ONTARIO POWER GENERATION

OPG Proprietary
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STANDARD TECHNICAL SPECIFICATION
OPG-M-377 R02
Terminal Blocks

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1. SCOPE OF WORK

This Specification covers the electrical and mechanical requirements of terminal blocks used as components in equipment supplied to Ontario Power Generation, Inc. (OPG). The terminal blocks and associated accessories are used in or on electrical equipment to terminate control, protection, instrument transformer secondary, power supply and other wiring.

2. LAWS, STANDARDS, AND CODES

2.1 General

All work shall conform to:

- The laws and regulations of Canada, the Province of Ontario, or local municipalities
- Specific standards listed in Section 2.2; their latest issues, amendments and supplements of which shall apply unless otherwise indicated in the contract documents
- Any other standards mentioned elsewhere in this document or that apply in general to this work.

The Contractor shall clearly state in its tender any exceptions or deviations it intends to take to these standards and specifications.

Should any law, standard or code be revised, the Contractor and OPG will make each other aware of the revision to discuss adoption of the revision.

Should conflict occur between laws, standards or codes and this Specification, the most stringent requirements shall govern.

2.2 Standards of the Canadian Standards Association (CSA)

- CAN/CSA-C22.2 NO. 0-10 (R2015) - General requirements - Canadian electrical code, part II
- CAN/CSA C22.2 No. 14 – Industrial Control Equipment CAN/CSA C22.2 No. 158 – Terminal Blocks

3. DEFINITIONS AND ABBREVIATIONS

Throughout this Specification the following definitions/abbreviations apply:

Class A terminal blocks	Terminal blocks which have clamp assemblies equipped with pressure plates which bear on the conductor
Class B terminal blocks	Terminal blocks which have clamp assemblies without pressure plates. The pressure screws bear directly on the conductor in this class of terminal block.
Contractor	The party named in the Contract to whom OPG has awarded the contract to design and supply the equipment (the Supplier, the subcontractor, the Supplier's personnel and any other person the Supplier or a Subcontractor is responsible for at law)
OPG	Ontario Power Generation, Inc.
OPG Representative	Engineer, employed by or representing OPG, responsible for ensuring that the Contractor is adhering to the specification

4. PRODUCT QUALIFICATION

The minimum requirement for qualification shall include certification by the Canadian Standards Association (CSA) testing Laboratories. OPG reserves the right to conduct additional tests.

5. GENERAL

The terminals may be of the block type (having multiple terminal points) for conventional mounting, or the unit type (having a single terminal point) for bar mounting. The terminals shall meet the requirements of CSA C22.2 No. 158, and the relevant requirements of CSA C22.2 No. 0 and C22.2 No. 14, and the additional requirements of the OPG Standard Specification, except as modified by the equipment specification but deemed acceptable by the owners engineer. The nominal voltage rating of the terminal blocks shall be at least two times higher than the actual circuit voltage (RMS value) on which the terminal blocks are used. The continuous current rating of the terminal blocks shall be at least two times higher than the actual continuous circuit current (RMS value) on which the terminal blocks are used.

The class of terminal blocks to be used shall be determined by the minimum size of conductor being terminated.

Class A terminal blocks shall be provided for terminal blocks used with conductor size of No. 6 AWG (Stranded) or smaller. Class A or Class B terminal blocks may be used with conductor sizes larger than No. 6 AWG stranded. The sizes of the equipment internal wiring and the OPG

incoming wiring will be specified in the OPG equipment specification, or other contract documents, which shall be read together with this specification, where applicable.

6. CONDUCTOR CLAMP ASSEMBLIES

6.1 Material

The current-carrying components of the assemblies shall be made of brass or copper. The material shall be plated to resist corrosion in use. Other components of the conductor clamp assemblies, which normally are not considered to be current-carrying components, may be made of steel. Steel components shall be plated to resist galvanic corrosion.

6.2 Design

Terminal blocks used for current-transformers secondary terminals shall be equipped with double conductor clamps (i.e. each conductor shall be gripped with two independent clamp connectors). This requirement may be satisfied by terminals with 4 clamp connectors (2 gripping each lead) or by through-type connectors, in which each connector grips each of the overlapping wires.

With the exception of current-transformer secondary wiring terminals, each terminal shall be of the single clamp type. For this requirement, the terminal provides a single, independent clamp connector for each lead, or 2 for each connection.

The shape of the conductor openings and the tolerance of the connector components shall be such that individual strands of conductors are securely retained within the connector when the connector is tightened on the conductor.

The terminal blocks shall be so designed that conductor strands are neither cut nor nicked when the recommended torque is applied to the pressure screw.

Pressure screws shall not loosen under conditions of vibration and/or temperature changes. The pressure screws and other live components of the conductor clamp assemblies shall be recessed into the insulation bodies, for electrical safety.

Unless the pressure screws are captive, those left for subsequent termination of OPG incoming wiring shall be tightened sufficiently that they will not loosen off in transit.

“Plug-in” connection type terminal block is not acceptable for Protection systems.

Terminal blocks shall be suitable for the application and of the following types, or OPG approved equivalent:

- Phoenix Contact UK Series, screw terminals.
- Phoenix Contact URK-ND 2 Series.
- ABB Entrelec, screw clamp terminals.
- Weiland selos, feed-through with screw connection.
- WAGO, TOPJOB S series, CAGE CLAMP S connection.
- WIBA 9060 a PDAKA Kr (CT Type).
- Phoenix Contact type ATS-RTK-BEN-KRI (Ground Slider Type).
- Weidmuller SAK Series, screw connection.
- Weidmuller SAK Series, ASK 1 fuse cartridge, screw connection.

6.3 Identification Markers

Identification markers shall be provided on each terminal block. The markers shall provide a surface, which will accept both graphite pencil and ink markings. They shall be removable; replacement shall be possible.

7. UNIT TYPE TERMINAL BLOCK FOR BAR MOUNTING

The following additional requirements shall apply to unit-type terminal blocks for bar mounting.

7.1 Retaining Devices

A corrosion-resistant retaining device shall be incorporated into each unit, to secure the unit to the mounting bar. The retaining device shall present a broad bearing surface in contact with the mounting bar, holding the unit securely in the mounting bar. Ten cycles of insertion and removal shall not:

(1) Cause visible removal of the protective coating;

(2) Cause damage to the insulating body of the unit; and

(3) Cause such distortion of the retaining device or bar as to lessen the stability of the unit, or to affect the ease of insertion and removal.

7.2 Mounting Bar

The mounting bar shall be made of steel, galvanized or of other corrosion-resistant material,

subject to the approval of OPG.

7.3 End Clamps

End clamps, designed to retain an assembly of units, shall be provided. They shall be made of, or coated with, corrosion-resistant material and shall be equipped with a fastening device to hold them in place on the mounting bar.

8. PRODUCT IDENTIFICATION

Terminal blocks shall be marked with the following information:

(1) The maximum voltage rating

(2) The conductor size (AWG) or range of sizes

(3) The CSA certification monogram

(4) The supplier's name or trademark

(5) The supplier's models or part number.