MODULAR SECONDARY CONNECTOR

7 Claims, 3 Drawing Figs.

ABSTRACT: Modular insulated connector for add-on underground residential distribution systems.
MODULAR SECONDARY CONNECTOR

This invention relates to electrical connectors and in particular to preinsulated modular secondary connectors for underground residential distribution systems. Multiple tap insulated connectors for making secondary or low voltage connection between a supply line and a number of residential installations are known. Unused taps remain available for subsequent connection to new installations. Since they must be thoroughly insulated when not in use, the insulation must first be removed when a new connection is desired. Since the several leads are permanently positioned, connecting cables must be first maneuvered into position to permit forming the connection. Only a fixed number of connections is possible, and surplus taps are therefore commonly provided for possible subsequent use.

The present invention provides a modular connector capable of accepting any desired number of tap connection modules within the current-carrying capacity of the system. Each module is self-insulated and is easily and quickly introduced into the assembly without requiring preliminary removal of insulation. The modules may be placed in any desired direction. Since modules are added only as required, no surplus taps are necessary.

A presently preferred form of the invention is illustrated in the accompanying drawing, in which:

FIG. 1 is a plan view, partly cut away to show interior detail, of a modular secondary connector having three taps,

FIG. 2 is a sectional view taken approximately at line 2-2 of FIG. 1, and

FIG. 3 is a sectional view taken approximately at line 3-3 of FIG. 1.

The assembly 10 of FIG. 1 will be seen to consist of three T-connection tap modules 11, 12, 13 held together with a bolt 14 and nut 15. For purposes of illustration the three modules each have a different cable contact extension; but it will be apparent that any combination of such elements may equally well be used. By selection of a bolt of suitable length it will also be apparent that any number of modules may be secured together.

As more specifically shown in FIG. 2 for module 11, the module comprises an annular body 16 having flat parallel end faces and a radial extension forming an elongate terminal 17, and covered with a rubber insulating coating 18. In the relaxed position the rubbery coating extends beyond the flat end face of the annular body 16 a distance sufficient to provide a water-impenetrable seal when two adjacent modules are drawn into metal-to-metal contact by the bolt 14 and nut 15.

Full conductive contact between modules may be achieved by face-to-face contact as shown between modules 12 and 13. The simple structure there indicated provides maximum economy and is entirely adequate where a specified number of modules are to be permanently combined.

An alternative structure, shown at the juncture of modules 11 and 12 in FIG. 1 and in lateral cross section in FIG. 3, employs a doubly tapered seize ring 19 fitting within corresponding tapered annular channels 20, 21 in the opposing faces of the two modules. Once the modules are forced together, the ring 19 becomes permanently seized or welded to the annular bodies to form a permanent junction. The bolt 14 may then be withdrawn without separation of the modules, thereby facilitating the insertion of a longer bolt and the addition of further modules as desired.

Terminal 17 is illustrated in FIGS. 1 and 2 as a simple crimp type tubular terminal for making permanent contact with a bar cable-end by mechanical crimping. The insulation 18 in this case covers only the first portion of the terminal. The terminal 17' of module 12 has a tapered socketlike open interior for accepting a tapered terminal plug, not shown. A key 22 fitting within a hole in the sidewalk is urged inwardly by the elastic covering 18' for retaining the suitably grooved plug. The insulating covering 18' extends slightly beyond the open end of the terminal 17' and is constricted to provide a tight seal over the connecting plug or cable. The terminal 17'' of module 13 consists of a half cylinder which mates with a corresponding half-cylinder terminal plug, not shown, being held in close contact therewith by a screw 23.

Particularly in the case of modules 11 and 13 as illustrated it will be appreciated that the terminal and the cable are to be provided with further sealants, insulating and protective coverings, and the like at the area of contact, e.g. by wrapping with rubbery adherent strip material, or by covering with an elastic tube, or by other means.

The head 24 of the bolt 14 is permanently covered with an insulating cap 25 bonded thereto and which, similarly to the coverings 18, extends slightly beyond the flat forward face of the head and when placed under compression forms a tight seal with said covering. The nut 15 is also covered with a tightly fitting insulating covering 26. In order to permit tightening of the nut 15, the covering 26 is supplied as a separate component which is snapped over the nut after the connector has been otherwise assembled. An inner ridge 27 fits into a peripheral groove 28 in the nut for this purpose.

In a typical example, the annular ring 16 has an outer diameter of 1.25 inch (31.6 mm.) and an inner diameter of 0.65 inch (16.5 mm.), and is 1.80 inches (4.6 cm.) between the two end faces. The terminal 17 extends a total of 3.50 inches (8.9 cm.) from the center of the ring and has an outer diameter of 1 inch (2.5 cm.). The modules are mounted on a ¾-inch (15.4 mm.) bolt. All metal parts are of aluminum. The insulating covering has a minimum thickness of about one-eighth inch (4 mm.), and is a hard rubbery material, preferably of "Nordil" ethylene-propylene terpolymer, having a Shore A dentsometer value of about 60. The polymer coating extends about 0.03 inch (0.75 mm.) past the contacting metal surface in each instance, and is lightly beveled at the edges so that full metal-to-metal contact may be attained.

What I claim is:

1. A module for a modular secondary connector comprising an annular metal body having flat parallel end faces and a radial extension forming a cable-receiving terminal, and an elastomeric insulating coating over said body and at least the first portion of said extension and extending fractionally past the plane of each of said faces.

2. The module of claim 1 wherein said body is provided with an annular lightly tapered channel at each of said faces, and including a doubly lightly tapered seize ring fitting within one of said channels and the opposite channel of an adjacent module.

3. A modular assembly of a plurality of modules as defined in claim 1 including terminally insulated bolt and nut means holding said modules in tight face-to-face contact.

4. A modular assembly of a plurality of modules as defined in claim 2 including terminally insulated bolt and nut means holding said modules in tight face-to-face contact.

5. The assembly of claim 3 wherein said nut is circumferentially exteriorly grooved and is covered with a correspondingly internally ridged insulative elastomeric cap.

6. Method of connecting cables suitable for use in underground residential distribution systems comprising connecting each said cable to a connector module as defined in claim 1, insulatingly protecting the connection, and assembling said modules together under compression sufficient to provide tight conductive contact between adjacent faces of said modules and to compress the adjacent fractional extensions of said insulating coatings to form a water-impenetrable seal.

7. Method of connecting cables suitable for use in underground residential distribution systems comprising connecting each said cable to a connector module as defined in claim 2, insulatingly protecting the connection, assembling said modules with an intervening seize ring between each two adjacent modules along a central support, and compressing said modules and ring together under pressure sufficient to cause seizure of said rings in said modules and permanent conductive contact between said modules and to compress the adjacent fractional extensions of said insulating coatings to form a water-impenetrable seal.