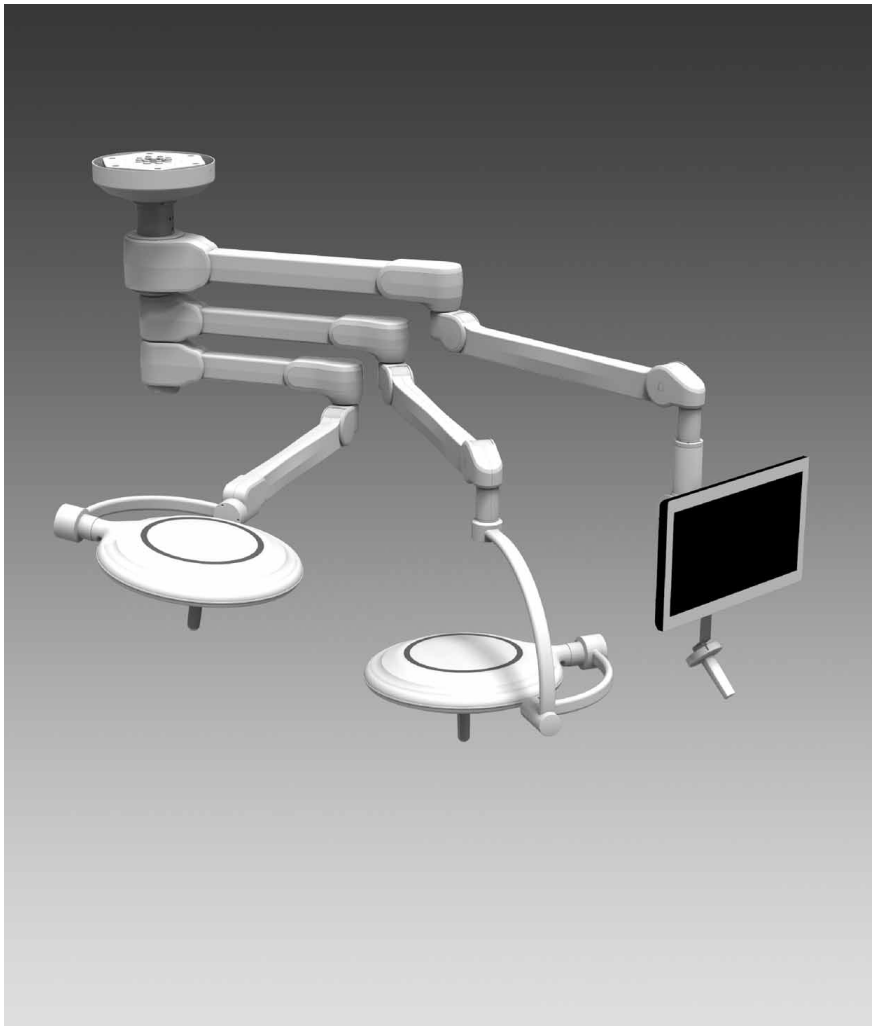
ZIMMER BIOMET
Your progress. Our promise.®

Claro™ Surgical Lights

Pre-Installation Requirement Reference



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GENERAL INFORMATION

Thank you for purchasing this Zimmer Biomet product. Please read this pre-installation manual carefully and abide by the safety notices.

PRODUCTS IN SCOPE OF THIS MANUAL

- Claro Surgical Lights

CONTACT INFORMATION

Distributor

Zimmer Surgical, Inc.
200 West Ohio Avenue Dover, Ohio 44622 USA
(800) 830-0970
www.ZimmerBiomet.com

Manufacturer

Ondal Medical Systems of America, Inc.
540 Eastpark Court, Suite A
Sandston, VA 23150 • USA

Ondal Medical Systems GmbH
Wellastraße 6
36088 Hünfeld Germany

INSTALLATION AND SERVICE

Installation **MUST BE PERFORMED** by a Zimmer Biomet authorized service provider to ensure the safety and effectiveness of the system. Prior to installation, information necessary for customization of the system will be obtained as part of the ordering process.

Zimmer Biomet Service
Phone: (800) 830-0971
Email: OmniSuiteSupport@zimmerbiomet.com

PARTY RESPONSIBILITIES

The responsibilities associated with planning and preparation for installation of Claro Light System equipment will be shared between the Hospital, Contractor, and Zimmer Biomet. These responsibilities are outlined below.

Hospital Responsibilities

- Complete and sign room drawings and provide to Zimmer Biomet. This must be completed ten (10) weeks prior to the requested ship date.
- The hospital must supply Zimmer Biomet 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
- The hospital must ensure Zimmer Biomet is notified of all revisions and changes to drawings prior to and during the scope of the project.
- Accept delivery of Zimmer Biomet equipment.
- All Zimmer Biomet-supplied equipment should be stored in a clean, temperature-controlled, dry environment prior to installation. Failure to comply may result in damage to the equipment.
    - Ambient conditions for storage and transport (in original packing materials):
        - Ambient temperature: -15°C (5°F) to 60°C (140°F)
        - Relative humidity: 10% to 95%
        - Atmospheric pressure: 500hPa to 1,060hPa
- Provide method for transport of Zimmer Biomet equipment from storage to the operating room (pallet jack).
- On the final day of installation, sign Zimmer Biomet Installation Acknowledgement Form. This form must be signed before the room can be turned over to the hospital.
- Install 3rd party equipment including pulling cables and installation related activities.
- Coordination of any 3rd party equipment to be attached to the Zimmer Biomet Claro Light System.

Contractor Responsibilities

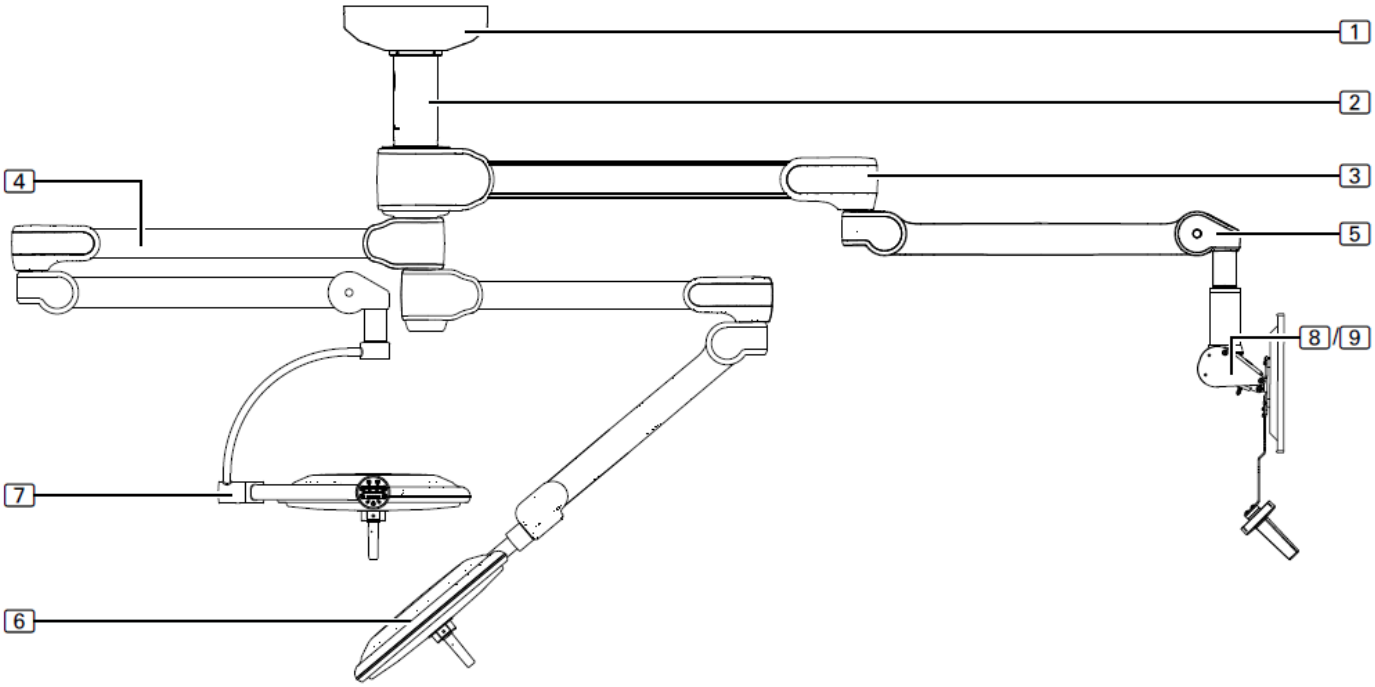
- Coordinate subcontractors.
- Prior to the installation start date, provide all rough-in requirements as explained in this manual and the Zimmer Biomet rough-in drawings.
- Prior to the installation start date, run all cabling, electrical, and data as instructed in this manual and the Zimmer Biomet drawings.
- Provide and pull all cables outside the operating room as specified in this manual.
- Prior to the installation start date, connect all the required electrical circuits.
- Prior to the installation start date, complete all work involving dust, paint, and flooring.
- All Zimmer Biomet equipment that attaches to the building structure, such as mounting plate and brackets must be mounted prior to Zimmer Biomet's installation date.
- All rooms must be reserved for Zimmer Biomet installation technicians only at all times during the installation dates.

Zimmer Biomet Responsibilities

- Provide design assistance and recommendations.
- Provide rough-in, cabling, electrical, and data requirements listed in this manual.
- Provide rough-in drawings.
- Provide the hospital with a scope of work for Zimmer Biomet equipment installation.
- Pull all cables within the operating room. Hospital provides and pulls all cables outside of the operating room.
- Break down packaging material and gather all trash in a central location in the work area for Hospital/Contractor removal.
- Perform a final review and "walk through" of the installation to ensure all equipment is functioning and all installation requirements have been met.
- Remove and dispose of the pallets, boxes, and trash during and after the installation.

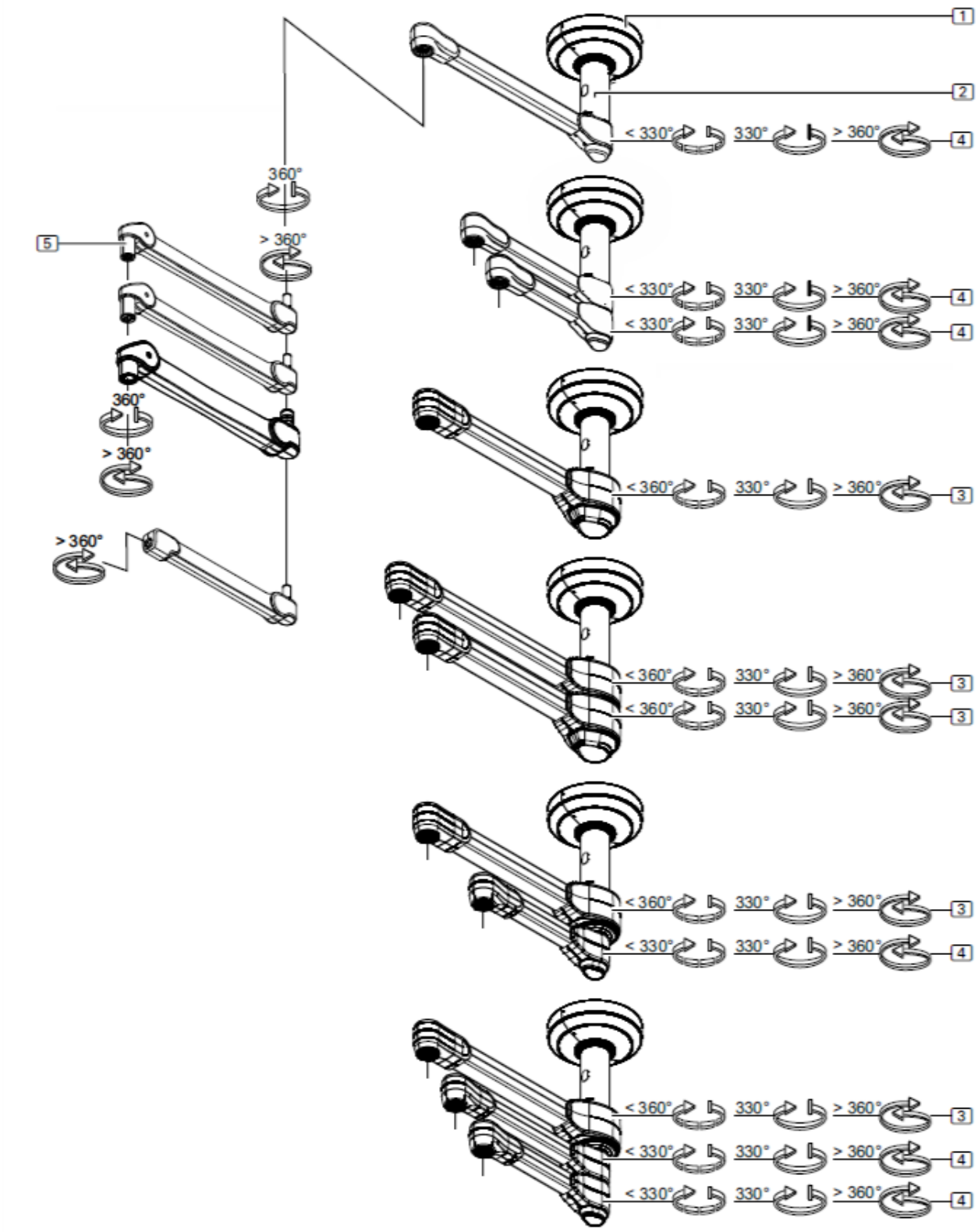
SYSTEM OVERVIEW

OVERVIEW OF CLARO LIGHTS



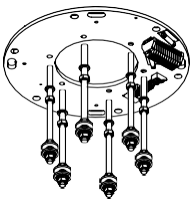
1. Canopy
2. Ceiling Tube
3. Central Axis C Extension Arm
4. Central Axis S Extension Arm
5. Spring Arm
6. Single Yoke Surgical Light
7. Dual Yoke Surgical Light
8. Monitor Carrier
9. Dual Monitor Carrier

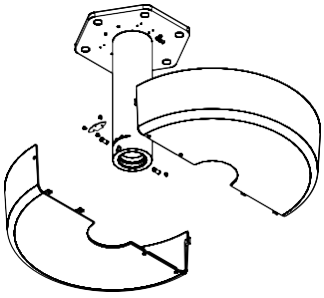
OVERVIEW OF CLARO LIGHTS VERSIONS

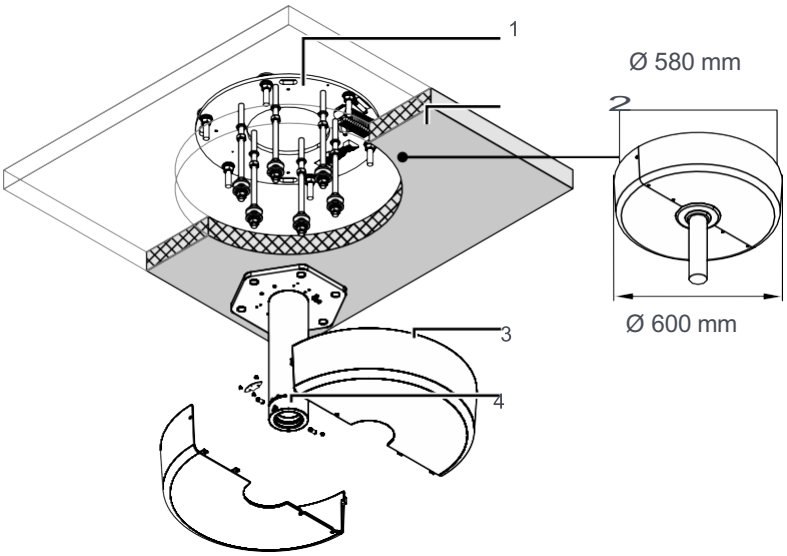


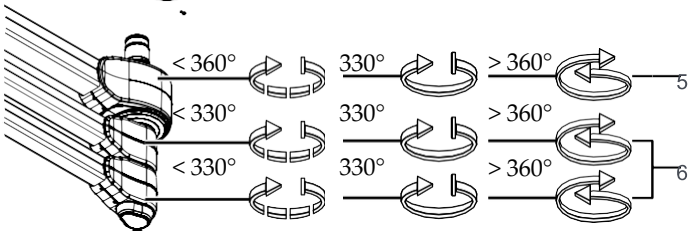
1. Canopy
2. Ceiling Tube
3. Central Axis C Extension Arm
4. Central Axis S Extension Arm

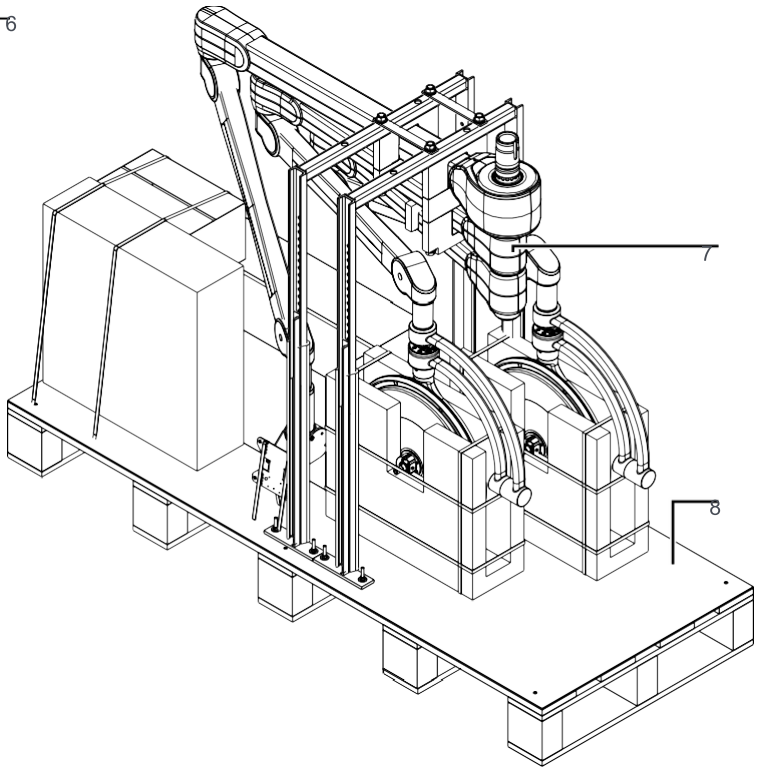
OVERVIEW OF CLARO LIGHTS CENTRAL AXIS C1S2











1. Interface Plate
2. Finished Ceiling
3. Canopy
4. Ceiling Tube with Flange
5. Extension Arm C1
6. Extension Arm S2
7. Light System
8. Transport Rack

SITE PREP REQUIREMENTS

SITE PREP REQUIREMENTS

Power

- All electrical circuits and wiring must be installed by a certified electrician contracted through the hospital. The electrician must be available for final electrical wiring during installation.
- All electrical services must meet national and local building and electrical codes and be routed to junction boxes. Junction box will need a single branch circuit with 20 Amp, 120V AC, 60Hz or equivalent per local electrical codes.
- Test connections before commissioning in accordance with all IEC, NEC, NFPA 99 or local codes.

Video and Data

- All video and data connection must be available prior to installation. See Zimmer Biomet Omni Surgical Suite System pre-installation manual for requirements and conduit schedule.
- If using non Zimmer Biomet video and data systems, it is the responsibility of the hospital to arrange installation of the video and data components for installation.

Conduit

- All conduit runs should include insulated bushings on all open ends.
- All conduit runs must include pull strings.
- All conduit should have minimum bends and / or curves and not exceed four (4) 90-degree bends.

Ceiling Mount / Support Structure

- Design of support structure lies entirely with the hospital / contractor. Zimmer Biomet will not review or approve the customer support structures. This is the responsibility of the customer's architect and designated structural engineer.
- A cut out in the ceiling for the mounting plate is required for installation of the light assembly. The cut out should match the outline of the mounting plate and be aligned with the center of the mounting interface plate. The cut out will be concealed by the Claro Light cover plate.

Retrofit Ceiling Mount

- In the case of retrofits to an already installed ceiling mount, the fixing elements used must be inspected by an architect and designated structural engineer, and approved prior to installation.
- Retrofits are NOT permitted if this approval has not been granted.

Ceiling Access

- A ceiling access panel 24" x 24" with direct access to the mounting interface structure is required. The ceiling access panel must be separate from the mounting structure cut out. Access is required to allow for power and data connections for installation and servicing the Claro Light System.

EQUIPMENT / TECHNICAL SPECIFICATIONS

WEIGHTS AND LOAD CAPACITY

Technical details of spring arms	
Product label	The product label is attached to the top side of the spring arm.
Maximum load bearing capacity:	
Spring arm L21	1.5 – 21.0 kg
Spring arm MD21	1.5 – 21.0 kg
Spring arm MD40+	18 – 40 kg
Spring arm LCH17	20 – 176 Nm
Technical details of monitor carriers	
Approved flat screen size	up to 32"
Maximum loading capacity:	
Monitor carrier single	17.5 kg
Monitor carrier dual	35 kg
Operating forces allowed when moving the flat screen	Manual force for tilting < 25N Manual force for swiveling < 20N

LOAD DATA

WARNING: **Light System Dropping**

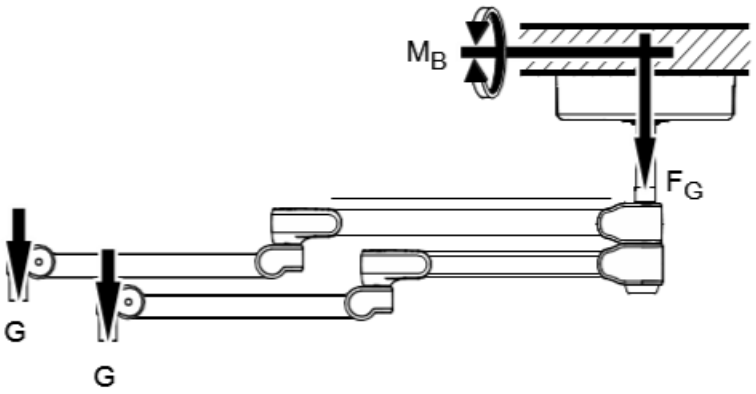
The safety factors prescribed in the individual regions must be taken into account for calculating the maximum load data.

LOAD DATA – LIGHT SYSTEM S1, S2

The data required for calculating the ceiling load is indicated in the tables below. When mounting the light system to the ceiling mount fixture, the vertical weight force of the ceiling mount fixture (the values correspond to the maximum load) must be added to the corresponding values of the light system in order to determine the ceiling load.

The table indicates the values for the maximum permissible load bearing capacity of the light system.

Figure 1: Load data of the light system S1, S2



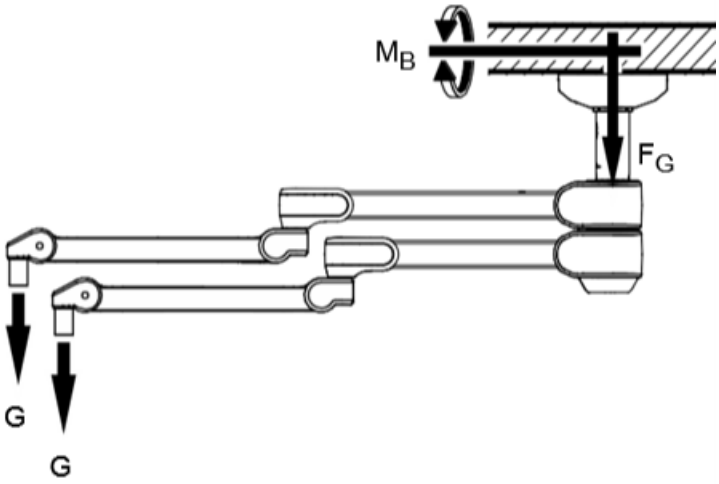
One arm light system S1 (with 1 extension arm)	Vertical weight force F_G in N	Vertical weight force of the ceiling mount F_G in N	Maximum bending moment M_B in Nm	Carrying loads G in kg
Extension arm, 750mm	597	1300	618	26
Extension arm, 900mm	603	1300	680	26
Extension arm, 1050mm	609	1300	744	26
Extension arm, 1200mm	567	1300	625	21
Two arm light system S2 (with 2 extension arms)	**Vertical weight force F_G in N**	**Vertical weight force of the ceiling mount F_G in N**	**Maximum bending moment M_B in Nm**	**Carrying loads G in kg**
Extension arm 750mm / 900mm	897	1300	1002	21 + 21 = 42
Extension arm 900mm / 1050mm	908	1300	1099	21 + 21 = 42
Extension arm 1050mm / 1200mm	892	1300	1137	21 + 18 = 39

LOAD DATA – LIGHT SYSTEM C1, C2

The data required for calculating the ceiling load is indicated in the table below. When mounting the product onto the ceiling mount fixture, the vertical weight force of the ceiling mount fixture (the values correspond to the maximum load) must be added to the value of the light system in order to determine the correct ceiling load.

The table indicates the values for the maximum permissible load bearing capacity of the light system.

Figure 2: Load data of the light system C1, C2



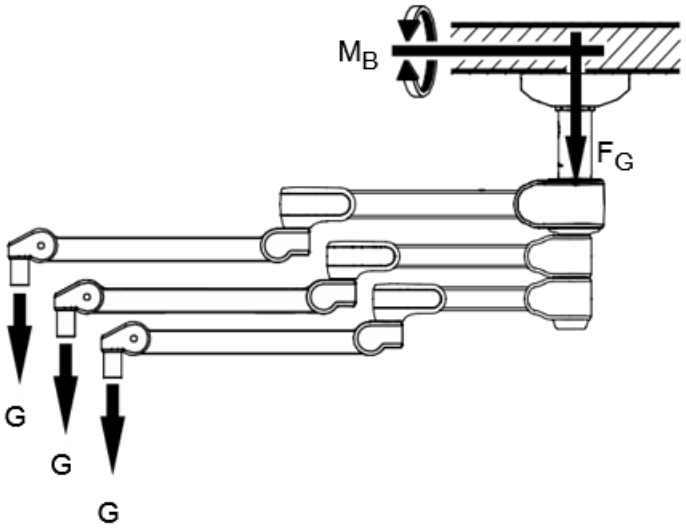
Light system C1 (with 1 extension arm)	Vertical weight force F_G in N	Vertical weight force of the ceiling mount F_G in N	Maximum bending moment M_B in Nm	Carrying loads G in kg
Extension arm, 750 – 1500mm	1081	1300	1437	40
Extension arm, 1650mm	1060	1300	1467	37
Extension arm, 1800mm	1039	1300	1490	34
Extension arm, 1950mm	1019	1300	1505	31
Extension arm, 2100mm	998	1300	1512	28
Extension arm, 2250mm	987	1300	1541	26
Light system C2 (with 2 extension arms)	Vertical weight force F_G in N	Vertical weight force of the ceiling mount F_G in N	Maximum bending moment M_B in Nm	Carrying loads G in kg
Extension arm, 750 / 900mm	1744	1300	1947	1x40 / 1x40
Extension arm, 1350 / 1500mm	1816	1300	2755	1x40 / 1x40
Extension arm, 2100 / 2250mm	1649	1300	3030	1x28 / 1x26

LOAD DATA – LIGHT SYSTEM C1, S2

The data required for calculating the ceiling load is indicated in the table below. When mounting the product onto the ceiling mount fixture, the vertical weight force of the ceiling mount fixture (the values correspond to the maximum load) must be added to the value of the light system in order to determine the correct ceiling load.

The table indicates the values for the maximum permissible load bearing capacity of the light system.

Figure 3: Load data of the light system C1, S2



Light system C1, S2 (with 3 extension arms)	Vertical weight force F_G in N	Vertical weight force of the ceiling mount F_G in N	Maximum bending moment M_B in Nm	Carrying loads G in kg
Extension arm 750 / 900 / 1050mm	1995	1300	2378	1x26 / 1x21 / 1x40
Extension arm 900 / 1050 / 1200mm	1903	1300	2426	1x21 / 1x21 / 1x40
Extension arm 1050 / 1200 / 1350mm	1895	1300	2583	1x21 / 1x18 / 1x40

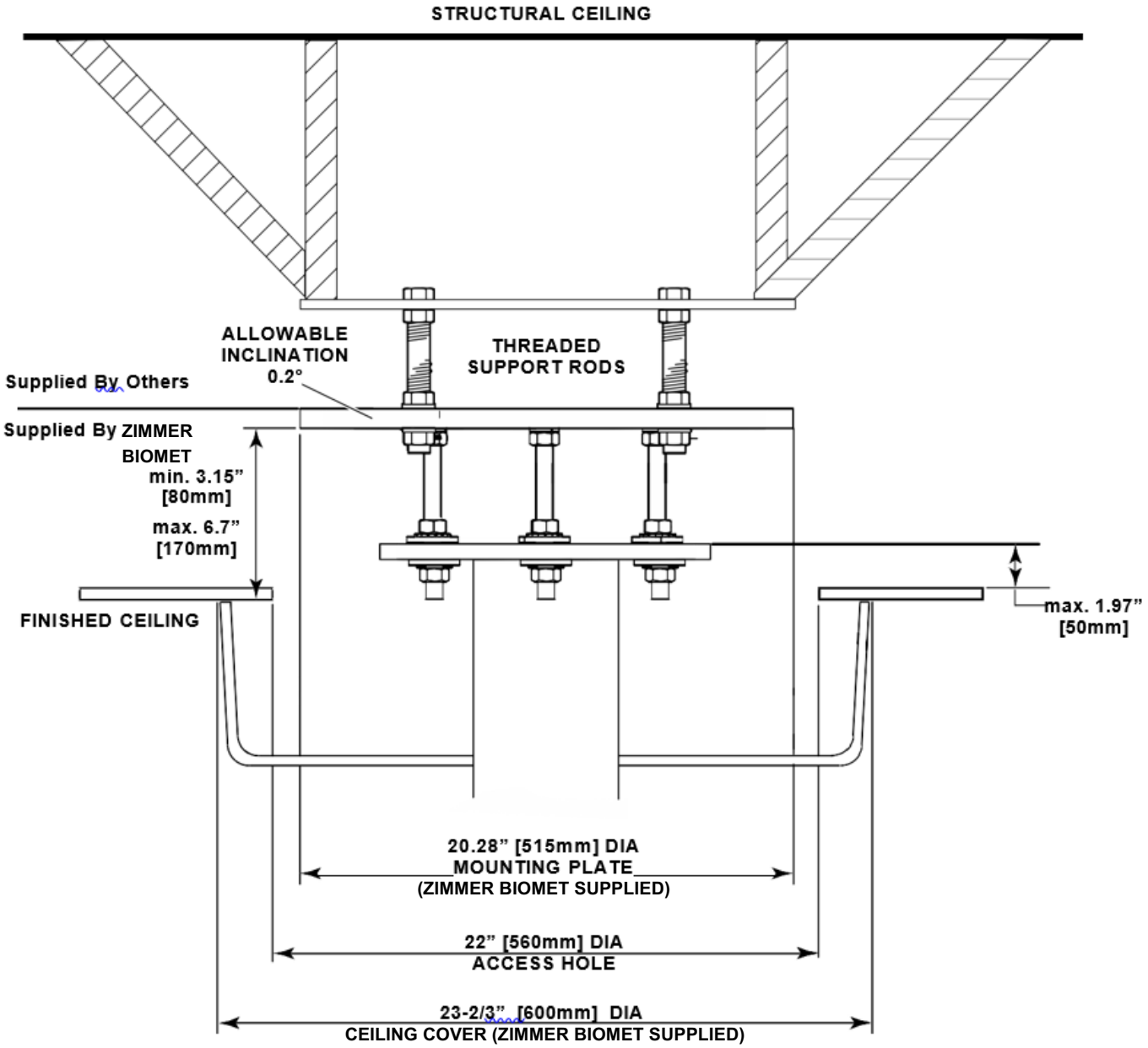
CEILING STRUCTURE AND INTERFACE PLATE MOUNTING

NOTE: The below drawings are reference only. The design of the support structure is the hospitals responsibility.
NOTE: Design of support structure lies entirely with the hospital / contractor. Zimmer Biomet will not review or approve the customer support structures. This is the responsibility of the customer's architect and designated structural engineer.

Figure 4 shows possible installation substructures for the installation of the light system. Check the strength and stability of the mounting structure.

- It should be fabricated of steel and welded or bolted to the structural ceiling.
- It should be braced to allow no twisting or lateral motion.
- In standard installations, a steel stiffener plate and threaded support rods should be used (determined by an engineer).
- Structure should be 3.15" – 6.7" (80 – 170mm) above the finished ceiling line measured from the bottom of the plate.

Figure 4: Typical Mounting Structure

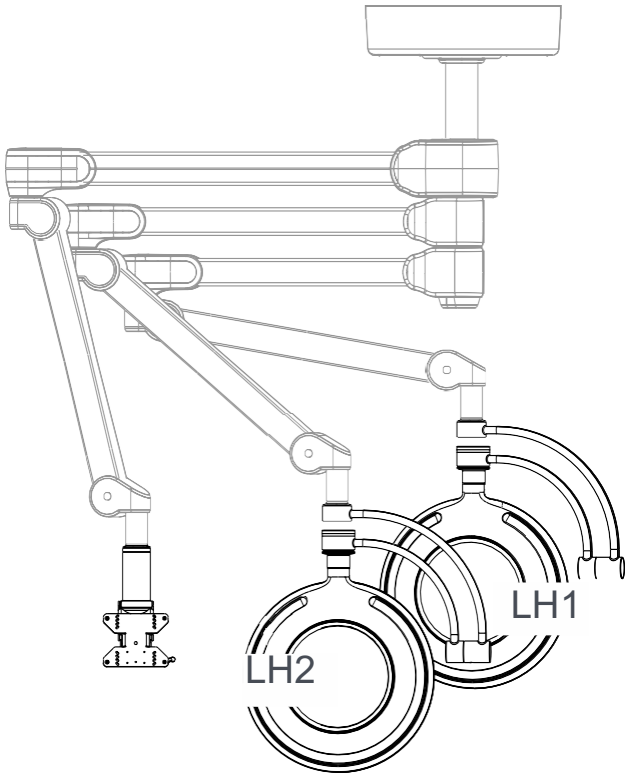


ELECTRICAL CONNECTIONS

Component description for this section:

- First light head with camera: respectively ‘LH1’.
- Second light head standard: ‘LH2’.
- First and second electrical panel: respectively ‘EP1’ (powering ‘LH1’) and ‘EP2’ (powering ‘LH2’).
- Wall control panel for 1 standard light head + 1 camera-ready light head: ‘WCP’ (‘LH1’ and ‘LH2’ control).

Figure 5: Power line connection



- There are 3 possible end devices of the light system: standard light head, camera-ready light head and monitor carrier.
- Each light head requires an individual power supply.
- The power supply receives facility power (110 – 240 Vac) as the input and outputs 24 Vdc.
- Each light head will have its own wiring cable (HDC cable) coming out of the top of the system.
- The standard light head has 4 wires (3 power and 1 communication).
- The camera-ready light head has 5 wires (3 power, 1 communication, and 1 BNC for video transmission).
- The monitor carrier is delivered without video cable.
- Power wires are routed to and connected to the provided junction box. Communication wires will be joined for multiple light heads and, if the optional wall control is present, connected to the wire from the wall control. The wall control will receive DC power from a power supply.

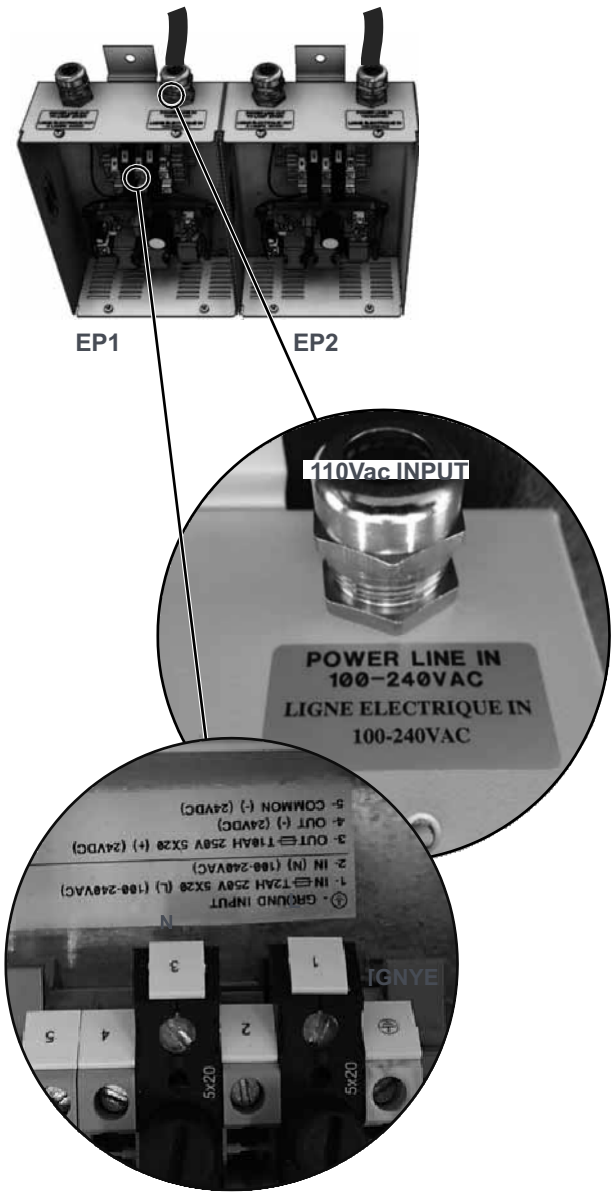
ELECTRICAL PANEL MAIN POWER LINE CONNECTION

Warning: **Electric Shock Hazard**

- Contact with energized components presents a danger to life from electric shock. Motor-driven, mobile device components can cause injury in the case of being switched on unintentionally.
- The electrical contractor is responsible for the selection of suitable materials compliant with national electrical standards and the authority having jurisdiction.
- Prior to any installation and setting up work, the light system must be disconnected from the mains.

The figure shows a simplified illustration of the electrical panel ‘EP1’ and‘EP2’, without the ceiling construction.

Figure 6: Electrical Panel



1. For each electrical panel ('EP1' and 'EP2'), pull the power cable(110VDC) through the opening marked ‘POWER LINE IN 100-240VAC’.
2. Connect the wires as follows:
   - N to ‘2’
   - L to ‘1’

- Ground [GNYE] to Ground

3. In certain situations, the power supplies may be mounted in a location that is not easily accessible to the installation team once the system is raised into place. If this is the case, cable whips should be added to the line out of each power supply. Leave enough length such that the whips will reach the opposite side of the opening in the ceiling for the lighting fixture.

The power whips will be connected to LH1 and LH2 HDC cables in a UL listed junction box (supplied by General or Electrical Contractor). Mount the junction box in an appropriate location that allows for service access in the future. Metal conduit required between fixture, junction box and power supply. Follow current standards from the NFPA (National Fire Protection Agency), NEC (National Electrical Code) and IEC (International Electrotechnical Commission) for proper compliance.

Requirements:

- All wires should be routed through 3/4" (19mm) flexible conduit.
- Minimum 12AWG wire size (2 wires per light head plus fixture ground) required between fixture and supplied power supply.
- All conduit, wiring, and other electrical materials as well as installation labor for such materials associated with the installation of the surgical light to be provided by an Electrical Contractor.
- All installations of Zimmer Biomet surgical lights should be under the direct supervision of a Zimmer Biomet representative.
- All wiring to be in accordance with local codes and by a certified electrician.

WALL CONTROL BOARD

Figure 7: Wall Control Board (1) and Back Box (2)

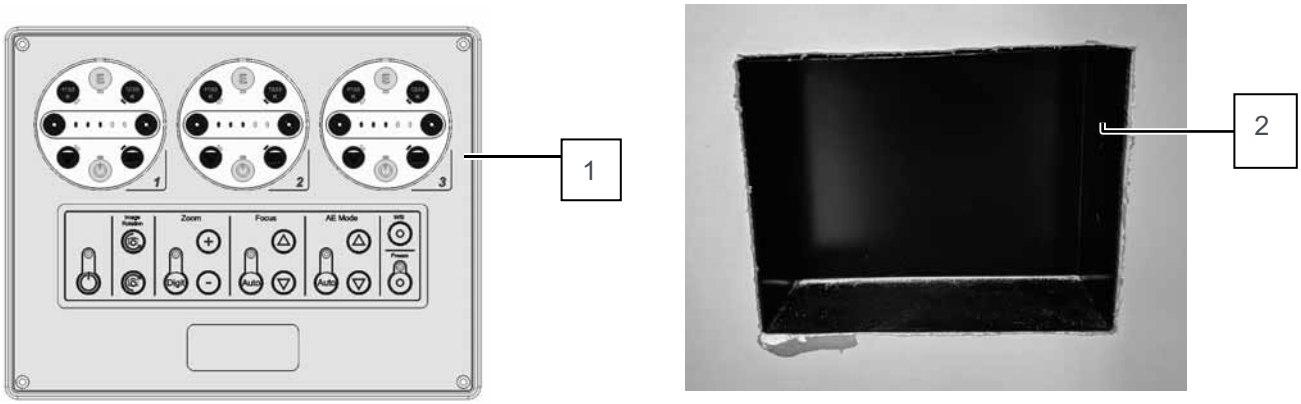
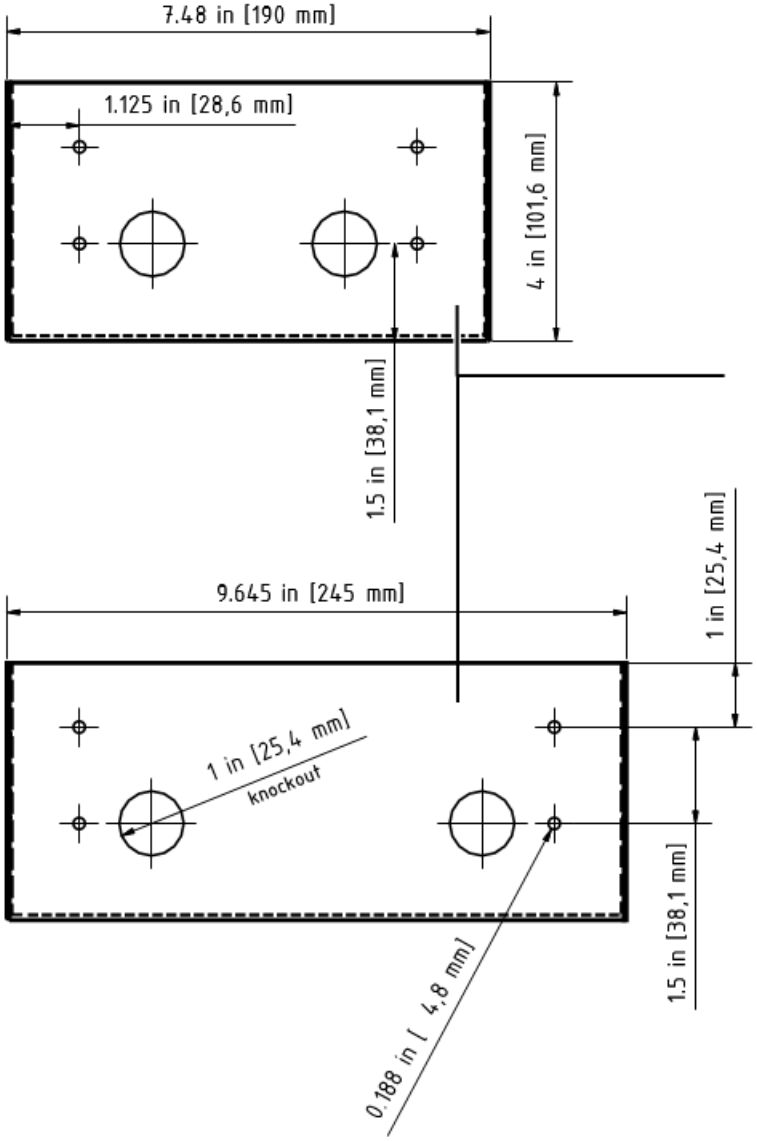


Figure 8: Back Box



NOTE: The back box has knockout and mounting locations on each side of the box for electrical connections and securing structural members

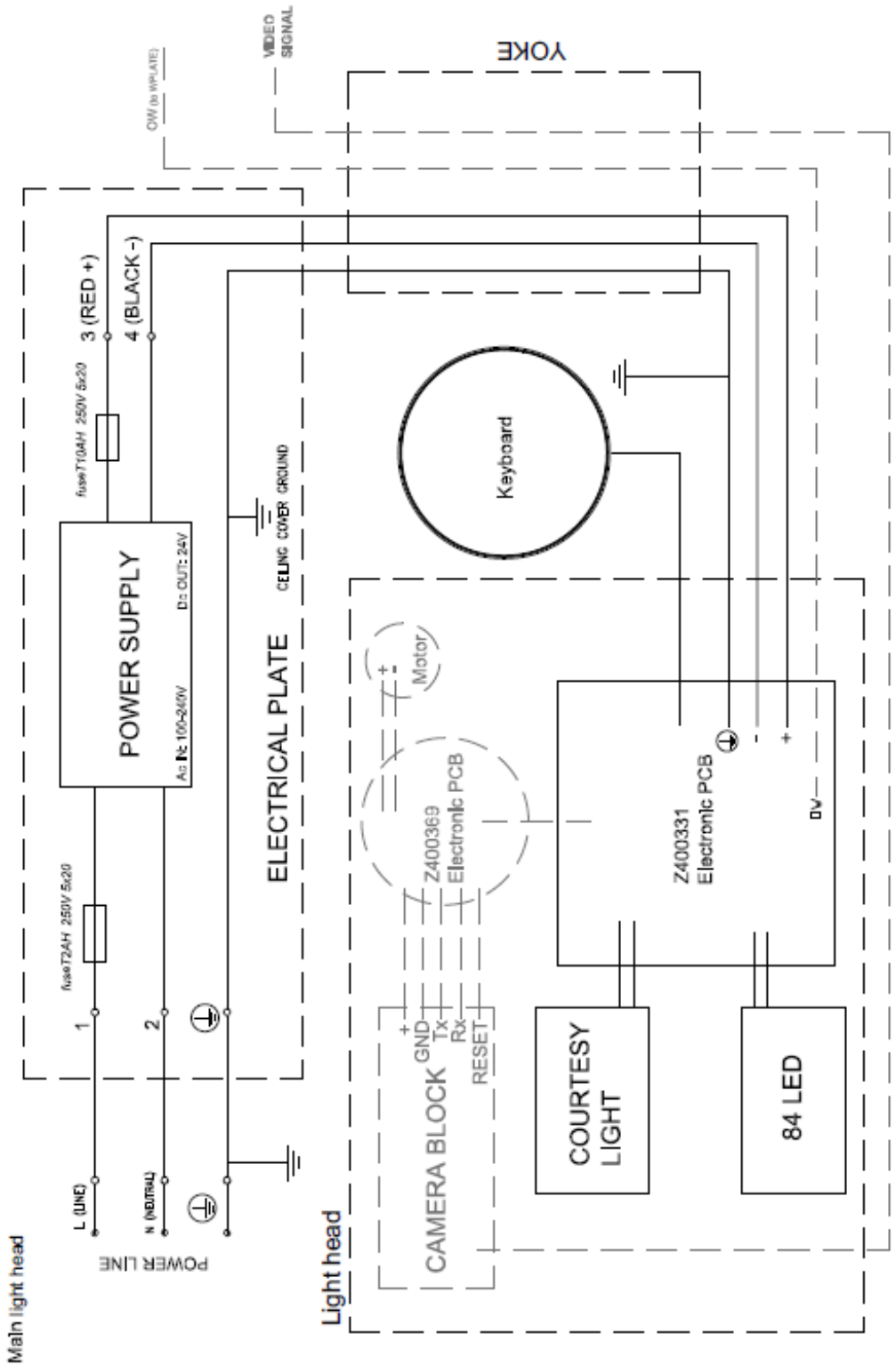
Requirements:

- It is responsibility of the hospital / contractor to install the Zimmer Biomet supplied backbox.
- 3/4” (19mm) flexible conduit between back box and electrical panel with pull string.
- Use Zimmer Biomet supplied back box and fasteners for installation.
- Install back box in the wall at desired location with the long edge mounted along a horizontal plane.
- Front edge of backbox should be installed flush with finished wall.

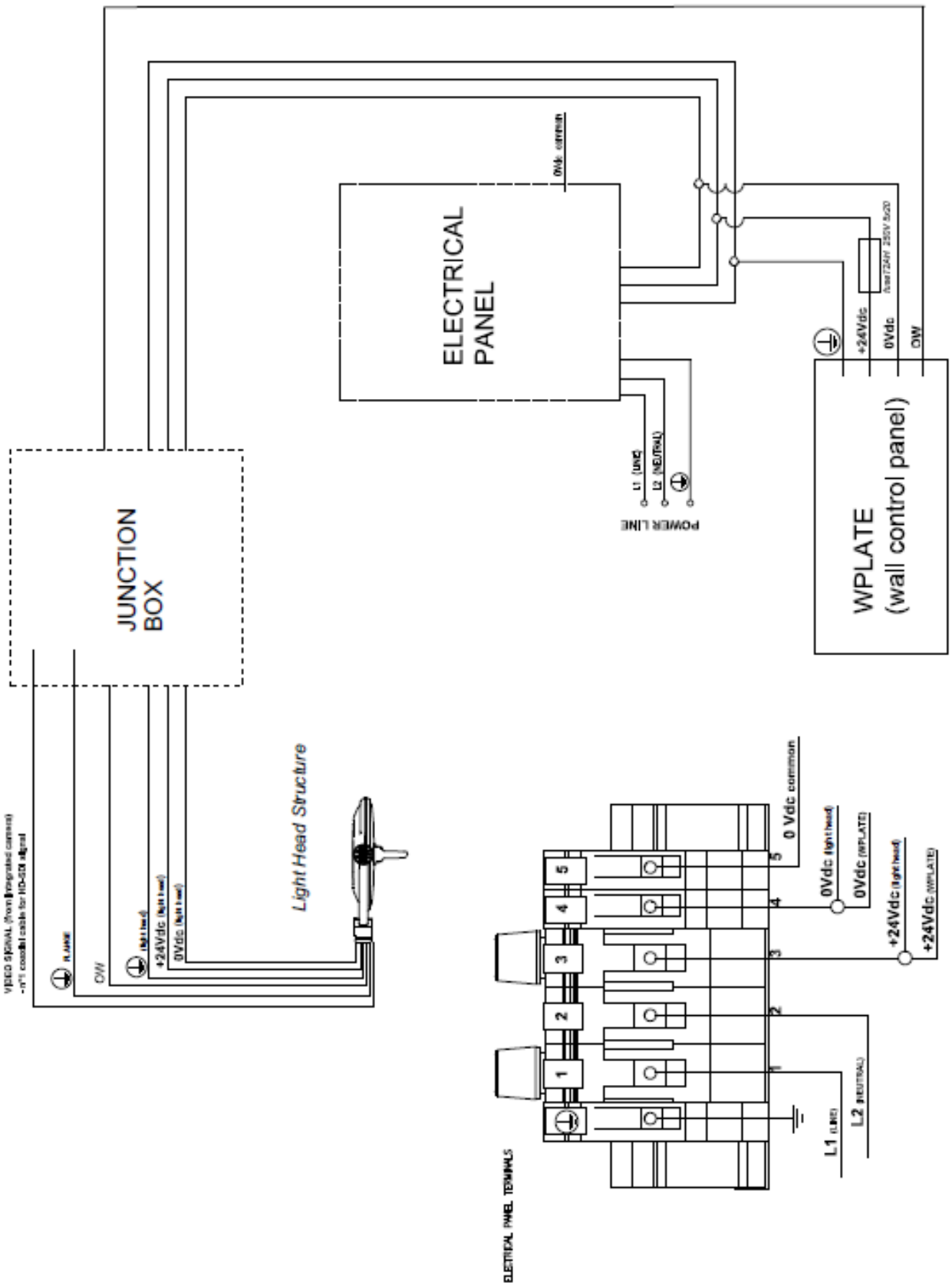
ELECTRICAL DRAWINGS

SINGLE ARM SYSTEM

Main light head



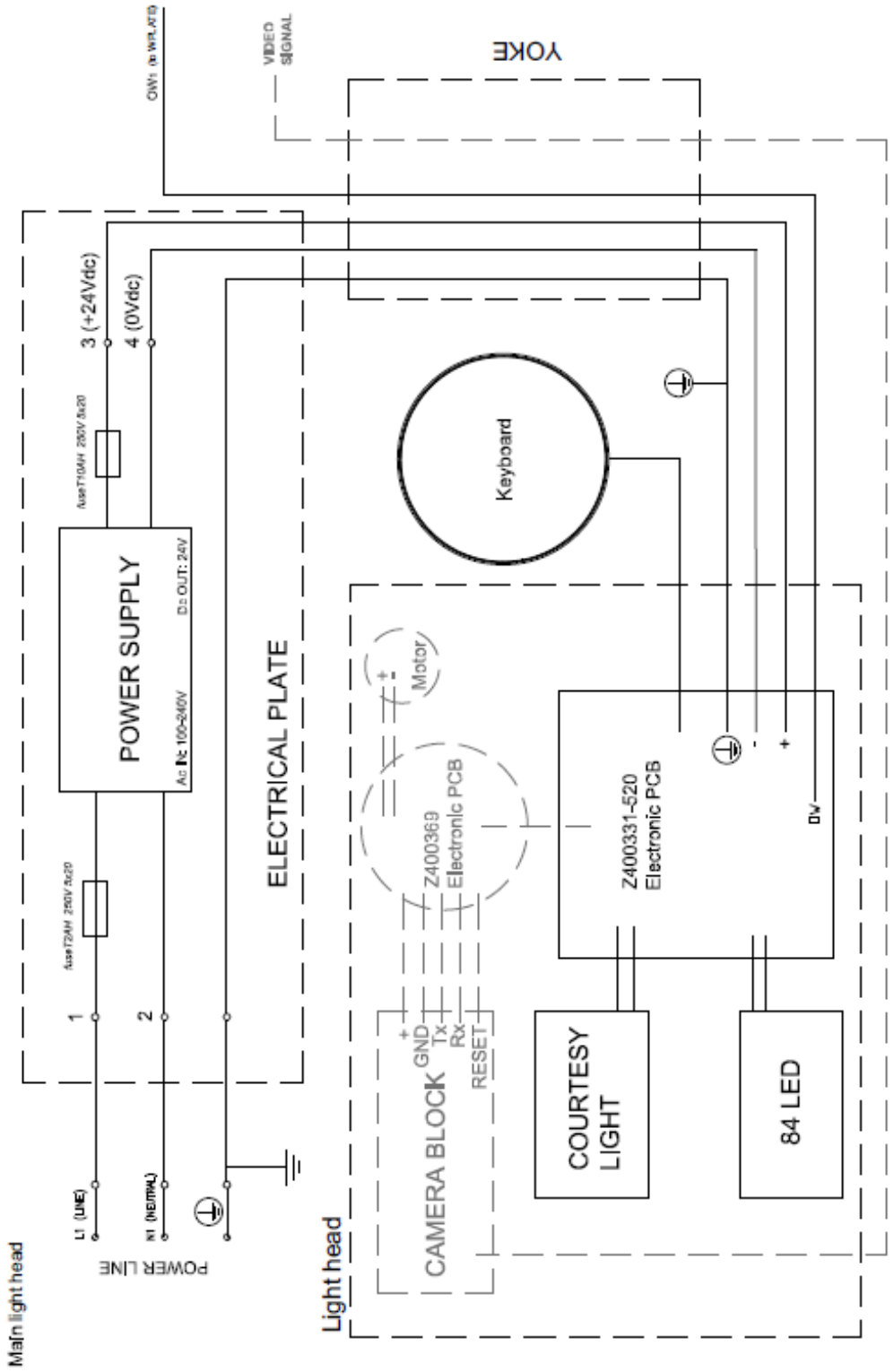
System diagram



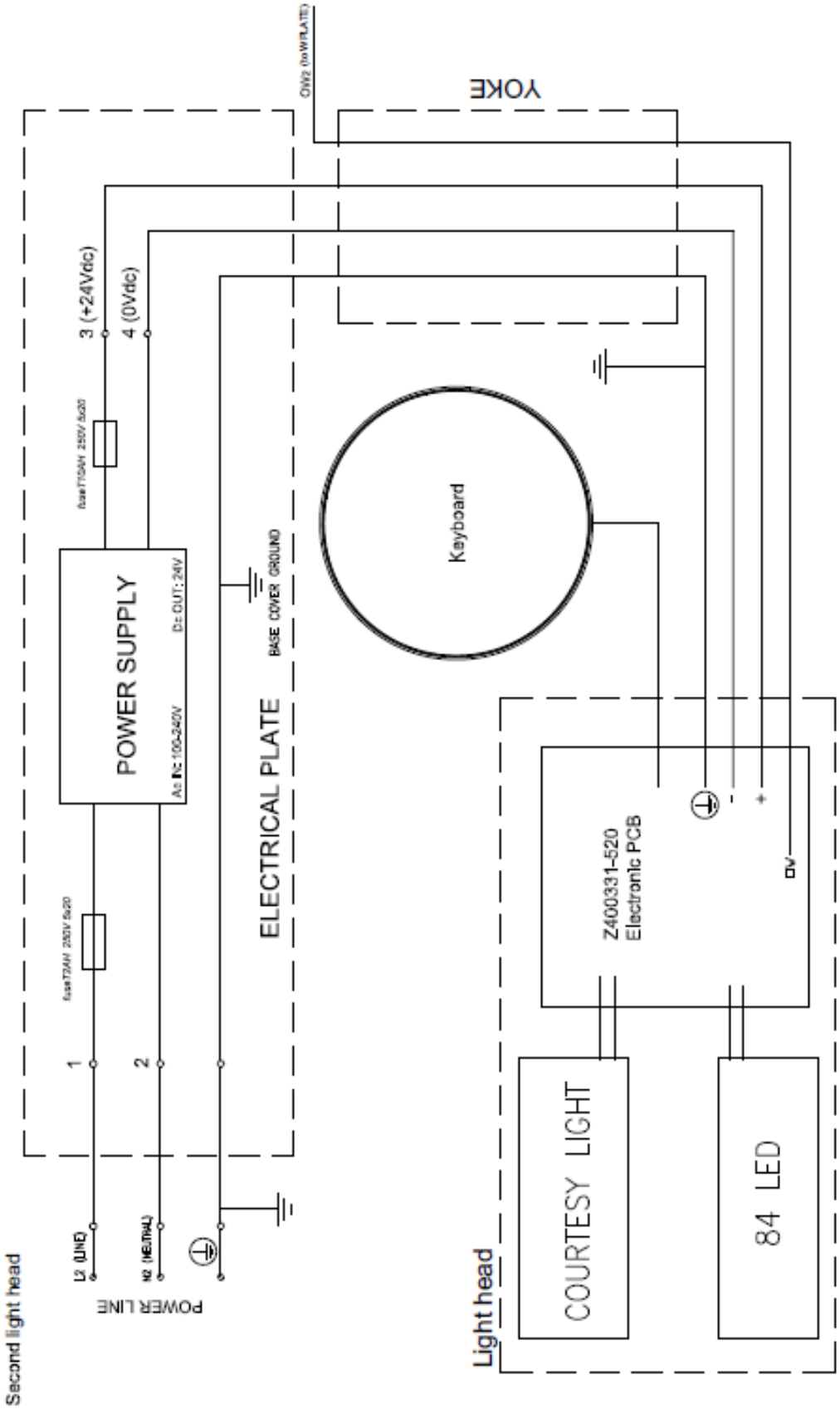
TRIPLE ARM SYSTEM

These drawings also apply for a Double Arm System. The monitor cables are not shown.

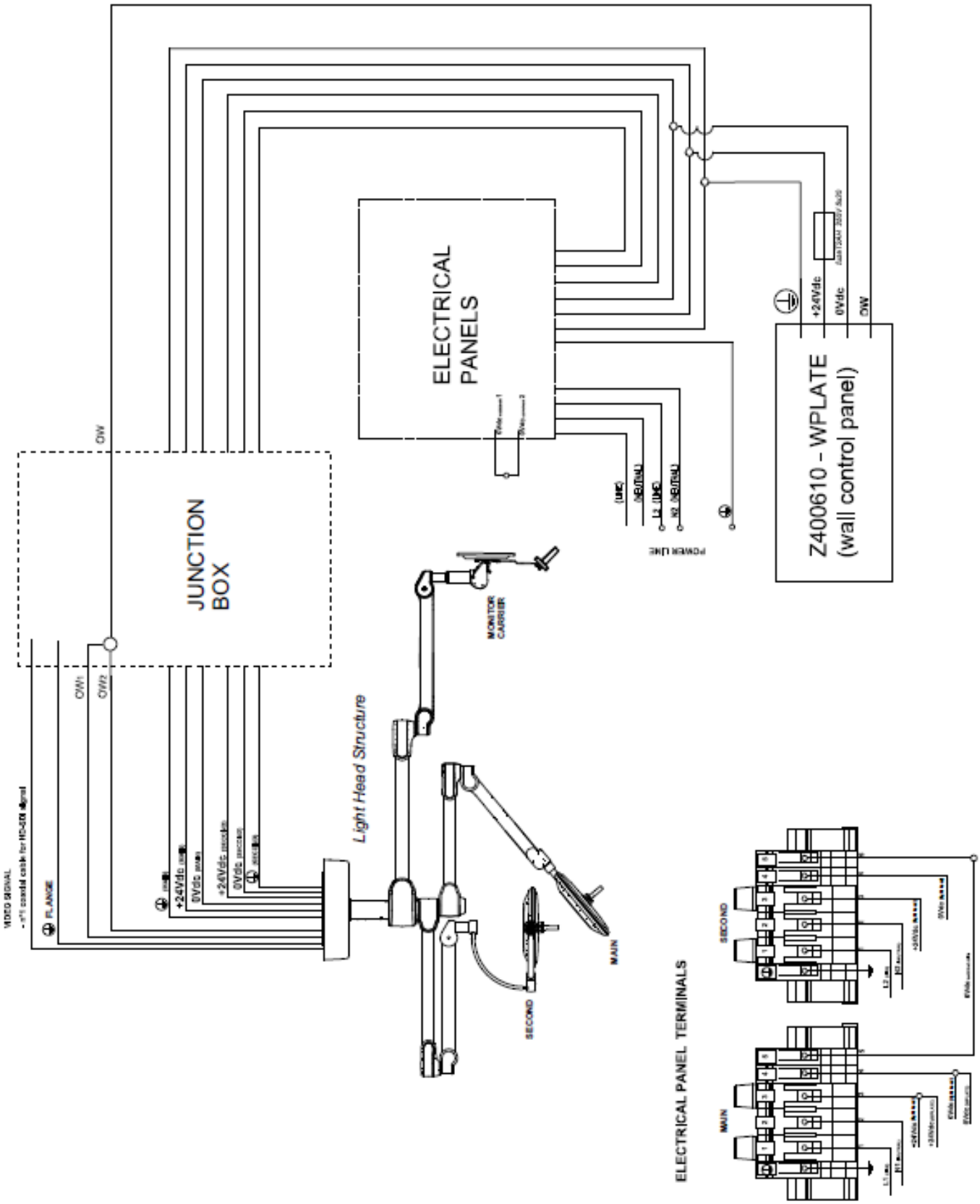
Main light head



Second light head



System diagram



SEISMIC DATA

CLARO (VALIAS) – 1 FOLD MD21+

EASE

EQUIPMENT **ANCHORAGE** & SEISMIC ENGINEERING
www.EquipmentAnchorage.com

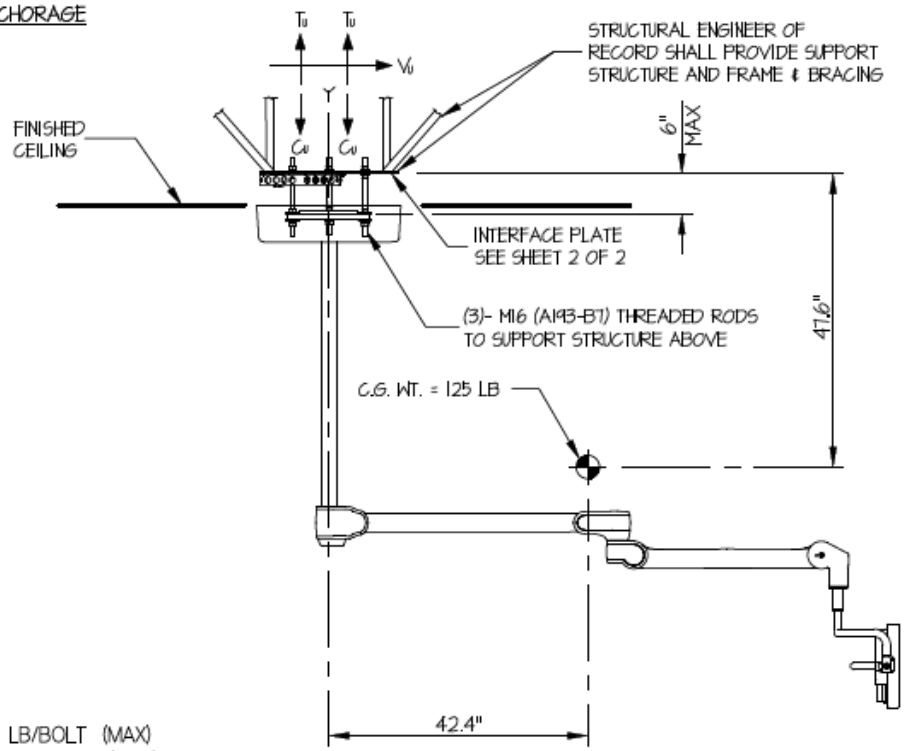
ONDAL MEDICAL SYSTEMS

VALIAS - 1FOLD MD21+

DES. J. ROBERSON
JOB NO. 11-1811
DATE 3/27/18

SHEET 1 OF 2 SHEETS

SEISMIC ANCHORAGE — CEILING MOUNTED



Tu = 4150 LB/BOLT (MAX)
Cu = 4063 LB/BOLT (MAX)
Vu = 434 LB/BOLT (MAX)

ELEVATION
N.T.S.

NOTES:

1. **FORCES ARE DETERMINED PER 2016 CALIFORNIA BUILDING CODE AND ASCE 7-10**
   STRENGTH DESIGN IS USED. (SDS = 2.20, ap = 2.5, Ip = 1.5, Rp = 2.5, z/h = 0)

   HORIZONTAL FORCE (Eh) = 3.96 Wp
   VERTICAL FORCE (Ev) = 0.44 Wp

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 FOR THE BUILDING SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN IN COMBINATION WITH ALL OTHER LOADS THAT MAY BE PRESENT.

REGISTERED PROFESSIONAL ENGINEER
JONATHAN ROBERSON
No. 4197
EXP. 6-30-2018
3/27/18
STRUCTURAL
STATE OF CALIFORNIA

NOT STRUCTURE OVERLAND

EASE

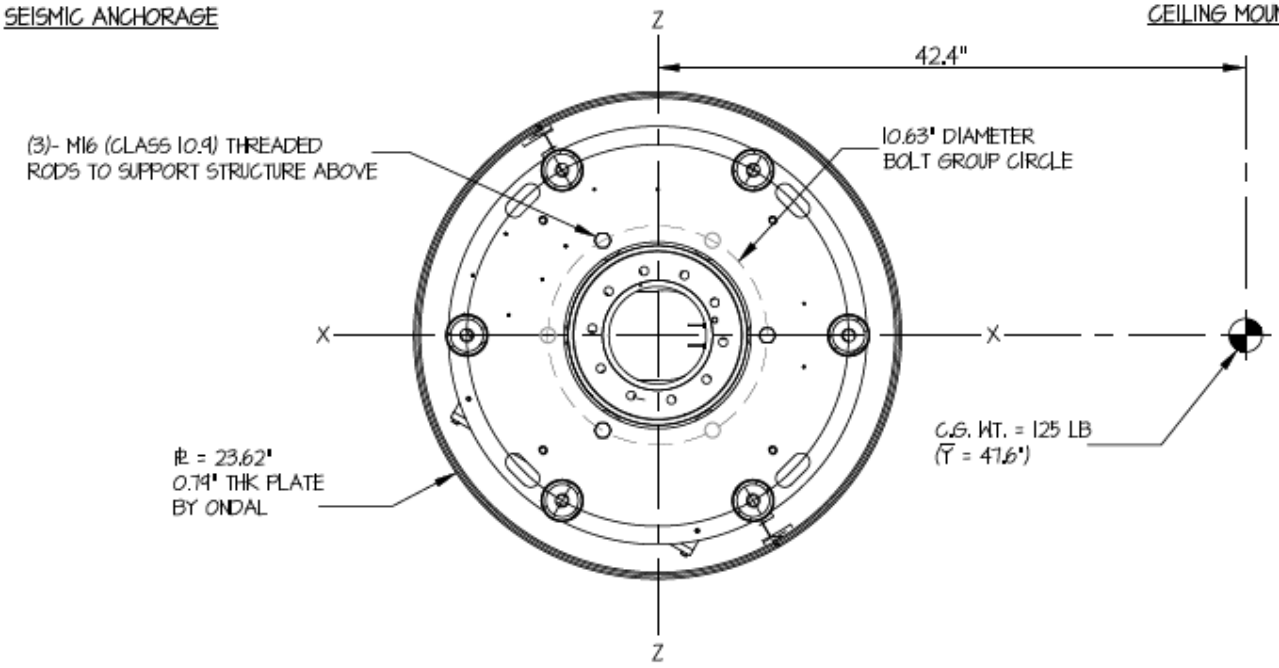
EQUIPMENT **ANCHORAGE** & SEISMIC ENGINEERING
www.EquipmentAnchorage.com

ONDAL MEDICAL SYSTEMS

VALIAS - 1FOLD MD21+

DES. J. ROBERSON
JOB NO. 11-1811
DATE 3/27/18
SHEET 2 OF 2 SHEETS

SEISMIC ANCHORAGE — CEILING MOUNTED



PLAN AT INTERFACE FLANGE
N.T.S.

LOADS:

WEIGHT = 125 LB
HORIZONTAL FORCE (E_h) = 3.96 W_p = 495 LB
VERTICAL FORCE (E_v) = 0.44 W_p = 55 LB

BOLT FORCES:

TENSION (T)

$$T_u = \frac{32254"\#(5.315")}{42} + \frac{(1.2(125\#) + 55\#)}{3\ \text{BOLTS}} = 4150\ \text{LB/BOLT (MAX)}$$

COMPRESSION (C)

$$C_u = \frac{32254"\#(5.315")}{42} - \frac{(0.9(125\#) - 55\#)}{3\ \text{BOLTS}} = 4063\ \text{LB/BOLT (MAX)}$$

SHEAR (V)

$$V_u = \frac{495\#}{3\ \text{BOLTS}} + \frac{4240"\#(5.315")}{84} = 434\ \text{LB/BOLT (MAX)}$$

BENDING (M)

$M_{act.}$ = 434#(4.976"/2) = 1080"#

COMBINED STRESS CHECK:

COMPRESSION: $\frac{C}{C_{STR}} + \frac{8}{9}\left(\frac{M}{M_{STR}}\right)$ = 0.66 < 1.00 ∴ OK

TENSION: $\frac{T}{T_{STR}} + \frac{8}{9}\frac{M}{M_{STR}}$ = 0.54 < 1.00 ∴ OK

M_{XX} = 495#(47.6") + (1.2(125#) + 55#)42.4" = 32,254"#
M_{ZZ} = 495#(47.6") + (1.2(125#) + 55#)42.4" = 32,254"#
M_{YY} = 100#(42.4") = 4240"#

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} = 42 $in.^4$
I_{z-z} = 42 $in.^4$
I_{y-y} = 84 $in.^4$

BOLT PROPERTIES:

F_y = 105 ksi : F_u = 125 ksi, d = 0.533" : ϕ = 0.90
$Z = d^3/6 = (0.533)^3/6 = 0.0252\ in.^3$
A_g = 0.2231 $in.^2$, A_b = 0.312
r = 0.1333 in.
KL/r = 1.2(4.976")/0.1333 = 44.8
M_n = 105 ksi (0.0252 $in.^3$) = 2646"#

$M_{STR} = \phi M_n = (0.9)(2646"\#) = 2381"\#$
T_{STR} = 21,938 lb. (AISC Eq J3-2)
C_{STR} = 15,501 lb. (AISC Eq E3-1)

CLARO (VALIAS) – 2 FOLD MD21+ L21

EASE

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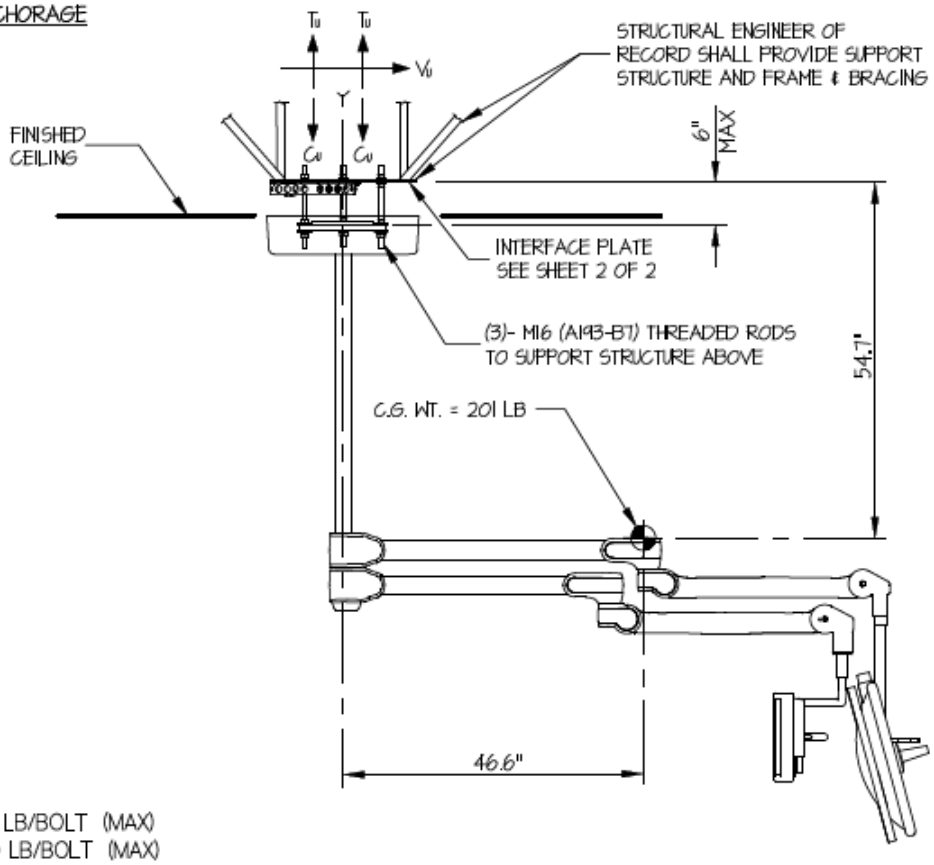
VALIAS - 2FOLD MD21+ L21

DES. J. ROBERSON
JOB NO. 11-1811
DATE 3/27/18
SHEET 1 OF 2 SHEETS

SEISMIC ANCHORAGE — CEILING MOUNTED



Tu = 7491 LB/BOLT (MAX)
Cu = 7350 LB/BOLT (MAX)
Vu = 558 LB/BOLT (MAX)

ELEVATION
N.T.S.

NOTES:

1. **FORCES ARE DETERMINED PER 2016 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 = 0)

   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 FOR THE BUILDING SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN IN COMBINATION WITH ALL OTHER LOADS THAT MAY BE PRESENT.

REGISTERED PROFESSIONAL ENGINEER
JONATHAN ROBERSON
No. 4197
EXP. 6-30-2018
3/27/18
STRUCTURAL
STATE OF CALIFORNIA

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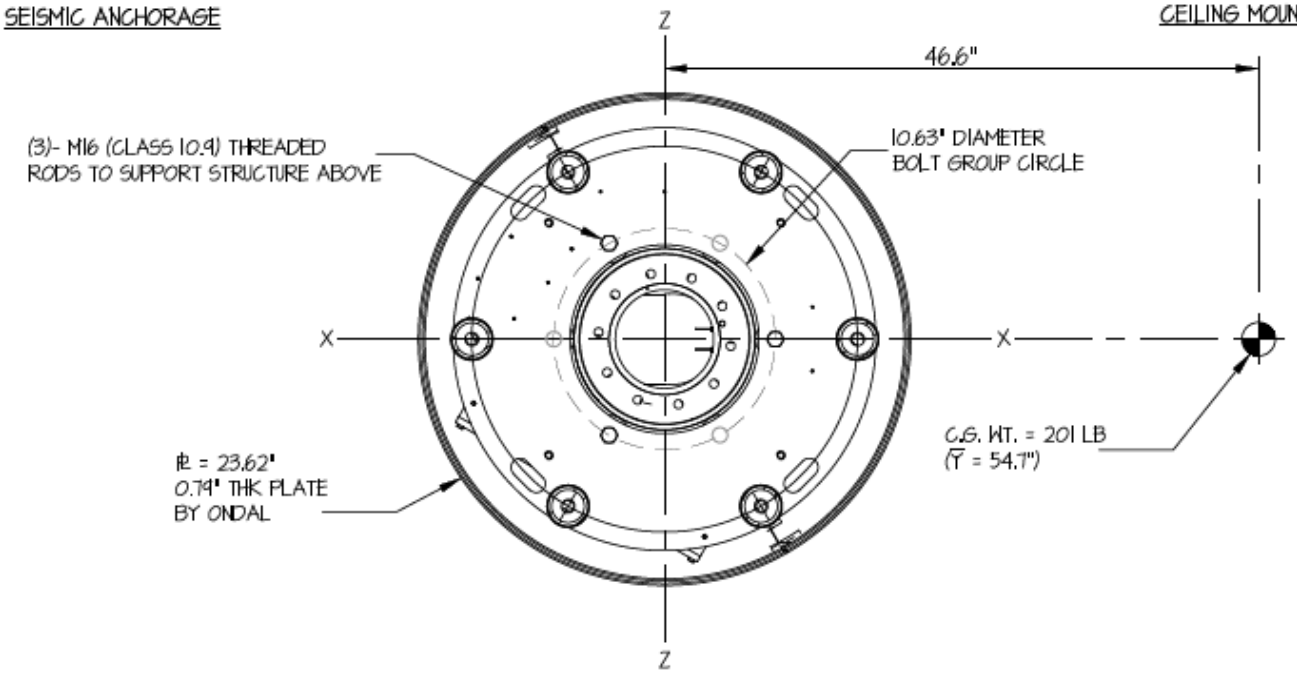
SHEET 2 OF 2 SHEETS

SEISMIC ANCHORAGE — CEILING MOUNTED



PLAN AT INTERFACE FLANGE
N.T.S.

LOADS:

WEIGHT = 201 LB
HORIZONTAL FORCE (E_h) = 3.96 W_p = 796 LB
VERTICAL FORCE (E_v) = 0.44 W_p = 88 LB

BOLT FORCES:

TENSION (T)

$$T_u = \frac{58882''\#(5.315'')}{42} + \frac{(1.2(201\#) + 88\#)}{3\ \text{BOLTS}} = 7491\ \text{LB/BOLT (MAX)}$$

COMPRESSION (C)

$$C_u = \frac{58882''\#(5.315'')}{42} - \frac{(0.9(201\#) - 88\#)}{3\ \text{BOLTS}} = 7350\ \text{LB/BOLT (MAX)}$$

SHEAR (V)

$$V_u = \frac{796\#}{3\ \text{BOLTS}} + \frac{4660''\#(5.315'')}{84} = 558\ \text{LB/BOLT (MAX)}$$

BENDING (M)

$M_{act.}$ = 558#(4.976"/2) = 1388"-#

COMBINED STRESS CHECK:

COMPRESSION: $\frac{C}{C_{STR}} + \frac{8}{9}\left(\frac{M}{M_{STR}}\right) = 0.99 < 1.00 \therefore$ OK

TENSION: $\frac{T}{T_{STR}} + \frac{8}{9}\frac{M}{M_{STR}} = 0.86 < 1.00 \therefore$ OK

M_{XX} = 796#(54.7") + (1.2(201#) + 88#)46.6" = 58,882"#
M_{ZZ} = 796#(54.7") + (1.2(201#) + 88#)46.6" = 58,882"#
M_{YY} = 100#(46.6") = 4660"#

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} = 42 $in.^4$
I_{z-z} = 42 $in.^4$
I_{y-y} = 84 $in.^4$

BOLT PROPERTIES:

F_y = 105 ksi : F_U = 125 ksi, d = 0.533" : ϕ = 0.90
$Z = d^3/6 = (0.533)^3/6 = 0.0252\ in.^3$
A_g = 0.2231 $in.^2$, A_b = 0.312 $in.^2$
r = 0.1333 in.
KL/r = 1.2(4.976")/0.1333 = 44.8
M_n = 105 ksi (0.0252 $in.^3$) = 2646"-#

$M_{STR} = \phi M_n$ = (0.9)(2646"-#) = 2381"-#
T_{STR} = 21,938 lb. (AISC Eq J3-2)
C_{STR} = 15,501 lb. (AISC Eq E3-1)

CLARO (VALIAS) – 3 FOLD MD21+ L21 L21

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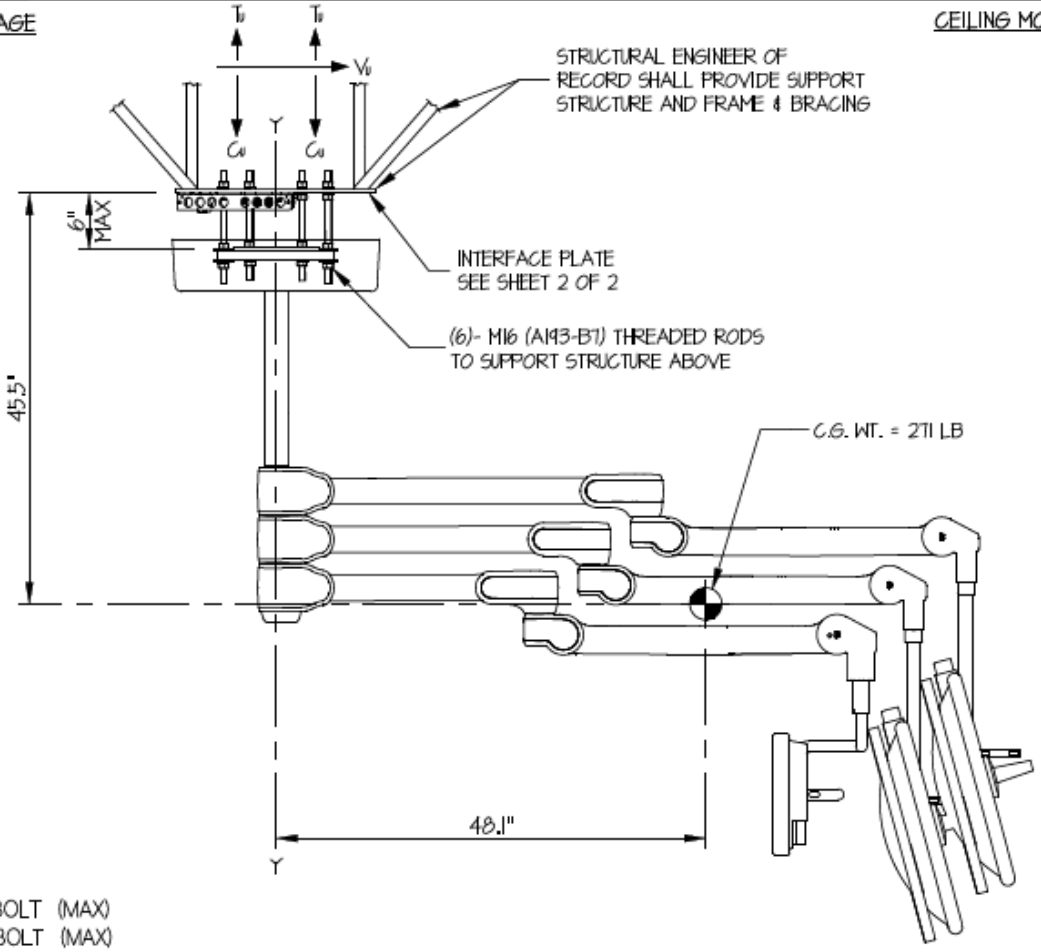
SEISMIC ANCHORAGE — CEILING MOUNTED



Tu = 4463 LB/BOLT (MAX)
Cu = 4368 LB/BOLT (MAX)
Vu = 329 LB/BOLT (MAX)

ELEVATION
N.T.S.

NOTES:

1. **FORCES ARE DETERMINED PER 2016 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 ≤ 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 FOR THE BUILDING SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN IN COMBINATION WITH ALL OTHER LOADS THAT MAY BE PRESENT.

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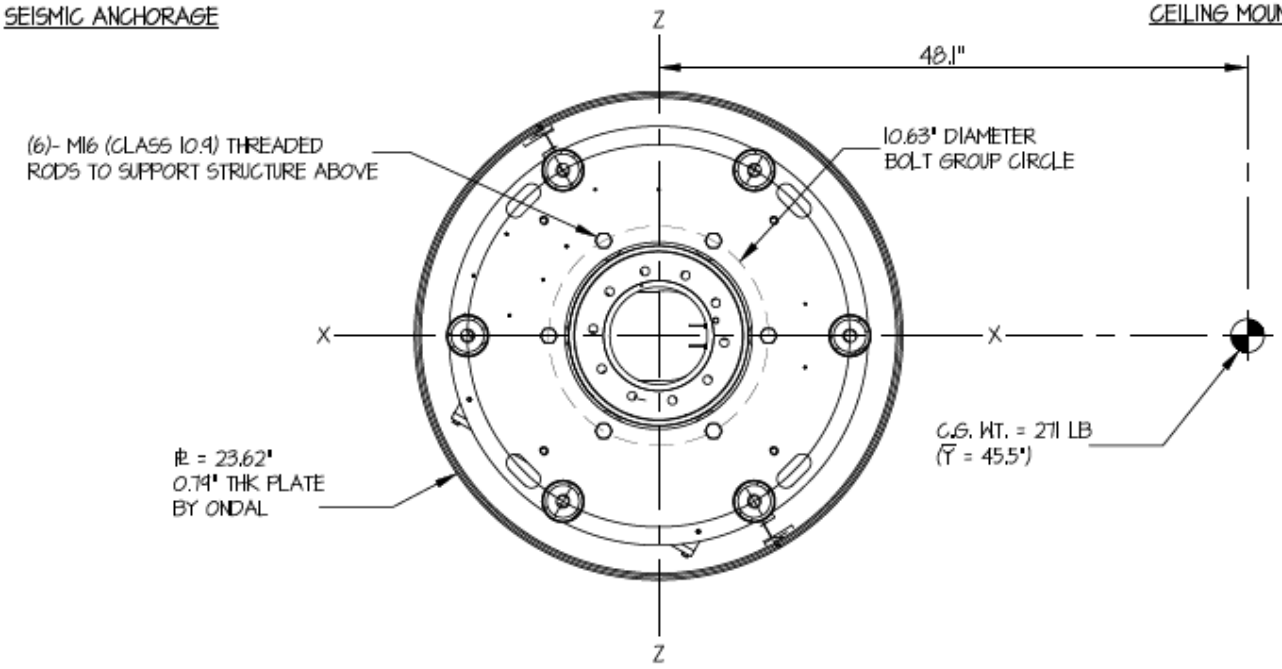

PLAN AT INTERFACE FLANGE
N.T.S.

LOADS:

WEIGHT = 271 LB
HORIZONTAL FORCE (E_h) = 3.96 W_p = 1073 LB
VERTICAL FORCE (E_v) = 0.44 W_p = 119 LB

BOLT FORCES:

TENSION (T)

$$T_u = \frac{70188''\#(5.315'')}{85} + \frac{(1.2(271\#) + 119\#)}{6\ \text{BOLTS}} = 4463\ \text{LB/BOLT (MAX)}$$

COMPRESSION (C)

$$C_u = \frac{70188''\#(5.315'')}{85} - \frac{(0.9(271\#) - 119\#)}{6\ \text{BOLTS}} = 4368\ \text{LB/BOLT (MAX)}$$

SHEAR (V)

$$V_u = \frac{1073\#}{6\ \text{BOLTS}} + \frac{4810''\#(5.315'')}{170} = 329\ \text{LB/BOLT (MAX)}$$
(PER AISC J3.7, LESS THAN 20% STRESS)

BENDING (M)

$M_{act.} = 329\#(4.976''/2) = 819''\text{-}\#$

$M_{XX} = 1073\#(45.5'') + (1.2(271\#) + 119\#)48.1'' = 70{,}188''\#$
$M_{ZZ} = 1073\#(45.5'') + (1.2(271\#) + 119\#)48.1'' = 70{,}188''\#$
$M_{YY} = 100\#(48.1'') = 4810''\#$

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:

$I_{x\text{-}x} = 85\ \text{in.}^4$
$I_{z\text{-}z} = 85\ \text{in.}^4$
$I_{y\text{-}y} = 170\ \text{in.}^4$

BOLT PROPERTIES:

F_y = 105 ksi : F_u= 125 ksi, d = 0.533" : ϕ = 0.90
$Z = d^3/6 = (0.533)^3/6 = 0.0252\ \text{in.}^3$
A_g= 0.2231 in.^2, A_b = 0.312
r = 0.1333 in.
KL/r = 1.2(4.976")/0.1333 = 44.8
M_n = 105 ksi (0.0252 in.^3) = 2646$''\text{-}\#$

$M_{STR} = \phi M_n = (0.9)(2646''\text{-}\#) = 2381''\text{-}\#$
T_{STR} = 21,938 lb. (AISC Eq J3-2)
C_{STR} = 15,501 lb. (AISC Eq E3-1)

COMBINED STRESS CHECK:

COMPRESSION: $\frac{C}{C_{STR}} + \frac{8}{9}\left(\frac{M}{M_{STR}}\right) = 0.59 < 1.00$ ∴ OK

TENSION: $\frac{T}{T_{STR}} + \frac{8}{9}\frac{M}{M_{STR}} = 0.51 < 1.00$ ∴ OK

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For indications, contraindications, warnings, precautions, potential adverse effects and patient counseling information, see the package insert or contact your local representative; visit www.zimmerbiomet.com for additional product information.

Manufacturer:
Ondal Medical Systems of America, Inc.
540 Eastpark Court, Suite A
Sandston, VA 23150 • USA

Ondal Medical Systems GmbH
Wellastraße 6
36088 Hünfeld Germany
+49(0)6652/81-0
https://www.ondal.com/en/home/

Distributed By:
Zimmer Surgical, Inc.
200 West Ohio Avenue
Dover, Ohio 44622 USA
(800) 830-0970
www.ZimmerBiomet.com

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