

Design and Application Manual



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Design and Application Manual

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Navigator™ Ceiling Arm Overview

Positioning

- Multiple arm configurations
- Suspension arms rotate 330°
- Head rotates 340°
- Low Effort to Load Ratio
- Drift-free positioning

Service Performance

- Multiple head configurations
- Up to 12 gas outlets
- Up to 18 electrical duplex outlets

Maintenance Features

- Simple design
- Smooth surfaces for ease of cleaning



Navigator™ Ceiling Arm Positioning

The Navigator™ Ceiling Arm provides the caregiver with a suspension system that is well balanced and can be guided easily into position.

The availability of retractable and fixed single or double arms provides the flexibility to adapt for a variety of environments.

The 330° arm joint rotation and 340° head rotation allow the Navigator™ Ceiling Arm to be adjusted to fit in the desired space. The low 83 to 1 lb. Effort to Load Ratio

facilitates ease of positioning. Once the arm is in place, the positive pneumatic braking system locks it in position. Conveniently located buttons release the brakes.

The combination of these individual elements allows medical personnel to move the Navigator™ Ceiling Arm freely into a variety of positions using only slight pressure on the head. Once positioned, the system remains stable, allowing focus to remain where it belongs...on the patient.

Navigator™ Ceiling Arm Service Performance

Multiple head configurations give the user extensive options for equipment service support.

The Navigator™ Ceiling Arm can provide up to 12 gas outlets, 18 electrical

duplex outlets, four shelves, two drawers, and a keyboard tray. This array of features is designed to meet a variety of equipment service needs.

Navigator™ Ceiling Arm Maintenance Features

The simple design requires only an annual service check.

The design replaces hard to reach joints with smooth surfaces to facilitate easy cleaning.

Planning

When designing the Navigator™ Ceiling Arm, Nuvo engineers worked to provide the healthcare industry with a product that incorporates a wide variety of improvements in function and form. We did not stop there. We engineered the

Installation process so the Navigator™ Ceiling Arm would be available to our customer's medical staff quickly and efficiently.

Prior to installing the Navigator™ Ceiling Arm, address the following items:

Architectural Considerations

- Room layout
- Floor-to-ceiling clearance
- Above-ceiling clearance
- Ceiling load-bearing strength
- Ceiling structure installation

Electrical and Gas Requirements

- Fuse box location
- Gas services location

Navigator™ Ceiling Arm Operating Room Configurations

The following pages show a variety of ways to use the Navigator™ Ceiling Arm in a surgical suite. These configurations are for planning purposes only.

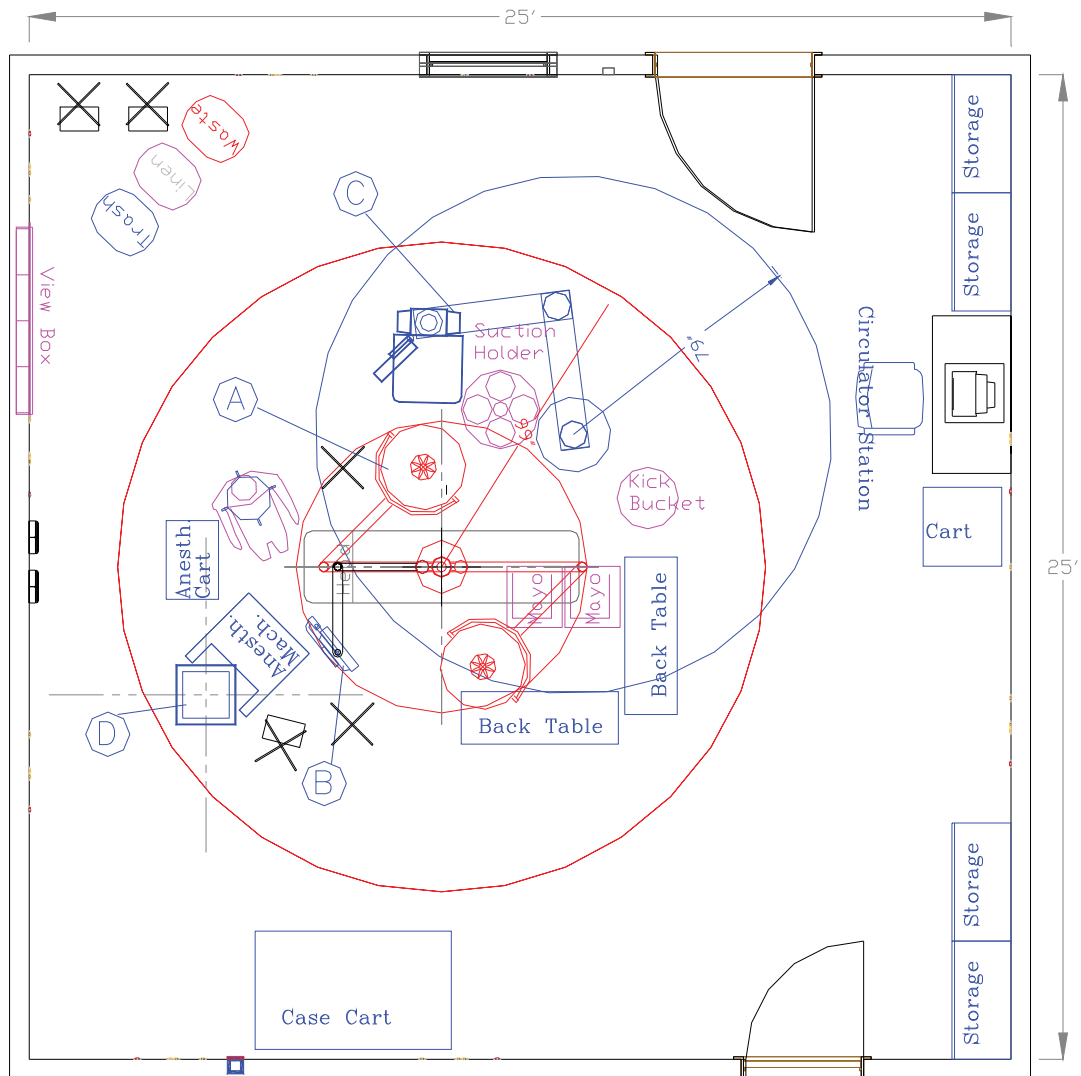
- General OR 1
- General OR 2
- Cardiovascular OR 1
- Cardiovascular OR 2
- Ear, Nose, Throat / Eye Room
- Gastro-Intestinal Lab / Urology Room
- Trauma Room
- Orthopedic OR 1
- Orthopedic OR 2



OR Systems

- (A) Surgical Light V1350D2
- (B) Surgical Light Monitor Arm
- (C) Double Arm Fixed w/1025 OR Head
- (D) Powered Telescoping Service Column

GENERAL NOTE:
1. LOCATION AND DIMENSIONS SHOWN ON DRAWING ARE PRELIMINARY LOCATIONS ONLY. FINAL LOCATION TO BE DETERMINED BY OWNER. STRUCTURAL SYSTEM ABOVE CEILING TO BE DETERMINED BY OWNER.
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General OR #1

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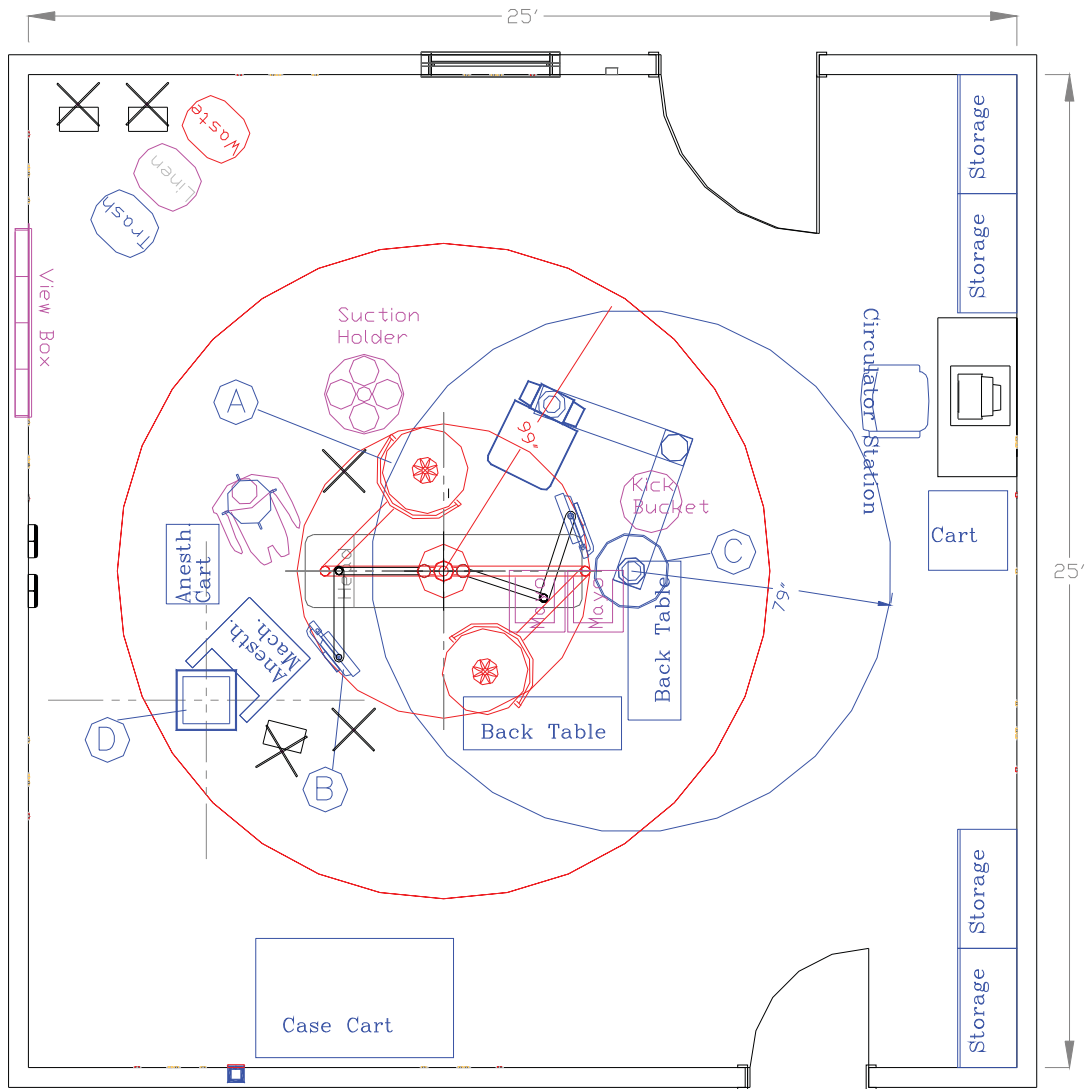




OR Systems

- A** Surgical Light V1350D2
- B** Surgical Light Monitor Arm
- C** Double Arm Rigid w/ 1025 OR Head
- D** Powered Telescoping Service Column

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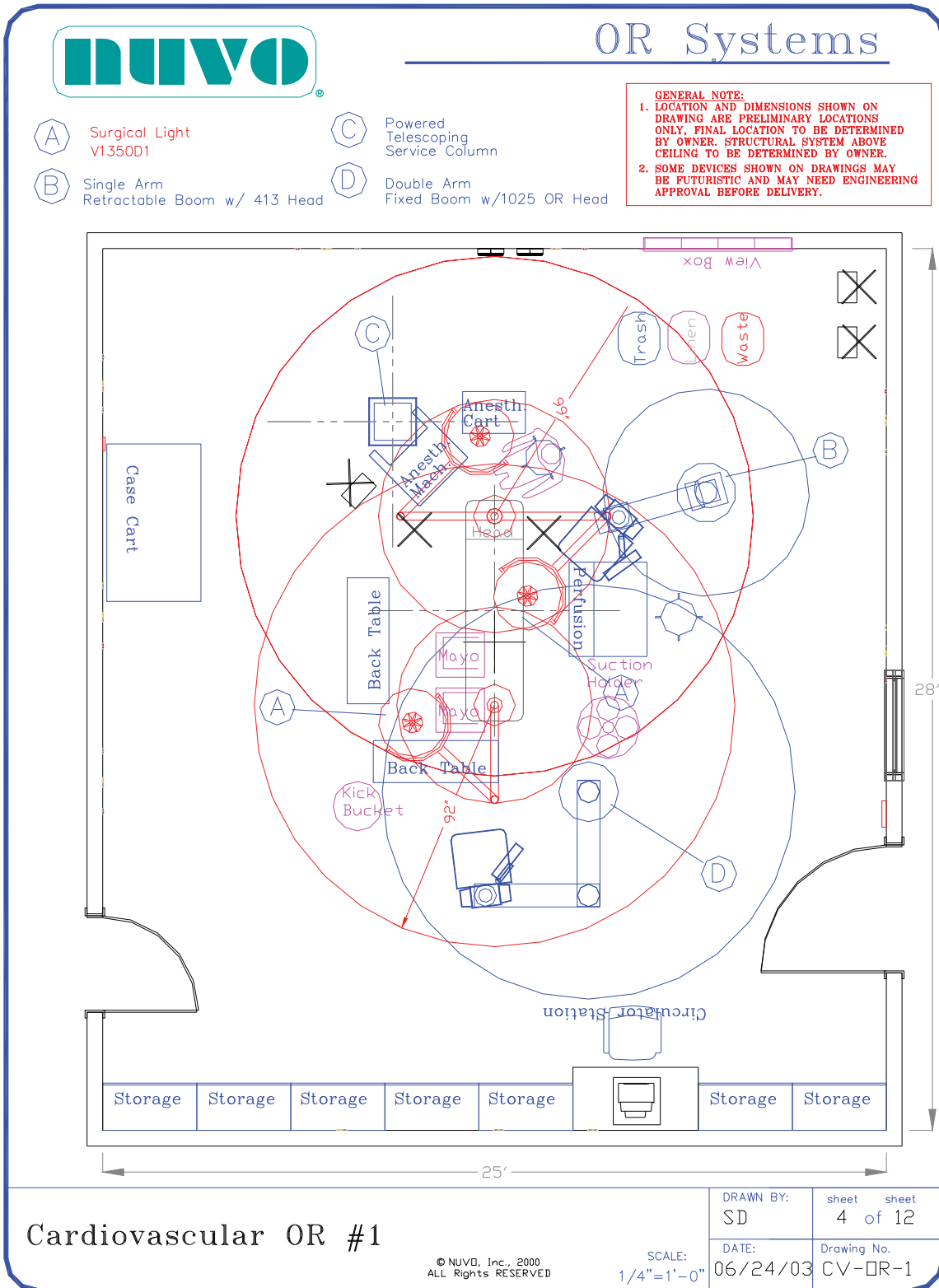
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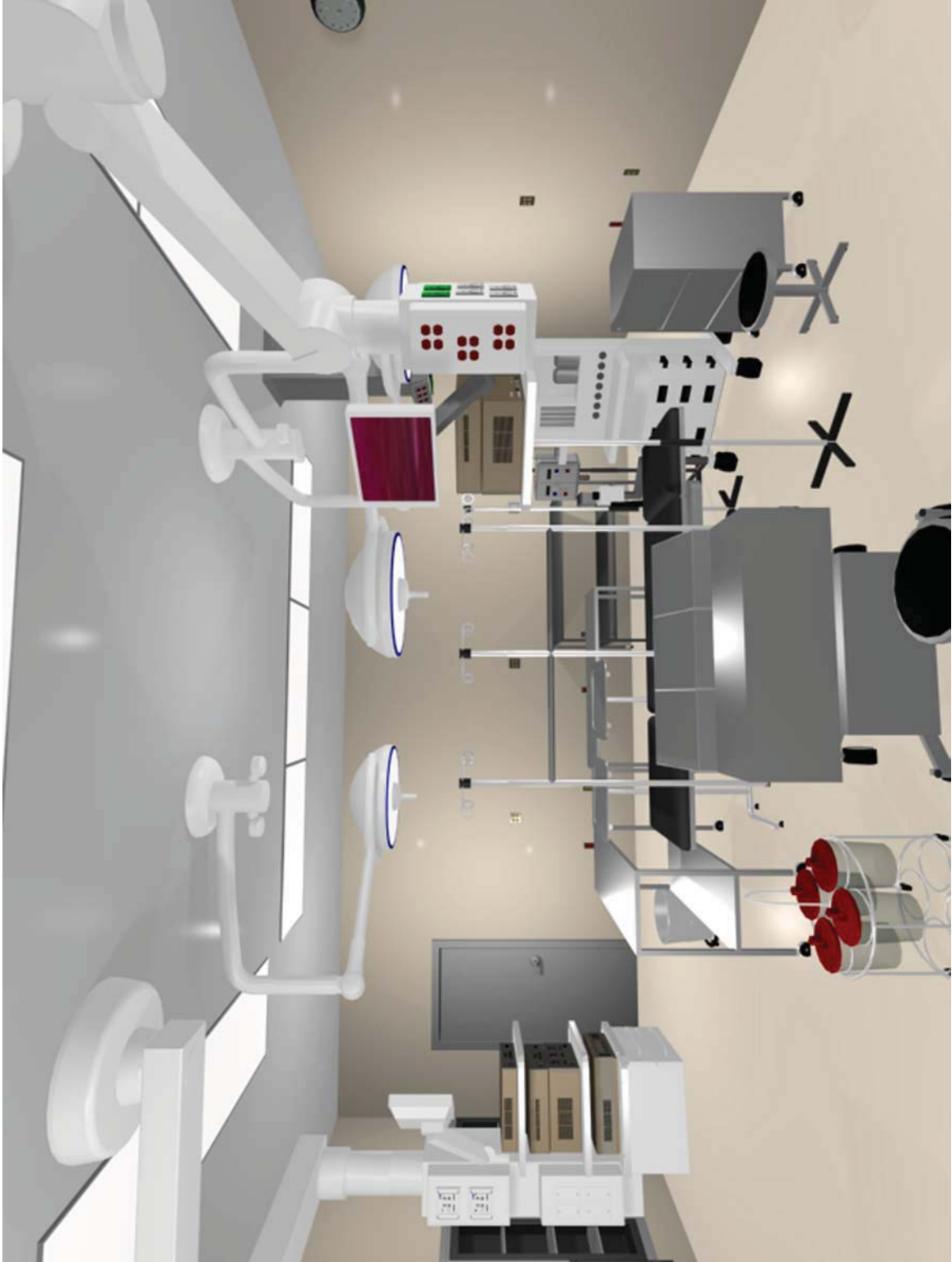
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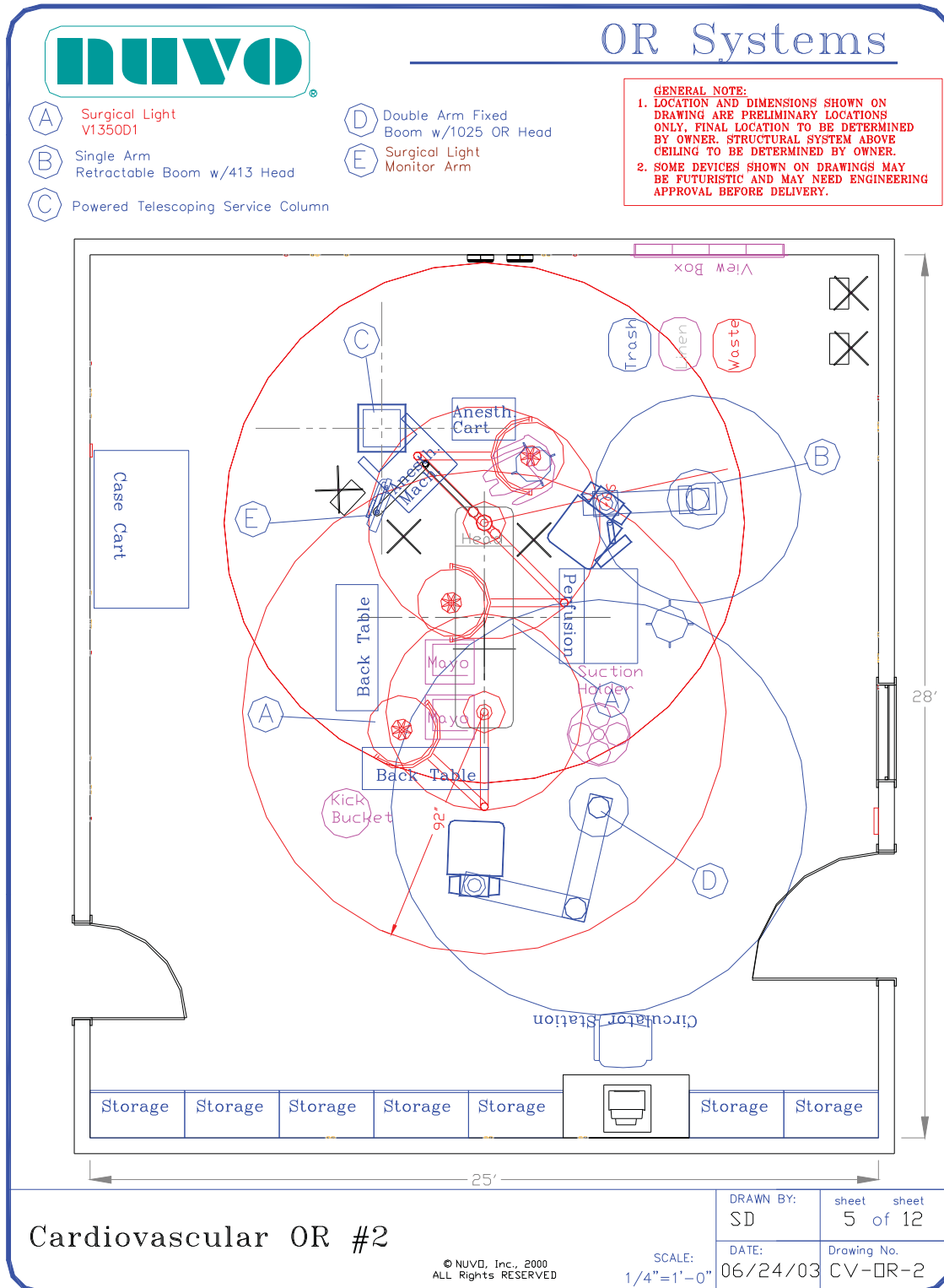
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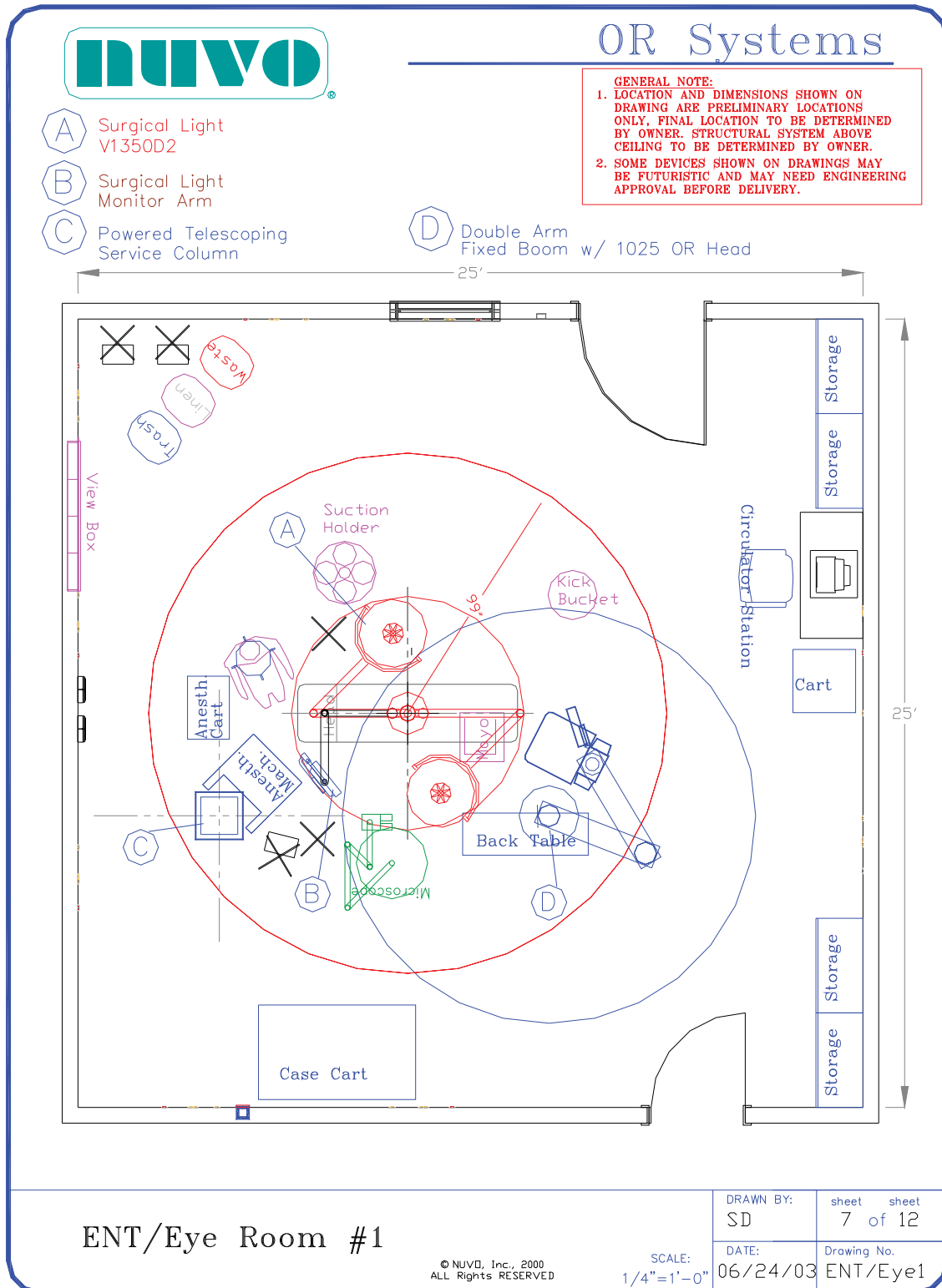


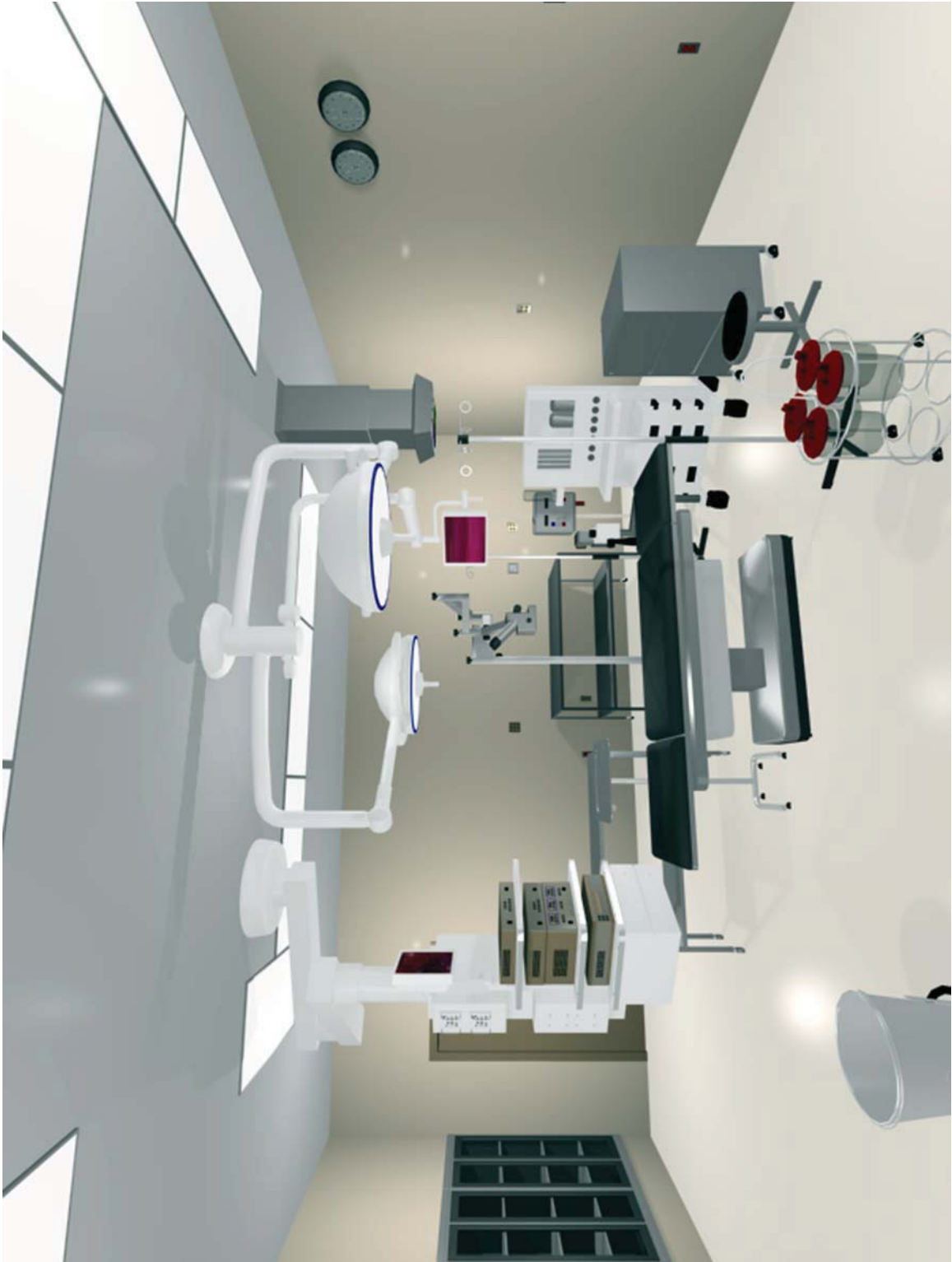












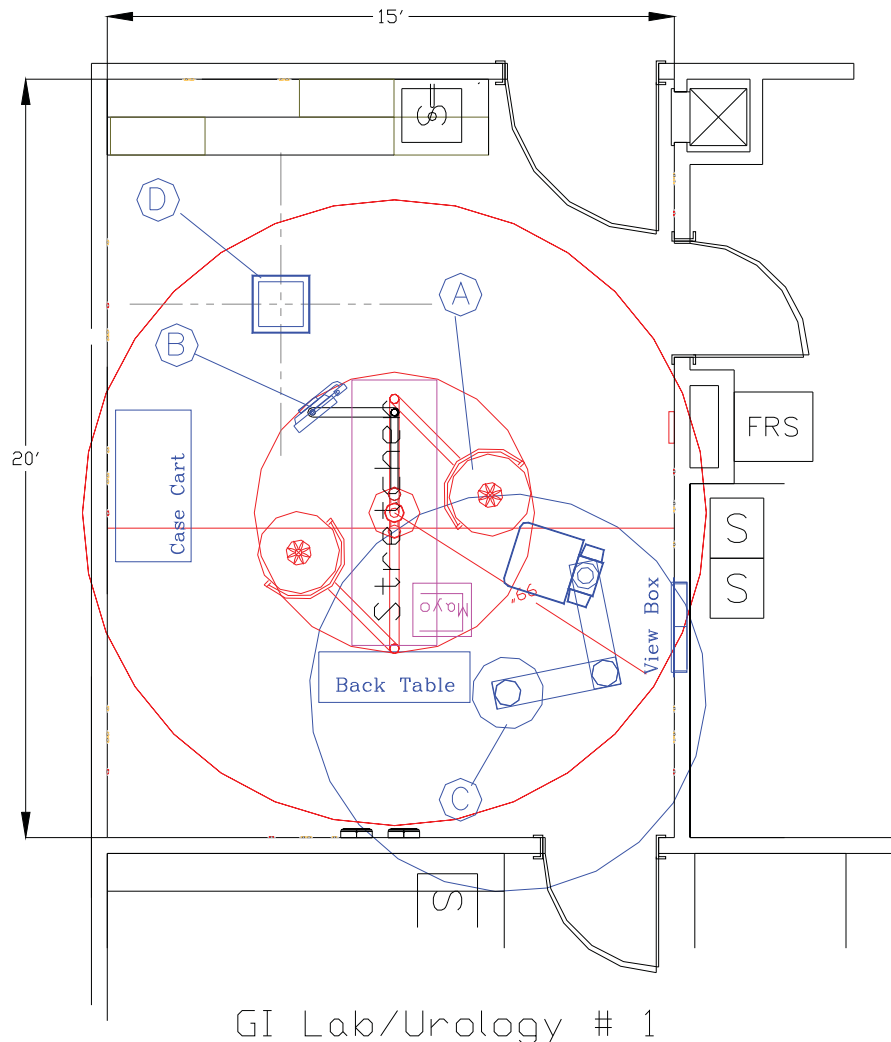


OR Systems

- A Surgical Light
V1350D2
- B Surgical Light
Monitor Arm
- C Double Arm Fixed
Boom w/ 1025 OR Head

- D Powered
Telescoping
Service Column

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CEILING TO BE DETERMINED BY OWNER.
2. SOME DEVICES SHOWN ON DRAWINGS MAY
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GI Lab Urology Rm. #1

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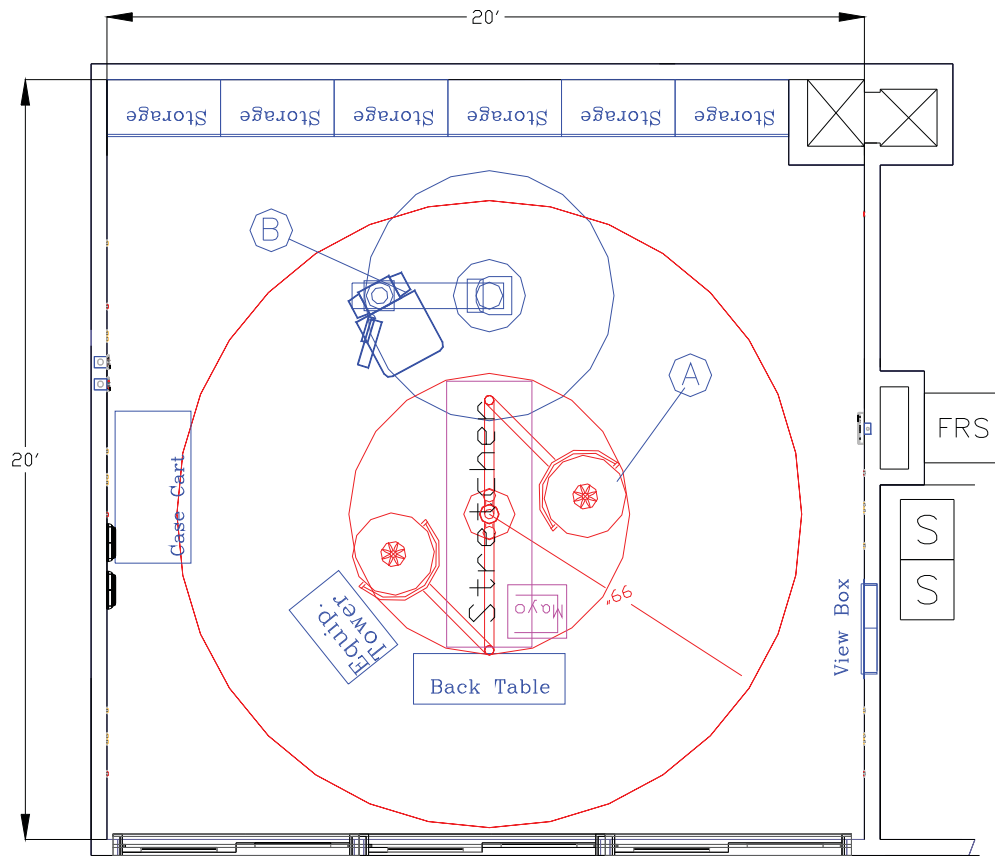




OR Systems

- (A) Surgical Light
V1350D2
- (B) Single Arm Retractable w/ 600 Head

GENERAL NOTE:
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2. SOME DEVICES SHOWN ON DRAWINGS MAY BE FUTURISTIC AND MAY NEED ENGINEERING APPROVAL BEFORE DELIVERY.



Trauma / Procedure Room

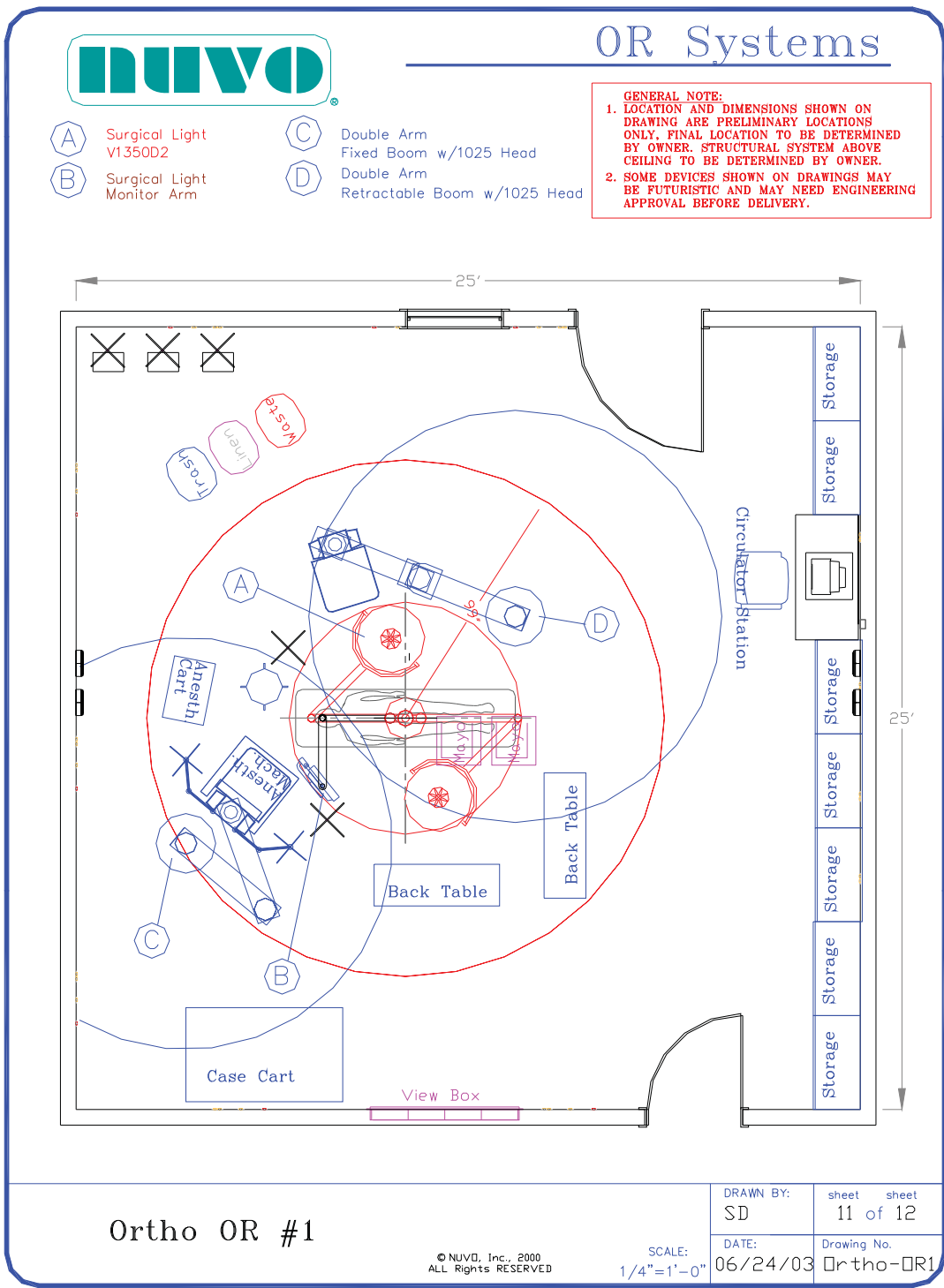
Trauma/Procedure Room

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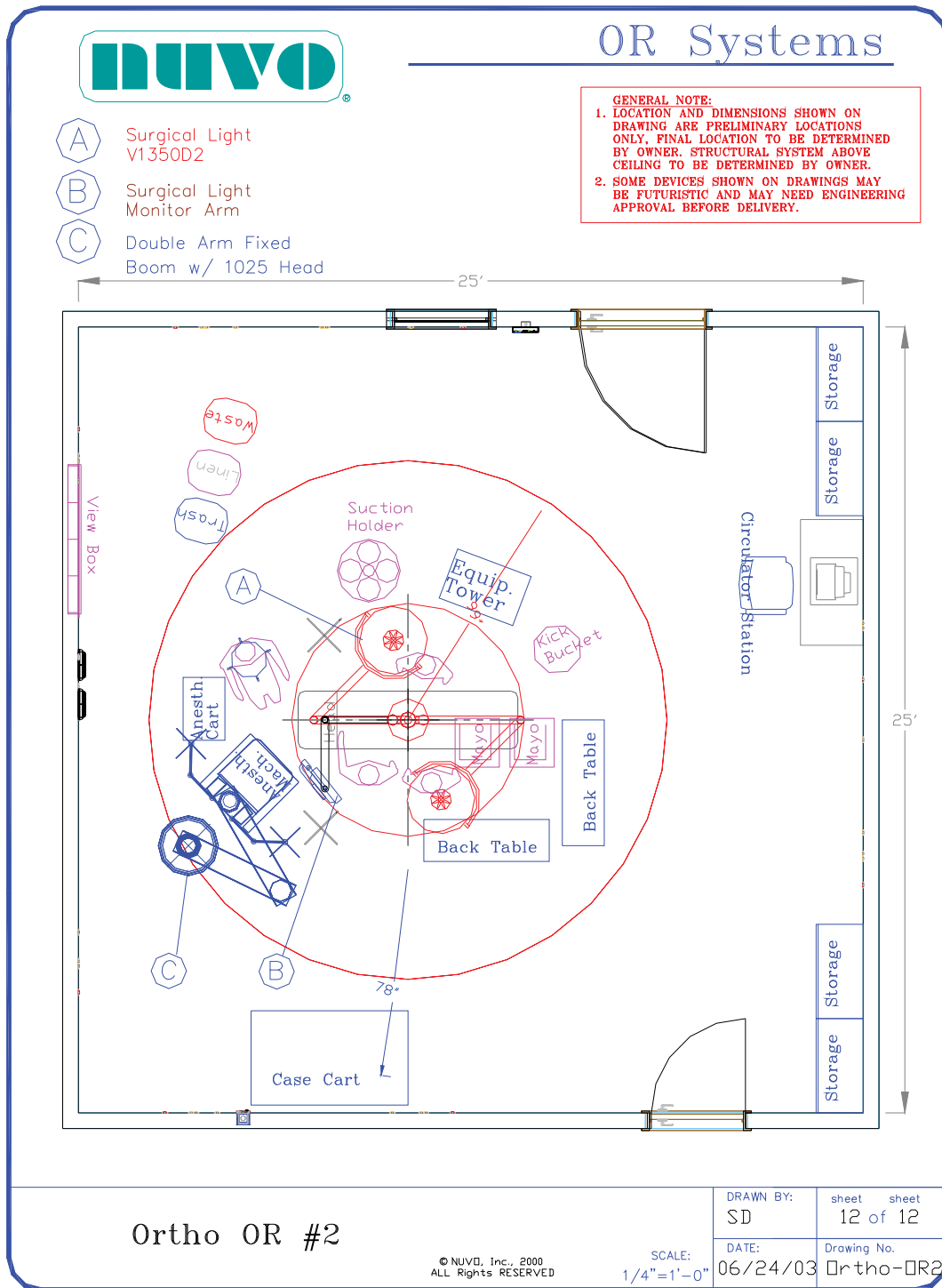
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Clearance Requirements

Articulation Range

When deciding on the placement of the mounting plate, consider the range of articulation. Most important is the distance from the center of the ceiling mounting plate to the outer edge of the service head,

With the arm fully extended. Ideally, this radius should be kept free of obstacles in order to take full advantage of the Navigator™ Ceiling Arm's extensive maneuverability.

Table 1. Clearance Requirements for Navigator™ Ceiling Arm

Configuration	Ceiling Height	Extended Radius
Single Retractable	9' (2743 mm) minimum	39.4" (1000 mm) maximum
Double Retractable		70.9" (1800 mm) maximum
Single Fixed		39.4" (1000 mm) maximum
Double Fixed 55" (1397 mm)		55.1" (1400 mm) maximum
Double Fixed 63" (1600 mm)		63.0" (1600 mm) maximum
Double Fixed 71" (1803 mm)		70.9" (1800 mm) maximum
Double Fixed 79" (2007 mm)		78.7" (2000 mm) maximum

Ceiling Height Requirements

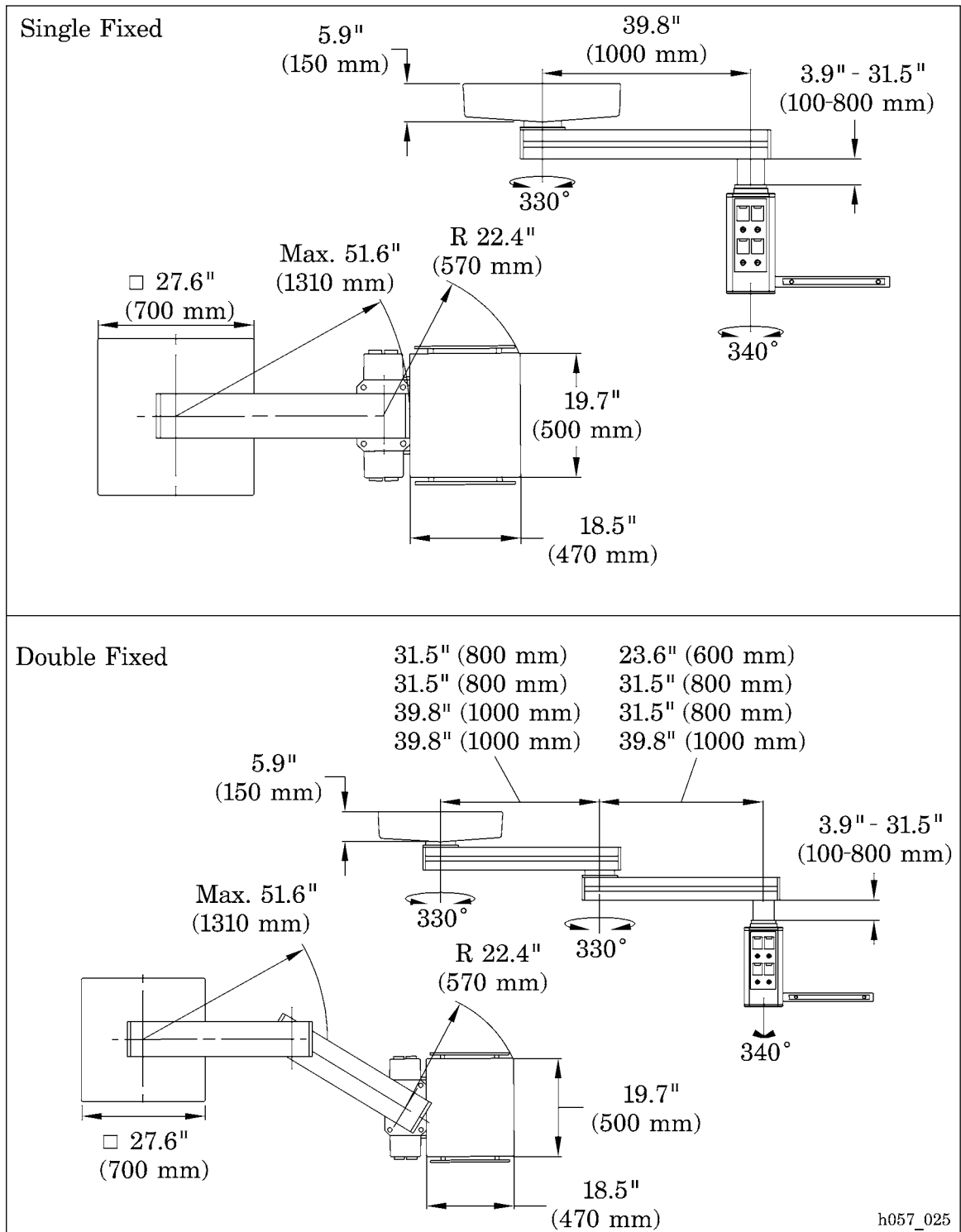
When planning for the installation of the Navigator™ Ceiling Arm, it is important to know the height of the ceiling from which the arm will be suspended. Ceiling height requirements are defined to ensure that a

78" (1981 mm) minimum clearance is maintained between the floor and the bottom of the motor housing. These heights allow a 2" (51 mm) gap for the adjusting nuts used to level the ceiling plate.

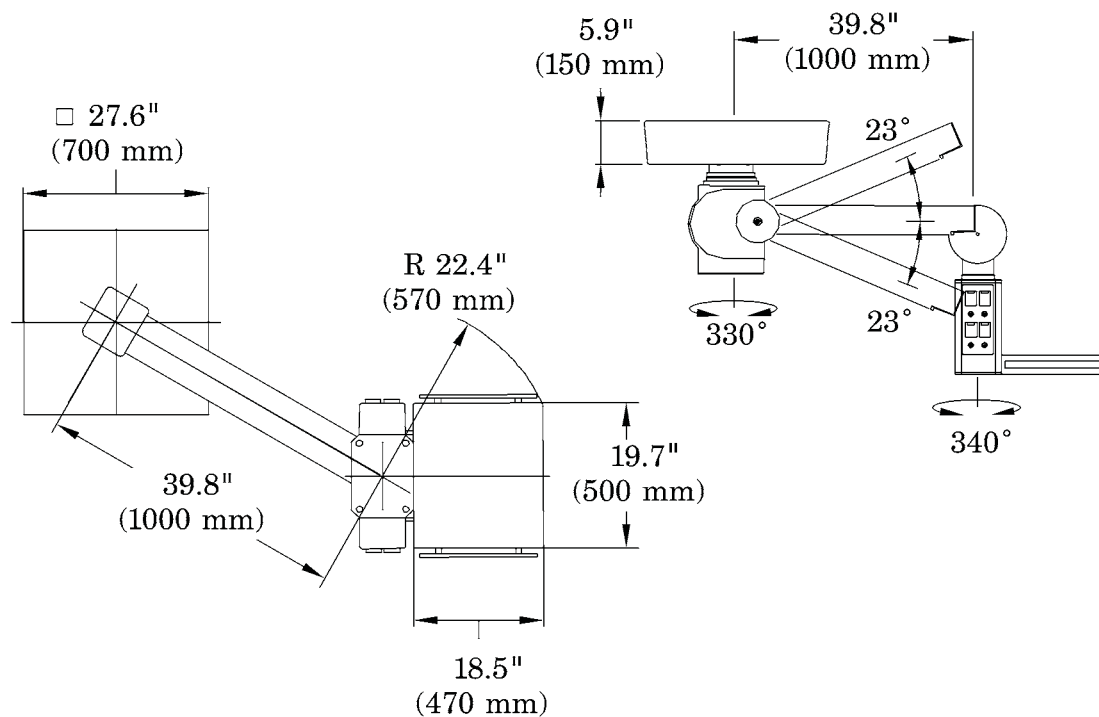
Table 2. Minimum Vertical Clearances for the Navigator™ Ceiling Arm (9' Ceiling)

Configuration	Bottom of Arm	Bottom of Head
Single Retractable w/ 413 head	80.2" (2037 mm)	74.5" (1892 mm)
Single Retractable w/ 600 head	80.2" (2037 mm)	67.2" (1707 mm)
Double Retractable w/ 413 head	78.0" (1981 mm)	72.3" (1836 mm)
Double Retractable w/ 600 head	78.0" (1981 mm)	65.0" (1651 mm)
Single Fixed w/ 1025 head	95.7" (2431 mm)	29.4" (747 mm)
Double Fixed w/ 1025 head	85.3" (2167 mm)	29.6" (752 mm)

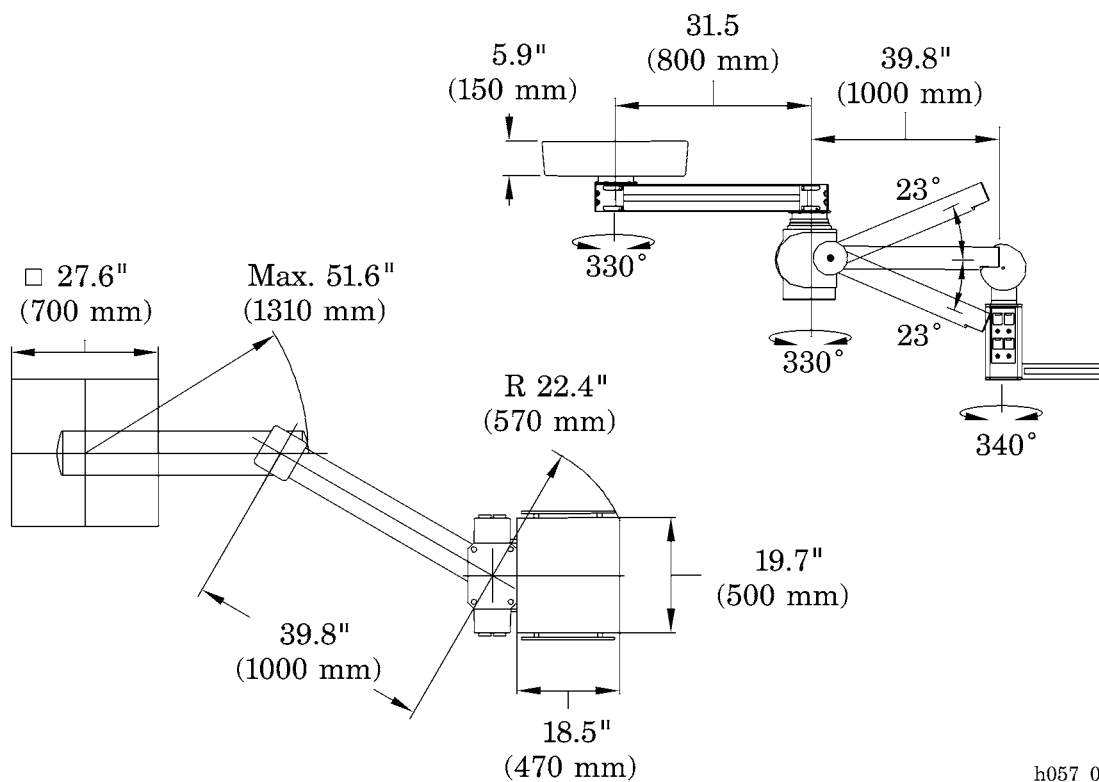
Navigator™ Ceiling Arm Range of Articulation and Circular Motion



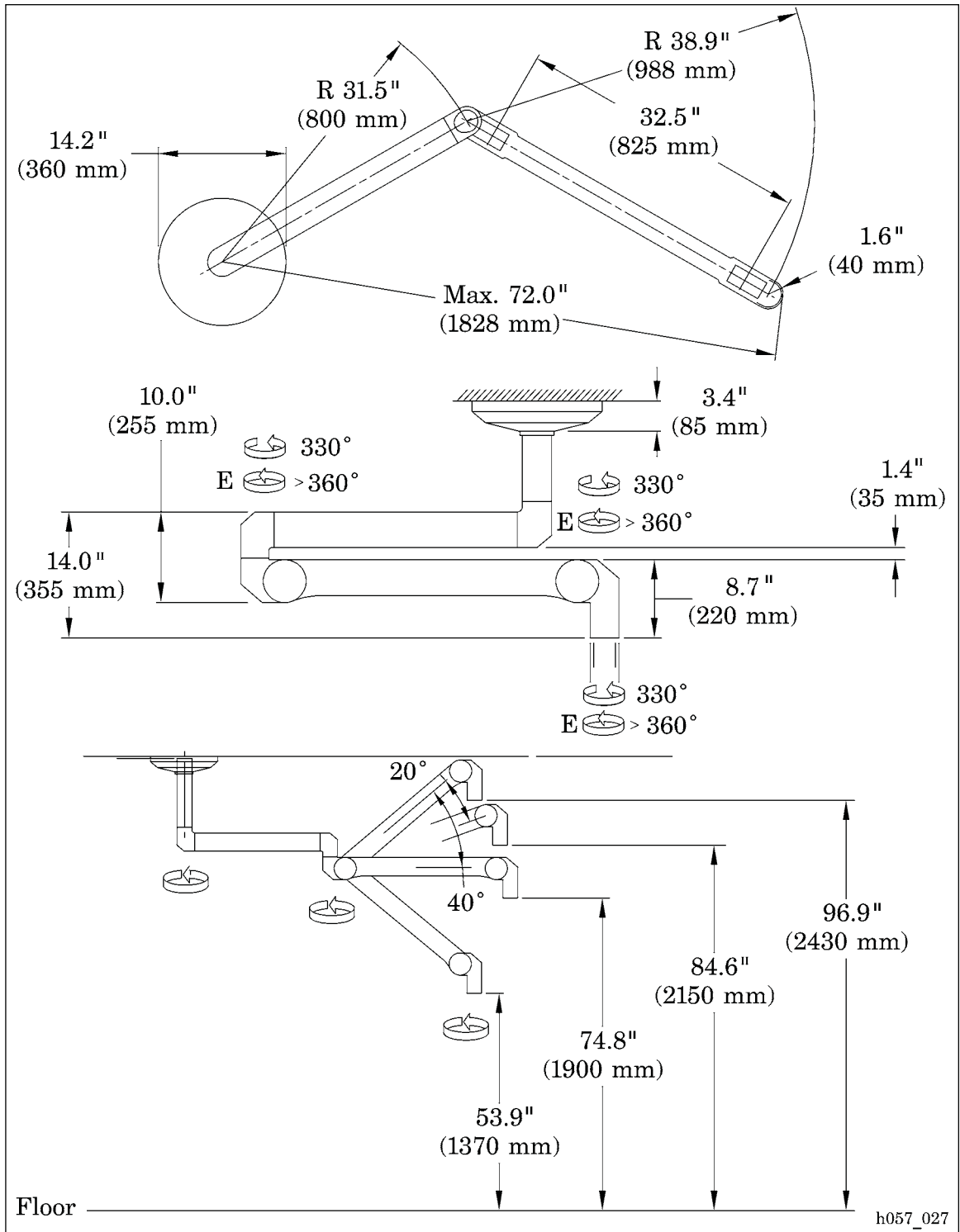
Single Retractable



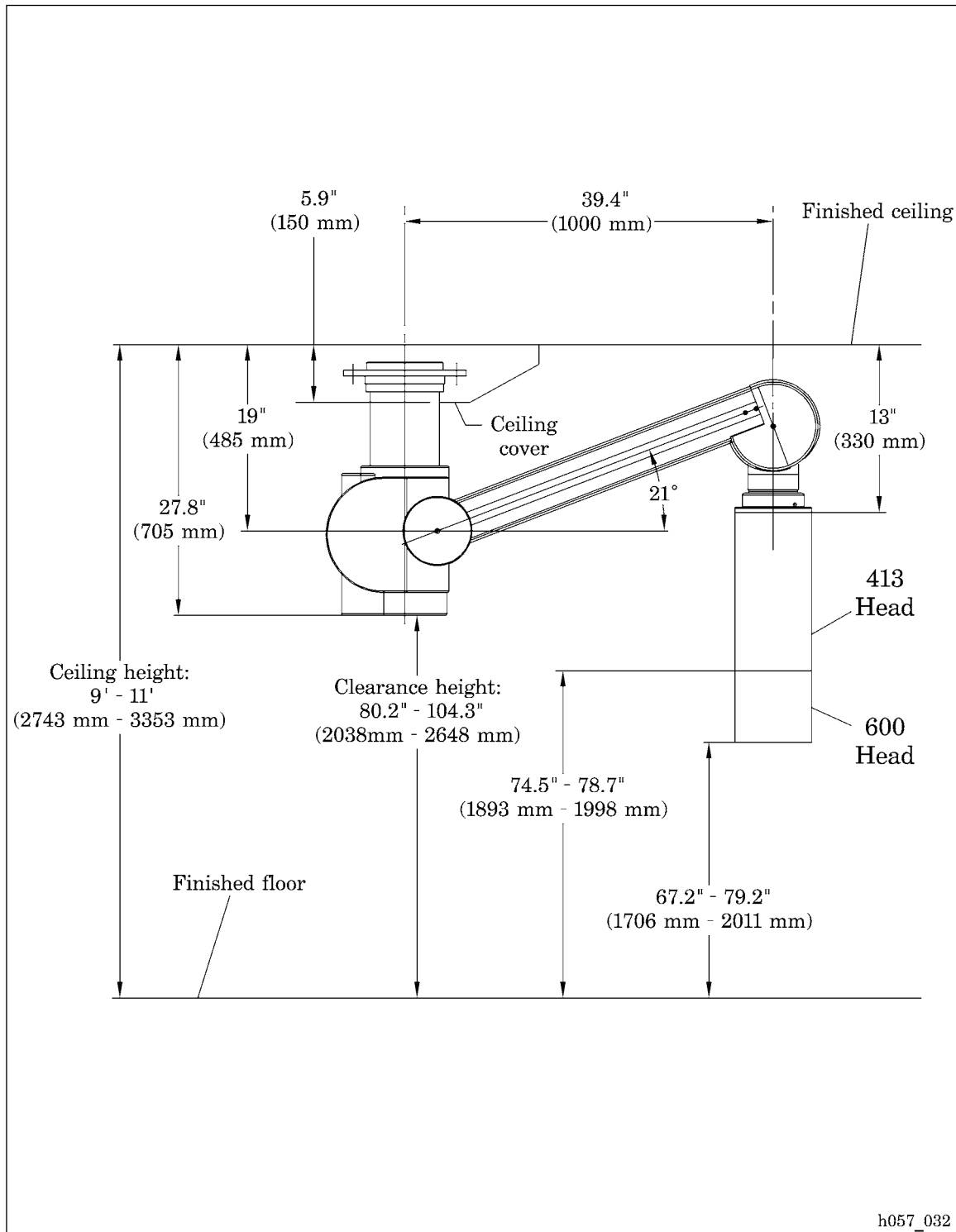
Double Retractable

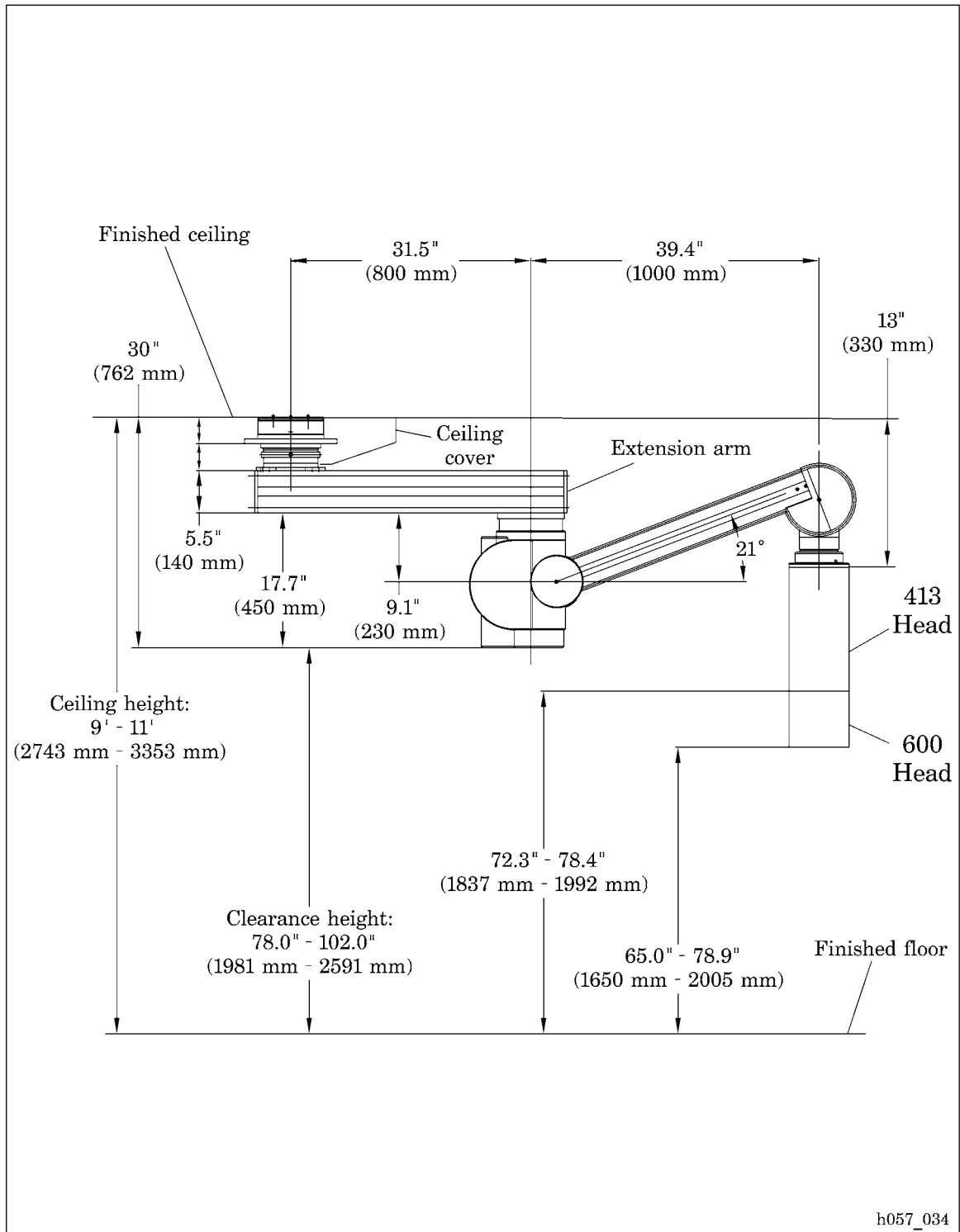


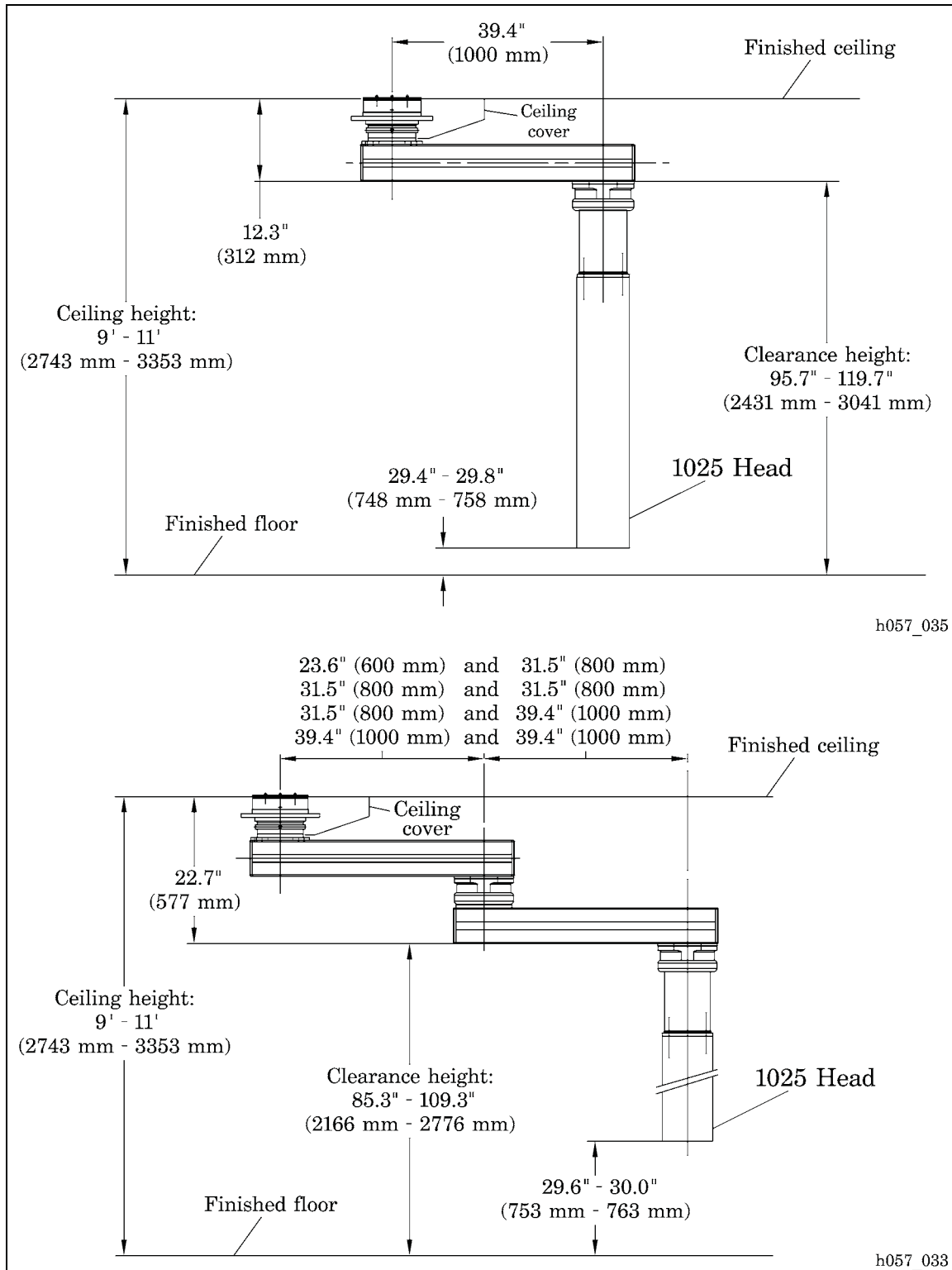
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Navigator™ Ceiling Arm Vertical Clearance







Ceiling Requirements

Ceiling Bearing Strength

The medical facility must provide a ceiling structure that is capable of sustaining the load requirements for the ceiling arm.

The structural support system must be designed by a certified structural engineer. Support structures for single or double arms must meet design requirements as detailed in the table below. To accomplish

this, it will be necessary to contract with an architect and certify that the Navigator™ Ceiling Arm can safely be installed.

The following table shows calculated worst case load conditions for mounting single and double fixed or retractable arms.

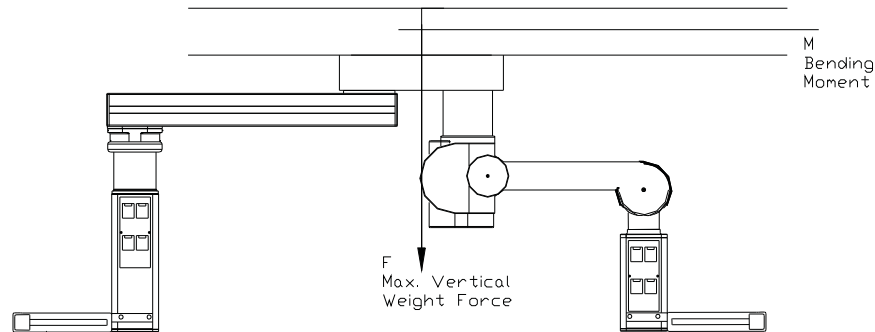
Structural Loading Requirements

Fixed Arm OV-1 and OV-2	Vertical Weight Force F in N (lbf)	Bending Moment M in N·m (ft-lb.)	Carrying Load per Arm in kg (lb.)
One Arm Ext. Arm 1000 mm	Single 5680 N (1277 lbf) Tandem 10110 N (2273 lbf)	Single 4000 N·m (2950 ft-lb) Tandem 8000 N·m (5900 ft-lb)	360 kg (794 lb)
Two Arm Ext. Arm 600 / 800 mm	Single 4775 N (1073 lbf) Tandem 8300 N (1866 lbf)	Single 4000 N·m (2950 ft-lb) Tandem 8000 N·m (5900 ft-lb)	230 kg (507 lb) per arm
Two Arm Ext. Arm 800 / 800 mm	Single 4425 N (995 lbf) Tandem 7590 N (1706 lbf)	Single 4000 N·m (2950 ft-lb) Tandem 8000 N·m (5900 ft-lb)	190 kg (419 lb) per arm
Two Arm Ext. Arm 1000 / 800 mm	Single 4170 N (937 lbf) Tandem 7090 N (1594 lbf)	Single 4000 N·m (2950 ft-lb) Tandem 8000 N·m (5900 ft-lb)	160 kg (353 lb) per arm
Two Arm Ext. Arm 1000 / 1000 mm	Single 4020 N (904 lbf) Tandem 6790 N (1526 lbf)	Single 4000 N·m (2950 ft-lb) Tandem 8000 N·m (5900 ft-lb)	140 kg (309 lb) per arm
Retractable Arm OMS-1 and OMS-2	Vertical Weight Force F in N (lbf)	Bending Moment M in N·m (ft-lb.)	Carrying Load per Arm in kg (lb.)
One Arm Motor Arm 1000 mm	Single 3670 N (825 lbf) Tandem 7340 N (1650 lbf)	Single 1500 N·m (1106 ft-lb) Tandem 3000 N·m (2213 ft-lb)	150 kg (330 lb)
Two Arm Ext. Arm 800 mm /. Motor Arm 1000 mm	Single 4350 N (978 lbf) Tandem 8700 N (1956 lbf)	Single 3200 N·m (2360 ft-lb) Tandem 6400 N·m (4720 ft-lb)	150 kg (330 lb) per arm

NOTE:

The vertical weight forces and bending moments of the different pendant systems can be added. For example: OV-1 (Ext. arm 1000 mm) with OMS-1 (Motor Arm 1000 mm).

- Sum of weights: 5680 N+3670 N = 9350 N
- Sum of Bend Moments: 4000 N·m+1500 N·m = 5500 N·m

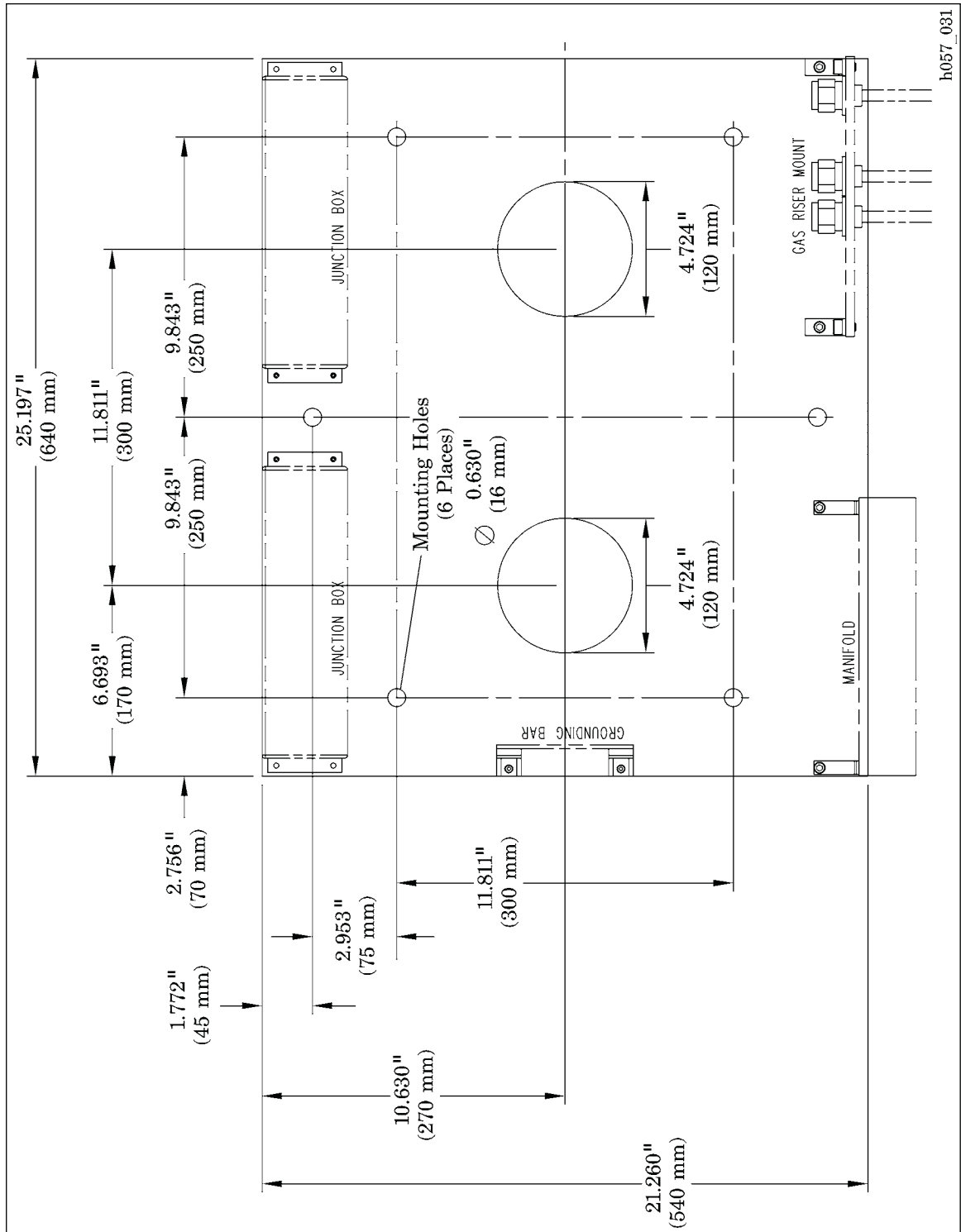


Mounting Plate Configuration

Nuvo recommends the use of the following items for the installation of the Navigator™ Ceiling Arm mounting plate:

Table 4. Recommended Mounting Plate Installation Parts

Part Description	Quantity
3" x 0.625" bolt, grade 5 or better	6
0.625" lockwasher	12
0.625" x 1.5" flat washer	12
0.625" nut	6

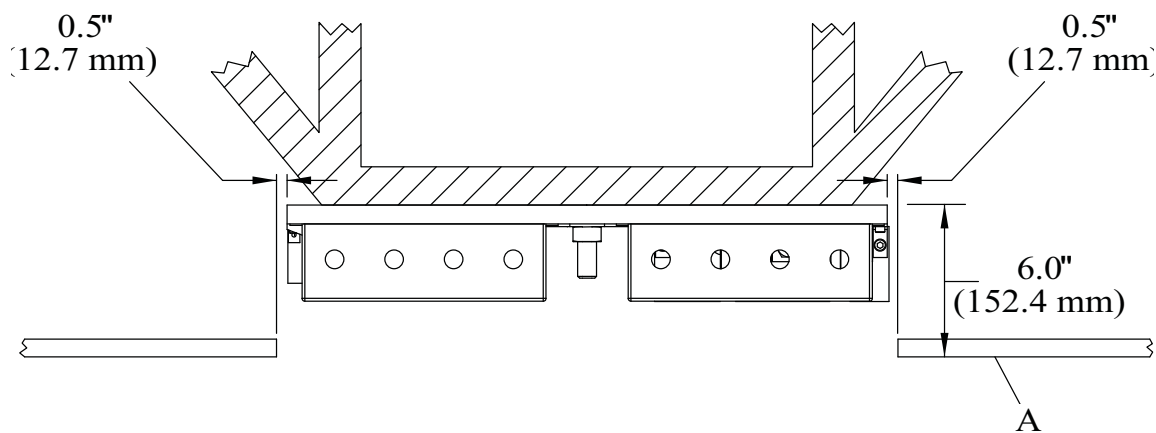


Ceiling Structure

Prior to the delivery and installation of the Navigator™ Ceiling Arm, it is the responsibility of the medical facility to have a ceiling structure installed that meets the load requirements and provides the necessary clearances.

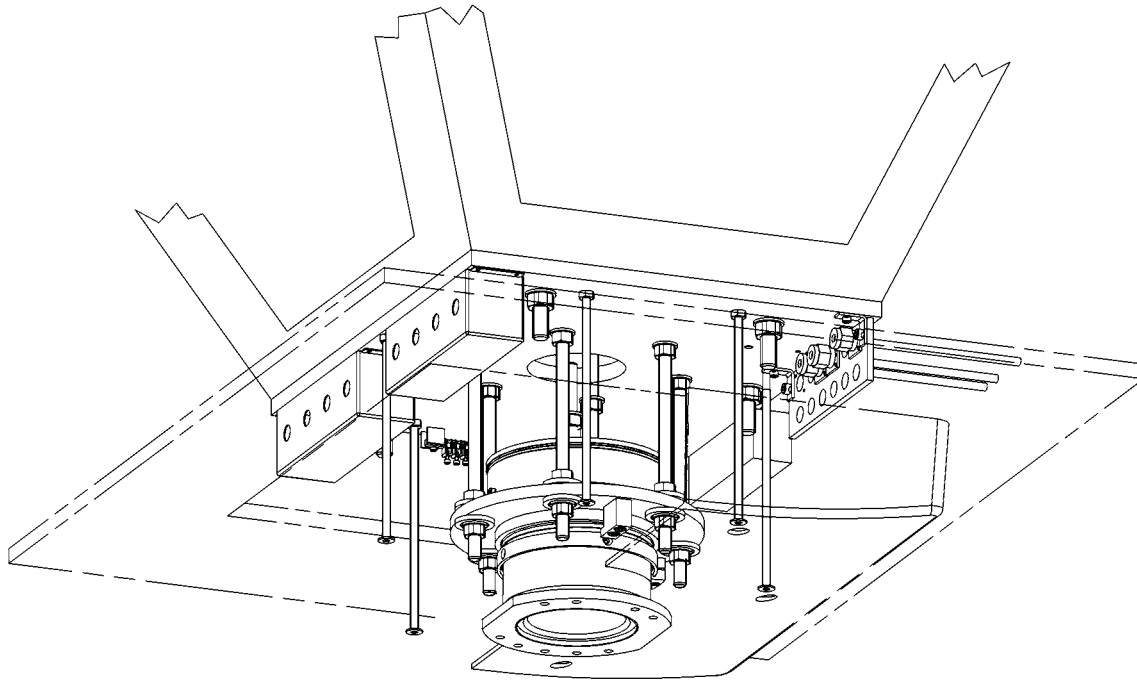
The mounting plate of the suspension arm assembly is unique, and is not compatible with other existing mounting systems.

Proper leveling of the contractor-installed ceiling structure is critical to the smooth, drift-free operation of the Navigator™ Ceiling Arm. Correctly installed, the bottom surface of the mounting plate will be level in two directions and 6" (152 mm) above the upper surface of the finished ceiling.



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Mounting Plate Alignment



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Planning Checklist

- Height of the finished ceiling is known, and floor to ceiling clearance requirements are met.
- Contractor-supplied ceiling structure is installed and leveled correctly.
- Ceiling structure meets moment and vertical load requirements.
- Ceiling structure will not deflect when load is applied.
- Ceiling arm mounting plate can be installed 4.5" (115 mm) above the upper surface of the finished ceiling.
- Electrical and gas services have been chased to the selected location.
- Mains power is accessible (retractable arms only).

Navigator™ Ceiling Arm Technical Specifications

Dimensions for the Navigator™ Ceiling Arm

Feature	Dimension
Horizontal range	330° for each arm
Single arm reach (both fixed and retractable arms)	39.4" (1000 mm)
Double fixed arm reach	55.1" (1400 mm) to 78.7" (2000 mm) depending on configuration
Double retractable arm reach	70.9" (1800 mm)
Service head overall height	413 mm, 600 mm, or 1025 mm
Service head rotation	340° for all heads

Vertical Load and Moment Load Characteristics

Fixed Arm OV-1 and OV-2	Vertical Weight Force F in N (lbf)	Bending Moment M in N·m (ft-lb.)	Carrying Load per Arm in kg
One Arm Ext. Arm 1000 mm	Single 5680 N (1277 lbf) Tandem 10110 N (2273 lbf)	Single 4000 N·m (2950 ft-lb) Tandem 8000 N·m (5900 ft-lb)	360 kg (794 lb)
Two Arm Ext. Arm 600 / 800 mm	Single 4775 N (1073 lbf) Tandem 8300 N (1866 lbf)	Single 4000 N·m (2950 ft-lb) Tandem 8000 N·m (5900 ft-lb)	230 kg (507 lb) per arm
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One Arm Motor Arm 1000 mm	Single 3670 N (825 lbf) Tandem 7340 N (1650 lbf)	Single 1500 N·m (1106 ft-lb) Tandem 3000 N·m (2213 ft-lb)	150 kg (330 lb)
Two Arm Ext. Arm 800 mm /.	Single 4350 N (978 lbf) Tandem 8700 N (1956 lbf)	Single 3200 N·m (2360 ft-lb) Tandem 6400 N·m (4720 ft-lb)	150 kg (330 lb) per arm

Motor Arm 1000 mm			
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Shelf Load Characteristics

Description	Specification
Shelf	110 lb (50 kg) including rail-mounted equipment
Accessory Rail	22.5 lb (10.2 kg)

Environmental Conditions for Transport and Storage

Description	Specification
Temperature	-40°F (-40°C) to 158°F (70°C)
Relative humidity	95% non-condensing

Environmental Conditions for Use

Description	Specification
Temperature	65°F (18°C) to 85°F (30°C) ambient temperature
Relative humidity range	60% to 80% non-condensing

Mains Power Requirements

Description	Specification
Rated current	120V AC, 20A
Frequency	60 Hz

Retractable Arm Motor Specifications

Description	Specification
Rated voltage	120V AC
Power	7.5A
Frequency	60 Hz

The Navigator™ Ceiling Arm is designed and manufactured according to the following equipment classifications and standards:

Classification and Standards

Technical and Quality Assurance Standards	CSA® C22.1 No. 125-M1994 CSA® Z305.1-92 NFPA 70 NFPA 99 ASTM E84
---	--

	ASTM 75 ASTM 450
Equipment Classification	Class I
Degree of Protection Against Electric Shock	Type B
Degree of Protection Against Ingress of Water	Ordinary equipment – IPX0
Degree of Protection Against the Presence of Flammable Anaesthetic Mixtures	Not for use with flammable anaesthetics. Not to be used with oxygen tents. Use oxygen-administering equipment of the nasal, mask, or ventilator type only.

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NOTES:



NAVIGATOR™

EQUIPMENT MANAGEMENT SYSTEM

BRINGING
EFFICIENCY
TO THE OPERATING ROOM



PRODUCT
OVERVIEW

NUVO offers greater control in the OR

The Navigator™ family of Equipment Management Platforms conveniently helps you organize the OR with customizable options that fit your available space. To provide the optimum configuration for your needs, our product specialists will work with you to choose from:

- Retractable or fixed (straight) suspension arms
- Small to large service heads
- Single or double arms

Navigator offers the following benefits:

Easy-to-adjust rotation

Each arm's 330 degree joint rotation adjusts in a snap.

Suspension arms glide into position

One person can comfortably move the Navigator's fixed suspension arm due to its high-quality bearings. With an amazingly low effort-to-load ratio of 1 to 83 pounds, a heavily-loaded Navigator arm virtually glides from one position to another.

You can also freely manage the space in your OR with electronically-controlled retractable suspension arms that raise out of the way when needed.

Pneumatic brakes lock the Navigator into place

The positive pneumatic braking system locks each joint with force so the arm stays put. The brake release button is conveniently located on the front and rear of the head.

Sleek design

NUVO Navigator's sleek design replaces screws and hard-to-reach joints with smooth easy-to-clean surfaces.

Designed for multiple service capacity

Navigator's oversized throat design and multiple head configurations accommodate up to 12 gases, 18 duplex- and six low-voltage positions, including telephone and data lines.

Simple brake maintenance

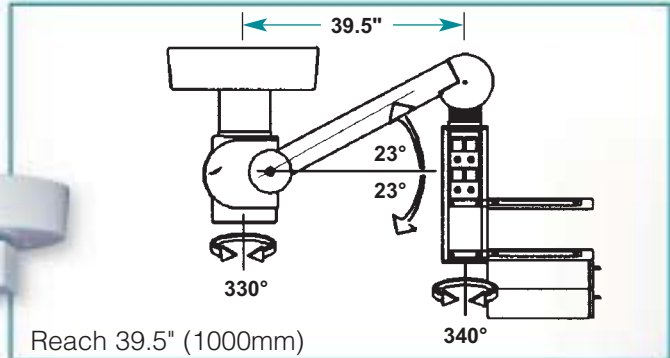
When needed, engineers can replace both pneumatic and friction brakes in minutes without disassembling the suspension arm.

Overall maintenance

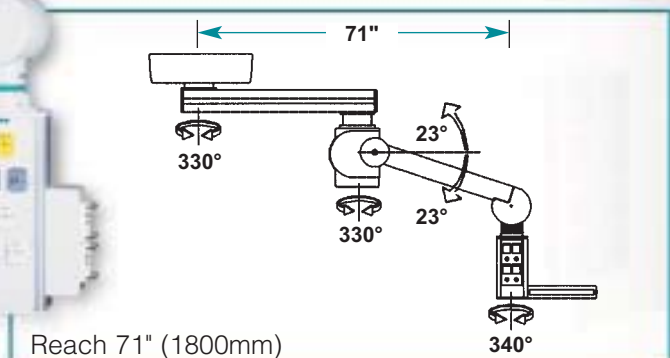
An annual check is recommended.

Retractable Suspension Arms

When not required, these arms will raise the service head electrically, creating more space.

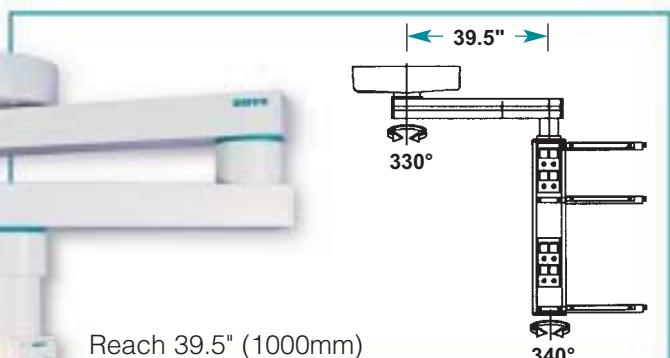


Single Retractable Arm

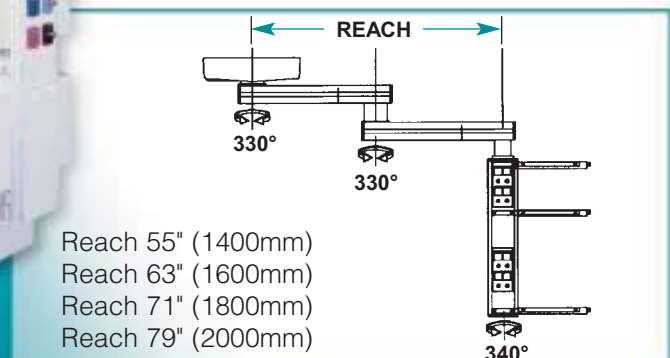


Double Retractable Arm

Straight Suspension Arms



Single Arm

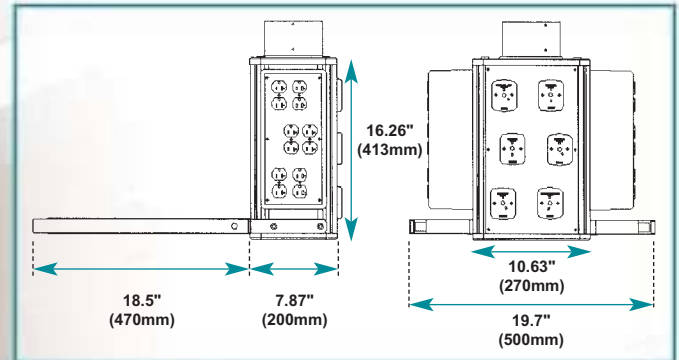


Double Arms

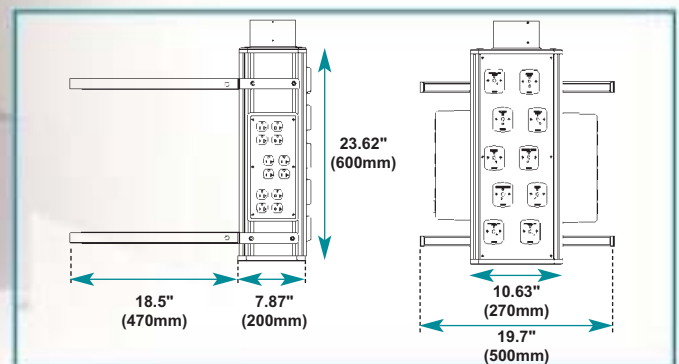
CUSTOMIZED CONFIGURATIONS

Navigator provides a choice of three service heads and seven suspension arm configurations with retractable and fixed (straight) suspension arms. With a custom configuration, you can position all utilities and instruments where you need them.

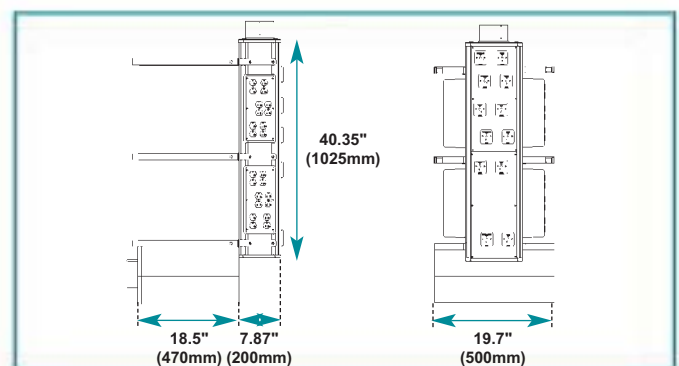
Service Heads



413 Service Head



600 Service Head



1025 OR Service Head

Accessories

- Shelf
- Drawer
- Keyboard Tray
- Set of IV Poles
- Flat Screen Monitor Arm
- Cord Wrap
- Cable Organizer
- Mayo Tray
- Suction Canister Holder
- Baskets
- Bottle Slide
- Tilting Monitor Support
- Retractable and Fixed Arm



Add Services with Ease

You can readily increase the life of your Navigator investment since the suspension arm's oversized throat design enables you to add services or change heads.

SPECIFICATIONS

Suspension Arms

	Single Retractable	Double Retractable	Single Fixed	Double Fixed			
Reach	39.5"/1000mm	71"/1800mm	39.5"/1000mm	55"/1400mm	63"/1600mm	71"/1800mm	79"/2000mm
Gross Payload <i>(Weight of the head to be subtracted)</i>	330 lb/150kg	330 lb/150kg	790 lb/360kg	500 lb/230kg	415 lb/190kg	350 lb/160kg	308 lb/140kg
Net Payload <i>(All Equipment/Accessories allowed on the Head)</i>							
With a 413 Head	264 lb/120kg	264 lb/120kg	—	—			
With a 600 Head	220 lb/100kg	220 lb/100kg	680 lb/310kg	390 lb/180kg	305 lb/140kg	240 lb/110kg	198 lb/90kg
With a 1025 Head	—	—	570 lb/260kg	280 lb/130kg	195 lb/90kg	130 lb/60kg	88 lb/40kg
Hi-Lo	28°/715mm	28°/715mm	—	—			
Rotation							
Ceiling Joint	330°	330°	330°	330°			
Middle Joint	—	330°	—	330°			
Head Joint	340°	340°	340°	340°			
Brakes							
Ceiling Joint	Air	Air	Air	Air			
Middle Joint	—	Air	—	Air			
Head Joint	Friction	Friction	Friction	Air			
Ceiling Height	9'-9"6"-10'-10"6"-11' 275-290-305-320-335cm	9'-9"6"-10'-10"6"-11' 275-290-305-320-335cm	8'-8"6"-9'-9"6"-10'-10"6"-11' 245-260-275-290-305-320-335cm	8'6"-9'-9"6"-10'-10"6"-11' 260-275-290-305-320-335cm			
Weight <i>(Avg. used on heads)</i>							
Mounting Plate	120 lb/55kg	120 lb/55kg	120 lb/55kg	120 lb/55kg			
Arm	165 lb/75kg	251 lb/114kg	141 lb/64kg	229 lb/104kg	240 lb/109kg	251 lb/114kg	262 lb/119kg
413 Head	66 lb/30kg	66 lb/30kg	—	—	—	—	—
600 Head	110 lb/50kg	110 lb/50kg	110 lb/50kg	110 lb/50kg	110 lb/50kg	110 lb/50kg	110 lb/50kg
1025 Head	—	—	220 lb/100kg	220 lb/100kg	220 lb/100kg	220 lb/100kg	220 lb/100kg

Service Heads

	413 Head	600 Head	1025 OR Head
Gas Outlets	6	10	12
Electrical Duplex	6	6	18
Low Voltage Provisions	4+(1) RJ45 & (1) RJ11	4+(1) RJ45 & (1) RJ11	4+(1) RJ45 & (1) RJ11
Shelf - 20.2 lbs. (9kg)	1	2	4
Drawer - 17.6 lbs. (8kg)	2	2	2
Keyboard Tray - 15.4 lbs. (7kg)	1	1	1
IV Poles - 22 lbs. (10kg)	Not Available	Not Available	Available



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