

GE Healthcare

# SmartStep Installation

Operating Documentation



2345629-100  
Revision: 6

# Effectivity

The information in this manual applies to the following CT and PET/CT Scanners:

LightSpeed 2.X (4-Slice)

HiSpeed QX/i (r-Slice MDAS)

LightSpeed 3.X (4/8-Slice)

LightSpeed 4.X (16-Slice)

Discovery ST (4/8/16-Slice PET)

LightSpeed 5.X (LS16 & Pro16)

BrightSpeed 5.X

Discovery VCT (PET)

LightSpeed 7.X (VCT)

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# **LEGAL NOTES**

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# IMPORTANT PRECAUTIONS

## LANGUAGE

<p><b>WARNING</b> (EN)</p>	<p>This service manual is available in English only.</p> <ul style="list-style-type: none"> <li>• If a customer's service provider requires a language other than english, it is the customer's responsibility to provide translation services.</li> <li>• Do not attempt to service the equipment unless this service manual has been consulted and is understood.</li> <li>• Failure to heed this warning may result in injury to the service provider, operator or patient from electric shock, mechanical or other hazards.</li> </ul>
<p><b>ПРЕДУПРЕЖДЕНИЕ</b> (BG)</p>	<p>Това упътване за работа е налично само на английски език.</p> <ul style="list-style-type: none"> <li>• Ако доставчикът на услугата на клиента изиска друг език, задължение на клиента е да осигури превод.</li> <li>• Не използвайте оборудването, преди да сте се консултирали и разбрали упътването за работа.</li> <li>• Неспазването на това предупреждение може да доведе до нараняване на доставчика на услугата, оператора или пациента в резултат на токов удар, механична или друга опасност.</li> </ul>
<p><b>警告</b> (ZH-CN)</p>	<p>本维修手册仅提供英文版本。</p> <ul style="list-style-type: none"> <li>? 如果客户的维修服务人员需要非英文版本，则客户需自行提供翻译服务。</li> <li>? 未详细阅读和完全理解本维修手册之前，不得进行维修。</li> <li>? 忽略本警告可能对维修服务人员、操作人员或患者造成电击、机械伤害或其他形式的伤害。</li> </ul>
<p><b>警告</b> (ZH-HK)</p>	<p>本服務手冊僅提供英文版本。</p> <ul style="list-style-type: none"> <li>? 倘若客戶的服務供應商需要英文以外之服務手冊，客戶有責任提供翻譯服務。</li> <li>? 除非已參閱本服務手冊及明白其內容，否則切勿嘗試維修設備。</li> <li>? 不遵從本警告或會令服務供應商、網絡供應商或病人受到觸電、機械性或其他危險。</li> </ul>
<p><b>警告</b> (ZH-TW)</p>	<p>本維修手冊僅有英文版。</p> <ul style="list-style-type: none"> <li>? 若客戶的維修廠商需要英文版以外的語言，應由客戶自行提供翻譯服務。</li> <li>? 請勿試圖維修本設備，除非 您已查閱並瞭解本維修手冊。</li> <li>? 若未留意本警告，可能導致維修廠商、操作員或病患因觸電、機械或其他危險而受傷。</li> </ul>
<p><b>UPOZORENJE</b> (HR)</p>	<p>Ovaj servisni priručnik dostupan je na engleskom jeziku.</p> <ul style="list-style-type: none"> <li>• Ako davatelj usluge klijenta treba neki drugi jezik, klijent je dužan osigurati prijevod.</li> <li>• Ne pokušavajte servisirati opremu ako niste u potpunosti proitali i razumjeli ovaj servisni priručnik.</li> <li>• Zanimarite li ovo upozorenje, može doći do ozljede davatelja usluge, operatera ili pacijenta uslijed strujnog udara, mehaničkih ili drugih rizika.</li> </ul>

<b>VÝSTRAHA</b> (CS)	<p>Tento provozní návod existuje pouze v anglickém jazyce.</p> <ul style="list-style-type: none"><li>• V případě, že externí služba zákazníkům potřebuje návod v jiném jazyce, je zajištění překladu do odpovídajícího jazyka úkolem zákazníka.</li><li>• Nesnažte se o údržbu tohoto zařízení, aniž byste si přečetli tento provozní návod a pochopili jeho obsah.</li><li>• V případě nedodržování této výstrahy může dojít k poranění pracovníka prodejního servisu, obslužného personálu nebo pacientů vlivem elektrického proudu, respektive vlivem mechanických či jiných rizik.</li></ul>
<b>ADVARSEL</b> (DA)	<p>Denne servicemanual findes kun på engelsk.</p> <ul style="list-style-type: none"><li>• Hvis en kundes tekniker har brug for et andet sprog end engelsk, er det kundens ansvar at sørge for oversættelse.</li><li>• Forsøg ikke at servicere udstyret uden at læse og forstå denne servicemanual.</li><li>• Manglende overholdelse af denne advarsel kan medføre skade på grund af elektrisk stød, mekanisk eller anden fare for teknikeren, operatøren eller patienten.</li></ul>
<b>WAARSCHUWING</b> (NL)	<p>Deze onderhoudshandleiding is enkel in het Engels verkrijgbaar.</p> <ul style="list-style-type: none"><li>• Als het onderhoudspersoneel een andere taal vereist, dan is de klant verantwoordelijk voor de vertaling ervan.</li><li>• Probeer de apparatuur niet te onderhouden alvorens deze onderhoudshandleiding werd geraadpleegd en begrepen is.</li><li>• Indien deze waarschuwing niet wordt opgevolgd, zou het onderhoudspersoneel, de operator of een patiënt gewond kunnen raken als gevolg van een elektrische schok, mechanische of andere gevaren.</li></ul>
<b>HOIATUS</b> (ET)	<p>See teenindusjuhend on saadaval ainult inglise keeles</p> <ul style="list-style-type: none"><li>• Kui klienditeeninduse osutaja nõuab juhendit inglise keelest erinevas keeles, vastutab klient tõlketeenuse osutamise eest.</li><li>• Ärge üritage seadmeid teenindada enne eelnevalt käesoleva teenindusjuhendiga tutvumist ja sellest aru saamist.</li><li>• Käesoleva hoiatuse eiramine võib põhjustada teenuseosutaja, operaatori või patsiendi vigastamist elektrilöögi, mehaanilise või muu ohu tagajärjel.</li></ul>
<b>VAROITUS</b> (FI)	<p>Tämä huolto-ohje on saatavilla vain englanniksi.</p> <ul style="list-style-type: none"><li>• Jos asiakkaan huoltohenkilöstö vaatii muuta kuin englanninkielistä materiaalia, tarvittavan käännöksen hankkiminen on asiakkaan vastuulla.</li><li>• Älä yritä korjata laitteistoa ennen kuin olet varmasti lukenut ja ymmärtänyt tämän huolto-ohjeen.</li><li>• Mikäli tätä varoitusta ei noudateta, seurauksena voi olla huoltohenkilöstön, laitteiston käyttäjän tai potilaan vahingoittuminen sähköiskun, mekaanisen vian tai muun vaaratilanteen vuoksi.</li></ul>

<p><b>ATTENTION</b> (FR)</p>	<p>Ce manuel d'installation et de maintenance est disponible uniquement en anglais.</p> <ul style="list-style-type: none"> <li>• Si le technicien d'un client a besoin de ce manuel dans une langue autre que l'anglais, il incombe au client de le faire traduire.</li> <li>• Ne pas tenter d'intervenir sur les équipements tant que ce manuel d'installation et de maintenance n'a pas été consulté et compris.</li> <li>• Le non-respect de cet avertissement peut entraîner chez le technicien, l'opérateur ou le patient des blessures dues à des dangers électriques, mécaniques ou autres.</li> </ul>
<p><b>WARNUNG</b> (DE)</p>	<p>Diese Serviceanleitung existiert nur in englischer Sprache.</p> <ul style="list-style-type: none"> <li>• Falls ein fremder Kundendienst eine andere Sprache benötigt, ist es Aufgabe des Kunden für eine entsprechende Übersetzung zu sorgen.</li> <li>• Versuchen Sie nicht diese Anlage zu warten, ohne diese Serviceanleitung gelesen und verstanden zu haben.</li> <li>• Wird diese Warnung nicht beachtet, so kann es zu Verletzungen des Kundendiensttechnikers, des Bedieners oder des Patienten durch Stromschläge, mechanische oder sonstige Gefahren kommen.</li> </ul>
<p><b>ΠΡΟΕΙΔΟΠΟΙΗΣΗ</b> (EL)</p>	<p>Το παρόν εγχειρίδιο σέρβις διατίθεται μόνο στα αγγλικά.</p> <ul style="list-style-type: none"> <li>• Εάν ο τεχνικός σέρβις ενός πελάτη απαιτεί το παρόν εγχειρίδιο σε γλώσσα εκτός των αγγλικών, αποτελεί ευθύνη του πελάτη να παρέχει τις υπηρεσίες μετάφρασης.</li> <li>• Μην επιχειρήσετε την εκτέλεση εργασιών σέρβις στον εξοπλισμό αν δεν έχετε συμβουλευτεί και κατανοήσει το παρόν εγχειρίδιο σέρβις.</li> <li>• Αν δεν προσέξετε την προειδοποίηση αυτή, ενδέχεται να προκληθεί τραυματισμός στον τεχνικό σέρβις, στο χειριστή ή στον ασθενή από ηλεκτροπληξία, μηχανικούς ή άλλους κινδύνους.</li> </ul>
<p><b>FIGYELMEZTETÉS</b> (HU)</p>	<p>Ezen karbantartási kézikönyv kizárólag angol nyelven érhető el.</p> <ul style="list-style-type: none"> <li>• Ha a vevő szolgáltatója angoltól eltérő nyelvre tart igényt, akkor a vevő felelőssége a fordítás elkészítése.</li> <li>• Ne próbálja elkezdeni használni a berendezést, amíg a karbantartási kézikönyvben leírtakat nem értelmezték.</li> <li>• Ezen figyelmeztetés figyelmen kívül hagyása a szolgáltató, működtető vagy a beteg áramütés, mechanikai vagy egyéb veszélyhelyzet miatti sérülését eredményezheti.</li> </ul>
<p><b>AÐVÖRUN</b> (IS)</p>	<p>Þessi þjónustuhandbók er aðeins fánleg á ensku.</p> <ul style="list-style-type: none"> <li>• Ef að þjónustuveitandi viðskiptamanns þarfnast annas tungumáls en ensku, er það skylda viðskiptamanns að skaffa tungumálaþjónustu.</li> <li>• Reynið ekki að afgreiða tækið nema að þessi þjónustuhandbók hefur verið skoðuð og skilin.</li> <li>• Brot á sinna þessari aðvörun getur leitt til meiðsla á þjónustuveitanda, stjórnanda eða sjúklings frá raflosti, vélrænu eða öðrum áhættum.</li> </ul>
<p><b>AVVERTENZA</b> (IT)</p>	<p>Il presente manuale di manutenzione è disponibile soltanto in lingua inglese.</p> <ul style="list-style-type: none"> <li>• Se un addetto alla manutenzione richiede il manuale in una lingua diversa, il cliente è tenuto a provvedere direttamente alla traduzione.</li> <li>• Procedere alla manutenzione dell'apparecchiatura solo dopo aver consultato il presente manuale ed averne compreso il contenuto.</li> <li>• Il mancato rispetto della presente avvertenza potrebbe causare lesioni all'addetto alla manutenzione, all'operatore o ai pazienti provocate da scosse elettriche, urti meccanici o altri rischi.</li> </ul>

<p><b>警告</b> (JA)</p>	<p>このサービスマニュアルには英語版しかありません。                  ? サービスを担当される業者が英語以外の言語を要求される場合、翻訳作業はその業者の責任で行うものとさせていただきます。                  ? このサービスマニュアルを熟読し理解せずに、装置のサービスを行わないでください。                  ? この警告に従わない場合、サービスを担当される方、操作員あるいは患者さんが、感電や機械的又はその他の危険により負傷する可能性があります。</p>
<p><b>경고</b> (KO)</p>	<p>본 서비스 매뉴얼은 영어로만 이용하실 수 있습니다 .                  ? 고객의 서비스 제공자가 영어 이외의 언어를 요구할 경우 , 번역 서비스를 제공하는 것은 고객의 책임입니다 .                  ? 본 서비스 매뉴얼을 참조하여 숙지하지 않은 이상 해당 장비를 수리하려고 시도하지 마십시오 .                  ? 본 경고 사항에 유의하지 않으면 전기 쇼크 , 기계적 위험 , 또는 기타 위험으로 인해 서비스 제공자 , 사용자 또는 환자에게 부상을 입힐 수 있습니다 .</p>
<p><b>BRDINJUMS</b> (LV)</p>	<p>Šī apkopes rokasgrāmata ir pieejama tikai angļu valodā.                  • Ja klienta apkopes sniedzējam nepieciešama informācija citā valodā, klienta pienākums ir nodrošināt tulkojumu.                  • Neveiciet aprīkojuma apkopi bez apkopes rokasgrāmatas izlasīšanas un saprašanas.                  • Šī brīdinājuma neievērošanas rezultātā var rasties elektriskās strāvas trieciena, mehānisku vai citu faktoru izraisītu traumu risks apkopes sniedzējam, operatoram vai pacientam.</p>
<p><b>ĮSPĖJIMAS</b> (LT)</p>	<p>Šis eksploatavimo vadovas yra tik anglų kalba.                  • Jei kliento paslaugų tiekėjas reikalauja vadovo kita kalba – ne anglų, suteikti vertimo paslaugas privalo klientas.                  • Nemėginkite atlikti įrangos techninės priežiūros, jei neperskaitėte ar nesupratote šio eksploatavimo vadovo.                  • Jei nepaisysite šio įspėjimo, galimi paslaugų tiekėjo, operatoriaus ar paciento sužalojimai dėl elektros šoko, mechaninių ar kitų pavojų.</p>
<p><b>ADVARSEL</b> (NO)</p>	<p>Denne servicehåndboken finnes bare på engelsk.                  • Hvis kundens serviceleverandør har bruk for et annet språk, er det kundens ansvar å sørge for oversettelse.                  • Ikke forsøk å reparere utstyret uten at denne servicehåndboken er lest og forstått.                  • Manglende hensyn til denne advarselen kan føre til at serviceleverandøren, operatøren eller pasienten skades på grunn av elektrisk støt, mekaniske eller andre farer.</p>
<p><b>OSTRZEŻENIE</b> (PL)</p>	<p>Niniejszy podręcznik serwisowy dostępny jest jedynie w języku angielskim.                  • Jeśli serwisant klienta wymaga języka innego niż angielski, zapewnienie usługi tłumaczenia jest obowiązkiem klienta.                  • Nie próbować serwisować urządzenia bez zapoznania się z niniejszym podręcznikiem serwisowym i zrozumienia go.                  • Niezastosowanie się do tego ostrzeżenia może doprowadzić do obrażeń serwisanta, operatora lub pacjenta w wyniku porażenia prądem elektrycznym, zagrożenia mechanicznego bądź innego.</p>

<p><b>ATENÇÃO</b> (PT-BR)</p>	<p>Este manual de assistência técnica encontra-se disponível unicamente em inglês.</p> <ul style="list-style-type: none"><li>• Se outro serviço de assistência técnica solicitar a tradução deste manual, caberá ao cliente fornecer os serviços de tradução.</li><li>• Não tente reparar o equipamento sem ter consultado e compreendido este manual de assistência técnica.</li><li>• A não observância deste aviso pode ocasionar ferimentos no técnico, operador ou paciente decorrentes de choques elétricos, mecânicos ou outros.</li></ul>
<p><b>ATENÇÃO</b> (PT-PT)</p>	<p>Este manual de assistência técnica só se encontra disponível em inglês.</p> <ul style="list-style-type: none"><li>• Se qualquer outro serviço de assistência técnica solicitar este manual noutro idioma, é da responsabilidade do cliente fornecer os serviços de tradução.</li><li>• Não tente reparar o equipamento sem ter consultado e compreendido este manual de assistência técnica.</li><li>• O não cumprimento deste aviso pode colocar em perigo a segurança do técnico, do operador ou do paciente devido a choques elétricos, mecânicos ou outros.</li></ul>
<p><b>ATENȚIE</b> (RO)</p>	<p>Acest manual de service este disponibil doar în limba engleză.</p> <ul style="list-style-type: none"><li>• Dacă un furnizor de servicii pentru clienți necesită o altă limbă decât cea engleză, este de datoria clientului să furnizeze o traducere.</li><li>• Nu încercați să reparați echipamentul decât ulterior consultării și înțelegerii acestui manual de service.</li><li>• Ignorarea acestui avertisment ar putea duce la rănirea depanatorului, operatorului sau pacientului în urma pericolelor de electrocutare, mecanice sau de altă natură.</li></ul>
<p><b>ОСТОРОЖНО!</b> (RU)</p>	<p>Данное руководство по техническому обслуживанию представлено только на английском языке.</p> <ul style="list-style-type: none"><li>• Если сервисному персоналу клиента необходимо руководство не на английском, а на каком-то другом языке, клиенту следует самостоятельно обеспечить перевод.</li><li>• Перед техническим обслуживанием оборудования обязательно обратитесь к данному руководству и поймите изложенные в нем сведения.</li><li>• Несоблюдение требований данного предупреждения может привести к тому, что специалист по техобслуживанию, оператор или пациент получит удар электрическим током, механическую травму или другое повреждение.</li></ul>
<p><b>UPOZORENJE</b> (SR)</p>	<p>Ovo servisno uputstvo je dostupno samo na engleskom jeziku.</p> <ul style="list-style-type: none"><li>• Ako klijentov serviser zahteva neki drugi jezik, klijent je dužan da obezbedi prevodilačke usluge.</li><li>• Ne pokušavajte da opravite uređaj ako niste proitali i razumeli ovo servisno uputstvo.</li><li>• Zanemarivanje ovog upozorenja može dovesti do povređivanja servisera, rukovaoca ili pacijenta usled strujnog udara ili mehaničkih i drugih opasnosti.</li></ul>

<b>UPOZORNENIE</b> (SK)	<p>Tento návod na obsluhu je k dispozícii len v angličtine.</p> <ul style="list-style-type: none"><li>• Ak zákazníkovi poskytovateľ služieb vyžaduje iný jazyk ako angličtinu, poskytnutie prekladateľských služieb je zodpovednosťou zákazníka.</li><li>• Nepokúšajte sa o obsluhu zariadenia, kým si neprečítate návod na obsluhu a neporozumiete mu.</li><li>• Zanedbanie tohto upozornenia môže spôsobiť zranenie poskytovateľa služieb, obsluhujúcej osoby alebo pacienta elektrickým prúdom, mechanické alebo iné ohrozenie.</li></ul>
<b>ATENCION</b> (ES)	<p>Este manual de servicio sólo existe en inglés.</p> <ul style="list-style-type: none"><li>• Si el encargado de mantenimiento de un cliente necesita un idioma que no sea el inglés, el cliente deberá encargarse de la traducción del manual.</li><li>• No se deberá dar servicio técnico al equipo, sin haber consultado y comprendido este manual de servicio.</li><li>• La no observancia del presente aviso puede dar lugar a que el proveedor de servicios, el operador o el paciente sufran lesiones provocadas por causas eléctricas, mecánicas o de otra naturaleza.</li></ul>
<b>VARNING</b> (SV)	<p>Den här servicehandboken finns bara tillgänglig på engelska. .</p> <ul style="list-style-type: none"><li>• Om en kunds servicetekniker har behov av ett annat språk än engelska, ansvarar kunden för att tillhandahålla översättningstjänster.</li><li>• Försök inte utföra service på utrustningen om du inte har läst och förstår den här servicehandboken.</li><li>• Om du inte tar hänsyn till den här varningen kan det resultera i skador på serviceteknikern, operatören eller patienten till följd av elektriska stötar, mekaniska faror eller andra faror.</li></ul>
<b>DIKKAT</b> (TR)	<p>Bu servis kılavuzunun sadece ingilizcesi mevcuttur.</p> <ul style="list-style-type: none"><li>• Eğer müşteri teknisyeni bu kılavuzu ingilizce dışında bir başka lisandan talep ederse, bunu tercüme ettirmek müşteriye düşer.</li><li>• Servis kılavuzunu okuyup anlamadan ekipmanlara müdahale etmeyiniz.</li><li>• Bu uyarıya uyulmaması, elektrik, mekanik veya diğer tehlikelerden dolayı teknisyen, operatör veya hastanın yaralanmasına yol açabilir.</li></ul>

## **DAMAGE IN TRANSPORTATION**

All packages should be closely examined at time of delivery. If damage is apparent, have notation "damage in shipment" written on all copies of the freight or express bill before delivery is accepted or "signed for" by a General Electric representative or a hospital receiving agent. Whether noted or concealed, damage MUST be reported to the carrier immediately upon discovery, or in any event, within 14 days after receipt, and the contents and containers held for inspection by the carrier. A transportation company will not pay a claim for damage if an inspection is not requested within this 14 day period.

To file a report:

- Call 1-800-548-3366 and use option 8.
- Fill out a report on <http://us44hdd21/sctq/InstallFulfill/InstalFulfillment.htm>
- Contact your local service coordinator for more information on this process.

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## **CERTIFIED ELECTRICAL CONTRACTOR STATEMENT**

All electrical Installations that are preliminary to positioning of the equipment at the site prepared for the equipment shall be performed by licensed electrical contractors. In addition, electrical feeds into the Power Distribution Unit shall be performed by licensed electrical contractors. Other connections between pieces of electrical equipment, calibrations and testing shall be performed by qualified GE Medical personnel. The products involved (and the accompanying electrical installations) are highly sophisticated, and special engineering competence is required. In performing all electrical work on these products, GE will use its own specially trained field engineers. All of GE's electrical work on these products will comply with the requirements of the applicable electrical codes.

The purchaser of GE equipment shall only utilize qualified personnel (i.e., GE's field engineers, personnel of third-party service companies with equivalent training, or licensed electricians) to perform electrical servicing on the equipment.

## **IMPORTANT...X-RAY PROTECTION**

X-ray equipment if not properly used may cause injury. Accordingly, the instructions herein contained should be thoroughly read and understood by everyone who will use the equipment before you attempt to place this equipment in operation. The General Electric Company, Medical Systems Group, will be glad to assist and cooperate in placing this equipment in use.

Although this apparatus incorporates a high degree of protection against x-radiation other than the useful beam, no practical design of equipment can provide complete protection. Nor can any practical design compel the operator to take adequate precautions to prevent the possibility of any persons carelessly exposing themselves or others to radiation.

It is important that anyone having anything to do with x-radiation be properly trained and fully acquainted with the recommendations of the National Council on Radiation Protection and Measurements as published in NCRP Reports available from NCRP Publications, 7910 Woodmont Avenue, Room 1016, Bethesda, Maryland 20814, and of the International Commission on Radiation Protection, and take adequate steps to protect against injury.

The equipment is sold with the understanding that the General Electric Company, Medical Systems Group, its agents, and representatives have no responsibility for injury or damage which may result from improper use of the equipment.

Various protective materials and devices are available. It is urged that such materials or devices be used.

## LITHIUM BATTERY CAUTIONARY STATEMENTS

### CAUTION



**Risk of Explosion.**

**Danger of explosion if battery is incorrectly replaced.**

**Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.**

### OMISSIONS & ERRORS

Customers, please contact your GE Sales or Service representatives.

GE personnel, please use the Healthcare PQR Process to report all omissions, errors, and defects in this publication.

# Revision History

Revision	Date	Reason for change
0	06/17/2002	New Manual for SmartStep
1	06/26/2003	Added "HiSpeed QX/i" product name.
2	06/03/2004	Added LS 5.X and DST.
3	11/23/2004	PQR 13026983: Updated Prerequisites.
4	4/10/07	PQR13092807: Chapter 3: Updated information for 7.X VCT systems. Updated front and back covers, warnings section with new information and additional languages, and company name.
5	9/18/08	New Program updates for VCT64 with GOC6. Deleted Theory section. Update prerequisites-Chpt 1 Sec. 3. Updated overview section in Chpt 3 Sec 1. Updated Figure 3-4, Page 40 Sec 2.3, Chpt 4 Sec 2 and 3.
6	9/11/09	New Program updates for BrightSpeed Delight, includes Chapter 4 additiion which defines IPC SmartStep configuration. Updated Language Policy.



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# Preface

## Publication Conventions

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### Section 1.0 Safety & Hazard Information

#### 1.1 Text and Character Representation

Within this publication, different paragraph and character styles have been used to indicate potential hazards. Paragraph prefixes, such as hazard, caution, danger and warning, are used to identify important safety information. Text (Hazard) styles are applied to the paragraph contents that is applicable to each specific safety statement. Words describe the type of potential hazard that may be encountered and are placed immediately before the paragraph it modifies. Safety information will normally include:

- Type of potential Hazard
- Nature of potential injury
- Causative condition
- How to avoid or correct the causative condition

#### EXAMPLES OF HAZARD STATEMENTS USED

It is important that you read and understand hazard statements, and not just ignore them.



#### DANGER

**DANGER IS USED WHEN A HAZARD EXISTS WHICH WILL CAUSE SEVERE PERSONAL INJURY OR DEATH IF INSTRUCTIONS ARE IGNORED. THEY CAN INCLUDE:**

- ELECTROCUTION
- CRUSHING
- RADIATION



#### WARNING

**WARNING IS USED WHEN A HAZARD EXISTS WHICH COULD OR CAN CAUSE SERIOUS PERSONAL INJURY OR DEATH IF INSTRUCTIONS ARE IGNORED. THEY CAN INCLUDE:**


- POTENTIAL FOR SHOCK
- EXPOSED WIRES
- FAILURE TO TAG AND LOCKOUT SYSTEM POWER COULD ALLOW FOR UN-COMMAND MOTION.




#### CAUTION

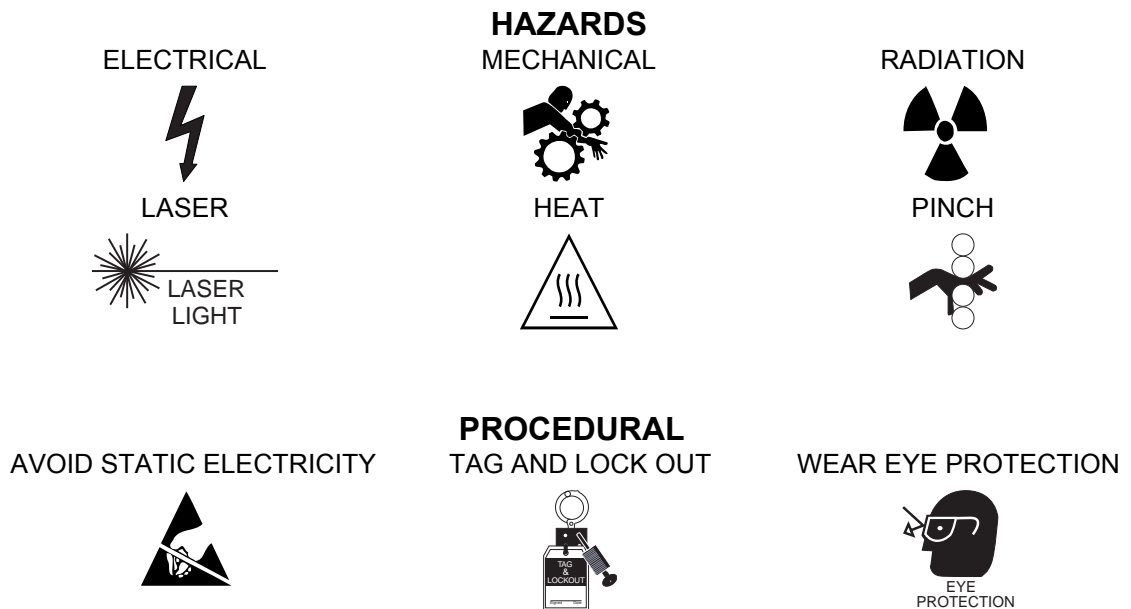
Caution is used when a hazard exists which can or could cause minor injury to self or others if instructions are ignored. They include for example:

- Loss of critical patient data
- Crush or pinch points
- Sharp objects

-  **NOTICE** Notice is used when a hazard is present that can cause property damage but has absolutely no personal injury risk. They can include:
- Disk drive will be destroyed
  - Internal mechanical damage, such as to the x-ray tube
  - Coasting the rotor through resonance.

## 1.2 Graphical Representation

Important information will always be preceded by the exclamation point  contained within a triangle, as seen throughout the Preface chapter. In addition to text, several different graphical icons (symbols) may be used to make you aware of specific types of hazards that could possibly cause harm.



## Section 2.0 Buttons, Switches and Keyboard Inputs (Hard & Soft Keys)

Different character styles are used to indicate actions requiring the reader to press either a hard or soft button, switch or key. Physical hardware, such as buttons and switches, are called hard keys because they are hard wired or mechanical in nature. A keyboard or on/off switch would be a hard key. Software or computer generated buttons are called soft keys because they are software generated. Software driven menu buttons are an example of such keys. Soft and hard keys are represented differently in this publication.

Example: A power switch **ON/OFF** or a keyboard key like **ENTER** is indicated by applying a character style that uses both over and under-lined bold text that is bold. This is a hard key.

Example: Whereas the computer MENU button that you would click with your mouse or touch with your hand uses over and under-lined regular text. This is a soft key.

**END OF SECTION**

# Chapter 1

## Overview

### Section 1.0

#### Hand-Held Controller

During needle biopsies, the Radiologist or Physician controls radiation with the foot switch, and uses the hand-held control (HHC) to view images on an in-room monitor. The HHC also provides alignment light, move-to-scan and cradle micro positioning controls. The Radiologist or Physician also has the option to release HHC control of the cradle, and use the cradle handle to manually position the patient in the scan field of view.

Refer to [Figure 1-1](#) and [Table 1-1](#), on page 20 for a description of each of the HHC push button functions.

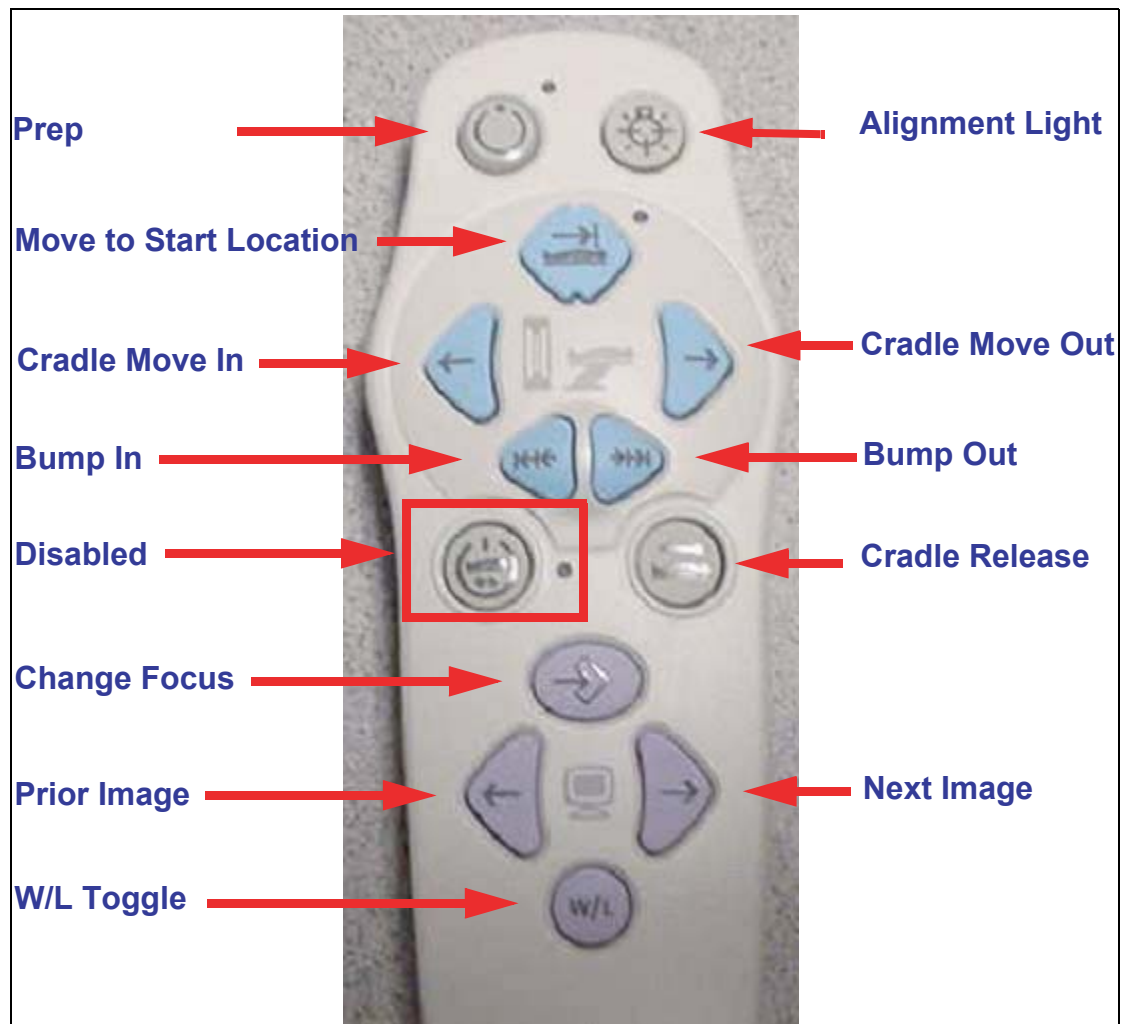











Figure 1-1 HHC Push buttons

**Table 1-1 HHC Push button Functions**

Button Name	Button	Description
Prep		Prepares the system for x-ray acquisitions.
Alignment Light		This button Enables the laser positioning lights.
Move to Start Location		This button positions the cradle to the start location prescribed by you in the SmartStep View/Edit screen.
Cradle Move In		The Cradle Move In button moves the cradle in towards the gantry.
Cradle Move Out		The Cradle Move In button moves the cradle away from the gantry.
Bump In		This moves the cradle a pre-defined bump distance towards the gantry. The bump distance is pre-defined on the View/Edit screen.
Bump Out		This moves the cradle a pre-defined bump distance away from the gantry. The bump distance is pre-defined on the View/Edit screen.
Disabled		This button is disabled. It is not used for SmartStep.
Cradle Release		This is a toggle button. It releases the cradle so it can be moved using the cradle handle. Pressing the button again latches the cradle.

## Section 2.0

### Prerequisites

- Must have all components in B7868SM Smart Step Collector - including software and hardware.
- Must have the correct hardware kit. B7710LM works for all systems other than LightSpeed 5.X, 7.X, DST HP60, and DVCT products.
- Must have B7710LN hardware kit for both PET DST HP60 and all LightSpeed 5.X and 7.X, and LightSpeed VCT 64 with GOC6 products. PET DST includes required additional PET hardware kit.

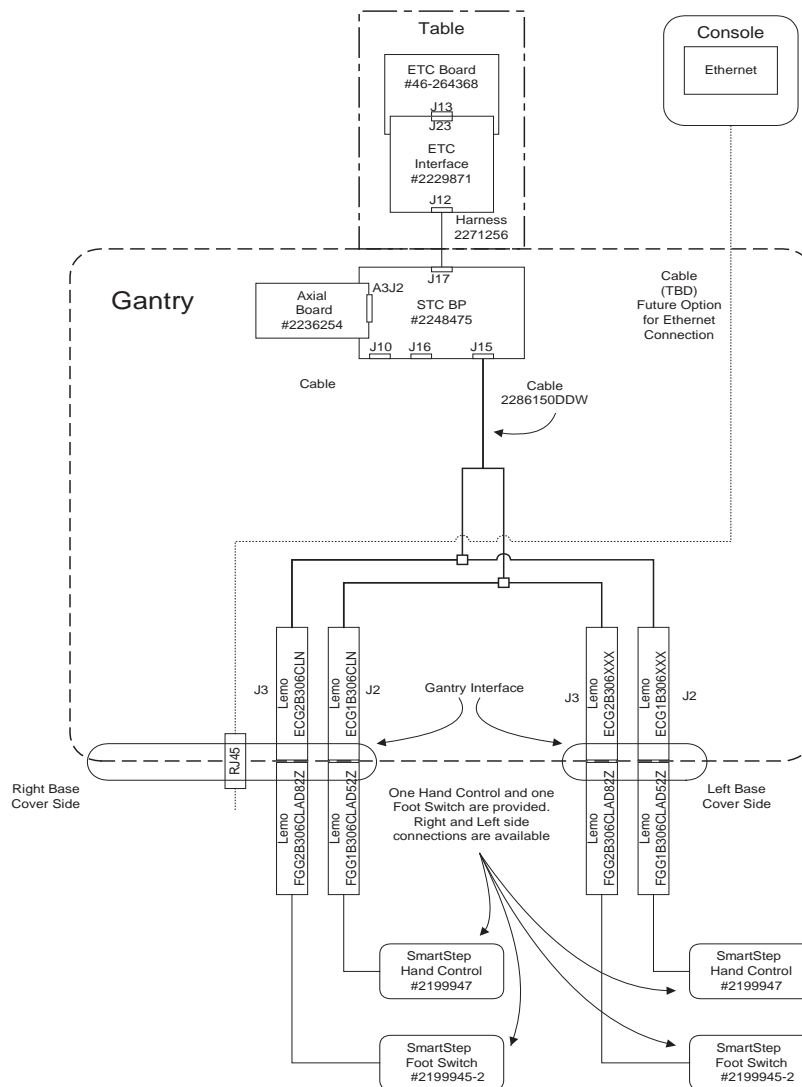


# Chapter 2

## Installation - LS2.X, 3.X, 4.X & PET DST

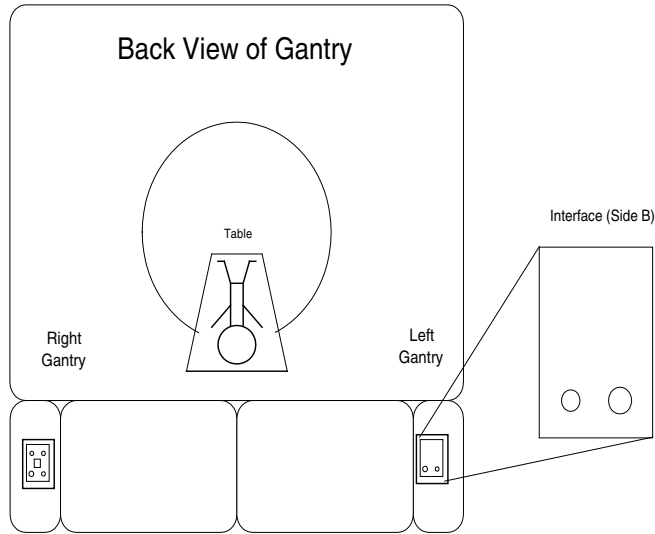
### Section 1.0 Overview

The information in this Chapter applies to LightSpeed 2.X (Plus), LightSpeed 3.X (Ultra) and LightSpeed 4.X (16) CT systems, as well as Discovery ST (w/ 16/8/4-Slice CT Gantry) PET systems. The SmartStep hardware is shipped ready for immediate installation. The following installation procedure describes how to install that hardware on the gantry. See [Figure 2-1](#) for a general layout of cabling and connections. Refer to [Table 2-1](#), on page 24 for a listing of the parts in the kit.



**Figure 2-1 SmartStep Interconnect and Functional Drawing**

See [Figure 2-2](#) for gantry's external connections.



**Figure 2-2 Gantry Connections**

**Table 2-1 2333973 SmartStep Kit Parts List (B7868WP)**

Qty	Part Number	Description
1	2199947	IHHC CT Sonata hand held control (includes support bracket)
1	2199945-2	Foot switch, CT Sonata Foot Switch for H2
1	2286150	Harness, SmartStep cable - bulkhead to STC
1	2288882-2	Bracket, 8 hole bulkhead for SmartStep
1	2288882-5	Bracket, 7 hole bulkhead for SmartStep
1	2288882-3	Bracket, 11 hole bulkhead for SmartStep and Cardiac or Pulmonary
1	46-302200P10	Rating Plate
1	2206664	Cradle Handle
1	2206657	Cradle Pan and Rail Assembly
1	2206663	Hand Held Control Holder
1	2222881-2	SmartStep Software Option Key
6	46-208758P5	Tie Wraps
1	46-328417P4	Screw, Ground
1	46-328432P2	Washer, Lock, Ground
1	46-328430P2	Washer, Flat, Ground
2	2290289-2	Connector Cover, Large
2	2290289	Connector Cover, Small
2	46-328417P74	Connector Cover Screws
1	2345629-100	SmartStep - LightSpeed Plus & HiSpeed QX/i Installation Manual
1	2355108	Cable Adapter

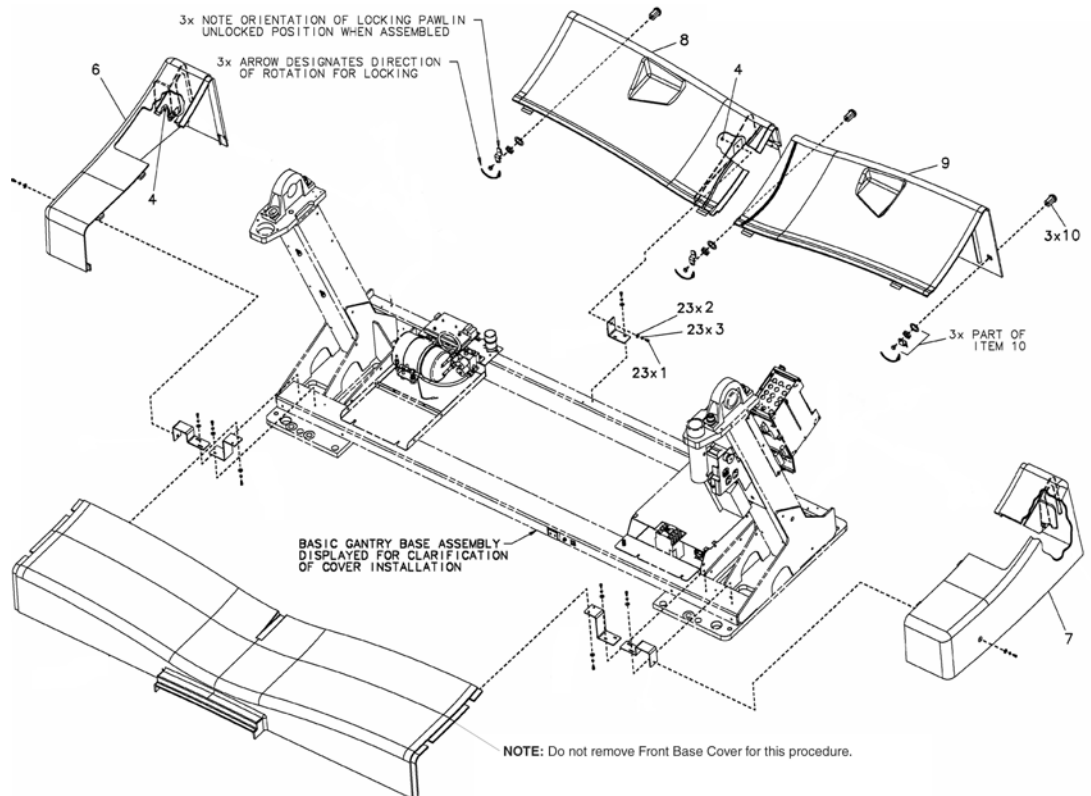
# Section 2.0 Procedure



**DANGER RISK OF ELECTRIC SHOCK. USE PROPER LOCKOUT/TAGOUT PROCEDURES.**

## 2.1 Preparation - Cover Removal

- 1.) Remove the two gantry side covers. Refer to your System Service Manual for any needed instruction.
- 2.) Turn **OFF** all 3 switches (Axial Drive, HVDC, 120 VAC) on the STC backplane.
- 3.) Remove both left and right Gantry side base covers (items 6 & 7, respectively, in [Figure 2-3](#)) and then both rear base covers (items 8 & 9, in [Figure 2-3](#)).



**Figure 2-3 Gantry Base Covers, exploded view**

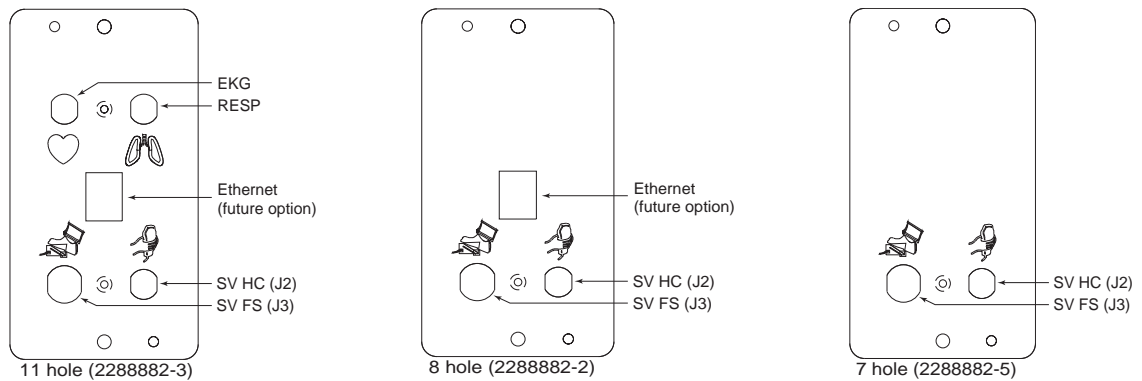
**Note: Do Not remove the front base cover!**

## 2.2 Installation - Faceplates

- 1.) Remove existing faceplates - may be blanks or, if installed, Cardiac Option faceplate.
- 2.) Install the appropriate faceplate (see [Figure 2-4](#)) at indicated location per [Table 2-2](#) using the four nuts removed with the original faceplates (two per faceplate).
- 3.) Install the connector covers to the faceplates using 46-328417P74, 2290289-2, and 2290289 for each side's faceplate.

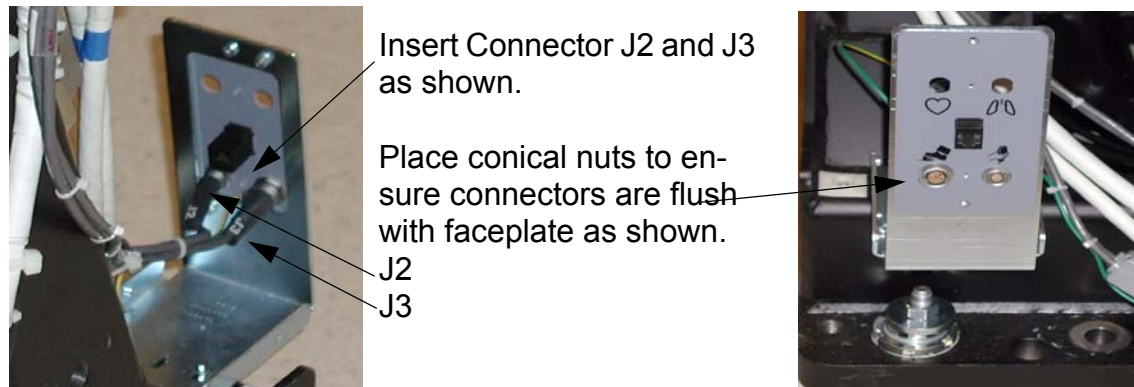
**Table 2-2 Faceplate Configurations**

Faceplate	Options Installed	Location
11 Hole (2288882-3)	Cardiac and SmartStep	STC Side of Gantry (Right)
8 Hole (2288882-2)	SmartStep	STC Side of Gantry (Right)
7 Hole (2288883-5)	Both Configurations	Other Side (Left)

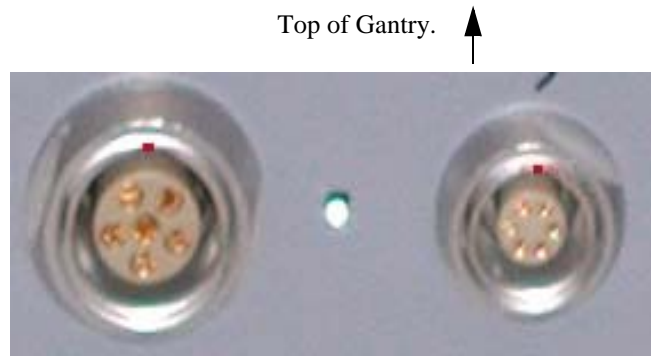


**Figure 2-4 Gantry Base Faceplates**

- 4.) Lay out, but do not yet mount, the included cable (2286150) along the rear cross-tube of the gantry so the connectors can reach both faceplates.
- 5.) Refer to [Figure 2-5](#). Attach the SmartStep cable to the faceplate, as follows:
  - a.) With the outer conical nut removed, insert a lemo connector through the appropriate hole in the faceplate, with the red dot facing UP (see [Figure 2-6](#), on page 27).
  - b.) Adjust the inside conical nut such that enough thread appears through the hole that the external nut can be firmly attached while keeping the connection flush with the faceplate.
  - c.) Repeat for the other three lemo connectors

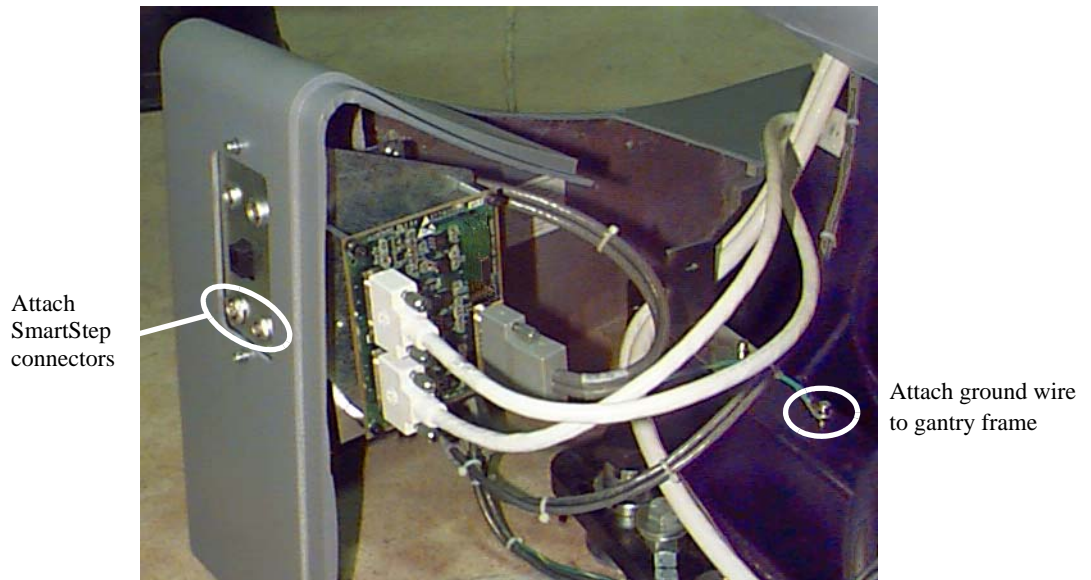


**Figure 2-5 Installing the Lemo Connectors**



**Figure 2-6 Orientation of Connectors**

- 6.) Using the provided M4 screw (46-328417P4), washer (46-328430P2) and lock washer (46-328432P2), attach the SmartStep cable ground wire to the cable tie screw hole on the chassis. Remove paint as necessary to ensure a good electrical connection. See [Figure 2-7](#) for location.



**Figure 2-7 Ground Wire Installation**

- 7.) Route the cables and tie wrap in place as shown in [Figure 2-8](#).

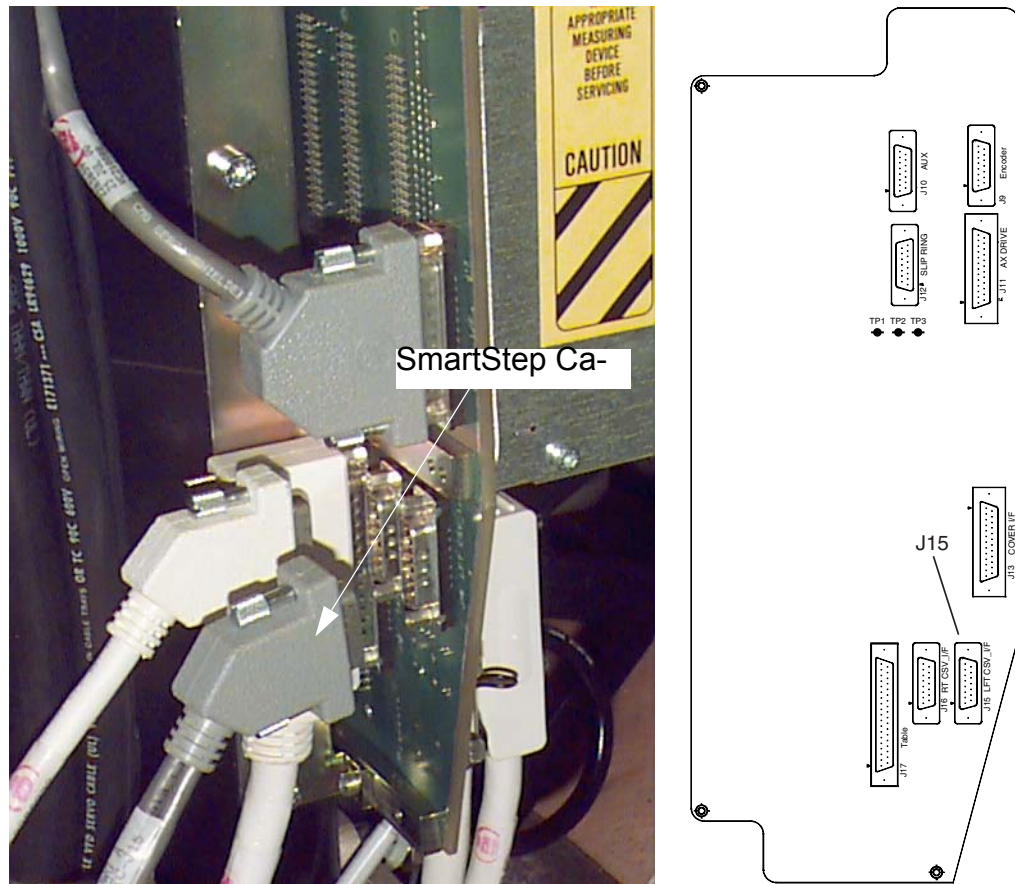


Route cable as shown along the gantry base's rear tube

**Figure 2-8 SmartStep Cable Routing**

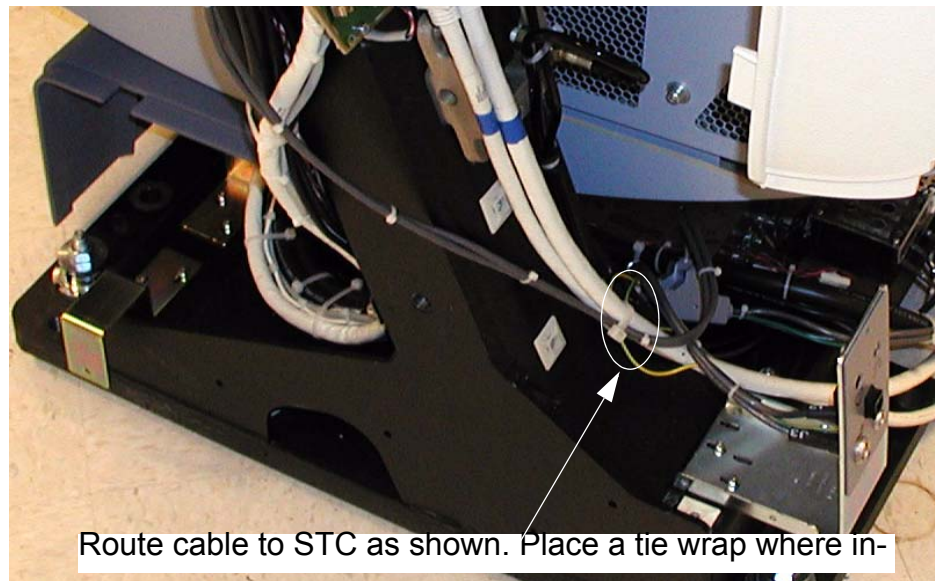
## 2.3 Installation - STC Connections (CT Scanners)

- 1.) Connect SmartStep cable to J15 on the STC backplane. Refer to [Figure 2-9](#), for locating J15.



**Figure 2-9 Locating connectors J15 (grey) on STC backplane**

- 2.) Tie wrap the STC connection cable as shown in [Figure 2-10](#), on page 29. Be sure tie wrap is far enough down on the two cables to allow the base side cover to clear.



---

**Figure 2-10 STC Cable Routing**

## **2.4 Installation - STC Connections (DST Scanners)**

Route Cable to STC as shown ([Figure 2-11](#) - without Gating option, or [Figure 2-12](#) - with Gating option). Place a tie-wrap, where indicated.







# **Chapter 3**

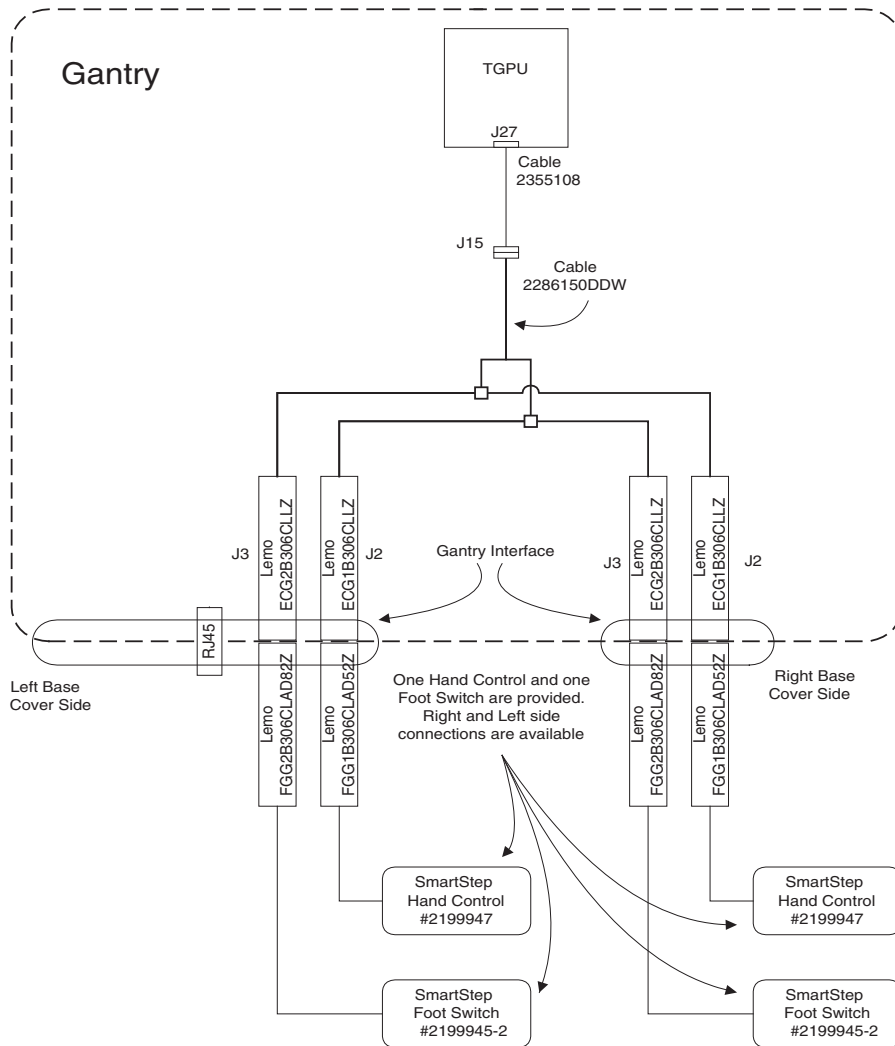
## **Installation - LightSpeed 5.X , 7.X, and VCT 64 with GOC6 (CT and PET)**

---

### **Section 1.0 Overview**

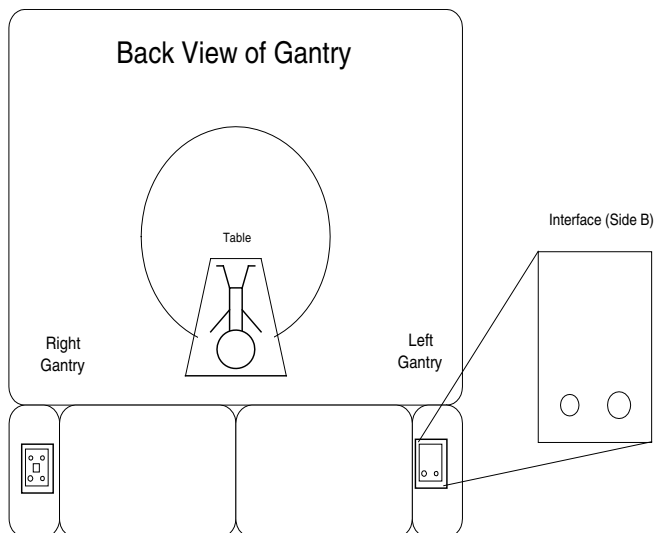
The information in this Chapter applies to LightSpeed 5.X and 7.X CT and PET systems, including LightSpeed 16, LightSpeed Pro16, LightSpeed VCT and VCT64 with GOC6 systems. The information also applies to Discovery ST HP60 and DVCT systems.

The SmartStep hardware is shipped ready for immediate installation. The following installation procedure describes how to install that hardware on the gantry. See [Figure 3-1](#) for a general layout of cabling and connections. Refer to [Table 3-1, on page 35](#) for a listing of the parts in the kit.



**Figure 3-1 SmartStep Interconnect and Functional Drawing (LS 5.X and 7.X)**

See [Figure 3-2](#) for gantry's external connections.



**Figure 3-2 Gantry Connections**

**Table 3-1 2333973 SmartStep Kit Parts List (B7868SM)**

Qty	Part Number	Description
1	2337414	DVD RAM Media, 9.4 GB
1	46-302233P7	Rating Plate Doc
AR	2211224-100	LightSpeed QX/I Options Installation Manual
1	2376773, incl: - 2200583-100 - 2211224-100	Boom-In-A-Room for Linux, includes: - CT/I (Sonata) Upgrade Manual - LightSpeed QX/I Options Installation Manual
1	2333973	SmartStep Kit, Controller and Footswitch

## Section 2.0 Procedure



**DANGER RISK OF ELECTRIC SHOCK. USE PROPER LOCKOUT/TAGOUT PROCEDURES.**

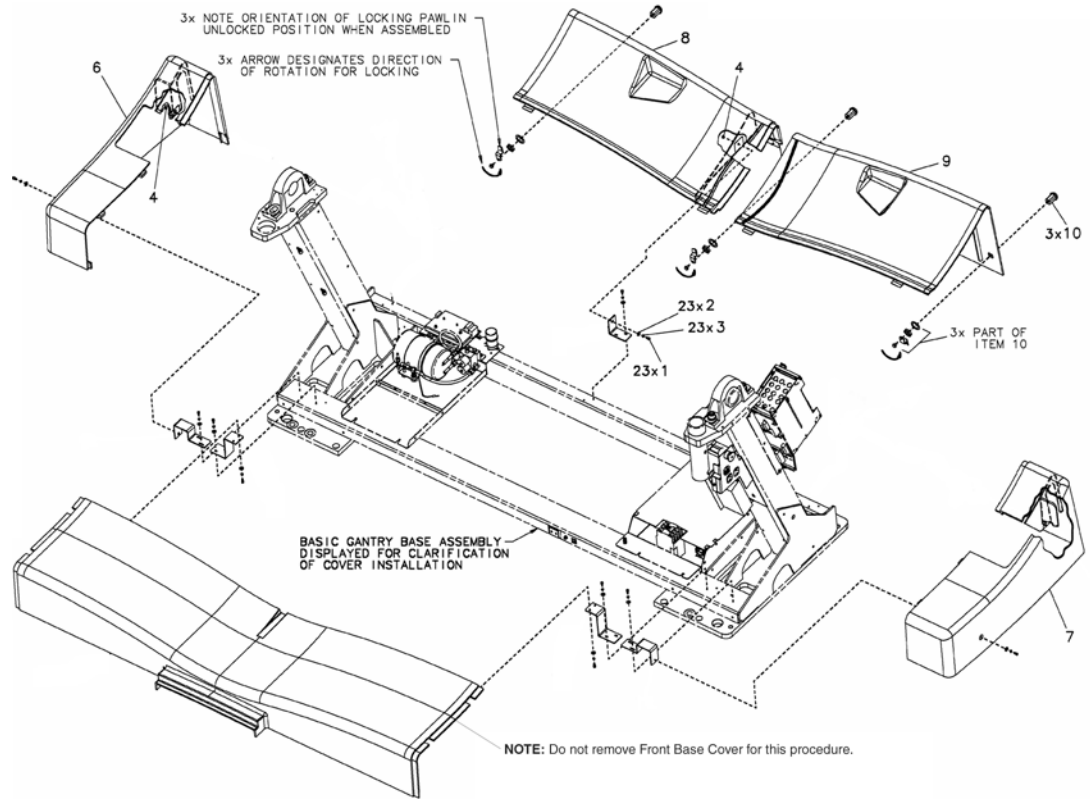
### 2.1 Preparation - Cover Removal

- 1.) Remove the two gantry side covers. Refer to your System Service Manual for any needed instruction.
- 2.) Turn **OFF** all three gantry service switches (Axial Drive, HVDC, 120 VAC).



Figure 3-3 LightSpeed Gantry Service Switches

- 3.) Remove both left and right Gantry side base covers (items 6 & 7, respectively, in [Figure 3-4](#)) and then both rear base covers (items 8 & 9, in [Figure 3-4](#)).



**Figure 3-4 Gantry Base Covers, exploded view of an H2 base. Cover installation is same for gantry procedures.**

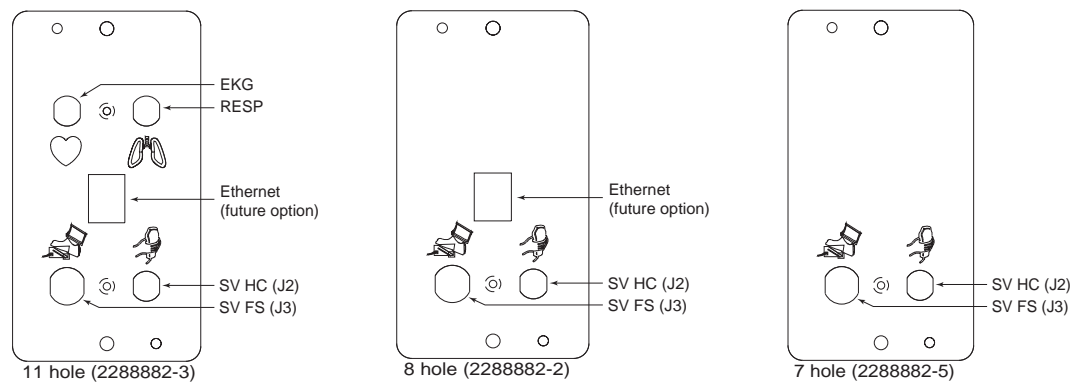
Note: **Do Not remove the front base cover!**

## 2.2 Installation - Faceplates

- 1.) Remove existing faceplates - may be blanks or, if installed, Cardiac Option faceplate.
- 2.) Install the appropriate faceplate (see [Figure 3-5](#)) at indicated location per [Table 3-2](#) using the four nuts removed with the original faceplates (two per faceplate).

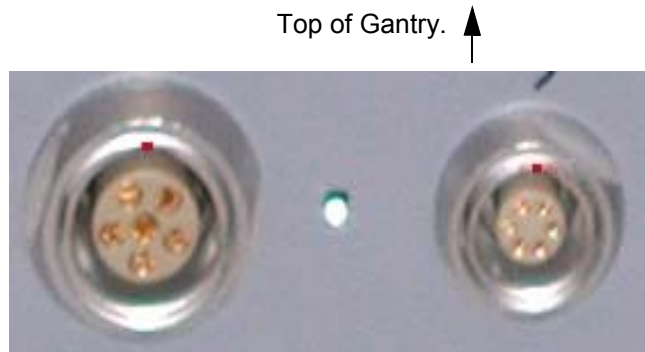
**Table 3-2 Faceplate Configurations**

Faceplate	Options Installed	Location
11 Hole (2288882-3)	Cardiac and SmartStep	MSUB - Left
8 Hole (2288882-2)	SmartStep	MSUB - Left
7 Hole (2288883-5)	Both Configurations	Other Side - Right



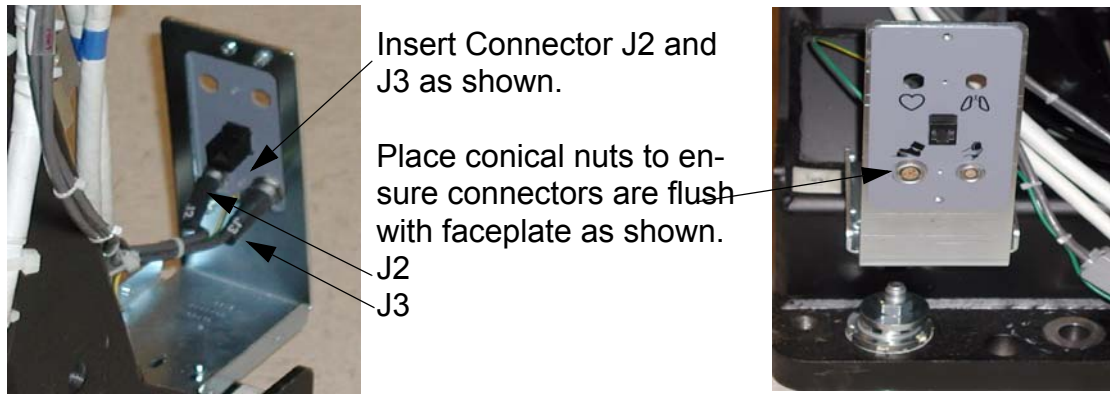
**Figure 3-5 Gantry Base Faceplates**

- 3.) Install the connector covers to the faceplates using 46-328417P74, 2290289-2, and 2290289 for each side's faceplate.
- 4.) Lay out, but do not yet mount, the included cable (2286150) along the rear cross-tube of the gantry so the connectors can reach both faceplates.
- 5.) Refer to [Figure 3-2, on page 34](#). Attach the SmartStep cable to the faceplate, as follows:
  - a.) With the outer conical nut removed, insert a lemo connector through the appropriate hole in the faceplate, with the red dot facing UP (see [Figure 3-6](#)).



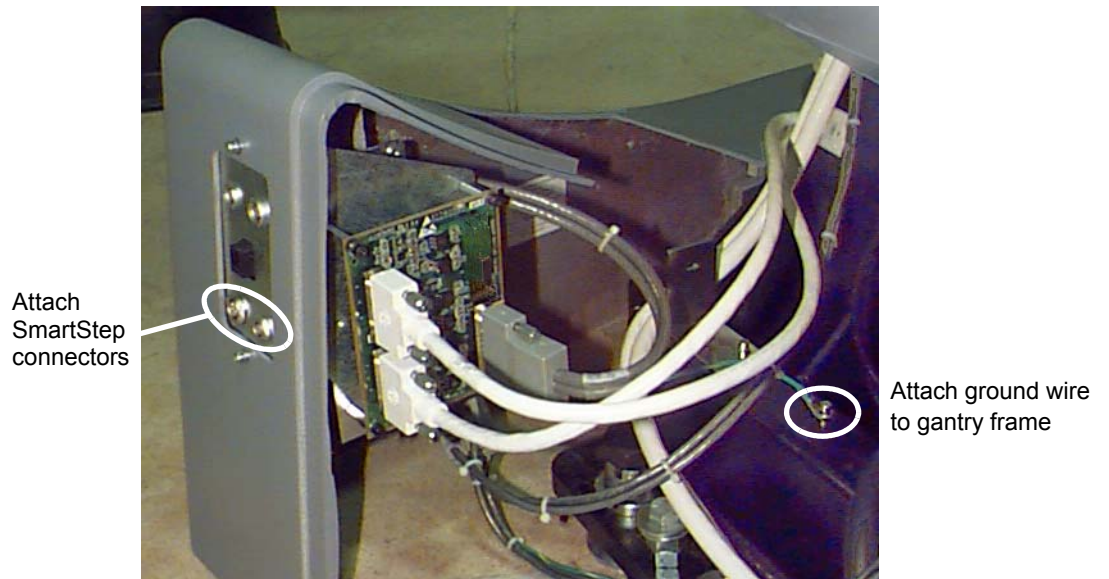
**Figure 3-6 Orientation of Connectors**

- b.) Adjust the inside conical nut such that enough thread appears through the hole that the external nut can be firmly attached while keeping the connection flush with the faceplate.
- c.) Repeat for the other three lemo connectors



**Figure 3-7 Installing the Lemo Connectors**

- 6.) Using the provided M4 screw (46-328417P4), washer (46-328430P2) and lock washer (46-328432P2), attach the SmartStep cable ground wire to the cable tie screw hole on the chassis. Remove paint as necessary to ensure a good electrical connection. See [Figure 3-8](#) for location.



**Figure 3-8 Ground Wire Installation**

- 7.) Route the cables and tie wrap in place as shown in [Figure 3-9](#).

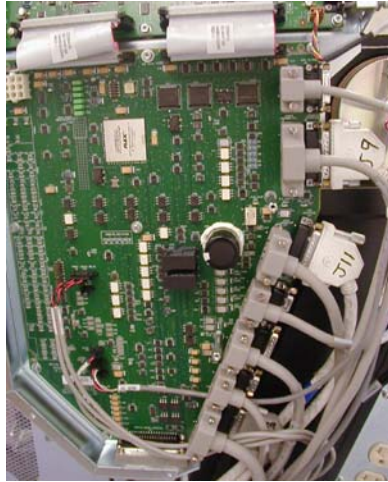


Route cable as shown along the gantry base's rear tube

**Figure 3-9 SmartStep Cable Routing**

## 2.3 Installation - Cables (LS 16, Pro16, VCT and VCT64 with GOC6)

- 1.) Locate the gantry MSUB. See [Figure 3-10](#).



**Figure 3-10 Gantry MSUB**

- 2.) Locate J27. See [Figure 3-11](#).



**Figure 3-11 Connector J27**

- 3.) Install cable 2355108 to J27. See [Figure 3-12](#).



**Figure 3-12 Install Cable 2355108**

- 4.) Connect the other end to gantry cable 2286150, J15.
- 5.) Carefully route the cable along the gantry stationary frame.
- 6.) Check that covers fit around the cables.



# Chapter 4 Installation - Systems with Integrated Peripheral Controller (IPC) Board

## Section 1.0

### OVERVIEW

This section applies to those systems that use the Integrated Peripheral Controller (IPC) Board. The SmartStep hardware is shipped ready for immediate installation. The following installation procedure describes how to install the hardware on the gantry. See Fig 4-1 for the general layout of the cabling and connections. Refer to Table 3-1 for a listing of the parts in the kit.

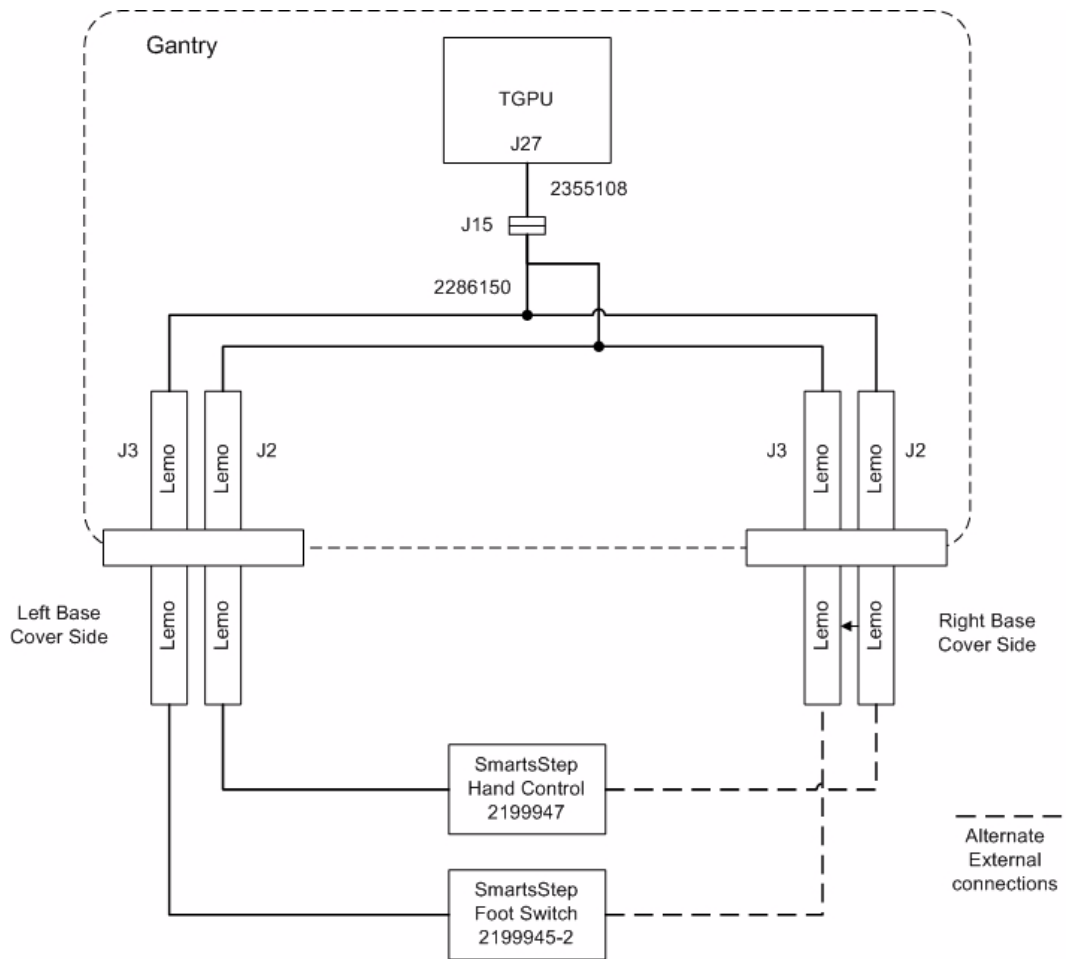


Figure 4-1 SmartStep Interconnect and Functional Drawing (Systems with IPC)



**DANGER** RISK OF ELECTRIC SHOCK. USE PROPER LOCKOUT/TAGOUT PROCEDURES.



## Section 2.0 Preparation - Cover Removal

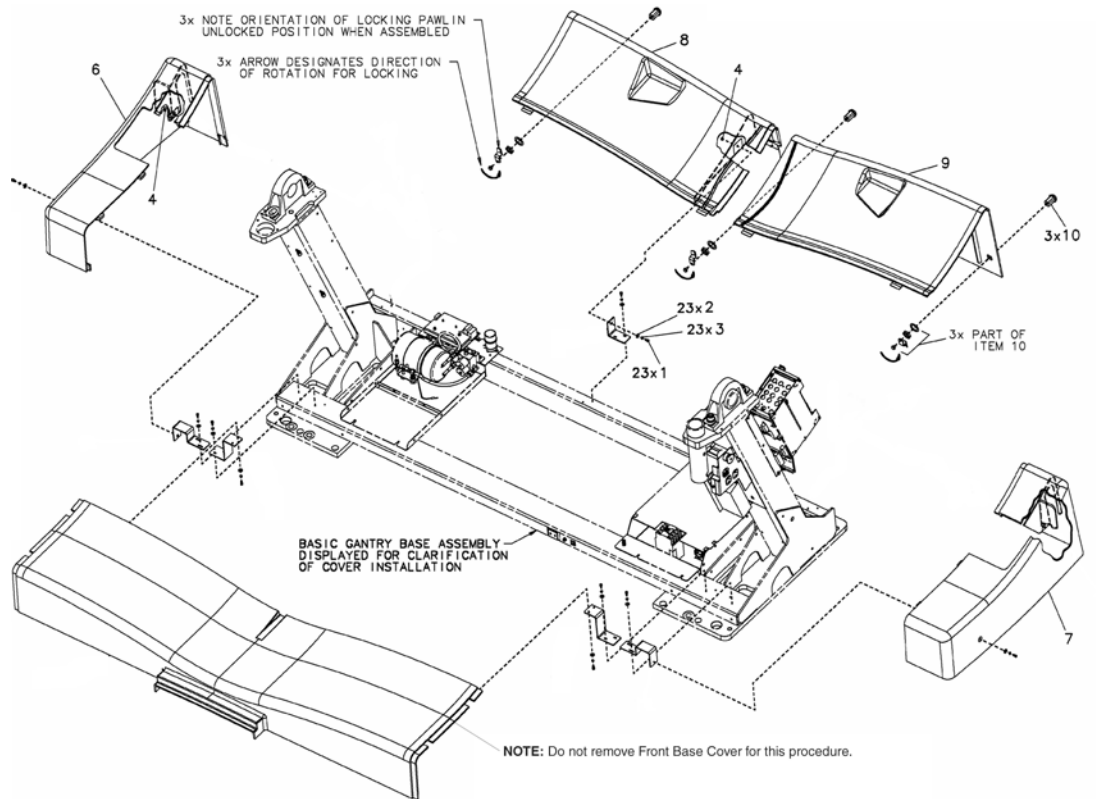
### 2.1 Preparation - Cover Removal

- 1.) Remove the two gantry side covers. Refer to your System Service Manual for any needed instruction.
- 2.) Turn **OFF** all three gantry service switches (Axial Drive, HVDC, 120 VAC).



Figure 4-2 LightSpeed Gantry Service Switches

- 3.) Remove both left and right Gantry side base covers (items 6 & 7, respectively, in Figure 3-4) and then both rear base covers (items 8 & 9, in Figure 3-4).

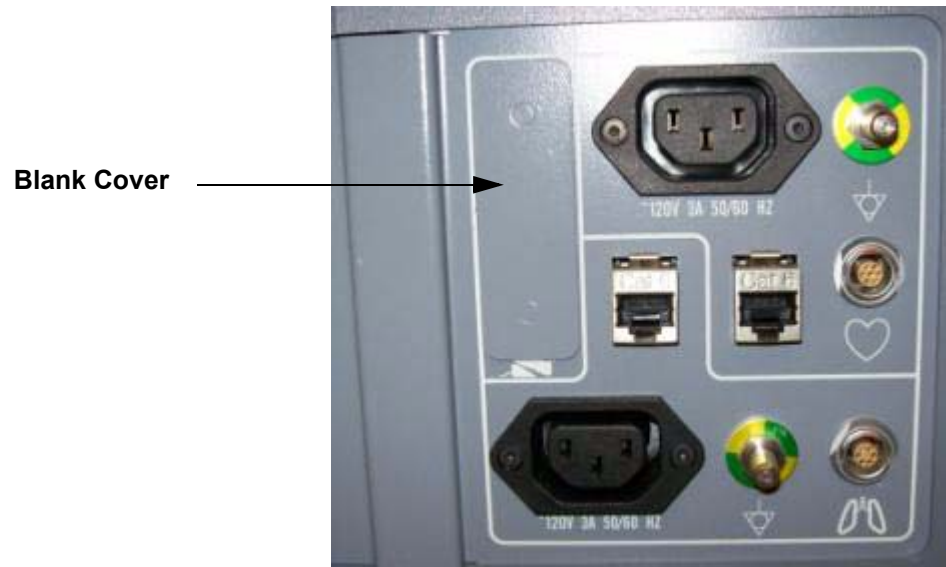


**Figure 4-3 Gantry Base Covers, exploded view of an H2 base. Cover installation is same for gantry procedures.**

Note: Do not remove the front base cover!

## 2.2 IPC Faceplate Modification

- 1.) Remove the blank cover from both of the IPC faceplates. Refer to Fig 4-4.



**Figure 4-4 Blank cover removal**

- 2.) Install the following cables as defined by the table below:

Cable	Cable Connector ID	Connection
2286150	ECG1B306CLLZ	J2
	ECG2B306CLLZ	J3
	ECG1B306CLLZ	J2
	ECG2B306CLLZ	J3

Table 4-1 Cable Definitions

- 3.) Restore gantry power at the Service Switch panel.
- 4.) Replace all covers removed.

# Chapter 5

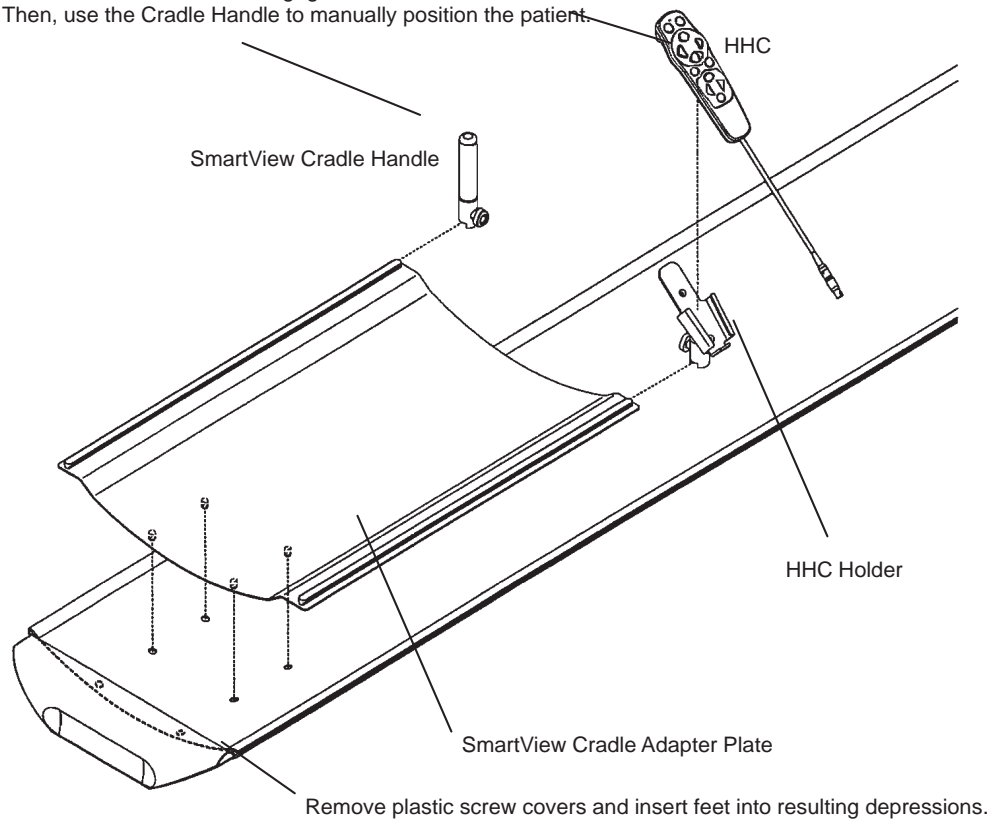
## Finalization (All Systems)

### Section 1.0

#### Installation - SmartStep Cradle Handle and HHC Holder

- 1.) Refer to [Figure 5-1](#).

Press the Cradle Release/Engage button to release HHC control.  
Then, use the Cradle Handle to manually position the patient.



**Figure 5-1 SmartStep Cradle Handle and HHC Installation**

- 2.) Remove the patient pad from the cradle and set aside.
- 3.) Remove and discard the four plastic covers shipped on the cradle adaptor plate.
- 4.) Remove and discard the front four plastic caps that cover the cradle screws.
- 5.) Orient the cradle handle adaptor plate, and lay it on the cradle top so with the four "feet" on the bottom of the adaptor plate rest in the front four cradle screw holes. This prevents slippage during manual positioning.
- 6.) Return the patient pad to the cradle.
- 7.) Slide the HHC holder and cradle handle onto the cradle adaptor plate. Orient them such that the knurled knobs face away from the cradle.
- 8.) Snug the holder and handle into place by tightening the knurled knobs.

Note: The cradle handle may have some lateral slop. This is normal.

## Section 2.0 Installation - Console Modifications

- 1.) Remove the modification plate from the upgrade kit.
- 2.) Refer to [Figure 5-2](#).
- 3.) Attach the new plate to the left of the existing rating plate(s).
- 4.) Take care not to cover any part of the existing plate(s). Install rating plate on console.
- 5.) Referring to your System Software Load From Cold Manual, install the SmartStep Option Key.



**Figure 5-2 Operator Console Rating Plate Attachment (Left to Right: H3, GOC1 & GOC5)  
NOT Shown: GOC6-rating plate located on bottom of console in similar location as GOC5.**

## Section 3.0 Finishing Up - Testing & Cover Re-Installation

- 1.) Be certain all obstructions to gantry motion are clear and turn **ON** all 3 switches (Axial Drive, HVDC, 120 VAC) on the service switch panel.
- 2.) Run a system functional check from the Service CD located under Function Checks, including a test scan, before installing the covers.
- 3.) Check SmartStep Operation - refer to SmartStep section of the Operator's Manual for procedure.
- 4.) Turn **OFF** all 3 switches (Axial Drive, HVDC, 120 VAC) on the service switch panel.
- 5.) Reinstall both rear base covers (See [Figure 2-3, on page 25](#) or [Figure 3-4, on page 37](#)).
- 6.) Reinstall the gantry side covers. Refer to your System Service Manual for any needed instruction.



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