

## Description

### Background of the invention

The invention relates to cable connectors and to a method for the processing of the end of a screened, multicore round cable provided with an outer sheath, and the subsequent connection thereof to a connector.

Such multicore round cables are increasingly used as control cables between peripheral equipment and signal processors. In this connection, the structure of the round cable is such that a number of signal wires are at least jointly and possibly separately metal-screened. As a result, these signal wires are screened against outside influences or they cannot radiate outwards when pulsed signals are transmitted over these signal wires. Because the screening is of considerable importance in these cases, the processing of the extremity of such a cable, for example when connecting to a cable connector, is difficult. In practice even complicated tools and cumbersome method steps are used for this purpose.

### Summary of the invention

The invention aims at providing as practical a method as possible for the processing of the end of a screened round cable and the subsequent connection of the latter to a cable connector. The method requires only a limited number of processing steps and simple tools. The costs are therefor relatively low.

The method of the present invention is achieved by means of the steps of:

a. cutting into the outer sheath of a cable down to the metallic screen along and completely around two circumferential lines spaced apart so that to form an auxiliary sheath tube therebetween, and also a form an end sheath tube toward the end of the cable;

b. sliding the end sheath tube aside for a distance and then sliding it back again with the screening so that the said screening initially beneath the end sheath tube bunches up, subsequently cutting off the bunched up screening, and removing of the end sheath tube and the severed screening;

c. sliding the auxiliary sheath tube aside over the edge of the cut-off screening and sliding it back again along with the screening initially beneath the auxiliary sheath tube so that said screening bunches up, and subsequent folding the bunched up screening all round over the auxiliary sheath tube; and

d. stripping the insulation from the separate conductors, connecting the conductors to an insulated contact block of the connector, and contacting a ground terminal of the connector to the folded-over screening.

By means of the above method according to the invention, a very simple processing of a screened cable end is obtained, combined with a very effective cable relief and connection of the cable end to the connector and simultaneous contacting of the latter to the cable screening.

he connector according to the invention is provided with an insulating casing having a cable-relief clamp to be placed inside it and a metallic shielding sleeve fitted with a ground terminal, which sleeve is slid over the insulated contact block to be connected to the cable cores, and a cable clamping cover.

### Brief description of the drawings

The invention will be explained in more detail on the basis of an exemplary embodiment with reference to the drawings, in which;

Figures 1a and 1b show diagrammatically the ten steps, designated I to X, of the method according to the invention; and

Figures 2a and 2b respectively show the connection to the cable connector specified in the steps VI to X of Fig. 1b via a rectilinearly terminating and laterally terminating cable end respectively;

Figures 3a and 3b show the connector of Fig. 2a and 2b respectively in assembled form; and

Figure 4 shows a connecting adaptor which can be plugged on to the connector of Fig. 3a and 3b.

### Description of the preferred embodiments

Figure 1a illustrates the five steps I to V of the method of the present invention.

In step I, a support ring 3 is placed around the end 1 of a multicore, screened round cable as an auxiliary tool in the position diagrammatically indicated in the figure. Subsequently, with the aid of cutting means not specified, or shown, the plastic outer sheath of the round cable is cut into down to the screening first along a circumference 2 and then along a circumference 2'. In this process a severed end sheath tube 4 and a severed auxiliary sheath tube 5 are produced.

In step II, the severed end sheath tube 4 is slid aside over a distance towards the cable end so that a part of the metallic screen 6 is exposed, and the support ring is slid up.

In step III, the support ring 3 is positioned at the cut edge 2 and the severed end sheath tube is clamped. Subsequently, this end sheath tube is slid back along with the screening 6 so that the latter bunches up against the support ring as shown. The bunched-up screening is then cut off with the aid of cutting means.

In step IV, the end sheath tube is then removed along with the severed screening. The support ring 3 is also drawn back. The auxiliary sheath tube 5 is then slid aside towards the cable end over the edge of the severed screening so that the latter is smoothed out.

In step V, the auxiliary sheath tubes is slid back to its original position and subsequently clamped. In this process the screening is bunched up and is then subsequently folded back 11 over the auxiliary sheath tube.

In Figure 1b, the subsequent steps VI to X of the method are illustrated. These will be explained in conjunction with the connector in Figures 2a and 2b.

In step VI, the separate signal conductors or

wire 7, exposed in the previous step, are selected and placed in sequence in a positioning clamp 8. The separate signal wires are then, if necessary, stripped of insulation and cut to length. The contacts are then fitted.

In step VII, the contacts are placed in an insulated contact block 9 of the connector with the aid of the positioning clamp. Contact blocks such as the PV<sup>TM</sup> receptacles and Dubox<sup>TM</sup> receptacles sold commercially by the assignee of the present application can be employed for this purpose.

In step VIII, the positioning clamp 8 is removed and a metallic shielding sleeve 10 is fitted over the contact block 9 of the connector, during which process a ground terminal 12 of the shielding sleeve is brought into contact with the screening 11 of the cable.

In step IX, a strain relief clamp 13a, 13b is placed on the cable at the location of the folded-over screening 11. This clamp may have the embodiment shown in Figures 2a and 2b respectively for a rectilinearly terminating cable end 1a and a laterally terminating cable end 1b.

In step X, the insulating outer casing 14 of the connector is placed over the shielding sleeve 10, after which the cable clamping piece 15a, 15b (shown in Figs. 2a, 2b) is pressed on and secures the cable.

Figures 3a and 3b show the final form of the connection of the cable to the connector according to Figures 2a and 2b.

Figure 4 shows a connecting adaptor which can be plugged onto the connector shown in Figures 3a and 3b for further connection to electrical circuits or equipment.

It will be understood that the foregoing is merely illustrative of the principles of the invention and that various modifications can be made by those skilled in the art without departing from the scope of the invention.

#### Claims

1. A method for the processing of the end of a screened, multicore round cable having an outer sheath and the connection of said cable end to a connector comprising the steps of

a. cutting into the outer sheath down to the metallic screen along and completely around two circumferential lines (2, 2') spaced apart so as to form an auxiliary sheath tube (5) therebetween, and also to form an end sheath tube (4) towards the end of the cable;

b. sliding the end sheath tube (4) aside for a distance and then sliding it back again with the screening (6) so that said screening initially beneath the end sheath tube bunches up, subsequently cutting off the bunched up screening, and removing of the end sheath tube and the severed screening;

c. sliding the auxiliary sheath tube (5) aside over the edge of the cut-off screening and sliding it back again along with the screening initially beneath the auxiliary sheath tube so that said screening bunches up, and subsequent folding

the bunched up screening all round over the auxiliary sheath tube; and

d. stripping the insulation from the separate conductors (7), connecting the conductors to an insulated contact block of the connector, and contacting a ground terminal of the connector to the folded-over screening.

2. The method according to claim 1, further comprising the additional steps of placing a support ring (3) around the cable adjacent to circumferential lines to be cut, sliding up and securing of the support ring at one of the circumferential lines after the sliding aside the end sheath tube, and removing the support ring after severing of the screening.

3. The method according to claim 2, further comprising the additional steps of clamping the end sheath tube (4) after it is slid aside for a distance, and clamping the auxiliary sheath tube (5) after it is slid aside over the edge of the severed screening.

4. The method according to claim 1, further comprising the additional steps of selecting of the separate conductors (7) and the securing of said conductors in a positioning clamp (8) of the connector.

5. The method according to claim 4, further comprising the additional steps of removing the positioning clamp (8) after the conductors have been connected to the insulated contact block, and placing a metallic shielding tube of the connector, fitted with the ground terminal, over the insulated contact block.

6. The method according to claim 5, further comprising the additional step of placing an insulating cable strain relief clamp (13a, b) of the connector over the cable at the position of the folded-over screening.

7. The method according to claim 5 further comprising the additional steps of placing an insulating casing (14) of the connector over the shielding tube and placing on said shielding tube a cable clamping cover of the connector.

8. A connector for use in the method of claim 1 comprising an insulating casing having a cable strain relief clamp (13a, b) which is located within said casing and a metallic shielding sleeve (10) fitted with a ground terminal, said sleeve being slideable over an insulated contacted block which is connected to the cable conductors, and a cable clamping cover.

#### Patentansprüche

1. Verfahren zum Bearbeiten des Endes eines abgeschirmten, mehradrigen, runden Kabels, das einen Aussenmantel hat, und der Verbindung des Kabelendes mit einem Verbinder, welches die Schritte aufweist:

a. Einschneiden in den Aussenmantel bis zu der metallischen Abschirmung längs und vollständig um zwei beabstandete Umfangslinien (2, 2') derart, dass dazwischen ein Hilfsmantelrohr (5) gebildet wird und auch ein Endmantelrohr (4) in Richtung des Endes des Kabels gebildet wird,

wire 7, exposed in the previous step, are selected and placed in sequence in a positioning clamp 8. The separate signal wires are then, if necessary, stripped of insulation and cut to length. The contacts are then fitted.

In step VII, the contacts are placed in an insulated contact block 9 of the connector with the aid of the positioning clamp. Contact blocks such as the PV<sup>TM</sup> receptacles and Dubox<sup>TM</sup> receptacles sold commercially by the assignee of the present application can be employed for this purpose.

In step VIII, the positioning clamp 8 is removed and a metallic shielding sleeve 10 is fitted over the contact block 9 of the connector, during which process a ground terminal 12 of the shielding sleeve is brought into contact with the screening 11 of the cable.

In step IX, a strain relief clamp 13a, 13b is placed on the cable at the location of the folded-over screening 11. This clamp may have the embodiment shown in Figures 2a and 2b respectively for a rectilinearly terminating cable end 1a and a laterally terminating cable end 1b.

In step X, the insulating outer casing 14 of the connector is placed over the shielding sleeve 10, after which the cable clamping piece 15a, 15b (shown in Figs. 2a, 2b) is pressed on and secures the cable.

Figures 3a and 3b show the final form of the connection of the cable to the connector according to Figures 2a and 2b.

Figure 4 shows a connecting adaptor which can be plugged onto the connector shown in Figures 3a and 3b for further connection to electrical circuits or equipment.

It will be understood that the foregoing is merely illustrative of the principles of the invention and that various modifications can be made by those skilled in the art without departing from the scope of the invention.

#### Claims

1. A method for the processing of the end of a screened, multicore round cable having an outer sheath and the connection of said cable end to a connector comprising the steps of

a. cutting into the outer sheath down to the metallic screen along and completely around two circumferential lines (2, 2') spaced apart so as to form an auxiliary sheath tube (5) therebetween, and also to form an end sheath tube (4) towards the end of the cable;

b. sliding the end sheath tube (4) aside for a distance and then sliding it back again with the screening (6) so that said screening initially beneath the end sheath tube bunches up, subsequently cutting off the bunched up screening, and removing of the end sheath tube and the severed screening;

c. sliding the auxiliary sheath tube (5) aside over the edge of the cut-off screening and sliding it back again along with the screening initially beneath the auxiliary sheath tube so that said screening bunches up, and subsequent folding

the bunched up screening all round over the auxiliary sheath tube; and

d. stripping the insulation from the separate conductors (7), connecting the conductors to an insulated contact block of the connector, and contacting a ground terminal of the connector to the folded-over screening.

2. The method according to claim 1, further comprising the additional steps of placing a support ring (3) around the cable adjacent to circumferential lines to be cut, sliding up and securing of the support ring at one of the circumferential lines after the sliding aside the end sheath tube, and removing the support ring after severing of the screening.

3. The method according to claim 2, further comprising the additional steps of clamping the end sheath tube (4) after it is slid aside for a distance, and clamping the auxiliary sheath tube (5) after it is slid aside over the edge of the severed screening.

4. The method according to claim 1, further comprising the additional steps of selecting of the separate conductors (7) and the securing of said conductors in a positioning clamp (8) of the connector.

5. The method according to claim 4, further comprising the additional steps of removing the positioning clamp (8) after the conductors have been connected to the insulated contact block, and placing a metallic shielding tube of the connector, fitted with the ground terminal, over the insulated contact block.

6. The method according to claim 5, further comprising the additional step of placing an insulating cable strain relief clamp (13a, b) of the connector over the cable at the position of the folded-over screening.

7. The method according to claim 5 further comprising the additional steps of placing an insulating casing (14) of the connector over the shielding tube and placing on said shielding tube a cable clamping cover of the connector.

8. A connector for use in the method of claim 1 comprising an insulating casing having a cable strain relief clamp (13a, b) which is located within said casing and a metallic shielding sleeve (10) fitted with a ground terminal, said sleeve being slideable over an insulated contacted block which is connected to the cable conductors, and a cable clamping cover.

#### Patentansprüche

1. Verfahren zum Bearbeiten des Endes eines abgeschirmten, mehradrigen, runden Kabels, das einen Aussenmantel hat, und der Verbindung des Kabelendes mit einem Verbinder, welches die Schritte aufweist:

a. Einschneiden in den Aussenmantel bis zu der metallischen Abschirmung längs und vollständig um zwei beabstandete Umfangslinien (2, 2') derart, dass dazwischen ein Hilfsmantelrohr (5) gebildet wird und auch ein Endmantelrohr (4) in Richtung des Endes des Kabels gebildet wird,





b. zur Seite schieben des Endmantelrohrs (4) um einen Weg und dann Zurückschieben desselben mit der Abschirmung (6), so dass die zu Beginn unter dem Endmantelrohr liegende Abschirmung aufsitzt, anschliessendes Abschneiden der aufsitzenden Abschirmung und Entfernen des Endmantelrohrs und der abgetrennten Abschirmung,

c. Verschieben des Hilfsmantelrohrs (5) über den Rand der abgeschnittenen Abschirmung zur Seite hin und Zurückschieben desselben zusammen mit der zu Beginn unter dem Hilfsmantelrohr liegenden Abschirmung, so dass die Abschirmung aufsitzt, und anschliessendes Falten der aufsitzenden Abschirmung insgesamt um und über das Hilfsmantelrohr, und

d. Abstreifen der Isolierung von den gesonderten Leitern (7), Verbinden der Leiter mit einem isolierten Kontaktblock des Verbinders und Kontaktierung eines Erdungsanschlusses des Verbinders mit der übergeschalteten Abschirmung.

2. Verfahren nach Anspruch 1, das ferner die zusätzlichen Schritte aufweist, gemäss denen ein Stützring (3) um das Kabel angrenzend an die zu schneidenden Umfangslinien gelegt wird, der Stützring an einer der Umfangslinien nach dem Wegschieben des Endmantelrohrs zur Seite hin aufgeschoben und festgelegt wird und der Stützring nach dem Durchtrennen der Abschirmung abgenommen wird.

3. Verfahren nach Anspruch 2, das ferner die zusätzlichen Schritte aufweist, gemäss denen das Endmantelrohr (4) nach seinem Seitwärtsschieben um einen Weg festgeklemmt wird und das Hilfsmantelrohr (5) nach dem Beiseiteschieben über den Rand der durchgetrennten Abschirmung festgeklemmt wird.

4. Verfahren nach Anspruch 1, das ferner die zusätzlichen Schritte aufweist, gemäss denen die gesonderten Leiter (7) ausgewählt werden und die Leiter in einer Positionierklemme (8) des Verbinders festgelegt werden.

5. Verfahren nach Anspruch 4, das ferner die zusätzlichen Schritte aufweist, gemäss denen die Positionierklemme (8) abgenommen wird, nachdem die Leiter mit dem isolierten Kontaktblock verbunden sind und ein metallisches Abschirmungsrohr des Verbinders, das passend mit dem Erdungsanschluss verbunden ist, über den isolierten Kontaktblock gelegt wird.

6. Verfahren nach Anspruch 5, das ferner die zusätzlichen Schritte aufweist, gemäss denen eine Isolierkabel-Zugbeanspruchungsentlastungsklemme (13a, b) des Verbinders über das Kabel an der Stelle der übergefalteten Abschirmung gelegt wird.

7. Verfahren nach Anspruch 5, das ferner die zusätzlichen Schritte aufweist, gemäss denen ein Isoliergehäuse (14) des Verbinders über das Abschirmungsrohr gelegt wird und eine Kabelklemmabdeckung des Verbinders auf das Abschirmungsrohr gelegt wird.

8. Verbinders zur Verwendung bei dem Verfahren nach Anspruch 1, welcher ein Isoliergehäuse aufweist, das eine Kabelzugbeanspruchsentla-

stungsklemme (13a, b) hat, die in dem Gehäuse vorgesehen ist, und eine metallische Abschirmungshülse (10) hat, die passend mit einem Erdungsanschluss verbunden ist, wobei die Hülse über einen isolierten Kontaktblock schiebbar ist, der mit den Kabelleitern verbunden ist und der eine Kabelklemmabdeckung aufweist.

## Revendications

1. Un procédé pour le traitement de l'extrémité d'un câble rond, multiconducteur blindé comportant une gaine extérieure et la connexion de ladite extrémité de câble à un connecteur, comportant les étapes qui consistent à:

a. à sectionner la gaine extérieure jusqu'au blindage métallique le long et complètement autour de deux lignes (2, 2') circonférentielles écartées l'une de l'autre de manière à former entre elles un tube de gaine auxiliaire (5) et de former aussi un tube de gaine d'extrémité (4) vers l'extrémité du câble;

b. à faire glisser le tube de gaine d'extrémité 4 de côté sur une certaine distance puis à la faire glisser en arrière sur le câble avec le blindage (6) de telle sorte que ledit blindage situé initialement au-dessous du tube de gaine d'extrémité foisonne, et subséquemment à sectionner le blindage foisonné et à enlever le tube de gaine d'extrémité et le blindage sectionné;

c. à faire glisser le tube de gaine auxiliaire (5) de côté au-dessus du bord du blindage sectionné puis à le faire glisser en arrière sur le câble en même temps que le blindage situé initialement au-dessous du tube de gaine auxiliaire de sorte que ledit blindage foisonne, puis à replier subséquemment le blindage foisonné tout autour et au-dessus du tube de gaine auxiliaire; et

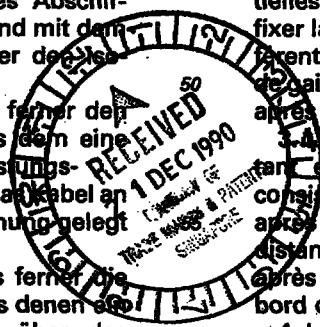
d. à dénuder ou enlever l'isolement des conducteurs séparés (7) en connectant les conducteurs à un bloc de contact du connecteur et à relier une borne de terre du connecteur au blindage replié.

2. Un procédé selon la revendication 1, qui comporte en outre les étapes supplémentaires qui consistent à placer une bague support 3 autour du câble, adjacente aux lignes circonférentielles devant être sectionnées, à faire glisser et à fixer la bague support sur l'une des lignes circonférentielles, après avoir fait glisser de côté le tube de gaine d'extrémité et à enlever la bague support après avoir sectionné le blindage.

3. Le procédé selon la revendication 2 comportant en outre les étapes supplémentaires qui consistent à serrer le tube de gaine d'extrémité (4) après qu'on l'a fait glisser de côté sur une certaine distance, et à serrer le tube de gaine auxiliaire (5) après qu'on l'a fait glisser de côté au-dessus du bord du blindage sectionné.

4. Le procédé selon la revendication 1 comportant en outre les étapes supplémentaires qui consistent à choisir les conducteurs séparés (7) et à fixer les-dits conducteurs séparés sur un serre-fil (8) de positionnement du connecteur.

5. Le procédé selon la revendication 4 comportant en outre les étapes supplémentaires qui



consistent à enlever le serre-fil (8) de positionnement après que les conducteurs ont été connectés au bloc de contact isolé et à placer un tube de protection métallique du connecteur, équipé de la borne de terre, au-dessus du bloc de contact isolé.

6. Le procédé selon la revendication 5, comportant en outre l'étape supplémentaire qui consiste à placer un serre-joint isolant de soulagement des tractions (13a, b) du connecteur au-dessus du câble à l'emplacement du blindage replié.

7. Le procédé selon la revendication 5 comportant en outre les étapes supplémentaires qui consistent à placer un boîtier isolant (14) du

connecteur au-dessus du tube de protection et à placer sur ledit tube de protection un couvercle de serrage de câble du connecteur.

8. Un connecteur destiné à être employé dans le procédé selon la revendication 1 comprenant un boîtier isolant ayant un serre-joint de soulagement des tractions (13a, b) qui est situé à l'intérieur du-dit boîtier et un manchon de protection métallique (10) équipé d'une borne de terre, ledit manchon pouvant glisser au-dessus d'un bloc de contacts isolant qui est connecté aux conducteurs du câble, et un couvercle serrant le câble.

