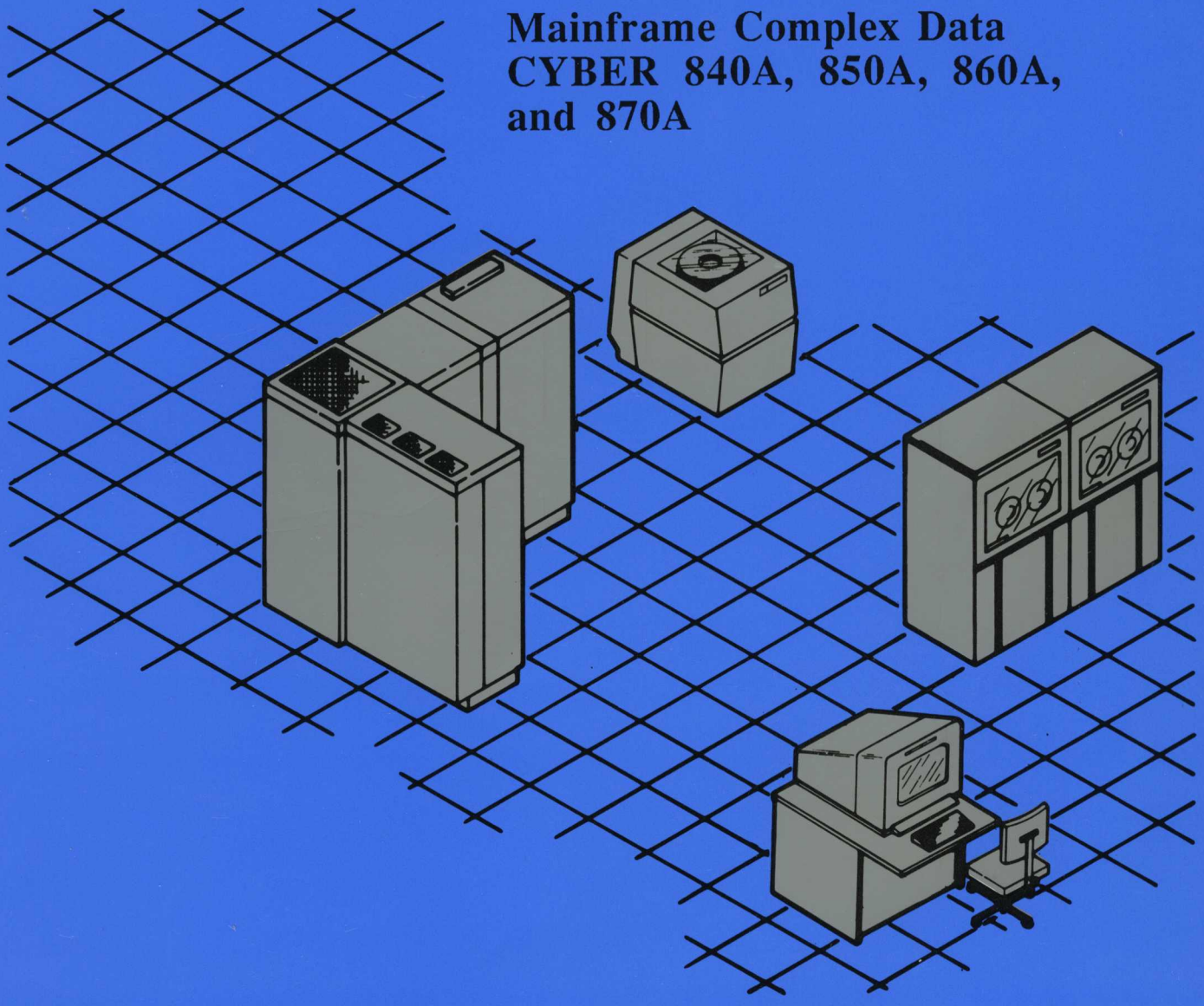
Control Data Computer Systems

Site Preparation

CONTROL DATA

Mainframe Complex Data CYBER 840A, 850A, 860A, and 870A



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CYBER 840A, 850A, 860A, and 870A
Site Preparation Manual

Publication Number 60463550

Manual History

Revision	Engineering, Field, or Publication Change Order(s)	Date
A	Manual Released	February 1986
B	ECO 48261	June 1987
C	ECO 48338	June 1987

Revision C obsoletes all previous editions.

About This Manual

This manual provides information for planning and preparing a computer site for the installation of the CONTROL DATA ® CYBER 840A, 850A, 860A, and 870A mainframe complexes.

Audience

The manual addresses Control Data customer personnel or their representatives who are responsible for planning and carrying out the site preparation activities.

Terminology

This manual uses the following terms as described.

Computer room	A room with a controlled environment maintained to meet the requirements of the system equipment.
Site	The computer room and other building locations that may include one or more motor-generator (M-G) sets and data media storage.
Mainframe complex	The central processor, input/output unit, central memory, system console, associated water cooling unit, M-G set, and any power control or environmental monitoring equipment that are part of the system.
Must	A mandatory requirement.
Should	A recommendation that is advised but not required.

Manual Organization

This manual contains sets of independent modules. Each module covers a single topic and contains a functional heading, one or more tables or figures, and additional paragraphs with detailed information on the topic. The modules in this manual are organized into six chapters and an appendix.

Introduction

Chapter 1 lists the equipment in the mainframe complex, lists the symbols used in plan views and diagrams, and contains a site planning worksheet.

Space Requirements

Chapter 2 gives the space required for placing equipment at the site, space required for moving equipment to the site, instructions for using scaled templates, and instructions for using full-size templates. This chapter contains a route planning worksheet.

Environmental Requirements

Chapter 3 specifies the planning requirements for the site air conditioning system, water system, and acoustical treatment, and contains air conditioning and site water worksheets.

Power Requirements

Control Data computing equipment requires 50/60-Hz primary power from the site electrical service entrance and 400-Hz secondary power from one or more M-G sets. Chapter 4 specifies the planning requirements for the site power distribution system and contains worksheets for 50/60-Hz power and 400-Hz power.

Communications Requirements

Chapter 5 specifies the planning requirements for the remote technical assistance (RTA) communications option.

Reports

Two reports must be filled in before the computer equipment is shipped. Chapter 6 contains the Site Data Report and the Site Readiness Report.

Grids and Templates

Appendix A contains scaled grids and templates of the mainframe complex equipment (except M-G sets).

Related Manuals

This manual presents site preparation data for a Control Data mainframe complex. The manual is intended to be used with the following manuals that describe general requirements for all computer systems and specific requirements for peripheral and communications equipment.

Control Data Computer Systems
Site Preparation General Information
(publication number 60275100)

Control Data Computer Systems
Site Preparation Peripheral Equipment Data
(publication number 60275300)

CDCNET Local Area Network
Installation
(publication number 60462870)

Ordering Manuals

You can order Control Data manuals from:

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

Ordering information, prices, and the current revision levels are in the Literature Catalog (publication number 90310500).

Disclaimer

Site preparation information for system equipment operation is valid only as described in this manual and other referenced manuals and documents. Control Data cannot be responsible for problems that result from improper site preparation or from the customer's failure to comply with applicable building, electrical and fire codes or ordinances.

IT IS THE CUSTOMER'S RESPONSIBILITY TO ENSURE THAT APPLICABLE BUILDING, ELECTRICAL, AND FIRE CODES OR ORDINANCES ARE FOLLOWED.

Contents

Figures

Tables

Introduction 1

Introduction 1

This chapter contains a list of equipment in the mainframe complex and a site planning worksheet. Use the information in this chapter to acquaint yourself with what equipment is in the complex and what you must do before the equipment arrives.

What Equipment Is in the Mainframe Complex?

The CYBER 840A, 850A, and 860A mainframe complexes consist of the equipment listed in table 1-1 and shown in figure 1-1; the CYBER 860A with 18559-3 CP-1 option or the 870A mainframe complex consist of the equipment listed in table 1-2 and shown in figure 1-2. (The M-G sets and RTA modem are not shown.)

Table 1-1. 840A/850A/860A Mainframe Complex Equipment

Product Number	Equipment	Qty
840A/850A/860A	Single-processor mainframe, includes system power monitor (SPM)	1
10513-740, 10514-740, 10513-780, or 10514-780	Motor-generator (M-G) set: • M-G control cabinet • MG (Kato or Piller)	1
18002-1	System console (required for NOS/BE or NOS)	1
18002-2	System console (required for NOS/VE)	1
18677-1	Water cooling unit	1
65348-1	Dew point sensor (DPS) (optional)	1
N/A	Remote technical assistance (RTA) modem (optional)	1

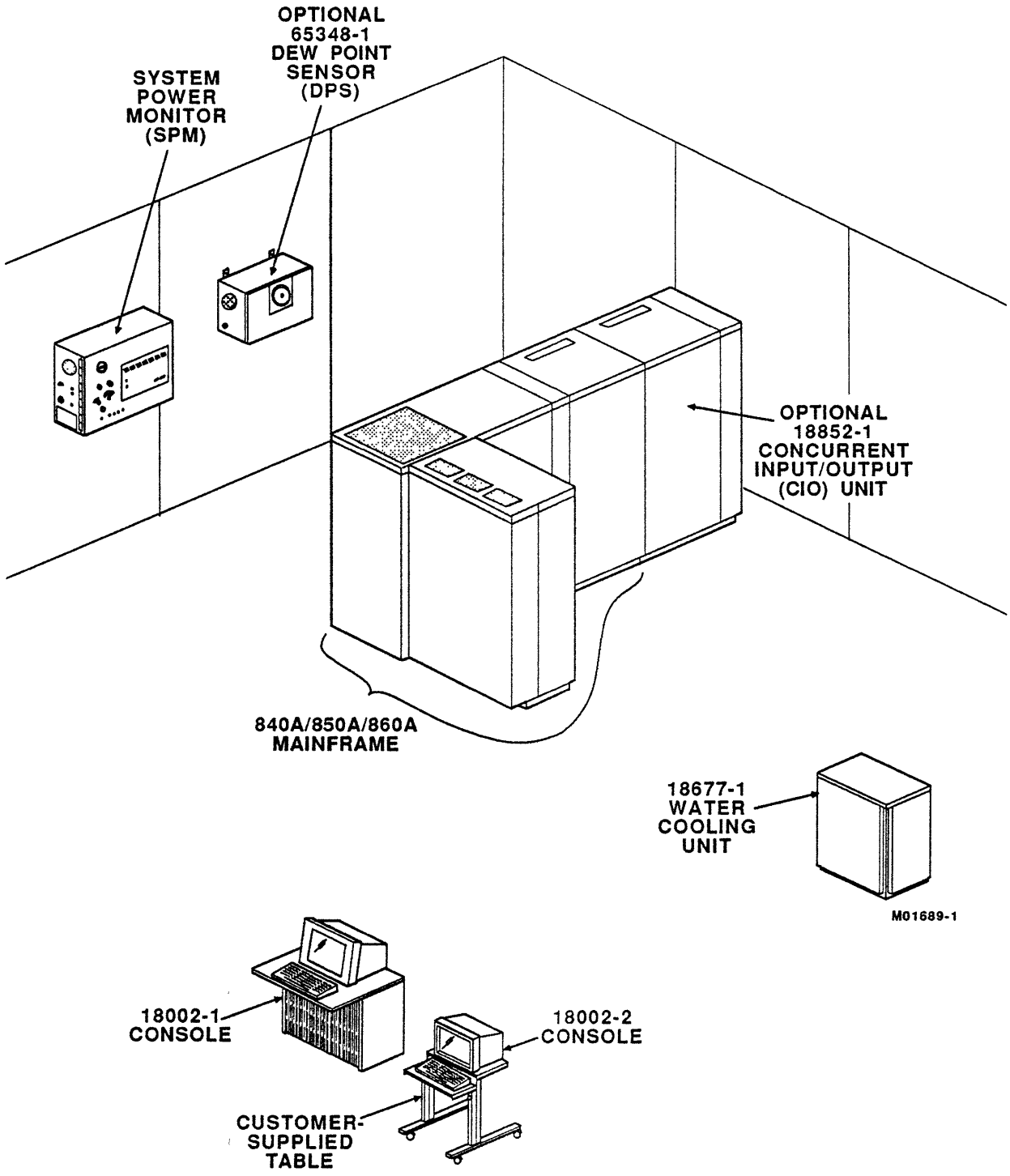


Figure 1-1. 840A/850A/860A Mainframe Complex

Table 1-2. 860A With 18559-3 or 870A Mainframe Complex Equipment

Product Number	Equipment	Qty
860A with 18559-3 or 870A	Dual-processor mainframe, includes system power monitor (SPM)	1
10513-780 or 10514-780	Motor-generator (M-G) set: • M-G control cabinet • MG (Kato or Piller)	1
18002-1	System console (required for NOS/BE or NOS)	1
18002-2	System console (required for NOS/VE)	1
18675-1/3 or 18677-1	Water cooling unit	1 Note[1]
65348-1	Dew point sensor (DPS) (optional)	1
N/A	Remote technical assistance (RTA) modem (optional)	1

Note:

1. Two 18677-1 water cooling units are required.

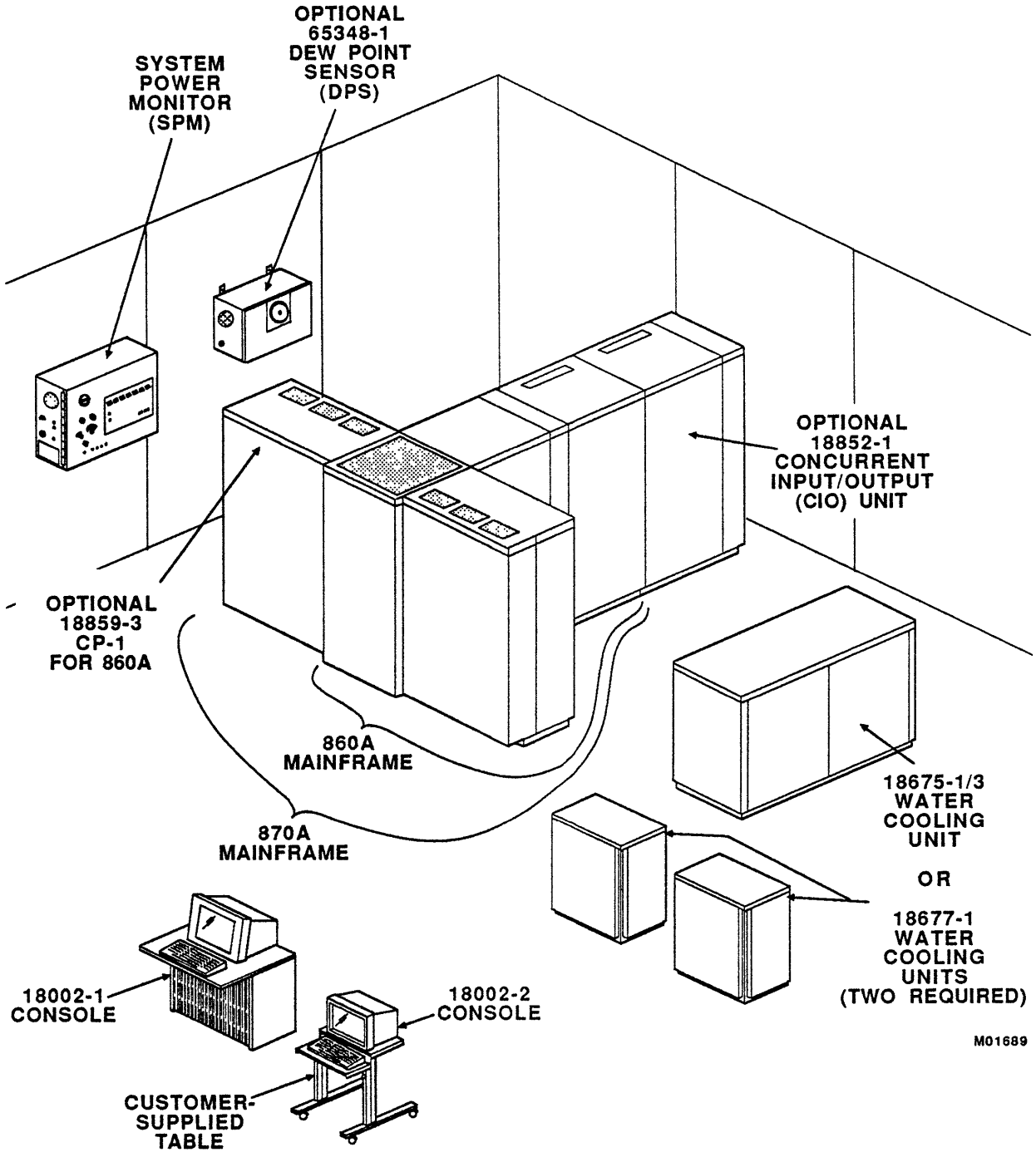


Figure 1-2. 860A With 18559-3 or 870A Mainframe Complex

What Units Make Up the Mainframe?

The units that make up the 840A/850A/860A and 870A mainframes are listed in table 1-3 and shown in figure 1-3.

Table 1-3. Mainframe Units

Unit Name	Unit Symbol	840A	850A	860A	870A
Central processor 0	CP-0	Std.	Std.	Std.	Std.
Central memory	CM	Std.	Std.	Std.	Std.
Interbay	Interbay	Std.	Std.	Std.	Std.
Nonconcurrent input/output	NIO	Std.	Std.	Std.	Std.
Central processor 1	CP-1	N/A	N/A	Opt.	Std.
Concurrent input/output	CIO	Opt.	Opt.	Opt.	Opt.
System power monitor	SPM	Std.	Std.	Std.	Std.

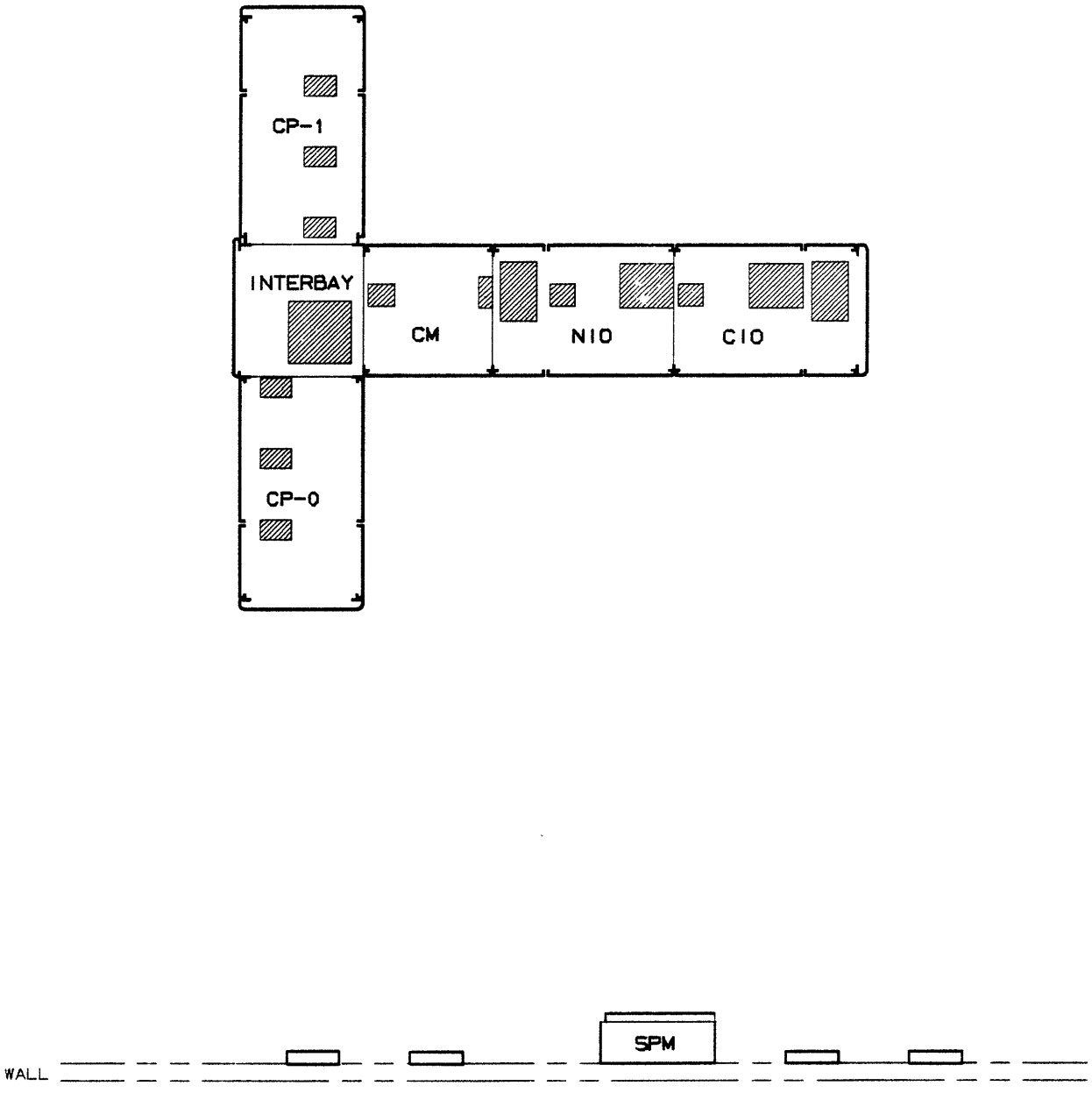


Figure 1-3. Mainframe Units

What Equipment Is Available for the Mainframe Complex?

The equipment that is available for the 840A/850A/860A/870A mainframe complexes is listed in numerical order in table 1-4 and shown in figure 1-4.

Table 1-4. Available Equipment for Mainframe Complex

Product Number	Description	Configuration
840A/850A/860A	Single-processor mainframe. Includes: • System power monitor (described below) • 2M words of central memory • 2K words of cache memory • 20 CYBER 170 peripheral processors • 24 CYBER 170 channels	Four units in L-shape and wall-mounted system power monitor
870A	Dual-processor mainframe. Includes: • System power monitor (described below) • 2M words of central memory • 2K words of cache memory • 20 CYBER 170 peripheral processors • 24 CYBER 170 channels	Five units in T-shape and wall-mounted system power monitor
N/A	System power monitor. Controls and monitors mainframe, two water cooling units for mainframe, one water cooling unit for peripheral equipment, and four MGs.	Wall-mounted panel
10513-740	40-kVA M-G set. Converts 60-Hz power to 400-Hz power for single-processor mainframe.	Two standalone units: MG and M-G control cabinet
10514-740	40-kVA M-G set. Converts 50-Hz power to 400-Hz power for single-processor mainframe.	Two standalone units: MG and M-G control cabinet
10513-780	80-KVA M-G set. Converts 60-Hz power to 400-Hz power for single-processor or dual-processor mainframe.	Two standalone units: MG and M-G control cabinet
10514-780	80-KVA M-G set. Converts 50-Hz power to 400-Hz power for single-processor or dual-processor mainframe.	Two standalone units: MG and M-G control cabinet
18002-1	System console. Consists of 21-in CRT display and attached keyboard. Required for NOS/BE or NOS operation.	Standalone unit
18002-2	System console. Consists of 15-in CRT display and detachable keyboard. Required for NOS/VE operation.	Tabletop unit

(Continued)

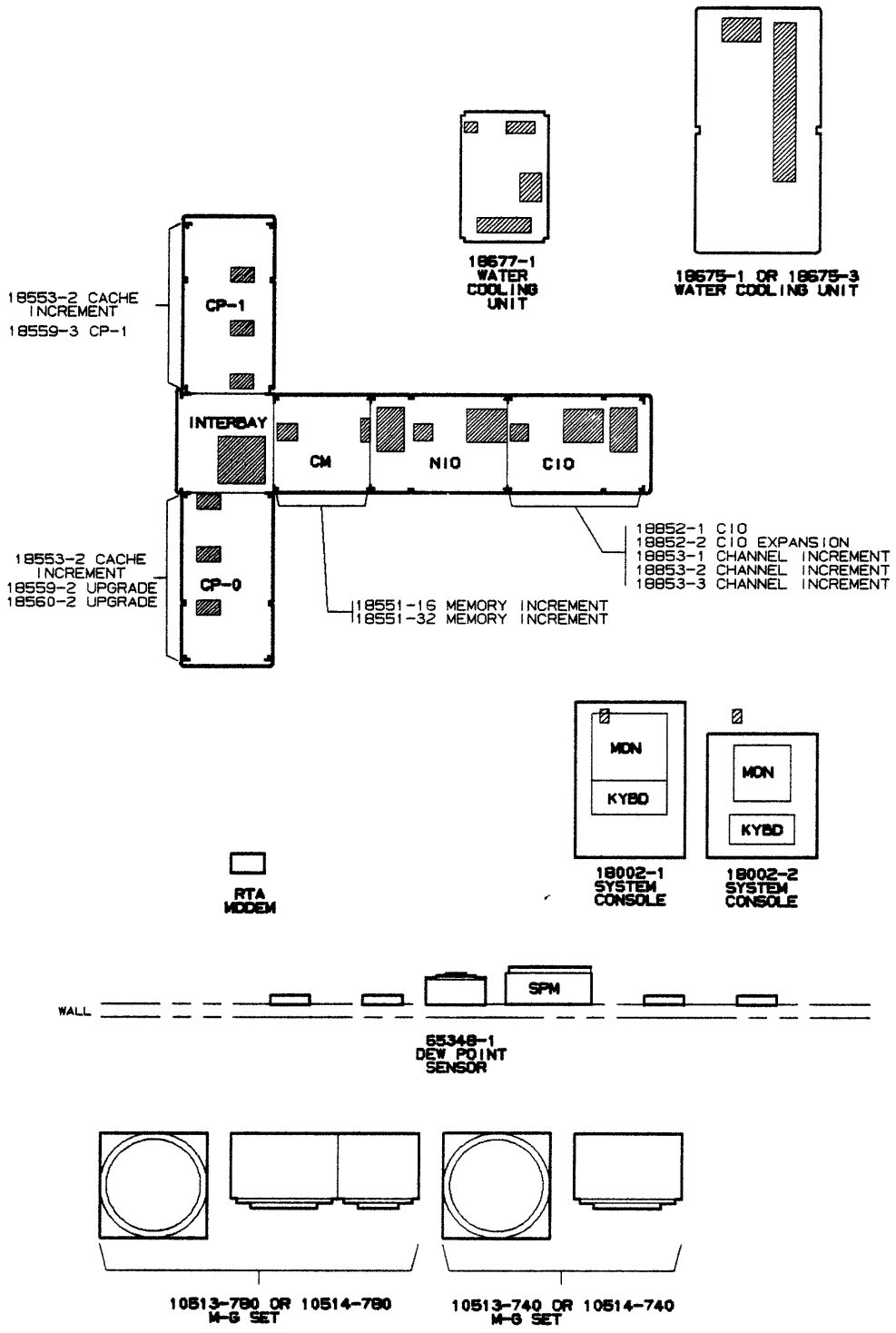
Table 1-4. Available Equipment for Mainframe Complex *(Continued)*

Product Number	Description	Configuration
18551-16	Memory increment. Adds 2M words to increase memory from 2M to 4M words.	Mounts in CM unit
18551-32	Memory increment. Requires prior installation of 18551-16. Initial 18551-32 adds 4M words to increase memory from 4M words to 8M words. Additional 18551-32 options can be installed to increase memory to 12M words or 16M words.	Mounts in CM unit
18553-2	Cache increment. Adds 2K words of cache memory to increase cache memory from 2K words to 4K words.	Mounts in CP-0 or CP-1 unit
18559-2	850A upgrade. Upgrades performance of 850A processor to that of an 860A.	Mounts in CP-0 unit
18559-3	860A upgrade. Upgrades 860A to a dual-processor mainframe. Requires 10513-780 or 10514-780 M-G set and 18675-1/3 water cooling unit or two 18677-1 water cooling units (an earlier 18674-1 water cooling unit can be used with an 18677-1 water cooling if one is present at site).	Adds CP-1 unit
18560-2	840A upgrade. Upgrades performance of 840A processor to that of an 850A.	Mounts in CP-0 unit
18675-1	220-L/min (58-gal/min) water cooling unit. Cools single-processor or dual-processor mainframe.	Standalone unit
18675-3	265 L/min (70 gal/min) water cooling unit. Cools single-processor or dual-processor mainframe.	Standalone unit

(Continued)

Table 1-4. Available Equipment for Mainframe Complex *(Continued)*

Product Number	Description	Configuration
18677-1	102-L/min (27-gal/min) water cooling unit. Cools single-processor mainframe. Two 18677-1 units (or one 18677-1 unit and one earlier 18674-1 unit) are required to cool a dual-processor mainframe.	Standalone unit
18852-1	CIO addition. Adds direct-memory access (DMA) subsystem with five peripheral processors and five ISI (intelligent standard interface)/DMA channels.	Adds CIO unit
18852-2	CIO expansion. Increases peripheral processors in 18852-1 to ten and provides logic for increasing DMA channels in 18852-1 to ten. Requires five DMA increments of 18853-1, 18853-2, or 18853-3 (or a mix).	Mounts in CIO unit
18853-1	DMA channel increment. Adds one ISI/DMA channel to 18852-2.	Mounts in CIO unit
18853-2	DMA channel increment. Adds one CYBER 170 DMA channel to 18852-2.	Mounts in CIO unit
18853-3	DMA channel increment. Adds one IPI(intelligent peripheral interface)/DMA channel to 18852-2.	Mounts in CIO unit
65347-1	60-Hz temperature/humidity recorder. Continuously records room temperature and humidity on a 7-day chart.	Mounts on wall
65347-2	50-Hz temperature/humidity recorder. Continuously records room temperature and humidity on a 7-day chart.	Mounts on wall
65348-1	Dew point sensor. Monitors room dew point for up to four mainframe complexes. Provides warning and shutdown signals to system power monitors if dew point reaches preset limits.	Mounts on wall
N/A	RTA modem. Allows diagnostics to be run from Control Data remote support office.	Table-top unit



NOTE;

1. OPTIONAL EQUIPMENT 65347-1 AND 65347-2 TEMPERATURE/HUMIDITY RECORDERS ARE NOT SHOWN.

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Figure 1-4. Available Equipment for Mainframe Complex

To present the information in this chapter in a structured format, this page has been left blank.

What to Do Before the Equipment Arrives

Before the equipment arrives, you must prepare the computer room and the M-G room to meet the space, environmental, power, and communications requirements of the mainframe complex and associated peripheral equipment. Use the following site planning worksheet to help you identify the requirements. For details, refer to the indicated chapter of this manual and to the Site Preparation General Information and Peripheral Equipment Data manuals.

During your site planning and preparations, you may have questions about circumstances that are beyond the descriptions covered in this and other site preparation manuals. Your Control Data Engineering Services installation coordinator is available to answer these questions or direct you to appropriate resources.

Site Planning Worksheet (Sheet 1 of 4)

	Notes	Done
Space Requirements - See Chapter 2		
Plan equipment layout using scaled grids and templates. Consider: • Equipment area (present and future). • Service clearance. • Weight distribution clearance. • Other restrictions, such as cable and hose lengths. • Operator access and workflow.	_____	_____
Order non-standard cables for peripheral equipment, if required.	_____	_____
Mark location of equipment and floor cutouts on raised floor. Use full-size templates for mainframe and water cooling units.	_____	_____
Make cutouts in raised floor.	_____	_____
Check obstructions on route from delivery truck to equipment site, and fill in route planning worksheet. Consider: • Doorway and hallway size. • Stairway or ramp size. • Elevator door size. • Elevator box size and capacity.	_____	_____
Make special arrangements to move equipment from delivery truck to site, if required.	_____	_____

Site Planning Worksheet (Sheet 2 of 4)

	Notes	Done
Environmental Requirements - See Chapter 3		
Evaluate air conditioning system, and fill in air conditioning worksheets. Consider: • Temperature. • Relative humidity. • Dewpoint. • Heat output to air (present and future).	_____	_____
Install air conditioning system, or add to present system, if required.	_____	_____
Install environmental monitors and alarms.	_____	_____
Evaluate site water system, and fill in site water worksheet. Consider: • Flow rate. • Pressure drop. • Temperature. • Heat output to water (present and future).	_____	_____
Install site water system, or add to present system, if required. • Insulate supply and return lines. • Label supply and return lines. • Flush supply and return lines.	_____	_____
Install Control Data supplied quick-disconnect couplings on site water supply and return lines.	_____	_____
Install customer-supplied nipples, shutoff valves, bypass valves, and strainers on site water supply and return lines.	_____	_____
Analyze site water quality, and treat, if required.	_____	_____
Evaluate noise level.	_____	_____
Install acoustical treatment if required.	_____	_____

Site Planning Worksheet (Sheet 3 of 4)

	Notes	Done
Power Requirements - See Chapter 4		
Evaluate site power distribution system, and fill in power worksheets. Consider: • Input voltage. • Power consumption (present and future).	_____	____
Install power distribution system, or add to present system, if required. • Install power and control wiring. • Install safety grounds.	_____	____
Install M-G sets, and test in local mode. Check for proper rotation.	_____	____
Install system power monitor (SPM) and 65348-1 dew point sensor, if ordered. Use full-size template for SPM.	_____	____
Install Control Data-supplied power connectors (unless prohibited by local electrical code).	_____	____
Install customer-supplied power cord plugs, connectors, receptacles, disconnects, circuit breakers, circuit breaker panels, magnetic contactors, emergency-off switches, and convenience outlets for test equipment.	_____	____
Prepare diagram of site power distribution system. Identify by number the equipment, circuit breaker panels, and circuit breakers.	_____	____

Site Planning Worksheet (Sheet 4 of 4)

	Notes	Done
Communications Requirements - See Chapter 5		
Install telephone line, telephone jack, and telephone, if RTA is ordered.	_____	____
Reports - See Chapter 6		
Fill in Site Data Report, and send to Engineering Services installation coordinator 45 days before delivery of mainframe.	_____	____
Fill in Site Readiness Report two weeks before delivery of mainframe.	_____	____

What Symbols Are Used in Plan Views and Diagrams?

Control Data standard symbols are used in plan views of equipment and in diagrams of hose interconnections. The symbols are shown in figures 1-5 and 1-6.

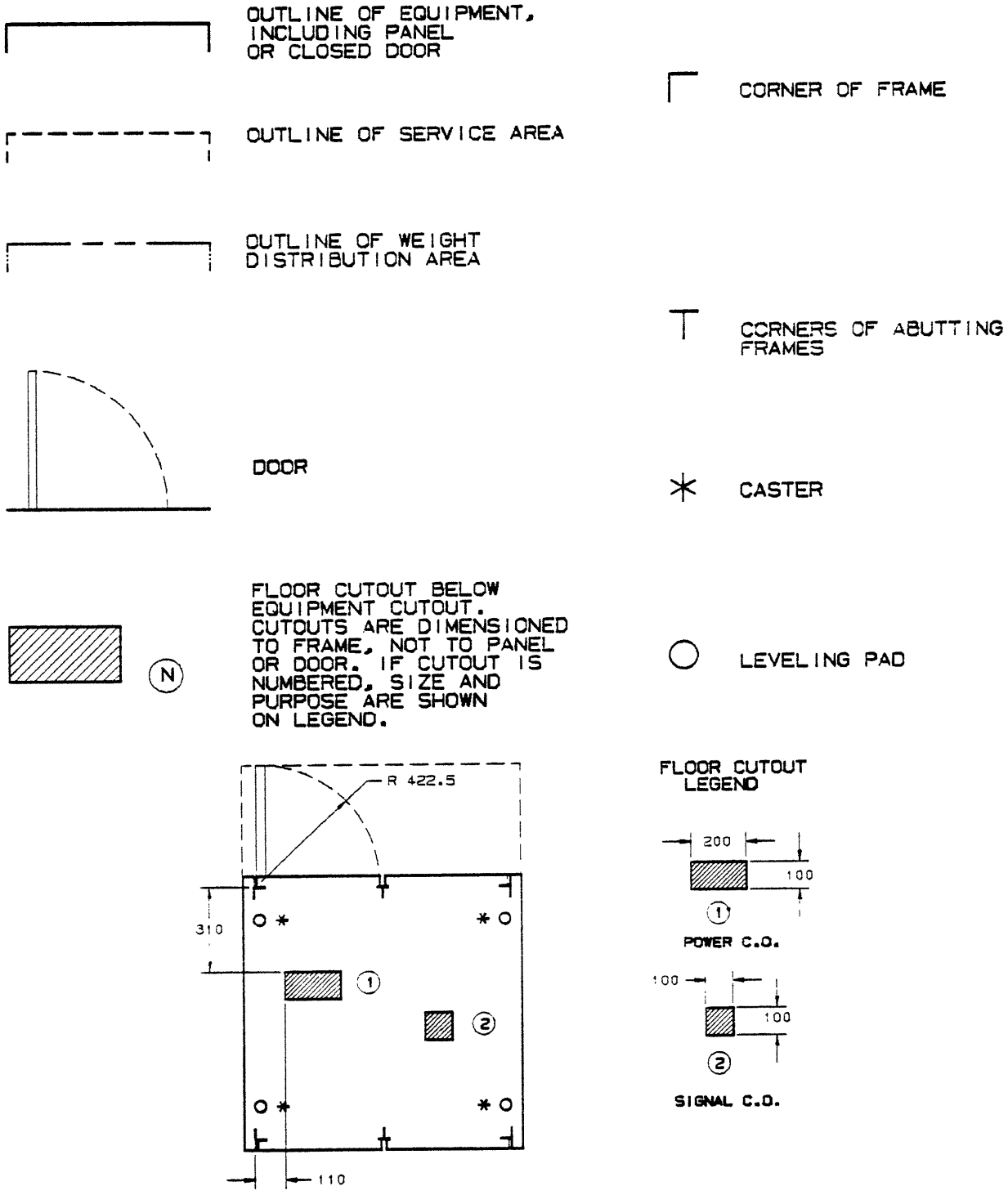


Figure 1-5. Symbols in Plan Views

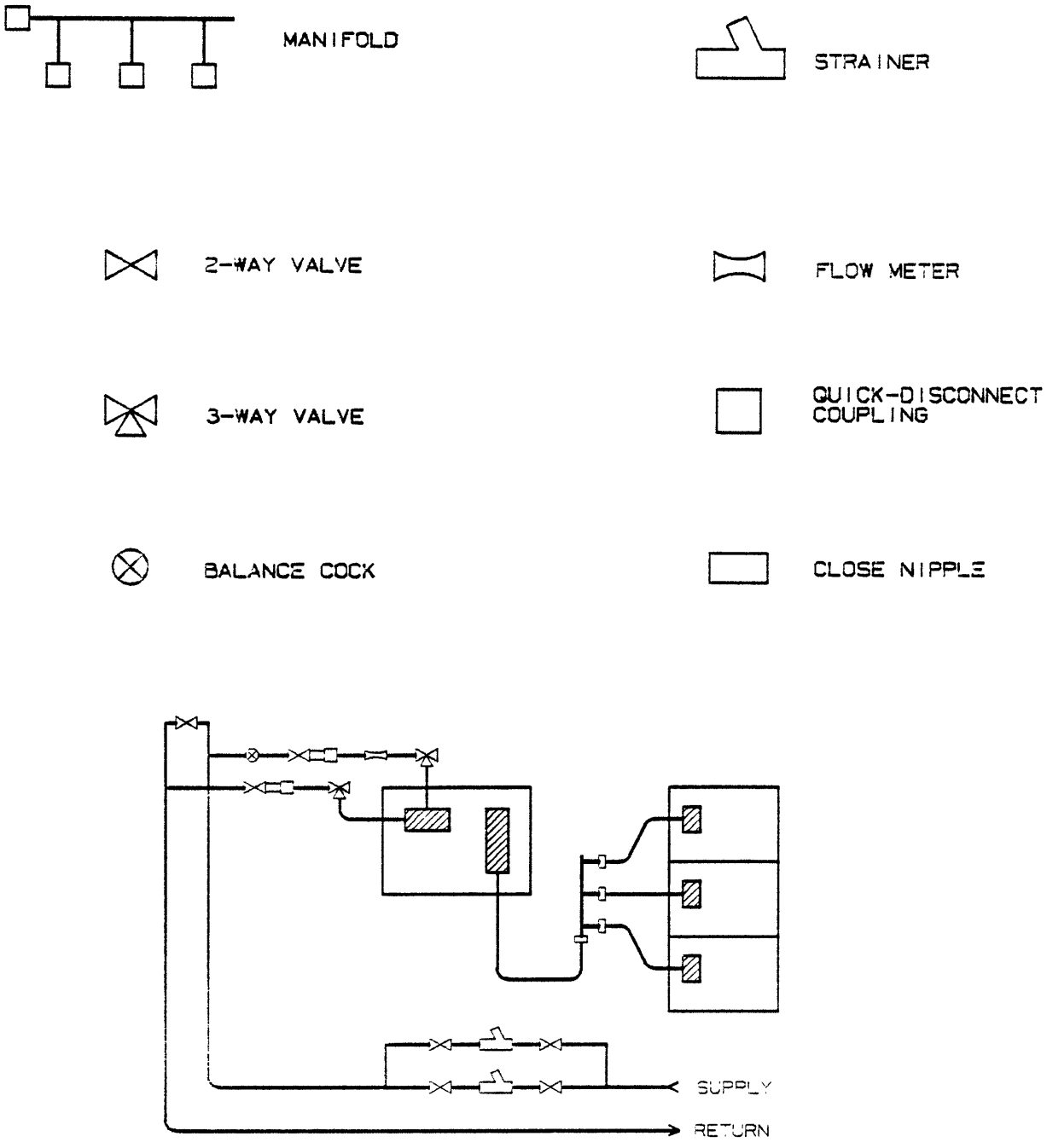


Figure 1-6. Symbols in Diagrams

Space Requirements 2

Space Requirements 2

This chapter contains physical specifications of the mainframe complex equipment and a route planning worksheet.

Chapter 2 of the Site Preparation Peripheral Equipment Data manual contains physical specifications of the peripheral equipment.

Chapter 2 of the Site Preparation General Information manual contains information on site location, space considerations, site construction, and site protection.

Use the information in these manuals to plan the equipment layout and the route from the delivery truck to the site.

How to Use the Scaled Grids and Templates to Plan the Layout

To plan the equipment layout using the Control Data-supplied scaled grids and templates, you will need to draw the computer room features on the grid, and place the templates on the grid. Place the mainframe and water cooling unit templates as shown in figures 2-1, 2-2, and 2-3. Consider future space requirements when you plan the layout.

Floor grids and equipment templates are included in appendix A of this manual and equipment templates are included in appendix B of the Site Preparation Peripheral Equipment Data manual to help you plan the equipment layout on the raised floor in the computer room. The grids and templates are scaled 12 mm = 600 mm (1/50 scale) for SI metric units and 1/2 in = 24 in (1/48 scale) for U.S. customary units. The templates are transparent, self-adhesive, and removable from the grids.

The grids show the 600-mm x 600-mm floor panels and the 24-in x 24-in floor panels (four sheets of each scale are included). The templates show plan views of the mainframe complex equipment (except M-G sets) and the peripheral equipment. The templates also show the service clearance and weight distribution clearance (where applicable) around the equipment. For definitions of service clearance and weight distribution clearance, refer to Equipment Floor Plan in chapter 2 of the Site Preparation General Information manual.

1. Remove the appropriate grids and templates from this manual and the Site Preparation Peripheral Equipment Data manual. You can use the Control Data-supplied grids, draw your own grid, or buy grid paper from a store that sells office or engineering supplies.

2. Trim the blank edges from the grid sheets, and join them together according to the size of the computer room.

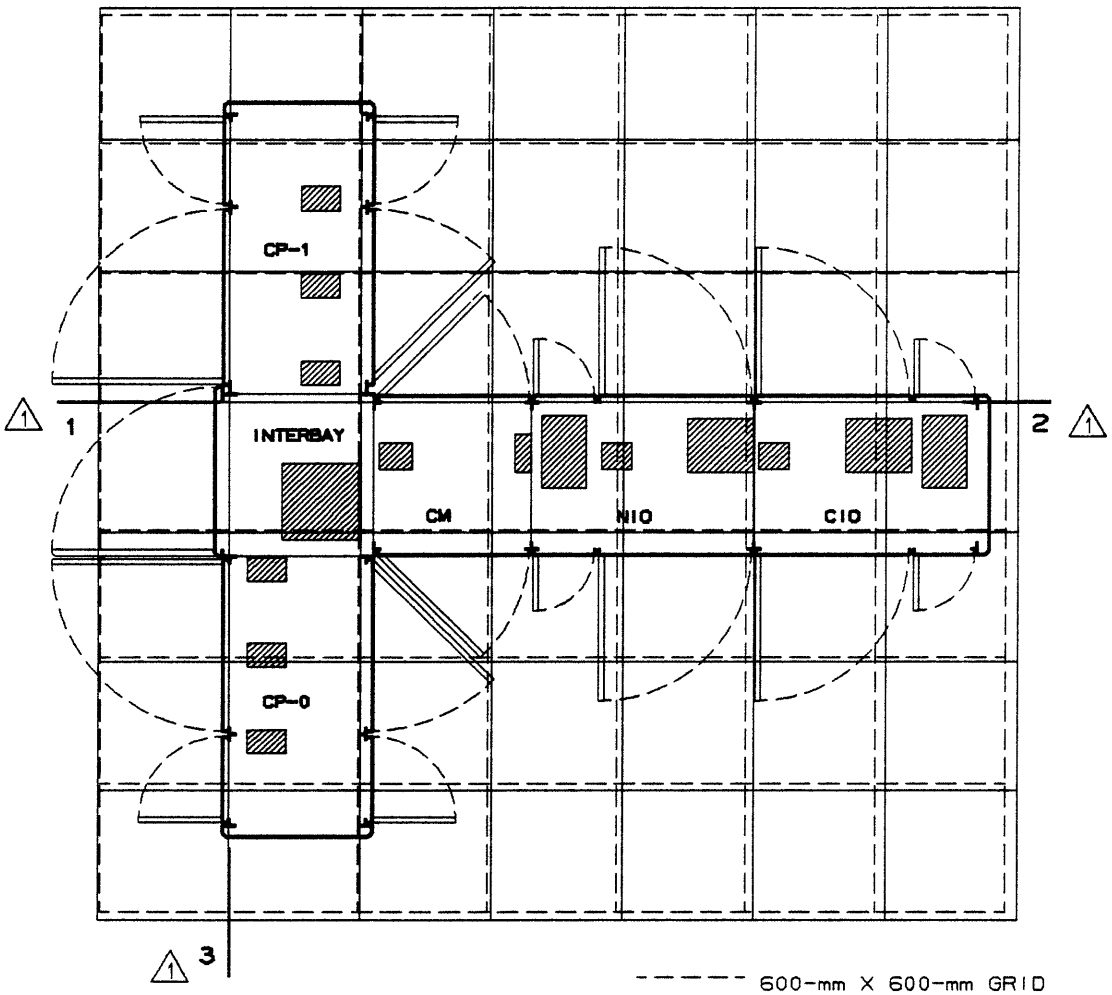
   NOTE

   The grids are accurately drawn to the same scale as the templates. To preserve the accuracy, do not copy the grids on your office copier.

3. On the grid, draw the walls, doors, obstructions, convenience outlets, and telephone jacks in the computer room. Be sure to draw the walls accurately. Partial floor panels may be next to the walls.

4. Place the templates on the grid.

   - For placement recommendations, refer to Equipment Floor Plan in chapter 2 of the Site Preparation General Information manual.
   - For placement restrictions, refer to What Are Restrictions on Locating Equipment? (in this chapter).
   - For placement of the mainframe and water cooling unit templates, refer to figures 2-1, 2-2, and 2-3. Control Data recommends these placements to minimize cutting the floor grid structure and maximize access to the cutouts in the equipment frame. Placement of the other templates is not critical.
   - Consider future space requirements.



NOTES:

1. ALIGN TEMPLATE REFERENCE LINES 1, 2, AND 3 WITH EDGES OF FLOOR PANELS.
2. FOR CLARITY, SERVICE AND WEIGHT DISTRIBUTION CLEARANCES ARE NOT SHOWN.

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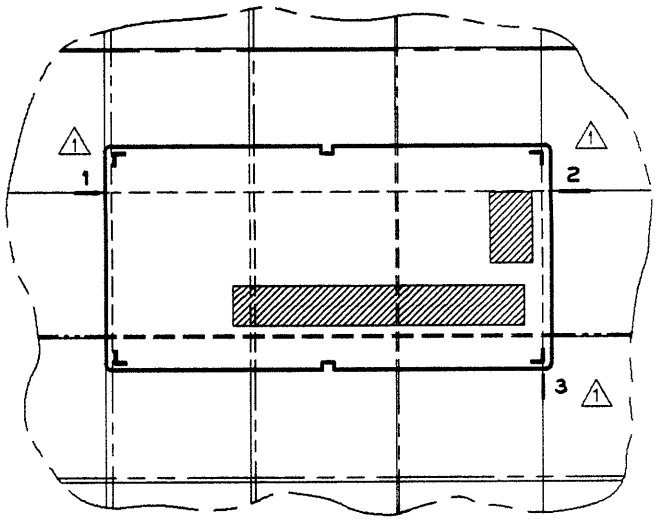
Figure 2-1. Placing Typical Scaled Mainframe Template



NOTES:

1. ALIGN TEMPLATE REFERENCE LINES 1, 2, AND 3 WITH EDGES OF FLOOR PANELS.
2. FOR CLARITY, SERVICE AND WEIGHT DISTRIBUTION CLEARANCES ARE NOT SHOWN.

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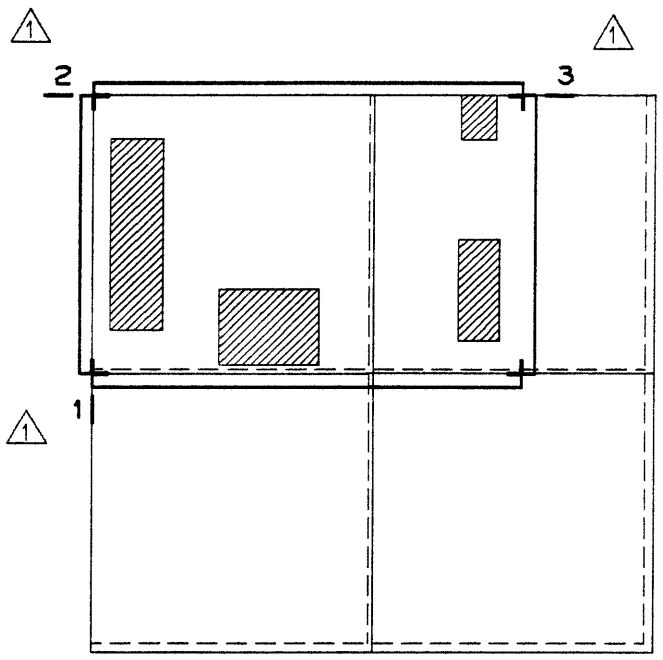
Figure 2-2. Placing the Scaled Template for 18675-1/3 Water Cooling Unit



NOTES:

1. ALIGN TEMPLATE REFERENCE LINES 1, 2, AND 3 WITH EDGES OF FLOOR PANELS.
2. FOR CLARITY, SERVICE AND WEIGHT DISTRIBUTION CLEARANCES ARE NOT SHOWN.

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Figure 2-3. Placing the Scaled Template for 18677-1 Water Cooling Unit

What Space Is Required for Equipment in the Computer Room?

In the computer room, space is required under the equipment and around the equipment.

Space Under Equipment

The equipment in the computer room is installed on the raised floor, on a table top, and mounted on the wall. Table 2-1 lists the equipment and its width, depth, height, operational weight, and distributed floor loading. From these dimensions, you can figure the space required under the equipment. Figures 2-4 through 2-12 show the equipment dimensions.

Operational weight includes:

- Weight of the equipment.
- Half the weight of power and signal cables that connect to the equipment.
- Weight of the water hoses and manifolds that connect to the water-cooled equipment plus the circulating water.

Distributed floor loading is the result of:

- Adding the operational weight to the weight of the raised floor (under equipment plus one-half of service clearance) using 50 kg/m^2 (10 lb/ft^2) for the weight of the raised floor.
- Dividing the sum of the weights by an area defined by the equipment and one-half of the service clearance.

Table 2-1. Dimensions, Weight, and Floor Loading of Computer Room Equipment

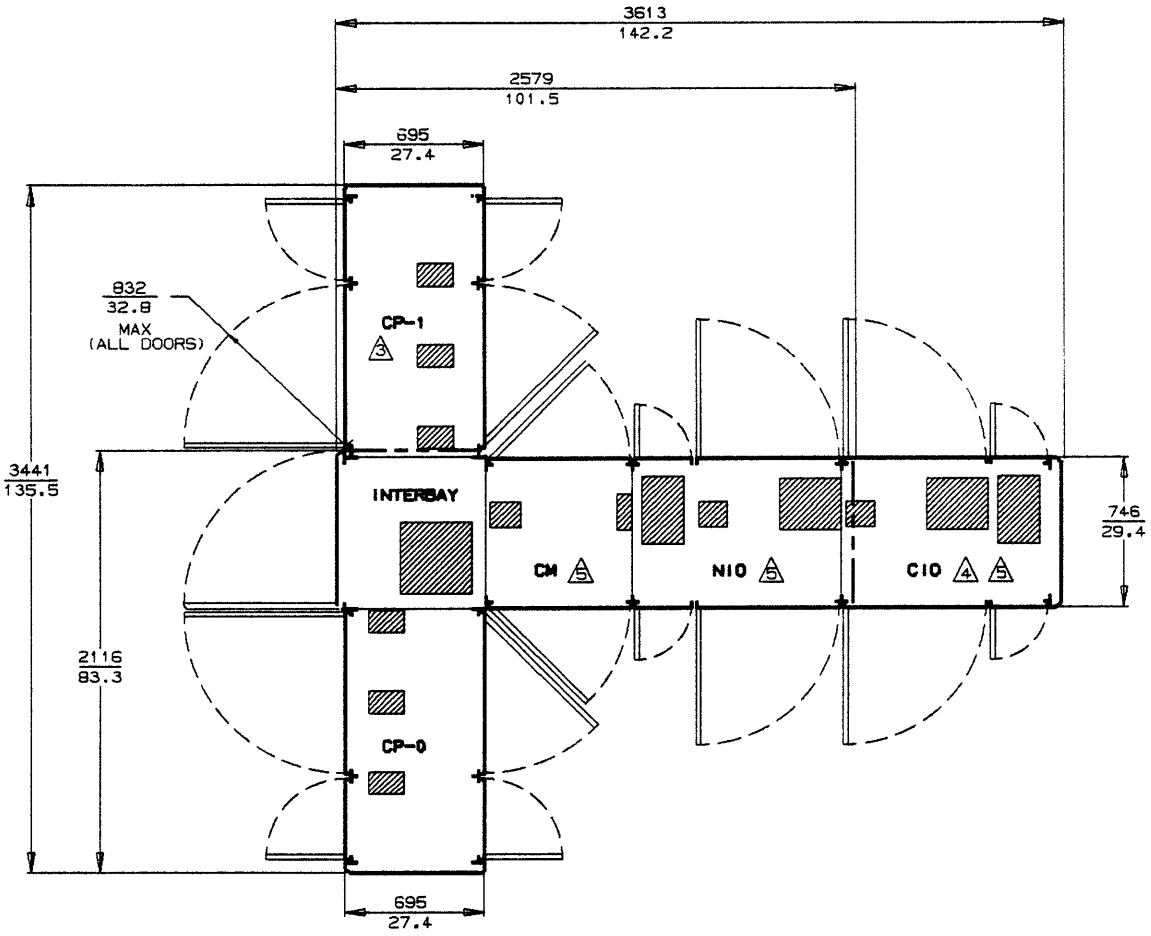
Equipment	Width mm (in)	Depth mm (in)	Height mm (in)	Operational Weight kg (lb)	Distributed Floor Loading kg/m^2 (lb/ft^2)
840A, 850A, or 860A mainframe	2579 (101.5)	2116 (83.3)	1930 (76.0)	2515 (5545)	341 (70)
860A mainframe with 18559-3 CP-1 option or 870A mainframe	2579 (101.5)	3441 (135.5)	1930 (76.0)	3720 (8200)	444 (91)

(Continued)

Table 2-1. Dimensions, Weight, and Floor Loading of Computer Room Equipment *(Continued)*

Equipment	Width mm (in)	Depth mm (in)	Height mm (in)	Operational Weight kg (lb)	Distributed Floor Loading kg/m^2 (lb/ft^2)
840A, 850A, or 860A mainframe with 18852-1 CIO option	3613 (142.2)	2116 (83.3)	1930 (76.0)	3056 (6738)	328 (67)
860A mainframe with 18559-3 CP-1 option and 18852-1 CIO option	3613 (142.2)	3441 (135.5)	1930 (76.0)	4262 (9395)	431 (88)
870A mainframe with 18852-1 CIO option	3613 (142.2)	3441 (135.5)	1930 (76.0)	4262 (9395)	431 (88)
System power monitor	650 (25.6)	292 (11.5)	450 (17.7)	36 (80)	Mounted on wall
18002-1 system console	826 (32.5)	1194 (47.0)	1232 (48.5)	188 (415)	102 (21)
18002-2 system console:					
• Monitor	430 (16.9)	430 (16.9)	440 (17.3)	19.5 (43)	Sits on table top
• Keyboard	490 (19.3)	230 (9.1)	80 (3.2)	2.3 (5)	Sits on table top
18675-1 water cooling unit	1866 (73.5)	940 (37.0)	1433 (56.4)	773 (1702)	220 (45)
18675-3 water cooling unit	1866 (73.5)	940 (37.0)	1433 (56.4)	677 (1492)	200 (41)
18677-1 water cooling unit	988 (38.9)	665 (26.2)	1257 (49.5)	227 (610)	160 (33)
65347-1 or 65347-2 temperature/humidity recorder	240 (9.5)	120 (4.7)	279 (11.0)	5 (12)	Mounted on wall
65348-1 dew point sensor	453 (17.8)	209 (8.2)	334 (13.1)	18 (40)	Mounted on wall
RTA modem (US and Canada) Note[1]	185 (7.3)	279 (11.0)	46 (1.8)	1 (2)	Sits on table top

1. Specifications for other countries may vary. Contact your Control Data representative for information.



NOTES:

1. ALL DIMENSIONS ARE IN mm/in.
2. DIMENSIONS INCLUDE END PANELS.
3. CP-1 IS OPTIONAL FOR 860A AND STANDARD FOR 870A.
4. CIO IS OPTIONAL.
5. AIR EXHAUST FROM TOP OF CM, NIO, AND CIO.

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Figure 2-4. Mainframe Dimensions

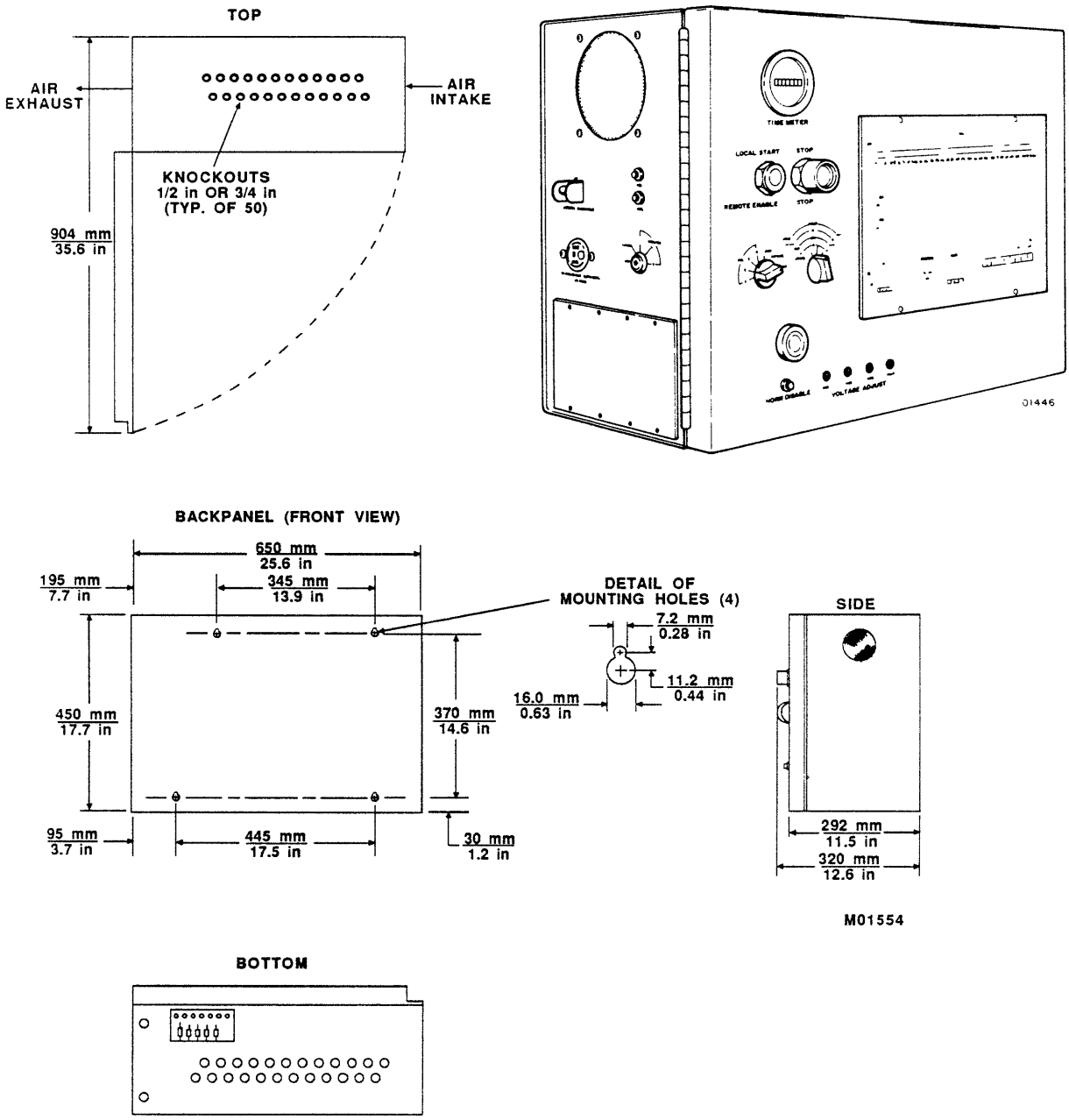

Figure 2-5. System Power Monitor Dimensions

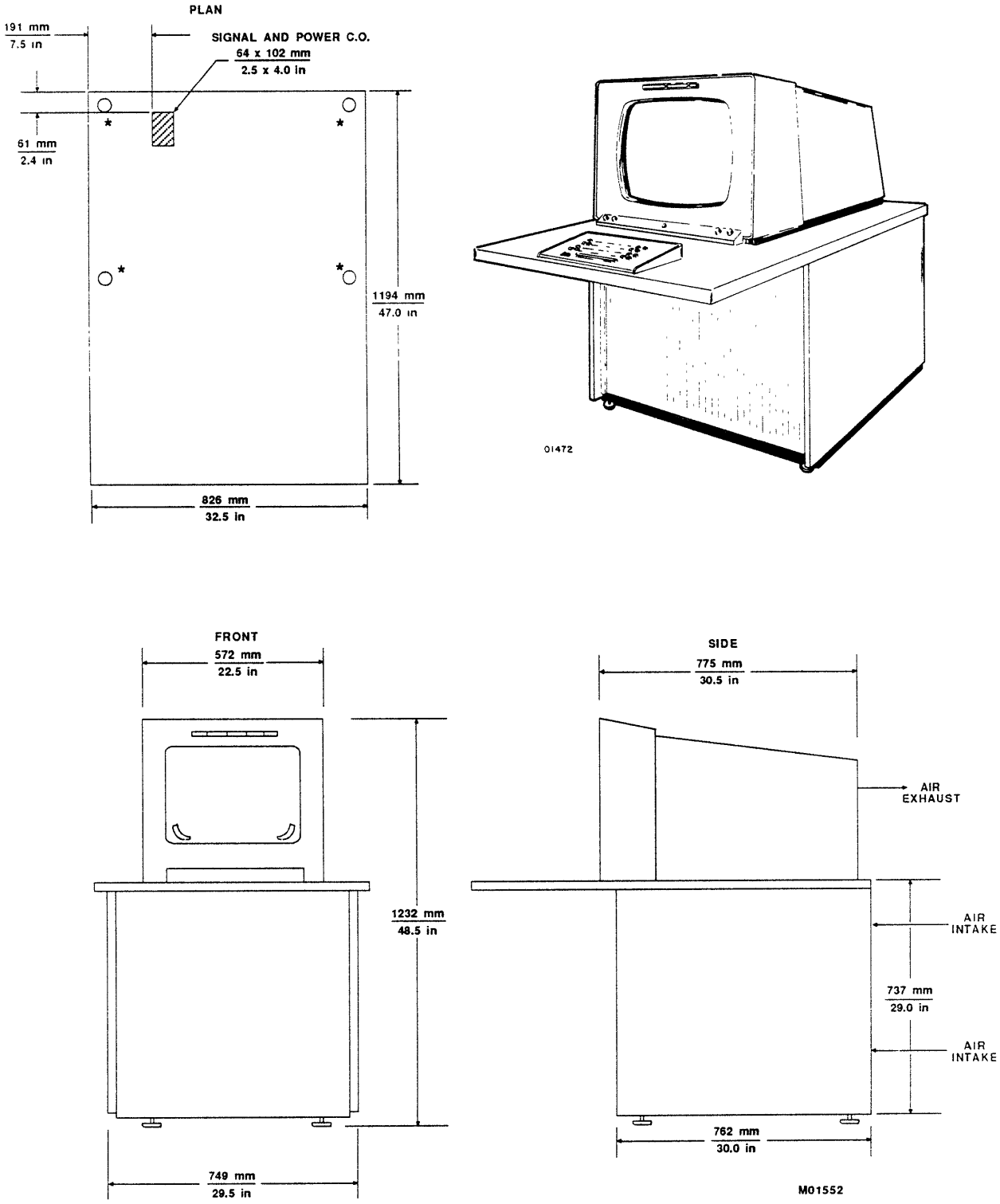

Figure 2-6. 18002-1 System Console Dimensions

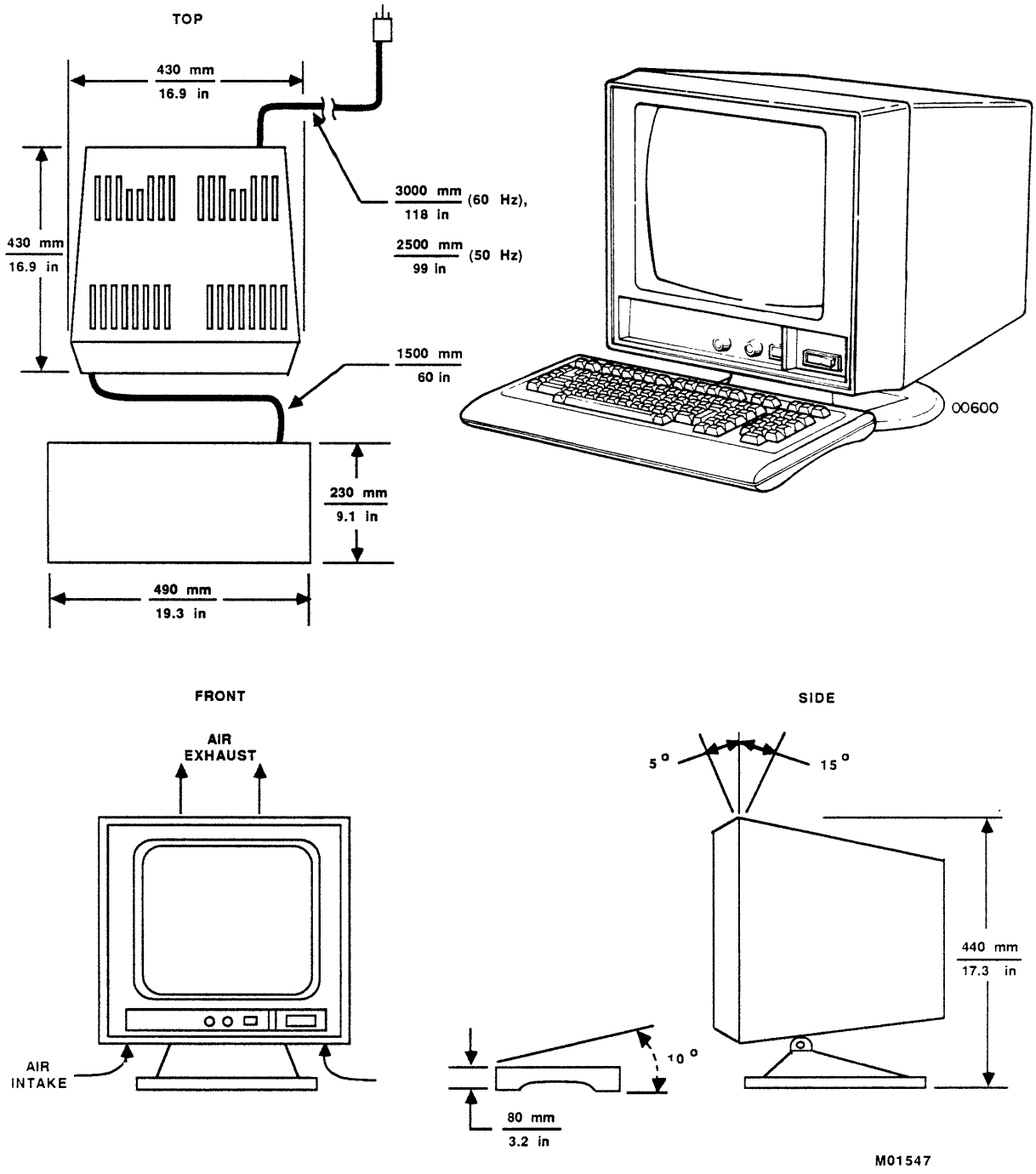

Figure 2-7. 18002-2 System Console Dimensions

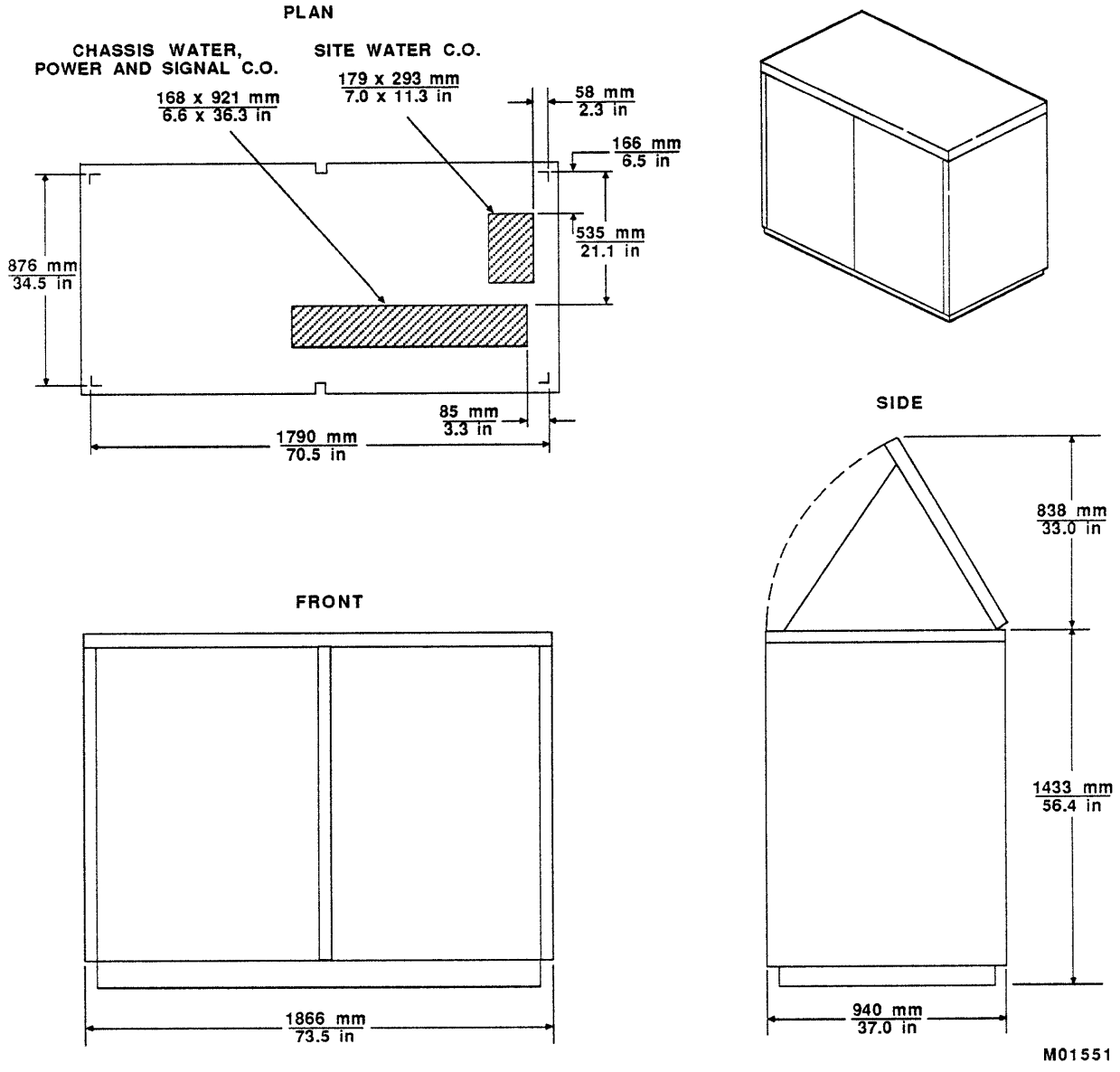

Figure 2-8. 18675-1/3 Water Cooling Unit Dimensions

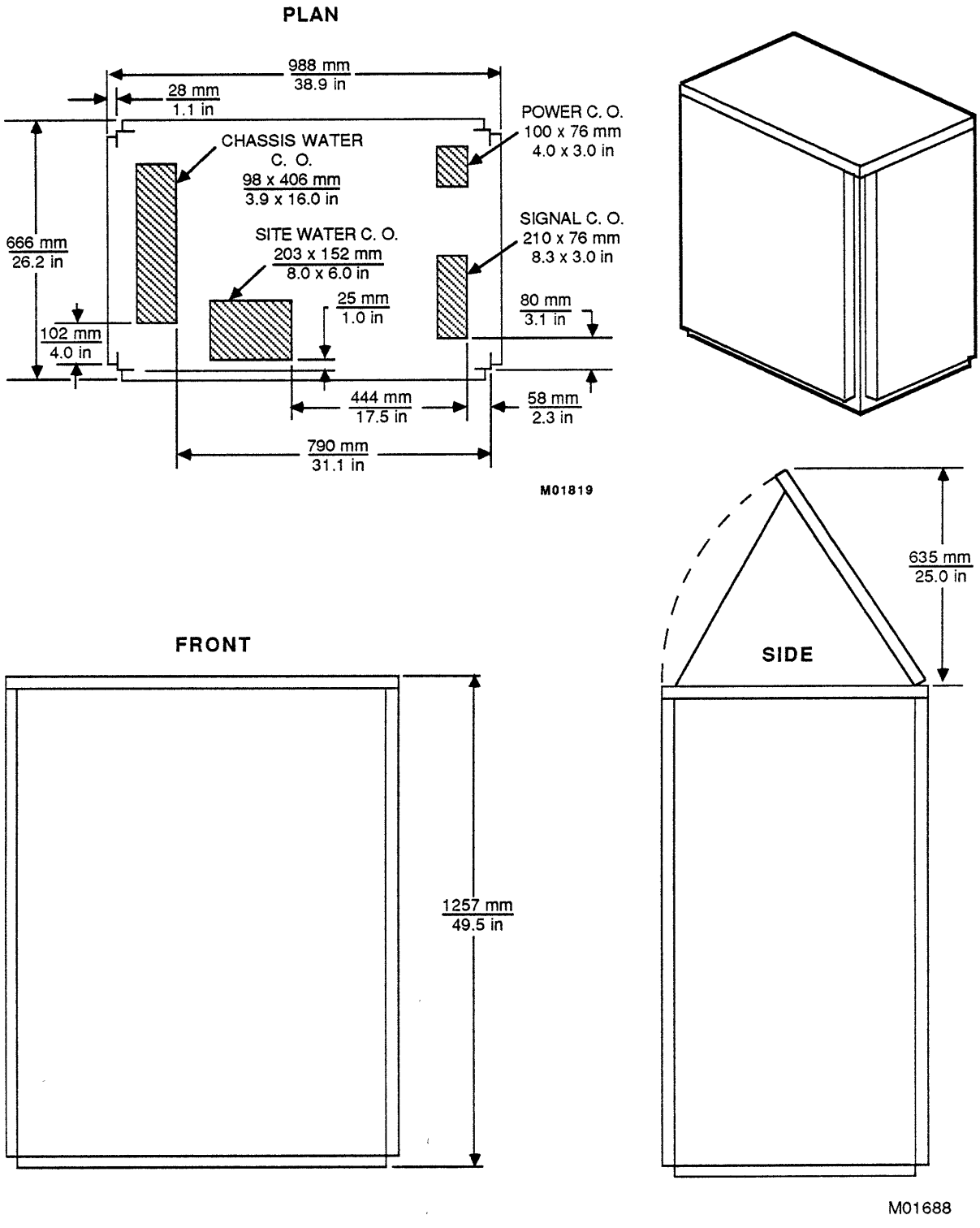

Figure 2-9. 18677-1 Water Cooling Unit Dimensions

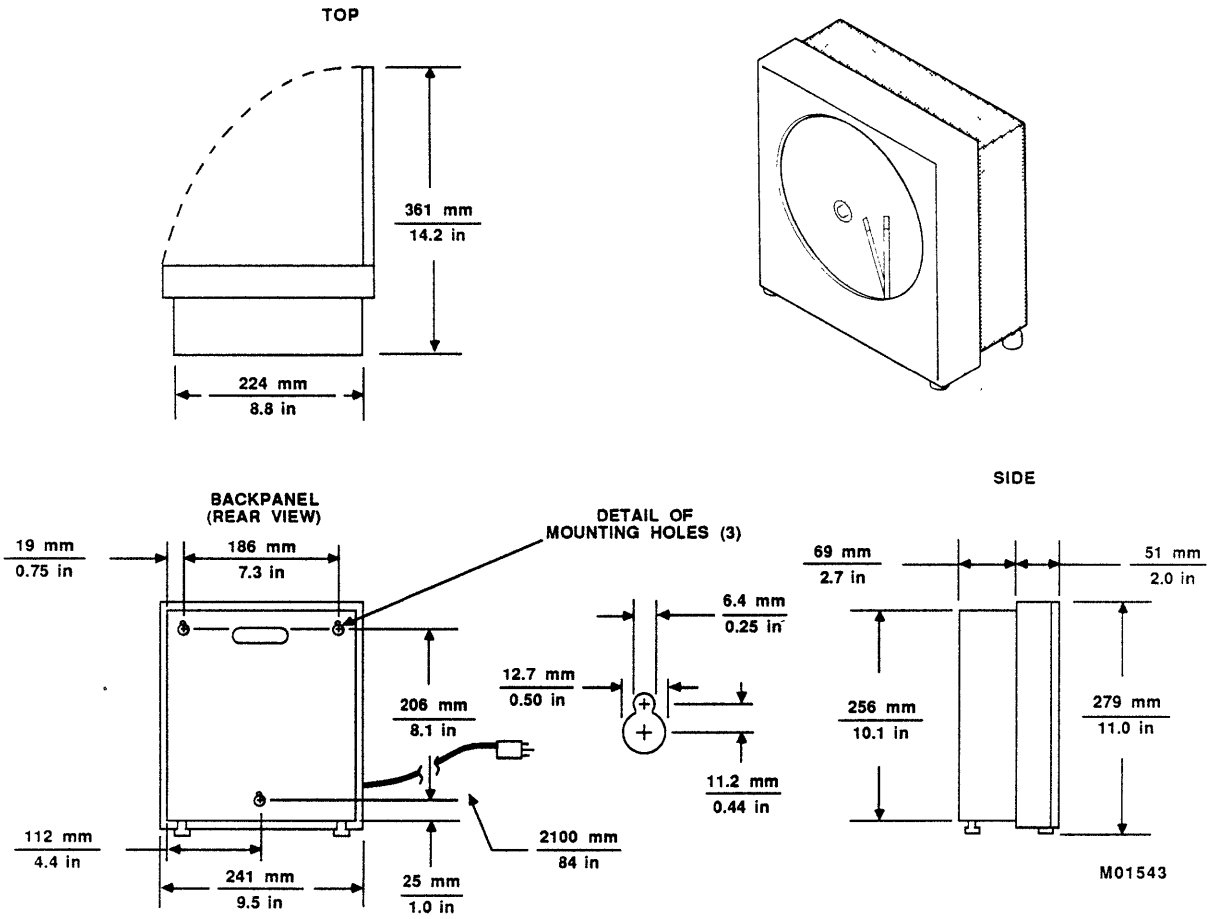

Figure 2-10. 65347-1/2 Temperature/Humidity Recorder Dimensions

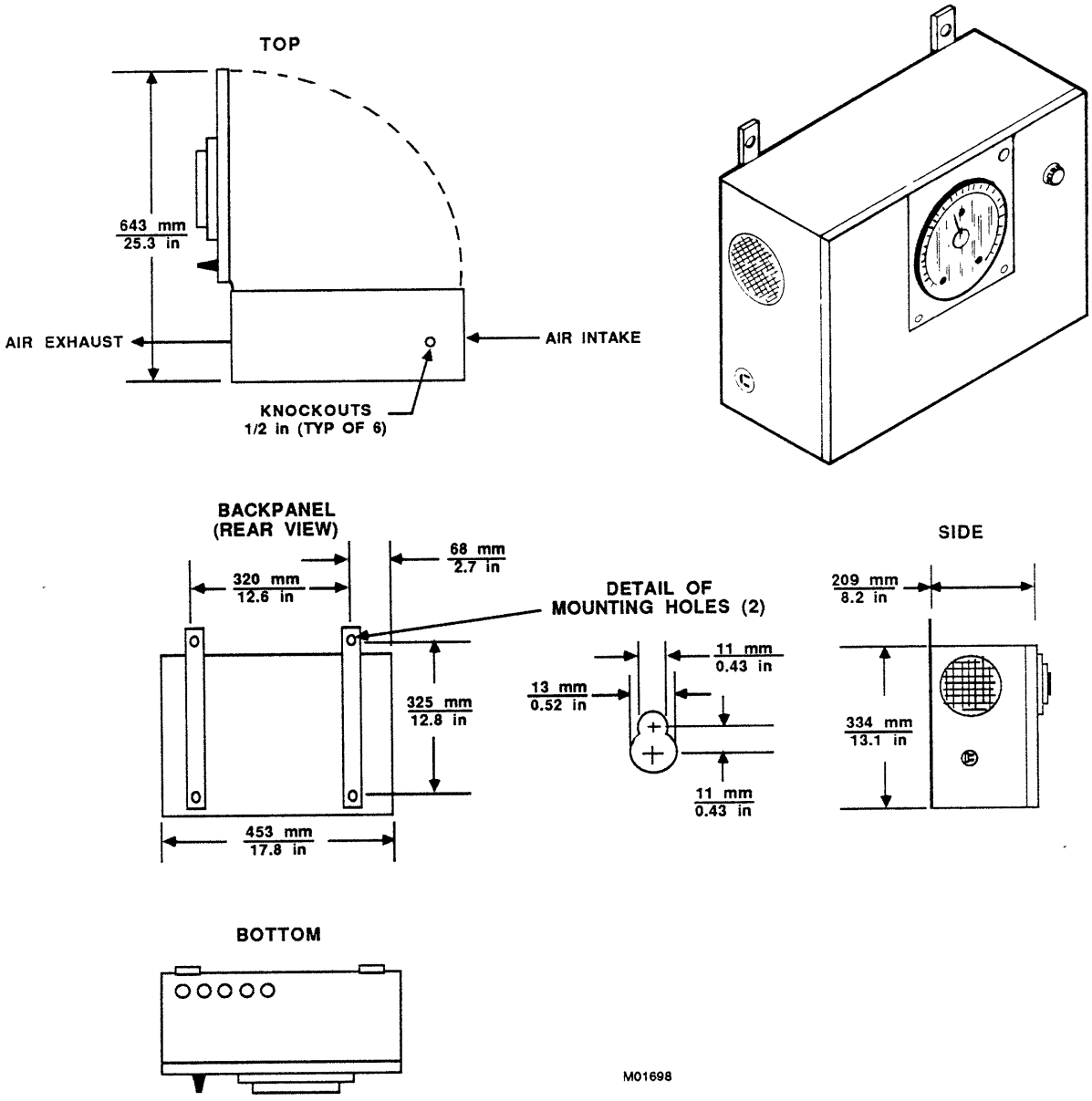

Figure 2-11. 65348-1 Dew Point Sensor Dimensions

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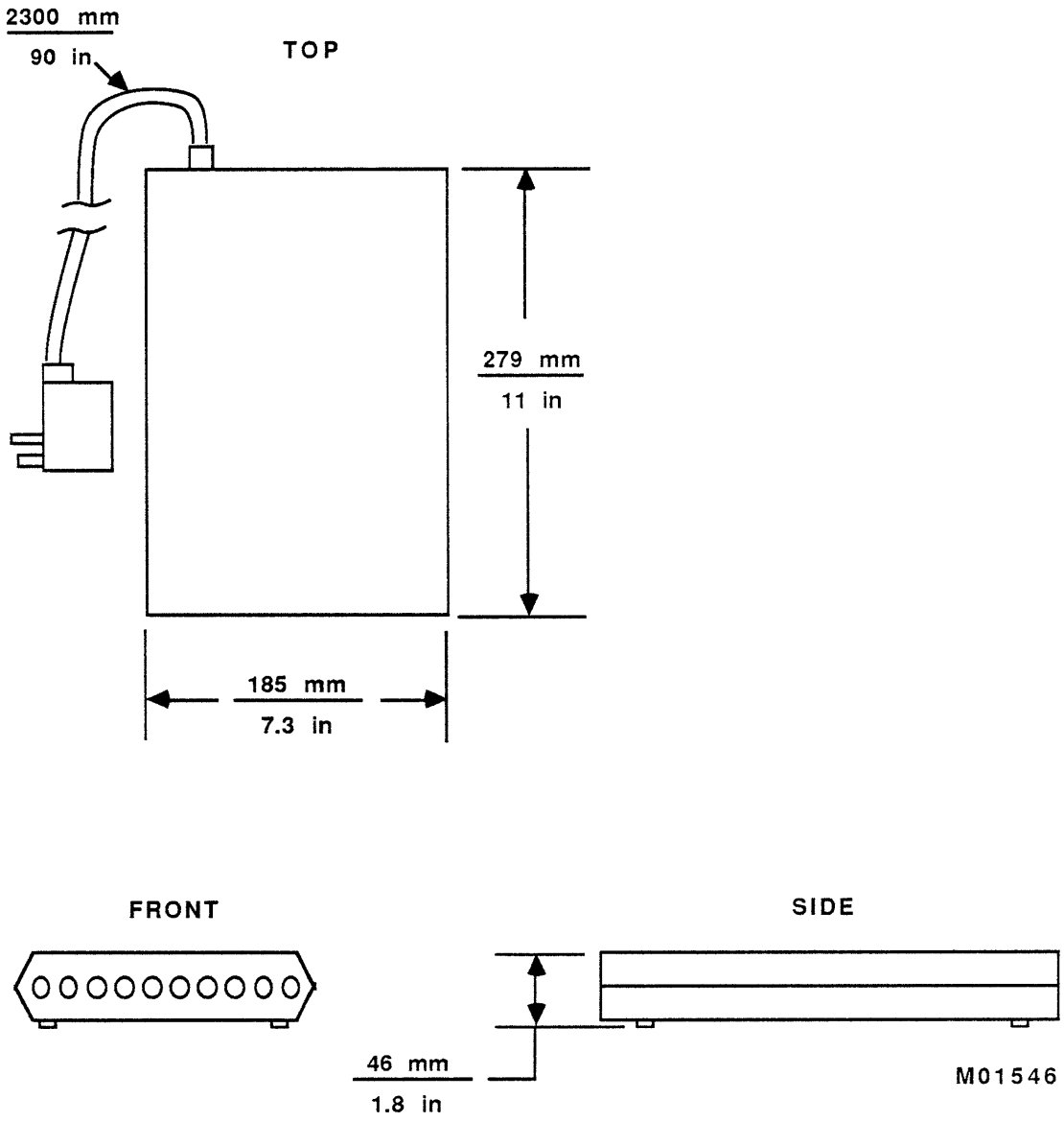


NOTE:

SPECIFICATIONS ARE FOR MODEMS USED IN U.S. AND CANADA; SPECIFICATIONS FOR MODEMS USED IN OTHER COUNTRIES MAY VARY. CONTACT YOUR LOCAL CONTROL DATA REPRESENTATIVE.

Figure 2-12. RTA Modem Dimensions

Space Around Equipment

Space is required around the equipment for installing, maintaining, and servicing it. Space is required around some equipment for air circulation. Space is required around the mainframe to reduce the distributed floor loading to 340 kg/m^2 (70 lb/ft^2). The minimum clearances for all equipment are listed in table 2-2. The service and weight distribution clearances for the mainframe are shown in figures 2-13 through 2-16. For definitions of service clearance and weight distribution clearance, refer to Equipment Floor Plan in chapter 2 of the Site Preparation General Information manual.

Table 2-2. Minimum Clearances for Computer Room Equipment

Equipment	Front mm (in)	Rear mm (in)	Left mm (in)	Right mm (in)	Top mm (in)
840A, 850A, or 860A mainframe (see figure noted)	2-13	2-13	2-13	2-13	2-13
860A mainframe with 18559-3 CP-1 option or 870A mainframe (see figure noted)	2-14	2-14	2-14	2-14	2-14
840A, 850A, or 860A mainframe with 18852-1 CIO option (see figure noted)	2-15	2-15	2-15	2-15	2-15
860A mainframe with 18559-3 CP-1 option and 18852-1 CIO option (see figure noted)	2-16	2-16	2-16	2-16	2-16
870A mainframe with 18852-1 CIO option (see figure noted)	2-16	2-16	2-16	2-16	2-16
System power monitor Note[1]	635 (25)	0 (0)	254 (10)	102 (4)	254 (10)
18002-1 system console	914 (36)	914 (36)	914 (36)	914 (36)	914 (36)
18002-2 system console	762 (30)	152 (6)	102 (4)	102 (4)	102 (4)
18675-1, 18675-3, or 18677-1 water cooling unit	762 (30)	762 (30)	762 (30)	762 (30)	914 (36)
65347-1 or 65347-2 temperature/humidity recorder	254 (10)	0 (0)	152 (6)	152 (6)	152 (6)
65348-1 dew point sensor Note[2]	432 (17)	0 (0)	152 (6)	152 (6)	0 (0)
RTA modem (U.S. and Canada) Note[3]	305 (12)	152 (6)	0 (0)	0 (0)	0 (0)

Notes:

1. Also requires 254 mm (10 in) clearance at bottom.

2. Also requires 152 mm (6 in) clearance at bottom.

3. Specifications for other countries may vary. Contact your Control Data representative for information.

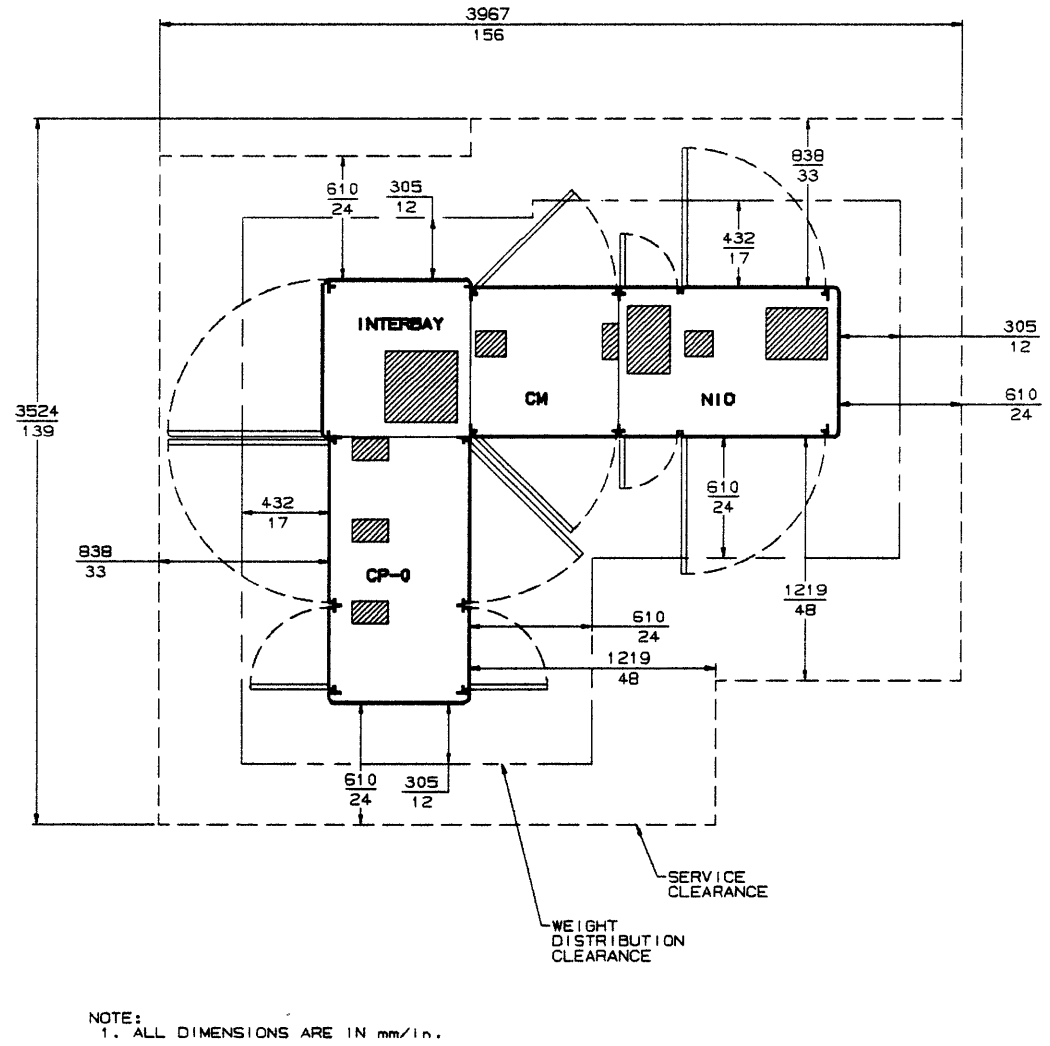
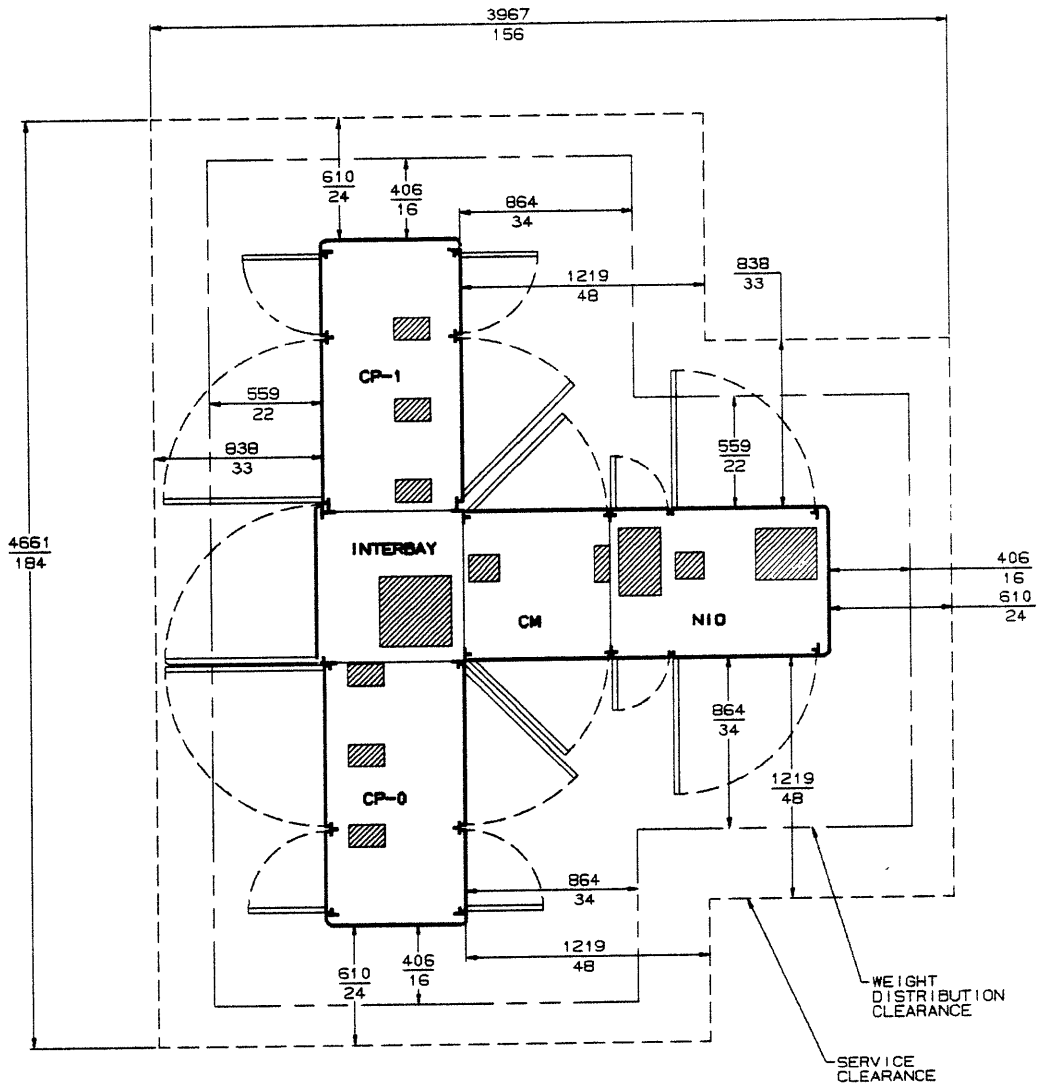


Figure 2-13. Service and Weight Distribution Clearances for 840A, 850A, or 860A Mainframes



NOTE:
1. ALL DIMENSIONS ARE IN mm/in.

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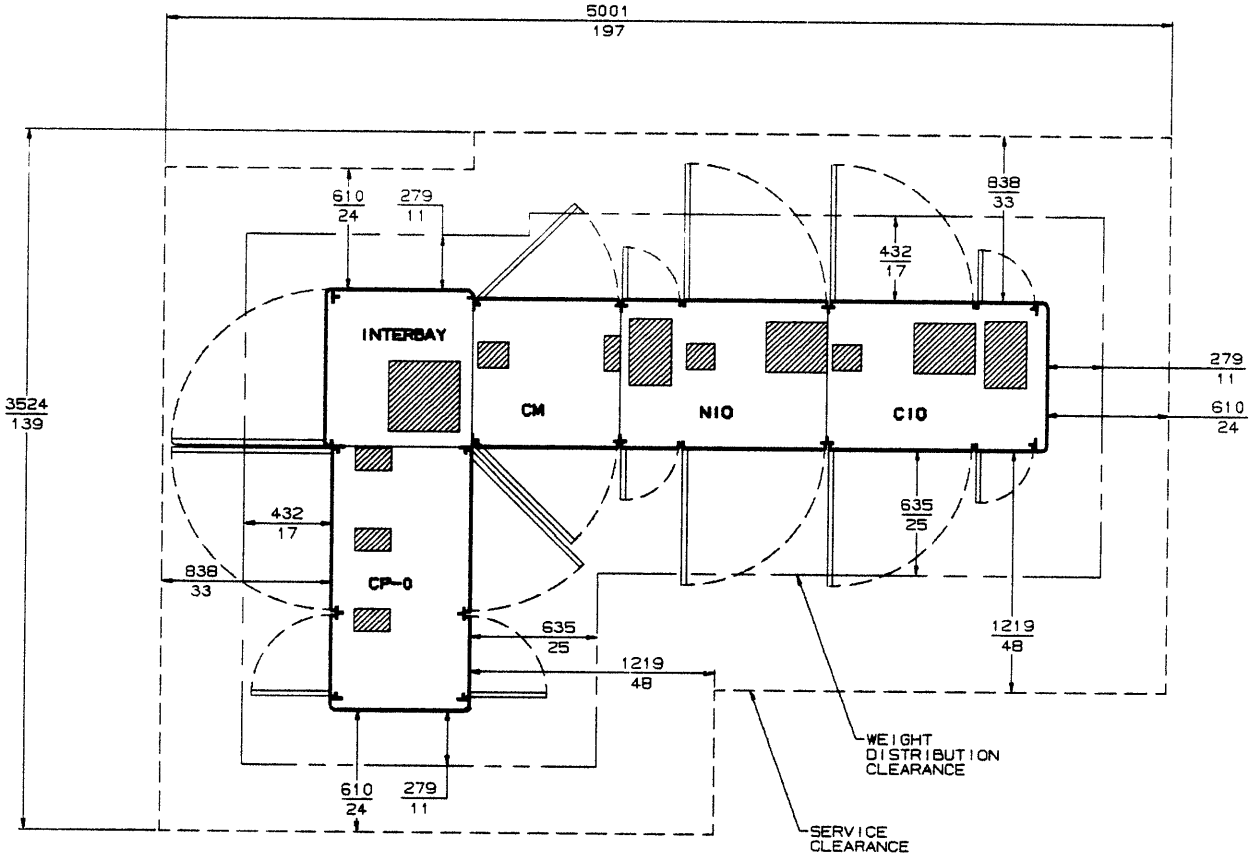
Figure 2-14. Service and Weight Distribution Clearances for 860A Mainframe With 18559-3 CP-1 Option or 870A Mainframe



NOTE:
1. ALL DIMENSIONS ARE IN mm/in.

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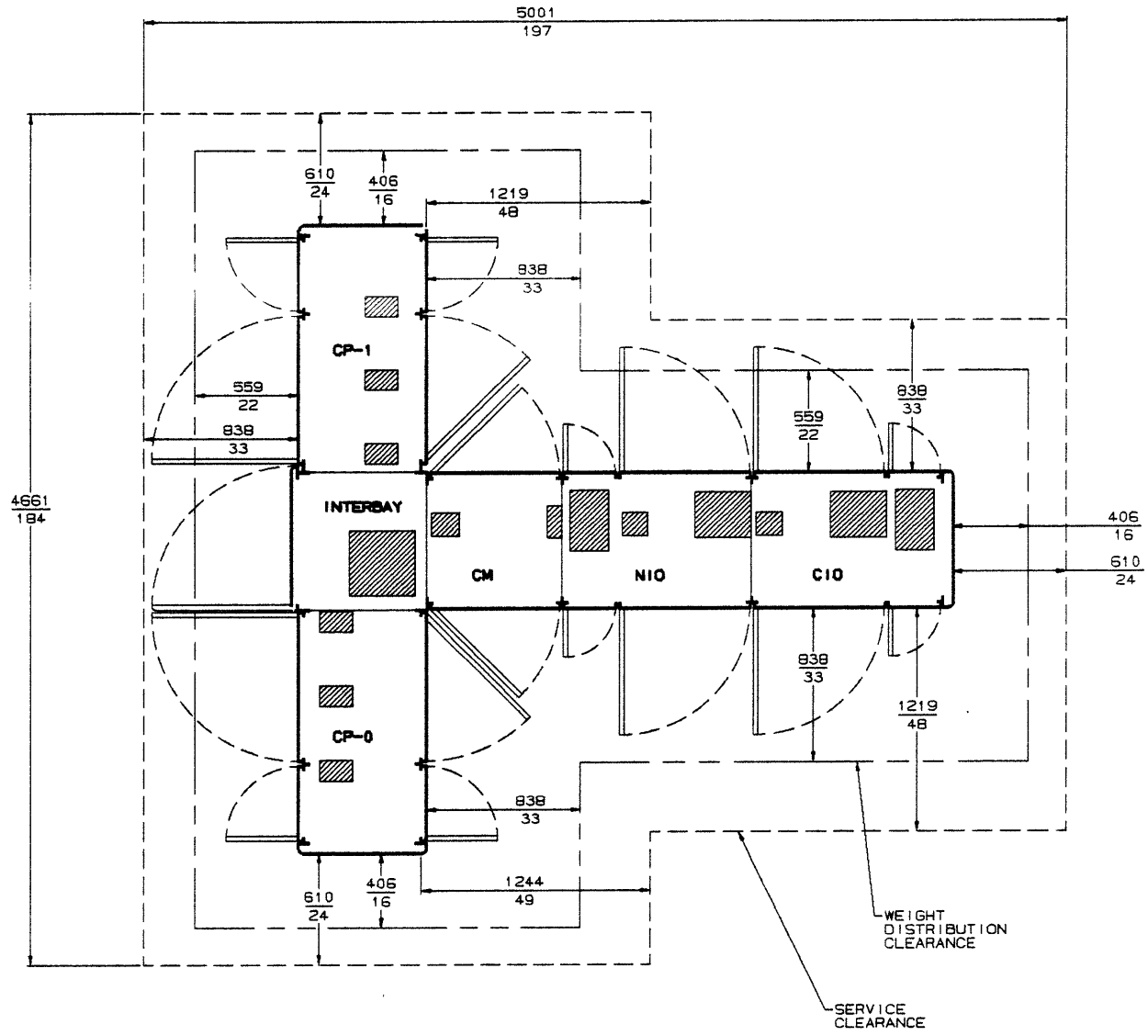
Figure 2-15. Service and Weight Distribution Clearances for 840A, 850A, or 860A Mainframe With 18852-1 CIO Option



NOTE:
1. ALL DIMENSIONS ARE IN mm/in.

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Figure 2-16. Service and Weight Distribution Clearances for 860A Mainframe With 18559-3 CP-1 and 18852-1 CIO Options or 870A Mainframe With 18852-1 CIO Option

What Space Is Required for Equipment in the M-G Room?

In the M-G room, space is required under the equipment and around the equipment.

Space Under Equipment

The equipment in the M-G room is installed on the floor. Table 2-3 lists the equipment and its width, depth, height, weight, and distributed floor loading. From these dimensions you can figure the space required under the equipment. Figures 2-17 through 2-22 show the equipment dimensions.

Distributed floor loading is the result of dividing the weight of the equipment by the floor area it occupies and half its service clearance.

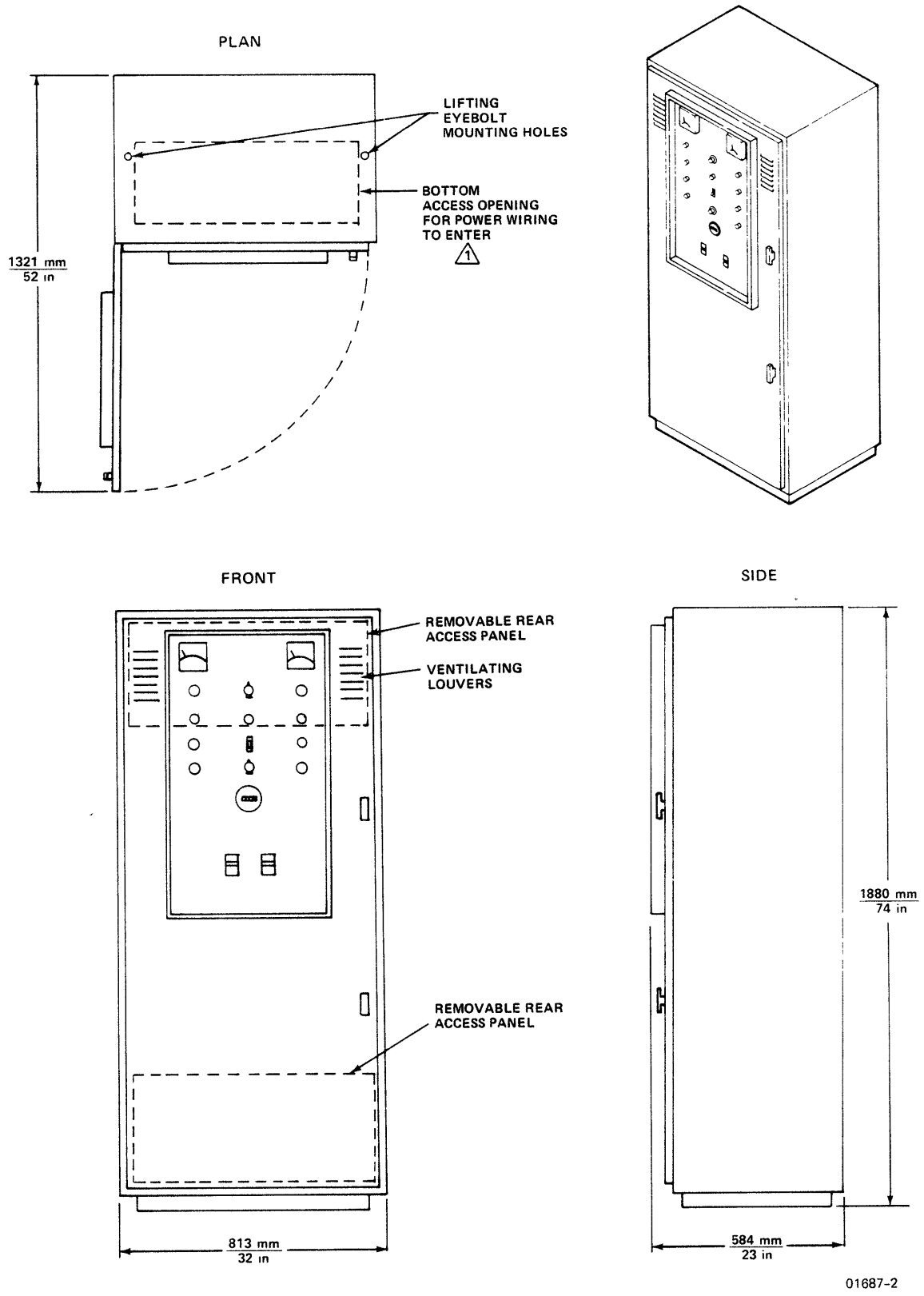
Table 2-3. Dimensions, Weight, and Floor Loading of M-G Room Equipment

Equipment	Width mm (in)	Depth mm (in)	Height mm (in)	Weight kg (lb)	Distributed Floor Loading kg/m^2 (lb/ft^2)
10513-740 M-G set:					
• M-G control cabinet, 40 kVA	813 (32.0)	584 (23.0)	1880 (74.0)	284 (625)	261 (53)
• *and* Kato MG, 40 kVA, 60 Hz	686 (27.0)	686 (27.0)	1445 (56.9)	1139 (2510)	817 (167)
• *or* Piller MG, 40 kVA, 60 Hz	820 (32.3)	820 (32.3)	1461 (57.5)	1284 (2831)	742 (152)
10513-780 M-G set:					
• M-G control cabinet, 80 kVA	1423 (56.0)	584 (23.0)	1880 (74.0)	436 (960)	227 (47)
• *and* Kato MG, 80 kVA, 60 Hz	813 (32.0)	813 (32.0)	1532 (60.3)	1757 (3875)	1028 (211)
• *or* Piller MG, 80 kVA, 60 Hz	820 (32.3)	820 (32.3)	1727 (68.0)	1850 (4070)	1068 (219)
10514-740 M-G set:					
• M-G control cabinet 40 kVA	813 (32.0)	584 (23.0)	1880 (74.0)	284 (625)	261 (53)
• *and* Kato MG, 40 kVA, 50 Hz	711 (28.0)	711 (28.0)	1524 (60.0)	1338 (2950)	920 (188)
• *or* Piller MG, 40 kVA, 50 Hz	820 (32.3)	820 (32.3)	1435 (56.5)	1435 (3160)	829 (169.9)

(Continued)

Table 2-3. Dimensions, Weight, and Floor Loading of M-G Room Equipment *(Continued)*

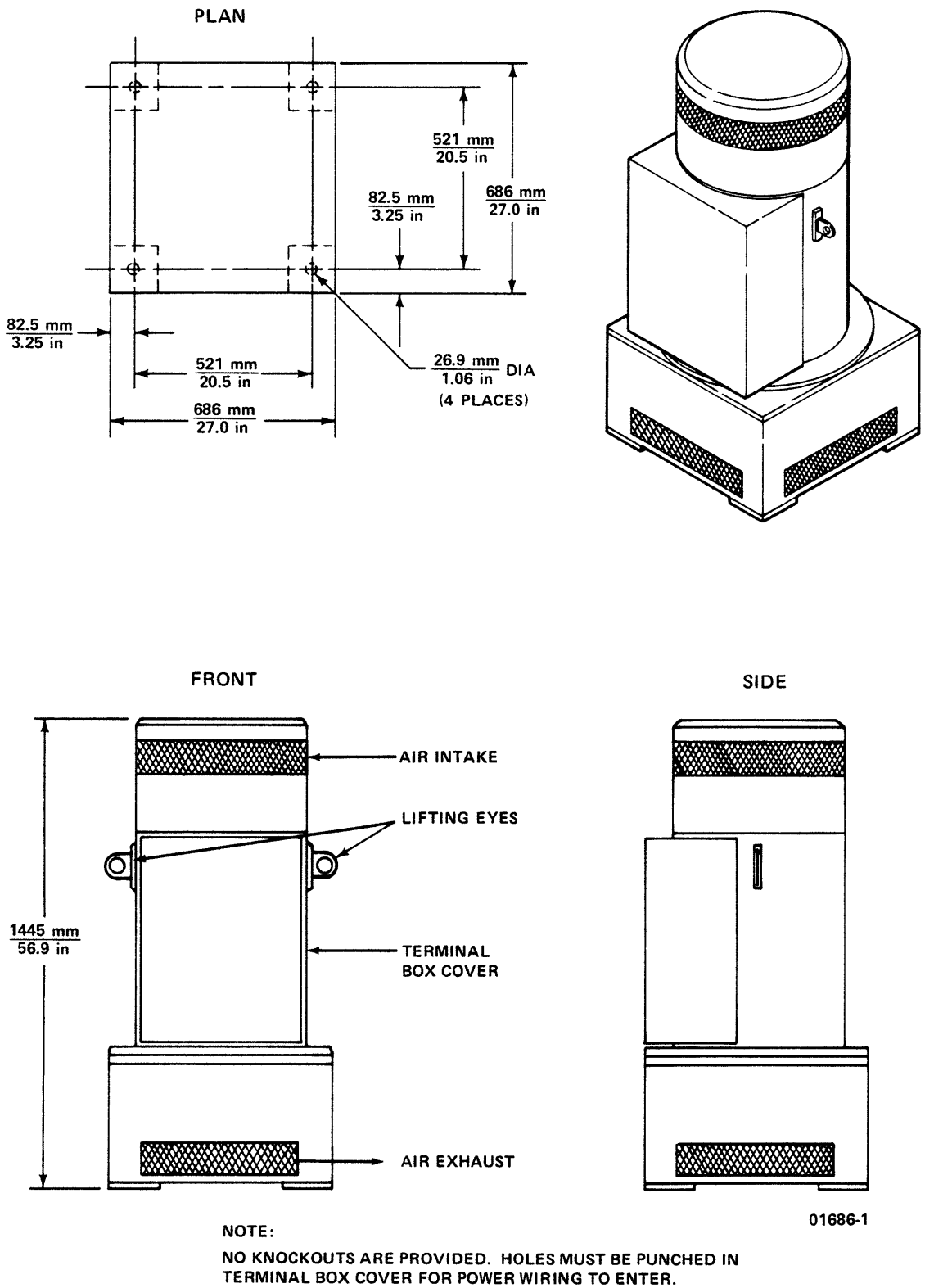
Equipment	Width mm (in)	Depth mm (in)	Height mm (in)	Weight kg (lb)	Distributed Floor Loading kg/m^2 (lb/ft^2)
10514-780 M-G set:					
• M-G control cabinet, 80 kVA	1423 (56.0)	584 (23.0)	1880 (74.0)	436 (960)	227 (47)
• *and* Kato MG, 80 kVA, 50 Hz	813 (32.0)	813 (32.0)	1626 (64.0)	2327 (5125)	1359 (279)
• *or* Piller MG, 80 kVA, 50 Hz	820 (32.3)	820 (32.3)	1918 (75.5)	1945 (4285)	1124 (230)



NOTE:

1 NO KNOCKOUTS ARE PROVIDED. HOLES MUST BE PUNCHED IN TOP, SIDES, OR BACK OF CABINET FOR POWER WIRING TO ENTER. IF CABINET IS MOUNTED ON CONCRETE PADS, BOTTOM ACCESS OPENING MAY BE USED FOR POWER WIRING.

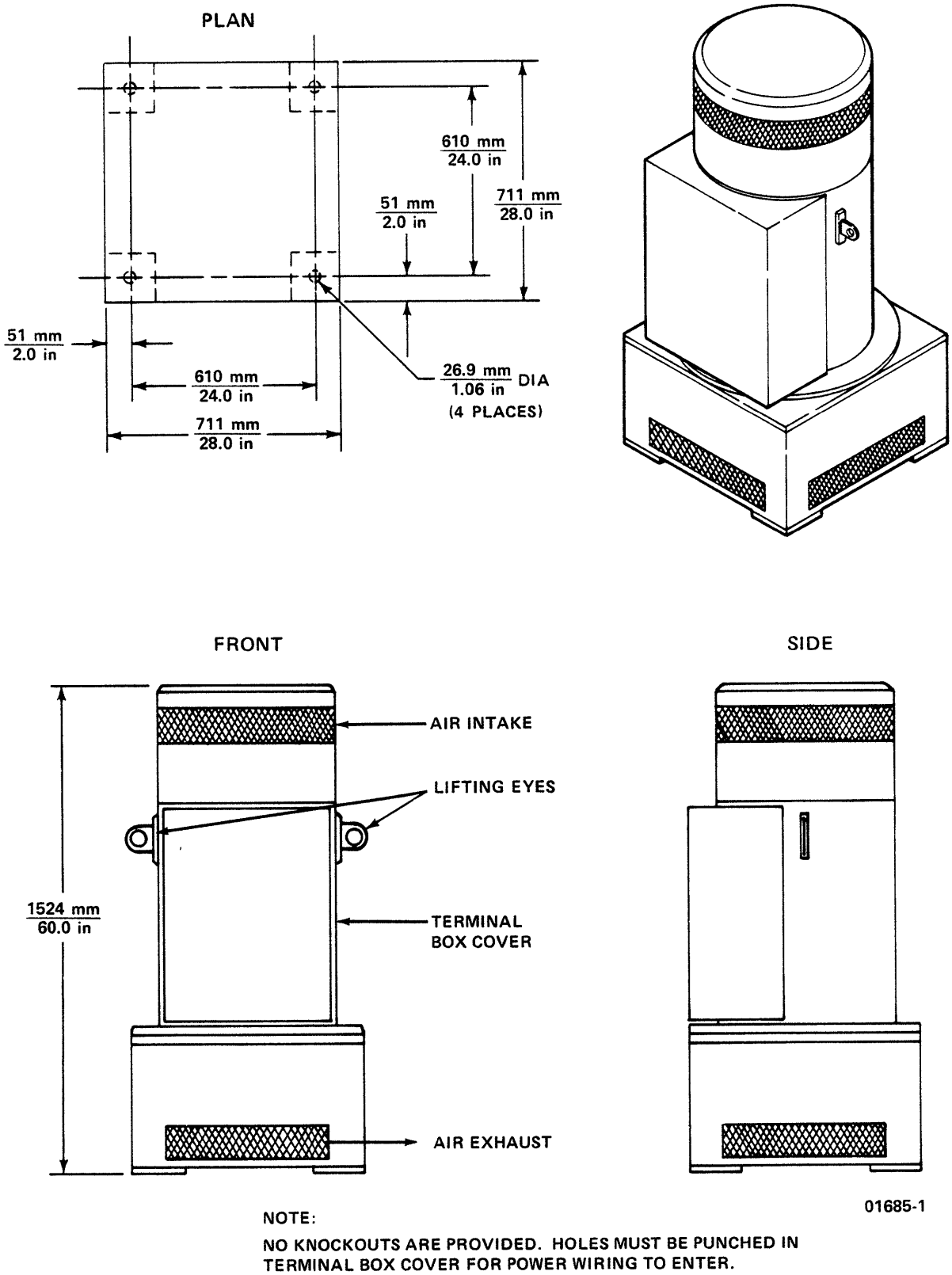
Figure 2-17. M-G Control Cabinet Dimensions, 40 kVA (Part of 10513-740/10514-740 M-G Set)



NOTE:

NO KNOCKOUTS ARE PROVIDED. HOLES MUST BE PUNCHED IN TERMINAL BOX COVER FOR POWER WIRING TO ENTER.

Figure 2-18. Kato MG Dimensions, 40 kVA, 60 Hz (Part of 10513-740 M-G Set)



NOTE:

NO KNOCKOUTS ARE PROVIDED. HOLES MUST BE PUNCHED IN TERMINAL BOX COVER FOR POWER WIRING TO ENTER.

Figure 2-19. Kato MG Dimensions, 40 kVA, 50 Hz (Part of 10514-740 M-G Set)

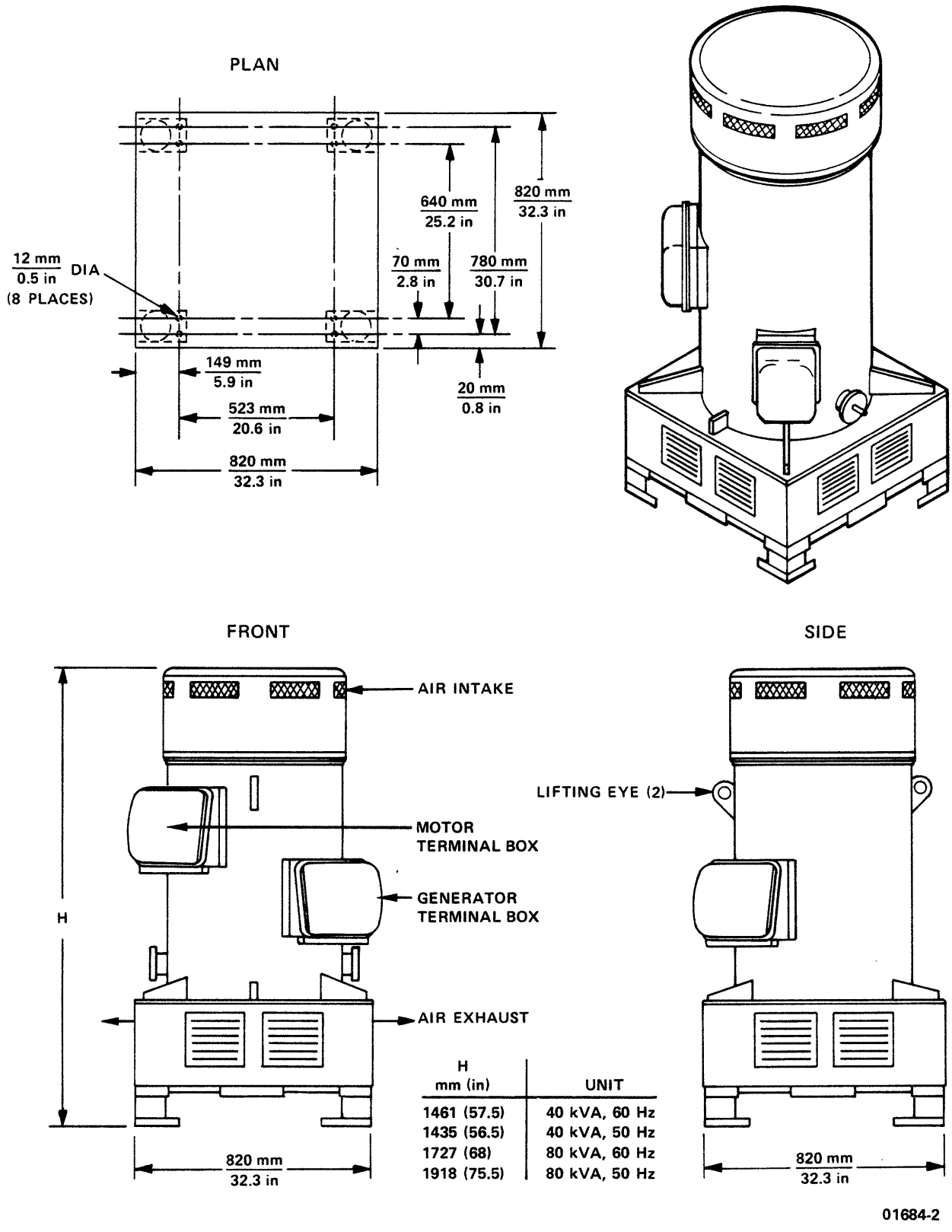
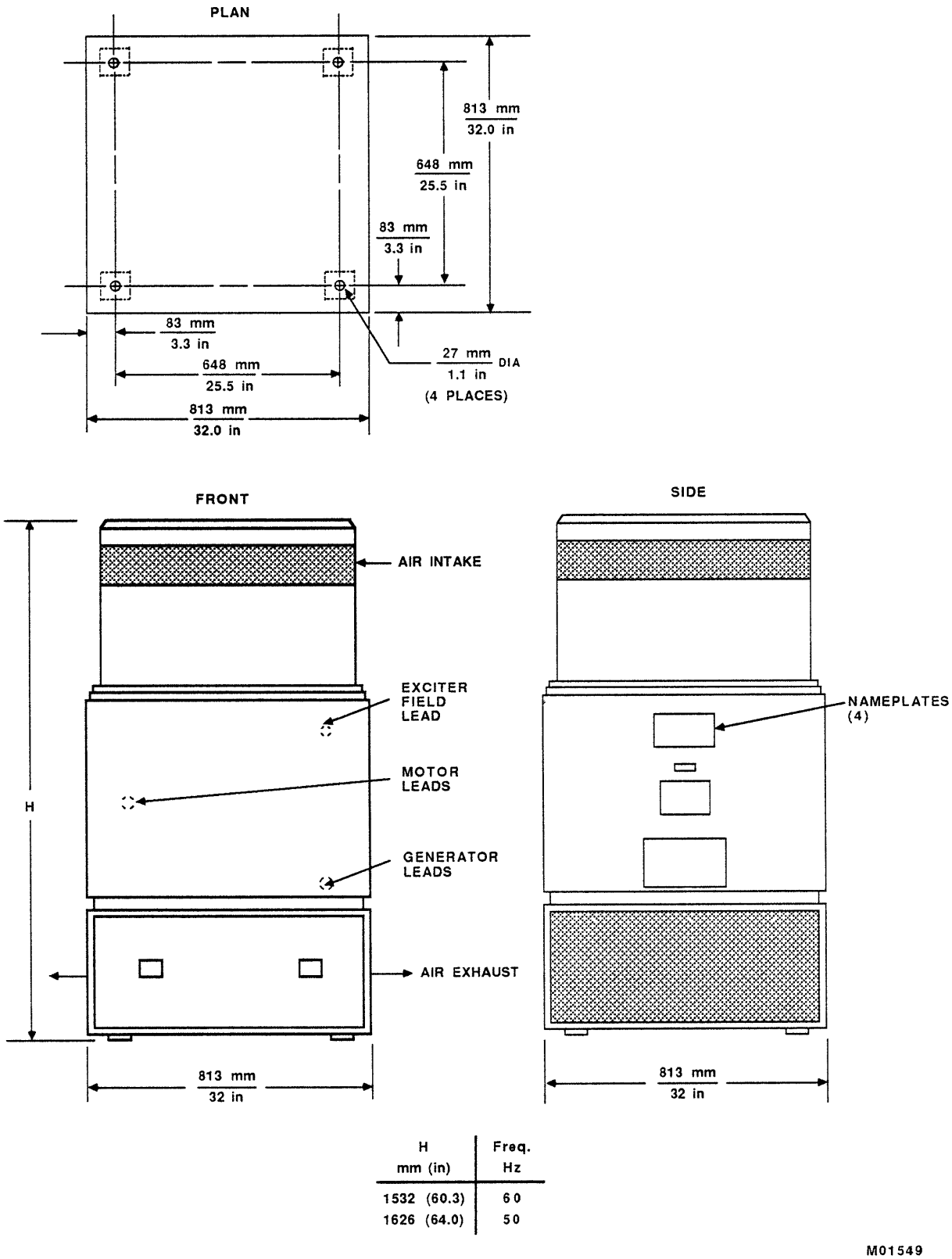


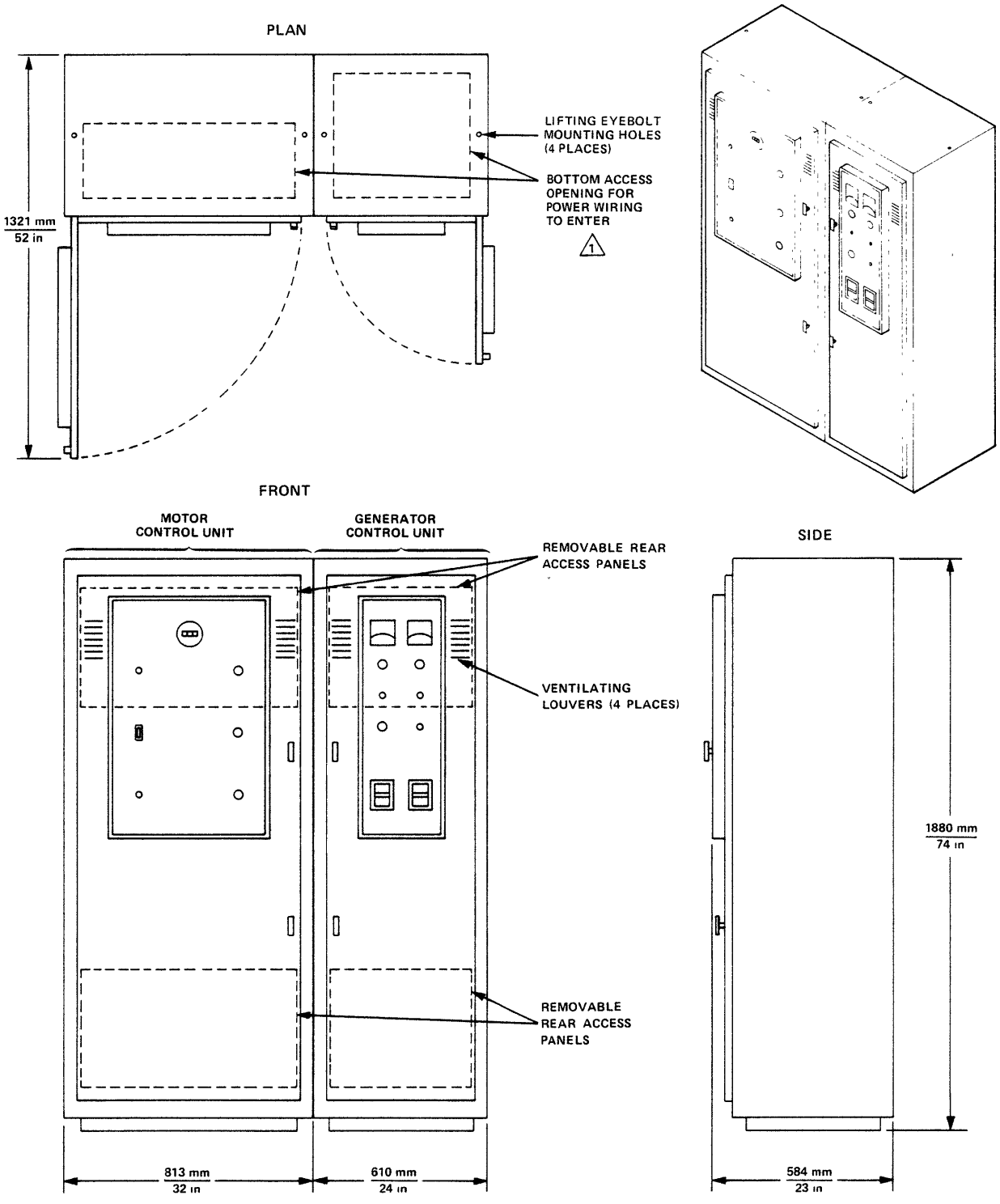
Figure 2-20. Piller MG Dimensions, 40/80 kVA, 50/60 Hz (Part of 10513-740/10513-780/10514-740/10514-780 M-G Set)



H mm (in)	Freq. Hz
1532 (60.3)	60
1626 (64.0)	50

NOTE:
NO KNOCKOUTS ARE PROVIDED. HOLES MUST BE PUNCHED IN CABINET FOR POWER WIRING TO ENTER.

Figure 2-21. Kato MG Dimensions, 80 kVA, 50/60 Hz (Part of 10513-780/10514-780 M-G Set)



NOTE:

1 NO KNOCKOUTS ARE PROVIDED. HOLES MUST BE PUNCHED IN TOP, SIDES, OR BACK OF CABINET FOR POWER WIRING TO ENTER. IF CABINET IS MOUNTED ON CONCRETE PADS, BOTTOM ACCESS OPENING MAY BE USED FOR POWER WIRING.

Figure 2-22. M-G Control Cabinet Dimensions, 80 kVA (Part of 10513-780/10514-780 M-G Set)

Space Around Equipment

The minimum clearances required around the equipment of 10513-740, 10513-780, 10514-740, or 10514-780 M-G sets are listed in table 2-4. This space is required for installing and servicing the equipment and for air circulation around the equipment. Figure 2-23 identifies the portion of the MG that is referred to in table 2-4 as the front.

Additional space is required around the MGs to reduce their distributed floor loading to 340 kg/m^2 (70 lb/ft^2). Table 2-5 lists these minimum weight distribution clearances for the MGs.

Table 2-4. Minimum Clearances for M-G Room Equipment

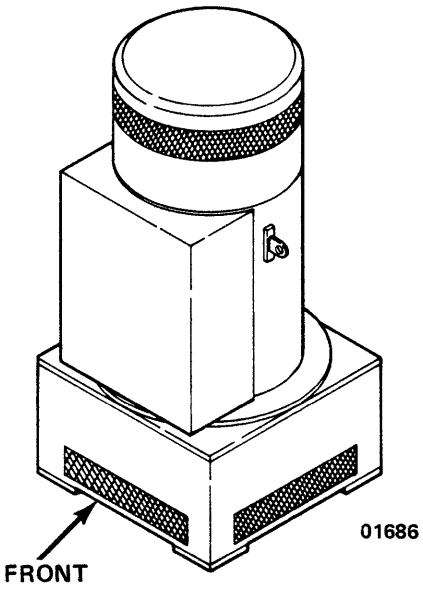
Equipment	Front mm (in)	Rear mm (in)	Left mm (in)	Right mm (in)	Top mm (in)
M-G control cabinet	762 (30)	Note[1]	Note[1]	Note[1]	Note[1]
Kato MG	457 (18)	457 (18)	305 (12)	762 (30)	406 (16)
or Piller MG	762 (30)	305 (12)	457 (18)	457 (18)	406 (16)

Note:

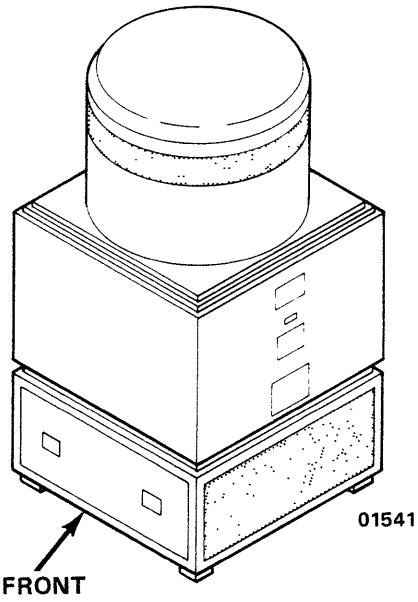
1. Clearances are not required at the rear, left, right, or top of the M-G control cabinet except for power wiring. Holes for power wiring may be made in any of these portions of the control cabinet or power wiring may be routed up through the bottom access opening(s). (See figures giving M-G control cabinet dimensions earlier in this chapter.)

Table 2-5. Minimum M-G Weight Distribution Clearances for 340-kg/m^2 (70-lb/ft^2) Floor Loading

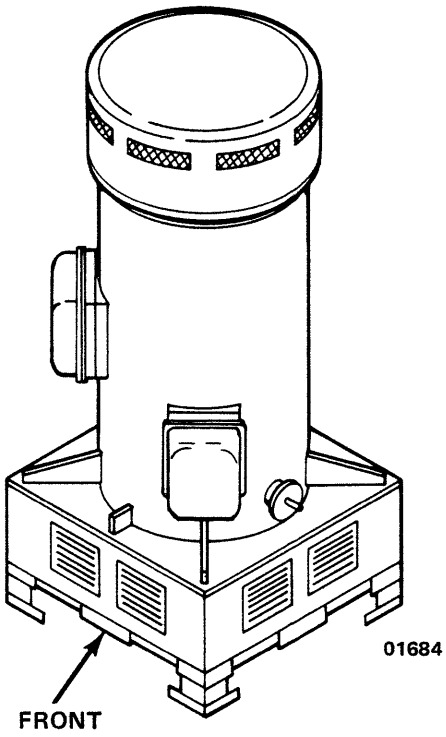
Equipment	Front mm (in)	Rear mm (in)	Left mm (in)	Right mm (in)
10513-740 M-G set:				
• Kato, 40 kVA, 60 Hz	721 (28)	721 (28)	721 (28)	721 (28)
• *or* Piller, 40 kVA, 60 Hz	762 (30)	762 (30)	762 (30)	762 (30)
10514-740 M-G set:				
• Kato, 40 kVA, 50 Hz	813 (32)	813 (32)	813 (32)	813 (32)
• *or* Piller, 40 kVA, 50 Hz	813 (32)	813 (32)	813 (32)	813 (32)
10513-780 M-G set:				
• Kato, 80 kVA, 60 Hz	737 (29)	737 (29)	737 (29)	737 (29)
• *or* Piller, 80 kVA, 60 Hz	762 (30)	762 (30)	762 (30)	762 (30)
10514-780 M-G set:				
• Kato, 80 kVA, 50 Hz	914 (36)	914 (36)	914 (36)	914 (36)
• *or* Piller, 80 kVA, 50 Hz	787 (31)	787 (31)	787 (31)	787 (31)



KATO MG, 40 KVA, 50/60 Hz



KATO MG, 80 KVA, 50/60 Hz



PILLER MG, 40/80 KVA, 50/60 Hz

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Figure 2-23. Front of MGs

What Are Restrictions on Locating Equipment?

Cable and hose lengths restrict the distance that equipment can be located from the mainframe and from other equipment. These cable and hose length restrictions plus other restrictions are described in this portion of the chapter.

Consider the following distances (shown in figure 2-24) when selecting a location for equipment that is restricted by the length of a cable or hose:

D	Routing distance between the floor cutouts below the equipment, including the distance for routing the cable or hose around obstructions under the raised floor
F	Height of the raised floor above the building floor. Multiply the height by 2 to account for both ends of the cable or hose.
H1 and H2	Heights of the cable connectors or hose couplings above the raised floor
S	Slack in cable or hose (not shown in figure 2-24). Typically, allow 0.6 m (2 ft) of slack.

The sum of these distances must not exceed the length (L) of the cable or hose connecting the equipment.

$$L \geq D + (2 \times F) + H1 + H2 + S$$

The H1 and H2 heights and the L lengths are listed in tables 2-6 through 2-9. The cable and hose interconnections are shown in diagram form on scaled drawings of the mainframe complex in figures 2-25 through 2-29.

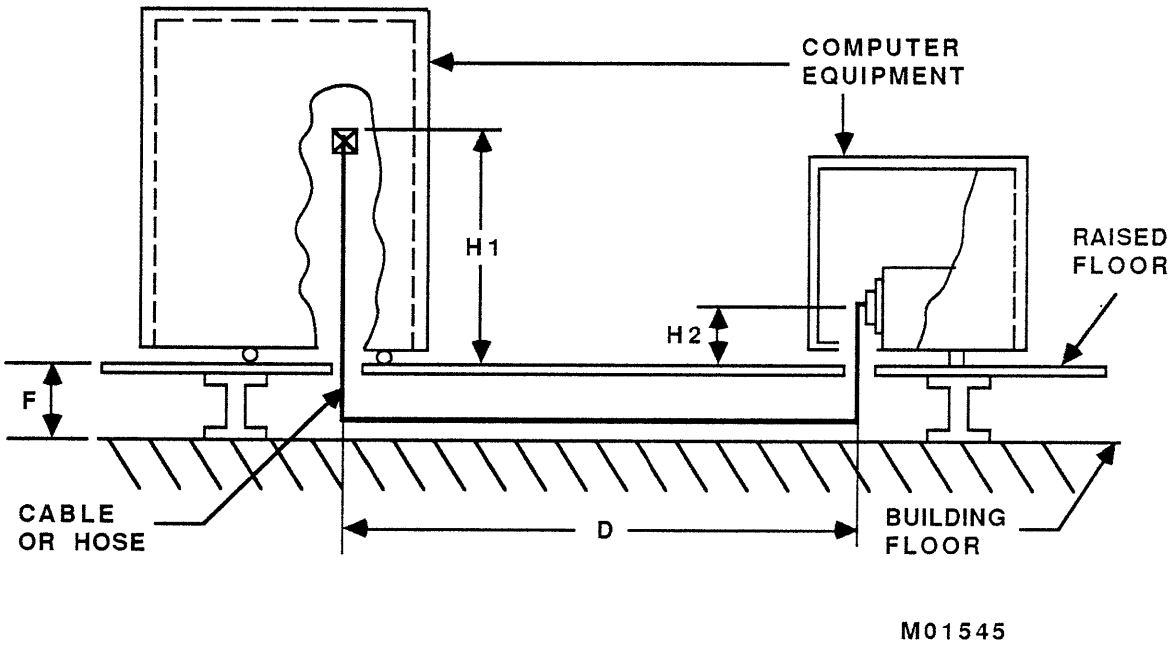

Figure 2-24. Distances Affecting Location of Equipment Connected by Cable or Hose

System Consoles and Peripheral Equipment

Channel cables connect the system consoles and peripheral equipment to the NIO and optional 18852-1 CIO of the mainframe. Table 2-6 lists these cables and figure 2-25 shows them in diagram form.

Table 2-6. Channel Cables

From	H1 Height mm (in)	To	H2 Height mm (in)	Qty.	Cable Length L m (ft)
18002-1 system console	0 (0)	NIO	533 (21.0)	2	19.8 (65)
18002-2 system console	191 (7.5) Note[1]	NIO	1486 (58.5)	1	15.2 (50)
Peripheral equipment on CYBER 170 channels Note[2]	Note[3]	NIO	1359 (53.5)	Note[3]	Note[3]
Peripheral equipment on DMA channels	Note[3]	18852-1 CIO option	1549 (61.0)	Note[3]	Note[3]

Notes:

1. Add height of table to get height above raised floor.

2. Includes Control Data Distributed Communications Network (CDCNET) and Loosely Coupled Network (LCN).

3. Based on equipment installed. Refer to Site Preparation Peripheral Equipment Data or CDCNET Local Area Network Installation manual.

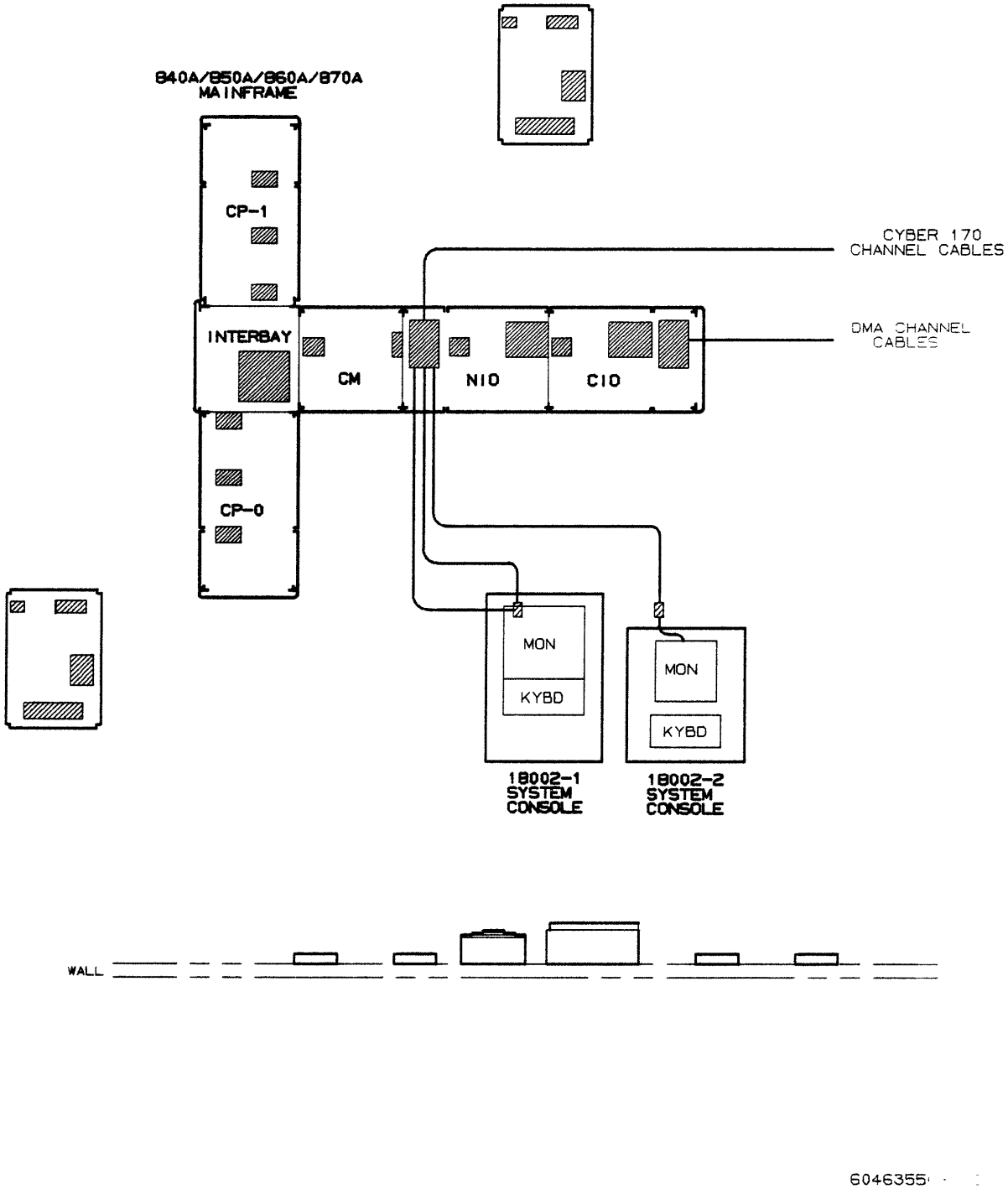

Figure 2-25. Channel Cable Diagram

System Power Monitor, Temperature/Humidity Recorder, and Dew Point Sensor

Control cables connect the system power monitor (SPM) to the interbay, CM, and NIO of the mainframe and to the water cooling unit(s). Control wiring connects the system power monitor to the optional 65348-1 dew point sensor. Table 2-7 lists these cables and wiring and figure 2-26 shows them in diagram form. Environmental considerations also restrict the location of the system power monitor and the dew point sensor. The power cord restricts the location of the optional 65347-1 or 65347-2 temperature/humidity recorder (not shown).

Table 2-7. Control Cables and Wiring

From	H1 Height mm (in)	To	H2 Height mm (in)	Qty	Cable Length L m (ft)
SPM	Note[1]	Interbay	25 (1.0)	2	15.2 (50)
SPM	Note[1]	CM	343 (13.5)	2	15.2 (50)
SPM	Note[1]	NIO	343 (13.5)	1	15.2 (50
SPM	Note[1]	18675-1 or 18675-3 water cooling unit	51 (2.0)	1	15.2 (50)
SPM	Note[1]	18677-1 water cooling unit	445 (17.5)	1	15.2 (50)
SPM	Note[1]	65348-1 dew point sensor	Note [1]	Note [2]	N/A

Notes:

1. Based on customer installation. Eye-level height is recommended for system power monitor, temperature/humidity recorder, and dew point sensor.

2. Customer-supplied control wiring with no L restriction.

System Power Monitor and Dew Point Sensor Environmental Considerations

The system power monitor monitors the temperature of the computer room and the optional 65348-1 dew point sensor monitors the dew point. To ensure accurate readings, locate the system power monitor and dew point sensor in an area that represents the overall temperature-humidity environment of the mainframe. Consider the following guidelines when selecting a location for the system power monitor and dew point sensor.

- Do not locate the system power monitor or dew point sensor near a doorway. When the door is opened, the unit is exposed to changing concentrations of humidity.
- Do not locate the system power monitor or dew point sensor near other equipment that could affect its ability to sample the temperature and humidity. If an system power monitor for another mainframe is in the same area, do not locate the air exhaust (left side) of one system power monitor near the air intake (right side) of the other system power monitor.
- Do not locate the system power monitor or dew point sensor above open floor panels. Air flowing up from under the floor could give false readings.

To protect the factory calibration and prevent damage to the probe in the dew point sensor:

- Do not splash water or other liquids on the dew point sensor.
- Do not expose the dew point sensor to humid conditions that can cause moisture to form on the unit.
- Do not expose the dew point sensor to materials such as hygroscopic sugars, glycerines, glycols, or gylcol vapor.
- Do not use the dew point sensor in atmospheres containing contaminants such as acetone, sulphur dioxide, acid vapors, chlorine ammonia, alcohols, alkaline vapors, acetylene, ethylene oxide, and salt air.

NOTE

Small amounts of alcohol or acetone can be used in the same room as the dew point sensor without adversely affecting its operation.

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Temperature/Humidity Recorder Power Cord

The power cord of the optional 65347-1 or 65347-2 temperature/humidity recorder plugs into the left side of the system power monitor. The power cord is 2.1 m (7 ft) long. Locate the temperature/humidity recorder near the system power monitor.

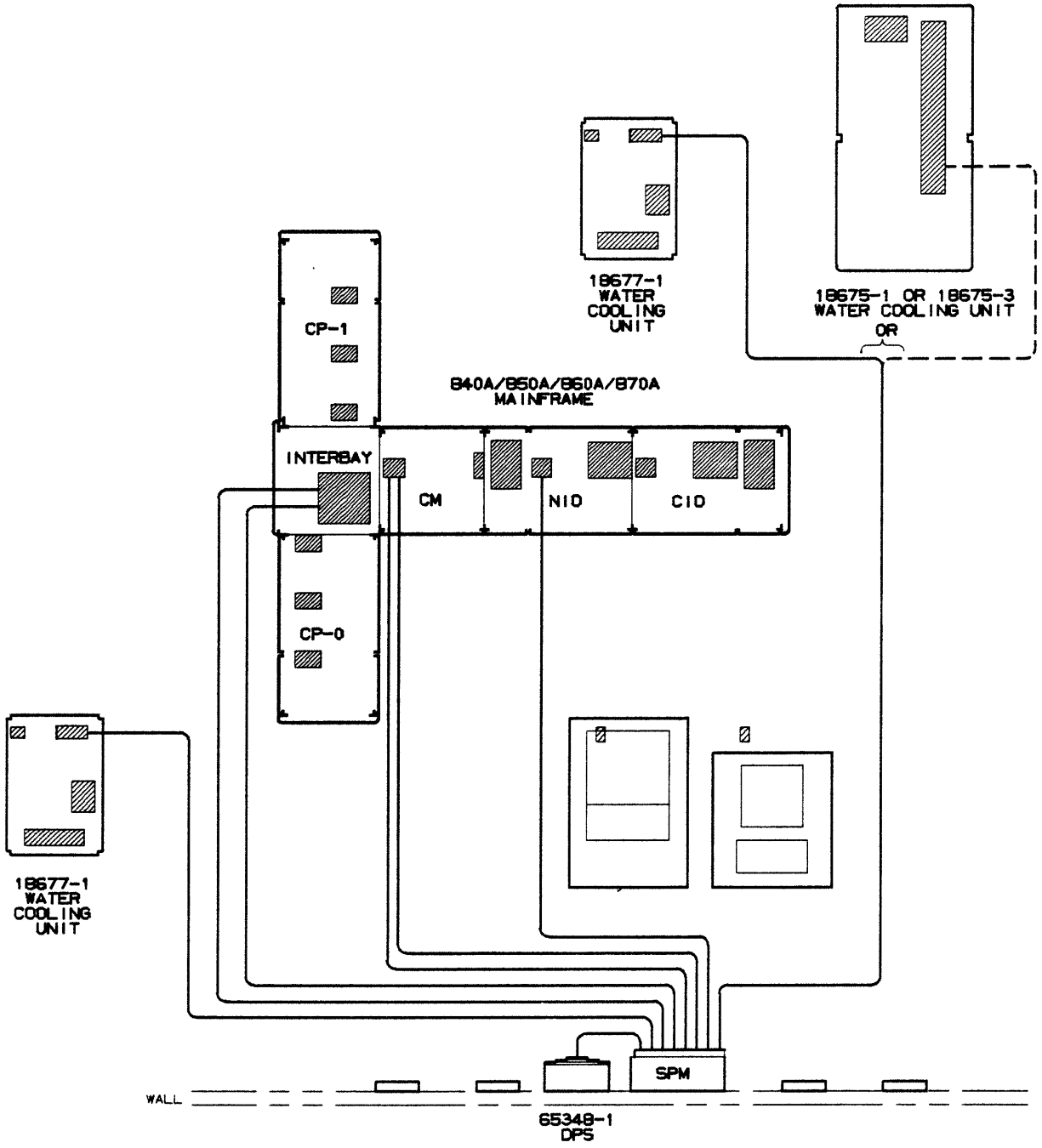

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Figure 2-26. Control Cable and Wiring Diagram

Water Cooling Units

L-shaped water hose assemblies connect the customer-supplied site water shutoff valves to the water cooling unit(s). Water hoses and manifolds connect the water cooling unit(s) to the mainframe. Table 2-8 lists these hoses for the 18675-1 and 18675-3 water cooling units and figure 2-27 shows them in diagram form. Table 2-9 and figure 2-28 does the same for the 18677-1 water cooling unit. An obstruction-free area is required for the water hoses and manifolds.

Obstruction-Free Area for Hoses and Manifolds

The customer-supplied site water supply and return lines to and from the water cooling unit(s) must not be routed under the raised floor where the mainframe is to be located. To provide an obstruction-free area under the mainframe for its water hoses and manifolds, route the site supply and return lines no closer than 1.2 m (4 ft) to the front or rear of the mainframe.

Table 2-8. Water Hoses for 18675-1/3 Water Cooling Unit

From	H1 Height mm (in)	To	H2 Height mm (in)	Qty.	Hose Length L m (ft)
Site water shut-off valves	Note[1]	Water cooling unit	457 (18.0)	2	See figure 2-27
Water cooling unit	216 (8.5)	Distribution manifold	Note[1]	2	7.6 (25)
Distribution manifold	Note[1]	CP-0, CP-1, and CM/NIO/CIO manifolds	Note[1]	6	3 (10)
CP-0 manifold	Note[1]	CP-0	178 (7.0)	6	2.4 (8)
CP-1 manifold	Note[1]	CP-1	178 (7.0)	6	2.4 (8)
CM/NIO/GIO manifold	Note[1]	CM, NIO, and CIO	356 (14.0)	6	2.4 (8)

Notes:

1. Coupling is below raised floor.

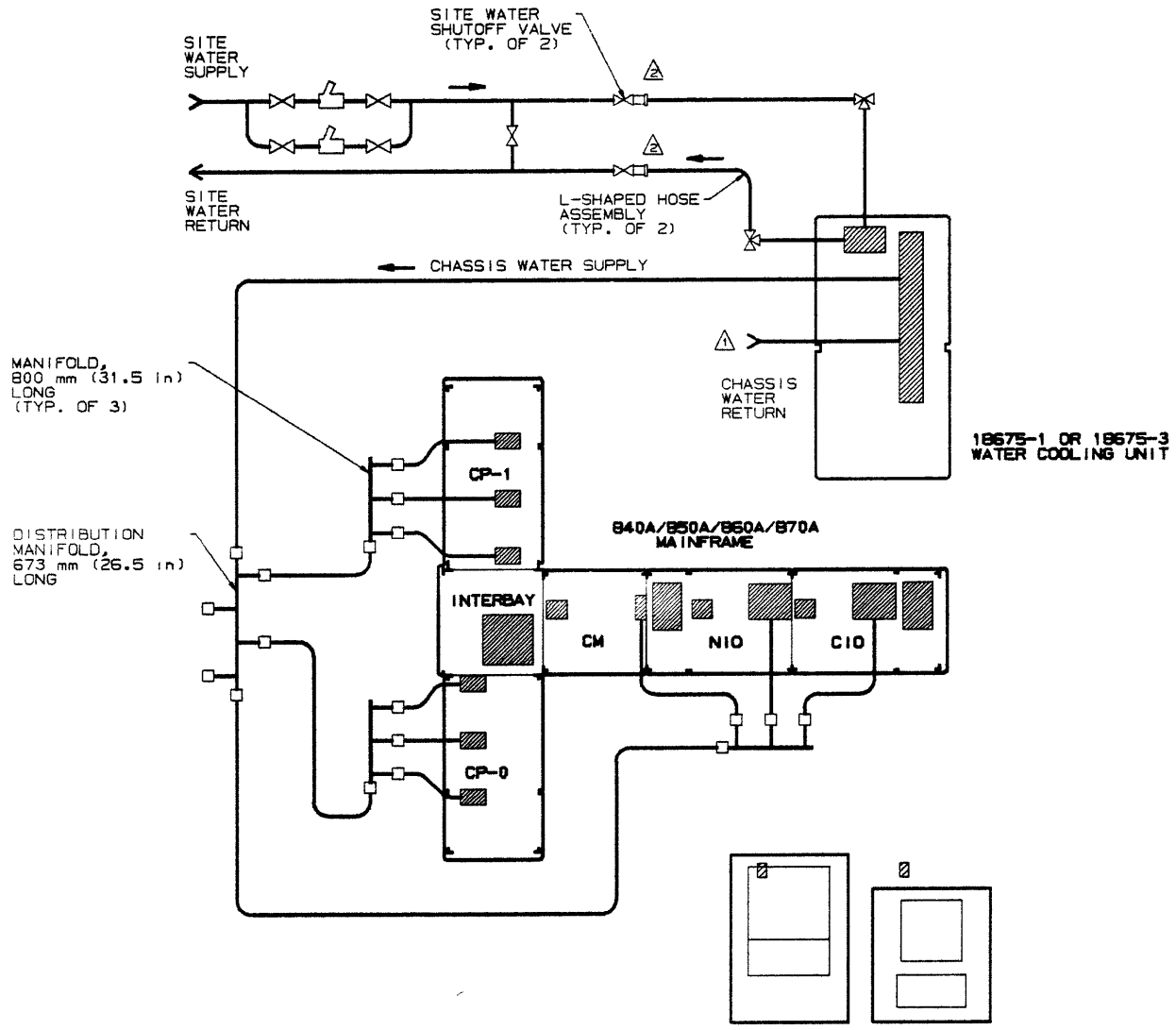


Figure 2-27. Water Hose Diagram With 18675-1/3 Water Cooling Unit

NOTE

For clarity, figure 2-28 and later diagrams show two 18677-1 water cooling units set apart. When two water cooling units are used, Control Data recommends placing them side by side.

Table 2-9. Water Hoses for 18677-1 Cooling Unit(s)

From	H1 Height mm (in)	To	H2 Height mm (in)	Qty.	Hose Length L m (ft)
Site water shutoff valves	Note[1]	Water cooling unit(s)	190.5 (7.5)	Note[2]	See figure 2-28
Water cooling unit	140 (5.5)	CP-0 manifold	Note[1]	2	9.1 (30)
CP-0 manifold	Note[1]	CP-0	178 (7.0)	6	2.4 (8)
CP-0 manifold	Note[1]	CM/NIO/CIO manifold	Note[1]	2	3.0 (10)
CM/NIO/CIO manifold	Note[1]	CM, NIO, and CIO	356 (14.0)	6	2.4 (8)
Water cooling unit	140 (5.5)	CP-1 manifold	Note[1]	2	9.1 (30)
CP-1 manifold	Note[1]	CP-1	178 (7.0)	6	2.4 (8)

Notes:

1. Coupling is below raised floor.

2. Two per water cooling unit.

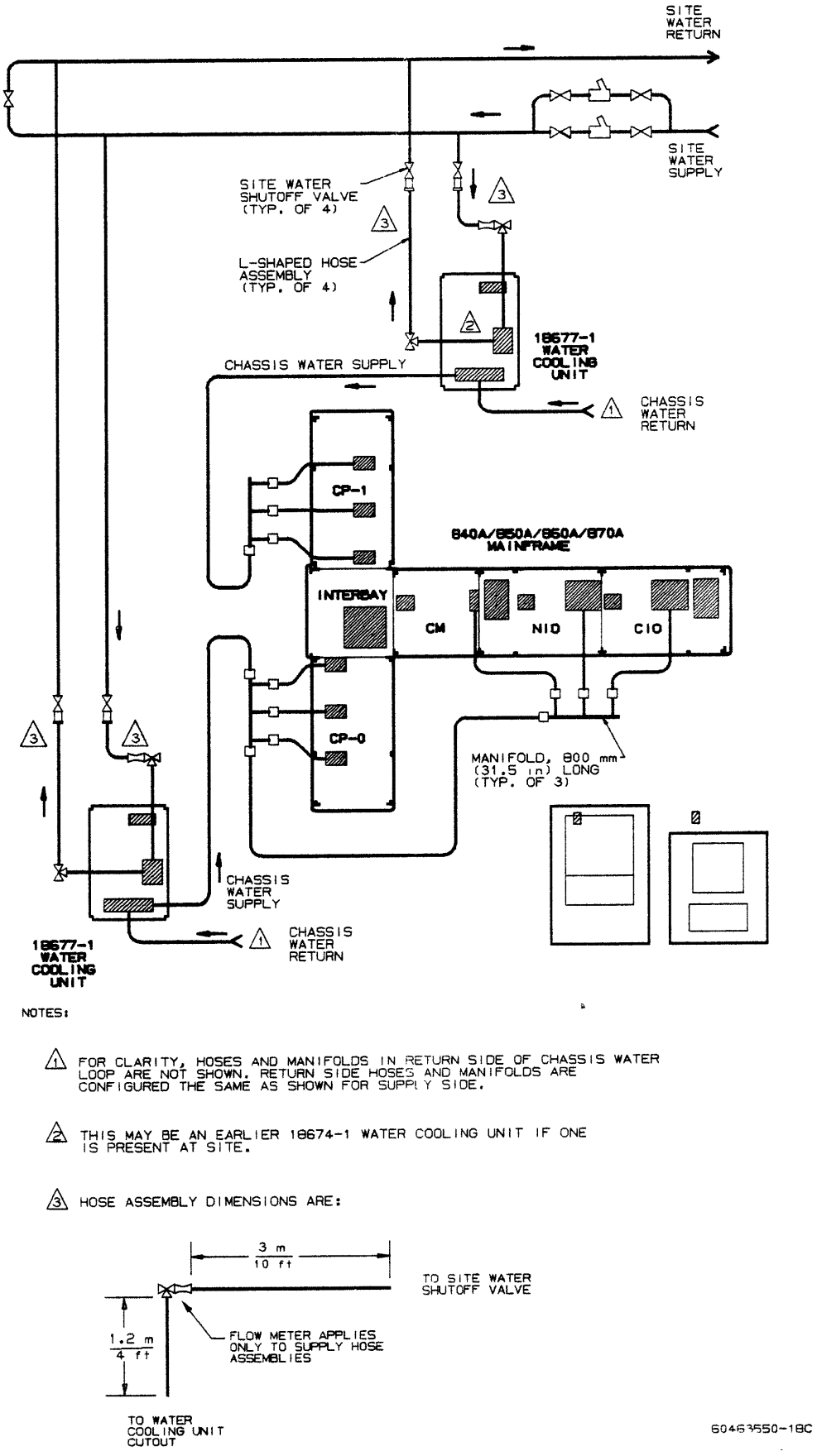


Figure 2-28. Water Hose Diagram With 18677-1 Water Cooling Unit(s)

RTA Modem

Cables connect the RTA modem to the NIO and to the customer-supplied telephone jack. Table 2-10 lists these cables and figure 2-29 shows them in diagram form. Operator considerations also restrict the location of the RTA modem.

Table 2-10. RTA Cables

From	H1 Height mm (in)	To	H2 Height mm (in)	Qty.	Cable Length L m (ft)
NIO	1486 (58.5)	Modem (U.S. and Canada) Note[1]	25 (1.0) Note[2]	1	15.2(50)
Modem (U.S. and Canada) Note[1]	25 (1.0) Note[2]	Telephone jack	Note[3]	1	2.1 (7)

Notes:

1. Specifications for other countries may vary. Contact your Control Data representative for information.

2. Add height of table to get height above raised floor.

3. Based on customer installation.

Operator Considerations

When RTA is necessary, the computer operator must use the telephone, modem, and system console(s). Locate the telephone and modem within 1.8 m (6 ft) of the system console(s).

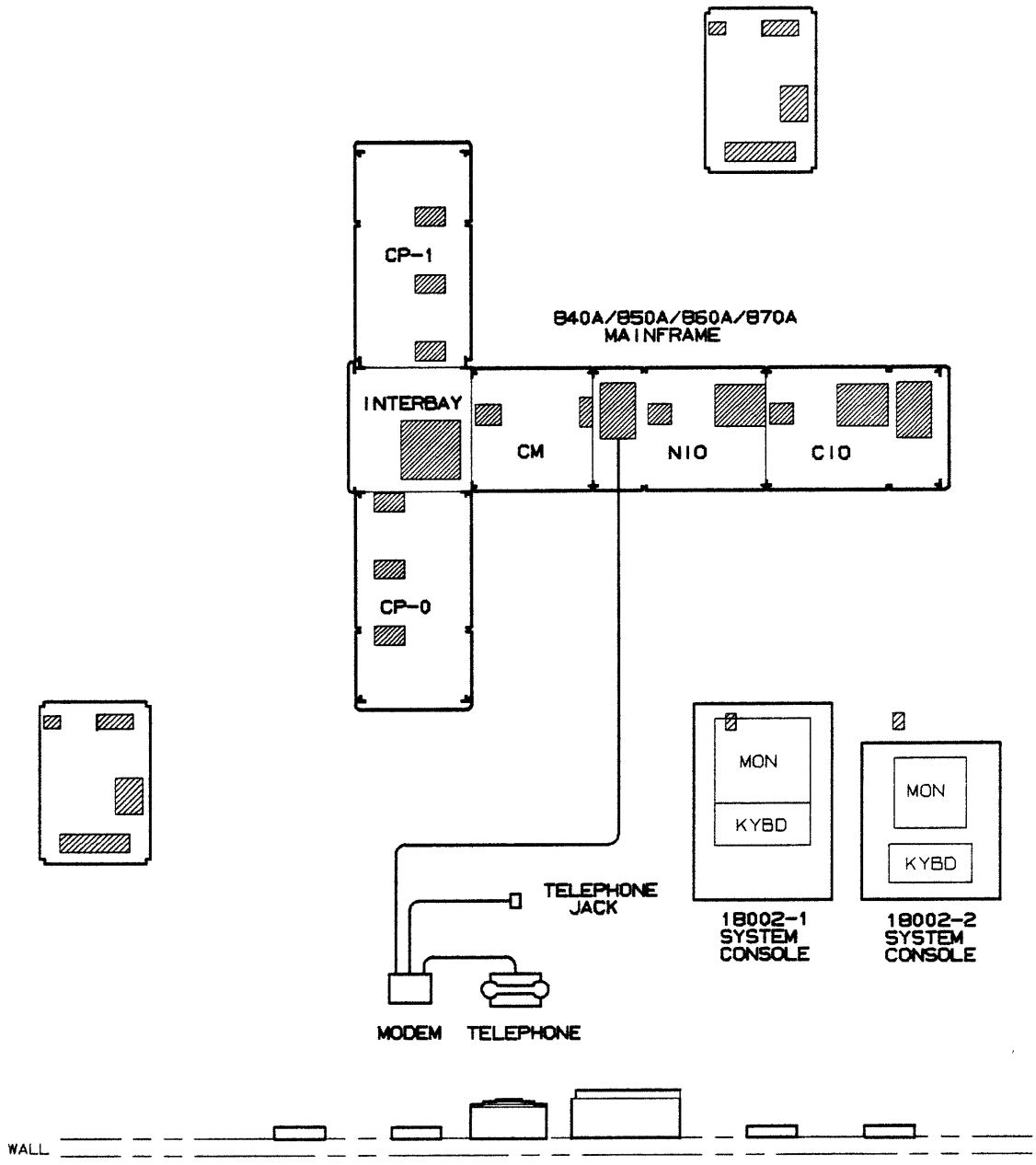


Figure 2-29. RTA Cable Diagram

What Floor Cutouts Are Required?

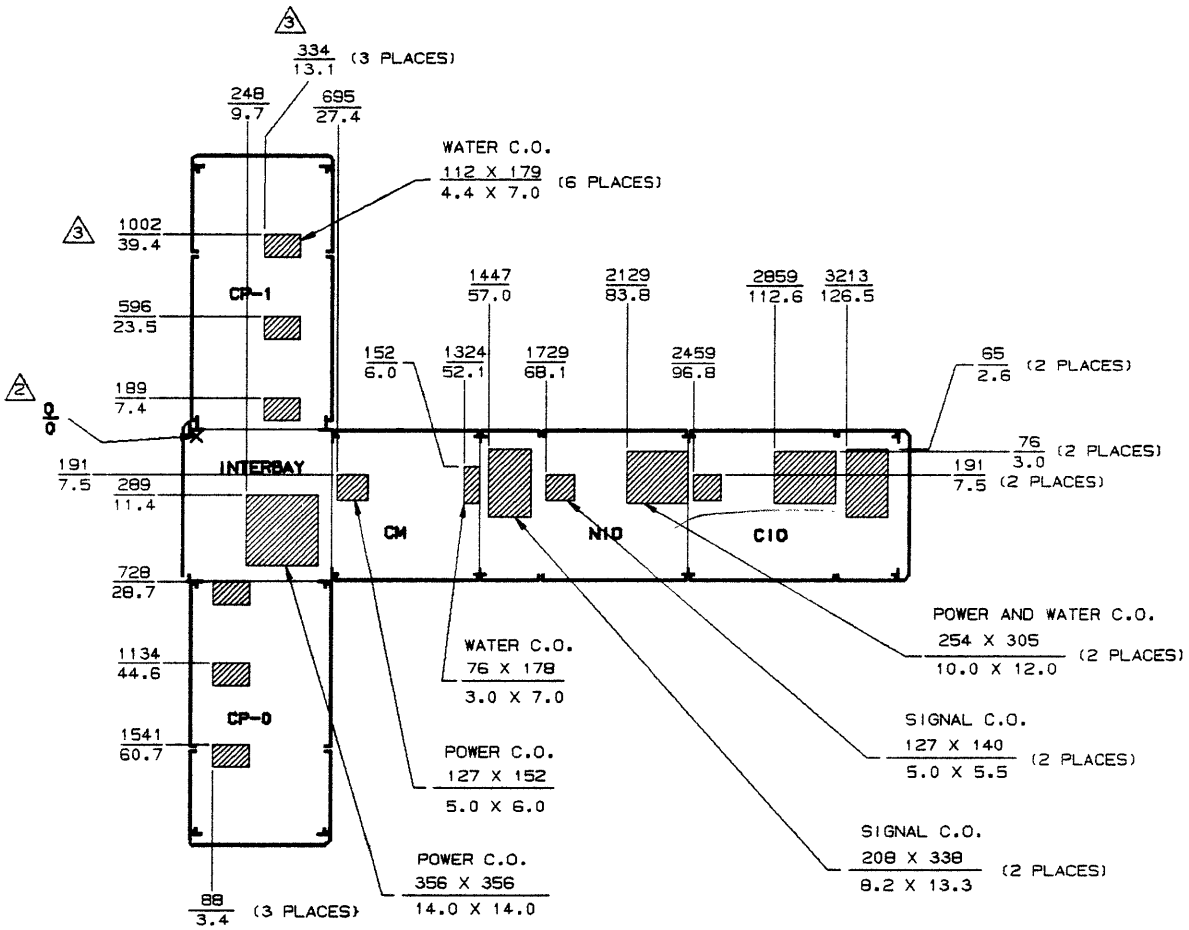
In the computer room, cutouts are required in the raised floor to route power wires, signal cables, and water hoses to the equipment in the mainframe complex. Table 2-11 lists the quantity, size, and purpose of the cutouts. Figures 2-30 through 2-34 show the size and location of the cutouts. In the M-G room, the equipment is installed directly on the building floor.

Table 2-11. Floor Cutouts

Equipment	Qty	Size mm (in)	Purpose
840A, 850A, or 860A mainframe: • CP-0 • CM • Interbay • NIO	9	See figure 2-30	Power, signal, water
860A mainframe with 18559-3 CP-1 option or 870A mainframe - includes preceding listed units and CP-1	12	See figure 2-30	Power, signal, water
18852-1 CIO option	3	See figure 2-30	Power, signal, water
System power monitor	1	64 x 102 (2.5 x 4.0) See figure 2-31	Signal
18002-1 system console	1 Note[1]	64 x 102 (2.5 x 4.0) See figure 2-32	Power, signal
18002-2 system console	1 Note[1]	64 x 102 (2.5 x 4.0)	Signal
18675-1 or 18675-3 water cooling unit	2	See figure 2-33	Power, signal, water
18677-1 water cooling unit	4	See figure 2-34	Power, signal, water
65347-1 or 65347-2 temperature/humidity recorder	None	N/A	N/A
65348-1 dew point sensor	None	N/A	N/A
RTA modem	1 Note[1]	64 x 102 (2.5 x 4.0)	Signal

Note:

1. One cutout can be used for system console(s) and modem.



NOTES:

1. ALL DIMENSIONS ARE IN mm/in.

2 REFERENCE POINT (0/0) IS AT THE INTERSECTION OF A HORIZONTAL LINE THROUGH THE TOP LEFT CORNER FRAME OF THE CM AND A VERTICAL LINE THROUGH THE TOP LEFT CORNER FRAME OF CP-1.

3 DIMENSIONS ARE DISTANCES FROM UPPER LEFT CORNER OF EACH FLOOR CUTOUT TO REFERENCE POINT 0/0.

60463550-7C

Figure 2-30. 840A/850A/860A/870A Mainframe Floor Cutouts

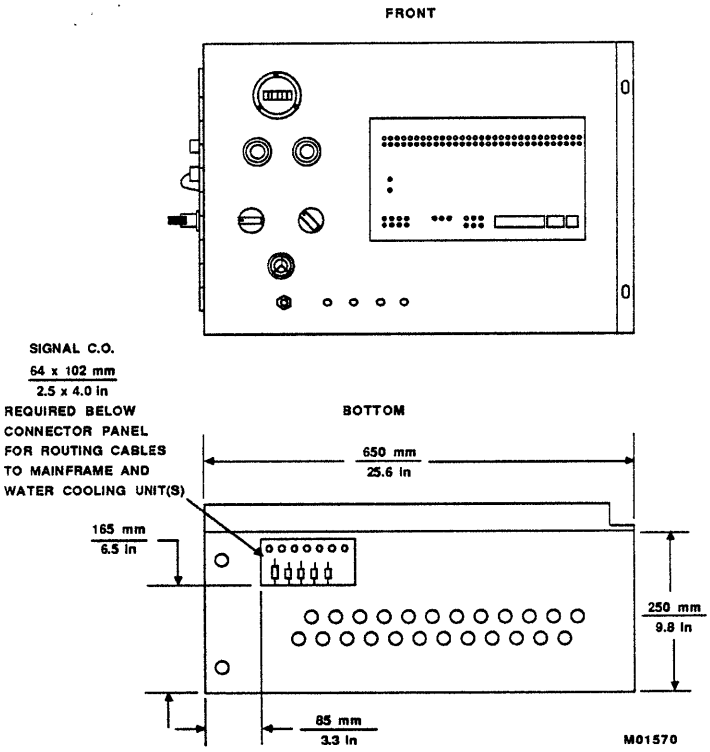


Figure 2-31. System Power Monitor Floor Cutout

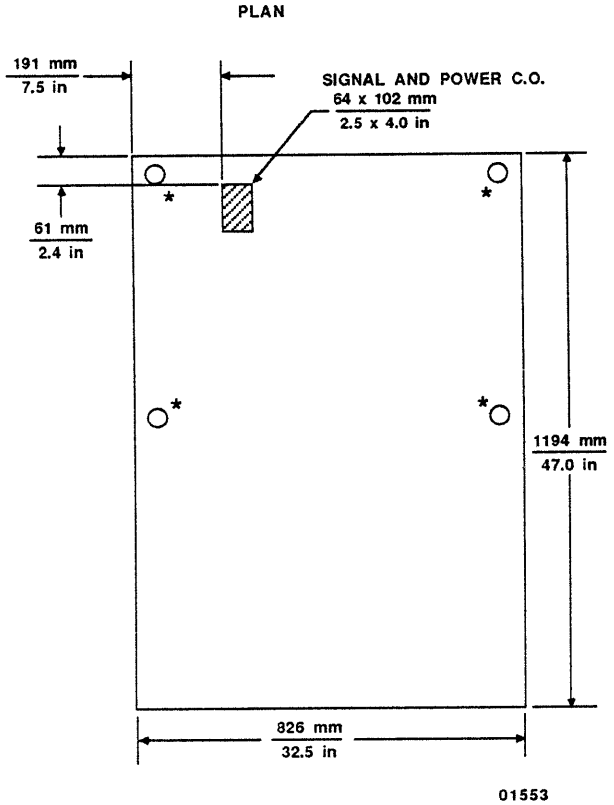


Figure 2-32. 18002-1 System Console Floor Cutout

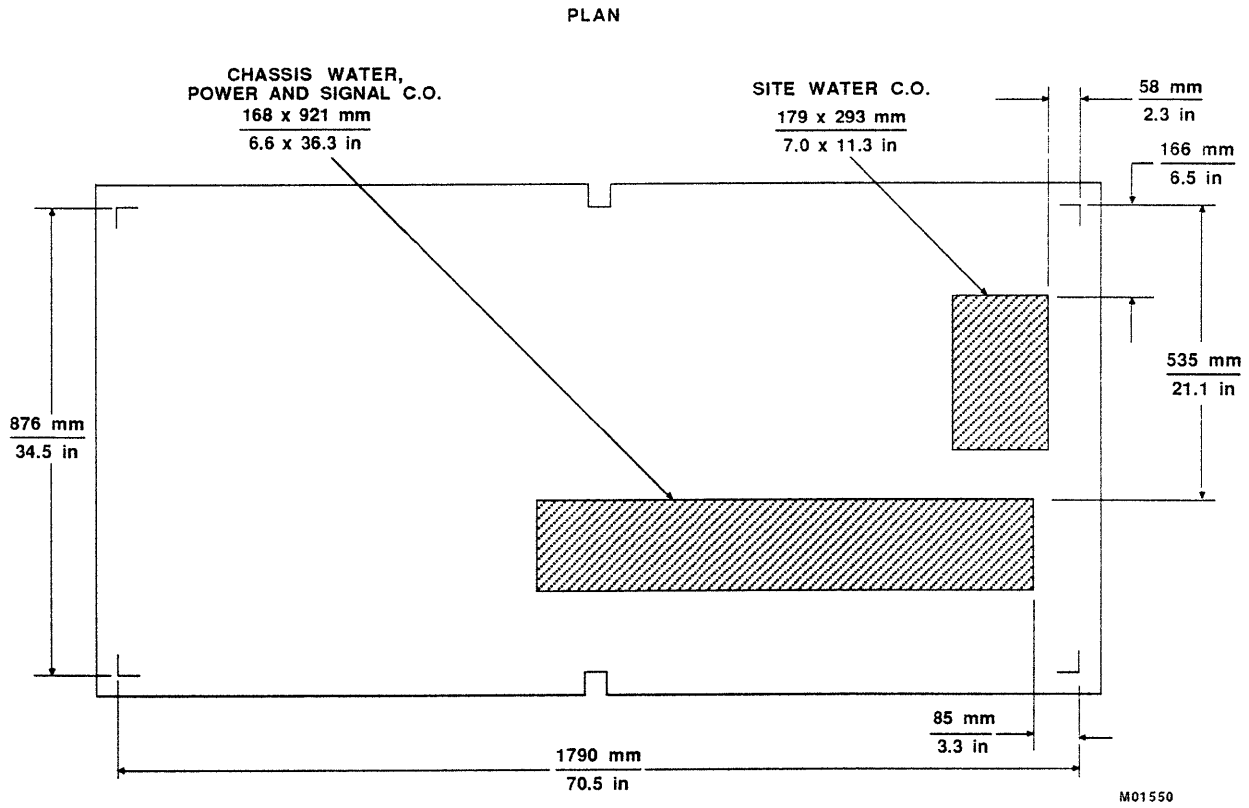


Figure 2-33. 18675-1/3 Water Cooling Unit Floor Cutouts

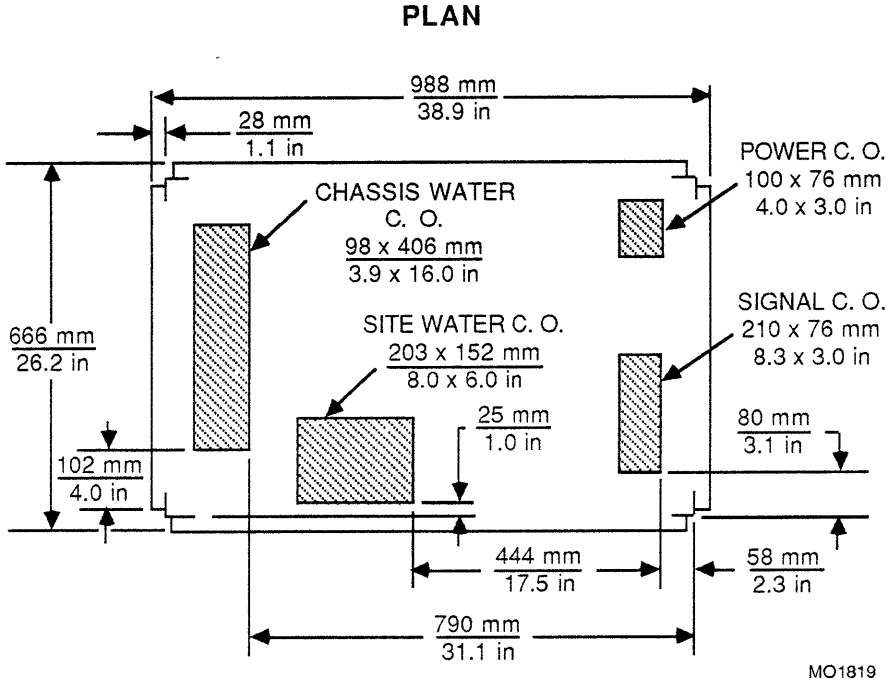


Figure 2-34. 18677-1 Water Cooling Unit Floor Cutouts

How to Order Full-Size Templates

Full-size paper templates, which show the equipment outline and floor cutouts or wall-mounting holes, are available for the mainframe, water cooling units, and system power monitor. The templates are included with the preinstallation kits that you receive two weeks before the mainframe.

If you plan to mark and cut out the floor or drill wall-mounting holes before you receive the preinstallation kits, you can order the templates at extra cost from:

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

Ordering information, prices, and current revision levels are in the Literature Catalog (publication 90310500). The publication numbers of the templates are listed in table 2-12.

Table 2-12. Full-Size Templates

Publication Number	Template	Mainframe Unit
22121091	840A, 850A, or 860A mainframe	Interbay, CM, NIO
22121092	840A, 850A, or 860A mainframe	CP-0
22121093	18559-3 CP-1 option for 860A mainframe	CP-1
22121091	870A mainframe	Interbay, CM, NIO
22121092	870A mainframe	CP-0
22121093	870A mainframe	CP-1
22121094	18852-1 CIO option	CIO
53595859	System power monitor	N/A
24615630	18675-1 or 18675-3 water cooling unit	N/A
24615631	18677-1 water cooling unit	N/A

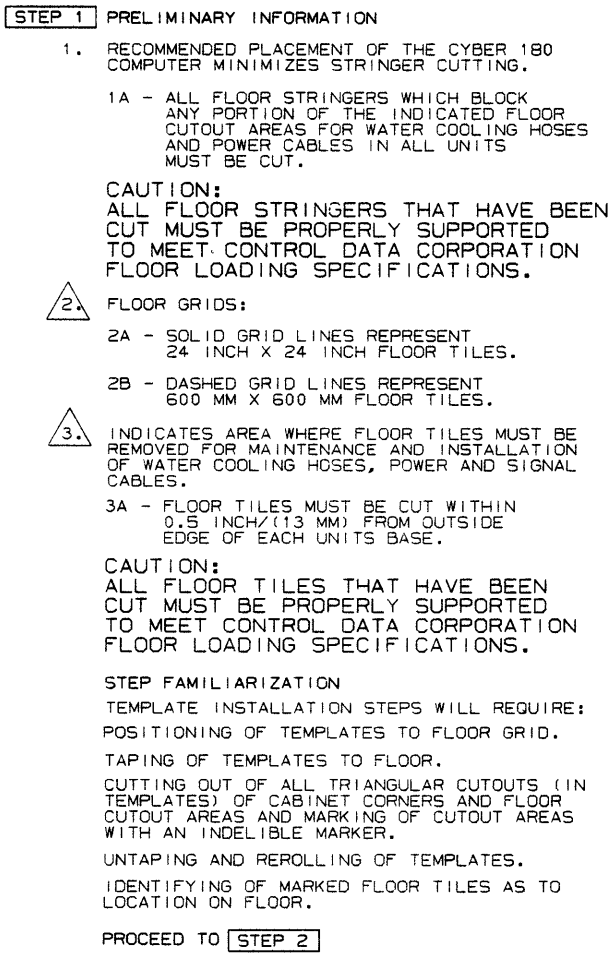
How to Use the Full-Size Mainframe Templates

The following text and figures are sample instructions on how to use the full-size 840A, 850A, 860A, and 870A mainframe templates. Numbers enclosed in triangles on the figures are keyed to notes on the facing pages. Step 1 on the next page gives preliminary information that you must know before using the templates. When you begin placing the templates, refer to the instructions printed on them.

The templates refer to portions of the mainframe by unit numbers. Table 2-13 defines the unit numbers used.

Table 2-13. Unit Numbers Used on Templates

Unit Number	Unit	Unit Number	Unit
1	Interbay	4	CIO
2	CM	5	CP-0
3	NIO	6	CP-1



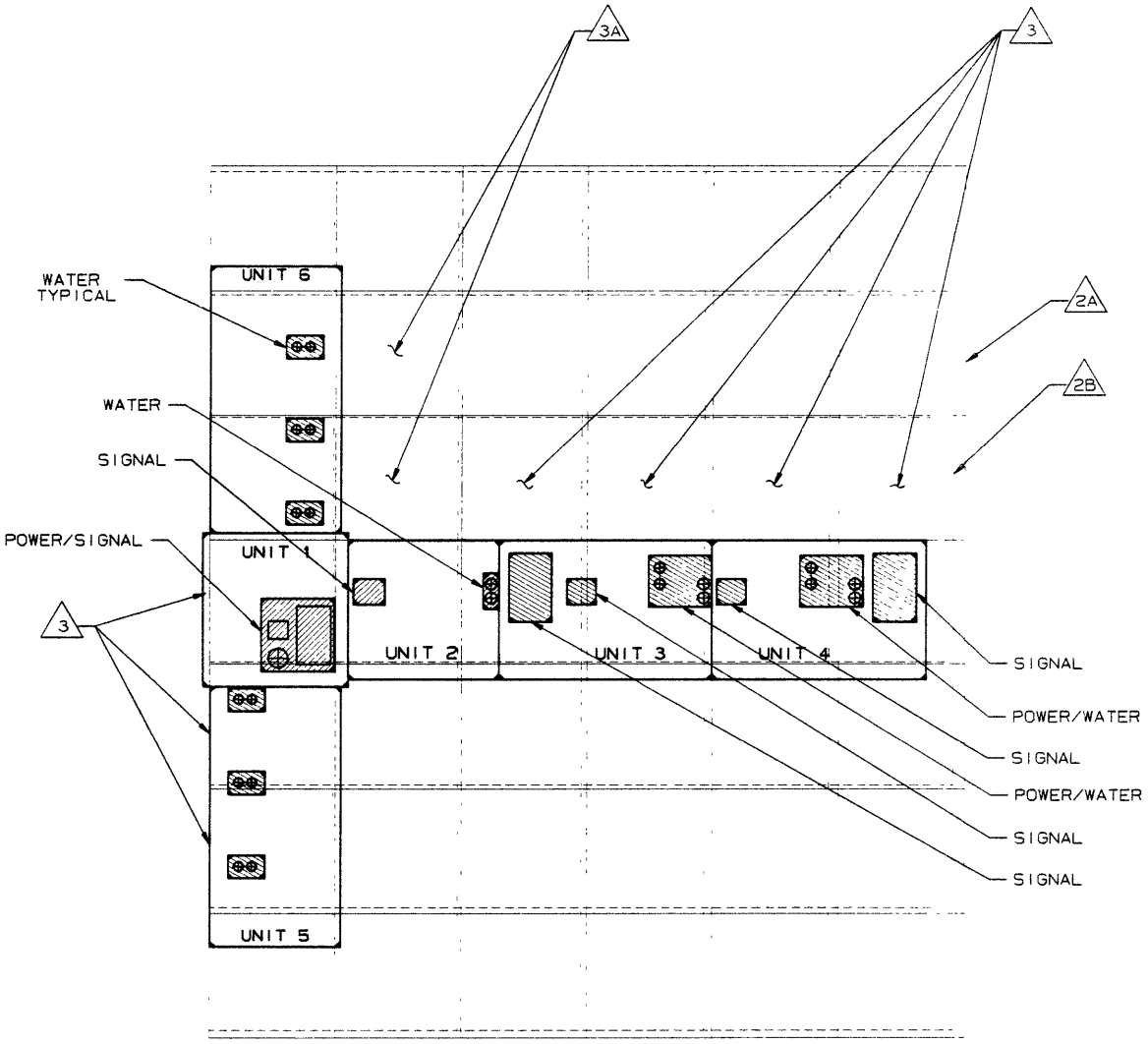


Figure 2-35. Scaled Diagram of Mainframe Templates

STEP 2 PLACEMENT INSTRUCTIONS FOR TEMPLATE 22121091

1. LOCATE ON FLOOR WHERE FRONT EDGE OF CYBER 180 (UNITS 1,2 AND 3) WILL BE POSITIONED.SEE DIAGRAM.

2. ROLL OUT TEMPLATE CONTAINING UNITS 1,2 AND 3.

3. CUT OUT SEMICIRCLES 1,2 AND 3 IN TEMPLATE.

4. ALIGN TEMPLATE ON FLOOR GRID USING SEMICIRCLES 1,2 AND 3 AS A GUIDE. SEE DIAGRAM.

   NOTE: TEMPLATE MUST BE FLAT (IE NO WRINKLES).

5. TAPE TEMPLATE SECURELY TO FLOOR.

6. CUT TRIANGULAR HOLES (IN TEMPLATE) AT ALL CABINET CORNERS AND FLOOR CUTOUT AREAS.

7. MARK ALL TRIANGULAR CUTOUTS ON FLOOR WITH AN INDELIBLE MARKER.

   NOTE: TRIANGULAR CABINET CORNER MARKINGS ON FLOOR ARE FOR POSITIONING CABINET AND NOT TO BE CUT IN FLOOR TILES.

PROCEED TO STEP 3 ON TEMPLATE 22121092

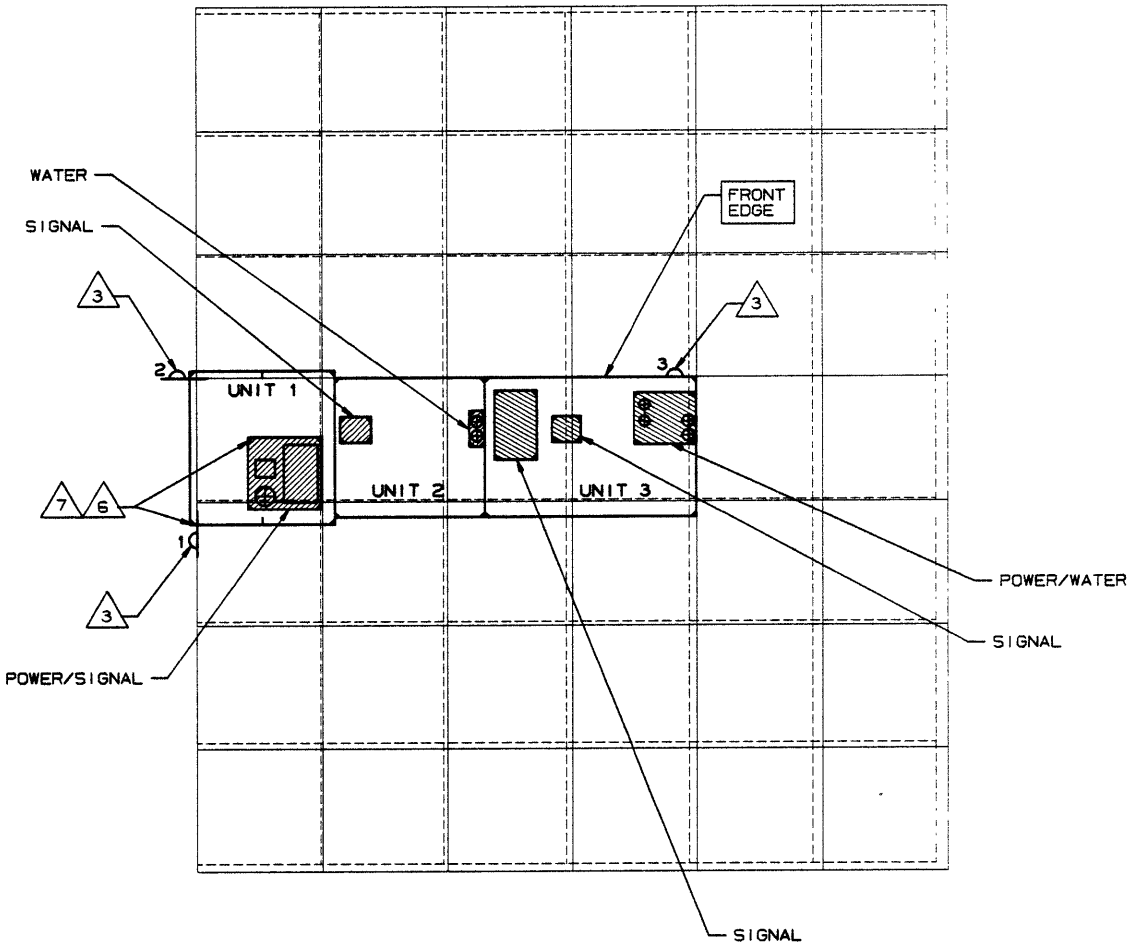


Figure 2-36. Placing Template 22121091 for Units 1 Through 3

STEP 3 PLACEMENT INSTRUCTIONS FOR TEMPLATE 22121092

1. ROLL OUT TEMPLATE CONTAINING UNIT 5.

2. CUTOUT SEMICIRCLES 4 AND 5 IN TEMPLATE.

3. PLACE TEMPLATE (UNIT 5) NEXT TO UNIT 1 AND ALIGN WITH FLOOR GRID USING SEMICIRCLES 4 AND 5 AS A GUIDE. SEE DIAGRAM.

   NOTE: TEMPLATE MUST BE FLAT (IE NO WRINKLES).

4. TAPE TEMPLATE SECURELY TO FLOOR.

5. CUT TRIANGULAR HOLES (IN TEMPLATE) AT ALL CABINET CORNERS AND FLOOR CUTOUT AREAS.

6. MARK ALL TRIANGULAR CUTOUTS ON FLOOR WITH AN INDELIBLE MARKER.

   NOTE: TRIANGULAR CABINET CORNER MARKINGS ON FLOOR ARE FOR POSITIONING CABINET AND NOT TO BE CUT IN FLOOR TILES.

7. UNTAPE AND REROLL TEMPLATES.

8. AFTER TEMPLATES ARE REMOVED TILES SHOULD BE MARKED WITH POWER, WATER AND SIGNAL CABLE DESIGNATIONS.

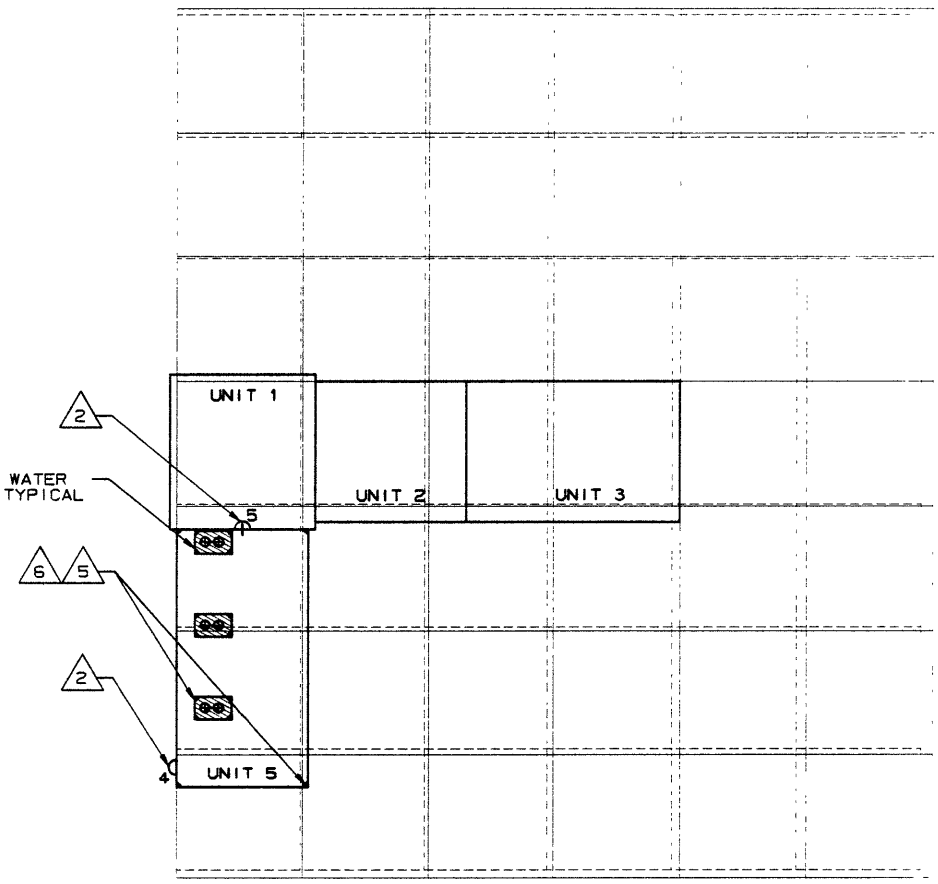


Figure 2-37. Placing Template 22121092 for Unit 5

PLACEMENT INSTRUCTIONS FOR TEMPLATE 22121093
(OPTIONAL CP CABINET)

1. ROLL OUT TEMPLATE CONTAINING UNIT 6.

2. CUTOUT SEMICIRCLES 6 AND 7 IN TEMPLATE.

3. PLACE TEMPLATE (UNIT 6) NEXT TO UNIT 1 AND ALIGN WITH FLOOR GRID USING SEMICIRCLES 6 AND 7 AS A GUIDE. SEE DIAGRAM.

   NOTE: TEMPLATE MUST BE FLAT (IE NO WRINKLES).

4. TAPE TEMPLATE SECURELY TO FLOOR.

5. CUT TRIANGULAR HOLES (IN TEMPLATE) AT ALL CABINET CORNERS AND FLOOR CUTOUT AREAS.

6. MARK ALL TRIANGULAR CUTOUTS ON FLOOR WITH AN INDELIBLE MARKER.

   NOTE: TRIANGULAR CABINET CORNER MARKINGS ON FLOOR ARE FOR POSITIONING CABINET AND NOT TO BE CUT IN FLOOR TILES.

7. UNTAPE AND REROLL TEMPLATE.

8. AFTER TEMPLATE IS REMOVED TILES SHOULD BE MARKED WITH WATER DESIGNATIONS.

9. INDICATES AREA WHERE FLOOR TILES MUST BE REMOVED FOR MAINTENANCE AND INSTALLATION OF WATER COOLING HOSES.

   FLOOR TILES MUST BE CUT WITHIN 0.5 INCH/(13 MM) FROM OUTSIDE EDGE OF EACH UNIT'S BASE.

CAUTION:
ALL FLOOR TILES THAT HAVE BEEN CUT MUST BE PROPERLY SUPPORTED TO MEET CONTROL DATA CORPORATION FLOOR LOADING SPECIFICATIONS.

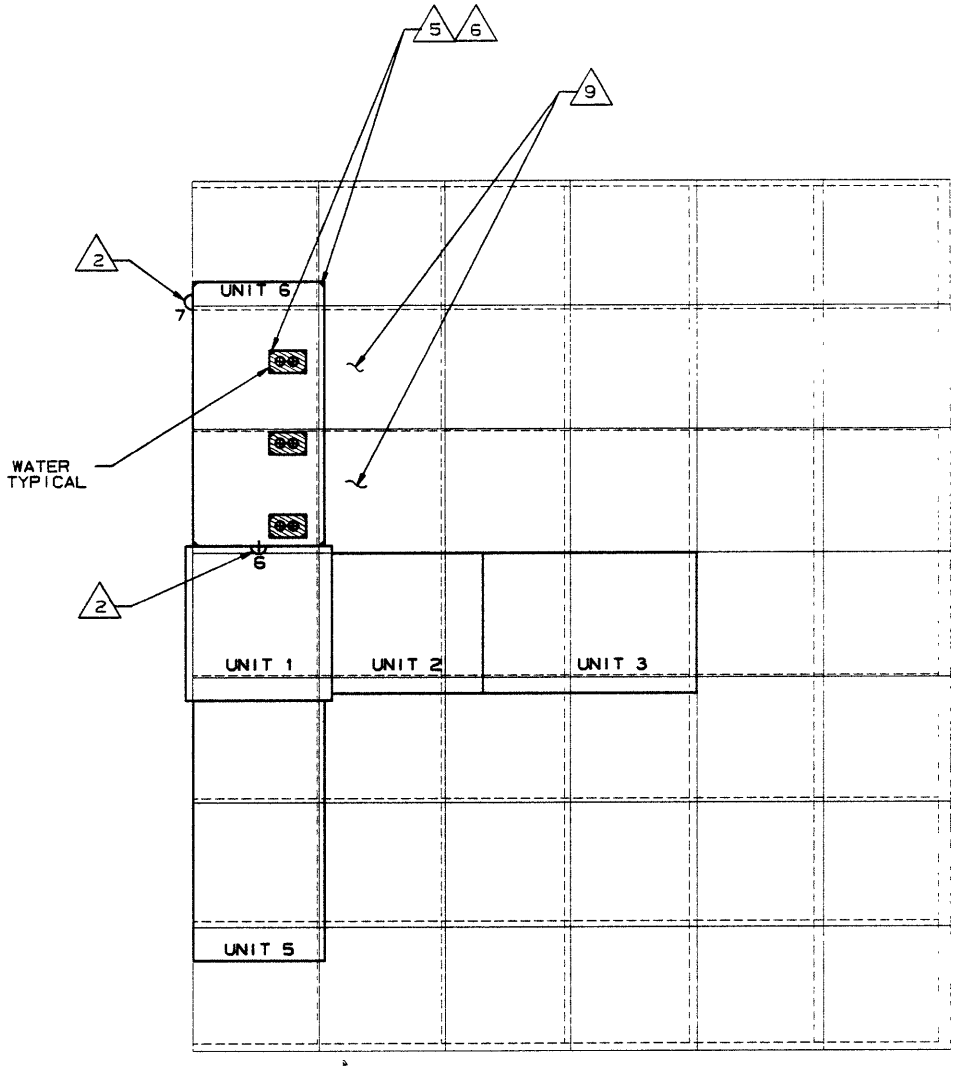


Figure 2-38. Placing Template 22121093 for Unit 6

PLACEMENT INSTRUCTIONS FOR TEMPLATE 22121094
(OPTIONAL CIO CABINET)

1. PLACE TEMPLATE (UNIT 4) NEXT TO UNIT 3. SEE DIAGRAM.

   NOTE: TEMPLATE MUST BE FLAT (IE NO WRINKLES).

2. TAPE TEMPLATE SECURELY TO FLOOR.

3. CUT TRIANGULAR HOLES (IN TEMPLATE) AT ALL CABINET CORNERS AND FLOOR CUTOUT AREAS.

4. MARK ALL TRIANGULAR CUTOUTS ON FLOOR WITH AN INDELIBLE MARKER.

5. UNTAPE AND REROLL TEMPLATE.

6. AFTER TEMPLATE IS REMOVED TILES SHOULD BE MARKED WITH POWER, WATER AND CABLE DESIGNATIONS.

   NOTE: TRIANGULAR CABINET CORNER MARKINGS ON FLOOR ARE FOR POSITIONING CABINET AND NOT TO BE CUT IN FLOOR TILES.

7. INDICATES AREA WHERE FLOOR TILES MUST BE REMOVED FOR MAINTENANCE AND INSTALLATION OF WATER COOLING HOSES, POWER AND SIGNAL CABLES.

   7A - ALL FLOOR STRINGERS WHICH BLOCK ANY PORTION OF THE INDICATED FLOOR CUTOUT AREAS FOR WATER COOLING HOSES AND POWER CABLES IN UNIT 4 MUST BE CUT.

CAUTION:
ALL FLOOR STRINGERS AND FLOOR TILES THAT HAVE BEEN CUT MUST BE PROPERLY SUPPORTED TO MEET CONTROL DATA CORPORATION FLOOR LOADING SPECIFICATIONS.

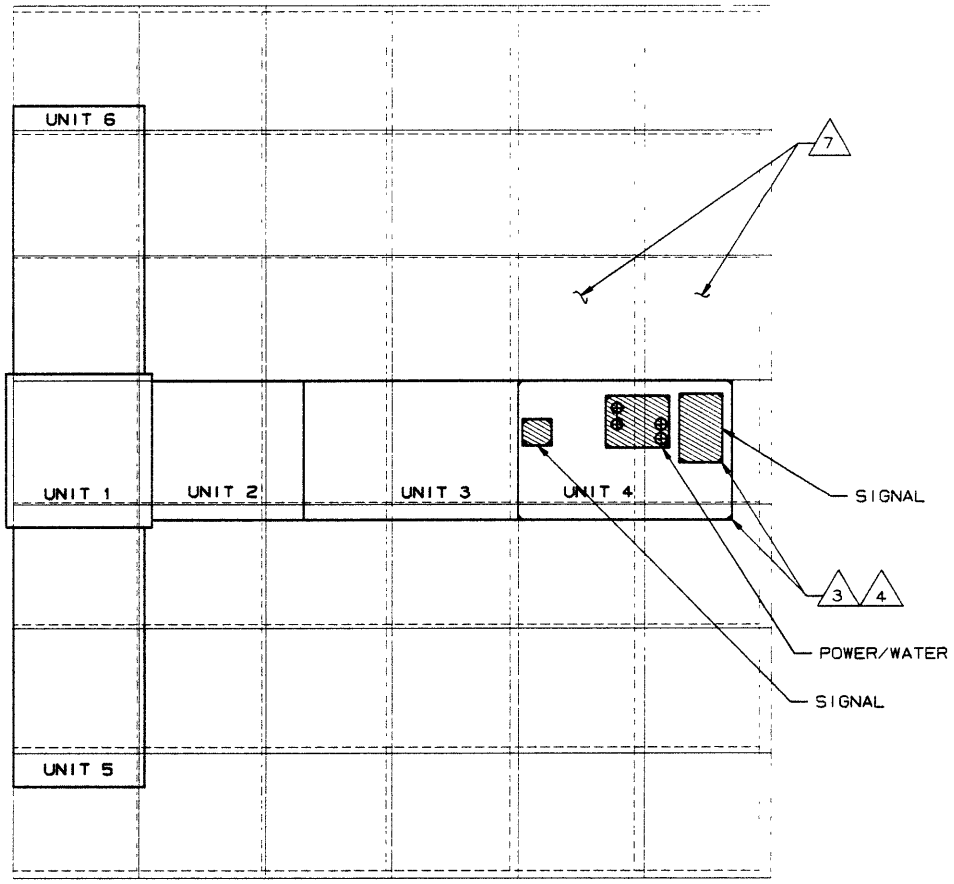


Figure 2-39. Placing Template 22121094 for Unit 4

How to Use the Full-Size Template for the 18675-1/3 Water Cooling Unit

The following text and figure are sample instructions on how to use the full-size template for the 18675-1 and 18675-3 water cooling units. Numbers enclosed in triangles on figure 2-40 are keyed to notes on this page. When you begin placing the template, refer to the instructions printed on it.

Following is preliminary information that you must know before using the template.

PRELIMINARY INFORMATION

RECOMMENDED PLACEMENT OF THE WATER COOLING UNIT

△1A - INDICATES AREA WHERE FLOOR TILES MUST BE REMOVED FOR MAINTENANCE AND INSTALLATION OF WATER COOLING HOSES, POWER AND SIGNAL CABLES.

△1B - SITE OPTION: THESE TILES MAY BE REMOVED PERMANENTLY INSTEAD OF CUTTING AS INDICATED.

△2A - FLOOR TILES MUST BE CUT WITHIN 0.5 INCH/(13 MM) FROM OUTSIDE EDGE OF WATER COOLING UNIT BASE.

CAUTION:
ALL FLOOR TILES THAT HAVE BEEN CUT MUST BE PROPERLY SUPPORTED TO MEET CONTROL DATA CORPORATION FLOOR LOADING SPECIFICATIONS.

Following are the placement instructions for the template.

PLACEMENT INSTRUCTIONS FOR TEMPLATE 24615630

1. LOCATE ON FLOOR WHERE WATER COOLING UNIT WILL BE POSITIONED.
2. ROLL OUT WATER COOLING UNIT TEMPLATE.
3. △3 CUT OUT SEMICIRCLES 1,2 AND 3 IN TEMPLATE.
4. ALIGN TEMPLATE ON FLOOR GRID USING SEMICIRCLES 1,2 AND 3 AS A GUIDE. SEE DIAGRAM.

   NOTE: TEMPLATE MUST BE FLAT (IE NO WRINKLES).
5. TAPE TEMPLATE SECURELY TO FLOOR.
6. △6 CUT TRIANGULAR HOLES (IN TEMPLATE) AT ALL CABINET CORNERS AND FLOOR CUTOUT AREAS. (TRIANGULAR HOLES FOR FLOOR CUTOUT AREAS DO NOT NEED TO BE CUT OUT AND MARKED IF OPTION 1B IS EXERCISED. CABINET CORNER MARKINGS ARE STILL REQUIRED FOR POSITIONING WATER COOLING UNIT)
7. △7 MARK ALL TRIANGULAR CUTOUTS ON FLOOR WITH AN INDELIBLE MARKER.

   NOTE: TRIANGULAR CABINET CORNER MARKINGS ON FLOOR ARE FOR POSITIONING CABINET AND NOT TO BE CUT IN FLOOR TILES.
8. UNTAPE AND REROLL TEMPLATE.
9. AFTER TEMPLATE IS REMOVED TILES SHOULD BE MARKED WITH POWER, WATER AND SIGNAL CABLE DESIGNATIONS.

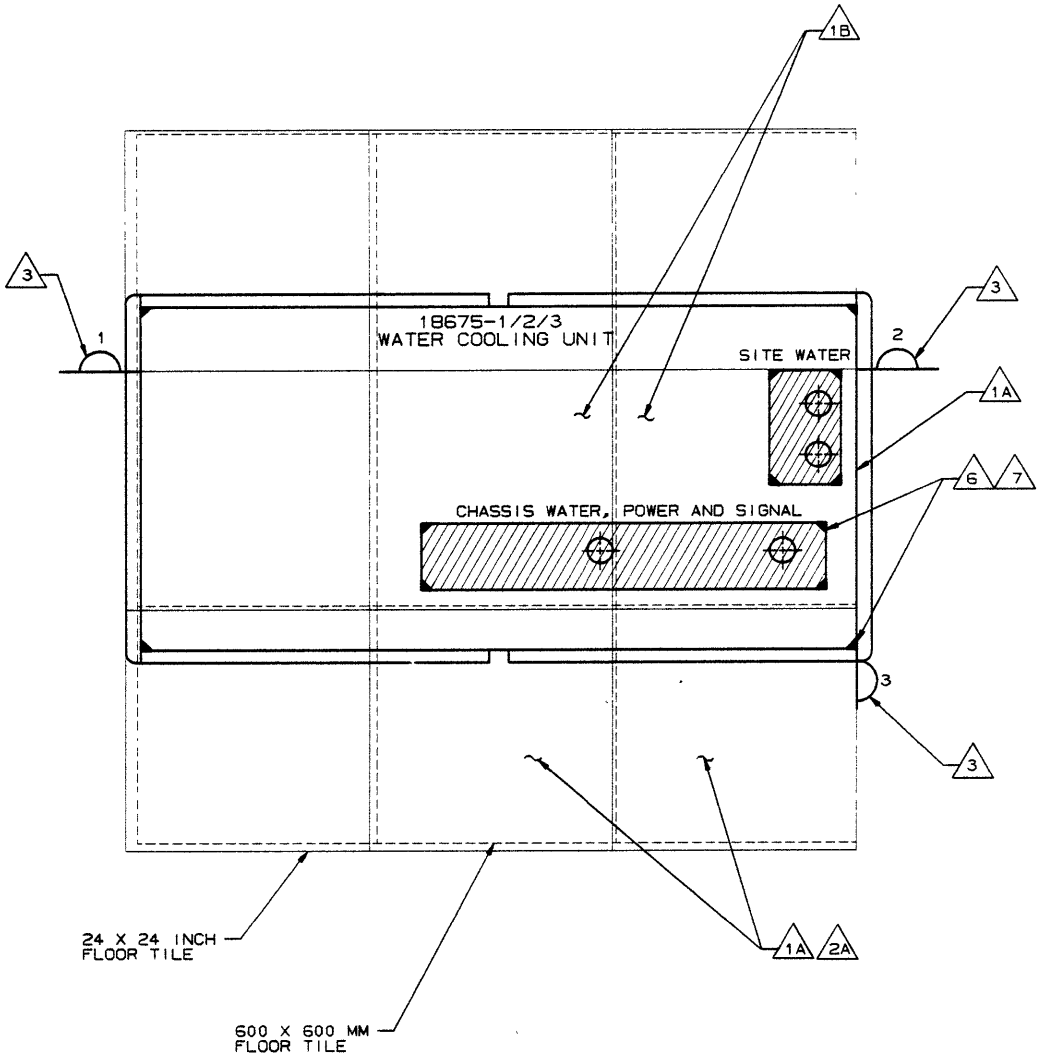


Figure 2-40. Placing Template 24615630 for 18675-1/3 Water Cooling Unit

How to Use the Full-Size Template for the 18677-1 Water Cooling Unit

The following text and figure are sample instructions on how to use the full-size template for the 18677-1 water cooling unit. Numbers enclosed in triangles on figure 2-41 are keyed to notes on this page. When you begin placing the template, refer to the instructions printed on it.

Following is preliminary information that you must know before using the template.

PRELIMINARY INFORMATION

RECOMMENDED PLACEMENT OF THE WATER COOLING UNIT.

△1A -INDICATES AREA WHERE FLOOR TILES MUST BE REMOVED FOR MAINTENANCE AND INSTALLATION OF WATER COOLING HOSES, POWER AND SIGNAL CABLES.

△2A -FLOOR TILES MUST BE CUT WITHIN 0.5 INCH/(13 MM) FROM OUTSIDE EDGE OF WATER COOLING UNIT BASE.

CAUTION:
ALL FLOOR TILES THAT HAVE BEEN CUT MUST BE PROPERLY SUPPORTED TO MEET CONTROL DATA CORPORATION FLOOR LOADING SPECIFICATIONS.

Following are the placement instructions for the template.

PLACEMENT INSTRUCTIONS FOR TEMPLATE 24615631

1. LOCATE ON FLOOR WHERE WATER COOLING UNIT WILL BE POSITIONED.
2. ROLL OUT WATER COOLING UNIT TEMPLATE.
△3. CUT OUT SEMICIRCLES 1,2 AND 3 IN TEMPLATE.
4. ALIGN TEMPLATE ON FLOOR GRID USING SEMICIRCLES 1,2 AND 3 AS A GUIDE. SEE DIAGRAM.

   NOTE: TEMPLATE MUST BE FLAT (IE NO WRINKLES).

5. TAPE TEMPLATE SECURELY TO FLOOR.
△6. CUT TRIANGULAR HOLES (IN TEMPLATE) AT ALL CABINET CORNERS AND FLOOR CUTOUT AREAS.
△7. MARK ALL TRIANGULAR CUTOUTS ON FLOOR WITH AN INDELIBLE MARKER.

   NOTE: TRIANGULAR CABINET CORNER MARKINGS ON FLOOR ARE FOR POSITIONING CABINET AND NOT TO BE CUT IN FLOOR TILES.

8. UNTAPE AND REROLL TEMPLATE.
9. AFTER TEMPLATE IS REMOVED TILES SHOULD BE MARKED WITH POWER, WATER AND SIGNAL CABLE DESIGNATIONS.

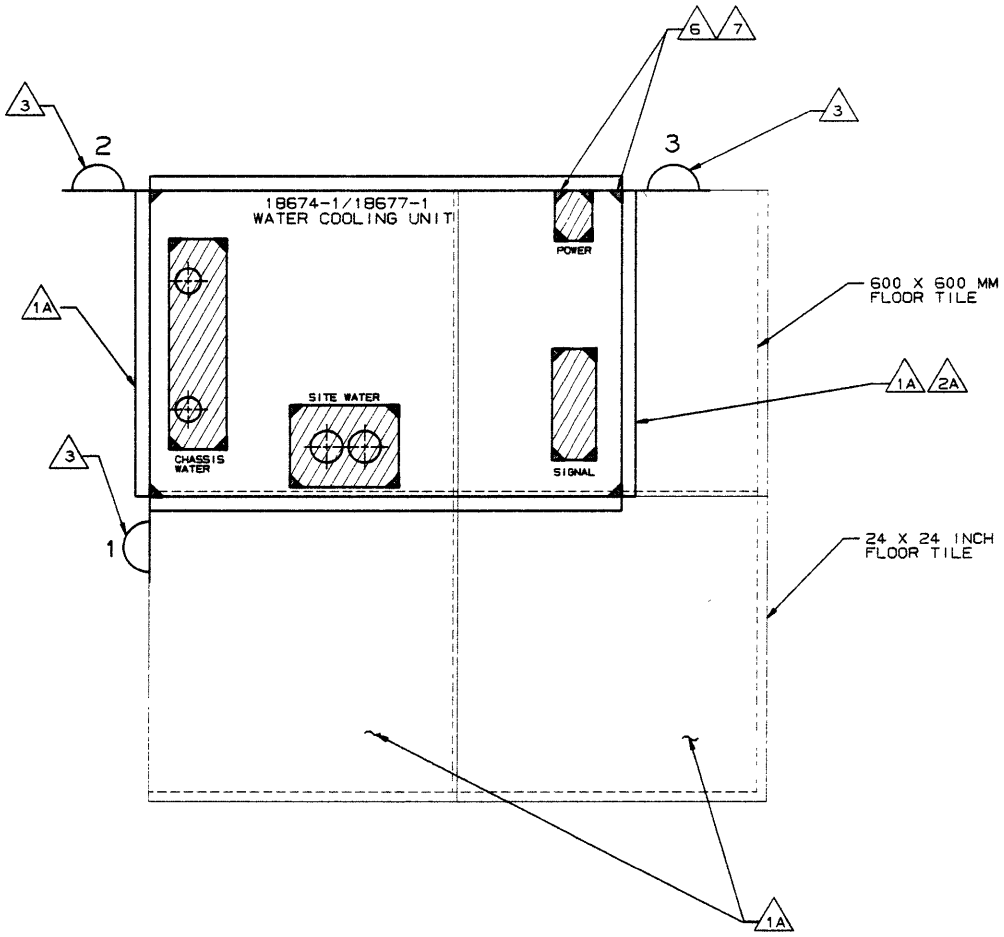


Figure 2-41. Placing Template 24615631 for 18677-1 Water Cooling Unit

To present the information in this chapter in a structured format, this page has been left blank.

What Space Is Required to Move Equipment to the Site?

The route from the delivery truck to the site (computer room and M-G room) may require moving the equipment through doorways, hallways, stairways, ramps, and elevators. Use the following route planning worksheet to help identify obstructions on the intended route. Compare the data on the worksheet with the dimensions and weight of the equipment listed in table 2-14, 2-15, or 2-16 to determine if you will need to make special arrangements to move the equipment to the site. Table 2-14 lists the dimensions and weight of the equipment with shipping containers for van shipment, table 2-15 lists similar information for air shipment, while table 2-16 lists the dimensions and weight of the equipment without shipping containers.

Also, consider that a pair of hydraulic lifts (Rol-a-lift Model M4-6) will be used to move the large equipment (mainframe units, water cooling units, and M-G sets) to the site. The Rol-a-lifts can raise the equipment from 0 to 305 mm (12 in) above the floor and typically add 25 mm (1 in) to the height of the equipment in normal use. A pair of Rol-a-lifts also add 914 mm (36 in) to the width or depth of the equipment (whichever is greater) and 154 kg (340 lb) to the weight.

Figure 2-42 shows how to calculate the space required to manuever equipment past a 90° turn in a hallway.

Route Planning Worksheet

Obstruction	Width mm (in)	Depth mm (in)	Height mm (in)	Capacity kg (lb)
Smallest doorway	_____		_____	
Smallest hallway	_____	_____	_____	
Smallest stairway or ramp Note[1]	_____	_____	_____	
Elevator door Note[2]	_____		_____	
Elevator box Note[2]	_____	_____	_____	_____

Notes:

1. Control Data equipment is designed to move over ramps with a maximum slope of 15°.

2. Be sure to consider the space taken by elevator railings and doors (figure 2-43). If railings are not removable, measure to railing not to wall.

CAUTION

To prevent damage to the surface of the floor on route to the site, use floor protection when moving equipment across carpeting or the raised floor. Do not move an MG across the raised floor.

To present the information in this chapter in a structured format, this page has been left blank.

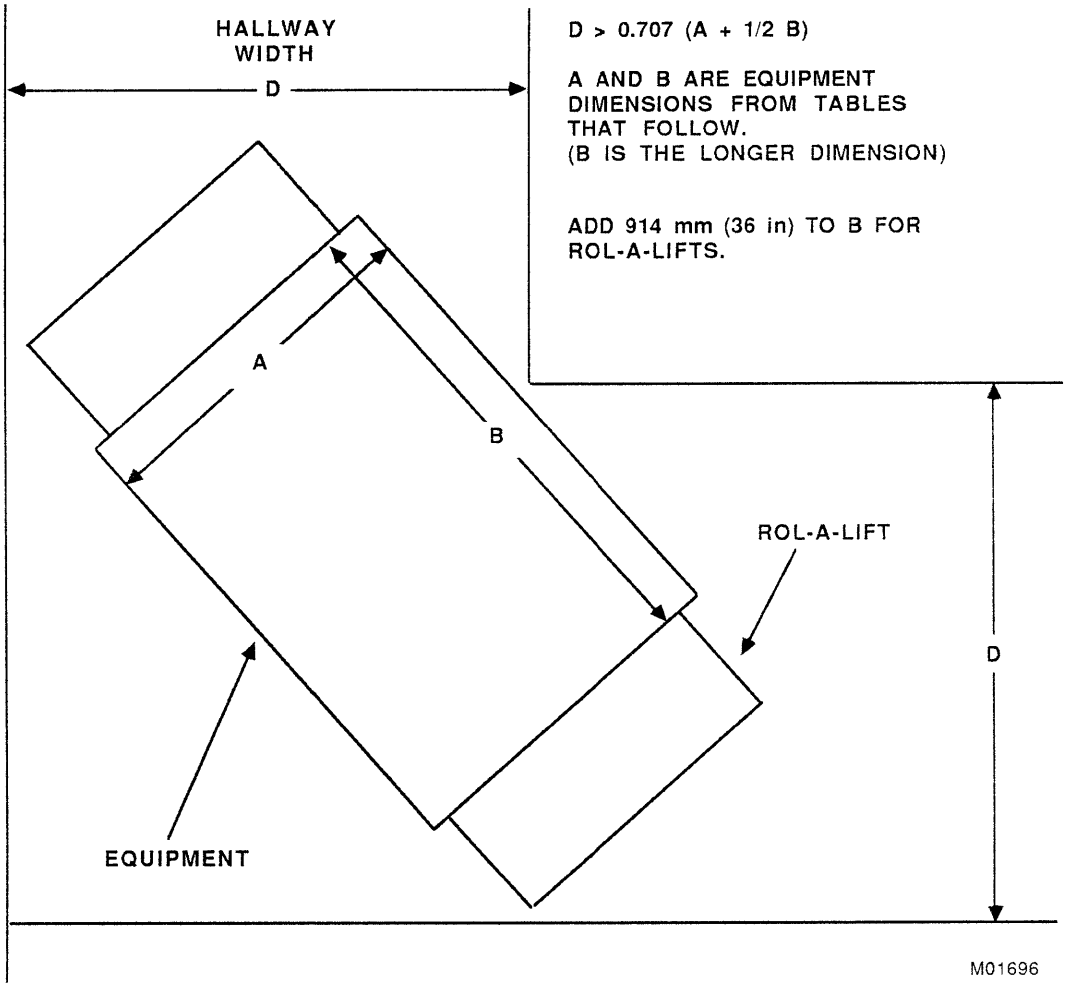


Figure 2-42. Hallway With 90° Turn

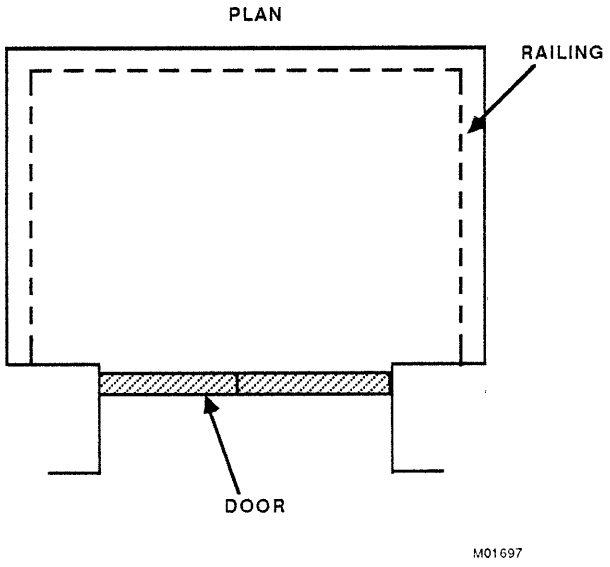


Figure 2-43. Elevator

Table 2-14. Van Shipment Dimensions and Weight

Equipment	Width mm (in)	Depth mm (in)	Height mm (in)	Weight kg (lb)
840A/850A/860A mainframe:				
• CP-0 and interbay Note[1]	2210 (87)	876 (34.5)	1981 (78)	1225 (2700)
• CM and NIO Note[1]	1930 (76)	851 (33.5)	1981 (78)	1077 (2375)
• System power monitor Note[2]	762 (30)	406 (16)	508 (20)	41 (90)
• Preinstallation kit	1270 (50)	660 (26)	1473 (58)	193 (425)
860A mainframe with 18559-3 CP-1 option or 870A mainframe - includes preceding listed units and CP-1	1422 (56)	813 (32)	1981 (78)	1111 (2450)
18852-1 CIO option	1118 (44)	864 (34)	1981 (78)	556 (1225)
18002-1 system console	889 (35)	1219 (48)	1245 (49)	182 (400)
18002-2 system console	559 (22)	533 (21)	762 (30)	28 (62)
18675-1 water cooling unit Note[3]	1892 (74.5)	1041 (41)	1473 (58)	726 (1600)
18675-3 water cooling unit Note[3]	1892 (74.5)	1041 (41)	1473 (58)	651 (1435)
18677-1 water cooling unit	1130 (44.5)	686 (27)	1270 (50)	261 (575)
65347-1 or 65347-2 temperature/humidity recorder	368 (14.5)	254 (10)	406 (16)	11 (25)
65348-1 dew point sensor	559 (22)	318 (12.5)	445 (17.5)	20 (45)
10513-740 M-G set:				
• M-G control cabinet, 40 kVA	838 (33)	610 (24)	1880 (74)	286 (630)
• *and* Kato MG, 40 kVA, 60 Hz	991 (39)	737 (29)	1778 (70)	1184 (2610)

Notes:

1. Units are bolted together for shipment.

2. Box is packed in preinstallation kit.

3. This equipment (with Rol-a-lifts) requires widest hallway to make a 90° turn. Hallway must be at least 1778 mm (70 in).

(Continued)

Table 2-14. Van Shipment Dimensions and Weight *(Continued)*

Equipment	Width mm (in)	Depth mm (in)	Height mm (in)	Weight kg (lb)
10513-780 M-G set:				
• M-G control cabinet, 80 kVA	1448 (57)	610 (24)	1880 (74)	440 (970)
• *and* Kato MG, 80 kVA, 60 Hz	991 (39)	864 (34)	1778 (70)	1930 (4250)
10514-740 M-G set:				
• M-G control cabinet, 40 kVA	838 (33)	610 (24)	1880 (74)	286 (630)
• *and* Kato MG, 40 kVA, 50 Hz	991 (39)	737 (29)	1778 (70)	1417 (3124)
• *or* Piller MG, 40 kVA, 50 Hz	900 (35.4)	900 (35.4)	1500 (59.1)	1500 (3305)
10514-780 M-G set:				
• M-G control cabinet 80 kVA	1448 (57)	610 (24)	1880 (74)	440 (970)
• *and* Kato MG, 80 kVA, 50 Hz	826 (32.5)	826 (32.5)	1930 (76)	2383 (5250)
• *or* Piller MG, 80 kVA, 50 Hz	900 (35.4)	900 (35.4)	2000 (78.7)	2000 (4405)
RTA modem	Note[4]	Note[4]	Note[4]	Note[4]

Note:

4. Customer engineer brings equipment to site.

Table 2-15. Air Shipment Dimensions and Weight

Equipment	Width mm (in)	Depth mm (in)	Height mm (in)	Weight kg (lb)
840A/850A/860A mainframe:				
• CP-0 and interbay Note[1]	2235 (88)	876 (34.5)	2083 (82)	1270 (2800)
• CM and NIO Note[1]	1956 (77)	889 (35)	2108 (83)	1123 (2475)
• System power monitor Note[2]	762 (30)	406 (16)	508 (20)	41 (90)
• Preinstallation kit	1270 (50)	660 (26)	1473 (58)	193 (425)
860A mainframe with 18559-3 CP-1 option or 870A mainframe - includes preceding listed units and CP-1	1422 (56)	838 (33)	2108 (83)	1157 (2550)
18852-1 CIO option	1181 (46.5)	889 (35)	2108 (83)	578 (1275)
18002-1 system console	991 (39)	1346 (53)	1600 (63)	216 (475)
18002-2 system console	559 (22)	533 (21)	762 (30)	28 (62)
18675-1 water cooling unit Note[3]	1930 (76)	1054 (41.5)	1588 (62.5)	749 (1650)
18675-3 water cooling unit Note[3]	1930 (76)	1054 (41.5)	1588 (62.5)	742 (1635)
18677-1 water cooling unit	1130 (44.5)	880 (31.5)	1372 (54)	284 (625)
65347-1 or 65347-2 temperature/humidity recorder	368 (14.5)	254 (10)	406 (16)	11 (25)
65348-1 dew point sensor	559 (22)	318 (12.5)	445 (17.5)	20 (45)
10513-740 M-G set:				
• M-G control cabinet, 40 kVA	889 (35)	610 (24)	1994 (78.5)	306 (675)
• *and* Kato MG, 40 kVA, 60 Hz	991 (39)	737 (29)	1778 (70)	1184 (2610)

Notes:

1. Units are bolted together for shipment.

2. Box is packed in preinstallation kit.

3. This equipment (with Rol-a-lifts) requires widest hallway to make a 90° turn. Hallway must be at least 1803 mm (71 in).

(Continued)

Table 2-15. Air Shipment Dimensions and Weight *(Continued)*

Equipment	Width mm (in)	Depth mm (in)	Height mm (in)	Weight kg (lb)
10513-780 M-G set:				
• M-G control cabinet, 80 kVA	1448 (57)	610 (24)	1994 (78.5)	463 (1020)
• *and* Kato MG, 80 kVA, 60 Hz	991 (39)	864 (34)	1778 (70)	1930 (4250)
10514-740 M-G set:				
• M-G control cabinet, 40 kVA	889 (35)	610 (24)	1994 (78.5)	306 (675)
• *and* Kato MG, 40 kVA, 50 Hz	991 (39)	737 (29)	1778 (70)	1417 (3124)
• *or* Piller MG, 40 kVA, 50 Hz	900 (35.4)	900 (35.4)	1500 (59.1)	1500 (3305)
10514-780 M-G set:				
M-G control cabinet 80 kVA	1448 (57)	610 (24)	1994 (78.5)	463 (1020)
• *and* Kato MG, 80 kVA, 50 Hz	826 (32.5)	826 (32.5)	1930 (76)	2383 (5250)
• *or* Piller MG, 80 kVA, 50 Hz	900 (35.4)	900 (35.4)	2000 (78.7)	2000 (4405)
RTA modem	Note[4]	Note[4]	Note[4]	Note[4]

Note:

4. Customer engineer brings equipment to site.

Table 2-16. Uncrated Dimensions and Weight

Equipment	Width mm (in)	Depth mm (in)	Height mm (in)	Weight kg (lb)
840A/850A/860A mainframe:				
• CP-0 and interbay Note[1]	2133 (84)	749 (29.5)	1930 (76)	1098 (2420)
• CM and NIO Note[1]	1820 (71.6)	762 (30)	1930 (76)	950 (2095)
• System power monitor	650 (25.6)	292 (11.5)	450 (17.7)	36 (80)
860A mainframe with 18559-3 CP-1 option or 870A mainframe - includes preceding listed units and CP-1	1369 (53.9)	695 (27.4)	1930 (76)	995 (2100)
18852-1 CIO option	1031 (40.6)	762 (30)	1930 (76)	492 (1085)
18002-1 system console	826 (32.5)	1194 (47)	1232 (48.5)	177 (390)
18002-2 system console:				
• Monitor	430 (16.9)	430 (16.9)	440 (17.3)	19.5 (43)
• Keyboard	490 (19.3)	230 (9.1)	80 (3.2)	2.3 (5)
18675-1 water cooling unit Note[2]	1866 (73.5)	940 (37)	1433 (56.4)	686 (1510)
18675-3 water cooling unit Note[2]	1866 (73.5)	940 (37)	1433 (56.4)	590 (1300)
18677-1 water cooling unit	988 (38.9)	665 (26.2)	1257 (49.5)	227 (500)
65347-1 or 65347-2 temperature/humidity recorder	240 (9.5)	119 (4.7)	279 (11.0)	5 (12)
65348-1 dew point sensor	453 (17.8)	209 (8.2)	334 (13.1)	18 (40)
10513-740 M-G set:				
• M-G control cabinet, 40 kVA	813 (32.0)	584 (23.0)	1880 (74.0)	284 (625)
• *and* Kato MG, 40 kVA, 60 Hz	686 (27.0)	686 (27.0)	1445 (56.9)	1139 (2510)
• *or* Piller MG, 40 kVA, 60 Hz	820 (32.3)	820 (32.3)	1461 (57.5)	1284 (2831)

Notes:

1. Units are bolted together for shipment.

2. This equipment (with Rol-a-lifts) requires widest hallway to make 90° turn. Hallway must be at least 1702 mm (67 in).

(Continued)

Table 2-16. Uncrated Dimensions and Weight *(Continued)*

Equipment	Width mm (in)	Depth mm (in)	Height mm (in)	Weight kg (lb)
10513-780 M-G set:				
• M-G control cabinet, 80 kVA	1423 (56.0)	584 (23.0)	1880 (74.0)	436 (960)
• *and* Kato MG, 80 kVA, 60 Hz	813 (32.0)	813 (32.0)	1532 (60.3)	1757 (3875)
• *or* Piller MG, 80 kVA, 60 Hz	820 (32.3)	820 (32.3)	1727 (68.0)	1850 (4070)
10514-740 M-G set:				
• M-G control cabinet, 40 kVA	813 (32.0)	584 (23.0)	1880 (74.0)	284 (625)
• *and* Kato MG, 40 kVA, 50 Hz	711 (28.0)	711 (28.0)	1524 (60.0)	1338 (2950)
• *or* Piller MG, 40 kVA, 50 Hz	820 (32.3)	820 (32.3)	1435 (56.5)	1435 (3160)
10514-780 M-G set:				
• M-G control cabinet, 80 kVA	1423 (56.0)	584 (23.0)	1880 (74.0)	436 (960)
• *and* Kato MG, 80 kVA, 50 Hz	813 (32.0)	813 (32.0)	1626 (64.0)	2327 (5125)
• *or* Piller MG, 80 kVA, 50 Hz.	820 (32.3)	820 (32.3)	1918 (75.5)	1945 (4285)

Environmental Requirements 3

Environmental Requirements 3

This chapter contains environmental specifications of the mainframe complex equipment, air conditioning and site water worksheets, and lists of water cooling items that Control Data supplies and that you must supply.

Chapter 2 of the Site Preparation Peripheral Equipment Data manual contains environmental specifications of the peripheral equipment.

Chapter 3 of the Site Preparation General Information manual contains information on air conditioning, water supply, lighting, and acoustics.

Use the information in these manuals to plan the site air conditioning system, site water system, and acoustical treatment of the computer room.

What Operating Temperature and Humidity Ranges Are Required?

Equipment operating in the computer room and the M-G room requires controlled ranges of temperature and humidity to ensure proper operation. Water-cooled equipment also have a maximum dew point. Table 3-1 lists the required operating conditions.

Table 3-1. Operating Conditions

Equipment	Temperature Range	Relative Humidity Range	Maximum Dew Point
840A, 850A, 860A, or 870A mainframe	15°C to 32°C (59°F to 90°F)	35% to 60%	13°C (56°F)
18002-1 system console	15°C to 32°C (59°F to 90°F)	35% to 60%	N/A
18002-2 system console	10°C to 40°C (50°F to 104°F)	20% to 80%	N/A
18675-1, 18675-3, or 18677-1 water cooling unit	15°C to 32°C (59°F to 90°F)	35% to 60%	13°C (56°F)
65347-1 or 65347-2 temperature/humidity recorder	-18°C to 66°C (0°F to 150°F)	15% to 95%	N/A
65348-1 dew point sensor	15°C to 32°C (59°F to 90°F)	35% to 60%	N/A
RTA modem (U.S. and Canada) Note[1]	10°C to 40°C (50°F to 104°F)	20% to 80%	N/A

Note:

1. Specifications for other countries may vary. Contact your Control Data representative for information.

(Continued)

Table 3-1. Operating Conditions *(Continued)*

Equipment	Temperature Range	Relative Humidity Range	Maximum Dew Point
10513-740 or 10514-740 M-G set:			
• M-G control cabinet, 40 kVA	0°C to 40°C (32°F to 104°F)	10% to 90%	N/A
• Kato or Piller MG, 40 kVA, 50/60 Hz	18°C to 40°C (65°F to 104°F)	10% to 90%	N/A
10513-780 or 10514-780 M-G set:			
• M-G control cabinet, 80 kVA	0°C to 40°C (32°F to 104°F)	10% to 90%	N/A
• Kato or Piller MG, 80 kVA, 50/60 Hz	0°C to 40°C (32°F to 104°F)	10% to 90%	N/A

How Are Environmental Conditions Monitored?

The system power monitor (SPM), optional 65348-1 dew point sensor (DPS), and optional 65347-1/2 temperature/humidity recorder monitor the environmental conditions of the computer room. The dew point sensor monitors the dew point of the computer room and sends a signal to the system power monitor if the dew point reaches a preset limit. The system power monitor sounds a horn and lights an indicator on its control panel if an environmental condition reaches a warning limit. The system power monitor shuts down the mainframe complex if an environmental condition reaches a shutdown limit. Table 3-2 lists the limits.

Table 3-2. Warning and Shutdown Limits

Environmental Condition	Warning Limit	Shutdown Limit
Room temperature	Under 12°C (54°F) Over 32°C (90°C)	Over 40°C (104°F)
Room dew point	Over 13°C (56°F) Note[1]	Over 14°C (58°F) Note[1]

Note:

1. Recommended setpoints for optional dew point sensor.

The optional temperature/humidity recorder monitors the temperature and relative humidity of the computer room and records the conditions on a 7-day chart.

What Nonoperating Temperature and Humidity Ranges Are Required?

Nonoperating equipment requires controlled ranges of temperature and humidity to prevent physical or operating problems when the operating environment is restored. Table 3-3 lists the required nonoperating conditions.

Table 3-3. Nonoperating Conditions

Equipment	Temperature Range	Relative Humidity Range
840A, 850A, 860A, or 870A mainframe	-15°C to 60°C (5°F to 140°F)	5% to 95%
18002-1 system console	-10°C to 50°C (14°F to 122°F)	10% to 90%
18002-2 system console	-40°C to 60°C (-40°F to 140°F)	5% to 95%
18675-1 or 18677-1 water cooling unit	-40°C to 60°C (-40°F to 140°F)	10% to 90%
18675-3 water cooling unit	-18°C to 60°C (0°F to 140°F)	10% to 90%
65347-1 or 65347-2 temperature/humidity recorder	-29°C to 60°C (-20°F to 140°F)	5% to 95%
65348-1 dew point sensor	-40°C to 60°C (-40°F to 140°F)	5% to 95%
RTA modem (U.S. and Canada) Note[1]	-40°C to 60°C (-40°F to 140°F)	5% to 95%
10513-740, 10513-780, 10514-740, or 10514-780 M-G set	-40°C to 52°C (-40°F to 125°F)	10% to 90%

Note:

1. Specifications for other countries may vary. Contact your Control Data representative for information.

How Much Heat Does the Equipment Output to Air in the Computer Room?

The typical heat outputs to air and airflow from the equipment in the computer room are listed in table 3-4. Use the air conditioning worksheet (on the next page) to help you determine the air conditioning requirements for the computer room. Consider future requirements when you plan the air conditioning system.

Table 3-4. Heat Output to Air in Computer Room

Equipment	Typical Heat Output kW (BTU/hr) Note[1]	Airflow m^3/min (ft^3/min)
840A, 850A, or 860A mainframe Note[2]	2.4 (8100)	31.2 (1100)
860A mainframe with 18559-3 CP-1 option or 870A mainframe Note[3]	3.6 (12 200)	31.2 (1100)
18852-1 CIO option Note[4]	0.5 (1600)	8.5 (300)
System power monitor	0.05 (170)	2.8 (100)
18002-1 system console	0.9 (3000)	18.3 (645)
18002-2 system console	0.1 (400)	None
65347-1 or 65347-2 temperature/humidity recorder	0.01 (50)	None
65348-1 dew point sensor	0.05 (150)	2.8 (100)
18675-1 water cooling unit	4.2 (14 400)	None
18675-3 water cooling unit	4.6 (15 800)	None
18677-1 water cooling unit	0.6 (1900)	None
RTA modem (U.S. and Canada) Note[5]	0.02 (70)	None

Notes:

1. Heat outputs of 0.1 kW (340 BTU/hr) or greater are rounded to the nearest 0.1 kW and 100 BTU/hr. Heat outputs less than 0.1 kW (340 BTU/hr) are rounded to the nearest 0.01 kW and 10 BTU/hr.

2. Includes 18551-16/18551-32 memory increment, 18553-2 cache increment, and 18559-2/18560-2 upgrade options.

3. Includes 18551-16/18551-32 memory increment and 18553-2 cache increment options.

4. Includes 18852-2 CIO expansion and 18853-1/18853-2/18853-3 DMA channel increment options.

5. Specifications for other countries may vary. Contact your Control Data Representative for information.

Air Conditioning Worksheet for Your Computer Room

Equipment	Heat Output Each	Qty	Heat Output Total
840A/850A,860A/870A mainframe			
18852-1 CIO option			
System power monitor			
18002-1 console			
18002-2 console			
18675-1/3 water cooling unit			
18677-1 water cooling unit			
65347-1/2 temperature/humidity recorder			
65348-1 dew point sensor			
RTA modem			
Peripheral equipment Note[1]			
Total			

Note:

1. Refer to Site Preparation Peripheral Equipment Data manual for heat output.

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How Much Heat Does the Equipment Output to Air in the M-G Room?

The no-load and full-load heat outputs to air and the airflow from the equipment in the M-G room are listed in table 3-5. Use the air conditioning worksheet (after next page) to help you determine the air conditioning requirements for the M-G room. Consider future requirements when you plan the air conditioning system.

Table 3-5. Heat Output to Air in M-G Room

Equipment	No-Load Heat Output kW (BTU/hr) Note[1]	Full-Load Heat Output kW (BTU/hr) Note[1]	Airflow m^3/min (ft^3/min)
10513-740 M-G set:			
• M-G control cabinet	0.3 (900)	0.8 (2700)	None
• *and* Kato MG	6.3 (21 300)	9.4 (32 000)	67.2 (2400)
• *or* Piller MG	6.3 (21 300)	9.6 (32 700)	67.2 (2400)
10513-780 M-G set:			
• M-G control cabinet	0.3 (1000)	0.9 (3200)	None
• *and* Kato MG	8.0 (27 300)	15.4 (52 600)	70.7 (2525)
• *or* Piller MG	8.7 (29 900)	14.1 (48 200)	100.8 (3600)
10514-740 M-G set:			
M-G control cabinet	0.3 (900)	0.8 (2700)	None
• *and* Kato MG	4.9 (16 700)	9.4 (32 000)	67.2 (2400)
• *or* Piller MG	6.9 (21 400)	14.7 (50 200)	67.2 (2400)
10514-780 M-G set:			
• M-G control cabinet	0.3 (1000)	0.9 (3200)	None
• *and* Kato MG	10.3 (35 200)	16.5 (56 300)	67.2 (2400)
• *or* Piller MG	9.0 (30 600)	14.1 (48 200)	84.0 (3000)

Note:

1. Heat outputs are rounded to the nearest 0.1 kW and 100 BTU/hr.

Use the following formula to calculate the approximate heat output for M-G equipment operating at less than full load:

HEAT OUTPUT = [LOAD FRACTION x (FULL-LOAD HEAT OUTPUT - NO-LOAD HEAT OUTPUT)] + NO-LOAD HEAT OUTPUT

where

LOAD FRACTION is from the 400-Hz power worksheet in chapter 4 and FULL-LOAD HEAT OUTPUT and NO-LOAD HEAT OUTPUT are from table 3-5.

For example, the heat output of a Kato 80-kVA, 60-Hz MG with 0.8 load fraction is:

HEAT OUTPUT = [0.8 (52 600 - 27 300)] + 27 300

HEAT OUTPUT = 0.8 (25 300) + 27 300

HEAT OUTPUT = 20 240 + 27 300

HEAT OUTPUT = 47 540 BTU/hr

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Air Conditioning Worksheet for Your M-G Room

Equipment	Load	Heat Output
MG	_____	_____
Associated M-G control cabinet	_____	_____
MG	_____	_____
Associated M-G control cabinet	_____	_____
Total heat	_____	_____

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What Site Water Flow Rates Are Required?

The site water flow rate required depends on the:

- Heat output of the mainframe to water
- Water cooling unit(s) used (whether 18675-1, 18675-3, or 18677-1)
- Site water temperature
- Percentage of ethylene glycol in the site water

Typical mainframe heat outputs to water are listed in tables 3-6 and 3-7. Table 3-6 applies to the heat outputs to 18675-1 and 18675-3 water cooling units, while table 3-7 applies to the heat outputs to 18677-1 water cooling units. Use the heat output(s) from the appropriate table along with the values of the site water temperature and ethylene glycol solution to determine the required site water flow rate.

Site water flow rates and pressure drops are listed in tables 3-8 through 3-10. Table 3-8 applies to 18675-1; table 3-9 applies to 18675-3 water cooling units; and table 3-10 applies to 18677-1 water cooling units. Use the site water worksheet (following table 3-10) to record the values of the site water temperature and ethylene glycol solution and the mainframe heat output(s). The site water worksheet contains instructions to help you determine the required site flow rate plus the site water pressure drop that will be caused by the water cooling unit(s).

Consider future requirements when you plan the site water system. For additional site water system requirements, refer to Water Supply in chapter 3 of the Site Preparation General Information manual.

Table 3-6. Heat Outputs to 18675-1/3 Water Cooling Units

Equipment	Typical Heat Output kW (BTU/hr) Note[1]
860A with 18559-3 CP-1 option or 870A Note[2]	32.1 (109 600)
860A with 18559-3 CP-1 and 18852-1 CIO options Note[3]	36.3 (124 000)
870A with 18852-1 CIO option Note[3]	36.3 (124 000)

Notes:

1. Heat outputs are rounded to the nearest 0.1 kW and 100 BTU/hr.

2. Includes 18551-16/18551-32 memory increment and 18553-2 cache increment options.

3. Includes 18551-16/18551-32 memory increment, 18553-2 cache increment, 18852-2 CIO expansion, and 18853-1/18853-2/18853-3 DMA channel increment options.

Table 3-7. Heat Outputs to 18677-1 Water Cooling Units

Equipment	Typical Heat Output kW (BTU/hr) Note[1]	Typical Heat Output to Second 18677-1 kW (BTU/hr) Note[1]
840A, 850A, or 860A Note[2]	21.5 (73 200)	N/A
840A, 850A, or 860A with 18852-1 CIO option Note[3]	25.7 (87 700)	N/A
860A with 18559-3 CP-1 option or 870A Note[4]	21.5 (73 200)	10.5 (36 300)
860A with 18559-3 CP-1 and 18852-1 CIO options Note[5]	25.7 (87 700)	10.5 (36 300)
870A with 18852-1 CIO option Note[5]	25.7 (87 700)	10.5 (36 300)

Notes:

1. Heat outputs are rounded to the nearest 0.1 kW and 100 BTU/hr.

2. Includes 18551-16/18551-32 memory increment, 18553-2 cache increment, and 18559-2/18560-2 upgrade options.

3. Includes 18551-16/18551-32 memory increment, 18553-2 cache increment, 18559-2/18560-2 upgrade, 18852-2 CIO expansion, and 18853-1/18853-2/18853-3 DMA channel increment options.

4. Includes 18551-16/18551-32 memory increment and 18553-2 cache increment options.

5. Includes 18551-16/18551-32 memory increment, 18553-2 cache increment, 18852-2 CIO expansion, and 18853-1/18853-2/18853-3 DMA channel increment options.

Table 3-8. Site Water Flow Rates and Pressure Drops for 18675-1 Water Cooling Unit Note[1]

Mainframe Heat Output kW (BTU/hr)	Site Water Temp °C (°F)	Ethylene Glycol Solution	Site Water Flow Rate L/min (gal/min)	Site Water Pressure Drop kPa (lb/in^2)
32.1 (109 600)	4° (40°)	0%	43.5 (11.5)	2.8 (0.4)
32.1 (109 600)	4° (40°)	20%	51.1 (13.5)	4.8 (0.7)
32.1 (109 600)	4° (40°)	40%	56.4 (14.9)	6.9 (1.0)
32.1 (109 600)	4° (40°)	60%	82.5 (21.8)	20.0 (2.9)
32.1 (109 600)	7° (45°)	0%	58.2 (15.4)	4.1 (0.6)
32.1 (109 600)	7° (45°)	20%	82.9 (21.9)	8.3 (1.2)
32.1 (109 600)	7° (45°)	40%	56.4 (14.9)	13.1 (1.9)
32.1 (109 600)	7° (45°)	60%	148.3 (39.2)	37.2 (5.4)
32.1 (109 600)	10° (50°)	0%	74.9 (19.8)	6.9 (1.0)
32.1 (109 600)	10° (50°)	20%	109.7 (29.0)	14.5 (2.1)
32.1 (109 600)	10° (50°)	40%	175.6 (46.4)	38.6 (5.6)
32.1 (109 600)	10° (50°)	60%	310.7 (82.1)	124.0 (18.0)
36.3 (124 000)	4° (40°)	0°	55.2 (14.6)	4.1 (0.6)
36.3 (124 000)	4° (40°)	20%	66.2 (17.5)	6.2 (0.9)
36.3 (124 000)	4° (40°)	40%	73.4 (19.4)	10.3 (1.5)
36.3 (124 000)	4° (40°)	60%	112.0 (29.6)	26.9 (3.9)
36.3 (124 000)	7° (45°)	0%	65.4 (17.3)	5.5 (0.8)

Note:

1. The data in this table is based on the following:

- Chassis water supply temperature of 17°C (63°F)
- Chassis water return temperature of 21°C to 23°C (69°F to 73°F)
- Chassis water flow rate of 77.2 L/min (24.5 gal/min) for mainframe heat output of 32.1 kW (109 600 BTU/hr) and 104.0 L/min (27.5 gal/min) for mainframe heat output of 36.3 kW (124 000 BTU/hr).

(Continued)

Table 3-8. Site Water Flow Rates and Pressure Drops for 18675-1 Water Cooling Unit Note[1] *(Continued)*

Mainframe Heat Output kW (BTU/hr)	Site Water Temp °C (°F)	Ethylene Glycol Solution	Site Water Flow Rate L/min (gal/min)	Site Water Pressure Drop kPa (lb/in^2)
36.3 (124 000)	7° (45°)	20%	102.2 (27.0)	13.1 (1.9)
36.3 (124 000)	7° (45°)	40%	73.4 (19.4)	20.7 (3.0)
36.3 (124 000)	7° (45°)	60%	211.2 (55.8)	53.1 (7.7)
36.3 (124 000)	10° (50°)	0%	85.9 (22.7)	8.3 (1.2)
36.3 (124 000)	10° (50°)	20%	121.5 (32.1)	17.2 (2.5)
36.3 (124 000)	10° (50°)	40%	191.5 (50.6)	42.7 (6.2)
36.3 (124 000)	10° (50°)	60%	330.8 (87.4)	130.9 (19.0)

Note:

1. The data in this table is based on the following:

- Chassis water supply temperature of 17°C (63°F)
- Chassis water return temperature of 21°C to 23°C (69°F to 73°F)
- Chassis water flow rate of 77.2 L/min (24.5 gal/min) for mainframe heat output of 32.1 kW (109 600 BTU/hr) and 104.0 L/min (27.5 gal/min) for mainframe heat output of 36.3 kW (124 000 BTU/hr).

Table 3-9. Site Water Flow Rates and Pressure Drops for 18675-3 Water Cooling Unit Note[1]

Mainframe Heat Output kW (BTU/hr)	Site Water Temp °C (°F)	Ethylene Glycol Solution	Site Water Flow Rate L/min (gal/min)	Site Water Pressure Drop kPa (lb/in^2)
32.1 (109 600)	4° (40°)	0%	37.9 (10.0)	110.2 (16.0)
32.1 (109 600)	4° (40°)	20%	Note[2]	Note[2]
32.1 (109 600)	4° (40°)	40%	Note[2]	Note[2]
32.1 (109 600)	4° (40°)	60%	Note[2]	Note[2]
32.1 (109 600)	7° (45°)	0%	Note[2]	Note[2]
32.1 (109 600)	7° (45°)	20%	Note[2]	Note[2]
32.1 (109 600)	7° (45°)	40%	Note[2]	Note[2]
32.1 (109 600)	7° (45°)	60%	Note[2]	Note[2]
32.1 (109 600)	10° (50°)	0%	Note[2]	Note[2]
32.1 (109 600)	10° (50°)	20%	Note[2]	Note[2]
32.1 (109 600)	10° (50°)	40%	Note[2]	Note[2]
32.1 (109 600)	10° (50°)	60%	Note[2]	Note[2]
36.3 (124 000)	4° (40°)	0°	Note[2]	Note[2]
36.3 (124 000)	4° (40°)	20%	Note[2]	Note[2]
36.3 (124 000)	4° (40°)	40%	Note[2]	Note[2]
36.3 (124 000)	4° (40°)	60%	Note[2]	Note[2]
36.3 (124 000)	7° (45°)	0%	Note[2]	Note[2]

Notes:

1. The 18675-3 water cooling unit has a three-way diverting valve with a flow coefficient (Cv) of 41 that controls site water flow to/from its heat exchanger.

2. To be supplied in a later revision.

(Continued)

Table 3-9. Site Water Flow Rates and Pressure Drops for 18675-3 Water Cooling Unit Note[1] *(Continued)*

Mainframe Heat Output kW (BTU/hr)	Site Water Temp °C (°F)	Ethylene Glycol Solution	Site Water Flow Rate L/min (gal/min)	Site Water Pressure Drop kPa (lb/in^2)
36.3 (124 000)	7° (45°)	20%	Note[2]	Note[2]
36.3 (124 000)	7° (45°)	40%	Note[2]	Note[2]
36.3 (124 000)	7° (45°)	60%	Note[2]	Note[2]
36.3 (124 000)	10° (50°)	0%	Note[2]	Note[2]
36.3 (124 000)	10° (50°)	20%	Note[2]	Note[2]
36.3 (124 000)	10° (50°)	40%	Note[2]	Note[2]
36.3 (124 000)	10° (50°)	60%	Note[2]	Note[2]

Notes:

1. The 18675-3 water cooling unit has a three-way diverting valve with a flow coefficient (Cv) of 41 that controls site water flow to/from its heat exchanger.

2. To be supplied in a later revision.

Table 3-10. Site Water Flow Rates and Pressure Drops for 18677-1 Water Cooling Units Note[1]

Mainframe Heat Output kW (BTU/hr)	Site Water Temp °C (°F)	Ethylene Glycol Solution	Site Water Flow Rate L/min (gal/min)	Pressure Drop kPa (lb/in^2)
10.5 (36 300)	4° (40°)	0%	11.7 (3.1)	15.2 (2.2)
10.5 (36 300)	4° (40°)	20%	12.8 (3.4)	15.2 (2.2)
10.5 (36 300)	4° (40°)	40%	14.3 (3.8)	15.2 (2.2)
10.5 (36 300)	4° (40°)	60%	17.4 (4.6)	37.9 (5.5)
10.5 (36 300)	7° (45°)	0%	15.8 (4.2)	15.2 (2.2)
10.5 (36 300)	7° (45°)	20%	18.1 (4.8)	15.2 (2.2)
10.5 (36 300)	7° (45°)	40%	20.0 (5.3)	22.7 (3.3)
10.5 (36 300)	7° (45°)	60%	27.7 (6.8)	53.1 (7.7)
10.5 (36 300)	10° (50°)	0%	26.1 (6.9)	15.2 (2.2)
10.5 (36 300)	10° (50°)	20%	32.5 (8.6)	22.7 (3.3)
10.5 (36 300)	10° (50°)	40%	35.2 (9.3)	45.5 (6.6)
10.5 (36 300)	10° (50°)	60%	48.8 (12.9)	106.1 (15.4)
21.5 (73 200)	4° (40°)	0%	40.5 (10.7)	17.9 (2.6)
21.5 (73 200)	4° (40°)	20%	47.6 (12.6)	26.9 (3.9)
21.5 (73 200)	4° (40°)	40%	56.0 (14.8)	48.9 (7.1)
21.5 (73 200)	4° (40°)	60%	82.5 (21.8)	129.5 (18.8)
21.5 (73 200)	7° (45°)	0%	54.5 (74.4)	21.4 (3.1)
21.5 (73 200)	7° (45°)	20%	88.2 (23.3)	54.4 (7.9)
21.5 (73 200)	7° (45°)	40%	113.9 (30.1)	90.3 (13.1)

Note:

1. The data in this table is based on the following:

- Chassis water supply temperature of 17°C (63°F)
- Chassis water return temperature of 21°C to 23°C (69°F to 73°F)
- Chassis water flow rate of 37.8 L/min (10 gal/min) for mainframe heat output of 10.5 kW (36 300 BTU/hr), 60.5 L/min (16 gal/min) for mainframe heat output of 21.5 kW (73 200 BTU/hr), and 75.7 L/min (20 gal/min) for mainframe heat output of 25.7 kW (87 700 BTU/hr)

(Continued)

Table 3-10. Site Water Flow Rates and Pressure Drops for 18677-1 Water Cooling Units Note[1] *(Continued)*

Mainframe Heat Output kW (BTU/hr)	Site Water Temp °C (°F)	Ethylene Glycol Solution	Site Water Flow Rate L/min (gal/min)	Pressure Drop kPa (lb/in^2)
21.5 (73 200)	7° (45°)	60%	171.1 (45.2)	217.0 (31.5)
21.5 (73 200)	10° (50°)	0%	73.8 (19.5)	31.0 (4.5)
21.5 (73 200)	10° (50°)	20%	107.1 (28.3)	66.1 (9.6)
21.5 (73 200)	10° (50°)	40%	170.7 (45.1)	165.4 (24.0)
21.5 (73 200)	10° (50°)	60%	294.1 (77.7) Note[2]	503.7 (73.1)
25.7 (87 700)	4° (40°)	0%	53.3 (14.1)	21.4 (3.1)
25.7 (87 700)	4° (40°)	20%	77.6 (20.5)	39.3 (5.7)
25.7 (87 700)	4° (40°)	40%	93.4 (24.7)	63.4 (9.2)
25.7 (87 700)	4° (40°)	60%	140.4 (37.1)	171.6 (24.9)
25.7 (87 700)	7° (45°)	0%	65.1 (17.2)	23.4 (3.4)
25.7 (87 700)	7° (45°)	20%	99.5 (26.3)	55.8 (8.1)
25.7 (87 700)	7° (45°)	40%	162.7 (43.0)	146.8 (21.3)
25.7 (87 700)	7° (45°)	60%	289.2 (76.4) Note[2]	472.7 (68.6)
25.7 (87 700)	10° (50°)	0%	91.2 (24.1)	45.5 (6.6)
25.7 (87 700)	10° (50°)	20%	129.8 (34.3)	88.2 (12.8)
25.7 (87 700)	10° (50°)	40%	202.5 (53.5) Note[2]	215.7 (31.3)
25.7 (87 700)	10° (50°)	60%	335.0 (88.5) Note[2]	611.1 (88.7)

Notes:

1. The data in this table is based on the following:
   - Chassis water supply temperature of 17°C (63°F)
   - Chassis water return temperature of 21°C to 23°C (69°F to 73°F)
   - Chassis water flow rate of 37.8 L/min (10 gal/min) for mainframe heat output of 10.5 kW (36 300 BTU/hr), 60.5 L/min (16 gal/min) for mainframe heat output of 21.5 kW (73 200 BTU/hr), and 75.7 L/min (20 gal/min) for mainframe heat output of 25.7 kW (87 700 BTU/hr)
2. Not recommended due to high velocity.

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Site Water Worksheet

Specification	Value
Mainframe heat output to water cooling unit	_____
Mainframe heat output to second water cooling unit	_____
Site water temperature	_____
Percentage of ethylene glycol in site water	_____

Use the specification values recorded above as follows:

1. Compare the specification values with the lines in table 3-8 for 18675-1 water cooling units, table 3-9 for 18675-3 water cooling units, or table 3-10 for 18677-1 water cooling units. Locate the line that has the matching mainframe heat output and the matching or closest to matching values for site water temperature and percentage of ethylene glycol.
2. Record below the site water flow rate and pressure drop listed on located line of table.
3. For heat output to a second water cooling unit, repeat steps 1 and 2.

Site water flow rate to water cooling unit	_____
Site water flow rate to second water cooling unit	_____
Add for total site water flow rate required	_____

Pressure drop for water cooling unit	_____
Pressure drop for second water cooling unit	_____
Larger pressure drop is approximate site water pressure drop caused by water cooling units	_____

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What Water Cooling Items Does Control Data Supply?

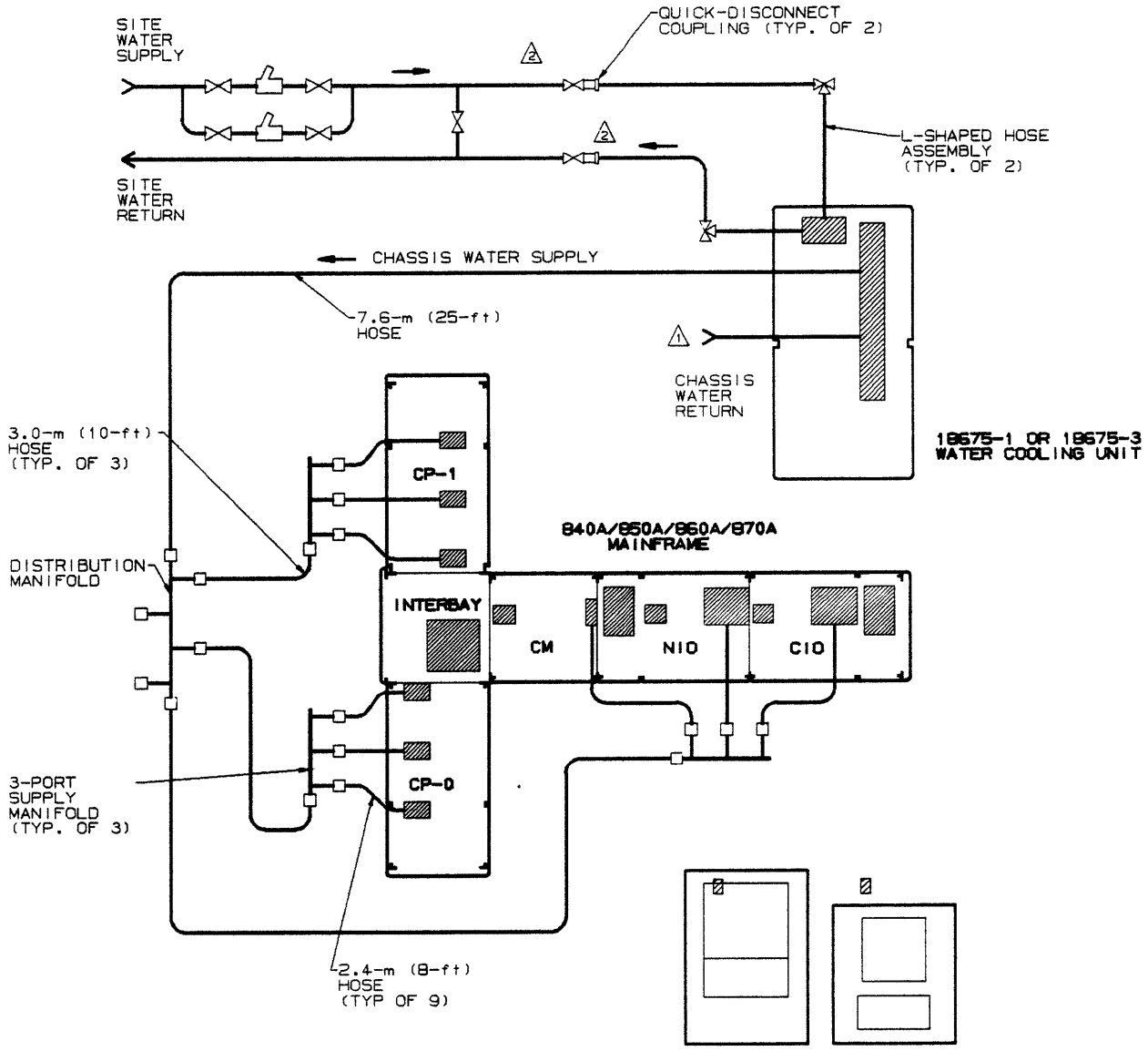
The water cooling items that Control Data supplies for a mainframe complex with an 18675-1 or 18675-3 water cooling unit are listed in table 3-11 and the items supplied for a mainframe complex with 18677-1 water cooling unit(s) are listed in table 3-12. Figures 3-1 and 3-2 show these items in diagram form. These items are included with the preinstallation kits that you receive two weeks before the mainframe.

Table 3-11. Control Data Supplied Items for Mainframe with 18675-1/3 Water Cooling Unit

Item	Quantity Note[1]
Quick-disconnect coupling, 2 in female NPT (11-1/2 threads per in)	2
L-shaped hose assembly - 1.5 x 1.5 m (5 x 5 ft)	2
Hose - 7.6 m (25 ft) long	2
Distribution manifold	2
Hose - 3.0 m (10 ft) long	6
3-port manifold	4 for 840A, 850A, or 860A mainframe 6 for 860A mainframe with 18559-3 CP-1 option or for 870A mainframe
Hose - 2.4 m (8 ft) long	10 for 840A, 850A, or 860A mainframe 16 for 860A mainframe with 18559-3 CP-1 option or for 870A mainframe 2 for 18852-1 CIO option

Note:

1. Quantity for supply plus return side.



NOTES:

1. FOR CLARITY, HOSES AND MANIFOLDS IN RETURN SIDE OF CHASSIS WATER LOOP ARE NOT SHOWN. RETURN SIDE HOSES AND MANIFOLDS ARE CONFIGURED THE SAME AS SHOWN FOR SUPPLY SIDE.

2. SHUTOFF VALVES AT END OF CUSTOMER SUPPLIED AND INSTALLED SITE WATER LINES.

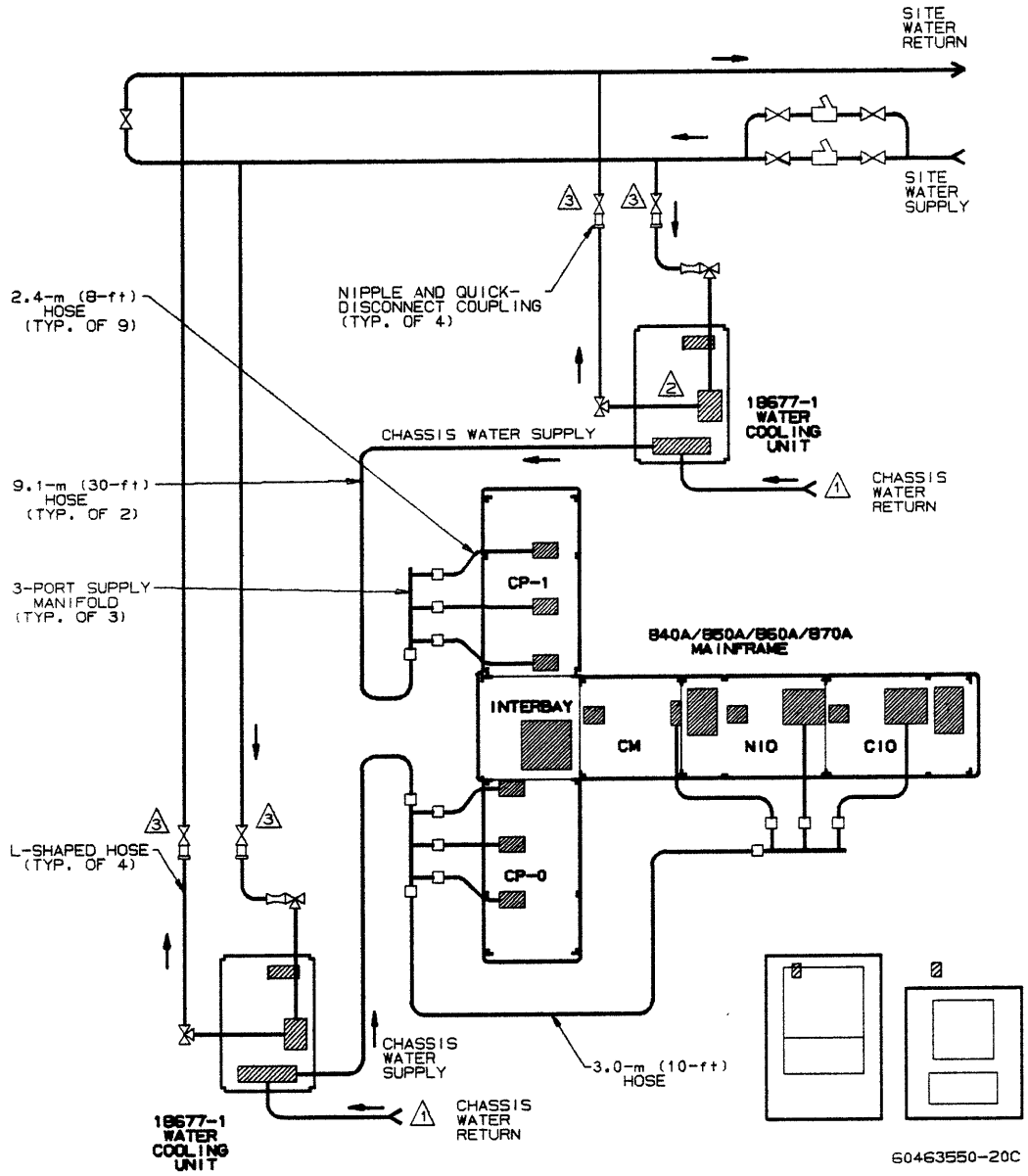
Figure 3-1. Water Cooling Diagram With 18675-1/3 Water Cooling Unit

Table 3-12. Control Data Supplied Items for Mainframe Complex with 18677-1 Water Cooling Unit(s)

Item	Quantity Note[1]
Nipple, close, 1-1/2 in NPT (11-1/2 threads per in)	2 per water cooling unit
Quick-disconnect coupling, 1-1/2 female NPT (11-1/2 threads per in)	2 per water cooling unit
L-shaped hose assembly - 3.0 x 1.2 m (10 x 4 ft)	2 per water cooling unit
Hose - 9.1 m (30 ft) long	2 per water cooling unit
3-port manifold	4 for 840A, 850A, or 860A
	6 for 860A mainframe with 18559-3 CP-1 option or for 870 mainframe
Hose - 3.0 m (10 ft) long	2
Hose - 2.4 m (8 ft) long	10 for 840A, 850A, or 860A mainframe
	16 for 860A mainframe with 18559-3 CP-1 option or for 870A mainframe
	2 for 18852-1 CIO option

Note:

1. Quantity for supply plus return side.



NOTES:

1. FOR CLARITY, HOSES AND MANIFOLDS IN RETURN SIDE OF CHASSIS WATER LOOP ARE NOT SHOWN. RETURN SIDE HOSES AND MANIFOLDS ARE CONFIGURED THE SAME AS SHOWN FOR SUPPLY SIDE.

2. THIS MAY BE AN EARLIER 18674-1 WATER COOLING UNIT IF ONE IS PRESENT AT SITE.

3. SHUTOFF VALVES AT END OF CUSTOMER SUPPLIED AND INSTALLED SITE WATER LINES.

Figure 3-2. Water Cooling Diagram With 18677-1 Water Cooling Unit(s)

What Water Cooling Items Must You Supply?

The water cooling items that you must supply and install for preinstallation are the site water supply and return lines. These lines must contain shutoff valves at the ends that will connect to the water cooling unit(s). When the preinstallation kits arrive, you must install the Control Data supplied quick-disconnect couplings to these shutoff valves. The quick-disconnect couplings supplied for 18675-1 or 18675-3 water cooling units have 2-in female NPT fittings for connecting to the shutoff valves, while the quick-disconnect couplings supplied for 18677-1 water cooling units have 1-1/2 in female NPT fittings. Mating nipples may be required to install the quick-disconnect couplings to the shutoff valves.

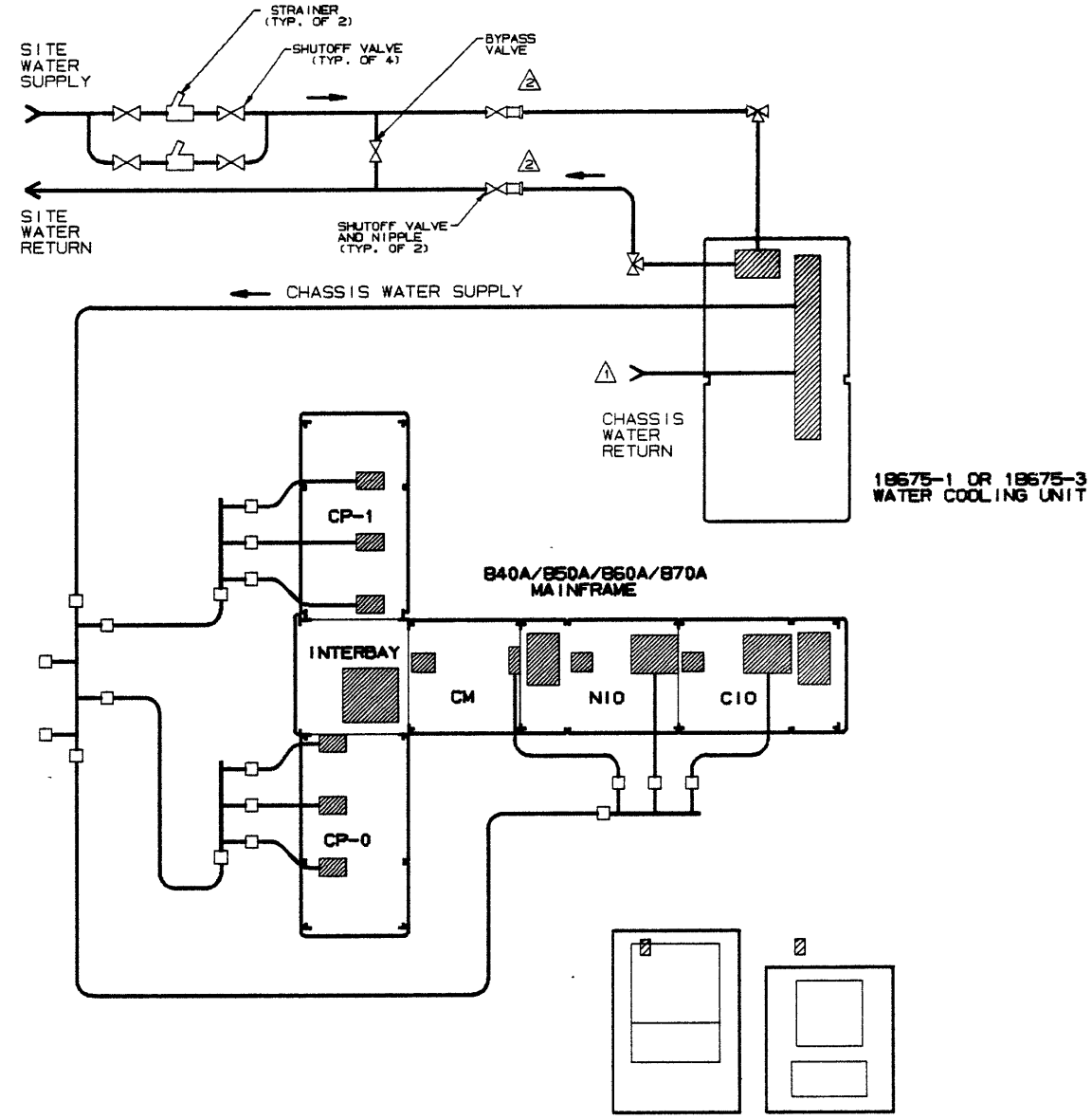
Table 3-13 lists the items that the site water supply and return lines must contain and figures 3-3 and 3-4 show the items in diagram form. Restrictions regarding the locations of the water cooling unit(s) and site water lines are given in chapter 2.

Table 3-13. Items That Must Be Installed in Site Water Lines

Item	Quantity
Shutoff valve for site water to/from water cooling unit(s) Note[1]	2 per water cooling unit
Bypass valve between site supply water and site water return	1
Shutoff valve to allow cleaning of strainer	4
Strainer (size 40 mesh) for filtering water in site water supply line	2

Note:

1. The quick-disconnect coupling supplied by Control Data must be installed on this valve.



NOTES:

1. FOR CLARITY, HOSES AND MANIFOLDS IN RETURN SIDE OF CHASSIS WATER LOOP ARE NOT SHOWN. RETURN SIDE HOSES AND MANIFOLDS ARE CONFIGURED THE SAME AS SHOWN FOR SUPPLY SIDE.
2. QUICK-DISCONNECT COUPLINGS (CONTROL DATA SUPPLIED) THAT MUST BE INSTALLED BY CUSTOMER.

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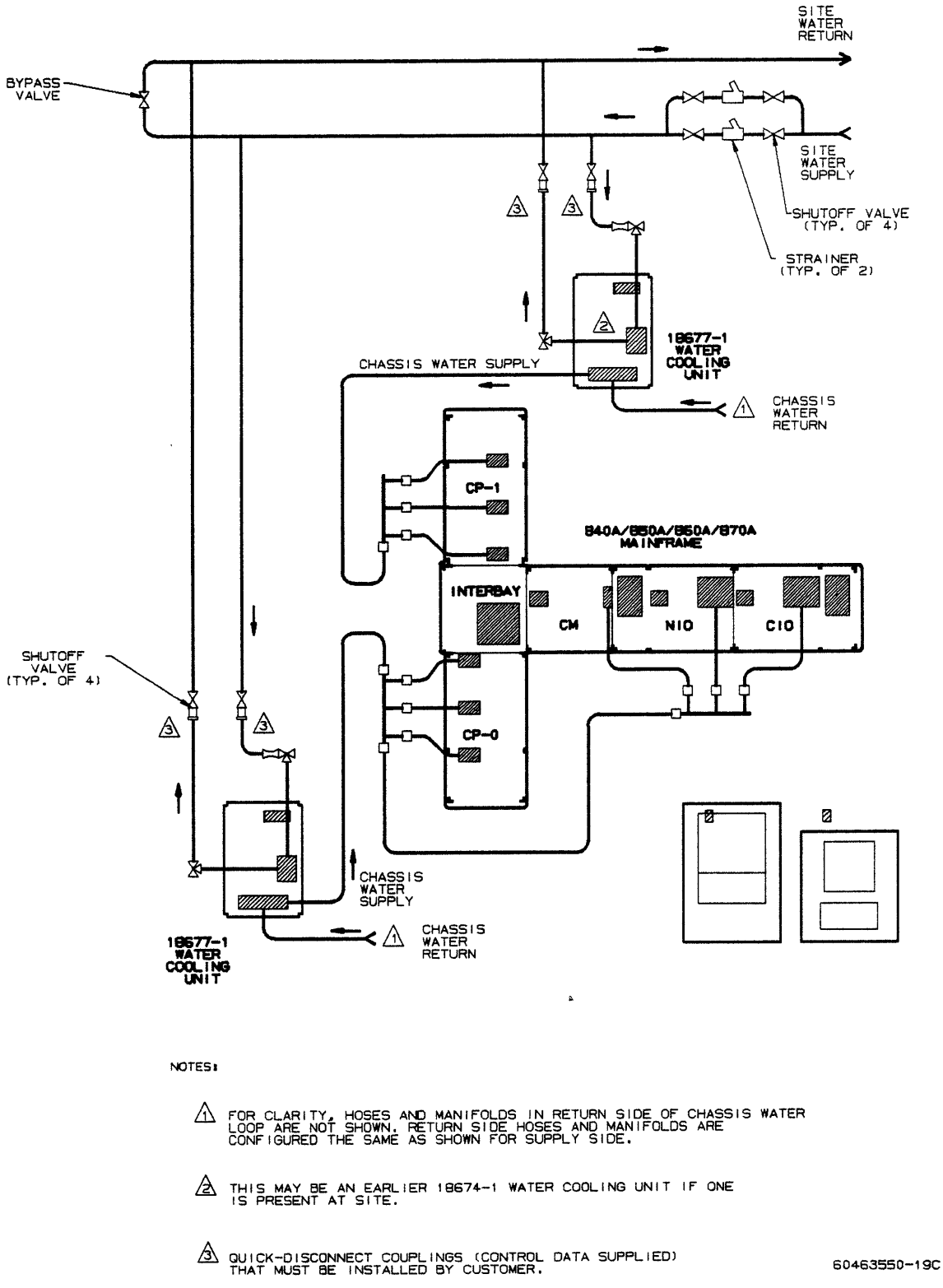
Figure 3-3. Water Cooling Diagram With 18675-1/3 Water Cooling Unit



NOTES:

1. FOR CLARITY, HOSES AND MANIFOLDS IN RETURN SIDE OF CHASSIS WATER LOOP ARE NOT SHOWN. RETURN SIDE HOSES AND MANIFOLDS ARE CONFIGURED THE SAME AS SHOWN FOR SUPPLY SIDE.

2. THIS MAY BE AN EARLIER 18674-1 WATER COOLING UNIT IF ONE IS PRESENT AT SITE.

3. QUICK-DISCONNECT COUPLINGS (CONTROL DATA SUPPLIED) THAT MUST BE INSTALLED BY CUSTOMER.

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Figure 3-4. Water Cooling Diagram With 18677-1 Water Cooling Unit(s)

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How Much Noise Does the Equipment Emit?

The noise emitted from the equipment to be located in a computer room is listed in table 3-14. These noise emissions are measured according to ANSI Standard S12.10 and are reported according to ECMA Standard 109. Except where indicated otherwise, the measurements reflect 50/60-Hz equipment operating at 60 Hz. The noise power emission level, the acoustical power that the equipment generates, is independent of measurement distance and the acoustical characteristics of the room.

Table 3-14. Noise Emission (ECMA Standard 109)

Equipment	Operating Noise Emission Level bel
840A, 850A, or 860A mainframe:	
• CP-0	6.8
• CM	7.0
• Interbay	None
• NIO	6.8
• System power monitor	6.8
860A mainframe with 18559-3 CP-1 option or 870A mainframe - includes preceding listed units and CP-1	6.8
18852-1 CIO option	6.8
18002-1 system console	6.1 5.0 Note[1]
18002-2 system console	5.2 4.7 Note[1]
18675-1 water cooling unit	6.4
18675-3 water cooling unit, 50 Hz	6.6
18675-3 water cooling unit, 60 Hz	7.0
18677-1 water cooling unit, 50 Hz	6.7
18677-1 water cooling unit, 60 Hz	7.0
65347-1 or 65347-2 temperature/humidity recorder	Negligible
65348-1 dew point sensor	Negligible
RTA modem	Negligible

Note:

1. Idle mode (equipment energized without keyboard being operated).

Power Requirements 4

Power Requirements 4

This chapter contains electrical specifications of the mainframe complex equipment, 50/60-Hz power and 400-Hz power worksheets, and lists of power and control items that Control Data supplies and that you must supply.

Chapter 2 of the Site Preparation Peripheral Equipment Data manual contains electrical specifications of the peripheral equipment.

Chapter 4 of the Site Preparation General Information manual contains information on power requirements, power distribution, power connections, convenience outlets, M-G sets, phase rotation, grounding, and lightning protection.

Use the information in these manuals to plan the site power distribution system.

What 50/60-Hz Input Voltage Is Required for the Equipment?

Some equipment in the computer room and M-G room requires 50-Hz or 60-Hz input voltage. Table 4-1 lists the required voltages and figure 4-1 shows the 50/60-Hz wiring diagram.

Table 4-1. 50/60-Hz Input Voltages

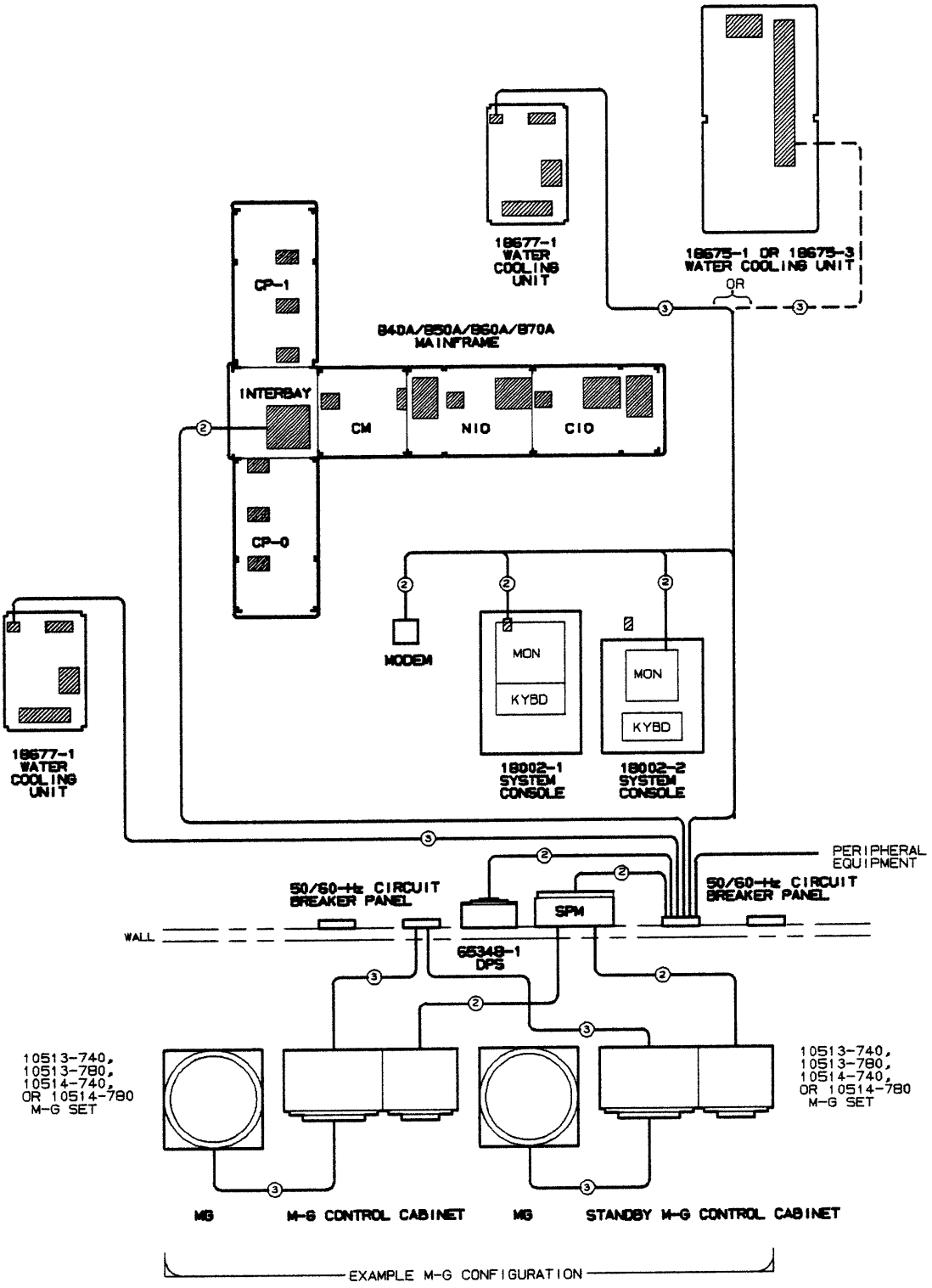
Equipment	50-Hz Voltage	60-Hz Voltage	Phase
840A,850A,860A, or 870A mainframe (including the system power monitor)	220 or 240	120	1
18002-1 system console	220 or 240	120	1
18002-2 system console Note[1]	220 or 240	120	1
18675-1, 18675-3, or 18677-1 water cooling unit	380 or 415	208	3
65347-1 temperature/humidity recorder Note[2]	-	120	1
65347-2 temperature/humidity recorder Note[2]	120	-	1
65348-1 dew point sensor	220 or 240	120	1
10513-740 M-G set	-	208, 440, 460, or 480	3
10513-780 M-G set	-	440 or 460	
10514-740 M-G set	220, 230, 240 380, 400, or 415	-	3
10514-780 M-G set	380, 400, or 415	-	3
RTA modem (U.S. and Canada) Note[3]	-	120	1

Notes:

1. Contains a switching power supply. See Special Power Distribution in chapter 4 of the Site Preparation General Information Manual.

2. Power cord plugs into the system power monitor.

3. Specifications for other countries may vary. Contact your Control Data representative for information.



NOTE:

1. NUMBERS WITHIN CIRCLES INDICATE THE CONDUCTORS IN THE RUN (DOES NOT INCLUDE SAFETY GROUND).

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Figure 4-1. 50/60-Hz Wiring Diagram

How Much 50/60-Hz Power Does the Equipment in the Computer Room Consume?

The 50-Hz or 60-Hz power that the equipment in the computer room consumes is listed in table 4-2. Use the power worksheet on the next page to help you determine the 50/60-Hz power requirements for the computer room. Consider future requirements when you plan the site power distribution system.

Table 4-2. 50/60-Hz Power Consumption in Computer Room

Equipment	Typical 50-Hz Power Consumption kVA	Typical 60-Hz Power Consumption kVA
840A, 850A, or 860A, mainframe Note[1]	1.9	1.9
860A mainframe with 18559-3 CP-1 option or 870A mainframe Note[2]	1.9	1.9
18852-1 CIO option Note[3]	0.4	0.4
18002-1 system console	0.3	0.3
18002-2 system console	0.2	0.2
18675-1 water cooling unit	4.0	4.3
18675-3 water cooling unit	3.9	5.0
18677-1 water cooling unit	3.6	3.6
65347-1 temperature/humidity recorder	N/A	0.01
65347-2 temperature/humidity recorder	0.01	N/A
65348-1 dew point sensor	0.05	0.05
RTA modem (U.S. and Canada) Note[4]	N/A	0.02

Notes:

1. Includes system power monitor, 18551-16/18551-32 memory increment option, 18553-2 cache increment option, and 18559-2/18560-2 upgrade option.

2. Includes system power monitor, 18551-16/18551-32 memory increment option, and 18553-2 cache increment option.

3. Includes 18852-2 CIO expansion and 18853-1/18853-2/18853-3 DMA channel increment options.

4. Specifications for other countries may vary. Contact your Control Data representative for information.

50/60-Hz Power Worksheet for Your Computer Room

Equipment	Power Consumption Each	Qty	Power Consumption Total
840A/850A,860A/870A mainframe			
18852-1 CIO option			
System power monitor			
18002-1 console			
18002-2 console			
18675-1/3 water cooling unit			
18677-1 water cooling unit			
65347-1/2 temperature/humidity recorder			
65348-1 dew point sensor			
RTA modem			
Peripheral equipment Note[1]			
Total			

Note:

1. Refer to Site Preparation Peripheral Equipment Data manual for heat 50/60-Hz power consumption.

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How Much 50/60-Hz Power Does the Equipment in the M-G Room Consume?

The 50-Hz or 60-Hz power that the equipment in the M-G room consumes during full-load operation and the current that the equipment draws during the starting sequence are listed in table 4-3. Use the power worksheet on the next page to help you determine the 50/60-Hz power requirements for the M-G room. Consider future requirements when you plan the site power distribution system.

Table 4-3. 50/60-Hz Power Consumption in M-G Room

Equipment	Full-Load Power Consumption kVA	Starting Current A per Ph
10513-740 M-G set with Kato MG	59	Note 1
10513-740 M-G set with Piller MG	59	Note 1
10514-740 M-G set with Kato MG	59	120
10514-740 M-G set with Piller MG	67	120
10513-780 M-G set with Kato MG	101	210
10513-780 M-G set with Piller MG	112	210
10514-780 M-G set with Kato MG	101	260
10514-780 M-G set with Piller MG	112	260

Note:

1. At 208 V, 170 A is drawn. At 440, 460, or 480 V, 100 A is drawn.

50/60-Hz Power Worksheet for Your M-G Room

Equipment	Power Consumption
M-G set No. 1	_____
M-G set No. 2	_____
50/60-Hz M-G room total	_____

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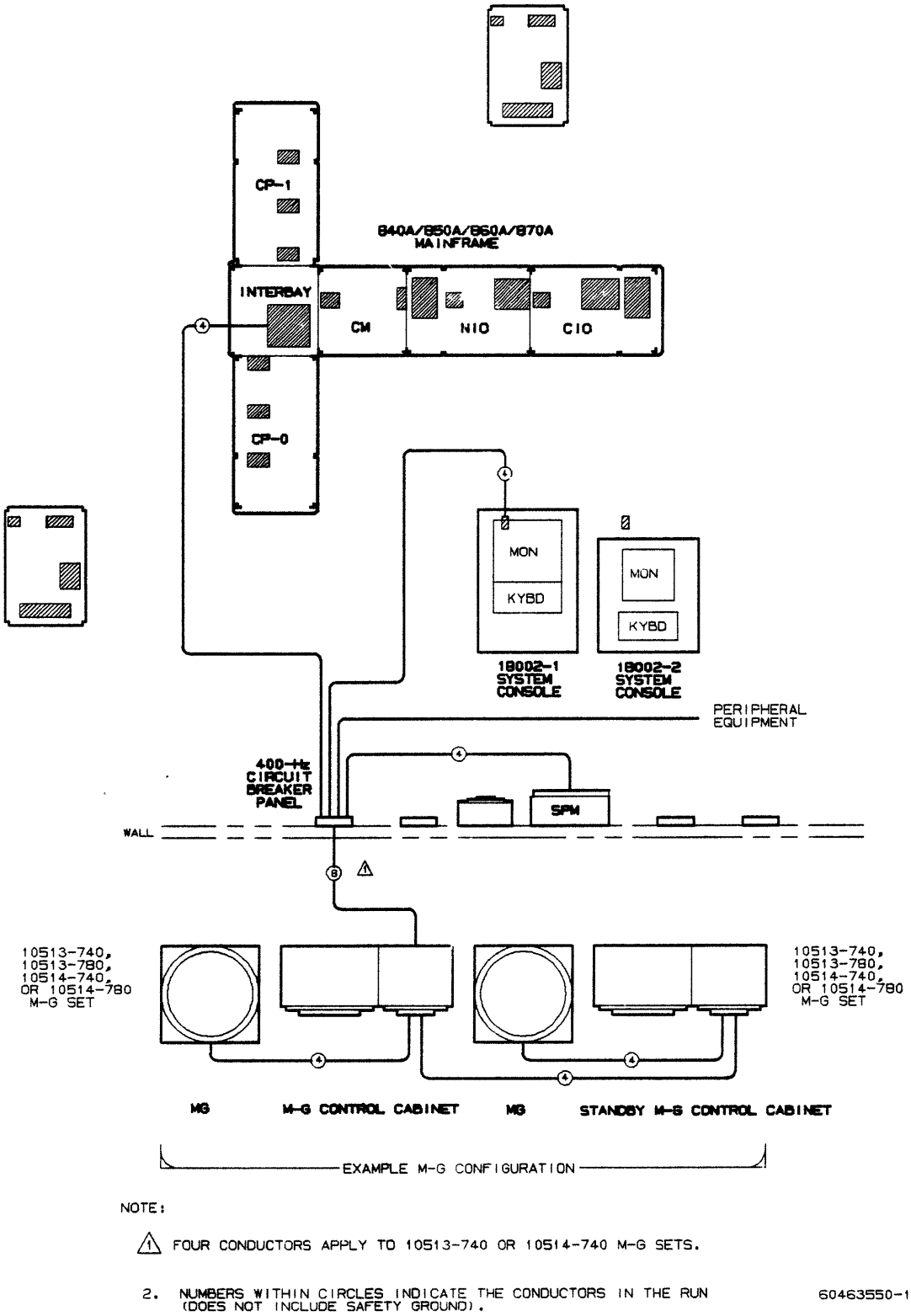
What 400-Hz Input Voltage is Required for the Equipment?

Some equipment in the computer room requires 400-Hz input voltage. (M-G sets convert 50-Hz or 60-Hz power to 400-Hz power.) Table 4-4 lists the required voltages and figure 4-2 shows the 400-Hz wiring diagram.

Table 4-4. 400-Hz Input Voltages

Equipment	400-Hz Voltage	Phase
840A, 850A, 860A, or 870A mainframe (including system power monitor)	120/208	3
18002-1 system console	120/208	3
18002-2 system console	None	None
18675-1, 18675-3, or 18677-1 water cooling unit	None	None
65347-1 or 65347-2 temperature/humidity recorder	None	None
65348-1 dew point sensor	None	None
RTA modem	None	None



NOTE:

1. FOUR CONDUCTORS APPLY TO 10513-740 OR 10514-740 M-G SETS.

2. NUMBERS WITHIN CIRCLES INDICATE THE CONDUCTORS IN THE RUN (DOES NOT INCLUDE SAFETY GROUND).

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Figure 4-2. 400-Hz Wiring Diagram

How Much 400-Hz Power Does the Equipment Consume?

The 400-Hz power that the equipment in the computer room consumes is listed in table 4-5. Equipment in the M-G room generates, but does not consume, 400-Hz power. Use the power worksheet to help you determine the load on each MG. Consider future requirements when you plan the site power distribution system.

Table 4-5. 400-Hz Power Consumption

Equipment	Typical Power Consumption kVA
840A, 850A, or 860A mainframe Note[1]	20.9
860A mainframe with 18559-3 CP-1 option or 870A mainframe Note[2]	32.9
18852-1 CIO option Note[3]	4.7
System power monitor	0.04 Note[4]
18002-1 system console	0.8
18002-2 system console	None
18675-1, 18675-3, or 18677-1 water cooling unit	None
65347-1 or 65347-2 temperature/humidity recorder	None
65348-1 dew point sensor	None
RTA modem	None

Notes:

1. Includes 18551-16/18551-32 memory increment, and 18553-2 cache increment, and 18559-2/18560-2 upgrade options.

2. Includes 18551-16/18551-32 memory increment and 18553-2 cache increment options.

3. Includes 18852-2 CIO expansion option and 18853-1/18853-2/18853-3 DMA channel increment options.

4. Power consumption for each M-G set connected to the SPM.

400-Hz Power Worksheet

Equipment	Power Consumption Each	Qty	Load That Cannot Be Split Note[1]	Load That Can Be Split
840A/850A/860A/870A Mainframe			_____	
18852-1 CIO option			_____	
System power monitor Note[2]			_____	_____
18002-1 system console				_____
Peripheral equipment Note[3]:				
_____	_____	___		_____
_____	_____	___		_____
_____	_____	___		_____
_____	_____	___		_____
_____	_____	___		_____
_____	_____	___		_____
_____	_____	___		_____
_____	_____	___		_____
400-Hz computer room total Note[4]			_____	_____
Load percentage (divide total by 40 for 40-kVA MG or by 80 for 80-kVA MG)			_____	_____

Notes:

1. The units contained in the mainframe make a single load that cannot be split.

2. The SPM places a 0.04-kVA load on each M-G set connected to it.

3. Refer to Site Preparation Peripheral Equipment Data manual for 400-Hz power consumption.

4. Control Data recommends limiting the load for normal operation to 85% of the full-load rating (for example, 0.85 x 40 kVA = 34 kVA). The recommended load provides reserve power for maintenance testing.

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How is Power Connected to Equipment in the Computer Room?

Power is connected to the mainframe via direct-wired connections to a power distribution panel in the interbay. Power is connected to most other equipment via power cords. Power to the water cooling unit(s) can be connected either via power cords, or if required by local electrical code, via direct wiring. You must supply and install the power distribution system for the equipment. And at time of installation you must supply an electrician to make the direct-wired connections to the equipment.

Tables 4-6 and 4-7 list the 50/60-Hz and 400-Hz power connections and figures 4-3 and 4-4 show the wiring diagrams.

Table 4-6. 50/60-Hz Power Connections to Equipment in Computer Room

Equipment	Power Cord Length m (ft)	Power Cord Plug 50-Hz/ 60-Hz	Mating Receptacle or Connector 50-Hz/ 60-Hz	Terminal Strip Ht. Above Raised Floor mm (in)
840A,850A,860A, or 870A mainframe	N/A	N/A	N/A	635(25) Note[1]
System power monitor	N/A	N/A	N/A	Customer dependent
18002-1 system console	N/A	N/A	N/A	406 (16)
18002-2 system console	2.6 (8.5)	CEE 7-7/ NEMA 5-15P	CEE 7-7/ NEMA 5-15R receptacle	N/A
18675-1 or 18675-3 water cooling unit Note[2]	1.8 (6)	Hubbell 516P6W/ 520P9W	Hubbell 516C6W/ 520C9W connector	102 (4)
18677-1 water cooling unit Note[2]	1.8 (6)	Hubbell 516P6W/ 520P9W	Hubbell 516C6W/ 520C9W connector	152 (6)

Notes:

1. Direct-wired connection for mainframe is made in the interbay.

2. Power to water cooling units can be direct wired if required by local electrical code.

(Continued)

Table 4-6. 50/60-Hz Power Connections to Equipment in Computer Room *(Continued)*

Equipment	Power Cord Length m (ft)	Power Cord Plug 50-Hz/ 60-Hz	Mating Receptacle or Connector 50-Hz/ 60-Hz	Terminal Strip Ht. Above Raised Floor mm (in)
65348-1 dew point sensor	N/A	N/A	N/A	Customer dependent
65347-1 or 65347-2 temperature/ humidity recorder	2.1 (7)	NEMA 5-15P	Note[3]	N/A
RTA modem (U.S. and Canada) Note[4]	2.3 (7.5)	N/A-NEMA 5-15P	N/A-NEMA 5-15R receptacle	N/A

Notes:

2. Power cord plug of temperature/humidity recorder plugs into the system power monitor.

4. Specifications for other countries may vary. Contact your Control Data representative for information.

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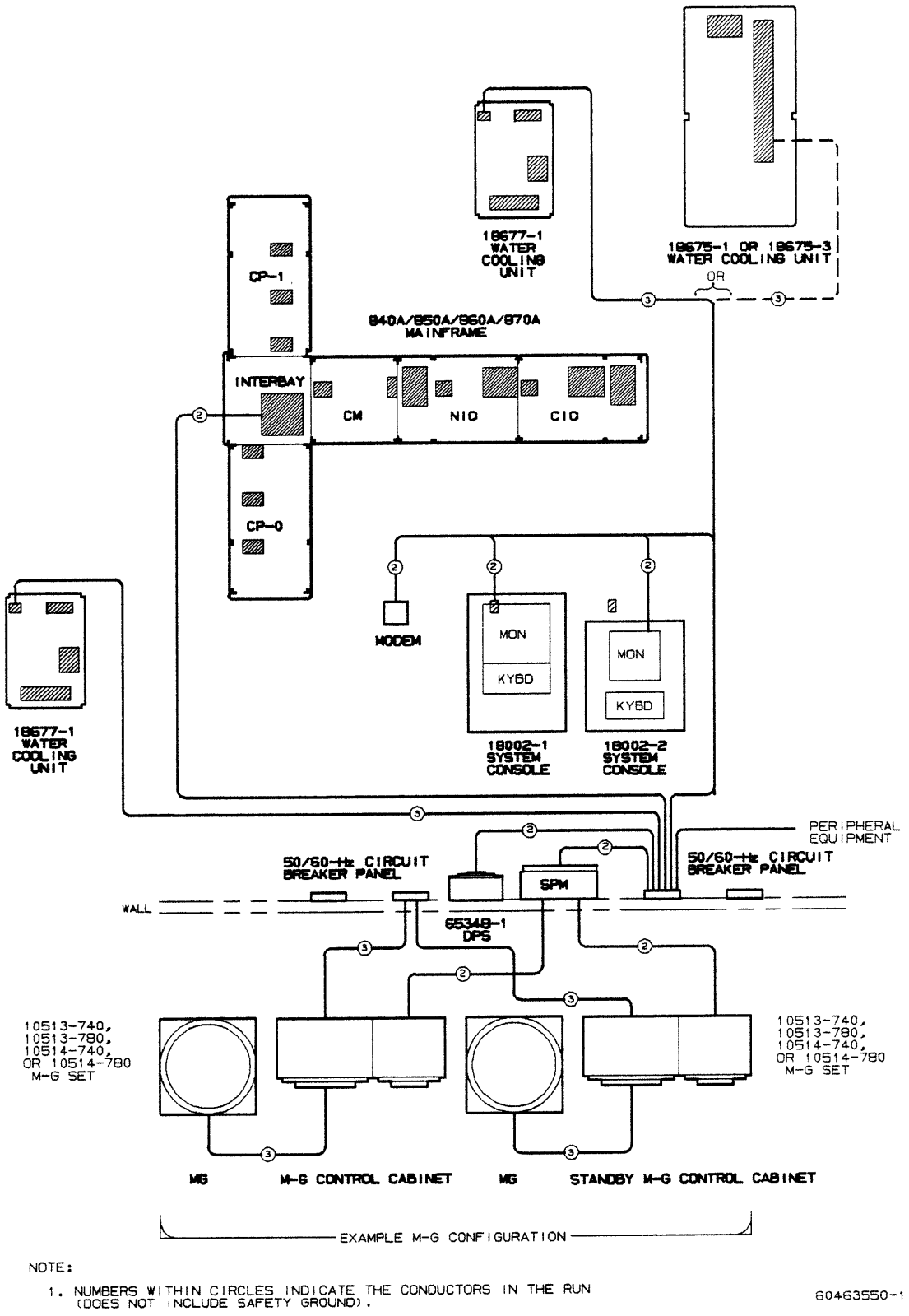

NOTE:

1. NUMBERS WITHIN CIRCLES INDICATE THE CONDUCTORS IN THE RUN (DOES NOT INCLUDE SAFETY GROUND).

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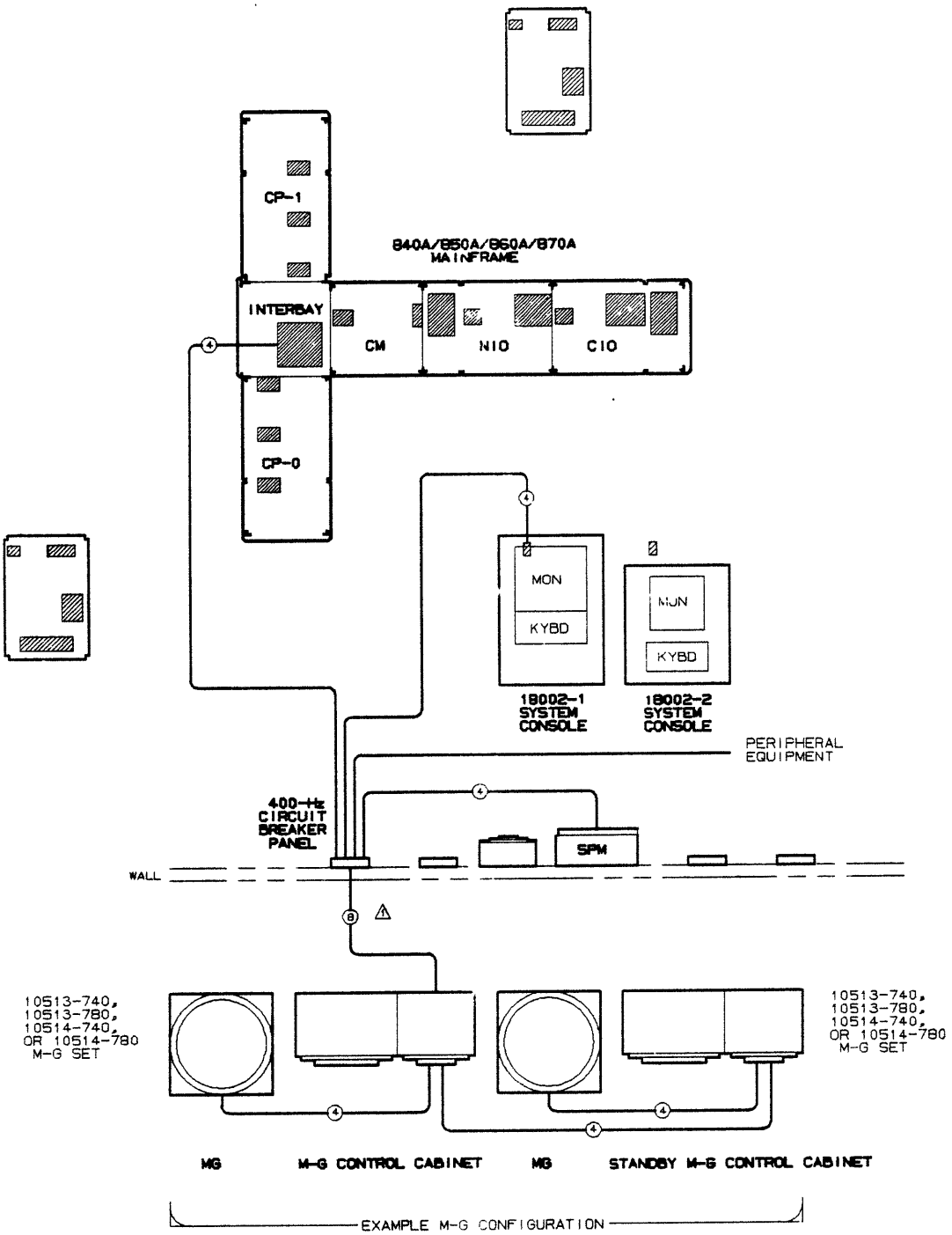
Figure 4-3. 50/60-Hz Wiring Diagram

Table 4-7. 400-Hz Power Connections to Equipment in Computer Room

Equipment	Terminal Strip Ht. Above Raised Floor mm (in)
840A,850A,860A, or 870A mainframe	406 (16) Note[1]
System power monitor	Customer dependent
18002-1 system console	508 (20)

Note:

1. Direct-wired connection for mainframe is made in the interbay.



NOTE:

1. FOUR CONDUCTORS APPLY TO 10513-740 OR 10514-740 M-G SETS.

2. NUMBERS WITHIN CIRCLES INDICATE THE CONDUCTORS IN THE RUN (DOES NOT INCLUDE SAFETY GROUND).

60463550-10C

Figure 4-4. 400-Hz Wiring Diagram

How is Power Connected to Equipment in the M-G Room?

Power is connected to equipment in the M-G room via direct-wiring connections to terminal strips. Table 4-8 lists the connections to 10513-740 and 10514-740 M-G sets, while table 4-9 lists the connections to 10513-780 and 10514-780 M-G sets.

You must supply and install the wiring from the circuit breaker to the terminal strips. You must install and test the M-G set(s) in the local mode at least two weeks before delivery of the mainframe. For installation instructions, refer to chapter 3 of the manual that is shipped with the M-G set.

NOTE

The term normal MG in the following tables refers to a normally active MG. Also, several normal MGs serviced by the same standby MG are referred to as adjacent MGs. Refer to the wiring diagram in figure 4-5 or 4-6.

Table 4-8. Power Connections to 10513-740 and 10514-740 M-G Sets

From	Terminal Strip Ht. Above Floor mm (in)	To	Terminal Strip Ht. Above Floor mm (in)	Wires Per Run	Recommended Wire Size Note[1]
50/60-Hz circuit breaker panel	Site dependent	M-G control cabinet (normal)	762 (30)	3	Note[2]
400-Hz circuit breaker panel	Site dependent	M-G Control cabinet (normal)	940 (37)	4	67 mm^2 (2/0 AWG) Note[3]
SPM - Remote Volt. Adj.	Site dependent	M-G Control cabinet (normal)	1245 (49)	2 Note[4]	3 mm^2 (12 AWG)
SPM - Remote Start/Stop	Site dependent	M-G Control cabinet (normal)	1245 (49)	2 Note[4]	3 mm^2 (12 AWG)

1. Based on insulated copper wire type THW at 75°C (167°F) maximum.

2. Recommended wire size is 107 mm^2 (4/0 AWG) for 208, 220, 230, or 240 input voltages; 33.6 mm^2 (2 AWG) for 380, 400, or 415 input voltages; and 26.7 mm^2 (3 AWG) for 440 or 460 input voltages.

3. Based on 30.5-m (100 ft) run. The neutral wire used in the run may be wire size 34 mm^2 (2 AWG) insulated copper wire type THW at 75°C (167°F) maximum. Voltage loss between the M-G control cabinet and 400-Hz circuit breaker panel must not exceed 2 percent of rated MG output.

4. The sets of wires for Remote Voltage Adjust, Remote Start/Stop, and Remote Status between the system power monitor and M-G control cabinet must be separated into three independent runs or be shielded (by sets) in conduit or by braided shielding.

(Continued)

Table 4-8. Power Connections to 10513-740 and 10514-740 M-G Sets *(Continued)*

From	Terminal Strip Ht. Above Floor mm (in)	To	Terminal Strip Ht. Above Floor mm (in)	Wires Per Run	Recommended Wire Size Note[1]
SPM - Remote Status	Site dependent	M-G control cabinet (normal)	1245 (49)	2 Note[4]	3 mm^2 (12 AWG)
Motor: • Kato • Piller	 889 (35) 889 (35)	M-G control cabinet (normal)	152 (6)	3	Note[2]
Exciter: • Kato • Piller	 965 (38) 590 (23)	M-G control cabinet (normal)	1245 (49)	2	3 mm^2 (12 AWG)
Generator: • Kato • Piller	 889 (35) 590 (23)	M-G control cabinet (normal)	940 (37)	4	67 mm^2 (2/0 AWG)
Standby - 400-Hz power Note[5]	940 (37)	M-G control cabinet (normal)	940 (37)	4	67 mm^2 (2/0 AWG)
Standby - Interlocutor Note[5]	1245 (49)	M-G control cabinet (normal)	1245 (49)	2	3 mm^2 (12 AWG)
Standby - Remote Control & Status Note[5]	1245 (49)	M-G control cabinet (normal)	1245 (49)	6	3 mm^2 (12 AWG)

Notes:

1. Based on insulated copper wire type THW at 75°C (167°F) maximum.

2. Recommended wire size is 107 mm^2 (4/0 AWG) for 208, 220, 230, or 240 input voltages; 33.6 mm^2 (2 AWG) for 380, 400, or 415 input voltages; and 26.7 mm^2 (3 AWG) for 440 or 460 input voltages.

4. The sets of wires for Remote Voltage Adjust, Remote Start/Stop, and Remote Status between the system power monitor (SPM) and M-G control cabinet must either be separated into three independent runs or be shielded (by sets) in conduit or by braided shielding.

5. If standby M-G control cabinet provides 400-Hz power to adjacent control cabinet, duplicate power, Interlocutor, and Remote Control and Status wiring goes to adjacent control cabinet.

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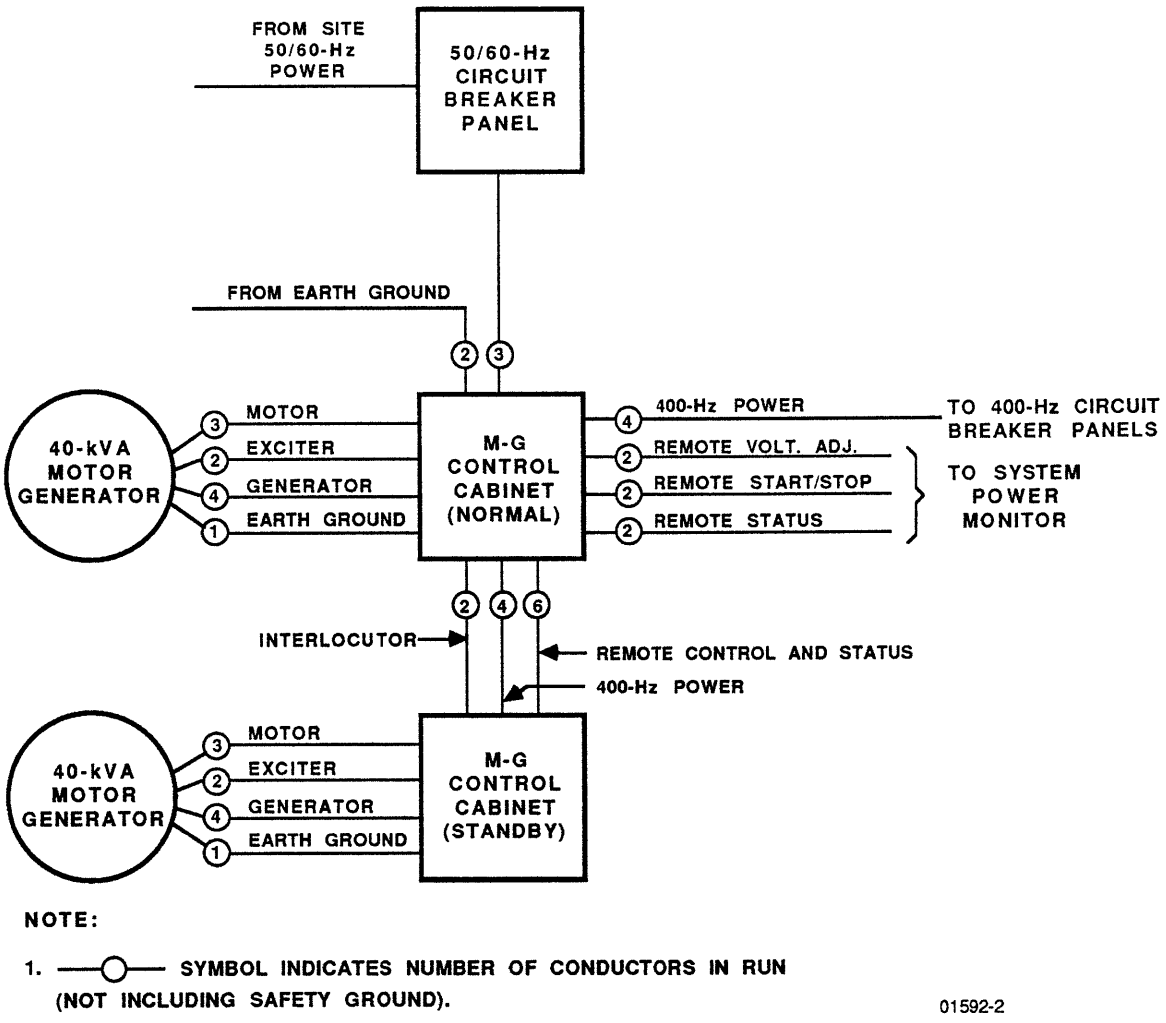

Figure 4-5. 10513-740/10514-740 M-G Set Wiring Diagram

Table 4-9. Power Connections to 10513-780 and 10514-780 M-G Sets

From	Terminal Strip Ht. Above Floor mm (in)	To	Terminal Strip Ht. Above Floor mm (in)	Wires Per Run	Recommended Wire Size Note[1]
50/60-Hz circuit breaker panel	Site dependent	M-G control cabinet (normal)	914 (36)	3	85 mm^2 (3/0 AWG) Note[2]
400-Hz circuit breaker panel	Site dependent	M-G control cabinet (normal)	279 (11)	8	107 mm^2 (4/0 AWG) Note[3]
SPM - Remote Volt. Adj.	Site dependent	M-G control cabinet (normal)	1524 (60)	2 Note[4]	3 mm^2 (12 AWG)
SPM - Remote Start/Stop	Site dependent	M-G control cabinet (normal)	1524 (60)	2 Note[4]	3 mm^2 (12 AWG)
SPM - Remote Status	Site dependent	M-G control cabinet (normal)	1524 (60)	2 Note[4]	3 mm^2 (12 AWG)
Motor: • Kato • Piller	 762 (30) 889 (35)	M-G control cabinet (normal)	254 (10)	3	85 mm^2 (3/0 AWG) Note[2]
Exciter: • Kato • Piller	 483 (19) 590 (23)	M-G control cabinet (normal)	1397 (55)	2	3 mm^2 (12 AWG)
Generator: • Kato • Piller	 483 (19) 590 (23)	M-G control cabinet (normal)	635 (25)	4	194 mm^2 (400 MCM)

Notes:

1. Based on insulated copper wire type THW at 75°C (167°F) maximum.

2. Recommended wire size is for all input voltages: 380, 400, 415, 440, or 460.

3. Based on 30.5-m (100-ft) run with six phase wires and two neutral wires. One neutral wire may be used; recommended wire size is 107 mm^2 (4/0 AWG) insulated copper wire type THW at 75°C (167°F) maximum. Voltage loss between the M-G control cabinet and 400-Hz circuit breaker panel must not exceed 2 percent of rated MG output.

4. The sets of wires for Remote Voltage Adjust, Remote Start/Stop, and Remote Status between the system power monitor (SPM) and M-G control cabinet must either be separated into three independent runs or be shielded (by sets) in conduit or by braided shielding.

(Continued)

Table 4-9. Power Connections to 10513-780 and 10514-780 M-G Sets *(Continued)*

From	Terminal Strip Ht. Above Floor mm (in)	To	Terminal Strip Ht. Above Floor mm (in)	Wires Per Run	Recommended Wire Size Note[1]
Standby - 400-Hz power Note[5]	279 (11) (normal)	M-G control cabinet	279 (11)	4	177 mm^2 (350 MCM)
Standby - Interlocutor Note[5]	1524 (60)	M-G control cabinet (normal)	1524 (60)	2	3 mm^2 (12 AWG)
Standby - Remote Control & Status Note[5]	1524 (60) (normal)	M-G control cabinet	1524 (60)	6	3 mm^2 (12 AWG)

Notes:

1. Based on insulated copper wire type THW at 75°C (167°F) maximum.

5. If standby M-G control cabinet provides 400-Hz power to adjacent control cabinet, duplicate power, Interlocutor, and Remote Control and Status wiring goes to adjacent control cabinet.

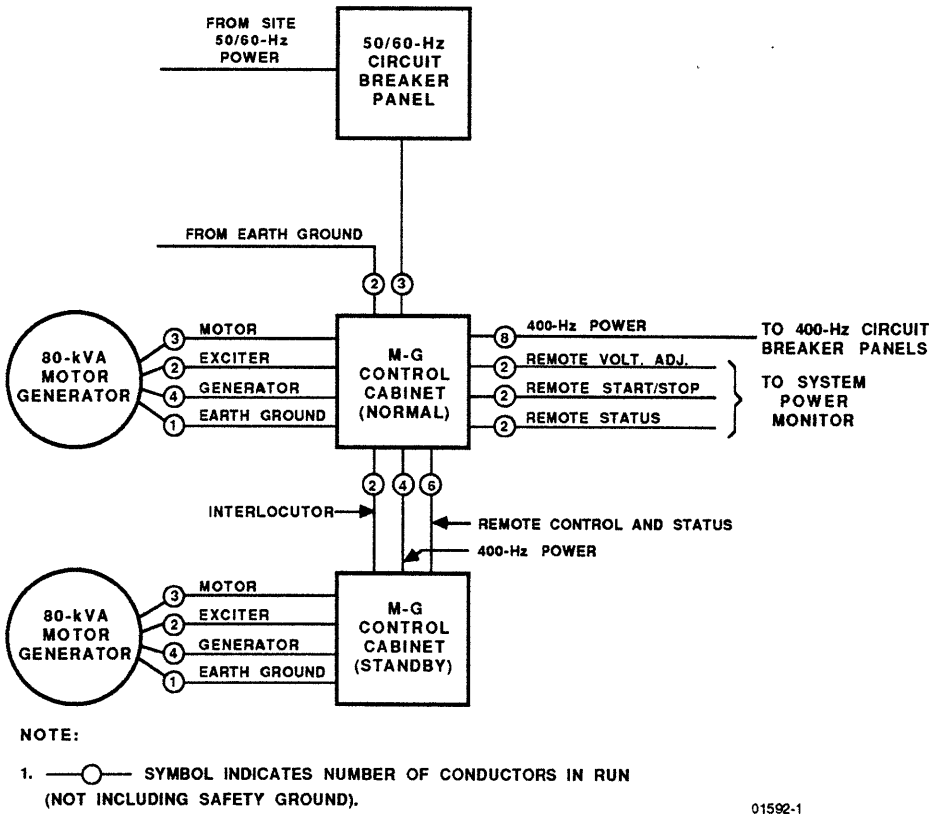

Figure 4-6. 10513-780/10514-780 M-G Set Wiring Diagram

How Are Power and Control Connected to the System Power Monitor?

Power and control are connected to the system power monitor (SPM) with terminal strips. The power and control connections are listed in table 4-10. Some of the control wiring from the SPM is designated for your use as described in the footnotes to table 4-10. The SPM wiring diagram is shown in figure 4-7.

You must supply and install the wiring to the SPM. You must install the SPM at least two weeks before delivery of the mainframe. Refer to How to Wire Power and Control to the System Power Monitor.

Table 4-10. Power and Control Wire Connections to System Power Monitor

From	To SPM Terminals	Wire Description	Wires Per Run	Recommended Wire Size Note[1]
50/60-Hz circuit breaker panel	TB1-1, N TB1-2, PH	50-Hz/60-Hz 1-ph 120/220/240 V	2	3 mm^2 (12 AWG)
400-Hz circuit breaker panel	TB5- 7, N TB5- 8, PH 1 TB5- 9, PH 2 TB5-10, PH 3	400-Hz sensing V	4	3 mm^2 (12 AWG)
M-G control cabinet	TB5-1 TB5-2	Remote Status	2	3 mm^2 (12 AWG)
M-G control cabinet	TB5-3 TB5-4	Remote Voltage Adjust	2	3 mm^2 (12 AWG)
M-G control cabinet	TB5-5 TB5-6	Remote Start/Stop	2	3 mm^2 (12 AWG)

Note:

1. Based on insulated copper wire type THW at 75°C (167°F) maximum.

(Continued)

Table 4-10. Power and Control Wire Connections to System Power Monitor *(Continued)*

From	To SPM Terminals	Wire Description	Wires Per Run	Recommended Wire Size Note[1]
Customer designated use Note[2]	TB6-1, NC TB6-2, Common TB6-3, NO	Emergency off control	2	3 mm^2 (12 AWG)
Peripheral equipment control panels Note[3]	TB6-5, NO-1 TB6-6, NO-1 TB6-7, NO-2 TB6-8, NO-2	Peripherals	2 per set	3 mm^2 (12 AWG)
Customer designated use Note[4]	TB6-9, NO TB6-10, NO	Cooling	2	3 mm^2 (12 AWG)
Remote emergency off switch(es) Note[5]	TB6-11 TB6-12, +22 V	Emergency off circuits	2	3 mm^2 (12 AWG)

Notes:

1. Based on insulated copper wire type THW at 75°C (167°F) maximum.

2. Terminals TB6-1, 2, 3 are for customer use, such as powering down other equipment or providing and an indication when an emergency off condition occurs. In the system power monitor (SPM), the terminals connect to two sets of contacts (rated at 120 V, 10 A). One set of contacts is normally-closed (NC). The other set is normally-open (NO). During an emergency off condition, the normally closed contacts open and the normally-open contacts close.

3. Terminals TB6-5, 6, 7, 8 are for customer use, such as remote control of peripheral equipment control panels. In the SPM, the terminals connect to two sets of normally-open contacts (rated at 120 V, 10 A). The contacts close when the SPM applies system power.

4. Terminals TB6-9, 10 are for customer use, such as controlling other equipment to coincide with the operation of the system water cooling unit(s). In the SPM, the terminals connect to a set of normally-open contacts (rated at 120 V, 10A). The contacts close when the SPM applies power to the system water cooling unit(s).

5. Terminals TB6-11, 12 are for customer use in connecting a remote emergency off switch. The remote switch must have normally-closed contacts. When two or more remote switches are used, they must connect in series. When no remote switches are used, TB6-11 *must be jumpered* to TB6-12.

(Continued)

Table 4-10. Power and Control Wire Connections to System Power Monitor *(Continued)*

From	To SPM Terminals	Wire Description	Wires Per Run	Recommended Wire Size Note 1
Customer designated use Note[6]	TB7-1 TB7-2	120 V ac remote on	2	3 mm^2 (12 AWG)
Customer designated use Note[7]	TB7-3 TB7-4	From contact closure remote on	2	3 mm^2 (12 AWG)
Dew point sensor	TB7-5 TB7-6	Dew point danger	2	3 mm^2 (12 AWG)
Dew point sensor	TB7-7 TB7-8	Dew point warning	2	3 mm^2 (12 AWG)
Customer designated use Note[8]	TB7-9, Com TB7-10, NO TB7-11, NC	To remote alarm	2	3 mm^2 (12 AWG)

Notes:

1. Based on insulated copper wire type THW at 75°C (167°F) maximum.

6. Terminals TB7-1, 2 are for customer use to remotely control the operation of the SPM. With the SPM REMOTE switch in position 1 and 115 V (20 ma) applied to TB7-1, 2, the SPM turns on. These terminals *must not be* used with TB7-3, 4.

7. Terminals TB7-3, 4 are for customer use to remotely control the operation of the SPM. With the SPM REMOTE switch in position 1 and the closure of the circuit between TB7-3, 4, the SPM turns on. These terminals *must not be* used with TB7-1, 2.

8. Terminals TB7-9, 10, 11 are for customer use in connecting a remote alarm. In the SPM, the terminals connect to two sets of contacts (rated at 120 V 10-A). One set of contacts is normally-closed. The other set is normally-open. During an emergency off condition, the normally-closed contacts open and the normally-open contacts close.

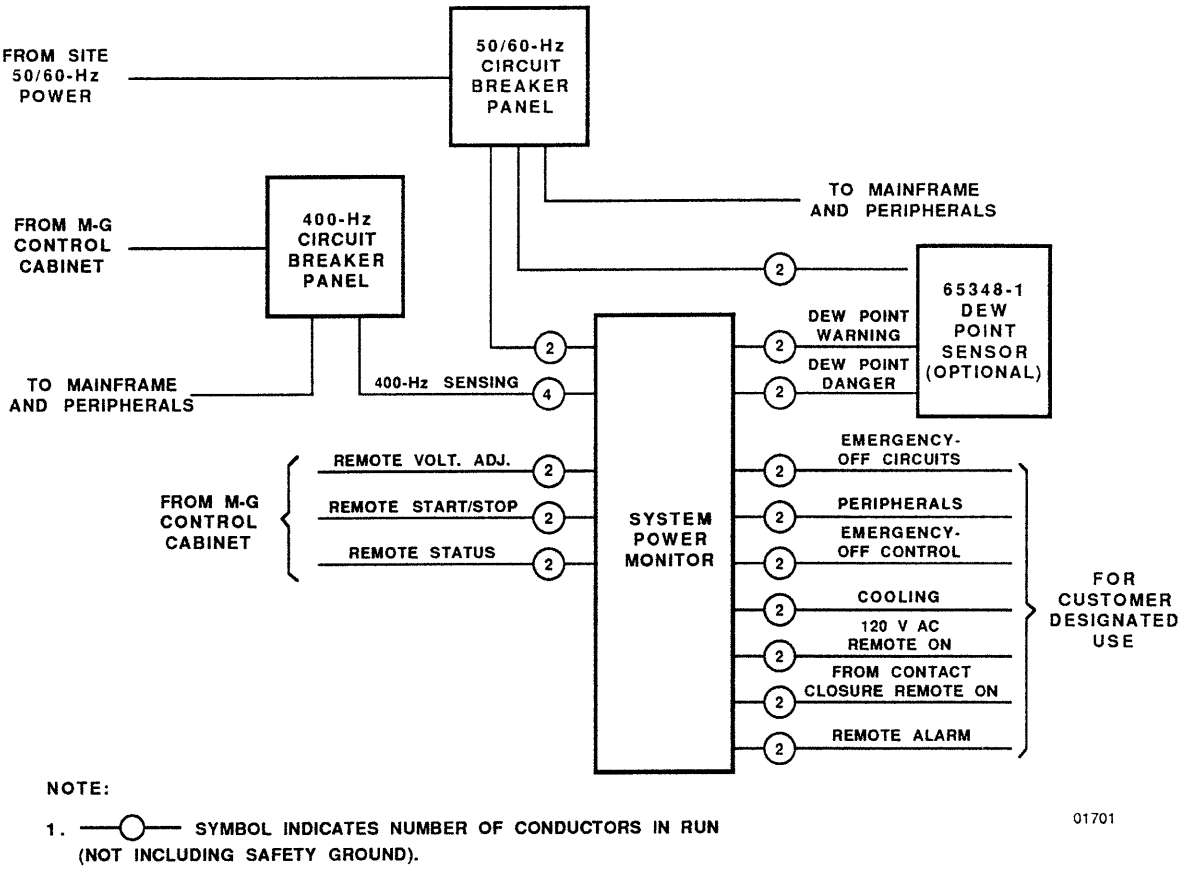

Figure 4-7. System Power Monitor Wiring Diagram

How to Wire Power and Control to the System Power Monitor

The 50/60-Hz power wires and a safety ground wire enter the system power monitor (SPM) through a wiring knockout hole near the bottom left corner of the SPM. The power wires connect to TB1, and the ground wire connects to the SAFETY GROUND terminal in the SPM power input box. The terminals are accessible by removing the power input box cover plate from the the left side of the SPM. The wiring locations are shown in figure 4-8.

Control and 400-Hz sensing wires enter the SPM through wiring knockout holes at the top or bottom of the SPM. The wires connect to TB5, TB6, and TB7 on the A2 I/O module assembly. This assembly is accessible by opening the SPM front panel.

CAUTION

Do not apply power to the SPM until after Control Data performs the preinstallation checks during the mainframe complex installation.

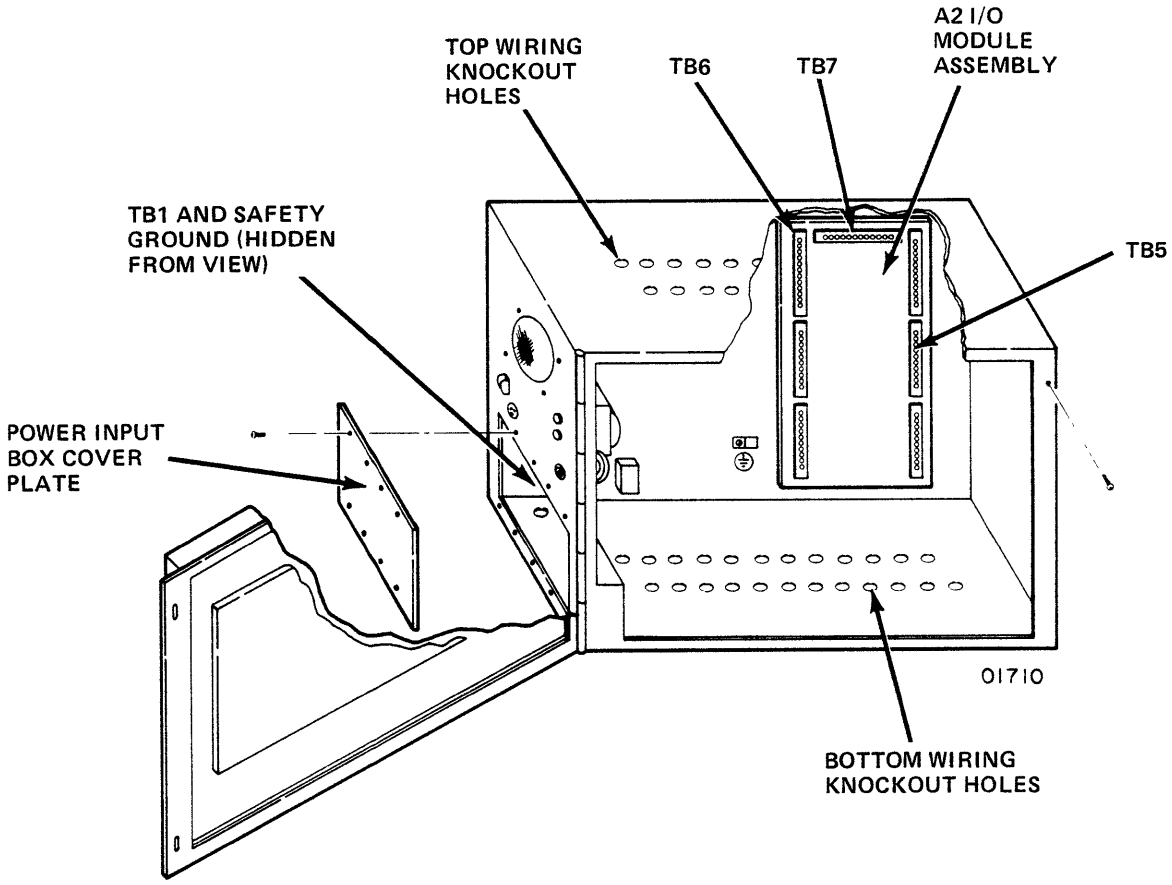

Figure 4-8. System Power Monitor Wiring Locations

How Are Power and Control Connected to the Dew Point Sensor?

Power and control are connected to the optional 65348-1 dew point sensor (DPS) with terminal strips. Figure 4-9 shows the wiring diagram and table 4-11 lists the connections.

You must supply and install the wiring to the DPS. You must install the DPS at least two weeks before delivery of the mainframe. Refer to How to Wire Power and Control to the Dew Point Sensor.

Table 4-11. Power and Control Wire Connections to 65348-1 Dew Point Sensor

From	To Dew Point Sensor Terminals	Wire Description	Wires Per Run	Remommended Wire Size Note 1
50/60-Hz circuit breaker panel	TB3-1, N TB3-2, 120 V or TB3-3, N TB3-4, 220 V or TB3-3, N TB3-5, 240 V	60-Hz 1-ph, 120 V 50-Hz 1-ph, 220 V 50-Hz 1-ph, 240 V	2	3 mm^2 (12 AWG)
SPM System 1 Note[2]	TB4-1, NC TB4-2, NC	Dew Point Warning	2	3 mm^2 (12 AWG)
SPM System 1 Note[3]	TB5-2, NO TB5-3, NO	Dew Point Danger	2	3 mm^2 (12 AWG)
SPM System 2 Note[2]	TB4-4, NC TB4-5, NC	Dew Point Warning	2	3 mm^2 (12 AWG)
SPM System 2 Note[3]	TB5-5, NO TB5-6, NO	Dew Point Danger	2	3 mm^2 (12 AWG)
SPM System 3 Note[2]	TB6-1, NC TB6-2, NC	Dew Point Warning	2	3 mm^2 (12 AWG)
SPM System 3 Note[3]	TB7-2, NO TB7-3, NO	Dew Point Danger	2	3 mm^2 (12 AWG)
SPM System 4 Note[2]	TB6-4, NC TB6-5, NC	Dew Point Warning	2	3 mm^2 (12 AWG)
SPM System 4 Note[3]	TB7-5, NO TB7-6, NO	Dew Point Danger	2	3 mm^2 (12 AWG)

Notes:

1. Based on insulated copper wire type THW at 75°C (167°F) maximum.

2. Normally closed (NC) contacts open during a dew point warning.

3. Normally open (NO) contacts close during a dew point danger.

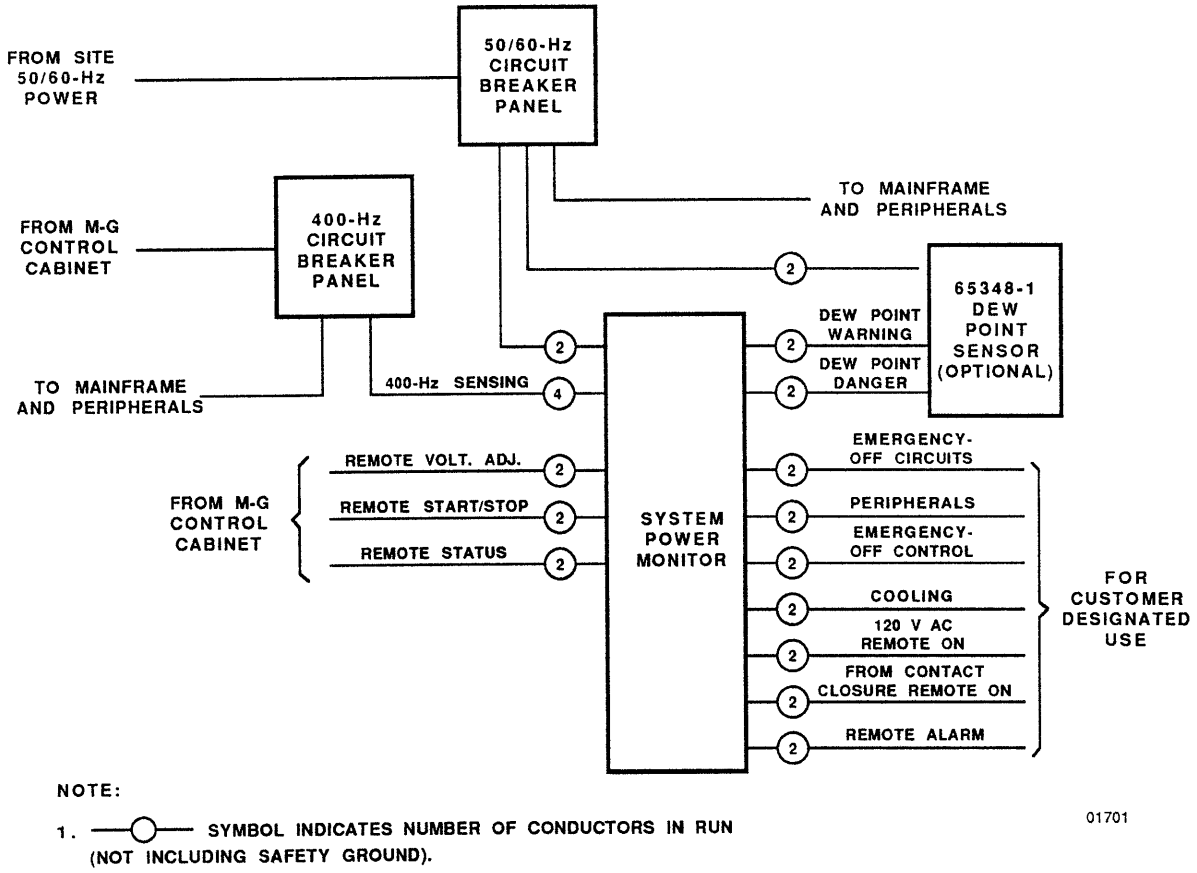

Figure 4-9. 65348-1 Dew Point Sensor Wiring Diagram

How to Wire Power and Control to the Dew Point Sensor

The 50/60-Hz power wires and a safety ground wire enter the optional 65348-1 dew point sensor (DPS) either through a wiring knockout hole at the top or bottom of the DPS. The power wires connect to TB3 and the ground wire to a ground lug. These terminals and lug are accessible after opening the DPS front panel (figure 4-10).

Control wires enter wiring knockout holes at the bottom of the DPS. The wires connect to terminal blocks TB4 and TB5 for a system 1 mainframe complex. The DPS may control up to three additional systems, which connect to TB4 through TB7.

CAUTION

Do not apply power to the DPS until after Control Data performs preinstallation checks. These checks are done during the installation of the mainframe complex.

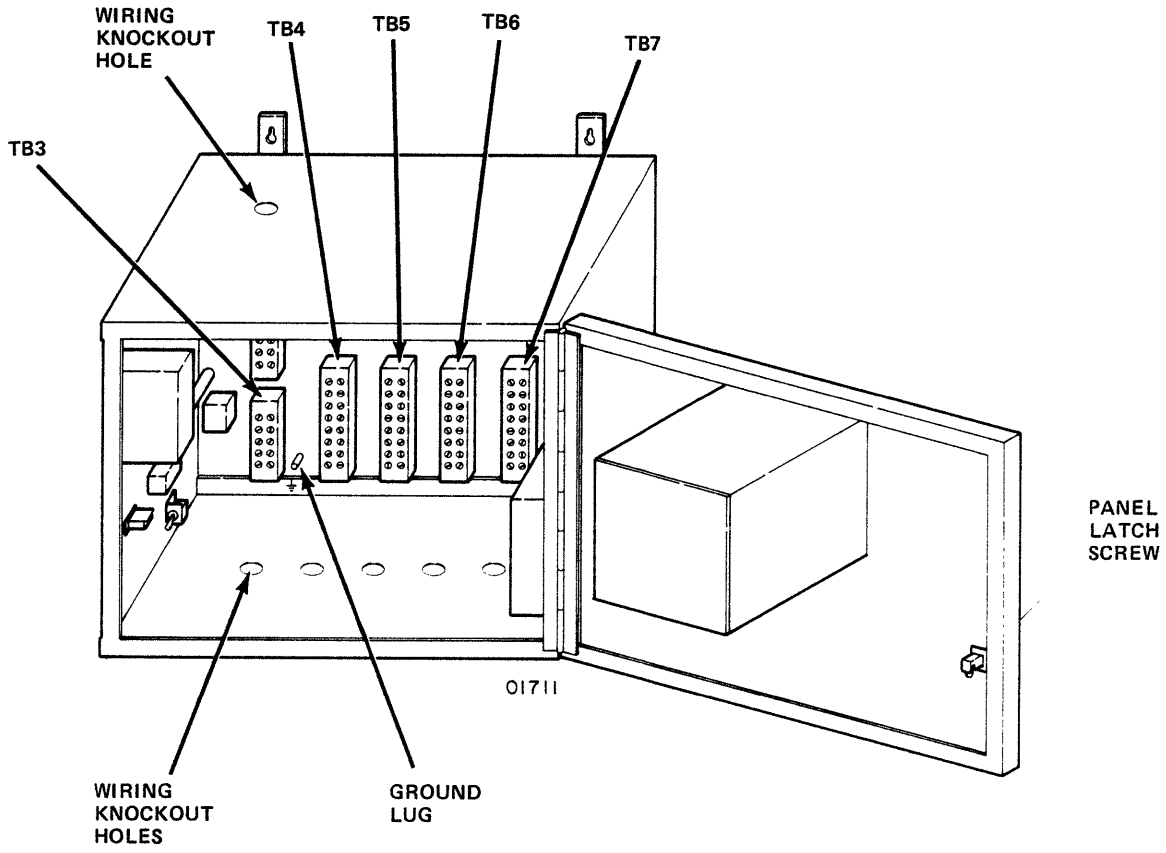

Figure 4-10. 65348-1 Dew Point Sensor Wiring Locations

What Power and Control Items Does Control Data Supply?

Control Data supplies the items listed in table 4-12 for connecting the SPM to the mainframe and water cooling units and for connecting power to the water cooling unit(s). The items are included with the preinstallation kits that you receive two weeks before the mainframe. The cables supplied for the SPM will be installed by Control Data personnel during preinstallation. The other items supplied are for your use in preparing power connections for the water cooling unit(s).

Table 4-12. Control Data-Supplied Power and Control Items

Item	Part Number	Qty
Control cable - 15.2 m (50 ft) long	53615357	3
Control cable - 15.2 m (50 ft) long	23141055	1
Control cable - 15.2 m (50 ft) long	23107064	1
Control cable - 15.2 m (50 ft) long	23141055	1 Note[1]
Power connector, 50 Hz - connects to power cord of water cooling unit	15186740 (Hubbell 516C6W)	1 Note[1]
Power connector, 60 Hz - connects to power cord of water cooling unit	15186710 (Hubbell 520C9W0	1 Note[1]
Conduit adapter - connects power connector to liquid-tight, 3/4-in flexible metal conduit	53586108	1 Note[1]
Conduit reducer - connects conduit adapter to 1/2-in conduit	53586120	1 Note[1]

Notes:

1. One supplied for each water cooling unit.

To present the information in this chapter in a structured format, this page has been left blank.

What Power Items Must You Supply?

The power items that you must supply are listed in tables 4-13 and 4-14. You must install these items in your site power distribution system at least two weeks before delivery of the mainframe.

In addition, you must supply and install power items such as: disconnects, circuit breaker panels, magnetic contactors, emergency-off switches, and convenience outlets for test equipment.

Table 4-13. Customer-Supplied Circuit Breakers for Power to Equipment

Qty.	Freq. Hz	Rating Amperes	Poles	Protects
1 per M-G set	50/60	Note[1]	3	M-G set
1 per water cooling unit	50/60	25	3	18675-1 or 18675-3 water cooling unit
1 per water cooling unit	50/60	15	3	18677-1 water cooling unit
1 per console	50/60	15	1	18002-1 or 18002-2 system console
1	50/60	15	1	RTA modem
1	50/60	15	1	840A,850A,860A, or 870A mainframe
1	50/60	15	1	System power monitor Note[2] Note[3]
1	50/60	15	1	65348-1 Dew point sensor Note[3] Note[4]

Notes:

1. Use 600-V circuit breaker with instantaneous trip set for 1300% of full-load current. Ampere rating of circuit breaker must be:

- 10513-740 M-G set - 225 A at 208 V; 125 A at 440, 460, or 480 V
- 10514-740 M-G set - 225 A at 220, 230, or 240 V; 125 A at 380, 400, or 415 V
- 10513-780 or 10514-780 M-G set - 225 A

2. Circuit breaker must be controlled only by a room emergency-off switch.

3. Removing power from this equipment shuts down the mainframe complex. To prevent accidental shutdown, power to circuit breaker must be independent of any power control panel.

4. An emergency-off switch must not control power to the dew point sensor (DPS) if the DPS is connected to more than one mainframe complex.

(Continued)

Table 4-13. Customer-Supplied Circuit Breakers for Power to Equipment *(Continued)*

Qty.	Freq. Hz	Rating Amperes	Poles	Protects
1	400	15	3	18002-1 system console
1	400	100	3	840A,850A, or 860A mainframe
1	400	225	3	860A mainframe with 18559-3 CP-1 option or 870A mainframe
1	400	15	3	System power monitor

Table 4-14. Customer-Supplied Power Connectors

Qty.	Freq. Hz	Receptacle or Connector	Connects to Power Cord of
1	50	CEE 7-7	18002-2 system console
1	60	NEMA 5-15R	18002-2 system console
1	60	NEMA 5-15R	RTA modem (U.S. and Canada) Note[1]

Note:

1. Specifications for other countries may vary. Contact your Control Data representative for information.

Communications Requirements 5

Communications Requirements 5

This chapter contains lists of items that Control Data supplies and that you must supply for the remote technical assistance (RTA) communications option.

Chapter 5 of the Site Preparation General Information manual contains information on Control Data Distributed Communications Network (CDCNET), Loosely Coupled Network (LCN), and RTA.

Use the information in these manuals to plan the RTA installation.

What RTA Items Does Control Data Supply?

Control Data supplies one each of the following items for the RTA option.

- Modem, 2400 bits/s, V.22bis-compatible.
- Signal cable - 15.2 m (50 ft) long. Connects modem to mainframe.
- Telephone cable - 2.1 m (7 ft) long. Connects modem to telephone jack.

A customer engineer delivers and installs the RTA items when the mainframe is installed. Figure 5-1 shows the RTA cable diagram.

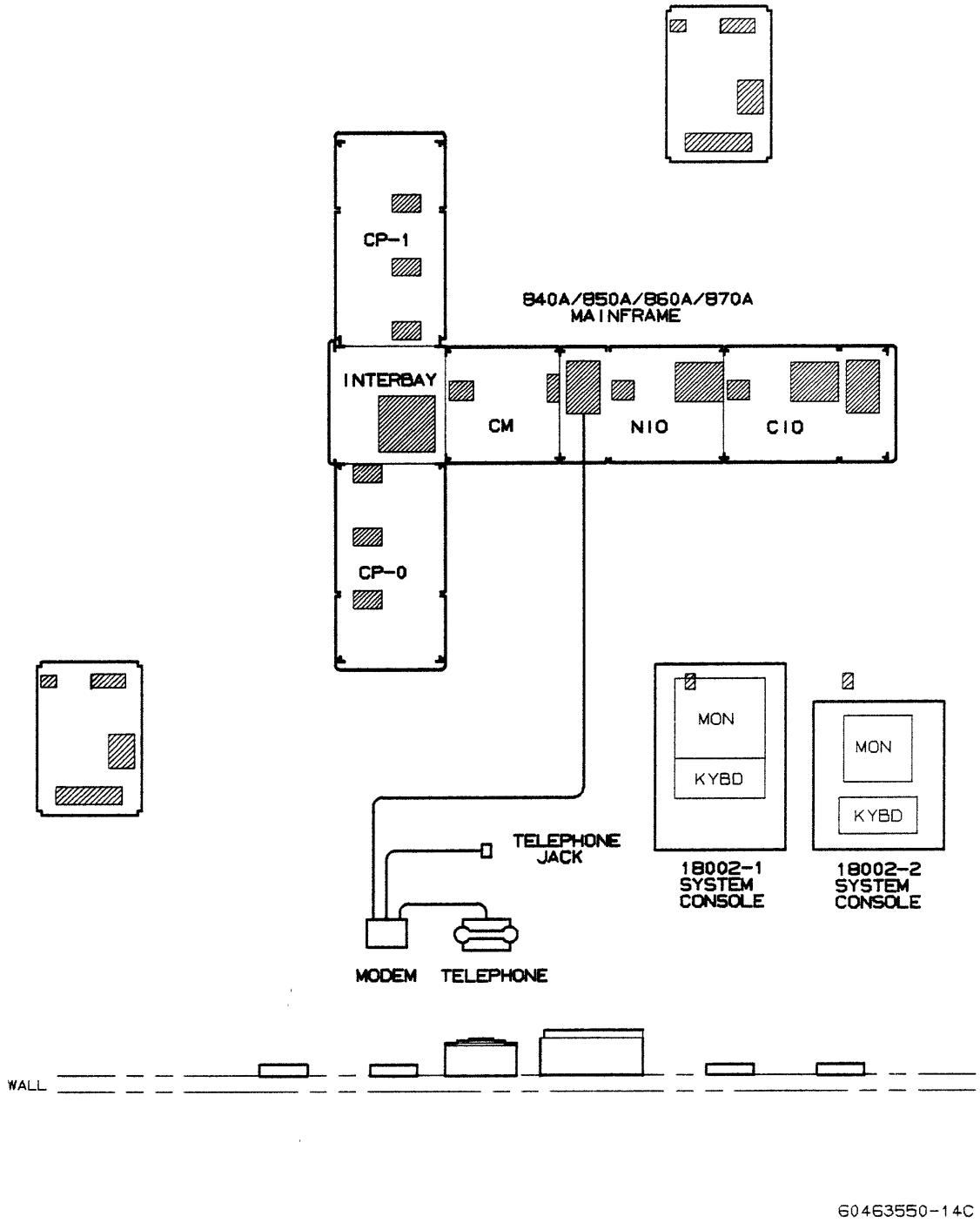

Figure 5-1. RTA Cable Diagram

What RTA Items Must You Supply?

You must supply one each of the following items.

- Telephone line, voice grade, tone or pulse dial for voice and data communications between site and remote support office
- Telephone jack (RJ11C in U.S. or Canada) for connecting modem to telephone line
- Telephone for voice communication between site and remote support office
- Telephone cable with plug to mate with telephone jack on modem

The items are needed one week before the mainframe is installed. Figure 5-1 shows the RTA cable diagram.

When RTA is installed in the U.S., give the following information to the local telephone company:

- Telephone number of line to which the modem is connected
- Type of telephone jack (RJ11C)
- Manufacturer and model number of modem
- FCC registration number of modem
- Ringer equivalence number (REN) of modem

Refer to the manual supplied with the modem for the FCC registration number and the ringer equivalence number.

Reports 6

Reports 6

This chapter contains the Site Data Report for reporting any problems with equipment delivery to your site and the Site Readiness Report for reporting that the site is ready for equipment installation. Fill in these reports near the end of your site preparations.

To present the information in this chapter in a structured format, this page has been left blank.

What are the Site Delivery Conditions?

Forty-five days before the equipment is to arrive, fill in the Site Data Report and send it to your Control Data Engineering Services installation coordinator. Use the Site Data Report to identify any problems with delivering the equipment to your site. Please answer all questions in the report. If a question does not apply to your site, mark "N/A" on the blank line.

NOTE

Control Data fills in the corporate file number (CFN).

Site Data Report (Sheet 1 of 2)

Corporate File Number _____

Customer Information

Customer name _____

Street address _____

City _____ State _____ Zip code _____

Contact name _____

Telephone number _____

General Information

Site is in building number ____.

Computer room is on floor number ____, in room number ____.

M-G room is on floor number ____, in room number ____.

Special delivery date or time is required? Yes____ No____

If Yes: Date _____ Time _____.

Security clearance is required? Yes____ No____

Dock

Equipment will be unloaded to a dock? Yes____ No____

Dock is accessible to a 65-ft tractor-trailer (tractor-trailer is 13 ft, 6 in high)? Yes____ No____

Site Data Report (Sheet 2 of 2)

Building Entrance (If No Dock)

Distance from unloading point to building entrance is ___ m/ft.

Surface from unloading point to building entrance is _____.
[Choose one] (cement) (black top) (grass) (other - explain)

Stairway or ramp is at building entrance? Yes_____ No_____

Building Interior

Distance from building entrance (or dock) to computer room is _____ m/ft.

Distance from building entrance (or dock) to M-G room is _____ m/ft.

Floor protection is required for moving equipment across carpeting and raised floor? Yes_____ No_____

Stairway or ramp is on route to computer room? Yes_____ No_____

Stairway or ramp is on route to M-G room? Yes_____ No_____

Smallest hallway on route to computer room is _____ mm/in wide.

Equipment must be moved through 90° turn in hallway? Yes_____ No_____

Ramp is required to move equipment onto raised floor of computer room? Yes_____ No_____

Customer will supply ramp? Yes_____ No_____

Elevator

Elevator is required to move equipment to computer room or M-G room? Yes_____ No_____

Elevator box is _____ mm/in wide, _____ mm/in deep.

Elevator door is _____ mm/in wide, _____ mm/in high.

Elevator load capacity is _____ kg/lb.

Is the Site Ready for the Equipment?

Two weeks before the equipment is to arrive, the site must be ready to meet the space, environmental, power, and communications requirements of the mainframe complex. Use the Site Readiness Report to help you verify that the site is ready. In the "Yes" column, make a checkmark if the item has been completed, or mark "N/A" if the item is not applicable. Completing this report does not mean that your site meets all of the requirements nor that Control Data approves the design of your site.

Site Readiness Report (Sheet 1 of 2)

	Notes	Yes
Space Requirements		
Room construction completed?	_____	____
Copies of scaled diagram of equipment layout available for contractors and Control Data Engineering Services personnel?	_____	____
Nonstandard cables for peripheral equipment ordered, if required?	_____	____
Location of equipment marked on raised floor?	_____	____
Floor cutouts made?	_____	____
Extra floor panels available?	_____	____
Stringer clamping bolts torqued according to manufacturer's specifications?	_____	____
Site Data Report completed and returned to Control Data?	_____	____
Environmental Requirements		
Air conditioning system installed and tested?	_____	____
Air distribution system operational?	_____	____
Air filtering system installed and cleaned?	_____	____
Environmental monitors and alarms installed?	_____	____

Site Readiness Report (Sheet 2 of 2)

	Notes	Yes
Environmental Requirements (Cont.)		
Site water system installed and tested?	_____	____
Site water supply and return lines insulated, labelled, and flushed?	_____	____
Quick-disconnect couplings, nipples, shutoff valves, bypass valves, and strainers installed on site water supply and return lines?	_____	____
Site water analyzed and treated, if required?	_____	____
Lighting installed?	_____	____
Acoustical treatment installed, if required?	_____	____
Power Requirements		
Circuit breaker panels installed and wired?	_____	____
Wiring from circuit breaker panels to equipment completed?	_____	____
Safety grounds installed?	_____	____
Power connectors installed, unless prohibited by local electrical code?	_____	____
Power cord plugs, receptacles, disconnects, and magnetic contactors installed?	_____	____
Emergency-off switches installed at room exits?	_____	____
Convenience outlets installed for test equipment?	_____	____
M-G set(s) installed, tested in local mode, and checked in local mode for proper rotation?	_____	____
Control Data power control or environmental monitoring equipment installed and wired?	_____	____
Diagram of site power distribution system available for Control Data Engineering Services personnel? Equipment, circuit breaker panels, and circuit breakers identified by numbers on the diagram?	_____	____
Communications Requirements		
Telephone line, telephone jack, and telephone installed for RTA?	_____	____

Grids and Templates A

Grids and Templates A

This appendix contains two sets of scaled grids and templates of the mainframe complex equipment (except M-G sets). The grids and templates are scaled 12 mm = 600 mm (1/50th) for SI metric units and 1/2 in = 24 in (1/48th) for U.S. customary units.

Appendix B of the Site Preparation Peripheral Equipment Data manual contains templates of the peripheral equipment.

Use the grids and templates to plan the equipment layout on the raised floor of the computer room. For instructions, refer to How to Use the Scaled Grids and Templates in chapter 2 of this manual.

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Worksheets

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Who are you?

- ☐ Manager
- ☐ Systems analyst or programmer
- ☐ Applications programmer
- ☐ Operator
- ☐ Other _____

How do you use this manual?

- ☐ As an overview
- ☐ To learn the product or system
- ☐ For comprehensive reference
- ☐ For quick look-up

What programming languages do you use? _____

_____

How do you like this manual? Check those questions that apply.

Yes	Somewhat	No	
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