

NTT Press Releases

August 4, 2014

Publication of World's first^{*1} Technical Requirements for the Next-generation Power supply Interface High Voltage Direct Current power supply system for full-scale introduction by the NTT Group companies in 2016

The Nippon Telegraph and Telephone Corporation (NTT, Chiyoda-ku, Tokyo, Hiroo Unoura (CEO)), has published the Technical Requirements (TR) for "High-Voltage DC (HVDC) power supply system"^{*2} that is considered as the next-generation power supply system, by summarizing technical specifications for introducing them to telecommunication and data-center buildings in NTT group.

The document, titled "Technical Requirements for High-voltage DC Power Supply Interfaces"^{*3}, is based on standards set by the International Telecommunications Union - Telecommunication Standardization Sector (ITU-T).

By opening to the public to this TR, NTT would like to widely stimulate use of HVDC in the information & communication fields. In addition, NTT is continuously making our efforts to tackling energy conservation throughout the ICT fields.

1. Background

The amount of energy consumed in the ICT field has been increasing year by year, and that has been accompanied by an increase in the emission of greenhouse gases, which has become a worldwide issue to be concerned. According to "SMART 2020: Enabling the low carbon economy in the information age"^{*4}, the greenhouse gas emissions in ICT amounted to 0.83 billion tons of CO2 in 2007, or 2% of the world total, but that amount is estimated to nearly double to 1.43 billion tons of CO2 by 2020.

Against that circumstance, the NTT Group which is one of the world largest companies to manage a large number of telecommunication and data-center buildings has been tackling in energy conservation measures under a policy: the Total Power Revolution (TPR), and focusing on the development and introduction of high-voltage DC power supply systems as a future measure. HVDC supply systems are attracting attention as the next-generation system because they have fewer voltage conversion steps than an AC system, so an increase in reliability and a reduction in power loss can be expected. Moreover, increasing the voltage creates advantages such as enabling use of thinner power cable that reduces construction costs (materials and labor) and energy efficiency through improved air flow below the raised flooring of machine rooms in telecommunication or data-center buildings. As an ability and energy usage of ICT equipment become increase, worldwide attention is being focused on HVDC power supply systems because they offer both high reliability and energy efficiency. Due to these advantages, standardization work in ITU-T has become active, and NTT energy and environmental systems laboratories have been leading the International standardization activities. As results, two international Recommendations have been established (ITU-T L.1200, "Direct current power feeding interface up to 400 V at the input to telecommunication and ICT equipment" in May, 2012 and ITU-T L.1201, "Configuration of Direct Current Power Supply Systems Up to 400 V" in March, 2014).

The NTT Group has led the way in introducing HVDC power supply systems, and as a step toward expansion to full-scale introduction of next-generation systems to NTT Group telecommunication and data-center buildings, we have summarized and published technical requirements for connection of HVDC power supply systems and ICT equipment in telecommunication or data-center buildings.

2. Overview of the Technical Requirements (TR)

The main published items are described below.

1) Interface

The input port to ICT equipment has been specified (Fig. 1). (It is also applicable to the input to voltage converters and other points receiving high-voltage DC power)

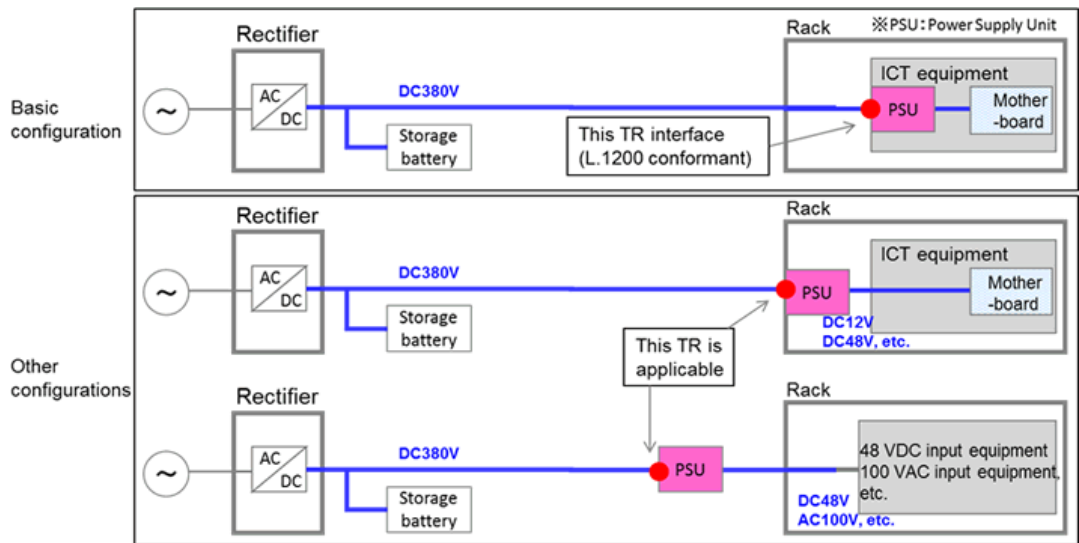


Figure 1. TR interface

2) ICT equipment operating voltage range and nominal voltage

Considering effective use of energy from storage batteries, the operating voltage range is set to from 260 V to 400 V and the nominal voltage is set to 380 V. These values are consistent with the L.1200 specifications and the reference voltage of various operation tests. The nominal voltage of 380 V is widely used around the world.

3) Other

In the requirements, the operating conditions in the case that the voltage is outside the operating voltage range, or supplying power exceeds rated power of the power supply unit in the ICT equipment, and the start-up current as well as various safety factors were taken into account.

The "Technical Requirements for High-voltage DC Power Supply Interfaces and Other Equipment" are available on the NTT public Web site

<http://www.ntt.co.jp/ontime/e/policy/tr/index.html>

3. Future work

We will introduce HVDC power supply system to our telecommunication and data center buildings from fiscal year 2016, in order to improve our energy efficiency. At the same time, we will be expanding introduction of DC power supply system, by flexibly introducing not only ICT equipment directly connected to HVDC system, but also the equipment connected to lower DC voltage (12V, 48V, etc) converted in a rack or in vicinity of a rack.

NTT Group will continuously be tackling on and accelerating conservation of energy. By introducing new power supply technologies, we will create flexible and optimal networks, in order to provide services with lower environment load.

Explanation of Terms

*1 As a result of survey carried out by NTT group until 30/06/2014.

*2 High-voltage DC power supply system (HVDC)

The DC power supply voltage used in telecommunication systems worldwide is 48 VDC. In contrast to that, the range from 300 VDC to 400 VDC or so is referred to as 'high-voltage DC'.

*3 Technical Requirements (TR)

The TR are reference materials that describe the basic NTT technical requirements for telecommunication system designers, manufacturers and other parties involved in the procurement activities of the NTT Group.

Sources

*4 SMART 2020: Enabling the low carbon economy in the information age

<http://www.smart2020.org/>

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