



***GE Medical Systems***

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## **Technical Publications**

**2148333–100**

**Revision 2**

# **SENOGRAPHÉ 700T/800T pim Pre-Installation Manual**

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# ATTENTION

## **LES APPAREILS À RAYONS X SONT DANGEREUX À LA FOIS POUR LE PATIENT ET POUR LE MANIPULATEUR SI LES MESURES DE PROTECTION NE SONT PAS STRICTEMENT APPLIQUEES**

Bien que cet appareil soit construit selon les normes de sécurité les plus sévères, la source de rayonnement X représente un danger lorsque le manipulateur est non qualifié ou non averti. Une exposition excessive au rayonnement X entraîne des dommages à l'organisme.

Par conséquent, toutes les précautions doivent être prises pour éviter que les personnes non autorisées ou non qualifiées utilisent cet appareil créant ainsi un danger pour les autres et pour elles-mêmes.

Avant chaque manipulation, les personnes qualifiées et autorisées à se servir de cet appareil doivent se renseigner sur les mesures de protection établies par la Commission Internationale de la Protection Radiologique, Annales 26 : Recommandations de la Commission Internationale sur la Protection Radiologique et les normes nationales en vigueur.

# WARNING

## **X-RAY EQUIPMENT IS DANGEROUS TO BOTH PATIENT AND OPERATOR UNLESS MEASURES OF PROTECTION ARE STRICTLY OBSERVED**

Though this equipment is built to the highest standards of electrical and mechanical safety, the useful x-ray beam becomes a source of danger in the hands of the unauthorized or unqualified operator. Excessive exposure to x-radiation causes damage to human tissue.

Therefore, adequate precautions must be taken to prevent unauthorized or unqualified persons from operating this equipment or exposing themselves or others to its radiation.

Before operation, persons qualified and authorized to operate this equipment should be familiar with the Recommendations of the International Commission on Radiological Protection, contained in Annals Number 26 of the ICRP, and with applicable national standards.

# ATENCION

## **LOS APARATOS DE RAYOS X SON PELIGROSOS PARA EL PACIENTE Y EL MANIPULADOR CUANDO LAS NORMAS DE PROTECCION NO ESTAN OBSERVADAS**

Aunque este aparato está construido según las normas de seguridad más estrictas, la radiación X constituye un peligro al ser manipulado por personas no autorizadas o incompetentes. Una exposición excesiva a la radiación X puede causar daños al organismo.

Por consiguiente, se deberán tomar todas las precauciones necesarias para evitar que las personas incompetentes o no autorizadas utilicen este aparato, lo que sería un peligro para los demás y para sí mismas.

Antes de efectuar las manipulaciones, las personas habilitadas y competentes en el uso de este aparato, deberán informarse sobre las normas de protección fijadas por la Comisión Internacional de la Protección Radiológica, Anales No 26: Recomendaciones de la Comisión Internacional sobre la Protección Radiológica y normas nacionales.

# ACHTUNG

## **RÖNTGENAPPARATE SIND EINE GEFAHR FÜR PATIENTEN SOWIE BEDIENUNGSPERSONAL, WENN DIE GELTENDEN SICHERHEITSVORKEHRUNGEN NICHT GENAU BEACHTET WERDEN**

Dieser Apparat entspricht in seiner Bauweise strengsten elektrischen und mechanischen Sicherheitsnormen, doch in den Händen unbefugter oder unqualifizierter Personen wird er zu einer Gefahrenquelle. Übermäßige Röntgenbestrahlung ist für den menschlichen Organismus schädlich.

Deswegen sind hinreichende Vorsichtsmaßnahmen erforderlich, um zu verhindern, daß unbefugte oder unqualifizierte Personen solche Geräte bedienen oder sich selbst und andere Personen deren Bestrahlung aussetzen können.

Vor Inbetriebnahme dieses Apparats sollte sich das qualifizierte und befugte Bedienungspersonal mit den geltenden Kriterien für den gefahrlosen Strahleneinsatz durch sorgfältiges Studium des Hefts Nr. 26 der Internationalen Kommission für Strahlenschutz (ICRP) vertraut machen: Empfehlungen der Internationalen Kommission für Strahlenschutz und anderer nationaler Normenbehörden.

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**WARNING**

- THIS PRE-INSTALLATION MANUAL (PIM) IS AVAILABLE IN ENGLISH ONLY.
- IF A CUSTOMER'S SERVICE PROVIDER REQUIRES A LANGUAGE OTHER THAN ENGLISH, IT IS THE CUSTOMER'S RESPONSIBILITY TO PROVIDE TRANSLATION SERVICES.
- DO NOT ATTEMPT TO SERVICE THE EQUIPMENT UNLESS THIS SERVICE MANUAL HAS BEEN CONSULTED AND IS UNDERSTOOD.
- FAILURE TO READ THIS PIM MAY RESULT IN INJURY TO THE SERVICE PROVIDER, OPERATOR OR PATIENT FROM ELECTRIC SHOCK, MECHANICAL OR OTHER HAZARDS.

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## REVISION HISTORY

REV	DATE	REASON FOR CHANGE
2	Juill 1996	Initial Release

## LIST OF EFFECTIVE PAGES

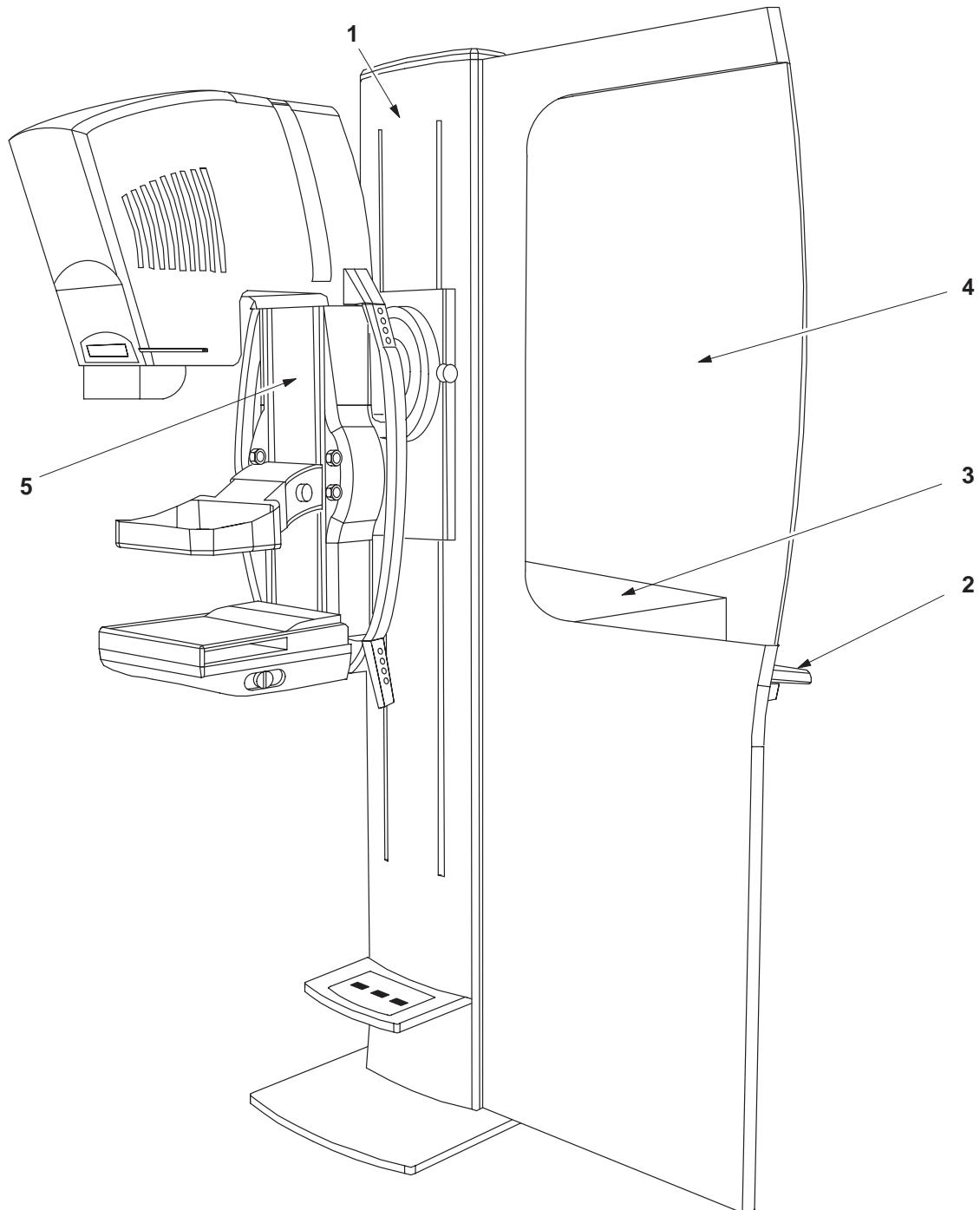
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## **CHAPTER 1 – INTRODUCTION**

ILLUSTRATION 1-1  
SENOGRAPHE BASIC CONFIGURATION



## SECTION 1 PURPOSE AND SCOPE OF THIS MANUAL

This planning direction provides pre-installation data for the SENOGRAPHE 700 T and 800T.

It considers only **product related** pre-installation.

## SECTION 2 PRODUCT IDENTIFICATION

Components of the SENOGRAPHE covered by this pre-installation manual comprise:

See Illustration 1-1.

1. Column
2. Control console
3. Electronic cabinet
4. Protective glass
5. Examination Arm

## OPTIONAL EQUIPMENT

- Accessories storage device.
- 24 x 30 Bucky + COMPRESSION PADDLE.
- Hydraulic chair.
- Rad shield 1, 2 or 3.
- Data flash.
- Cassette storage.
- Collimator blade storage.
- 2nd set of compression pedal.
- Axillary compression paddle.

TABLE 1-1  
PRODUCT STRUCTURE

<b>PRODUCT COMPLIES WITH THE FOLLOWING REGULATIONS:</b> IEC601.2.7; UL187; CSA No. 22.114; CFR21 Part 1020.30; and MDD: 93/42/EEC	
<b>BASIC CONFIGURATION</b>	
SENOGRAPHHE 700T and SENOGRAPHHE 800T <ul style="list-style-type: none"><li>- TUBE STAND WITH COLUMN</li><li>- GENERATOR CABINET</li><li>- CONTROL CONSOLE</li><li>- DUAL FOCUS (0.3/0.1) X-RAY TUBE</li><li>- ZERO POINT METHOD (AOP)</li><li>- AEC METHOD</li><li>- MANUAL METHOD</li><li>- SID 660</li><li>- MOTORIZED COMPRESSION WITH MANUAL ADJUSTMENT</li><li>- MANUAL COLLIMATOR</li><li>- SHOULDER PROTECTION</li><li>- 1 SET OF COMPRESSION PEDALS</li><li>- FILM-MAKER DEVICE (MANUAL)</li><li>- 18 x 24 BUCKY</li><li>- 18 x 24 CASSETTE HOLDER</li><li>- 18 x 24 COMPRESSION PADDLE</li><li>- CENTERED COMPRESSION PADDLE</li><li>- AXILLARY COMPRESSION PADDLE</li><li>- MAGNIFICATION STAND</li><li>- PRODUCT DOCUMENTATION</li></ul>	

## CHAPTER 2 – ROOM REQUIREMENTS

### SECTION 1 ENVIRONMENTAL REQUIREMENTS/LIMITATIONS

#### 1–1 Room climate

TABLE 2–1  
ENVIRONMENTAL REQUIREMENTS/LIMITATIONS

HUMIDITY				TEMPERATURE				ALTITUDE	
In–Use		Storage (equipment packed)		In–Use		Storage (equipment packed)		In–Use	Storage
Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	4000 m	4000 m
30%	75%	10%	95%	10°C 50°F	40°C 104°F	– 20°C 68°F	70 °C 158°F		

#### 1–2 Equipment heat output

IN OPERATION: 1.5 KW (4950 BTU/h) during 6 sec. max.

IN STAND-BY: 500 W (1650 BTU/h).

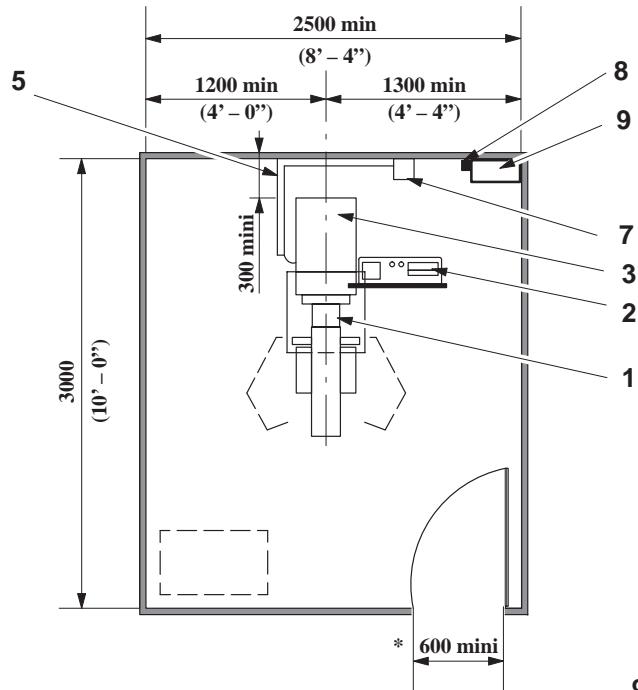
#### 1–3 Electromagnetic compatibility

Compliant with:

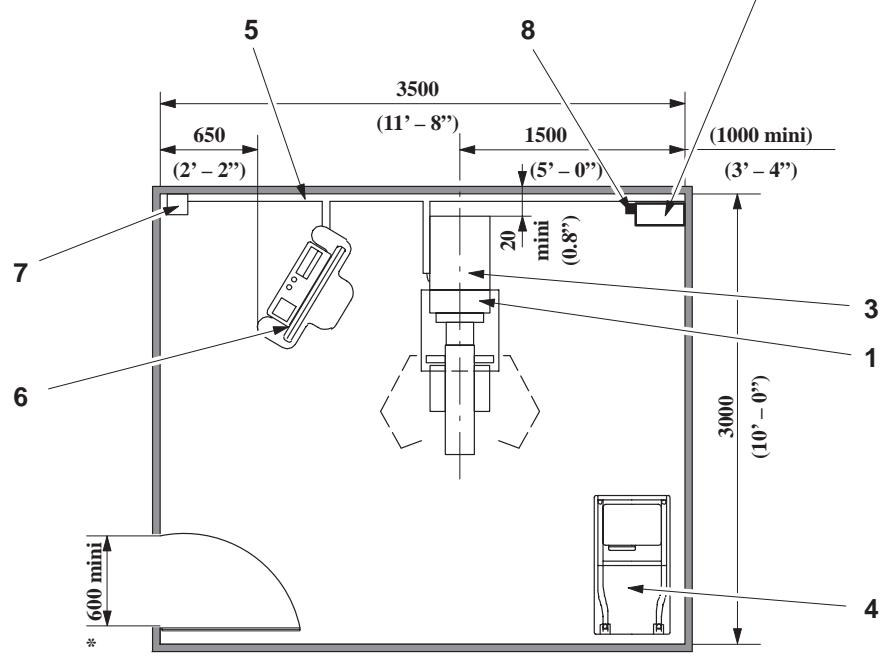
- Emission:
  - CISPR11 class A: Electromagnetic disturbances.
- Immunity:
  - IEC 801–2: Electrostatic discharge (conducting parts: 3 kV, non-conducting parts: 8 kV).
  - IEC 801–3: Radiated electromagnetic fields (3 V/m, from 26 MHz to 1 GHz).
  - IEC 801–4: Electrical fast transient/burst (2 kV on power supply cables, 500 V interconnection cables).
  - IEC 801–5: Shock waves: (2 kV common mode, 1 kV differential mode).

**ILLUSTRATION 2-1  
BASIC SYSTEM**

Configuration 1: with a Protective Glass



Configuration 2: with a Rad Shield



\* 600 mm (2' - 0") is the absolute minimum access width

**SECTION 2  
STRUCTURAL REQUIREMENTS****WARNING**

**THE GANTRY MUST BE ANCHORED TO THE FLOOR IN AREAS EFFECTED BY SEISMIC ACTIVITY.**

**2-1 Floor mounting**

For the stand column cabinet and rad shield: four anchoring points (see Illustration 3-1).

GEMS provides:

- Four screws 10 dia x 80 mm ( $25/64$ " dia x  $3\frac{5}{32}$ ") long. Maximum permissible pull-strength on each bolt: 500 daN (1102 lbs).

Inserts for these three screws are supplied by GEMS for concrete slab only (see Illustration 3-1).

- The finished floor of the exam room must be flat and within a good horizontal tolerance.

**2-2 Ceiling/Wall mounting**

None.

**2-3 Minimum room size**

See Illustration 2-1.

1. Stand column.
2. Control console with a protective glass.
3. Cabinet.
4. Accessories storage device (option).
5. Wall duct (customer supply).  
All interconnecting cables must be protected in a cable housing or ducting.
6. Optional Rad Shield with Control Console.
7. Power Distribution Board (supplied by Customer).
8. Phone outlet.
9. E.D.M.

**SECTION 3  
ELECTRICAL REQUIREMENTS****3-1 Line voltage specifications**

- Single-phase input voltage: (phase to neutral or phase to phase)
  - 200/208/220/230/240 V ( $\pm 10\%$ ).

### 3-2 Line frequency specifications

- 50 or 60 Hz ( $\pm 3$  Hz).

### 3-3 kVA load characteristics

- 6 kVA for exposures up to 6 s.
- Power factor: 0.6.

### 3-4 Input impedance

- $R_I$  = total line resistance (two-wire) of the circuit,

$$R_I = \begin{array}{l} 0.33 \Omega/200 \text{ V} \\ 0.36 \Omega/208 \text{ V} \\ 0.40 \Omega/220 \text{ V} \\ 0.44 \Omega/230 \text{ V} \\ 0.48 \Omega/240 \text{ V} \end{array}$$

### 3-5 Feeder wire

GEMS supplies a 3 x AWG 10 (5.32 mm<sup>2</sup>) cable:

- Total length = 5 m,
- Usable length = 4.5 m.

### 3-6 Main circuit breaker

**Note:** The main circuit breaker is supplied by the customer and must be sized in accordance with local regulations.

**Circuit breakers sizes for European market:**

- From 200 V up to 240 V: circuit breaker: In = 30 A – magnetic I = 7 In  $\pm 20\%$ .

**Circuit breakers size and supply conductors for US market:** refer to Section 517-71(a) and Section 517-73(a) (Item 1, 2) of the NEC-1993 (see below).

– The branch circuit conductors used must be rated 30 A at least.

- NEC 1993 Section 517-71 (a) Fixed and Stationary Equipment

Fixed and stationary x-ray equipment shall be connected to the power supply by means of a wiring method meeting the general requirements of this Code.

*Exception: Equipment properly supplied by a branch circuit rated at not over 30 amperes shall be permitted to be supplied through a suitable attachment plug and hard-service cable or cord.*

- NEC 1993 Section 517-73 (a) Item 1:

The ampacity of supply branch circuit conductors and the current rating of overcurrent protective devices shall not be less than 50 percent of the momentary rating or 100 percent of the long-time rating, whichever is greater.

- NEC 1993 Section 517-73 (a) Item 2:

The ampacity of supply feeders and the current rating of overcurrent protective devices supplying two or more branch circuits supplying x-ray units shall not be less than 50 percent of the momentary demand rating of the largest unit plus 25 percent of the momentary demand rating of the next largest unit plus 10 percent of the momentary demand rating of each additional unit. Where simultaneous biplane examinations are undertaken with the x-ray units, the supply conductors and overcurrent protective devices shall be 100 percent of the momentary demand rating of each x-ray unit.

## SECTION 4 INSITE

The Senographe will use the Generic EDM (Equipment Diagnostic Monitor) when it is available (1st quarter 1996). The Generic EDM is supplied as a Service option, in a separate cabinet. The Generic EDM can be installed on a shelf or anchored to the wall using an installation kit. The Generic EDM will be preferably installed close to the cabinet but as the Generic EDM can monitor several systems at the same time, it can also be placed in another room. See Generic EDM manual for additional details.

The Generic EDM cabinet has the size of a mini-tower PC:

Height x Length x Width = 350 x 430 x 170 in mm (14" x 17,2" x 6,8") in inches.

A dedicated phone line with a local socket used only for the connection to a modem will preferably be located close to the EDM cabinet. The Generic EDM is supplied with 220 V AC exclusively. This supply must be as permanent as possible (e.g. not switchable with the main circuit breaker of the Senographe).

**Note:**

**ONLY for GEMSE:** the Generic EDM is associated to an external modem (Motorola 3265) mounted on the EDM cabinet.

For GEMS A and GEMS AM the Generic EDM incorporates a modem board inside the EDM cabinet.



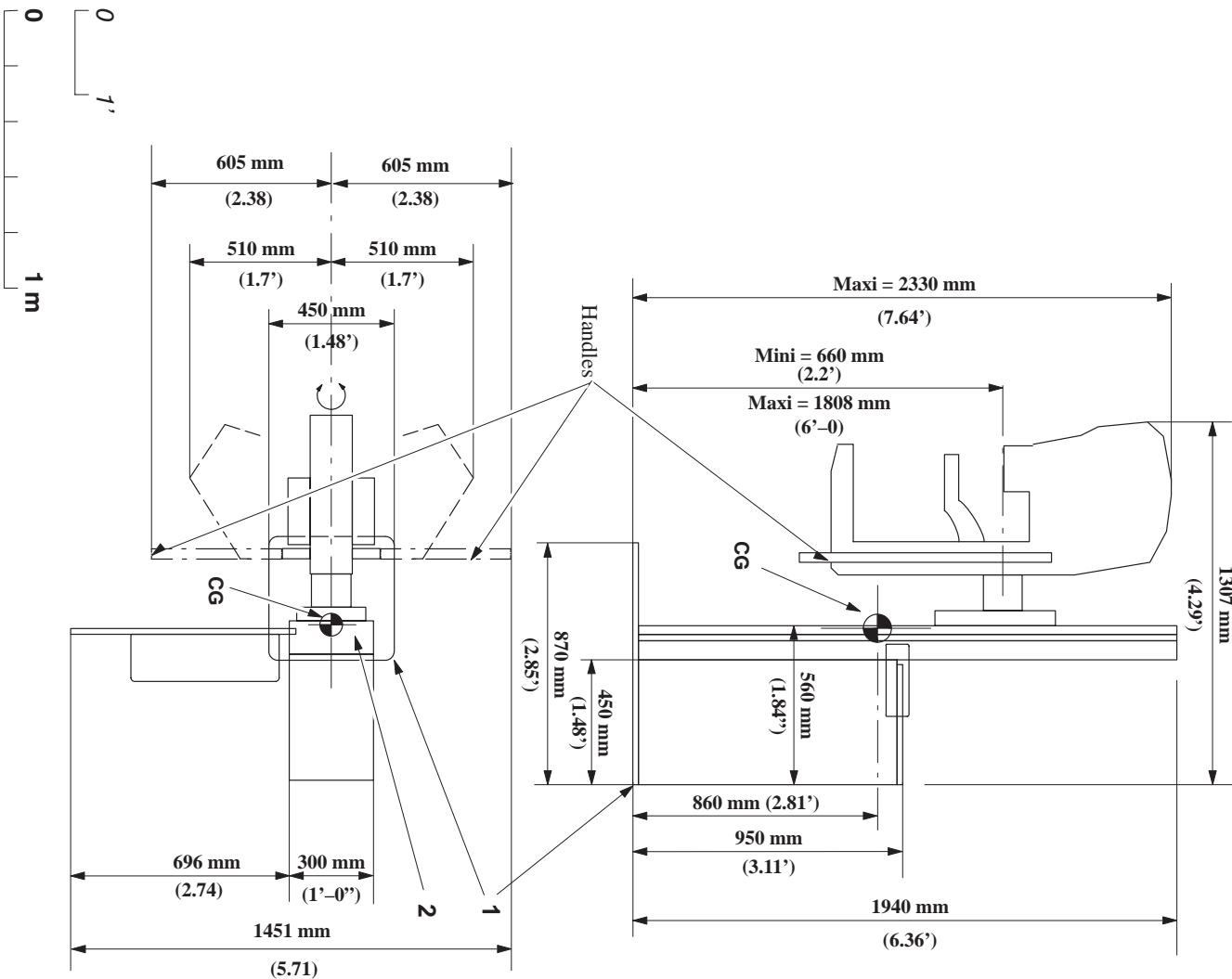
**Only for GEMSE a modem compliant to the country is supplied with a SENOGRAPHE.**

**For other GEMS A and GEMS AM, current process is applied.**

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## CHAPTER 3 – PRODUCT PHYSICAL CHARACTERISTICS

ILLUSTRATION 3-1  
SENOGRAPHE DIMENSIONAL



## SECTION 1 DIMENSIONS

TABLE 3-1  
PRODUCT PHYSICAL CHARACTERISTICS

PRODUCT/ COMPONENT	DIMENSIONS			WEIGHT kg (pounds)	ILLUSTRATION
	Length mm (feet)	Width mm (feet)	Height mm (feet)		
Stand column + Cabinet	1307 (4.29')	450 (1.48')	2330 (7.64')	257 (566.5)	3-1
Console	550 (1.81')	180 (0.54')	85 (0.28')	3 (6.6)	-
Protective glass + console	200 (0.65')	600 (1.97')	1870 (6.13')	45 (99.2)	3-1
Rad shield screen + console	700 (2.29')	490 (1.60')	2200 (7.21')	90 (155)	3-3
Accessories storage device	900 (2.95')	500 (1.61')	890 (2.92')	50 (110.2)	3-7
Cassette Storage	470 (1.54')	300 (0.98')	180 (0.54')		
Collimator Blade Storage	420 (1.38')	410 (1.35')	123 (0.40')	5 (11)	
DATAFLASH option	400 (1.31')	330 (1.08')	395 (1.29')	11.4 (25.1)	3-8

### 1. Base Plate Dimensional (see Illustration 3-2)

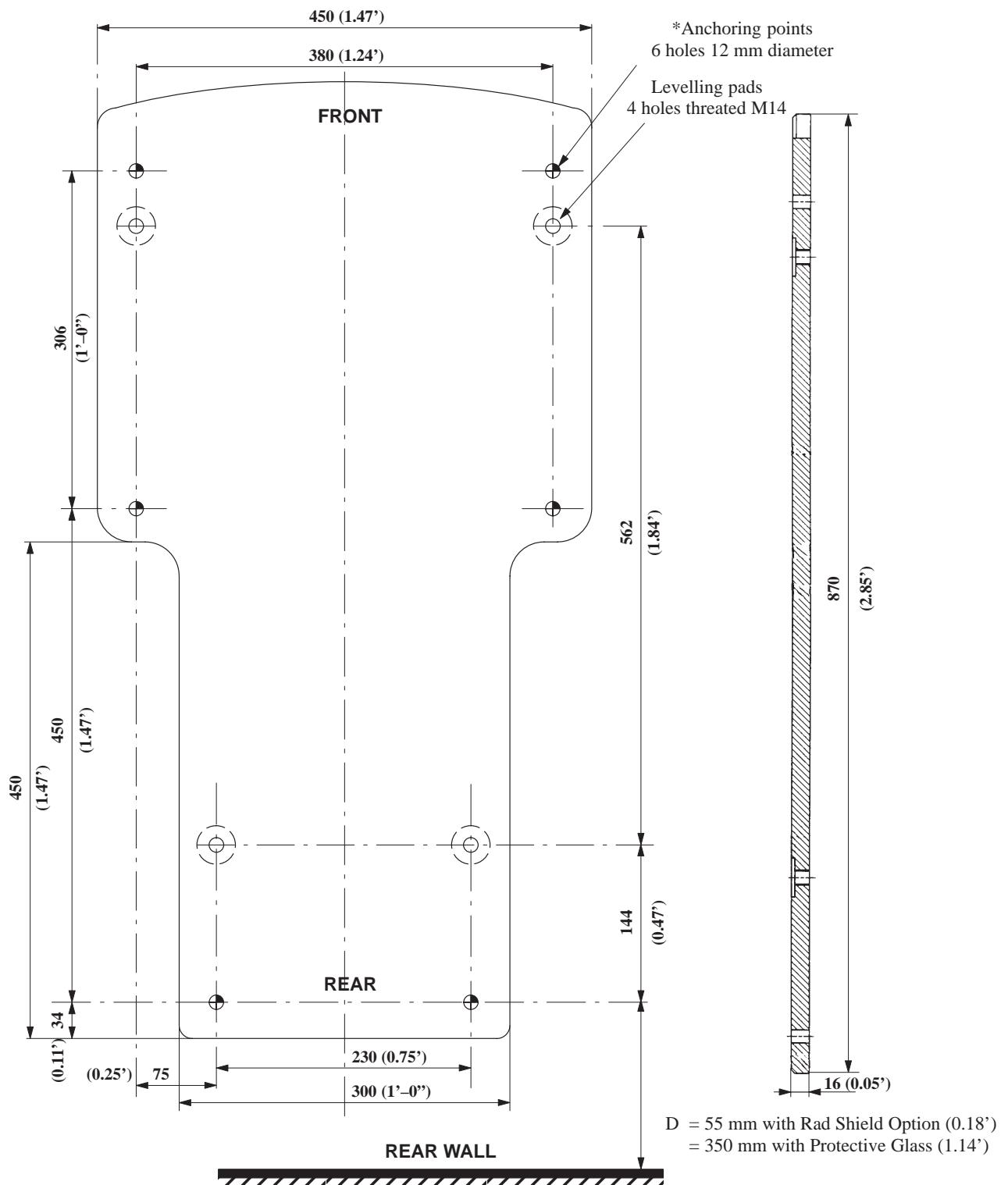
If anchoring is required, select four anchoring holes among the six drilled in the base plate.

GEMS provides four 10-mm dia screws with three Hilti HDE M10 for use in concrete slab construction only (For HDE M10 bolts, drill a 62-mm deep 18-mm dia hole).

Anchoring components for other floor construction types must be supplied locally.

### 2. Feeder wire inlet

ILLUSTRATION 3-2



\* Only 4 holes among the 6 will be used to anchor the SENOGRAPHHE 700/800T when anchoring is required.

ILLUSTRATION 3-3  
DIMENSIONS OF OPTIONAL RAD SHIELD SCREEN

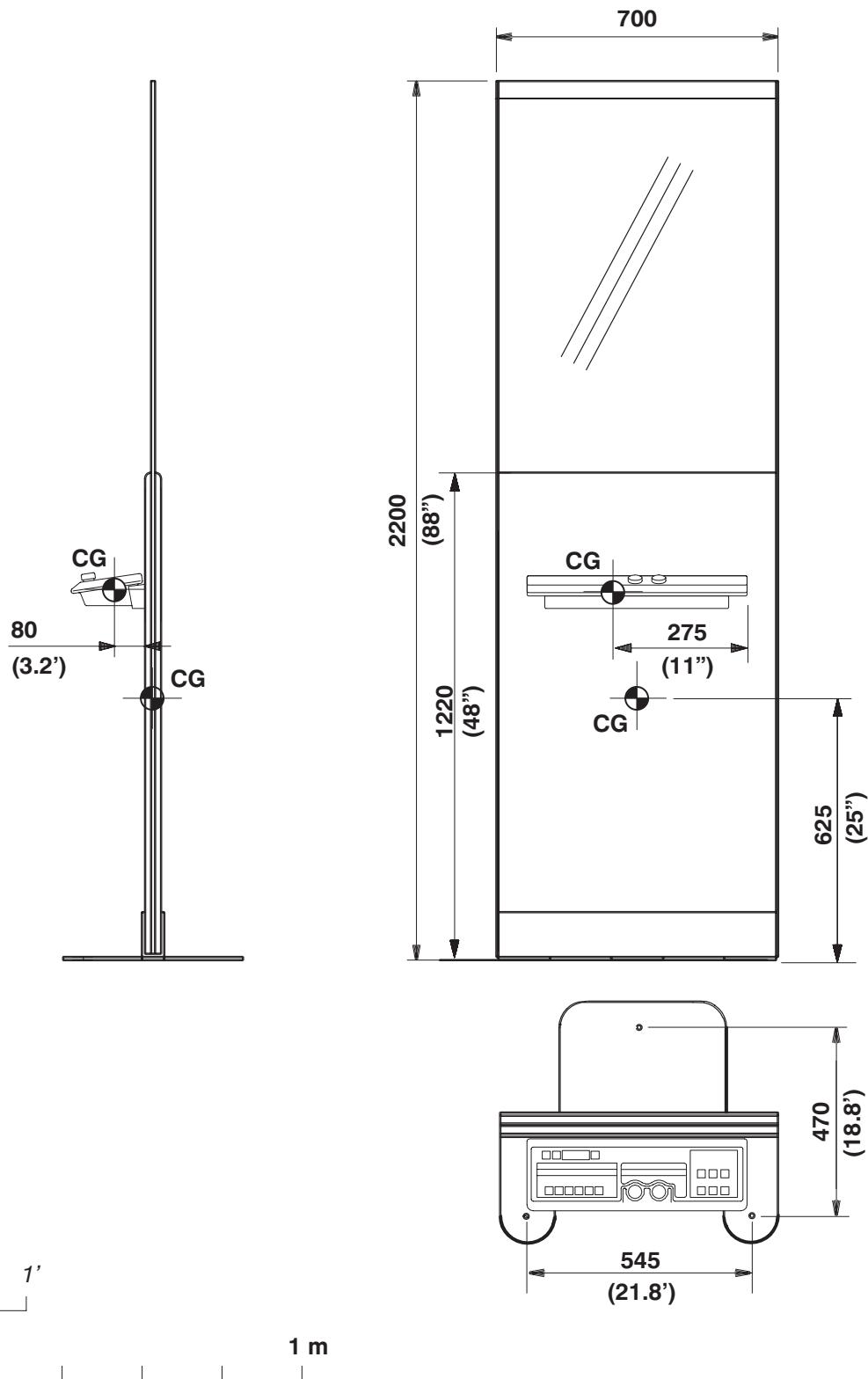
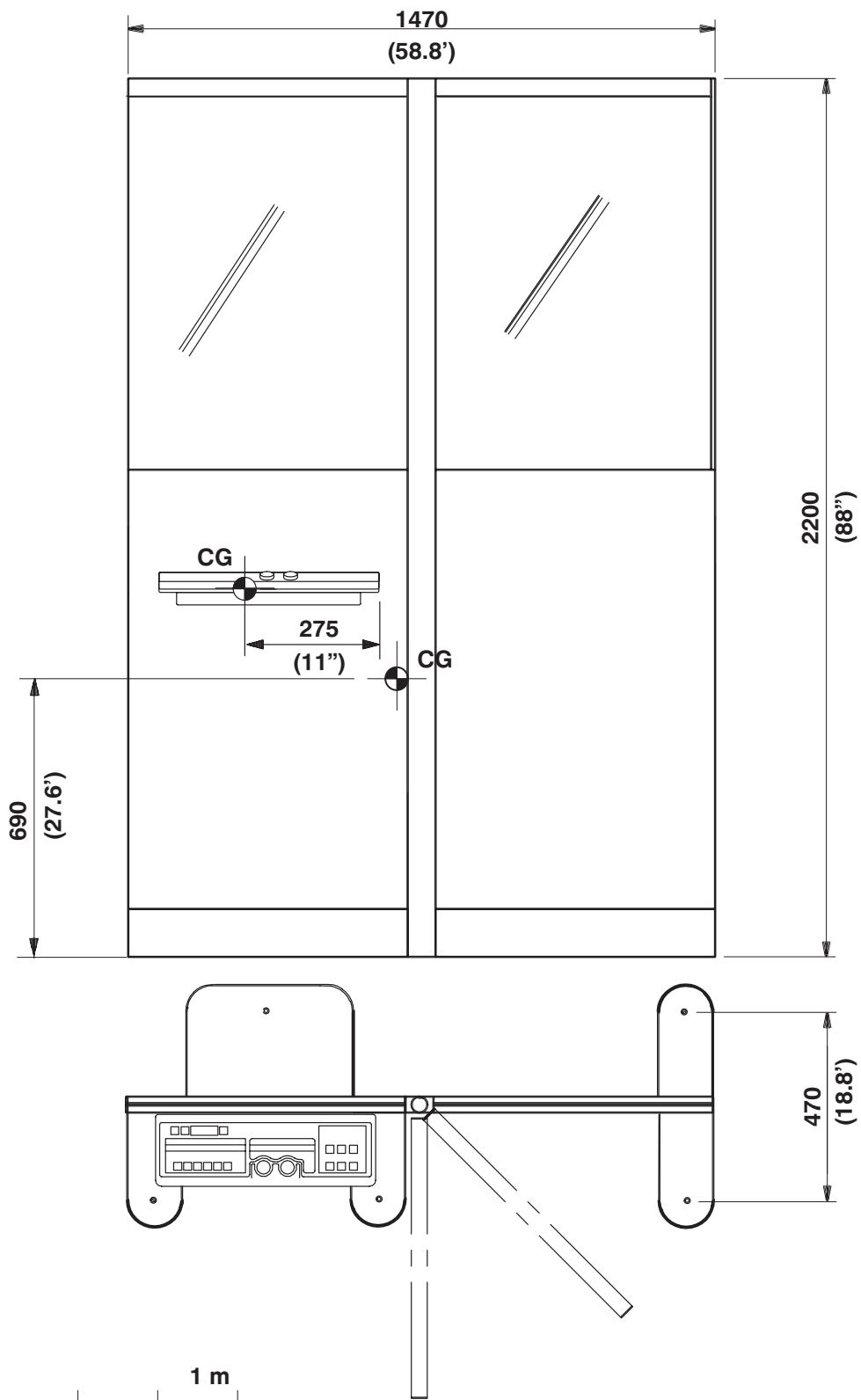


ILLUSTRATION 3-4  
DIMENSIONS OF RAD SHIELD SCREEN AND OPTIONAL RAD SHIELD SCREEN



Prod. Physical Carac.

ILLUSTRATION 3-5  
DIMENSIONS OF RAD SHIELD SCREEN AND TWO OPTIONAL RAD SHIELD SCREENS

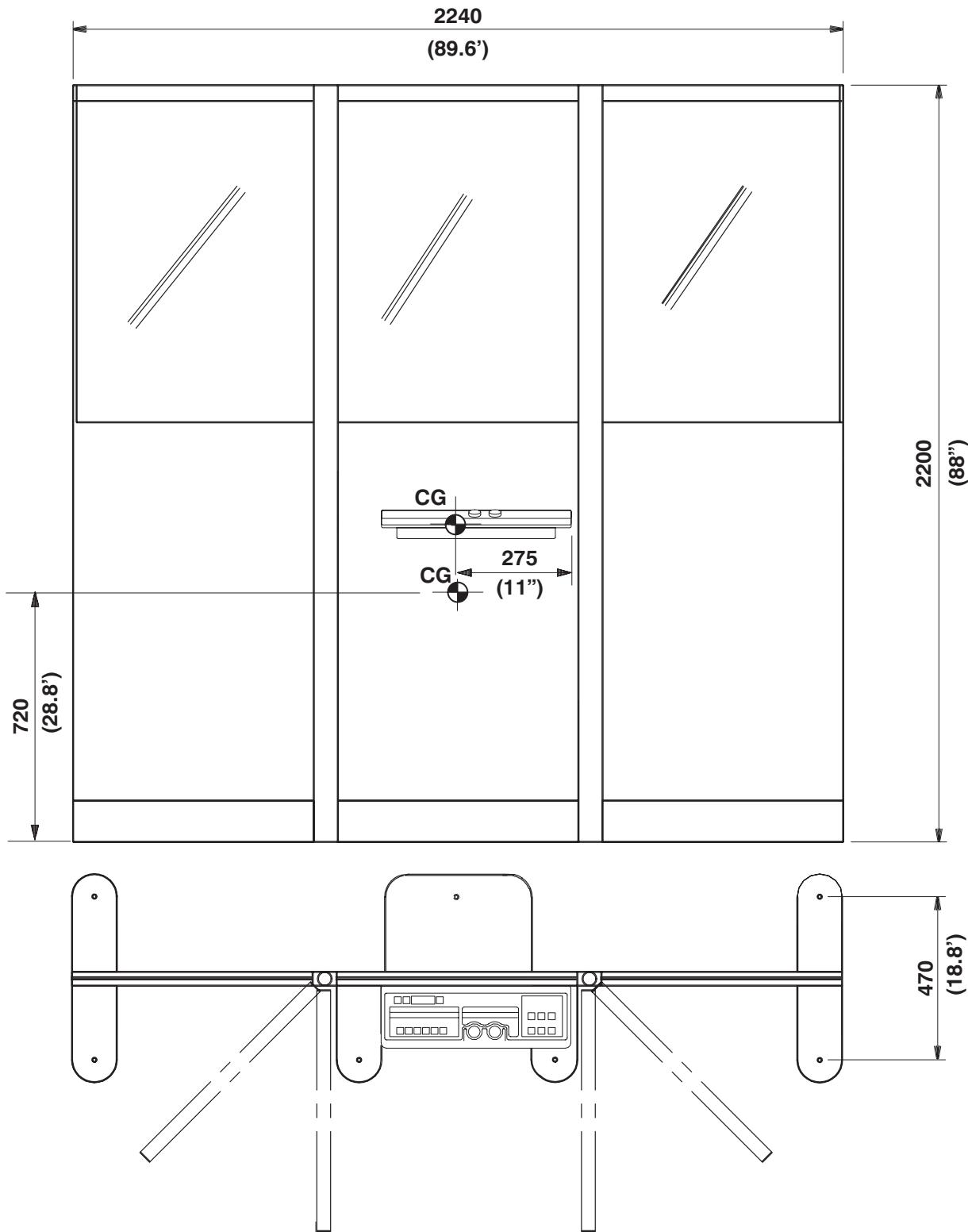


ILLUSTRATION 3-6  
DIMENSIONS OF ACCESSORIES STORAGE DEVICE

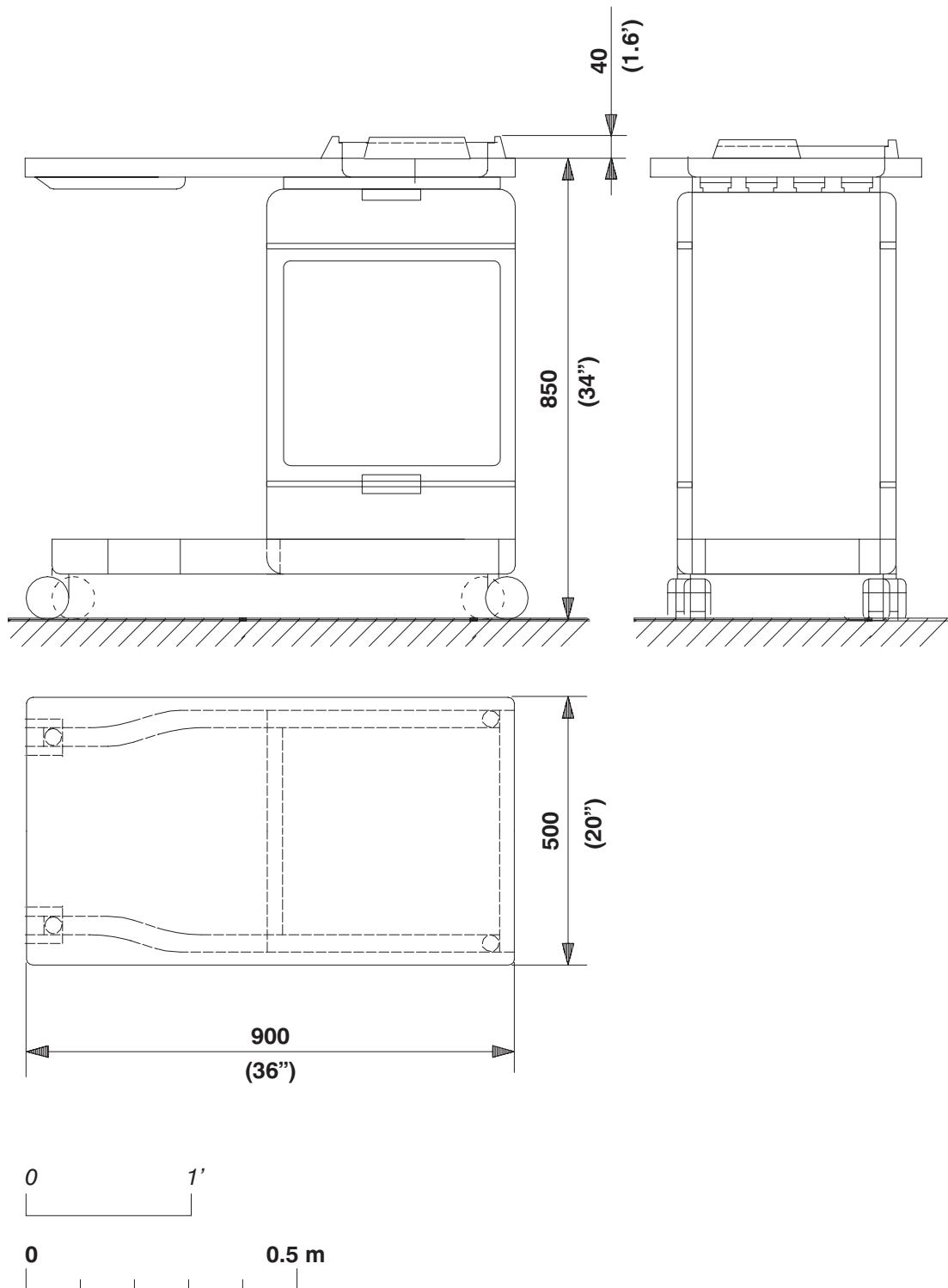
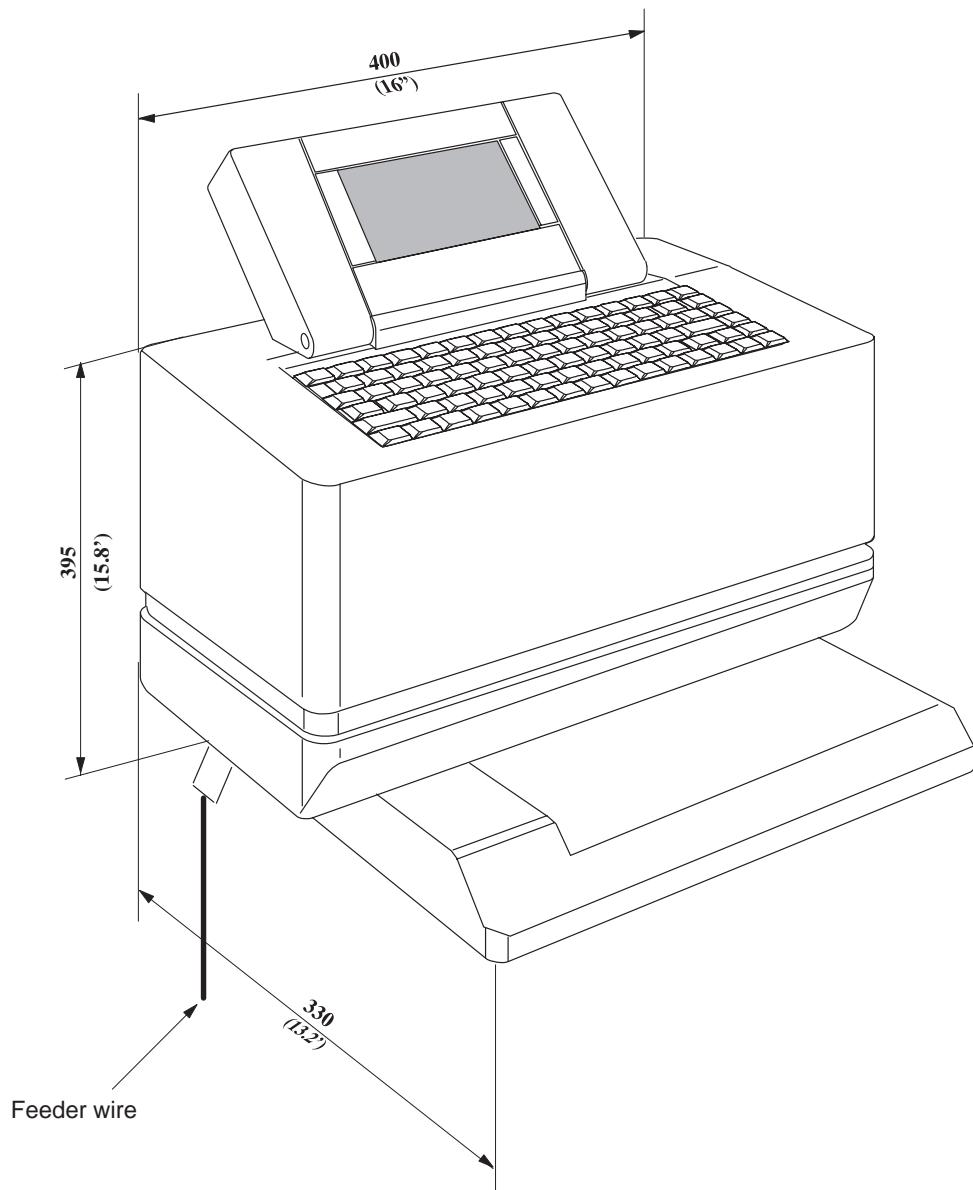


ILLUSTRATION 3-7  
DATAFLASH DIMENSIONS



## SECTION 2

### MOUNTING REQUIREMENTS

Stand column and protective glass require a minimum amount of "free space" (see Table 3–2 below).

TABLE 3–2  
MOUNTING REQUIREMENTS

PRODUCT/ COMPONENT	Length mm (feet)	Width mm (feet)	Height mm (feet)
Stand column + protective glass	3000 (10')	2500 (8.20')	2500 (8.20')

## SECTION 3

### NOISE

- 60 dBA at 1 m (3'3").

## SECTION 4

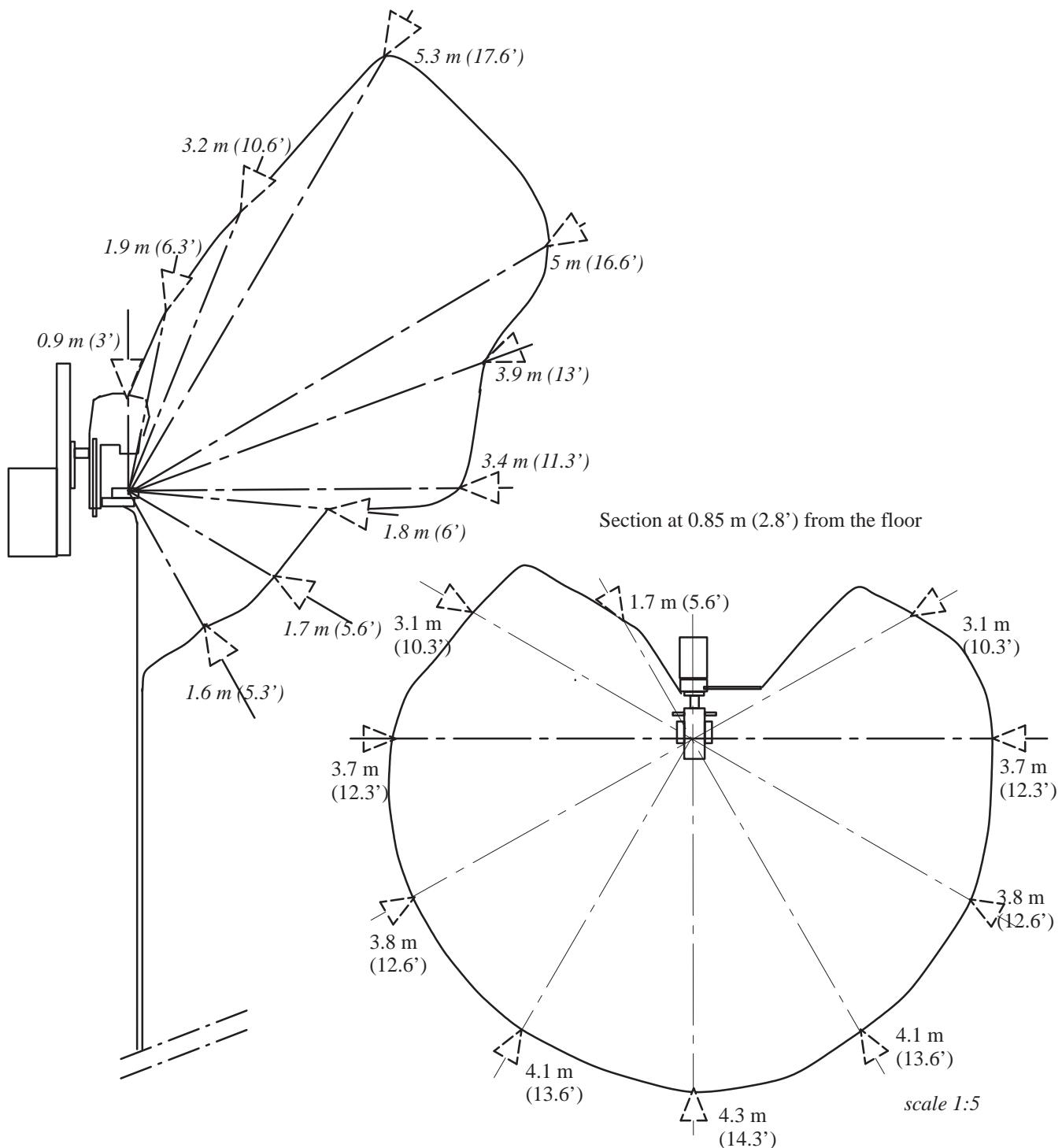
### RADIATION SHIELDING

The Protective Glass has a 0.1 mm (0.025") lead thickness equivalency.

The RAD shield screen has a 1 mm (0.04") lead thickness equivalency.

A minimum permissible distance to be out of a 50 mSev (5Rem) limit value for the whole body equivalent dose is given on Illustration 3–8.

ILLUSTRATION 3-8  
ISODOSE CURVE 50MSEV WITH PROTECTIVE GLASS



35kV, 8700mAs in 1h, 2000h/year,  
large focus, Mo Track, Mo filter,  
exposure on 4cm of lucite

## CHAPTER 4 – ADDITIONAL PLANNING AIDS

### SECTION 1 PRODUCT SHIPPING INFORMATION

#### AIR AND ROAD SHIPMENT

PRODUCT/ COMPONENT	HEIGHT X WIDTH X DEPTH m (feet)	WEIGHT daN (pounds)	METHOD OF SHIPMENT
SENO	(7.6' x 3' x 6.3') 2.30 x 0.90 x 1.90 (2,30 x 0,92 x 2,14)	280 (616) 400 (880)	PALLET (ROAD) CRATE (AIR)
ACCESSORIES STORAGE DEVICE (OPTION)	(7.6' x 3' x 7.2') 1.26 x 0.68 x 1.08 (4.13' x 2.18' x 3.54')	140 (308)	CRATE
DATAFLASH OPTION	0.45 X 0.33 X 0.40 (1.5' x 1.1' x 1.33')	12.5 (27.5)	CRATE

### SECTION 2 TOOLS AND TEST EQUIPMENT

- NOT APPLICABLE.

### SECTION 3 INTERCONNECTIONS

- See Illustration 4-1.
- MAXIMUM CONNECTOR SIZE: 56 mm x 15 mm (2.1" x 0.6").

**ILLUSTRATION 4-1  
INTERCONNECTION SCHEMATIC**

A = Input voltage = 200/208/220/230/240 V single-phase.

