



PARIC CORPORATION
77 Westport Plaza Suite 250
St. Louis, MO 63146
TEL: 636-561-9500
FAX: 636-561-9501

REQUEST FOR INFORMATION DATE: June 13, 2016 NO.: RFI-167

To: Cannon Design

Attn: Kelvin Patel

From: Paric Corporation

Requested By: Joe Voypick

Project Name: 15051-Webster University Interdisciplinary Science Building Project No.: 15051

Subject: Surgical light installation

Response Required By: June 20, 2016

Drawing / Spec Reference:

Information Requested:

See attached cut sheets for surgical light and detail 16/S0304 and advise how to proceed.

- Please see page 6 of 14 of the attached pdf, we have highlighted portions of it.
- The ¾" mounting ring is supplied by Berchtold, and they ask for (4) kickers anchored/welded to it.
- I called the 800-243-5135 number listed and spoke briefly to 'Glenn' (contact info below), the mounting ring has a center hole in it to suit 6" pipe.

Glenn's contact info below
Glenn Jaromin
Sr. Technical Support Specialist
Stryker

Stryker Communications
1950 Hanahan Road
Charleston, SC 29406

P 843 569 6100 ext. 2
C 843 478.8504
F 843 574 1333
glenn.jaromin@stryker.com

Response:

Answered By: _____

Date: _____



ARCHITECT'S RESPONSE:

This information is provided as an interpretation of the Contract Documents for implementation. It is not an authorization for change to the Contract Sum or Contract Time. If this information results in a claim for a change to the Contract, the Contractor shall notify the [Construction Manager][Architect] of a change through the change process.

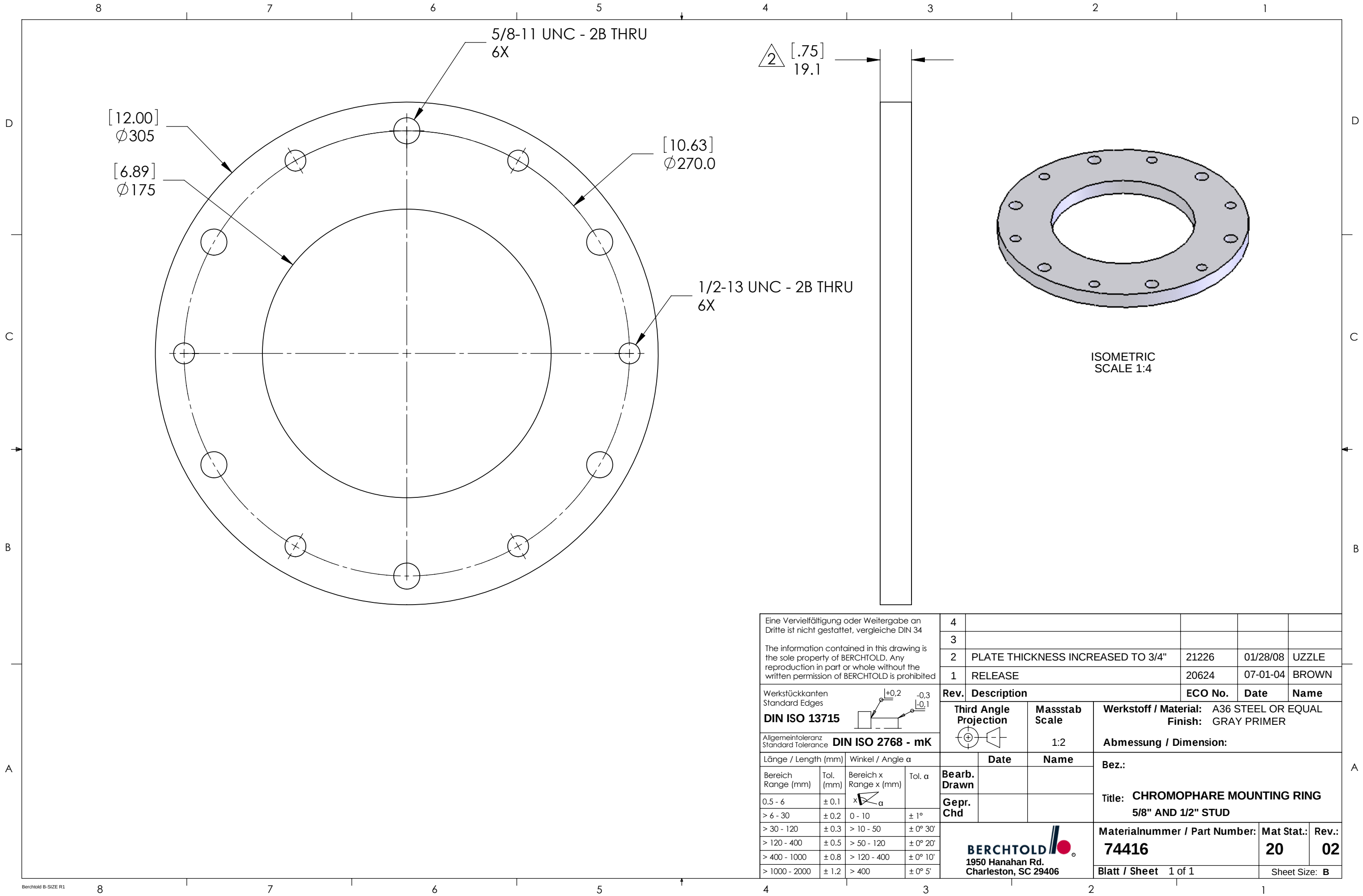
Cc: Kathy Bathe, Paric Corporation

Webster University has revised the light selection to following model:

Stryker Visum Blade LED Surgical Light with NO in-light camera

Attached is the installation manual.

Structural details will be issued in future ASI.



Eine Vervielfältigung oder Weitergabe an Dritte ist nicht gestattet, vergleiche DIN 34				4						
The information contained in this drawing is the sole property of BERCHTOLD. Any reproduction in part or whole without the written permission of BERCHTOLD is prohibited				3						
				2	PLATE THICKNESS INCREASED TO 3/4"	21226	01/28/08	UZZLE		
				1	RELEASE	20624	07-01-04	BROWN		
Werkstückkanten Standard Edges				Rev. Description		ECO No.	Date	Name		
DIN ISO 13715				Third Angle Projection	Masstab Scale	Werkstoff / Material: A36 STEEL OR EQUAL Finish: GRAY PRIMER				
Allgemeintoleranz Standard Tolerance				DIN ISO 2768 - mK		1:2	Abmessung / Dimension:			
Länge / Length (mm)		Winkel / Angle α			Date	Name	Bez.:			
Bereich Range (mm)	Tol. (mm)	Bereich x Range x (mm)	Tol. α	Bearb. Drawn			Title: CHROMOPHARE MOUNTING RING 5/8" AND 1/2" STUD			
0.5 - 6	± 0.1			Gepr. Chd						
> 6 - 30	± 0.2	0 - 10	± 1°							
> 30 - 120	± 0.3	> 10 - 50	± 0° 30'	BERCHTOLD 1950 Hanahan Rd. Charleston, SC 29406			Materialnummer / Part Number:		Mat Stat.:	Rev.:
> 120 - 400	± 0.5	> 50 - 120	± 0° 20'				74416		20	02
> 400 - 1000	± 0.8	> 120 - 400	± 0° 10'				Blatt / Sheet 1 of 1		Sheet Size: B	
> 1000 - 2000	± 1.2	> 400	± 0° 5'							



CHROMOPHARE[®] D650, D660, D530, & D540 PREINSTALLATION MANUAL

Pre-Install Manual: 700000006

Related Publications:

700000088 Operator Manual

This manual contains proprietary information of BERCHTOLD Corporation. It shall not be reproduced in whole or in part without the written permission of BERCHTOLD Corporation.

ETL/CETL LISTED TO IEC 60601-1. MEDICAL ELECTRICAL EQUIPMENT

CHROMOPHARE® IS A REGISTERED TRADEMARK OF BERCHTOLD CORPORATION.

TABLE OF CONTENTS

INTRODUCTION & GENERAL INFORMATION.....2

SUPERSTRUCTURE DESIGN AND SPECIFICATION INFORMATION.....3

 RECOMMENDED DESIGN SPECIFICATIONS.....3

 MINIMUM DESIGN SPECIFICATIONS BY PRODUCT TYPE.....3

ELECTRICAL REQUIREMENTS5

 ELECTRICAL REQUIREMENTS FOR STANDARD MOUNTING5

 STANDARD MOUNTING – DETAILS (SEE PAGE 6 FOR LAYOUT DIAGRAM)6

 LOW PROFILE MOUNTING – LAYOUT DIAGRAM7

 LOW PROFILE MOUNTING – DETAILS (SEE PAGE 7 FOR LAYOUT DIAGRAM).....8

 FLAT PANEL PRODUCTS (WITH AND WITHOUT LIGHTS)9

WALL CONTROL BOX DIMENSIONS.....10

SK BOX DIMENSIONS10

PRE-INSTALLATION GUIDE PUBLICATION HISTORY11

 PUBLICATION HISTORY11

INTRODUCTION & GENERAL INFORMATION

INTRODUCTION & GENERAL INFORMATION

This Pre-Installation Guide details and describes the structural, mechanical, and electrical requirements of the room or site to allow proper installation of BERCHTOLD CHROMOPHARE® D-Series Surgical Lights and Flat Panel products. (D-Series Surgical Lights include D650, D660, D530, and D540.)

It is intended for use by technical individuals involved in the specification, design, and construction of the room or site, such as architects, structural engineers, contractors, electricians, and pipe fitters.

The Hospital and/or its contractors are responsible for the preparation of the room or site including the superstructure design and installation and all other mechanical and electrical requirements described within this guide and those specified by AHJ (Authorities Having Jurisdiction).

Painting and flooring need to be completed before the product can be installed.

Questions pertaining to the information contained in this guide can be addressed by contacting your local BERCHTOLD Technical Service Representative or BERCHTOLD Technical Service at 1-800-243-5135. This guide is applicable to the following BERCHTOLD products:

CHROMOPHARE® D650 and D660

CHROMOPHARE® D530 and D540

All multiple combinations of the CHROMOPHARE® D-Series.

Stand alone Flat Panel Products

Flat Panel combined with either one or two CHROMOPHARE® D-Series lights.

SUPERSTRUCTURE DESIGN AND SPECIFICATION INFORMATION

The customer/contractor has responsibility to ensure the superstructure design meets specifications. BERCHTOLD recommends that a Structural Engineer be involved in the design of the superstructure.

Important: Weights and moments must be adjusted when designing for use in seismic zones. Check with your local construction-engineering agency for applicable local and state codes.

RECOMMENDED DESIGN SPECIFICATIONS

BERCHTOLD Corporation **STRONGLY recommends** that the superstructure be designed to meet the following specifications. (Reference drawing on next page). Designing to these specifications will allow combinations of Light or Flat Panel product to be hung from the structure.

Product Type	Weight (T) lbs.	Moment (M) ft-lb with less than 0.1 °
Light / Flat Panel Combinations	375	1538

Loads to support structure				
Case	Fp	Tmax (LBS)	Vmax (LBS)	Mmax (Ft-#)
1	2.83	760	1107	7713
2	1.89	6.37	739	5663
3	1.54	592	602	4893

MINIMUM DESIGN SPECIFICATIONS BY PRODUCT TYPE

If the customer decides to design the superstructure to the requirements of the specific product type, the superstructure design specifications can be found in the table below.

Product Type	Weight (T) lbs.	Moment (M) ft-lb with less than 0.1 ° rotation at
Single Light	114	360
Double Light or Double Flat Panel	197	656
Triple Light	311	1016
Flat Panel only	114	360
Single Light with Flat Panel	197	656
Double Light with Flat Panel	311	1016
Single Light with Double Flat Panel	311	1016

PRE-INSTALLATION GUIDE

SUPERSTRUCTURE DESIGN AND SPECIFICATION INFORMATION

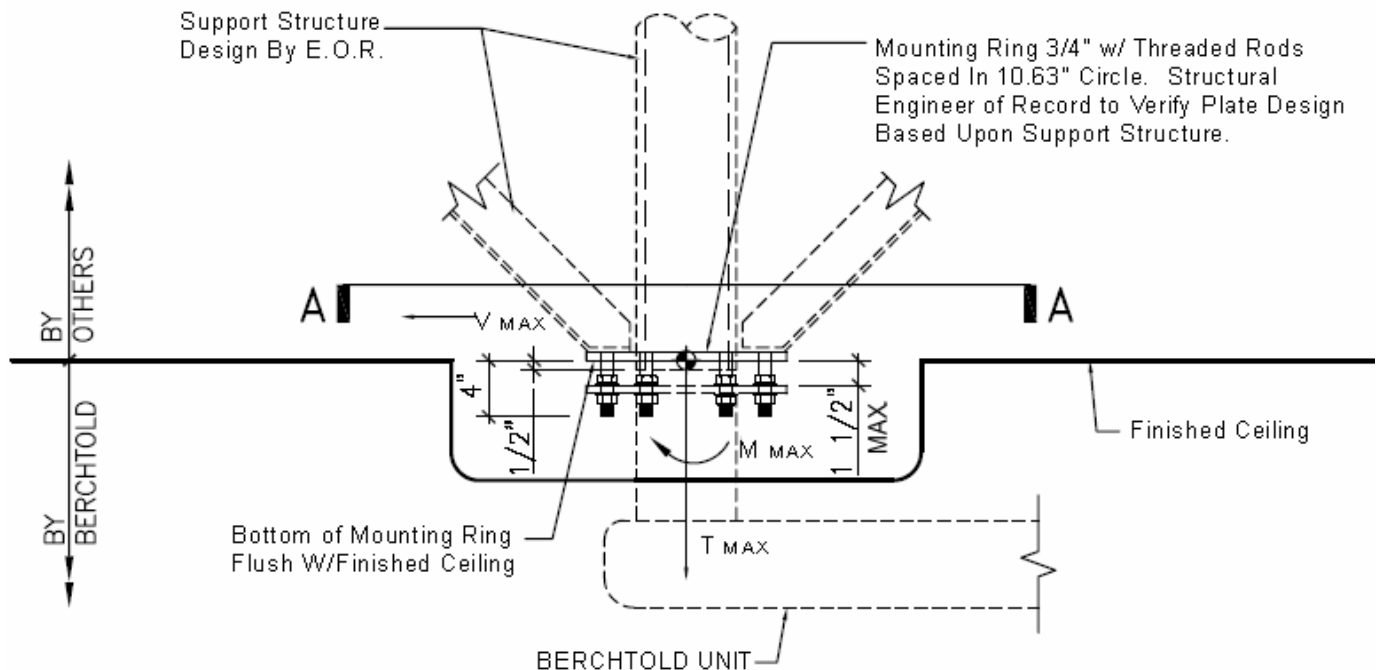
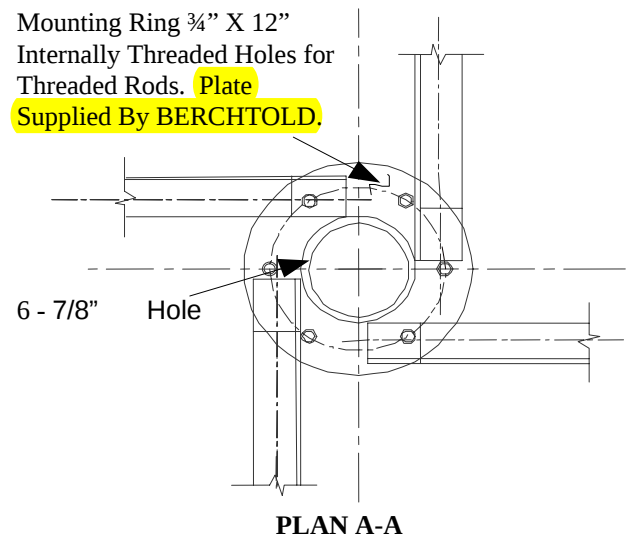
A representative superstructure is shown below. The engineer of record must verify that any structure meets all applicable building codes, especially in seismic zones.

Important design notes:

1. Four (4) kickers are needed.
2. Kickers should be anchored (welding preferred) to the mounting ring as shown in Detail A. Do NOT anchor to vertical pipe.
3. The Mounting Ring (provided by BERCHTOLD) should be installed flush with the ceiling with the studs pointing down. Call 1-800-243-5135 for additional details.

NOTES:

1. LOAD USED FOR DESIGN:
TOTAL WT.:-----375 LB.
MAX. STATIC TORQUE—1538 FT-LB
2. MOUNTING RING IS DESIGNED FOR A
MAXIMUM BRACE FORCE OF 2500 LBS @ 45° IN
BRACING CONFIGURATION SHOWN



Superstructure Design – See Specifications on Page 3

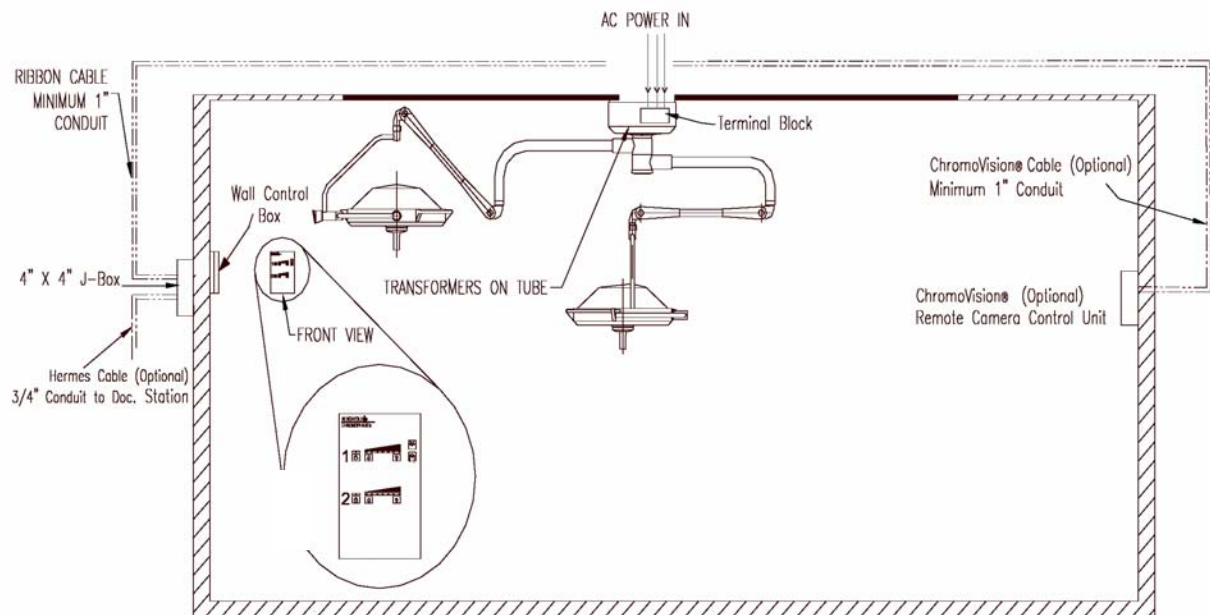
ELECTRICAL REQUIREMENTS

ELECTRICAL REQUIREMENTS

Hospital/Contractor has responsibility for completing all wiring and conduit runs detailed below BEFORE the product can be installed.

ELECTRICAL REQUIREMENTS FOR STANDARD MOUNTING

Check with Site Project Manager or BERCHTOLD Customer Service to determine whether Standard Mounting or Low Profile Mounting style is to be used.



Standard Mounting – Layout Diagram (see page 6 for details and description)

ELECTRICAL REQUIREMENTS

STANDARD MOUNTING – DETAILS (SEE PAGE 5 FOR LAYOUT DIAGRAM)**1. AC Wiring**

Wiring should be 3 wire, 14AWG min., and 600V.

Wiring for lights should be flexible conduit exiting ceiling at the mounting ring and falling 18", min., below ceiling.

CHROMOPHARE® lights require a 120VAC, 50/60 Hz supply. BERCHTOLD recommends a separate 120VAC supply for each mounting ring.

Each light head draws 2 Amps.

2. Conduit and boxes

A standard 4X4 junction box should be installed in the wall for mounting of the light Wall Control. Front of box should be flush with the wall. BERCHTOLD suggests that this box be located approximately 53" off the floor.

For each mounting ring a minimum 1" conduit, with finish grommets at each end, should be installed from the Wall Control junction box and terminated as close to the mounting ring as possible. **Note:** Conduit openings need to be easily accessible at both ends.

3. Optional Equipment

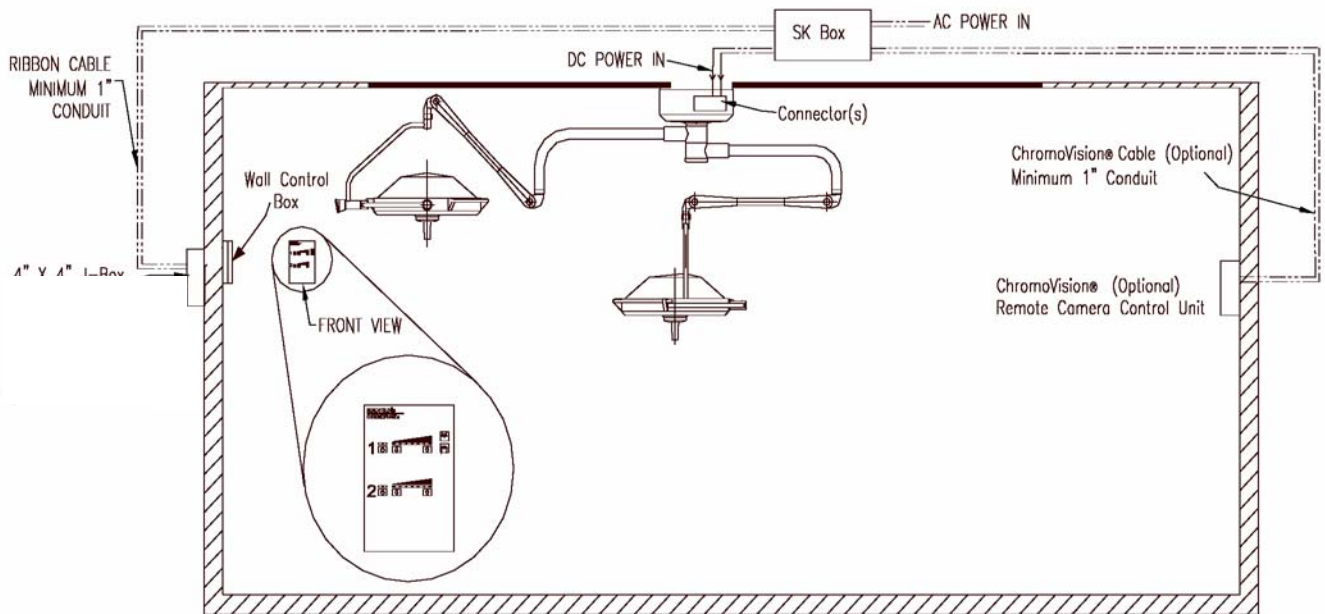
(Contractors – please check with customer to see if any options are to be installed.)

ChromoVision® camera system - Minimum 1" conduit, with finish grommets at each end, should be installed from the mounting ring to either a junction box used for mounting the camera control or the documentation console, per customer specification.

Communication Interface Systems – Conduit as required by the manufacturer of the interface unit.

LOW PROFILE MOUNTING – LAYOUT DIAGRAM

(See page 8 for details and description)



ELECTRICAL REQUIREMENTS

LOW PROFILE MOUNTING – DETAILS (SEE PAGE 7 FOR LAYOUT DIAGRAM)**1. SK Box Mounting**

SK box must be mounted within 10' of mounting ring and be easily accessible. An access panel close to the box mounting location is recommended.

Single Light SK box weighs approximately 30 lbs.; double Light SK box weighs approximately 50 lbs.

2. AC Wiring (to input of SK box)

AC supply should be 120VAC, 50/60 Hz. Wiring to be 3 wires, 14AWG min., 600V rated wire and run per local code to the SK box and terminated to the fused terminal block inside the SK box.

Each light head draws 2 Amps.

3. DC Wiring (from SK Box to Mounting Ring)

12 AWG, 600 volt, 1 pair per light head and 1 ground wire per mounting ring. Wire is terminated to the non-fused terminal block inside the SK box.

Wiring should run from output of SK box and fall 18", min., from ceiling at the mounting ring.

4. Conduit and boxes

A standard 4X4 junction box should be installed in the wall for mounting of the light Wall Control. Front of box should be flush with the wall. BERCHTOLD suggests that this box be located approximately 53" off the floor.

Minimum 1" conduit, with finish grommets at each end, should be installed from the Wall Control junction box and terminated at the SK box

AC wiring – As required by local code.

DC wiring – As required by local code. **Note:** Conduit openings need to be easily accessible at both ends.

5. Optional Equipment

(Contractors – please check with customer to see if any options are to be installed.)

ChromoVision[®] camera system - Minimum 1" conduit, with finish grommets at each end, should be installed from the SK box to either a junction box used for mounting the camera control or the documentation console, per customer specification. **Note:** Conduit openings need to be easily accessible at both ends.

Communication Interface Systems – Conduit as required by the manufacturer of the interface unit.

FLAT PANEL PRODUCTS (WITH AND WITHOUT LIGHTS)

When included as part of a Light assembly:

1. AC wiring (In addition to Light AC wiring)

Should be 3 wire, 14AWG min., and 600V. Conduit as required by local code.

Wiring should exit ceiling at the mounting ring and fall 18", min., below ceiling.

2. Low voltage video cable conduit

If conduit for low voltage cable is required by code then BERCHTOLD suggests 2" conduit to allow for the various types and quantities of video cabling that can be run. Conduit should run from the mounting ring to a destination determined by the customer. **Note:** Conduit openings need to be easily accessible at both ends.

Stand Alone Flat Panel Products:

1. AC wiring

Should be 3 wire, 14AWG min., 600V. Conduit as required by local code.

Wiring should exit ceiling at the mounting ring and fall 18", min., below ceiling.

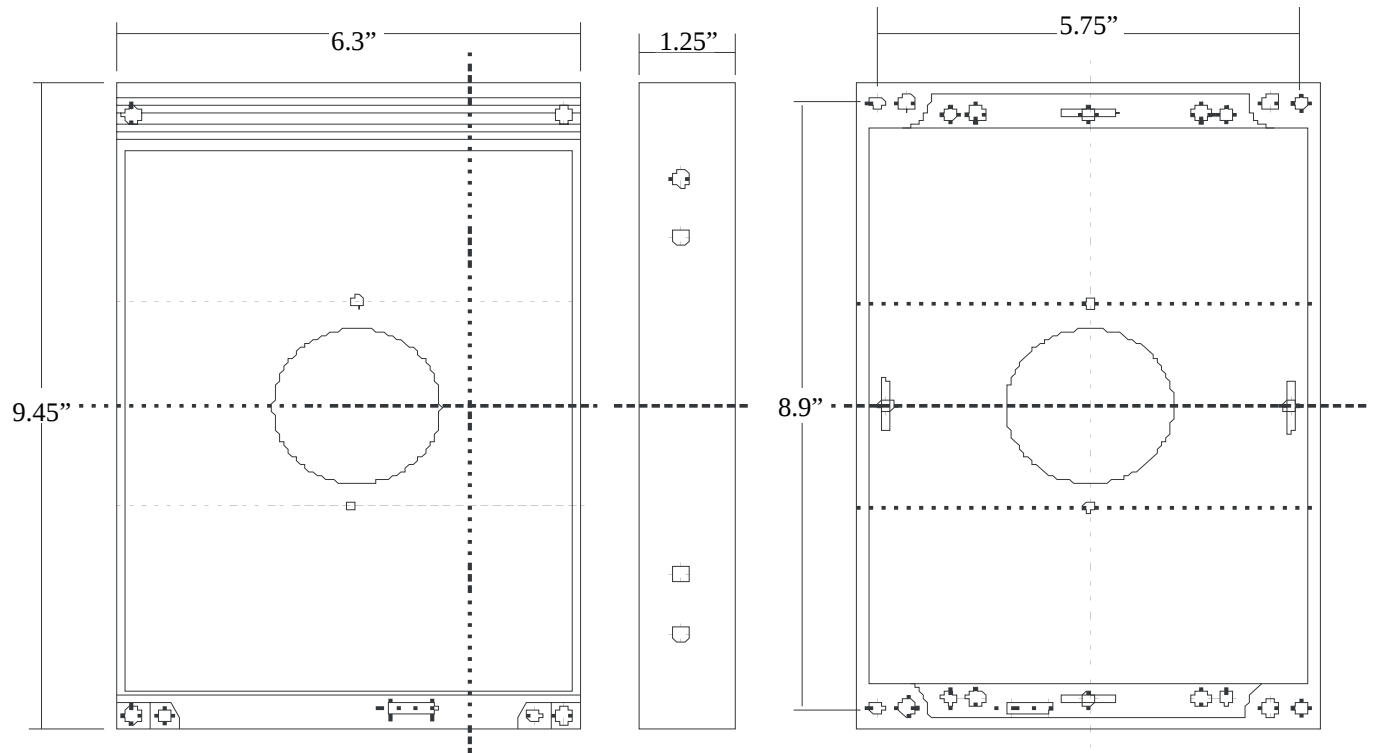
2. Low voltage video cable conduit

If conduit for low voltage cable is required by code then BERCHTOLD suggests 2" conduit to allow for the various types and quantities of video cabling that can be run. Conduit should run from the mounting ring to a destination determined by the customer. **Note:** Conduit openings need to be easily accessible at both ends.

BOX DIMENSIONS

WALL CONTROL BOX DIMENSIONS

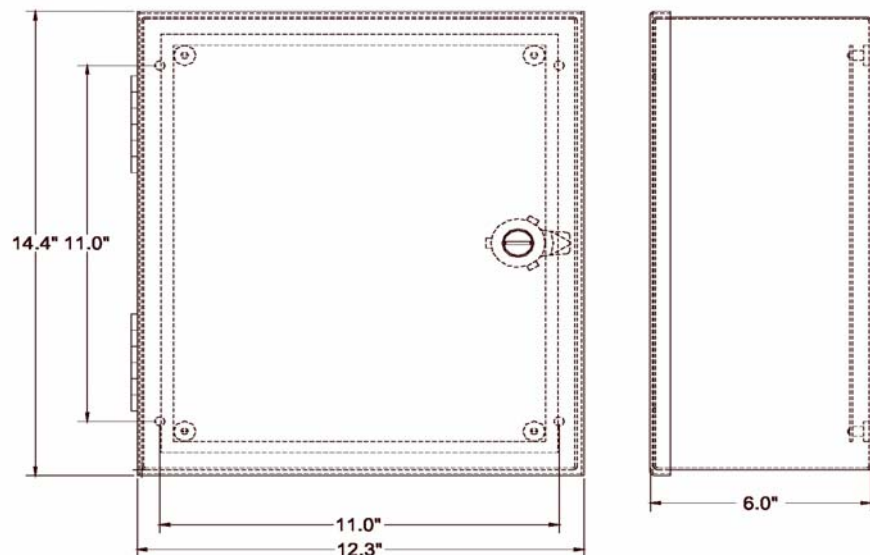
Back Panel (BERCHTOLD Dwg. 10-007-2030)



SK BOX DIMENSIONS

SK Box for Single & Double Light

Note: Triple light uses one double SK box and one single SK box.
 BERCHTOLD dwg. 71039, Hoffman Engineering No. A-14N126



PRE-INSTALLATION GUIDE PUBLICATION HISTORY

This publication describes the equipment as of the date of issue listed below. BERCHTOLD Corporation reserves the right to make changes in design or specifications at any time without notice. If you find any difference between the equipment you received and the components or assemblies described in this publication, contact BERCHTOLD Customer Service at 800-243-5135 for information.

PUBLICATION HISTORY

Revision	Issue Date
-----------------	-------------------

Revision 1	Original Issue: September 2002 (ECO 20149)
------------	--

Revision 2	November (ECO 21108)
------------	----------------------

TELETOM[®] is a Registered Trademark of BERCHTOLD Corporation.

©2004 BERCHTOLD Corporation. All Rights Reserved

SAFE • INNOVATIVE • BERCHTOLD

BERCHTOLD Corporation

1950 Hanahan Road

Charleston, SC 29406

Phone: 843-569-6100

Phone: 800-243-5135

Fax: 843-569-6133

Manual No. 70-000-0006

**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

This manual contains confidential information that shall not be disclosed or duplicated for any reason other than to use and maintain Visum™ Surgical Lights and Flat Plane Arms. This restriction does not limit the right to use information contained in this manual if it is obtained from another source without restriction. The information subject to this restriction is contained in all pages of this manual.

© 2016/04 Stryker Communications. All Rights Reserved. Information in this document is subject to change without notice. Stryker and Stryker logo are registered trademarks of Stryker.

Endosuite® OR and iSuite® are registered trademarks of Stryker.

All Rights Reserved

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

Contents

1. General Warnings and Cautions	7
1.1 Warnings	7
1.2 Cautions	7
2. Product Symbol Definition.....	8
3. Scope.....	9
4. Hospital/Contractor Responsibility	10
4.1 Delivery and Storage	10
4.2 Drawings and Information	10
4.3 Ceiling Access	10
5. Stryker's Responsibilities	11
6. Structural Responsibilities	12
6.1 Support Structure/Mounting Support.....	12
6.2 Support Structure Design Considerations.....	12
6.3 Site Preparations	15
6.3.1 Mounting (Interface) Plate	15
6.3.2 Stryker Single Mounting Common Plate (Stryker-Supplied).....	16
6.4 Mechanical Specifications	18
6.5 Support Structure Loads	18
7. Electrical Responsibilities	20
7.1 Electrical and Data Infrastructure.....	20
7.2 Electrical Installation	20
7.3 Power Supply Box Mounted in Documentation Station (Halogen)	21
7.3.1 Visum 450 & 600 (Halogen) Light Power Supply Box	21
7.3.2 Visum 450 & Visum 600 (Halogen) Light and Camera Wall Control Panel	22
7.4 Power Supply Box Mounted in Documentation Station (LED)	24
7.4.1 Power Supply Box for Visum LED	24
7.4.2 Visum LED Wall Control Panel.....	25
7.4.3 Visum Blade LED Wall Control Panel	26
7.5 Wall-Mounted Power Supply Box (Visum LED).....	27
7.5.1 Power Supply Box Wall Mount (Optional)	28

7.6	HD Camera Decoder Box Mounted in Documentation Station	28
7.7	Wall Mounted HD Camera Decoder Box (Optional).....	29
7.8	Electrical Installation Drawings.....	30
7.9	Electrical Specifications	37
7.10	Video and Data Conduit Requirements	37
8.	Environmental Specifications	38
8.1	Operating Conditions.....	38
8.2	Storage Conditions	38
8.3	Light Suspension Specifications	39
Appendix A: Seismic Calculations (Light Suspensions)		42
Appendix B: Seismic Certificates (Light Suspensions).....		45
Appendix C: Seismic Calculations (Blade Light Suspensions).....		49

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 lightening 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.
4. This equipment must be connected to an emergency power auxiliary system that can restore power in 50 milliseconds or less.

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:

	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.
	A lightning bolt within a triangle indicates the presence of hazardous voltage. Refer all service to authorized personnel.
	Denotes oxygen explosion hazard.
	Denotes usage tips and useful information.
	Denotes compliance to European Community Directive 93-42-EEC.
	Indicates hot surfaces.
	Denotes compliance to CSA Standard C22.2, 60601.1, AAMI ES 60601-1.
	Denotes the date the equipment was manufactured.
	Denotes the manufacturer of the device.
	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.
	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. Note: The device does not contain any hazardous materials. 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.

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.

For surgical lighting systems mounted to a Teletom equipment boom, refer to the Teletom Pre-Install Manual, P/N 700000231, for the mechanical ceiling mounting requirements.

4. Hospital/Contractor Responsibility



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.

4.1 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, temperature controlled, dry environment prior to installation. Failing to comply with this requirement may lead to damage of equipment, possible failure of life support components, theft, and damage.
3. Remove and dispose of the pallets, boxes, and trash after completing the installation.

4.2 Drawings and Information

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

4.3 Ceiling Access

1. A 24" x 24" (610mm x 610mm) minimum access panel must be installed in the ceiling within 18" (450mm) of the Stryker-supplied Mounting (Interface) Plate to allow connection of electrical and data cables during final installation. In this instance, an access panel is defined as an opening in the ceiling near the fixture that allows for servicing the equipment. The access panel must be separate from the hole where the equipment is hung and it must have a door for future serviceability.
2. A 21-22" diameter (533mm-558mm) hole, concentric with the Stryker-supplied Mounting (Interface) Plate center is required for the light assembly installation. A 24" (600mm) diameter ceiling cover (Stryker-supplied) will conceal the hole after the suspension has been completely installed.

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.

6. Structural Responsibilities

Installation of the support structure, 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.

6.1 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 Stryker-supplied Mounting (Interface) Plate at the bottom of each support structure at 3" (76.2 mm) above the finished ceiling in accordance with the recommended method. THIS MUST BE INSTALLED PRIOR TO STRYKER'S ON-SITE ARRIVAL FOR INSTALLATION.
3. Ensure that Stryker equipment and infrastructure is not impeded by the design of the support structure.
4. Verify that the clearance for the mounting site is at least 25" (635mm) to install the Surgical Light System (LED or Halogen).
5. Install a 24" x 24" (610mm X 610mm) access panel directly adjacent to each mounting point for installation, maintenance, and future service.

6.2 Support Structure Design Considerations

The support structure must be designed and fabricated to adequately support the loads specified for each application and to conform to all applicable regulations. Figure 6.1 is only an example of how all of the required components tie in with the hospital-supplied 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

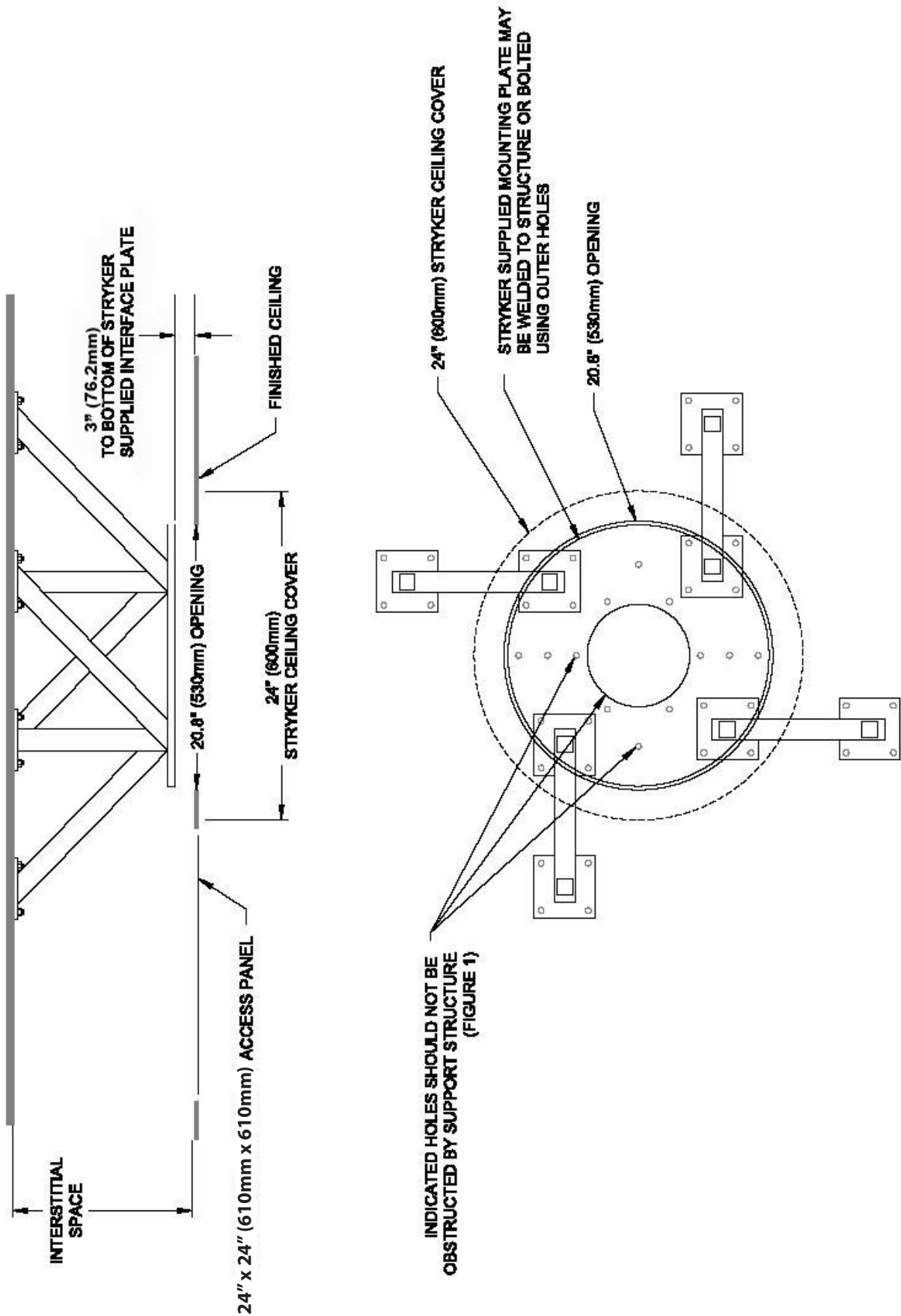


Figure 6.1 - Support Structure

use the six .83" (21mm) holes along the outer edge of the plate to bolt it to the support structure (see Figure 6.2).

3. The Stryker-supplied Mounting (Interface) Plate must be level within 0.25" (6.4mm). The bottom of the mounting plate must be 3" (76.2mm) above the finished ceiling. Allow enough space to route cables to the surgical light and Flat Panel Navigation Arm (see Figure 6.1).



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



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 the mounting plate is sufficiently supported to carry the loads defined for the support structure.



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.



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 Stryker-supplied Mounting (Interface) Plate as well as the 9.06" (230 mm) diameter center hole.

6.3 Site Preparations

6.3.1 Mounting (Interface) Plate

The Stryker-supplied Mounting Plate is the primary mounting component for new surgical light installations. It is the responsibility of the hospital/contractor to install the plate, as it is considered part of the structure. The mounting plate **MUST** be installed by the hospital/contractor prior to the installation start date.

Note When using the Common Plate (see 6.3.2), the bottom must be recessed 3 inches, +/- 1/4-inch above the finished ceiling.

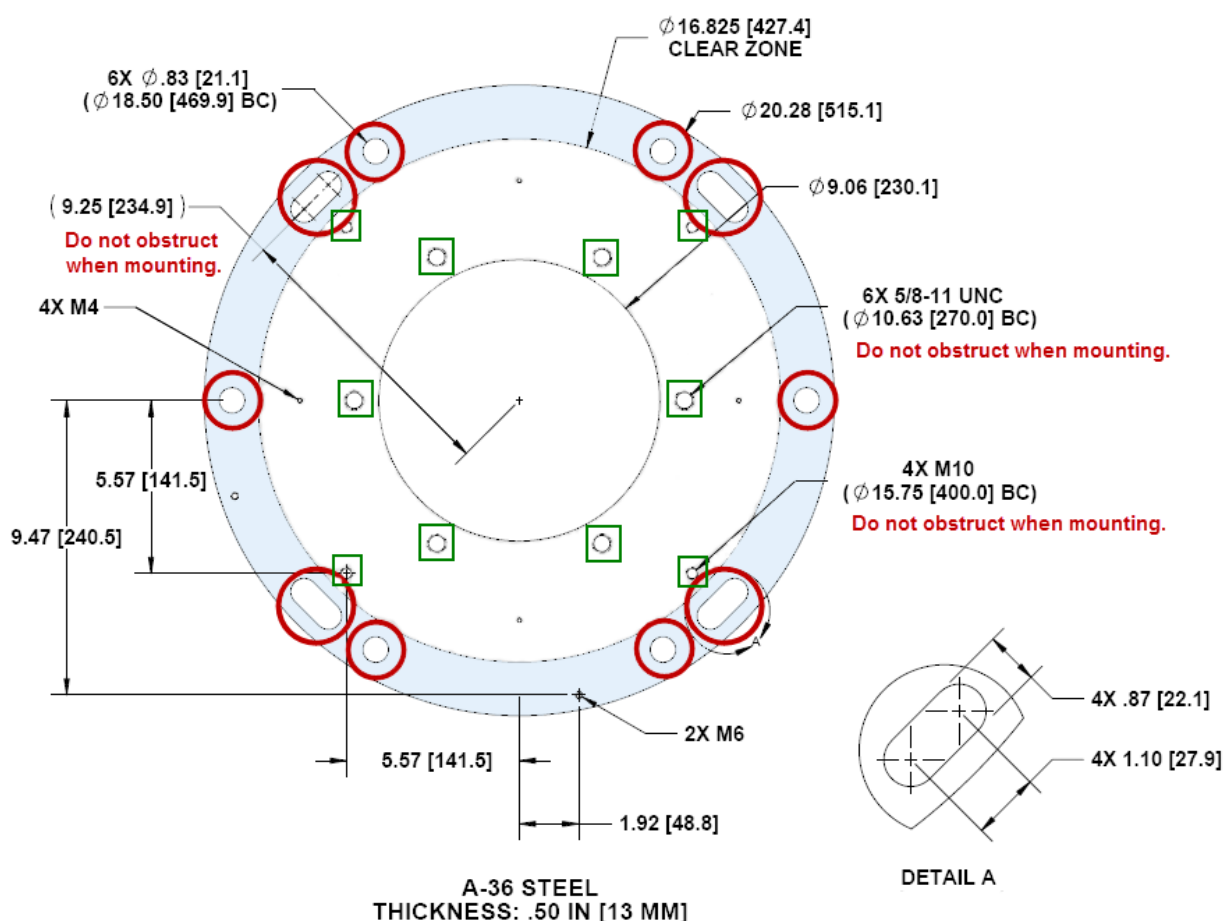


Figure 6.2 - Stryker-supplied Mounting (Interface) Plate
Material: Steel, .05" (12.7mm) thick, approximately 40lb (18kg)

Note The green squares denote Stryker-only threaded holes. Red circles are acceptable mounting holes for the contractor. The shaded areas are acceptable welding points.

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

6.3.2 Stryker Single Mounting Common Plate (Stryker-Supplied)

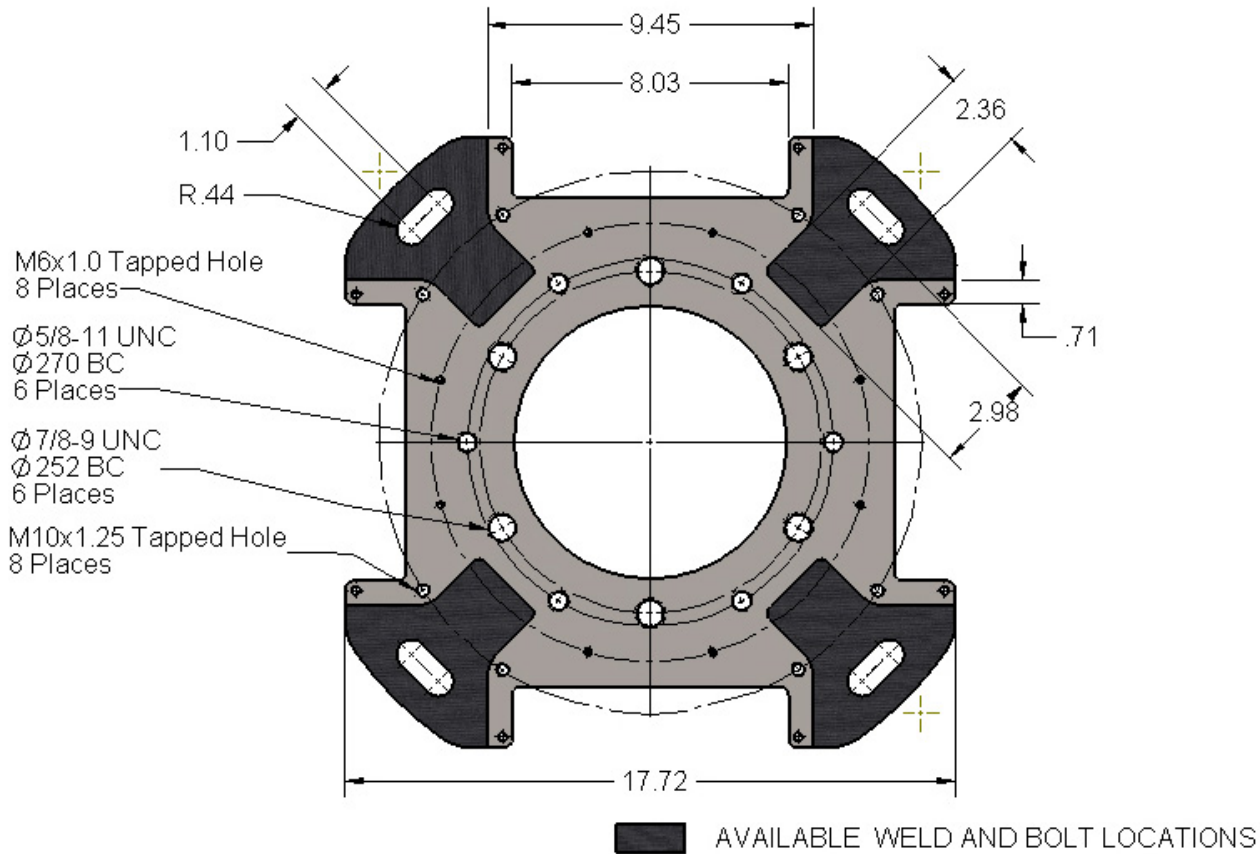


Figure 6.3 - Single Common Plate (PN P29282)
(Material: Steel, 1.00" (25.4mm) thick, approximately 52 lb [23.6 kg])



Note

Light shaded areas denote Stryker-only threaded holes. Dark shaded areas are acceptable mounting holes for the contractor. Dark shaded areas are also acceptable for welding.



Note

When using the Common Plate, the bottom must be recessed 3 inches, +/- 1/4-inch above the finished ceiling.

6.3.3 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.

The Stryker-supplied Universal Mounting Plate was designed to bolt directly to most existing bolt patterns, but the hospital is required to confirm a matching bolt pattern before installation.

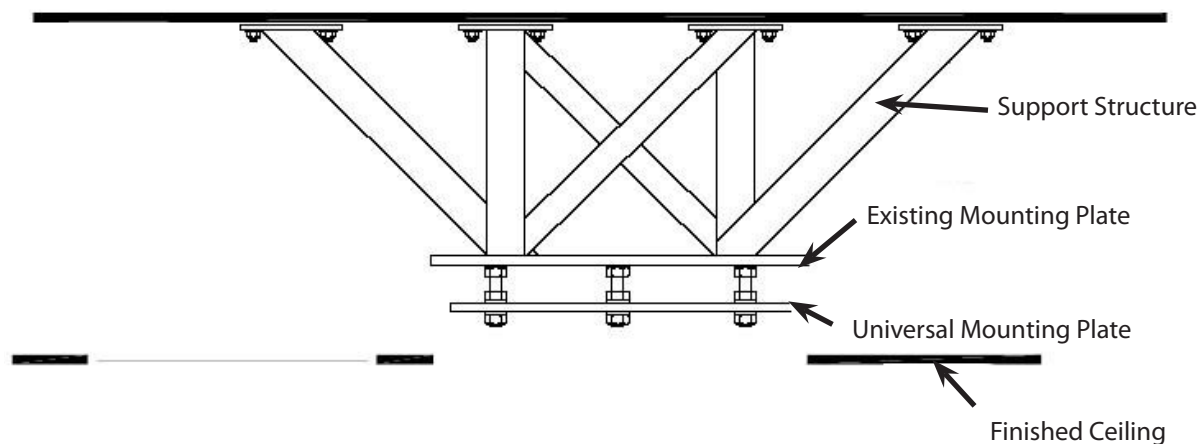


Figure 6.4- Mounting & Universal Plate Diagram

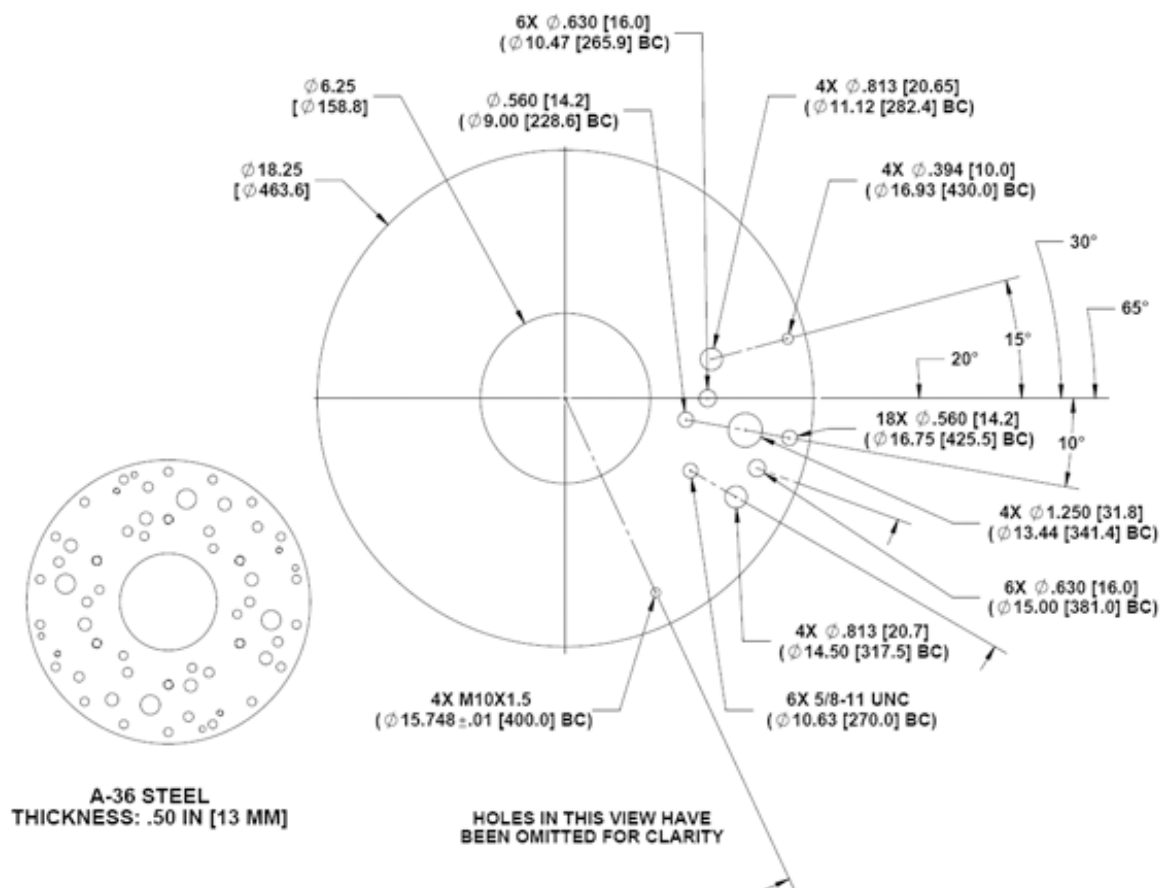


Figure 6.5- Universal Mounting Plate

6.4 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)
Medium Duty Dual Yoke Spring Arm Medium Duty Suspension Spring Arm	up to 45 kg (99.2 lbs)
Light Duty Suspension Spring Arm	up to 16 kg (35.3 lbs)

*Check load capacity of Spring Arm prior to loading.

6.5 Support Structure Loads

Specification for ALL Installation Zones								
Model		Config.	Weight		CGx		Cgy	
Visum II LED	Single Arm	L	58 kg	(129 lbs)	78 cm	(30.9 in)	114 cm	(45.0 in)
	Dual Arm	L/L	93 kg	(204 lbs)	103 cm	(40.6 in)	133 cm	(52.3 in)
		L/FP	93 kg	(204 lbs)	103 cm	(40.6 in)	130 cm	(51.3 in)
	Triple Arm	L/L/L	129 kg	(285 lbs)	116 cm	(45.6 in)	145 cm	(57.1 in)
		L/L/FP	129 kg	(285 lbs)	116 cm	(45.6 in)	143 cm	(56.3 in)
	EHA Single	L/L	70 kg	(154 lbs)	112 cm	(44.0 in)	117 cm	(46.0 in)
	EHA Dual	L/L	114 kg	(251 lbs)	131 cm	(51.6 in)	135 cm	(53.3 in)
		L/FP	114 kg	(251 lbs)	131 cm	(51.6 in)	133 cm	(52.4 in)
Visum Blade	Single Arm	L	65 kg	(143 lbs)	81 cm	(32.0 in)	98 cm	(38.5 in)
	Dual Arm	L/L	106 kg	(234 lbs)	106 cm	(41.6 in)	113 cm	(44.4 in)
		L/FP	107 kg	(237 lbs)	107 cm	(42.0 in)	122 cm	(48.1 in)
	Triple Arm	L/L/L	146 kg	(321 lbs)	110 cm	(43.2 in)	122 cm	(48.1 in)
		L/L/FP	147 kg	(324 lbs)	110 cm	(43.4 in)	129 cm	(50.8 in)
Single Flat Panel			42.41	(94 lbs)	99 cm	(39.1 in)	65 cm	(25.4 in)
Med Duty Dual Flat Panel			104.6	(231 lbs)	133 cm	(52.2 in)	99 cm	(39.0 in)

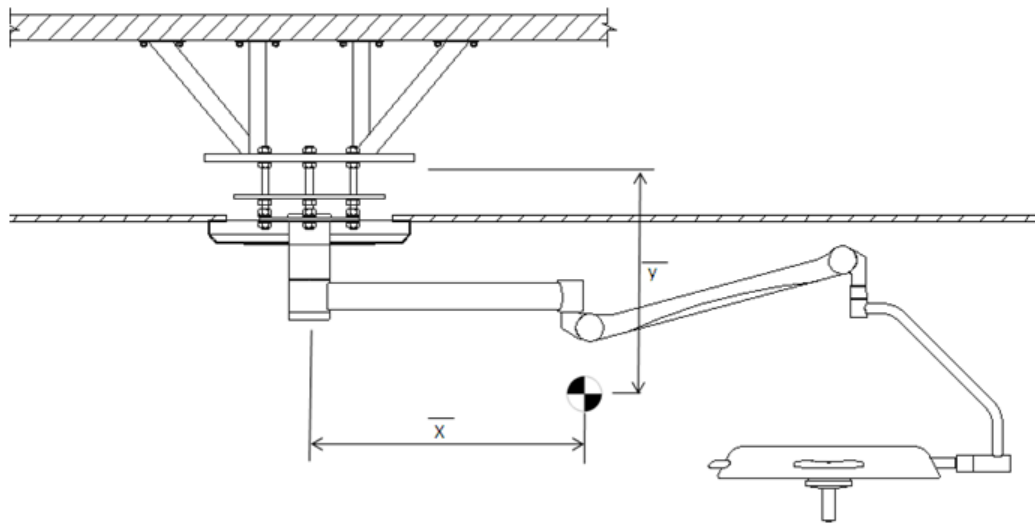


Figure 6.6 - Horizontal ($\bar{x}$) & Vertical ($\bar{y}$) Locations of Center Mass

7. Electrical Responsibilities

Installation of the support structure, 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.

7.1 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.

If the contractor is unable to provide fuses or wishes to use a Stryker provided solution, 5 amp fuse kits are available as part number 0682400420 (5 amp). The fuse kit is intended to be mounted in a junction box 4" square and 1.5" deep.

2. Provide an uninterrupted, 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.
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.
8. Install a circuit breaker that breaks both line and neutral and is capable of being locked in the off position. The breaker must also meet the creepage and clearance requirement of 3mm. A 15A breaker is recommended, but may vary depending on hospital policy.

7.2 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 7.9, 7.10, 7.11 and 7.12) indicate the maximum length of cables routed through conduits. Ensure the maximum conduit run between the mount and the power supply box does not exceed 50’.

7.3 Power Supply Box Mounted in Documentation Station (Halogen)

1. Install a vertically mounted RACO 942 three gang junction box for each wall control panel.

**Note**

For every two light configurations a RACO 942 junction box is required. For example, one and two light configurations require one RACO 942; but three and four light configurations require two RACO 942 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 a 6” x 6” (152mm x 152mm) back box behind the documentation station where the power supply box will be located.
3. Verify a grounded, uninterrupted, and isolated power outlet 115/230V is available within 48” (1.2m) of each power supply box.
4. Install conduits as specified in Figure 7.9.
5. 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 7.9.

**Note**

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

7.3.1 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**

There is no wall mount option for Visum 450 & 600 Halogen lights.

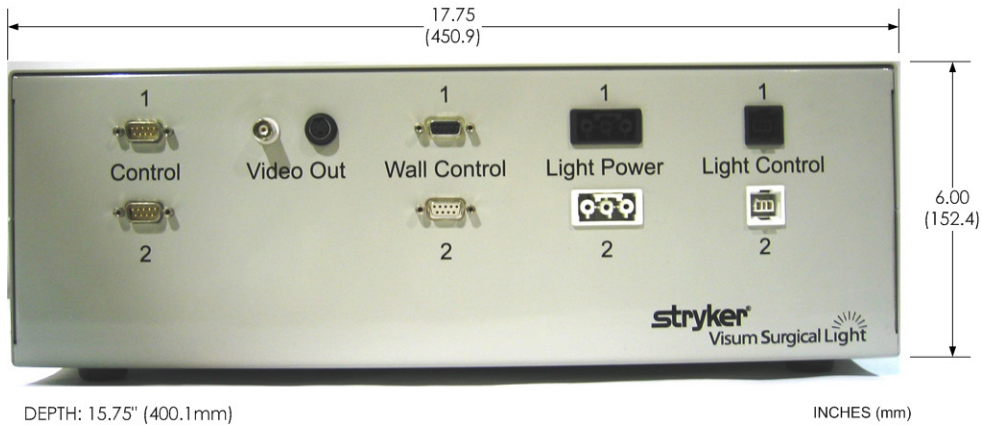
**Note**

Single and dual-light configurations require one power supply box. Three or four-light configurations require two power supply boxes. If two power supply boxes are used, each power supply box should be installed on a 14-18” (356mm-457mm) center.

3. Use a Documentation Station to accommodate the power supply box and a SwitchPoint 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 7.1 - Power Supply Box

7.3.2 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 For every two light configurations a RACO 942 junction box is required. For example, one and two light configurations require one RACO 942 junction box; but, three and four light configurations require two RACO 942 junction boxes.



Note The wall control panel must be within 60' (18.3m) of the power supply box.

2. A RACO 942 three-gang box is required for Stryker to attach the wall control panel.

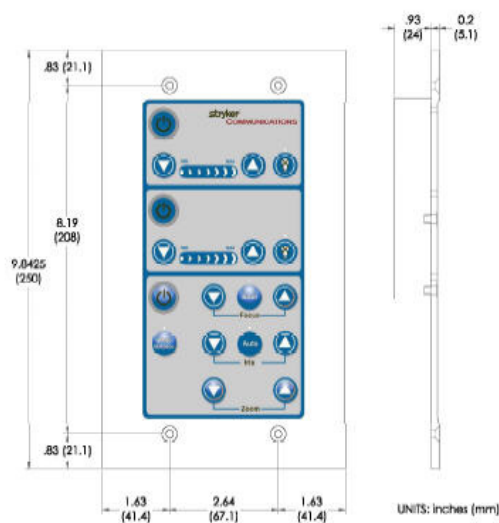


Figure 7.2 - Wall Control Panel



Note

If two wall control panels are used, each control panel should be installed on an 8-10" (203 mm-254mm) center.



Note

For proper installation of the wall control panel, a standard RACO 942 three-gang box should be mounted vertically.

7.4 Power Supply Box Mounted in Documentation Station (LED)

1. Verify an Ethernet drop is available within 72" (1.8m) of the power supply box.
2. Verify a grounded, uninterrupted and isolated power outlet 100/230V is available within 48" (1.2m) of each power supply box

7.4.1 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

Verify a grounded, uninterrupted, and isolated power outlet 100/230V is available within 48" (1.2m) of each power supply box. If two power supply boxes are used, each power supply box should be installed on a 14"-18" (356mm-457mm) center.

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

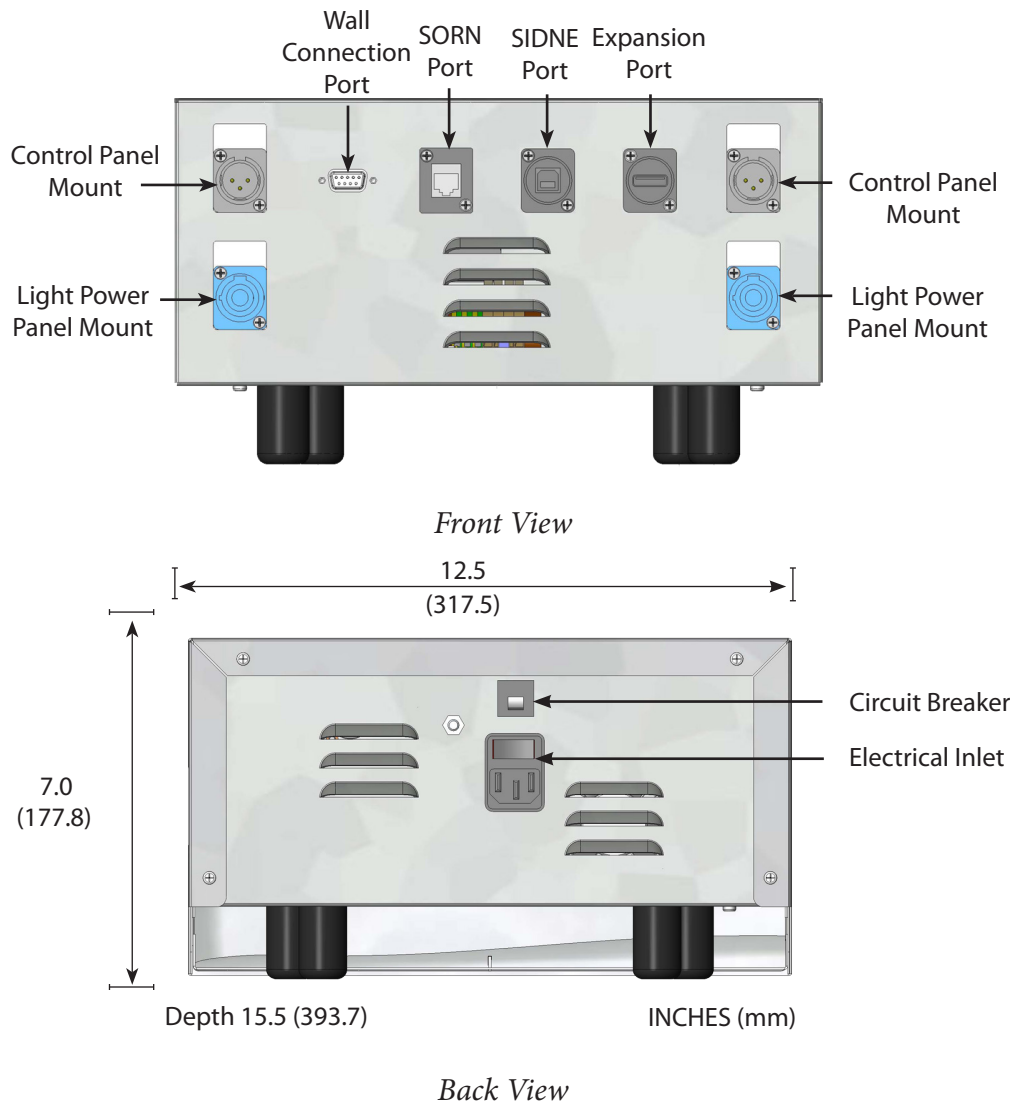


Figure 7.3 - Power Supply Box & Ports (for Visum LED Surgical Lights)

7.4.2 Visum LED Wall Control Panel

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

1. Stryker will vertically mount the panel at conventional light switch height. The wall control panel comes with four screws to attach the panel to a RACO 942 three-gang box.



Note For every two light configurations a RACO 942 junction box is required. For example, one and two light configurations require one RACO 942 junction box; but, three and four light configurations require two RACO 942 junction boxes.



Note The wall control panel must be within 60' (18.3m) of the power supply box.

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

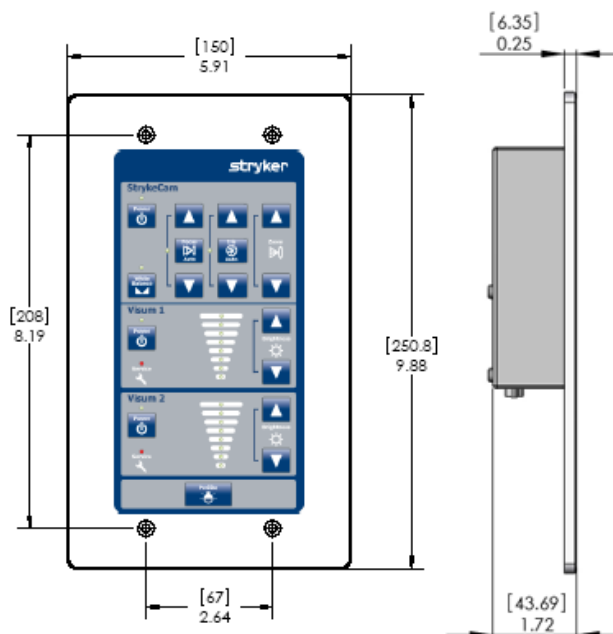


Figure 7.4 - Wall Control Panel



Note If two wall control panels are used, each control panel should be installed on an 8-10" (203 mm-254mm) center.

7.4.2.1 Suspensions with Flat-Panel Arms

For each suspension with a flat panel monitor:

1. Install an additional 1.25" (32mm) conduit between the suspension and the documentation station (see Figure 7.10). If applicable, an in-light camera can share this conduit.
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.

**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.

An additional fuse kit is not required for dual yoke applications; the dual yoke system contains fuses for the system at the terminal block.

If the contractor is unable to provide fuses or wishes to use a Stryker provided solution, 5 amp fuse kits are available as part number 0682400420 (5 amp). The fuse kit is intended to be mounted in a junction box 4" square and 1.5" deep.

7.4.2.2 Single/Dual Flat-Panel Arms

1. Install 1.25" (32mm) 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 uninterruptable power within 18" (46cm) of the mounting plate.

For Medium Duty Dual Yoke installations, it is the customer's responsibility to provide electrical wiring for two monitors. This includes wiring for two line, neutral, and ground connections that are colored according to local code. Ground wire gauge shall be 11 AWG or 4.00 mm². Line and Neutral wire gauge shall be a maximum of 12 AWG or 2.5mm². Wires must be long enough to drop 2 ft (61cm) below the ceiling to connect to the Medium Duty Dual Yoke terminal block. Wire whips must be hardwired from Stryker terminal block to the junction box.

7.4.2.3 Navigation Arms

1. Install 1.25" (32mm) conduit between the suspension and the documentation station.
2. Provide pull strings and terminate all conduits with bushings.

7.4.3 Visum Blade LED Wall Control Panel

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

1. Stryker will mount the panel at conventional light switch height. The wall control panel comes with four screws to attach the panel to a two-gang box, Crouse-Hinds P/N TP521 (Stryker P/N P26343).

**Note**

The orientation of the box is critical to the proper orientation of the wall control panel.

**Note**

A junction box is required for every four light configurations.

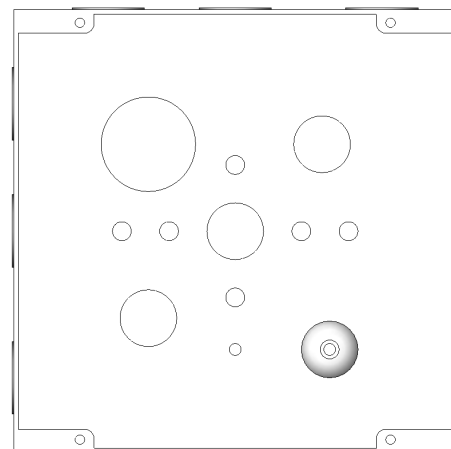


Figure 7.5 - Wall Control Panel Junction Box

Note The wall control panel must be within 60' (18.3m) of the power supply box.

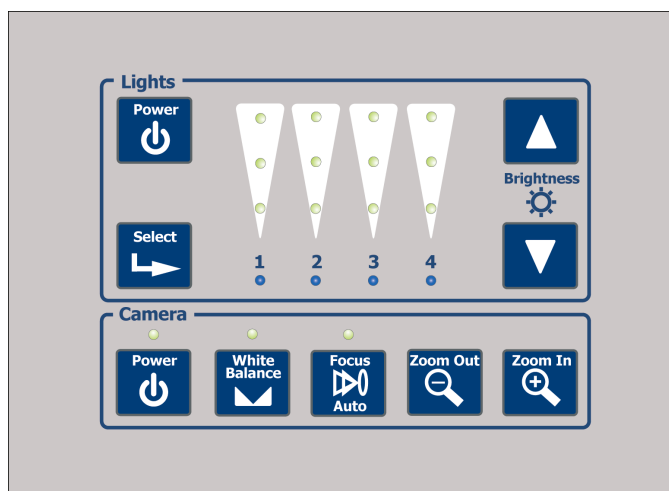


Figure 7.6 - Wall Control Panel

Note Panel assembly installed to two-gang box, then front bezel installed.

7.5 Wall-Mounted Power Supply Box (Visum LED)

1. Install a 10" x 10" x 4" (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.

2. Provide an Ethernet drop terminated in a Hubbell Wiegmann junction box. The Ethernet drop must be within 72" (1.8m) of the power supply box.

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

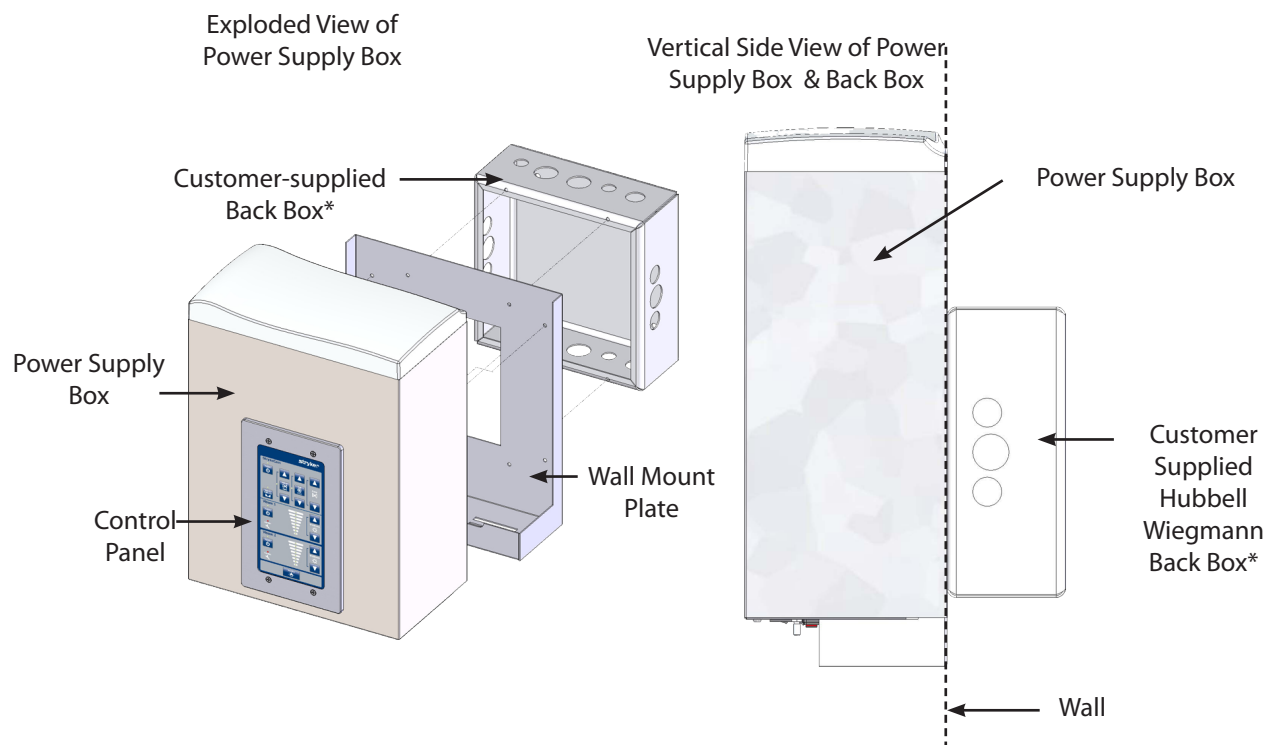
3. Install the conduits as specified in Figure 7.10.
4. Provide pull-strings and terminate all conduits with bushings.

Note All components must be located so that conduits do not exceed the maximum lengths specified in the drawings in Section 7.7.

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

7.5.1 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 7.7 - 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.

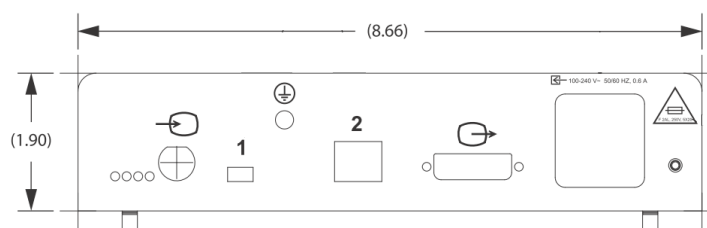
7.6 HD Camera Decoder Box Mounted in Documentation Station

1. Verify a grounded, uninterrupted and isolated power outlet 100V – 240V, 0.6A is available within 48" (1.2m) of Dcoder Box
2. Verify that the approximately 2.2" H x 8.7" W x 14.7" L space is available when used in a documentation station. Additional clearance along the length will need to be accounted for if using the optical extenders.



Note

The decoder box should be located within 48" of s-video cable from the Light suspension and 120" to the DVI endpoint.



Front View

Figure 7.8 - Decoder Box (dimensions are in inches)

7.7 Wall Mounted HD Camera Decoder Box (Optional)

1. Install 2-gang junction or RACO 185/189 style box (customer-supplied back box) at the location of wall mount/Decoder Box.
2. An electrician must run a 1/2" conduit from the suspension to the box, and another 1/2" conduit must be run from the box to the display if fiber cable will be used.



Note

Location of Decoder Box/Wall mount must be within

- 48" of a grounded, uninterrupted power outlet 100V – 240V, 0.6A circuit.
- 48" of s-video cable from the Light suspension
- 120" to the DVI endpoint

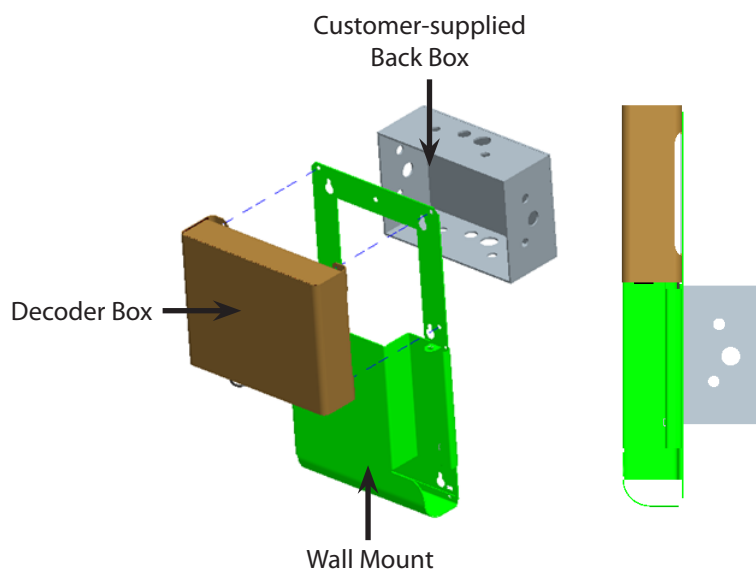


Figure 7.9 - Exploded/Side View of Decoder Box



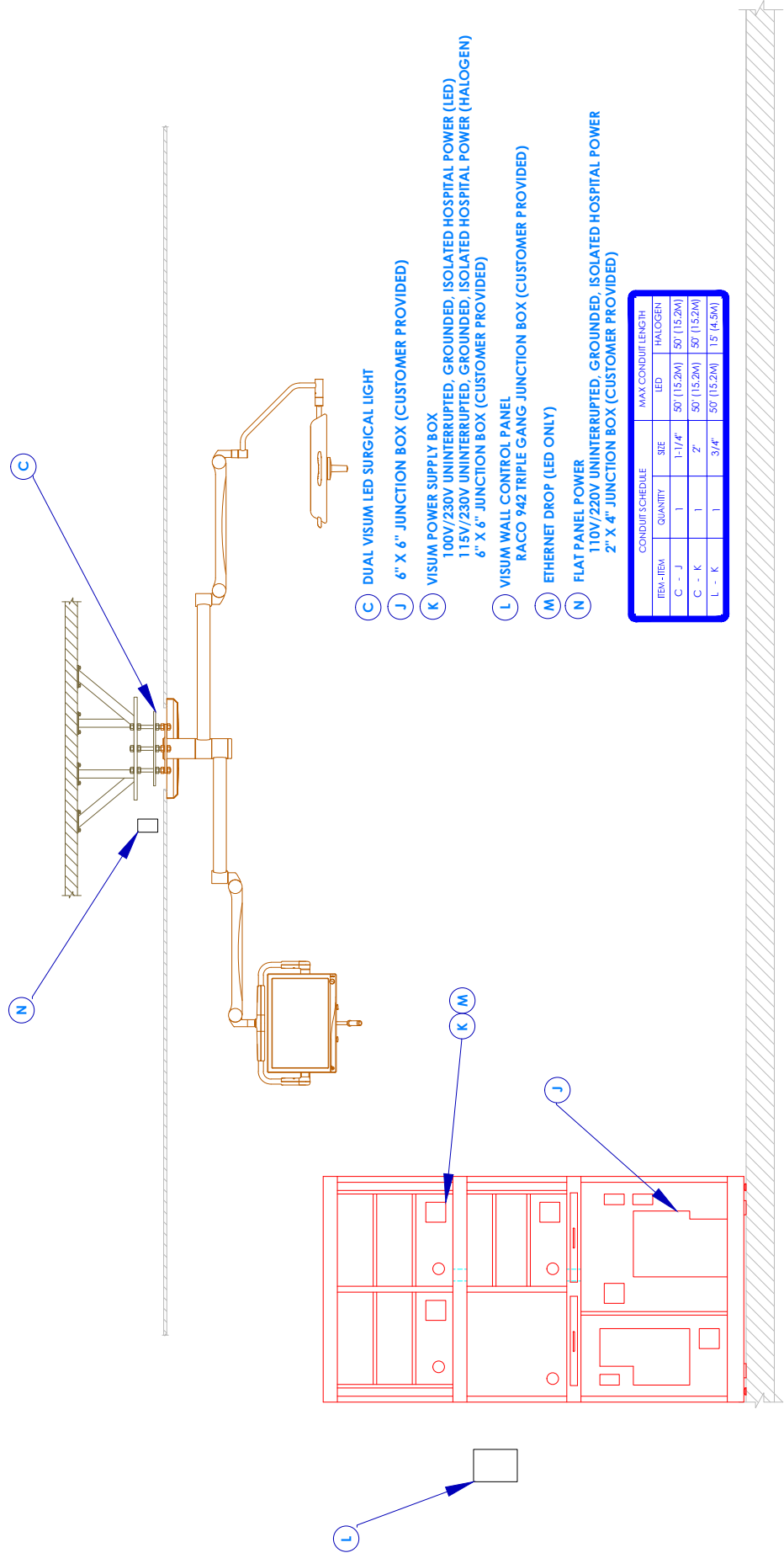


Figure 7.11 - Electrical Installation with Wall-Mounted Power Supply Box & Documentation Station

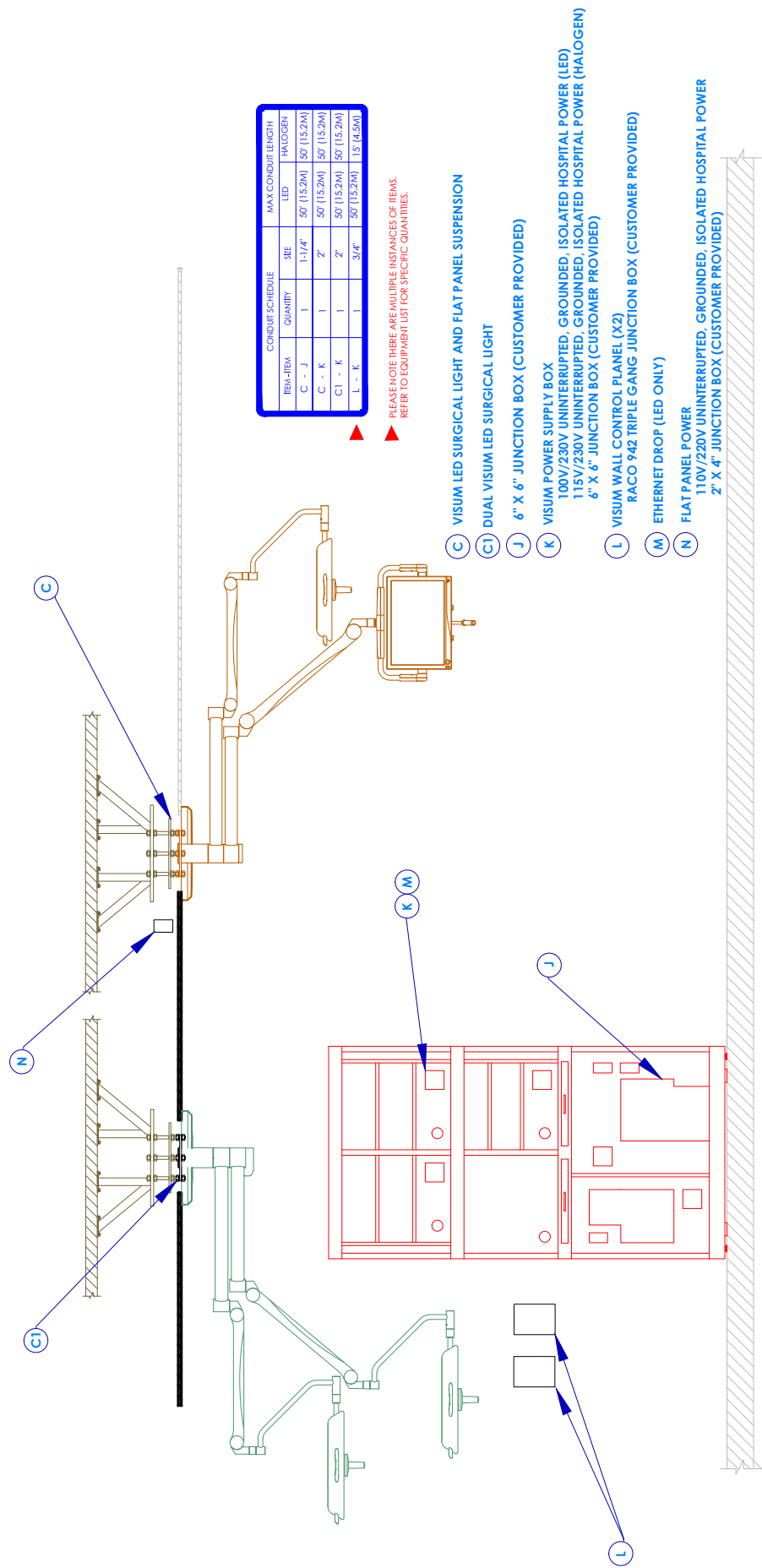


Figure 7.12 - Electrical Installation with Flat Panel & Documentation Station

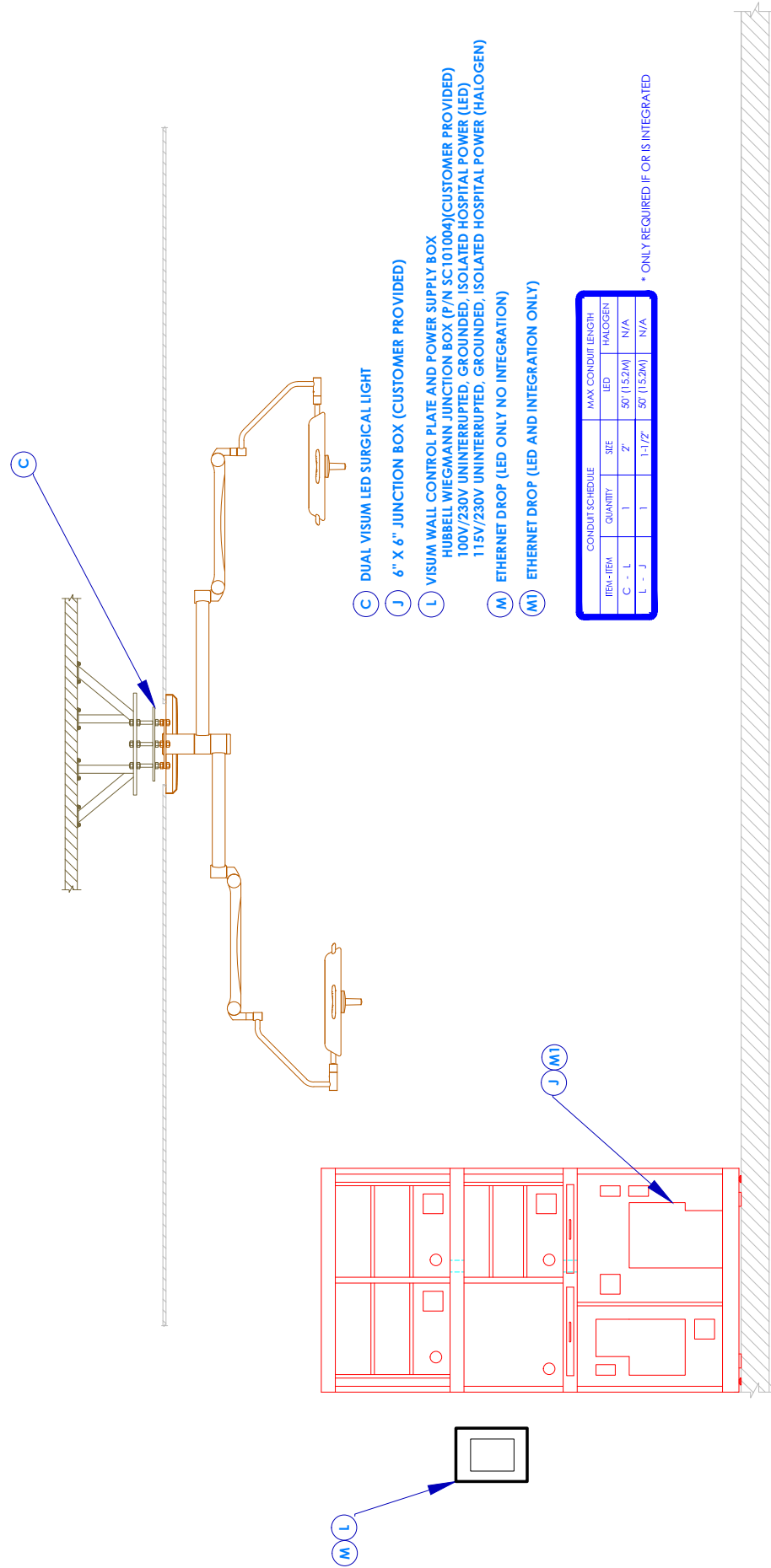
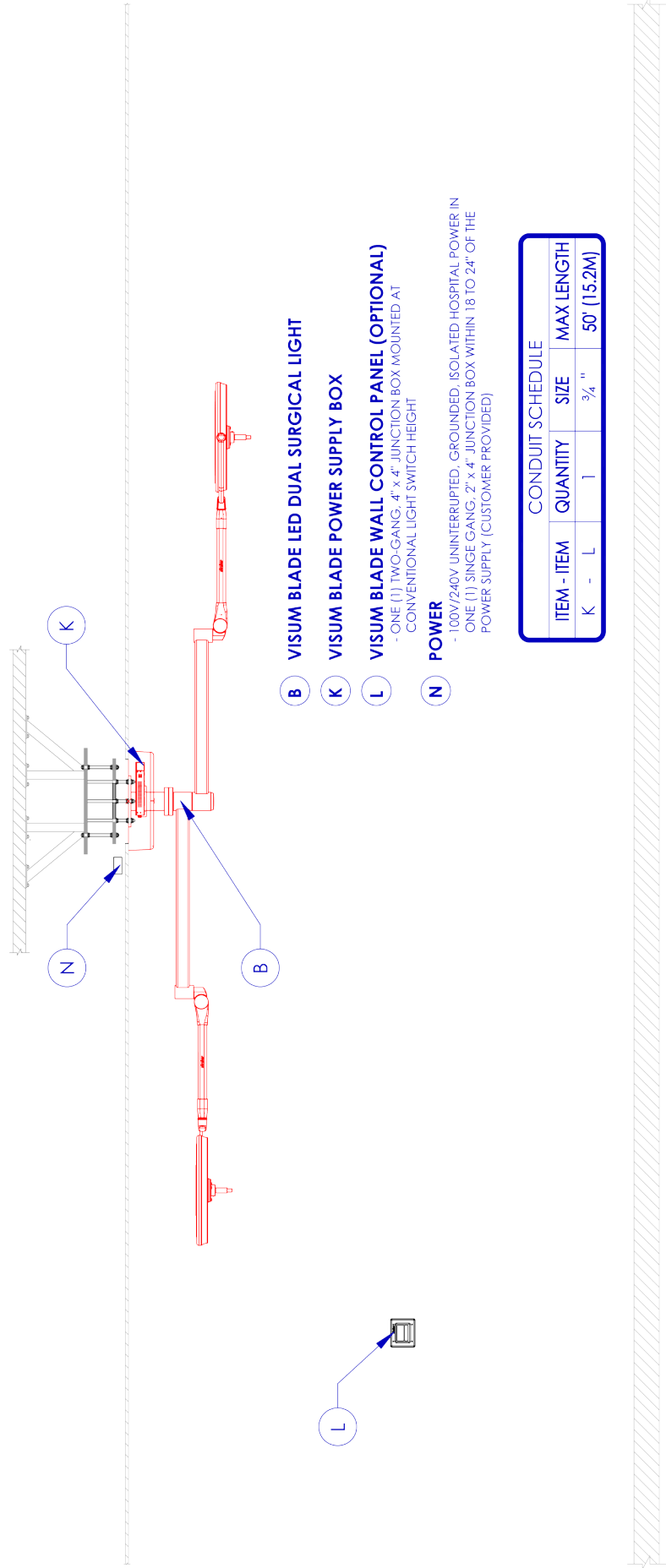


Figure 7.13 - Dual Light Suspension Configuration with a Wall-Mounted Power Supply Box



AC WIRING DETAILS			
ITEM - ITEM	QUANTITY	TYPE	MAX LENGTH
N - K	1	3-CONDUCTOR, 12 GAGE, SOLID	72" (1.8M)

Figure 7.14 - Dual Blade Light Configuration with Optional Wall Control Panel

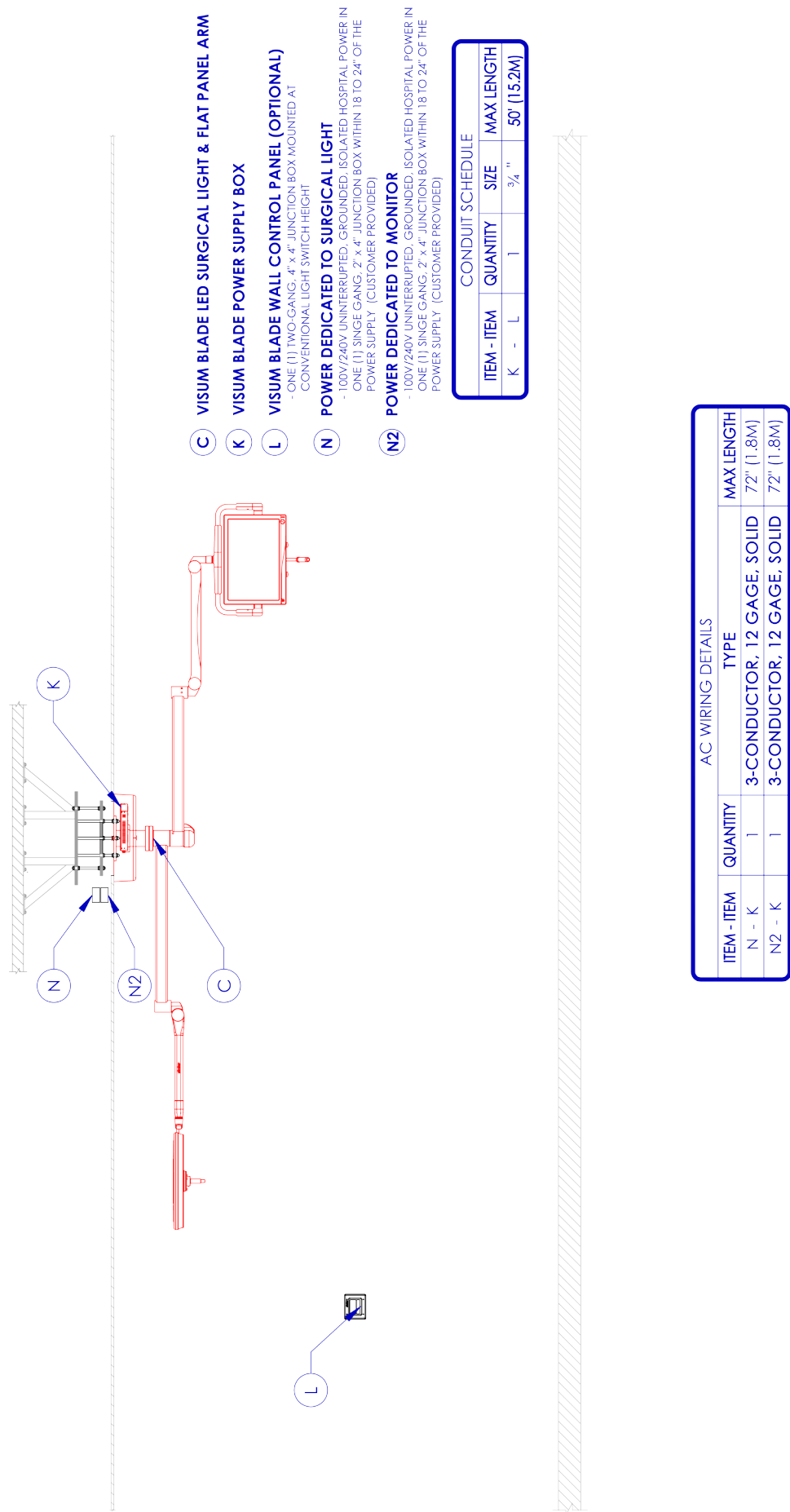
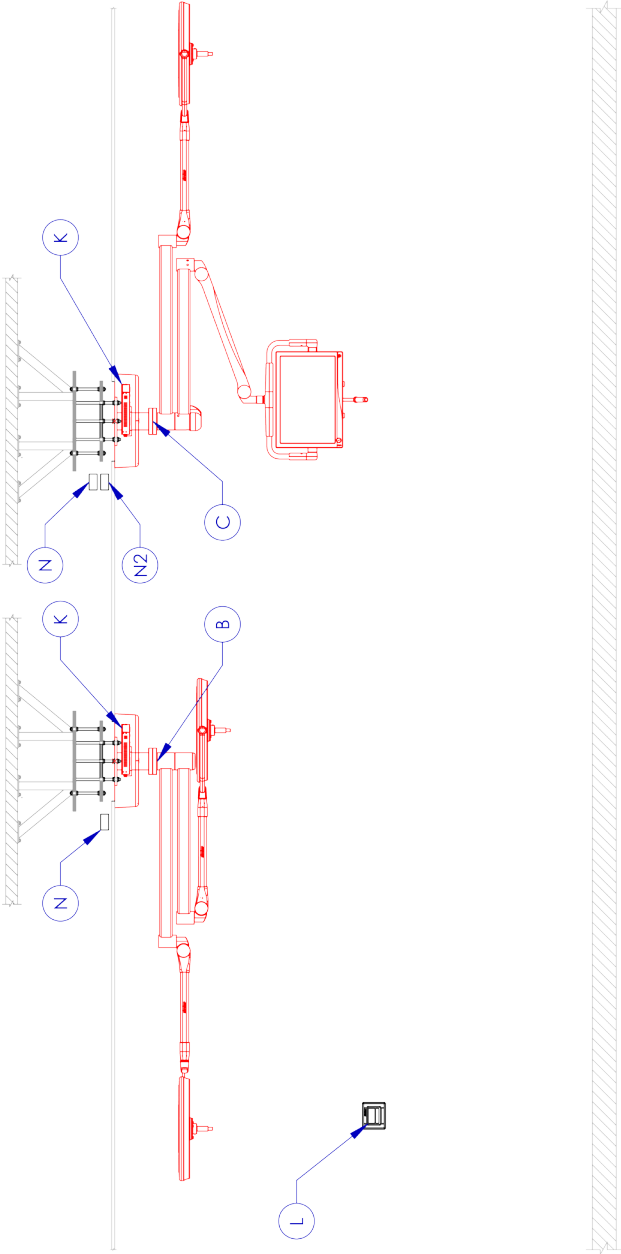


Figure 7.15 - Blade Light and Flat Panel Configuration with Optional Wall Control Panel



- B** VISUM BLADE LED DUAL SURGICAL LIGHT
- C** VISUM BLADE LED SURGICAL LIGHT & FLAT PANEL ARM
- K** VISUM BLADE POWER SUPPLY BOX - (X2)
- L** VISUM BLADE WALL CONTROL PANEL (OPTIONAL)
 - ONE (1) TWO-GANG, 4" x 4" JUNCTION BOX MOUNTED AT CONVENTIONAL LIGHT SWITCH HEIGHT
- N** POWER DEDICATED TO SURGICAL LIGHT - (X2)
 - 100V/240V UNINTERRUPTED, GROUNDED, ISOLATED HOSPITAL POWER IN ONE (1) SINGLE GANG, 2" x 4" JUNCTION BOX WITHIN 18 TO 24" OF THE POWER SUPPLY (CUSTOMER PROVIDED)
- N2** POWER DEDICATED TO MONITOR
 - 100V/240V UNINTERRUPTED, GROUNDED, ISOLATED HOSPITAL POWER IN ONE (1) SINGLE GANG, 2" x 4" JUNCTION BOX WITHIN 18 TO 24" OF THE POWER SUPPLY (CUSTOMER PROVIDED)

CONDUIT SCHEDULE			
ITEM - ITEM	QUANTITY	SIZE	MAX LENGTH
K - L	2	3/4"	50' (15.2M)

▲ PLEASE NOTE THERE ARE MULTIPLE INSTANCES OF ITEMS. REFER TO EQUIPMENT LIST FOR SPECIFIC QUANTITIES.

AC WIRING DETAILS			
ITEM - ITEM	QUANTITY	TYPE	MAX LENGTH
N - K	2	3-CONDUCTOR, 12 GAGE, SOLID	72" (1.8M)
N2 - K	1	3-CONDUCTOR, 12 GAGE, SOLID	72" (1.8M)

Figure 7.16 - Triple Blade Light with Flat Panel Configuration with Optional Wall Control Panel

7.9 Electrical Specifications

Rated Input	Voltage	115/230V ~50/60 Hz (Halogen) 100-230V~50/60 Hz (LED) 100-240V ~50/60Hz (Blade LED)
	Current	4/2A (Halogen) 6A (LED/Blade 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)
Visum Blade LED	With Camera	485 Btu/hr (142W)
	Without Camera	416 Bth/hr (122W)

7.10 Video and Data Conduit Requirements

1. All conduits will have insulation bushings.
2. Conduit size and routings will be specified in Stryker rough-in drawings.
3. Stryker cable installation only covers cable pulls less than 50'.
4. Any cable runs outside of the Operating Room or over 50' are the responsibility of the Hospital/ Contractor to source.
5. All conduits must have pull strings in place.
6. All hard conduit must be terminated within 18" the center of the mount.
7. For plenum rated spaces a 8" X 8" X 4" J-box with flexible conduit to the center of the mount is required.

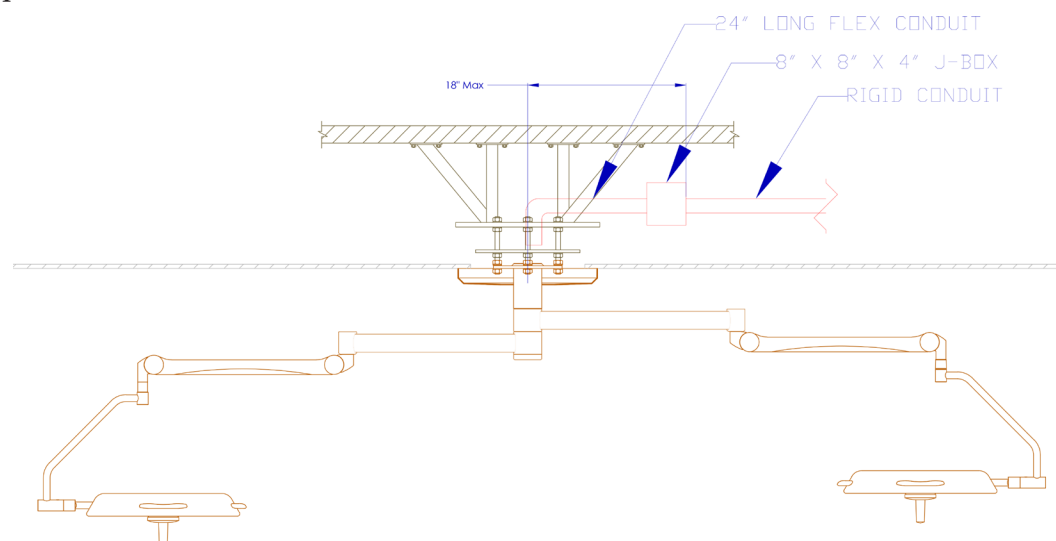


Figure 7.17 - Conduit Requirements for Plenum Rated Specs

8. Environmental Specifications

8.1 Operating Conditions

	Operating Humidity	Operating Temperature	Pressure
Visum® LED Surgical Light/ StrykeCam® 2	10%–50%	41–100°F (5–38°C)	21–31 in. Hg (71kPa–105kPa)
HD Camera		50–86°F (10–30°C)	--
Visum Blade LED Surgical Light		50–86°F (10–30°C)	--

8.2 Storage Conditions

	Storage Humidity	Storage Temperature
Visum® LED Surgical Light/ StrykeCam® 2	10%–50%	41–100°F (5–38°C)
Visum Blade LED Surgical Light		41–100°F (5–38°C)
HD Camera		50–86°F (10–30°C)

8.3 Light Suspension Specifications

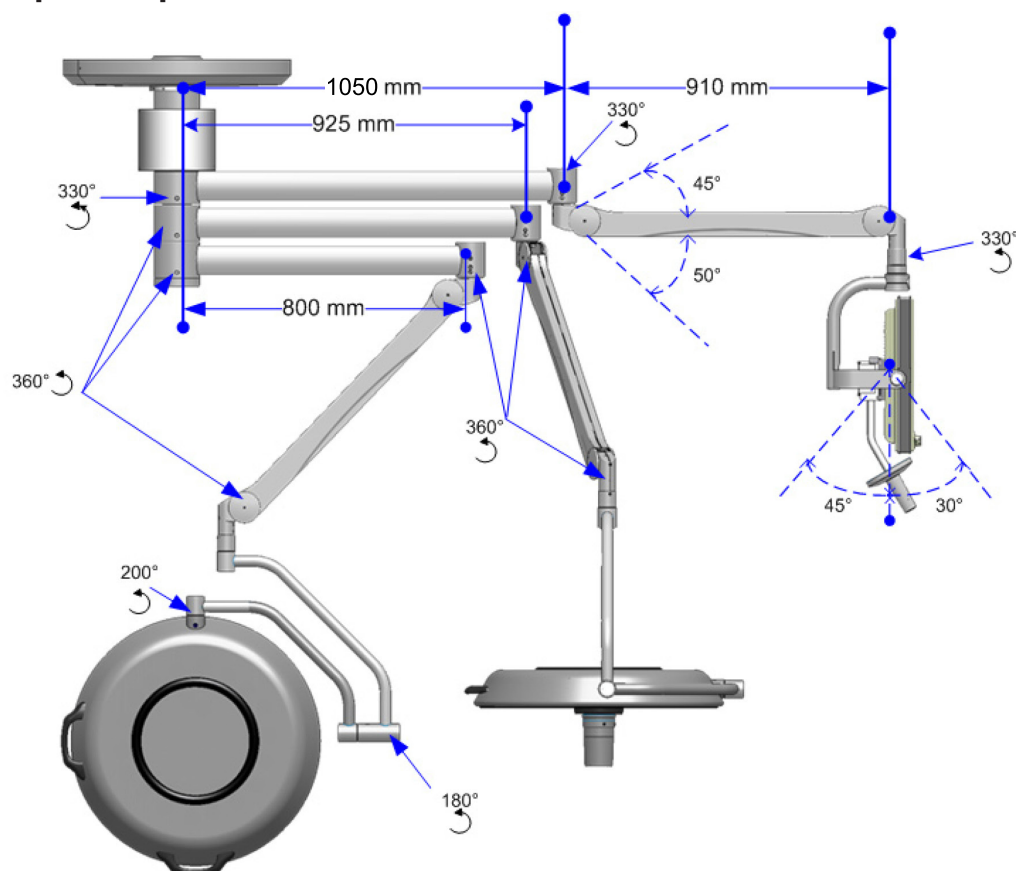


Figure 8.1 - Light Suspension Specifications (LED Suspension shown)

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)

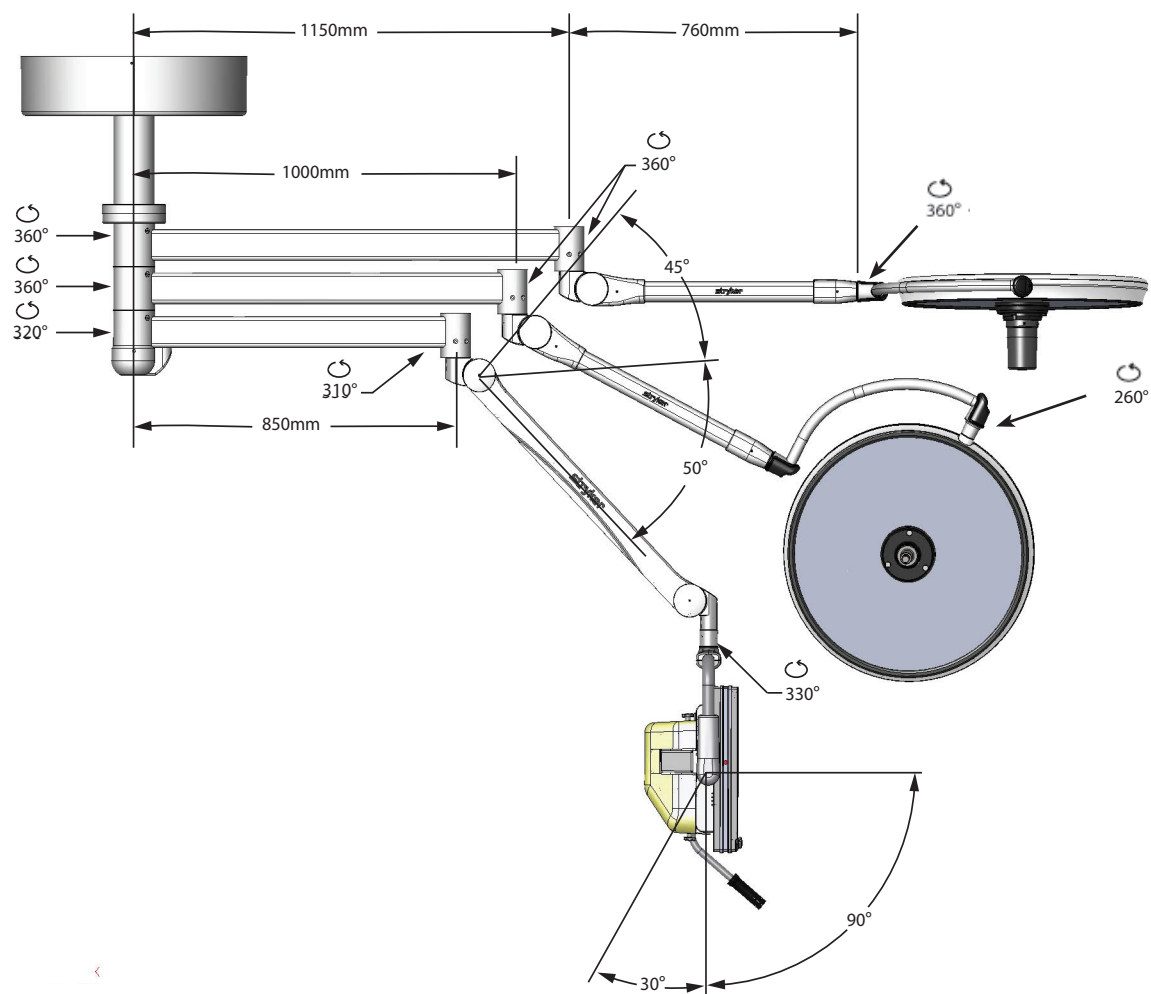


Figure 8.2 - Blade LED Light Suspension Specifications

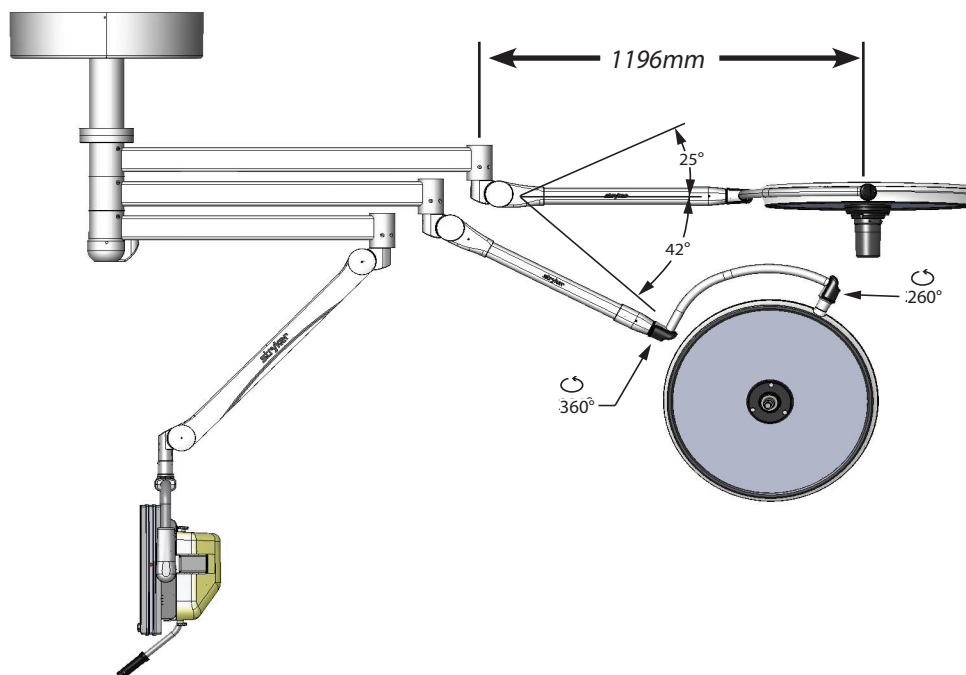
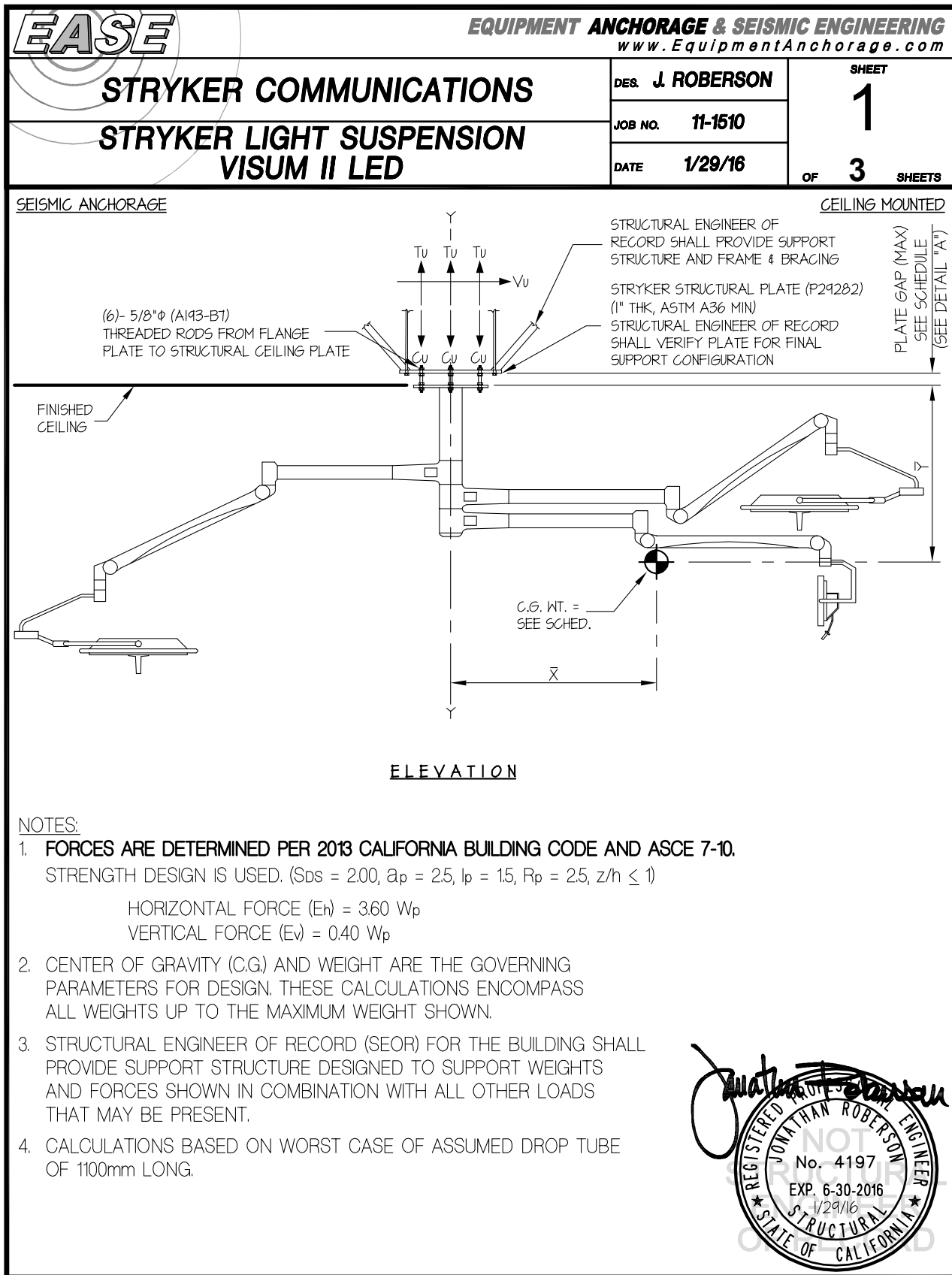


Figure 8.3 - Blade LED Light Suspension Specifications

Suspension Capacity	Extension Arm Lengths Blade LED
Single	39.4in (1000mm)
Dual	45.3in (1150mm) 39.4in (1000mm)
Triple	45.3in (1150mm) 39.4in (1000mm) 33.5in (850mm)

Appendix A: Seismic Calculations (Light and Flat Panel Suspensions)





EQUIPMENT ANCHORAGE & SEISMIC ENGINEERING

www.EquipmentAnchorage.com

STRYKER COMMUNICATIONS

STRYKER LIGHT SUSPENSION
VISUM II LED

DES. J. ROBERSON

JOB NO. 11-1510

DATE 1/29/16

SHEET

2

OF 3 SHEETS

SEISMIC ANCHORAGE

FLANGE PLATE TO STRUCTURAL CEILING PLATE

CONFIGURATION		COMPONENTS	PLATE GAP (in.)	MAX WEIGHT (lb)	$\bar{X}$ (in.)	$\bar{Y}$ (in.)	Tu (lb.)	Cu (lb.)	Vu (lb.)	MOMENT (Mxx) (IN-LB)	MOMENT (Myy) (IN-LB)
SINGLE	800mm	LIGHT	8.0	128.5	30.9	45.0	1,965	1,920	174	30,880	3,090
DOUBLE	925mm/800mm	LIGHT-LIGHT	8.0	204.4	40.6	52.3	3,660	3,589	250	57,668	4,060
		LIGHT-FLAT PANEL	8.0	204.4	40.6	51.3	3,614	3,543	250	56,932	4,060
TRIPLE	1040mm/925mm 800mm	* LIGHT-LIGHT-LIGHT	7.75	285.1	45.6	57.1	5,537	5,437	314	87,335	4,560
		LIGHT-LIGHT-FLAT PANEL	7.75	285.1	45.6	56.3	5,486	5,386	314	86,514	4,560

NOTES: 1) TOTAL LOAD IS MAXIMUM WEIGHT OF EQUIPMENT AND CONTENTS ADDRESSED BY THIS CALCULATION

2) $\bar{Y}$ IS MEASURED FROM CG TO TOP OF FLANGE PLATE.

3) * THIS MODEL IS REPRESENTED IN THE CALCULATION PROVIDED

EASE**EQUIPMENT ANCHORAGE & SEISMIC ENGINEERING**
www.EquipmentAnchorage.com**STRYKER COMMUNICATIONS****STRYKER LIGHT SUSPENSION
VISUM II LED**DES. **J. ROBERSON**JOB NO. **11-1510**DATE **1/29/16**

SHEET

3OF **3** SHEETSSEISMIC ANCHORAGEFLANGE PLATE TO STRUCTURAL CEILING PLATE

STRYKER STRUCTURAL PLATE (P29282)
(1" THK, ASTM A36 MIN)
STRUCTURAL ENGINEER OF RECORD
SHALL VERIFY PLATE FOR FINAL
SUPPORT CONFIGURATION

(6)- 5/8"Φ (A193-B7)
THREADED RODS FROM
FLANGE PLATE TO
STRUCTURAL CEILING PLATE

210mm (10.63")Φ BOLT
GROUP CIRCLE

PRE-MANUFACTURED
FLANGE PLATE
(12.1"Φ, 12mm THK. (MIN), 50 KSI)

PLAN AT FLANGE PLATE

C.G. WT. =
285.1 LB
($\bar{Y}$ = 57.1")

STRUCTURAL
CEILING PLATE

FLANGE PLATE
(BY MFR)

DETAIL "A"LOADS:

WEIGHT = 285.1 LB

HORIZONTAL FORCE (E_h) = $3.60W_p$ = 1026 LBVERTICAL FORCE (E_v) = $0.40W_p$ = 114 LBBOLT FORCES:TENSION (T)

$$T_u = \frac{87335\#(5.315')}{84} + \frac{12(285.1\#) + 114\#}{6 \text{ BOLTS}} = 5537 \text{ LB/BOLT (MAX)}$$

COMPRESSION (C)

$$C_u = \frac{87335\#(5.315')}{84} - \frac{0.9(285.1\#) - 114\#}{6 \text{ BOLTS}} = 5437 \text{ LB/BOLT (MAX)}$$

SHEAR (V)

$$V_u = \frac{1026\#}{6 \text{ BOLTS}} + \frac{4560\#(5.315')}{169} = 314 \text{ LB/BOLT (MAX)}$$

(PER AISC J3.7, LESS THAN 20% STRESS)

BENDING (M)

$$M_u = 314\#(6.875'/2) = 1079\text{'-}\#$$

COMBINED STRESS CHECK:

$$\text{COMPRESSION: } \frac{C}{C_{STR}} + \frac{8}{9} \left(\frac{M}{M_{STR}} \right) = 0.90 < 1.00 \therefore \text{OK}$$

$$\text{TENSION: } \frac{T}{T_{STR}} + \frac{8}{9} \left(\frac{M}{M_{STR}} \right) = 0.67 < 1.00 \therefore \text{OK}$$

MOMENTS:

$$M_{xx} = 1026\#(64.85') + (12(285.1\#) + 114\#)45.6' = 87,335\text{'-}\#$$

$$M_{zz} = 1026\#(64.85') + (12(285.1\#) + 114\#)45.6' = 87,335\text{'-}\#$$

$$M_{yy} = 100\#(45.60') = 4560\text{'-}\#$$

NOTE: UNIT IS FREE TO ROTATE 360 DEGREES ABOUT Y-Y AXIS.
BRAKING SYSTEM RELEASES WITH APPLIED LOAD OF 25 LB.
AT C.G. LOCATION. CALCULATION USES 100 LBS. FOR A SAFETY FACTOR OF 4.

BOLT GROUP PROPERTIES:

$$I_{x-x} = 84 \text{ in.}^4$$

$$I_{z-z} = 84 \text{ in.}^4$$

$$I_{y-y} = 169 \text{ in.}^4$$

BOLT PROPERTIES:

$$F_y = 105 \text{ ksi} ; F_u = 125 \text{ ksi} ; d = 0.527" ; \phi = 0.90$$

$$Z = d^3/6 = (0.527')^3/6 = 0.0244 \text{ in.}^3$$

$$A_g = 0.2181 \text{ in.}^2, A_b = 0.307$$

$$r = 0.1318 \text{ in.}$$

$$KL/r = 12(6.875')/0.1318 = 62.6$$

$$M_n = 105 \text{ ksi} (0.0244 \text{ in.}^3) = 2562\text{'-}\#$$

$$M_{STR} = \phi M_n = (0.9)(2562\text{'-}\#) = 2306\text{'-}\#$$

$$T_{STR} = 21,586 \text{ lb. (AISC Eq J3-2)}$$

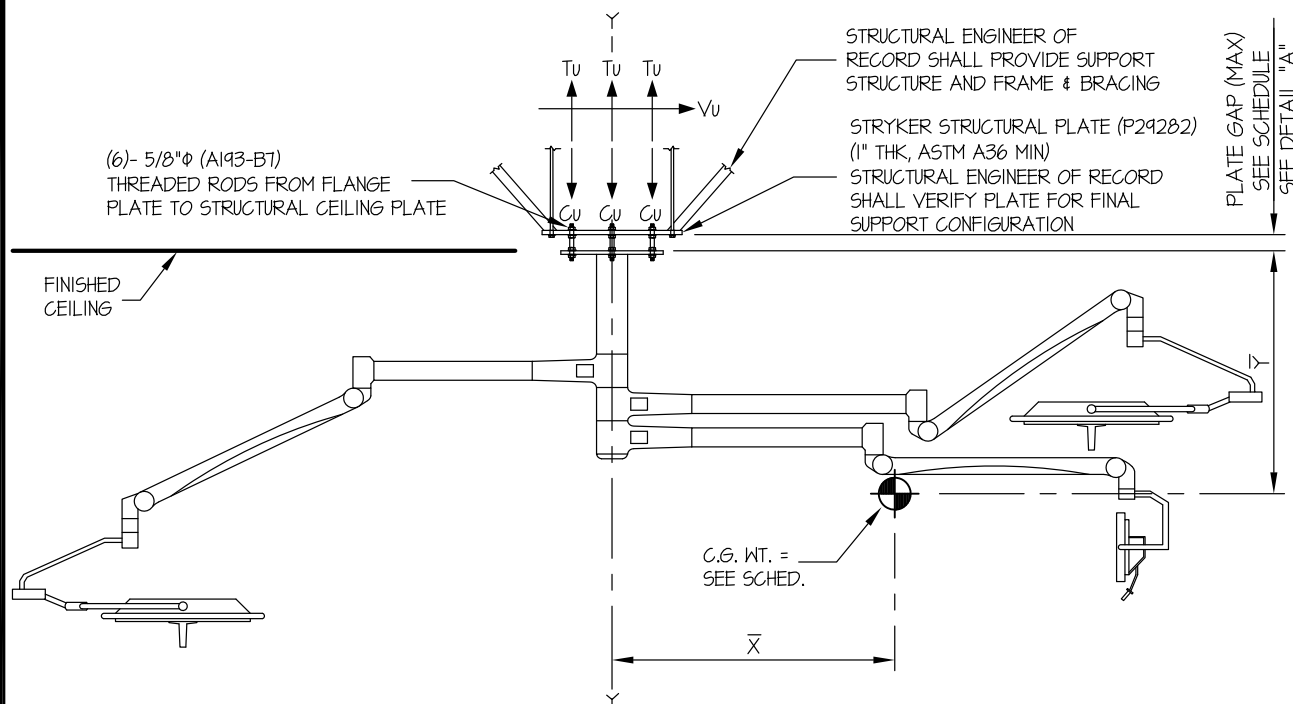
$$C_{STR} = 11,287 \text{ lb. (AISC Eq E3-1)}$$

EASE**EQUIPMENT ANCHORAGE & SEISMIC ENGINEERING**

www.EquipmentAnchorage.com

STRYKER COMMUNICATIONS**STRYKER LIGHT SUSPENSION
VISUM BLADE**DES. **J. ROBERSON**JOB NO. **11-1510**DATE **1/29/16**

SHEET

1OF **3** SHEETSSEISMIC ANCHORAGECEILING MOUNTEDELEVATIONNOTES:

1. FORCES ARE DETERMINED PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10.

STRENGTH DESIGN IS USED. ($S_{ds} = 2.00$, $a_p = 2.5$, $I_p = 1.5$, $R_p = 2.5$, $z/h \leq 1$)HORIZONTAL FORCE (E_h) = $3.60 W_p$ VERTICAL FORCE (E_v) = $0.40 W_p$

2. CENTER OF GRAVITY (C.G.) AND WEIGHT ARE THE GOVERNING PARAMETERS FOR DESIGN. THESE CALCULATIONS ENCOMPASS ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.
3. STRUCTURAL ENGINEER OF RECORD (SEOR) FOR THE BUILDING SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN IN COMBINATION WITH ALL OTHER LOADS THAT MAY BE PRESENT.
4. CALCULATIONS BASED ON WORST CONDITION OF ASSUMED DROP TUBE IS 1100mm LONG.





STRYKER COMMUNICATIONS

STRYKER LIGHT SUSPENSION
VISUM BLADE

DES. J. ROBERSON

JOB NO. 11-1510

DATE 1/29/16

SHEET

2

OF 3 SHEETS

SEISMIC ANCHORAGE

FLANGE PLATE TO STRUCTURAL CEILING PLATE

CONFIGURATION		COMPONENTS	MAX GAP (in.)	MAX WEIGHT (lb)	$\bar{X}$ (in.)	$\bar{Y}$ (in.)	Tu (lb.)	Cu (lb.)	Vu (lb.)	MOMENT (Mxx) (IN-LB)	MOMENT (Myy) (IN-LB)
SINGLE	1000mm	LIGHT	8.0	1433	32.0	38.5	1,997	1,946	187	31,321	3,200
DOUBLE	1150mm/1000mm	LIGHT-LIGHT	8.0	234.4	41.6	44.4	3,804	3,722	271	59,837	4,160
		LIGHT-FLAT PANEL	8.0	236.6	42.0	48.1	4,047	3,964	274	63,712	4,200
TRIPLE	1150mm/1000mm 850mm	* LIGHT-LIGHT-LIGHT	7.75	321.4	43.2	48.1	5,517	5,404	329	86,853	4,320
		LIGHT-LIGHT- FLAT PANEL	7.75	323.6	43.4	50.8	5,737	5,624	331	90,371	4,340

NOTES: 1) TOTAL LOAD IS MAXIMUM WEIGHT OF EQUIPMENT AND CONTENTS ADDRESSED BY THIS CALCULATION

2) $\bar{Y}$ IS MEASURED FROM CG TO TOP OF FLANGE PLATE.

3) * THIS MODEL IS REPRESENTED IN THE CALCULATION PROVIDED

EASE**EQUIPMENT ANCHORAGE & SEISMIC ENGINEERING**

www.EquipmentAnchorage.com

STRYKER COMMUNICATIONS**STRYKER LIGHT SUSPENSION
VISUM BLADE**DES. **J. ROBERSON**JOB NO. **11-1510**DATE **1/29/16**

SHEET

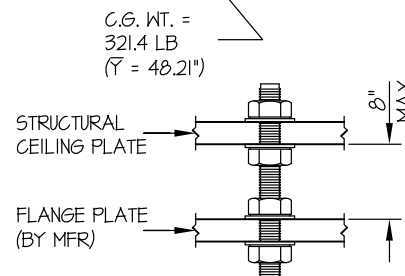
3OF **3** SHEETSSEISMIC ANCHORAGEFLANGE PLATE TO STRUCTURAL CEILING PLATE

STRYKER STRUCTURAL PLATE (P29282)
(1" THK, ASTM A36 MIN)
STRUCTURAL ENGINEER OF RECORD
SHALL VERIFY PLATE FOR FINAL
SUPPORT CONFIGURATION

(6)- 5/8"φ (A193-B7)
THREADED RODS FROM
FLANGE PLATE TO
STRUCTURAL CEILING PLATE

270mm (10.63")φ BOLT
GROUP CIRCLE

PRE-MANUFACTURED
FLANGE PLATE
(12.1"φ, 12mm THK. (MIN), 50 KSI)

PLAN AT FLANGE PLATE**DETAIL "A"**LOADS:

WEIGHT = 3214 LB

HORIZONTAL FORCE (E_h) = $3.60W_p$ = 1157 LBVERTICAL FORCE (E_v) = $0.40W_p$ = 129 LBBOLT FORCES:TENSION (T)

$$T_u = \frac{86853\#(5.315'')}{84} + \frac{12(3214\#) + 129\#}{6 \text{ BOLTS}} = 5517 \text{ LB/BOLT (MAX)}$$

COMPRESSION (C)

$$C_u = \frac{86853\#(5.315'')}{84} - \frac{0.9(3214\#) - 129\#}{6 \text{ BOLTS}} = 5404 \text{ LB/BOLT (MAX)}$$

SHEAR (V)

$$V_u = \frac{1157\#}{6 \text{ BOLTS}} + \frac{4320\#(5.315'')}{169} = 329 \text{ LB/BOLT (MAX)}$$

(PER AISC J3.7, LESS THAN 20% STRESS)

BENDING (M)

$$M_u = 329\#(6.875'/2) = 1131\#'$$

COMBINED STRESS CHECK:

COMPRESSION: $\frac{C}{C_{STR}} + \frac{8}{9} \left(\frac{M}{M_{STR}} \right) = 0.91 < 1.00 \therefore \text{OK}$

TENSION: $\frac{T}{T_{STR}} + \frac{8}{9} \left(\frac{M}{M_{STR}} \right) = 0.69 < 1.00 \therefore \text{OK}$

MOMENTS:

$$M_{XX} = 1157\#(55.85'') + (12(3214\#) + 129\#)43.2'' = 86,853\#'$$

$$M_{ZZ} = 1157\#(55.85'') + (12(3214\#) + 129\#)43.2'' = 86,853\#'$$

$$M_{YY} = 100\#(43.2'') = 4320\#'$$

NOTE: UNIT IS FREE TO ROTATE 360 DEGREES ABOUT Y-Y AXIS.
BRAKING SYSTEM RELEASES WITH APPLIED LOAD OF 25 LB.
AT C.G. LOCATION. CALCULATION USES 100 LBS. FOR A SAFETY FACTOR OF 4.

BOLT GROUP PROPERTIES:

$$I_{x-x} = 84 \text{ in.}^4$$

$$I_{z-z} = 84 \text{ in.}^4$$

$$I_{y-y} = 169 \text{ in.}^4$$

BOLT PROPERTIES:

$$F_y = 105 \text{ ksi} ; F_u = 125 \text{ ksi}, d = 0.527'' : \phi = 0.90$$

$$Z = d^3/6 = (0.527')^3/6 = 0.0244 \text{ in.}^3$$

$$A_g = 0.2181 \text{ in.}^2, A_b = 0.307$$

$$r = 0.1318 \text{ in.}$$

$$KL/r = 12(6.875'')/0.1318 = 62.6$$

$$M_n = 105 \text{ ksi} (0.0244 \text{ in.}^3) = 2562\#'$$

$$M_{STR} = \phi M_n = (0.9)(2562\#') = 2306\#'$$

$$T_{STR} = 21,586 \text{ lb. (AISC Eq J3-2)}$$

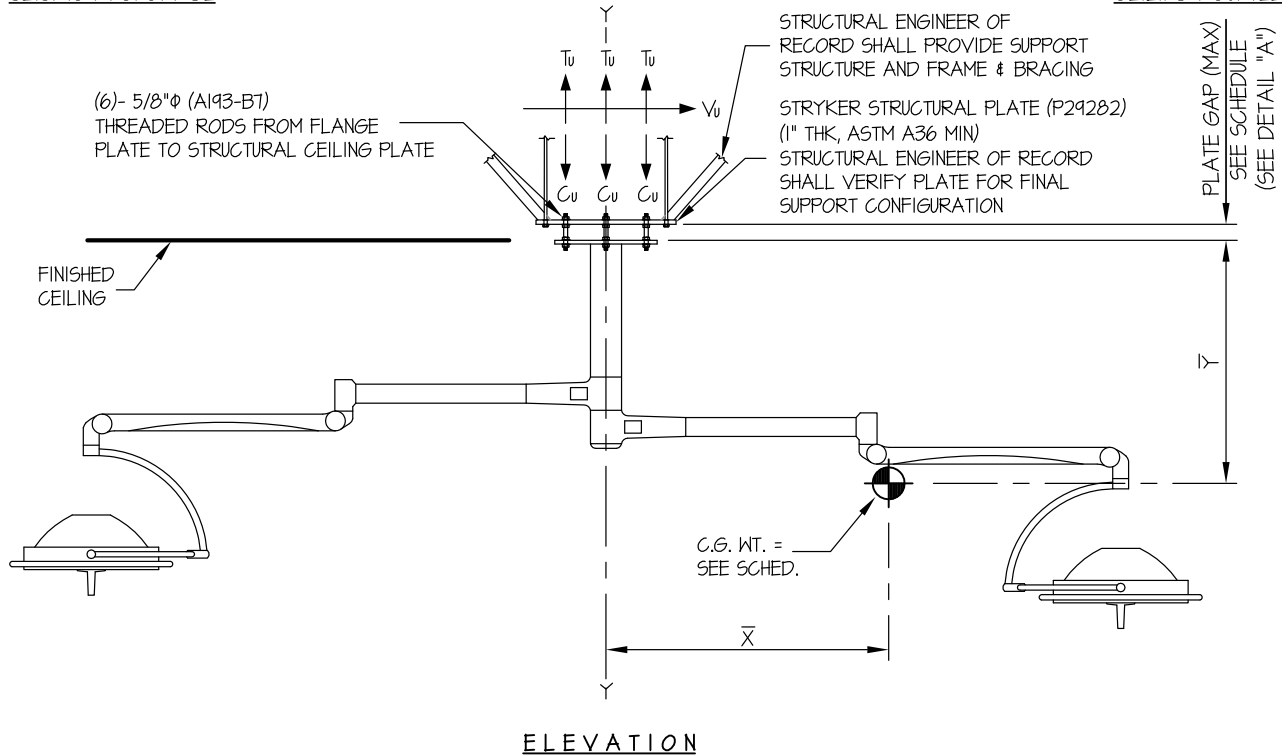
$$C_{STR} = 11,287 \text{ lb. (AISC Eq E3-1)}$$

EASE**EQUIPMENT ANCHORAGE & SEISMIC ENGINEERING**

www.EquipmentAnchorage.com

STRYKER COMMUNICATIONSDES. **J. ROBERSON**

SHEET

1**STRYKER LIGHT SUSPENSION
VISUM II EXTENDED HORIZONTAL ARM**JOB NO. **11-1510**DATE **1/29/16**OF **3** SHEETSSEISMIC ANCHORAGECEILING MOUNTEDNOTES:

- FORCES ARE DETERMINED PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10.
STRENGTH DESIGN IS USED. ($S_{bs} = 2.00$, $a_p = 2.5$, $I_p = 1.5$, $R_p = 2.5$, $z/h \leq 1$)

HORIZONTAL FORCE (E_h) = $3.60 W_p$ VERTICAL FORCE (E_v) = $0.40 W_p$

- CENTER OF GRAVITY (C.G.) AND WEIGHT ARE THE GOVERNING PARAMETERS FOR DESIGN. THESE CALCULATIONS ENCOMPASS ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.
- STRUCTURAL ENGINEER OF RECORD (SEOR) FOR THE BUILDING SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN IN COMBINATION WITH ALL OTHER LOADS THAT MAY BE PRESENT.
- CALCULATIONS BASED ON WORST CASE OF ASSUMED DROP TUBE OF 1100mm LONG.




STRYKER COMMUNICATIONS

 DES. **J. ROBERSON**

SHEET

2
**STRYKER LIGHT SUSPENSION
VISUM II EXTENDED HORIZONTAL ARM**

 JOB NO. **11-1510**

 DATE **1/29/16**

 OF **3** SHEETS

SEISMIC ANCHORAGE
FLANGE PLATE TO STRUCTURAL CEILING PLATE

CONFIGURATION		COMPONENTS	MAX GAP (in.)	MAX WEIGHT (lb)	$\bar{X}$ (in.)	$\bar{Y}$ (in.)	T _u (lb.)	C _u (lb.)	V _u (lb.)	MOMENT (M _{xx}) (IN-LB)	MOMENT (M _{yy}) (IN-LB)
SINGLE	1600mm	LIGHT	8.0	153.9	44.0	46.0	2,590	2,537	231	40,770	4,400
DOUBLE	1600mm/1450mm	* LIGHT-LIGHT	8.0	251.3	51.6	53.3	4,835	4,747	313	76,249	5,160
		LIGHT-FLAT PANEL	8.0	251.3	51.6	52.4	4,784	4,696	313	75,434	5,160

NOTES: 1) TOTAL LOAD IS MAXIMUM WEIGHT OF EQUIPMENT AND CONTENTS ADDRESSED BY THIS CALCULATION

 2) $\bar{Y}$ IS MEASURED FROM CG TO TOP OF FLANGE PLATE.

3) * THIS MODEL IS REPRESENTED IN THE CALCULATION PROVIDED

EASE**EQUIPMENT ANCHORAGE & SEISMIC ENGINEERING**

www.EquipmentAnchorage.com

STRYKER COMMUNICATIONSDES. **J. ROBERSON**

SHEET

3**STRYKER LIGHT SUSPENSION
VISUM II EXTENDED HORIZONTAL ARM**JOB NO. **11-1510**DATE **1/29/16**OF **3** SHEETSSEISMIC ANCHORAGEFLANGE PLATE TO STRUCTURAL CEILING PLATE

STRYKER STRUCTURAL PLATE (P29282)
(1" THK, ASTM A36 MIN)
STRUCTURAL ENGINEER OF RECORD
SHALL VERIFY PLATE FOR FINAL
SUPPORT CONFIGURATION

(6)- 5/8"φ (A193-B7)
THREADED RODS FROM
FLANGE PLATE TO
STRUCTURAL CEILING PLATE

270mm (10.63")φ BOLT
GROUP CIRCLE

PRE-MANUFACTURED
FLANGE PLATE
(12.1"φ, 12mm THK. (MIN), 50 KSI)

PLAN AT FLANGE PLATE

C.G. WT. =
251.3 LB
($\bar{Y}$ = 53.3")

STRUCTURAL
CEILING PLATE
FLANGE PLATE
(BY MFR)

DETAIL "A"LOADS:

WEIGHT = 2513 LB
HORIZONTAL FORCE (E_h) = $3.60W_p$ = 905 LB
VERTICAL FORCE (E_v) = $0.40W_p$ = 101 LB

BOLT FORCES:TENSION (T)

$$T_u = \frac{76022\#(5.315")}{84} + \frac{12(2513\#) + 101\#}{6 \text{ BOLTS}} = 4835 \text{ LB/BOLT (MAX)}$$

COMPRESSION (C)

$$C_u = \frac{76022\#(5.315")}{84} - \frac{0.9(2513\#) - 101\#}{6 \text{ BOLTS}} = 4747 \text{ LB/BOLT (MAX)}$$

SHEAR (V)

$$V_u = \frac{905\#}{6 \text{ BOLTS}} + \frac{5160\#(5.315")}{169} = 313 \text{ LB/BOLT (MAX)}$$

(PER AISC J3.7, LESS THAN 20% STRESS)

BENDING (M)

$$M_u = 313\#(7.125"/2) = 1115\#-\text{in}$$

COMBINED STRESS CHECK:

COMPRESSION: $\frac{C}{C_{STR}} + \frac{8}{9} \left(\frac{M}{M_{STR}} \right) = 0.87 < 1.00 \therefore \text{OK}$

TENSION: $\frac{T}{T_{STR}} + \frac{8}{9} \left(\frac{M}{M_{STR}} \right) = 0.65 < 1.00 \therefore \text{OK}$

MOMENTS:

$$M_{XX} = 905\#(61.3") + (12(2513\#) + 101\#)51.6" = 76,022\#-\text{in}$$

$$M_{ZZ} = 905\#(61.3") + (12(2513\#) + 101\#)51.6" = 76,022\#-\text{in}$$

$$M_{YY} = 100\#(51.6") = 5160\#-\text{in}$$

NOTE: UNIT IS FREE TO ROTATE 360 DEGREES ABOUT Y-Y AXIS.
BRAKING SYSTEM RELEASES WITH APPLIED LOAD OF 25 LB.
AT C.G. LOCATION. CALCULATION USES 100 LB. FOR A SAFETY FACTOR OF 4.

BOLT GROUP PROPERTIES:

$$I_{x-x} = 84 \text{ in.}^4$$

$$I_{z-z} = 84 \text{ in.}^4$$

$$I_{y-y} = 169 \text{ in.}^4$$

BOLT PROPERTIES:

$$F_y = 105 \text{ ksi} ; F_u = 125 \text{ ksi}, d = 0.527" ; \phi = 0.90$$

$$Z = d^3/6 = (0.527")^3/6 = 0.0244 \text{ in.}^3$$

$$A_g = 0.2181 \text{ in.}^2, A_b = 0.307$$

$$r = 0.1318 \text{ in.}$$

$$KL/r = 12(7.125")/0.1318 = 64.9$$

$$M_n = 105 \text{ ksi} (0.0244 \text{ in.}^3) = 2562\#-\text{in}$$

$$M_{STR} = \phi M_n = (0.9)(2562\#-\text{in}) = 2306\#-\text{in}$$

$$T_{STR} = 21,586 \text{ lb. (AISC Eq J3-2)}$$

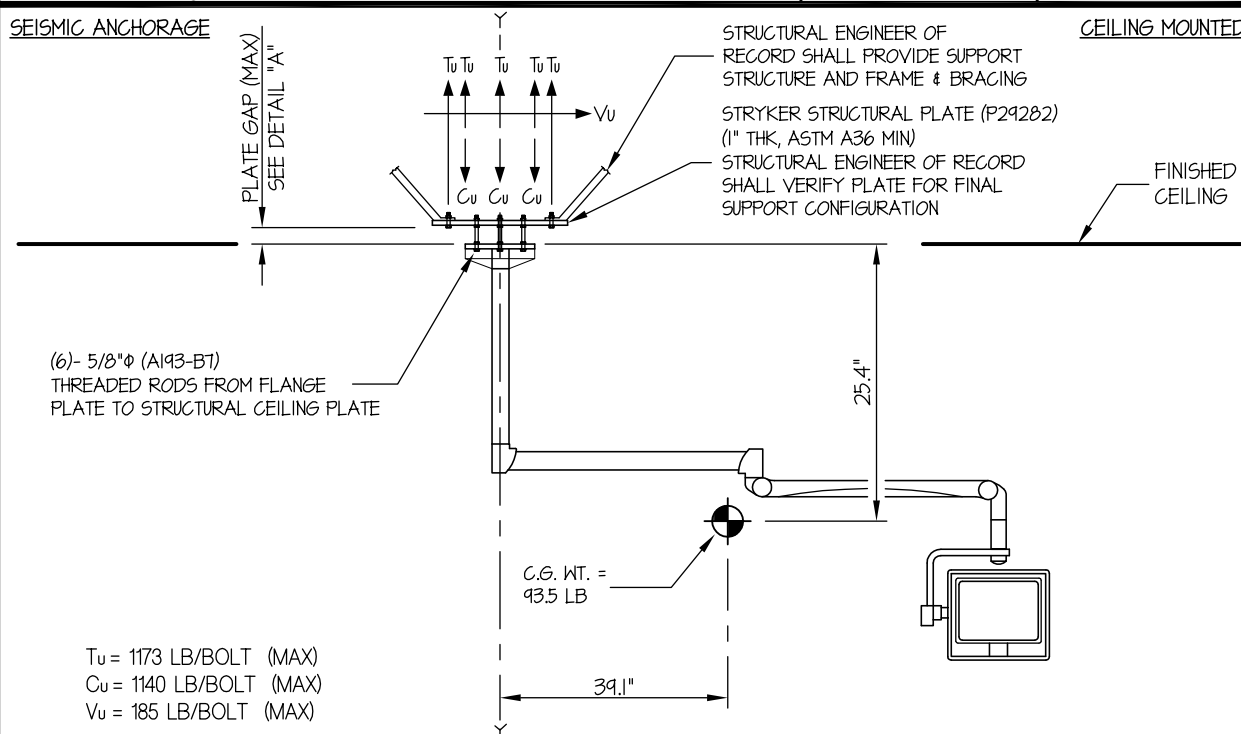
$$C_{STR} = 10,796 \text{ lb. (AISC Eq E3-1)}$$

EASE**EQUIPMENT ANCHORAGE & SEISMIC ENGINEERING**

www.EquipmentAnchorage.com

STRYKER COMMUNICATIONS**SINGLE FLAT PANEL ARM**DES. **J. ROBERSON**JOB NO. **11-1510**DATE **1/19/16**

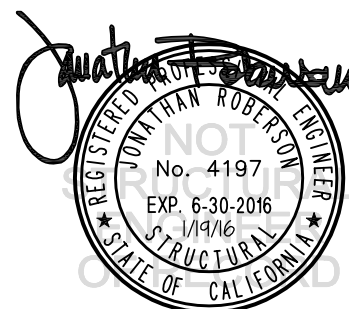
SHEET

1OF **2** SHEETSSEISMIC ANCHORAGECEILING MOUNTEDELEVATIONNOTES:

- FORCES ARE DETERMINED PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10.

STRENGTH DESIGN IS USED. ($S_{ds} = 2.20$, $a_p = 2.5$, $I_p = 1.5$, $R_p = 2.5$, $z/h \leq 1$)HORIZONTAL FORCE (E_h) = $3.96 W_p$ VERTICAL FORCE (E_v) = $0.44 W_p$

- CENTER OF GRAVITY (C.G.) AND WEIGHT ARE THE GOVERNING PARAMETERS FOR DESIGN. THESE CALCULATIONS ENCOMPASS ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.
- STRUCTURAL ENGINEER OF RECORD (SEOR) FOR THE BUILDING SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN IN COMBINATION WITH ALL OTHER LOADS THAT MAY BE PRESENT.
- CALCULATIONS BASED ON WORST CASE OF ASSUMED DROP TUBE OF 400mm LONG.



EASE**EQUIPMENT ANCHORAGE & SEISMIC ENGINEERING**
www.EquipmentAnchorage.com**STRYKER COMMUNICATIONS****SINGLE FLAT PANEL ARM**DES. **J. ROBERSON**JOB NO. **11-1510**DATE **1/19/16**

SHEET

2OF **2** SHEETSSEISMIC ANCHORAGE

STRYKER STRUCTURAL PLATE (P29282)
(1" THK, ASTM A36 MIN)
STRUCTURAL ENGINEER OF RECORD
SHALL VERIFY PLATE FOR FINAL
SUPPORT CONFIGURATION

(6)- 5/8"φ (A193-B7)
THREADED RODS FROM
FLANGE PLATE TO
STRUCTURAL CEILING PLATE

270mm (10.63")φ BOLT
GROUP CIRCLE

PRE-MANUFACTURED
FLANGE PLATE
(12.1"φ 12mm THK. (MIN), 50 KSI)

PLAN AT FLANGE PLATE

C.G. WT. =
93.5 LB
($\bar{Y}$ = 25.4")

STRUCTURAL
CEILING PLATE

FLANGE PLATE
(BY MFR)

LOADS:

WEIGHT = 93.5 LB

HORIZONTAL FORCE (E_H) = $3.96W_p$ = 370 LBVERTICAL FORCE (E_v) = $0.44W_p$ = 41 LBBOLT FORCES:TENSION (T)

$$T_u = \frac{18348\#(5.315'')}{84} + \frac{12(93.5\#) + 41\#}{6 \text{ BOLTS}} = 1173 \text{ LB/BOLT (MAX)}$$

COMPRESSION (C)

$$C_u = \frac{18348\#(5.315'')}{84} - \frac{0.9(93.5\#) - 41\#}{6 \text{ BOLTS}} = 1140 \text{ LB/BOLT (MAX)}$$

SHEAR (V)

$$V_u = \frac{370\#}{6 \text{ BOLTS}} + \frac{3910\#(5.315'')}{169} = 185 \text{ LB/BOLT (MAX)}$$

(PER AISC J3.7, LESS THAN 20% STRESS)

BENDING (M)

$$M_u = 185\#(7.125''/2) = 659\#''$$

COMBINED STRESS CHECK:

COMPRESSION: $\frac{C}{C_{STR}} + \frac{8}{9} \left(\frac{M}{M_{STR}} \right) = 0.36 < 100 \therefore \text{OK}$

TENSION: $\frac{T}{T_{STR}} + \frac{8}{9} \left(\frac{M}{M_{STR}} \right) = 0.31 < 100 \therefore \text{OK}$

MOMENTS:

$$M_{XX} = 370\#(33.4'') + (12(93.5\#) + 41\#)39.1'' = 18,348\#''$$

$$M_{ZZ} = 370\#(33.4'') + (12(93.5\#) + 41\#)39.1'' = 18,348\#''$$

$$M_{YY} = 100\#(39.1'') = 3910\#''$$

NOTE: UNIT IS FREE TO ROTATE 360 DEGREES ABOUT Y-Y AXIS.
BRAKING SYSTEM RELEASES WITH APPLIED LOAD OF 25 LB.
AT C.G. LOCATION. CALCULATION USES 100 LBS. FOR A SAFETY FACTOR OF 4.

DETAIL "A"BOLT GROUP PROPERTIES:

$$I_{x-x} = 84 \text{ in.}^4$$

$$I_{z-z} = 84 \text{ in.}^4$$

$$I_{y-y} = 169 \text{ in.}^4$$

BOLT PROPERTIES:

$$F_y = 105 \text{ ksi}; F_u = 125 \text{ ksi}; d = 0.527''; \phi = 0.90$$

$$Z = d^3/6 = (0.527'')^3/6 = 0.0244 \text{ in.}^3$$

$$A_g = 0.2181 \text{ in.}^2, A_b = 0.307$$

$$r = 0.1318 \text{ in.}$$

$$KL/r = 12(7.125'')/0.1318 = 64.9$$

$$M_n = 105 \text{ ksi} (0.0244 \text{ in.}^3) = 2562\#''$$

$$M_{STR} = \phi M_n = (0.9)(2562\#'') = 2306\#''$$

$$T_{STR} = 21,586 \text{ lb. (AISC Eq J3-2)}$$

$$C_{STR} = 10,796 \text{ lb. (AISC Eq E3-1)}$$

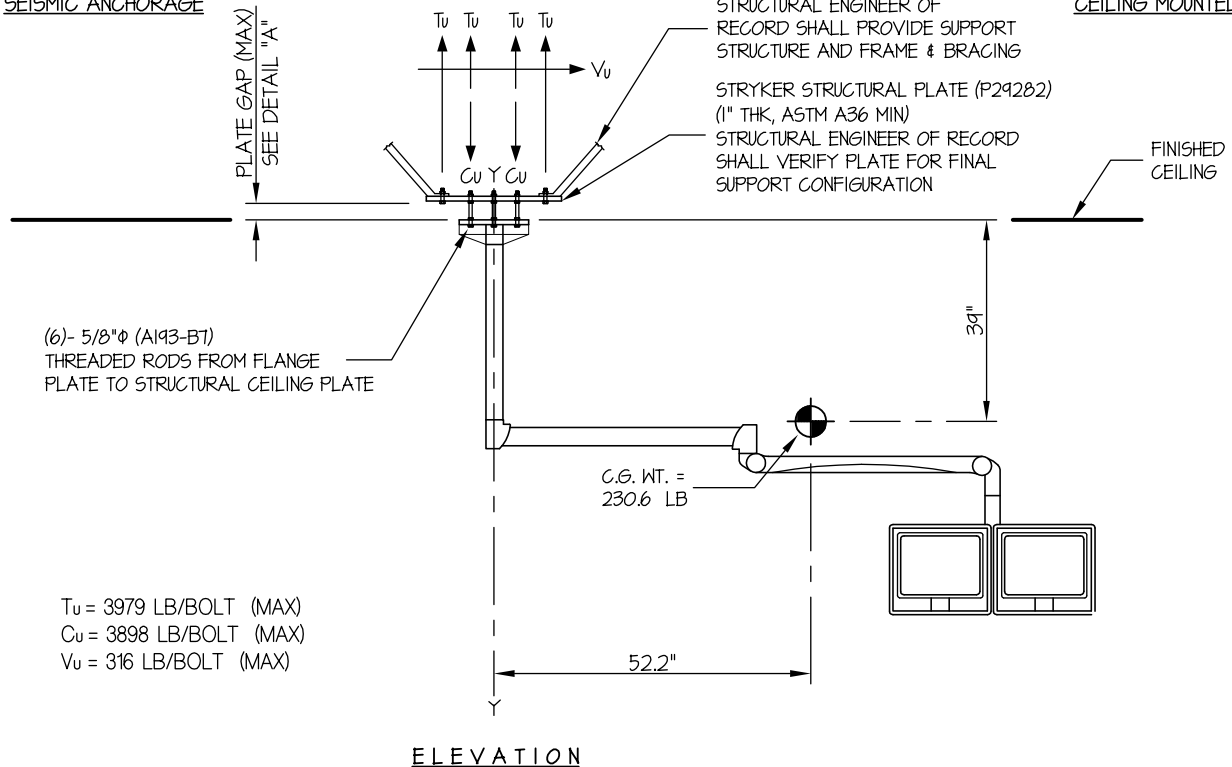
EASE**EQUIPMENT ANCHORAGE & SEISMIC ENGINEERING**
www.EquipmentAnchorage.com**STRYKER COMMUNICATIONS****MEDIUM DUTY DUAL YOKE SUSPENSION**DES. **J. ROBERSON**JOB NO. **11-1510**DATE **1/18/16**

SHEET

1OF **2** SHEETS

SEISMIC ANCHORAGE

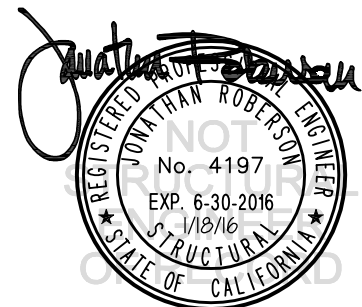
CEILING MOUNTED

**NOTES:**

1. **FORCES ARE DETERMINED PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10.**

STRENGTH DESIGN IS USED. ($S_{ds} = 2.20$, $a_p = 2.5$, $I_p = 1.5$, $R_p = 2.5$, $z/h \leq 1$)HORIZONTAL FORCE (E_h) = $3.96 W_p$ VERTICAL FORCE (E_v) = $0.44 W_p$

2. CENTER OF GRAVITY (C.G.) AND WEIGHT ARE THE GOVERNING PARAMETERS FOR DESIGN. THESE CALCULATIONS ENCOMPASS ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.
3. STRUCTURAL ENGINEER OF RECORD (SEOR) FOR THE BUILDING SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN IN COMBINATION WITH ALL OTHER LOADS THAT MAY BE PRESENT.
4. CALCULATIONS BASED ON WORST CASE OF ASSUMED DROP TUBE OF 600mm LONG.




STRYKER COMMUNICATIONS
MEDIUM DUTY DUAL YOKE SUSPENSION
DES. **J. ROBERSON**JOB NO. **11-1510**DATE **1/18/16**

SHEET

2OF **2** SHEETSSEISMIC ANCHORAGE

STRYKER STRUCTURAL PLATE (P29282)
 (1" THK, ASTM A36 MIN)
 STRUCTURAL ENGINEER OF RECORD
 SHALL VERIFY PLATE FOR FINAL
 SUPPORT CONFIGURATION

(6)- 5/8"φ (A193-B7)
 THREADED RODS FROM
 FLANGE PLATE TO
 STRUCTURAL CEILING PLATE

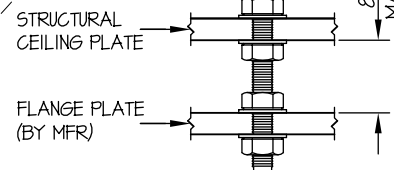
270mm (10.63")φ BOLT
 GROUP CIRCLE

PRE-MANUFACTURED
 FLANGE PLATE
 (12.1"φ 12mm THK. (MIN), 50 KSI)

PLAN AT FLANGE PLATE

CEILING MOUNTED

C.G. WT. =
 230.6 LB
 (Y = 39")

**DETAIL "A"**LOADS:

WEIGHT = 230.6 LB
 HORIZONTAL FORCE (E_h) = $3.96W_p = 913$ LB
 VERTICAL FORCE (E_v) = $0.44W_p = 101$ LB

BOLT FORCES:TENSION (T)

$$T_u = \frac{62628\#(5.315")}{84} + \frac{12(230.6\#) + 101\#}{6 \text{ BOLTS}} = 3979 \text{ LB/BOLT (MAX)}$$

COMPRESSION (C)

$$C_u = \frac{62628\#(5.315")}{84} - \frac{0.9(230.6\#) - 101\#}{6 \text{ BOLTS}} = 3898 \text{ LB/BOLT (MAX)}$$

SHEAR (V)

$$V_u = \frac{913\#}{6 \text{ BOLTS}} + \frac{5220\#(5.315")}{169} = 316 \text{ LB/BOLT (MAX)}$$

(PER AISC J3.7, LESS THAN 20% STRESS)

BENDING (M)

$$M_u = 316\#(7.125"/2) = 1126\text{"}\cdot\#$$

COMBINED STRESS CHECK:

COMPRESSION: $\frac{C}{C_{STR}} + \frac{8}{9} \left(\frac{M}{M_{STR}} \right) = 0.80 < 1.00 \therefore \text{OK}$

TENSION: $\frac{T}{T_{STR}} + \frac{8}{9} \left(\frac{M}{M_{STR}} \right) = 0.62 < 1.00 \therefore \text{OK}$

MOMENTS:

$$M_{XX} = 913\#(47") + (12(230.6\#) + 101\#)52.2" = 62,628\text{"}\cdot\#$$

$$M_{ZZ} = 913\#(47") + (12(230.6\#) + 101\#)52.2" = 62,628\text{"}\cdot\#$$

$$M_{YY} = 100\#(52.2") = 5220\text{"}\cdot\#$$

NOTE: UNIT IS FREE TO ROTATE 360 DEGREES ABOUT Y-Y AXIS.
 BRAKING SYSTEM RELEASES WITH APPLIED LOAD OF 25 LB.
 AT C.G. LOCATION. CALCULATION USES 100 LBS. FOR A SAFETY FACTOR OF 4.

BOLT GROUP PROPERTIES:

$$I_{x-x} = 84 \text{ in.}^4$$

$$I_{z-z} = 84 \text{ in.}^4$$

$$I_{y-y} = 169 \text{ in.}^4$$

BOLT PROPERTIES:

$$F_y = 105 \text{ ksi} ; F_u = 125 \text{ ksi} ; d = 0.527" ; \phi = 0.90$$

$$Z = d^3/6 = (0.527)^3/6 = 0.0244 \text{ in.}^3$$

$$A_g = 0.2181 \text{ in.}^2, A_b = 0.307$$

$$r = 0.1318 \text{ in.}$$

$$KL/r = 12(7.125")/0.1318 = 64.9$$

$$M_n = 105 \text{ ksi} (0.0244 \text{ in.}^3) = 2562\text{"}\cdot\#$$

$$M_{STR} = \phi M_n = (0.9)(2562\text{"}\cdot\#) = 2306\text{"}\cdot\#$$

$$T_{STR} = 21586 \text{ lb. (AISC Eq J3-2)}$$

$$C_{STR} = 10,796 \text{ lb. (AISC Eq E3-1)}$$



Stryker Communications
1410 Lakeside Parkway #100,
Flower Mound, TX 75028
1-866-841-5663
U.S. Patents: www.stryker.com/patents

Stryker Corporation or its divisions or other corporate affiliated entities own, use or have applied for the following trademarks or service marks: the **Stryker logo**. All other trademarks are trademarks of their respective owners or holders.



1001400008YA

2016/04

WCR: NONE