

TOTOKU Has Developed AWG 12-Sized Triple Insulated Winding Wires of Multiple Stranded Conductors

— Contributing to the increased efficiency, miniaturization and weight reduction of transformers for electric vehicles and servers

TOTOKU ELECTRIC CO., LTD. (HQ : Minato-ku, Tokyo, President : Hiroshi Kawaguchi) is pleased to announce that it has developed triple insulated winding wires (TIW) which can be used under the high electric current of transformers used for electric vehicles and servers, and which can contribute to the increased efficiency, miniaturization and weight reduction of these transformers.

The number of wires stranded has been hugely increased to enlarge the cross-section of the conductor. Nonetheless, the finished outer diameter is small, using the wound tape insulation technology that TOTOKU alone has in Japan. TOTOKU will be preparing for mass production which will commence by February 2023.

Background behind the Development

Electronic devices require power sources that supply stable direct current with limited voltage fluctuation. These power sources are equipped with high frequency transformers which are decisive parts for performance.

Amid the shift towards a carbon-free society, demand for electric vehicles is growing. Big data is processed at high speeds on servers. Transformers for these devices must support a high electric current and exhibit high efficiency. The transformers for electric vehicles must be both small and lightweight.

Details of the Development

TOTOKU's TIW has features including low loss and a smaller finished outer diameter than the wire produced by the general extrusion method.

The low loss is attained by the use of multiple stranded conductors, and the small diameter is achieved because of the three-layer thin tape insulation winding. These features pave the way for transformers that are highly efficient, small and lightweight.

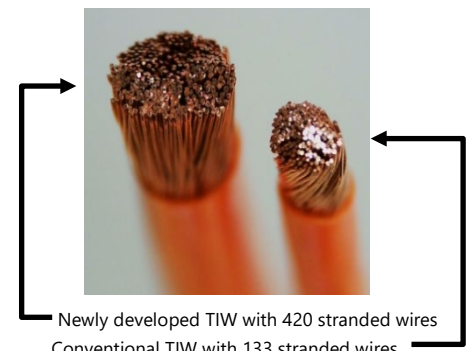
The maximum conductor diameter of tape-wound TIW is equivalent to American Wire Gauge (AWG)¹ 17. It was achieved using 133 wires with a 0.10 mm diameter. TOTOKU recently advanced its original wound tape insulation technology to open the way for wound tape insulation for 420 stranded conductors and for the development of an AWG 12 TIW.

Its conductor cross-section is about threefold that of the 133-wire TIW. Despite this, the wound tape insulation achieved a smaller finished outer diameter. With its higher efficiency, small size and light weight, the new product will significantly contribute to the creation of transformers that support high electric currents.

The lineup includes models with Class B and Class F thermal resistance for applications that require thermal resistance.

*1 The AWG number indicates the wire size certified under the UL standard.

| Applications | Transformers for electric vehicles and for servers | |
|---------------------|---|--|
| Main Specifications | Conductor size | AWG 12 (17) with 420 (133) 0.10-mm wires |
| | Conductor cross-section | 3.30 (1.05) mm ² |
| | Standard outer diameter | 3.13 (1.80) mm |
| | Thermal resistance | Class B <130 °C> and Class F <155 °C> |
| | Preparations underway for acquiring UL standard certification | |



Newly developed TIW with 420 stranded wires
Conventional TIW with 133 stranded wires

Figures in parentheses () represent the specifications of TOTOKU's conventional TIW with 133 0.10-mm stranded wires.

Contact: <https://www.totoku.com/inquiry/>

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| Inquiries about this document: | Corporate Planning Department | TEL +81-3-5860-2121 |
| Customer inquiries about products: | Wires&Cables Sales Section, Sales Department | TEL +81-3-5860-2128 |