Visum™ Surgical Lights

- **Halogen**
- **LED**

stryker®

Pre-Installation Manual

2007 1001-400-008 www.stryker.com

Visum™ Surgical Lights

(Halogen & LED)

Pre-Installation Manual

Visum™ Surgical Lights (Halogen & LED) Pre-Installation Manual

1001-400-008 REV F

Contents

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, and power supply. This guide does not describe the installation of the surgical monitors or support arm assemblies.

Warnings and Cautions

Read this guide and follow its instructions carefully. The words WARNING, CAUTION, and Note carry special meaning and should be carefully reviewed:

WARNING **A warning indicates that the personal safety of the patient or physician may be involved. Disregarding this information could result in injury to the patient or physician.**

Caution **A caution indicates that there is risk of damaging the instrument.**

WARNING **A warning with a lightning bolt warns of hazardous voltage. All service must be performed by authorized personnel.**

Note A note provides additional information, which may be useful but is not essential to complete the procedure.

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

- Use caution when lifting heavy objects to avoid serious bodily injury or damage to equipment.
- 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.
- 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 and possible failure of life support components.

Symbols

Denotes oxygen explosion - Oxygen forms explosive mixtures with oils, greases, and lubricants. Compressed oxygen presents an explosion hazard. Keep oxygen and gas outlets free from substances that contain oil, grease, or lubricants

Denotes compliance to CSA Standard C22.2, 60601.1 - M90

Denotes compliance to CSA Standard C22.2, 60601.1 - M90, AS 3200, IEC 60601, IEC 60601-2-41

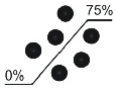
Denotes hot surfaces

Denotes compliance to European Community Directive 93/42/EEC.

Denotes temperature limits for indicated operation or storage.

Provides usage tips and useful information

Denotes electric shock hazard



Denotes humidity limits for indicated operation or storage.

Terms

- Interstitial Space — The area between solid ceiling and finished ceiling.
- HTM2007 — Design considerations and Validation of Electrical Services
- HBN 26 — Guidelines for the design of Facilities for Surgical Procedures
- HTM2022 — Sign, installation, validation, and verification of Medical Gas Pipeline Systems
- IEC60601 — Medical Electrical Equipment - General requirements for safety
- IEC364 — Electrical Installations of Buildings: section 710 Medical Locations
- NEC — National Electrical Code
- NFPA — National Fire Protection Agency (see http://www.nfpa.org)
- NFPA 99 — Section of NFPA relating to Health Care Facilities
- OSHPD — Office of Statewide Health Planning and Development (California) (see http://www.oshpd.cahwnet.gov)

Hospital/Contractor Responsibility

Super 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 21in-22in to install the LED Surgical Light System.
6. Install access panels directly adjacent to each mounting point for future access for service and maintenance as described in this manual.

Delivery and Storage

1. Accept delivery of Stryker crates and equipment to the proper room prior to the installation date.

   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 and possible failure of life support components.
2. Remove and dispose of the pallets and boxes after completing the installation.

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.

Electrical and Data Infrastructure

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

Note Flat Panel Only: Optional 5A in-line fuses are provided and may be installed by the electrical contractor when the flat panel power is connected to the house power..

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.

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.

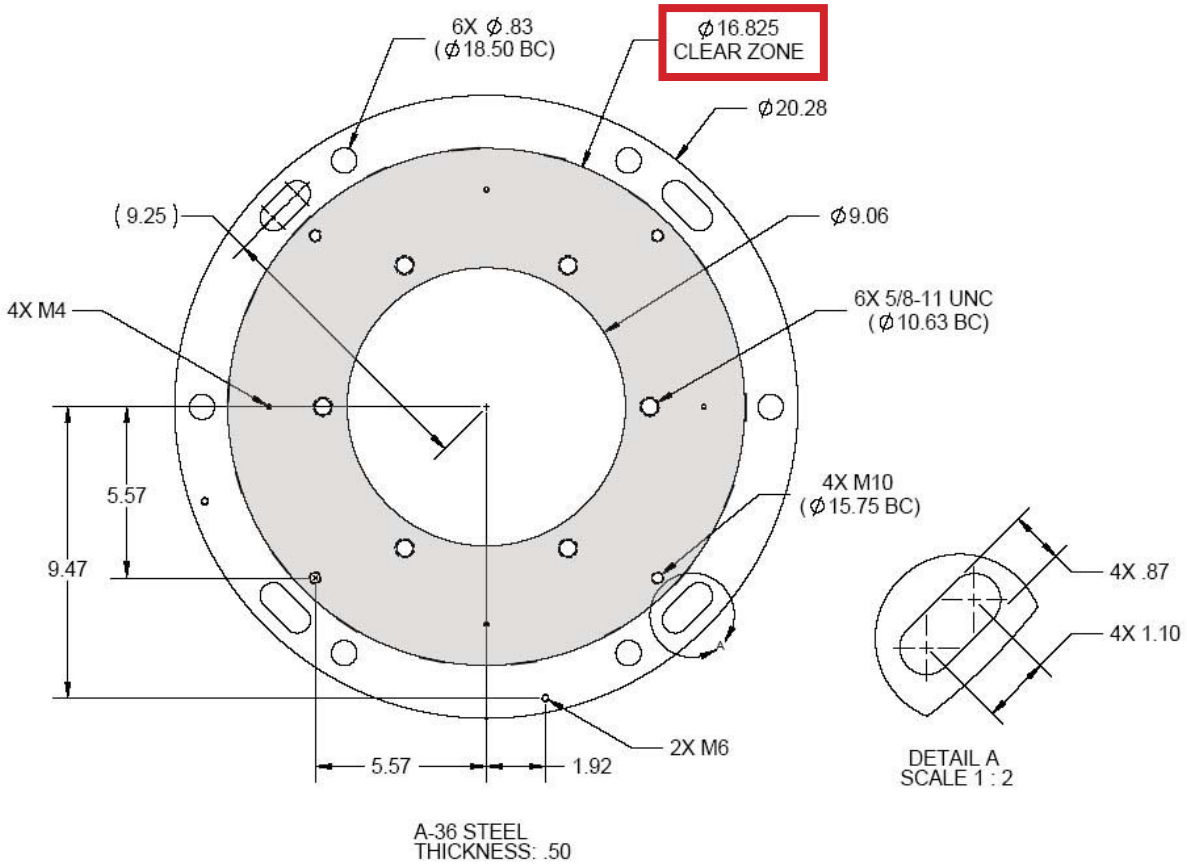


Figure 1: Stryker-supplied Mounting (Interface) Plate

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.

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.

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.

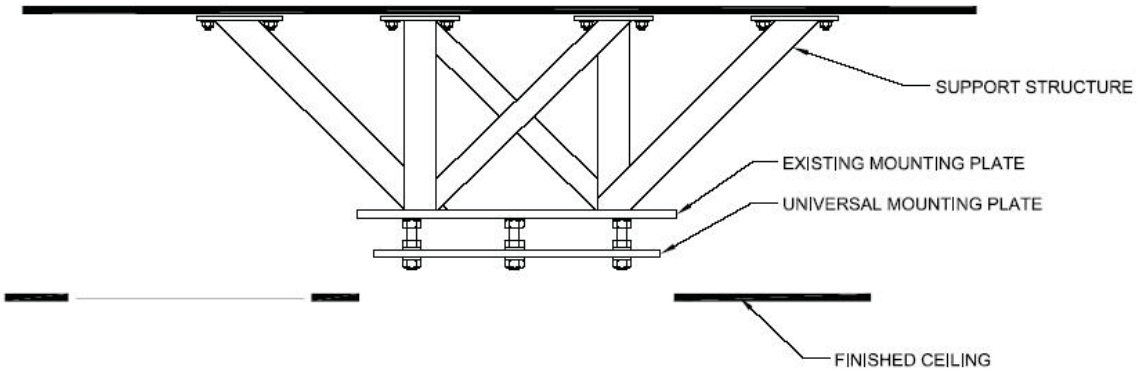


Figure 2: Mounting & Universal Plate Diagram

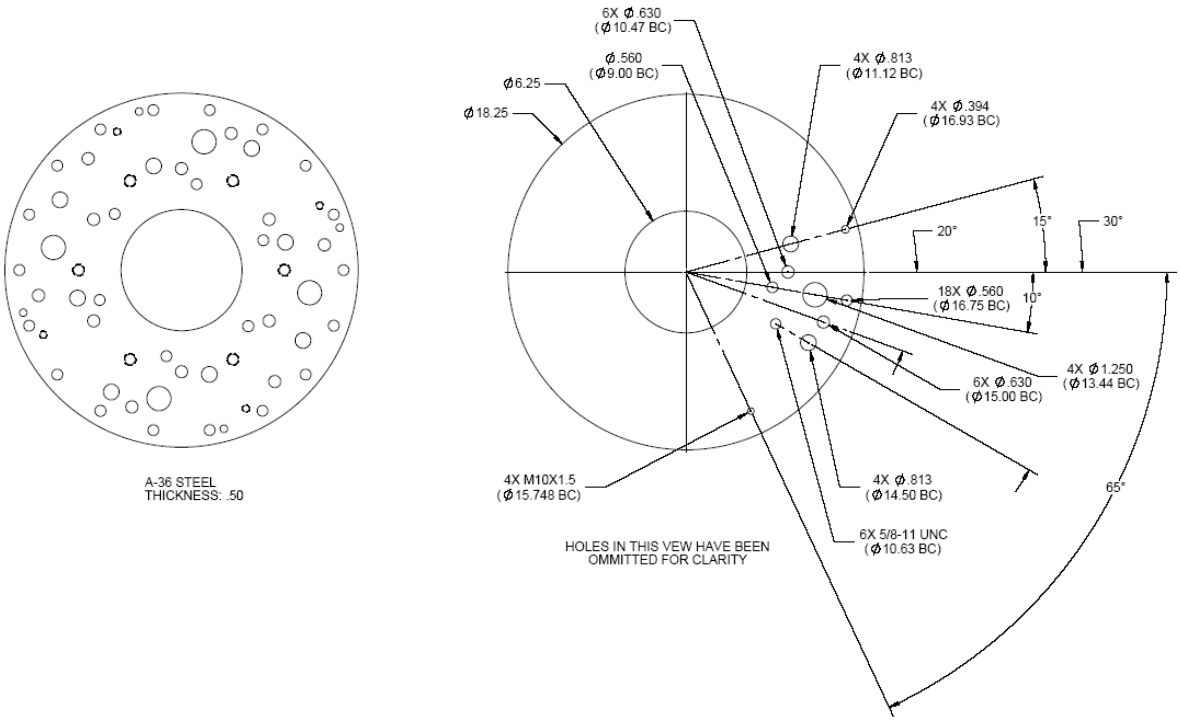


Figure 3: Universal Mounting Plate

Visum 450 & 600 (Halogen) Light Power Supply Box

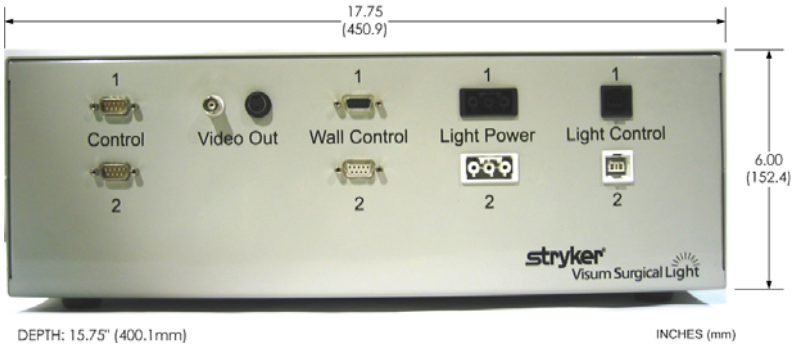
(Weight: 36.5 lbs/16.5 kg)

1. The power supply box provides 24 VDC power to the surgical lights from a 120/230 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 SwitchPoint™ unit.

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



Front View of Power Supply Box

Back View of Power Supply Box

Figure 4: Power Supply Box

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 power supply box. Three or four-light configurations require two power supply boxes.

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

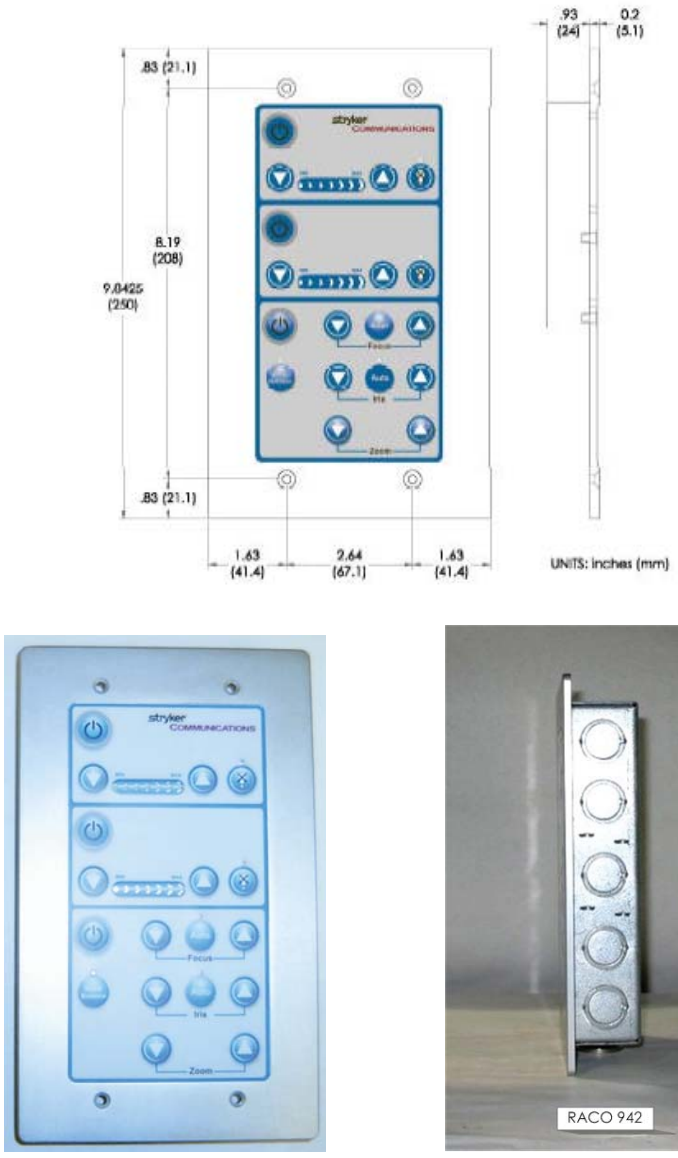


Figure 5: Wall Control Panel

> **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.

Power Supply Box for Visum LED

(Weight: 20lbs/9.09 kg)

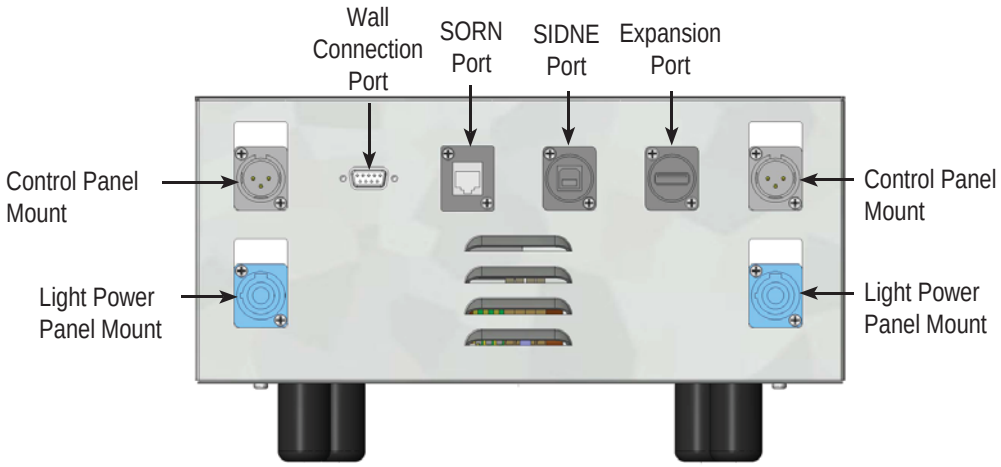
The power supply box provides 24 VDC power to the surgical lights from a 120/240 VAC source.

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

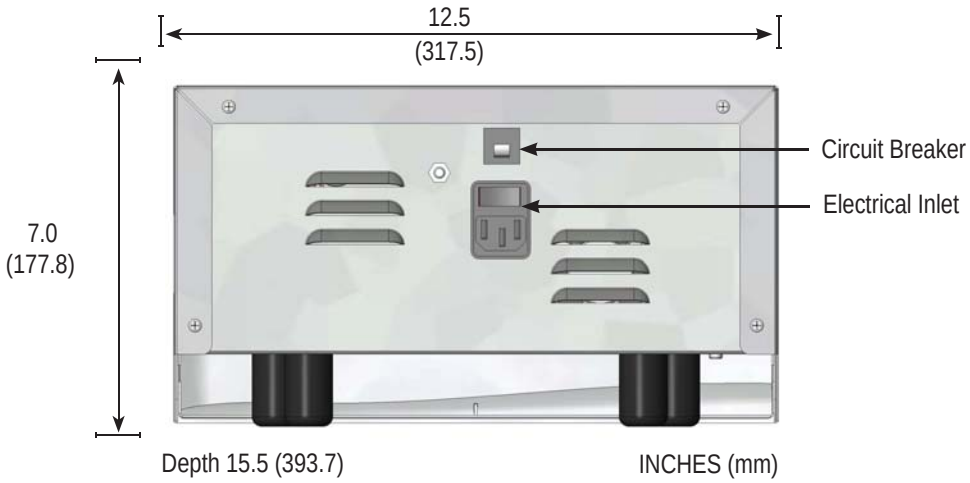
   Consider spacing on the floor, away from walking traffic, to accommodate the power supply box.

> **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™ unit.



Front View



Back View

Figure 6: Power Supply Box & Ports (for Visum LED Surgical Lights)

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.

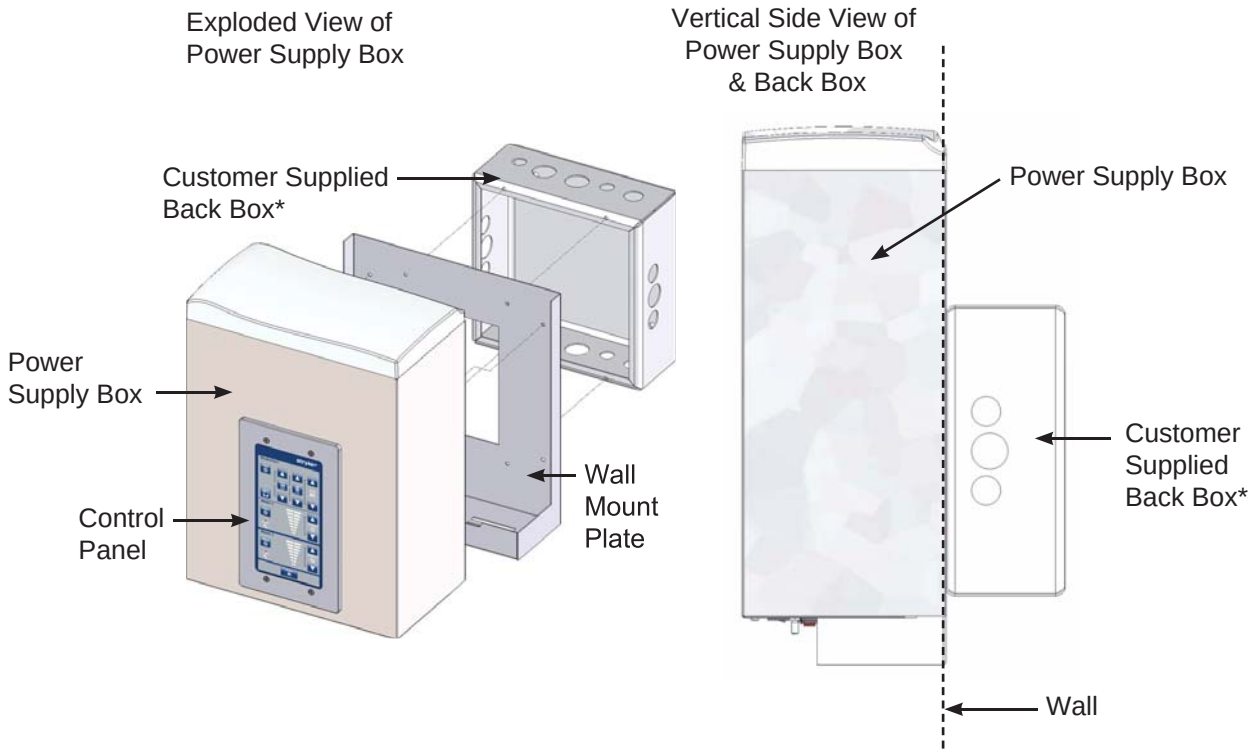


Figure 7: Exploded/Side view of Power Supply Box

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.

Visum LED Wall Control Panel

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

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 power supply box. Three or four-light configurations require two power supply boxes.

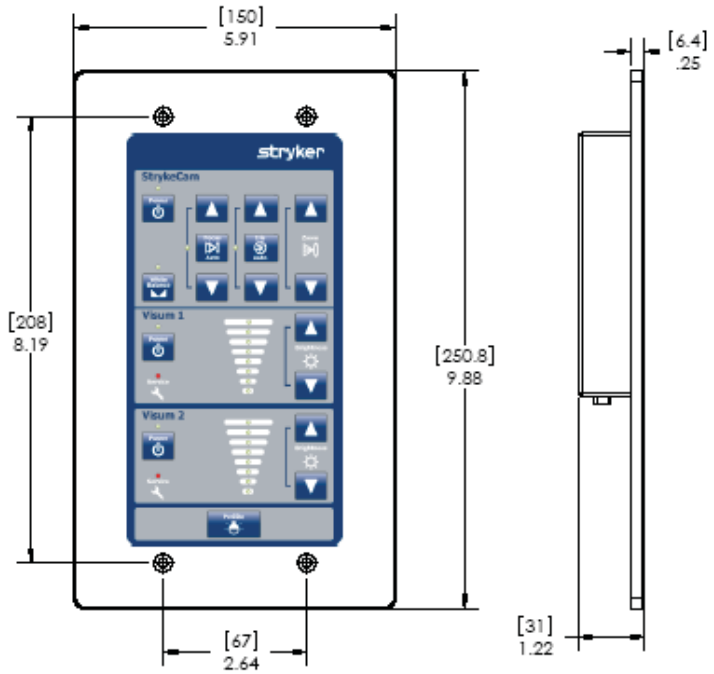


Figure 8: Wall Control Panel

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.

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˚ ($^{1}/_{360}$ 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) holes along the outer edge of the plate to bolt it to the support structure (see Figure 1).

   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.

   The Mounting (Interface) Plate must be level within 0.25in (6.4mm). The bottom of the mounting plate must be 2in-4in (50mm-100mm) above the finished ceiling. The space allows cables and hoses to be routed from the surgical light and Flat Panel Arm.

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.

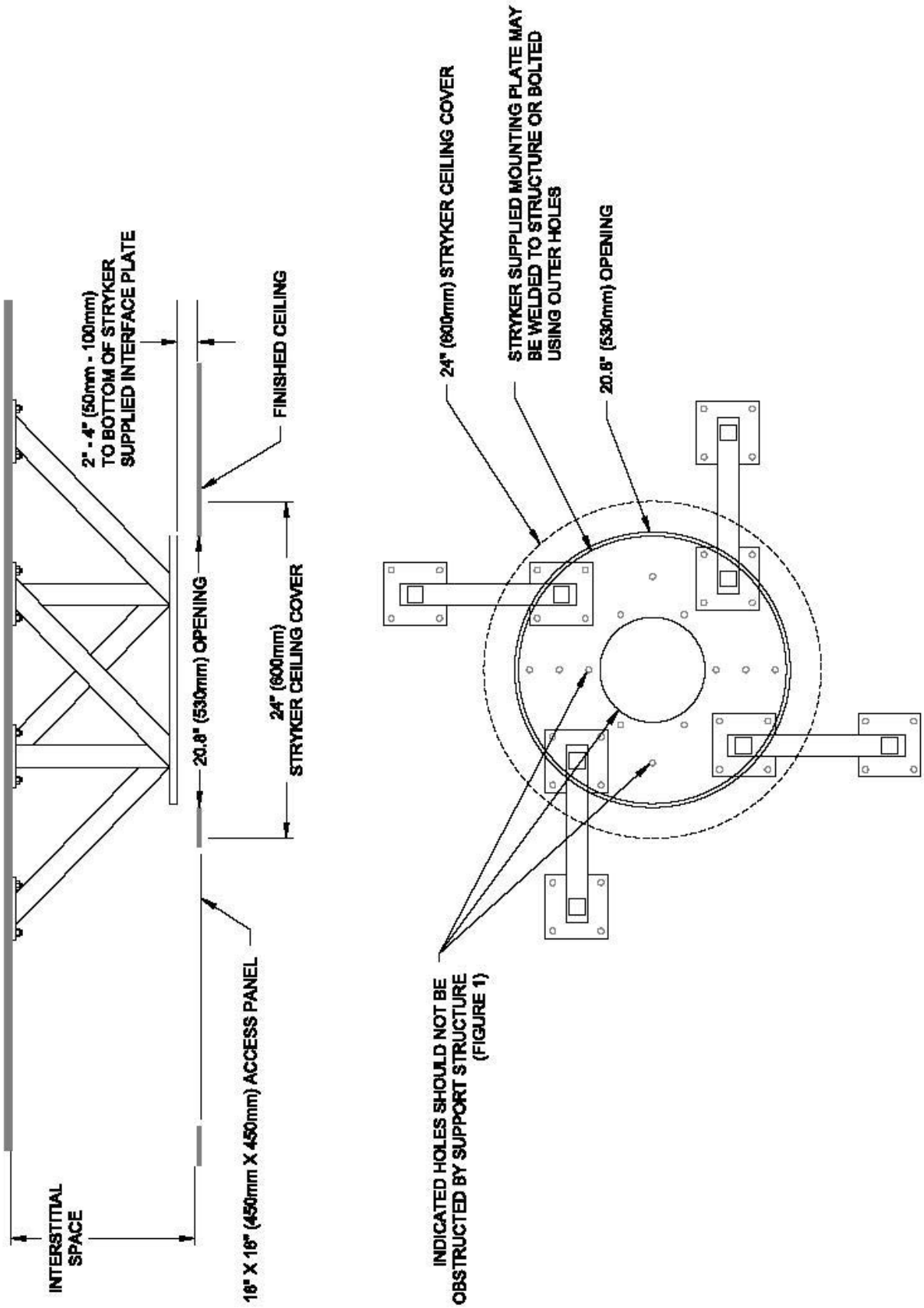


Figure 9: Support Structure

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 (230mm) 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.

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 21in-22in (533mm-558mm) hole, either circular or square, 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.

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.

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.

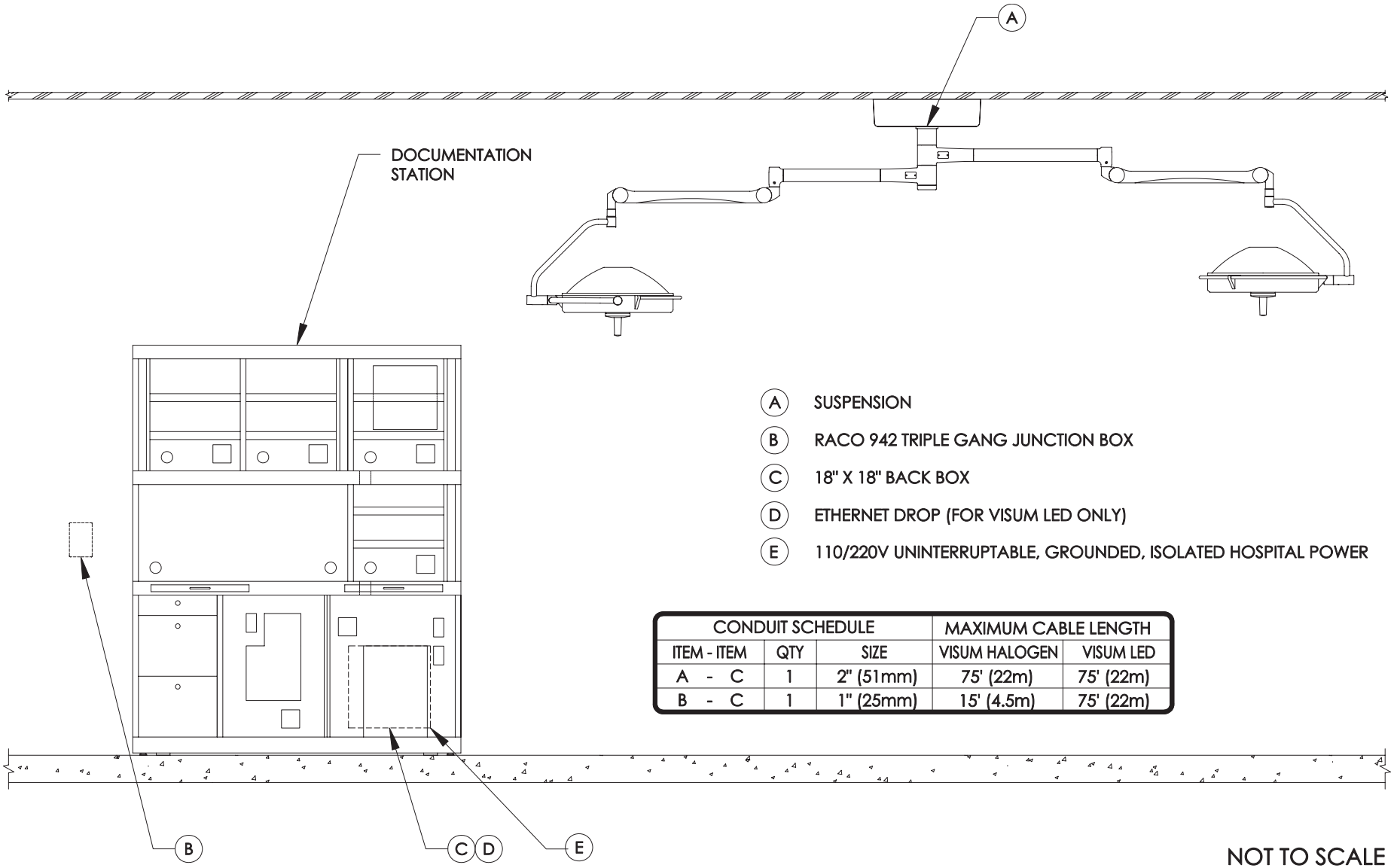
Note One and two-light configurations require one junction box; three and four-light configurations require two junction boxes.

Note It is not neccesarry 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 (110V/220V) is available wtihin 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).



CONDUIT SCHEDULE			MAXIMUM CABLE LENGTH	
ITEM - ITEM	QTY	SIZE	VISUM HALOGEN	VISUM LED
A - C	1	2" (51mm)	75' (22m)	75' (22m)
B - C	1	1" (25mm)	15' (4.5m)	75' (22m)

Figure 10: Electrical Installation with Power Supply Box & Documentatin Station

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 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.

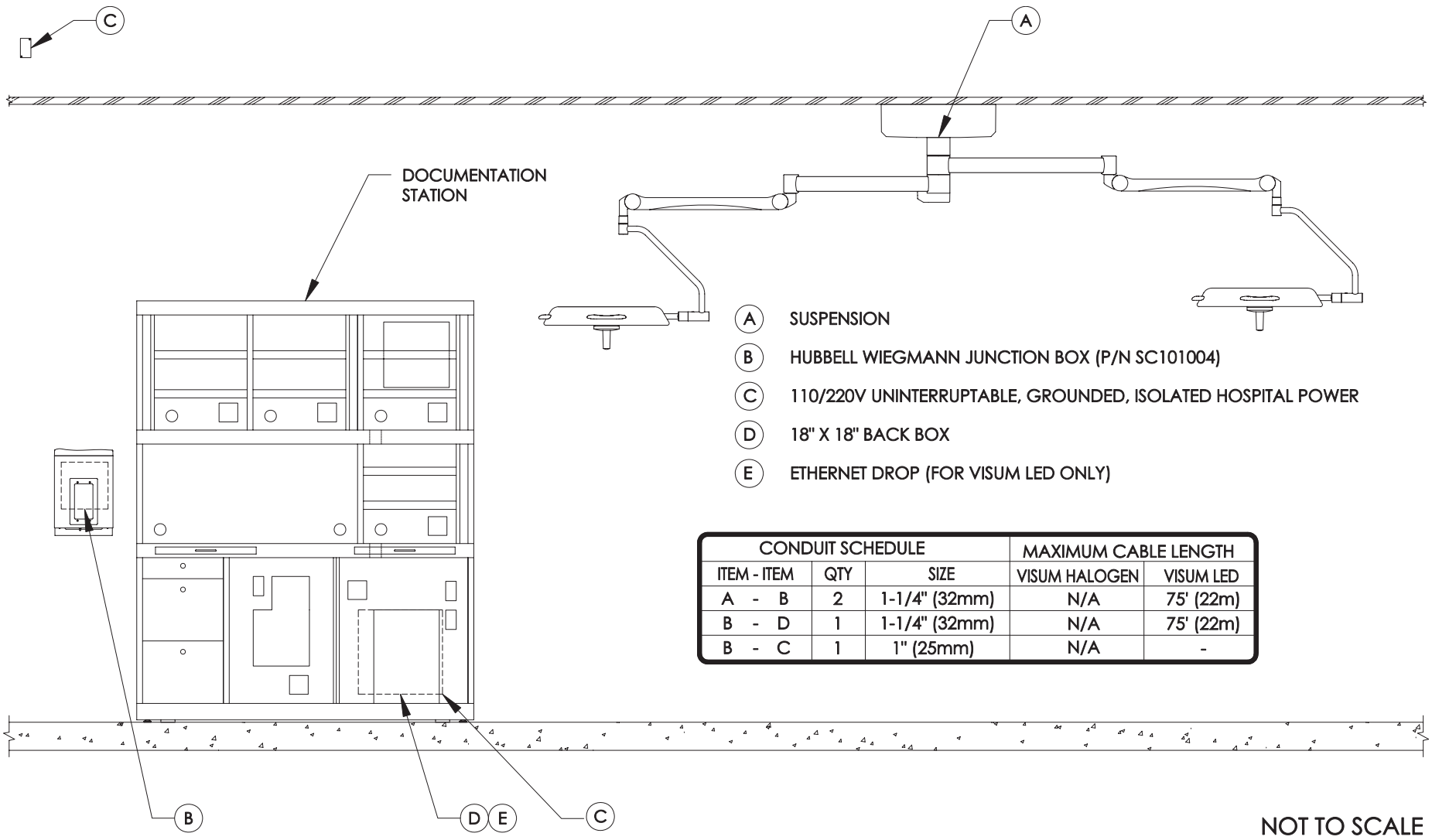
3. Provide 110V/200V, uninterruptible, grounded and isolated power to the 10in x 10in junction box.

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).



CONDUIT SCHEDULE			MAXIMUM CABLE LENGTH	
ITEM - ITEM	QTY	SIZE	VISUM HALOGEN	VISUM LED
A - B	2	1-1/4" (32mm)	N/A	75' (22m)
B - D	1	1-1/4" (32mm)	N/A	75' (22m)
B - C	1	1" (25mm)	N/A	-

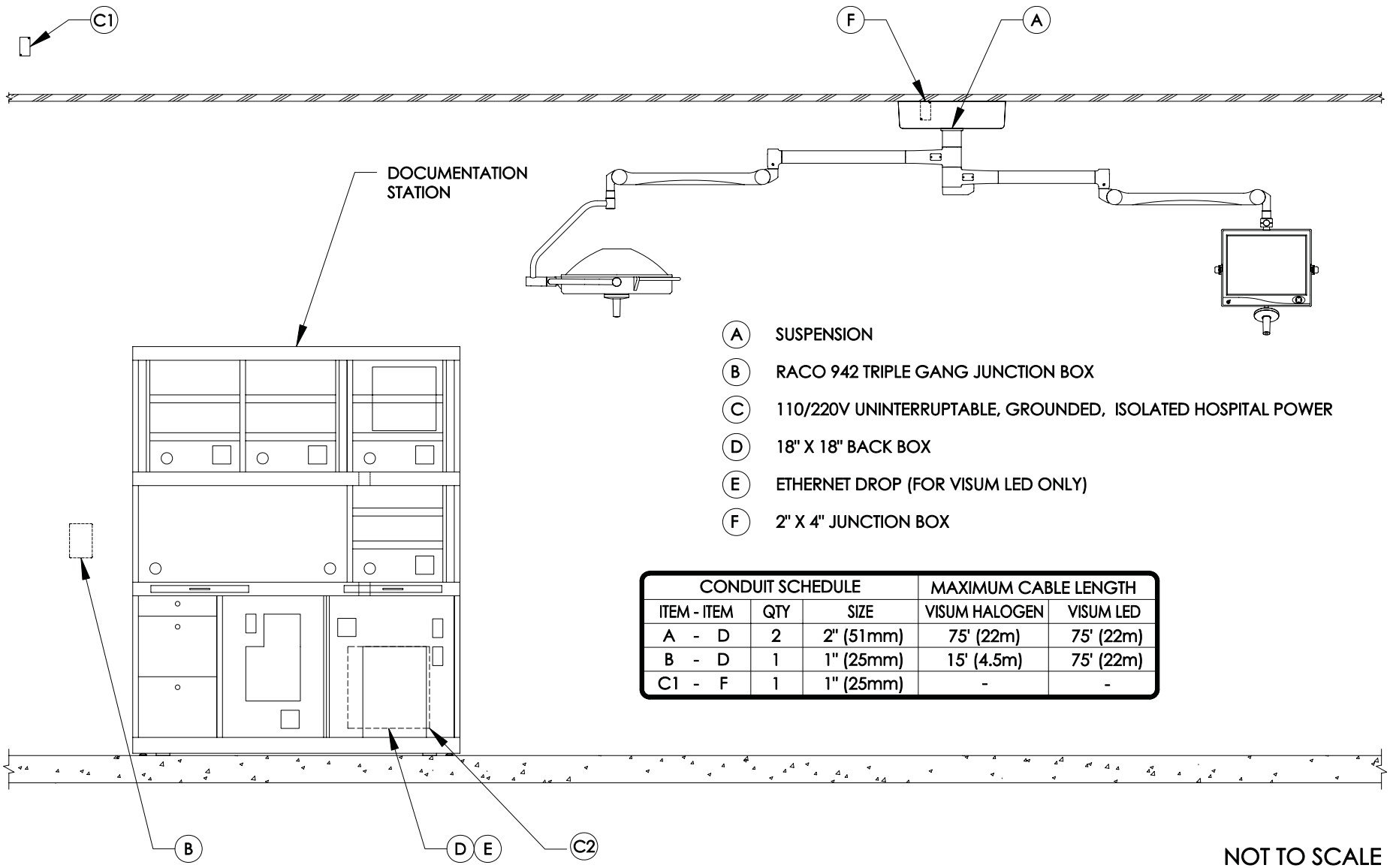
Figure 11: Electrical Installation with Wall-Mounted Power Supply Box & Documentation Station

Suspensions with Flat-Panel Arms

For each suspension with a flat panel monitor:

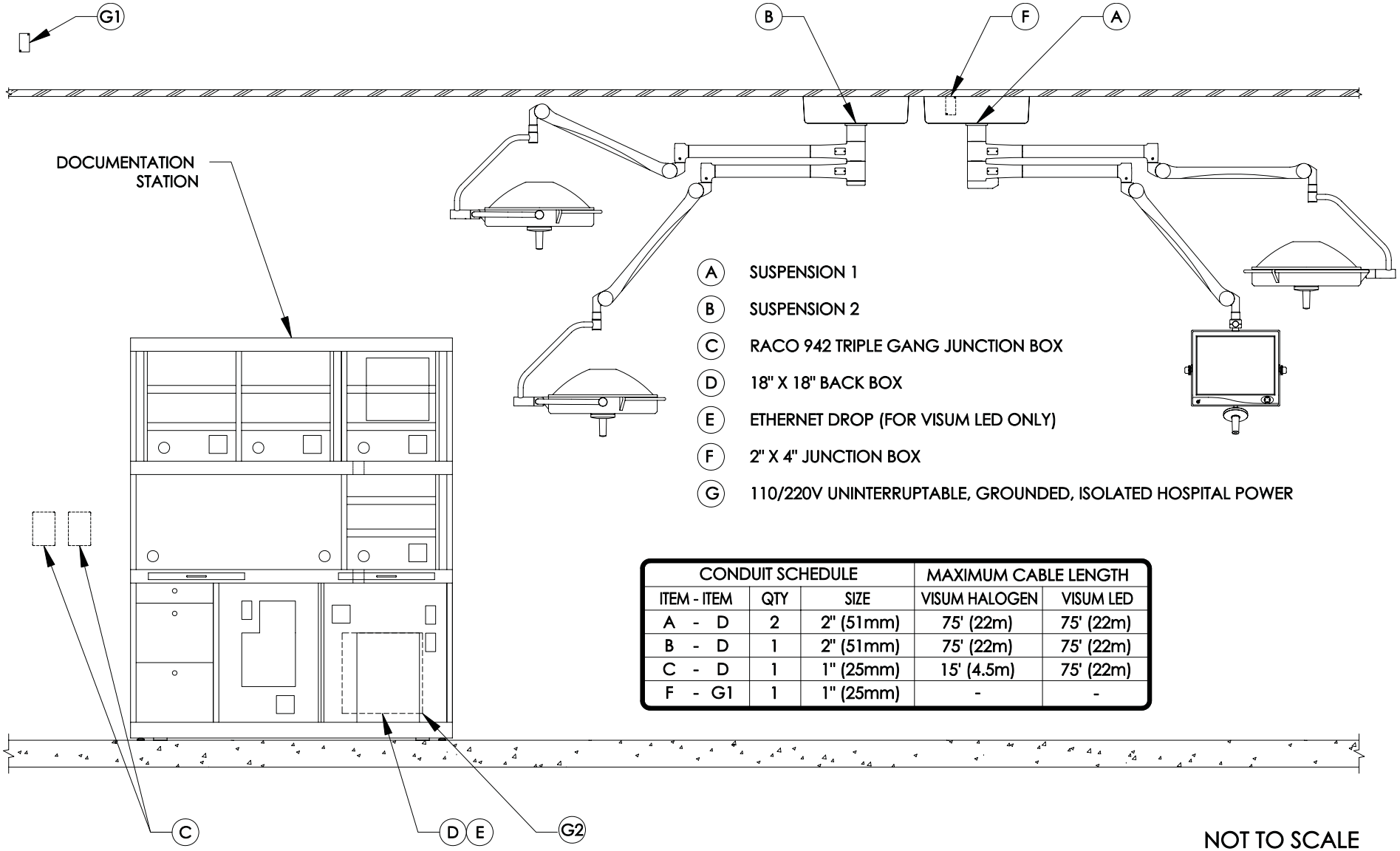
1. Install an additional 2in (50mm) conduit between the suspension and the documentation station (see Figure 12).
2. Provide pull-strings and terminate all conduits with bushings.
3. Install a junction box with 110/220V uninterruptible power within 12in (30cm) of the mounting plate.

Note If required, provide optional 5A in-line fuses for connection of a flat panel monitor to the Mains power. An electrical contractor must install the fuses.



CONDUIT SCHEDULE			MAXIMUM CABLE LENGTH	
ITEM - ITEM	QTY	SIZE	VISUM HALOGEN	VISUM LED
A - D	2	2" (51mm)	75' (22m)	75' (22m)
B - D	1	1" (25mm)	15' (4.5m)	75' (22m)
C1 - F	1	1" (25mm)	-	-

Figure 12: Electrical Installation with Flat Panel & Documentation Station



CONDUIT SCHEDULE			MAXIMUM CABLE LENGTH	
ITEM - ITEM	QTY	SIZE	VISUM HALOGEN	VISUM LED
A - D	2	2" (51mm)	75' (22m)	75' (22m)
B - D	1	2" (51mm)	75' (22m)	75' (22m)
C - D	1	1" (25mm)	15' (4.5m)	75' (22m)
F - G1	1	1" (25mm)	-	-

Figure 13: 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.

Specifications

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	21-31 in. Hg (71kPa-105kPa)

Electrical Specifications

Rated Input	**Voltage**	115-230 V~50/60 Hz
	Current	4.5 A
Power per Light Head (Visum LED)	**With Camera**	443.59 Btu/hr (130 W)
	Without Camera	429.93 Btu/hr (126 W)
Visum 450 (Halogen)	**With Camera**	511.82 Btu/hr (150 W)
	Without Camera	409.46 Btu/hr (120 W)
Visum 600 (Halogen)	**With Camera**	614.19 Btu (180 W)
	Without Camera	511.82 Btu/hr (150 W)

Mechanical Specifications

Max Load Capacity of Light Spring Arm	46.2 lbs (21kg)

Critical Distances

- The bottom of the mounting plate must be within 2in-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 (203mm-254mm) center.
- If two power supply boxes are used, each power supply box should be installed on a 14in-18in (356mm-457mm) center.

Support Structure Loads

Support Structure Loads			Load Location	
Equipment	**Suspension**	**Weight**	$\bar{x}$	$\bar{y}$
Halogen	Single	113 lbs (51 kg)	37 in (940 mm)	40 in (1016 mm)
	Dual	179 lbs (81 kg)	38 in (965 mm)	40 in (1016 mm)
	Triple	246 lbs (112 kg)	39 in (991 mm)	40 in (1016 mm)
LED	Single	131 lbs (59 kg)	30.1 in (765 mm)	53 in (1346 mm)
	Dual	204 lbs (93 kg)	40.2 in (1021 mm)	61.6 in (1564 mm)
	Triple	282 lbs (128 kg)	45.6 in (1158 mm)	65.4 in (1661 mm)
Flat Panel Arm		214 lbs (97 kg)	33 in (838 mm)	49 in (1245 mm)

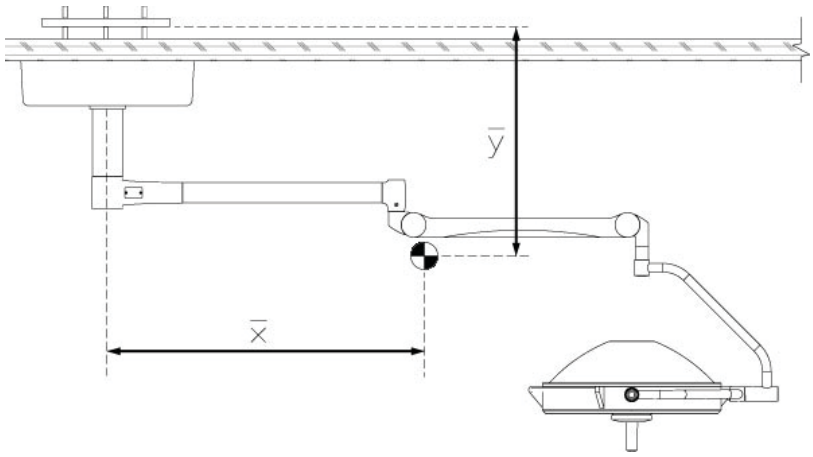


Figure 14: Horizontal ($\bar{x}$) & Vertical ($\bar{y}$) Locations of Center Mass

Light Suspension Specifications

(Visum LED only)

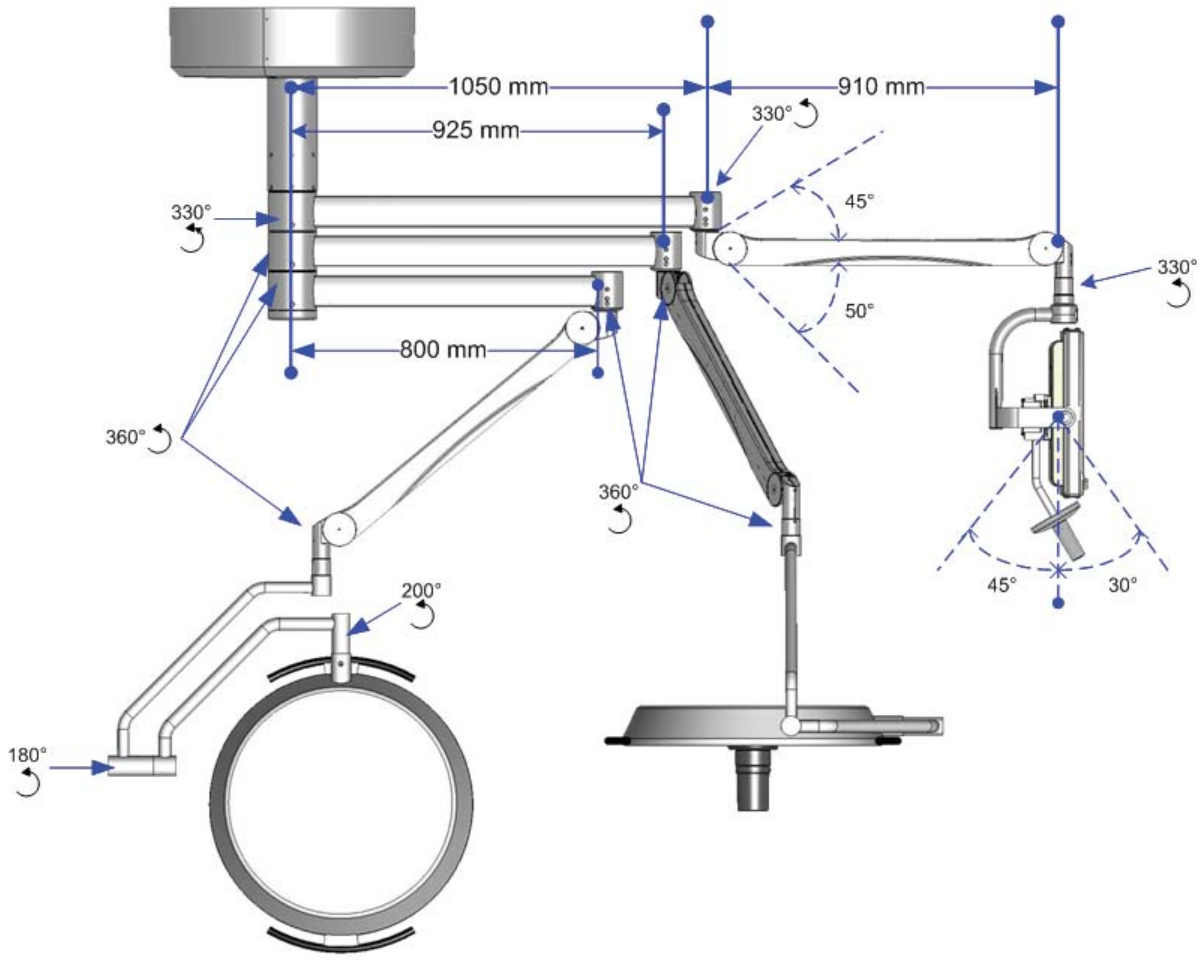


Figure 15: Light Suspension Specifications

Suspension Capacity	Extension Arm Lengths	
	Visum LED	Visum Halogen
Single	31.5 in (800 mm)	39.4 in (1000 mm)
Dual	31.5 in (800 mm) 36.4 in (925 mm)	39.4 in (1000 mm) 33.5 in (850 mm)
Triple	31.5 in (800 mm) 36.4 in (925 mm) 41.3 in (1050 mm)	39.4 in (1000 mm) 33.5 in (850 mm) 29.5 in (750 mm)

Appendix A: Seismic Calculations (Halogen Surgical Lights)

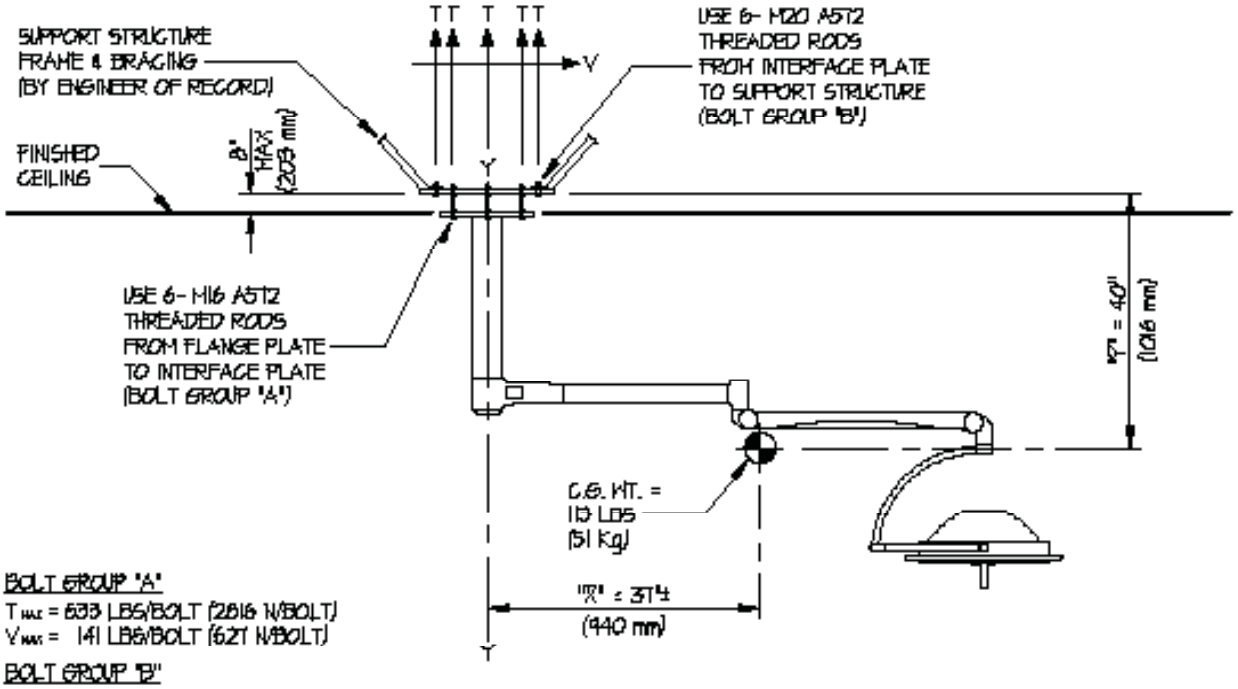
EASE EQUIPMENT ANCHORAGE & SEISMIC ENGINEERING
www.equipmentanchorage.com

STRYKER COMMUNICATIONS

SINGLE ARM SURGICAL LIGHT

DES. R. LA BRIE	SHEET 1
JOB NO. D-0528	
DATE 4/6/05	OF 3 SHEETS

SEISMIC ANCHORAGE — CEILING MOUNTED



BOLT GROUP 'A'
T_{max} = 633 LBS/BOLT (2816 N/BOLT)
V_{max} = 141 LBS/BOLT (627 N/BOLT)

BOLT GROUP 'B'
T_{max} = 376 LBS/BOLT (1673 N/BOLT)
V_{max} = 89 LBS/BOLT (396 N/BOLT)

ELEVATION

NOTES:

1. FORCES ARE DETERMINED PER 2001 CALIFORNIA BUILDING CODE - SECTION 1632A AND HAVE BEEN FACTORED TO REPRESENT WORKING DESIGN LOADS, NOT ULTIMATE.
   HORIZONTAL FORCE (V_H) = $0.94W \cdot (C_a = .66, I_p = 1.5, a_p = 1.0, R_p = 3)$
   VERTICAL FORCE (V_v) = $0.33(V_H)$
2. CENTER OF GRAVITY (C.G.) WEIGHT IS A MAXIMUM. THIS CALCULATION ENCOMPASSES ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.
3. ENGINEER OF RECORD FOR THE BUILDING SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN.

REGISTERED PROFESSIONAL ENGINEER
JOSEPH LA BRIE
No. 3566
EXP. 3-31-2006
4/6/05
STRUCTURAL
STATE OF CALIFORNIA

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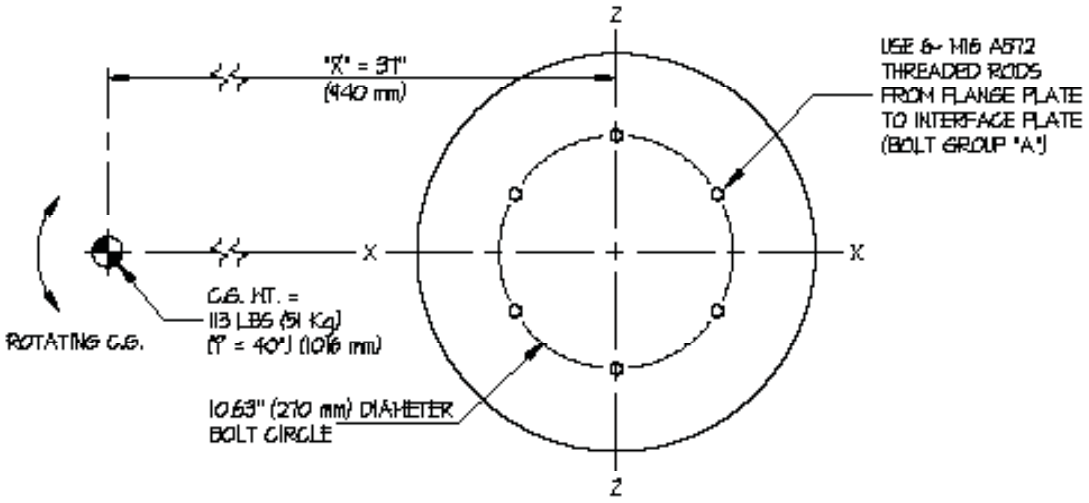
STRYKER COMMUNICATIONS	DES. R. LA BRIE	SHEET 2
	JOB NO. 11-0518	
SINGLE ARM SURGICAL LIGHT	DATE 4/6/05	OF 3 SHEETS

SEISMIC ANCHORAGE

FLANGE PLATE



PLAN AT FLANGE PLATE

LOADS:

WEIGHT = 113 LBS (503 N)
HORIZONTAL FORCE (V_H) = 106 LBS (472 N)
VERTICAL FORCE (V_V) = 35 LBS (156 N)

BOLT GROUP PROPERTIES:

I_{X-X} = 85 in.^{2}/BOLT (54839 mm^2/BOLT)
I_{Z-Z} = 85 in.^{2}/BOLT (54839 mm^2/BOLT)
I_{Y-Y} = 169 in.^{2}/BOLT (109032 mm^2/BOLT)

MOMENTS:

M_{XX} = 106#(40") + (113# + 35#)37" = 9,716"# (1098 N-m)
M_{ZZ} = 106#(40") + (113# + 35#)37" = 9,716"# (1098 N-m)
M_{YY} = 106#(37") = 3,922"# (443 N-m)

BOLT FORCES:

TENSION (T)

$$T = \frac{9716"\#(5.32")}{85} + \frac{113\# + 35\#}{6} = 633 \text{ LBS/BOLT (MAX) (2816 N/BOLT)}$$

SHEAR (V)

$$V = \frac{106\#}{6} + \frac{3922"\#(5.32")}{169} = 141 \text{ LBS/BOLT (MAX) (627 N/BOLT)}$$

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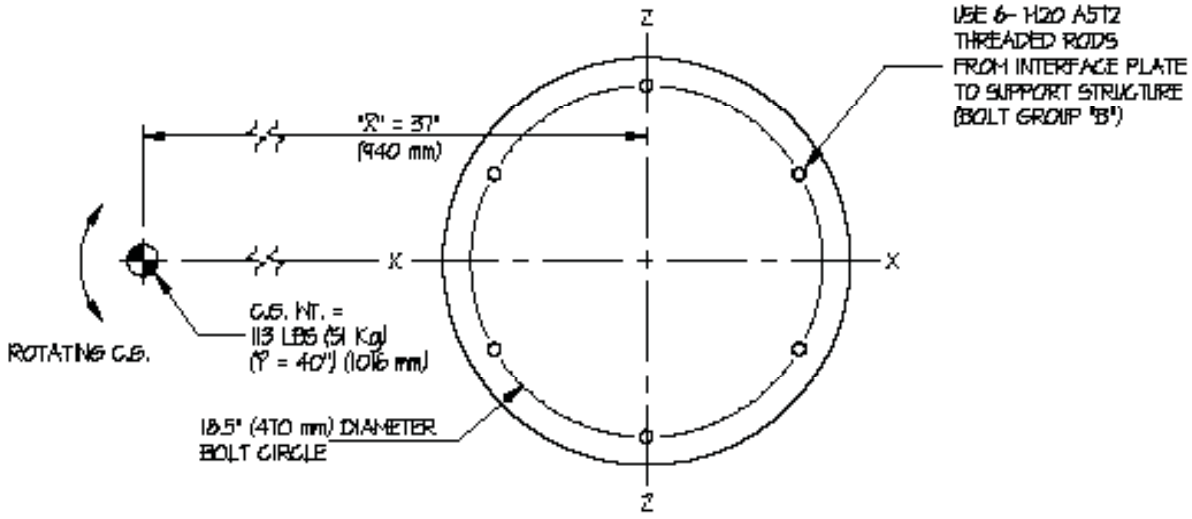
STRYKER COMMUNICATIONS	DES. R. LA BRIE	SHEET 3
	JOB NO. 11-0578	
SINGLE ARM SURGICAL LIGHT	DATE 4/6/15	OF 3 SHEETS

SEISMIC ANCHORAGE

INTERFACE PLATE



PLAN AT INTERFACE PLATE

LOADS:

WEIGHT = 113 LBS (503 N)
HORIZONTAL FORCE (V_H) = 106 LBS (472 N)
VERTICAL FORCE (V_V) = 35 LBS (156 N)

BOLT GROUP PROPERTIES:

I_{X-X} = 256 in.^{2}/BOLT (165161 mm^2/BOLT)
I_{Z-Z} = 256 in.^{2}/BOLT (165161 mm^2/BOLT)
I_{Y-Y} = 512 in.^{2}/BOLT (330322 mm^2/BOLT)

MOMENTS:

M_{XX} = 106#(40") + (113# + 35#)37" = 9,716"# (1098 N-m)
M_{ZZ} = 106#(40") + (113# + 35#)37" = 9,716"# (1098 N-m)
M_{YY} = 106#(37") = 3,922"# (443 N-m)

BOLT FORCES:

TENSION (T)

$$T = \frac{9716"\#(9.25")}{256} + \frac{113\# + 35\#}{6} = 376 \text{ LBS/BOLT (MAX) (1673 N/BOLT)}$$

SHEAR (V)

$$V = \frac{106\#}{6} + \frac{3922"\#(9.25")}{512} = 89 \text{ LBS/BOLT (MAX) (396 N/BOLT)}$$

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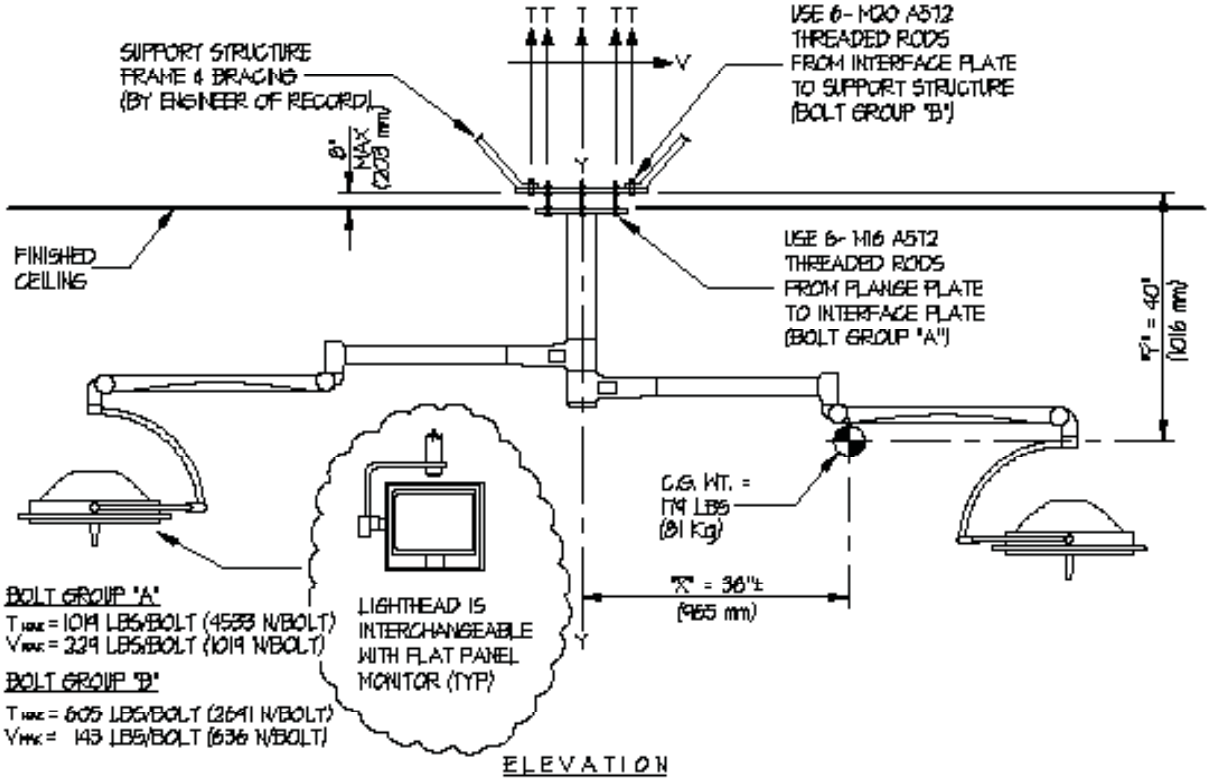
STRYKER COMMUNICATIONS

DUAL ARM SURGICAL LIGHT

DES. R. LA BRIE | JOB NO. 11-0518 | DATE 4/6/15 | SHEET 1 OF 3 SHEETS

SEISMIC ANCHORAGE — CEILING MOUNTED



ELEVATION

NOTES:

1. FORCES ARE DETERMINED PER 2001 CALIFORNIA BUILDING CODE - SECTION 1632A AND HAVE BEEN FACTORED TO REPRESENT WORKING DESIGN LOADS, NOT ULTIMATE
   HORIZONTAL FORCE (V_H) = 0.44W - (C_a = .66, I_p = 1.5, a_p = 1.0, R_p = 3)
   VERTICAL FORCE (V_v) = 0.33(V_H)
2. CENTER OF GRAVITY (C.G.) HEIGHT IS A MAXIMUM. THIS CALCULATION ENCOMPASSES ALL HEIGHTS UP TO THE MAXIMUM HEIGHT SHOWN.
3. ENGINEER OF RECORD FOR THE BUILDING SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN.

REGISTERED PROFESSIONAL ENGINEER
JOSEPH L. LaBRIE
No. 3566
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4/6/05
STRUCTURAL
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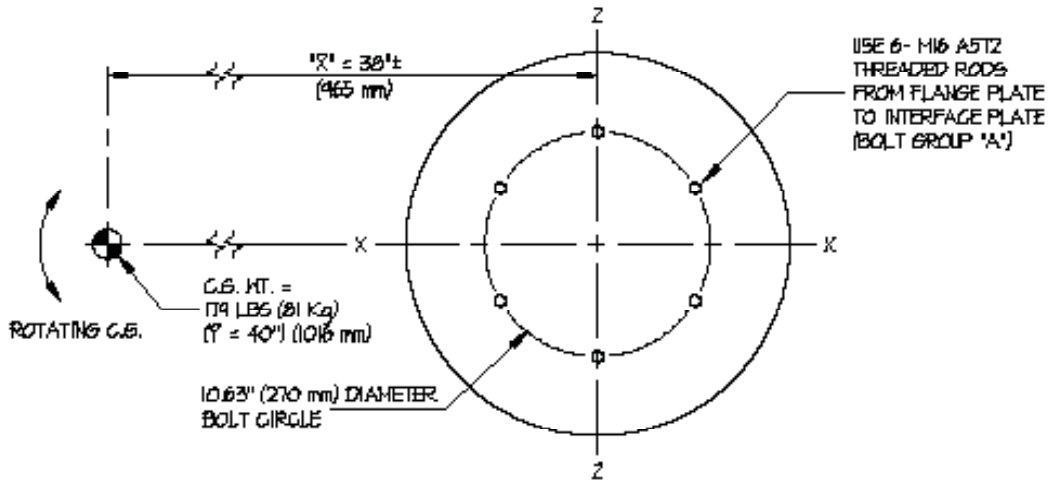
STRYKER COMMUNICATIONS	DES. R. LA BRIE	SHEET 2
	JOB NO. 11-0518	
DUAL ARM SURGICAL LIGHT	DATE 4/6/05	OF 3 SHEETS

SEISMIC ANCHORAGE

FLANGE PLATE



PLAN AT FLANGE PLATE

LOADS:
WEIGHT = 179 LBS (796 N)
HORIZONTAL FORCE (V_H) = 168 LBS (747 N)
VERTICAL FORCE (V_V) = 56 LBS (249 N)

BOLT GROUP PROPERTIES:
I_{X-X} = 85 IN.^{2}/BOLT (54839mm^2/BOLT)
I_{Z-Z} = 85 IN.^{2}/BOLT (54839mm^2/BOLT)
I_{Y-Y} = 169 IN.^{2}/BOLT (109032mm^2/BOLT)

MOMENTS:
M_{XX} = 168#(40") + (179# + 56#)38" = 15,650"# (1768 N-m)
M_{ZZ} = 168#(40") + (179# + 56#)38" = 15,650"# (1768 N-m)
M_{YY} = 168#(38") = 6,384"# (721 N-m)

BOLT FORCES:

TENSION (T)

$$T = \frac{15650"\#(5.32")}{85} + \frac{179\# + 56\#}{6} = 1019 \text{ LBS/BOLT (MAX) (4533 N/BOLT)}$$

SHEAR (V)

$$V = \frac{168\#}{6} + \frac{6384"\#(5.32")}{169} = 229 \text{ LBS/BOLT (MAX) (1019 N/BOLT)}$$

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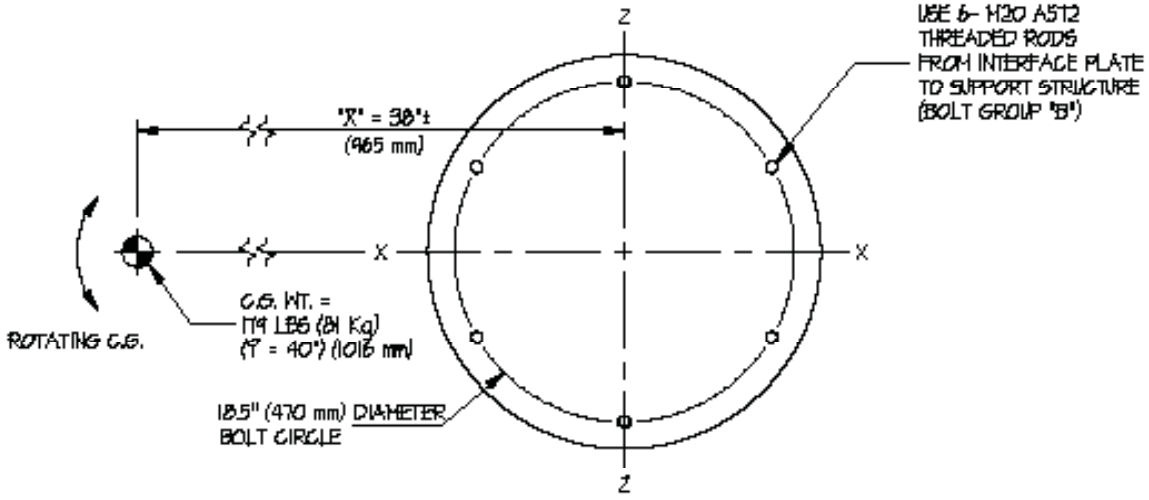
STRYKER COMMUNICATIONS	DES. R. LA BRIE	SHEET 3
	JOB NO. 11-0518	
DUAL ARM SURGICAL LIGHT	DATE 4/6/05	OF 3 SHEETS

SEISMIC ANCHORAGE

INTERFACE PLATE



PLAN AT INTERFACE PLATE

LOADS:

WEIGHT = 179 LBS (796 N)
HORIZONTAL FORCE (V_H) = 168 LBS (747 N)
VERTICAL FORCE (V_V) = 56 LBS (249 N)

BOLT GROUP PROPERTIES:

I_{X-X} = 256 in.^{2} /BOLT (165161mm^2/BOLT)
I_{Z-Z} = 256 in.^{2} /BOLT (165161mm^2/BOLT)
I_{Y-Y} = 512 in.^{2} /BOLT (330322mm^2/BOLT)

MOMENTS:

M_{XX} = 168#(40") + (179# + 56#)38" = 15,650"# (1768 N-m)
M_{ZZ} = 168#(40") + (179# + 56#)38" = 15,650"# (1768 N-m)
M_{YY} = 168#(38") = 6,384"# (721 N-m)

BOLT FORCES:

TENSION (T)

$$T = \frac{15650"\#(9.25")}{256} + \frac{179\# + 56\#}{6} = 605 \text{ LBS/BOLT (MAX) (2691 N/BOLT)}$$

SHEAR (V)

$$V = \frac{168\#}{6} + \frac{6384"\#(9.25")}{512} = 143 \text{ LBS/BOLT (MAX) (636 N/BOLT)}$$

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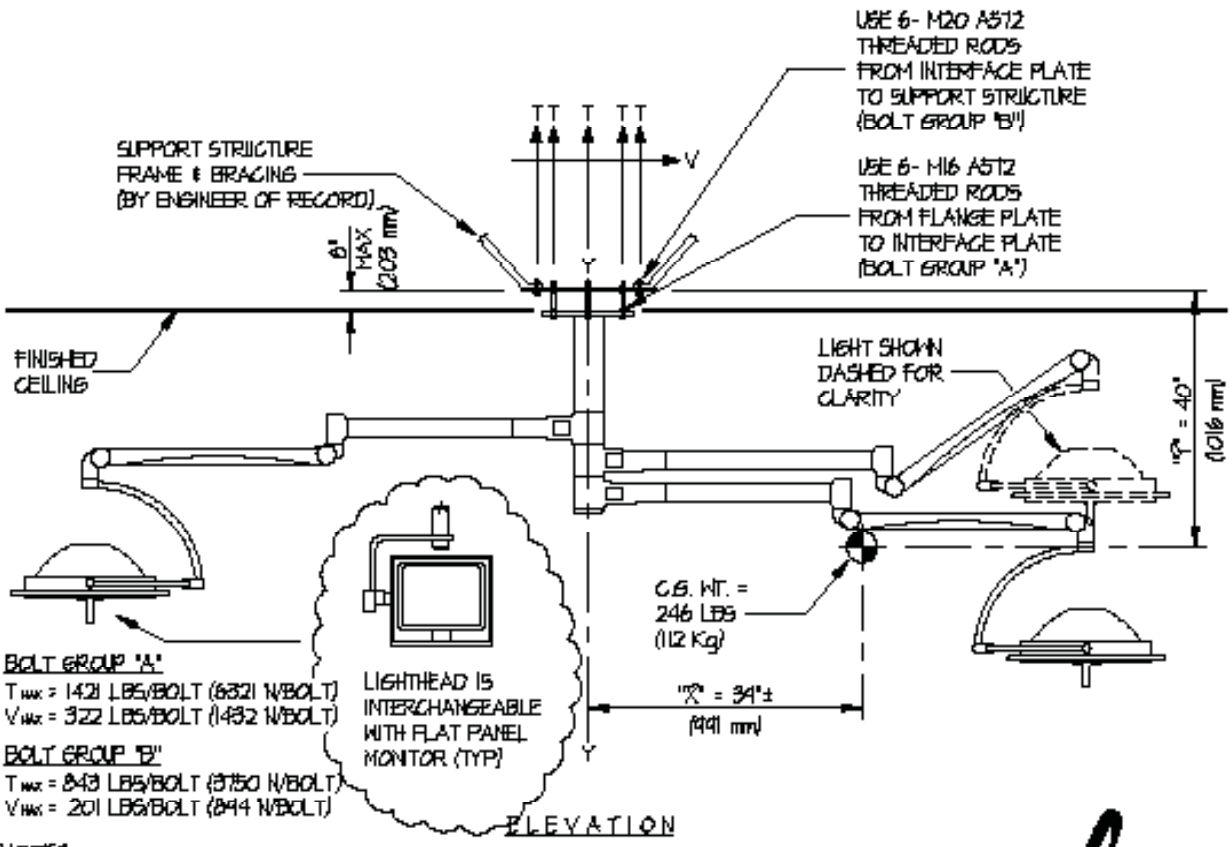
STRYKER COMMUNICATIONS

TRIPLE ARM SURGICAL LIGHT

DES. R. LA BRIE
JOB NO. 11-0518
DATE 4/6/05
SHEET 1 OF 3 SHEETS

SEISMIC ANCHORAGE — CEILING MOUNTED



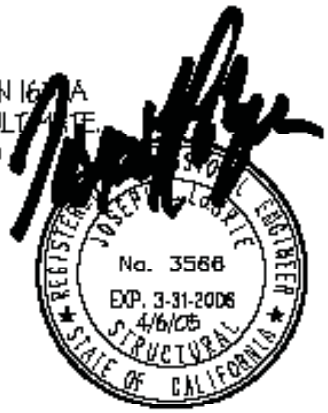
BOLT GROUP "A"
T_{MAX} = 1421 LBS/BOLT (6321 N/BOLT)
V_{MAX} = 322 LBS/BOLT (1432 N/BOLT)

BOLT GROUP "B"
T_{MAX} = 843 LBS/BOLT (3750 N/BOLT)
V_{MAX} = 201 LBS/BOLT (894 N/BOLT)

ELEVATION

NOTES:

1. FORCES ARE DETERMINED PER 2001 CALIFORNIA BUILDING CODE - SECTION 1632A AND HAVE BEEN FACTORED TO REPRESENT WORKING DESIGN LOADS, NOT ULTIMATE.
   HORIZONTAL FORCE (V_H) = 0.94W - (C_a= .66, I_p= 1.5, a_p= 1.0, R_p= 3)
   VERTICAL FORCE (V_V) = 0.33(V_H)
2. CENTER OF GRAVITY (C.G.) WEIGHT IS A MAXIMUM. THIS CALCULATION ENCOMPASSES ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.
3. ENGINEER OF RECORD FOR THE BUILDING SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN.



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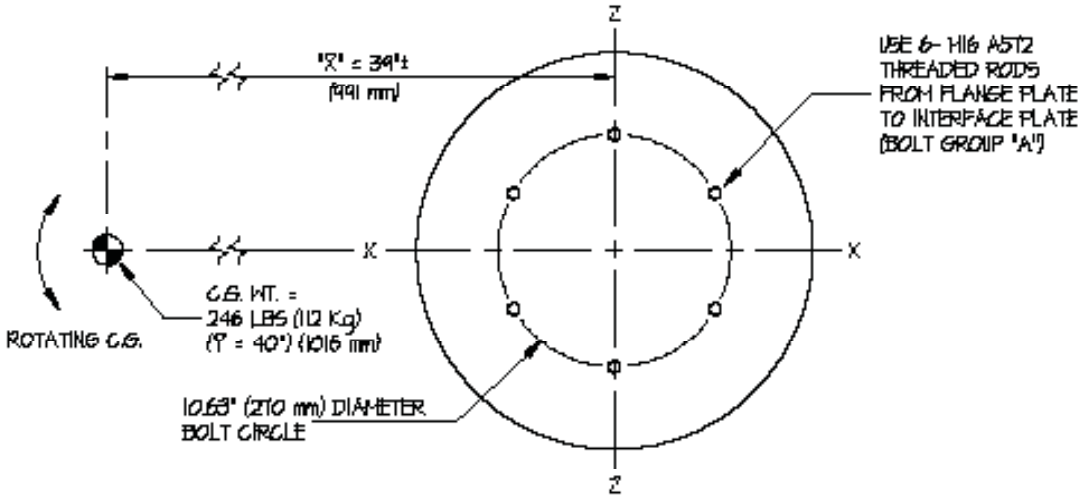
STRYKER COMMUNICATIONS	BY R. LA BRIE	SHEET 2
	JOB NO. 11-0518	
TRIPLE ARM SURGICAL LIGHT	DATE 4/6/05	OF 3 SHEETS

SEISMIC ANCHORAGE

FLANGE PLATE



PLAN AT FLANGE PLATE

LOADS:

WEIGHT = 246 LBS (1094 N)
HORIZONTAL FORCE (V_H) = 231 LBS (1028 N)
VERTICAL FORCE (V_V) = 77 LBS (343 N)

BOLT GROUP PROPERTIES:

I_{X-X} = 85 in.^{2}/BOLT (54839 mm^2/BOLT)
I_{Z-Z} = 85 in.^{2}/BOLT (54839 mm^2/BOLT)
I_{Y-Y} = 169 in.^{2}/BOLT (109032 mm^2/BOLT)

MOMENTS:

M_{XX} = 231#(40") + (246# + 77#)39" = 21,837"# (2467 N-m)
M_{ZZ} = 231#(40") + (246# + 77#)39" = 21,837"# (2467 N-m)
M_{YY} = 231#(39") = 9,009"# (1018 N-m)

BOLT FORCES:

TENSION (T)

$$T = \frac{21837"\#(5.32")}{85} + \frac{246\# + 77\#}{6} = 1421 \text{ LBS/BOLT (MAX) (6321 N/BOLT)}$$

SHEAR (V)

$$V = \frac{231\#}{6} + \frac{9009"\#(5.32")}{169} = 322 \text{ LBS/BOLT (MAX) (1432 N/BOLT)}$$

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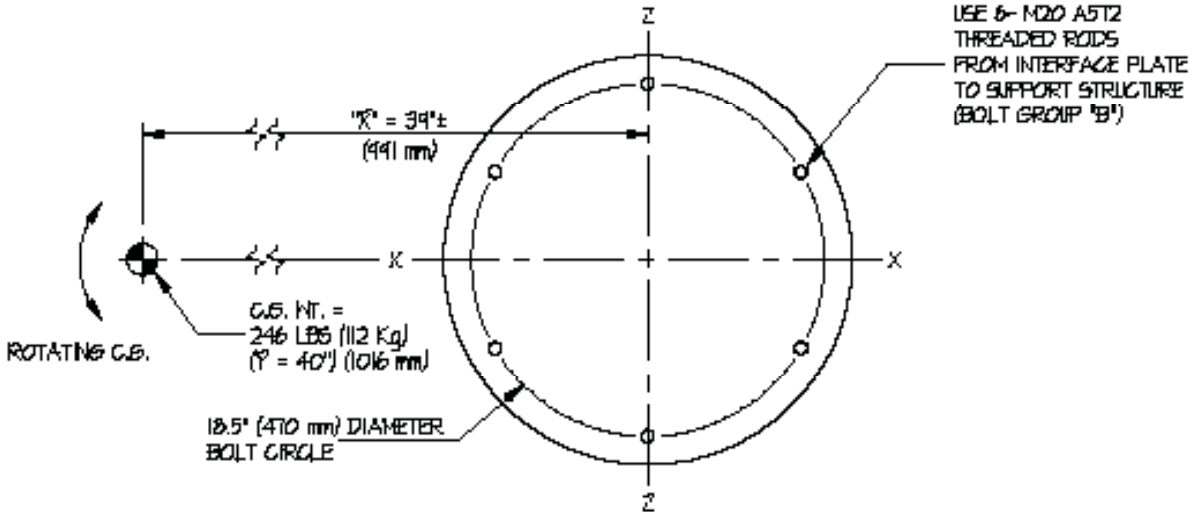
STRYKER COMMUNICATIONS	DES. R. LA BRIE	SHEET 3
	JOB NO. 11-0578	
TRIPLE ARM SURGICAL LIGHT	DATE 4/6/15	OF 3 SHEETS

SEISMIC ANCHORAGE

INTERFACE PLATE



PLAN AT INTERFACE PLATE

LOADS:

WEIGHT = 246 LBS (1094 N)
HORIZONTAL FORCE (V_H) = 231 LBS (1028 N)
VERTICAL FORCE (V_V) = 77 LBS (343 N)

BOLT GROUP PROPERTIES:

I_{X-X} = 256 in.^{2}/BOLT (165161 mm^2/BOLT)
I_{Z-Z} = 256 in.^{2}/BOLT (165161 mm^2/BOLT)
I_{Y-Y} = 512 in.^{2}/BOLT (330322 mm^2/BOLT)

MOMENTS:

M_{XX} = 231#(40") + (246# + 77#)39" = 21,837"# (2467 N-m)
M_{ZZ} = 231#(40") + (246# + 77#)39" = 21,837"# (2467 N-m)
M_{YY} = 231#(39") = 9,009"# (1018 N-m)

BOLT FORCES:

TENSION (T)

$$T = \frac{21837"\#(9.25")}{256} + \frac{246\# + 77\#}{6} = 843 \text{ LBS/BOLT (MAX) (3750 N/BOLT)}$$

SHEAR (V)

$$V = \frac{231\#}{6} + \frac{9009"\#(9.25")}{512} = 201 \text{ LBS/BOLT (MAX) (894 N/BOLT)}$$

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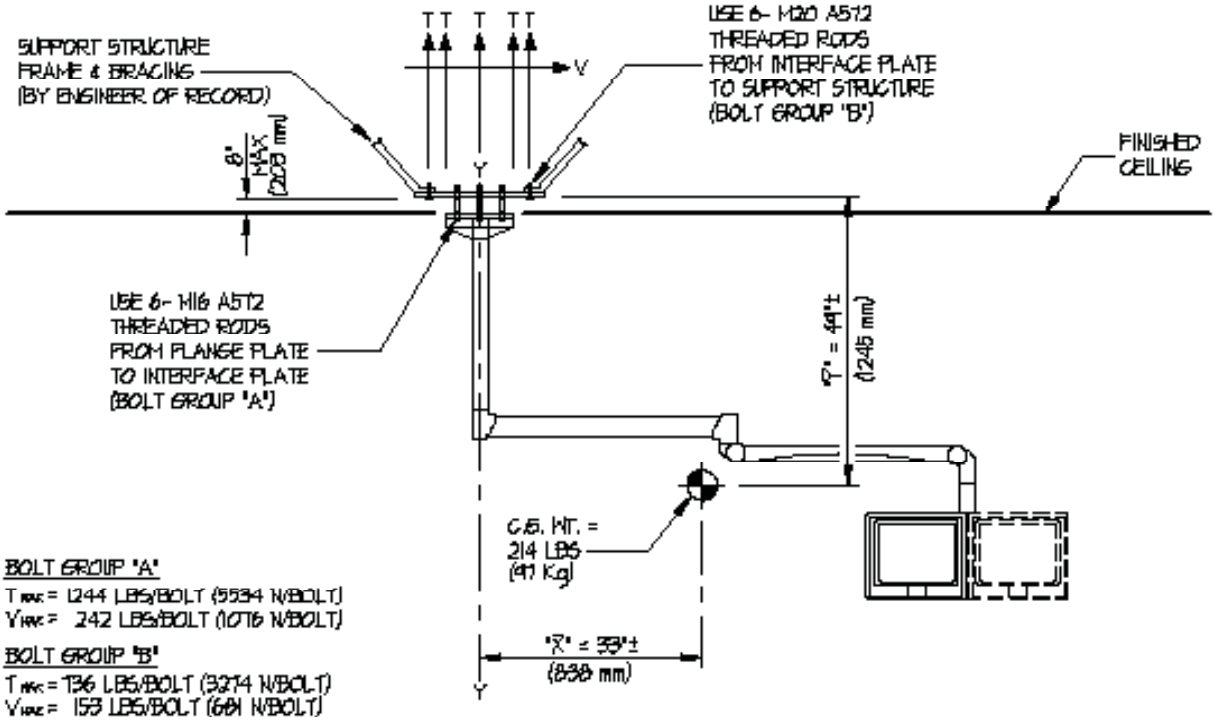
STRYKER COMMUNICATIONS

FLAT PANEL MONITOR ARM - SINGLE/DUAL FLAT PANELS -

DES. R. LA MARIE | JOB NO. 11-0518 | DATE 4/6/05 | SHEET 1 OF 3 SHEETS

SEISMIC ANCHORAGE — CEILING MOUNTED



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

BOLT GROUP 'B'
T_{max} = 736 LBS/BOLT (3274 N/BOLT)
V_{max} = 153 LBS/BOLT (681 N/BOLT)

ELEVATION

NOTES:

1. FORCES ARE DETERMINED PER 2001 CALIFORNIA BUILDING CODE - SECTION 1632A AND HAVE BEEN FACTORED TO REPRESENT WORKING DESIGN LOADS, NOT ULTIMATE.
   HORIZONTAL FORCE (V_H) = 0.94W - (C_a = .66, I_p = 1.5, a_p = 1.0, R_p = 3)
   VERTICAL FORCE (V_V) = 0.33(V_H)
2. CENTER OF GRAVITY (C.G.) WEIGHT IS A MAXIMUM. THIS CALCULATION ENCOMPASSES ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.
3. ENGINEER OF RECORD FOR THE BUILDING SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN.

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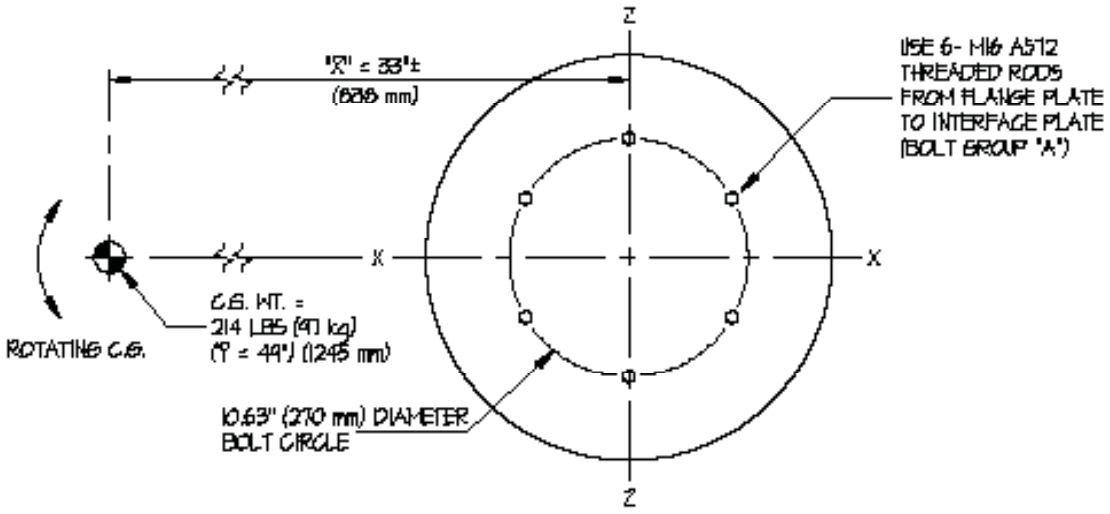
STRYKER COMMUNICATIONS	DES. R. LA BRIE	SHEET 2
FLAT PANEL MONITOR ARM - SINGLE/DUAL FLAT PANELS -	JOB NO. 11-0578	
	DATE 4/6/15	OF 3 SHEETS

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 IN.^{2} /BOLT (54839mm^2/BOLT)
I_{Z-Z} = 85 IN.^{2} /BOLT (54839mm^2/BOLT)
I_{Y-Y} = 169 IN.^{2} /BOLT (109032mm^2/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)

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

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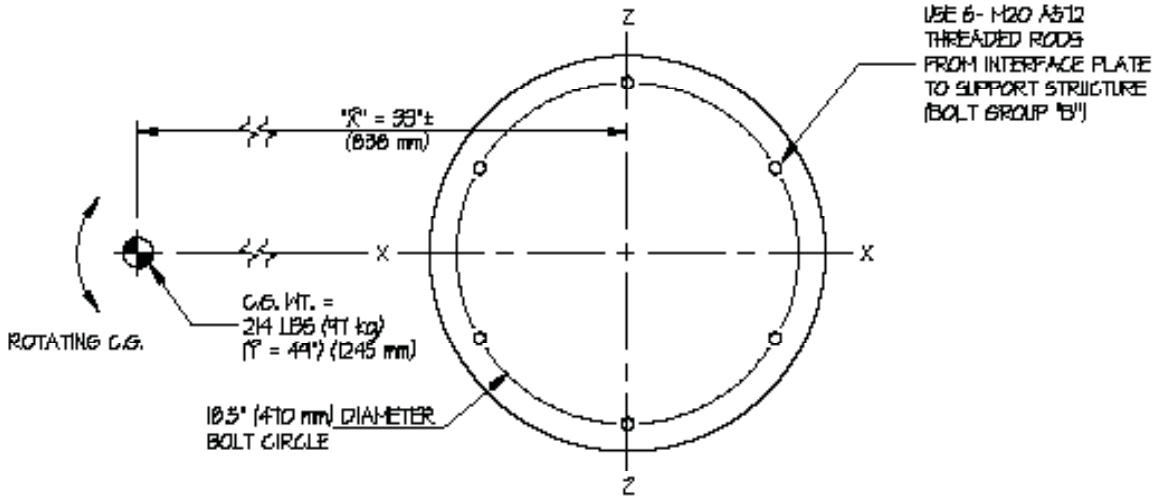
STRYKER COMMUNICATIONS	DES. R. LA BRIE	SHT 3
FLAT PANEL MONITOR ARM - SINGLE/DUAL FLAT PANELS -	JOB NO. 11-0518	
	DATE 4/6/05	OF 3 SHEETS

SEISMIC ANCHORAGE

INTERFACE PLATE



PLAN AT 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 $in.^2$ /BOLT (165161mm^2/BOLT)
I_{Z-Z} = 256 $in.^2$ /BOLT (165161mm^2/BOLT)
I_{Y-Y} = 512 $in.^2$ /BOLT (330322mm^2/BOLT)

MOMENTS:

M_{XX} = 201#(49") + (214# + 67#)33" = 19,122"# (2161 N-m)
M_{ZZ} = 201#(49") + (214# + 67#)33" = 19,122"# (2161 N-m)
M_{YY} = 201#(33") = 6,633"# (749 N-m)

BOLT FORCES:

TENSION (T)

$$T = \frac{19122"\#(9.25")}{256} + \frac{201\# + 67\#}{6} = 736 \text{ LBS/BOLT (MAX) (3274 N/BOLT)}$$

SHEAR (V)

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

EASE
EQUIPMENT ANCHORAGE & SEISMIC ENGINEERING
2801 Connery Way, Suite B
Missoula, MT 59808
Phn: (406) 541-EASE (3273) Fax: (406) 541-3274

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

1. 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.
2. THIS PRE-APPROVAL CONFORMS TO THE 2001 CALIFORNIA BUILDING CODE.
3. THE DETAILS IN THIS PRE-APPROVAL MAY BE USED AT ANY LOCATION AND AT ANY HEIGHT IN THE STATE OF CALIFORNIA.
4. 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.
5. ALL ANCHOR FORCES SHOWN ON THE DRAWINGS ARE WORKING LOADS (AS OPPOSED TO ULTIMATE LOADS) AND MAY BE USED FOR ALLOWABLE STRENGTH DESIGN.

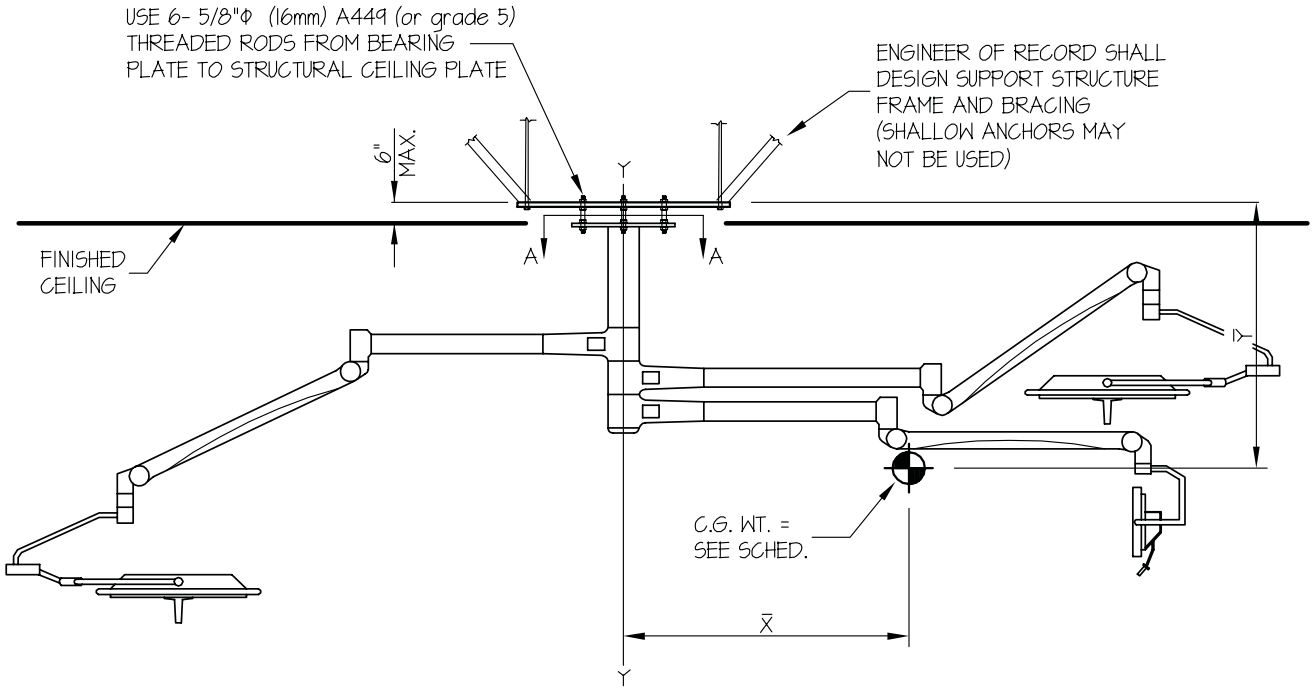
REGISTERED PROFESSIONAL ENGINEER
JOSEPH LABRIE
No. 3566
EXP. 3-31-2008
3/1/07
STRUCTURAL
STATE OF CALIFORNIA

APPROVED
Fixed Equipment Anchorage
Office of Statewide Health Planning and Development
OPA-1649
on
Wednesday, March 7, 2007
Anthony R. Pike (916) 654-3362

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

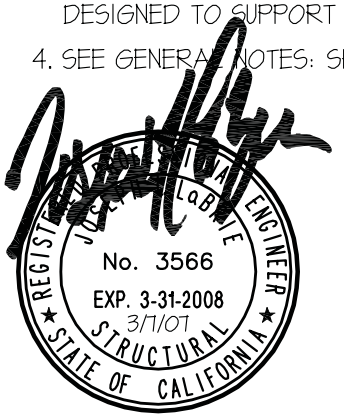
SEISMIC ANCHORAGE PRE-APPROVAL

CEILING MOUNTED



NOTES:

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



APPROVED
Fixed Equipment Anchorage
Office of Statewide Health Planning and Development
OPA-1649
on
Wednesday, March 7, 2007
Anthony R. Pike (916) 654-3362

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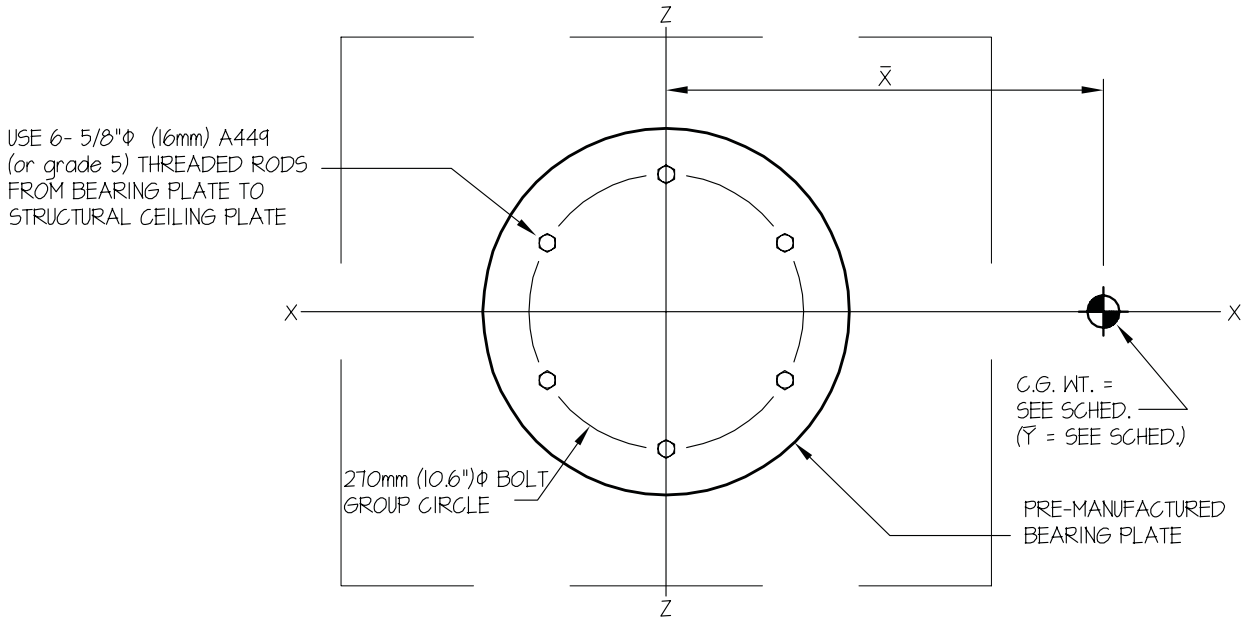
DES. R. LA BRIE
JOB NO. 11-0712
DATE 3/7/07
SHEET 3 OF 3 SHEETS

SEISMIC ANCHORAGE PRE-APPROVAL

BEARING PLATE TO STRUCTURAL CEILING PLATE



PLAN AT BEARING PLATE

SECTION A-A

MODEL (ARM LENGTH)	MAX WEIGHT (lbs)	X̄ (in)	Ȳ (in)	Mxx & Mzz	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

REGISTERED PROFESSIONAL ENGINEER
JOSEPH R. LaBRIE
No. 3566
EXP. 3-31-2008
3/7/07
STRUCTURAL
STATE OF CALIFORNIA

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Office of Statewide Health Planning and Development
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