

STANDARD INFORMATION

This SUN establishes the Continuing Certification approach to Photovoltaic Combiners and Recombiners

Standard Number: CSA C22.2 No. 290

Standard Name: Photovoltaic Combiners and Recombiners

Standard Edition and Issue Date: 2nd Edition dated July 1, 2019

Date of Revision: July 1, 2019

Date of Previous Revision of Standard: 1st Edition dated December 1, 2015

EFFECTIVE DATE OF NEW/REVISED REQUIREMENTS

Effective Date: **No action is required for currently certified products to maintain certification.**

This SUN is being presented to assist users of the standard to appreciate the significance of the changes made to the standard that will apply should the product described be modified after October 1, 2021

IMPACT, OVERVIEW, AND ACTION REQUIRED

Impact Statement: Effective immediately, this revised standard will be exclusively used for evaluation of new products unless the Applicant requests in writing that current requirements be used along with their understanding that their listings will be withdrawn on Effective Date noted above, unless the product is found to comply with new/revised requirements.

Overview of Changes:

- Additional requirements for disconnecting means
- Additional requirements for fuse servicing

Specific details of new/revised requirements are found in table below.

Current Listings Not Active? – Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records. We will do this at no charge as long as Intertek is notified in writing prior to the review of your reports.



STANDARD INFORMATION

CLAUSE	VERDICT	COMMENT
		<p>Additions to existing requirements are <u>underlined</u> and deletions are shown lined out below.</p>
4	Info	Construction
4.2	Info	Disconnecting means
4.2.1	Info	Disconnecting means for equipment
		<p>If provided, a disconnecting means for a circuit shall</p> <p>a) open all ungrounded conductors of the circuit simultaneously; b) consist of a manually operable switch or a circuit breaker; c) employ an operating mechanism such as a handle or push button that is accessible from outside of the enclosure or located behind a hinged cover not requiring a tool for opening; and d) be marked in accordance with Clause 5.3.</p> <p>Disconnecting means shall be provided for each combiner or recombiner (see Note).</p> <p>Note: Based on the overall system design for a specific installation, a disconnecting means might be required to be an integral part of the combiner or recombiner, or it could be located separately elsewhere in the system. The Canadian Electrical Code, Part I should be reviewed regarding the appropriate disconnecting means requirements for each installation.</p> <p>For a combiner, the disconnecting means shall be an integral part of the combiner, or the instruction manual shall specify that it is to be provided at the time of installation in accordance with Clause 5.15 d) and the combiner shall be marked in accordance with Clause 5.3 b).</p> <p>For a recombiner, the disconnecting means, if required, shall be an integral part of the recombiner or the instruction manual shall specify that it is to be provided at the time of installation in accordance with Clause 5.3 c), and the recombiner shall be marked in accordance with Clause 5.3 b).</p>
		<i>New clause added;</i>
4.2.1.2		<p>If the disconnecting means required by Clause 4.2.1.1 is provided in the (re)combiner, then parts that remain energized with the disconnecting means in the OFF position shall be guarded against inadvertent contact by service personnel, in accordance with Clause 4.3.7.</p>



CLAUSE	VERDICT	COMMENT
		<i>New clause added;</i>
4.2.1.3		<p>If provided integral to the (re)combiner, the disconnecting means in Clause 4.2.1.1 shall</p> <ul style="list-style-type: none">a) open all ungrounded conductors of the circuit simultaneously;b) consist of a manually operable switch or a circuit breaker;c) be load break rated; andd) be marked in accordance with Clause 5.3 a).
		<i>New clause added;</i>
4.2.14		<p>Where the operating handle of a disconnect device is operated vertically rather than rotationally or horizontally, the up position of the handle shall be the ON position.</p>
		<i>New section added;</i>
4.2.2		Disconnecting and isolating means for fuse servicing
		<p>A photovoltaic (re)combiner that is equipped with fuses to protect the input photovoltaic source circuits or input photovoltaic output circuits shall be provided with integral means to fully de-energize the fuses from all sources before servicing, or</p>
4.2.2.1		<ul style="list-style-type: none">a) for a combiner, the instruction manual shall specify that it is to be provided at the time of installation in accordance with Clause 5.3 b); orb) for a recombiner, the instruction manual shall specify that it is to be provided at the time of installation in accordance with Clause 5.3 c). <p>Note: In a (re)combiner, each fuse is potentially energized by the PV circuit it is connected to, by backfeed from the other fuses connected to the combined bus, and by capacitors in the downstream power conversion equipment.</p>
		<p>For (re)combiners, the disconnecting means required by Clause 4.2.2.1 shall consist of</p>
4.2.2.2		<ul style="list-style-type: none">a) a single disconnecting means;b) multiple disconnecting means in which case the (re)combiner shall be marked in accordance with Clause 5.22; orc) non-load-break rated isolating means such as touch-safe fuseholders or connectors, in combination with disconnecting means interlocked with the cover giving access to the fuses, to interrupt load current before the cover can be opened.
4.2.2.3		<p>Inadvertent access to parts of the fuse, fuseholder, and (re)combiner that remain energized after the disconnecting and isolating means are opened shall be prevented in accordance with Clause 4.3.7.</p>



CLAUSE	VERDICT	COMMENT
4.2.2.4		For a combiner, the disconnecting means required by Clause 4.2.2.1 shall be interlocked with the cover giving access to the fuses, to interrupt load current before the cover can be opened.
4.2.2.5		If a combiner with a combination of disconnecting means and isolating means in accordance with Clause 4.2.2.2 c) does not use touch-safe fuseholders, the isolating means shall also be interlocked with the cover giving access to the fuses. Note: An example of the situation in this Clause is a combiner with an output disconnect switch to interrupt load current and isolate from the output side, with input PV connectors as isolating means on the input side of the combiner. Without touch-safe fuseholders, interlocking the PV connectors with the cover is required to ensure both sides of the fuses are de-energized before they are accessible.
5	Info	Marking With reference to Clause 4.2.1, a marking shall be provided identifying the disconnecting means for the power sources. Where one or more disconnecting means for external sources is not provided integral to the combiner, the combiner shall be marked with a warning that the installer shall supply the required disconnecting means. The warning shall state, “WARNING: DISCONNECTING MEANS MUST BE PROVIDED BY THE INSTALLER” or equivalent. <u>With reference to Clause 4.2.1, the following requirements shall apply:</u> <u>a) A marking shall be provided identifying the disconnecting means for the power sources.</u> <u>b) Where one or more disconnecting means for external sources is not provided integral to a combiner, the following wording, or equivalent, shall be included in the installation instructions in accordance with Clause 5.15 d) and shall be marked on the combiner in a location visible after installation:</u> <u>“WARNING: DISCONNECTING MEANS SHALL BE INSTALLED IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE, PART I”.</u> <u>c) Where one or more required disconnecting means for external sources is not provided integral to a recombiner, the following wording, or equivalent, shall be included in the installation instructions in accordance with Clause 5.16 d) and shall be marked on the combiner in a location visible after installation:</u> <u>“WARNING: ADDITIONAL DISCONNECTING MEANS MAY BE REQUIRED BY THE CANADIAN ELECTRICAL CODE, PART I”.</u>



CLAUSE	VERDICT	COMMENT
		<i>New clause added;</i>
		Where multiple disconnecting means are provided for servicing of fuses, in accordance with Clause 4.2.2.2, the following or equivalent wording shall be marked on the cover (or door) giving access to the fuses:
5.22		CAUTION: BEFORE SERVICING FUSES, THE FOLLOWING DISCONNECTING MEANS MUST ALL BE OPENED: (followed by a list of devices and locations). Note: The list of devices and locations referred to above will not always be able to be specific. For devices provided with the (re)combiner, a specific list should be provided in the marking (e.g., "Input switches S1-S6 and output switch S7 on this combiner"). Where the (re)combiner is not provided with all the devices, a more general listing is acceptable and the location may be omitted as it is not known (e.g., "Disconnecting means for all 6 photovoltaic inputs and for the output circuit).
		CUSTOMERS PLEASE NOTE: This Table and column "Verdict" can be used in determining how your current or future production is or will be in compliance with new/revised requirements.