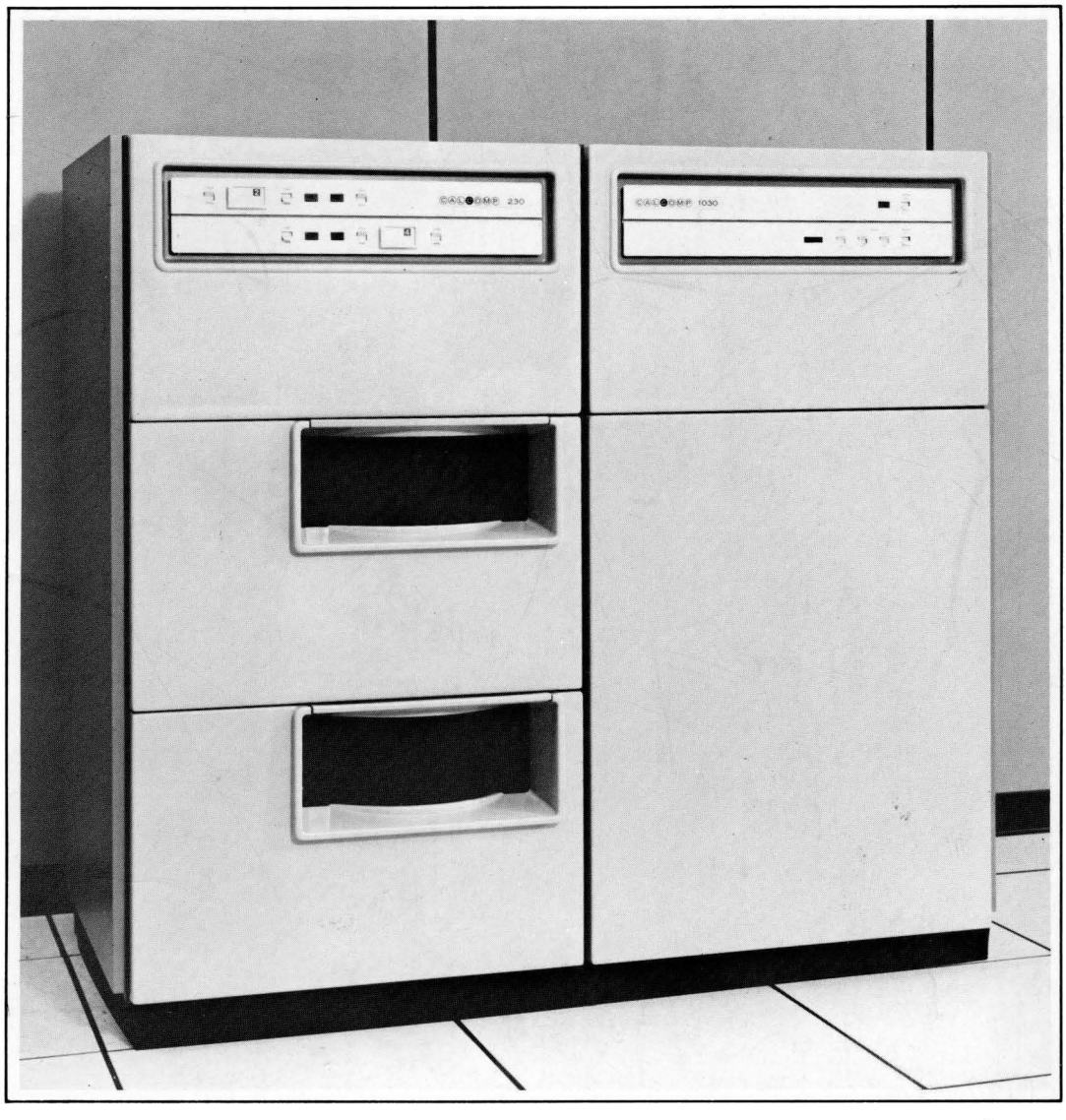
CalComp

1030 Disk Storage Facility

Physical Planning Guide



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1030 Disk Storage Facility

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TABLE OF CONTENTS

The following statement concerning grounding is in part from the UL manual, STANDARDS FOR SAFETY, ELECTRONIC DATA – PROCESSING UNITS AND SYSTEMS, UL478, paragraph 284.

The paragraph is in reference to the input AC power service ground.

> "An insulating grounding conductor that is identical in size and insulation to the grounded and ungrounded branch-circuit supply conductors except that it is green or green with one or more yellow stripes is to be installed as part of the branch-circuit that supplies this unit.
>
> "The grounding conductor is to be grounded at the service equipment.
>
> "The attachment-plug receptacles in the vicinity of the unit are all to be of a grounding type, and the grounding conductors serving these receptacles are to be connected to the grounding conductor that serves this unit."

MODEL 1030/230 DISK DRIVE SYSTEM

INTRODUCTION

This document contains information helpful in planning and ordering, for the installation of the Model 1030/230 Disk Drive System.

The system utilizes a Model 1030 Disk Drive Controller, and up to four Model 230 Disk Drives. This system configuration provides up to eight disk drive spindles.

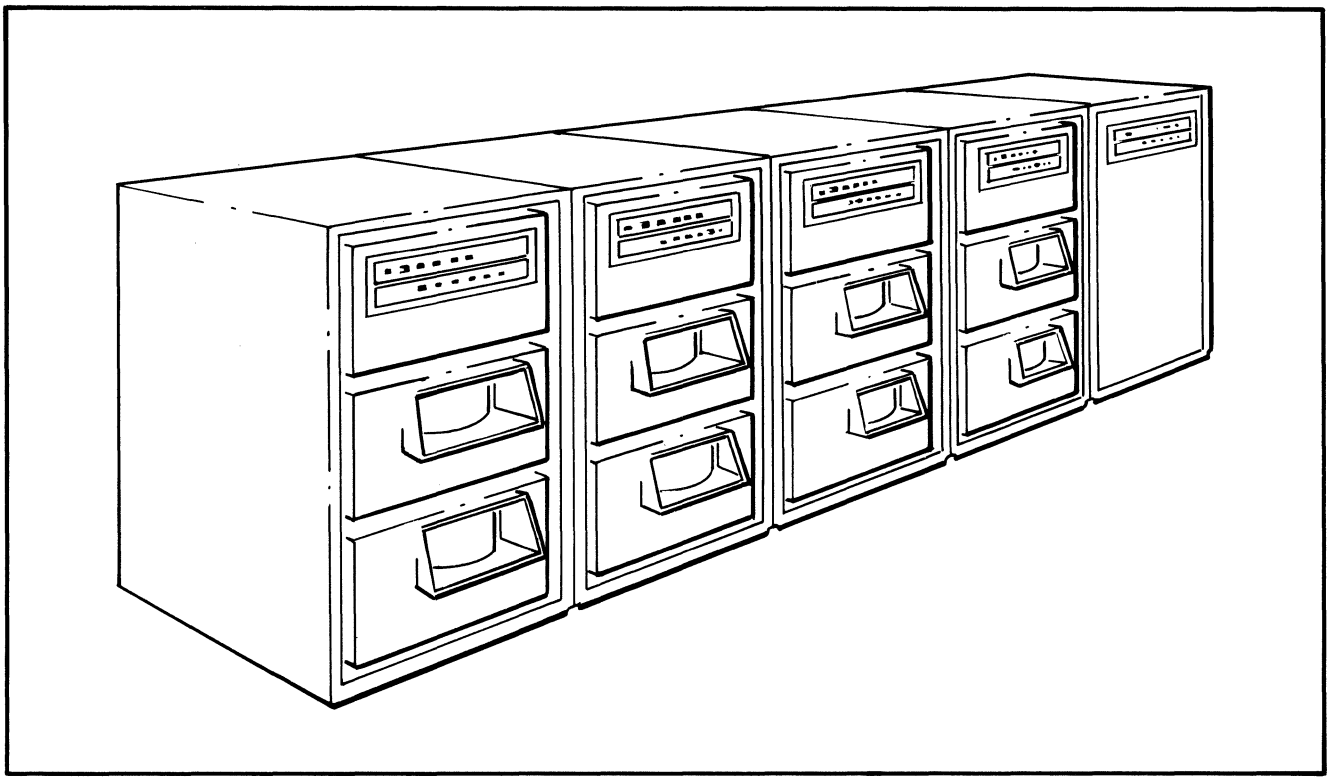
Model 1030 Disk Drive Controller

The Model 1030 Disk Drive Controller controls data transfer between an IBM block multiplexer or selector channel and up to eight on-line disk drive spindles. The disk drive system is interchangeable, plug-to-plug, with the IBM 3330 direct-access storage facility and uses the IBM 3336 disk pack, or its equivalent. A two-channel switch option allows the controller to be connected to two block multiplexer or selector channels.

When four Model 230's are on-line (eight spindles), the system provides random-access storage for up to 800 million 8-bit bytes of data; 800 million bits per spindle. Data transfer rate is 806,000 bytes per second. The inline feature included in the Model 1030 permits servicing a disk drive without interfering with system operation.

Model 230 Disk Drive

The disk drive is a high-speed, random-access memory device designed for mass storage in data processing systems. This unit comprises two complete and independent drives in a single cabinet. The upper one-third of the cabinet contains power supplies, power distribution circuits, and controls for the two drives. The lower two-thirds of the cabinet contains two drawer-mounted drives utilizing removable disk packs (IBM 3336 or equivalent). Both drawers are power-operated and can be extended individually to the front for disk pack installation or extended to the rear for maintenance.



Model 1030/230 Disk Drive System

A maximum of eight drives (four Model 230 Disk Drives) can be connected to a single Model 1030 Controller. The controller provides the data and control interface between the disk drives and the I/O interface of the CPU.

DOCUMENTS

The following sections in this manual contain additional physical planning information:

Physical Planning Notes:
- Model 1030 Disk Drive Controller
- Model 230 Disk Drive

CONNECTING CABLES

The connecting cables required to install the Model 1030/230 Disk Drive System are listed in the Standard Order List. Additional information is provided, showing the installed configuration of each cable type, with recommended cable lengths. In addition, a sample system configuration shows a typical installation, with all cables connected.

STANDARD ORDER LIST MODEL 1030/230 DISK DRIVE SYSTEM

Item and Part No. / No. of Spindles		2	4	6	8
EPO Cable	91695-xxx	1	1	1	1
Bus and Tag Cables	91693-xxx	2	2	2	2
Signal Cable	97528-011	2	2	2	2
	97528-016		2	4	6
Sequence Cable	97525-009	1	1	1	1
	97525-006		1	2	3
Dc Cable	10155-004	1	1	1	1
	10155-003		1	2	3
*Ac Cable, 60 Hz	10156-007	1	1	1	1
	10156-013			1	1
	10156-003		1	1	2
PLO Cable	97529-012	1	1	1	1
	97529-015		1	1	1
	97529-017			1	1
	97529-020				1
Terminator	97303-001	2	2	2	2
Jumper Plug	97514-001	1	1	1	1

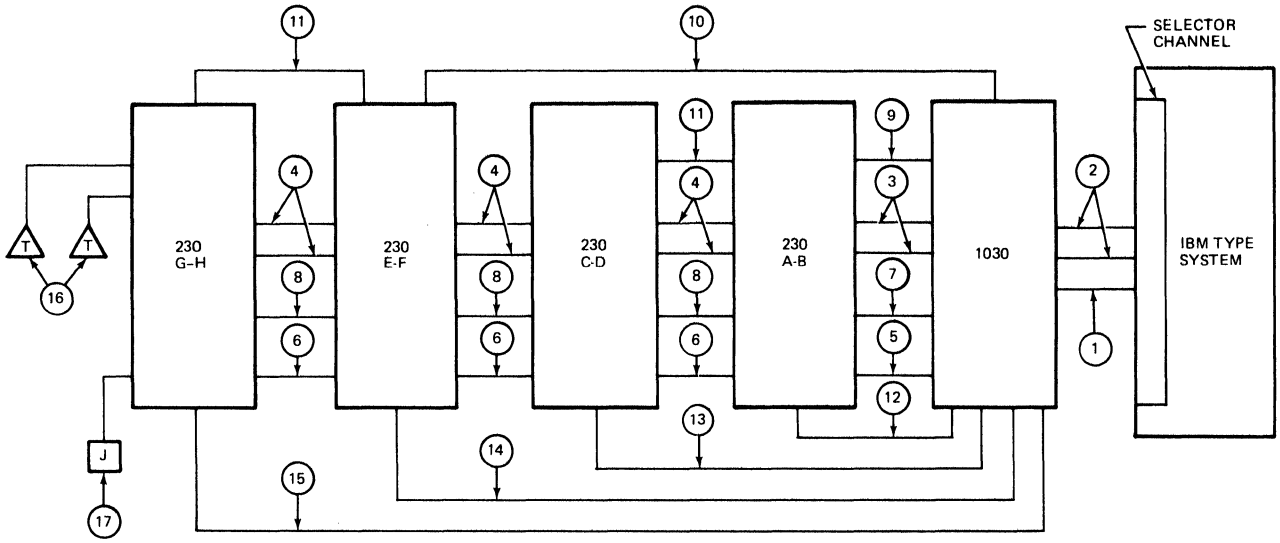
*For 50-Hz power use Part No. 10157-xxx

NOTES:

1. The standard configuration is with the disk drives in a straight line, adjacent to the controller.
2. Order the EPO, Bus and Tag cables long enough to connect the selector channel to the controller without exceeding maximum length.
3. This configuration is for one Model 1030 and from one to eight spindles on one selector channel. If the controller is connected to two selector channels, order two EPO cables (91695-xxx), and four Bus and Tag cables (91693-xxx).

EPO Cable=91695-xxx (xxx=length)
020=20 ft, 040=40 ft, 060=60 ft, 080=80 ft.

Bus & Tag Cable=91693-xxx (xxx=length)
010=10 ft, 020=20 ft, 030=30 ft, 040=40 ft,
050=50 ft, 060=60 ft, 070=70 ft.



Sample Order List

Item	Part	Number	Quantity
1	EPO Cable	91695-xxx	1
2	Bus and Tag Cables	91693-xxx	2
3	Signal Cable	97528-011	2
4	Signal Cable	97528-016	6
5	Sequence Cable	97525-009	1
6	Sequence Cable	97525-006	3
7	Dc Cable	10155-004	1
8	Dc Cable	10155-003	3
9	*Ac Cable, 60 Hz	10156-007	1
10	*Ac Cable, 60 Hz	10156-013	1
11	*Ac Cable, 60 Hz	10156-003	2
12	PLO Cable	97529-012	1
13	PLO Cable	97529-015	1
14	PLO Cable	97529-017	1
15	PLO Cable	97529-020	1
16	Terminator	97303-001	2
17	Jumper Plug	97514-001	1

*For 50 Hz use 10157-xxx

NOTES:

1. Order the EPO, Bus and Tag Cables long enough to connect the block multiplex or selector channel to the Model 1030 without exceeding maximum length.
2. For fewer disk drives see page 3.
3. The 208/230 vac power connector must be within 15 feet of controller.
4. Cut cable entrance holes for the controller.
5. Only cables under floor are Model 1030 ac power, EPO, and Bus and Tag cables.
6. Controller and drives bolt together.

Model 1030/230 Disk Drive System, Sample System Configuration

MODEL 1030 DISK DRIVE CONTROLLER

INTRODUCTION

This document contains information helpful in planning and ordering, for the installation of the Model 1030 Disk Drive.

PHYSICAL DIMENSIONS (Nominal) — With Side Panels

Height	60.00 inches
Width	34.00 inches
Depth	33.00 inches
Weight	600 pounds (operation)

SERVICE CLEARANCES (Nominal)

Front and Rear	36.00 inches

INSTALLATION CLEARANCES (Typical)

Space between controller and disk drive:

None, may be next to each other (with side panels) or controller may be bolted to first drive (without side panels).

HEAT DISSIPATION/AIR FLOW

Dissipation	4000 Btu per hour (typical)
Air Flow	200 cfm, minimum

ENVIRONMENT (Operating)

Temperature	60°F to 90°F
Rate of temperature change	15°F per hour, maximum
Relative Humidity	10% to 80% (without condensation)
Altitude	Mean sea level to 10,000 feet

AC POWER

Input Voltage	208/230 vac ±10%, 3-phase, 3-wire plus ground. 380/415 vac ±10%, 3-phase, 4-wire plus ground.
Input frequency	60 Hz ±10% (50 Hz ±1% available)
Operating current	4 amps rms*
Input power circuit breaker	55 amps
Power Rating	0.90 KVA (operational)

DC POWER

Add dc voltages are supplied by an internal power supply.

AC INPUT POWER CABLE

The ac input power cable is supplied with the controller. The controller end is permanently connected and the other end is terminated with a power connector. The power cable extends 15 feet from the controller for 60-amp service. If customer has 30-amp service, an adapter cable must be used and a maximum of four drive spindles may be connected.

*This is the operating current for the controller only. Disk drive ac power is also supplied through the controller and must be added to this rating (see Model 230 Disk Drive section).

DISK DRIVE CABLES

There are five types of interconnecting cables between the disk drive and controller. They are:

- Signal Cable
- Sequence Cable
- Dc Cable
- AC Cable
- PLO Cable

Signal Cable

There are two identical signal cables that interconnect the controller and the first disk drive cabinet. One is the Signal Out cable and the other is the Signal In cable.

Sequence Cable

There is one sequence cable interconnecting the controller and the first disk drive cabinet.

Dc Cable

There is one dc cable interconnecting the controller and the first disk drive cabinet. The dc cable carries +24 vdc.

Ac Cable

There are two ac power output cables provided to supply ac power from the controller to the first and third disk drive cabinets. Up to four spindles can be supplied from each controller ac output connector.

PLO Cable

There is one PLO cable interconnecting the controller and each disk drive cabinet. Since the controller may operate up to four disk deive cabinets, there are a maximum of four PLO cables from the controller.

CHANNEL CABLES

There are two types of interconnecting cables between the channel and the controller. They are:

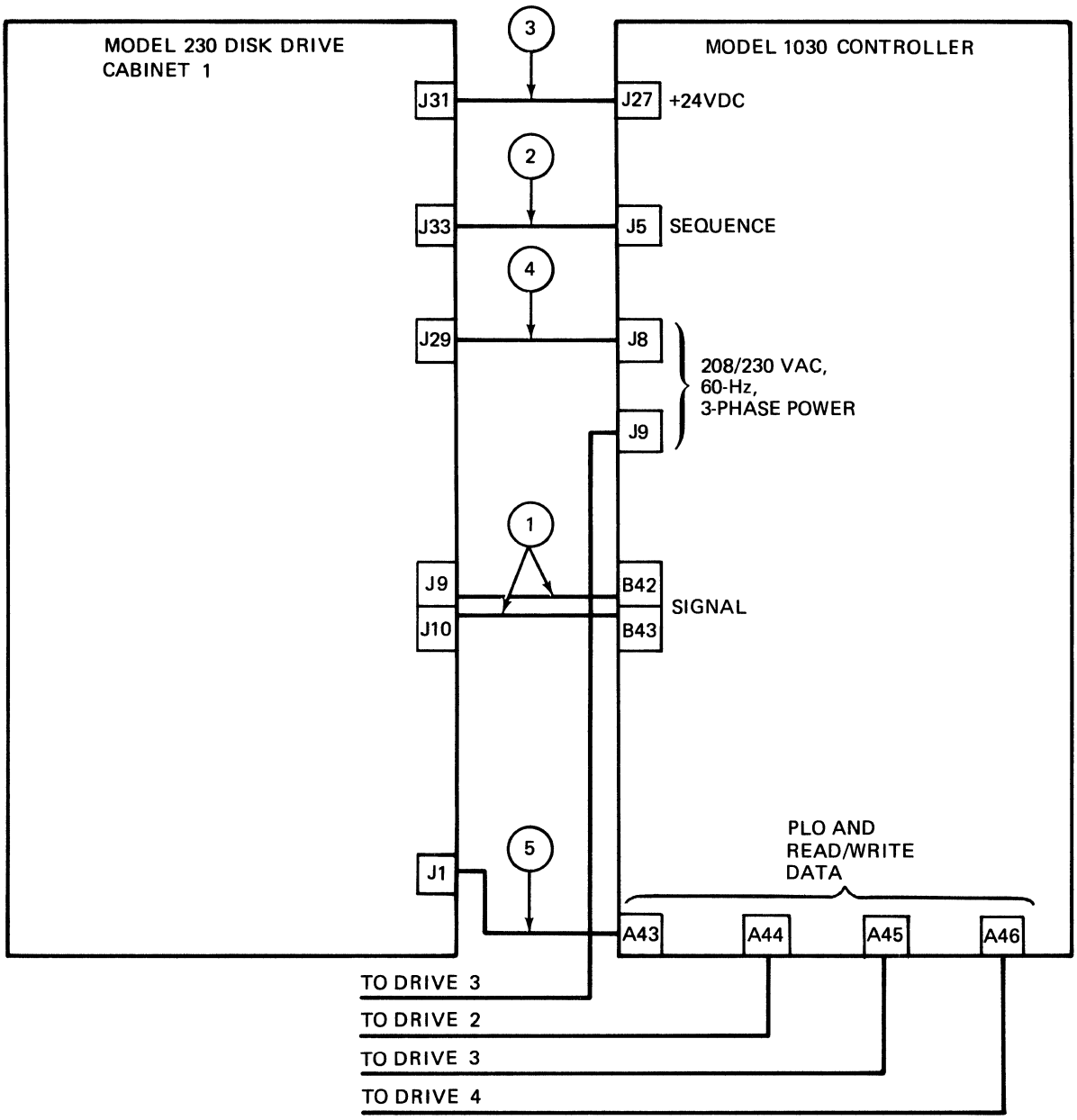
- Bus and Tag Cables
- EPO Cable

Bus and Tag Cables

The bus and tag cables connect the controller to the computer block multiplexer or selector channel. Although one cable carries tag information and one carries bus information, both cables are the same type. If other controllers are connected to the same channel, identical bus and tag cables are inserted into the Bus Out and Tag Out ports of the first controller and connected to the next controller. The last controller has two terminator plugs: one for Bus Out and one for Tag Out. The terminators are supplied with the computer system. The total cable length from the selector channel to the last controller must not exceed 150 feet.

EPO Cable

The EPO (Emergency Power Off) cable between the computer system and the controller supplies the power-sequencing voltage to the controller. If the controller is connected to more than one computer channel, or to separate CPU's, two EPO cables are required. The maximum standard EPO cable length is 80 feet.

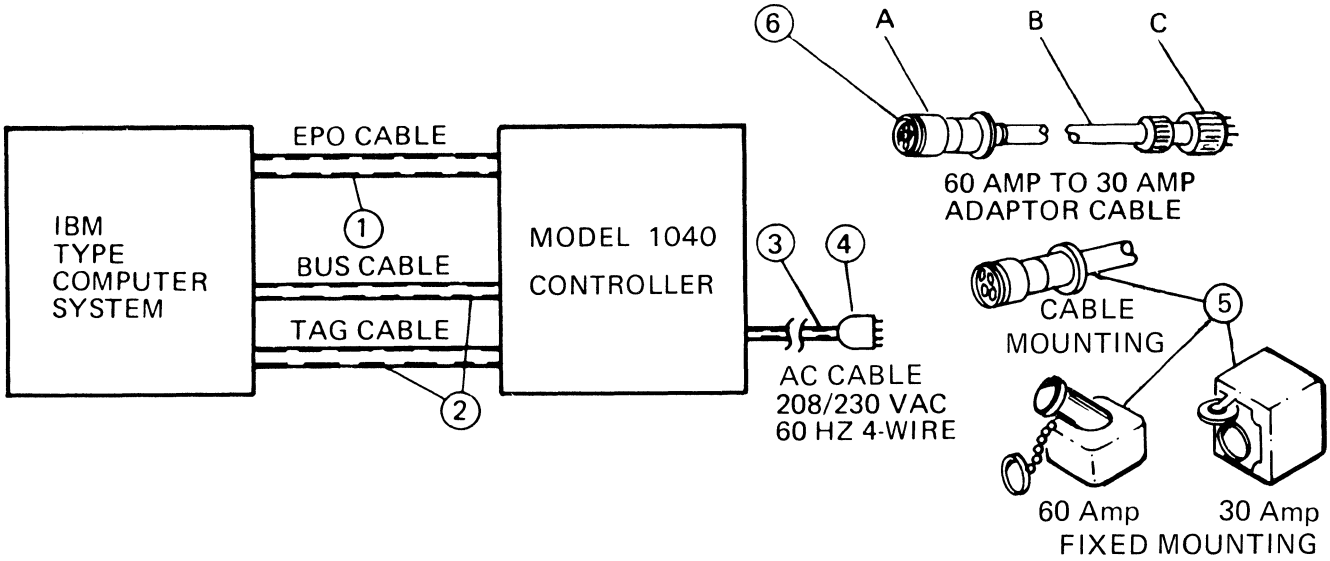


Sample Order List

Item	Part	Number	Quantity
1	Signal Cable	97528-011	2
2	Sequence Cable	97525-009	1
3	Dc Cable	10155-004	1
4	*Ac Cable, 60 Hz	10156-007	1
5	*Ac Cable, 60 Hz	10156-013	1
6	PLO Cable	97529-012	1
7	PLO Cable	97529-015	1
8	PLO Cable	97529-017	1
9	PLO Cable	97529-020	1

*For 50-Hz power use Part No. 10157-xxx.

Disk Drive/Controller Cabling



① EPO CABLE

Part No.	Length (ft)
91695-020	20
91695-040	40
91695-060	60
91695-080	80

② BUS & TAG CABLES

Part No.	Length (ft)
91693-010	10
91693-020	20
91693-030	30
91693-040	40
91693-050	50
91693-060	60
91693-070	70

③ AC CABLE

Supplied with Controller (15 ft)

④ AC POWER PLUG

Russell & Stoll 60-Amp, 4-pin.
Standard 60-Hz 91941 =SC7328

NOTE

50 Hz systems have no connectors. Terminal lugs are provided for terminal board connection.

⑤ AC POWER RECEPTACLE

Russell & Stoll 60-Amp, 4-pin.
Standard 60 Hz =SC7324
(fixed mounting)
=SC7428 (cable mounting)

30-Amp, 4-pin.
Standard 60 Hz =FS3754
(fixed mounting)
=FS3934 (cable mounting)

⑥ 60 TO 30 AMP ADAPTOR CABLE

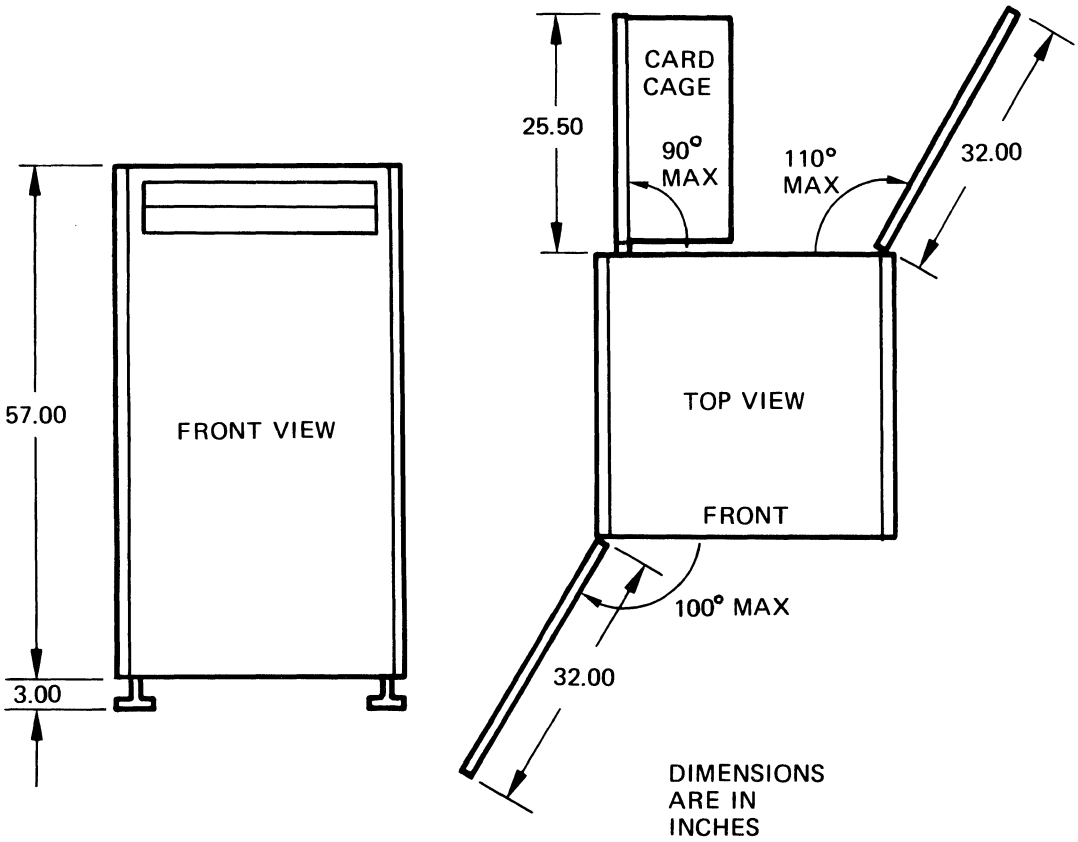
NOTE

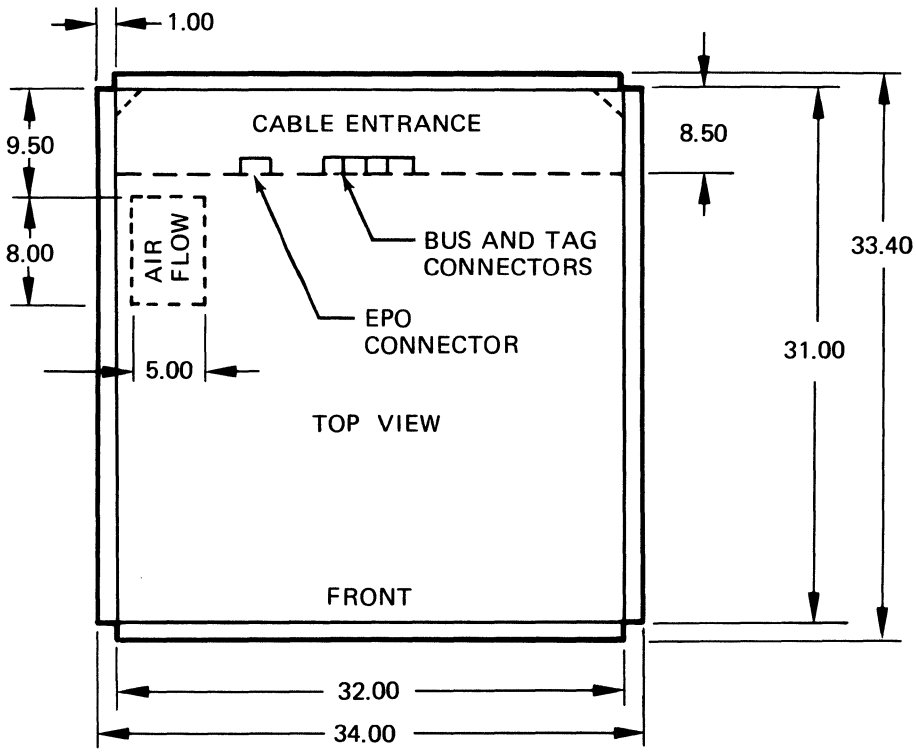
93125-001 can only be used with up to 4 drive spindles.

A. 93217=R&S No. 7428-JG64, 60 amp.
B. 93199=10/4@600v 24" long.
C. *93218=R&S No. 3760-JG34, 30 amp.

*Can be used with R&S Nos. FS3754 (fixed) or FS3934 (cable).

Computer/Controller Cabling





Model 1030 Controller, Installation Clearances

MODEL 230/231 DISK DRIVES

INTRODUCTION

This document contains information helpful in planning and ordering, for the installation of the Model 230/231 Disk Drives.

PHYSICAL DIMENSIONS (Nominal)

	230	231
Height	60.00 inches	60.00 inches
Width	32.00 inches	32.00 inches
Depth	34.50 inches	34.50 inches
Weight	850 pounds	600 pounds

SERVICE CLEARANCES (Nominal)

Drawers	Front (disk pack access) 36.00 inches Rear (maintenance) 36.00 inches
Sides	Bolted to adjacent drive, or with end panels
Rear	36.00 inches

INSTALLATION CLEARANCES (Minimum)

Space between adjacent drives	None – sides bolted to adjacent drives
Front	18.00 inches (Drawer)
Rear	22.62 inches (Chassis logic)

HEAT DISSIPATION/AIR FLOW

Dissipation	5700 Btu/hour (nominal per cabinet, loaded) 9900 Btu/hour (maximum per cabinet, operating)
Air Flow	200 cfm (per cabinet)

ENVIRONMENT

Temperature	60°F to 90°F
Rate of temperature Change	15°F per hour, maximum
Relative Humidity	10% to 80% (without condensation)
Altitude	Mean sea level to 10,000 feet

AC POWER

Input Voltage	208 or 230 vac ±10%, 3-phase, 3-wire plus ground (380 vac ±10%, 3-phase, 4-wire plus ground for 50 Hz)
Input Frequency	60 Hz ±1% (50 Hz ±1% available)
Starting Current	17 amps rms for 10 seconds (per drawer)
Operating Current	5.5 amps rms (per drawer)

DC POWER

All dc voltages are supplied by internal independent power supplies for each disk drive.

CONNECTING CABLES

There are five types of connecting cables between the disk drive and controller. They are:

- Signal Cable
- Sequence Cable
- Dc Cable
- Ac Cable
- PLO Cable

Signal Cable

There are two identical signal cables that connect the controller to the SIGNAL IN connectors of the first disk drive cabinet; Bus In and Bus Out cables. Each additional disk drive is connected to the SIGNAL OUT

connectors of the preceding disk drive. Insert two terminators in the SIGNAL OUT connectors of the last disk drive. The combined lengths of signal cables must not exceed 59 feet.

Sequence Cable

There is one sequence cable that connects the controller to the first disk drive cabinet. Each additional cabinet is connected to the SEQ OUT connector of the preceding cabinet. Insert a jumper plug in the SEQ OUT connector of the last cabinet. The combined lenghts of sequence cables must not exceed 27 feet.

Ac Cable

The ac power cable for the first and third disk drive cabinets are connected directly from the controller to the AC IN connector. The second and fourth disk drive cabinets has its ac power cable connected to the AC OUT connector of the preceding cabinets. The maximum combined length of any ac power cable is 16 feet.

Dc Cable

There is one dc cable that connects the controller to the DC IN connector of the first disk drive cabinet. Each additional cabinet is connected to the DC OUT connector of the preceding cabinet. The maximum combined length of any dc power cable is 13 feet.

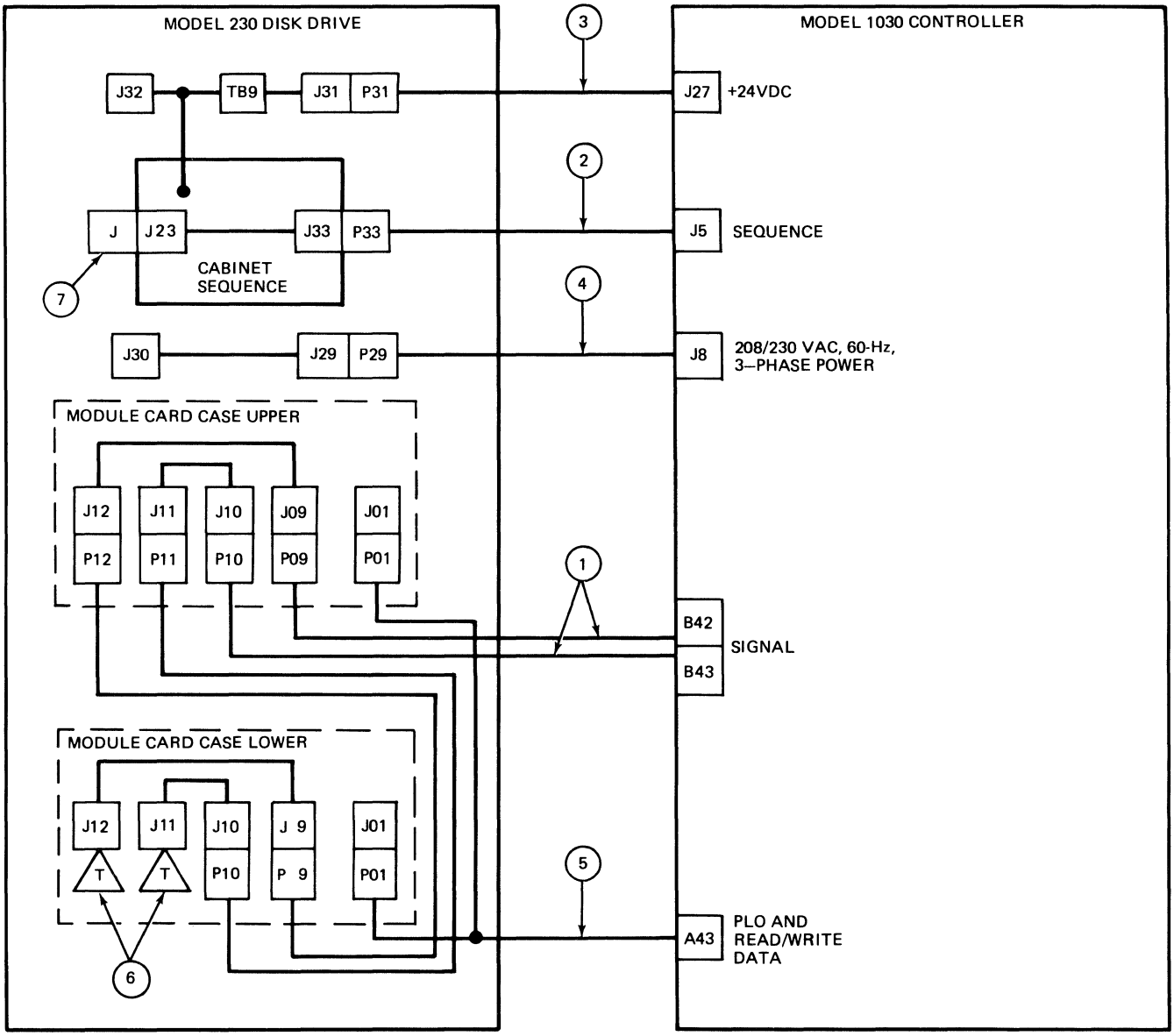
PLO Cable

Each disk drive cabinet is connected to the controller by a PLO cable. The cable is a shielded twisted pair: one line is bidirectional carrying read or write data; the other line carries PLO sync pulses to the controller. The maximum cable length of the fourth cabinet is 20 feet.

Cable List, Model 230 Disk Drives

Signal Cable	Sequence Cable	*Ac Cable	Dc Cable	PLO Cable	Terminator	Jumper Plug
97528-011 11 ft 97528-016 16 ft	97525-006 6 ft 97525-009 9 ft	10156-003 3 ft 10156-007 7 ft 10156-013 13 ft	10155-003 3 ft 10155-004 4 ft	97529-012 12 ft 97529-015 15 ft 97529-017 17 ft 97529-020 20 ft	97303-001	97514-001

*Use 10157-xxx for 50 Hz. xxx = ft.

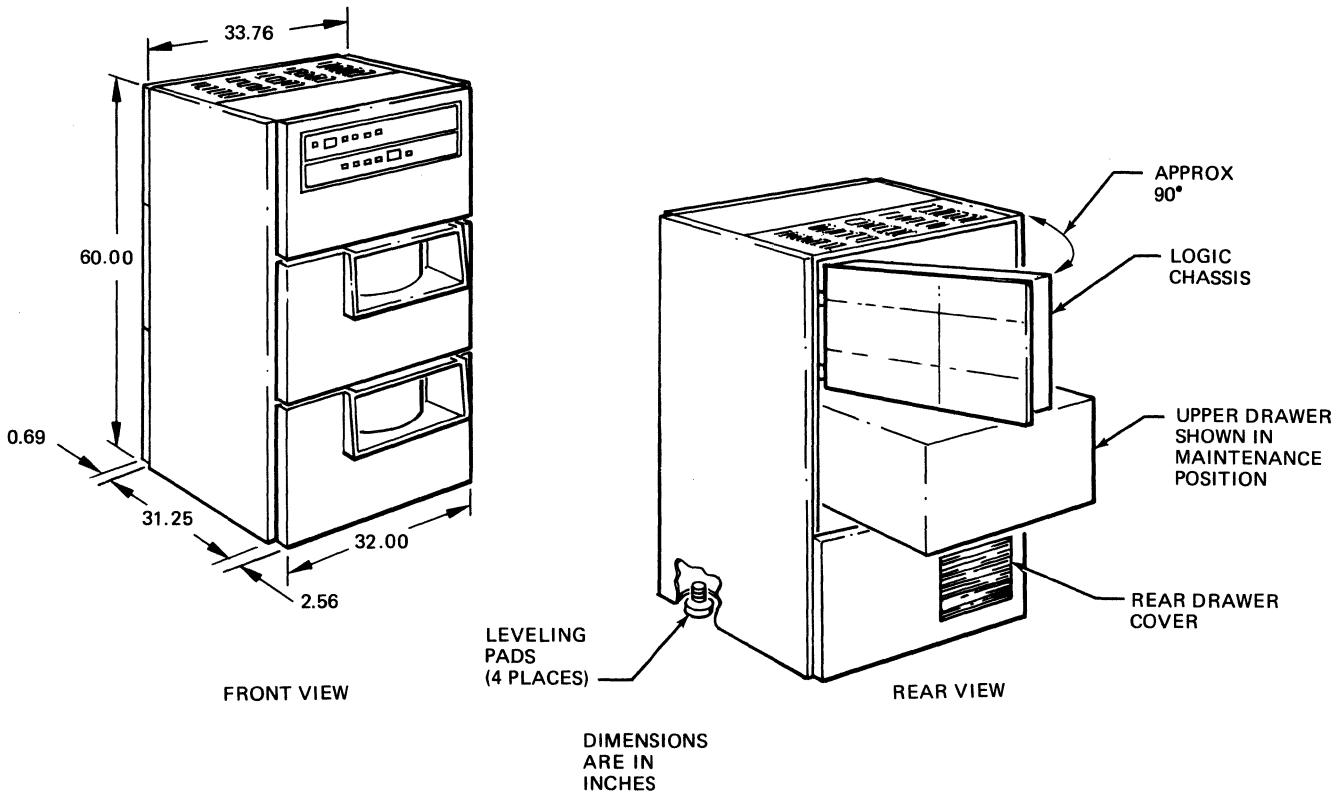


Sample Order List

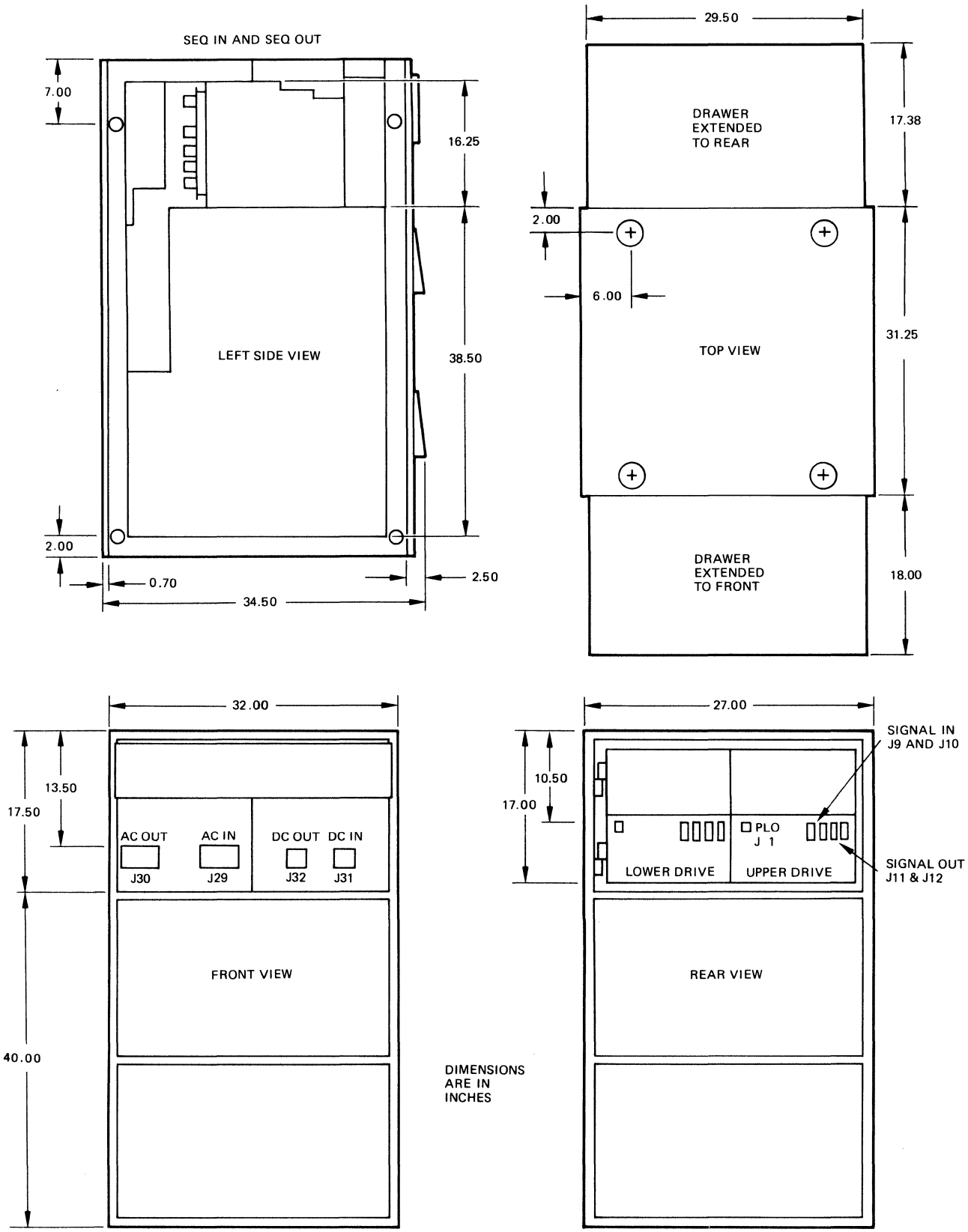
Item	Part	Number	Quantity
1	Signal Cable	97528-011	2
2	Sequence Cable	97525-009	1
3	Dc Cable	10155-004	1
4	*Ac Cable, 60 Hz	10156-007	1
5	PLO Cable	97529-012	1
6	Terminator	97303-001	2
7	Jumper Plug	97514-001	1

*For 50 Hz power use Part No. 10157-007

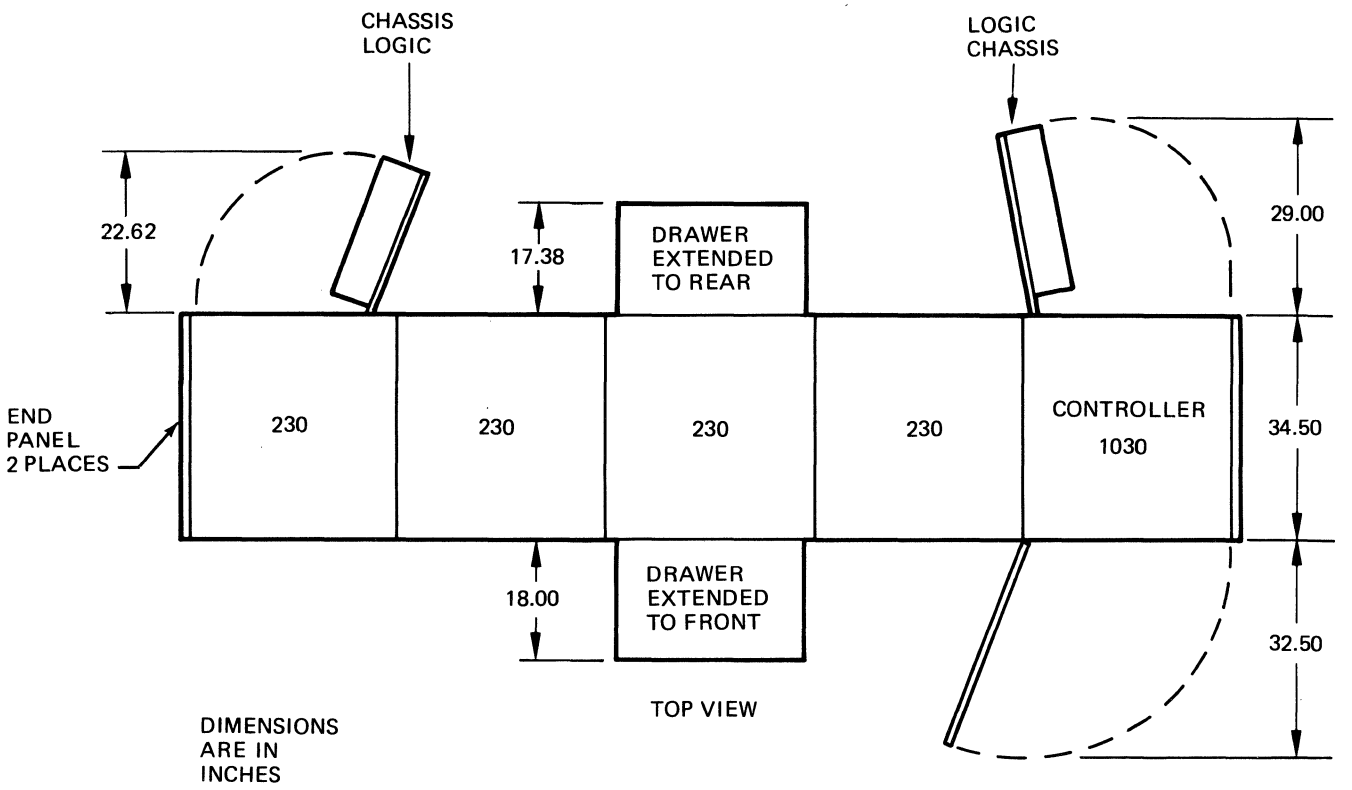
Model 230 Disk Drive, Single Installation Configuration

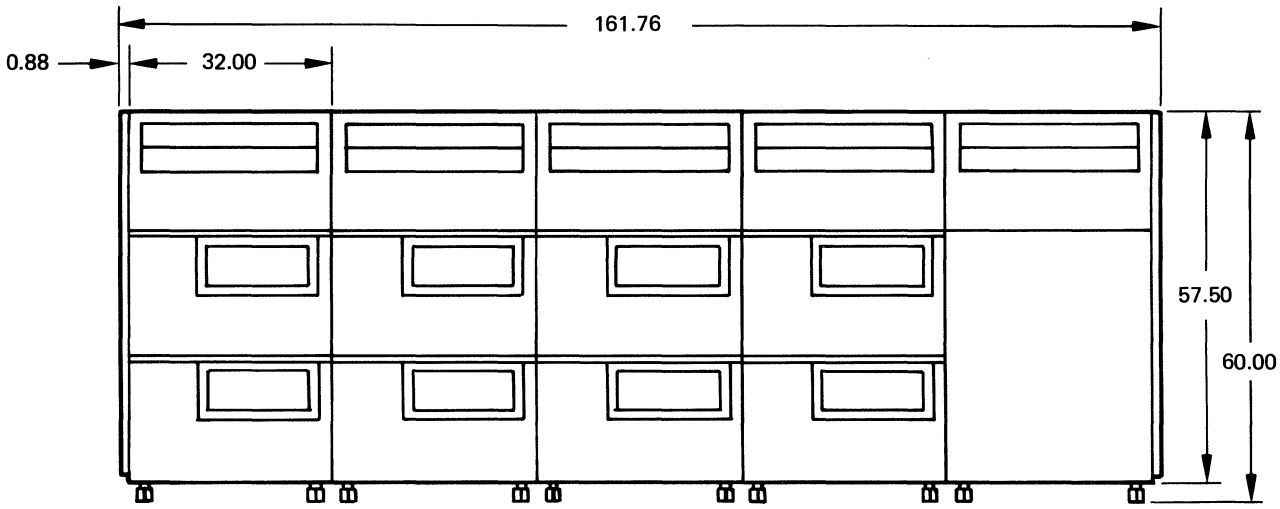


Model 230 Disk Drive, Front and Rear Views



Model 230 Disk Drive, Single Cabinet Dimensions





Model 230 Disk Drives, System Layout

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