Instruction Manual

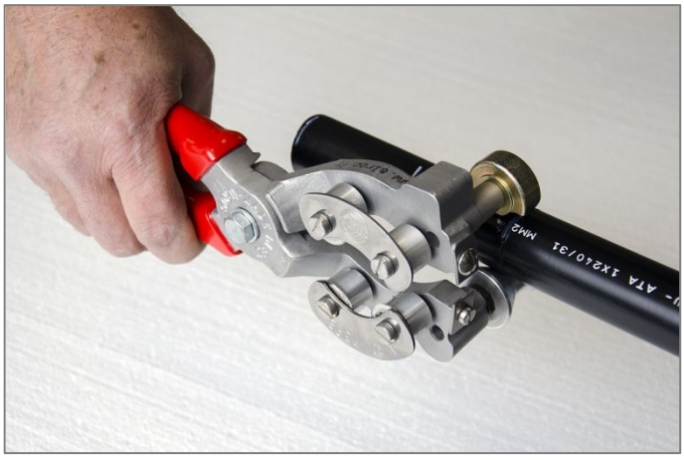
SOLARpower Alu-ATA terminal and grounding assembling

Overview of all necessary material instructions and toolings.

Cut-back dimensions according to the installation instructions of the lug manufacturer (for example Pfisterer).

Cutting the cable.

Stripping and preparation of the cable end.



Cutting back the outer sheath.

Easy separate the outer sheath from the armour.

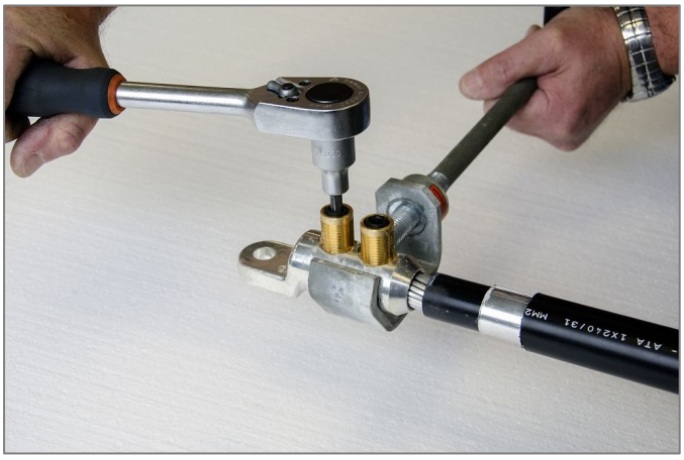
Outer sheat removed.

Removing the armouring.

Removing the unnecessary armouring tape to ensure the insulation distance between cable lug an armouring / screen.

Removing the oxide layer even if not visible on the stripped conductor.

Fastening the cable lug according to the instructions of the cable lug manufacturer either with a wrench or an impact wrench.



Remove the oxide of the armour.

Winding the sealing tape on the cable especially at the location where the braided have the sealing by soldering.

Fixing the earthing on armour with a clamping spring.

Use self bonding electrical tape to fix and sealing the grounding connection.

Cutting the heat shrink tube (inside coated with hot glue for water tight bonding).

Bring the heat shrink tube in the correct position and…

…shrink the tube to a water tight bonding.

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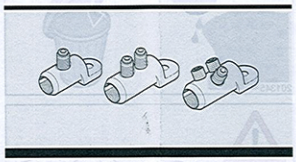
(D) **PFISTERER**

MONTAGEANLEITUNG

Schraubkabelschuh für Energiekabel

Produktbeschreibung

Dieser Schraubkabelschuh ist ausgelegt um Al- oder Cu-Leiter zu verbinden (siehe Zuordnungstabelle).



PFISTERER Kontaktsysteme GmbH haftet nicht bei unsachgemäßer Anwendung und Nichteinhaltung von geltenden Sicherheitsvorschriften, sowie für deren Folgeschäden.

Wichtige Hinweise!

Die Montage von Schraubkabelschuhen darf nur von qualifiziertem und geschultem Fachpersonal durchgeführt werden.
Montage sauber und trocken ausführen.

Vor der Montage Montageanleitung sorgfältig lesen.

Dieser Schraubkabelschuh ist für die Kontaktierung von Kupfer- und Aluminiumkabelenden konzipiert.

MONTAGE UNTER SPANNUNG IST NICHT ZULÄSSIG!

Vor Montagebeginn zu beachten!

- Schrauben vor dem Einführen der Kabelenden weder aus- noch eindrehen!
- Keine Schlüsselverlängerung verwenden!
- Fett nicht entfernen!
- Verschmutzte Schraubkabelschuhe dürfen nicht verwendet werden!
- Kunststoffabdeckungen nicht in Kombination mit Warmschrumpfmuffen verwenden!

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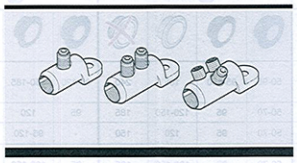
(GB) **PFISTERER**

INSTALLATION INSTRUCTIONS

Bolted cable lug for power cables

Product description

This bolted cable lug is designed to connect Al or Cu conductors (according to the assignment table).



PFISTERER Kontaktsysteme GmbH will assume no liability for improper use and failure to comply with the safety regulations in force or for consequential damage arising from this.

Important notes!

Bolted cable lugs may only be installed by qualified and trained specialist personnel. Installation has to be carried out in clean and dry conditions.

Carefully read and follow the steps in the installation instructions.

This bolted cable lug is specially designed for copper or aluminium conductors.

DO NOT INSTALL ON ENERGIZED LINES!

Please pay attention to the following before starting installation!

- Do not screw or unscrew the shear-off bolt!
- Do not use an extension key!
- Do not remove the grease!
- Do not use if soiled or damaged!
- Covering caps are not heat resistant. Do not use with heat-shrink material!

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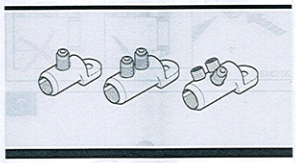
(F) **PFISTERER**

INSTRUCTIONS DE MONTAGE

Cosse d´extrémité à serrage mécanique pour câble de puissance

Description du produit

Ce cosse d´extrémité à serrage mécanique est concu pour raccorder des conducteurs Al ou Cu (voir tableau de classification).



PFISTERER Kontaktsysteme GmbH décline toute responsabilité en cas d´utilisation non conforme ou de non respect des consignes de sécurité applicables, ainsi que pour tout dommage consécutif.

Remarques importantes!

Le montage de cosse d´extrémité à serrage mécanique ne doit être effectué que par un personnel qualifié et formé à cet effet. Le montage doit se faire dans un endroit propre, et à l'abri de l'humidité.

Lire attentivement les instructions de montage avant de l'effectuer.

Ce cosse d´extrémité à serrage mécanique est spécialement conçu pour des âmes cuivre ou aluminium.

MONTAGE SOUS TENSION N´EST PAS PERMIS!

Veuillez respecter le suivant avant de commencer l´installation!

- Ne pas visser ni dévisser les boulons fusibles avant le montage du connecteur!
- Ne pas utiliser de rallonge de clef!
- Ne pas dégraisser le raccord!
- Ne pas utiliser des cosse d´extrémité à serrage mécanique souillés!
- Ne pas utiliser les capuchons en plastique en combinaison avec des manchons thermo-rétractables!

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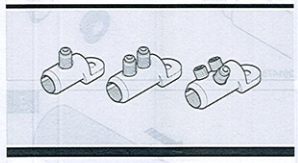
(E) **PFISTERER**

INSTRUCCIONES DE MONTAJE

Terminal a tornillos para cables de energía eléctrica

Descripción del producto

Este terminal a tornillos es dise ñado para conectar conductores de Al o de Cu (véase tabla de asignación).



En caso de uso incorrecto del producto o de incumplimiento de las normas de seguridad aplicables, PFISTERER Kontaktsysteme GmbH ni asume ninguna responsabilidad sobre el producto ni los daños resultantes.

Notas importantes!

El montaje de terminal a tornillos sólo debe ser realizado por personal técnico debidamente formado y cualificado. El montaje deberá realizarse en condiciones limpias y secas.

Antes del montaje deberá leer con detención las instrucciones de montaje.

Este terminal a tornillos se ha concebido especialmente para cables de cobre o aluminio.

MONTAJE EN TENSIÓN NO ES PERMITIDO!

Tenga en cuenta lo siguiente antes de que empiece el montaje!

- Ni atornillar ni desartornillar el tornillo fusible antes de introducir el alma del cable!
- No utilizar de alargador de llave!
- No elimine bajo ningún concepto esta grasa!
- No es permitido utilizar terminal a tornillos ensuciados!
- No usar cubiertas de plástico en combinación con cubiertas termorretráctiles!

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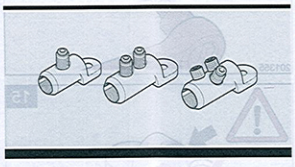
(I) **PFISTERER**

ISTRUZIONI DI MONTAGGIO

Capocorda con serraggio a viti a rottura per cavi di energia

Descrizione prodotto

Questo capocorda con serraggio a viti a rottura è progettato per dei collegamenti in cavo di Al o Cu (vedi la tabella di corrispondenza).



PFISTERER Kontaktsysteme GmbH non risponde in caso di uso non conforme e di mancata osservanza delle norme di sicurezza vigenti, né risponde delle relative conseguenze.

Note importanti!

Il montaggio dei capocorda con serraggio a viti può essere esequito esclusivamente da personale specializzato qualificato e addestrato. Eseguire il montaggio in ambiente pulito e asciutto.

Prima del montaggio, leggere con attenzione le istruzioni di montaggio.

Il presente capocorda con serraggio a viti è destinato al collegamento di cavi in rame e in alluminio.

NON INSTALLARE SU COLLEGAMENTI SOTTO TENSIONE!

Si prega di notare quanto segue prima di iniziare l´installazione!

- Non serrare né allentare le viti prima di inserire le estremità dei cavi!
- Utilizzare sempre chiavi senza la prolunga!
- Non rimuovere il grasso!
- Non utilizzate le viti se sporche!
- I tappi in plastica non sono resistenti ad alta temperatura. Non utilizzarli assieme ai manicotti termoretraibili!

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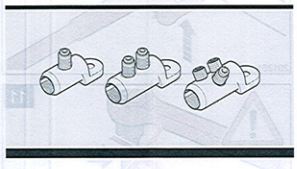
(NL) **PFISTERER**

Gebruikershandleiding

Schroefkabelschoen voor Energiekabels

Productomschrijving

De schroefkabelschoen is geschikt voor montage op zowel koper als aluminium geleiders van verschillende vormen en kwadraturen (zie selectietabel).



PFISTERER Kontaktsysteme GmbH is niet aansprakelijk voor eventuele (gevolg) schade of letsel door oneigenlijk gebruik, misbruik van de producten of het niet volgens de geldende (veiligheids) voorschriften werken en monteren.

Belangrijk!

De montage van schroefkabelschoenen dient uitgevoerd te worden in droge en schone omstandigheden door daartoe bevoegde personen.

Voorafgaand aan de montage, de instructie zorgvuldig lezen.

De schroefkabelschoen is geschikt voor montage op zowel koper als aluminium geleiders van verschillende vormen en kwadraturen.

Montage op een onder spanning staande geleider is niet toegestaan!

Belangrijk:

- Draai de bouten nooit in of uit zonder een geleider in de schacht.
- Geen verlenging op het aandraaigereedschap gebruiken.
- Vet op de bout en in de verbinder niet verwijderen!
- Vervuilde kabelschoenen mogen niet worden gebruikt.
- De kunststof afdekplaatjes niet gebruiken in combinatie met warmtekrimpbuizen.

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(D) Symbolbeschreibung / (GB) Description of symbol / (F) Description de symbole
(E) Descripción de los simbolos / (I) Descrizione dei simboli / (NL) Verklaring van symbolen

(D) Achtung! Hinweise im Bild beachten.
(GB) Attention! Follow the advice in the figure.
(F) Attention! Respecter les consignes figurant dans l´image.
(E) Atención! Siga las instrucciones en la imagen.
(I) Attenzione! Seguire le note nell´imagine.
(NL) Opgelet! Volg het advies in de afbeelding.

(D) Siehe Tabelle.
(GB) See table.
(F) Voir tableau.
(E) Véase tabla.
(I) Vedere tabella.
(NL) Zie Tabel.

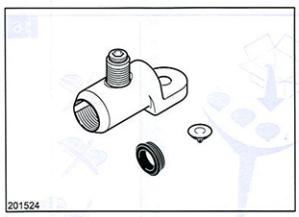
(D) Anleitung des Endverschlussherstellers beachten!
(GB) Follow the termination manufacturer´s instructions!
(F) Installer conformément aux instructions du matériel de raccordement!
(E) Siga las instrucciones del fabricante del manguito!
(I) Fare riferimento al manuale del fabbricante del terminale!
(NL) Volg de instructie van de leverancier van het garnituur!

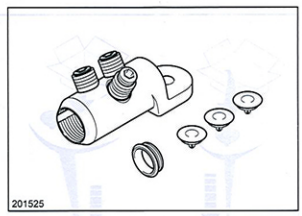
(D) Teil umweltgerecht entsorgen.
(GB) Dispose of all waste according to environmental regulations.
(F) Jeter les composants non-utilisés en respectant l´environnement.
(E) Deseche los componentes de una manera ecológica.
(I) Smaltire il componente nel rispetto dell´ambiente.
(NL) Verwijder het afval volgens de geldende milieuregels.

(D) Hinweispfeil
(GB) Indicator arrow
(F) Flèche indicative
(E) Flecha indicadora
(I) Informazione
(NL) Aanduidingspijl

(D) Pfeil für geradlinige Bewegungen
(GB) Arrow for linear movement
(F) Flèche pour mouvement linéaire
(E) Flecha para movimiento en linea recta
(I) Indicazione movimento lineare
(NL) Pijl voor rechte bewegingen

(D) Pfeil für Drehbewegungen
(GB) Arrow for turning movements
(F) Flèche pour mouvement rotatoire
(E) Flecha para movimiento en rotación
(I) Indicazione movimento di rotazione
(NL) Pijl voor draaibewegingen


201524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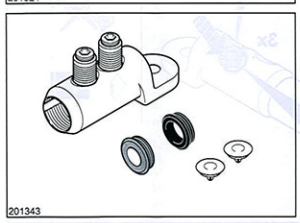
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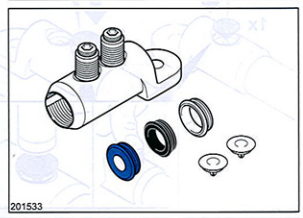
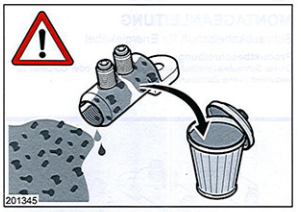
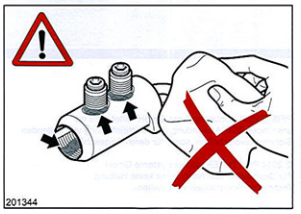
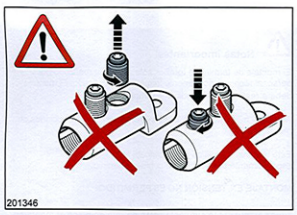

201533

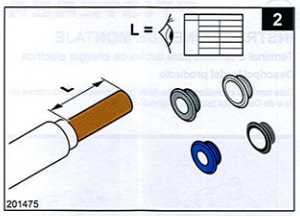
(D) Zuordnungstabelle Zentrierhülsen und Absetzmaße / (GB) Assignment table for centring rings and cut-back dimensions /
(F) Tableau de classification des douilles de centrage et longeur de dénudage / (E) Tabla de asignaciòn para casquillos de centraje y longitud de desaislamiento
(I) Tabella di assegnazione per anelli di centraggio e lunghezza di spellatura / (NL) Selectietabel centreerhuls en af te strippen lengte

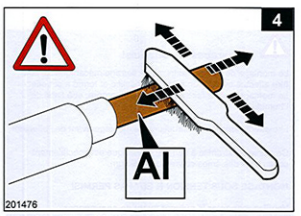
			332 604 .... 10-95 mm²		332 599 .... 25-150 mm²			332 595 .... 50-240 mm²				332 605 .... 95-300 mm² + 400 RE				332 625 .... 185-400 mm² + 500 RE		332 606 .... 300-630 mm² + 800 RE	
			5		5			6				8				8		8	
	Al Cu		10-50	70-95	25-70	95-120	150	50-95	95-150	185	240	95-120	150-185	240	300-400	185-300	400-500	300-400	500-800
	Al Cu	90°	-	50-95	25-70	95	120	50-70	95	120-150	185	95	120	150-185	240	185	240	-	-
		120°	-	50-70	25-50	70-95	120	50-70	95	120	150	-	95-120	150	185-240	-	185-240	-	-
	Al Cu		10-35	50-95	25-50	70-95	120-150	50-70	95	120-150	185	95	120-150	185	240-300	185	240-400	300	400-630
	Al Cu		10-35	50-95	25-70	95	120-150	50-70	95-120	150-185	240	95-120	150-185	240	300	185-240	300-400	300-400	500-630
	Al Cu	90°	-	35-70	25-50	70	95	50	70	95-120	150	-	95	120-150	185-240	-	185-240	-	300-400
		120°	-	35-70	25-35	50	70-95	50	70	95	120-150	-	95	120	150-240	-	185	-	300-400
	L = mm		40	35	60		55	70			65	75			70	90	85	120	115

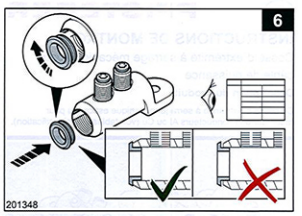


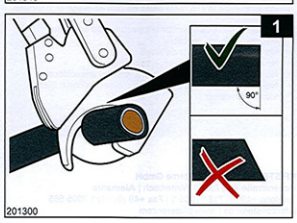


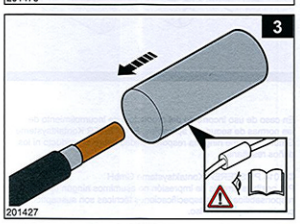


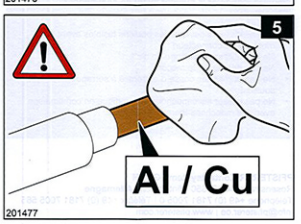


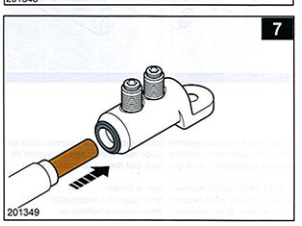


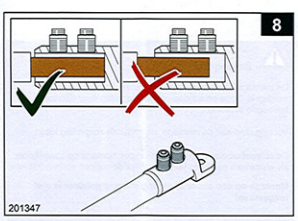


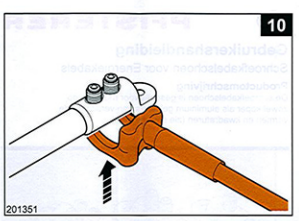


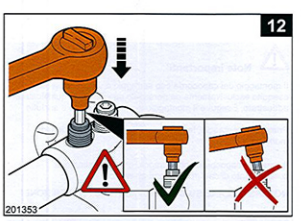


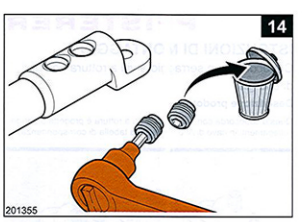


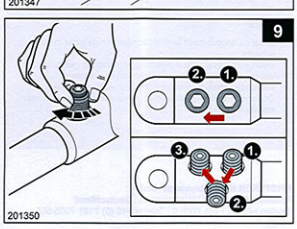


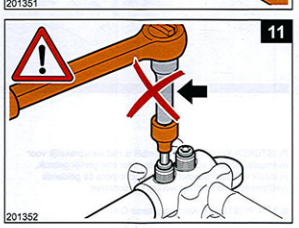


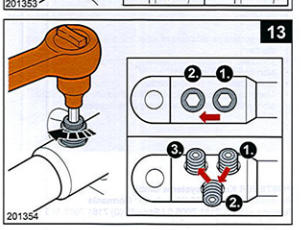


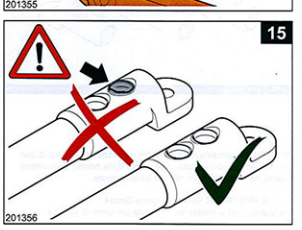


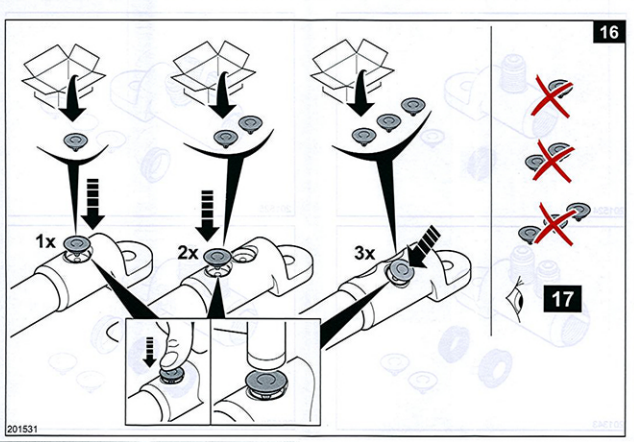


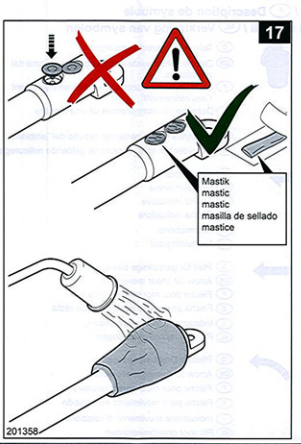


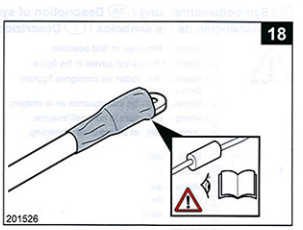












General Handling, Storage and Installation Instructions

The Quality Connection

LEONI

STUDER CABLES

This information is intended to offer recommendations related to the installation of power cables, in order to prevent damage or deterioration, to ensure safety, functionality and protection from inappropriate handling before and during installation.

Handling

Upon receipt, and before acceptance of a shipment, all reels should be inspected for evidence of damage during shipment. This damage would include broken flanges, damaged wrapping or lagging, interlocked flanges, reels broken loose from their ties or blocking, check by defect or missing end caps etc. Any signs of such damage should immediately be reported to the carrier.

If the protective wrapping or lagging is removed to inspect for possible damage during shipment, it should be replaced prior to placing the reel into long term storage.

Unloading of reels from the delivery truck must be accomplished in a manner that prevents the transfer equipment from coming into contact with either the cable itself or the protective covering over the reel.

A crane may be used to lift reels using a steel shaft of sufficient strength placed through the arbour holes. The shaft must be lifted using a spreader bar to prevent the lifting cable or chain from pressing against the reel flanges. The force exerted by improperly positioned slings has been known to break reel flanges, resulting in damaging the cable.

Reels never should be dropped from the delivery vehicle to the ground.

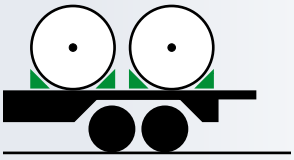
Lifting of specific cable lengths on the site shall respect the same handling procedure mentioned above, i.e. by using drums.

Storage

Reels should be stored in an area reserved for this purpose. The location shall be accessible to forklifts and trucks, but apart from areas of constant traffic. Suitable barriers should be erected to prevent damage from moving equipment. Reels must be stored in an area where they cannot be damaged by falling objects, chemical spills including oil and grease, open flames or welding operations, and excessive heat. Whenever possible, reels should be stored indoors to provide maximum protection.

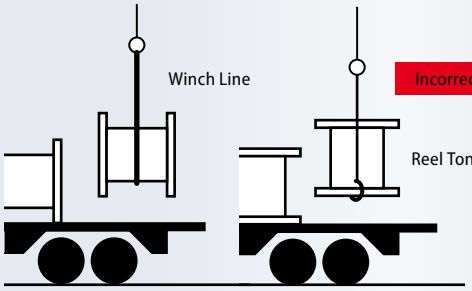
If the cable must be stored outside, the reels should be placed on a hard, well-drained surface with an overhead protection or be covered with a suitable material such as canvas or opaque polyethylene to avoid prolonged exposure to sunlight or rain.

If only a portion of the cable is used, the open end of the cable remaining on the reel should be re-sealed in a manner equivalent to the factory seal (with end caps) to prevent the entrance of moisture. After re-sealing, the cut end should be fixed to the

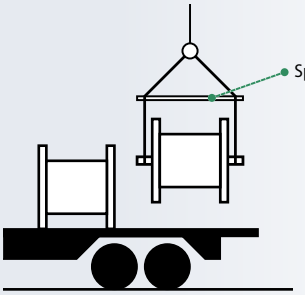


Correct

Load with flanges on edge and chock securely.

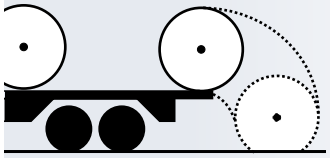


Incorrect



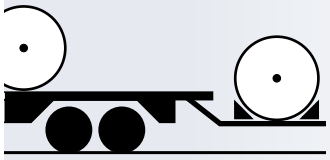
Correct

Reels should be liftet with a shaft extending through both flanges



Incorrect

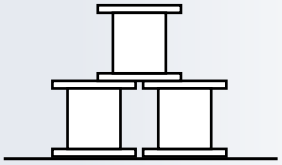
Never drop reels from trailer



Correct

Reels should be lowered using hydraulic gate, hoist or forklift

LOWER CAREFULLY

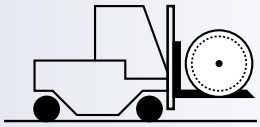


Incorrect

Inspect all reels. Reels laying flat should be refused or received subject to inspection.

Incorrect

Do not allow forks to touch cable or reel wrap.



Incorrect

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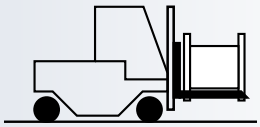

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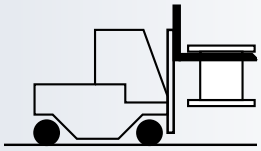
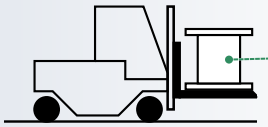


Incorrect

Do not allow forks to touch cable or reel wrap.

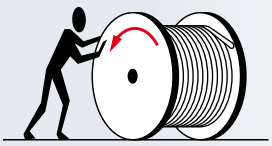


Correct

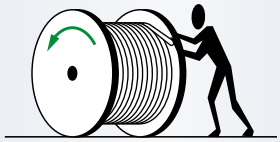
This method OK for Low Voltage Cable ONLY.

If a fork lift truck is used, the forks shall be placed at a 90° angle to the flanges, and must be long enough to make contact with both flanges. **Under no circumstances should the forks directly touch the cable or protective covering.**

Incorrect



Correct



When a reel is rolled from one point to another, care shall be taken to ensure that the reel does not straddle objects such as rocks, pipes, or wooden blocks which could damage the cable or protective covering.
A reel should always be rolled in the direction indicated by arrows on the flange in order to avoid unintended uncoiling.

inside edge of the reel flange to prevent the end from extending beyond the flanges during reel movement.

Reels should always be stored with their flanges vertical. They shall not be stored on their sides or stacked one on top of another. Care should be taken that reels cannot roll into one another, so that the flange of one reel hits the surface of cable on another reel.

If necessary, reel flanges should be chocked to prevent movement.Storage of cable drums shall respect the environment temperature range as mentioned in the specific cable data sheets.

Installation

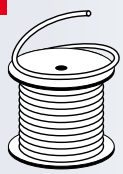
Minimum temperature during installation

- To avoid risk of damage during handling, the cable should be installed only when both the cable and ambient temperature are above **+ 5 °C** and precautions have been taken to maintain the cable above this temperature. Low temperatures create handling and pulling difficulties of varying degrees depending on cable construction and installation location.

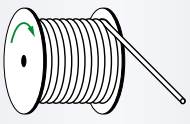
Laying

- **Drums should be mounted in a manner that the cable is pulled from the top of the drum.**
  Cable rollers are recommended to prevent the cable from touching the ground. Correct positioning of rollers is important to keep friction to a minimum. The cable should preferably be drawn to its final position in a continuous manner. During stops, the cable will settle between rollers and may cause high strain on men and machines during restarting. Whether the pulling is manual or with a winch, it is necessary for one man to be stationed at the drum with a plank of wood wedged against the flange of the drum so that over-running

Incorrect



Correct



Special care shall be taken during uncoiling or unreeling cables since their performance is substantially influenced by the way in which they are handled. Reverse bending or twisting can cause internal damage which can adversely affect the lifetime of the cable.
The cable should never be pulled over the flange of a reel, or pulled off the side of a coil. The mechanical forces occurring due to torsion can seriously damage the cable or cable elements such as the armour, braid, shielding etc.

of the drum is prevented if the pulling stops. Otherwise, many loose turns can easily develop on the drum.

- **In any case the maximum pulling load must be strictly observed.**
- **The pulling load shall be increased constantly up to the maximum allowed values without jerky movement.**
- **Under no circumstances should the bending radius be less than the minimum permissible limits.**
  It is particularly important to have a generous bending radius when cables are to be pulled by a power winch, so as to keep within the maximum permissible pulling tension and to prevent the cable being flattened around bends or in cable laying systems (ducts, trays, etc.).

Installation parameters

- **Recommended standard values for the minimum bending radii**

Type of cable	Min. bending radius
	Cable ∅ × factor
Single core unarmoured	18
Single core armoured	20
Multicore unarmoured > 95 mm²	15
Multicore unarmoured > 120 mm²	18
Multicore armoured	20

- **Maximum permissible tensile load during installation**

Type of cable	Formula	Factor
	P	N/mm²
Single core unarmoured (Cu)	$\sigma \times A$	$\sigma = 50$
Single core unarmoured (Al)	$\sigma \times A$	$\sigma = 30$
Multicore unarmoured (Cu)	$\sigma \times A$	$\sigma = 50$
Multicore unarmoured (Al)	$\sigma \times A$	$\sigma = 30$
Single core steel wire armoured	$K \times d^2$	$K = 9$
Multicore steel wire armoured	$K \times d^2$	$K = 9$
Single core steel tape armoured	$K \times d^2$	$K = 3$
Multicore steel tape armoured	$K \times d^2$	$K = 3$

P = Pulling load in N
σ = Maximum permissible tensile load in N/mm²
A = Algebraic sum of conductor cross sections in mm² (without elements such as braid, shielding etc.)
d = Overall cable diameter in mm
K = Empirically calculated factor

- **Fire resistant cables with halogen free flame retardant outer sheath need to be handled with specific care during installation. While special additives are used in the formulation of their compounds to achieve the typical characteristics e.g.:** Limited Oxygen Index, Low Smoke Density, No Acid Gas Release and Flame Retardancy, some of their mechanical properties are decreasing.
- **When pulled on cable trays special attention is required to avoid scrubbing on any uneven or unusually rough surface.**
- **Rollers and bends should not have any sharpness which may damage the outer sheath.**

Note: Discrepancies with the above mentioned instructions require to be coordinated/clarified with the manufacturer. Particular attention should be paid to relevant local Safety Regulations, Technical Specifications and Environmental Prescriptions.

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