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### A.9.3.

#### Amapcity Program of IEC 60287 and JCS 168E Suitable for KEPCO

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Recently, basic concepts to calculate the current-carrying capability of underground power cables in Korea Electric Power Corporation (KEPCO) changed JCS 163E into IEC 60287. As a result of it, while the current-carrying capability of underground power cables were decreased under the installation of directly buried and duct bank(or pipe), their capability were increased in tunnel. Major reasons to decrease or increase of current-carrying capability according to the status of installation are as follows.

The first reason is that IEC 60287 does not use the reduction factor of soil thermal resistance, but JCS 168E uses the reduction factor of soil thermal resistance. The reduction factor of soil thermal resistance decreases the external resistance of IEC 60287 and as its result their current ratings are increased. It is judged for characteristic of JCS 168E to be reflected that the water level will be at 3m under ground level. In JCS 168E, the external resistance is decreased by regular reduction factor in proportion to the increase of the number of cables in groups. The second reason is that the thermal resistance between cable and duct(or pipe) of IEC 60287 does not correspond with JCS 168E. The third reason is that the methodology to calculate reduction coefficients for cables which are installed in tunnel is quite different. Thus, in case of IEC 60287, the reduction coefficients for groups is calculated by a clearance(thermal proximity effect) which is negligible or not, while in case of JCS 168E its coefficients is high in proportion to the number of cable(circuits) which is installed in tunnel.

This paper presents the comparison of IEC 60287 and JCS 168E and the special features of standard of calculating the current-carrying capability of underground power cables which is adopted by KEPCO. Also, in this paper, the program to calculate its current-carrying efficiently under the status of buried power cable in KEPCO is developed. This developed program can calculate not only the current rating at 100% load factor or not by using IEC 60287 and Neher-NcGrath procedure but also analyses the temperature distribution in components of cable. Also, in case of installation of large numbers of circuits, it is possible to calculate the current rating by each circuit at once execution. This program executed under MS-Windows 98 above and is applied under a graphic user interface process.