



GE Healthcare

Technical Publications

Direction 2190775–100

Revision 2

Stranded Steel Cable Inspection

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Operating Documentation



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Languages

ПРЕДУПРЕЖДЕНИЕ (BG)	Това упътване за работа е налично само на английски език. <ul style="list-style-type: none"> • Ако доставчикът на услугата на клиента изиска друг език, задължение на клиента е да осигури превод. • Не използвайте оборудването, преди да сте се консултирали и разбрали упътването за работа. • 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.
警告 (ZH-CN)	本维修手册仅提供英文版本。 ㉔ 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。 ㉔ 未详细阅读和完全理解本维修手册之前，不得进行维修。 ㉔ 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。
警告 (ZH-HK)	本服務手冊僅提供英文版本。 ㉔ 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。 ㉔ 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。 ㉔ 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。
警告 (ZH-TW)	本維修手冊僅有英文版。 ㉔ 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。 ㉔ 請勿試圖維修本設備，除非 您已查閱並瞭解本維修手冊。 ㉔ 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。
UPOZORENJE (HR)	Ovaj servisni priručnik dostupan je na engleskom jeziku. <ul style="list-style-type: none"> • Ako davatelj usluge klijenta treba neki drugi jezik, klijent je dužan osigurati prijevod. • Ne pokušavajte servisirati opremu ako niste u potpunosti pročitali i razumjeli ovaj servisni priručnik. • Zanimarite li ovo upozorenje, može doći do ozljede davatelja usluge, operatera ili pacijenta uslijed strujnog udara, mehaničkih ili drugih rizika.
VÝSTRAHA (CS)	Tento provozní návod existuje pouze v anglickém jazyce. <ul style="list-style-type: none"> • V případě, že externí služba zákazníkům potřebuje návod v jiném jazyce, je zajištění překladu do odpovídajícího jazyka úkolem zákazníka. • Nesnažte se o údržbu tohoto zařízení, aniž byste si přečetli tento provozní návod a pochopili jeho obsah. • 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.

ADVARSEL (DA)	<p>Denne servicemanual findes kun på engelsk.</p> <ul style="list-style-type: none"> • Hvis en kundes tekniker har brug for et andet sprog end engelsk, er det kundens ansvar at sørge for oversættelse. • Forsøg ikke at servicere udstyret uden at læse og forstå denne servicemanual. • Manglende overholdelse af denne advarsel kan medføre skade på grund af elektrisk stød, mekanisk eller anden fare for teknikeren, operatøren eller patienten.
WAARSCHUWING (NL)	<p>Deze onderhoudshandleiding is enkel in het Engels verkrijgbaar.</p> <ul style="list-style-type: none"> • Als het onderhoudspersoneel een andere taal vereist, dan is de klant verantwoordelijk voor de vertaling ervan. • Probeer de apparatuur niet te onderhouden alvorens deze onderhoudshandleiding werd geraadpleegd en begrepen is. • 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.
WARNING (EN)	<p>This service manual is available in English only.</p> <ul style="list-style-type: none"> • If a customer's service provider requires a language other than english, it is the customer's responsibility to provide translation services. • Do not attempt to service the equipment unless this service manual has been consulted and is understood. • Failure to heed this warning may result in injury to the service provider, operator or patient from electric shock, mechanical or other hazards.
HOIATUS (ET)	<p>See teenindusjuhend on saadaval ainult inglise keeles</p> <ul style="list-style-type: none"> • Kui klienditeeninduse osutaja nõuab juhendit inglise keelest erinevas keeles, vastutab klient tõlketeenuse osutamise eest. • Ärge üritage seadmeid teenindada enne eelnevalt käesoleva teenindusjuhendiga tutvumist ja sellest aru saamist. • Käesoleva hoiatuse eiramine võib põhjustada teenuseosutaja, operaatori või patsiendi vigastamist elektrilöögi, mehaanilise või muu ohu tagajärjel.
VAROITUS (FI)	<p>Tämä huolto-ohje on saatavilla vain englanniksi.</p> <ul style="list-style-type: none"> • Jos asiakkaan huoltohenkilöstö vaatii muuta kuin englanninkielistä materiaalia, tarvittavan käännöksen hankkiminen on asiakkaan vastuulla. • Älä yritä korjata laitteistoa ennen kuin olet varmasti lukenut ja ymmärtänyt tämän huolto-ohjeen. • Mikäli tätä varoitusta ei noudateta, seurauksena voi olla huoltohenkilöstön, laitteiston käyttäjän tai potilaan vahingoittuminen sähköiskun, mekaanisen vian tai muun vaaratilanteen vuoksi.
ATTENTION (FR)	<p>Ce manuel d'installation et de maintenance est disponible uniquement en anglais.</p> <ul style="list-style-type: none"> • 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. • Ne pas tenter d'intervenir sur les équipements tant que ce manuel d'installation et de maintenance n'a pas été consulté et compris. • 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.

WARNUNG (DE)	<p>Diese Serviceanleitung existiert nur in englischer Sprache.</p> <ul style="list-style-type: none"> Falls ein fremder Kundendienst eine andere Sprache benötigt, ist es Aufgabe des Kunden für eine entsprechende Übersetzung zu sorgen. Versuchen Sie nicht diese Anlage zu warten, ohne diese Serviceanleitung gelesen und verstanden zu haben. Wird diese Warnung nicht beachtet, so kann es zu Verletzungen des Kundendiensttechnikers, des Bedieners oder des Patienten durch Stromschläge, mechanische oder sonstige Gefahren kommen.
ΠΡΟΕΙΔΟΠΟΙΗΣΗ (EL)	<p>Το παρόν εγχειρίδιο σέρβις διατίθεται μόνο στα αγγλικά.</p> <ul style="list-style-type: none"> Εάν ο τεχνικός σέρβις ενός πελάτη απαιτεί το παρόν εγχειρίδιο σε γλώσσα εκτός των αγγλικών, αποτελεί ευθύνη του πελάτη να παρέχει τις υπηρεσίες μετάφρασης. Μην επιχειρήσετε την εκτέλεση εργασιών σέρβις στον εξοπλισμό αν δεν έχετε συμβουλευτεί και κατανοήσει το παρόν εγχειρίδιο σέρβις. Αν δεν προσέξετε την προειδοποίηση αυτή, ενδέχεται να προκληθεί τραυματισμός στον τεχνικό σέρβις, στο χειριστή ή στον ασθενή από ηλεκτροπληξία, μηχανικούς ή άλλους κινδύνους.
FIGYELMEZTETÉS (HU)	<p>Ezen karbantartási kézikönyv kizárólag angol nyelven érhető el.</p> <ul style="list-style-type: none"> Ha a vevő szolgáltatója angoltól eltérő nyelvre tart igényt, akkor a vevő felelőssége a fordítás elkészítése. Ne próbálja elkezdni használni a berendezést, amíg a karbantartási kézikönyvben leírtakat nem értelmezték. Ezen figyelmeztetés figyelmen kívül hagyása a szolgáltató, működtető vagy a beteg áramütés, mechanikai vagy egyéb veszélyhelyzet miatti sérülését eredményezheti.
AÐVÖRUN (IS)	<p>Þessi þjónustuhandbók er aðeins áánleg á ensku.</p> <ul style="list-style-type: none"> Ef að þjónustuveitandi viðskiptamanns þarfnast annas tungumáls en ensku, er það skylda viðskiptamanns að skaffa tungumálapjónustu. Reynið ekki að afgreiða tækið nema að þessi þjónustuhandbók hefur verið skoðuð og skilin. Brot á sinna þessari aðvörun getur leitt til meiðsla á þjónustuveitanda, stjórnanda eða sjúklings frá raflosti, vélrænu eða öðrum áhættum.
AVVERTENZA (IT)	<p>Il presente manuale di manutenzione è disponibile soltanto in lingua inglese.</p> <ul style="list-style-type: none"> Se un addetto alla manutenzione richiede il manuale in una lingua diversa, il cliente è tenuto a provvedere direttamente alla traduzione. Procedere alla manutenzione dell'apparecchiatura solo dopo aver consultato il presente manuale ed averne compreso il contenuto. 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.
警告 (JA)	<p>このサービスマニュアルには英語版しかありません。</p> <ul style="list-style-type: none"> 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>경고 (KO)</p>	<p>본 서비스 매뉴얼은 영어로만 이용하실 수 있습니다 .</p> <ul style="list-style-type: none"> • 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 . <p>본 경고 사항에 유의하지 않으면 전기 쇼크 , 기계적 위험 , 또는 기타 위험으로 인해 서비스 제공자 , 사용자 또는 환자에게 부상을 입힐 수 있습니다 .</p>
<p>BRDINJUMS (LV)</p>	<p>Šī apkopes rokasgrāmata ir pieejama tikai angļu valodā.</p> <ul style="list-style-type: none"> • 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>ĮSPĖJIMAS (LT)</p>	<p>Šis eksploatavimo vadovas yra tik anglų kalba.</p> <ul style="list-style-type: none"> • 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>ADVARSEL (NO)</p>	<p>Denne servicehåndboken finnes bare på engelsk.</p> <ul style="list-style-type: none"> • 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>OSTRZEŻENIE (PL)</p>	<p>Niniejszy podręcznik serwisowy dostępny jest jedynie w języku angielskim.</p> <ul style="list-style-type: none"> • 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>ATENÇÃO (PT-BR)</p>	<p>Este manual de assistência técnica encontra-se disponível unicamente em inglês.</p> <ul style="list-style-type: none"> • Se outro serviço de assistência técnica solicitar a tradução deste manual, caberá ao cliente fornecer os serviços de tradução. • Não tente reparar o equipamento sem ter consultado e compreendido este manual de assistência técnica. • A não observância deste aviso pode ocasionar ferimentos no técnico, operador ou paciente decorrentes de choques elétricos, mecânicos ou outros.

<p>ATENÇÃO (PT-PT)</p>	<p>Este manual de assistência técnica só se encontra disponível em inglês.</p> <ul style="list-style-type: none"> • Se qualquer outro serviço de assistência técnica solicitar este manual noutra língua, é da responsabilidade do cliente fornecer os serviços de tradução. • Não tente reparar o equipamento sem ter consultado e compreendido este manual de assistência técnica. • O não cumprimento deste aviso pode colocar em perigo a segurança do técnico, do operador ou do paciente devido a choques eléctricos, mecânicos ou outros.
<p>ATENȚIE (RO)</p>	<p>Acest manual de service este disponibil doar în limba engleză.</p> <ul style="list-style-type: none"> • Dacă un furnizor de servicii pentru clienți necesită o altă limbă decât cea engleză, este de datoria clientului să furnizeze o traducere. • Nu încercați să reparați echipamentul decât ulterior consultării și înțelegerii acestui manual de service. • Ignorarea acestui avertisment ar putea duce la rănirea depănatorului, operatorului sau pacientului în urma pericolelor de electrocutare, mecanice sau de altă natură.
<p>ОСТОРОЖНО! (RU)</p>	<p>Данное руководство по техническому обслуживанию представлено только на английском языке.</p> <ul style="list-style-type: none"> • Если сервисному персоналу клиента необходимо руководство не на английском, а на каком-то другом языке, клиенту следует самостоятельно обеспечить перевод. • Перед техническим обслуживанием оборудования обязательно обратитесь к данному руководству и поймите изложенные в нем сведения. • Несоблюдение требований данного предупреждения может привести к тому, что специалист по техобслуживанию, оператор или пациент получит удар электрическим током, механическую травму или другое повреждение.
<p>UPOZORENJE (SR)</p>	<p>Ovo servisno uputstvo je dostupno samo na engleskom jeziku.</p> <ul style="list-style-type: none"> • Ako klijentov serviser zahteva neki drugi jezik, klijent je dužan da obezbedi prevodilačke usluge. • Ne pokušavajte da opravite uređaj ako niste proitali i razumeli ovo servisno uputstvo. • Zanimanje ovog upozorenja može dovesti do povređivanja serviser, rukovoca ili pacijenta usled strujnog udara ili mehaničkih i drugih opasnosti.
<p>UPOZORNENIE (SK)</p>	<p>Tento návod na obsluhu je k dispozícii len v angličtine.</p> <ul style="list-style-type: none"> • Ak zákazník poskytovateľ služieb vyžaduje iný jazyk ako angličtinu, poskytnutie prekladateľských služieb je zodpovednosťou zákazníka. • Nepokúšajte sa o obsluhu zariadenia, kým si neprečítate návod na obsluhu a neporozumiete mu. • Zanedbanie tohto upozornenia môže spôsobiť zranenie poskytovateľa služieb, obsluhujúcej osoby alebo pacienta elektrickým prúdom, mechanické alebo iné ohrozenie.

<p>ATENCION (ES)</p>	<p>Este manual de servicio sólo existe en inglés.</p> <ul style="list-style-type: none"> • 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. • No se deberá dar servicio técnico al equipo, sin haber consultado y comprendido este manual de servicio. • 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.
<p>VARNING (SV)</p>	<p>Den här servicehandboken finns bara tillgänglig på engelska. .</p> <ul style="list-style-type: none"> • Om en kunds servicetekniker har behov av ett annat språk än engelska, ansvarar kunden för att tillhandahålla översättningstjänster. • Försök inte utföra service på utrustningen om du inte har läst och förstår den här servicehandboken. • 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.
<p>DIKKAT (TR)</p>	<p>Bu servis kılavuzunun sadece ingilizcesi mevcuttur.</p> <ul style="list-style-type: none"> • Eğer müşteri teknisyeni bu kılavuzu ingilizce dışında bir başka lisandan talep ederse, bunu tercüme ettirmek müşteriye düşer. • Servis kılavuzunu okuyup anlamadan ekipmanlara müdahale etmeyiniz. • Bu uyarıya uyulmaması, elektrik, mekanik veya diğer tehlikelerden dolayı teknisyen, operatör veya hastanın yaralanmasına yol açabilir.

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 everyone 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, GE Healthcare Group, its agents, and representatives have no responsibility for injury or damage which may result from improper use of the equipment.

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

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 Healthcare 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.

DAMAGE IN TRANSPORTATION

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://egems.med.ge.com/edq/home.jsp>
- Contact your local service coordinator for more information on this process.

Rev. June 13, 2006

LITHIUM BATTERY CAUTIONARY STATEMENTS

⚠ CAUTION

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.

⚠ CAUTION

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fab

REVISION HISTORY

REV	DATE	REASON FOR CHANGE
0	Aug. 15, 1997	Initial Release.
1	22JUN2011	Revised Sections 1, 2-2, 3-1 and 5. Added notes and illustration regarding inspection of cable fasteners and application of Loctite 242. Refer to Trackwise # 4071941.
2	14DEC2011	Update Sections 2-2 and 5-2 to indicate there are only 2 holding nuts.

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SECTION 1 – CABLE INSPECTION

Steel cables have load carrying capabilities many times that of the loads carried. This statement is only true provided that the cable is in good condition and properly installed.

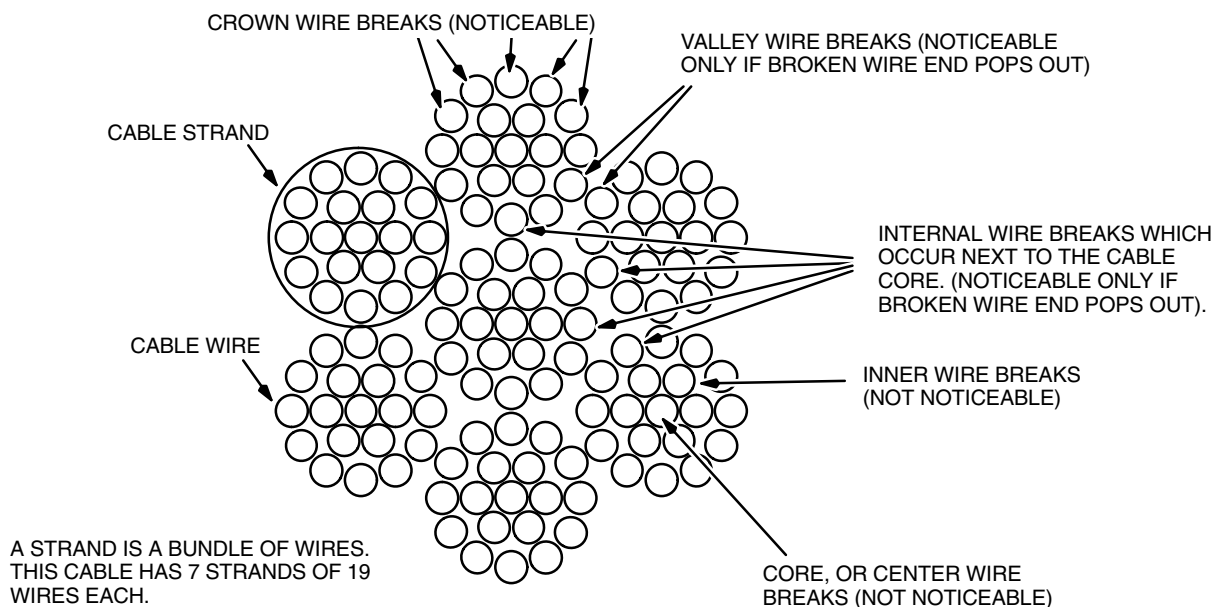
During the early period of use, a cable assembly need not be replaced if one or two broken wires is detected. However, the same number of broken wires in an old assembly should justify immediate replacement. In an older assembly, the rate of broken wires is indeterminate and maybe accelerated.

Normal use will cause slow cable deterioration. Broken wire progression is related to time and equipment usage. Normally, large numbers of broken wires do not occur in a short span of time, therefore there is a warning period between the beginning of wire breakage and complete cable failure. This is why periodic inspection is very important so that corrective action can be taken.

The holding nuts that attach the cables to the carriage can become loose over time, which could cause detachment of both the counterweight and/or safety cables. Inspecting the fasteners is equally important as inspecting the condition of the cables themselves.

Refer to Illustration 1 for cable configuration and common types of cable defects.

ILLUSTRATION 1
7X19 CABLE CROSS SECTION



SECTION 2 – TYPES OF CABLE FAILURE

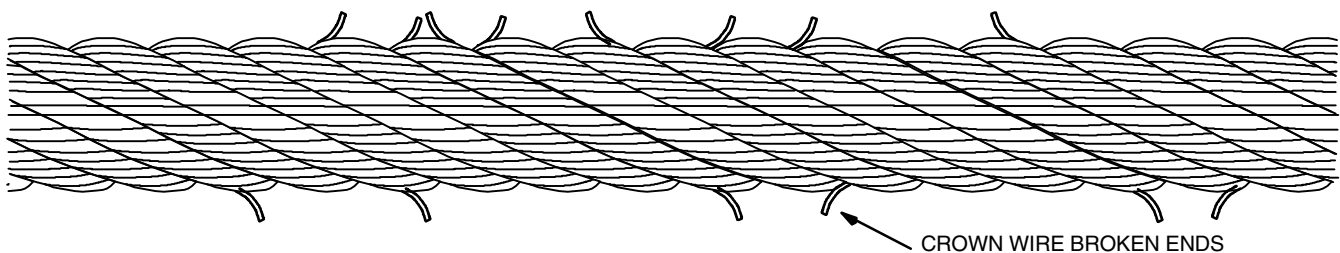
2-1 Broken Wires

Cable strength is not necessarily impaired by an occasional broken wires. However consideration should be given as to its location, length of time the assembly has been in service and the general condition of the remainder of the cable.

2-1-1 Crown Wire Breaks

Crown breaks are breaks that occur in the outer wires of the outer strands of a cable. Refer to Illustration 1. Because they are on the outer surface of the cable, they are visible upon inspection and are represented by short broken wire ends. This failure mode will generally show both broken protruding wire ends. Refer to Illustration 2.

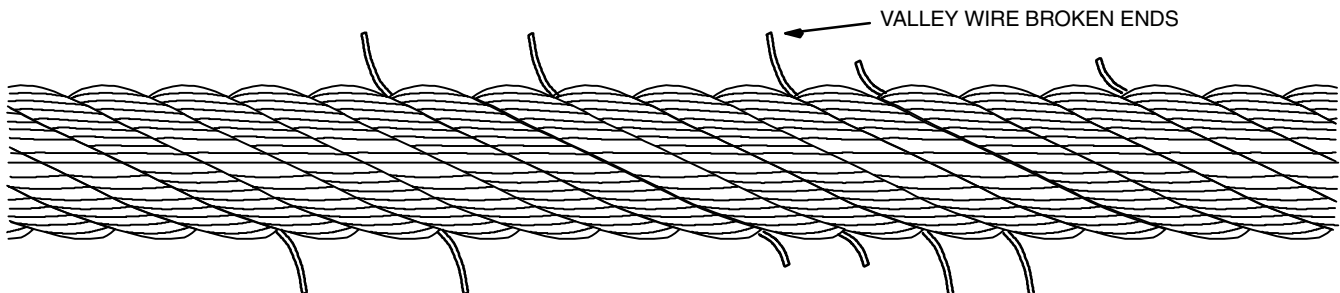
ILLUSTRATION 2
CROWN WIRE BREAKS



2-1-2 Valley Wire Breaks

Valley wire breaks occur down in the valley between two adjacent strands. Refer to Illustration 1. The protruding wire end resulting from this type of break would be longer and would stand out further from the cable than a crown wire break. Only one end, the long end of a valley wire break can usually be detected, since the other end remains buried in the valley between two adjacent strands. Refer to Illustration 3. Unfortunately, a valley wire break usually does not visibly manifest itself until quite an advanced stage of deterioration has taken place. It is also very often true that valley wire breaks may exist without having the free end spring out of place.

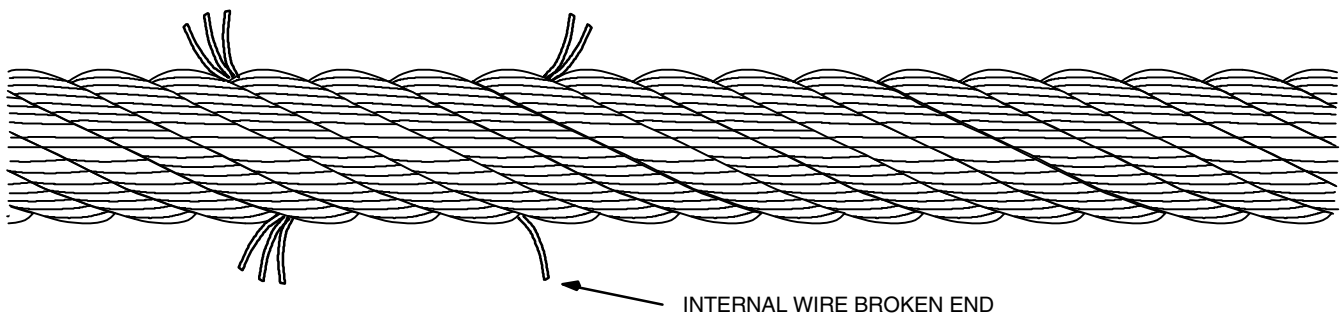
ILLUSTRATION 3
VALLEY WIRE BREAKS



2-1-3 Internal Wire Breaks

Another type of cable deterioration is the internal wire failure. This failure cannot be detected visually. This type of break takes place in the outer wires of the main strand and the outer wires of the outer strands located inside the cable. Refer to Illustration 1. It is underneath where the outer strands come in contact with the cable center member. Usually these breaks can only be detected by slackening the cable and bending it opposite to the curvature it normally assumes over the pulley sheave. This however is often most impractical to do because of inaccessibility. Here again the protruding wire end would be considerably longer than those of a crown wire break and would be even slightly longer than the protruding end of a valley wire break. Refer to Illustration 4.

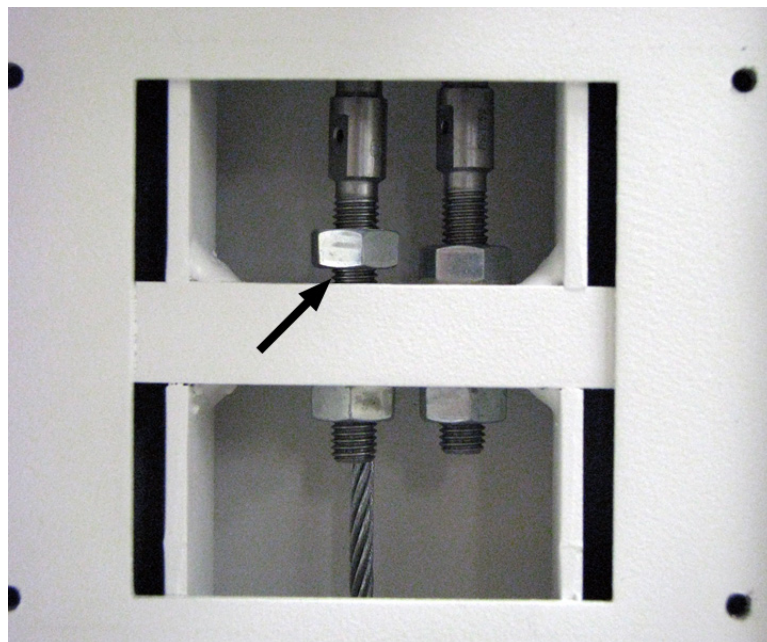
ILLUSTRATION 4
INTERNAL WIRE BREAKS



2-2 Loosened Cable Stud Nuts

Another type of failure that can occur is when the cable stud nuts loosen off of the studs themselves, which can cause the arm to fall. The tightness of each of the 2 holding nuts should be inspected every time that the cables are inspected.

ILLUSTRATION 5
LOOSENED CABLE STUD NUTS



SECTION 3 – BASIS FOR CABLE FAILURE

3-1 Causes of Deterioration

Counterweight cables deteriorate from common causes such as abuse, wear and fatigue during normal equipment operation. All of these factors eventually result in the development of broken wires and if the broken wires accumulate in large enough numbers in localized areas, complete cable failure will result. Broken cable wires cause unbalanced cable structure resulting in unbalanced load distribution. This results in increased stress on the remaining unbroken wires.

Normal use of the system may cause the cable stud nuts to work themselves loose over time.

3-1-1 PM Inspection

Although some cable deterioration cannot be detected by visual external inspection, the visible extent of cable surface deterioration can be used as a reliable basis for cable replacement. The cable should be replaced if any broken wire are caused by abuse. The cause of this cable abuse should be immediately determined and corrected.

Because of the serious consequences of possible cable failure, the field service person must be prepared to use judgment regarding cable condition and never hesitate to make a replacement. Several months or a half year's usage is small compensation if there is any danger of cable failure.

SECTION 4 – FREQUENCY OF INSPECTION

This is a variable factor and often can be partially based on equipment usage. It is recommended that counterweight cables be inspected once every six months and at more frequent intervals if equipment usage warrants.

Note: It is important to note that the number of times the device is moved determines frequency of equipment usage rather than the number of patients x-rayed.

SECTION 5 – INSPECTION PROCEDURE

5-1 Cable Inspection

Record inspection data. This inspection history data can be valuable in making a cable replacement determination.



**USE CARE, SHORT SHARP BROKEN WIRE ENDS CAN INFLICT
PERSONAL INJURY DURING PHYSICAL CABLE INSPECTION.**

Visual inspection, plus running a soft cloth over the cable's surface should be used to detect broken wires, cable abrasion and cable corrosion which are major types of cable deterioration.

Note: When inspecting a cable that disappears at one point and reappears at another, be sure to mark the cable at that point and then move the cable so that when the mark reappears no portion of the cable that passes over a pulley or that is subjected to abrasion is neglected.

External lubrication guards against corrosion and reduces abrasion. Coat soft cloth with STP lubricant and apply to the external surface during regular PM inspection.

Note: Excessive wear not only weakens the cable, but influences the development and rate of wire failure.

Close inspection should be made of cable terminations. Broken wires at cable terminals will require immediate cable replacement.

Because valley wire breaks accompany advanced stages of cable deterioration, the cable should be replaced immediately regardless of outward appearance. A cable badly affected by crown fatigue wire breaks should be replaced. Attention is called to a crown wire break as shown in Illustration 6, longer broken wire ends of both valley and internal wire breaks and also the unbalanced cable structure resulting not only from the uneven occurrence of wire failure but also from the unbalanced load distribution.

ILLUSTRATION 6
SINGLE CROWN WIRE BREAK



ILLUSTRATION 7
TWISTED WIRE SPLICE IN 1 OF 12 INNER WIRES

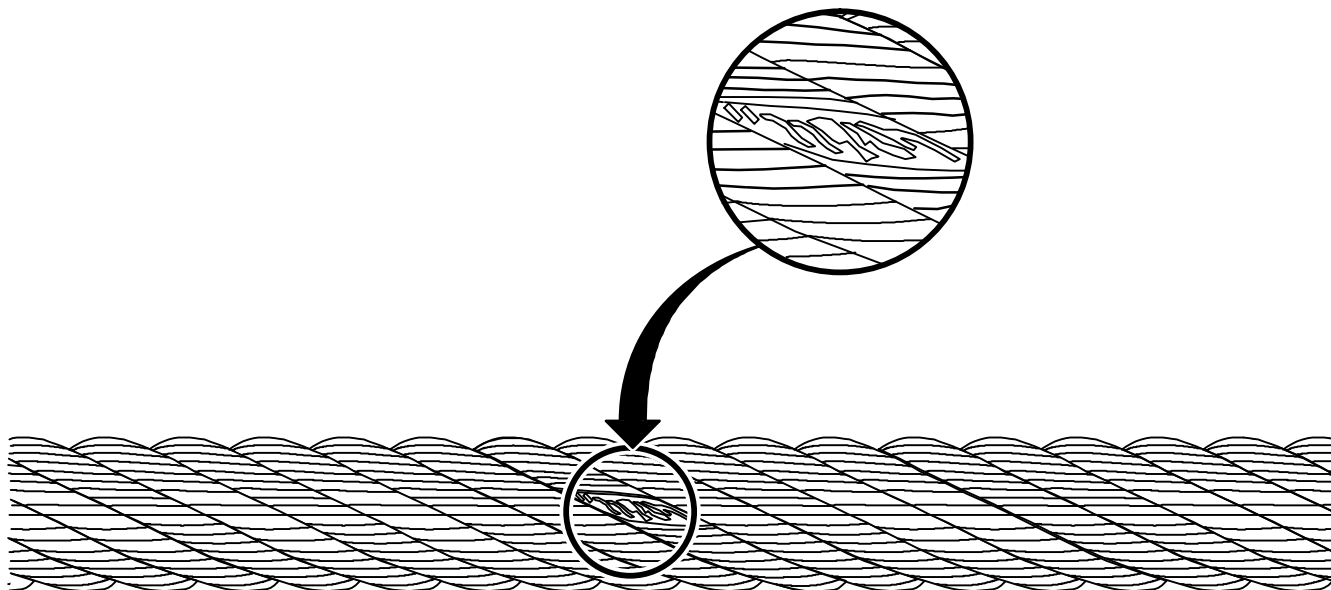
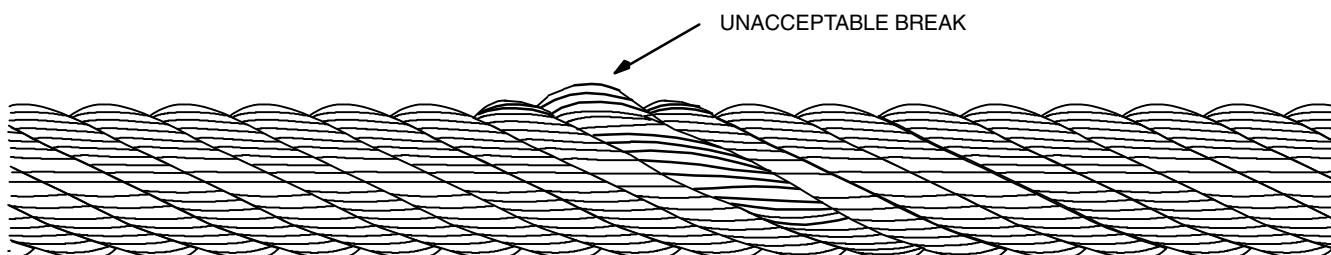


ILLUSTRATION 8
TWISTED WIRE SPLICE IN 1 OF 6 INNER WIRES



5-2 Cable Stud Nut Inspection

The tightness of each of the 2 holding nuts and 2 jam nuts should be inspected every time that the cables are inspected. Since these nuts have had Loctite applied, they cannot simply be snugged up without breaking the Loctite bonds. A visual inspection of the studs and nuts can be used to indicate that the nuts are tight. Any gap seen between a nut and the carriage's horizontal bar would indicate a loosened condition. An additional inspection of wiggling the studs by hand can indicate a loose condition. Access to the studs can be gained by removing the cover plate on the column. Should any of the nuts need to be tightened, be sure to apply a new coating of Loctite 242 to the threads beforehand. Refer to Illustration 5.

Note: There are three ways to ensure that the cable stud nuts are tight. All three can be done without breaking the Loctite bond between the nut and bolt. All three methods should be used.

1. Visual inspection: Any thread gap seen between the nuts and the horizontal bar of the carriage would indicate a loose nut.
2. Wiggling the stud: If you can support the system arm and wiggle a stud by hand, there is likely a loose nut.

3. Vertical arm travel: While moving the horizontal arm up and down, watch the studs. If any stud position deviates slightly, there is likely a loose stud.

These methods should be used to inspect the main cable, the safety cable, and the follower cable. Section 5-3 of the AMX-4+ Service manual provides useful information regarding the proper tensioning of each cable.



GE Healthcare

*GE Healthcare: Telex 3797371
P.O. Box 414, Milwaukee, Wisconsin 53201 U.S.A.
(Asia, Pacific, Latin America, North America)*

*GE Healthcare — Europe: Telex 698626
283, rue de la Minière, B.P. 34, 78533 Buc Cedex
France*