



National Differences For

Low-voltage switchgear and controlgear – Part 7-1: Ancillary equipment – Terminal blocks for copper conductors

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National Differences For

Low-voltage switchgear and controlgear – Part 7-1: Ancillary equipment – Terminal blocks for copper conductors

Fourth Edition

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This revision of ANSI/UL 60947-7-1 is to revise the National Differences to include Canada. This standard is harmonized for Canada, Mexico and the United States and co-published by all three standards development organizations (CSA Group, ANCE and UL).

This document provides a single listing of the National Differences included in the UL adoption of the corresponding IEC standard.

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Preface

This document provides a single listing of the technical National Differences included in the UL adoption of the corresponding IEC standard.

In its IEC-based standards, UL uses the notations indicated below to identify national difference type, and these types are additionally noted in this document. The standard may not use all types of these deviations.

D1 - These are deviations which are based on basic safety principles and requirements, elimination of which would compromise safety for U.S. consumers and users of products.

D2 - These are deviations based on safety practices. These are deviations for IEC requirements that may be acceptable, but adopting the IEC requirements would require considerable retesting or redesign on the manufacturer's part.

DC - These are deviations based on the component standards and will not be deleted until a particular component standard is harmonized with the IEC component standard.

DE - These are deviations based on editorial comments or corrections.

DR - These are deviations based on the national regulatory requirements.

Each national difference contains a description of what the national difference entails. Typically one of the following words is used to explain how the text of the national difference is to be applied to the base IEC text:

Addition / Add - An addition entails adding a complete new numbered clause, subclause, table, figure, or annex. Addition is not meant to include adding select words to the base IEC text.

Deletion / Delete - A deletion entails complete deletion of an entire numbered clause, subclause, table, figure, or annex without any replacement text.

Modification / Modify - A modification is an altering of the existing base IEC text such as the addition, replacement or deletion of certain words or the replacement of an entire clause, subclause, table, figure, or annex of the base IEC text.

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National Differences

DV.4 DC Modification to Standard Title:

Replace “Terminal blocks for copper conductors” with “Terminal blocks for copper and aluminum conductors”.

1.1DV D2 Modification to add the following:

1.1DV.1 This standard specifies requirements for terminal blocks with screw-type or screw-less-type clamping units primarily intended for industrial or similar use and to be fixed to a support, in accordance with Annex DVB, National Electrical Code, NFPA 70 (for use in the USA), or CSA C22.1–15 Canadian Electrical Code, Part I (for use in Canada), and NOM-001-SEDE, Electrical Installations (Utility) ([for use in Mexico]).

1.1DV.2 The wire range for terminal blocks covered by this standard include 0,051 mm² to 1 010 mm² (30 AWG to 2 000 kcmil) copper conductors and 3,31 mm² to 1 010 mm² (12 AWG to 2 000 kcmil) aluminum conductors. See Annex DVA for aluminum requirements.

In Mexico, 3,31 mm² (12 AWG), 5,26 mm² (10 AWG), and 8,37 mm² (8 AWG) aluminum conductors are not allowed.

1.1DV.3 The voltage range includes up to 1 500 Vac and 1 500 Vdc.

1.2DV D1 Modification to add the following:

See Annex DVB for Canada, Mexico, and USA Standard References.

2.5DV D2 Addition of the following definitions:

2.5DV.1 printed circuit board (PCB) terminal block: a one-piece, or modular, or two-piece terminal block fixed to a printed circuit board by soldering or other suitable means.

2.5DV.2 special preparation (of conductor end): alteration of the manufactured shape or surface of the conductor to enable it to be connected to the terminal.

2.5DV.3 factory wiring terminal: a terminal intended in the end application to be connected under controlled conditions, usually at a manufacturer's location. Such terminations use prepared or unprepared conductors. Applicable for the United States. In Canada and Mexico, this definition does not apply.

2.5DV.4 insulation piercing or displacement clamping unit: a clamping unit for the connection and possible disconnection of one conductor or the interconnection of two or more conductors, the connection being made by piercing, boring through, cutting through, removing, displacing, or making ineffective in some other manner the insulation of the conductor or conductors without previous stripping.

2.5DV.5 post connector: a connector utilizing a post onto which one or more conductors are secured by means of a tool.

2.5DV.6 stud-and-nut type connector: a connector in which a conductor can be looped around a stud and retained by a nut or a connector that can retain a conductor that is first terminated in a wire connector.

3DV.1 D2 Modification by adding the following to the list of distinction for types of terminal blocks:

– for field and factory wiring or for factory wiring only. In Canada and Mexico, this does not apply.

3DV.2 D3 Modification to add the following:

In Canada, the general requirements applicable to this Standard are provided in CAN/CSA-C22.2 No. 0.

4.3.1DV D2 Modification of 4.3.1 by adding the following:

Subclause 4.3.1.1 of the standards contained in Annex DVB, Table DVB.2, reference no. 9 applies.

4.3.3DV D2 Modification to add the following:

The standard values of cross-sections of round copper conductors to be used are contained in Table 1DV.

Table 1DV D2 Modification by replacing Table 1 with the following:

Table 1DV – Standard cross-sections of round copper conductors

Metric size ISO mm ²	Comparison between AWG/kcmil and metric sizes	
	Size AWG/kcmil	Equivalent metric area mm ²
–	30 AWG	0,051
–	28	0,081
–	26	0,128
0,2	24	0,205
0,34	22	0,324
0,5	20	0,519
0,75	18	0,824
1	–	–
1,5	16	1,31
2,5	14	2,08
4	12	3,31
6	10	5,26
10	8	8,37
16	6	13,3
25	4	21,2
35	2	33,6
–	1	42,4
50	0	53,5
70	00	67,4
95	000	85

Table 1DV – Standard cross-sections of round copper conductors Continued on Next Page

Table 1DV – Standard cross-sections of round copper conductors (Continued)

Metric size ISO mm ²	Comparison between AWG/kcmil and metric sizes	
	Size AWG/kcmil	Equivalent metric area mm ²
–	0000	107
120	250 kcmil	127
150	300	152
185	350	177
240	500	253
300	600	304
350	700	355
380	750	380
400	800	405
450	900	458
500	1000	507
630	1250	633
750	1500	760
890	1750	887
1000	2000	1 010

4.3.4DV D2 Modification by replacing 4.3.4 with the following:

The rated cross-section shall be selected from the standard cross-sections given in Table 1DV.

4.3.5DV D2 Modification by adding the following:

The minimum wire range specified in Table 2 does not apply.

4.3.6DV D2 Addition of 4.3.6DV.1 – 4.3.6DV.7:

4.3.6DV.1 Rated Current – The manufacturer shall declare the maximum value of current per terminal assembly.

4.3.6DV.2 Rated Torque – The tightening torque value or range shall be specified.

4.3.6DV.3 In the United States, a terminal block shall be rated for factory wiring only if applicable. In Canada and Mexico, this requirement does not apply.

4.3.6DV.4 Any special wire types such as pre-bonded, pre-tinned, or double tinned wire shall be specified.

4.3.6DV.5 All terminal blocks shall be rated "Solid" or "Stranded" or both as appropriate.

4.3.6DV.6 A terminal block having insulation piercing or displacement connections shall be rated for specific insulation types.

4.3.6DV.7 A terminal block having screwless type terminals shall be rated with a nominal strip length.

5.2DV.1 *D2 Modification by adding the following to item a):*

Item (a) does not apply in Canada and the United States.

In Mexico, replace item (a) with "NMX-J-XXX-ANCE, if the manufacturer claims compliance with this standard;"

5.2DV.2 *D2 Modification to the list by adding the following items after item f):*

GDV the rated current. Reference 4.3.6DV.1;

HDV the tightening torque. Reference 4.3.6DV.2. In Canada and Mexico, the tightening torque need not be marked unless the manufacturer specifies a tightening torque;

IDV in the United States, factory wiring only when applicable. Reference 4.3.6DV.3. In Canada and Mexico, this does not apply;

JDV "CU" or "Copper" if rated for copper wire only; also see DVA.3.1 for aluminum conductors;

KDV special conductor preparation or use of prepared conductors. Reference 4.3.6DV.4;

LDV specific insulation types (insulation displacement/piercing). Reference 4.3.6DV.6;

MDV solid conductors only or stranded conductors only as appropriate. Reference 4.3.6DV.5;

NDV special conductor types. Reference 4.3.6DV.4;

ODV instructions to clearly indicate any rearrangement or adjustment necessary to adapt to various sizes of wires;

PDV instructions for proper installation of the wire where the wiring method is not obvious;

QDV a nominal strip length for a terminal block having screwless-type terminals. Reference 4.3.6DV.7;

RDV rated operational voltage. Reference 4.3.1DV.

7.1.1DV.1 *D2 Modification by adding the following to 7.1.1:*

In the United States, for clamping units rated only for factory wiring, only 8.3.3.1 is applicable. In Canada and Mexico, all of 7.1.1 applies.

7.1.1DV.2 D2 Addition of 7.1.1DV.2.1 – 7.1.1DV.2.2.3

7.1.1DV.2.1 Current-carrying parts and their connections

7.1.1DV.2.1.1 A current-carrying part intended for use with copper wire shall be of copper, a copper alloy, or other material suitable for the purpose.

7.1.1DV.2.2 Wiring terminals

7.1.1DV.2.2.1 A wire-binding screw or stud-and-nut type terminal for field wiring may be employed for conductors not larger than 5,3 mm² (10 AWG), provided that the application of normal clamping action as intended will not impair the integrity of the joint. See Solid-Wire Tightening Test, 8.3.3.6DV.2.

7.1.1DV.2.2.2 A field wiring connector employing a wire-binding screw or stud-and-nut terminal shall be capable of accommodating a three-quarter loop.

7.1.1DV.2.2.3 To determine compliance with 7.1.1DV.2.2, the conditions in items a) and b) shall be met or, for a solid conductor, the test described in 8.3.3.6DV.2 shall be conducted. A terminal for a stranded conductor shall meet conditions described in items a) and b).

a) The threaded screw or stud shall not have more than 12,6 threads per centimeter and shall not be smaller than 4,2 mm diameter for wire larger than 2,1 mm² (14 AWG) and not smaller than 3,5 mm diameter for 14 AWG and smaller wire. A wire-binding screw or stud-and-nut type terminal shall be provided with upturned lugs, a cupped washer, barriers, or other equivalent means to hold the wires in position even if the screw or nut becomes slightly loose.

b) The tapped terminal plate shall not have less than two full threads, and shall be of metal not less than 1,3 mm thick for a wire larger than 14 AWG and not less than 0,76 mm thick 14 AWG or smaller wire. Threads provided by extruding a hole before tapping shall be counted if the thickness of the unextruded metal is not less than the pitch of the thread.

7.1.2DV D2 Modification by adding the following:

In Canada and the United States, tests in accordance with 8.3.2 are not required.

7.1.3DV D2 Modification by adding the following and Table 7.1.3DV.1:

The spacings on a terminal block shall be as specified in Table 7.1.3DV.1. Alternatively, the creepage and clearance distances given in Tables 13 and 15 of the standards contained in Annex DVB, Table DVB.2, reference no. 9, may be used.

Note 1DV: For information regarding verification of clearances and creepage distances by measurement, see the standards contained in Annex DVB, Table DVB.2, reference no. 9, Annex G.