Indication
		NOTE The Temperature Modulator is now ready for operation. However, if the Temperature Modulator is not to be used within a reasonable length of time, disconnect power cable and place plastic bags over quick-disconnect adapters.	
55.	PURGE CART	Cover quick-disconnect adapters with dust caps provided.	
56.	PURGE CART	Press and release FILL WATER pushbutton/lamp.	FILL WATER lamp is not lit.
57.	PURGE CART	Press and release MAIN pushbutton/lamp.	MAIN POWER OFF lamp is lit.
		CAUTION Always disconnect power cable before disconnecting compressed air source. Air source prevents buildup of combustible vapors in switch housing.	
58.	PURGE CART	If purging cart is not to be used within a reasonable length of time, disconnect compressed air source and power cables.	

Figure 5-1. Distilled Water Filling Procedure (Sheet 8)

Step	Unit	Operation	Normal Indication
1.	TEMP MOD	Remove front, left, right, and rear side covers.	
2.	TEMP MOD	Set (push in) interlock switches located behind front, left, right, and rear side covers.	
		NOTE The (HP) component references in this procedure are internal Temperature Modulator components, accessible after cover removal. The location of these HP referenced components is shown in figure 10-8.	
		CAUTION To avoid damaging valves, do not use excessive force in attempting to further close or open valves HP4, HP17, HP18, and HP39 after initial seat or stop contact has been made.	
3.	TEMP MOD	Close (turn fully clockwise) valve HP13, accessible from left side.	
4.	TEMP MOD	Close (turn fully clockwise) valve HP4, accessible from rear side.	
		NOTE The opening of valves HP18 and HP39 allows a bypass path around valves HP29 and HP30. (Refer to figure 10-11.)	
5.	TEMP MOD	Open (turn fully counterclockwise) valves HP18 and HP39, accessible from rear side.	
6.	TEMP MOD	Turn DATA ADAPTER FLOW RATE control fully counterclockwise.	
7.	TEMP MOD	Turn COMPUTER FLOW RATE control fully counterclockwise.	

Figure 5-2. Purging Procedure (Sheet 1 of 8)

Step	Unit	Operation	Normal Indication
		CAUTION To avoid possible damage to the Temperature Modulator coolant pump the power phase sequence connected to J1 must be as follows: Phase A - J1-X Phase B - J1-Y Phase C - J1-Z	
8.	TEMP MOD	Connect power cable (part number 6943093) between connector J1 and 115VAC, 60 cps, three-phase power source.	MAIN POWER OFF lamp is lit.
		NOTE The use of an Equipment Test Stand 6943000 and a Launch Vehicle Digital Computer Manual Exerciser (LVDCME) in steps 9 and 10 is not necessary if the following jumper wires are used: (Refer to figure 7-1 for fabrication of jumpers.) a. From J2 pin F to J3 pin J. b. From J2 pin J to J3 pin G. c. From J2 pin G to J3 pin H. d. From J2 pin C to J2 pin E.	
9.	TEMP MOD	Connect cable BA (part number 6940054) between TEMP MOD connector J2 and Equipment Test Stand 6943000 connector J2.	
10.	TEMP MOD	Connect cable AZ (part number 6900073) between TEMP MOD connector J3 and LVDCME panel 02A3 connector J21.	
11.	TEMP MOD	Press and release LAMP TEST pushbutton/lamp.	All display lamps are lit.
12.	TEMP MOD	Press and release LAMP TEST pushbutton/lamp.	MAIN POWER OFF lamp only is lit.

Figure 5-2. Purging Procedure (Sheet 2)

Step	Unit	Operation	Normal Indication
		NOTE This procedure requires the use of the Purging Cart, IBM Tool number 657900. If a normal indication cannot be obtained as specified in this procedure, refer to the technical manual, Laboratory Maintenance Instructions, Purging Cart, IBM Tool number 657900.	
13.	PURGE CART	Observe the WASTE TANK liquid level indicator on the back of the purging cart.	No level visible.
14.	PURGE CART	Check MOISTURE INDICATOR.	MOISTURE INDICATOR is blue (not pink).
15.	PURGE CART	Make sure FILL WATER and FILL 60-40 valves are closed (fully clockwise).	
16.	PURGE CART	Connect an 80 (±20) psi compressed air source to the adapter hose assembly provided with the cart. Connect adapter hose assembly to AIR coupling.	
17.	PURGE CART	Connect power cable to 115 VAC, 60 cps, single-phase power source.	MAIN POWER OFF lamp is lit.
18.	PURGE CART	Press LAMP TEST switch.	All lamps are lit except MAIN POWER ON.
19.	PURGE CART	Operate the following switches so that their lamps are off: VACUUM PUMP DE-AIR SYSTEM FILL WATER FILL 60/40 PURGE WATER PURGE 60/40	
20.	PURGE CART	Press and release MAIN POWER ON pushbutton/lamp.	MAIN POWER ON lamp is lit.
21.	PURGE CART	Adjust HIGH PRESSURE REGULATOR control so that HIGH PRESSURE gage indicates 30 psi.	

Figure 5-2. Purging Procedure (Sheet 3)

Step	Unit	Operation	Normal Indication
22.	PURGE CART	Using flex hoses provided with cart, connect DISTILLED WATER OUTLET adapter to LVDC OUTLET adapter on TEMP MOD; connect LIQUID RETURN adapter to LVDC INLET adapter on TEMP MOD.	
23.	PURGE CART	Press and release PURGE WATER pushbutton/lamp.	PURGE WATER lamp is lit.
24.	TEMP MOD	Wait about one minute and crack open valve HP17; then after a few seconds, fully open valve HP17.	
25.	TEMP MOD	Wait about one minute and close (turn fully clockwise) valve HP17; then after about one minute repeat step 24.	
26.	TEMP MOD	Crack open valve HP13; then after a few seconds, fully open valve HP13.	
27.	TEMP MOD	Wait about one minute then close (turn fully clockwise) valve HP13; then after about one minute repeat step 26.	
28.	PURGE CART	Wait five minutes, then press and release PURGE WATER pushbutton/lamp.	PURGE WATER lamp is not lit.
		WARNING Look away from quick-disconnect adapters when detaching flex hoses. In case of valve failure, coolant may be deflected into eyes.	
29.	TEMP MOD	Move flex hose from LVDC OUTLET adapter to LVDA OUTLET adapter disconnect flex hose between LVDC INLET adapter and LIQUID RETURN adapter on purging cart.	

Figure 5-2. Purging Procedure (Sheet 4)

Step	Unit	Operation	Normal Indication
		NOTE The flex hoses (part numbers 6943112, 6943113, 6943114, and 6943115), used with the Temperature Modulator during normal operation are purged in steps 30 and 31.	
30.	TEMP MOD	Interconnect flex hoses 6943112, 6943113, 6943114 and 6943115 in a serial fashion between LVDA OUTLET adapter and DISTILLED WATER OUTLET adapter on purging cart.	
31.	PURGE CART	Press and release PURGE WATER pushbutton/lamp.	PURGE WATER lamp is lit.
32.	PURGE CART	Wait five minutes, then press and release PURGE WATER pushbutton/lamp.	PURGE WATER lamp is not lit.
		WARNING Look away from quick-disconnect adapters when detaching flex hoses. In case of valve failure, coolant may be deflected into eyes.	
33.	TEMP MOD	Remove flex hoses 6943112, 6943113, 6943114, and 6943115 between LVDA OUTLET adapter and DISTILLED WATER OUTLET adapter on purging cart.	
34.	PURGE CART	Using flex hose provided with cart, connect DISTILLED WATER OUTLET adapter to LVDA OUTLET adapter on TEMP MOD.	
		NOTE In step 35 a flex cable is connected between the Temperature Modulator LVDC INLET adapter and the LVDC OUTLET adapter to prevent air leakage at adapters during a DE-AIR operation.	

Figure 5-2. Purging Procedure (Sheet 5)

Step	Unit	Operation	Normal Indication
35.	TEMP MOD	Connect flex hose 6943112 between LVDC INLET and LVDC OUTLET adapters.	
36.	TEMP MOD	Press and release PURGE WATER pushbutton/lamp.	PURGE WATER lamp is lit.
		NOTE To purge the maximum amount of residual coolant in the pump impeller housing during step 37, the Temperature Modulator can be tilted forward (raise rear side) 35 to 40 degrees. This operation can best be accomplished with the aid of a fork-lift truck.	
		CAUTION To avoid possible damage to the pump, do not run pump for more than 10 seconds when the pump impeller housing is dry.	
37.	TEMP MOD	Place a low pan under valve HP26, accessible from front; and crack open valve HP26: then "jog" pump by depressing, in rapid succession MAIN POWER ON and MAIN POWER OFF pushbutton/lamps, discontinue operation when a maximum of two dry cycles occur.	
38.	TEMP MOD	Close (fully clockwise) valve HP26, accessible from front.	
39.	PURGE CART	Press and release PURGE WATER pushbutton/lamp.	PURGE WATER lamp is not lit.
40.	PURGE CART	Press and release DE-AIR SYSTEM pushbutton/lamp.	DE-AIR SYSTEM lamp is lit.
41.	PURGE CART	Press and release VACUUM PUMP pushbutton/lamp.	VACUUM PUMP lamp is lit. VACUUM CONTROLLER gage indicates approximately 750 mm Hg (delayed).

Figure 5-2. Purging Procedure (Sheet 6)

Step	Unit	Operation	Normal Indication
42.	PURGE CART	Wait 30 minutes then press DE-AIR SYSTEM pushbutton/lamp.	DE-AIR SYSTEM lamp is not lit.
43.	PURGE CART	Press VACUUM PUMP push-button/lamp.	VACUUM PUMP lamp is not lit.
		If new coolant is to be loaded, proceed as directed in figure 5-1, starting with step 17. Otherwise, continue with re-mainder of this procedure.	
44.	TEMP MOD	Disconnect power cable 6943093.	
45.	PURGE CART	Adjust HIGH PRESSURE REGU-LATOR control so that HIGH PRESSURE gage indicates 3 psi.	
46.	PURGE CART	Press and release PURGE WATER pushbutton/lamp.	PURGE WATER lamp is lit.
47.	PURGE CART	Wait one minute; then press and release PURGE WATER pushbutton/lamp.	PURGE WATER lamp is not lit.
		WARNING Look away from quick-disconnect adapters when detaching flex hoses. In case of valve failure, coolant may be deflected into eyes.	
48.	TEMP MOD	Remove flex hoses from TEMP MOD and purging cart. Cover ends of flex hoses with dust caps provided.	

Figure 5-2. Purging Procedure (Sheet 7)

Step	Unit	Operation	Normal Indication
49.	TEMP MOD	Cover quick-disconnect adapters with dust caps provided.	
50.	TEMP MOD	Install front, left, right, and rear side covers.	
		NOTE Perform storage preparations as described in paragraph 5-21 if the TEMPERATURE MODULATOR is not to be used within a reasonable length of time.	
51.	PURGE CART	Cover quick-disconnect adapters with dust cap provided.	
52.	PURGE CART	Press and release MAIN POWER OFF pushbutton/lamp.	MAIN POWER OFF lamp is lit.
		CAUTION Always disconnect power cable before disconnecting compressed air source. Air source prevents buildup of combustible vapors in switch housing.	
53.	PURGE CART	If purging cart is not to be used within a reasonable length of time, disconnect compressed air source and power cable.	

Figure 5-2. Purging Procedure (Sheet 8)

SECTION VI

PREVENTIVE MAINTENANCE

6-1. SCOPE.

6-2. This section contains the recommended inspection and maintenance methods for Equipment Test Stands 6940100 and 6943000 and the Temperature Modulator.

6-3. INSPECTION.

6-4. There is no recommended inspection for Equipment Test Stands 6943000 and the Temperature Modulator. However, if during use of these equipments exterior damage, or deterioration or discoloration of panel markings is noted, repair the fault as described in Section IX.

6-5. PERIODIC MAINTENANCE.

6-6. There is no recommended periodic maintenance for Equipment Test Stand 6940100. Recommended periodic maintenance of Equipment Test Stand 6943000 is limited to power supply servicing as prescribed in figure 6-1. Figure 6-1 lists the location of the power supplies, maintenance intervals, and the method of maintenance.

6-7. Figure 6-2 prescribes the recommended periodic maintenance schedules for the Temperature Modulator. Periodic maintenance of the Temperature Modulator is limited to the inspection and servicing of non-electrical components. Figure 6-2 lists the items to be inspected, and the method of inspection and/or maintenance.

ASSEMBLY Trygon Power Supplies (See below for assembly numbers and models) REFERENCE MANUAL Trygon Instruction and Maintenance Manuals				PREVENTIVE MAINTENANCE SCHEDULE		
Item	Location	Frequency	Observe	Clean	Lubricate	Note
Fan Motor	See pictorial representation of the inside of a supply in the back of the reference manual.	Monthly			Oil motor shaft at tubes on each end of motor. Use a light oil. (Mobile Vacuoline Oil E or equivalent.)	

The above preventive maintenance applies to the following assemblies:

1. Power Supply 01A1PS1 (Trygon Model M36-5-0V).
2. Power Supply 01A1PS2 (Trygon Model M36-10A-0V).
3. Power Supply 01A1PS3 (Trygon Model M36-30A202).
4. Power Supply 01A1PS4 (Trygon Model M15-5-0V).
5. Power Supply 01A1PS5 (Trygon Model M15-5-0V).

Figure 6-1. Power Supplies (Trygon) Preventive Maintenance

ASSEMBLY Temperature Modulator
REFERENCE MANUAL (None)

PREVENTIVE MAINTENANCE SCHEDULE

Item	Location	Frequency	Observe	Clean	Lubricate	Note
Pump Motor Bearings	See reference B3 on figure 10-8 for location of pump.	Yearly	Check to see if lubrication is needed (see "Lubricate" column).		*Lubricate as follows:* (a) Clean and remove filler and drain plugs. (b) Clean out hardened grease. (c) Add ball bearing grease until all of old grease is expelled through the drain hole. (d) Run motor with drain plug removed to eliminate excess grease. (e) Clean and replace both plugs.	CAUTION Do not overlubricate ball bearings. Use Socony Mobil Oil Co., "Mobilux Grease No. 2", or equivalent.
Coolant	Coolant sample can be taken at valve HP12. (See figure 10-8 for location.)	Every 8 hours	Record resistivity and pH with Barnstead Resistivity Meter and Beckman pH Meter. (See "Note" column).			If resistivity is below 100,000 ohm-centimeters and/or pH level is below 6 or above 8, replace coolant. (Refer to Purge and Filling Procedures in Section V of this volume.) Sample coolant using the Millipore Bomb Sampling Kit with collection screen holder. If sample shows coolant is contaminated, replace filter HP28, IBM part number 6903974, and perform cleaning procedure called out in "Clean" column.
		Every 5 days		See "Note" column first. If cleaning is necessary, clean the cooling system as prescribed in figure 6-3.		
Compressor Oil Level	See reference HP37 on figure 10-8 for location of compressor.	Quarterly	Check oil level in the compressor crankcase during stabilized operation only. (See "Lubricate" column.)		If the oil level is not approximately at the center of the viewing glass, add Suniso 3G oil, 150 viscosity.	

Figure 6-2. Temperature Modulator Preventive Maintenance (Sheet 1 of 2)

ASSEMBLY Temperature Modulator REFERENCE MANUAL (None)				PREVENTIVE MAINTENANCE SCHEDULE		
Item	Location	Frequency	Observe	Clean	Lubricate	Note
Refrigerant	See reference HP3 on figure 10-8 for location of refrigerant sight glass.	Quarterly	Check the oval image in the port of the refrigerant sight glass. (See "Note" column.)			NOTE If either or both of the following actions is required, a qualified refrigeration service man should perform the required action. If the image is at right angles to the flow, the system is full of refrigerant. If it is parallel to the flow, the refrigerant is low. If refrigerant is required, add refrigerant 12 gas only to the low side of the compressor. NOTE Refrigerant should be charged through a dryer in vapor form. If the indicator registers a bright pink, the refrigerant is wet. Therefore, pump down the refrigerant into the receiver and replace the drier-strainer HP1, IBM part number 6903925.
			Check the Liquid Moisture Indicator in the refrigerant sight glass. (See "Note" column).			
Condenser Unit	See reference HP15 on figure 10-8 for location of condenser.	Quarterly	Check condensing unit grids for cleanliness.	Clean any dust accumulation by use of a vacuum cleaner.		

Figure 6-2. Temperature Modulator Preventive Maintenance (Sheet 2)

(To Be Supplied With Delivery of Purging Chart.)

Figure 6-3. Temperature Modulator Coolant System Cleaning Procedure

SECTION VII

CALIBRATION

7-1. SCOPE.

7-2. This section contains the calibration instructions for the Temperature Modulator. The Equipment Test Stand 6943000 calibration instructions are included in Volume IV, Section VII since the test stand and the LVDAME are calibrated together. Equipment Test Stand 6940100 requires no calibration.

7-3. GENERAL.

7-4. The Temperature Modulator calibration procedure consists of a check of the Temperature Modulator's control of liquid coolant temperature and circulation using simulated computer and data adapter inputs. The simulated inputs are obtained from the Launch Vehicle Digital Computer and Data Adapter Simulation Controller (SIM CON), IBM part number 6903999 or equivalent.

7-5. The special test equipment required to perform the Temperature Modulator calibration procedure is as follows:

a. Launch Vehicle Digital Computer and Data Adapter Simulation Controller, IBM part number 6903999 or equivalent.

b. DC Voltmeter, Triplett model 630, or equivalent.

c. Power Supply (-26 VDC), Trygon model T50-2, or equivalent.

d. Resistance Bridge, Industrial Instruments model RN-2, or equivalent.

e. Digital Thermometer, United Systems Corp. model 501, or equivalent.

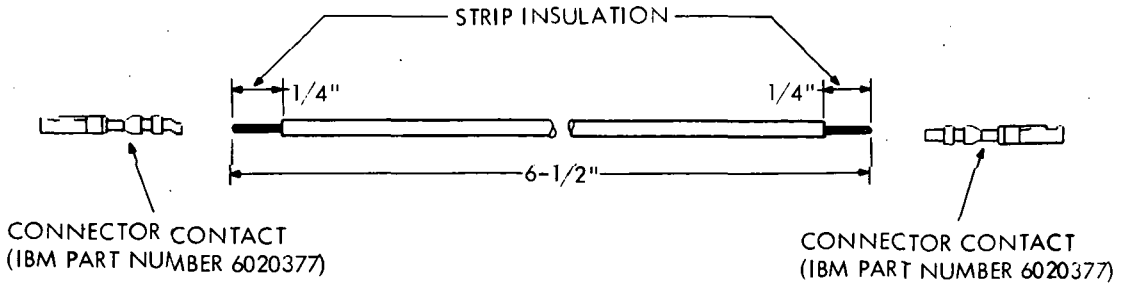
f. Four self-check jumper wires. (See part A of figure 7-1 for illustration of parts and fabrication procedure.)

g. Two triple jumpers. (See part B of figure 7-1 for illustration of parts and fabrication procedure.)

h. One voltmeter to connector lead. (See part C of figure 7-1 for illustration of parts and fabrication procedure.)

7-6. The calibration procedure shall be performed every four months. All of the steps shall be performed sequentially to the end of the procedure. If a failure occurs as evidenced by indications other than the normal indications listed, refer to the Temperature Modulator Electrical Circuit Adjustments procedure (figure 7-2) or to Trouble Isolation, Section VIII.

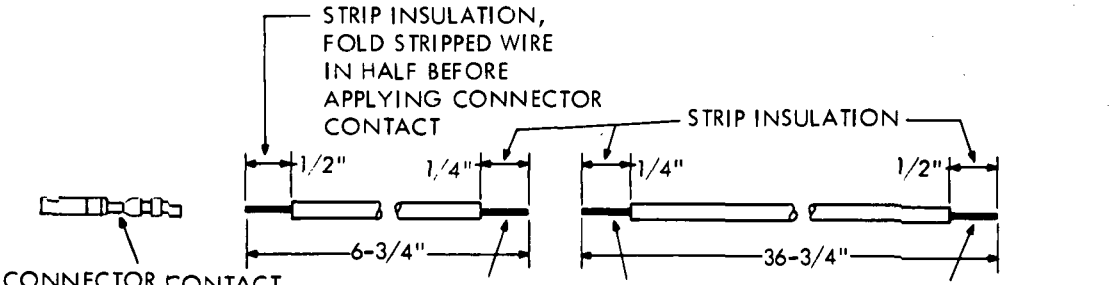
7-7. The procedure may be used at any time to check the functions of the Temperature Modulator. If any one function is to be checked, the Temperature Modulator system must be filled with liquid coolant. (Refer to Section V for distilled water filling procedure.)



NOTES:

1. USE NUMBER 16 WIRE (IBM PART NUMBER 6032006 OR EQUIVALENT).
2. USE CRIMPING TOOL (BENDIX PART NUMBER 11-7295) FOR CRIMPING CONNECTOR CONTACTS.

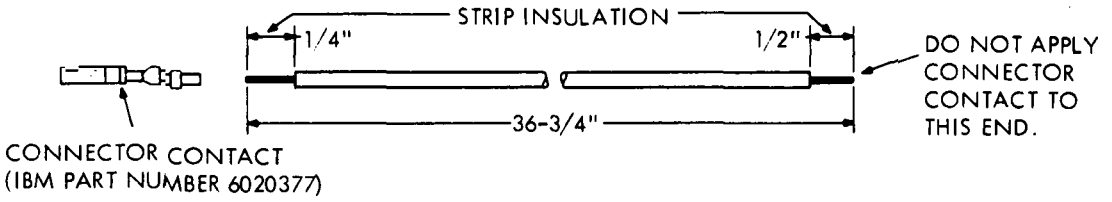
(A) SELF-CHECK JUMPER WIRES (4 REQUIRED)



NOTES:

1. USE NUMBER 20 WIRE (IBM PART NUMBER 6032031 OR EQUIVALENT).
2. USE CRIMPING TOOL (BENDIX PART NUMBER 11-7295) FOR CRIMPING CONNECTOR CONTACTS.

(B) TRIPLE JUMPERS (2 REQUIRED)



NOTES:

1. USE NUMBER 16 WIRE (IBM PART NUMBER 6032006 OR EQUIVALENT).
2. USE CRIMPING TOOL (BENDIX PART NUMBER 11-7295) FOR CRIMPING CONNECTOR CONTACTS.

(C) VOLTMETER TO CONNECTOR LEAD (1 REQUIRED).

Figure 7-1. Jumper Wires Required for Temperature Modulator Calibration

7-8. PRELIMINARY PROCEDURES.

7-9. The two special procedures required are as follows:

a. SIM CON Purge and Fill Procedure. This procedure is performed prior to the Temperature Modulator calibration procedure, and is prescribed in the following paragraphs.

b. Temperature Modulator Distilled Water Filling Procedure. (Refer to Section V.) This procedure is performed during the Temperature Modulator Electrical Circuit Adjustments procedure (figure 7-2), after certain pre-required electrical checks have been made.

7-10. SIM CON PURGE AND FILL PROCEDURE.

7-11. SPECIAL EQUIPMENT. The special equipment used to purge and fill the SIM CON is as follows:

a. Saturn V Purging Cart, IBM tool number 657900.

b. Two flex-hoses, IBM part numbers 6943112 and 6943113.

7-12. Purge the SIM CON data adapter simulator portion as follows:

a. Turn both PRESSURE DIFFERENTIAL control knobs, on SIM CON front control panel, fully clockwise.

b. Connect a flex-hose from OUTLET adapter (Purging Cart) to SLVDA INLET adapter (SIM CON).

c. Connect the other flex-hose from INLET adapter (Purging Cart) to SLVDA OUTLET adapter (SIM CON).

d. Adjust HIGH PRESSURE AIR REGULATOR control knob (Purging Cart, lower control panel) to obtain a reading of 30 PSI on HIGH PRESSURE gage.

e. Press and release PURGE SYSTEM pushbutton/lamp (Purging Cart, upper control panel).

f. Allow SIM CON to be purged for five minutes.

g. Press and release PURGE SYSTEM pushbutton/lamp.

h. Press and release DE-AIR SYSTEM pushbutton/lamp (Purging Cart, upper control panel).

i. Press and release VACUUM PUMP pushbutton/lamp (Purging Cart, upper control panel). VACUUM PUMP lamp shall light indicating that vacuum pump is operating.

j. Wait for Purging Cart Vacuum Controller gage to indicate approximately 5 mm Hg; then allow SIM CON system to de-air for ten minutes. Then press and release DE-AIR SYSTEM pushbutton/lamp.

k. Press and release VACUUM PUMP pushbutton/lamp (Purging Cart, upper control panel). VACUUM PUMP lamp shall go out indicating that pump is off.

7-13. Fill the SIM CON data adapter simulator portion with liquid coolant as follows:

a. Connect an air hose to the air coupling (Purging Cart, lower control panel).

b. Adjust LOW PRESSURE AIR REGULATOR control knob (Purging Cart, lower control panel) to obtain a reading of 5 PSI on LOW PRESSURE air gage.

c. Press and release FILL SYSTEM pushbutton/lamp (Purging Cart, upper control panel).

d. Slowly open FILL VALVE (Purging Cart, lower control panel) until SIM CON system is full. SIM CON is full when level of water in sight glass (rear of Purging Cart) remains steady.

e. Close FILL VALVE.

f. Remove all flex-hoses.

NOTE

The SIM CON data adapter simulator portion is now full and ready for use.

7-14. Purge and fill the SIM CON digital computer simulator portion as follows:

a. Connect a flex-hose from OUTLET adapter (Purging Cart) to SLVDC INLET adapter (SIM CON).

b. Connect the other flex-hose from INLET adapter (Purging Cart) to SLVDC OUTLET adapter (SIM CON).

c. Repeat steps d. through k. of paragraph 7-12 and steps a. through f. of paragraph 7-13.

NOTE

The SIM CON digital computer simulator portion is now full and ready for use.

7-15. ABBREVIATIONS USED IN CALIBRATION PROCEDURES.

7-16. The following abbreviations are used in the PANEL column of figures 7-2 through 7-6:

Abbreviation	Definition
BP	Back Panel
FCP	Front Control Panel
LVDAME	Launch Vehicle Data Adapter Manual Exerciser

Abbreviation	Definition
LVDCME	Launch Vehicle Digital Computer Manual Exerciser
N/A	Not Applicable
PC	Power Control Panel
SIM CON	Launch Vehicle Digital Computer and Data Adapter Simulation Controller
TEMP MOD	Launch Vehicle Digital Computer and Data Adapter Temperature Modulator
TEST STAND 9430	Equipment Test Stand 6943000

7-17. The definitions in the PANEL column of figures 7-2 and 7-3 pertain only to the Temperature Modulator. The definitions in the PANEL column of figures 7-4 through 7-6 may pertain to either the Temperature Modulator, SIM CON, LVDAME, LVDCME, or TEST STAND 9430, and are thus specified.

7-18. Other abbreviations used throughout the procedure are as follows:

Abbreviations	Definition
PPM	Pounds per Minute
PSI	Pounds per Square Inch
°F	Degrees Fahrenheit

7-19. TEMPERATURE MODULATOR CALIBRATION CHECKS.

7-20. The Temperature Modulator electrical circuit adjustments are listed in figure 7-2. The performance of the instructions contained in figure 7-2 will calibrate or verify the accuracy of the °F MANUAL control, overheat thermostat, and AMBIENT temperature gage. The shut-down of the condenser fan and compressor is also verified when the pressure sensing devices are activated.

7-21. The Temperature Modulator electrical circuit functional checks are listed in figure 7-3. These checks verify the operation of the emergency off system, circuit breaker functions, front panel controls and indicators, Temperature Modulator interlocks, prime equipment interlocks, and flow detectors.

7-22. The Temperature Modulator coolant temperature stabilization circuits checks are listed in Figure 7-4. These checks verify the operation of the stabilization circuits at different inlet coolant temperatures.

7-23. The Temperature Modulator and LVDCME interlock compatibility checks are contained in figure 7-5. Interlock features used on the Temperature Modulator and LVDCME are checked for compatibility when the Temperature Modulator and LVDCME are interconnected.

7-24. The Temperature Modulator, LVDAME, and Equipment Test Stand 6943000 interlock compatibility checks are contained in figure 7-6. The interlock features used on these equipments are checked for compatibility when equipments are interconnected.

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDC/DA Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
4.1	BP	Connect the following jumper wires: a. J2 pin F to J3 pin J. b. J2 pin J to J3 pin G. c. J2 pin G to J3 pin H. d. J2 pin C to J2 pin E.		
4.2	FCP	Press EMERGENCY PULL switch to reset (in) position.		
4.3	BP	Open circuit breaker access door and set all circuit breakers to ON.		
4.4	BP	Connect 3 ϕ, 30 amp AC power cable between service outlet and TEMP MOD connector J1.		
4.5	N/A	Remove left side panel; then verify that all other panels and doors on TEMP MOD are closed.		
4.6	N/A	Set (push in) left side panel interlock. CAUTION In the following step, be sure that pump rotation is clockwise (viewed from front of TEMP MOD). Do not continue until pump rotation is correct; otherwise pump damage may result.		

A B C D E F G H I J K L M N O P Q R | PAGE 3 | OF PAGES | NUMBER A- 64-385-9420

Figure 7-2. Temperature Modulator Electrical Circuit Adjustments (Sheet 1 of 7)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDC/DA Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
4.7	FCP	Press and release MAIN POWER ON pushbutton/lamp; then quickly press and release MAIN POWER OFF pushbutton/lamp and observe pump rotation as viewed from the front of TEMP MOD.	Clockwise Rotation	_____
		Note Before continuing with this procedure, fill the Temperature Modulator cooling system as prescribed in figure 5-1.		
4.8	FCP	Turn THERMAL MODE °F MANUAL knob to 55.		
4.9	FCP	Unlock and swing front control panel forward.		
4.10	FCP	Connect an Industrial Instruments, Model RN-2, Resistance Bridge between R4-1 and R4-2; then record reading.	Record	_____
		Note Proceed to step 4.15 if a reading of 727 ohms was obtained in step 4.10; otherwise continue with step 4.11.		
4.11	FCP	Loosen set screws on THERMAL MODE °F MANUAL knob and remove knob.		
4.12	FCP	Turn potentiometer R4 until a reading of 727 ohms is obtained on resistance bridge.	727 ohms	_____

A B C D E F G H I J K L M N O P Q R | PAGE 4 OF PAGES | NUMBER A- 64-385-9420

Figure 7-2. Temperature Modulator Electrical Circuit Adjustments (Sheet 2)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDC/DA Temperature Modulator | UNIT NO. 6903800

Step	Panel	Operation	Normal Indication	Data
4.13	FCP	Install knob on shaft of potentiometer R4 and set knob to 55; then carefully tighten set screws without changing the 727 ohm reading on the resistance bridge.		
4.14	FCP	Verify that resistance bridge reads 727 ohms at the 55° setting.	727 ohms	_____
4.15	FCP	Remove resistance bridge and close front control panel.		
4.16	N/A	Remove front, rear, left, and right side covers.		
4.17	N/A	Verify that the following valves are fully open (counterclockwise). a. HP4 - Upper left rear, above reservoir tank. b. HP13 - Center left side.	Verified	_____
4.18	N/A	Verify that the following valves are fully closed (clockwise). a. HP17 - Center right side. b. HP18 - Center rear side. c. HP39 - Center rear side. d. HP26 - Lower left front.	Verified	_____
4.19	N/A	Verify that water level on indicator HP11 (left rear, mounted on side of reservoir tank) is above the 2-inch level.	Verified	_____
		Note Using IBM Purge and Fill Cart, TL #657880 or equivalent, add water to reservoir if water level is below 2-inch level.		

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Figure 7-2. Temperature Modulator Electrical Circuit Adjustments (Sheet 3)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDC/DA Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
4.20	N/A	Adjust the overheat thermostat control (lower left rear) for a setting of 105°F.	105° F	_____
4.21	N/A	Set (push in) interlock switches located behind all four side covers.		
4.22	BP	Install the following jumper wires: a. J2 pin F to J3 pin J. b. J2 pin G to J3 pin H. c. J2 pin J to J3 pin G. d. J2 pin C to J2 pin E.		
4.23	BP	Connect flex-hoses from LVDC INLET to LVDC OUTLET and LVDA INLET to LVDA OUTLET.		
4.24	FCP	Press EMERGENCY PULL switch to reset (in) position.		
4.25	BP	Open circuit breaker access door and set all circuit breakers to ON.		
4.26	BP	Close circuit breaker access door.		
4.27	FCP	Press and release MAIN POWER ON pushbutton/lamp.		
4.28	FCP	Observe MAIN POWER ON indicator lamp.	Lit	_____
4.29	FCP	Press and release HEATER ON indicator lamp.		
4.30	FCP	Observe HEATER ON indicator lamp.	Lit	_____

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Figure 7-2. Temperature Modulator Electrical Circuit Adjustments (Sheet 4)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDC/DA Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
4.31	N/A	Turn overheat thermostat control knob counterclockwise until HEATER ON indicator lamp goes out and HEATER OFF indicator lamp is lit. Verify.	Verified	_____
4.32	N/A	Return overheat thermostat control knob to 105° F. setting.	105° F	_____
4.33	N/A	Verify that HEATER OFF indicator lamp remains lit.	Lit	_____
		Note If compressor is off due to normal cycling, wait until the compressor cycles on before continuing.		
4.34	N/A	Remove cover from high pressure switch S17 (bottom front); then disconnect one lead from the contacts.		
4.35	FCP	Observe COOLING UNIT ON indicator lamp.	Not lit	_____
4.36	N/A	Verify condenser fan and compressor shuts down (bottom).	Verified	_____
4.37	FCP	Press and release SYSTEM pushbutton/lamp. Lamp lights when pushbutton is pressed, and goes out when released.	Lit/Not lit	_____
4.38	N/A	Connect lead on S17. Replace cover.		
4.39	FCP	Press and release SYSTEM pushbutton/lamp.		
4.40	FCP	Observe only the SYSTEM indicator lamp.	Lit	_____

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Figure 7-2. Temperature Modulator Electrical Circuit Adjustments (Sheet 5)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDC/DA Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
		Note If compressor is off due to normal cycling, wait until cycle on before continuing.		
		Note In the following step, make sure that solid jumper contact is made when jumper is connected or TEMP MOD. will revert to BYPASS.		
4.41	N/A	Remove cover of low pressure switch S18 (bottom) and connect jumper lead across contacts.		
4.42	N/A	Verify that condenser fan and compressor shuts down.	Verified	_____
4.43	FCP	Observe COOLING UNIT indicator lamp.	Lit	_____
4.44	FCP	Observe SYSTEM indicator lamp.	Lit	_____
4.45	N/A	Disconnect jumper lead across S18.		
4.46	FCP	Observe SYSTEM indicator lamp.	Lit	_____
4.47	FCP	Observe COOLING UNIT indicator lamp.	Lit	_____
4.48	N/A	Verify condenser fan and compressor starts.	Verified	_____
4.49	N/A	Connect jumper lead across contacts of S18.		
4.50	N/A	Remove cover of low-low pressure switch S16 (bottom) and disconnect one lead from contacts.		

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Figure 7-2. Temperature Modulator Electrical Circuit Adjustments (Sheet 6)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDC/DA Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
4.51	FCP	Observe COOLING UNIT indicator lamp.	Not lit	_____
4.52	FCP	Observe SYSTEM indicator lamp; approximately five seconds after the lead from S16 is removed. SYSTEM lamp goes out.	Not lit	_____
4.53	N/A	Verify that condenser fan and compressor shuts down.	Verified	_____
4.54	N/A	Reconnect lead on S16 and replace cover.		
4.55	N/A	Disconnect jumper lead across S18 and replace cover.		
4.56	FCP	Press and release MAIN POWER OFF pushbutton/lamp.		
4.57	FCP	Observe that MAIN POWER OFF indicator lamp is lit.	Lit	_____
4.58	N/A	Place a probe from a United Systems Corporation, Model 501, Digital Thermometer (or equivalent) next to the ambient temperature sense probe located on left side of bracket 6943167 on front of TEMP MOD.		
4.59	N/A	Verify that the reading on the digital thermometer and the reading on the TEMP MOD AMBIENT gauge agree within $\pm 1.0^{\circ}$ F. after a delay of 10 minutes.	$\pm 1.0^{\circ}$ F.	_____
4.60	N/A	Remove digital thermometer probe.		
4.61	N/A	Replace all covers.		

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Figure 7-2. Temperature Modulator Electrical Circuit Adjustments (Sheet 7)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDA or LVDC Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
		Note Connect flex hoses on temperature modulator from LVDC inlet to LVDC outlet and LVDA inlet to LVDA outlet.		
1.1	BP	Connect the following self-check jumper wires: a. From J2 pin F to J3 pin J. b. From J2 pin J to J3 pin G. c. From J2 pin G to J3 pin H. d. From J2 pin C to J2 pin E.		
1.2	BP	Open circuit breaker access door (back-panel) and set circuit breakers CB1, CB2, CB3, CB4 and CB5 to OFF.	OFF	_____
1.3	BP	Connect 3 ϕ , 30 amp AC power cable between service outlet and TEMP. MOD. connector J1.		
1.4	ACPB	Open front control panel and observe and record the time on elapsed time indicator M1.		_____
1.5	N/A	Verify that all panels, covers and doors on TEMP. MOD. are closed.	Verified	_____
1.6	FCP	Press EMERGENCY PULL switch to reset (in) position.		
1.7	FCP	Observe all front panel indicator lamps.	Not lit	_____
1.8	BP	Open circuit breaker access door and set interlock switch (in).		
1.9	BP	Set main circuit breaker CB1, ON.		

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Figure 7-3. Temperature Modulator Electrical Circuit Functional Checks (Sheet 1 of 14)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDA or LVDC Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
1.10	FCP	Observe all front panel indicator lamps.	Not lit	_____
1.11	BP	Set (24 VAC primary) circuit breaker CB2, ON.		
1.12	FCP	Observe all front panel indicator lamps.	Not lit	_____
1.13	BP	Set (24 VAC secondary) circuit breaker CB3, ON.		
1.14	FCP	Observe MAIN POWER OFF indicator lamp.	Lit	_____
1.15	BP	Set (pump) circuit breaker CB4, ON.		
1.16	FCP	Observe MAIN POWER OFF indicator lamp.	Lit	_____
		Note: In the following step, no other electrical function is caused to occur except lamp test.		
1.17	FCP	Press and release LAMP TEST pushbutton/lamp.		
1.18	FCP	Observe that all display lamps are lit.	Lit	_____
1.19	FCP	Press and release LAMP TEST pushbutton/lamp.		
1.20	FCP	Observe only MAIN POWER OFF indicator lamp is lit.	Lit	_____
1.21	FCP	Press and release MAIN POWER ON pushbutton/lamp.		

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Figure 7-3. Temperature Modulator Electrical Circuit Functional Checks (Sheet 2)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDA or LVDC Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
1.22	FCP	Observe the following indicator lamps:		
		1. MAIN POWER OFF	Not lit	_____
		2. MAIN POWER ON	Lit	_____
		3. PUMP ON	Lit	_____
		4. BYPASS	Lit	_____
		5. HEATER OFF	Lit	_____
		6. COOLING UNIT ON	Lit	_____
		7. SYSTEM	Not lit	_____
		8. HEATER ON	Not lit	_____
		9. READY, LVDA/LVDC	Not lit	_____
		10. LAMP TEST	Not lit	_____
		11. CHAMBER	Not lit	_____
		12. BENCH	Lit	_____
		13. FLOW METER RETICLE LAMPS	Lit	_____
1.23	N/A	Open bottom front cover.		
1.24	FCP	Observe MAIN POWER OFF lamp.	Lit	_____
1.25	FCP	Observe all other lamps. Replace bottom front cover.	Not lit	_____
1.26	FCP	Press and release MAIN POWER ON pushbutton/lamp.		
1.27	FCP	Observe MAIN POWER ON lamp.	Lit	_____
1.28	N/A	Open right side cover.		
1.29	FCP	Observe MAIN POWER OFF lamp.	Lit	_____
1.30	FCP	Observe all other lamps.	Not lit	_____
1.31	N/A	Replace right side cover.		
1.32	FCP	Press and release MAIN POWER ON pushbutton/lamp.		

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Figure 7-3. Temperature Modulator Electrical Circuit Functional Checks (Sheet 3)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDA or LVDC Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
1.33	FCP	Observe MAIN POWER ON lamp.	Lit	_____
1.34	N/A	Open back cover.		
1.35	FCP	Observe MAIN POWER OFF lamp.	Lit	_____
1.36	FCP	Observe all other lamps.	Not lit	_____
1.37	N/A	Replace back cover.		
1.38	FCP	Press and release MAIN POWER ON pushbutton/lamp.		
1.39	FCP	Observe MAIN POWER ON lamp.	Lit	_____
1.40	N/A	Open left side cover.		
1.41	FCP	Observe MAIN POWER OFF lamp.	Lit	_____
1.42	FCP	Observe all other lamps.	Not lit	_____
1.43	N/A	Replace left side cover.		
1.44	FCP	Press and release MAIN POWER ON pushbutton/lamp.		
1.45	FCP	Observe MAIN POWER ON lamp.	Lit	_____
1.46	FCP	Open front control panel.		
1.47	FCP	Observe MAIN POWER OFF lamp.	Lit	_____
1.48	FCP	Observe all other lamps.	Not lit	_____
1.49	FCP	Close front control panel.		
1.50	FCP	Press and release MAIN POWER ON pushbutton/lamp.		
1.51	FCP	Observe MAIN POWER ON lamp.	Lit	_____

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Figure 7-3. Temperature Modulator Electrical Circuit Functional Checks (Sheet 4)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDA or LVDC Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
1.52	BP	Open interlock on circuit breaker access door.		
1.53	FCP	Observe MAIN POWER OFF lamp.	Lit	_____
1.54	FCP	Observe all other lamps.	Not lit	_____
1.55	BP	Reset interlock on circuit breaker door.		
1.56	FCP	Press and release MAIN POWER ON pushbutton/lamp.		
1.57	FCP	Observe MAIN POWER ON lamp.	Lit	_____
1.58	FCP	Pull EMERGENCY PULL switch.		
1.59	FCP	Observe all front panel indicators and lamps.	Not lit	_____
1.60	BP	Observe CB3.	Off	_____
1.61	FCP	Open front control panel.		
1.62	FCP	Reset EMERGENCY PULL switch.		
1.63	FCP	Close front control panel.		
1.64	FCP	Observe all indicators and lamps on front panel.	Not lit	_____
1.65	BP	Reset CB3.		
1.66	FCP	Observe MAIN POWER OFF indicator lamp.	Lit	_____
1.67	N/A	Remove left side cover.		
1.68	N/A	Set interlock switch (in) located behind cover.		

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Figure 7-3. Temperature Modulator Electrical Circuit Functional Checks (Sheet 5)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDA or LVDC Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
1.69	FCP	Press and release MAIN POWER ON pushbutton/lamp.		
1.70	FCP	Observe MAIN POWER ON lamp.	Lit	_____
1.71	BP	Turn CB4 OFF (down).		
1.72	N/A	Observe pump motor (bottom right).	Off	_____
1.73	FCP	Observe PUMP ON indicator lamp.	Not lit	_____
		CAUTION Do not operate unit more than five minutes with pump motor off.		
1.74	N/A	Replace left side cover. (Exercise care that interlock does not open.		
1.75	BP	Reset CB4 (ON) (up).		
1.76	BP	Turn CB5 ON (up).		
1.77	FCP	Press and release HEATER ON pushbutton/lamp.		
1.78	FCP	Observe HEATER ON indicator lamp.	Lit	_____
1.79	FCP	Observe HEATER OFF indicator lamp.	Not lit.	_____
1.80	FCP	Press and release MAIN POWER OFF pushbutton/lamp.		
1.81	FCP	Observe MAIN POWER OFF indicator lamp.	Lit	_____
1.82	FCP	Press and release MAIN POWER ON pushbutton/lamp.		

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Figure 7-3. Temperature Modulator Electrical Circuit Functional Checks (Sheet 6)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDA or LVDC Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
1.83	FCP	Observe MAIN POWER ON lamp.	Lit	_____
1.84	FCP	Observe HEATER ON indicator lamp.	Not lit	_____
1.85	FCP	Press and release CHAMBER pushbutton/lamp.		
1.86	FCP	Observe CHAMBER indicator lamp.	Lit	_____
1.87	FCP	Observe BENCH indicator lamp.	Not lit	_____
1.88	FCP	Press and release MAIN POWER OFF pushbutton/lamp.		
1.89	FCP	Observe MAIN POWER OFF indicator lamp.	Lit	_____
1.90	FCP	Press and release MAIN POWER ON pushbutton/lamp.		
1.91	FCP	Observe MAIN POWER ON lamp.	Lit	_____
1.92	FCP	Observe CHAMBER indicator lamp.	Not lit	_____
1.93	FCP	Press and release SYSTEM pushbutton/lamp.		
1.94	FCP	Observe SYSTEM indicator lamp.	Lit	_____
1.95	FCP	Observe BYPASS indicator lamp.	Not lit	_____
1.96	FCP	Press and release HEATER ON pushbutton/lamp. HEATER ON lamp lights only when pushbutton is pressed. When released lamp goes out.	Lit/Not lit	_____
1.97	FCP	Press and release MAIN POWER OFF pushbutton/lamp.		

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Figure 7-3. Temperature Modulator Electrical Circuit Functional Checks (Sheet 7)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDA or LVDC Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
1.98	FCP	Observe MAIN POWER OFF indicator lamp.	Lit	_____
1.99	FCP	Press and release MAIN POWER ON pushbutton/lamp.		
1.100	FCP	Observe MAIN POWER ON lamp.	Lit	_____
1.101	FCP	Observe SYSTEM indicator lamp.	Not lit	_____
1.102	FCP	Observe BYPASS indicator lamp.	Lit	_____
1.103	FCP	Press and release HEATER ON pushbutton/lamp.		
1.104	FCP	Observe HEATER ON lamp.	Lit	_____
1.105	FCP	Press and release SYSTEM pushbutton/lamp. SYSTEM lamp lights only when pushbutton is pressed. When released, lamp goes out.	Lit/Not lit	_____
1.106	BP	Turn CB5 OFF.		
1.107	BP	Turn CB5 ON and close circuit breaker door. (Exercise care that interlock does not open.)		
1.108	FCP	Observe HEATER OFF indicator lamp.	Lit	_____
1.109	FCP	Observe HEATER ON indicator lamp.	Not lit	_____
1.110	FCP	Press and release MAIN POWER OFF pushbutton/lamp.		
1.111	FCP	Observe MAIN POWER OFF indicator lamp.	Lit	_____

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Figure 7-3. Temperature Modulator Electrical Circuit Functional Checks (Sheet 8)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDA or LVDC Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
1.112	FCP	Pull EMERGENCY PULL switch.		
1.113	BP	Connect (-26 VDC) Trygon power supply, model T50-2 or equivalent as follows: a. From J2 pin K to -26 VDC terminal of power supply. b. From J3 pin K to -26 VDC terminal of power supply. c. From J2 pin P to -26 VDC return terminal of power supply. d. From J3 pin P to -26 VDC return terminal of power supply.		
1.114	FCP	Press EMERGENCY PULL switch to reset (in) position.		
1.115	BP	Open circuit breaker access door and reset CB3 to ON.		
1.116	BP	Close circuit breaker access door.		
1.117	N/A	Connect power supply, 115 VAC power plug to single phase, 115 VAC outlet. Note In the following step adjust voltage to the power supply voltmeter.		
1.118	N/A	Turn power supply ON, and adjust voltage to -26 VDC.		

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Figure 7-3. Temperature Modulator Electrical Circuit Functional Checks (Sheet 9)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDA or LVDC Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
1.119	FCP	Observe MAIN POWER OFF indicator lamp.	Lit	_____
1.120	FCP	Observe all other front panel indicator lamps.	Not lit	_____
1.121	FCP	Press and release MAIN POWER ON pushbutton/lamp.		
1.122	FCP	Observe MAIN POWER ON indicator lamp.	Lit	_____
1.123	FCP	Observe READY, LVDA/LVDC indicator lamps.	Not lit	_____
1.124	FCP	Turn DATA ADAPTER FLOW RATE valve off (fully clockwise).		
1.125	FCP	Turn COMPUTER FLOW RATE valve off (fully clockwise).		
1.126	FCP	Press and release SYSTEM pushbutton/lamp.		
1.127	FCP	Observe SYSTEM indicator lamp.	Lit	_____
1.128	FCP	Observe READY, LVDA/LVDC indicator lamps.	Not lit	_____
1.129	BP	Connect DC voltmeter (TRIPLETT model 630 or equivalent) between -26 VDC return (power supply) and J2 pin L.		
1.130	N/A	Observe voltmeter.	0 VDC	_____
1.131	BP	Connector DC voltmeter between -26 VDC return (power supply) and J3 pin L.		
1.132	N/A	Observe voltmeter.	0 VDC	_____

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Figure 7-3. Temperature Modulator Electrical Circuit Functional Checks (Sheet 10)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDA or LVDC Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
1.133	FCP	Slowly turn COMPUTER FLOW RATE valve (increase) until READY, LVDC indicator lamp lights. Note When reading the flow rate meters on TEMP MOD, use the center of ball as reference.		
1.134	FCP	Turn COMPUTER FLOW RATE valve (decrease) until COMPUTER FLOW RATE meter indicates 1.25 PPM.	1.25 PPM	_____
1.135	N/A	Observe voltmeter.	-26 VDC	_____
1.136	FCP	Turn COMPUTER FLOW RATE valve off (fully clockwise).		
1.137	FCP	Observe READY, LVDC indicator lamp.	Not lit	_____
1.138	N/A	Observe voltmeter.	0 VDC	_____
1.139	FCP	Slowly turn DATA ADAPTER FLOW RATE valve (increase) until READY, LVDA indicator lamp lights.		
1.140	FCP	Turn DATA ADAPTER FLOW RATE valve (decrease) until DATA ADAPTER FLOW RATE meter indicates 1.25 PPM.	1.25 PPM	_____
1.141	BP	Connect voltmeter between -26 VDC return (power supply) and J2 pin L		
1.142	N/A	Observe voltmeter.	-26 VDC	_____

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Figure 7-3. Temperature Modulator Electrical Circuit Functional Checks (Sheet 11)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDA or LVDC Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
1.143	FCP	Turn DATA ADAPTER FLOW RATE valve off (fully clockwise).		
1.144	FCP	Observe READY, LVDA indicator lamp.	Not lit	_____
1.145	N/A	Observe voltmeter.	0 VDC	_____
1.146	BP	Connect jumper wire between J2 pin M and J2 pin N.		
1.147	N/A	Observe voltmeter.	0 VDC	_____
1.148	BP	Connect voltmeter between -26 VDC return (power supply) and J3 ptn L.		
1.149	N/A	Observe voltmeter.	0 VDC	_____
1.150	FCP	Increase both DATA ADAPTER FLOW RATE and COMPUTER FLOW RATE to 2 PPM.	2 PPM	_____
1.151	FCP	Observe READY, LVDA indicator lamp.	Lit	_____
1.152	N/A	Observe voltmeter.	0 VDC	_____
1.153	BP	Connect voltmeter between -26 VDC return (power supply) and J2 pin L.		
1.154	N/A	Observe voltmeter.	-26 VDC	_____
1.155	FCP	Decrease COMPUTER FLOW RATE valve to obtain a FLOW RATE meter reading of 0.5 PPM.	.5 PPM	_____
1.156	FCP	Observe READY, LVDA/LVDC indicator lamps.	Not lit	_____

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Figure 2-3. Temperature Modulator Electrical Circuit Functional Checks (Sheet 12)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDA or LVDC Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
1.157	N/A	Observe voltmeter.	0 VDC	_____
1.158	FCP	Increase COMPUTER FLOW RATE valve to obtain a FLOW RATE meter reading of 2 PPM.		
1.159	FCP	Observe READY, LVDA/LVDC indicator lamps.	Lit	_____
1.160	FCP	Decrease DATA ADAPTER FLOW RATE valve to obtain a FLOW RATE meter reading of 0.5 PPM.	.5 PPM	_____
1.161	FCP	Observe READY, LVDA/LVDC indicator lamps.	Not lit	_____
1.162	N/A	Observe voltmeter.	0 VDC	_____
1.163	FCP	Increase DATA ADAPTER FLOW RATE valve to obtain a FLOW RATE meter reading of 2 PPM.	2 PPM	_____
1.164	FCP	Observe READY, LVDA/LVDC indicator lamps.	Lit	_____
1.165	N/A	Observe voltmeter.	-26 VDC	_____
1.166	BP	Connect voltmeter between -26 VDC return (power supply) and J3 pin L.		
1.167	N/A	Observe voltmeter.	0 VDC	_____
1.168	N/A	Remove voltmeter leads.		
1.169	FCP	Press and release MAIN POWER OFF pushbutton/lamp.		
1.170	FCP	Observe MAIN POWER OFF indicator lamp.		

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Figure 7-3. Temperature Modulator Electrical Circuit Functional Checks (Sheet 13)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDA or LVDC Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
1.171	FCP	Observe all other front panel indicator lamps.	Not lit	_____

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Figure 7-3. Temperature Modulator Electrical Circuit Functional Checks (Sheet 14)

INTERNATIONAL BUSINESS MACHINES—

UNIT NAME: LVDA or LVDC Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
2.1	SIM CON and TEMP MOD BP	Connect flex hoses (part numbers 6943112, 6943113, 6943114 and 6943115) as labeled, from TEMP MOD to corresponding SIM CON connectors.		
2.2	TEMP MOD BP	Connect the following jumper wires: a. J2 pin F to J3 pin J. b. J2 pin G to J3 pin H. c. J2 pin J to J3 pin G. d. J2 pin C to J2 pin E.		
2.3	SIM CON FCP	Set up SIM CON controls as follows: a. Turn both HEATER POWER control knobs fully counter-clockwise. b. Turn both PRESSURE DIFFERENTIAL control knobs fully counter-clockwise, then clockwise two full turns.		
2.4	N/A	Connect SIM CON 115 VAC power plug to single phase, 115 VAC outlet.		
2.5	TEMP MOD FCP	Press and release MAIN POWER ON pushbutton/lamp.		
2.6	TEMP MOD FCP	Observe the following lamps: a. MAIN POWER ON lamp. b. PUMP ON lamp. c. BYPASS lamp. d. COOLING UNIT ON lamp. e. HEATER OFF lamp. f. BENCH lamp.	 Lit Lit Lit Lit Lit Lit	 _____ _____ _____ _____ _____ _____

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Figure 7-4. Temperature Modulator Coolant Temperature Stabilization Circuit Checks (Sheet 1 of 6)

INTERNATIONAL BUSINESS MACHINES—

UNIT NAME: LVDC or LVDA Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
2.7	TEMP MOD FCP	Press and release SYSTEM push-button/lamp.		
2.8	TEMP MOD FCP	Observe the following lamps:		
		a. BYPASS lamp.	Not lit	_____
		b. SYSTEM lamp.	Lit	_____
2.9	TEMP MOD FCP	Turn DATA ADAPTER FLOW RATE control knob until flow rate meter reading of 2.7 PPM is obtained.	2.7 PPM	_____
2.10	TEMP MOD FCP	Turn COMPUTER FLOW RATE control knob until a flow rate meter reading of 1.8 PPM is obtained.	1.8 PPM	_____
	SIM CON	Note When reading the flow rate meters on SIM CON, use the bottom of the cone as reference.		
2.11	SIM CON FCP	Verify that SIM CON flow rate meters indicate the same as corresponding TEMP MOD flow rate meters to within a tolerance of ±0.5 PPM.		
		a. DATA ADAPTER FLOW RATE	2.2 to 3.2 PPM	_____
		b. COMPUTER FLOW RATE.	1.3 to 2.3 PPM	_____
2.12	SIM CON FCP	Turn DIGITAL COMPUTER SIMULATION, PRESSURE DIFFERENTIAL control knob until the indicated difference as indicated on INLET and OUTLET pressure gauges is 2.5 PSI.	Difference of 2.5 PSI	_____

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Figure 7-4. Temperature Modulator Coolant Temperature Stabilization Circuit Checks (Sheet 2)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDA or LVDC Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
2.13	SIM CON FCP	Turn DATA ADAPTER SIMULATION, PRESSURE DIFFERENTIAL control knob until the indicated difference as indicated on INLET and OUTLET pressure gauges is 3.5 PSI.	Difference of 3.5 PSI	_____
2.14	TEMP MOD FCP	Readjust the DATA ADAPTER FLOW RATE control knob to obtain a flow rate meter reading of 2.7 PPM.	2.7 PPM	_____
2.15	TEMP MOD FCP	Readjust the COMPUTER FLOW RATE control knob to obtain a flow rate meter reading of 1.8 PPM	1.8 PPM	_____
2.16	SIM CON FCP	Press and release DIGITAL COMPUTER SIMULATION, HEATER POWER ON pushbutton/lamp.		
2.17	SIM CON FCP	Observe HEATER POWER ON lamp.	Lit	_____
		Note The power dissipation in the following step simulates a computer with eight memories.		
2.18	SIM CON FCP	Adjust the DIGITAL COMPUTER SIMULATION, HEATER POWER control knob to obtain an indicated power dissipation of 150 watts on the wattmeter.	150 watts	_____
2.19	SIM CON FCP	Press and release DATA ADAPTER SIMULATION, HEATER POWER ON pushbutton/lamp.		
2.20	SIM CON FCP	Observe HEATER POWER ON lamp.	Lit	_____

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Figure 7-4. Temperature Modulator Coolant Temperature Stabilization Circuit Checks (Sheet 3)

INTERNATIONAL BUSINESS MACHINES—

UNIT NAME: LVDC or LVDA Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
2.21	SIM CON FCP	Adjust the DATA ADAPTER SIMULATION, HEATER POWER control knob to obtain an indicated power dissipation of 425 watts on the wattmeter	425 watts	_____
2.22	SIM CON and TEMP MOD FCP	Observe that both TEMPERATURE, INLET gauges (SIM CON) are within $+8^{O}$ and -5^{O} F of the temperature monitored on the AMBIENT gauge (TEMP MOD), after a delay of 5 minutes.		
		a. DATA ADAPTER TEMPERATURE INLET.	AMBIENT $+8^{O}$, -5^{O} F	
		b. COMPUTER TEMPERATURE INLET.	AMBIENT $+8^{O}$, -5^{O} F	
2.23	SIM CON FCP	Readjust both PRESSURE DIFFERENTIAL control knobs until the indicated difference between INLET and OUTLET pressure of each set of PRESSURE gauges is 7 1/2 PSI.	Difference of 7 1/2 PSI	_____
2.24	TEMP MOD FCP	Readjust COMPUTER FLOW RATE to a flow of 1.8 PPM.	1.8 PPM	_____
2.25	TEMP MOD FCP	Readjust DATA ADAPTER FLOW RATE to a flow of 2.7 PPM.	2.7 PPM	_____
2.26	SIM CON FCP	Readjust both HEATER POWER control knobs to obtain an indicated power dissipation of 500 watts on each wattmeter.	500 watts	_____

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Figure 7-4. Temperature Modulator Coolant Temperature Stabilization Circuit Checks (Sheet 4)

INTERNATIONAL BUSINESS MACHINES—

UNIT NAME: LVDC or LVDA Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
2.27	SIM CON and TEMP MOD FCP	Observe that both TEMPERATURE INLET gauges (SIM CON) are within +8° and -5° F of the temperature monitored on the AMBIENT gauge (TEMP MOD), after a delay of 5 minutes.		
		a. DATA ADAPTER TEMPERATURE INLET.	AMBIENT +8°, -5° F	_____
		b. COMPUTER TEMPERATURE INLET.	AMBIENT +8°, -5° F	_____
2.28	SIM CON FCP	Press and release both HEATER POWER OFF pushbuttons/lamps.		
2.29	SIM CON FCP	Observe that both HEATER POWER OFF indicator lamps are lit.	Lit	_____
2.30	TEMP MOD FCP	Press and release CHAMBER pushbutton/lamp.		
2.31	TEMP MOD FCP	Observe CHAMBER lamp.	Lit	_____
2.32	TEMP MOD FCP	Observe BENCH lamp.	Not lit	_____
2.33	TEMP MOD FCP	Set °F MANUAL temperature control knob to 55 and allow 15 minutes to stabilize.		
2.34	TEMP MOD	Verify a reading of 55° +2 1/2° on COMPUTER/DATA ADAPTER INLET gauge.	52 1/2° to 57 1/2°	

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Figure 7-4. Temperature Modulator Coolant Temperature Stabilization Circuit Checks (Sheet 5)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDC or LVDA Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
2.35	SIM CON FCP	Press and release both HEATER POWER ON pushbutton/lamps.		
2.36	SIM CON FCP	Observe that both HEATER POWER ON indicator lamps are lit.	Lit	_____
2.37	SIM CON FCP	After a delay of 10 minutes, verify that both SIM CON, INLET TEMPERATURE gauges indicate 55^{0} F $\pm 2\ 1/2^{0}$ F.	$52\ 1/2^{0}$ to $57\ 1/2^{0}$	_____
2.38	SIM CON FCP	Turn both HEATER POWER control knobs fully counterclockwise.	0 watts on each wattmeter	_____
2.39	SIM CON and TEMP MOD FCP	After a delay of 10 minutes, verify that the TEMP MOD COMPUTER/DATA ADAPTER INLET gauge and both SIM CON INLET TEMPERATURE gauges indicate 55^{0}F $\pm 2\ 1/2^{0}$F.	Verified	_____
2.40	SIM CON FCP	Press and release both HEATER POWER OFF pushbutton/lamps.		
2.41	TEMP MOD FCP	Press and release MAIN POWER OFF pushbutton/lamp.		
2.42	TEMP MOD FCP	Observe MAIN POWER OFF indicator lamp is lit.	Lit	_____

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Figure 7-4. Temperature Modulator Coolant Temperature Stabilization Circuit Checks (Sheet 6)

INTERNATIONAL BUSINESS MACHINES—

UNIT NAME: LVDA or LVDC Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
1.1	TEMP MOD BP	Connect flex hoses on temperature modulator from LVDC inlet to LVDC outlet and LVDA inlet to LVDA outlet.		
1.2	TEMP MOD BP	Connect the following self-check jumper wires: a. J2-C to J2-E. b. J2-F to J2-J. c. J2-H to J2-G.		
1.3	LVDCME 02A3	Remove self-check cable 6900073 from 02A3 connector J21 and connect to Temp. Mod. connector J3.		
1.4	LVDCME 9020	Verify that jumper plug is connected on J29.		
1.5	LVDCME PC	Press EMERGENCY PULL sw to reset (in) position.		
1.6	TEMP MOD BP	Press EMERGENCY PULL sw to reset position; then open circuit breaker access door, set CB1 thru CB5 to ON, and close door.		
1.7	LVDCME PC	Press and release MAIN POWER ON pushbutton/lamp.		
1.8	LVDCME PC	Verify that MAIN POWER ON lamp is lit and POWER OFF lamp is not lit.	Verified	_____
1.9	TEMP MOD FCP	Press and release MAIN POWER ON pushbutton/lamp.		

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Figure 7-5. Temperature Modulator and LVDCME Interlock Compatibility Checks (Sheet 1 of 6)

INTERNATIONAL BUSINESS MACHINES—

UNIT NAME: LVDA or LVDC Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
1.10	TEMP MOD FCP	Verify that MAIN POWER ON lamp is lit and MAIN POWER OFF lamp is not lit.	Verified	_____
1.11	TEMP MOD FCP	Press and release COOLANT CONTROL SYSTEM pushbutton/lamp.		
1.12	TEMP MOD FCP	Verify that COOLANT CONTROL SYSTEM lamp is lit.	Lit	_____
1.13	TEMP MOD FCP	Adjust COMPUTER FLOW RATE valve to obtain a FLOW RATE meter reading of 2.0 PPM.	2.0 PPM	_____
1.14	TEMP MOD FCP	Verify that READY LVDC lamp is not lit.	Not lit	_____
1.15	LVDCME PC	Press and release ACME POWER SEQ ON pushbutton/lamp.		
1.16	LVDCME PC	Verify that ACME POWER SEQ ON lamp is lit.	Lit	_____
1.17	TEMP MOD FCP	Verify that READY LVDC lamp is lit.	Lit	_____
1.18	LVDCME PC	Press and release COMP POWER SEQ ON pushbutton/lamp.		
1.19	LVDCME PC	Verify that COMP POWER SEQ ON lamp is lit.	Lit	_____
1.20	TEMP MOD FCP	Decrease COMPUTER FLOW RATE valve to obtain a FLOW RATE meter reading of 0.5 PPM.	0.5 PPM	_____

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Figure 7-5. Temperature Modulator and LVDCME Interlock Compatibility Checks (Sheet 2)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDA or LVDC Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
1.21	TEMP MOD FCP	Verify that READY LVDC lamp is not lit.	Not lit	_____
1.22	LVDCME PC	Verify that COMP POWER SEQ OFF lamp is lit (delayed).	Lit (Delayed)	_____
1.23	TEMP MOD FCP	Increase COMPUTER FLOW RATE valve to obtain a FLOW RATE meter reading of 2.0 PPM.	2.0 PPM	
1.24	LVDCME PC	Press and release ACME POWER SEQ OFF pushbutton/lamp.		
1.25	LVDCME PC	Verify that ACME POWER SEQ OFF lamp is lit.	Lit	_____
1.26	TEMP MOD FCP	Press and release MAIN POWER OFF pushbutton/lamp.		
1.27	TEMP MOD FCP	Press and release MAIN POWER ON pushbutton/lamp.		
1.28	TEMP MOD FCP	Verify that COOLANT CONTROL SYSTEM lamp is not lit.	Not lit	_____
1.29	LVDCME PC	Press and release ACME POWER SEQ ON pushbutton/lamp.		
1.30	LVDCME PC	Verify that ACME POWER SEQ ON lamp is lit.	Lit	_____
1.31	LVDCME PC	Press and release COMP POWER SEQ ON pushbutton/lamp.		
1.32	LVDCME PC	Verify that COMP POWER SEQ OFF lamp remains lit.	Lit	_____

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Figure 7-5. Temperature Modulator and LVDCME Interlock Compatibility Checks (Sheet 3)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDA or LVDC Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
1.33	TEMP MOD FCP	Press and release COOLANT CONTROL SYSTEM pushbutton/lamp.		
1.34	TEMP MOD FCP	Verify that COOLANT CONTROL SYSTEM lamp is lit.	Lit	_____
1.35	LVDCME PC	Press and release COMP POWER SEQ ON pushbutton/lamp.		
1.36	LVDCME PC	Verify that COMP POWER SEQ ON lamp is lit.	Lit	_____
p.37	TEMP MOD FCP	Open front control panel.		
1.38	TEMP MOD FCP	Verify that MAIN POWER ON lamp is not lit.	Not lit	_____
1.39	TEMP MOD FCP	Verify that MAIN POWER OFF lamp is lit.	Lit.	_____
1.40	LVDCME PC	Verify that COMP POWER SEQ OFF lamp is lit (delayed).	Lit (Delayed)	_____
1.41	LVDCME PC	Verify ACME POWER SEQ ON and MAIN POWER ON lamps are lit.	Lit	_____
1.42	TEMP MOD FCP	Close and secure front control panel.		
1.43	TEMP MOD FCP	Press and release MAIN POWER ON pushbutton/lamp.		

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Figure 7-5. Temperature Modulator and LVDCME Interlock Compatibility Checks (Sheet 4)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDA or LVDC Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
1.44	TEMP MOD FCP	Verify that MAIN POWER ON lamp is lit and MAIN POWER OFF lamp is not lit.	Verified	_____
1.45	TEMP MOD FCP	Pull EMERGENCY PULL switch.		
1.46	TEMP MOD FCP	Verify that MAIN POWER ON and MAIN POWER OFF lamps are not lit.	Not lit	_____
1.47	LVDCME PC	Verify that all lamps are not lit.	Not lit	_____
1.48	TEMP MOD FCP	Press EMERGENCY PULL switch to reset (in) position.		
1.49	TEMP MOD BP	Open circuit breaker access door and set CB3 to ON.		
1.50	TEMP MOD BP	Close circuit breaker access door.		
1.51	TEMP MOD FCP	Press and release MAIN POWER ON pushbutton/lamp.		
1.52	TEMP MOD FCP	Verify that MAIN POWER ON lamp is lit and MAIN POWER OFF lamp is not lit.	Verified	_____
1.53	LVDCME PC	Press and release MAIN POWER ON pushbutton/lamp.		
1.54	LVDCME PC	Verify that MAIN POWER ON lamp is lit and POWER OFF lamp is not lit.	Verified	_____

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Figure 7-5. Temperature Modulator and LVDCME Interlock Compatibility Checks (Sheet 5)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDA or LVDC Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
1.55	LVDCME PC	Open POWER CONTROL panel.		
1.56	LVDCME PC	Verify that MAIN POWER ON and POWER OFF lamps are not lit.	Not lit	_____
1.57	TEMP MOD FCP	Verify that MAIN POWER ON lamp is lit.	Lit	_____
1.58	LVDCME PC	Close and secure POWER CONTROL panel.		
1.59	LVDCME PC	Press and release MAIN POWER ON pushbutton/lamp.		
1.60	LVDCME PC	Verify that MAIN POWER ON lamp is lit and POWER OFF lamp is not lit.	Verified	_____
1.61	LVDCME PC	Pull EMERGENCY PULL switch.		
1.62	LVDCME PC	Verify that MAIN POWER ON and POWER OFF lamps are not lit	Not lit	_____
1.63	TEMP MOD FCP	Verify that MAIN POWER OFF lamp is lit and MAIN POWER ON lamp is not lit	Verified	_____

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Figure 7-5. Temperature Modulator and LVDCME Interlock Compatibility Checks (Sheet 6)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDC or LVDA Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
2.1	TEMP MOD BP	Connect flex hoses on temperature modulator from LVDC INLET to LVDC OUTLET and LVDA INLET to LVDA OUTLET.		
2.2	TEMP MOD BP	Connect a jumper wire from connector J3 pin G to pin J.		
2.3	TEST STAND 9430	Remove jumper plug from 9430 J2 and connect cable 6940054 from 9430 J2 to J2 of TEMP MOD.		
2.4	LVDAME 9420	Verify that jumper plug is connected on J24.		
2.5	LVDAME PC	Press EMERGENCY PULL switch to reset (in) position.		
2.6	TEMP MOD FCP	Press EMERGENTY PULL switch to reset (in) position; then open circuit breaker access door, set CB1 through CB5 to ON, and close door.		
2.7	LVDAME PC	Press and release MAIN POWER ON pushbutton/lamp.		
2.8	LVDAME PC	Verify that MAIN POWER ON indicator lamp is lit and POWER OFF lamp is not lit.	Verified	_____
2.9	TEMP MOD FCP	Press and release MAIN POWER ON pushbutton/lamp.		
2.10	TEMP MOD FCP	Press and release MAIN POWER ON pushbutton/lamp.		

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Figure 7-6. Temperature Modulator, LVDAME and Equipment Test Stand 6943000 Interlock Compatibility Checks (Sheet 1 of 7)

INTERNATIONAL BUSINESS MACHINES—

UNIT NAME: LVDC or LVDA Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
2.11	TEMP MOD FCP	Verify that MAIN POWER ON lamp is lit and MAIN POWER OFF lamp is not lit.	Verified	_____
2.12	TEMP MOD FCP	Press and release COOLANT CONTROL SYSTEM pushbutton/ lamp.		
2.13	TEMP MOD FCP	Verify that COOLANT CONTROL SYSTEM lamp is lit.	Lit	_____
2.14	TEMP MOD FCP	Adjust DATA ADAPTER FLOW RATE control for a flow rate meter reading of 2.0 PPM.	2.0 PPM	_____
2.15	LVDAME PC	Press and release DC VOLTAGE DC ON pushbutton/lamp.		
2.16	LVDAME PC	Verify that DC VOLTAGE DC ON indicator lamp is lit.	Lit	_____
2.17	TEMP MOD FCP	Verify that READY LVDA indicator lamp is lit.	Lit	_____
2.18	LVDAME PC	Verify the DC POWER ON lamp is lit.	Lit	_____
2.19	TEMP MOD FCP	Verify that READY LVDA lamp is lit.	Lit	_____
2.20	LVDAME PC	Press and release DATA ADAPTER CONTROL POWER UP FULL SEQ pushbutton/lamp.		
2.21	LVDAME PC	Verify that DATA ADAPTER CONTROL POWER UP FULL SEQ indicator lamp is lit.	Lit	_____

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Figure 7-6. Temperature Modulator, LVDAME, and Equipment Test Stand 6943000 Interlock Compatibility Checks (Sheet 2)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDC or LVDA Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
2.22	TEMP MOD FCP	Decrease DATA ADAPTER FLOW RATE control to obtain a flow rate meter reading of 0.5 PPM.	0.5 PPM	
2.23	TEMP MOD FCP	Verify that READY LVDA indicator lamp is lit.	Lit	_____
2.24	LVDAME PC	Verify that DATA ADAPTER CONTROL DOWN SEQ OFF lamp is lit and POWER UP FULL SEQ lamp is not lit.	Verified	_____
2.25	TEMP MOD FCP	Increase DATA ADAPTER FLOW RATE control to obtain a flow rate meter reading of 2.0 PPM.	2.0 PPM	_____
2.26	LVDAME PC	Press and release DC VOLTAGE DC OFF pushbutton/ lamp.		
2.27	LVDAME PC	Verify that DC VOLTAGE DC OFF indicator lamp is lit.	Lit	_____
2.28	TEMP MOD FCP	Press and release MAIN POWER OFF pushbutton/lamp.		
2.29	TEMP MOD FCP	Press and release MAIN POWER ON pushbutton/lamp.		
2.30	TEMP MOD FCP	Verify that COOLANT CONTROL SYSTEM lamp is not lit.	Not lit	_____
2.31	LVDAME PC	Press and release DC VOLTAGE DC ON pushbutton/lamp.		
2.32	LVDAME PC	Verify that DC VOLTAGE DC ON lamp is lit.	Lit	_____

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Figure 7-6. Temperature Modulator, LVDAME, and Equipment Test Stand 6943000 Interlock Compatibility Checks (Sheet 3)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDC or LVDA Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
2.33	LVDAME PC	Press and release DATA ADAPTER POWER UP FULL SEQ pushbutton/lamp.		
2.34	LVDAME PC	Verify that DATA ADAPTER POWER DOWN SEQ OFF lamp remains lit.	Lit	_____
2.35	TEMP MOD FCP	Press and release COOLANT CONTROL SYSTEM pushbutton/lamp.		
2.36	TEMP MOD FCP	Verify that COOLANT CONTROL SYSTEM lamp is lit.	Lit	_____
2.37	LVDAME PC	Press and release DATA ADAPTER POWER UP FULL SEQ pushbutton/lamp.		
2.38	LVDAME PC	Verify that DATA ADAPTER POWER UP FULL SEQ lamp is lit.	Lit	_____
2.39	TEMP MOD FCP	Open front control panel.		
2.40	TEMP MOD FCP	Verify that MAIN POWER ON lamp is not lit.	Not lit	_____
2.41	TEMP MOD FCP	Verify that MAIN POWER OFF lamp is lit.	Lit	_____
2.42	LVDAME PC	Verify that DATA ADAPTER CONTROL POWER DOWN SEQ OFF lamp is lit	Lit	_____
2.43	LVDAME PC	Verify that DC VOLTAGE DC ON and MAIN POWER POWER ON lamps are lit.	Lit	_____

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Figure 7-6. Temperature Modulator, LVDAME, and Equipment Test Stand 6943000 Interlock Compatibility Checks (Sheet 4)

INTERNATIONAL BUSINESS MACHINES-

UNIT NAME: LVDC or LVDA Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
2.44	TEMP MOD FCP	Close and secure front control panel.		
2.45	TEMP MOD FCP	Press and release MAIN POWER ON pushbutton/lamp.		
2.46	TEMP MOD FCP	Verify that MAIN POWER ON lamp is lit and MAIN POWER OFF lamp is not lit.	Verified	_____
2.47	TEMP MOD FCP	Pull EMERGENCY PULL switch.		
2.48	TEMP MOD FCP	Verify that all indicator lamps are not lit.	Not lit	_____
2.49	LVDAME PC	Verify that all indicator lamps are not lit.	Not lit	_____
2.50	TEMP MOD FCP	Press EMERGENCY PULL switch to reset (in) position.		
2.51	TEMP MOD BP	Open circuit breaker access door and set CB3 to ON.		
2.52	TEMP MOD BP	Close circuit breaker access door.		
2.53	TEMP MOD FCP	Press and release MAIN POWER ON pushbutton/lamp.		

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Figure 7-6. Temperature Modulator, LVDAME, and Equipment Test Stand 6943000 Interlock Compatibility Checks (Sheet 5)

INTERNATIONAL BUSINESS MACHINES—

UNIT NAME: LVDA or LVDC Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
2.54	TEMP MOD FCP	Verify that MAIN ON lamp is lit and MAIN POWER OFF lamp is not lit.	Verified	_____
2.55	LVDAME PC	Press and release MAIN POWER ON pushbutton/lamp.		
2.56	LVDAME PC	Verify that MAIN POWER ON lamp is lit and POWER OFF lamp is not lit.	Verified	_____
2.57	TEST STAND 9430	Open front panel.		
2.58	LVDAME FPC	Verify POWER OFF lamp is lit.	Lit	_____
2.59	TEMP MOD FCP	Verify that MAIN POWER ON lamp is lit.	Lit	_____
2.60	TEST STAND 9430	Close and secure front panel.		
2.61	LVDAME PC	Press and release MAIN POWER ON pushbutton/lamp.		
2.62	LVDAME PC	Verify that MAIN POWER ON lamp is lit and MAIN POWER OFF lamp is not lit.	Verified	_____
2.63	TEST STAND 9430	Pull EMERGENCY PULL switch.		
2.64	LVDAME PC	Verify that all lamps are not lit.	Not lit	_____

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Figure 7-6. Temperature Modulator, LVDAME, and Equipment Test Stand 6943000 Interlock Compatibility Checks (Sheet 6)

INTERNATIONAL BUSINESS MACHINES—

UNIT NAME: LVDC or LVDA Temperature Modulator | UNIT NO. 6903900

Step	Panel	Operation	Normal Indication	Data
2.65	TEMP MOD FCP	Verify that MAIN POWER OFF lamp is lit and MAIN POWER ON lamp lamp is not lit.	Verified	_____
2.66	TEST STAND 9430	Press EMERGENCY PULL switch to reset (in) position.		
2.67	TEMP MOD FCP	Press and release POWER ON pushbutton/lamp.		
2.68	TEMP MOD FCP	Verify that MAIN POWER ON lamp is lit and MAIN POWER OFF lamp is not lit.	Verified	_____
2.69	LVDAME PC	Press and release MAIN POWER ON pushbutton/lamp.		
2.70	LVDAME PC	Verify that MAIN POWER ON lamp is lit and POWER OFF lamp is not lit.	Verified	_____
2.71	LVDAME PC	Pull EMERGENCY PULL switch.		
2.72	LVDAME PC	Verify that all lamps are not lit.	Not lit	_____
2.73	TEMP MOD FCP	Verify that MAIN POWER OFF lamp is lit and MAIN POWER ON lamp is not lit.	Verified	_____

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Figure 7-6. Temperature Modulator, LVDAME, and Equipment Test Stand 6943000 Interlock Compatibility Checks (Sheet 7)

SECTION VIII

TROUBLE ISOLATION

8-1. SCOPE.

8-2. This section contains trouble isolation instructions for Equipment Test Stand 6943000 and the Temperature Modulator. Trouble isolation instructions are not supplied for Equipment Test Stand 6940100 due to its simplicity.

8-3. EQUIPMENT TEST STAND 6943000.

8-4. Malfunctions of the test stand power circuits will be discovered either during calibration or during normal operation. When electrical malfunction occur, analyze the circuits shown on the electrical schematic diagram (figure 10-5) with the aid of the circuit descriptions in Section II. If the malfunction is isolated to an individual power supply, refer to the trouble isolation instructions in the commercial manual for the affected power supply. (Refer to the List of Related Manuals in the front of this volume.)

8-5. Power distribution probing points are readily accessible on relay gate 01A2, resistor panel 01A3, and at the various connectors. Probing points within AC power box 01A4 are accessible when the rear hinged panel is opened. Terminal board 01A2TB4 probe points are accessible when the AC power box is moved forward on its rails.

8-6. TEMPERATURE MODULATOR.

8-7. Malfunctions of the Temperature Modulator may be detected during normal operation by abnormal lamp indications, tripped circuit breakers, or by abnormal temperature gage readings. Malfunctions may also be detected by abnormal indications while performing the calibration procedures in Section VII. Abnormal indications during normal operation or calibrations should localize the malfunction to a Temperature Modulator functional circuit.

8-8. When the malfunction has been localized, analyze the circuit(s) shown on the piping schematic diagram (figure 10-11) and the electrical schematic diagram (figure 10-10) with the aid of the circuit descriptions in Section II. After the malfunctioning component is determined, replace the component as described in Section IX.

8-9. PROBING CIRCUIT POINTS.

8-10. All circuits shown on figure 10-10 are located in the AC power box or on the control panel. Circuit points on the control panel are accessible when the hinged panel is opened forward. The circuit points in the AC power box are accessible only after the AC power box is removed from the top console of the Temperature Modulator.

8-11. To remove the AC power box from the top console, proceed as follows:

a. Disconnect power and interface cables from connectors J1, J2, and J3 at rear of top console.

b. Remove the eight AC power box retaining screws located at rear of top console.

c. Unlock the hinged front control panel and open forward; then disconnect the four cables at connectors J4, J5, J6, and J7 of the AC power box.

d. Remove the Temperature Modulator left side panel and extend outward the four cables formerly connected to the AC power box.

e. Slide the AC power box outward on its rails; then lift the AC power box onto a table placed at the left side of the Temperature Modulator.

f. Reconnect the extended cables to connectors J4, J5, J6, and J7 of the AC power box.

g. Remove the 27 top cover retaining screws of the AC power box; then remove the top cover.

h. Many circuit points of the AC power box are now readily accessible; however, circuit points of the relays mounted on the left panel (as viewed from the circuit breaker side) can be made more accessible by performing step i.

i. Remove the eight left side panel retaining screws of the AC power box; then move panel outward as far as cabling permits.

8-12. Power can be applied to the Temperature Modulator while the AC power box cover is removed.

WARNING

Extremely hazardous voltages exist at exposed circuit points when power is applied. Use extreme care to avoid personal contact with exposed circuit points.

Reconnect the power and interface cables to AC power box connectors J1, J2, and J3 and close the control panel and side panel interlock switches to enable power to be applied to Temperature Modulator circuits.

8-13. A trouble isolation guide is shown in figure 8-1 which contains possible malfunction indications with probable causes and suggested remedies. The malfunction indications are listed in the sequence in which they would likely be encountered during normal operation. Probable causes listed for some malfunction indications exclude probable causes which would be detected by previously listed malfunction indications.

Step	Malfunction Indication	Probable Cause	Remedy
1	MAIN POWER ON lamp indicator not lit when MAIN POWER ON pushbutton switch is depressed.	a. EMERGENCY PULL switch energized. (EMERGENCY PULL switches on interface connected equipments energized.)	a. Reset EMERGENCY PULL switch.
		b. Interlock switches S9 through S14 not closed.	b. Close interlock switches.
		c. MAIN POWER ON indicator bulb defective.	c. Replace MAIN POWER ON indicator bulb.
		d. Relay K1 defective	d. Replace relay K1.
2	PUMP ON lamp indicator not lit while MAIN POWER ON lamp is lit.	a. PUMP ON indicator bulb defective.	a. Replace PUMP ON indicator bulb.
		b. Circuit breaker CB4 tripped.	b. Reset circuit breaker CB4.
		c. Pump motor defective.	c. Replace pump motor.
		d. Relay K1 or K10 defective.	d. Replace defective relay
3	COOLING UNIT ON lamp indicator not lit while MAIN POWER ON lamp is lit.	a. COOLING UNIT ON indicator bulb defective.	a. Replace COOLING UNIT ON indicator bulb.
		b. Low-low pressure switch S16 tripped.	b. Reset low-low pressure switch S16.
		c. High pressure switch S17 tripped.	c. Reset high pressure switch S17.
		d. Low pressure switch S18 defective.	d. Replace low pressure switch S18.
		e. Relay K6 or K7 defective.	e. Replace defective relay.
		f. Thermal cutoff switch on compressor motor B1 tripped.	f. Reset thermal cutoff switch.
		g. Compressor motor B1 defective.	g. Replace compressor motor B1.

Figure 8-1. Temperature Modulator Trouble Isolation Guide (Sheet 1 of 4)

Step	Malfunction Indication	Probable Cause	Remedy
4	BYPASS lamp indicator not lit while MAIN POWER ON lamp is lit.	a. BYPASS indicator bulb defective.	a. Replace BYPASS indicator bulb.
		b. Relay K15 or K4 defective.	b. Replace defective relay.
5	SYSTEM lamp indicator not lit when SYSTEM pushbutton switch is depressed.	a. Coolant heater HR1 is on as indicated by HEATER ON lamp being lit.	a. Press HEATER OFF pushbutton switch.
		b. SYSTEM indicator bulb defective.	b. Replace SYSTEM indicator bulb.
		c. Relay K14 or K15 defective.	c. Replace defective relay.
6	HEATER ON lamp indicator not lit when HEATER ON pushbutton switch is depressed.	a. System flow path is energized as indicated by SYSTEM lamp indicator being lit.	a. Turn MAIN POWER off and on.
		b. HEATER ON indicator bulb defective.	b. Replace HEATER ON indicator bulb.
		c. Circuit breaker CB5 tripped.	c. Reset circuit breaker CB5.
		d. Heater HR1 shorted.	d. Replace heater HR1.
		e. Thermostat S21 open due to a coolant temperature in excess of 105°F or S21 defective.	e. Wait for coolant to cool if temperature exceeds 105°F or replace S21 if defective.
		f. Relay K11 or K12 defective.	f. Replace defective relay
7	LVDC READY lamp indicator not lit when SYSTEM flow path is selected and computer flow rate is greater than 1PPM.	a. LVDC READY indicator bulb defective.	a. Replace LVDC READY indicator bulb.
		b. LVDA flow switch S19 defective.	b. Replace switch S19.
		c. Relay K16, K18, K20, or K21 defective.	c. Replace defective relay.

Figure 8-1. Temperature Modulator Trouble Isolation Guide (Sheet 2)

Step	Malfunction Indication	Probable Cause	Remedy
8	LVDA READY lamp indicator not lit when SYSTEM flow path is selected and data adapter flow rate is greater than 1PPM.	a. LVDA READY indicator bulb defective.	a. Replace LVDA READY indicator bulb.
		b. LVDA flow switch S20 defective.	b. Replace switch S20.
		c. Relay K17, K19, K20 or K21 defective.	c. Replace defective relay.
9	CHAMBER lamp indicator not lit when CHAMBER pushbutton lamp is depressed.	a. CHAMBER indicator bulb defective.	a. Replace CHAMBER indicator bulb.
		b. Relay K3 or K13 defective.	b. Replace defective relay.
10	BENCH lamp indicator not lit when BENCH pushbutton lamp is depressed.	a. BENCH indicator bulb defective.	a. Replace BENCH indicator bulb.
		b. Relay K4 or K13 defective.	b. Replace defective relay.
11	COMPUTER/DATA ADAPTER INLET temperature gage readings not consistent with either AMBIENT or °F MANUAL readings.	a. Coolant sensor A1 defective.	a. Replace coolant sensor A1.
		b. Temperature controller Z1 defective.	b. Repair or replace temperature controller Z1.
		c. Mixing valve HP25 or motor B4 defective.	c. Replace defective valve or motor.
		d. Bypass solenoid L1 defective.	d. Replace solenoid L1.
		e. COMPUTER/DATA ADAPTER INLET gage defective.	e. Replace COMPUTER/DATA ADAPTER gage.
12	COMPUTER/DATA ADAPTER INLET temperature gage readings not consistent with AMBIENT gage readings.	a. Ambient sensor A2 defective	a. Replace ambient sensor A2.
		b. Temperature controller Z1 defective.	b. Repair or replace temperature controller Z1.
		c. AMBIENT gage defective.	c. Replace AMBIENT gage.

Figure 8-1. Temperature Modulator Trouble Isolation Guide (Sheet 3)

Step	Malfunction Indication	Probable Cause	Remedy
13	COMPUTER/DATA ADAPTER INLET temperature gage readings not consistent with °F MANUAL settings.	a. Potentiometer R4 not properly adjusted or defective	a. Adjust potentiometer R4 as prescribed in figure 7-2, or replace defective potentiometer.
		b. Temperature Controller Z1 defective.	b. Repair or replace temperature controller A1.

Figure 8-1. Temperature Modulator Trouble Isolation Guide (Sheet 4)

SECTION IX

REPAIR

9-1. SCOPE.

9-2. This section contains: (1) lists of replaceable assemblies and parts for Equipment Test Stands 6940100 and 6943000, and the Temperature Modulator; (2) descriptions of recommended methods of replacement of these assemblies and parts; (3) a list of materials to refurbish the exterior surfaces of the Equipment Test Stands and the Temperature Modulator; and (4) a description of recommended methods for refurbishing these surfaces.

9-3. REPAIR.

9-4. EQUIPMENT TEST STAND 6940100.

9-5. The repair of Equipment Test Stand 6940100 is limited to the replacement of the fans (IBM part number 597300) and the circuit breaker (IBM part number 6080041). Procedures for replacement of the fans and the circuit breaker are evident; therefore, the procedures are not included.

9-6. EQUIPMENT TEST STAND 6943000.

9-7. The replaceable assemblies and the recommended replaceable parts for Equipment Test Stand 6943000 are listed in figures 9-1 and 9-2, respectively. The procedures for replacement of these parts and assemblies are evident. However, the replacement of terminal lugs 6011465, 6029424, 6029425, and 6033229 requires a crimping tool kit, Bendix tool number 11-7295. (See figure 4-8.)

9-8. TEMPERATURE MODULATOR.

9-9. REPLACEABLE PARTS AND ASSEMBLIES. The recommended replaceable parts and assemblies for the Temperature Modulator are listed in figures 9-3 through 9-5. Figure 9-3 lists the recommended replaceable electrical parts; figure 9-4 lists the recommended replaceable coolant system parts and assemblies; and figure 9-5 lists the recommended replaceable refrigerant system parts and assemblies. Figure 9-3 through 9-5 reference the control panel and assembly drawings to enable locating the parts and assemblies when replacement is necessary.

9-10. REPAIR TECHNIQUES. The methods for replacing the electrical parts listed in figure 9-3 are evident; therefore, the methods are not included. To replace coolant system parts and/or assemblies listed in figure 9-4 proceed as follows:

a. Purge the Temperature Modulator cooling system as prescribed in figure 5-2.

NOTE

If any part of an assembly is to be replaced the assembly is removed first.

b. Locate the assembly to be removed; then remove (push back or cut away) the insulation surrounding the assembly, and retain the insulation for reuse.

c. Disconnect the necessary fittings, mounts, and electrical connections to remove the assembly; then remove the assembly.

NOTE

To replace a part of an assembly, disassemble the assembly as necessary to remove and replace the part; then install replacement part, and reassemble the assembly.

d. Observe the fittings of the replacement assembly. If the fittings are the 37 1/2 degree flare type, proceed to step f.; otherwise continue with the next step.

e. Place teflon tape, IBM part number 6943251 or equivalent, on male pipe fitting(s); use tape as necessary to provide a good seal.

f. Install replacement assembly and reconnect appropriate fittings, mounts, and electrical connections, as necessary.

g. Fill the Temperature Modulator cooling system as prescribed in figure 5-1.

h. Check the fittings of the replaced assembly for leaks; then, providing there are no leaks, recover the assembly with the insulation previously removed, and secure insulation with adhesive, IBM part number 6943187 or equivalent.

Reference Designation	Name	Manufacturer's Part Number	Vendor Code
01A1PS1	Power Supply	Model M36-5-OV	09206
01A1PS2	Power Supply	Model M36-10A-OV	09206
01A1PS3	Power Supply	Model M36-30A202	09206
01A1PS4	Power Supply	Model M15-5-OV	09206
01A1PS5	Power Supply	Model M15-5-OV	09206

Figure 9-1. Equipment Test Stand 6943000 Replaceable Assemblies.

Reference Designation	Assembly	Name	Part Number	Figure 10-6 Index
CB1	Chassis Box	Circuit Breaker	6081132	(61)
CB3, CB5	AC Power Box	Circuit Breaker	6081047	(74)
CB4	AC Power Box	Circuit Breaker	6081046	(74)
FL2	AC Power Box	Filter	6043132	(74)
J1	AC Power Box	Connector	6076319	(74)
J8 thru J16	AC Power Box	Outlet	6070428	(74)
J17	Chassis	Connector	6070447	(61)
K1	Relay Panel	Socket	6078153	(39)
K2, K3, K4	Relay Panel	Relay	6081048	(39)
K5, K6, K8	Relay Panel	Relay	6081049	(39)
K7	Relay Panel	Relay	6081050	(39)
P1 thru P9	Fan Plug	Connector	0597301	(16)
R1 thru R6	Load Resistor Panel	Resistor	6081166	(67)
R5 thru R8	AC Power Box	Resistor	6081045	(74)
S1	Dummy Panel	Switch	0482219	(34)
S2 thru S5	Mechanical	Switch	6078449	(39)
T1	AC Power Box	Transformer	0423426	(74)
	Mechanical	Receptacle	6909093	(53)
General Wiring		Terminal Lug	6011465	
General Wiring		Terminal Lug	6029424	
General Wiring		Terminal Lug	6029425	
General Wiring		Terminal Lug	6033229	

Figure 9-2. Recommended Replaceable Parts for Equipment Test Stand 6943000

Reference Designation	Name	Part Number	Figure & Index
C1 thru C4	Capacitor	6903912	10-10
CB1	Circuit Breaker	6903937	10-10 (15)
CB2	Circuit Breaker	6903934	10-10 (12)
CB3	Circuit Breaker	6903938	10-10 (16)
CB4	Circuit Breaker	6903935	10-10 (13)
CB5	Circuit Breaker	6903936	10-10 (14)
DS1 thru DS12	Bulb Indicator	6040257	3-4
DS9	Indicator	6903952	3-4
DS10	Indicator	6903951	3-4
DS11	Indicator	6903950	3-4
DS12	Indicator	6903949	3-4
J1	Connector	6903946	10-10 (33)
K1	Contact	6903918	10-10 (21)
K1	Contractor	6903919	10-10 (21)
K2 thru K5, K8, K12 thru K17, K20, K21	Relay	6903916	10-10 (28)
K6	Relay	6903914	10-10 (26)
K7, K10, K22	Relay	6903915	10-10 (27)
K9	Relay	6903941	10-10 (29)
K11	Relay	6903913	10-10 (25)
K18, K19	Relay	6903565	10-10 (24)
M2	Temp. Gage	6903930	3-4
R1 thru R3	Resistor	6903911	10-10 (23)
T1	Transformer	6903923	10-10 (17)
Z1	Temp. Control	6903924	10-10 (19)

Figure 9-3. Recommended Replaceable Electrical Parts for the Temperature Modulator (Sheet 1 of 2)

Reference Designation	Name	Part Number	Figure & Index
A1	Ambient Sensor	6943190	10-8 (73)
R4	Potentiometer	6943193	3-4
DS1	Switch Indicator	6903956	3-4
DS2	Switch Indicator	6903957	3-4
DS3	Switch Indicator	6903960	3-4
DS4	Switch Indicator	6903955	3-4
DS5	Switch Indicator	6903954	3-4
DS6	Switch Indicator	6903959	3-4
DS7	Switch Indicator	6903958	3-4
DS8	Switch Indicator	6903953	3-4

Figure 9-3. Recommended Replaceable Electrical Parts for the Temperature Modulator Sheet 2)

Reference Designation	Name	Part Number	Figure & Index
A2	Coolant Sensor	6943191	10-8 (74)
HP4	Needle Valve	6903970	10-8 (72)
HP8	Pump	6903933	10-8 (62)
HP13	Ball Valve	6903967*	10-8 (36)
HP14, 19, 36, 45	Adapter	6080552	10-8 (69)
HP25	Control Valve	6943192**	10-8 (64)
HP28	Micron Filter	6903974	10-8 (90)
HP29	Solenoid Valve	6903940	10-8 (36)
HP30	Reg. Valve	6903968*	10-8 (36)
HP32, HP41	Needle Valve	6903969	3-4
S19, S20	Flow Switch	6903939	10-8 (65)

* This part is a part of the Solenoid Valve Assembly 6943243.

** This part is a part of the Motor Operated Valve Assembly 6943258.

Figure 9-4. Recommended Replaceable Coolant System Parts and Assemblies for the Temperature Modulator

Reference Designation	Name	Part Number	Figure and Index
HP1	Filter Drier	6903925	10-8 (63)
HP3	Moisture Ind.	6903991	10-8 (37)
HP6	Thermal Valve	6903927*	10-8 (37)
HP24	Evap. Press. Reg.	6903926*	10-8 (37)
S16	Low-Low Press. Control	6903972	10-8 (68)
S17	High Press. Control	6903932	10-8 (67)
S18	Low Press. Control	6903929	10-8 (66)

*This part is included as part of the Thermal Expension Valve Assembly 6943244.

Figure 9-5. Recommended Replaceable Refrigerant System Parts and Assemblies for the Temperature Modulator.

9-11. The replacement of refrigerant parts and assemblies listed in figure 9-5 must be accomplished by a qualified refrigeration service man; therefore, replacement procedures are not provided. Prior to replacement of any refrigerant part or assembly, the refrigerant must be pumped down into receiver HP5. After a refrigerant part or assembly is replaced, any refrigerant inadvertantly lost must be replaced.

9-12. EXTERIOR SURFACE COATINGS.

9-13. Figure 9-6 lists the solvents, reducers, primers, and paints needed to refurbish Equipment Test Stand (6940100 and 6943000) coatings that become chipped, discolored, or otherwise defective. Figure 9-7 lists the materials needed to refurbish the Temperature Modulator coatings. The recommended methods for refurbishing these surfaces are described in the following paragraph.

9-14. REPAINTING TECHNIQUES. The following paragraphs indicate the recommended consistencies for the paints and other fluids needed to repair the exterior coatings of the test stand. A fine brush should be used to retouch defective panel markings and any small scratches on the test stand. For repainting areas greater than 1 square inch, the paint should be applied by spraying.

9-15. Solvents. The surface to be repainted should be thoroughly cleaned by wiping it with the solvent indicated in figures 9-6 and 9-7. The surface should then be allowed to dry for at least 30 minutes.

9-16. Primers. If the coating has been marred so that the metal surface is exposed, a primer coating should be applied before the paint is applied. The primer need not be diluted for brush application; however, for spray application the primer should be diluted with one part reducer to two parts primer. The primer coating should be air dried for at least three minutes before paint is applied.

9-17. Paints. The paints need not be diluted for brush application; however, for spray application the paint should be diluted with one part reducer to four parts paint. Four or more sprayed coats should be applied, allowing a minimum time of one minute between the application of each coat. For a non-textured finish, these applications are the finish coat; however, for a textured finish these applications are only the first finish coat.

NOTE

The number of paint coats required to adequately repair the defective surface depends on the depth of the defect and the thickness of the original coatings.

9-18. If the final surface is to be textured, the second finish coat of paint should be applied after the first finish coat has been air dried. The paint for this second finish coat need not be diluted for brush application; however, for spray application, the paint should be diluted with one part reducer to eight parts paint. Five or more sprayed coats should be applied, allowing a minimum time of one minute between the application of each coat. (See note in preceding paragraph.)

9-19. Texturing Agent. The texturing agent should not be diluted before being sprayed as a fine mist coat over the second finish coat.

Surface	Solvent	Reducer	Primer	Paint (Vinyl)	Notes
Frame Covers	Xylene conforming to Federal Specification TT-X-916	John L. Armitage Co., A-903, or equivalent	Charcoal, John L. Armitage Co., P-318, or equivalent	Charcoal, John L. Armitage Co., U-211, or equivalent	Texturing agent, John L. Armitage Co., M-411, or equivalent is required.
Name Plate		John L. Armitage Co., A-903, or M-130, or equivalent	Yellow, John L. Armitage Co., P-321, or equivalent	Yellow, John L. Armitage U-396S, or equivalent	
			Blue, John L. Armitage Co., P-300, or equivalent	Sky Blue, John L. Armitage Co., U-333S, or equivalent	
				White, Irvin, Jewell, and Vinson Co., 4795, or equivalent	Used to fill engraved portion of name plate.

Figure 9-6. Recommended Repainting Materials for Equipment Test Stands

Surface	Solvent	Reducer *	Primer *	Paint (Vinyl) *	Notes *
Frame Covers	Xylene conforming to Federal Specification TT-X-916	John L. Armitage Co., A-903	Charcoal, John L. Armitage Co., P-318	Charcoal, John L. Armitage Co., U-211	Use texturing agent, John L. Armitage Co., M-411.
Top Console			Blue-Gray, John L. Armitage Co., P-350	Light Grey, John L. Armitage Co., U-148	
Control Panels Background		John L. Armitage Co., A-903 or M-130	Blue-Gray, John L. Armitage Co., P-350	Light Gray, John L. Armitage Co., U-662S	
Functional Areas				Dark Gray, John L. Armitage Co., M-1085	
Panel Markings				White, John L. Armitage Co., M-1027	Used on Dark Gray functional areas.
				Black, John L. Armitage Co., M-1035	Used on Light Gray areas.
Name Plate		John L. Armitage Co., A-903, or M-130	Yellow, John L. Armitage Co., P-321	Yellow, John L. Armitage Co., U-396S	
			Blue, John L. Armitage Co., P-300	Sky Blue, John L. Armitage Co., U-333S	
				White, John L. Armitage Co., M-1027	Used as a filler for engraving.

* Equivalent materials may be used.

Figure 9-7. Recommended Repainting Materials for the Temperature Modulator

SECTION X

DIAGRAMS

10-1. GENERAL.

10-2. This section contains the engineering drawings that are required to maintain Equipment Test Stands (IBM part numbers 6940100 and 6943000) and the Temperature Modulator (IBM part number 6903900). Drawings for the commercial equipment supplied with Equipment Test Stand 6943000 are supplied in the appropriate commercial manuals. (Refer to the list of related manuals located in the front-matter of this volume.)

10-3. The engineering drawings for Equipment Test Stand 6940100 consist of the following:

Figure 10-1. Equipment Test Stand 6940100 Assembly Drawing

Figure 10-2. Fixture Assembly (6940120) Assembly Drawing

Figure 10-3. Electrical Power Cable Assembly (6900034) Assembly Drawing

The encircled references appearing on appropriate figures in this section may be used during maintenance to locate items shown on the respective list of materials. Notes appearing on the figures in this section are used during assembly of the respective assemblies; consequently, these notes are not applicable to this manual.

10-4. The engineering drawings for Equipment Test Stand 6943000 consist of the following:

Figure 10-4. Equipment Test Stand 6943000 Assembly Drawing

Figure 10-5. Equipment Test Stand 6943000 Electrical Schematic Diagram

Figure 10-6. Equipment Test Stand 6943000 Mechanical Assembly Drawing

Figure 10-7. Equipment Test Stand 6943000 Power Cable (6943092) Drawing

10-5. The engineering drawings for the Temperature Modulator IBM part number 6903900 consist of the following:

Figure 10-8. Temperature Modulator 6903900 Assembly Drawing

Figure 10-9. Temperature Modulator Power Box Assembly (6943176) Assembly Drawing

Figure 10-10. Temperature Modulator Electrical Schematic Diagram

Figure 10-11. Temperature Modulator Piping Schematic Diagram

Figure 10-12. Temperature Modulator Wiring Diagram

Figure 10-13. Temperature Modulator Power Cable (6943093) Drawing

The encircled apha-numeric references shown on figures 10-8 and 10-11 may be used to locate items mentioned in Section V of this volume.

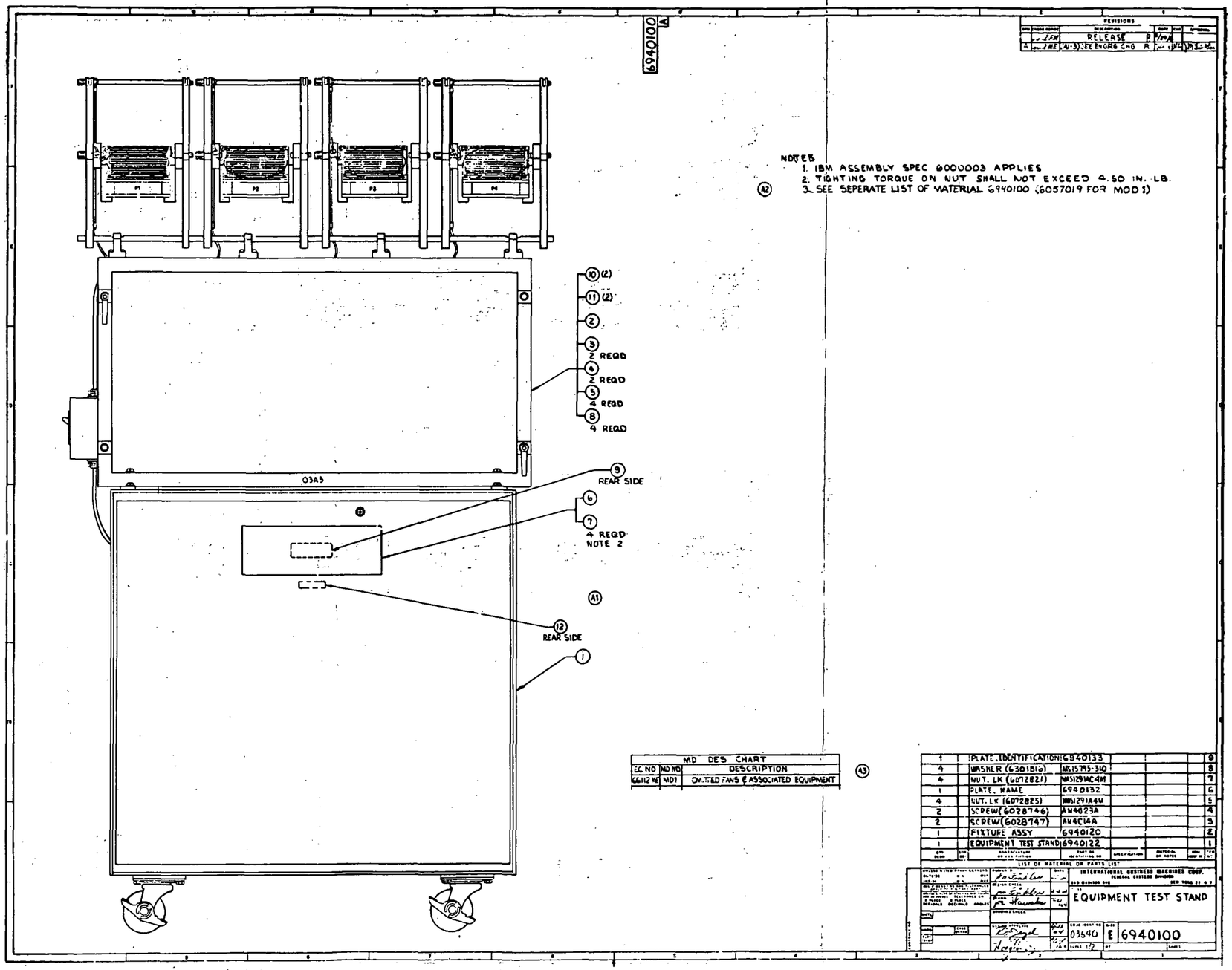
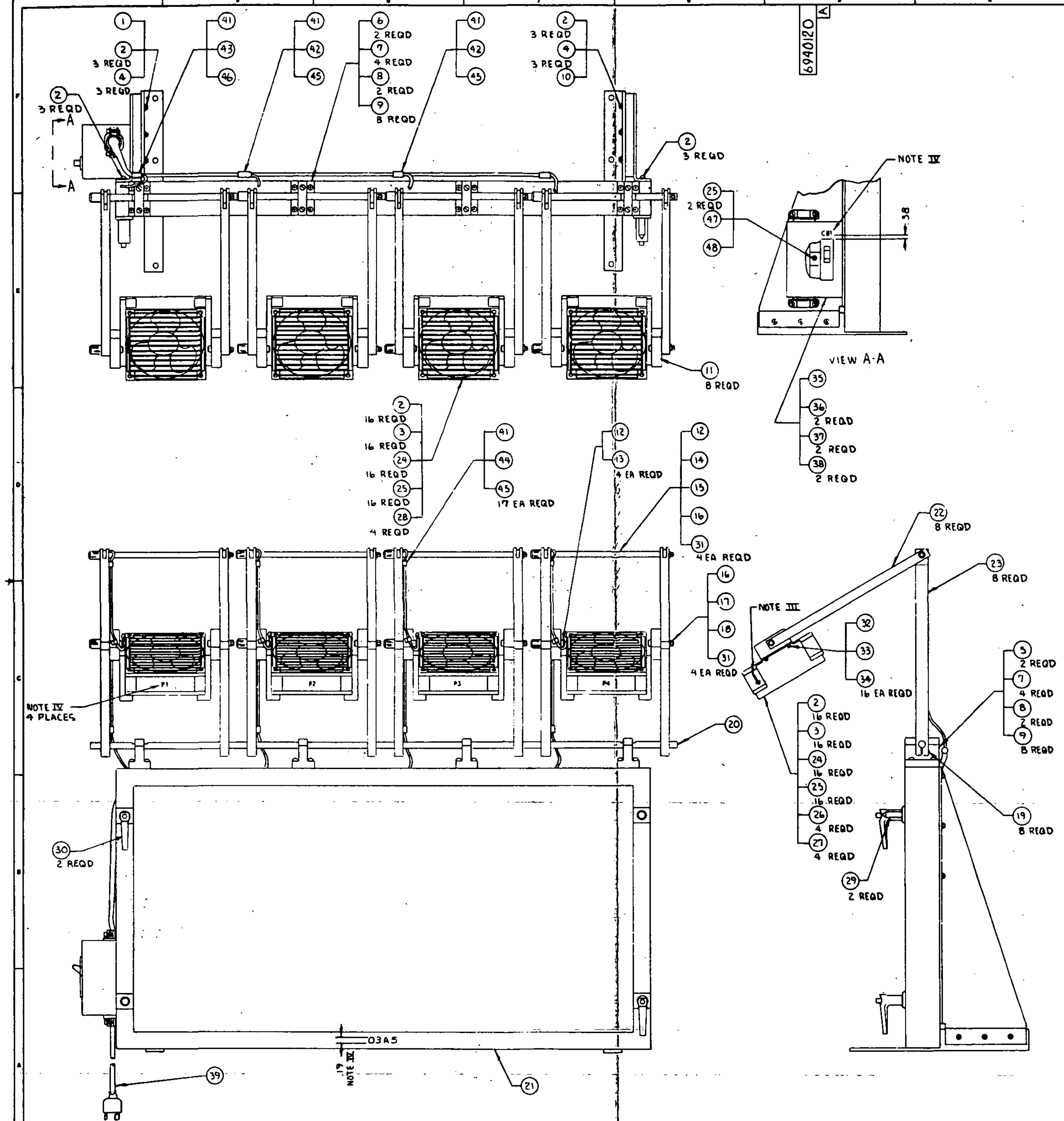


Figure 10-1. Equipment Test Stand 6940100 Assembly Drawing



DO NOT USE FOR FUTURE DESIGN

REVISIONS					
SYM	ENGRG NOTICE	DESCRIPTION	DATE	CHK	APPROVAL
	66112-FM	RELEASE			
A	66112NK	SEE ENGRG NOTICE			FINKLER

NOTES
- I IDENTIFICATION OF SYMBOLS
  V- VENDOR ITEM - SEE SPEC OR SOURCE CONTROL DWG
- II IBM ASSY SPEC 6000003 APPLIES
- III ARROW DESIGNATES DIRECTION OF AIR FLOW
- IV APPLY REFERENCE DESIGNATIONS PER IBM SPEC 6009974 COLOR WHITE LOCATE APPROX AS SHOWN
- V WIRE PER WIRING LIST 6903098

QTY REQD	SYMBOL	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	CODE IDENT NO	ITEM NO
1		SCREW (6028130)	AN500AD6-12				48
1		SCREW (6035791)	MS35333-71				47
1			6013301				46
19		WASHER	6013352				45
17			6027083				44
1			6072584				43
2		CLAMP	6072583				42
20		SCREW	55726			88340	41
REF		WIRE LIST	6903098				40
1		CABLE	6900034				39
2		NUT, LK (6072823)	NAS1291A08M				38
2		SCREW (6035723)	MS35216-41				37
2	V	CABLE CLAMP	6070746				36
1	V	CIRCUIT BREAKER	6080041				35
16		WASHER, LK (6029220)	MS35338-80				34
16		WASHER (6048639)	MS15795-307				33
16		SCREW	6027868				32
8		WASHER, LK (6029221)	MS35338-81				31
2		HANDLE, RETAINING	6080250				30
2		PIN, ALIGNMENT	6903049				29
4		FAN GUARD	177946				28
4		FAN	597300				27
4		FAN MTG BKT	597343			88340	26
34		NUT, HEX (6048620)	MS35649-64				25
32		WASHER, LK (6029219)	MS35338-79				24
8		ARM	6903012				23
8		ARM	6903092				22
1		FIXTURE SUB ASSY	6903073				21
1		ROD	6903086				20
8		SCREW (6035763)	MS24674-8				19
4		SCREW, SHOULDERED	6903011				18
4		WASHER (6301812)	MS15795-308				17
8		NUT, HEX (6034354)	MS35650-104				16
4		WASHER (6028981)	AN960-10L				15
4		PIN, SHOULDERED HEADLESS	6903009				14
4	V	SCREW, SHOULDERED	6079914				13
8		NUT, KNURLED	6903010				12
8		BLOCK, FAN BKT MTG	6903008				11
1		BRACKET, SUPPORT	6903079				10
16		SCREW (6035713)	MS35216-29				9
4		BRACKET, TEE	6903081				8
8		SCREW (6035649)	MS24693C30				7
2		CLAMP, MIDDLE	6903082				6
2		CLAMP, END	6903083				5
6		NUT, LK (6072822)	NAS1291A06M				4
32		WASHER (6047219)	MS15795-306				3
44		SCREW (6035711)	MS35216-27				2
1		BRACKET, SUPPORT	6903080				1

LIST OF MATERIAL OR PARTS LIST

INTERNATIONAL BUSINESS MACHINES CORP.
FEDERAL SYSTEMS DIVISION

TITLE: FIXTURE ASSY

E 6940120

Figure 10-2. Fixture Assembly (6940120) Assembly Drawing

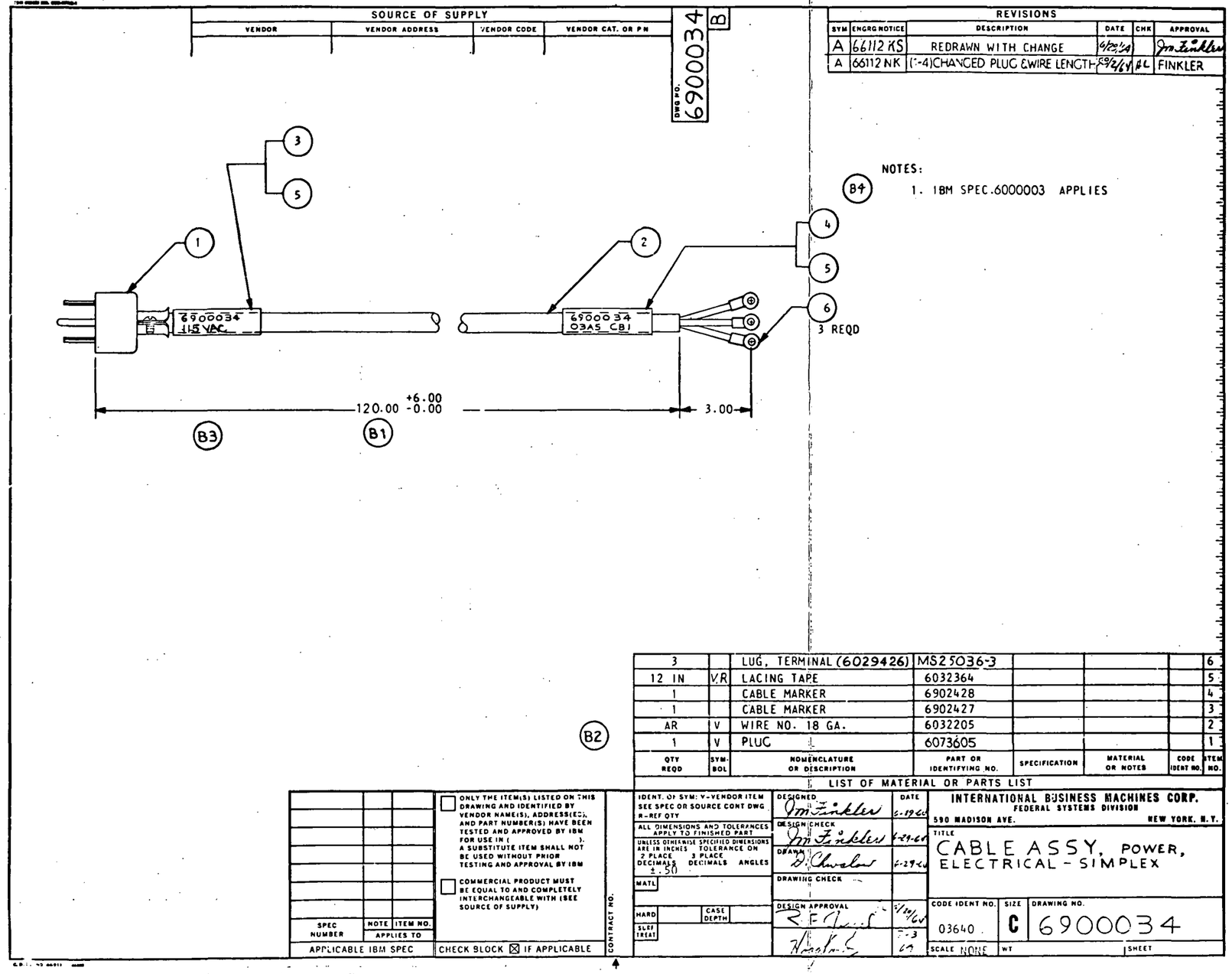


Figure 10-3. Electrical Power Cable Assembly (6900034) Assembly Drawing

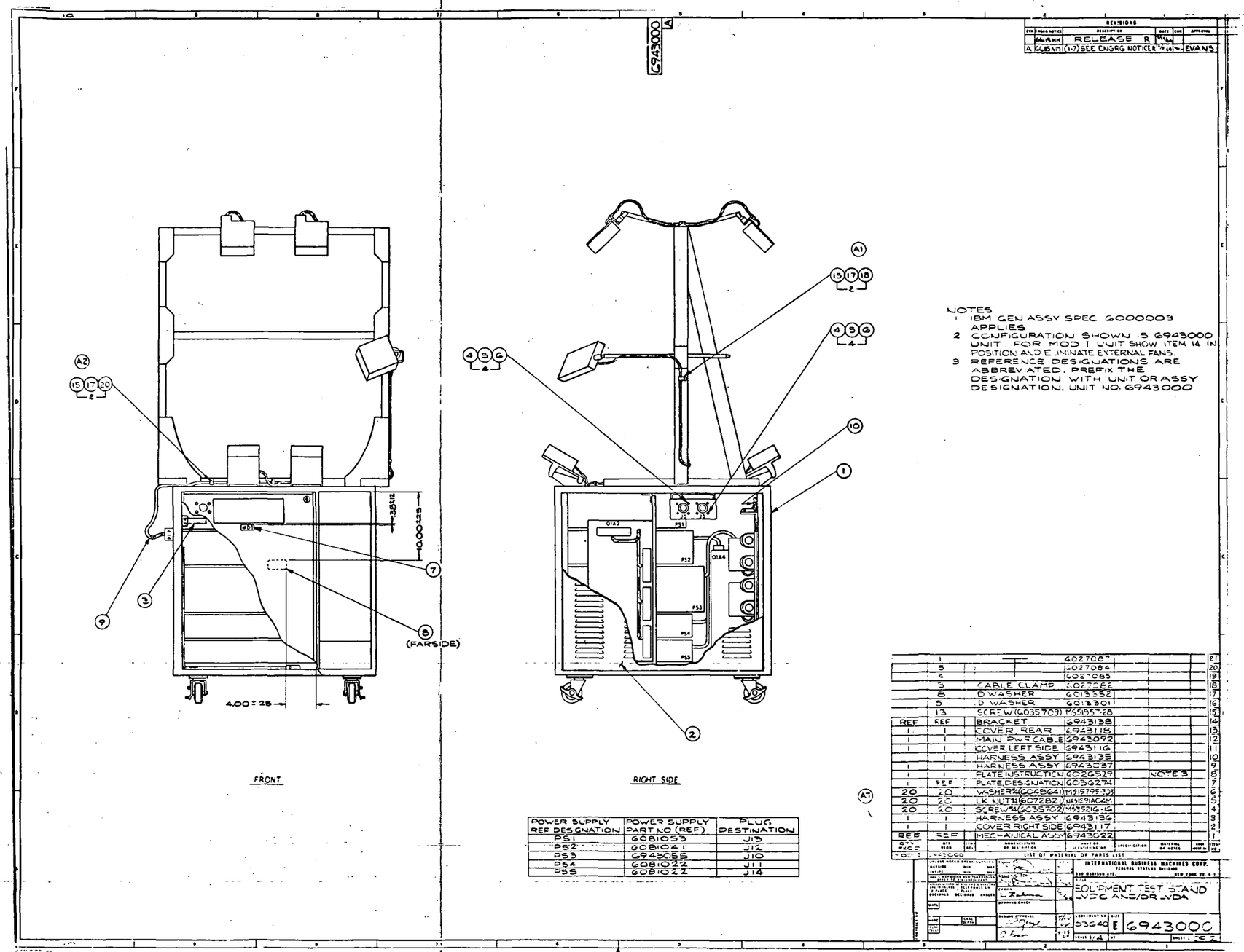


Figure 10-4. Equipment Test Stand 6943000 Assembly Drawing (Sheet 1 of 2)

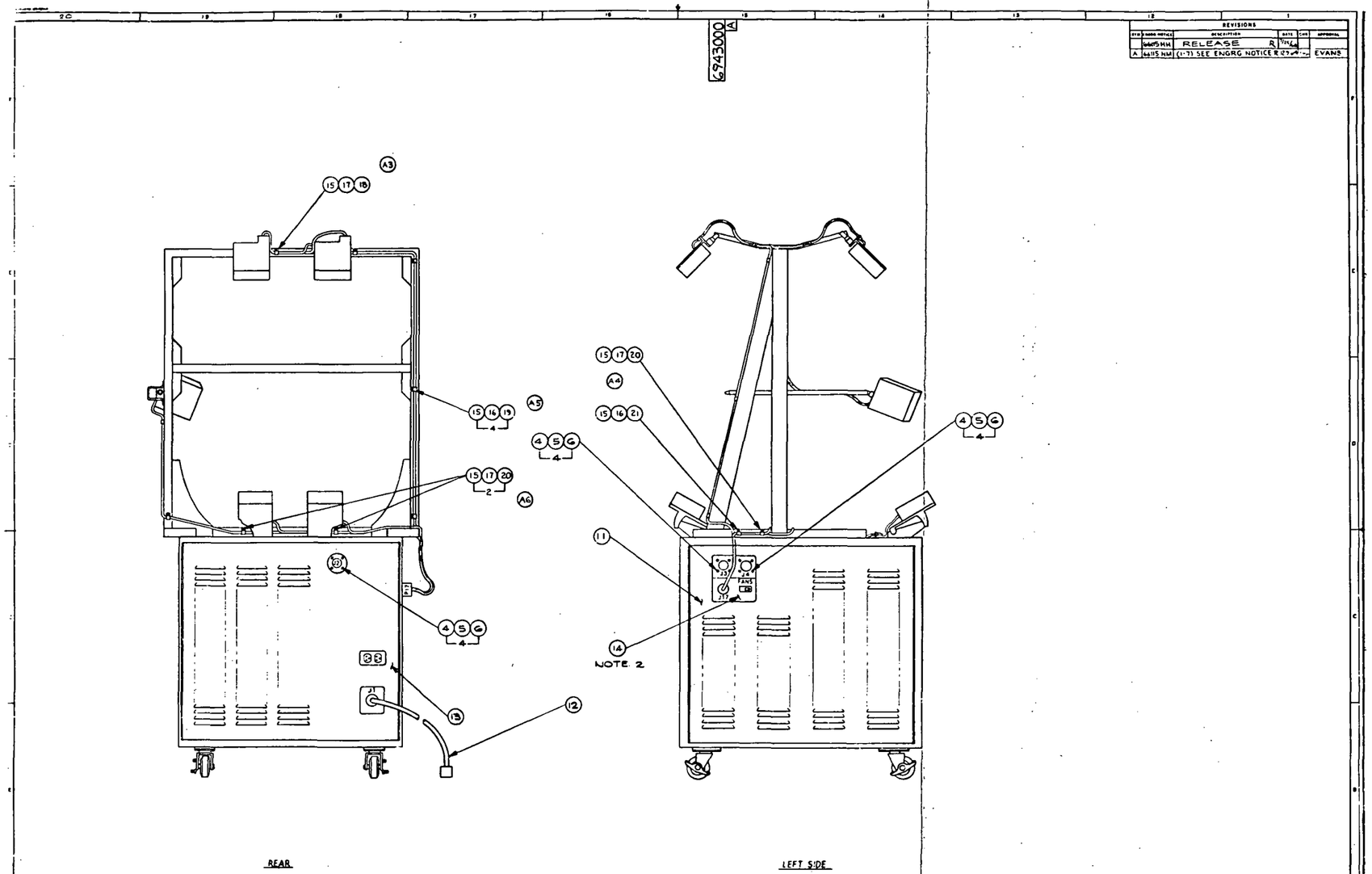


Figure 10-4. Equipment Test Stand 6943000 Assembly Drawing (Sheet 2)

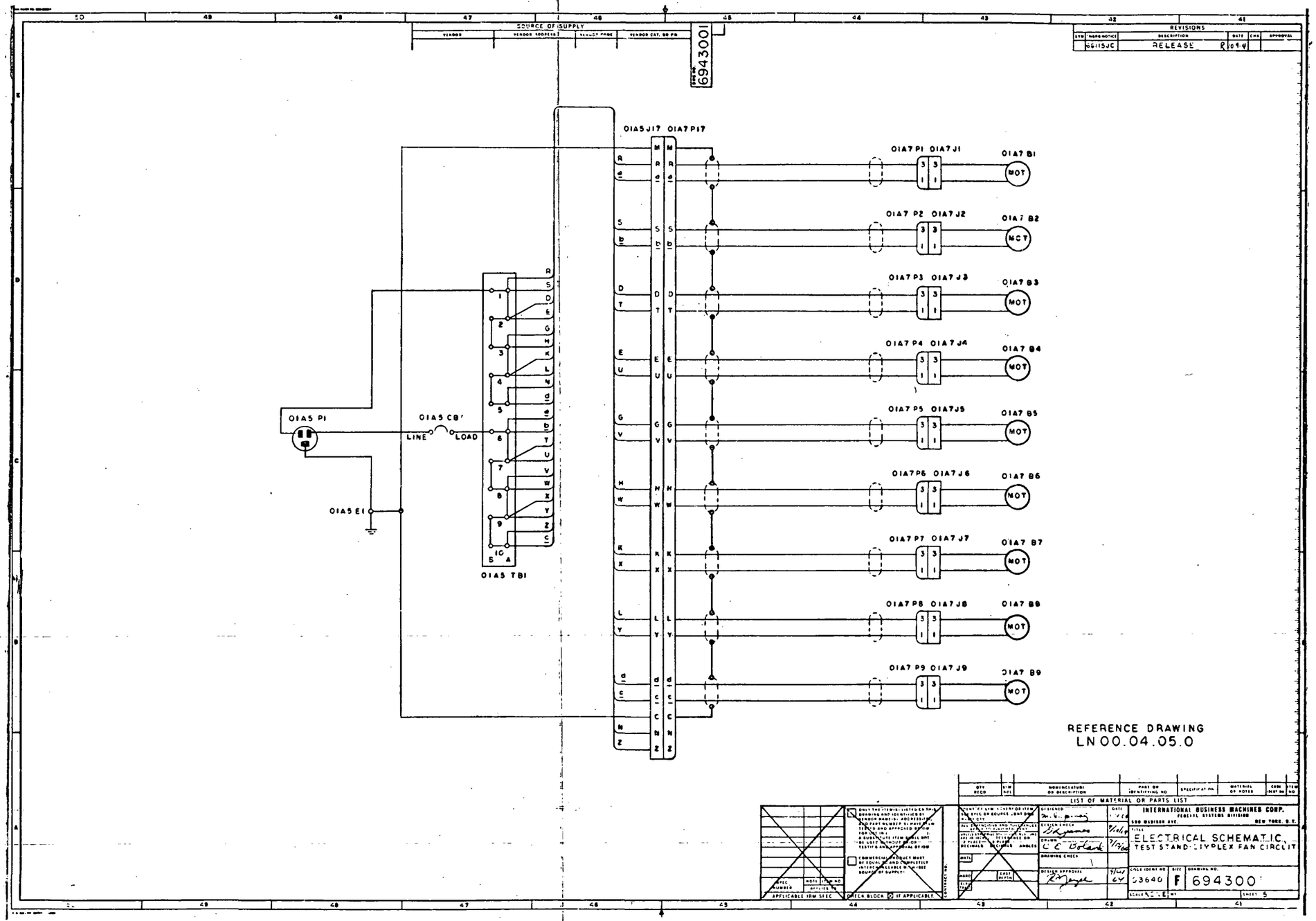


Figure 10-5. Equipment Test Stand 6943000 Electrical Schematic Diagram (Sheet 1 of 5)

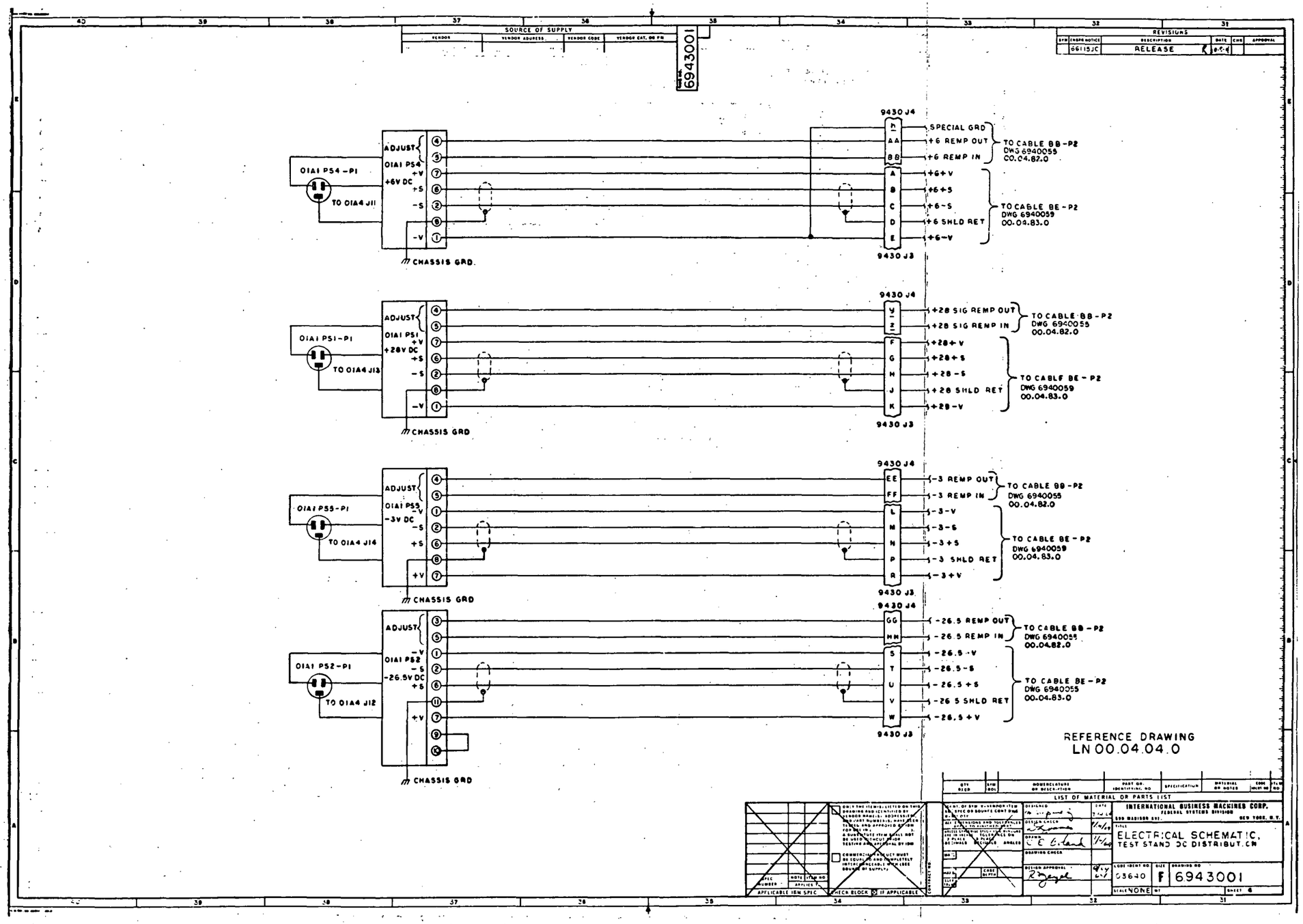


Figure 10-5. Equipment Test Stand 6943000 Electrical Schematic Diagram (Sheet 2)

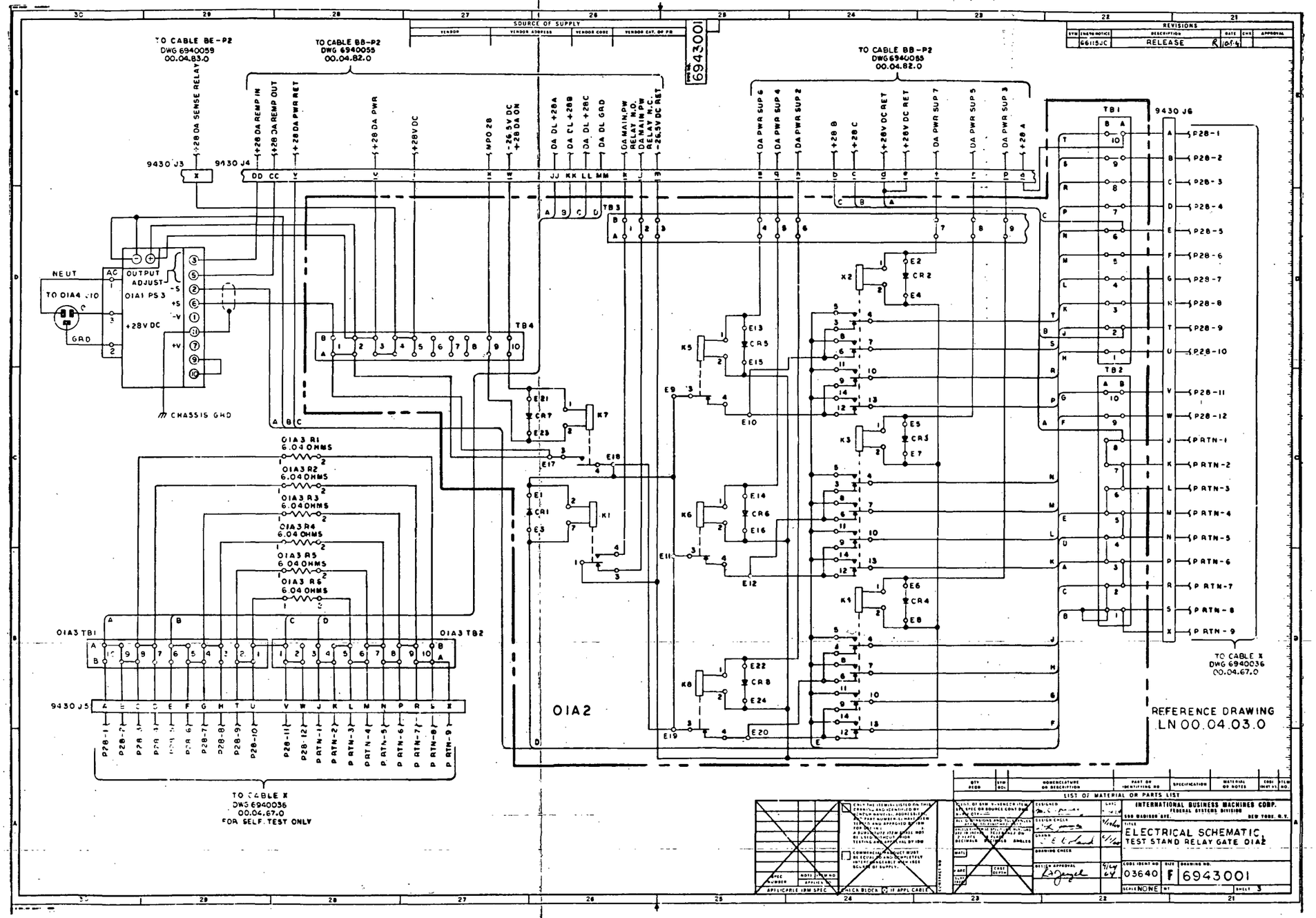


Figure 10-5. Equipment Test Stand 6943000 Electrical Schematic Diagram (Sheet 3)

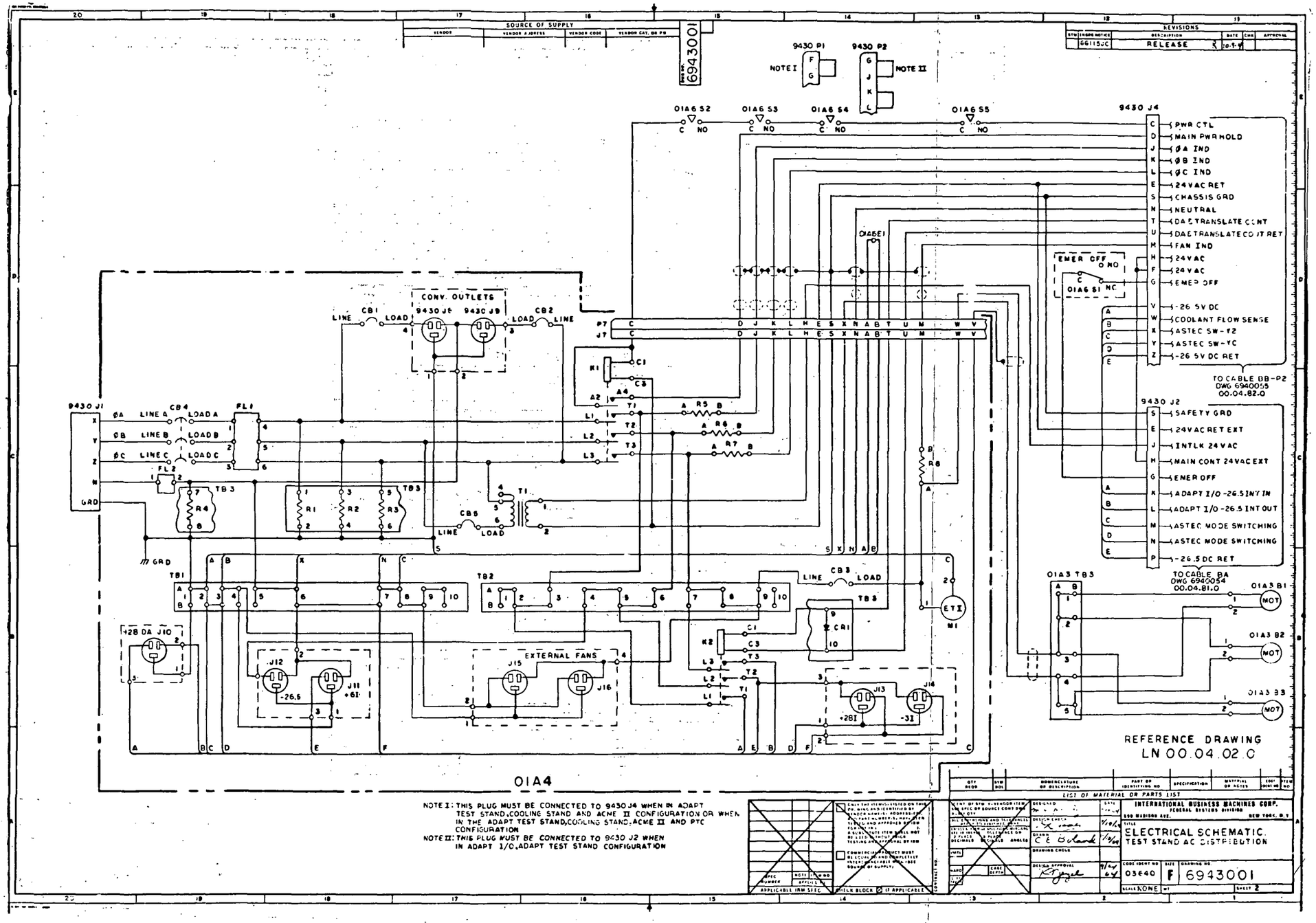


Figure 10-5. Equipment Test Stand 6943000 Electrical Schematic Diagram (Sheet 4)

SOURCE OF SUPPLY

VENDOR	VENDOR ADDRESS	VENDOR CODE	VENDOR CAT. OR P.N.

6943001

REVISIONS				
SYM	ENGR'G NOTICE	DESCRIPTION	DATE	CHK	APPROVAL
	66115-C	RELEASE	10-4		

COMPONENTS LIST

REFERENCE DES	DESCRIPTION	VALUE	TOL ±%	RATING
01A1	DC DISTRIBUTION (ASSY 6943022)			
PS1	POWER SUPPLY	36 V		5 AMPS
PS2	POWER SUPPLY	36 V		10 AMPS
PS3	POWER SUPPLY	36 V		30 AMPS
PS3 P1	PLUG			
PS4	POWER SUPPLY	15 V		5 AMPS
PS5	POWER SUPPLY	15 V		5 AMPS
01A2	RELAY GATE	(ASSY 6943035)		
CR1-CR8	DECDE (IN647)			
K1	RELAY			
K2-K4				
K5, K6, K8				
K7				
TB1-TB4	TERMINAL BOARD			
01A3	PANEL ASSY	(ASSY 6943079)		
B1-B3	MOTOR			
R1-R6	RESISTOR	6.04 OHMS		
TB1-TB3	TERMINAL BOARD			
01A4	AC POWER BOX	(ASSY 6943025)		
CB1, CB2	CIRCUIT BREAKER			
CB3, CB5				
CB4				
FL1	FILTER			
FL2	FILTER			
J7	CONNECTOR			
J10	RECEPTACLE			
J11-J16				
K1	CONTACTOR			
K2				
M1	ELAPSED TIME METER			
P7	CONNECTOR			

REFERENCE DES	DESCRIPTION	VALUE	TOL ±%	RATING
01A4 R5-R8	RESISTOR	2.87 K	±3	10 W
T1	TRANSFORMER			
TB1-TB2	TERMINAL BOARD			
TB3				
TB1-CR1	DIODE (IN647)			
TB1R1-TB1R4	RESISTOR	39 K	±5	1 W
01A5	CHASSIS ASSY.	(ASSY 6943118)		
CB1	CIRCUIT BREAKER			
J17	CONNECTOR			
P1	PLUG			
TB1	TERMINAL BOARD			
01A6	MECH ASSY (6943022)			
S1	EMER OFF SWITCH			
S2-S5	INTERLOCK SWITCH			
01A7	MECH ASSY (6943022)			
B1-B9	MOTOR			
J1-J9	RECEPTACLE			
P1-P9	PLUG			
P17	CONNECTOR			
9430	MECH ASSY (6943087)			
J1-J4	CONNECTOR			
J6				

REFERENCE DRAWING
LN 00.04.01.0

LIST OF MATERIAL OR PARTS LIST

INTERNATIONAL BUSINESS MACHINES CORP.
FEDERAL SYSTEMS DIVISION
590 MADISON AVE. NEW YORK, N.Y.

TITLE: ELECTRICAL SCHEMATIC TEST STAND COMPONENTS LIST

CAGE IDENT NO 03640 | SIZE F | DRAWING NO. 6943001

SCALE NONE | WT | SHEET 5 OF 5

Figure 10-5. Equipment Test Stand 6943000 Electrical Schematic Diagram (Sheet 5)

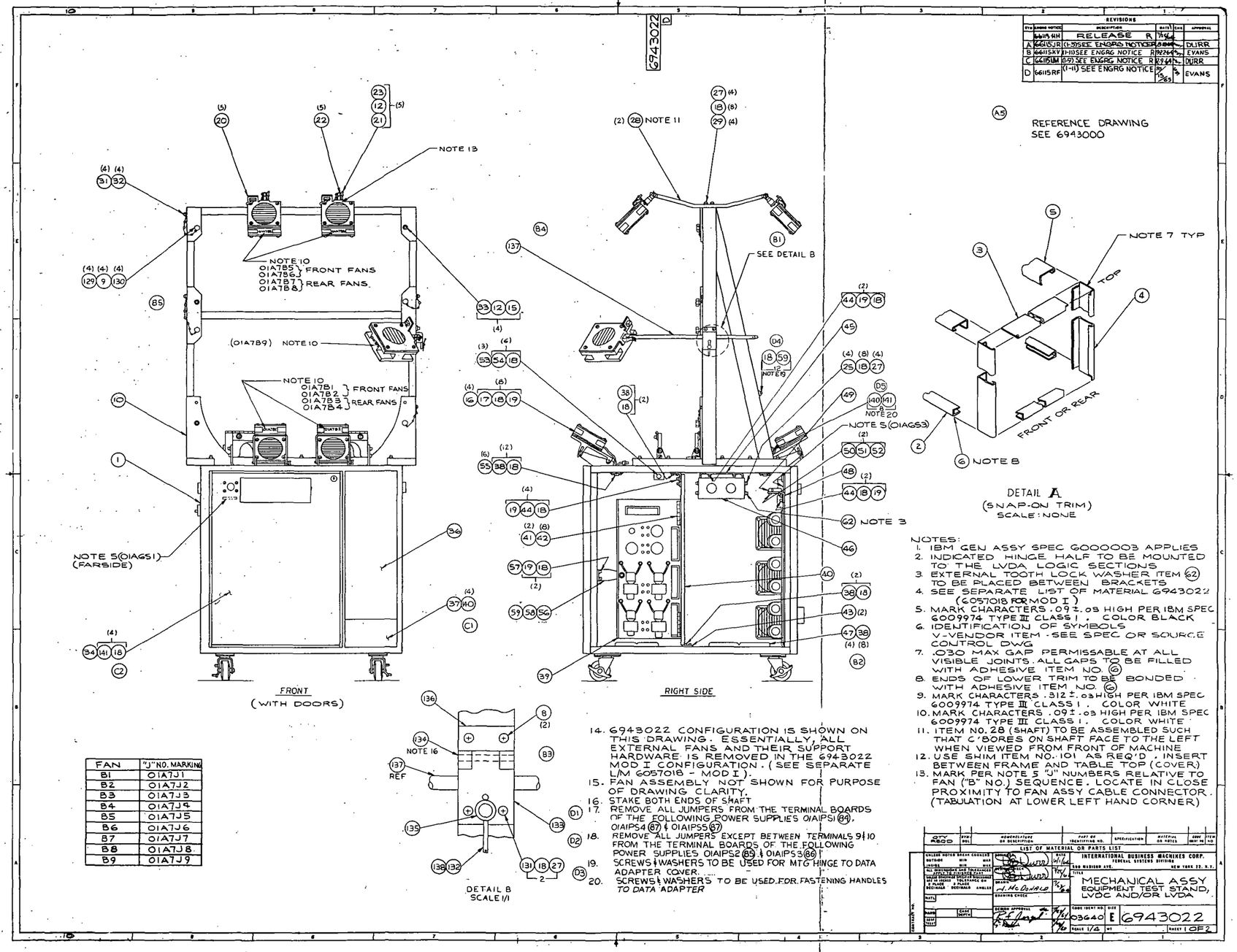


Figure 10-6. Equipment Test Stand 6943000 Mechanical Assembly Drawing (Sheet 1 of 3)

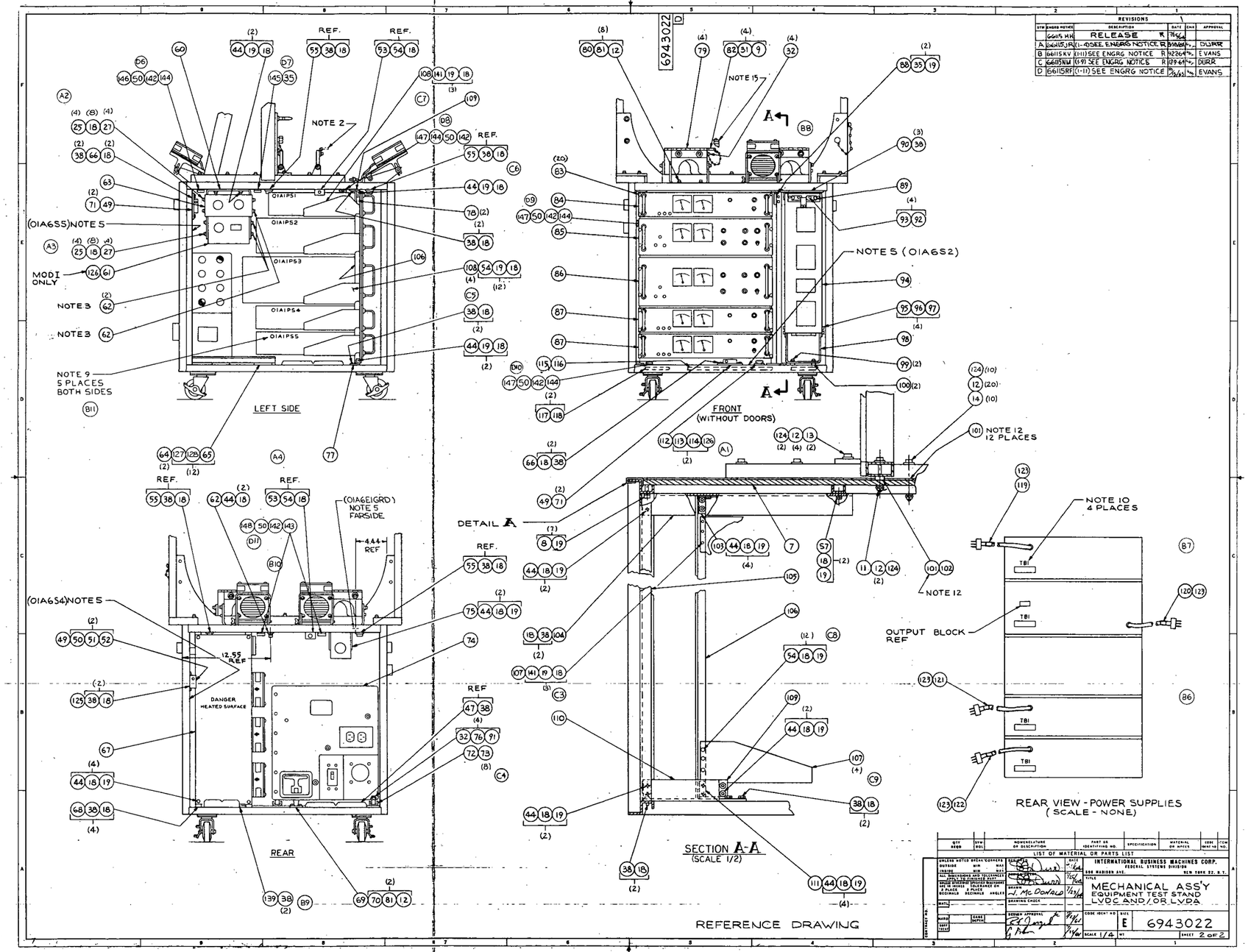


Figure 10-6. Equipment Test Stand 6943000 Mechanical Assembly Drawing (Sheet 2)

Item No.	Part No.	Description	Quantity
1	6943125	Frame Assembly	1
2	0194343	Trim	4
3	0194344	Trim	2
4	0194345	Trim	4
5	0194346	Trim	2
6	0597535	Adhesive	1
7	6943023	Cover Assembly	1
8	AN501AD10-14	Screw (6028499)	9
9	6081657	Hook	8
10	6943008	Support Assembly	1
11	0059649	Screw	1
12	MS15795-310	Washer (6301816)	45
13	0186914	Screw	2
14	0059652	Screw	10
15	NAS1291A4M	Nut (6072825)	4
16	6943026	Adjustable Fan Assembly	4
17	MS35217-56	Screw (6035737)	8
18	MS15795-308	Washer (6301812)	144
19	MS35338-81	Lockwasher (6029221)	81
20	6943056	Bracket Assembly - Fan	5
21	MS35751-16	Carriage Bolt (6080876)	5
22	MS35335-61	Washer External Tooth (6035799)	5
23	0312469	Wing Nut	5
24			
25	MS16996-11	Screw (6080500)	14
26			
27	NAS1291A3M	Nut (6072824)	18
28	6943060	Shaft - Upper Fan	2
29	MS35217-62	Screw (6035743)	4
30			4
31	6035461	Bead String	8
32	0003153	Screw	4
33	6943039	Locating Pin	4
34	6943061	Panel Assembly	1
35	MS35217-52	Screw (6035733)	6
36	0597342	Cover	1
37	6901042	Panel Assembly	1
38	177397	Screw	43
39	6943035	Relay Panel	1
40	6943074	Support	1
41	6661120	Hinge	2
42	6013007	Screw	8
43	6943069	Bracket	2
44	MS16996-9	Screw (6080498)	27
45	6943064	Bracket	1
46	6943088	Bracket	1
47	0194370	Bracket	4

Item No.	Part No.	Description	Quantity
71	MS24693C24	Screw (6035643)	4
72	6081376	Slide	1
73	0004636	Screw	4
74	6943025	AC Power Box Assy.	1
75	6943086	Bracket Assembly	1
76	NAS1291A08M	Nut (6072823)	4
77	6940011	Bracket	1
78	6900493	Spacer	2
79	6943051	Hinge Block Assembly	4
80	MS16996-23	Screw (6080508)	8
81	MS35338-82	Lockwasher (6029245)	10
82	6943040	Hinge Pin	4
83	6073913	Screw	20
84	6081053	Power Supply	1
85	6081041	Power Supply	1
86	6943055	Power Supply	1
87	6078122	Power Supply	2
88	6940129	Strike	1
89	0194361	Bracket	1
90	0597295	Hinge	1
91	MS15795-307	Washer (6048639)	4
92	0130434	Screw	4
93	0056079	Lockwasher	4
94	0597100	Frame Assembly	1
48	6943078	Bracket	1
49	6078449	Interlock Switch	4
50	MS35216-24	Screw (6033700)	4
51	MS15795-306	Washer (6047219)	4
52	MS35338-79	Lockwasher (6029219)	4
53	6903093	Receptacle	3
54	MS35217-53	Screw (6035734)	44
55	0194371	Strike	6
56	6943075	Stop	1
57	MS16996-10	Screw (6080499)	4
58	6075589	Receptacle	1
59	6033986	Nut	1
60	6943063	Bracket	1
61	6943119	Chassis Assy.	1
62	MS35335-60	Washer External Tooth (6035798)	4
63	6943071	Bracket	1
64	6943128	Support	2
65	0045690	Washer	12
66	6943083	Bracket	2
67	6943079	Panel Assembly - Resistor	1
68	6943077	Bracket	4
69	6943130	Latch Stop	1
70	6028531	Screw	2

Item No.	Part No.	Description	Quantity
95	0007327	Screw	4
96	0056121	Lockwasher	4
97	0011598	Nut	4
98	0597116	Bracket	1
99	0005677	Screw	2
100	0344052	Spacer	2
101	0336334	Shim	75
102	0126520	Spacer	1
103	6943070	Bracket	1
104	6943068	Bracket	1
105	6940126	Angle Stop	1
106	6940015	Support, Panel Mtg	2
107	6900499	Bracket L. H.	5
108	6900497	Bracket R. H.	5
109	6940012	Bracket	2
110	6943062	Bracket	1
111	6943066	Bracket	1
112	0323917	Catch	1
113	MS35216-12	Screw (6035698)	2
114	MS35338-78	Lockwasher (6029218)	2
115	0597334	Filter	1
116	0184657	Screen	1
117	0597250	Filter	2
118	0184663	Screen	2
119	6943145	Cable Marker	1
120	6943144	Cable Marker	1
121	6943143	Cable Marker	1
122	6943146	Cable Marker	1
123	6032364	Lacing Tape	3
124	6015325	Nut	13
125	6943082	Bracket	1
126	MS15795-303	Washer (6048641)	2
127	MS16995-25	Screw (6080492)	12
128	MS35338-80	Lockwasher (6029220)	12
129	6081656	Screw	4
130	6081655	Ring	4
131	MS246936282	Screw (6035679)	2
132	6943149	Handle	1
133	6943150	Pivot	1
134	6943151	Shaft	1
135	6943152	Stud	1
136	6943153	Base	1
137	6943036	Shaft	1
138	MS16562-189	Roll Pin (6074839)	1
139	6943154	Bracket	1

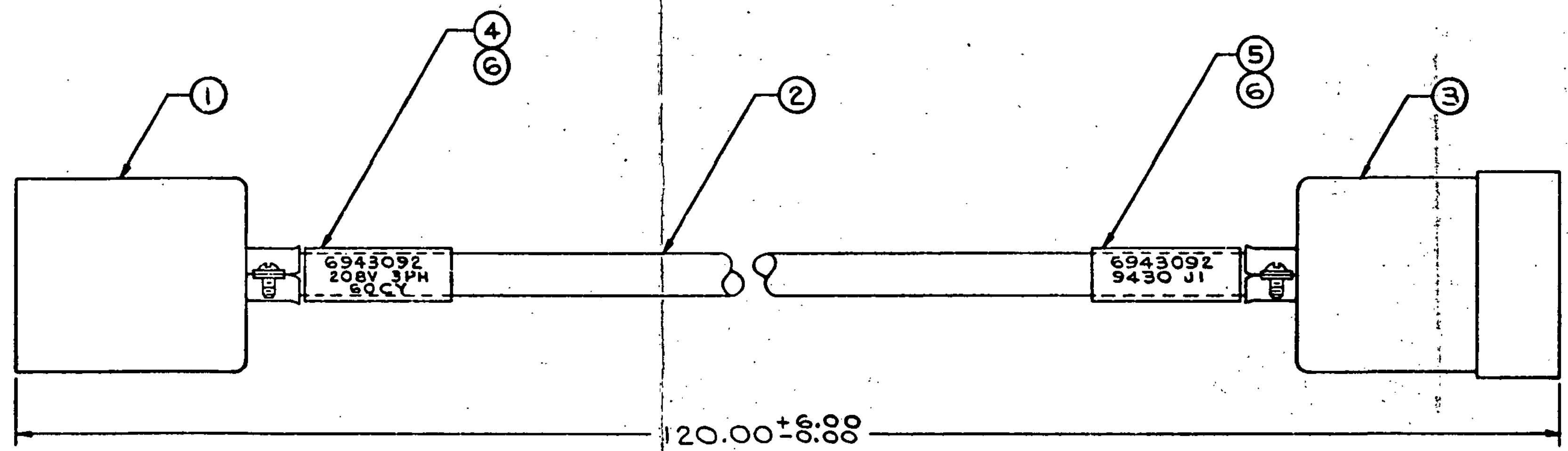
Figure 10-6. Equipment Test Stand 6943000 Mechanical Assembly Drawing (Sheet 3)

6943092

SYM	ENGRG NOTICE	DESCRIPTION	DATE	CHK	APPROVAL
	66112-HP	RELEASE R	5/8/64		

COND NO.	COLOR	FROM	TO
1	BLK	P1-X	P2-X
2	ORN	P1-Y	P2-Y
3	RED	P1-Z	P2-Z
4	WHT	P1-N	P2-N
5	GRN	P1-GRD	P2-GRD

NOTES.
1. IBM GEN ASSY SPEC 6000003 APPLIES
2. IDENTIFICATION OF SYMBOLS:
   V= VENDOR ITEM - SEE SPEC OR SOURCE CONTROL DWG



QTY REQD	SYMBOL	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	CODE IDENT NO.	ITEM NO.
12 IN.		LACING TAPE	6032364				6
1		CABLE MARKER	6943098				5
1		CABLE MARKER	6943097				4
1	V	CONNECTOR, FEMALE	6072156				3
125 IN.	V	CABLE	6077134				2
1	V	CONNECTOR, MALE	6070010				1

LIST OF MATERIAL OR PARTS LIST

UNLESS NOTED BREAK CORNERS OUTSIDE MIN MAX INSIDE MIN MAX
ALL DIMENSIONS AND TOLERANCES APPLY TO FINISHED PART
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE ON 2 PLACE DECIMALS 3 PLACE DECIMALS ANGLES
MATL
HARD CASE DEPTH
SURF TREAT
CONTRACT NO.

DESIGNED: M. [signature] — DATE 5-8-64
DESIGN CHECK: [signature] — 5/8/64
DRAWN: J R VMD — 4-30-64
DRAWING CHECK
DESIGN APPROVAL: [signature] — 5-8-64; [signature] — 5/14/64

INTERNATIONAL BUSINESS MACHINES CORP.
FEDERAL SYSTEMS DIVISION
590 MADISON AVE. NEW YORK 22, N.Y.

TITLE: CABLE ASSY, MAIN POWER, EQUIPMENT TEST STAND

CODE IDENT NO. 03640 — SIZE C — 6943092
SCALE NONE — WT — SHEET

Figure 10-7. Equipment Test Stand 6943000 Power Cable (6943092) Drawing

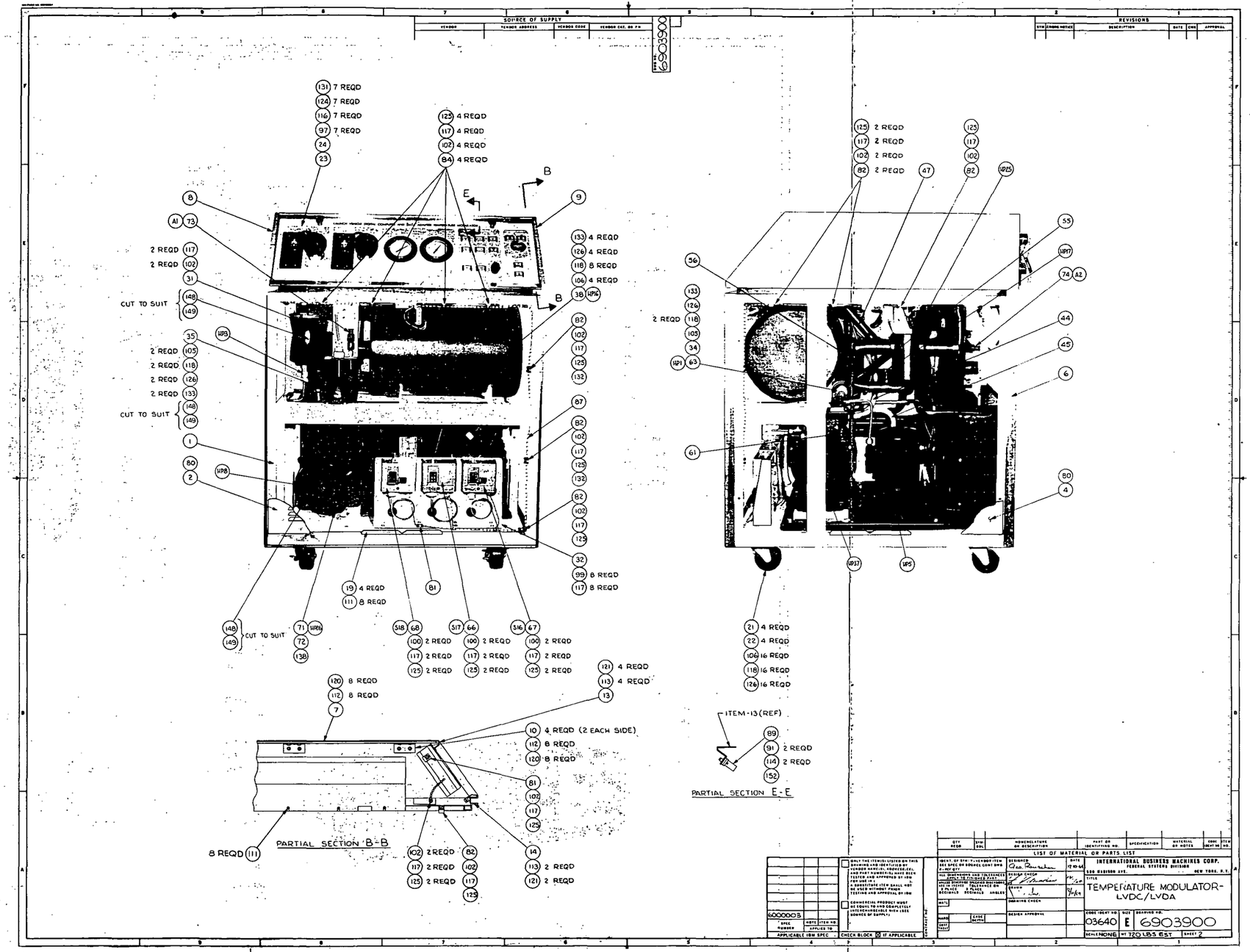


Figure 10-8. Temperature Modulator 6903900 Assembly Drawing (Sheet 1 of 3)

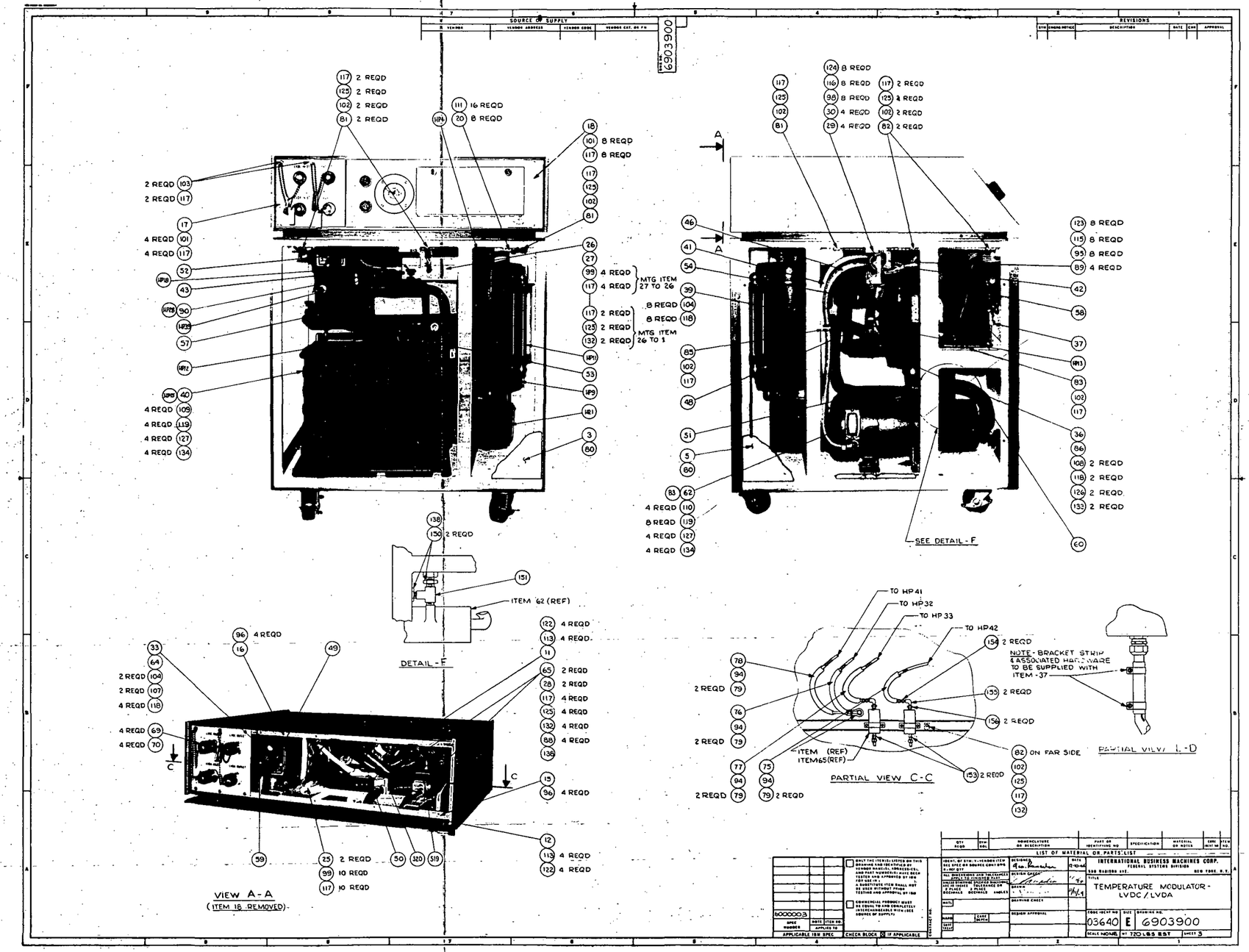


Figure 10-8. Temperature Modulator 6903900 Assembly Drawing (Sheet 2)

6903900

WIRE JUMPER DATA							
CONDUCTOR			FROM		TO		
WIRE PART NO (REF)	COLOR TYPE	SIZE AWG	TERM PART NO(REF)	CIRCUIT POINT	CIRCUIT POINT	TERM PART NO(REF)	LENGTH (INCHES)
6903976	RED	16	6903666	TB2-A	B1L3	6903663	32
6903977	BLK	16		TB2-B	B1L2	6903663	31
6903978	ORN	16		TB2-C	B1L1	6903663	31
6903983	YEL	20		TB2-D	B1 FUSITE	SOLDER	32
6903976	RED	16		TB2-E	B3-T3	6903664	47
6903977	BLK	16		TB2-F	B3-T2	6903664	46
6903978	ORN	16		TB2-G	B3-T1	6903664	45
6903976	RED	16		TB2-H	HR1-3	6903664	45
6903977	BLK	16		TB2-J	HR1-2	6903664	43
6903978	ORN	16		TB2-K	HR1-1	6903664	43
6903976	RED	16		TB2-L	L1-1	6903663	18
6903637	WHT	16		TB2-M	L1-2	6903663	17
6903637	WHT	16		TB2-M	B4L2	6903664	33
6903976	RED	16		TB2-N	B4L1	6903664	33
6903637	WHT	16		TB2-P	B4-2	6903664	34
6903637	WHT	16		TB2-R	B4X	6903664	34
6903637	WHT	16		TB2-S	B4-3	6903664	35
6903983	YEL	20		TB3-1	S21-1	6903663	43
6903983	YEL	20	6903666	TB3-2	S21-2	6903663	43

REF. DESIG.	DESCRIPTION
A1	AMBIENT SENSOR
A2	COOLANT SENSOR
B3	PUMP MOTOR
HP1	REFRIGERANT DRIER, STRAINER
HP3	REFRIGERANT SIGHT GLASS
HP4	NEEDLE VALVE
HP5	REFRIGERANT RECEIVER
HP8	CENTRIFIGAL PUMP
HP9	COOLANT TANK
HP11	COOLANT LEVEL INDICATOR
HP12	QUICK DISCONNECT
HP13	BALL VALVE
HP15	CONDENSER
HP16	CHILLER
HP17	BY-PASS VALVE
HP18	BY-PASS VALVE
HP25	MIXING VALVE
HP26	DRAIN VALVE
HP28	MICRON FILTER
HP37	COMPRESSOR
HP39	BY-PASS VALVE
HR1	HEATER
S16	LOW-LOW PRESSURE SWITCH
S17	HI-PRESSURE SWITCH
S18	LOW PRESSURE SWITCH
S19	FLOW SWITCH
S20	FLOW SWITCH

QTY REQD	SYMBOL	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	CODE IDENT NO	ITEM NO
2		REDUCING BUSHING	912-4S				156
2		90° ELBOW	AN914-3S				155
2		MALE CONNECTOR	AN816-6-6S				154
2		MALE CONNECTOR	J816-8-8S				153
1	V	NYLON SCREW	6943270				152
1		TEE	AN917-4S				151
2		NIPPLE	AN816-8-8S				150
AR	V	ADHESIVE	6943187				149
AR	V	INSULATION	6943261				148
AR		SOLDER	SN60TYPEAR	QQ-S-571			147
19	V	LUG	6903666				146
11	V	LUG	6903664				145
7	V	LUG	6903663				144
134IN	V	WIRE	6903983				143
126IN	V	WIRE	6903978				142
126IN	V	WIRE	6903977				141
224IN	V	WIRE	6903976				140
160IN	V	WIRE	6903637				139
AR	V	TAPE	6943251				138
							137
							136
							135
8		NUT	MS35690-610				134
9		NUT	MS35690-410				133
9		NUT	MS35650-104				132
7		NUT	MS35649-84				131
							130
							129
							128
8		WASHER, LOCK	MS35338-84				127
25		WASHER, LOCK	MS35338-82				126
33		WASHER, LOCK	MS35338-81				125
15		WASHER, LOCK	MS35338-80				124
8		WASHER, LOCK	MS35338-79				123
8		WASHER	510810				122
6		WASHER	1940				121
16		WASHER	47242				120
12		WASHER, FLAT	MS15795-315				119
41		WASHER, FLAT	MS15795-310				118
73		WASHER, FLAT	MS15795-308				117
15		WASHER, FLAT	MS15795-307				116
8		WASHER, FLAT	MS15795-306				115
2		SCREW	AN 507C632-7				114
14		SCREW	221790				113
16		SCREW	32042				112
24		SCREW	177396				111
4		SCREW	MS35307-65				110
4		SCREW	MS35307-64				109
2		SCREW	MS35307-14				108
2		SCREW	MS35307-10				107
20		SCREW	MS35307-8				106
3		SCREW	MS35307-7				105
10		SCREW	MS35307-6				104
2		SCREW	MS35234-64				103
32		SCREW	MS35234-63				102
12		SCREW	MS35234-62				101
6		SCREW	MS35234-61				100
22		SCREW	MS35233-64				99
8		SCREW	MS35233-46				98
7		SCREW	MS35233-44				97
8		SCREW	MS35233-42				96
8		SCREW	MS35233-26				95
AR	V	INSULATION	6943186				94
1		HARNESS-"F"	6943175				93
1		HARNESS-"D"	6943173				92
2		SPACER INTERLOCK	6903668				91

LIST OF MATERIAL OR PARTS LIST

QTY REQD	SYMBOL	NOMENCLATURE OR DESCRIPTION	PART NO IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	CODE IDENT NO	ITEM NO
1		MANIFOLD ASS'Y	6943260				90
5		INTERLOCK SWITCH	6078449				89
4		NIPPLE	AN816-8-8S				88
1		HARNESS-"E"	6943174				87
1		BRACKET	6903635				86
1		CLAMP	MS21919-20				85
4		CLAMP	MS21919-5				84
1		CLAMP	MS21919-4				83
10		CLAMP	MS21919-3				82
6		CLAMP	MS21919-2				81
4		DOOR LATCH	6903541				80
8		WASHER, HOSE	6943252				79
1	V	HOSE	6903671				78
1	V	HOSE	6903670				77
1	V	HOSE	6903669				76
1	V	HOSE	6903554				75
1	V	TEMP SENSOR	6943191				74
1	V	TEMP SENSOR	6943190				73
1	V	VALVE	6903970				72
1		ELBOW	6903625				71
4		CAP					70
4		QUICK DISCONNECT					69
1	V	PRESS. CONTROL	6903972				68
1	V	PRESS. CONTROL	6903932				67
1	V	PRESS. CONTROL	6903929				66
2	V	FLOW SWITCH	6903939				65
1		MOTOR OPER. ASS'Y	6943258				64
1	V	FILTER-DRIER	6903925				63
1	V	CENTRIFUGAL PUMP	6903933				62
1		TUBING ASS'Y.	6903667				61
1		TUBING ASS'Y	6903658				60
1		TUBING ASS'Y	6903657				59
1		TUBING ASS'Y	6903656				58
1		TUBING ASS'Y	6903655				57
1		TUBING ASS'Y.	6903654				56
1		TUBING ASS'Y.	6903653				55
1		TUBING ASS'Y.	6903652				54
1		TUBING ASS'Y.	6903651				53
1		TUBING ASS'Y.	6903650				52
1		TUBING ASS'Y.	6903649				51
1		TUBING ASS'Y.	6903648				50
1		TUBING ASS'Y.	6903646				49
1		TUBING ASS'Y.	6903645				48
1		TUBING ASS'Y.	6903643				47
1		CONDUIT ASS'Y.	6943182				46

LIST OF MATERIAL OR PARTS LIST

QTY REQD	SYMBOL	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	CODE IDENT NO	ITEM NO.
1		CONDUIT ASS'Y.	6943181				45
1		CONDUIT ASS'Y.	6943180				44
1		CONDUIT ASS'Y.	6943179				43
1		CONDUIT ASS'Y.	6943178				42
1		CONDUIT ASS'Y.	6943177				41
1		CONDENSING UNIT	6903674				40
1		TANK ASSEMBLY	6903962				39
1		COOLER ASS'Y.	6903558				38
1		THRM. EXP. VALVE ASS'Y.	6943244				37
1		SOLENOID VALVE ASS'Y	6943243				36
1		EVAP. REG. VALVE ASS'Y.	6943242				35
1		CLAMP	6903633				34
1		BRACKET	6903626				33
1		BKT. PRESS. SWITCH	6903555				32
1		BKT. TEMP SENSOR	6943167				31
4		SPACER	6903644				30
4		BRACKET, LATCH	6903542				29
2		BKT FLOW SWITCH	6903634				28
1		COVER	6903636				27
1		ELECTRICAL BOX	6903638				26
2		RAIL	690357[illegible]				25
1		SPACER	6943230				24
1		PANEL ASS'Y.	6903538				23
4		SPACER, CASTER	6903061				22
4		CASTER	6079394				21
8		STRIKE	194371				20
4		BRACKET	194370				19
1		POWER SUPPLY	6943176				18
1		QUARTER PANEL	6903628				17
1		SUPPORT UPPER	6903630				16
1		SUPPORT LOWER	6903629				15
1		TRIM LOWER FRONT	6903567				14
1		BRACKET ASS'Y.	6903659				13
1		TRIM LOWER REAR	552248				12
1		TRIM UPPER REAR	552242				11
4		BRACKET, TOP	552241				10
1		COVER R/S	552240				9
1		COVER L/S	552239				8
1		COVER, TOP	552244				7
1		SNAP ON TRIM	194348				6
1		COVER ASS'Y. L/S	6903672				5
1		COVER ASS'Y. R/S	6903549				4
1		COVER ASS'Y. REAR	6903548				3
1		COVER ASS'Y. FRONT	6903547				2
1		FRAME ASSEMBLY	6903985				1

LIST OF MATERIAL OR PARTS LIST

NOTES:
I IDENT OF SYMBOLS:
V= VENDOR ITEM SEE SPEC OR SOURCE CONTROL DRAWING
II IBM SPEC 6000003 APPLIES

REVISIONS

UNLESS NOTED BREAK CORNERS OUTSIDE MIN MAX INSIDE MIN MAX
ALL DIMENSIONS AND TOLERANCES APPLY TO FINISHED PART
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE ON 2 PLACE DECIMALS 3 PLACE DECIMALS ANGLES

DESIGNED Geo. Rauschen DATE 12-7-64
DESIGN CHECK
DRAWN Geo. Rauschen 12-7-64
DRAWING CHECK
DESIGN APPROVAL

INTERNATIONAL BUSINESS MACHINES CORP.
FEDERAL SYSTEMS DIVISION
590 MADISON AVE. NEW YORK 22, N.Y.

TITLE TEMPERATURE MODULATOR-LVDC/LVDA

CODE IDENT NO 03640 SIZE E 6903900
SCALE NONE WT 720LBS EST. SHEET 1 OF 3

Figure 10-8. Temperature Modulator 6903900 Assembly Drawing (Sheet 3)

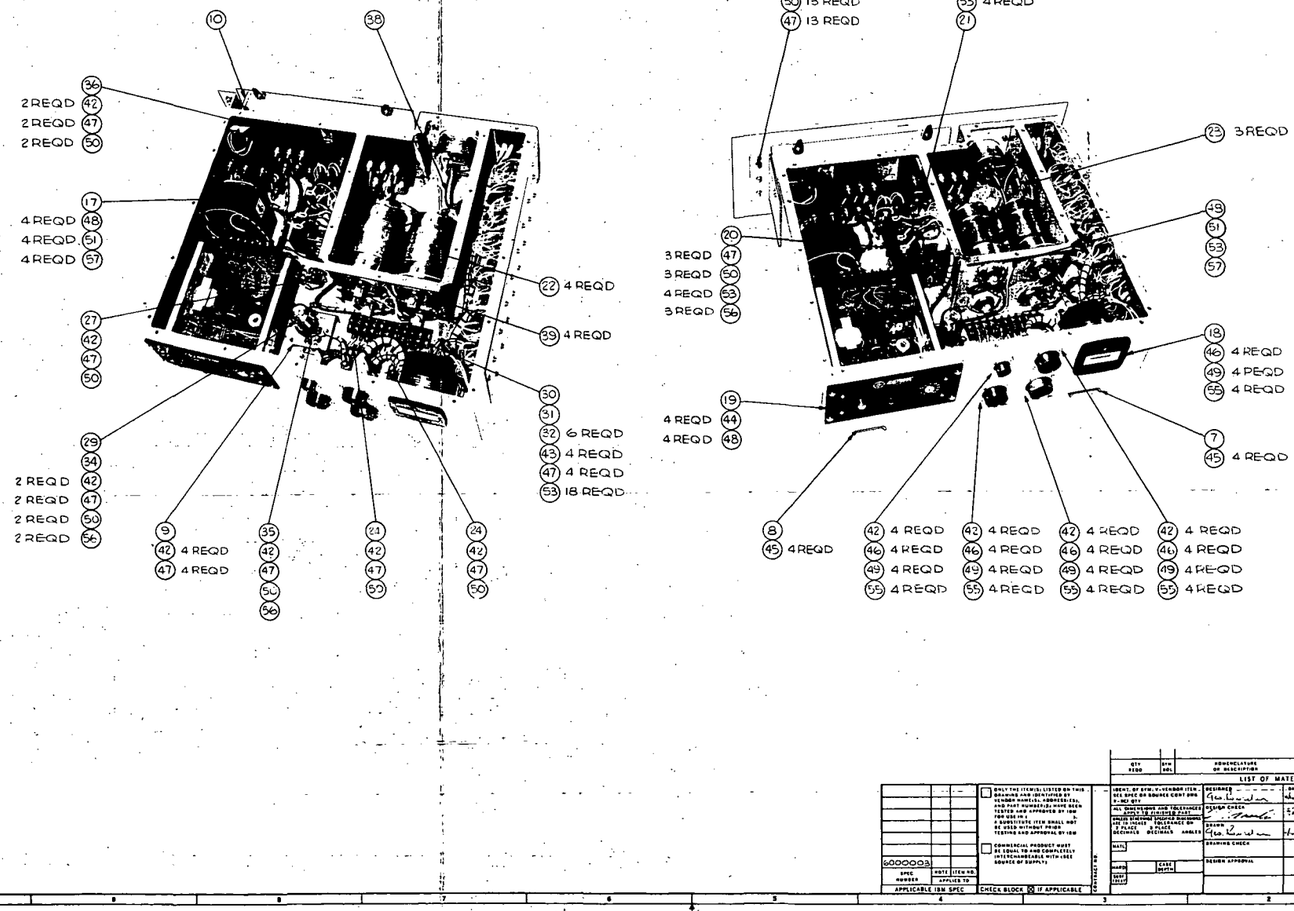


Figure 10-9. Temperature Modulator Power Box Assembly (6943176) Assembly Diagram (Sheet 1 of 3)

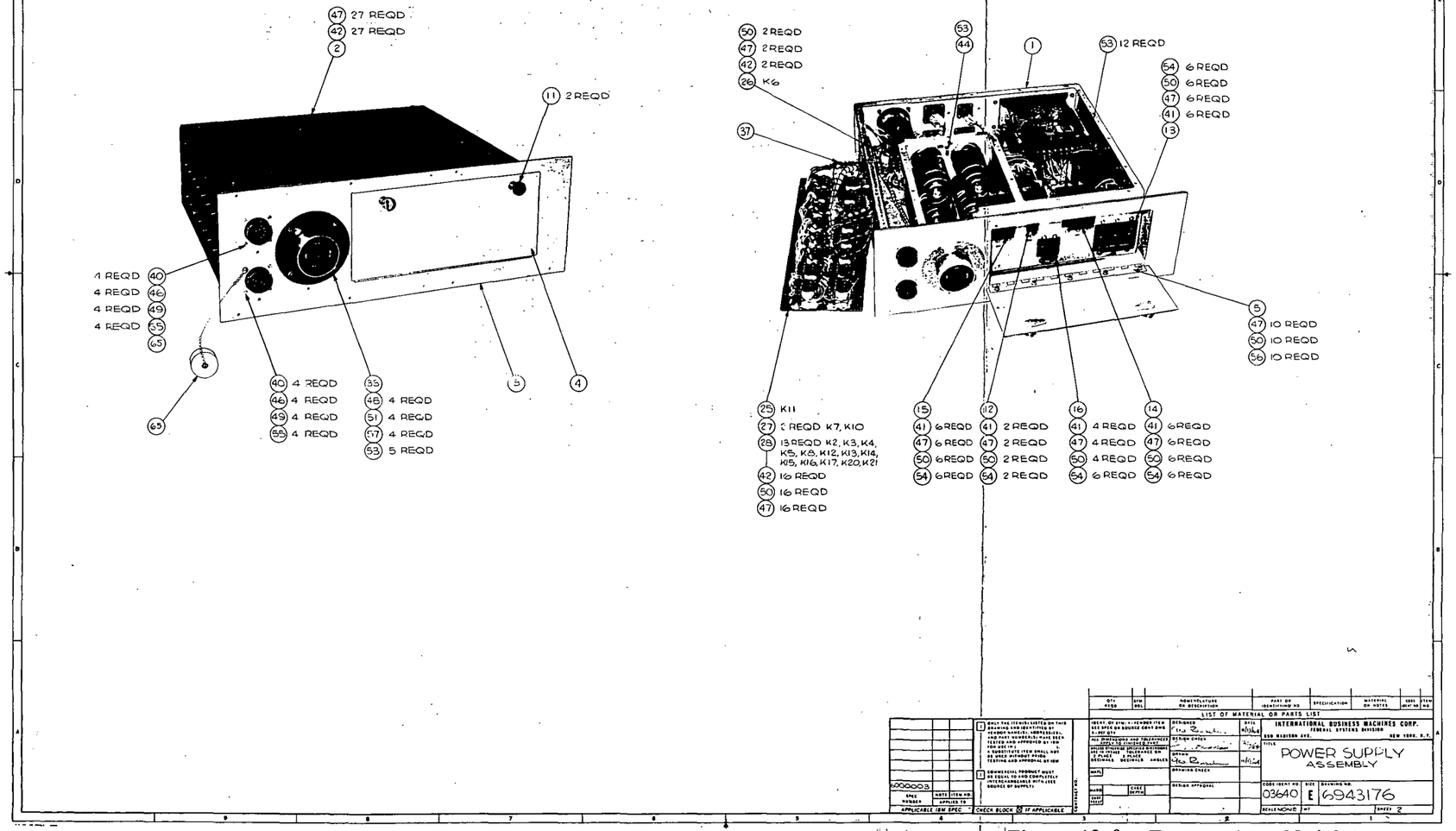


Figure 10-9. Temperature Modulator Power Box Assembly (6943176) Assembly Diagram (Sheet 2)

6943176

WIRE JUMPER DATA							
CONDUCTOR			FROM		TO		
WIRE PART NO (REF)	COLOR TYPE	SIZE AWG	TERM PART NO(REF)	CIRCUIT POINT	CIRCUIT POINT	TERM PART NO(REF)	LENGTH (INCHES)
6903983	YEL	20	SOLDER	KINCI	KINOI	SOLDER	3.00
6903983	YEL	20		K2-4	K2-5		2.50
6903983	YEL	20		K2-5	K2-6		2.50
6903983	YEL	20		K2-6	K3-4		3.00
6903983	YEL	20		K2-10	K3-10		3.00
6903979	GRN	20		K2-11	K3-11		3.50
6903983	YEL	20		K3-4	K3-5		2.50
6903983	YEL	20		K3-5	K3-6		2.50
6903983	YEL	20		K3-6	K4-4		5.00
6903983	YEL	20		K3-10	K4-10		5.00
6903979	GRN	20		K3-11	K4-11		3.50
6903983	YEL	20		K4-4	K4-5		2.50
6903983	YEL	20		K4-5	K4-6		2.50
6903983	YEL	20		K4-6	K5-4		5.00
6903983	YEL	20		K4-10	K5-10		3.50
6903979	GRN	20		K4-11	K5-11		3.50
6903983	YEL	20		K5-4	K5-5		2.50
6903983	YEL	20		K5-5	K5-6		2.50
6903983	YEL	20		K7-4	K8-6		3.00
6903983	YEL	20		K7-5	K8-5		3.00
6903983	YEL	20		K7-7	K8-8		2.75
6903983	YEL	20		K7-9	K8-9		2.50
6903983	YEL	20		K7-9	K10-7		4.50
6903983	YEL	20		K8-11	K11-11		5.25
6903983	YEL	20		K11-10	K12-10		3.50
6903979	GRN	20		K11-11	K12-11		3.50
6903979	GRN	20		K12-11	K13-11		3.50
6903983	YEL	20		K13-4	K13-10		2.00
6903979	GRN	20		K13-11	K14-11		3.50
6903982	RED	20		K14-8	K16-4		4.25
6903983	YEL	20		K14-10	K15-10		3.50
6903979	GRN	20		K14-11	K15-11		3.50
6903982	RED	20		K16-7	K20-8		5.25
6903979	GRN	20		K16-11	K17-11		3.50
6903982	RED	20		K17-7	K20-9		3.25
6903979	GRN	20		K17-11	K20-11		3.60
6903982	RED	20		K20-5	K20-8		2.00
6903983	YEL	20		K20-10	K21-10		3.50
6903979	GRN	20	SOLDER	K20-11	K21-11	SOLDER	3.50
6903979	GRN	20	6903663	CB3-B1	CB3-C1	6903663	3.00
6903983	YEL	20	SOLDER	T1-BOT-O	T1-TOP-12	SOLDER	4.50
6903564	GRN	16	SOLDER	E2	E4	SOLDER	3.50
6903564	GRN	16	SOLDER	E4	E6	SOLDER	3.50
6903564	GRN	16	SOLDER	E6	E7	6903664	14.50

1 METAL JUMPER DATA		
CIRCUIT POINT (FROM)	CIRCUIT POINT (TO)	PART NO (REF)
1TB1-1	TB1-2	6903642
1TB1-2	TB1-3	6903642
1TB1-3	TB1-4	6903642
1TB1-5	TB1-6	6903642
1TB1-6	TB1-7	6903642
1TB1-8	TB1-9	6903642

QTY REQD	SYM BOL	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	CODE IDENT NO	ITEM NO.
2	V	PROTECTION CAP	6903965				65
AR		SOLDER	SN(60)TYPE AR	QQ-S-571			64
1		LUG	6903664				63
2		LUG	6903663				62
95 IN		WIRE	6903983				61
20 IN		WIRE	6903982				60
45 IN		WIRE	6903979				59
28 IN		WIRE	6903564				58
9		NUT	MS35649-84				57
29		NUT	MS35649-64				56
28		NUT	MS35649-44				55
26		WASHER, LOCK	MS35335-60				54
7		WASHER, LOCK	MS35335-59				53
38		WASHER, LOCK	MS35335-58				52
9		WASHER, LOCK	MS35338-80				51
75		WASHER, LOCK	MS35338-79				50
28		WASHER, LOCK	MS35338-78				49
13		WASHER, FLAT	MS15795-307				48
123		WASHER, FLAT	MS15795-306				47
28		WASHER, FLAT	MS15795-303				46
8		SCREW	MS24693C-26				45
5		SCREW	MS35233-45				44
4		SCREW	MS35233-31				43
68		SCREW	MS35233-29				42
40		SCREW	MS35233-27				41
24		SCREW	MS35233-16				40
4		WASHER	6943169				39
1		HARNESS "B"	6943171				38
1		HARNESS "A"	6943170				37
1	V	INTERLOCK SWITCH	6078449				36
1	V	CLAMP, TUBE	6903944				35
1	V	SOCKET, TUBE	6903945				34
1	V	CONNECTOR	6903946				33
1	V	JUMPER	6903642				32
1		MARKER STRIP	6903532				31
1	V	TERMINAL BOARD	6903639				30
1	V	RELAY	6903941				29
13	V	RELAY	6903916				28
3	V	RELAY	6903915				27
1	V	RELAY	6903914				26
1	V	RELAY	6903913				25
2	V	RELAY	6903565				24
3	V	RESISTOR	6903911				23
4		CAPACITOR	6943264				22
1	V	AUX. CONTACT	6903918				21
1	V	CONTACTOR	6903919				20
1	V	ELECTRONIC TEMP. CONT.	6903924				19
1		ELAPSED TIME METER	6943263				18
1	V	TRANSFORMER	6903923				17
1	V	CIRCUIT BREAKER	6903938				16
1	V	CIRCUIT BREAKER	6903937				15
1	V	CIRCUIT BREAKER	6903936				14
1	V	CIRCUIT BREAKER	6903935				13
1	V	CIRCUIT BREAKER	6903934				12
2	V	DOOR LATCH	6903541				11
1		EXTENSION SHAFT	6903631				10
1		BKT. ASS'Y. TUBE SOC.	6903560				9
1		SLIDE RIGHT HAND	6903573				8
1		SLIDE LEFT HAND	6903572				7
1		SIDE PLATE	6903556				6
1		HINGE, COVER	6903570				5
1		COVER, HINGED	6903569				4
1		PANEL	6903566				3
1		COVER, TOP	6903562				2
1		CHASSIS	6903561				1

LIST OF MATERIAL OR PARTS LIST

INTERNATIONAL BUSINESS MACHINES CORP.
FEDERAL SYSTEMS DIVISION

POWER SUPPLY ASSEMBLY

03640 E 6943176

SHEET 1 OF 3

Figure 10-9. Temperature Modulator Power Box Assembly (6943176) Assembly Diagram (Sheet 3)

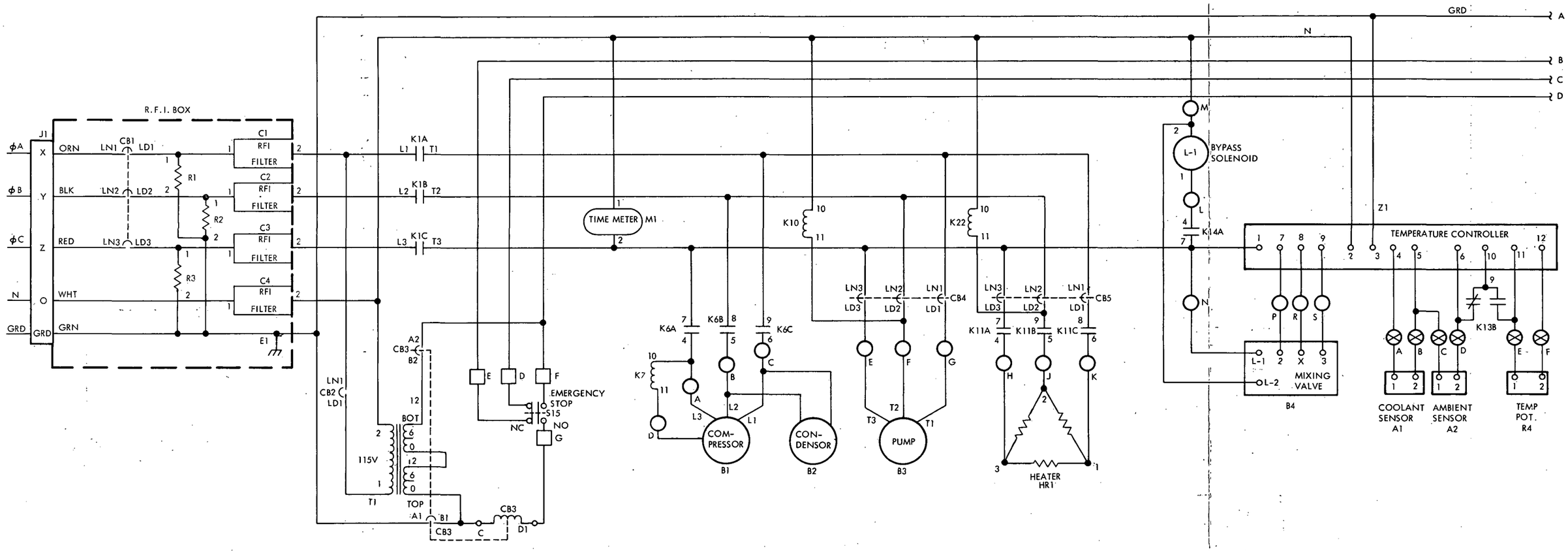


Figure 10-10. Temperature Modulator Electrical Schematic Diagram (Sheet 1 of 2)

NOTE:

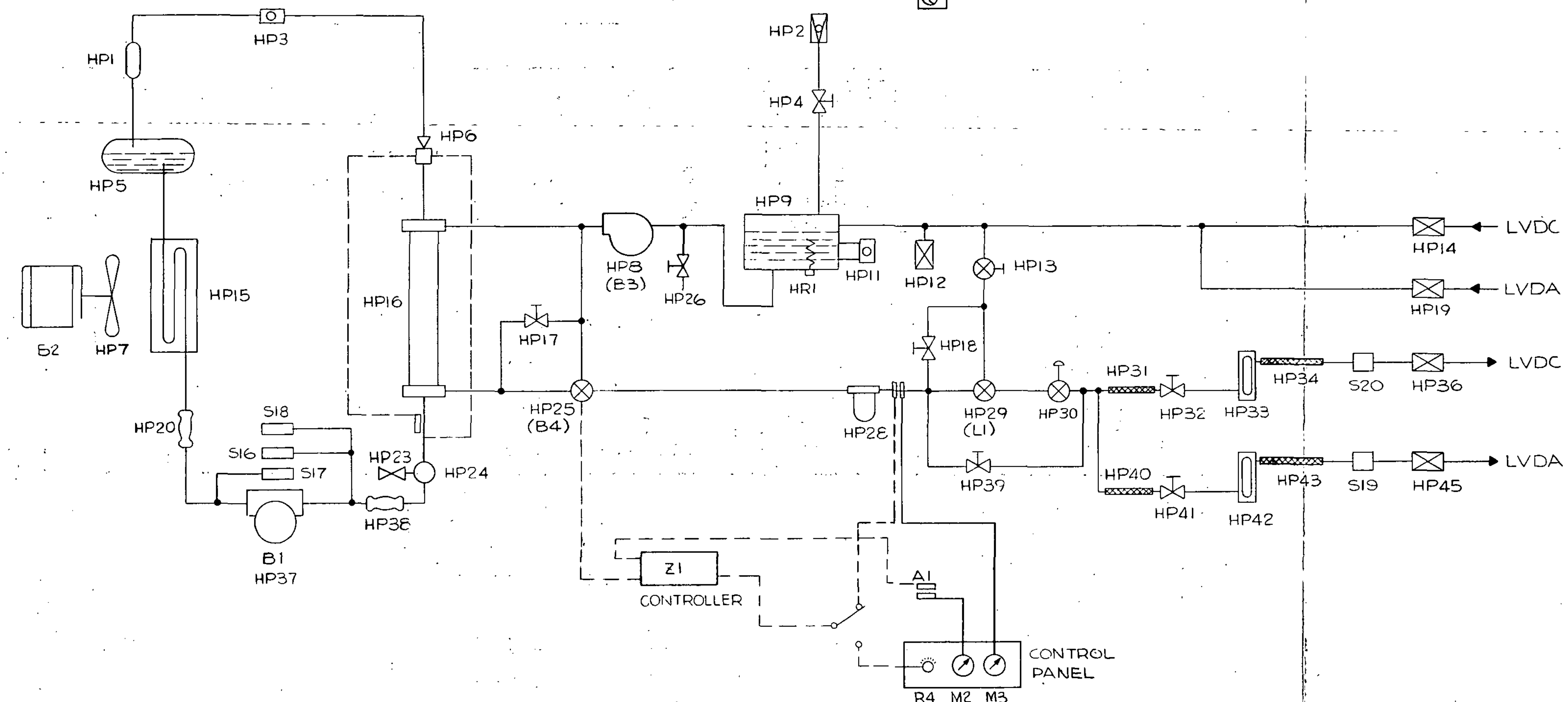
SPECIAL SYMBOLS	CONNECTOR
⊗	J4
△	J5
○	J6
□	J7

THIS DRAWING WILL BE REPLACED WHEN AN EQUIVALENT ENGINEERING DRAWING BECOMES AVAILABLE.

Figure 10-10. Temperature Modulator Electrical Schematic Diagram (Sheet 2)

6903902

REVISIONS: SYM | ENGRG NOTICE | DESCRIPTION | DATE | CHK | APPROVAL



DESIG.	DESCRIPTION
B1	COMPRESSOR MOTOR
B2	FAN MOTOR
B3	PUMP MOTOR
B4	MIXING VALVE MOTOR
HP1	DRIER, STRAINER
HP2	CHECK VALVE
HP3	SIGHT GLASS
HP4	NEEDLE VALVE
HP5	REFRIGERANT RECEIVER
HP6	THERMAL EXPANSION VALVE
HP7	FAN
HP8	PUMP
HP9	TANK
HP11	LEVEL INDICATOR
HP12	QUICK DISCONNECT
HP13	BALL VALVE
HP14	QUICK DISCONNECT

DESIG.	DESCRIPTION
HP15	CONDENSER
HP16	CHILLER
HP17	BY-PASS VALVE
HP18	BY-PASS VALVE
HP19	QUICK DISCONNECT
HP20	VIBRATION ELIMINATOR
HP23	ANGLE VALVE
HP24	CHILLER PRESS. REGULATOR
HP25	MIXING VALVE
HP26	DRAIN VALVE
HP28	MICRON FILTER
HP29	SOLENOID VALVE
HP30	PRESSURE REGULATING VALVE
HP31	FLEXIBLE HOSE
HP32	FLOW CONTROL VALVE

DESIG.	DESCRIPTION
HP33	FLOW METER
HP34	FLEXIBLE HOSE
HP36	QUICK DISCONNECT
HP37	COMPRESSOR
HP38	VIBRATION ELIMINATOR
HP39	BY-PASS VALVE
HP40	FLEXIBLE HOSE
HP41	FLOW CONTROL VALVE
HP42	FLOW METER
HP43	FLEXIBLE HOSE
HP45	QUICK DISCONNECT
HR1	HEATER
S16	LOW-LOW PRESSURE SWITCH
S17	HI-PRESSURE SWITCH
S18	LOW PRESSURE SWITCH
S19	FLOW SWITCH
S20	FLOW SWITCH

DESIG	DESCRIPTION
A1	AMBIENT SENSOR
A2	COOLANT SENSOR
M2	AMBIENT TEMP METER
M3	COOLANT TEMP METER
R4	POTENTIOMETER
Z1	CONTROLLER

QTY REQD | SYMBOL | NOMENCLATURE OR DESCRIPTION | PART OR IDENTIFYING NO. | SPECIFICATION | MATERIAL OR NOTES | CODE IDENT NO. | ITEM NO.

LIST OF MATERIAL OR PARTS LIST

INTERNATIONAL BUSINESS MACHINES CORP.
FEDERAL SYSTEMS DIVISION
590 MADISON AVE. NEW YORK 22, N.Y.

TITLE: PIPING SCHEMATIC

DESIGNED: 6-3-64 — DRAWN: 6-3-64

CODE IDENT NO. 03640 | SIZE D | 6903902

SCALE NONE

Figure 10-11. Temperature Modulator Piping Schematic Diagram

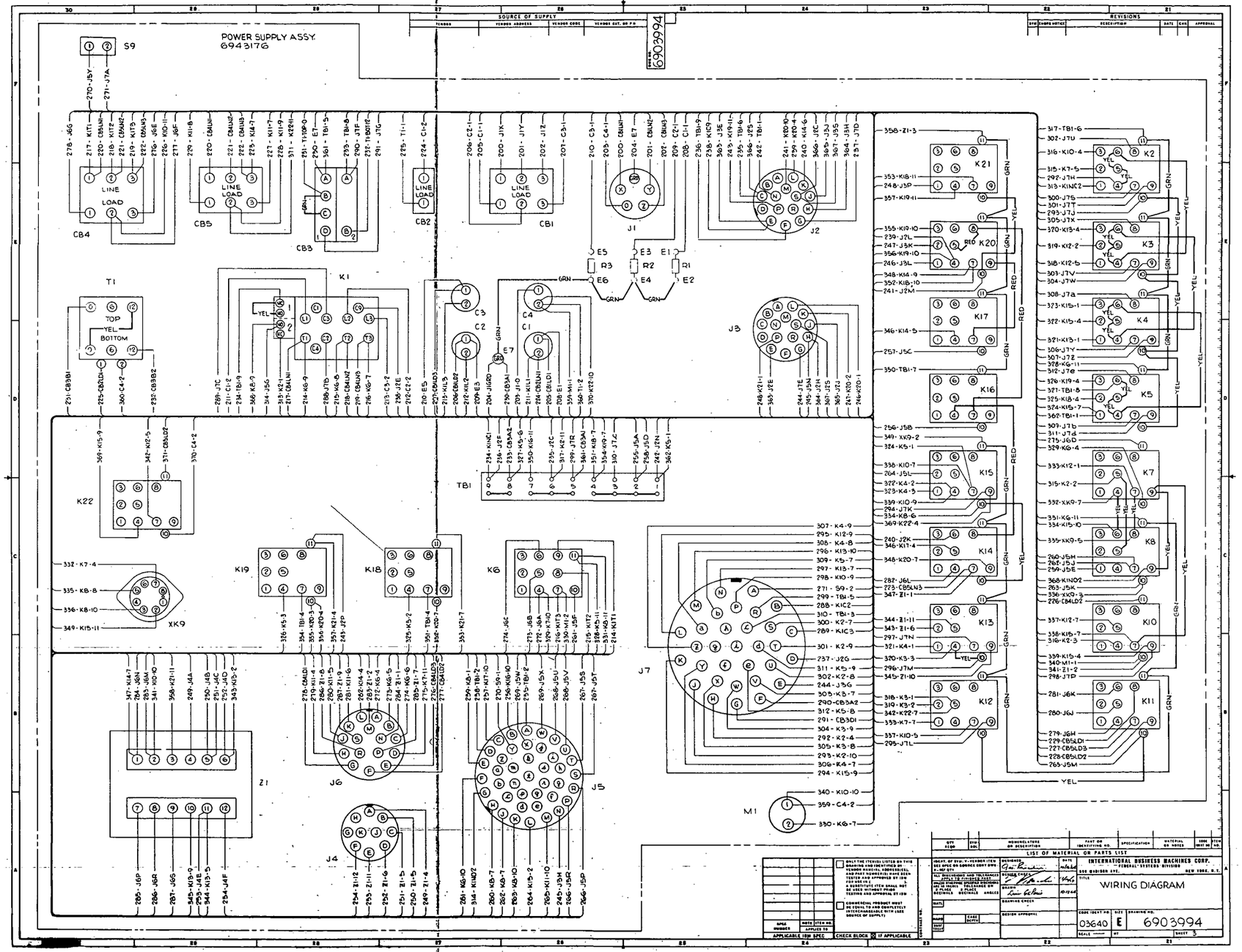


Figure 10-12. Temperature Modulator Wiring Diagram (Sheet 1 of 3)

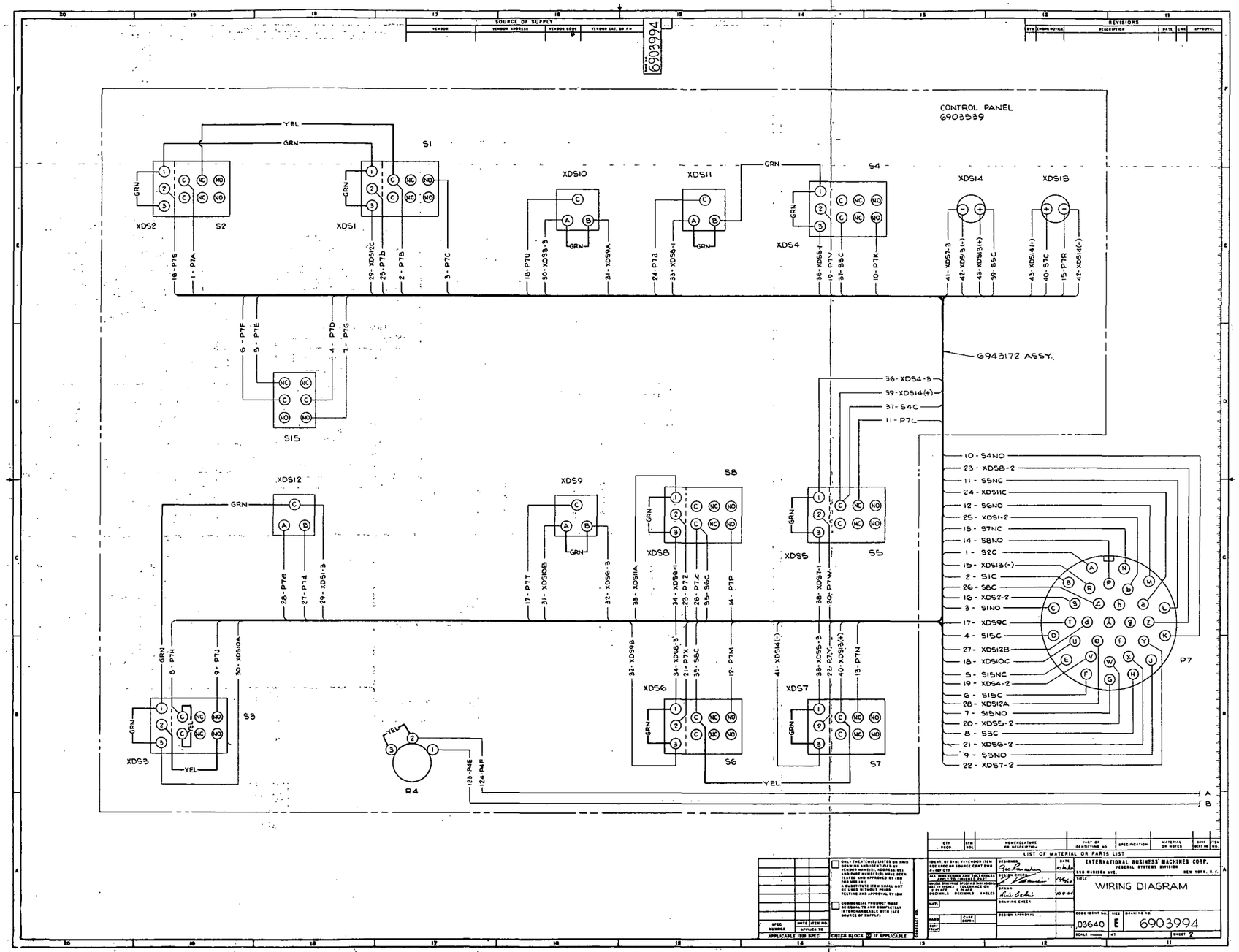


Figure 10-12. Temperature Modulator Wiring Diagram (Sheet 2)

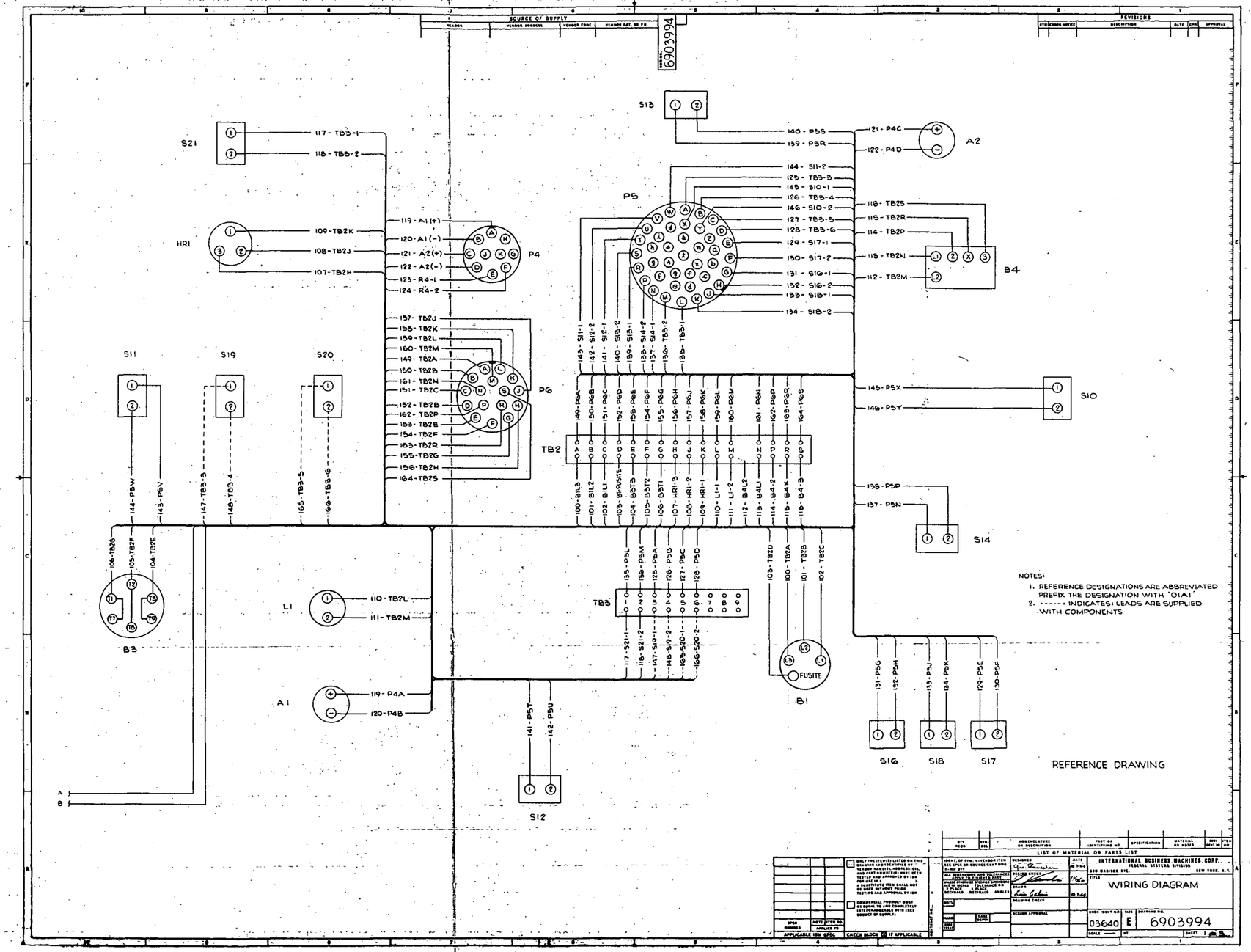


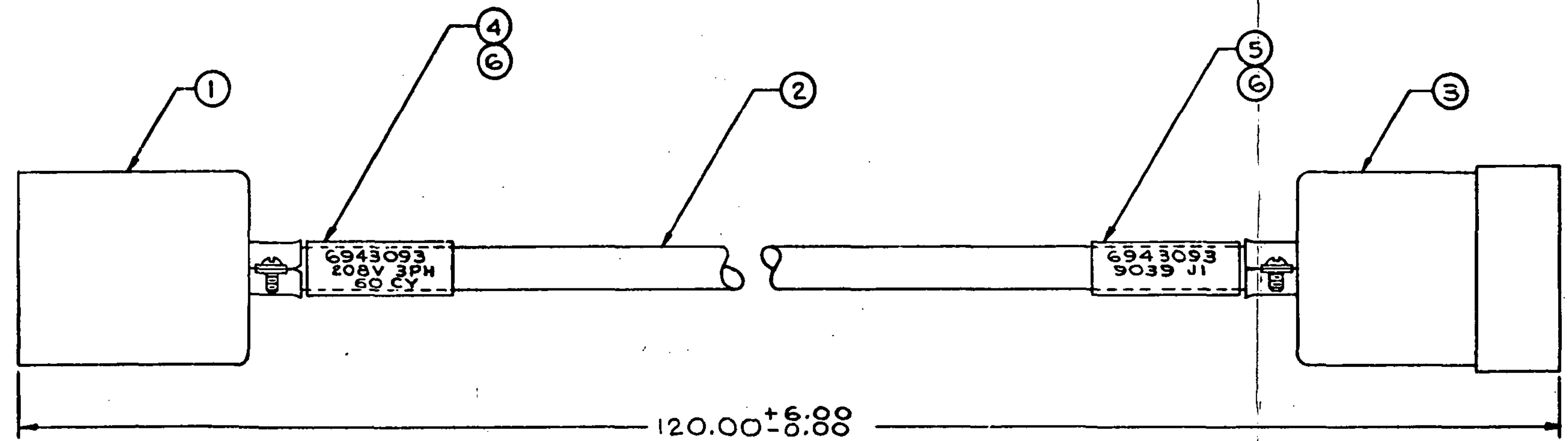
Figure 10-12. Temperature Modulator Wiring Diagram (Sheet 3)

6943093

REVISIONS					
SYM	ENGRG NOTICE	DESCRIPTION	DATE	CHK	APPROVAL
	66112-HM	RELEASE R	5/6/64		

COND NO.	COLOR	FROM	TO
1	BLK	P1-X	P2-X
2	ORN	P1-Y	P2-Y
3	RED	P1-Z	P2-Z
4	WHT	P1-N	P2-N
5	GRN	P1-GRD	P2-GRD

NOTES
1. IBM GEN ASSY SPEC 6000003 APPLIES
2. IDENTIFICATION OF SYMBOLS:
   V=VENDOR ITEM-SEE SPEC OR SOURCE CONTROL DWG



QTY REQD	SYMBOL	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	CODE IDENT NO.	ITEM NO.
12 IN.		LACING, TAPE	6032364				6
1		CABLE MARKER	6943096				5
1		CABLE MARKER	6943095				4
1	V	CONNECTOR, FEMALE	6072156				3
125 IN.	V	CABLE	6077134				2
1	V	CONNECTOR, MALE	6070010				1

LIST OF MATERIAL OR PARTS LIST

UNLESS NOTED BREAK CORNERS
OUTSIDE MIN MAX
INSIDE MIN MAX
ALL DIMENSIONS AND TOLERANCES APPLY TO FINISHED PART
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE ON 2 PLACE DECIMALS 3 PLACE DECIMALS ANGLES
MATL
HARD CASE DEPTH
SURF TREAT
CONTRACT NO.

DESIGNED 5/6/64
DESIGN CHECK 5/6/64
DRAWN JR VMD 4-30-64
DRAWING CHECK
DESIGN APPROVAL 5-7-64
7/1/64

INTERNATIONAL BUSINESS MACHINES CORP.
FEDERAL SYSTEMS DIVISION
590 MADISON AVE. NEW YORK 22, N.Y.

TITLE
CABLE ASSY,
MAIN POWER,
TEMPERATURE MODULATOR

CODE IDENT NO. 03640 SIZE C 6943093
SCALE NONE WT SHEET

Figure 10-13. Temperature Modulator Power Cable (6943093) Drawing

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S (cont)

T

COMMENT SHEET

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