



Specifications

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Document(s): S-E-03 (section 4.2.7) S-E-08 (sections 7 and 10)	Issue Date: 2015-06-12	Effective Date: 2016-01-01
	Supersedes: Technical bulletin E.1.35.7 (1985)	

Specification for installation and use: size of wires used to connect meters to conventional instrument transformers

1.0 Scope

This specification applies to all electricity metering installations which include conventional instrument transformers and are intended to be used in revenue metering. This specification does not apply to connections between meters and electronic voltage and/or current transformers, connections between meters and milliamp current transformers, or transformers/transducers that are integral to multi-customer metering systems.

2.0 Authority

This specification is issued under the authority of subsection 12(2) of the *Electricity and gas inspection regulations*.

3.0 References

3.1 *S-E-03 — Specification for the installation and use of electricity meters – input connections and ratings*

3.2 *S-E-08 — Specifications for the installation and use of electricity meters – Measurement Canada standard drawings for electricity metering installations*

4.0 Terminology

Run length

The distance between the meter and the instrument transformers as taken by following the path of connecting conductors.

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5.0 General

5.1 The total burden on any instrument transformer includes all devices and leads connected to the transformer's secondary output. The total burden shall not exceed the rated burden for which the instrument transformer is designed and approved.

5.2 Wires used to connect meters and electricity measuring devices to instrument transformers shall be of sufficient gauge such that the length of wire does not impart a burden greater than that established in sections 6.0, 7.0, 8.0 and 9.0.

5.3 Except where permitted pursuant to the provisions of section 8.0, all connecting leads shall be a minimum of 14 gauge (1.6 mm conducting diameter).

5.4 To determine the minimum wire gauge in Table 1 and Table 2, select the row for the run length of the secondary leads in the first column and proceed across to the column for the transformer burden. This cell provides the minimum wire gauge that can be used for the available burden. Where the wire gauge is presented as "n+n", the wire must consist of two strands of "n" gauge wire.

6.0 Current transformers

6.1 Connecting leads shall not impart a burden more than 50% that of the instrument transformer's rated burden.

6.2 Table 1 indicates the minimum wire gauges required for a given run length of wire connected to a current transformer of a given rated burden.

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Table 1 – Minimum wire gauge requirements: current transformer

Run length (metres)	5 ampere current transformer rated burden					
	0.1	0.2	0.5	0.9	1.0	1.8
2	14	16	16	16	16	16
5	12	14	16	16	16	16
10	8	12	16	16	16	16
15	6	10	14	16	16	16
20	8+8	8	12	14	16	16
30	6+6	6	10	12	14	16
50		6+6	8	10	12	14
70		6+6	6	10	10	12
100			8+8	8	8	10
200			6+6	8+8	8+8	8
300				6+6	6+6	6

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7.0 Potential transformers

7.1 Connecting leads shall not impart a burden that would cause an error of more than 0.3% in the meter registration of active energy.

7.2 Table 2 indicates the minimum wire gauges required for a given run length of wire connected to a potential transformer of a given rated burden.

Table 2 – Minimum wire gauge requirements: potential transformer

Run length (metres)	Potential transformer rated burden				
	W	X	Y	Z	ZZ
3	16	16	16	16	12
5	16	16	16	14	10
7	16	16	16	12	10
10	16	16	14	10	8
15	14	16	14	8	6
20	12	16	12	8	8+8
30	10	16	10	6	
50	8	14	8	6+6	
70	8	14	6		
100	6	12	8+8		
200	6+6	8			
300		6			

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8.0 Smaller gauge conductors

8.1 Installations that have connecting leads smaller than 14 gauge may be permitted (and classified as non-standard), where the owner provides empirical evidence (which shall include test data) that confirms the conductor(s) will not:

- a) impart a current burden greater than 50% of the current transformer's rated burden.
- b) impart a voltage burden that would cause an error of more than 0.3% in the meter registration of active energy.
- c) result in ampacity lower than required for the expected secondary current.

8.2 Molded current transformers which integrate 16-gauge wire into the molded body (as indicated in the Notice of Approval) may be permitted (and classified as standard). The run length shall comply with Table 1 wire gauge requirements and there shall be no splice in the conductor between the transformer and the meter.

9.0 Longer conductor runs

Installations that have a run length greater than the maximum identified for any given burden rating may be permitted (and classified as non-standard), where the owner provides empirical evidence (which shall include test data), that confirms the conductor(s) will not:

- a) impart a current burden greater than 50% of the current transformer's rated burden.
- b) impart a voltage burden that would cause an error of more than 0.3% in the meter registration of active energy.

10.0 Auxiliary transformers

Auxiliary transformers used in conjunction with instrument transformers will increase the burden on the secondary circuit. Where auxiliary transformers are used, the minimum wire gauge shall correlate with that specified in the preceding tables for the run length indicated in the row below the row that indicates the actual run length.

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Examples

1. A current transformer (rating factor = 1.0) has a B0.9 rating, the run length is 30 metres, and auxiliary transformers are used. The wire must be 10 gauge as opposed to 12 gauge (10 gauge correlates to a 50-metre length).
2. A potential transformer has an X rating, the run length is 100 metres, and auxiliary transformers are used. The wire must be 8 gauge as opposed to 12 gauge (8 gauge correlates to a 200-metre length).