
**CDC[®] CYBER 180 MODELS 810 AND 830
COMPUTER SYSTEMS**

**SECTION 2
SYSTEM DATA**

SITE PREPARATION MANUAL

LIST OF EFFECTIVE PAGES

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PREFACE

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

A valuable reference before and after installation is a set of four manuals and a handbook published by Control Data Corporation. The manuals are designated as site preparation sections 1, 2, 3, and 4. Complete documentation of a system requires all the sections as well as the handbook.

Control Data Corporation urges the customer to consult local authorities if requirements in the manuals conflict with those in the local building, fire ordinance, or electrical codes. Any deviations from the manual procedures and/or requirements, for reasons other than complying with local regulations, must be approved by Control Data Computer Facility Services.

The manuals and handbook are available from:

Control Data Corporation
Literature and Distribution Services
308 North Dale Street
St. Paul, Minnesota 55103

A description of the sections and handbook follows.

SECTION 1. GENERAL INFORMATION

The section 1 manual, titled General Information Large- and Medium-Scale Computer Systems (publication number 60275100), details those aspects of site preparation common to more than one system. The section 1 manual contains information on the following topics:

- Site Planning Procedures
- Computer Facility Layout
- General Construction
- Mechanical System Requirements
- Electrical System Requirements
- Fire and Security

SECTION 2. SYSTEM DATA

The section 2 manual, titled System Data (publication number 60469430), is the manual you are now reading. This manual contains information applicable to a specific computer system and selected low cost peripherals but excludes information on large, high performance peripheral equipment. The section 2 manual contains the following:

- Specifications for the computer system including the number, function, and placement of the system cabinet and other units.
- Equipment data sheets that describe 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

The section 3 manual, titled Peripheral Equipment Data (publication number 60275300), documents only peripheral equipment. The section 3 manual contains the following:

- A table of peripheral equipment and controllers, which describes each peripheral unit and indicates if the unit is self-contained.
- Peripheral equipment data sheets, which include the power and environmental requirements, the physical configuration, and the dimensions of each peripheral unit.

SECTION 4. MONITORING AND POWER DATA

The section 4 manual, titled Monitoring and Power Data (publication number 60451300), contains physical, electrical, and environmental information related to wall-mounted panels and to terminator power supplies. This manual also contains data on motor-generator sets used with computer systems. The section 4 manual contains information on the following topics:

- Wall-Mounted Panels
- Wall-Mounted Panel Data Sheets

- Wall-Mounted Panel Schematics
- Electric 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

SITE ENVIRONMENTAL MAINTENANCE HANDBOOK

This handbook (publication number 60424500) contains information applicable to the computer

system site. It describes site maintenance recommendations as well as procedures necessary for reliable computer operations. Also included are minimum maintenance schedules and guidelines. The handbook contains the following:

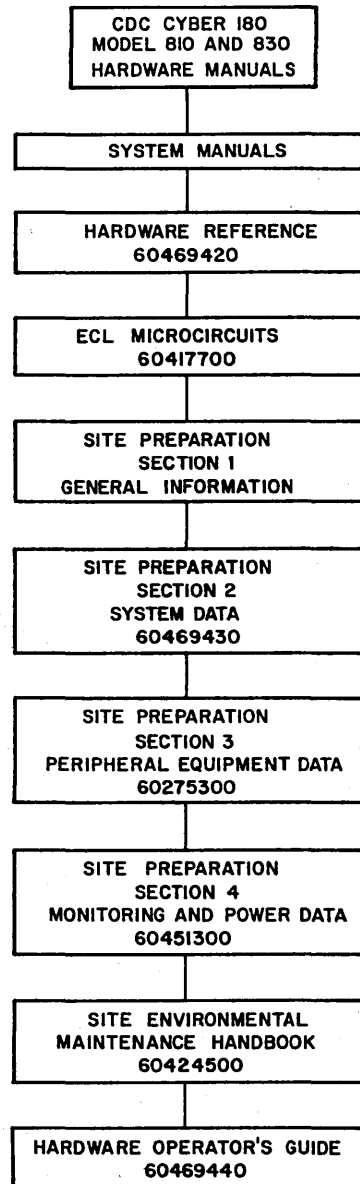
- Guidelines and recommendations for the proper implementation of general site maintenance such as cleanliness, floor coverings, and safety.
- Guidelines and recommendations for the proper implementation of technical site maintenance such as environmental control, water treatment and handling, cabling,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

SYSTEM PUBLICATION INDEX

The following index lists CDC® CYBER 180 Models 810 and 830 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



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INTRODUCTION

The CDC CYBER 180 Models 810 and 830 Computer Systems consist of a single mainframe which includes:

- Central Processing Unit (CPU)
- Central Memory (CM)
- Input/Output (I/O)
- Power Module

The computer system is designed to operate on 50/60-Hz power. For the convenience of customers who desire the added stability of a motor generator (MG) set, power options are available to allow the 180-810/830 to run on 400-Hz power. An MG set is also required for high performance peripherals such as the 844 or 885 disk storage units, 67X magnetic tape transport and peripherals which require 400-Hz power.

memory (CM), the input/output unit (IOU), and power module as shown in figure 1-1. Table 1-1 lists the computer system specifications. Table 1-2 lists the system standard options. Table 1-3 lists the motor generator options.

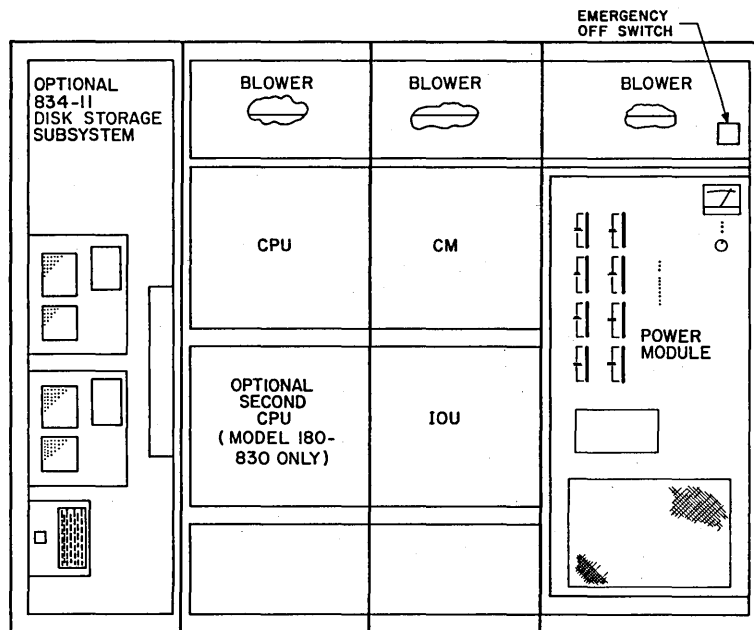
In addition to the logic, memory, and power hardware, the mainframe contains blowers which circulate ambient room air over the logic hardware to cool it.

The computer system requires power option 18105-X and a separate operator display station. There are two operator display stations to choose from: 18002-1 and 18002-2. The 18002-1 consists of a display, keyboard, and integral stand. The 18002-2 consists of a display with a detachable keyboard and requires 18110-1 or customer provided table/desk.

The motor generator (MG) set (when used) consists of an MG and an MG control cabinet. The size of the MG set depends on total system requirements (with consideration for possible expansion). For more information, refer to MG Set in part 3 of this manual. Site planning information for the MG set can be found in the Site Preparation Section 4 manual.

CABINET CONFIGURATIONS

The mainframe consists of a single cabinet containing the central processing unit (CPU), the central



CABINET-FRONT VIEW

C1034

Figure 1-1. Cabinet Front View

TABLE 1-1. COMPUTER SYSTEM SPECIFICATIONS

Model	Description	Cabinet
180-810, 180-830	Computer: Includes single central processor capable of dual state operation. In CYBER 170 state, the processor uses 6 bit characters, 60 bit words, and executes the C170 instruction set. In virtual state, the processor uses 8 bit characters, 64 bit words, a virtual addressing mechanism, and executes an expanded virtual state instruction set. Also includes 2 MB (262,144 words) of semiconductor memory with error correction code; ten peripheral processors, each with 4096 16-bit words (plus one parity bit) of memory; six external data channels; two integrated controller interface (ICI) channels; and space for peripheral adapters. Air cooled. Does not include operator console or power option.	Single, stand-alone cabinet

TABLE 1-2. SYSTEM STANDARD OPTIONS (1 of 4)

Model Number	Description	Cabinet
530-1	Print Band: US ASCII-2 63 character plus space character set.	Mounts in 533-1/536-1.
530-2	Print Band: US ASCII-2 95 character plus space	Mounts in 533-1/536-1.
533-1	Line Printer: 300 lpm printer. When using a 64 character set print band, prints 132 columns at 6 or 8 lines per inch. Supports standard 64 or 96 character print band. Asynchronous communication (RS236-C) interface at 110 or 19,200 bps. Contains I/O multiple vertical format unit, operator/CE control panel/control indicators, and paper basket. Printer is 50/60 Hz. Requires 530-X print band.	Stand-alone unit.
536-1	Line Printer: 600 lpm printer. When using a 64 character set print band, prints 132 columns at 6 or 8 lines per inch. Supports standard 64 or 96 character print band. Asynchronous communication (RS236-C) interface at 110 or 19,200 bps. Contains I/O multiple vertical format unit, operator/CE control panel/control indicators, and paper basket. Printer is 50/60 Hz. Requires 530-X print band.	Stand-alone unit.
639-1	Magnetic Tape Transport: Provides a microprocessor-based 1/2 inch wide magnetic tape drive unit. Consists of a tape deck, read/write electronics, formatting electronics, microprocessor-based control logic, adapter interface, and cabinet. Has three operating modes; 25 inches per second (ips) start/stop, 25 ips streaming mode, and 75 ips streaming mode. Data is recorded in the ANSI compatible 1600 cpi, phase encoded or 6250 cpi group coded recording method. Tapes written or read are compatible with any other ANSI compatible tape unit.	Stand-alone unit.
834-11	Disk Storage Subsystem: Provides high performance random access Mass Storage Subsystem using non-removable disk. Subsystem includes cabinet with two Disk Storage Units, one Control Module, and necessary power supplies and cabling. Power ride-through provided when Battery Backup Option 18104-1 installed in CYBER 180 mainframe. Space provided in cabinet to add two	Housed in bolt-on cabinet.

TABLE 1-2. SYSTEM STANDARD OPTIONS (2 of 4)

Model Number	Description	Cabinet
834-11 cont'd	additional Disk Storage Units and three additional Control Modules. Each Disk Storage Unit has a formatted capacity of 126 million eight-bit characters with a maximum transfer rate of 9.6 million bits per second. Two 7255-1 Disk Adapters and a minimum of two 10395-1 Control Modules are required for simultaneous dual access operation of the Disk Storage Units. A maximum of two 834-11 subsystems can be configured per mainframe.	
834-12	Disk Storage Unit: Provides a random access device using nonremovable disk. Formatted capacity is 126 million eight-bit characters. Maximum data transfer rate is 9.6 million bits per second with an average seek time of 36 ms and average latency of 9.3 ms. Disk Storage Unit mounts in available space in 834-11 Disk Storage Subsystem. Power ride-through provided when Battery Backup Option 18104-1 is installed in CYBER 180 mainframe.	Housed in 834-11 cabinet.
7221-1	Magnetic Tape Adapter: This device allows the CYBER 180-810/830 computer with an ICI channel to communicate with one 639-1 magnetic tape transport. A maximum of four adapters (7221-1, 7255-1) in any combination can be used in the mainframe.	Mounts in 180-810/830 mainframe.
7255-1	Disk Adapter: This device allows the CYBER 180 Models 810 and 830 Computers with an Integrated Controller Interface (ICI) channel to communicate with a 834-11 Mass Storage Subsystem. The disk adapter can communicate with up to eight 834-12 Disk Storage Units within the subsystems. A maximum of four adapters (7221-1, 7255-1) in any combination can be used in the mainframe.	Mounts in 180-810/830 mainframe.
10395-1	Control Module Option: Consists of a control module, COS firmware, and supplementary hardware. Provides an additional data path between 7255-1 Disk Adapter and 834-12 Disk Storage Unit. Allows simultaneous data transfer between two disk adapters and two 834-12 Disk Storage Units in the subsystem.	Housed in 834-11 Disk Storage Subsystem cabinet.
10475, 10476	CYBER Power Island: Distributes 60-Hz and 400-Hz power, where applicable, from a single-input common source to the entire computer system. Power is transmitted through internal circuit breakers and flexible, water-tight, shielded cables. Refer to Power Island in part 3 of this manual for further information.	Stand-alone cabinets.
18001-1	Single Data Channel Converter (DCC): Permits one to eight pieces of the 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 (for both models 810 and 830).	Stand-alone table-top unit.
18001-2	Single Data Channel Converter (DCC): Permits one to eight pieces of the 3000 series peripheral equipment to attach to the CYBER channel. Includes one DCC and cabinet. The 18001-2 contains the Pass On/Pass Back facility which allows two DCCs to be used on a single channel. Meets UL and CSA requirements for 115-V, 50/60-Hz power (for both models 810 and 830).	Stand-alone table-top unit.

TABLE 1-2. SYSTEM STANDARD OPTIONS (3 of 4)

Model Number	Description	Cabinet
18002-1	Operator Display Station: Consists of 21-inch CRT display, alphanumeric keyboard and integral stand; connects to mainframe via channel (cables provided).	Single, stand-alone cabinet
18002-2	Operator Display Station: Consists of 15 inch CRT display and detachable keyboard; connects to mainframe via two port multiplexer (cable included).	Desk-top cabinet requires 18110-1 or customer provided table/desk
18003-1	Terminator Power Supply: Provides terminator power required when using 580 line printer, 405 card reader, or other products with 3000 channel interface.	Wall Mounted Panel
18101-2	Memory Increment: Adds 2 MB (262,144 words) of semiconductor memory, increasing central memory from 2 MB (262,144 words) to 4 MB (524,288 words).	Mounts in 180-810/830 mainframe.
18101-4	Memory Increment: Adds 4 MB (524,288 words) of semiconductor memory. Initial 18101-4 option increases memory from 4 MB (524,288 words) to 8 MB (1,048,576 words); additional 18101-4 options can be used to increase memory to 12 or 16 MB (1,572,864 or 2,097,152 words). Requires prior installation of option 18101-2.	Mounts in 180-810/830 mainframe.
18101-16	Memory Increment: Adds 16 MB (2,097,152 words) of semiconductor memory, increasing central memory from 16 MB (2,097,152 words) to 32 MB (4,194,304 words). Requires prior installation of option 18112-X. Memory sizes above 16 MB are supported only by NOS/VE.	Mounts in 180-810/830 mainframe.
18102-1	Channel Increment: Adds three C170 channels and one ICI channel. A maximum of two 18102-1 options can be installed in mainframe.	Mounts in 180-810/830 mainframe.
18102-2	Channel Change: Changes basic channel configuration from six C170 channels and two ICI channels, to four C170 channels and four ICI channels. Parts removed during installation of this option, including the channels delivered as part of the mainframe, remain or become the property of Control Data.	Mounts in 180-810/830 mainframe.
18103-1	Peripheral Processor Increment: Adds ten peripheral processors; resulting system has 20 peripheral processors. Requires prior installation of two 18102-1 channel increments.	Mounts in 180-810/830 mainframe.
18104-1	Battery Backup Option: Provides control circuitry and sufficient battery power to carry mainframe and 834 disk subsystem through short duration power outages.	Mounts in 180-810/830 mainframe.
18105-X	System Power Option: Provides power cable and other apparatus necessary to accommodate indicated power sources:	Mounts in 180-810/830 mainframe.
18105-1	60 Hz, 120/208 V, Wye, 3 Phase, Max. 13.8 kVa	
18105-2	60 Hz, 240 V, Delta, 3 Phase, Max. 13.8 kVa	
18105-3	50 Hz, 220/380/240/415 V, 3 Phase, Max. 13.8 kVa	
18105-4	400 Hz, 120/208 V, 3 Phase, Max. 12 kVa and 60 Hz, 120/208 V, 3 Phase, Max. 1.7 kVa	
18105-5	400 Hz, 120/208 V, 3 Phase, Max. 12 kVa and 50 Hz, 220/380/240/415 V, 3 Phase, Max. 1.7 kVa	

TABLE 1-2. SYSTEM STANDARD OPTIONS (4 of 4)

Model Number	Description	Cabinet
18106-1	System Power Control Panel: Provides power monitoring and control capabilities needed when using 25 kVa or larger 400-Hz motor generator.	Wall-mounted panel.
18107-1	Processor Upgrade: Upgrades a 180-810 processor to 180-830 level performance. Parts replaced in performing the upgrade are the property of Control Data.	Mounts in 180-810 mainframe.
18109-1	Second Central Processor: Adds a second (dual state) central processor to a 180-830 system, or to a 180-810 system which has been upgraded to 180-830 performance with option 18107-1.	Mounts in 180-830 mainframe.
18110-1	Dual Level Table: Dual level table for use with 18002-2 operator console.	Floor table.
18112-1	Memory Increment: For 810/830 systems with no 18101-X memory option installed. Upgrades central memory from 2 MB (262, 144 words) to 16 MB (2,097,152 words). Installation of this option requires removal of all existing memory. All parts removed during the installation of this option, including the memory delivered as part of the mainframe, remain or become the property of Control Data.	Mounts in 180-810/830 mainframe.
18112-2	Memory Increment: For 810/830 systems with one 18101-2 and no 18101-4 memory option installed. Upgrades central memory from 4 MB (524,288 words) to 16 MB (2,097,152 words). Installation of this option requires removal of all existing memory. All parts removed during the installation of this option, including the memory delivered as part of the mainframe, remain or become the property of Control Data.	Mounts in 180-810/830 mainframe.
18112-3	Memory Increment: For 810/830 systems with one 18101-2 and one 18101-4 memory option installed. Upgrades central memory from 8 MB (1,048,576 words) to 16 MB (2,097,152 words). Installation of this option requires removal of all existing memory. All parts removed during the installation of this option, including the memory delivered as part of the mainframe, remain or become the property of Control Data.	Mounts in 180-810/830 mainframe.
18112-4	Memory Increment: For 810/830 systems with one 18101-2 and two 18101-4 memory options installed. Upgrades central memory from 12 MB (1,572,864 words) to 16 MB (2,097,152 words). Installation of this option requires removal of all existing memory. All parts removed during the installation of this option, including the memory delivered as part of the mainframe, remain or become the property of Control Data.	Mounts in 180-810/830 mainframe.
18113-1	Memory Increment: For 810/830 systems with one 18101-2 and three 18101-4 memory options installed. Upgrades central memory from 16 MB (2,097,152 words) to 32 MB (4,194,304 words) of semiconductor memory. Installation of this option requires removal of all existing memory. All parts removed during the installation of this option, including the memory delivered as part of the mainframe, remain or become the property of Control Data. Memory sizes above 16 MB (2,097,152 words) are supported only by NOS/VE.	Mounts in 180-810/830 mainframe.

TABLE 1-3. MOTOR GENERATOR OPTIONS

10513-101	Reduced voltage start option for MG option 10513-712 60 to 400-Hz, 12.5-kVa MG.	Mounts in 10513-712 MG.
10513-712	Frequency converter; 60 to 400-Hz, 12.5-kVa MG. 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 MG. MG is mounted within its control cabinet.	Stand-alone unit.
10513-740	Frequency converter; 60 to 400-Hz, 40-kVa MG. Separate control cabinet.	Two stand-alone units made up of the MG and the control cabinet.
10514-725	Frequency converter; 50 to 400-Hz, 25-kVa MG. MG is mounted within its control cabinet.	Stand-alone unit.
10514-740	Frequency converter; 50 to 400-Hz, 40-kVa MG. Separate control cabinet.	Two stand-alone units made up of the MG and the control cabinet.

COMPUTER SYSTEM REQUIREMENTS

ENVIRONMENTAL

The following are the environmental requirements of the computer system. These requirements may be less restrictive than those of some individual pieces of 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 from 10°C per hour (18°F per hour).

TEMPERATURE/MONITORING

Chassis inlet temperature and outlet temperature thermistors monitor the mainframe. The mainframe blowers are also monitored for proper operation.

The optional wall-mounted system power control panel (SPCP) provides temperature monitoring, sequential on/off control of system power, fault sensing, alarm indication and system shutdown. The SPCP must be used with a 25-kVa or larger MG.

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 operator console to audible and visual indication terminating in a total system shutdown.

The types of faults and associated alarm warnings fall into two categories; short or long.

Short Warning Faults

Short warning faults may cause instantaneous shutdown or the system may 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 conditions are generated from three main sources:

- The SPCP, when used, monitors the computer room temperature.
- The CPU, IOU, and CM monitor mainframe temperature and blowers.
- The system MG control cabinet monitors mains power to the MG.

Visual Indicators

All of the monitored faults provide a visual alarm indication via the operator console.

Operator Console

Alarm indication on the operator 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 as well as the appropriate course of action.

Cabinet Display

The cabinet contains a set of indicators located on the computer power module.

Each of the following conditions causes an associated indicator to light up when the fault is detected.

- HIGH INLET AIR TEMP FAULT
- LOW AIRFLOW FAULT
- HIGH OUTLET AIR TEMP FAULT
- POWER SUPPLY FAULT
- CIRCUIT BREAKER OFF FAULT
- PROTECTION CABLE FAULT

Audible Indicators

When the SPCP is used, a small horn provides an audible alarm. This horn is mounted on the lefthand side of the SPCP (when viewed from the front). Only the SPCP provides an audible alarm indication. The activated alarm cannot be manually silenced. It ceases automatically when:

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

CAUTION

When an audible alarm has been activated, immediate action to lower temperature in the computer area is necessary to avoid automatic shutdown of the system.

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

COMPUTER ROOM REQUIREMENTS

The Control Data CYBER 180 Models 810 and 830 are designed for placement on either a normal or on a raised floor system. Raised floor systems provide an under floor cavity for accommodation of conduits, electrical cables, signal cables, and ducting.

NOTE

A raised floor system must be used for certain high performance peripherals, such as 844 or 885 disk storage units and 67X magnetic tape transport, to ensure adequate distribution of cooling air to these units.

The computer room requirements, as described in the Site Preparation Section 1 manual, include space for equipment cabinets, related power service panels, emergency off switches, air

conditioning equipment, test equipment, and personnel movement. When used, the location of the MG set varies. The 12.5-kVa MG must be located in the computer room. The 25-kVa MG may be located in either the computer room or in a separate MG room. Due to the acoustical noise of the MG, systems having a 40-kVa MG must have a separate MG room. Other computer room requirements for the system equipment can be found on the data sheets in part 2 of this manual.

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

The computer room and associated MG 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 MG sets. The MG 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 conveniently located, wall-mounted emergency off switches.

Room Air

Room air requires filtering to avoid possible contamination or damage to the magnetic surfaces of peripheral storage devices, such as disk and tape units (refer to the Site Preparation Section 1 manual). The ambient air intake is located at the bottom front of the mainframe cabinet. Air exits at the top rear of the cabinet.

Communication Line Access Requirements

Two standard telephones must be installed within 12.2 m (40 ft) of the mainframe. These telephone lines are required in order to provide a telecommunication path for Remote Terminal Assistance (RTA) via the IOU multiplexer channel as well as communication with technical support personnel during RTA operations.

GRID GROUND

The CYBER 180-810/830 does not require a grid ground. A grid ground is required when upgrading an old site if unshielded signal cables are used. Refer to electromagnetic compatibility (EMC) grounding in part 3 of this manual.

SIGNAL CABLES

Control Data provides the computer system signal cables. Many of the cables carry time-dependent signals and therefore have a fixed length. Equipment using these cables requires 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 cable lengths and are as short as possible to minimize signal transmission delays.

TABLE 1-4. SYSTEM ALARMS

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

*System uses only one size of MG (e.g.: 12.5-kVa, 25-kVa, or 40-kVa). Therefore only one of these signal definitions is applicable.

Figures 1-2 and 1-3 indicates system cable quantities, connector pins, and standard lengths. Additional cable length information can be found in the System Data Sheets which make up part 2 of this manual. Cable length information also exists in the Peripheral Equipment Data sheets in this manual and the Site Preparation Section 3 manual.

The computer is designed for installation on a normal floor or a raised floor. However, the use of high performance peripherals requires a raised floor. Refer to the caution under Raised Floor System.

NOTE

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

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

RAISED FLOOR SYSTEM

When a raised floor is used, Control Data recommends the use of a stringer type system for stability.

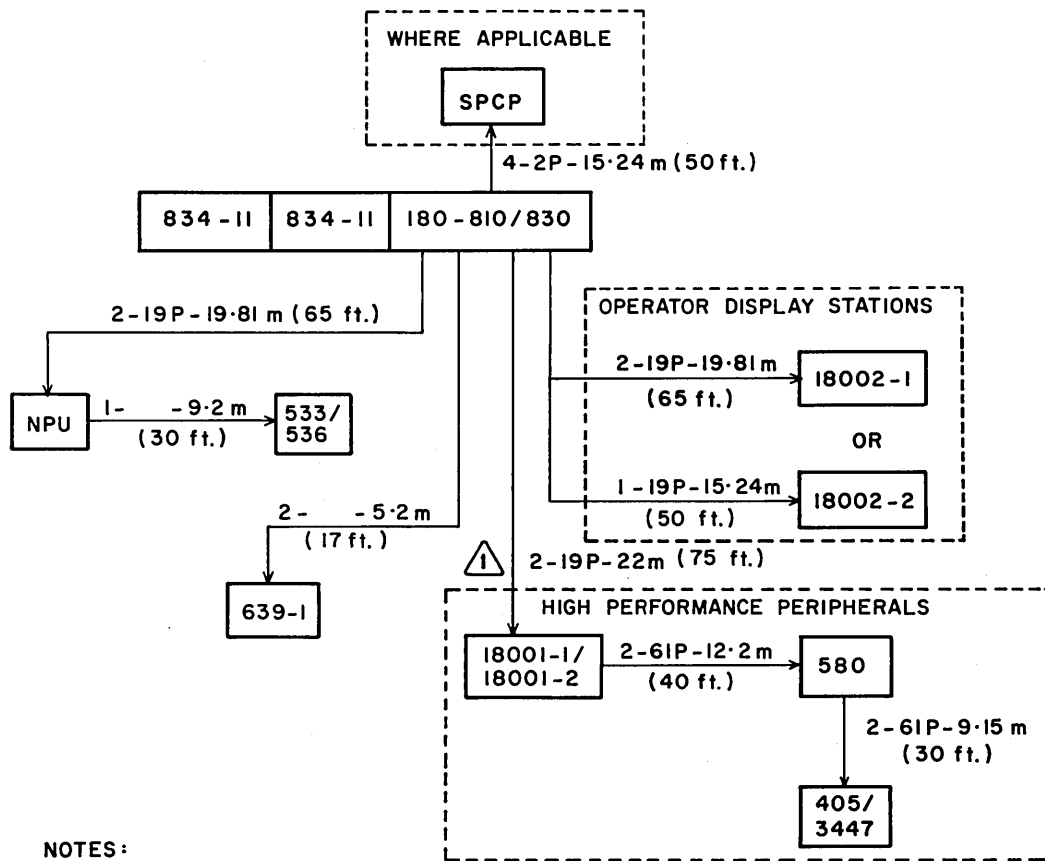
CAUTION

The floor must be level within 3.2 mm (1/8 inch) 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, or air ducting under the computer system cabinets.

Recommended minimum under floor clearance is 305 mm (12 in) unless otherwise approved by Control Data.

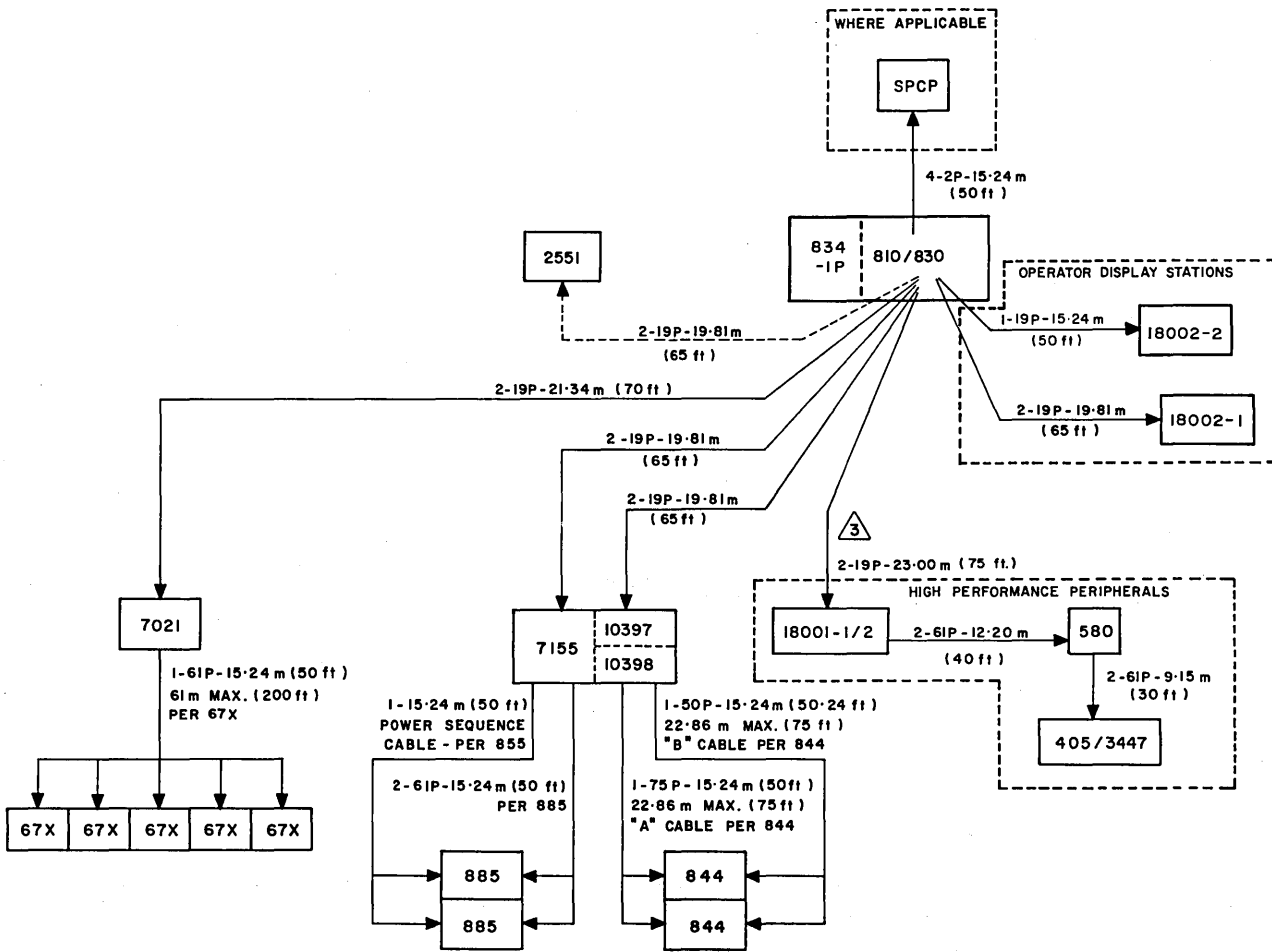


NOTES:

- ⚠ TOTAL CABLE LENGTH PER DATA CHANNEL CONVERTER NOT TO EXCEED 305 m (1000 ft.)

C1056

Figure 1-2. System Signal Cabling, 50/60-Hz Peripherals



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 304.8 m (1000 ft)

C1033

Figure 1-3. System Signal Cabling, 400-Hz Peripherals

Additional information concerning the raised floor is available in the Site Preparation Section 1 manual.

SYSTEM COOLING

The computer and associated peripheral equipment are cooled with ambient room air. Integral blowers pull ambient air into the cabinet from

near the bottom front, force it over the logic components, and expel the heated air from the top of the cabinet.

The total system heat load (mainframe and peripherals) requires supplemental cooling for the computer room. Refer to the appropriate data sheets or the Product Profile supplied by Control Data Computer Facility Services for the total system cooling requirements.

Data sheets for the 180-810 and 180-830 computers, 834-11 disk storage subsystem, 639 tape transport, 533/536 line printers, 18002-1 and 18002-2 operator consoles are included here. For other data sheets refer to section 3 of this manual. The physical, electrical, and environmental information on the data sheets is based on individual product descriptions. The maximum equipment configuration figures should be used for site design to allow for future system expansion, sizing of CB's, and to meet local and state electrical codes.

Data sheets with views of the equipment floor plan show cutouts (CO) that are located within the equipment frames. These cutouts are not necessarily the same size as the recommended cutouts in the floor of the computer site. Floor cutout information must be obtained from a Control Data template drawing. Using these templates, personnel from CDC Computer Facility Services tailor a drawing for the specific customer site.

Data sheets for the SPCP, terminator power supply, and motor generator sets are in the Site Preparation Section 4 manual.

**180-810, 180-830 COMPUTER
SINGLE CABINET CONTAINING CM, CPU, AND IOU**

Width 1885 mm (74.25 in) Height 1670 mm (65.8 in)
Depth 730 mm (28.8 in) Weight 794 kg (1750 lb) (supported by the cabinet frame)

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

Power connector (located in the cabinet base): 2.4 m (8 ft) cord and connector above or below floor level

External terminator power connection is not normally required. The optional 20-A, 40 VDC terminator power supply is required when using the 405 card reader or the 580 line printer.

Control Data signal cables*: Refer to individual data sheets

Distance from internal signal cable connectors to floor: 356 mm (14.0 in) maximum

Cooling: ambient room air (blowers)
air intake at bottom front of cabinet

Permissible range of room relative humidity (no condensation):

Operating 20% to 80%
Nonoperating 0% 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

*External cables only (intracabinet cables not shown).

180-810, 180-830 COMPUTER

CYBER 180 - 810/830 INPUT POWER OPTIONS AND POWER CONSUMPTION (1 OF 2)

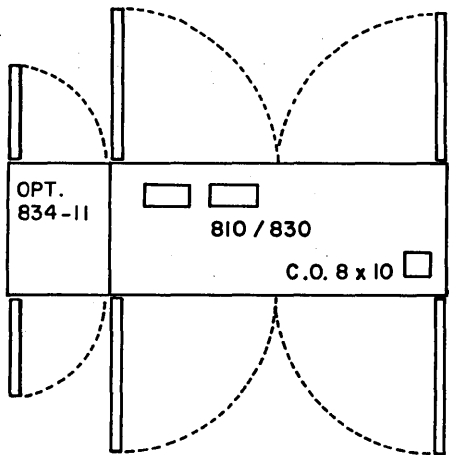
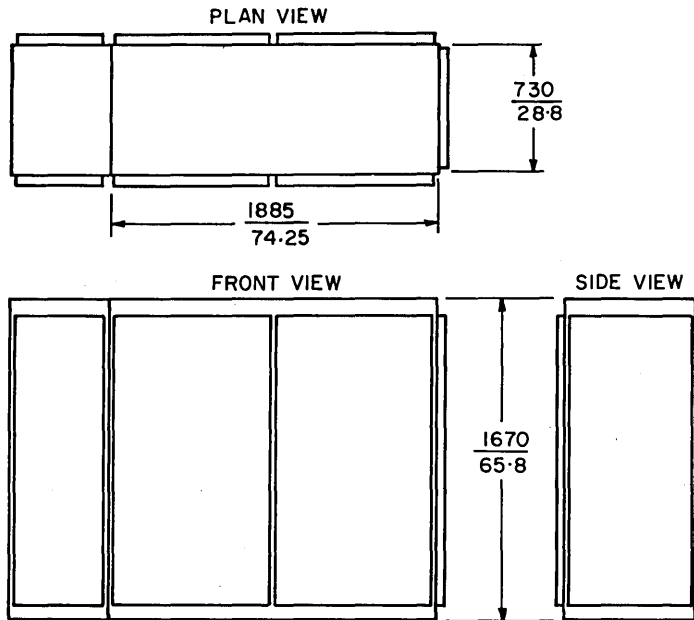
MODEL NUMBER	NOTES	18105-1	18105-2	18105-3	18105-4		18105-5		HEAT REJECTION RATE
		208V, 60 HZ 3 PHASE WYE	240V, 60 HZ 3 PHASE DELTA	380-415V 50 HZ 3 PHASE	208V 60 HZ 3 PHASE	208V 400 HZ 3 PHASE	380-415V 50 HZ 3 PHASE	208V 400 HZ 3 PHASE	
810/830 MAINFRAME	ENTRY LEVEL 2MB MEMORY, 1OPP, 6 CHANNEL, 2ICI's	5.6 kVa	5.6 kVa	5.6 kVa	1.7 kVa	3.9 kVa	1.7 kVa	3.9 kVa	5200 WATTS (17750 Btu/hr)
18109-1 2ND CPU	MAX. OF 1 CAN BE ADDED TO 810/830	2.2 kVa	2.2 kVa	2.2 kVa	-	2.2 kVa	-	2.2 kVa	2050 WATTS (6983 Btu/hr)
834-11 DISK STORAGE SUBSYSTEM	MAX. OF 2 CAN BE BOLTED TO 810/830	1.0 kVa	1.0 kVa	1.0 kVa	-	1.0 kVa	-	1.0 kVa	950 WATTS (3242 Btu/hr)
834-12 DISK STORAGE UNIT	MAX. OF 2 CAN BE ADDED TO EACH 834-11	0.5 kVa	0.5 kVa	0.5 kVa	-	0.5 kVa	-	0.5 kVa	475 WATTS (1621 Btu/hr)
18101-2 2MB MEM	MAX. OF 1 CAN BE ADDED TO 810/830	0.14 kVa	0.14 kVa	0.14 kVa	-	0.14 kVa	-	0.14 kVa	130 WATTS (445 Btu/hr)
18101-4 4MB MEM	MAX. OF 3 CAN BE ADDED TO 810/830	0.28 kVa	0.28 kVa	0.28 kVa	-	0.28 kVa	-	0.28 kVa	260 WATTS (890 Btu/hr)
18101-16 16 TO 32 MB MEM	MAX. OF 1 CAN BE ADDED TO 810/830 FOUR ADDITIONAL 3HBH PAKS	0.28 kVa	0.28 kVa	0.28 kVa	-	0.28 kVa	-	0.28 kVa	260 WATTS (890 Btu/hr)
18102-1 CHANNEL INCREMENT	MAX. OF 2 CAN BE ADDED TO 810/830	0.08 kVa	0.08 kVa	0.08 kVa	-	0.08 kVa	-	0.08 kVa	75 WATTS (508 Btu/hr)
10102-2 ICI CHANNEL INCREMENT	MAX. OF 1 CAN BE ADDED TO 810/830	0 kVa	0 kVa	0 kVa	-	0 kVa	-	0 kVa	0 WATTS (0 Btu/hr)
18103-1 PP INCREMENT	MAX. OF 1 CAN BE ADDED TO 810/830	0.32 kVa	0.32 kVa	0.32 kVa	-	0.32 kVa	-	0.32 kVa	298 WATTS (1016 Btu/hr)

180-810, 180-830 COMPUTER

CYBER 180 - 810/830 INPUT POWER OPTIONS AND POWER CONSUMPTION (2 OF 2)

MODEL NUMBER	NOTES	18105-1	18105-2	18105-3	18105-4		18105-5		HEAT REJECTION RATE
		208V, 60 HZ 3 PHASE WYE	240V, 60 HZ 3 PHASE DELTA	380-415V 50 HZ 3 PHASE	208V 60 HZ 3 PHASE	208V 400 HZ 3 PHASE	380-415V 50 HZ 3 PHASE	208V 400 HZ 3 PHASE	
DISK/TAPE ADAPTER MODULES	MAX. OF 8 CAN BE ADDED TO 810/830	0.1 kVa	0.1 kVa	0.1 kVa	-	0.1 kVa	-	0.1 kVa	93 WATTS (318 Btu/hr)
18104-1 BATTERY BACK-UP OPTION	MAX. OF 1 CAN BE ADDED TO 810/830	0.25 kVa	0.25 kVa	0.25 kVa	0.25 kVa	-	0.25 kVa	-	233 WATTS (795 Btu/hr)
18112-1 2 TO 16 MB MEM	MAX. OF 1 CAN BE ADDED TO 810/830	0.14 kVa	0.14 kVa	0.14 kVa	-	0.14 kVa	-	0.14 kVa	130 WATTS (445 Btu/hr)
18112-2 4 TO 16 MB MEM	MAX. OF 1 CAN BE ADDED TO 810/830	0 kVa	0 kVa	0 kVa	-	0 kVa	-	0 kVa	0 WATTS (0 Btu/hr)
18112-3 8 TO 16 MB MEM	MAX. OF 1 CAN BE ADDED TO 810/830	-0.28 kVa	-0.28 kVa	-0.28 kVa	-	-0.28 kVa	-	-0.28 kVa	-260 WATTS (-890 Btu/hr)
18112-4 12 TO 16 MB MEM	MAX. OF 1 CAN BE ADDED TO 810/830	-0.56 kVa	-0.56 kVa	-0.56 kVa	-	-0.56 kVa	-	-0.56 kVa	-520 WATTS (-1780 Btu/hr)
18113-1 16 TO 32 MB MEM	MAX. OF 1 CAN BE ADDED TO 810/830 REPLACES ODPH WITH 3HBH PAKS	-0.56 kVa	-0.56 kVa	-0.56 kVa	-	-0.56 kVa	-	-0.56 kVa	-520 WATTS (-1780 Btu/hr)
MAXIMUM 810/830 INPUT POWER CONSUMPTION ALL OPTIONS INSTALLED		14.5 kVa AT 0.9 PF	14.5 kVa AT 0.9 PF	14.5 kVa AT 0.9 PF	1.95 kVa AT 0.9 PF	12.52 kVa AT 0.9 PF	1.95 kVa AT 0.9 PF	12.52 kVa AT 0.9 PF	13533 WATTS (46188 Btu/hr)
CIRCUIT BREAKER SIZE		50 AMPS	50 AMPS	30 AMPS	15 AMPS	50 AMPS	15 AMPS	50 AMPS	N/A

180-810, 180-830 COMPUTER



C1030

* Cutout is 51 mm (2.0 in) from cabinet frame.

834-11 DISK STORAGE SUBSYSTEM

Width 457 mm (18.0 in)
 Depth 730 mm (28.8 in)

Weight 195kg (430 lb)
 Height 1671 mm (65.8 in)

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

Power consumption, steady state, maximum: 280 V dc 950 W
 Receives power from mainframe.

Control Data signal cables: no external cables

External terminator power connection required: no

Type of cooling: forced air from fans in each power supply, disk drive, and control module.

Source of cooling: ambient room air

Heat rejection rate, maximum to air: 950 W (3242 Btu/hr)

Permissible range of room relative humidity: 20% to 80%

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)

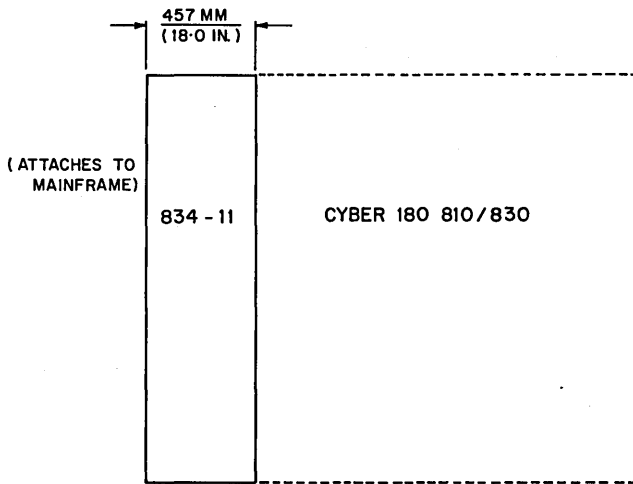
Maximum rate of change (operating):

Temperature 10°C (18°F)/hr
 Relative humidity 10%/hr

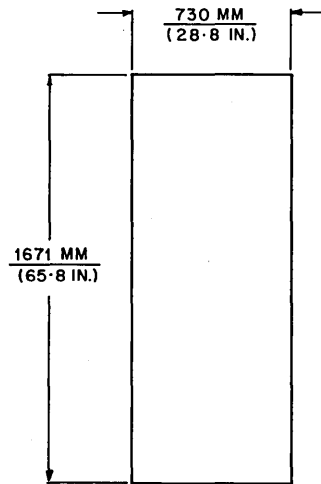
834-11 DISK STORAGE SUBSYSTEM



PLAN



FRONT



SIDE

C1029

18002-1 OPERATOR 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 with all doors extended, refer to floor plan layout.

Power configuration:

Power consumption, steady state, maximum:

- | | |
|---------------------------|---------|
| a. 400 Hz, 208 V, 3 phase | 0.8 kVa |
| b. 60 Hz, 120 V, 1 phase | 0.3 kVa |
| or | |
| 50 Hz, 220 V, 1 phase | 0.3 kVa |

External terminator power connection required: no

Circuit breakers:

Power connector locations above cabinet base:

- | | |
|--------------------------|---------------------------------|
| a. 400 Hz, 15 A, 3 phase | Terminal strip 508 mm (20.0 in) |
| b. 60 Hz, 15 A, 1 phase | Terminal strip 406 mm (16.0 in) |
| or | |
| 50 Hz, 15 A, 1 phase | Terminal strip 406 mm (16.0 in) |

Control Data signal cables:

	Quantity	Standard length	Maximum length
Console to mainframe	2	19.8 m (65 ft)	19.8 m (65 ft)

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

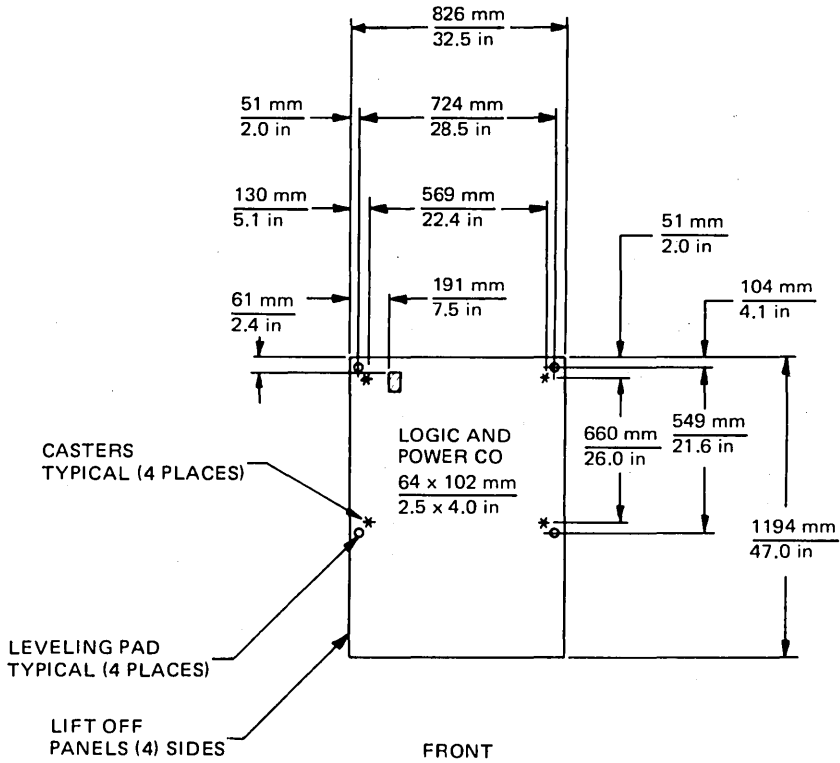
Type of cooling: internal fan
 Source of cooling: ambient room air
 Heat rejection rate, maximum to air: 888 W (3030 Btu/hr)
 Permissible range of room relative humidity: 35% to 60%

Temperature range:

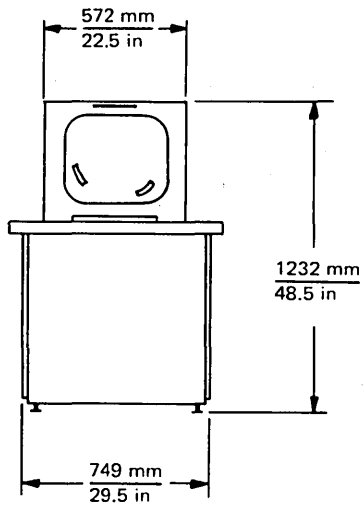
	Maximum	Recommended	Minimum
Operating temperature	32°C (90°F)	23°C (74°F)	15°C (59°F)
Storage temperature	54°C (130°F)		-18°C (0°F)

18002-1 OPERATOR DISPLAY STATION

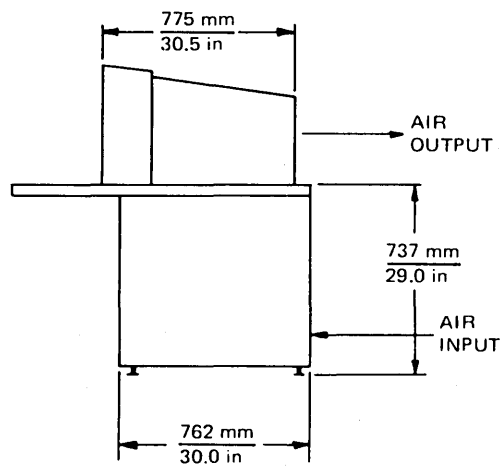
PLAN



FRONT



SIDE



18002-2 OPERATOR DISPLAY STATION

Display			Keyboard	
Width	430 mm	(16.9 in)	490 mm	(19.3 in)
Depth	430 mm	(16.9 in)	230 mm	(9.1 in)
Height	440 mm	(17.3 in)	50 mm	(1.9 in)
Weight	19 kg	(42 lb) (including keyboard)		

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

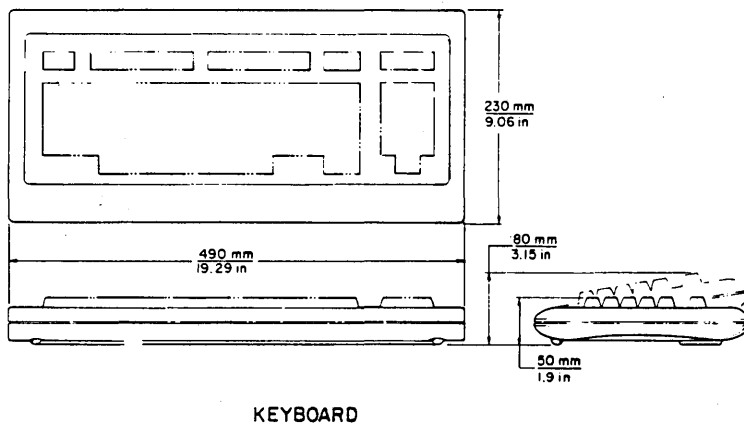
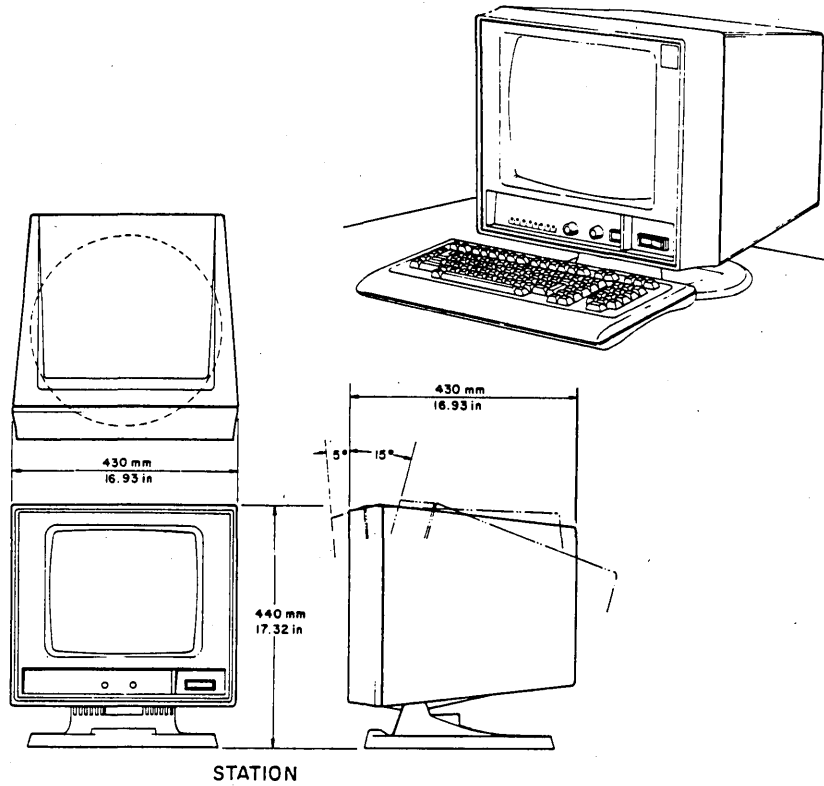
Power configuration: (SW selectable)	Power consumption, steady state, maximum:
a. 50/60 Hz, 120V, single phase	0.16 kVa
or	
50/60 Hz, 220V, single phase	0.16 kVa
or	
50/60 Hz, 240V, single phase	0.16 kVa
Circuit breaker:	50/60 Hz 15 AMP, single phase
AC Power Cable and Connector:	
Cord Length:	2.74 m (9 ft) flexible power cord supplied.
Plug (NEMA):	5-15 (60-Hz) CDC supplied. 6-15 (50-Hz) customer to supply and install.
Mating Connector (NEMA):	5-15R (60-Hz) CDC supplied. 6-15R (50-Hz) customer to supply and install.

Control Data signal cables:	Quantity	Standard length	Maximum length
Console to mainframe	1	15m (50 ft)	15m (50 ft)

Type of cooling:	internal fan
Source of cooling:	ambient room air
Heat rejection rate, maximum to air:	107 W (365 Btu/hr)
Permissible range of room relative humidity:	20% to 80%

Temperature range:	Maximum	Recommended	Minimum
Operating temperature	40°C (104°F)	23°C (74°F)	10°C (50°F)
Storage temperature	60°C (140°F)		-40°C (-40°F)

18002-2 OPERATOR DISPLAY STATION



533/536 LINE PRINTER

Dimensions:

Width: 730 mm (28.8 in)
Depth: 683 mm (26.9 in)
Height: 915 mm (36.0 in)

Weight: 108 kg (240 lb)
Shipping: 136 kg (300 lb)
Supported by 4 casters

Power Requirements: (steady state maximum)

Hz	60	50	50
Voltage	120	220	240
Amperes	7.2	4	3.6
kVa	0.86	0.88	0.86
Phase	1	1	1
Breaker	15A	15A	15A

AC Power Cable and Connector:

Cord Length: 2.3 m (7.5 ft) flexible power cord supplied.

Plug (NEMA): 5-15 (60-Hz) CDC supplied.
6-15 (50-Hz) customer to supply and install.

Mating Connector (NEMA): 5-15R (60-Hz) CDC supplied.
6-15R (50-Hz) customer to supply and install.
H is 6-15 R (50-Hz)

I/O Cable

Length:	Supplied	9.2 m (30 ft.)
	Maximum	15.3 m (50 ft.)
	Connected above floor	0.89 m (35 in.)

External terminator power connection required: no

Heat Dissipation:

Standby:	852 Btu/h (250 W)
Printing:	1534 Btu/h (450 W)

Type of cooling: forced air

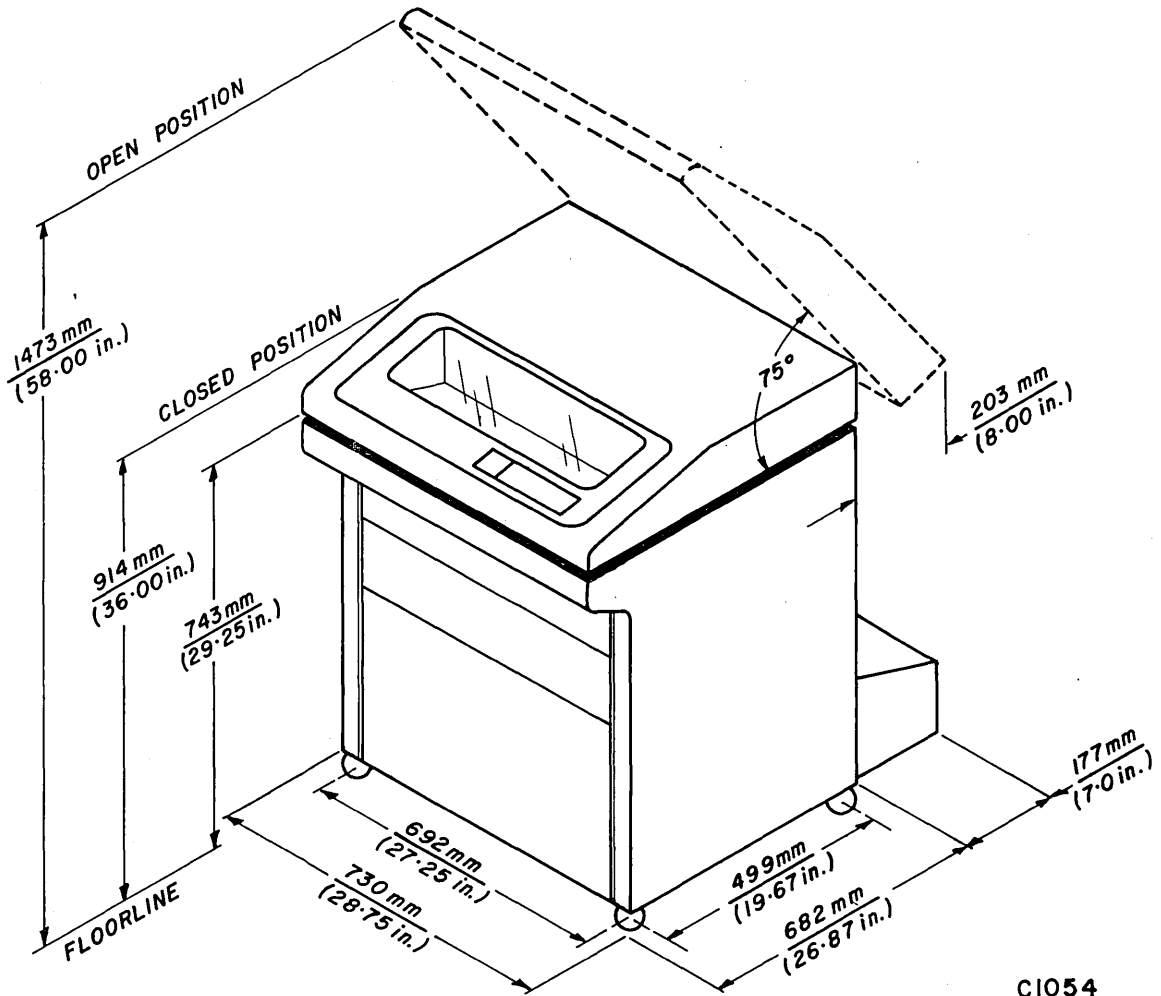
Source of cooling: ambient room air

Operating Environment:

Temperature:	10°C to 40°C (50°F to 104°F)*
Temperature Gradient:	10°C (18°F) per hour
Relative Humidity:	20% to 80%
RH Gradient:	10% per hour
Altitude:	2000m (6560 ft) [to 3000m (9850 ft) with high alt. kit]

*Maximum operating temperature 35°C (95°F) above 305m (1000 ft).

533/536 LINE PRINTER



C1054

639-1 MAGNETIC TAPE TRANSPORT

Width	483 mm (19 in)	Height	914 mm (36 in)
Depth	914 mm (36 in)	Weight	121 kg (267 lb) (Supported by frame)

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

Power consumption (steady state maximum): 60 Hz, 120V, 1 phase, 0.4 kVA (0.3 kW)

or

50 Hz, 220/240 V, 1 phase, 0.4 kVA (0.3 kW)

Circuit breakers:

60 Hz, 15 A, 1 phase

or

50 Hz, 15 A, 1 phase

Power connector:

3 m (10 ft) power cord with 3-prong plug (NEMA 15-5) provided

3 m (10 ft) power cord; customer to provide and install mating plug

Control Data signal cables:	Quantity	Maximum length
From tape transport to adapter	2	5.2 m (17 ft)

Distance from internal signal cable connectors to floor: 61 cm (24 in)

External terminator power connection required: no

Environmental considerations:

Type of cooling:

Forced air (internal fans)

Source of cooling:

Ambient room air

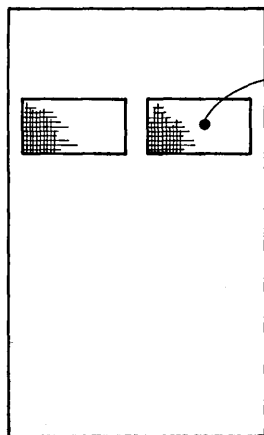
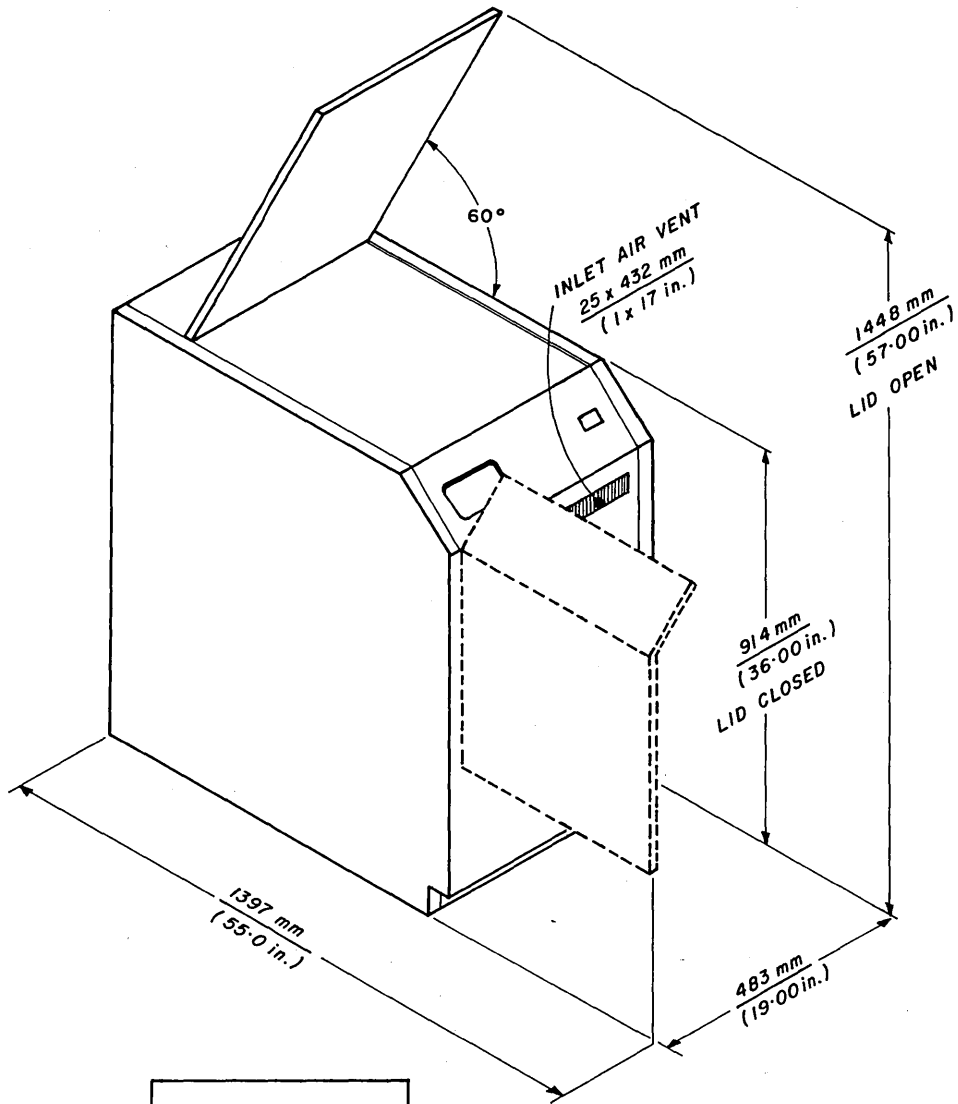
Heat rejection rate, maximum to air:

300 W (1024 Btu/hr)

Permissible range of room relative humidity: 20% to 80%

	Maximum	Recommended	Minimum	Dew Point Limitation
Operating temperature (ambient or plenum inlet temperature)	32°C (90°F)	22.2°C (72°F)	15° (59°F)	26°C (79°F)
Storage temperature	50°C (122°F)	N/A	-10° (14°F)	N/A

639-1 MAGNETIC TAPE TRANSPORT



EXHAUST AIR VENT (6)
89 x 183 mm
(3.5 x 7.2 in.)

C1055

PRIMARY POWER

The CYBER 180 Models 810 and 830 computer systems are designed to operate on either 50-Hz or 60-Hz input power. The system can also use 400-Hz power from Control Data Corporation MG sets. Refer to the data sheets in section 2 for the various input voltage/frequency options available.

Power may be distributed to the computer system directly from the building's wiring via conduits, cables, disconnects, and circuit breakers. Power may also be sent to a commercially available computer power island (power center) which is placed in the computer facility and distributes power to the computer system via cables and circuit breakers provided with the unit. See section 1 of the Site Preparation manual (60275100) for additional information about computer power islands.

The computer system has the following power requirements.

- Mainframe: 50-Hz or 60-Hz input power is always required. When 400-Hz power is available, it can be used to power the mainframe and disk storage subsystem (ISD). In this case the 50/60-Hz power is utilized only for the mainframe cooling system blowers and for battery-backup recharging. The MG set supplies 400 Hz 120/208-volt, 3-phase, 4-wire power to the central computer.
- MG Set: Where 400-Hz input power is required, it is supplied via an MG set. The MG primary power is supplied in 3-phase via a 4-wire cable. Refer to table 3-1 for MG input power requirements.
- Peripheral equipment: Refer to this manual and/or Site Preparation section 3 manual for data sheets.

- Controls and wall-mounted panels: the terminator power supply, when required, and/or the System Power Control Panel (SPCP) for the MG set(s). Refer to the power distribution diagram found in figure 3-1.
- Mainframe Cooling system blowers: The cooling system uses internal blowers to circulate ambient room air, taken from an opening in the bottom front of the cabinet, over the logic components. These blowers require a 230-volt input. A 3-phase isolation transformer is located in the 50/60-Hz power module box to transform 208/220/240-volt inputs to the required 230-volt level. The transformer also provides for battery recharging.

To ensure that the system components arrive at the computer site with the blowers, motors, power supplies, etc., preconnected for the proper input voltage/frequency, the customer must inform Control Data of frequency and voltage available at the site by selecting the appropriate 18105-X power option.

POWER DISTRIBUTION

Power plugs provide convenient power connections and rapid installation for the mainframe. Refer to table 3-2 for connection specifications.

Figures 3-1, 3-2, and 3-3 indicate typical 50/60-Hz power distribution schemes for the computer system. An entry level system is shown in figure 3-1. An entry level system using the 12.5-kVa MG is shown in figure 3-2. A system with an SPCP and a 25-kVa or larger MG is shown in figure 3-3.

TABLE 3-1. MG INPUT POWER REQUIREMENTS

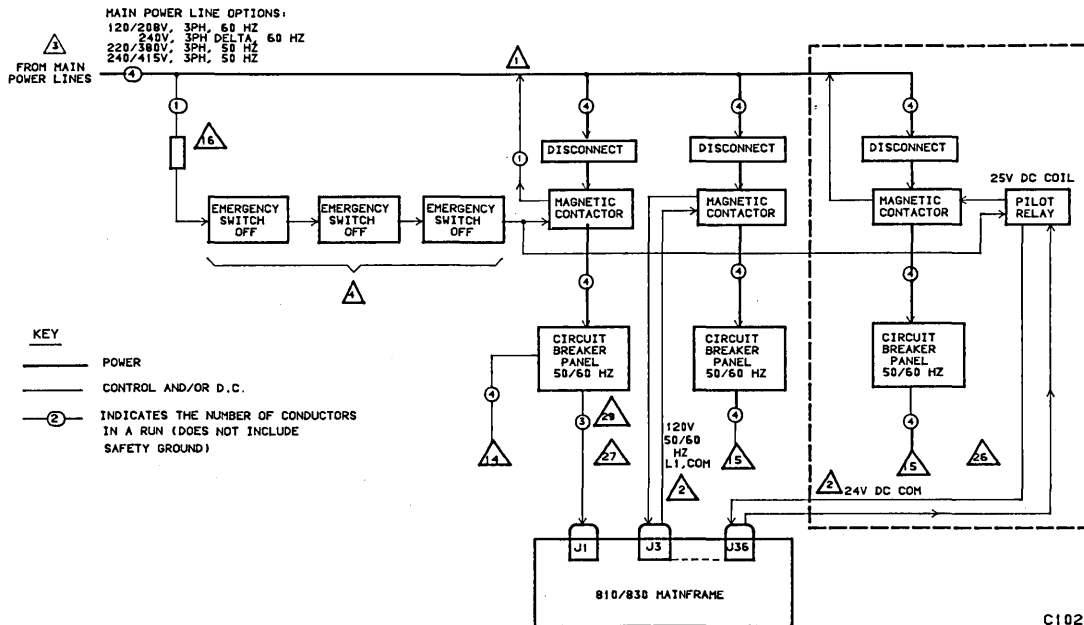
MG Set	50 Hz	60 Hz
12.5 kVa	Not available for 50 Hz	208/220 V ($\pm 10\%$)
25 kVa	398 V ($\pm 15\%$)	208/220/440/460 V ($\pm 10\%$)
40 kVa	220/230/240/380/398/415 V ($\pm 10\%$)	208/220/440/460 V ($\pm 10\%$)

* A Central Power Control/Monitoring/Distribution Unit

TABLE 3-2. POWER PLUG/CONNECTOR SPECIFICATIONS

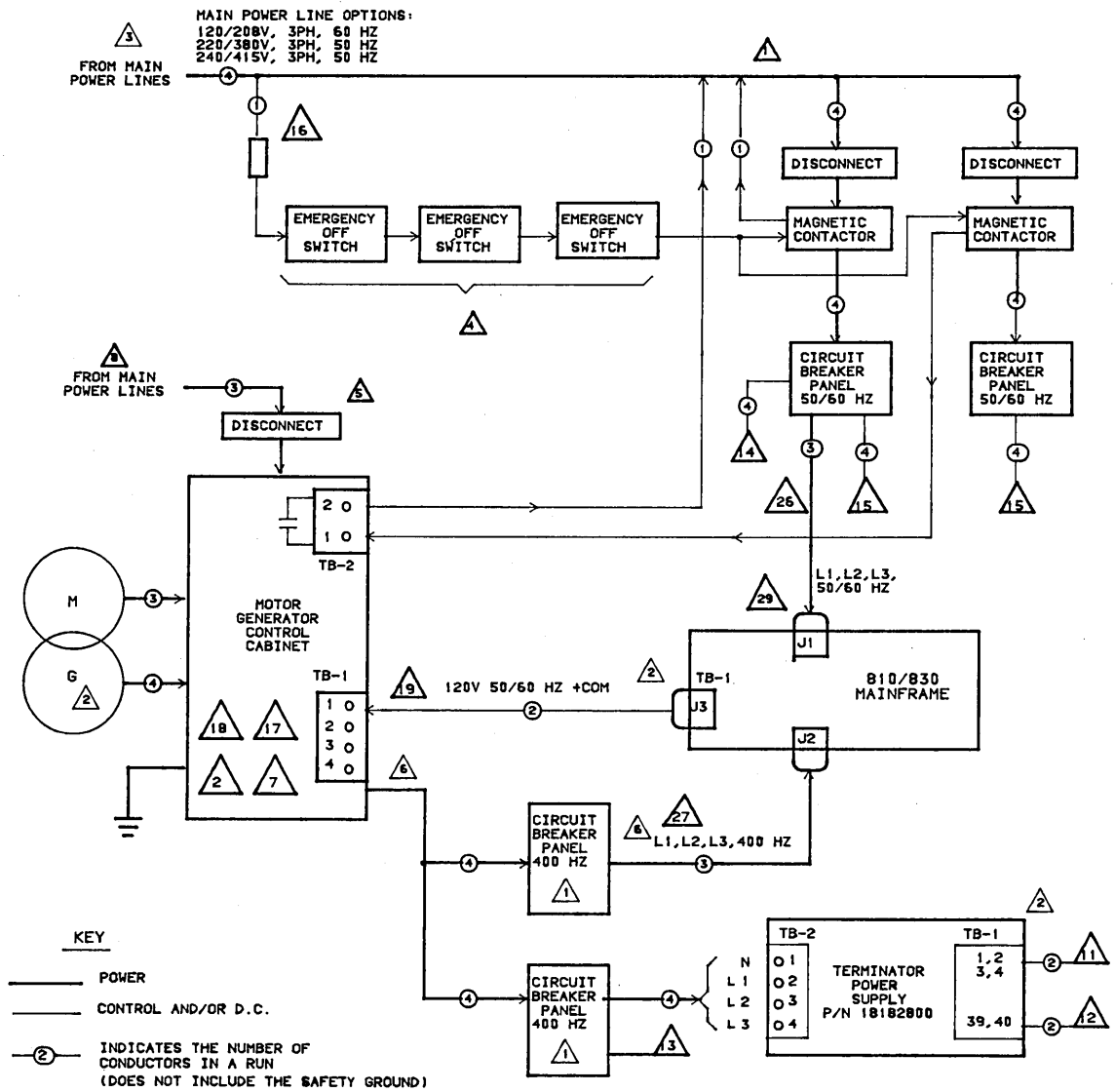
INPUT POWER			CDC SUPPLIED MATING CONNECTOR (1)			POWER OPTION
VOLTAGE	FREQUENCY	PHASES	WIRES	HUBBELL TYPE	CDC P/N	
120/208	60Hz	3	4 WIRE + GRD	560C9W	15186720	18105-1
120/208 PLUS 120/208	60Hz 400Hz	3 3	4 WIRE + GRD 4 WIRE + GRD	520C9W 560C2WS	15186710 15186725	18105-4
220/380 OR 240/415	50Hz	3	4 WIRE + GRD	532C6W 32-6h-RED 3P-N-GROUND (2)	15186730	18105-3
220/380 OR 240/415 PLUS 120/208	50Hz 400Hz	3 3	4 WIRE + GRD 4 WIRE + GRD	516C6W 560C2WS	15186740 15186725	18105-5
240 DELTA	60Hz	3	3 WIRE + GRD	460C9W	15186715	18105-2

(1) The customer must install the CDC supplied mating connector prior to system arrival. The connector should be on flexible cord/conduit and terminated within 2.43 m (8 ft) of the mainframe power entry point.



See diagram notes on following pages.

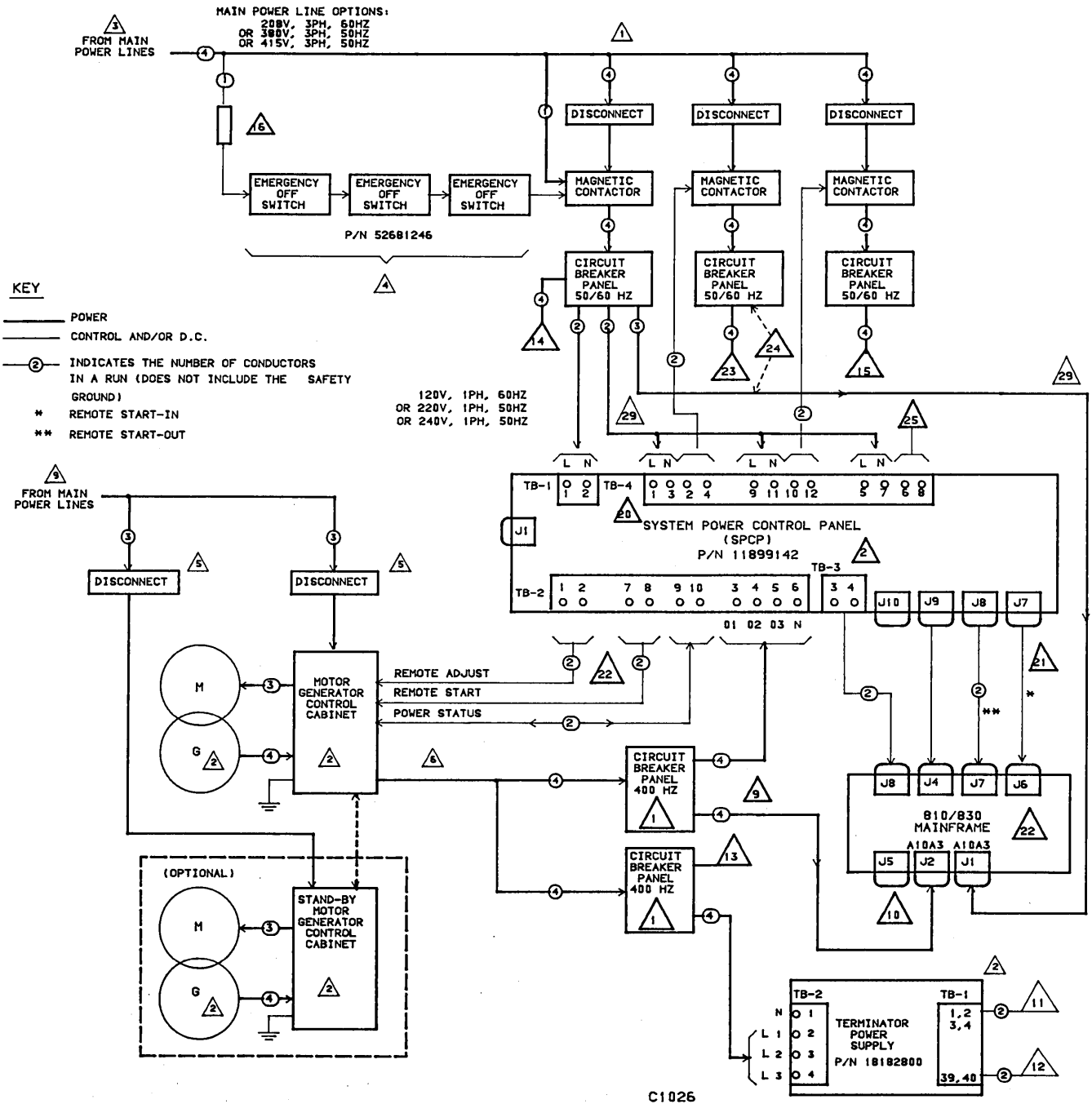
Figure 3-1. Power Distribution Diagram, 50/60 Hz



C1025

See diagram notes on following pages.

Figure 3-2. Power Distribution Diagram, 12.5 kVa MG



See diagram notes on following pages.

Figure 3-3. Power Distribution Diagram, 25 kVa or Larger MG

1. Circuit breakers, breaker panels, magnetic contactors, main disconnect 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.

Acceptable voltage requirements for all (50/60 and 400 Hz) installations:

120/208V, 60 Hz, 3 Ph
220/380V, 50 Hz, 3 Ph
240/415V, 50 Hz, 3 Ph

Additional voltage requirement acceptable for 50/60 Hz installations:

240V 60 Hz, 3 Ph Delta

4. Emergency off switches should be located approximately 1.5 m (5 ft) from the floor with one near each exit and shall be wired in series.
5. Size of MG input power disconnect and motor power wiring shall be based on motor power characteristics. Refer to Site Preparation Section 4 Manual (60451300).
6. Voltage loss between MG and computer equipment must not exceed two percent of the MG rated output.
7. MG output is 12.5 kVA, 208 V, 3 phase, 400 Hz.
8. Power input for 12.5 kVA MG:
208 V, $\pm 10\%$, 3 phase, 60 Hz.
9. Power input for 25 kVA MG:
208/220/440/460 V $\pm 10\%$, 3-phase, 60 Hz
or
398 V, $\pm 15\%$, 3-phase, 50 Hz
10. J5 is terminated.
11. ± 20 -V dc terminator power to 405 card reader (if used).
12. ± 20 -V dc terminator power to 580-XXX line printer (if used).
13. To associated peripheral equipments that require 400-Hz power.
14. Provides 50/60-Hz power to items which should always remain on except when the wall-mounted emergency off switch is pulled (that is, test equipment service outlets).
15. Provides 50/60-Hz power to equipment that requires power when 400-Hz is available.
16. Fuse, customer furnished and installed.

17. MG must be placed in close proximity to the mainframe because 400-Hz voltage adjustment is done at MG cabinet front panel.
18. When 400-Hz load is increased or decreased, MG output may have to be readjusted to 208 V.
19. Connections:

<u>M-G</u>	to	<u>Mainframe</u>
TB1-1		J3
TB1-2		J3
TB1-3		J3
TB1-4		J3

20. Numbered to show wiring connections; TB-4 terminals are actually numbered sequentially.
21. SPCP should be located approximately 1.5 m (5 ft) from the floor. Unit is 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 monitor cables will reach, taking into consideration the cable drop lengths from the SPCP to the room floor (below the raised floor) and the rise back up and 457 mm (18 in) into the mainframe.
22. MG remote adjust, remote start, and power status wiring between SPCP and MG control cabinet must have separate raceways (three independent runs of two each) unless adequately shielded from one another by use of conduit, greenfield, or braided shield within the power cables.
23. Same as 14 except breaker panel may be shut off via the service switch within the SPCP.
24. 50/60-Hz power to the mainframe may be supplied from this panel also.
25. Circuit may be used to switch control power for an additional magnetic contactor. The circuit may be adjusted to come on 0 to 5 minutes prior to 400-Hz power and to stay on 0 to 5 minutes after 400-Hz power is removed.
26. Circuitry shown inside dash line is an alternate remote control to that shown connected to J3. This alternate circuit is used if 120 V coil magnetic contactors are not available (that is at 50-Hz sites).
27. Main power supply (-5.2 V, -2.2 V, +5.0 V) to the logics.
28. Power to auxiliary power (+5 V, -12 V, +12 V), auxiliary battery charger, blowers, and so forth.
29. Power supply options from 50/60 Hz circuit breaker panel:
 - 208 V, 3 Ph, 60 Hz
 - 380 V, 3 Ph, 50 Hz
 - 415 V, 3 Ph, 50 Hz
 - 240 V, 3 Ph Delta, 60 Hz

Notes for Power Distribution Diagrams (1 of 2)

Notes for Power Distribution Diagrams (2 of 2)

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. The customer must supply and install all primary power source circuit breakers, breaker panels, emergency off switches, disconnects, ductwork, magnetic contactors, and power cabling including the cabling required for signal cable terminator power distribution. Upon delivery, the customer must also wire and install the selected system motor-generator set as well as the CDC furnished wall-mounted panels (when used).

POWER ISLAND

Computer power islands (PI) sometimes referred to as power distribution units or power centers are stand alone cabinets that distribute building power (50 or 60 Hz and/or 400 Hz) from a common source to the entire computer system through integral circuit breakers and shielded power cables.

A power island is a general purpose unit that is custom tailored to a particular computer system configuration via proper selection of cables, breakers, and selected options.

In its basic form, a power island has an enclosure, an input circuit breaker, and output circuit breakers all mounted in a suitable panel or panels. Power cables are enclosed in water tight, shielded, flexible conduit and are cut to appropriate lengths which are fitted with suitable terminations for connection to the individual computer equipment.

To this basic configuration can be added enhancements to provide line isolation/filtering, monitoring, alarms, indicators, and controls.

The units are equipped with castors for easy relocation and, when the output cables are fitted with connectors, installation or re-location is a simple matter of rolling the PI into place, extending the output cables to the appropriate equipment and plugging in the equipment, plugging in the input power and any control cables to a pre-wired junction box, and turning on the input and output circuit breakers.

The features of the PI provide numerous customer advantages and benefits:

- Improved installability - Rapid installation via pre-determined cable lengths and plug-gable connectors.

- Portability - Compact size and castors.
- Flexibility - When properly sized for future growth, additional equipment can easily, quickly, and inexpensively be added to an existing PI.
- Reduced contractor costs - The PI replaces most of the wall panels, breakers, and conduits that are traditionally installed by the electrical contractor.
- Improved system uptime - Faster on-line due to the rapid installation time. Also, when the PI is equipped with an isolation transformer, most voltage transients, spikes, and glitches are filtered out. Additionally, the PI provides a separate power ground closer to the computer thus reducing possible ground noise injection susceptibility.
- Environmental control - Continuous monitoring of power to/from the unit and integrity of the grounding system.

For additional information on the availability of these units and/or the various options and sizes, contact your Control Data Computer Facility Services site planning engineer.

MG SET

An MG set is not included with the computer system. When an MG set is required for the mainframe and peripherals, the customer and CDC sales personnel consider present needs, future plans and overall costs and then select a MG set. Three sizes of MG sets are available: 12.5-kVa, 25-kVa, and 40-kVa.

NOTE

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

CAUTION

Control Data uses unregulated power supplies in certain pieces of peripheral equipment. Regulation is provided by the MG set which is specially manufactured to meet CDC MG design specifications. The use of other vendor's 400-Hz power sources may cause damage to the mainframe and/or peripherals. Alternate power sources are not recommended and will not be permitted unless it can be shown that they either meet or exceed the CDC MG design specifications.

When determining the MG size, take the following into consideration:

- The kVa figures for all equipment, both mainframe and peripherals, on the equipment data sheets and in the site planning product profile printout.
- Consideration should be given to future expansion requirements. For example, the money saved by operating near full load on a smaller MG may be more than offset by the costs of rewiring for a larger MG at a future date in the event that the system is expanded or additions exceed the capability of the smaller set.
- Within the constraints determined by the items above, consideration should be given to higher loading of the MG. This improves both power factor and efficiency for maximum operating cost effectiveness.

NOTE

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

The 25-kVa and 40-kVa MGs have vertical housings with the rotation axis 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-kVa and 25-kVa MG sets are single units, having both the MG and associated control circuitry mounted in a single cabinet. The cabinet is acoustically treated and matches the style and color of the CDC CYBER line. The 12.5-kVa MG must be located in the computer room, close to the mainframe, as output voltage must be adjusted at the MG cabinet. The 25-kVa MG may be located in the computer room or in a separate MG room.

As mentioned in the section titled Computer Room Requirements, the noise level of the 40-kVa MG set makes installation in a separate MG room necessary.

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

The customer is responsible for providing primary power. This power must be capable of handling the starting load current of the specific MG installation as well as the main power line disconnects in accordance with local codes. Load currents, disconnect sizes, and other MG installation details can be found in the MG data sheets of the Site Preparation Section 4 manual.

TABLE 3-3. SPCP/MG CONNECTIONS

SPCP Schematic Diagram Designation	Function	MG Control Cabinet Vendor Diagram Designations*
MG remote control voltage	Provides remote MG starting capability by supplying 120-V ac from SPCP to MG control cabinet.	to remote control at mainframe; 120-V ac from mainframe; control voltage from mainframe; to remote control voltage from mainframe; remote control on.
MG remote adjustment	Enables remote adjustment of the MG 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.

* Terminology variations used by the vendors on various WI, I, and EI diagrams

SPCP MG CONTROL AND STATUS

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

Table 3-3 indicates the required connections between the SPCP and the MG control cabinet. For specific power connection terminals, refer to the appropriate MG control cabinet manual external interconnection (EI) wiring diagram and the Site Preparation Section 4 manual. For the SPCP schematic diagram and its connections, refer to the Site Preparation Section 4 manual.

NOTE

The SPCP must be used with a 25-kVa or larger MG.

SYSTEM GROUNDING

The customer must install grounding systems for all equipment in the computer system. The grounding systems must meet local electrical codes which 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 can be found 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 the mainframe and peripheral units not on casters, cable shielding should extend into the cabinet. If the shielding is rigid, and local codes permit, a short piece of flexible shielding should connect to the rigid shielding at a point below the surface of the raised floor (if applicable) and extend into the cabinet. If the shielding is flexible, it should extend directly into the cabinet.

* Registered trademark of the Zipper Tubing Co., Los Angeles, Ca.

- 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 (if applicable). The junction box should be immediately below the peripheral equipment cable cutout or as close to it as possible. Local codes determine the exact placement of the junction box.

NOTE

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

EMC GROUNDING

Many computer systems require an under-floor grid ground to provide maximum electromagnetic compatibility (EMC) and minimize electromagnetic interference (EMI) among the system cabinets and components. Due to the EMI immunity design features of the mainframe cabinets, CYBER 180-810/830 mainframes with totally shielded cables make the installation of a grid ground reference grid unnecessary. All equipment in the system must use shielded signal cables to maintain EMC integrity.

CAUTION

If any CYBER 180-810/830 mainframes are used in conjunction with any peripherals using unshielded logic cables, then all components in the system must be connected to an acceptable reference-plane grid ground as set in Site Preparation Section 1 manual.

If the customer chooses to or must use a grid ground, the EMC grounding strap must be connected to the EMC stud in the mainframe. The EMC grounding connections should utilize a 25 mm (1.0 in) wide tinned-copper braided grounding strap (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.

When using a raised floor and a grid ground, 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:

- Emergency off switches that are customer furnished and installed
- SPCP (systems with 25-kVa or larger MG)
- 20-A terminator power supply*

Control Data supplies the SPCP and terminator power supply 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 only part of the system is intended. Power to the SPCP must only be controlled by the emergency off switches. The SPCP also requires side and bottom clearance as set forth in the section titled Computer 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 nonautomatic reset type, such as break-glass units. This restricts their function to emergency use only. The interconnection to provide a system emergency off is shown in figures 3-1, 3-2, and 3-3.

* A 20 Amp, 40 V dc terminator power supply is an option required with the 405 card reader and/or 580 line printer (if applicable).

COMMENT SHEET

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