

**Visum™ Surgical Lights and
Flat Panel Arms
(Halogen and LED)**

stryker®

Pre-Installation Manual



Visum™ Surgical Lights and Flat Panel Arms

(Halogen and LED)

Pre-Installation Manual

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Stryker Visum Surgical Lights and Flat Panel Arms Pre-Installation Manual

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1. General Warnings and Cautions

Please read this manual and follow its instructions carefully. The words WARNING, CAUTION, and Note carry special meanings and should be carefully reviewed:



WARNING The personal safety of the patient or user may be involved. Disregarding this information could result in injury to the patient.



Caution Special service procedures or precautions must be followed to avoid damaging the instrument.



WARNING A lightning bolt within a triangle is intended to warn of the presence of hazardous voltages. Refer all service to authorized personnel.



Note Special information to make maintenance easier or important information more clear.

To avoid potential serious injury to the user and the patient and/or damage to this device, the user must adhere to the following warnings and cautions.

1.1 Warnings

1. Read this manual thoroughly, and be familiar with its contents prior to installing this equipment.
2. Test this equipment before release for use by hospital personnel.
3. Energized electrical circuits can cause severe injury or death. Ensure that all personnel working around energized circuits have been trained in and follow proper lock-out/tag-out and other applicable safety procedures.

1.2 Cautions

1. Use caution when lifting heavy objects to avoid serious bodily injury or damage to equipment.
2. All Stryker-supplied equipment should be stored in a clean, dry environment prior to installation. Failing to comply with this requirement may lead to equipment damage.

2. Product Symbol Definition

The following symbols may be found on the Stryker Visum LED and Flat Panel Arms:

	<p>An exclamation mark within a triangle is intended to alert the user to the presence of important operating and maintenance (service) instructions in the literature accompanying the product.</p>
	<p>A lightning bolt within a triangle indicates the presence of hazardous voltage. Refer all service to authorized personnel.</p>
	<p>Denotes oxygen explosion hazard.</p>
	<p>Denotes usage tips and useful information.</p>
	<p>Denotes compliance to European Community Directive 93-42-EEC.</p>
	<p>Indicates hot surfaces.</p>
	<p>Denotes compliance to CSA Standard C22.2, 60601.1 - M90, AS 3200, IEC 60601, IEC 60601-2-41, UL 60601, EN 60601</p>
	<p>Denotes the date the equipment was manufactured.</p>
	<p>Denotes the manufacturer of the device.</p>
	<p>A yellow box with a hand within a triangle is intended to warn the user of the presence of an electrostatic sensitive device. Follow ESD prevention procedures.</p>
	<p>In accordance with European Community Directive 2002/96/EC on Waste Electrical and Electronic Equipment, this symbol indicates that the product must not be disposed of as unsorted municipal waste but should be collected separately.</p> <p>Note: The device does not contain any hazardous materials.</p> <p>Legal regulations may include specifications regarding the disposal of this product. We request that you contact Stryker when you plan to withdraw this device from service for discard.</p>

3. Scope

This Pre-Installation Guide describes the requirements for assembling and installing components used in the support of Stryker ceiling-mounted surgical lighting and monitor carrying assemblies prior to installation. This guide covers all mechanical and electrical pre-installation requirements for the lights, control panel, power supply, surgical light suspensions, and flat panel/navigation suspensions. This guide does not describe the installation of the surgical monitors or support arm assemblies.

4. Guidelines and Responsibilities

4.1 Hospital/Contractor Responsibility

4.1.1 Support Structure/Mounting Support



WARNING Responsibility for proper design of the support structure lies entirely with the hospital/contractor and is not covered through warranty by Stryker. An improperly designed support structure may result in poor performance or damage to equipment and possible injury to the user. Service charges related to inadequate support structure design is at the customer's expense. Stryker will not review or approve customer support structures. This is the responsibility of the customer's architect and designated structural engineer. Any visit by Stryker personnel to view the steelwork is only to compare its position to ceiling plans.

1. Design and install the support structure to:
 - Support (Stryker-supplied) weight and moment loads of each equipment piece.
 - Satisfy all applicable regulations including, but not limited to, building and electrical codes.
2. Install the Stryker-supplied Mounting (Interface) Plate at the bottom of each support structure in accordance with the recommended method.
3. Loosely install (Stryker-supplied 5/8-11 UNC, M16 if provided) all thread, nuts and washers into the six (6) holes of the Mounting (Interface) Plate to avoid loss of hardware prior to installation.
4. Ensure that Stryker equipment and infrastructure is not impeded by the design of the support structure.
5. Verify that the diameter of the mounting site is 21-22in (53-56cm) to install the Surgical Light System (LED or Halogen).
6. Install access panels directly adjacent to each mounting point for future access for service and maintenance as described in this manual.
 - Each access panel must be a minimum of 18in x 18in (450mm x 450mm).

4.1.2 Delivery and Storage

1. Accept delivery of Stryker crates and equipment to the proper room prior to the installation date.
2. All Stryker-supplied equipment should be stored in a clean, dry environment prior to installation. Failing to comply with this requirement may lead to damage of equipment.
3. Remove and dispose of the pallets and boxes after completing the installation.

4.1.3 Drawings and Information

- The hospital must supply Stryker with up-to-date drawings in *.dwg* format (CAD) including but not limited to:
 - a. Room layout plans (current and proposed)
 - b. Electrical services drawings
 - c. Mechanical services drawings
 - d. Elevation drawings
 - e. Structural steel (support structure) drawings
 - f. Ceiling drawings
- The hospital must ensure that Stryker is notified of all revisions and changes to drawings prior to and during the scope of the project.

4.1.4 Electrical and Data Infrastructure

1. Provide and install the Mains power, junction boxes, Ethernet drops and grounded power outlets as described in this manual, CAD drawings and applicable regulations and standards.



Note For Flat Panel and Light/Flat Panel installations: Install a 5 amp fuse for 100V-120V applications, or a 2.5 amp fuse for 200V-240V applications, if required by local electrical code. These fuses must be provided by the contractor.

2. Provide an uninterruptible, grounded and isolated power to the surgical light system.
3. Install the appropriate conduit, catenaries and cable trays between mains power, surgical light power supply box, wall control panel and the support structure mounting points.
 - **For Visum LED Lights:** Install the back box for the wall-mounted Visum LED Surgical Lights application.
4. Provide access for all Stryker personnel to route Stryker-supplied cables from locations within each room to the termination locations, as specified in the CAD drawings.
5. Verify the capacity of electrical infrastructure is capable of meeting the requirements as specified by Stryker for the project.
6. Perform final electrical testing and validation for all electrical cables and power outlets, including those on Stryker-supplied booms.
7. Make all connections of Stryker equipment to Mains Power.

4.1.5 Stryker's Responsibilities

- Provide the hospital or designated contractor with CAD drawings including elevation and room configuration drawings for Stryker-supplied equipment.
- Advise the hospital of a proposed time-frame for installation of Stryker-supplied infrastructure.
- Check in with hospital personnel and/or contractor to announce arrival.
- Install the surgical lights and calibrate the brakes according to Stryker specifications.
- Connect low voltage electrical and data cables for surgical lights and adjust lighting (voltage, field diameter adjustments, etc.) to Stryker specifications.
- Install the flat panel monitor arm (if applicable) and calibrate the brakes to Stryker specifications.
- Route and terminate all audio visual cables required for Stryker-supplied equipment.
- Install flat panel monitor (if applicable) and connect audio visual wiring kit to the flat panel.

5. Mounting Plate Descriptions

5.1 Mounting (Interface) Plate

The Mounting Plate is the primary mounting component for new surgical light installations. The plate must be welded or bolted to the support structure by the hospital/contractor.

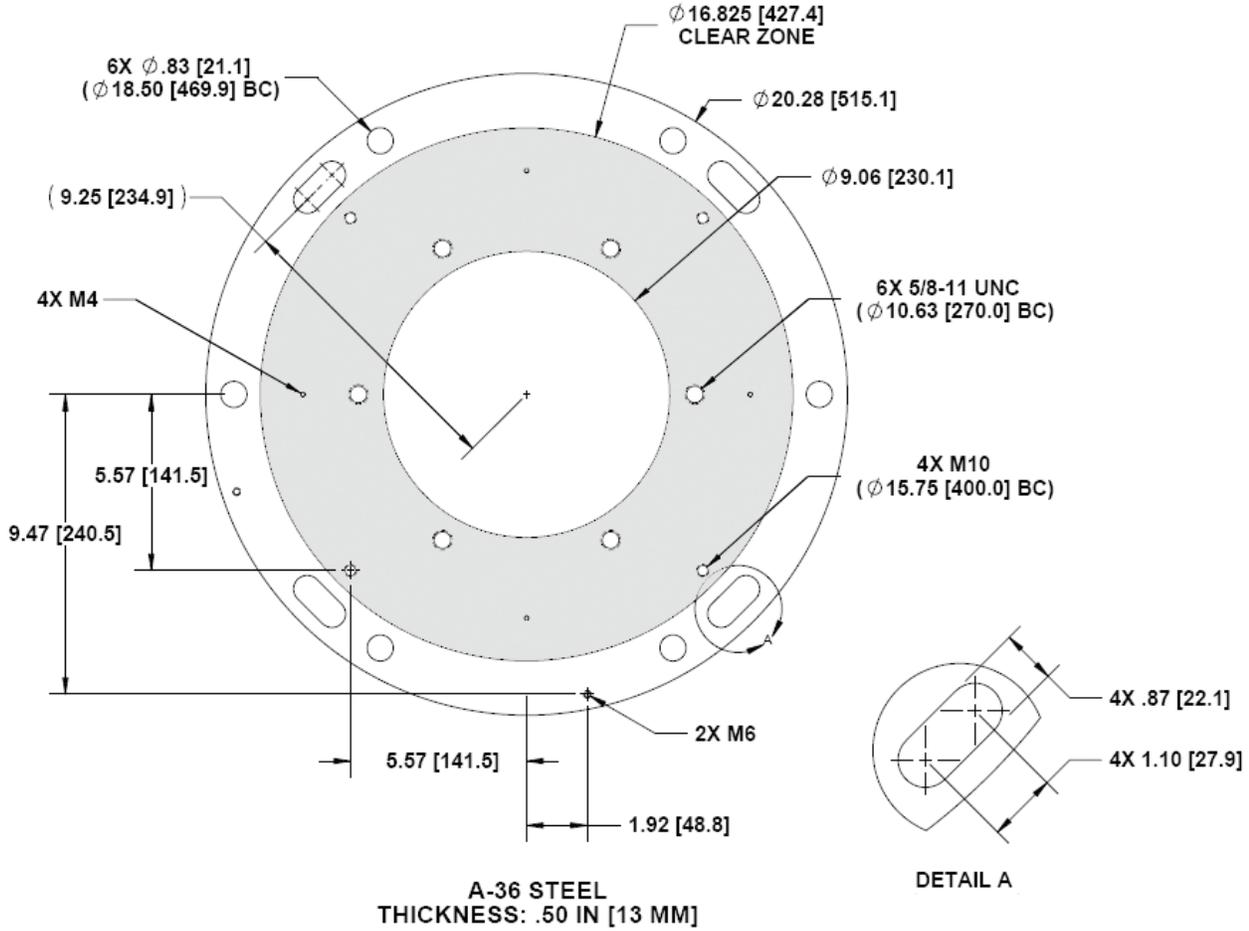


Figure 5.1 - Stryker-supplied Mounting (Interface) Plate



WARNING The mounting plate is part of the support structure. It is the hospital's responsibility to ensure that the mounting plate can sufficiently support the loads defined for the support structure.



Note Ensure that the area inside the Clear Zone and at least one of the 2X M6 holes remain unobstructed by the support structure or weld slug.

5.2 Universal Mounting Plate

The Universal Mounting Plate adapts the hole-pattern of existing ceiling plates to accommodate Stryker equipment. At least one hole pattern in the existing mounting plate must align with one hole pattern in the Universal Mounting Plate.



WARNING The Universal Mounting plate is only intended for use with light suspensions and flat panel suspensions. It cannot be used to mount a boom.

For all references in this guide, the Universal Mounting Plate only adapts Stryker equipment to existing mounting plates supplied by Steris®, Berchtold® or Getinge. It is the hospital responsibility to determine whether their existing plate is compatible with the Universal Mounting Plate prior to site preparation.



WARNING The existing mounting plate is part of the support structure. It is the hospital's responsibility to ensure that the existing plate is sufficiently strong to support the loads defined in this manual.

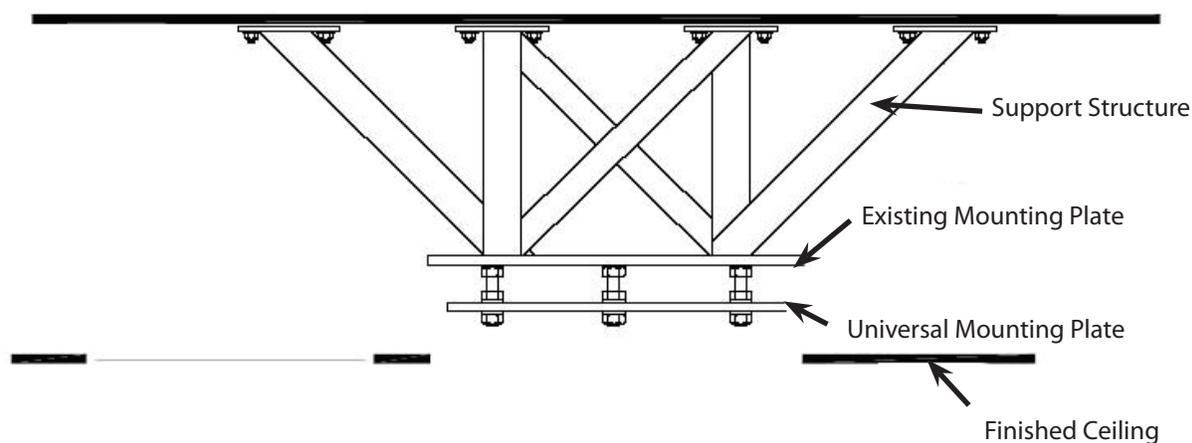


Figure 5.2 - Mounting & Universal Plate Diagram

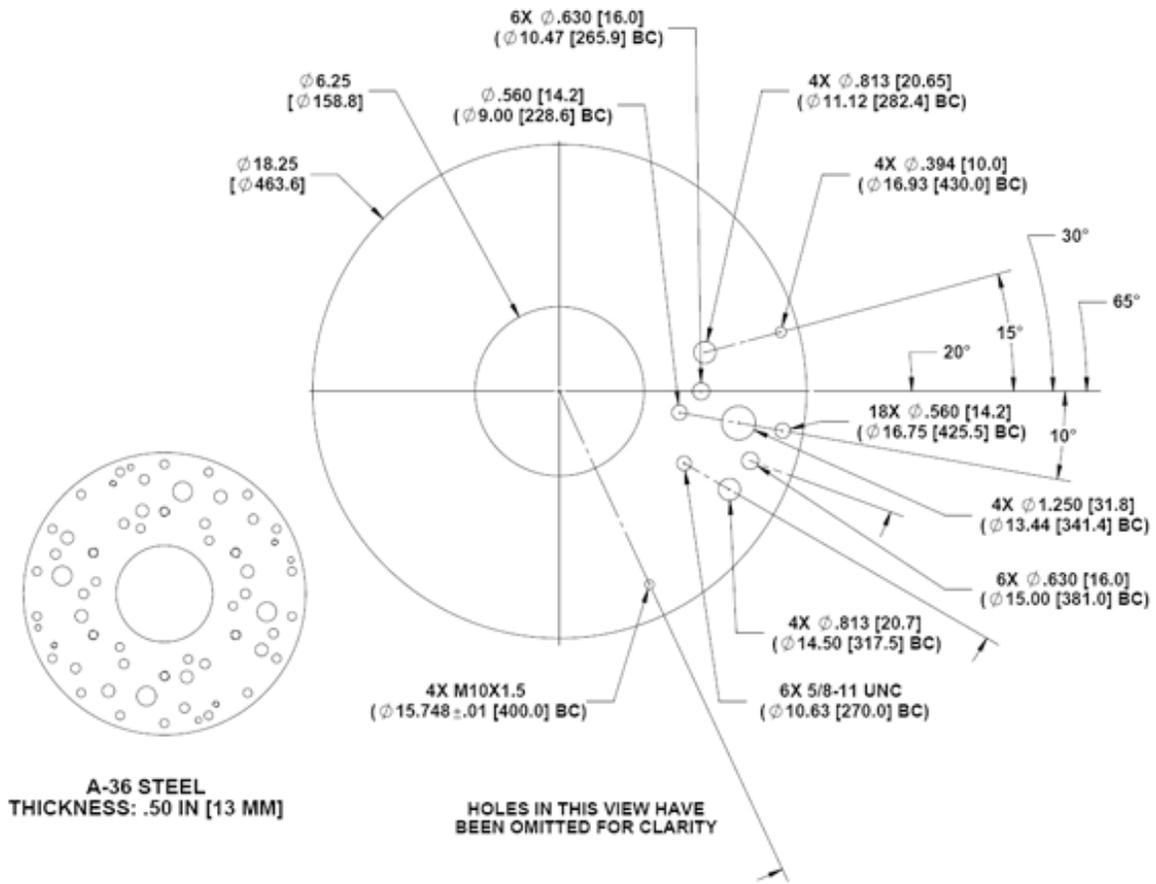


Figure 5.3 - Universal Mounting Plate

6. Visum 450 and Visum 600 (Halogen) Part Descriptions

6.1 Visum 450 & 600 (Halogen) Light Power Supply Box

(Weight: 36.5 lbs/16.5 kg)

1. The power supply box provides 24V DC power to the surgical lights from a 115/230 VAC source.
2. Mount the power supply box at the documentation station.

Note Single and dual-light configurations require one power supply box. Three or four-light configurations require two power supply boxes.

3. Use a Three-Bay Documentation Station to accommodate the power supply box and a Switch-Point Infinity® unit.

Note The power supply box can be configured with an optional 24V inlet for battery backup, if required by the hospital.



Front View of Power Supply Box



Back View of Power Supply Box

Figure 6.1 - Power Supply Box

6.2 Visum 450 & Visum 600 (Halogen) Light and Camera Wall Control Panel

The wall control panel provides control for lighting levels as well as control for cameras where applicable.

1. Vertically mount the wall control panel at conventional light switch height.



Note Single and dual-light configurations require one wall control. Three or four-light configurations require two wall controls.

2. Attach the wall control panel to the three-gang box (use the provided screws).

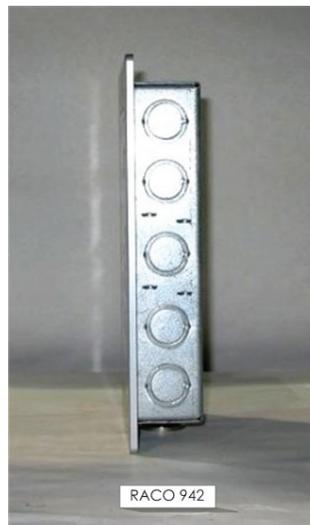
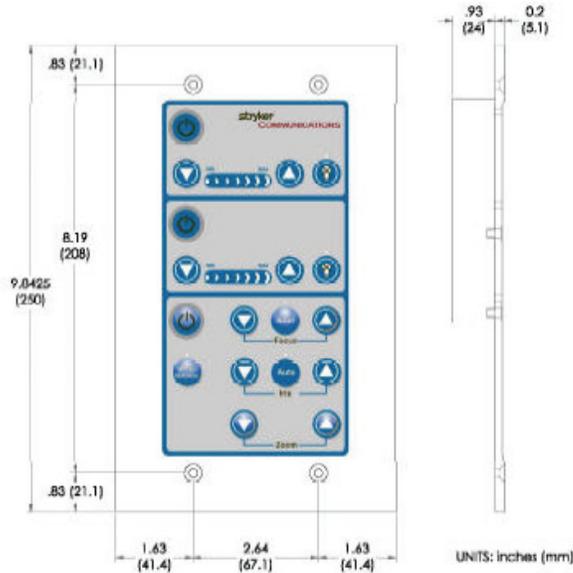


Figure 6.2 - Wall Control Panel



Note It is not required to install the wall control panel inside the documentation station. Consult the hospital to determine ideal placement near or in the documentation station. For proper installation of the wall control panel, a standard RACO 942 three-gang box should be mounted vertically.

7. Visum LED Part Descriptions

7.1 Power Supply Box for Visum LED

(Weight: 20lbs/9.09 kg)

The power supply box provides 24 VDC power to the surgical lights from a 100-230 VAC source.

1. Mount the power supply box at the documentation station or near a power outlet and Ethernet drop.



Note Single and dual-light configurations require one power supply box. Three or four-light configurations require two power supply boxes.

2. Use a Three-Bay Documentation Station to accommodate a power supply box and a SwitchPoint Infinity® unit.

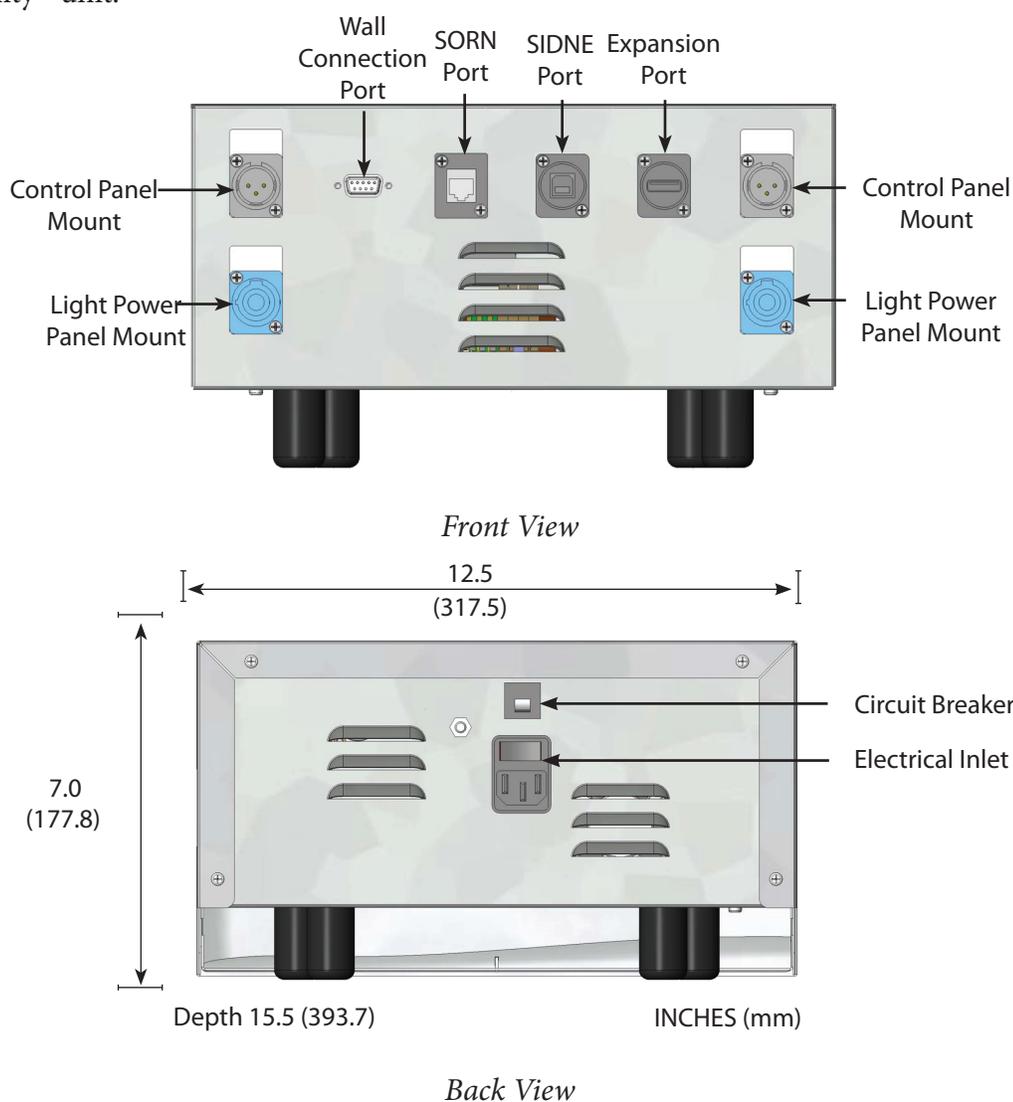
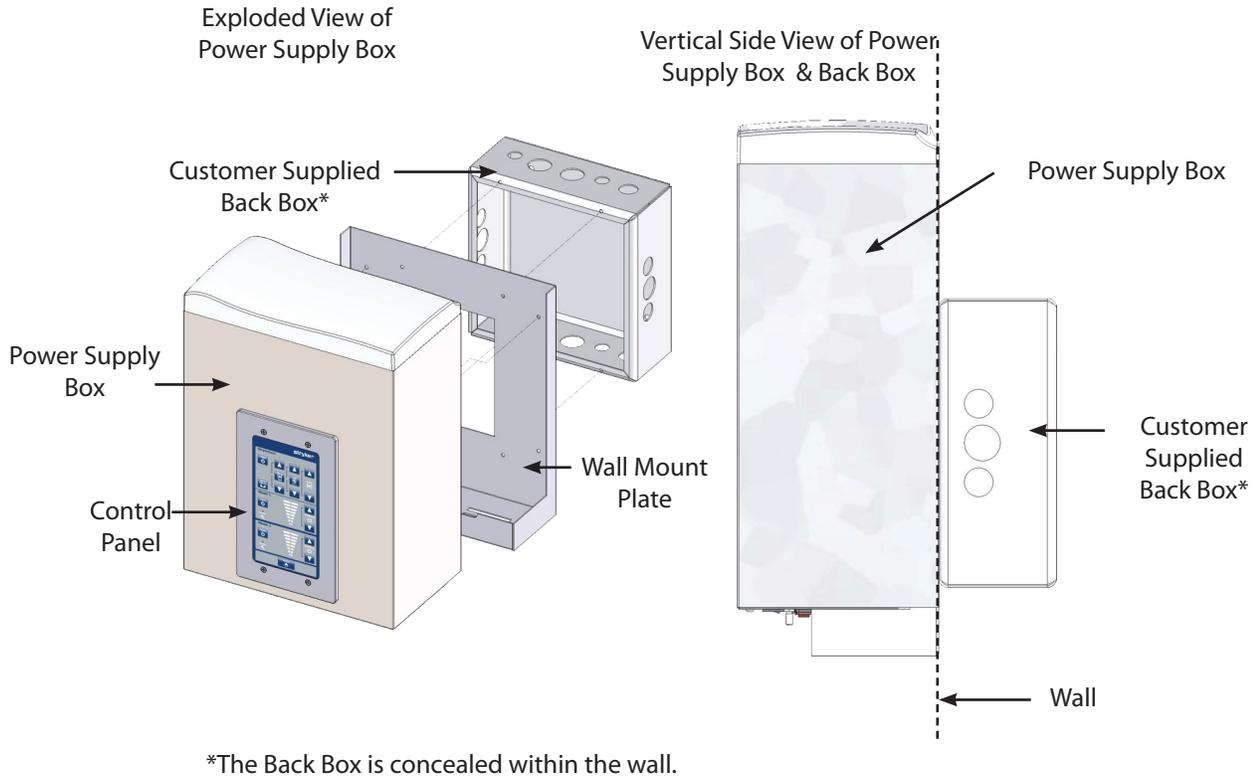


Figure 7.1 - Power Supply Box & Ports (for Visum LED Surgical Lights)

7.2 Power Supply Box Wall Mount (Optional)

The Power Supply Box Wall Mount should be used to securely install and mount a Visum LED power supply box to a wall.



*The Back Box is concealed within the wall.

Figure 7.2 - Exploded/Side View of Power Supply Box

 **Note** Mount a standard Hubbell Wiegmann (P/N SC101004) junction box for proper installation of a wall-mounted power supply box. Consult the hospital to determine ideal placement for the power supply box.

7.3 Visum LED Wall Control Panel

The Visum LED Wall Control Panel enables users to control light intensity as well as In-Light camera functions.

1. Vertically mount the panel at conventional light switch height. The wall control panel comes with four screws to attach the panel to a three-gang box.

 **Note** Single and dual-light configurations require one wall control. Three or four-light configurations require two wall controls.

2. For three or four light installations, mount the power supplies side by side at a distance of 16 in (406mm) from center to center between back boxes.

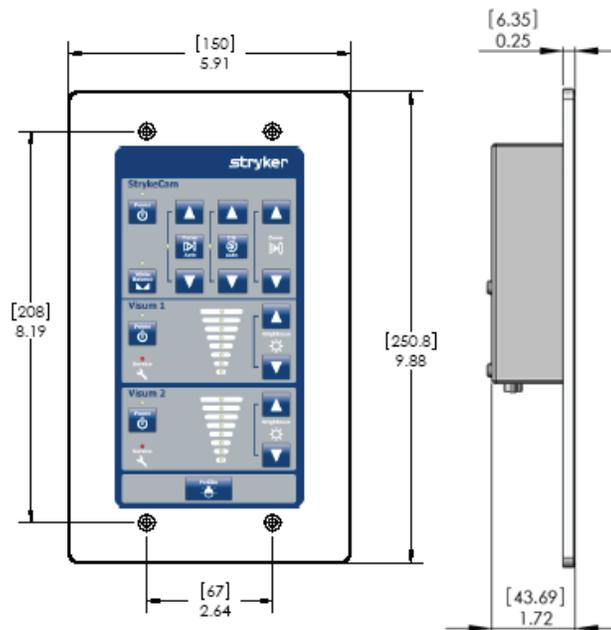


Figure 7.3 - Wall Control Panel

8. Site Preparation

Installation of the support structure (as outlined in the Guidelines and Responsibilities section of this guide), electrical conduits, junctions boxes, video, data, and other services should be installed by the hospital or contractor and are not contained within the scope of work for Stryker. Stryker assumes all work has been performed in accordance with all applicable engineering and electrical building codes.

8.1 Support Structure

1. Position the support structure according to the room layout provided by Stryker.



WARNING The maximum allowed deflection of the ceiling plate under maximum load is 1° ($1/300$ deflection ratio).



Note The support structure must adequately support the loads specified for each application. Structure designs can vary significantly based on load, interstitial space, obstructions, and building codes.

2. Weld the Mounting (Interface) Plate to the support structure along the outer edge of the plate or use the six .83in (21mm) holes along the outer edge of the plate to bolt it to the support structure (see Figure 1).
3. Do not use Stryker-supplied thread-all rods to attach the suspension to the Mounting (Interface) Plate. The bolts must be supplied by the contractor.
4. The Mounting (Interface) Plate must be level within 0.25in (6.4mm). The bottom of the mounting plate must be 2-4in (50mm-100mm) above the finished ceiling. Allow enough space to route cables to the surgical light and Flat Panel Navigation Arm (see Figure 9).



WARNING Caution must be exercised when lifting heavy objects to avoid serious bodily injury or damage to equipment.



Note Dynamic (seismic) loads per California Building Code 1632A are available in Appendices A and B. If seismic calculations are required for a local region, they must be determined by the structural engineer.

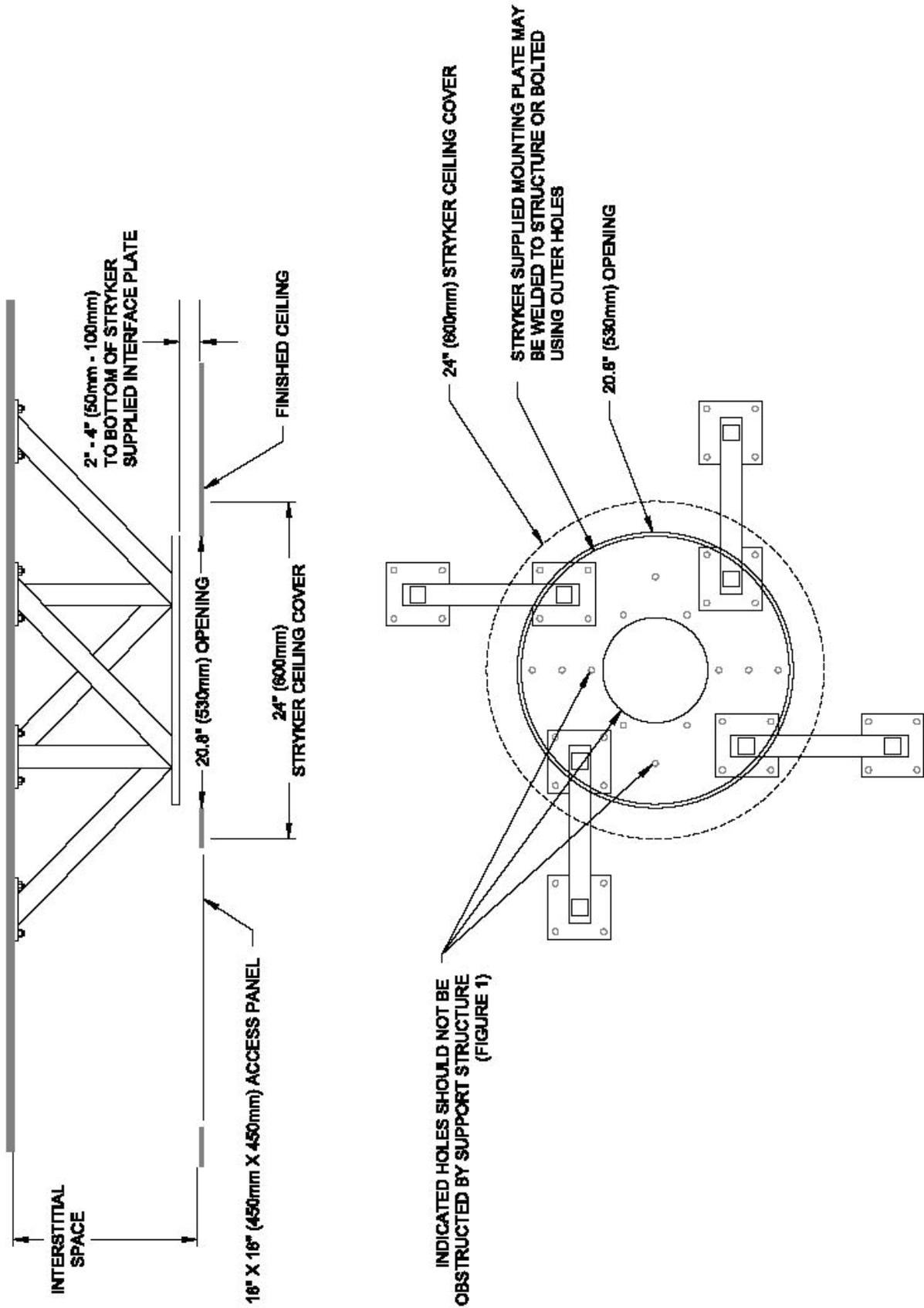


Figure 8.1 - Support Structure



WARNING Proper design and manufacture of the support structure is the hospital and contractor's responsibility and is not covered through warranty by Stryker. Insufficient structure support may result in poor performance or damage to equipment as well as injury to the user. Service charges related to inadequate structure support are the hospital's responsibility.



WARNING The mounting plate is part of the support structure. It is the hospital's responsibility to ensure that the mounting plate is sufficiently supported to carry the loads defined for the support structure.



Note The support structure must be designed and installed to avoid obstruction of or interference with the six tapped holes [5/8-11 UNC (M16)] located adjacent to the inner diameter of the Mounting (Interface) Plate as well as the 9.06in (230 mm) diameter center hole.



Note "Bolt-together," prefabricated, structural members are highly discouraged and considered an unacceptable solution for the support structure design. This approach generally allows considerable flexing of the structure resulting in poor performance and possible equipment damage.

8.1.1 Ceiling Access

- An 18in x 18in (450mm x 450mm) minimum access panel must be installed in the ceiling within 18in (450mm) of the Mounting (Interface) Plate to allow connection of electrical and data cables during final installation.
- An 21-22in diameter (533mm-558mm) hole, concentric with the Mounting (Interface) Plate center is required for the light assembly installation. A 24in (600mm) diameter ceiling cover (Stryker-supplied) will conceal the hole after the suspension has been completely installed.

8.2 Electrical Installation



WARNING Energized electrical circuits can cause severe injury or death. Ensure that all personnel working around energized circuits have been trained in and follow proper lock out/tag out and other applicable safety procedures.



Note Electrical installation and components must conform to all applicable regulations.



Note All contractor-provided components must be UL-approved or UL-recognized.



Note Maximum cable lengths specified in Conduit Schedules (Figures 10, 11 and 12) indicate the maximum length of cables routed through conduits. Ensure that the cable distance between the components (e.g., suspension and power supply box) does not exceed the specified lengths.

8.2.1 Power Supply Box Mounted in Documentation Station

1. Install a vertically-mounted, three-gang junction box (e.g., RACO 942) for each wall control panel.

**Note**

One and two-light configurations require one junction box; three and four-light configurations require two junction boxes.

**Note**

It is not necessary to install the wall control panel inside the documentation station. Consult the hospital to determine ideal placement near or in the documentation station for the wall control panel.

2. Install an 18in x 18in (45cm x 45cm) back box behind the documentation station where the power supply box will be located.
3. (Visum LED only) Verify that an Ethernet drop is available within 72in (1.8m) of the power supply box.
4. Verify that a grounded, uninterruptible and isolated power outlet 115/230V (Halogen) and 100-230V (LED) is available within 48in (1.2m) of each power supply box.
5. Install conduits as specified in Figure 10.
6. Provide pull-strings and terminate all conduits with bushings.

**Note**

All components must be located so that conduits do not exceed the maximum lengths specified in Figure 10.

**Note**

Suspensions with flat panel monitors require additional electrical components (see Suspensions with Flat Panel Arms).

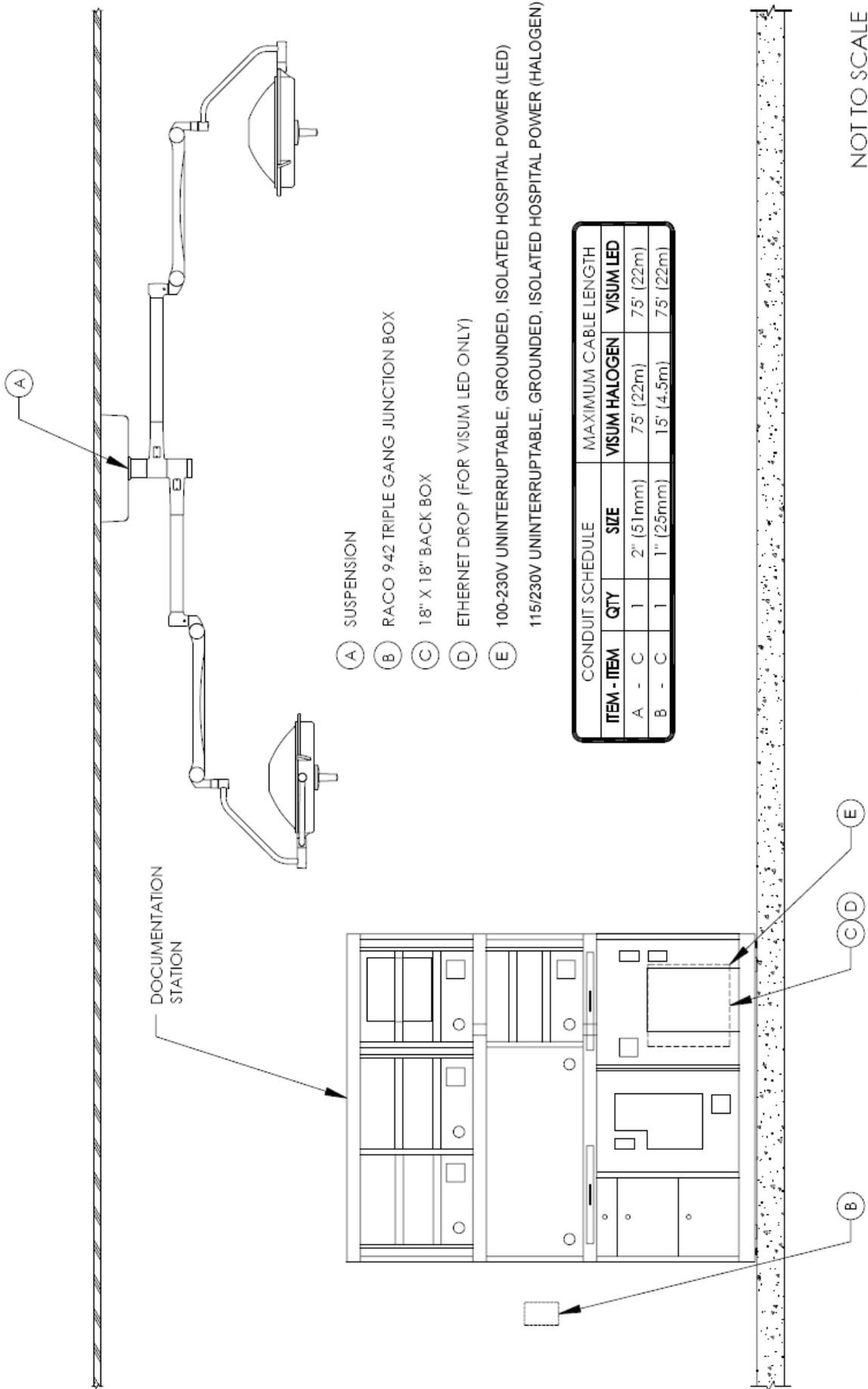


Figure 8.2 - Electrical Installation with Power Supply Box & Documentation Station

8.2.2 Wall-Mounted Power Supply Box (Visum LED only)

1. Install an 18in x 18in (45cm x 45cm) back box behind the documentation station, if applicable.
2. Install a 10in x 10in x 4in (25.4cm x 25.4cm x 10.6) Hubbell Wiegmann (P/N SC101004) junction box at the location of the power supply box.



Note The wall control panel is mounted on the power supply box for wall-mounted applications.

3. Provide 100-230V, uninterruptible, grounded and isolated power to the 10in x 10in (25.4cm x 25.4cm) junction box.



Note The hospital must appoint an electrician to connect the power supply box to the house power.

4. (Visum LED only) Verify that an Ethernet drop is available within 72in (1.8m) of the documentation station.
5. Install the conduits as specified in Figure 11.
6. Provide pull-strings and terminate all conduits with bushings.



Note All components must be located so that conduits do not exceed the maximum lengths specified in Figure 11.



Note Suspensions with flat panel monitors require additional electrical components (see Suspensions with Flat Panel Arms).

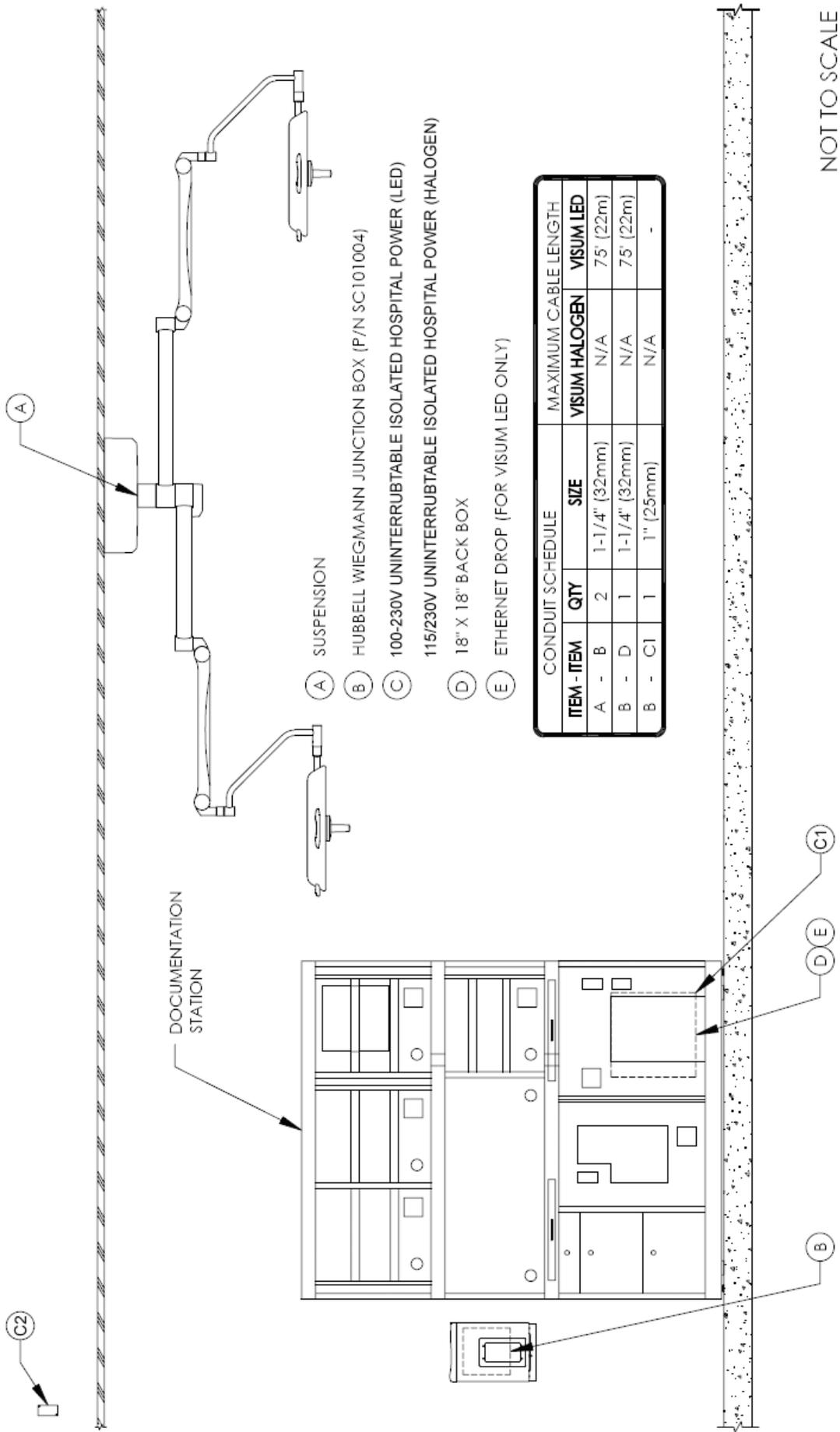


Figure 8.3 - Electrical Installation with Wall-Mounted Power Supply Box & Documentation Station

8.2.3 Suspensions with Flat-Panel Arms

For each suspension with a flat panel monitor:

1. Install an additional 2" (50mm) conduit between the suspension and the documentation station (see Figure 12).
2. Provide pull-strings and terminate all conduits with bushings.
3. Install a junction box with 110/220V uninterruptible power within 12in (30cm) of the mounting plate.

**Note**

For Flat Panel and Light/Flat Panel installations: install 5 amp fuse for 100V-120V applications or a 2.5 amp fuse for 200V-240V applications, if required by local electrical code. These fuses must be provided by the contractor.

8.2.4 Single/Dual Flat-Panel Arms

1. Install 2" (50mm) conduit between the suspension and the documentation station.
2. Provide pull strings and terminate all conduits with bushings.
3. Install a junction box with 110/220V uninterruptible power within 12" (30cm) of the mounting plate.

8.2.5 Navigation Arms

1. Install 2" (50mm) conduit between the suspension and the documentation station.
2. Provide pull strings and terminate all conduits with bushings.

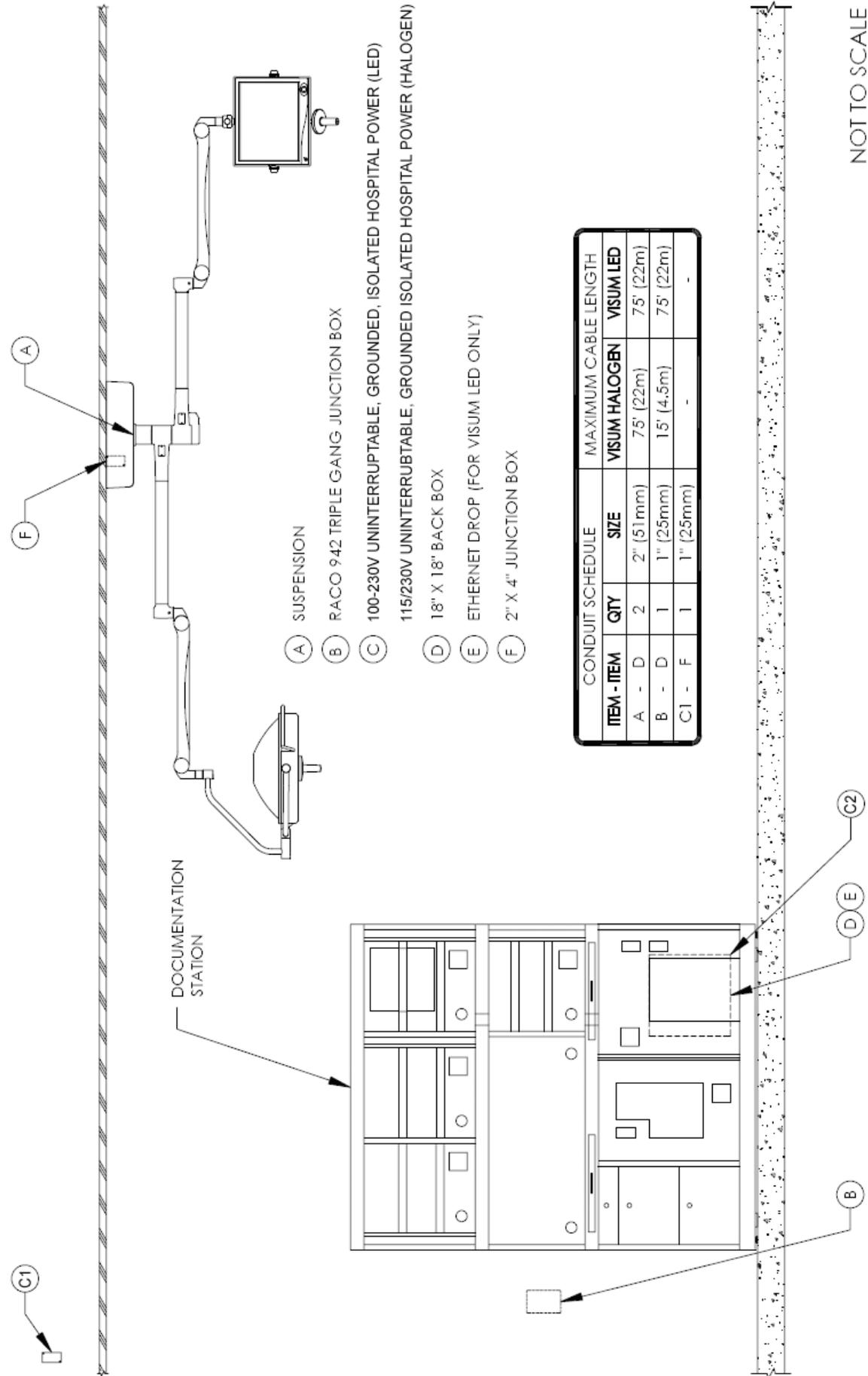


Figure 8.4 - Electrical Installation with Flat Panel & Documentation Station

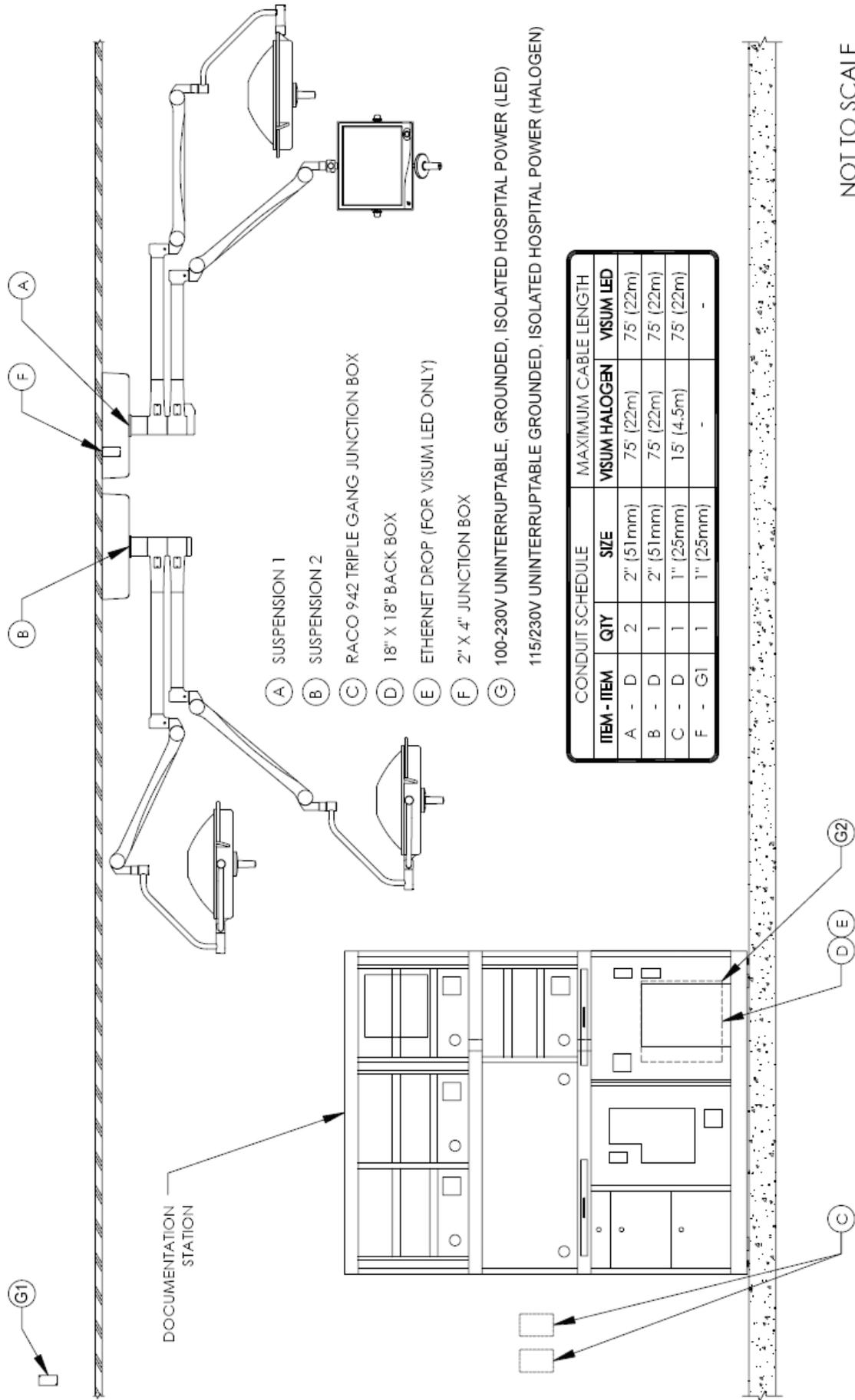


Figure 8.5 - Electrical Installation for Two-Suspension Configuration

Figure Explanation: Two power supply boxes are mounted in the documentation station. One additional conduit is required for the flat panel suspension and two vertically mounted junction boxes are required for two wall control panels.

9. Specifications

9.1 Environmental Specifications

Operating Humidity:	10%–95%
Storage Humidity	10%–95%

Operating Temperature	Visum LED Surgical Light/StrykeCam 2	41–100 °F (5–38 °C)
Storage Temperature	Visum LED Surgical Light/StrykeCam 2	
Pressure	Visum LED Surgical Light/StrykeCam 2	21–31in. Hg (71kPa–105kPa)

9.2 Electrical Specifications

Rated Input	Voltage	115/230V ~50/60 Hz (Halogen) 100-230V~50/60 Hz (LED)
	Current	4/2A (Halogen) 6A (LED)
Power per Light Head (Visum LED)	With Camera	475 Btu/hr (140W)
	Without Camera	325 Btu/hr (95W)
Visum 450 (Halogen)	With Camera	511.82 Btu/hr (150W)
	Without Camera	409.46 Btu/hr (120W)
Visum 600 (Halogen)	With Camera	614.19 Btu/hr (180W)
	Without Camera	511.82 Btu/hr (150W)

9.3 Mechanical Specifications

Max Load Capacity	with all models, including Stryker Visum™ Surgical Light
Navigation Spring Arm:	up to 7.0 kg (15.4 lbs)
Single Flat Panel Spring Arm:	up to 18 kg (39.6 lbs)
Dual Flat Panel Spring Arm:	up to 45 kg (99.2 lbs)
Horizontal Arm:	up to 45 kg (99.2 lbs)
Flat Panel Spring Arm on Light Suspensions	up to 21 kg* (46.3 lbs)

*Check load capacity of Spring Arm prior to loading.

9.4 Critical Distances

- The bottom of the mounting plate must be within 2-4in (50mm-100mm) above the finished ceiling.
- The Ethernet drop must be within 72in (1.8m) of the power supply box.
- The wall control panel must be within 60ft (18.3m) of the power supply box.
- If two wall control panels are used, each control panel should be installed on an 8in-10in (203 mm-254mm) center.
- If two power supply boxes are used, each power supply box should be installed on a 14in-18in

(356mm-457mm) center.

9.5 Support Structure Loads

Support Structure Loads			Load Location	
Equipment	Suspension	Weight	\bar{x}	\bar{y}
LED and Halogen	Single	131 lbs (59 kg)	34.4in (874mm)	53in (1346mm)
	Dual	204 lbs (93 kg)	40.2in (1021mm)	61.6in (1564mm)
	Triple	282 lbs (128 kg)	45.6in (1158mm)	65.4in (1661mm)
Flat Panel Arm	Dual	214 lbs (97 kg)	33in (838mm)	49in (1245mm)
	Single	184 lbs (83 kg)	31in (787mm)	45in (1143mm)

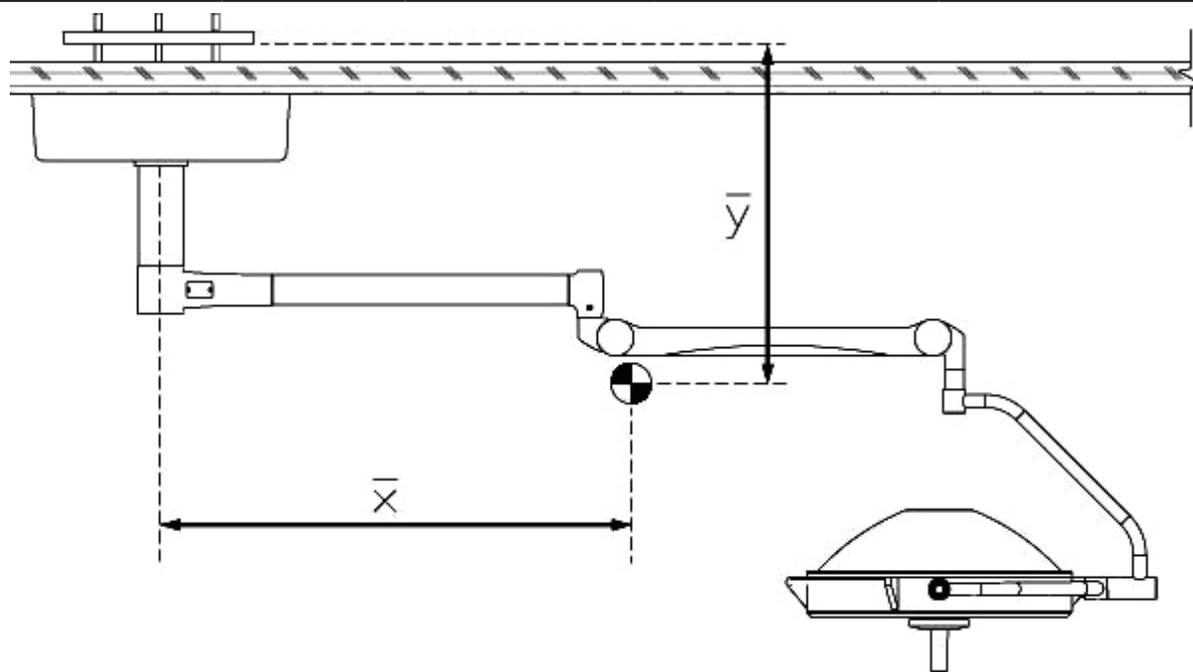


Figure 9.1 - Horizontal (\bar{x}) & Vertical (\bar{y}) Locations of Center Mass

9.6 Light Suspension Specifications

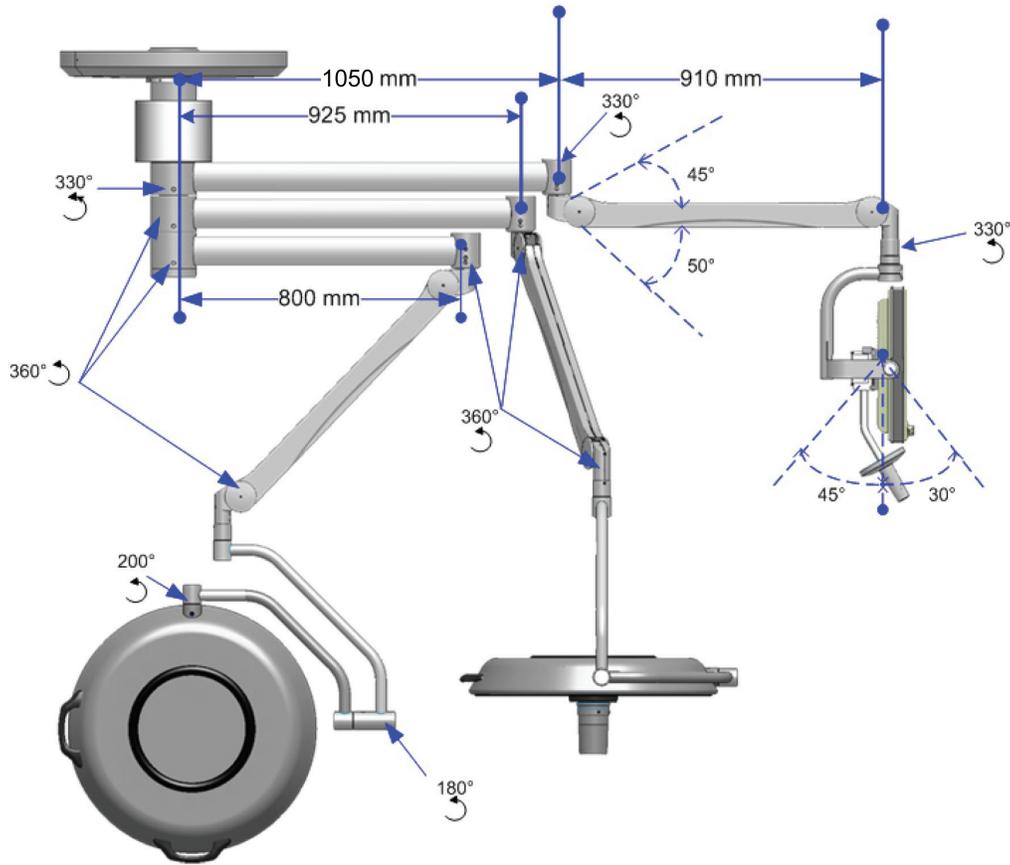


Figure 15: Light Suspension Specifications (LED Suspension shown)

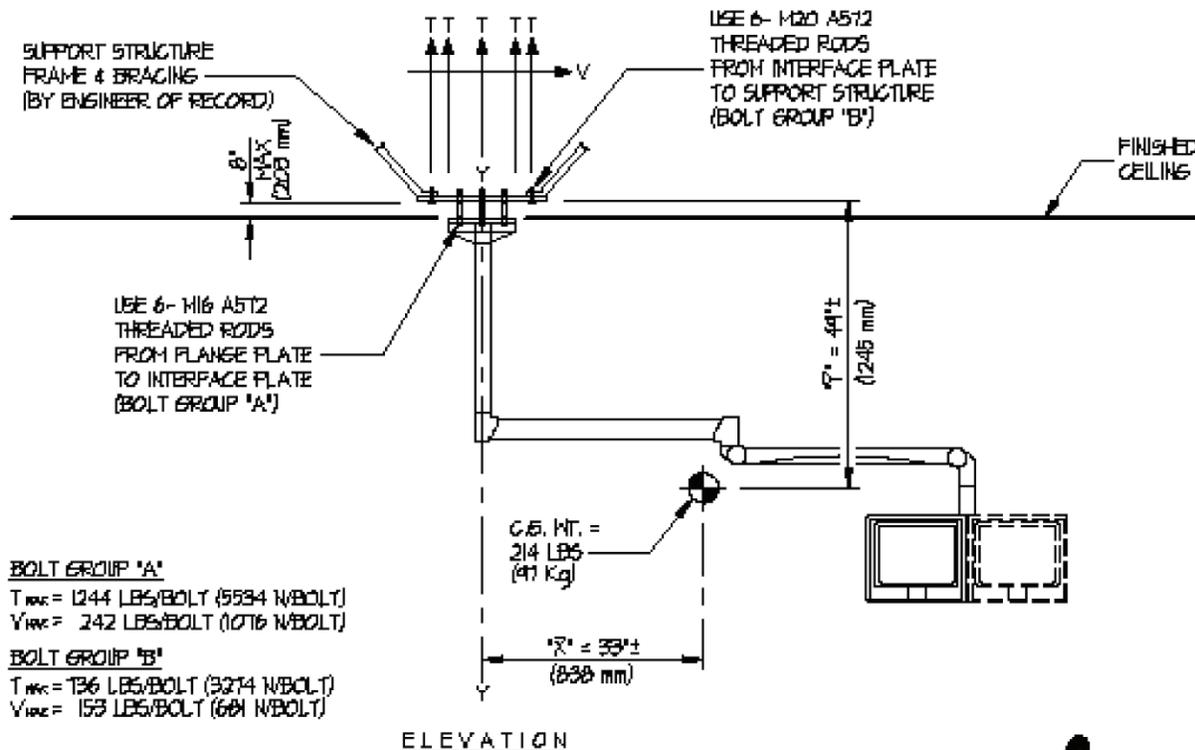
Suspension Capacity	Extension Arm Lengths LED and Halogen
Single	31.5in (800mm)
Dual	31.5in (800mm) 36.4in (925mm)
Triple	31.5in (800mm) 36.4in (925mm) 41.3in (1050mm)

Appendix A: Seismic Calculations (Flat Panel Arms)

EASE EQUIPMENT ANCHORAGE & SEISMIC ENGINEERING www.equipmentanchorage.com	DES. R. LA HRIE	SHEET 1
	DATE 11-0518	OF 3 SHEETS
STRYKER COMMUNICATIONS FLAT PANEL MONITOR ARM - SINGLE/DUAL FLAT PANELS -		

SEISMIC ANCHORAGE

CEILING MOUNTED

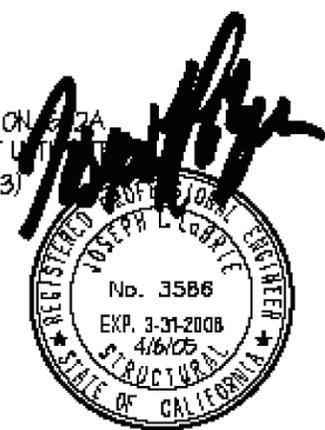


BOLT GROUP 'A'
 $T_{max} = 1244 \text{ LBS/BOLT (5534 N/BOLT)}$
 $V_{max} = 242 \text{ LBS/BOLT (1076 N/BOLT)}$

BOLT GROUP 'B'
 $T_{max} = 136 \text{ LBS/BOLT (3274 N/BOLT)}$
 $V_{max} = 153 \text{ LBS/BOLT (684 N/BOLT)}$

NOTES:

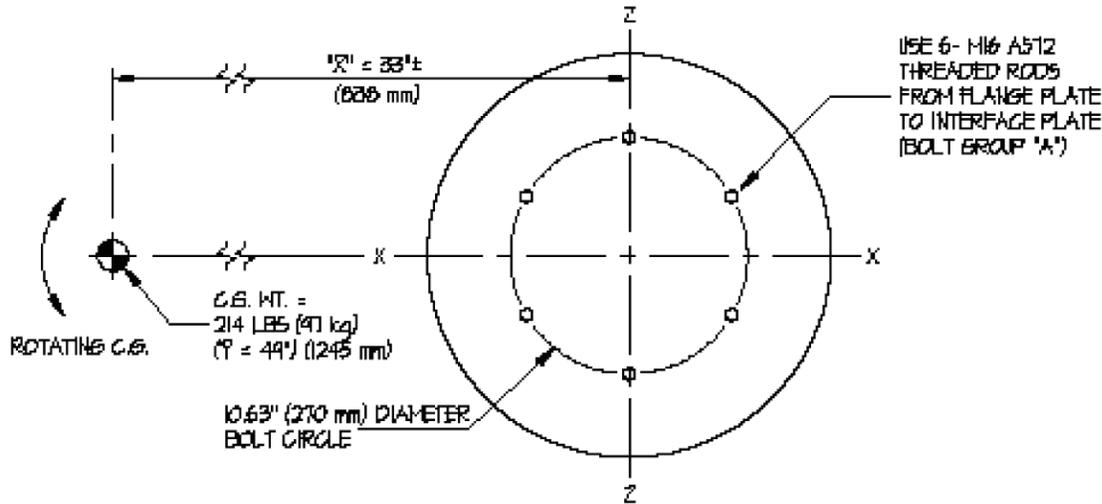
- FORCES ARE DETERMINED PER 2001 CALIFORNIA BUILDING CODE - SECTION 1607A AND HAVE BEEN FACTORED TO REPRESENT WORKING DESIGN LOADS, NOT ULTIMATE. HORIZONTAL FORCE (V_H) = $0.94H - (C_a = .66, I_p = 1.5, a_p = 1.0, R_p = 3)$ VERTICAL FORCE (V_V) = $0.33V_H$
- CENTER OF GRAVITY (C.G.) WEIGHT IS A MAXIMUM. THIS CALCULATION ENCOMPASSES ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.
- ENGINEER OF RECORD FOR THE BUILDING SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN.



EASE EQUIPMENT ANCHORAGE & SEISMIC ENGINEERING www.equipmentanchorage.com	STRYKER COMMUNICATIONS	DES. R. LA BRUE	2 OF 3 SHEETS
	FLAT PANEL MONITOR ARM - SINGLE/DUAL FLAT PANELS -	JOB NO. 11-0528	
		DATE 4/6/15	

SEISMIC ANCHORAGE

FLANGE PLATE



PLAN AT FLANGE PLATE

LOADS:

WEIGHT = 214 LBS (952 N)
 HORIZONTAL FORCE (V_H) = 201 LBS (894 N)
 VERTICAL FORCE (V_V) = 67 LBS (298 N)

BOLT GROUP PROPERTIES:

$I_{X-X} = 85 \text{ IN.}^2$ /BOLT (54839mm²/BOLT)
 $I_{Z-Z} = 85 \text{ IN.}^2$ /BOLT (54839mm²/BOLT)
 $I_{Y-Y} = 169 \text{ IN.}^2$ /BOLT (109032mm²/BOLT)

MOMENTS:

$M_{XX} = 201\#(44') + (214\# + 67\#)33' = 19,122'\#$ (2161 N-m)
 $M_{ZZ} = 201\#(44') + (214\# + 67\#)33' = 19,122'\#$ (2161 N-m)
 $M_{YY} = 201\#(33') = 6,633'\#$ (749 N-m)

BOLT FORCES:

TENSION (T)

$$T = \frac{19122'\#(5.32')}{85} + \frac{214\# + 67\#}{6} = 1244 \text{ LBS/BOLT (MAX) (5534 N/BOLT)}$$

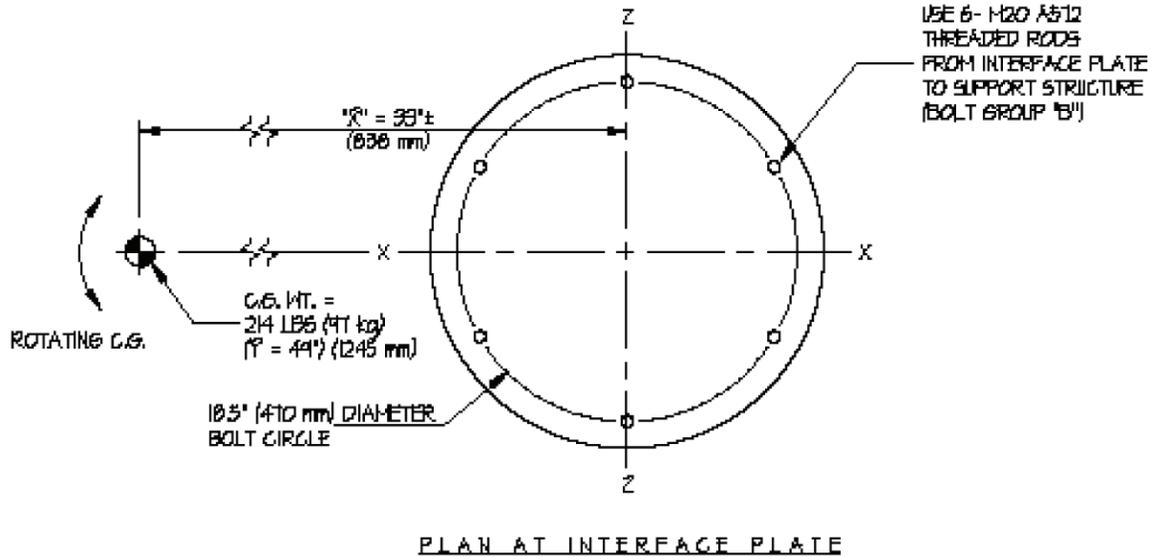
SHEAR (V)

$$V = \frac{201\#}{6} + \frac{6633'\#(5.32')}{169} = 242 \text{ LBS/BOLT (MAX) (1076 N/BOLT)}$$

 EQUIPMENT ANCHORAGE & SEISMIC ENGINEERING www.equipmentanchorage.com	DES. R. LA BRIE	3 OF 3 SHEETS
	STRYKER COMMUNICATIONS	
FLAT PANEL MONITOR ARM - SINGLE/DUAL FLAT PANELS -	DATE 4/6/05	

SEISMIC ANCHORAGE

INTERFACE PLATE

**LOADS:**

WEIGHT = 214 LBS (952N)

HORIZONTAL FORCE (V_h) = 201 LBS (894 N)VERTICAL FORCE (V_v) = 67 LBS (298 N)**BOLT GROUP PROPERTIES:** $I_{x-x} = 256 \text{ in.}^2 / \text{BOLT}$ (16516 mm²/BOLT) $I_{z-z} = 256 \text{ in.}^2 / \text{BOLT}$ (16516 mm²/BOLT) $I_{y-y} = 512 \text{ in.}^2 / \text{BOLT}$ (330322 mm²/BOLT)**MOMENTS:** $M_{xx} = 20\#(49") + (214\# + 67\#)(33") = 19,122\#$ (2161 N-m) $M_{zz} = 20\#(49") + (214\# + 67\#)(33") = 19,122\#$ (2161 N-m) $M_{yy} = 20\#(33") = 6,633\#$ (744 N-m)**BOLT FORCES:**

TENSION (T)

$$T = \frac{19122\#(9.25")}{256} + \frac{201\# + 67\#}{6} = 136 \text{ LBS/BOLT (MAX) (3214 N/BOLT)}$$

SHEAR (V)

$$V = \frac{201\#}{6} + \frac{6633\#(9.25")}{512} = 153 \text{ LBS/BOLT (MAX) (681 N/BOLT)}$$

Appendix B: Seismic Calculations (LED and Halogen Surgical Lights)



EQUIPMENT ANCHORAGE & SEISMIC ENGINEERING
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Sheet 1 of 3

Office of Statewide Health Planning and Development
ANCHORAGE PRE-APPROVAL

OPA-1649

Equipment Manufacturer: Stryker Communications

Equipment Type: Stryker EDS Light Suspension

GENERAL NOTES

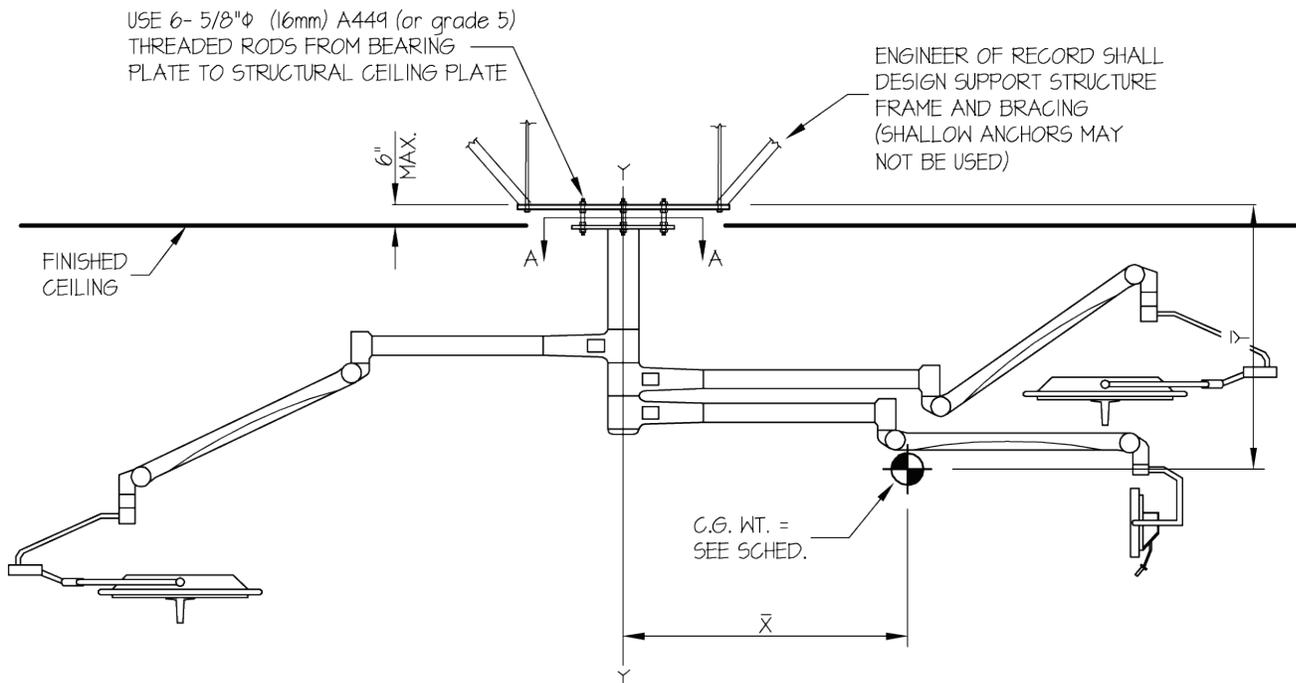
- FORCES ARE DETERMINED PER 2001 CBC 1632A.2, EQUATIONS 32-A1, A2 & A3, WHERE $C_a = .66$, $a_p = 2.5$, $I_p = 1.5$ AND $R_p = 3.0$
PLEASE NOTE THAT THE RESULT FROM EQUATIONS 32-A1, A2 & A3
HAVE BEEN REDUCED BY A FACTOR OF 1.4 FOR ALLOWABLE STRESS DESIGN.
- THIS PRE-APPROVAL CONFORMS TO THE 2001 CALIFORNIA BUILDING CODE.
- THE DETAILS IN THIS PRE-APPROVAL MAY BE USED AT ANY LOCATION AND AT ANY HEIGHT IN THE STATE OF CALIFORNIA.
- THE ENGINEER OF RECORD SHALL DESIGN BACKING BARS, STUDS, FRAMES ABOVE THE CEILING, ETC.
WHICH THE UNITS ARE ATTACHED TO AS NOTED ON THE DRAWINGS. THE ENGINEER OF RECORD
SHALL ALSO VERIFY THE ADEQUACY OF THE STRUCTURES (SUCH AS WALLS AND FLOORS)
WHICH SUPPORT THE UNITS FOR THE LOADS IMPOSED ON THEM BY THE UNITS AS WELL AS ALL OTHER LOADS.
- ALL ANCHOR FORCES SHOWN ON THE DRAWINGS ARE WORKING LOADS (AS OPPOSED TO ULTIMATE LOADS)
AND MAY BE USED FOR ALLOWABLE STRENGTH DESIGN.



EASE EQUIPMENT ANCHORAGE & SEISMIC ENGINEERING www.equipmentanchorage.com	DES. R. LA BRIE	SHEET 2
	JOB NO. 11-0712	OF 3 SHEETS
	DATE 3/7/07	

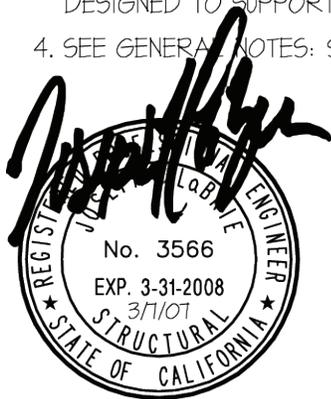
SEISMIC ANCHORAGE PRE-APPROVAL

CEILING MOUNTED



NOTES:

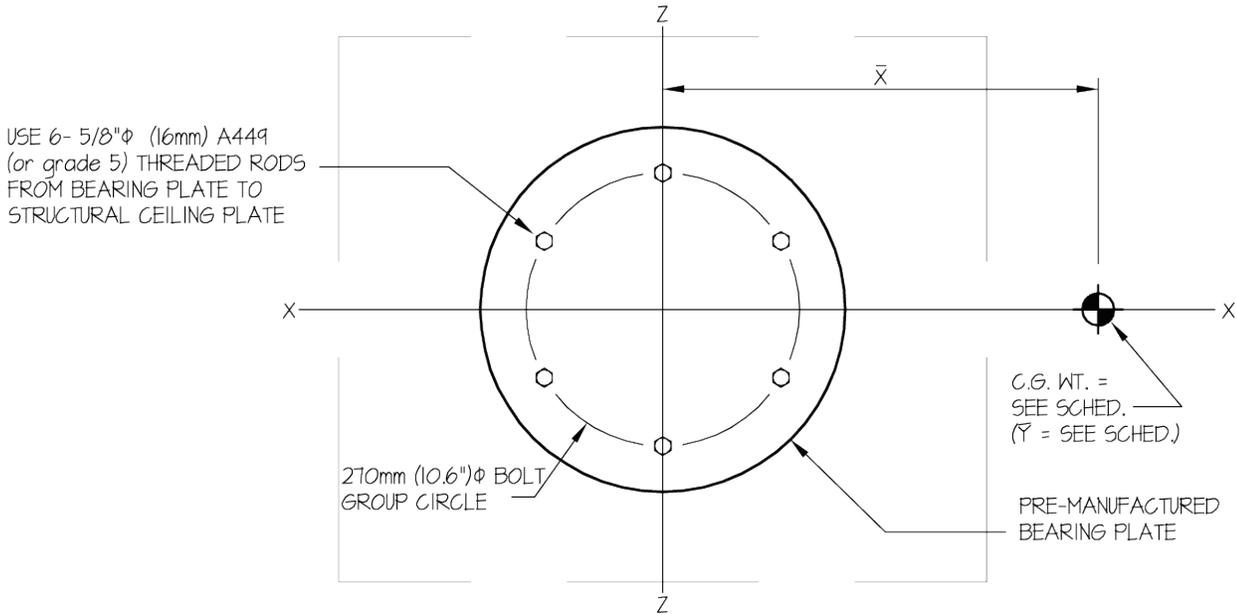
- ANCHORAGE DESIGN PER 2001 CALIFORNIA BUILDING CODE - SECTION 1632A AND HAVE BEEN FACTORED TO REPRESENT WORKING DESIGN LOADS, NOT ULTIMATE.
 HORIZONTAL FORCE (V_H) = $1.77W_p(C_a = .66, I_p = 1.5, a_p = 2.5, R_p = 3.0)$
 VERTICAL FORCE (V_V) = $0.35 W_p$
- CENTER OF GRAVITY (C.G.) WEIGHT IS A MAXIMUM. THIS PRE-APPROVAL ENCOMPASSES ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.
- ENGINEER OF RECORD FOR THE BUILDING SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN, IN ADDITION TO ALL OTHER LOADS.
- SEE GENERAL NOTES: SHEET 1



EASE EQUIPMENT ANCHORAGE & SEISMIC ENGINEERING www.equipmentanchorage.com	DES. R. LA BRIE	SHEET 3
	JOB NO. 11-0712	OF 3 SHEETS
	DATE 3/7/07	
STRYKER COMMUNICATIONS STRYKER EDS LIGHT SUSPENSION		

SEISMIC ANCHORAGE PRE-APPROVAL

BEARING PLATE TO STRUCTURAL CEILING PLATE



PLAN AT BEARING PLATE
SECTION A-A

MODEL (ARM LENGTH)	MAX WEIGHT (lbs)	\bar{X} (in)	\bar{Y} (in)	M_{xx} & M_{zz}	T MAX (lbs/bolt)	V MAX (lbs/bolt)
SINGLE ARM	131	30.1	53	26004	1135	39
DOUBLE ARM	204	40.2	61.6	35625	2136	60
TRIPLE ARM	282	45.6	65.4	46016	3188	83





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Stryker Communications

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www.stryker.com