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**CDC<sup>®</sup> CYBER 170 MODEL 815 AND 825  
COMPUTER SYSTEMS**

**SECTION 2  
SYSTEM DATA**

**SITE PREPARATION MANUAL**



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## REVISION RECORD

REVISION	DESCRIPTION
A (09-81)	Manual Released
B (05-82)	Manual revised. The following tables have been amended: 1-2, 1-3, 3-1, and 3-2. Information about the use of the system on a nonraised floor has been amended (page 1-5). A statement about the requirements for a telecommunication line has been added (page 1-5).
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## LIST OF EFFECTIVE PAGES

New features, as well as changes, deletions, and additions to information in this manual, are indicated by bars in the margins or by a dot near the page number if the entire page is affected. A bar by the page number indicates pagination rather than content has changed.

PAGE	REV	PAGE	REV	PAGE	REV	PAGE	REV	PAGE	REV
Front cover	F								
Title page	F								
ii	F								
iii/iv	F								
v	F								
vi	F								
vii/viii	F								
ix/x	F								
1-1	F								
1-2	F								
1-3	F								
1-4	F								
1-5	F								
1-6	F								
2-1	F								
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3-2	F								
3-3	F								
3-4	F								
3-5	F								
3-6	F								
3-7	F								
3-8	F								
3-9	F								
Divider	F								
A-1	F								
A-2	F								
Comment Sheet	F								



## PREFACE

Control Data Corporation maintains a Facility Planning and Construction Organization to assist the customer in preparing the site for a computer system installation. To aid in preparing the site for the installation, Control Data publishes this and other site preparation manuals. The manuals provide system and individual equipment references for use before and after the installation.

The manuals are divided into two groups (refer to site preparation publication index), computer systems and minicomputer systems. For computer systems manuals, sections 1 through 4 are required and for minicomputer systems manuals, sections 1 through 3 or a site planning kit are required to document the site preparation information for a specific system. An additional manual, useful after completion of the site preparation phase, is the Site Environmental Maintenance Handbook, publication number 60424500.

Control Data urges the customer to consult local authorities if the requirements in the manuals conflict with local building, electrical, or fire codes or ordinances. Any deviations from the manual procedures in sections 1 through 4, except to comply with local codes or ordinances, must be approved by the Facility Planning and Construction Organization.

### SECTION 1. GENERAL INFORMATION

Section 1 details computer installation information that is common to more than one computer system. Three separate section 1 manuals are available. The first applies to minicomputer systems\*, the second applies to small-scale computer systems,\*\* and the third applies to large- and medium-scale computer systems.\*\*\* A section 1 manual contains the following information:

- Site planning procedures
- Computer facility layout
- General construction
- Mechanical system requirements
- Electrical system requirements
- Fire and security

### SECTION 2. SYSTEM DATA

Section 2 contains information related to the physical and environmental specifications of models 815 and 825 as follows:

- Specifications for the computer system including the number, function, and placement of the system cabinet and/or other units
- Equipment data sheets that detail system power and environmental requirements, individual equipment dimensions, and physical configurations
- Electrical schematics that document typical external power connections among the system equipment and between the system and electrical switchgear

### SECTION 3. PERIPHERAL EQUIPMENT DATA

Section 3 documents only peripheral equipment that connects to more than one type, series, or family of computers. Two section 3 manuals are available. The first applies to minicomputer systems and the second applies to all other peripherals. A section 3 manual contains the following information:

- A table of peripheral equipment and controllers that gives a brief description of each peripheral unit and indicates its cabinet type
- Peripheral equipment data sheets that include power and environmental requirements and the physical configuration and dimensions of each equipment

### SECTION 4. MONITORING AND POWER DATA

Section 4 contains physical, electrical, and environmental data related to wall-mounted panels. \*\*\*\* Additionally, this section contains data on motor-generator (M-G) sets used with computing systems. A section 4 manual contains the following information:

- Wall-mounted panels

\*CDC® MP-17, System 17, CYBER 18, 1500 equipment, and similar systems.

\*\*CDC® SC1700, 1700, 8090, 160-A, CYBER 1000, and similar systems.

\*\*\*CDC® 3000, 6000, 7000, CYBER 170, and similar systems.

\*\*\*\*Includes terminator power supply.

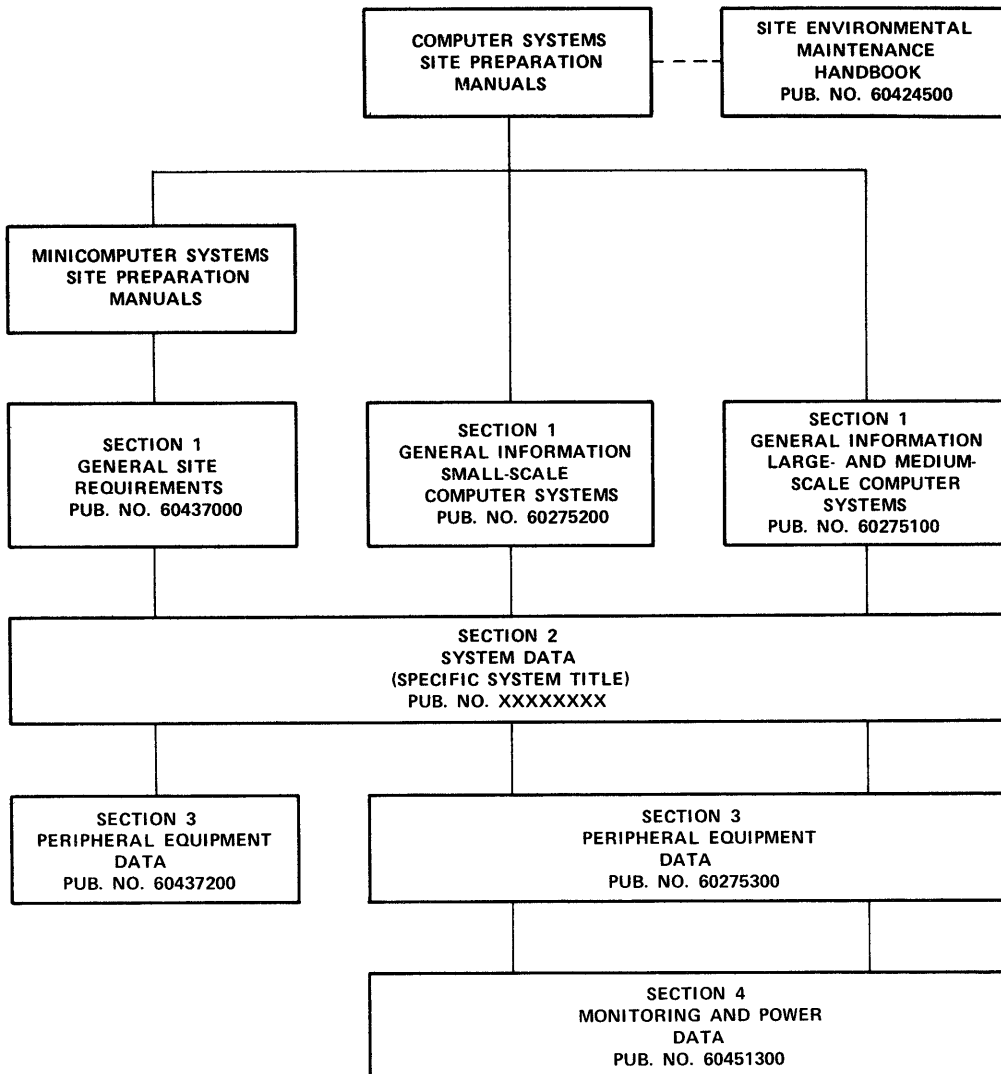
- Wall-mounted panel data sheets
- Wall-mounted panel schematics
- Electrical machinery motor-generator set data sheets
- Kato motor generator set data sheets
- Piller motor generator set data sheets
- Control Data motor generator control-cabinet data sheets

The Site Environmental Maintenance Handbook applies mainly to medium- and large-scale computer sites; however, parts of the handbook are applicable to small-scale and minicomputer systems. The handbook contains the following information.

- Guidelines and recommendations for the proper implementation of general site maintenance such as cleanliness, floor coverings, and safety
- Guidelines and recommendations for the proper implementation of technical site maintenance such as environmental control, water treatment and handling, cabling, lighting, and power

## SITE ENVIRONMENTAL MAINTENANCE HANDBOOK

This manual contains information applicable to the computer system site. It describes site maintenance recommendations and procedures necessary for reliable computer operations and minimum maintenance schedules and guidelines.



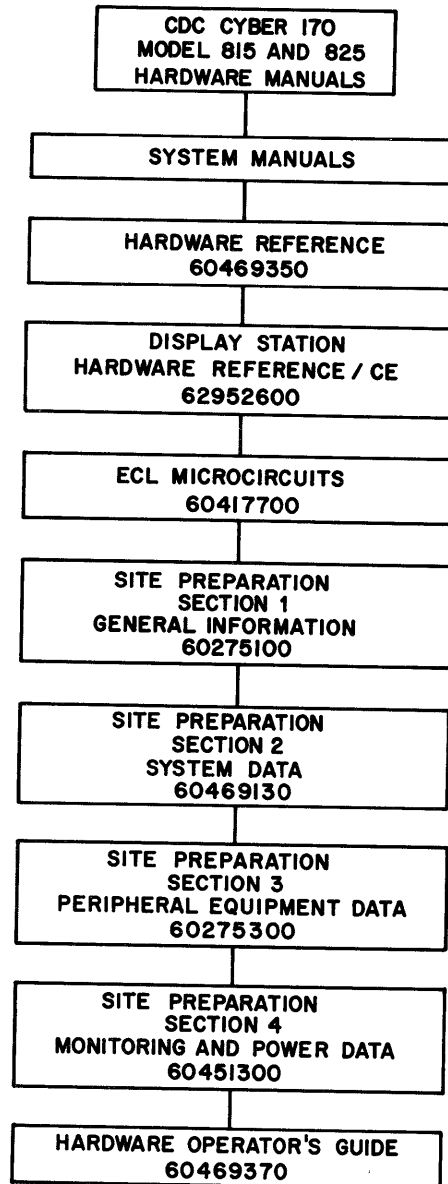
### SITE PREPARATION PUBLICATION INDEX

## SYSTEM PUBLICATION INDEX

The following index lists CDC® CYBER 170 Model 815 and 825 hardware manuals.

Each manual has an 8-digit (60xxxxx0) publication number which should be used with the title for commenting or ordering purposes.

## SYSTEM PUBLICATION INDEX



C0262





# CONTENTS

## 1. SYSTEM SPECIFICATIONS

Introduction	1-1
Cabinet Configurations	1-1
Computer System Requirements	1-3
Environmental	1-3
Temperature/Monitoring	1-3
System Alarms	1-3
Short Warning Faults	1-3
Long Warning Faults	1-3
Visual Indicators	1-3
Console Display	1-4
Cabinet Display	1-4
Audible Indicators	1-4
Computer Room Requirements	1-4
Room Air	1-5
Communication Line Access Requirements	1-5
Grid Ground	1-5
Signal Cables	1-5
System Cooling	1-5
Raised Floor System	1-5

## 2. SYSTEM DATA SHEETS

Central Computer Models 815 and 825	2-1
Display Station	2-4
System Power Control Panel	2-6

## 3. POWER REQUIREMENTS

Primary Power	3-1
Power Distribution	3-1
M-G Set	3-6
M-G Control and Status (SPCP Only)	3-6
System Grounding	3-7
EMC Grounding	3-8
Wall-Mounted Boxes	3-8
Emergency Off Switches	3-8

## APPENDIX

A 50/60 Hz Power Control Box	A-1
Cooling System Blowers	
Buck-Boost Transformer	
Tap Connections	

## FIGURES

1-1 Cabinet Front View	1-1	3-2 Power Distribution Diagram	
1-2 System Signal Cabling	1-6	Showing Options	3-4
3-1 Power Distribution Diagram, Entry Level	3-2	3-3 50/60 Hz, 400 Hz, and EMC Grid Ground	3-9
		Connections	

## TABLES

1-1 System Specifications	1-2	1-4 System Alarms	1-4
1-2 System Standard Options	1-2	3-1 M-G Input Power Requirements	3-1
1-3 System Power Standard Options	1-3	3-2 SPCP/M-G Connections	3-7



## INTRODUCTION

The CDC® CYBER 170 Model 815 and 825 Computer Systems include the following individual cabinets:

- Mainframe containing:
  - Central Processor Unit (CPU)
  - Memory Unit
  - Input/Output Unit (IOU)
- Display Station
- Motor-Generator set (M-G)

Each computer system requires a motor-generator (M-G) set to provide 400-Hz power. Each M-G set consists of a motor generator (MG) and MG control cabinet. M-G sets are available for 50- or 60-Hz input power and for outputs of 12.5, 25, or 40 kVA. The size of the M-G set is dependent on the total system requirements (with consideration for possible expansion). Refer to M-G Set in section 3 of this manual. Site planning information for the M-G sets is in the Site Preparation Section 4 manual.

## CABINET CONFIGURATIONS

The computer system configuration consists of a single cabinet containing the CPU, the memory unit, and the IOU, as shown in figure 1-1.

The cabinet configuration is the same for all equipment options. Table 1-1 lists the system specifications. Table 1-2 lists the system standard options. Table 1-3 lists the system power standard options.

In addition to the logic and memory hardware, the cabinet contains blowers which circulate ambient room air over the logic for cooling.

The computer system also includes a separate display station. This station is a desk-type cabinet that includes an entry keyboard, cathode-ray-tube display, associated logic, power supplies, and cooling fans.

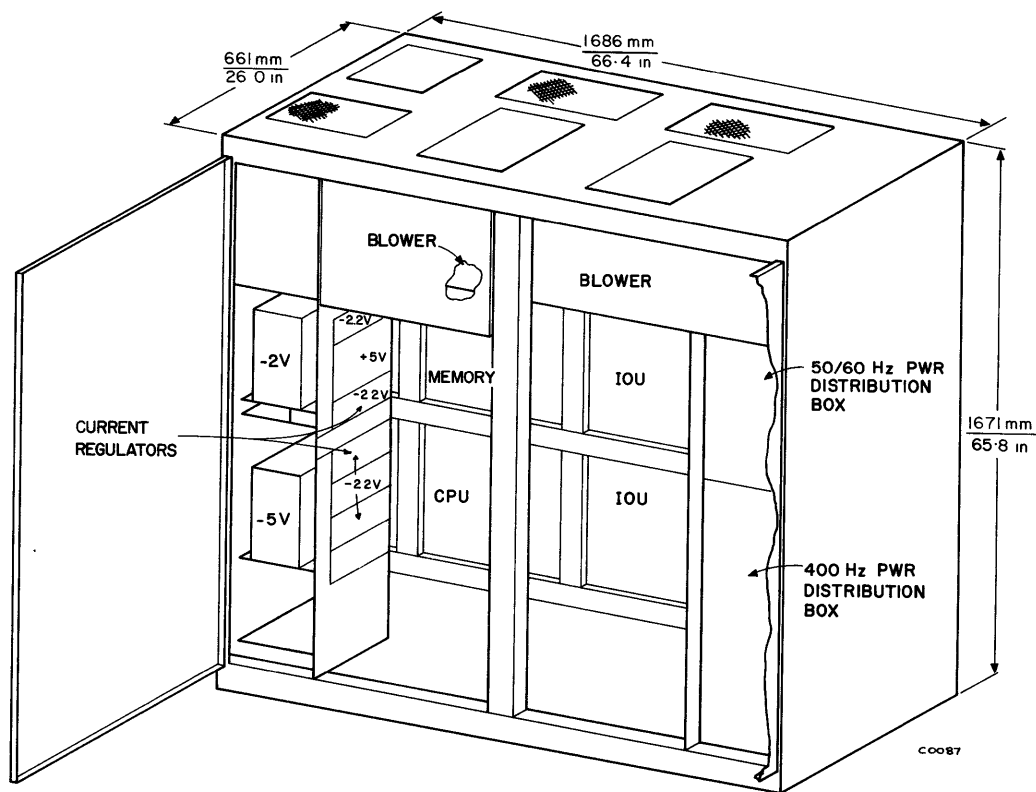


Figure 1-1. Cabinet Front View

TABLE 1-1. SYSTEM SPECIFICATIONS

Model	Description	Cabinet
815 and 825	Central computer, comprising: CPU Memory of 262 144 words IOU with 10 peripheral processors (PPs) and 12 data channels Display controller Power supplies Cooling blowers Buck-boost transformers for the cooling blowers	Single, stand-alone cabinet  Mounts in cabinet
1051X-XXX	For system motor-generator refer to table 1-3	
Part of 815 and 825	Display station	Stand-alone desk console
XXXXX-XX	For optional equipment refer to table 1-2	

TABLE 1-2. SYSTEM STANDARD OPTIONS

Model Number	Description	Cabinet
18001-1	Single data channel converter (DCC) - permits one to eight 3000 series peripheral equipment to attach to the CYBER channel. Includes one DCC and cabinet. Meets UL requirements for 115/230-V, 50/60-Hz power (both model 815 and 825).	Stand-alone table-top unit.
18001-2	Single data channel converter (DCC) - permits one to eight 3000 series peripheral equipment to attach to the CYBER channel. Includes one DCC and cabinet. The 18001-2 contains Pass On/Pass Back facility which allows 2 DCCs to be used on a single channel. Meets UL and CSA requirements for 115-V, 50/60-Hz power (both model 815 and 825).	Stand-alone table-top unit.
18159-1	CPU upgrade - upgrades 170-815 CPU to 170-825 level of performance (option applies to 170-815 only).	Mounts in 815 cabinet.
18251-2	Memory increment - adds 262 144 words of integrated circuit memory to increase memory from 262 144 to 524 288 words.	Mounts in appropriate 815 or 825 cabinet.
18251-4	Memory increment - adds 524 288 words of integrated circuit memory to increase memory from 524 288 to 1 048 576 words.	Mounts in appropriate 815 or 825 cabinet.
18252-1	PP increment - adds five PP's and twelve I/O channels resulting in a total of 15 PP's and 24 I/O channels.	Mounts in appropriate 815 or 825 cabinet.
18252-2	PP increments - adds five PP's resulting in a total of 20 PP's and 24 I/O channels.	Mounts in appropriate 815 or 825 cabinet.
18256-1	Parity disable option - provides ability to selectively disable parity on the 170-815 or 170-825 data channels. Required to connect the 7021-1/2, 7054-1/2, or any other peripheral device without channel parity.	Mounts in appropriate 815 or 825 cabinet.

Model Number	Description	Cabinet
10513-101	Reduced voltage start frequency converter; 60 to 400-Hz, 12.5-kVA M-G. MG is mounted within its control cabinet. Not available in a 50 to 400-Hz version.	Stand-alone unit.
10513-712	Frequency converter; 60 to 400-Hz, 12.5-kVA M-G. MG is mounted within its control cabinet. Not available in a 50 to 400-Hz version.	Stand-alone unit.
10513-725	Frequency converter; 60 to 400-Hz, 25-kVA M-G. MG is mounted within its control cabinet.	Stand-alone unit.
10513-740	Frequency converter; 60 to 400-Hz, 40-kVA M-G. Separate control cabinet.	Two stand-alone units (MG and control cabinet).
10514-725	Frequency converter; 50 to 400-Hz, 25-kVA M-G. MG is mounted within its control cabinet.	Stand-alone unit.
10514-740	Frequency converter; 50 to 400-Hz, 40-kVA M-G. Separate control cabinet.	Two stand-alone units (MG and control cabinet).

## COMPUTER SYSTEM REQUIREMENTS

### ENVIRONMENTAL

Following are the environmental requirements of the computer system. They may be less restrictive than those of some individual equipment.

- Permissible range of inlet air temperature is 10°C to 40°C (50°F to 104°F).
- Permissible range of ambient relative humidity is 20 percent to 80 percent.
- Maximum rate of humidity change is 10 percent per hour.
- Maximum rate of temperature change is 10°C per hour (18°F per hour).

### TEMPERATURE/MONITORING

Chassis high temperature and heat sink high temperature thermostats monitor the computer. Additionally, the cabinet blowers are monitored for proper operation.

The wall-mounted system power control panel (SPCP) is supplied with each system. The SPCP cannot be used with a 12.5-kVA M-G, but must be used with a 25-kVA or larger M-G. The SPCP provides temperature monitoring, sequential on/off control of system power, fault sensing, alarm indication and system shutdown.

### SYSTEM ALARMS

A fault detection and alarm system protects the computer system from potentially damaging

situations. Alarm conditions range from a simple visual indication on the system console to audible and visual indication terminating in a total system shutdown.

The type of fault and associated alarm warning fall into two categories; short or long.

#### Short Warning Faults

Short warning faults cause instantaneous shutdown or provide a short delay (usually 2 to 5 seconds) prior to shutdown.

#### Long Warning Faults

Long warning faults cause an indication (with no resulting action) of a potential problem or cause a shutdown after timing out for several minutes. Alarm (fault) conditions are generated from three main sources:

- The SPCP when used, monitors the computer room temperature.
- The CPU, IOU, and memory monitor chassis temperature, and blowers.
- The system M-G control cabinet monitors mains power to the M-G.

#### Visual Indicators

All of the monitored faults provide a visual alarm indication via the system's console display.

Console Display

Alarm indication on the console display is limited to a statement which says ENVIRONMENTAL FAULT. The system's program must interrogate the fault register bits, determine the type of fault, and initiate the appropriate course of action.

Cabinet Display

The cabinet contains a set of indicators located within the cabinet on the system 50/60 Hz power control panel. Each of the following conditions cause an associated indicator to light up when the fault is detected.

- HIGH AMBIENT TEMP
- BLOWER 1 FAULT
- BLOWER 2 FAULT
- HEAT SINK HIGH TEMP

**Audible Indicators**

When the SPCP is used, a small horn provides the audible alarm. This horn is mounted on the left-hand side of the SPCP (as viewed from the front). Only the SPCP provides an audible alarm indication.

**CAUTION**

An audible alarm requires immediate action to lower temperature in the computer area to avoid automatic shutdown of the system.

The activated alarm cannot be manually silenced. It ceases only when:

- The alarm condition is corrected.
- The system shuts down because the environment reaches the short warning shutdown condition.

Table 1-4 provides a detailed explanation of the system alarms.

**COMPUTER ROOM REQUIREMENTS**

The computer room requirements include space for equipment cabinets, related power service panels, air conditioning equipment, test equipment, and personnel movement as described in the Site Preparation Section 1 manual. The M-G set is often

TABLE 1-4. SYSTEM ALARMS

Item Monitored	Location	Alarm Condition	Warning Type	Description
Heat Sink	Cabinet Power Supply	High Heat Sink Temperature	Short	Lights an indicator in cabinet. Indicates that power supply rectifier heat sink has reached a temperature of 88°C (190°F). System powers down immediately.
Mainframe Chassis High Ambient Temperature	Cabinet	41°C (105°F)	Long	Provides a visual ENVIRONMENTAL FAULT indication on system console display and lights an indicator lamp in cabinet. Cabinet shuts down in approximately 1.5 minutes if fault condition is not corrected.
Mainframe Cabinet Cooling Blowers	Cabinet	Blower Failure	Long	Provides a visual ENVIRONMENTAL FAULT indication on system console display and lights up an indicator lamp in cabinet indicating which blower (1 or 2) failed. If alarm condition is not corrected within 2 minutes, cabinet shuts down.
Mains Power*	12.5-kVA MG	Incoming Mains Power Failure	Short	Provides a visual ENVIRONMENTAL FAULT indication on system console display. Entire system shuts down 0.1 second after detection of fault condition.
Mains Power*	SPCP via 25-KVA or larger MG	Incoming Mains Power Failure	Short	Provides a visual ENVIRONMENTAL FAULT indication on system console display. Entire system shuts down 2.5 seconds after detection of fault condition; if mains power returns within 2.5 seconds, system recovers without interruption to processing and without loss of data.

\*System uses only one size of M-G (e.g.: 12.5-kVA, 25-kVA, or 40-kVA); therefore, only one of these signal definitions is applicable.

located in an adjacent room; however, the 12.5 and 25-kVA M-G sets are self-contained units (MG and associated controls in a single acoustical cabinet).

The 12.5-kVA M-G must be located in the computer room; the 25-kVA M-G may be located in either the computer room or in a separate M-G room. Due to acoustical noise of the M-G, systems having a 40-kVA M-G must have a separate M-G room. Other computer room requirements for system equipment are on the data sheets in section 2 of this manual.

The room must provide locations for system wall-mounted panels and emergency off switches. When these panels and switches are used, they require 254 mm (10.0 in) clearance, left-hand side (as viewed from the front); 102 mm (4.0 in) clearance, right-hand side; and 254 mm (10.0 in) clearance on the bottom for the SPCP. These clearances are required for access to jumper plugs and switches.

The computer room and associated M-G room (if applicable) require 50- or 60-Hz utility power (depending on computer system power requirements) for air conditioning, lighting, test equipment, and the system M-G sets. The M-G set converts the utility power to 400 Hz for the computer system's mainframe and certain peripheral equipment. All system power is subject to emergency off control which is manually initiated from wall mounted, conveniently located, emergency off switches.

#### Room Air

Room air requires filtering to avoid possible contamination or damage to the magnetic surface areas of peripheral storage devices, such as disk and tape units. (Refer to the Site Preparation Section 1 manual for large systems.) Ambient air intake is at bottom rear of mainframe.

#### Communication Line Access Requirements

Two standard telephone lines must be installed within 12.2 m (40 ft) of the computer cabinet. These lines provide telecommunication paths for remote terminal assistance (RTA) via the IOU multiplexer channel, and communication with technical support personnel during RTA operations.

#### GRID GROUND

The computer system does not require a grid ground to provide electromagnetic compatibility (EMC) and minimum electromagnetic interference (EMI) among the system cabinets and components.

#### SIGNAL CABLES

Control Data provides the computer system signal cables. Many of the cables carry time-dependent signals and have a fixed length. Equipment using these cables requires relative room locations that are within the cable length limitations. Some signal cables do not carry time-dependent signals. The cables provided are as uniform in length as

possible to standardize lengths and are as short as possible to minimize signal transmission delays.

Figure 1-2 indicates system cable quantities, connector pins, and standard lengths. Additional cable length information is in the System Data Sheets, part 2 of this manual, and in the Peripheral Equipment Data sheets in the Site Preparation Section 3 manual.

The computer is designed for installation on an access floor or any nonraised floor. However, the use of certain peripherals may require the use of a raised floor.

The cabinet is designed to provide logic cable access either through the bottom of the cabinet (as shown on the view in the Data Sheets) or through the rear of the cabinet near the floor.

#### NOTE

Cable protectors must be used if the system is installed on a nonraised floor.

#### RAISED FLOOR SYSTEM

When a raised floor is used, Control Data recommends the use of a stringer type system for stability. Floors used for EMI reference grid must be approved by Control Data.

Recommended minimum under floor clearance is 305 mm (12 in) unless otherwise approved by Control Data. Additional information concerning the raised floor is available in the Site Preparation Section 1 manual.

#### CAUTION

The raised floor must be level within 1.6 mm per meter (.0625 in per five feet) and within 3.2 mm (0.125 in) over any continuous length of cabinet or cabinets joined end-to-end.

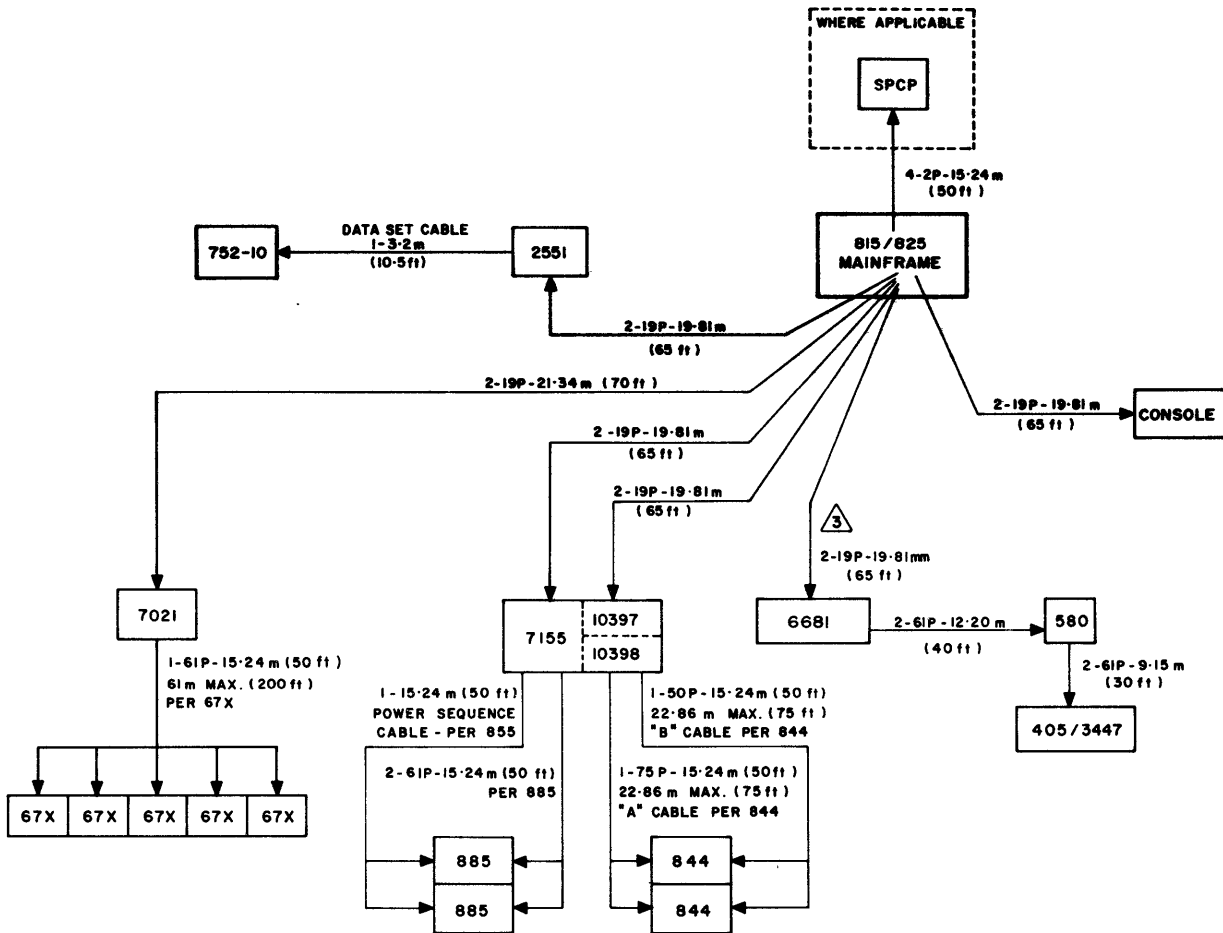
#### NOTE

To prevent under floor connection problems, avoid routing power cables, signal cables, water or refrigerant piping, or air ducting under the computer system cabinets.

#### SYSTEM COOLING

The computer is cooled with ambient room air. Integral blowers pull ambient air into the cabinet near the bottom rear and force it over the logic components, expelling the heated air from the top of the cabinet.





**NOTES:**

1 CABLES SHOWN ARE STANDARD LENGTH SUPPLIED AND MAXIMUM PERMITTED UNLESS OTHERWISE INDICATED. NONSTANDARD CABLE LENGTHS UP TO MAXIMUM (WHERE INDICATED) ARE OPTIONAL AT ADDITIONAL COST.

2 FOR SPECIFIC CABLE LENGTHS AND LIMITATIONS CONTACT THE COMPUTER SITE ENGINEER.

3 TOTAL CABLE LENGTH PER DATA CHANNEL CONVERTER SHOULD NOT EXCEED 60.69 m (200 ft).

C1033A

Figure 1-2. System Signal Cabling

The data sheets are for model 815 and 825 computer systems and the display station. The physical, electrical, and environmental information on the data sheets is for maximum equipment configurations. Systems with fewer options will draw less power and generate less heat to the ambient air. The maximum equipment configuration figures should be used to allow for possible (and probable) future system expansion and local and state electrical codes for system power wiring purposes.

Data sheets with the equipment floor plan views show cutouts (CO) that are located within the

equipment frames. These cutouts are not necessarily the same size as the corresponding cutouts in the floor of the computer site. Floor cutout information must be obtained from a Control Data template drawing. Using these templates, the CDC Facility Planning and Construction Organization personnel tailor a drawing specifically for the customer site.

Data sheets for the system power control panel, emergency off switches, terminator power supply, and the system motor-generator sets are in the Site Preparation Section 4 manual.

**CENTRAL COMPUTER MODELS 815 AND 825**  
**SINGLE CABINET CONTAINING MEMORY, CPU, AND IOU**

Width	1686 mm	(66.4 in)
Depth	661 mm	(26.0 in)
Height	1671 mm	(65.8 in)
Weight	794 kg	(1750 lb) (supported by the cabinet frame)

For maximum width/depth, all doors extended, refer to floor plan layout.

Power configuration:	Power consumption, steady state, maximum:
400 Hz, 208 V, 3 phase	5.5 kVA (entry level machine using 12.5-kVA M-G) or 7.9 kVA (full level machine using 25-kVA M-G)
and	
60 Hz, 208 V, line-to-line	0.52 kVA
or	
50 Hz, 230 V, 1 phase	0.67 kVA

External terminator power connection is not required. A 20-A, 40-Vdc terminator power supply is furnished with the system for use with the 405 card reader and 580 line printer (if applicable).

Circuit breakers:	Power connector locations above cabinet base:
400 Hz, 30 A, 3 phase	Terminal strip (203 mm (8.0 in))
and	
60 Hz, 15 A, 1 phase, 2-pole	Terminal strip (203 mm (8.0 in))
or	
50 Hz, 30 A, 1 phase	Terminal strip (203 mm (8.0 in))

Control Data signal cables*:	Quantity	Standard length	Maximum length
IOU to console	2	19.8 m (65 ft)	19.8 m (65 ft)
IOU to peripherals	24	19.8 m (65 ft)	19.8 m (65 ft)

Distance from internal signal cable connectors to floor: 1524 mm (60.0 in) maximum

\*External cables only (intracabinet cables not shown)

Type of cooling: forced air (blowers); air intake at bottom rear of cabinet

Source of cooling: ambient room air

Entry level: Heat rejection rate maximum to air\*:

60 Hz 5883 W (20 070 BTU/hr)  
50 Hz 6033 W (20 585 BTU/hr)

Full level: Heat rejection rate maximum to air\*:

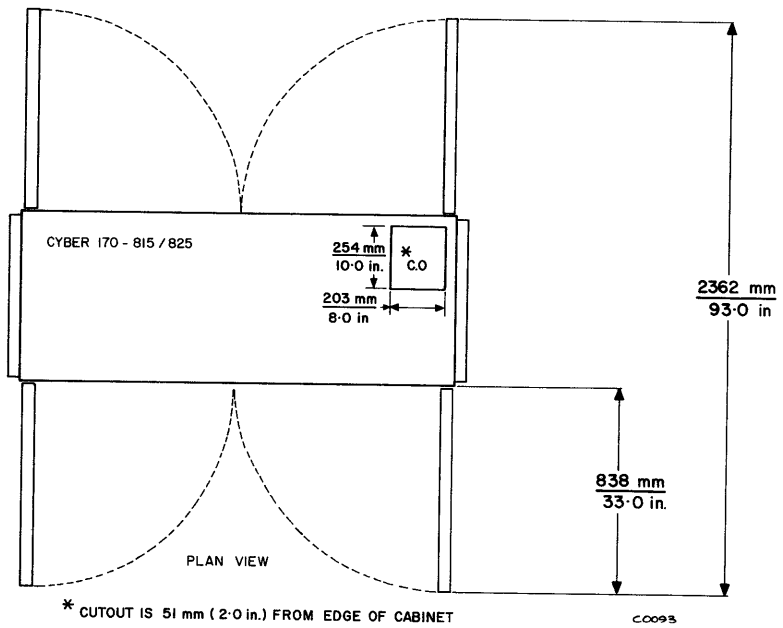
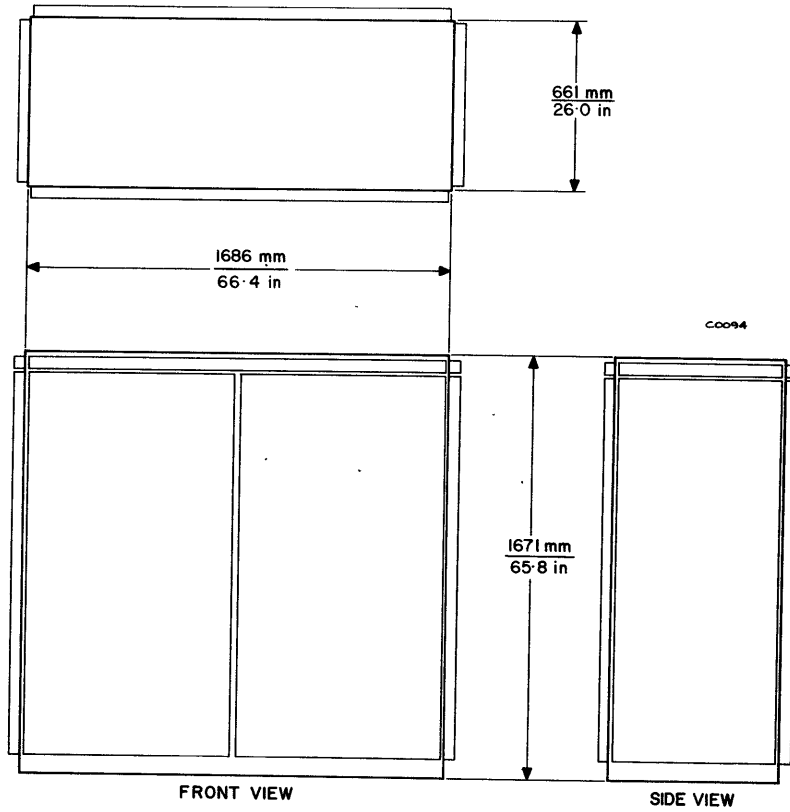
60 Hz 8236 W (28 100 BTU/hr)  
50 Hz 8387 W (28 610 BTU/hr)

Permissible range of room relative humidity: operating, 20% to 80%  
(No condensation) nonoperating, 10% to 90%

Temperature range:	Maximum	Recommended	Minimum
Operating temperature	40°C (104°F)	23°C (74°F)	10°C (50°F)
Storage temperature	50°C (122°F)		-10°C (14°F)
Maximum rate of change (operating):			
Temperature	10°C (18°F)/hr		
Relative humidity	10%/hr		

\*Based upon an environment of 22°C (72°F) at 50% relative humidity.

# CENTRAL COMPUTER MODELS 815 AND 825



## DISPLAY STATION

Width 826 mm (32.5 in)  
 Depth 1194 mm (47.0 in)  
 Height 1232 mm (48.5 in)  
 Weight 177 kg (390 lb) (supported by 4 leveling pads)

For maximum width/depth, all doors extended, refer to floor plan layout.

Power configuration:	Power consumption, steady state, maximum:
400 Hz, 208 V, 3 phase and	0.8 kVA
60 Hz, 120 V, 1 phase or	0.3 kVA
50 Hz, 220 V, 1 phase	0.3 kVA

External terminator power connection is not required.

Circuit breakers:	Power connector locations above cabinet base:
400 Hz, 15 A, 3 phase and	Terminal strip 508 mm (20.0 in)
60 Hz, 15 A, 1 phase or	Terminal strip 406 mm (16.0 in)
50 Hz, 15 A, 1 phase	Terminal strip 406 mm (16.0 in)

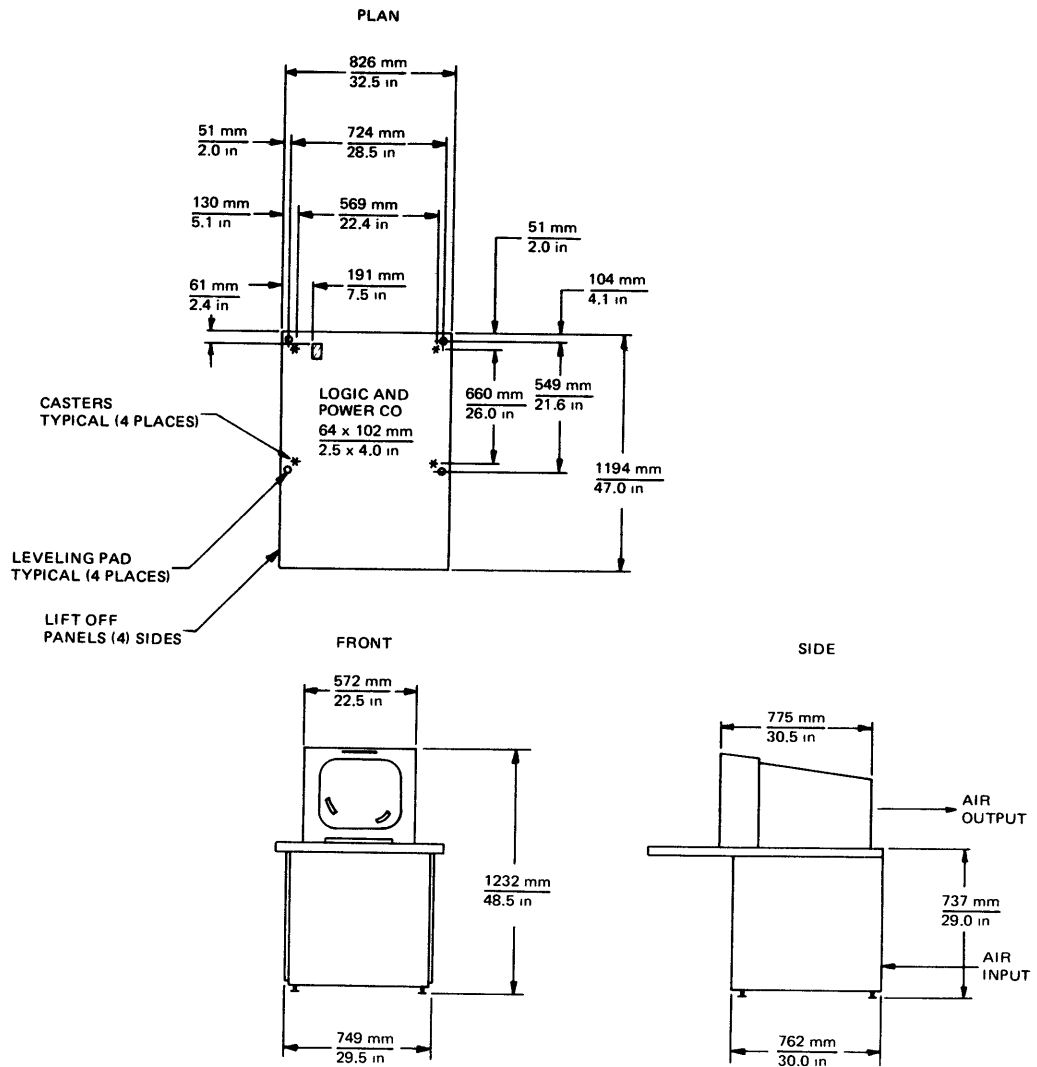
Control Data signal cables:	Quantity	Standard length	Maximum length
Console to central computer	2	19.8 m (65 ft)	19.8 m (65 ft)

Distance from internal signal cable connectors to floor: 457 mm (18.0 in)

Type of cooling:	internal fan
Source of cooling:	ambient room air
Heat rejection rate, maximum to air:	888 W (3030 BTU/hr)
Permissible range of room relative humidity:	35% to 60%

Temperature range:	Maximum	Recommended	Minimum
Operating temperature	30°C (86°F)	23°C (74°F)	15°C (59°F)
Storage temperature	54°C (130°F)		-18°C (0°F)

# DISPLAY STATION



## SYSTEM POWER CONTROL PANEL

The SPCP cannot be used with a 12.5-kVA M-G.

The SPCP must be used with a 25-kVA or larger M-G.

Width	580 mm	(22.8 in)
Depth	220 mm	(8.7 in)
Height	540 mm	(21.3 in)

**PRIMARY POWER**

The computer system requires either a 50- or 60-Hz power source in addition to 400-Hz power supplied by an M-G set. Refer to Installation and Checkout manual and Power Distribution and Warning System Cooling System manual during installation.

The computer has the following power requirements.

- M-G set primary: Primary power supplied to the system M-G sets may not require voltage transformation if the correct voltage input levels are available. See table 3-1. The power is supplied in 3-phase via a 3-wire cable.
- Peripheral equipment: Refer to Peripheral Equipment Data, Site Preparation Section 3 manual.
- Central computer main: The M-G set supplies 400-Hz, 120-/208-volt, 3-phase, 4-wire power to the central computer.
- Controls, wall-mounted panels: Refer to the power distribution diagram, figure 3-1.
- Cooling system blowers: The cooling system uses blowers within the cabinet to circulate ambient room air, from the bottom rear of the cabinet, over the logic components. The blowers require a 230-volt input. A buck-boost transformer is located in the 50-/60-Hz power distribution box to transform 208-/220-/240-volt inputs to the required 230-volt level. Schematics and tap connections for the buck-boost transformer are shown in appendix A.

To ensure that system components arrive at the computer site with the proper blowers, motors, and power supplies, the customer must inform Control Data of power available at the site.

**POWER DISTRIBUTION**

Terminal strips and/or junction boxes provide convenient power connection locations and power installations for the computer system cabinets.

Figures 3-1 and 3-2 indicate typical 50-/60-Hz power distribution schemes for the computer system. Figure 3-1 indicates an entry level system using the 12.5-kVA M-G; figure 3-2 indicates a system with an SPCP and 25-kVA M-G. Control Data provides the customer with a simplified power distribution diagram tailored to the specific computer site configuration.

**NOTE**

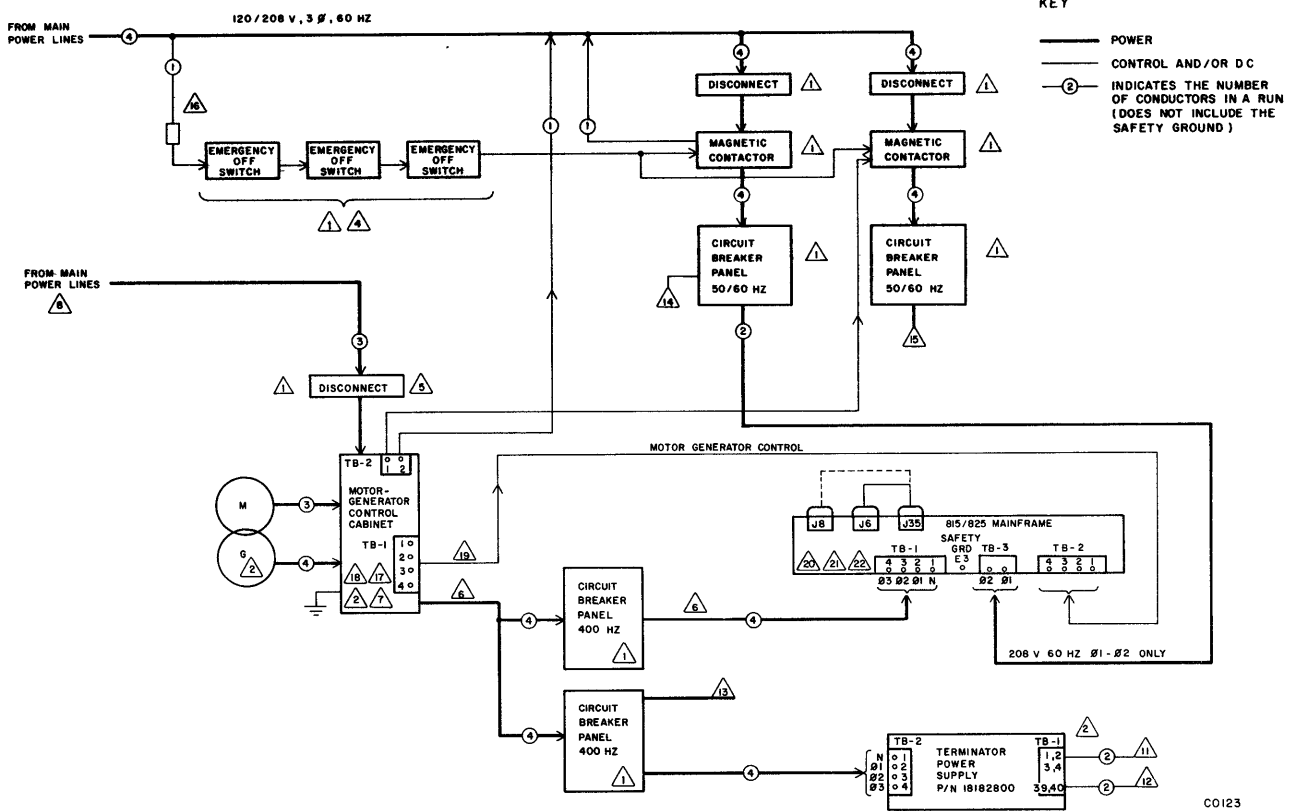
The customer is responsible for providing and installing all items related to the computer system power distribution as defined in this manual and in the Site Preparation Section 1 manual for large systems. The customer must supply and install all primary power source circuit breakers, panels, emergency off switches, disconnects, ductwork, magnetic contactors, and power cabling, including cabling required for signal cable terminator power distribution. Upon delivery, the customer must also wire and install the selected system motor-generator set, and CDC furnished wall-mounted panels.

Power cables must extend 610 mm (24.0 in) above the surface of the raised floor. Insulation should be stripped back 152 mm (6.0 in) on all cables and 13 mm (0.5 in) on individual wires.

TABLE 3-1. M-G INPUT POWER REQUIREMENTS

M-G Set	50 Hz	60 Hz
12.5 kVA	Not available for 50 Hz	208/220 V ( $\pm 10\%$ )
25 kVA	398 V ( $\pm 15\%$ )	208/220/440/460 V ( $\pm 10\%$ )
40 kVA	220/230/240/380/398/415 V ( $\pm 10\%$ )	208/220/440/460 V ( $\pm 10\%$ )



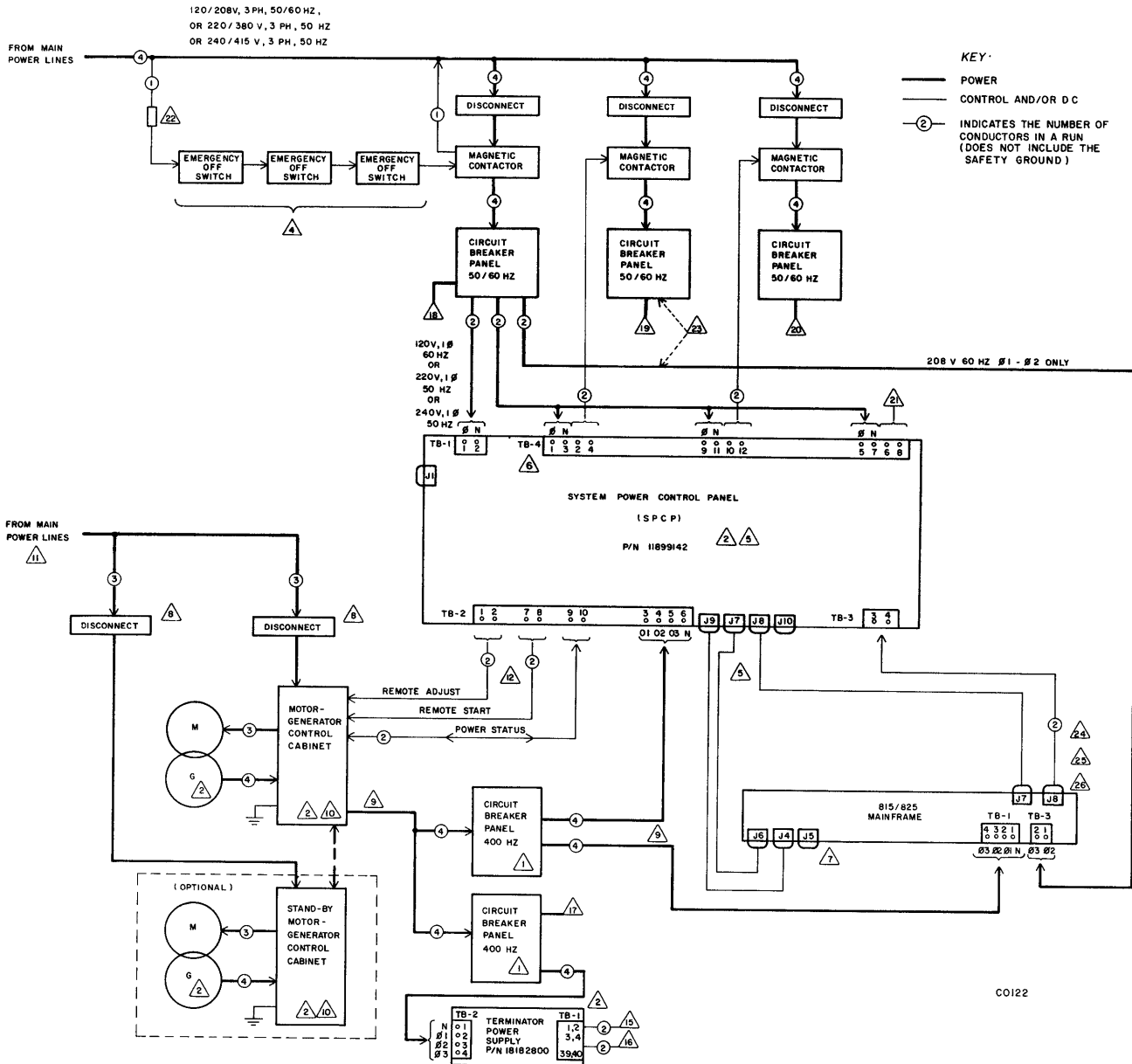


CO123

Figure 3-1. Power Distribution Diagram, Entry Level (Page 1 of 2)

1. Circuit breakers, breaker panels, magnetic contactors, main disconnect switches, emergency off switches, junction boxes, and associated wiring must be customer furnished and installed prior to computer equipment installation.
2. Part furnished by Control Data and installed by customer.
3. All wiring must be in accordance with applicable local and national codes and must be labeled for identification of source and termination.
4. Emergency off switches should be located approximately 1.5m (5 ft) from the floor with one near each exit and shall be wired in series.
5. Size of M-G input power disconnect and motor power wiring shall be based on motor power characteristics. Refer to Site Preparation section 4 manual.
6. Voltage loss between M-G and computer equipment must not exceed 2 percent of the M-G rated output.
7. M-G output is 12.5 kVA, 208 V, 3 phase, 400 Hz.
8. For 12.5-kVA M-G: 208 V,  $\pm 10\%$ , 3 phase, 60 Hz.
9. All power and 40-Vdc terminator power wiring must be adequately shielded from one another by use of conduit, greenfield, or braided shield within the power cables.
10. 50/60-Hz and 400-Hz power cables must not be run in the same raceway.
11.  $\pm 20$ -Vdc terminator power to 405 card reader (if used).
12.  $\pm 20$ -Vdc terminator power to 580-XXX line printer (if used).
13. To associated peripheral equipment that requires 400-Hz power.
14. Provides 50/60-Hz power to items which should always remain on except when the emergency off switch is pulled (e.g. test equipment service outlets).
15. Provides 50/60-Hz power to equipment that requires power when 400-Hz is available.
16. Fuse is customer furnished and installed.
17. M-G must be placed in close proximity to the mainframe as 400-Hz voltage is adjusted at MG cabinet front panel.
18. Whenever 400-Hz load is either increased or decreased M-G output may have to be readjusted to 208 V.
19. Connections:
 

M-G	to	Mainframe
TB1-1		TB2-1
TB1-2		TB2-2
TB1-3		TB2-3
TB1-4		TB2-4
20. When system power up is controlled by mainframe push-buttons the following connections of the BNC connectors on the bottom of the I/O panel must be made:
  - 1) Jumper cable (53615358) from J35 to J6
  - 2) Shorting plug (24535000) to J8
21. When system power up is controlled by software the following connections of the BNC connectors on the bottom of the I/O panel must be made:
  - 1) Jumper cable (53615358) from J35 to J8
  - 2) Shorting plug (24535000) to J6
22. Control switch on 50/60-Hz power control box on mainframe must be in LOCAL position.



1. Circuit breakers, breaker panels, magnetic contactors, main disconnect switches, emergency off switches, junction boxes, and associated wiring must be customer furnished and installed prior to computer equipment installation.



2. Part furnished by Control Data and installed by customer.

3. All wiring must be in accordance with applicable local and national codes and must be labeled for identification of source and termination.

Figure 3-2. Power Distribution Diagram Showing Options (Page 1 of 2)

Notes For Figure 3-2. Power Distribution Diagram Showing Options (Page 2 of 2)

4. Emergency off switches should be located approximately 1.5m (5 ft) from the floor with one near each exit and one near the system power control panel and shall be wired in series.
5. SPCP should be located approximately 1.5 m (5 ft) from the floor. Unit supplied with 15.2 m (50 ft) monitor cables P/N 53615357. Connect between SPCP and mainframe as indicated. The SPCP must be installed close enough to the mainframe that the 15.2 m (50 ft) monitor cables will reach, taking into consideration the cable drop lengths from the SPCP to the room floor (below the raised floor, if any) and the rise back up and 457 mm (18 in) into the mainframe.
6. Numbered to show wiring connections. TB-4 terminals are numbered sequentially.
7. Requires terminator plug P/N 24616098 (supplied with the SPCP).
8. Size of M-G input power disconnect and motor power wiring shall be based on motor power characteristics. Refer to Site Preparation section 4 manual.
9. Voltage loss between M-G and computer equipment must not exceed 2 percent of the M-G rated output.
10. M-G output is 25 kVA.
11. For 25-kVA M-G: 208/220/440/460 V +10%, 3 phase, 60 Hz or 398 V, +15%, 3 phase, 50 Hz
12. M-G remote adjust, remote start, and power status wiring between SPCP and MG control cabinet must have separate raceways (3 independent runs of 2 each) unless adequately shielded by use of conduit, greenfield, or braided shield within the power cables.
13. All power and 40-Vdc terminator power wiring must be shielded from one another by use of conduit, greenfield, or braided shield within the power cables.
14. 50/60-Hz and 400-Hz power cables must not be run in the same raceway.
15. +20-Vdc terminator power to 405 card reader (if used).
16. +20-Vdc terminator power to 580-XXX line printer (if used).
17. To associated peripheral equipment that requires 400-Hz power.
18. Provides 50/60-Hz power to items which should always remain on except when the emergency off switch is pulled (e.g. test equipment service outlets).
19. Same as 18 except breaker panel may be shut off via the service switch within the SPCP.
20. Provides 50/60-Hz power to equipment that requires power when 400-Hz is available.
21. Circuit may be used to switch control power for an additional magnetic contactor. The circuit may be adjusted to come on 0-5 minutes prior to 400-Hz power and adjustable to stay on 0-5 minutes after 400-Hz power is removed.
22. Fuse is customer furnished and installed.
23. 50/60-Hz power to the mainframe may be supplied from this panel also.
24. When system power control is initiated at SPCP pushbuttons, the SPCP mode switch must be in the LOCAL position.
25. When system power control is initiated from software control, the SPCP mode switch must be in the REMOTE 1 position.
26. For notes 24 and 25, control switch on 50/60-Hz power control box on mainframe must be in the REMOTE position.

## M-G SET

In order to allow the customer the flexibility to select the M-G size which best suits his particular site requirements and future plans, and which permits maximum economic consideration, the M-G set is not included with the system. Instead, different size M-Gs (12.5-, 25-, and 40-kVA) are offered as separate cost items.

The customer, in conjunction with the CDC salesman and site planner, determines which size M-G set(s) are desired.

### NOTE

CDC will deliver the selected MG and associated control cabinet to the customer. The customer is responsible for wiring and installing the M-G set.

### CAUTION

Control Data uses unregulated power supplies in the mainframes and certain peripheral equipment. Regulation is provided by the M-G set which is specially manufactured to meet CDC M-G design specifications. Accordingly, use of other vendor 400-Hz power sources may cause damage to the mainframes and/or peripherals. Therefore, the use of other vendor 400-Hz power sources is not recommended and will not be permitted unless it can be shown that they either meet or exceed the CDC M-G design specifications.

When determining the M-G size, the following should be taken into consideration:

- The kVA figures (for all equipment, mainframe and peripheral) on the equipment data sheets and in the site planning Machine Unit Specification (MUS) printout reflect maximum values. Mainframes reflect all options installed, +5 percent voltage margins; peripherals reflect heads positioning, tapes in motion, printers printing, and so on.

Accordingly, actual nominal operating kW is generally 20 percent to 30 percent less than these figures.

- Consideration should be given to future expansion requirements. For example, the economy and money saved by operating near full load on a smaller M-G may be more than offset by the costs of rewiring at a future date for a larger M-G when the system is expanded or additions exceed the capability of the smaller set.

- Within the constraints determined in the items above, consideration should be given to higher loading of the M-G. This improves both power factor and efficiency for maximum operating cost effectiveness.

### NOTE

M-G sets, in general, operate most efficiently when loaded at about 85 percent of rated output.

The 25- and 40-kVA MGs have vertical housings with the axis of rotation of the motor and generator shaft perpendicular to the floor. Each MG has a flywheel mounted on the lower end of its shaft. In the event of input power failure, the flywheel causes the MG to maintain its nominal output power for 2.5 seconds after the failure occurs. If main input power returns within 2.5 seconds, no interruption in processing nor loss of data will occur.

The CDC 12.5- and 25-kVA M-G sets are single units, having both the MG and associated control circuitry mounted in a single cabinet. The cabinet is acoustically treated and matches, in style and color, the CDC CYBER line. The 12.5-kVA M-G must be located in the computer room, preferably close to the mainframe as output voltage must be adjusted at the M-G cabinet. The 25-kVA M-G may be located in either the computer room or in a separate M-G room.

As mentioned under Computer Room Requirements, the noise level of the 40-kVA M-G set requires that it be installed in a separate M-G room.

The M-G control cabinets have front-panel controls and indicators and inside-cabinet control circuitry that provide such features as output voltage regulation and overvoltage protection. The cabinets have bottom openings for entry of all power and control wiring. Detailed M-G set installation information for the cabinets and MGs is available in the Site Preparation Section 4 manual and the M-G manuals supplied with the M-G set.

The customer is responsible for providing primary power capable of handling the starting load current of the specific M-G installation and main power line disconnects in accordance with local codes. Load currents, disconnect sizes, and other M-G installation details are in the M-G data sheets in the Site Preparation Section 4 manual.

## M-G CONTROL AND STATUS (SPCP ONLY)

The System Power Control Panel (SPCP) provides remote control voltage starting, remote output voltage adjustment, and main input power status indication for the remotely located M-G set.

Table 3-2 indicates the required connections between the SPCP and the MG control cabinet.

TABLE 3-2. SPCP/M-G CONNECTIONS

SPCP Schematic Diagram Designation	Function	M-G Control Cabinet Vendor Diagram Designations*
M-G remote control voltage	Provides remote MG starting capability by supplying 120-Vac from SPCP to MG control cabinet.	to remote control at computer; 120-Vac from computer; control voltage from computer; to remote control voltage from computer; remote control on.
M-G remote adjustment	Enables remote adjustment of the M-G output voltage from the SPCP.	to remote voltage adjust potentiometer; customer remote VAR; to remote voltage adjust.
Power status	Closed circuit signal to SPCP, which indicates that input power is available to MG; circuit opens upon loss of input power.	to remote power status indicator; remote power status contact; to customer power status indicator; to remote power status indicator circuit; contact: motor on.

Refer to the appropriate MG control cabinet external interconnection (EI) wiring diagram in the Site Preparation Section 4 manual for specific power connection terminals. Refer to the Power Distribution and Warning System Cooling System manual for the SPCP schematic diagram and its connections.

**NOTE**

The SPCP cannot be used with a 12.5-kVA M-G. The SPCP must be used with a 25-kVA or larger M-G.

**SYSTEM GROUNDING**

The customer must install grounding systems for all equipment in the computer system. The grounding systems must meet local electrical codes that usually specify detailed protective grounding requirements. Although the intent of the various local codes is the same, the approved methods and materials vary from code to code.

The Site Preparation Section 1 manual contains specific Control Data grounding requirements. Additional grounding information is in the Control Data Digital Computer System Grounding Standard, Engineering Standard 1.30.023.

In addition to the grounding requirements in the Site Preparation Section 1 manual, Control Data requires the following grounding and shielding for system installations:

- All power and control cable runs must have shielding grounded on each end of the cable runs. The following types of shielding are acceptable:

Totally enclosed conductive busways  
 Steel thin-walled metallic conduit  
 Flexible metallic conduit  
 Braided metallic-shielded jacketing  
 Zip-on flexible metallic-shielded jacketing (for example, Zippertubing\*\*)

- For central processor unit, memory unit, input/output unit, and peripheral units not on casters, cable shielding should extend into the cabinet. If the shielding is rigid and local codes permit, a short length of flexible shielding should connect to the rigid shielding at a point below the surface of the raised floor and extend into the cabinet. If the shielding is flexible, it should extend directly into the cabinet.
- For each piece of peripheral equipment on casters with a drop cable, cable shielding should terminate at a junction box located below the surface of the raised floor. The junction box should be immediately below the peripheral equipment cable cutout or as close as possible. Local codes determine the exact placement of the junction box.

**NOTE**

If either logic or drop cables are a source of electromagnetic interference, Control Data shields cables with a zip-on type shielding.

\* Terminology variations used by the vendors on various WI, I, and EI diagrams  
 \*\* Registered trademark of the Zipper Tubing Co., Los Angeles, Ca.

## EMC GROUNDING

The cabinets are designed to maximize electromagnetic interference (EMI) immunity. Cabinets are provided with an EMC grid grounding point that must be connected following the requirements set forth here and in the Site Preparation Section 1 manual. Additionally, all equipment in the system must use shielded logic cables to maintain EMC.

The EMC grounding connections (figure 3-3) include 25 mm (1.0 in) wide, tinned-copper, braided grounding straps (Control Data part number 24534811 or equivalent).

### NOTE

All grounding strap terminations must conform with the grounding instructions in part 7 of the Site Preparation Section 1 manual for large systems.

The computer system is shipped with one end of each grounding strap connected to the EMC ground lug. Place the unconnected end of the strap through the cutout openings in the bay and raised floor and connect the strap to the grid ground. The strap connection point on the grid ground should not be more than 610 mm (24.0 in) from the cutout opening in the computer bay.

## WALL-MOUNTED BOXES

The SPCP (when used) and terminator power supply panel are wall-mounted. The SPCP contains control circuitry which manually energizes or automatically deenergizes the computer system in predetermined sequence. The box also provides monitoring and indicates abnormal operating conditions. When

certain limits of temperature occur and are not corrected within a preset time, the control circuits automatically deenergize the computer system.

The wall-mounted items consist of:

- SPCP (systems with 25-kVA or larger M-G)
- 20-A terminator power supply

Control Data supplies these items with the system. The customer is responsible for the installation and wiring. Wiring information for the panels is in the Power Distribution and Warning System Cooling System manual.

### CAUTION

Power to the SPCP must be wired from a separate circuit breaker not controlled from any of the system power control panels. This prevents accidental power removal from the entire system when power removal from part of the system is intended. Power to the SPCP must be controlled only by the emergency off switches. The SPCP also requires side and bottom clearance as set forth under Room Requirements.

## EMERGENCY-OFF SWITCHES

The customer must provide and install emergency off devices at principal locations and at all exits from the computer room per National Electric Code and local codes. The devices should be of the non-automatic reset type, such as break-glass units, to restrict their function to emergency use only. The interconnection to provide a system emergency off is shown in figures 3-1 and 3-2.

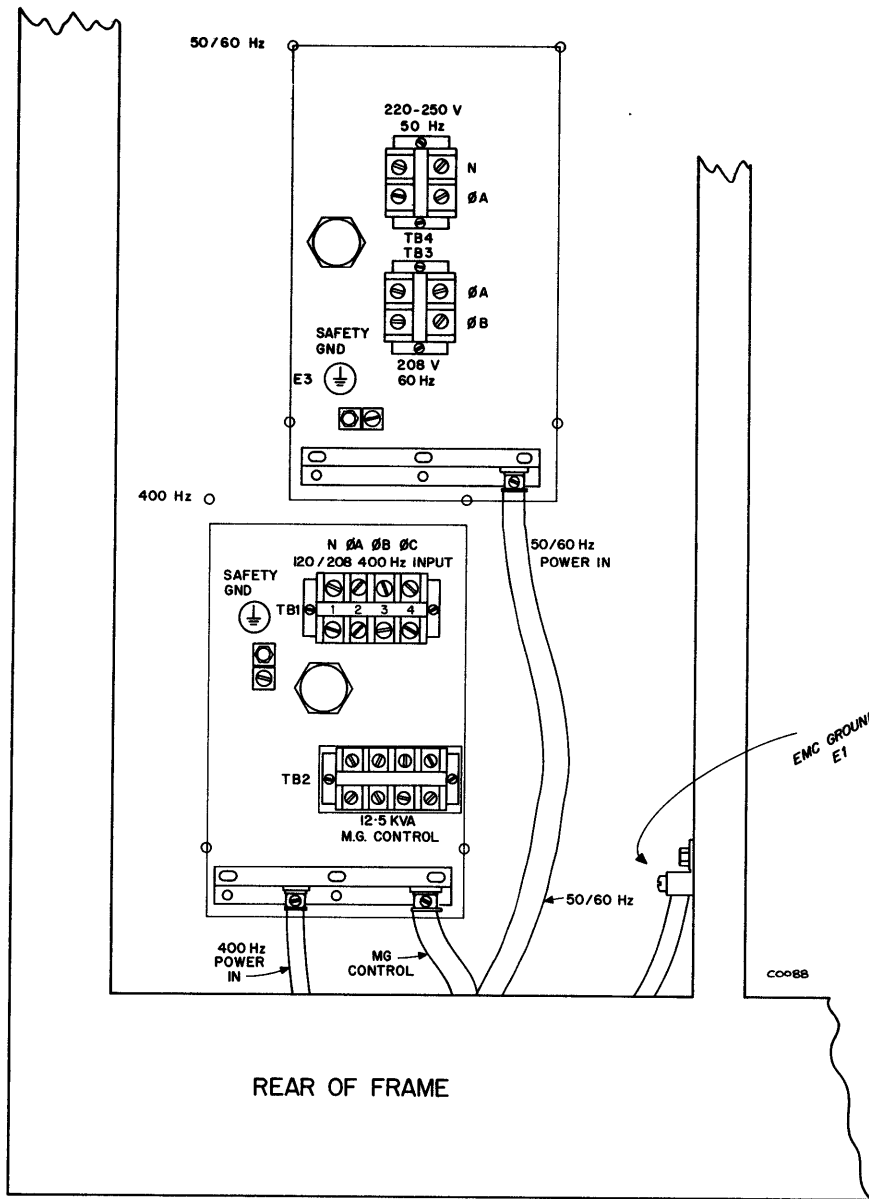


Figure 3-3. 50/60 Hz, 400 Hz, and EMC Grid Ground Connections





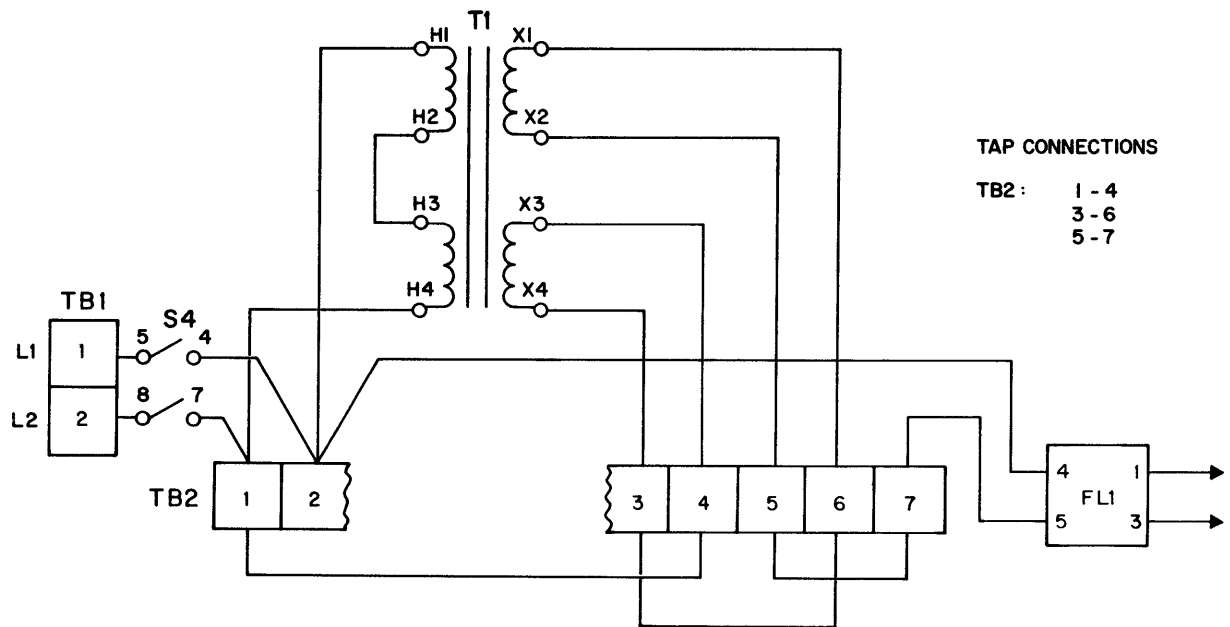
## **APPENDIX A**

### **50/60 Hz POWER CONTROL BOX COOLING SYSTEM BLOWERS BUCK-BOOST TRANSFORMER TAP CONNECTIONS**

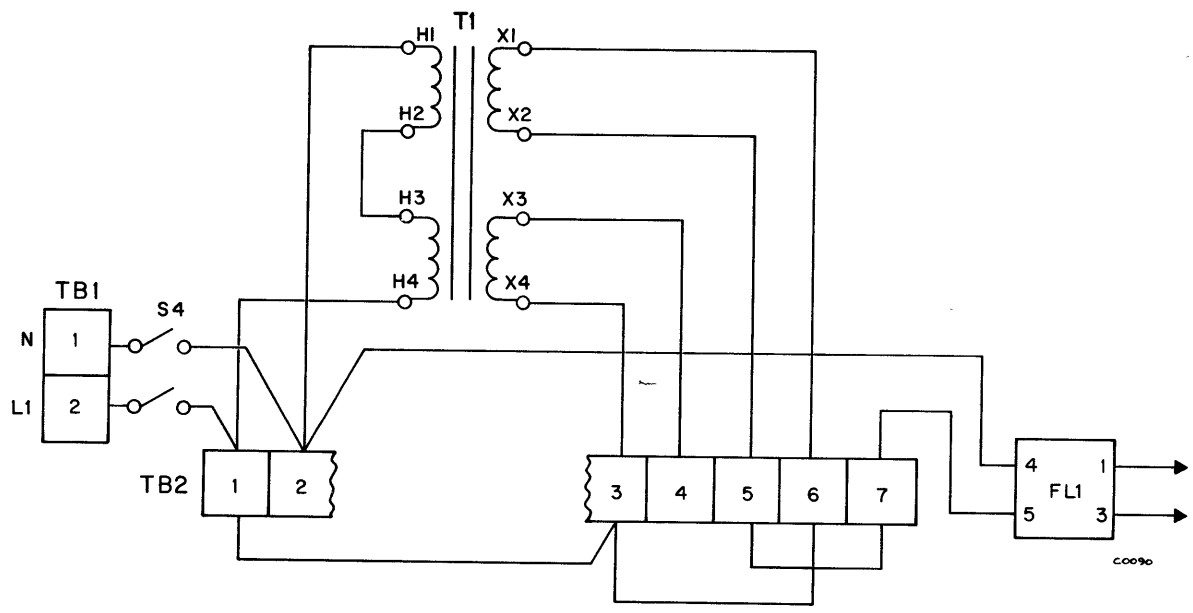
Cabinets (as shipped) are wired for 120/208V. For wiring connection changes necessary for other input voltages refer to:

Figure A-1 for 220/380V  
Figure A-2 for 240/415V



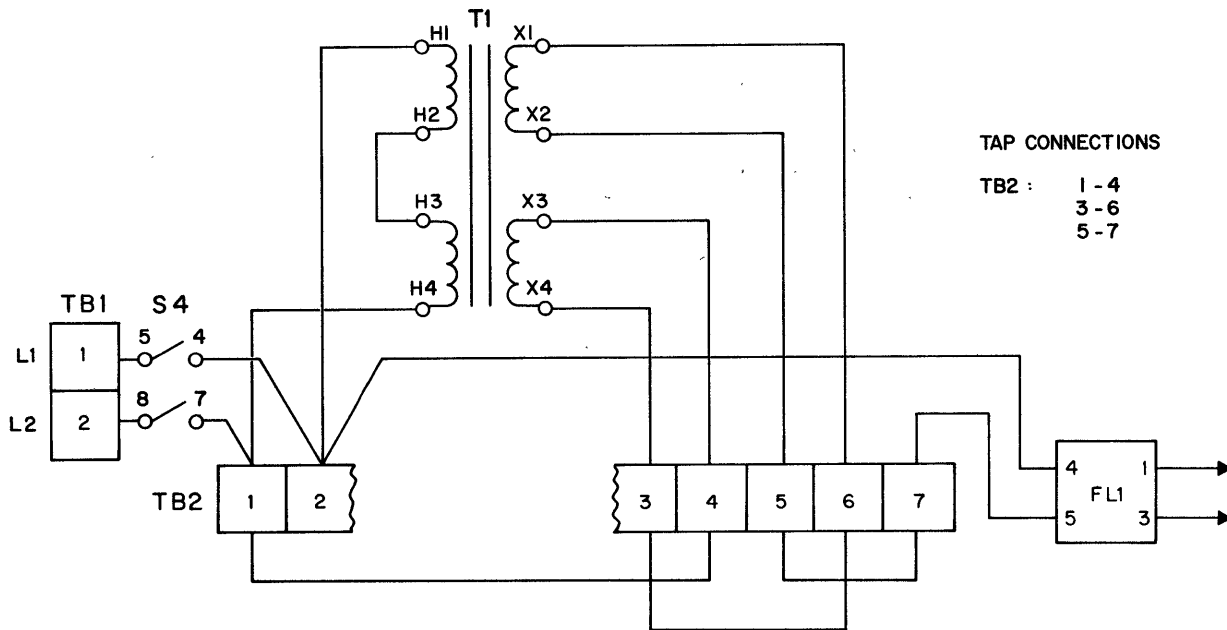


120/208V, 3-phase, 60-Hz Buck-Boost Transformer Power Connections (As shipped)

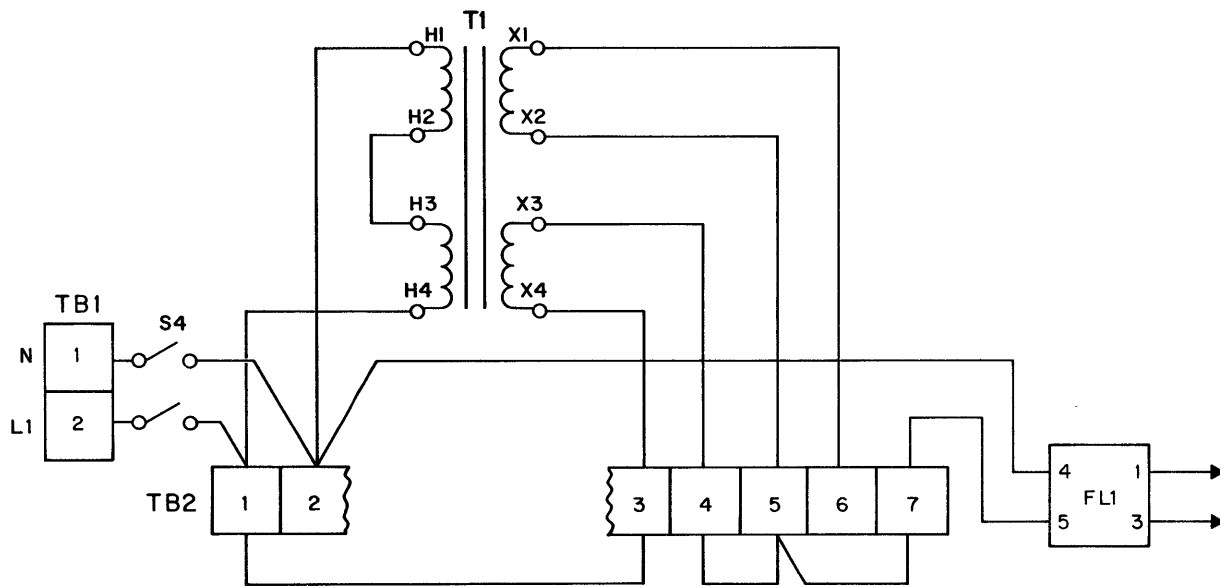


**RECONNECT TAP CONNECTIONS**  
**ON TB2:** 1-3  
 3-6 } UNCHANGED  
 5-7 }

Figure A-1. 220/380V, 3-phase, 50-Hz Buck-Boost Transformer Power Connections



120/208V, 3-phase, 60-Hz Buck-Boost Transformer Power Connections (As shipped)



RECONNECT TAP CONNECTIONS  
ON TB2: 1-3  
4-5  
5-7 } UNCHANGED

Figure A-2. 240/415V, 3-phase, 50 Hz Buck-Boost Transformer Power Connections

# COMMENT SHEET

**MANUAL TITLE:** CYBER 170 Model 815 and 825 Computer Systems  
Site Preparation Manual, Section 2, System Data  
**PUBLICATION NO.:** 60469130 **REVISION:** F

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