

RESPIRATORY GATING FOR SCANNERS (RGSC) PRODUCT PLANNING GUIDE



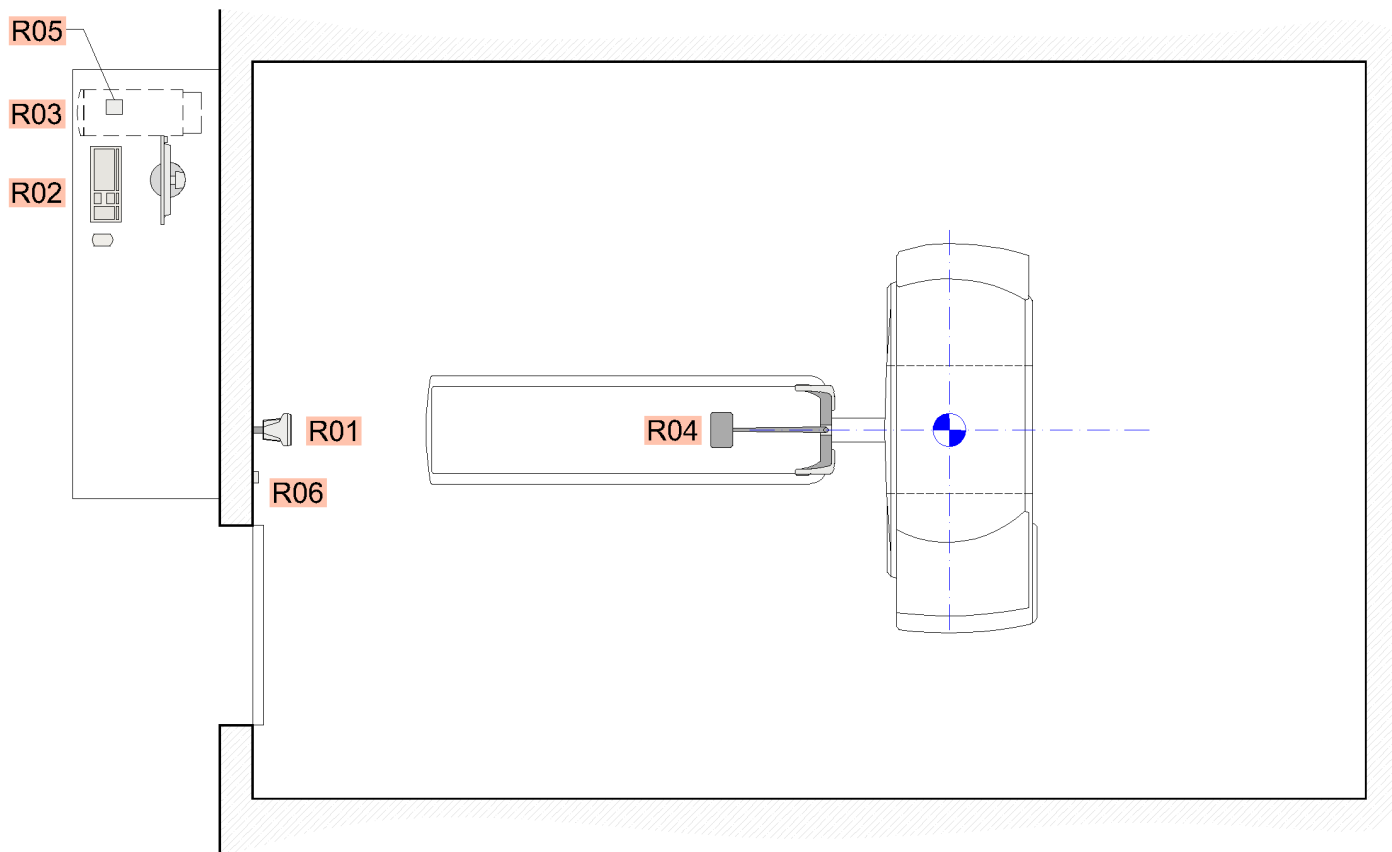


Figure 1-2 Typical Scanner Room Layout with RGSC System and VCD

Table 1-1 RGSC Components			
R01	RGSC Camera	R05	VCD Charging Station (<i>optional</i>)
R02	RGSC Console	R06	WLAN Access Point (WAP) (<i>optional</i>)
R03	RGSC Cabinet	R07	Connector Interface Box (<i>not shown</i>)
R04	Visual Coaching Device (<i>optional</i>)	R08	Couch Mount Camera Cable (<i>not shown</i>)

1.1 COMPATIBILITY



Check the RGSC Compatibility Matrix for system compatibility then confirm the compatibility of the specific scanner model with the vendor.

1.2 REFERENCES

These support reference documents and other more detailed documents are available from the Varian Planning Department or your Varian PM.

- [1] Varian RGSC Pre-Installation Checklist
- [2] RGSC Customer Release Notes (CRN)
- [3] RGSC Compatibility Matrix



2 VARIAN SYSTEM

2.1 BASE SYSTEM COMPONENTS

The following are the base RGSC system components:

- RGSC Camera
 - Wall / Ceiling Mount Kit
 - or
 - Camera Couch Mount Kit
- RGSC Console
- RGSC Cabinet
- Marker Block
- Breathing Phantom



Verify the mounting kit sales configuration that was purchased with the final sales order.

2.1.1 RGSC CAMERA

The RGSC camera has two available mounting configurations, a wall/ceiling kit or a couch-mount kit. For more details on mounting options, see [3.1 Mounting Methods](#).



The RGSC camera has a reference point, indicated by the red dot in [Figure 2-1](#), which is used for positioning, see [3.1.1 Wall-Mount, Ceiling-Mount](#) for more information.

Table 2-1 Camera Weight		
Description	kg	lb
RGSC Camera	1.05	2.3

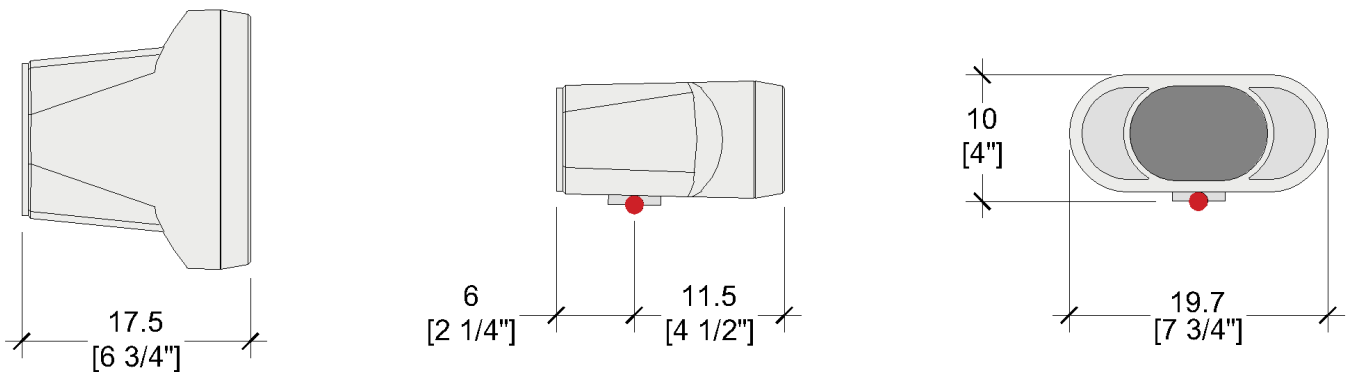


Figure 2-1 RGSC Camera and Reference Point





Figure 2-6 CCM with Camera



Figure 2-7 Connector Interface Box

Table 2-4 CCM Component Weights and Sizes				
Description	kg	W x L x H (cm)	lb	W x L x H (in)
CCM (including camera)	4.0	20 x 20 x (44 – 64)	8.8	8" x 8" x (1'-6" – 2'-2")
Connector Interface Box	0.93	18 x 24 x 9	2.0	7" x 9 1/2" x 3 1/2"

CCM CAMERA CABLE

The cable connects the CCM to the Connector Interface Box, see [Table 2-10 RGSC System Cables](#) and [3.4.4 Cable Containment](#).

- Cable diameter – 1.5cm [5/8"]
- Bend radius – 12cm [4 3/4"]

Table 2-5 CCM Camera Cable Weight				
Description	kg	Length (m)	lb	Length (ft-in)
CCM Camera Cable	2.64	10m	7.5	32'-8"



The CCM Cable weighs 0.26 kg/m [0.18 lb/ft].



2.1.2 RGSC CONSOLE

Monitor, Keyboard, and Mouse

Table 2-6 RGSC Console Weights and Sizes				
Description	kg	W x L x H (cm)	lb	W x L x H (in)
Monitor	6.4	54 x 22 x (38 – 51)	14.1	21 1/2" x 8 1/2" x (15" – 20")
Keyboard (wired)	n/a	46.7 x 20 x 2.7	n/a	1'-6 1/2" x 8" x 1 1/8"
Mouse (wired)	n/a	7 x 11.7 x 3	n/a	46 x 45 x 64

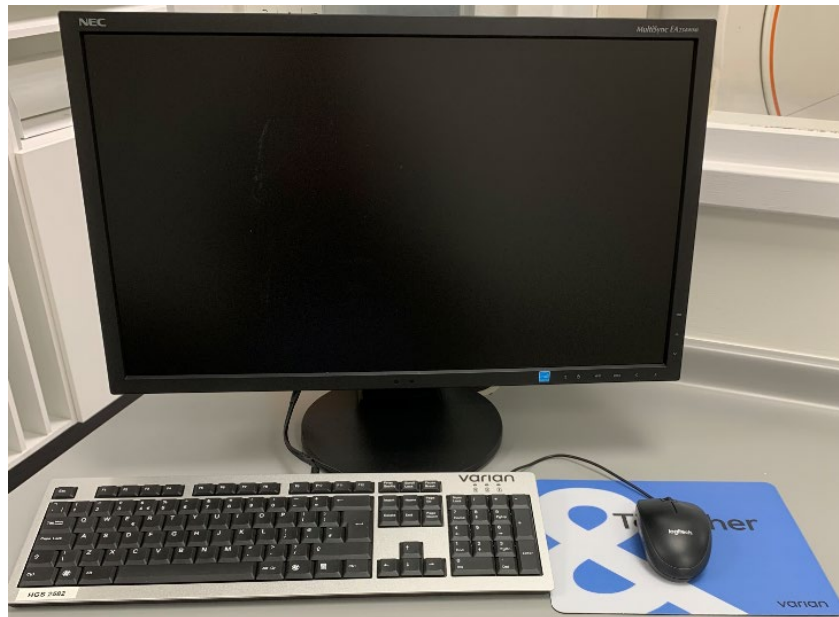


Figure 2-8 Monitor, Keyboard and Mouse

2.1.3 RGSC CABINET

The RGSC cabinet contains the RGSC workstation, Real-Time Node (RTN), a Juniper Firewall, and a Network Switch.

Table 2-7 RGSC Cabinet Weights and Sizes				
Description	kg	W x L x H (cm)	lb	W x L x H (in)
RGSC Cabinet	60	29 x 76 x 63	132	11 1/4" x 2'-5 3/4" x 2'-0 1/2"

- The CT interface connection is an HD-Dsub 26 pin, female connector.





Figure 2-9 RGSC Cabinet



Audio prompts are available as an option. The RGSC Cabinet has a 3.5mm output jack (1 vrms full-scale output voltage). If desired, the customer shall provide all wiring, amplification, and speakers.

2.1.4 STANDARD ACCESSORIES

Table 2-8 Standard Accessory Weights and Sizes				
Description	kg	W x L x H (cm)	lb	W x L x H (in)
RGSC Marker Block	0.04	7.7 x 8.7 x 5.3	0.09	3" x 3 1/2" x 2"
Breathing Phantom	0.75	10 x 15 x 10	1.65	4" x 6" x 4"



Figure 2-10 RGSC Marker Block

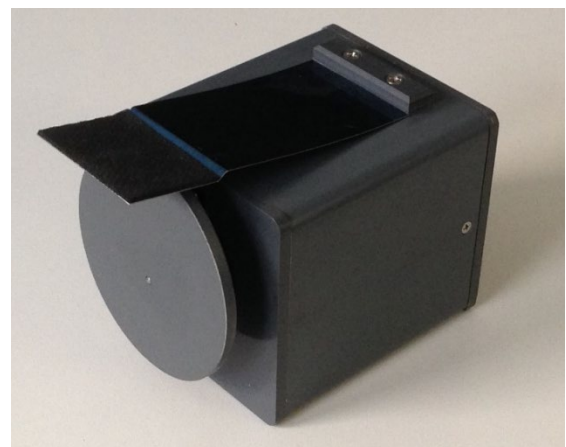


Figure 2-11 Breathing Phantom





Figure 2-13 VCD Battery Pack and Charging Station

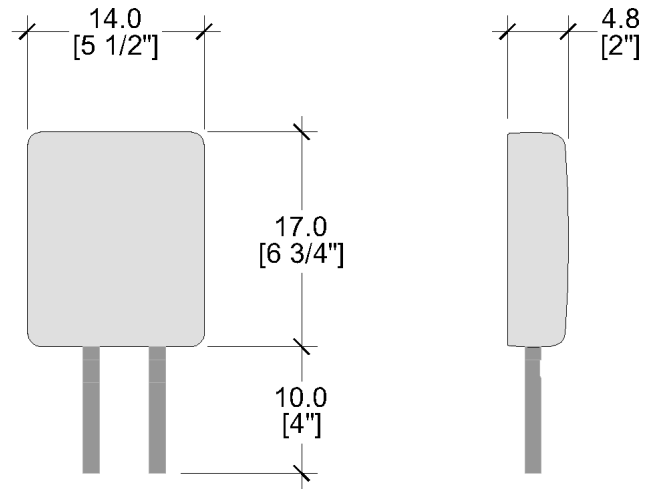


Figure 2-14 WLAN Access Point (WAP)

2.3 CABLES

This section provides the maximum cable length point to point connection between components for the Varian-supplied system cables. Refer to [3.4.4 Cable Containment](#) for maximum containment lengths.

Table 2-10 RGSC System Cables					
Cable Run	Cables Type	Maximum Cable Length	# of Cables	Start	Finish
A[†]	Cat7, CTIF, Ground	35m [114']	3	R03 – RGSC Cabinet	R01 – RGSC Camera
B^{††}					R07 – Connector Interface Box
C	USB, DVI, AC Power	3m [10']	3		R02 – RGSC Console
D^{†††}	Cat6	35m [114']	1		R06 – WAP
E^{††}	Hybrid	10m [33']	1	R07 – Connector Interface Box	R01 – RGSC Camera

† Wall/Ceiling Mount Only

†† CCM Only

††† VCD Option

3 CUSTOMER REQUIREMENTS



NOTICE

It is the Customer's responsibility to determine the quantity, size, and type of mounting hardware required for anchoring the Varian-provided components to the building and to comply with all local, state, and national codes and regulations.

No reflective components, labels, or other objects can be in the field of view of the camera.



The customer is responsible for the safety of the equipment layout within both the Control Area and Treatment Room, particularly for ceiling and wall-mounted equipment.

3.1 MOUNTING METHODS

The RGSC Camera can be mounted to the wall, ceiling, or to the couch depending on the kit ordered. Verify the selected option on the final sales order.

3.1.1 WALL-MOUNT, CEILING-MOUNT



NOTICE

The RGSC Camera reference point must be located in the allowed or optimal mounting area. Refer to [Figure 2-1 RGSC Camera and Reference Point](#).

The camera mount and mounting surface for the wall-, or ceiling-mount must be vibration-free.



The optimal mounting area provides the most visibility of the reflector block for common CT geometries. Mounting outside the optimal area will not degrade system performance but may introduce some limitations in marker visibility.

The angles for the camera mounting area focus at the Camera Alignment Point, refer to [Figure 3-2](#) and [Figure 3-3](#).

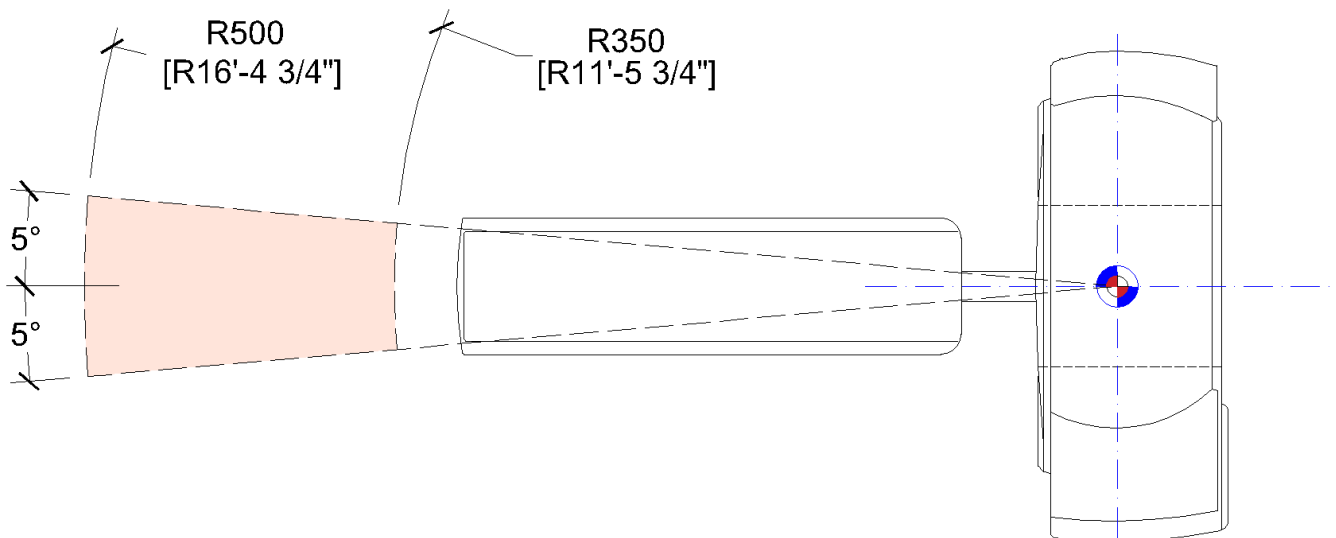


Figure 3-1 Wall or Ceiling Mounting Area – Plan View



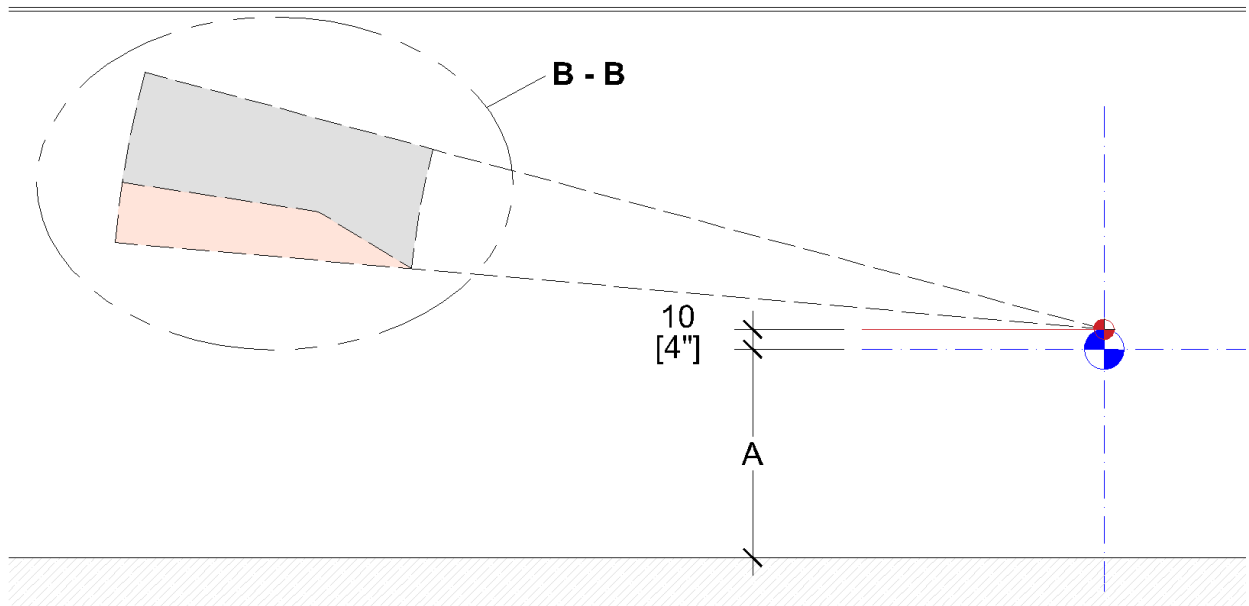


Figure 3-2 Wall or Ceiling Mounting Area – Section View

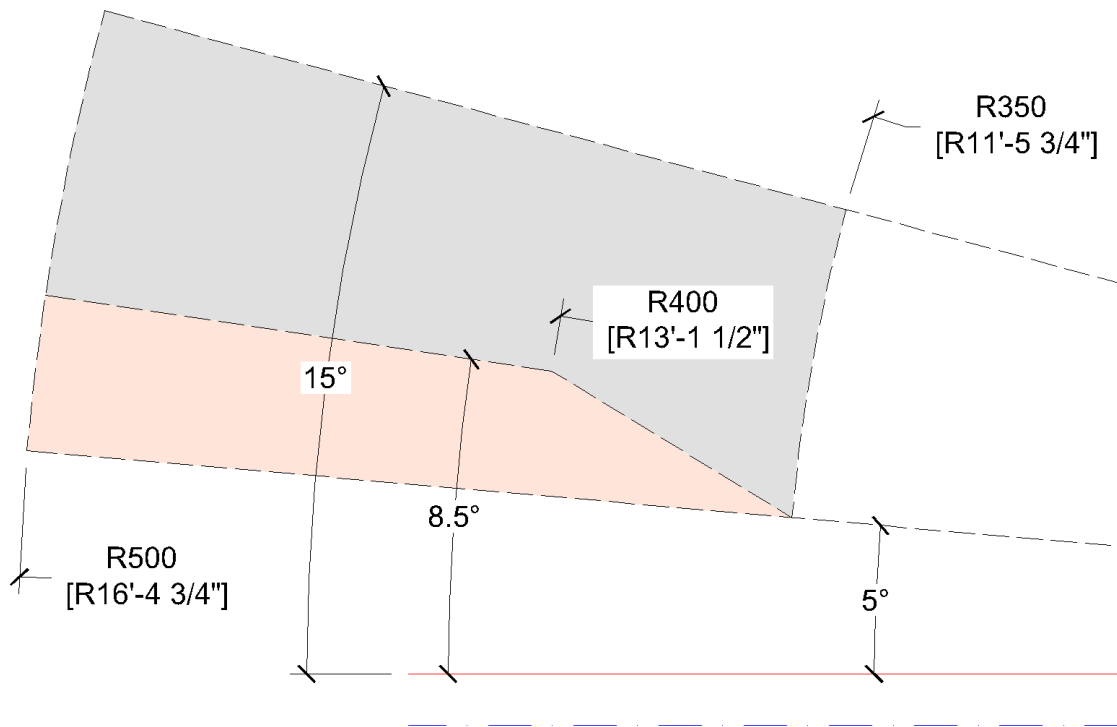





Figure 3-3 Wall or Ceiling Mounting Area – Detail B-B

Table 3-1 Wall- or Ceiling-Mounting Area	
A	Isocenter Height (<i>varies per vendor</i>)
	Camera Alignment Point
	Optimal Mounting Area
	Allowed Mounting Area



3.1.1.1 WALL-MOUNT

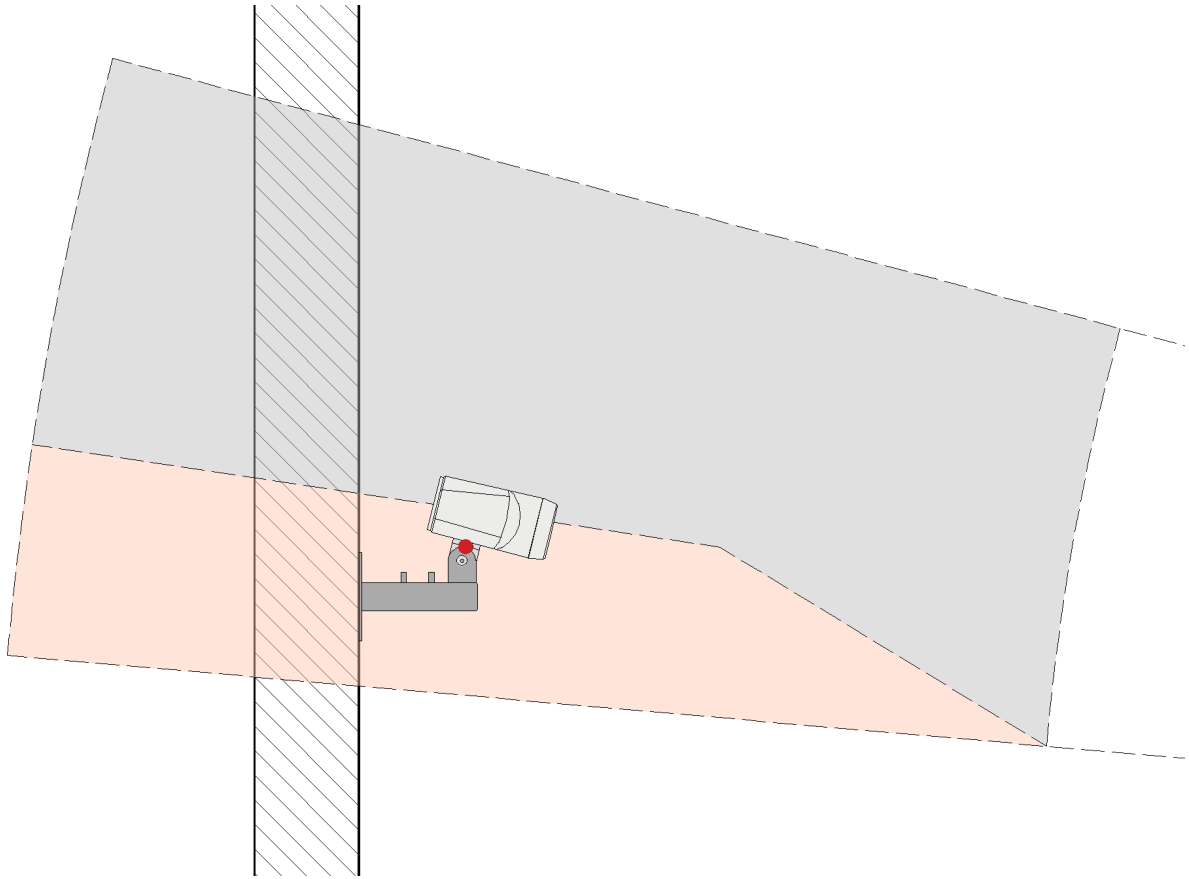


Figure 3-4 Wall-Mounted Camera Location – Detail

Table 3-2 Wall-Mounted Camera References	
●	Camera Reference Point



3.1.1.2 CEILING-MOUNT

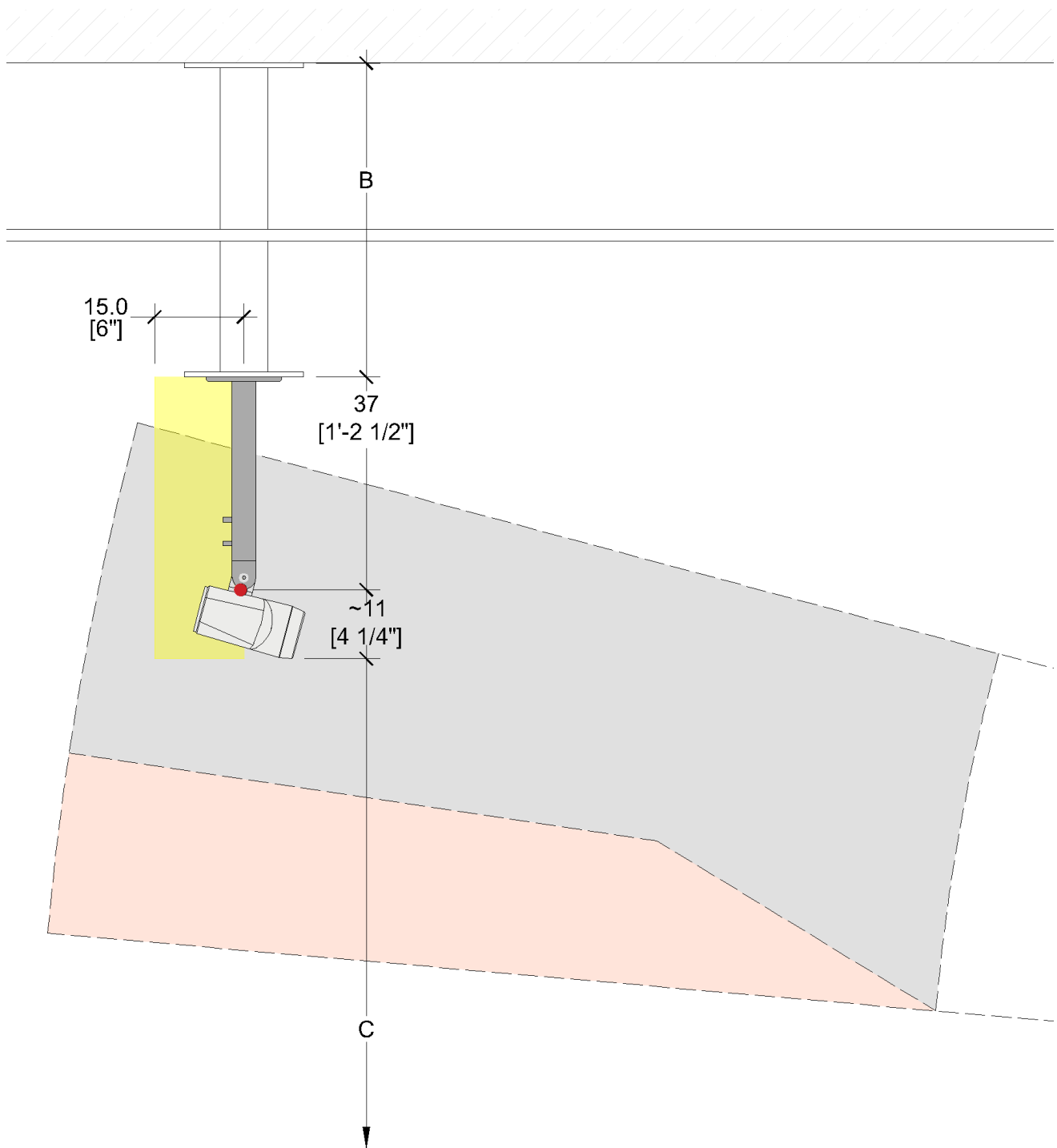


Figure 3-5 Ceiling-Mounted Camera Location - Detail

Table 3-3 Ceiling-Mounted Camera References	
B	Contractor-Provided Support Structure <i>(if needed)</i>
C	To Finished Floor
	Required Service/Cable Clearance



WARNING

The customer must maintain a minimum clearance of at least 203cm [6'-8"] between the finished floor and ceiling-mounted camera.



3.1.2 CAMERA COUCH MOUNT

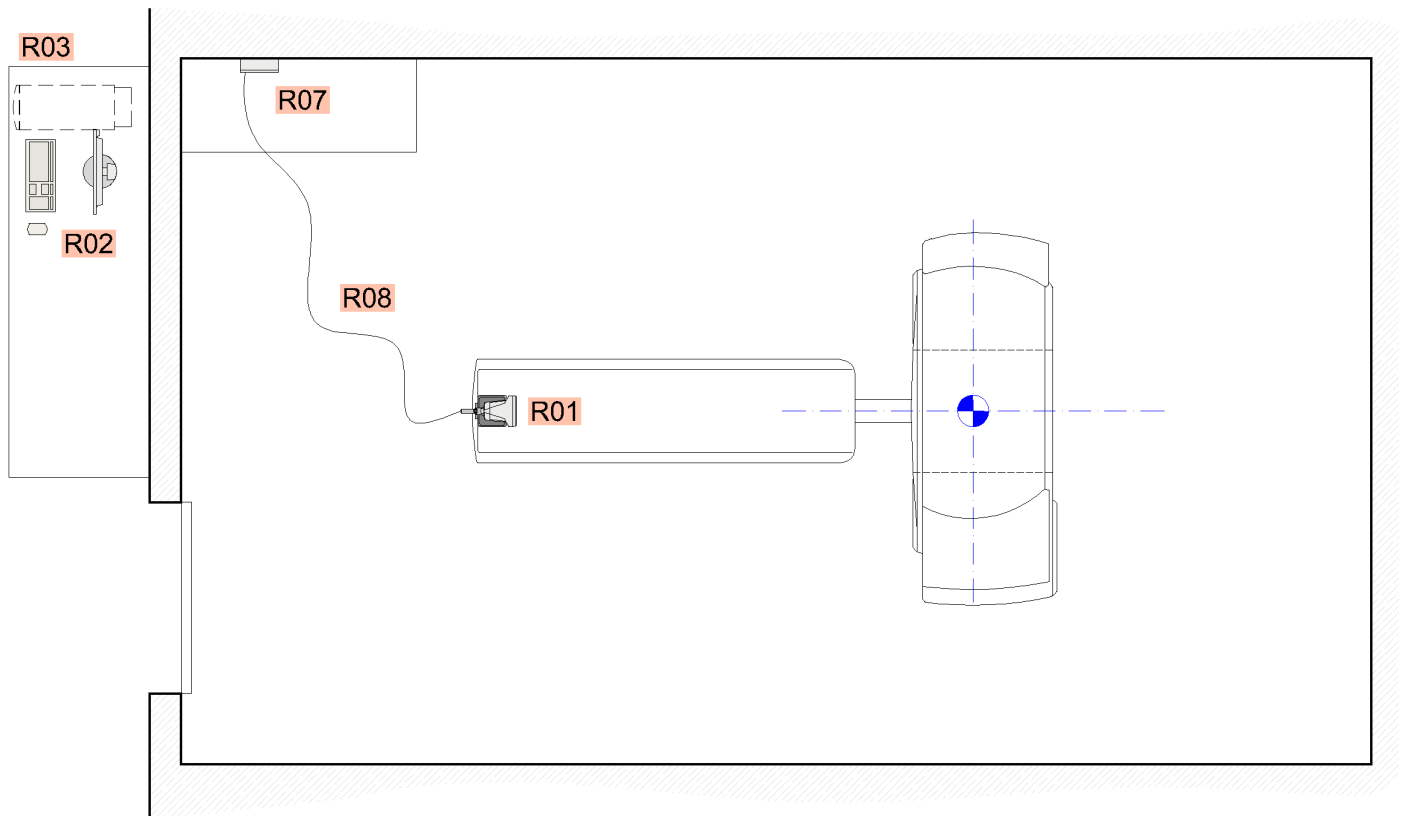


Figure 3-6 Couch Camera Mount – Plan View

It is recommended that the RGSC Connector Interface Box (CIB) is mounted in a cabinet, so the CCM with Camera and CCM Cable can be stored without being disconnected when not in use.



Alternately, the RGSC CIB may be wall-mounted above the false ceiling. This requires a customer-provided and installed ceiling-mounted rail to manage the CCM Cable from laying on the floor during operation.

The CCM and Camera detach from the couch top. Refer to the sizes in [Table 2-4](#) to assist with storage requirements.



CAUTION

The CCM Camera Cable may be a temporary tripping hazard if it lays across the floor during use.

3.2 CONTROL AREA LAYOUT

A typical control area setup is shown below, component positioning may vary based on site-specific conditions, consult with the Customer on the desired layout, and if additional storage space is required.

- Install the RGSC Cabinet in the console area within 3m [10'-0"] from the Monitor.
- The Keyboard and Mouse cables connect to USB ports in the Monitor.



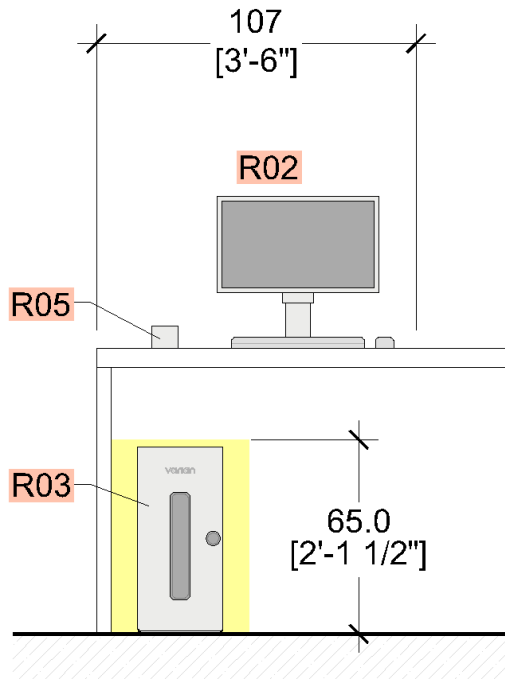


Figure 3-7 Typical Control Console Layout

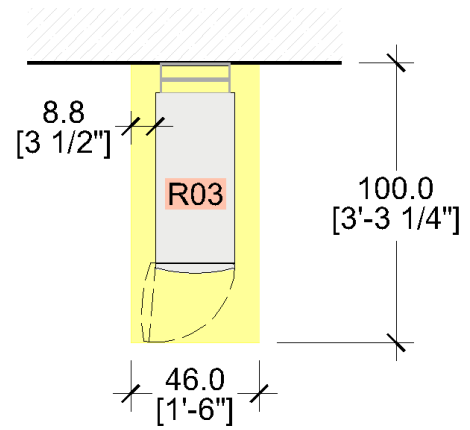


Figure 3-8 RGSC Cabinet Clearance

3.3 VCD

The WAP is part of the optional Visual Coaching Device (VCD) package and is typically mounted on the wall or the false ceiling, along the axis of the couch within the shaded area shown in Figure 3-9.

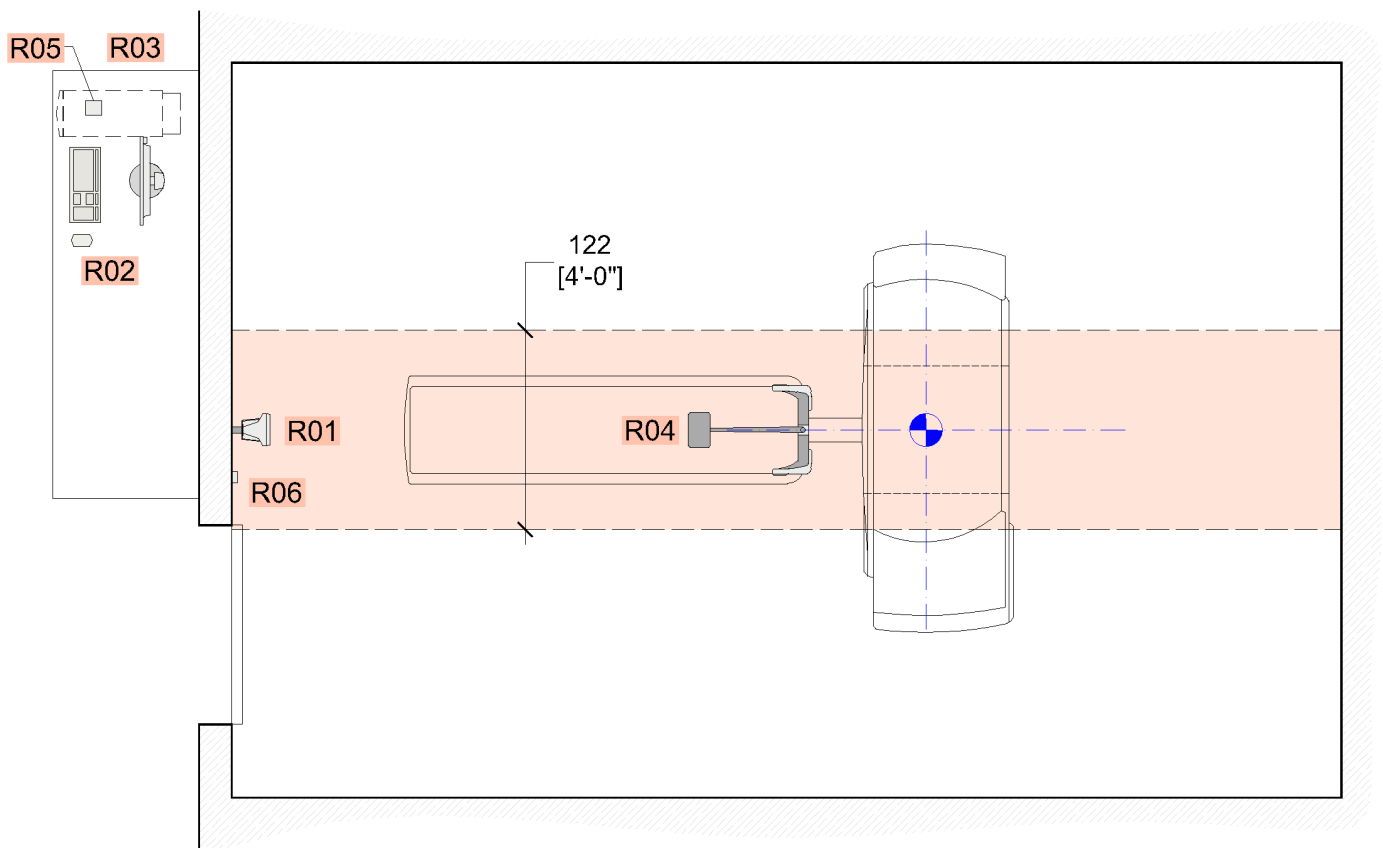


Figure 3-9 WAP Mounting Location



NOTICE

The WAP must be installed below the false ceiling and have a direct line-of-sight with the VCD as it travels into the bore.



The Battery Charging station for the VCD can be located in either the control console area or the CT Scanner treatment room.

The VCD, Base, and Arm detach from the couch top. Refer to the sizes in [Table 2-9](#) to assist with storage requirements.

3.4 ELECTRICAL

3.4.1 POWER REQUIREMENTS

Table 3-4 System Power Requirements	
Description	RGSC Cabinet
Input Voltage	100 – 240 VAC
Input Frequency	50 or 60 Hz ±3 Hz
System Load	240 VA
Mandatory Grounding	See Dedicated Earthing/Ground Requirements



NOTICE

If the mains power to the CT Scanner is on a UPS system, then the power to the RGSC Cabinet receptacle must be on a UPS system (customer-provided).

3.4.2 POWER OUTLETS

All power outlets should be within 100cm [3'-0"] of the component they are supplying.

- (1) Standard power outlet for the RGSC Cabinet (**R03**)
- (1) Standard power outlet for the VCD Charging Station (**R05**)
 - Uses an AC to DC power supply, 5 Vdc, 2.6A maximum



The RGSC Console Monitor, RGSC Camera, and WAP are powered by the RGSC Cabinet.

3.4.3 DEDICATED EARTHING/GROUND REQUIREMENTS

The RGSC Cabinet requires an independent Ground/Protective Earth (G/PE) conductor. Terminate the G/PE conductor with an 8 mm [3/8"] diameter ring lug at the rear of the RGSC Cabinet.

The dedicated G/PE must be common to power outlet ground for the RGSC Cabinet listed in [3.4.2 Power Outlets](#).



CAUTION

The G/PE conductor must meet or exceed local code requirements but no smaller than 6 mm² [8 AWG].

Connect to facility ground, do not use water supply piping for ground.





Contact the CT or PET-CT vendor for additional grounding requirements

3.4.4 CABLE CONTAINMENT



NOTICE

The customer is responsible for ensuring that the cable installation meets applicable local codes and requirements.

This may affect the choice of cable routes, the number of conduits/ducts, specifications of mains power and data cables, and the choice of installation locations of system components.

The customer shall provide conduits or raceway ducts for all system cables, as described in this section.

System cables are not plenum rated.

System cables shall not be permanently installed through a walking path.

- Terminate conduits with insulating bushings or similar means to protect cables from abrasion.
- All conduits shall be smooth-walled, corrugated conduits are not acceptable.
- Conduit bends shall have a radius no less than 6 times the conduit's diameter.
- There shall be no more than three 90-degree bends per conduit (or equivalent).
- Allowance should be made for the storage of excess cable, due to the use of standard lengths.
- Reference [Table 2-10 RGSC System Cables](#) for maximum cable lengths.

Table 3-5 RGSC System Cables				
Cable Run	Minimum Conduit Size Ø	Maximum Run Length	Start (From)	Finish (To)
A†	50mm [2"]	30m [100']	R03 – RGSC Cabinet	R01 – RGSC Camera
B††				R07 – Connector Interface Box
C	n/a	n/a		R02 – RGSC Console
D†††	25mm [1"]	30m [100']		R06 – WAP
E††	n/a	10m [33']	R07 – Connector Interface Box	R01 – RGSC Camera

† Wall/Ceiling Mount only

†† CCM only

††† VCD Option





The cable conduit/duct route must be shorter than the maximum cable length. Provide excess cable at each end for connection and service with a minimum of 3m [10'-0"] at the RGSC Cabinet.

The interface cable between the CT Scanner and RGSC Cabinet is customer-provided, ordered from the CT or PET/CT vendor.

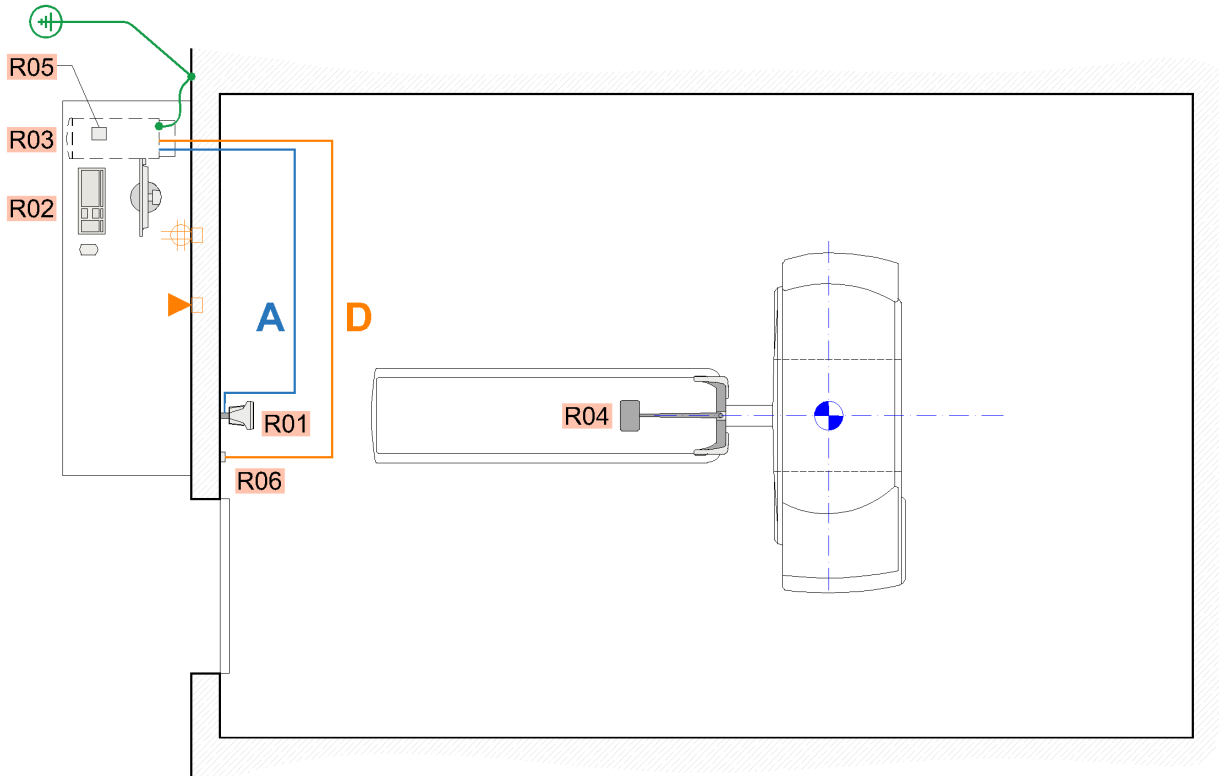


Figure 3-10 Generic Wall Mount Containment Layout

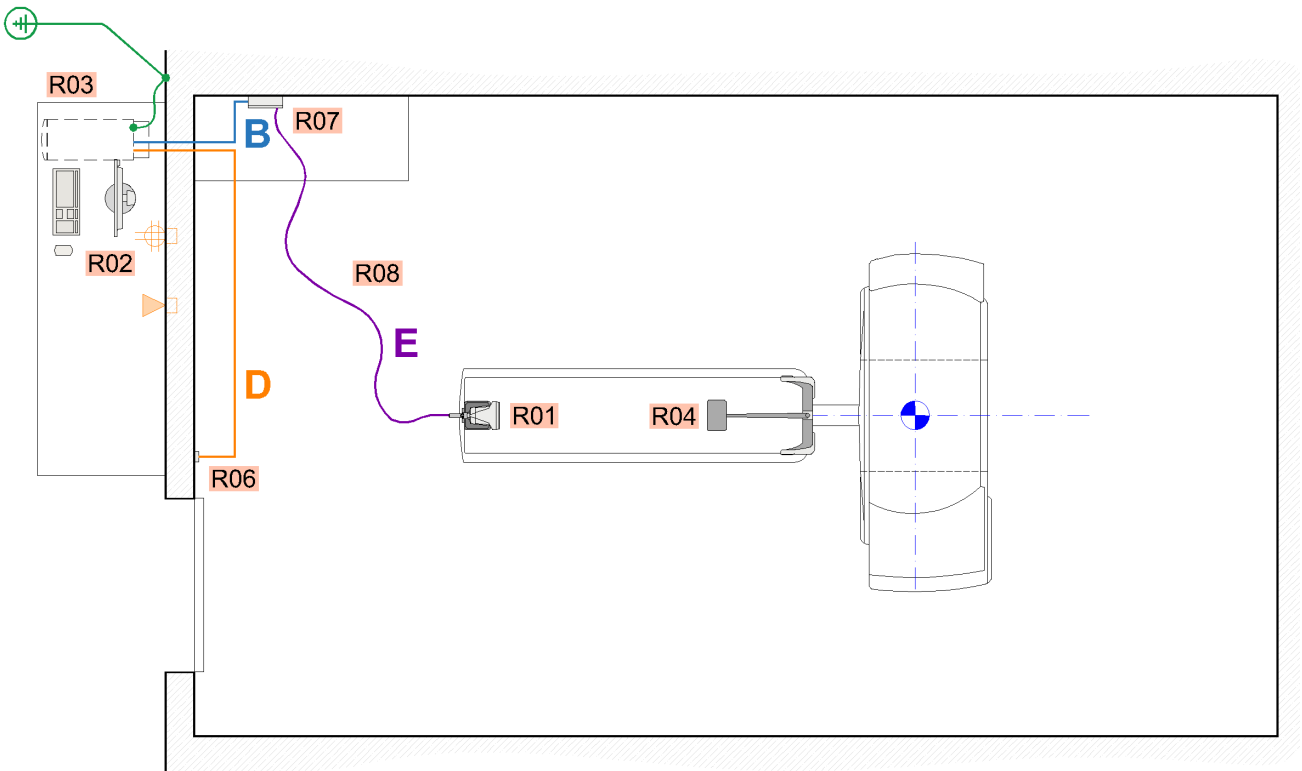


Figure 3-11 Generic Couch Mount Containment Layout



3.4.5 NETWORK

- (1) Network outlet (RJ-45) near the RGSC Cabinet.
- Cat 5e cable (minimum), Cat 6 (recommended).
- Bandwidth 100Mbps, full duplex 100BASE-T (minimum), 1Gbit/s or higher (recommended).
- The RJ-45 jack must meet TIA/EIA-568-A wiring pattern.
- Varian recommends isolating the Oncology domain from the Enterprise Network.
- The RGSC Cabinet requires a static IP address.
- Refer to Varian network configuration guide - MICAP, contact Varian PM for document details.

3.5 ENVIRONMENTAL SPECIFICATIONS

- Ambient Temperature Range 16° to 27°C [60° to 80°F]
- Humidity Range 30% to 75% Relative Humidity, non-condensing

3.5.1 VENTILATION



Changes in the airflow intensity, direction, and temperature between the RGSC Single Camera and the reflector block can lead to an increased noise level for the reflector block position measurement.

Nearby sources of air (e.g. air conditioning units, heater, ventilator) need to be considered when selecting the RGSC camera mounting option and mounting position.

It may also be required that the sources of the air have to be adapted or turned off during the usage of RGSC to get an acceptable noise level.

Description	W	BTU/Hr
R03 – RGSC Cabinet	240	819



4 PROJECT MANAGEMENT

4.1 RESPONSIBILITIES

All pre-installation dates for Varian deliverables and milestones are scheduled by the Varian PM, based on an agreement between the customer and the Varian PM and communications with Varian Planning and Sales. The Varian PM will communicate regularly with the customer throughout all phases of the project.

The Varian PM is available to help answer questions during the site preparation and typically will perform a Pre-Installation site inspection approximately 10 days before the install date to verify 100% completion as defined by the [1] Varian RGSC Pre-Installation Checklist.

4.2 OBJECTIVES

The items listed below must be completed before the Final Inspection can be performed by Varian and the equipment is released for delivery. Varian's installation timeline is based on these items being completed. The complete [1] Varian RGSC Pre-Installation Checklist can be provided by the Varian PM on request.

- The treatment room and control areas are finished to a clinical standard and are dust-free with no other construction trades or installers having access.
- MICAP survey has been completed and submitted.
- A live hospital network (internet access) is available.
- All electrical requirements are completed including live permanent power, cable containment, and grounding.
- The ceiling support post is installed, if required (see [Figure 3-5](#)).



4.3 RGSC INSTALLATION

Sub Project No.	1	This document's primary purpose is to provide an overview of the roles and responsibilities of Varian and the Customers appointed contractors during the installation. It should be read in conjunction with the PPG-GS. If you have any doubts, then ask the Varian PM for clarification.		
Task Name	RGSC System Installation			
Task Overview	Install and calibrate the RGSC system			
Prerequisites	<ul style="list-style-type: none"> • All containment is available • All outlets are installed, tested, and live. • Delivery has been taken for the RGSC System 			
Responsibilities	Task	Varian	Customer	
	Install wall or ceiling mount support		X	
	Install Interface box		X	
	Install cameras and peripherals	X		
	Replace ceiling tiles		X	
	Connection of RGSC and CT, and testing		X	
	Calibration	X		
	Acceptance	X	X	
Duration	4 days			
Customer Supplied Resources & Materials	IT connection to the hospital network Suitable fixings for wall and ceiling mounts Physicist for acceptance CT interface cable to RGSC Cabinet CT vendor engineer for connection Qualified hospital personnel to operate the CT			
Results	Accepted system			
Acceptance	Acceptance document IPA-GS			



APPENDIX A SHIPPING INFORMATION

1 SHIPPING WEIGHTS AND SIZES

Description	Metric		Imperial	
	Weight (kg)	H x W x D (cm)	Weight (Lb)	H x W x D (in)
RGSC System	116	128 x 120 x 80	256	50 x 47 x 31

