

**IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF NORTH CAROLINA**

SHOALS TECHNOLOGIES GROUP, LLC,

Plaintiff,

v.

VOLTAGE, LLC AND NINGBO VOLTAGE
SMART PRODUCTION CO.,

Defendant.

Case No. 1:25-cv-026-WO

VOLTAGE’S PRELIMINARY INVALIDITY CONTENTIONS

Pursuant to Local Patent Rule (“L.P.R.”) 103.3 and the Court’s Scheduling Order (Dkts. 28, 29), Defendants Voltage, LLC and Ningbo Voltage Smart Production Co. (collectively “Voltage” or “Defendants”), by their attorneys, set forth the following Preliminary Invalidity Contentions to Plaintiff Shoals Technologies Group, LLC (“Shoals”).

Voltage provides these Preliminary Invalidity Contentions despite the fact that Shoals has not yet provided its Preliminary Infringement Contentions, and has not yet identified the Asserted Claims of U.S. Patent Nos. 12,015,375 (the “’375 Patent”) and 12,015,376 (the “’376 Patent”) (together, the “Asserted Patents”) that it contends are infringed by Voltage. Voltage’s discovery and investigation in connection with the validity of the claims of the Asserted Patents is ongoing, and Voltage’s response is based on information obtained to date. Voltage expressly reserves the right to identify other grounds for invalidity as discovery progresses, based on Shoals’ identification of Asserted Claims, based on the construction of the Asserted Claims by the Court, based on positions that Shoals may take regarding the Asserted Claims, and based on review and analysis by expert witnesses. Voltage’s contentions regarding invalidity of the Asserted Claims

are necessarily preliminary until the Court has construed the claims as a matter of law. The Court must also assess the “level of skill” that a person of ordinary skill in the art would have possessed at the time of the invention.

Voltage’s response is based in whole or in part on its present understanding of Shoals’ positions concerning the scope and construction of the claims of the Asserted Patents, to the extent that those positions can be deduced from Shoals’ pleadings to date. However, nothing herein should be construed as an admission that Voltage agrees with Shoals’ apparent claim constructions. Voltage expressly reserves the right to propose alternative constructions to those advocated by Shoals and to rebut Shoals’ actual claim construction positions. This response is intended to apprise Shoals of Voltage’s present invalidity contentions based on information obtained to date, and is not intended to proffer any proposed claim constructions.

Furthermore, this response is based on Voltage’s current understanding as to how the claims of the Asserted Patents are being interpreted and applied by Plaintiffs. In other words, to the extent that Shoals contends that any current commercial product of Voltage includes a particular claim element, which claim element may also be present in prior art commercial products (of Voltage or otherwise). This response is not, however, an admission that any particular claim element is present in any current commercial product of Voltage, either literally or under the doctrine of equivalents. In fact, Voltage maintains that the claims of the Asserted Patents, if properly construed, do not read on any current commercial product of Voltage.

Some or all of the items of prior art identified in this response or otherwise identified in the prior art publications, patents or other documents identified by Voltage will be the subject of continuing investigation and discovery, including potentially third party discovery. Voltage reserves the right to supplement this response consistent with the Court’s Scheduling Order, any

other orders by the Court, and/or the Federal Rules, in the event that additional information is discovered relating to these devices or systems. Additionally, prior art not included in this response, whether or not now known to Voltage, may become relevant depending on the claim constructions that the Court may adopt. Voltage's discovery and investigation may also uncover additional prior art, and this response is subject to modification based on such additional prior art.

I. VOLTAGE'S PRELIMINARY INVALIDITY CONTENTIONS

Pursuant to Local Patent Rule ("L.P.R.") 103.3 and the Court's Scheduling Order (Dkts. 28, 29), and subject to Voltage's reservation of rights as stated herein, Voltage provides these preliminary invalidity contentions for the following Asserted Patents. At this time, Shoals has not yet served its Preliminary Infringement Contentions and thus no Asserted Claims have been identified. Voltage reserves the right to amend its Preliminary Invalidity Contentions upon Shoals' belated identification of Asserted Claims.

- U.S. Patent No. 12,015,375 (the "'375 Patent")
- U.S. Patent No. 12,015,376 (the "'376 Patent")

As explained herein and in Exhibits A-1 through A-42 and B-1 through B-42, Voltage contends that the claims of the Asserted Patents are invalid under 35 U.S.C. §§ 102, 103, and/or 112.

B. Priority Date of the Asserted Patents

The claims of the '375 and the '376 Patents are not entitled to a priority date earlier than September 9, 2015, the filing date of U.S. Patent Appl. No. 14/849,458, which issued as U.S. Patent No. 10,992,254 (the "'254 Patent"), and from which the asserted '375 and '376 Patents are continuation patents with a common specification, because the Provisional Application fails to disclose all of the limitations recited in the claims. Shoals bears the burden of establishing an

earlier priority date than the actual filing date of the '254 Patent. Shoals has yet to meet its burden in doing so.

A. Identification of Prior Art (L.P.R. 103.3(a))

Voltage identifies in the tables set forth below¹ the prior art that anticipates and/or renders obvious the claims of the Asserted Patents either expressly or inherently when considered in light of the general knowledge and skill of a person having ordinary skill in the art (“POSITA”) at the time of the alleged inventions and based on Shoals’ apparent interpretation of the claims. On information and belief, each listed reference qualifies as prior art to the Asserted Patents.

To the extent that any of the following are prior art, Voltage reserves the right to rely upon foreign counterparts of the U.S. patents identified herein; U.S. counterparts of foreign patents and foreign patent applications identified herein; and U.S. and foreign patents and patent applications corresponding to articles and publications identified herein. Voltage also reserves the right to rely upon parent or ancestor patents or patent applications from which any of the patents or patent applications identified herein claim priority to as continuation, divisional, or continuation-in-part applications. Identification of dates of publication are made based on currently available information, and Voltage reserves the right to rely upon an earlier date should evidence supporting an earlier date be discovered:

1. Identification of Prior Art Patents and Patent Publications

Patent/Publication No.	Country of Origin	Date of Issue/Publication²
U.S. Patent No. 6268559 (Yamawaki)	United States	July 31, 2001
CN2785100 (Shao)	China	May 31, 2006

¹ Voltage also hereby identifies any systems or products that embody the technology described in any patent or publication identified in these Invalidity Contentions. Voltage reserves the right to rely on any documents or other evidence regarding such systems.

² For any patent that claims the benefit of provisional application(s), Voltage may rely on the provisional application(s), for purposes of establishing invalidity. Voltage may also rely upon the date of filing of any issued patent or patent application to show the priority of that reference.

KR10-1428689 (Kim)	Korea	August 11, 2014
U.S. Patent App. Pub. No. 2010/0139733 (Jonczyk)	United States	June 10, 2010
JP4080663 (Tamura)	Japan	April 23, 2008
U.S. Patent App. Pub. No. 2011/0011642 (Solon 642)	United States	January 20, 2011
U.S. Patent App. Pub. No. 2011/0209741 (Solon 741)	United States	September 1, 2011
CN201750032U (Ji)	China	Feb. 16, 2011
JP2008187814A (Tanaka)	Japan	August 14, 2008
JP2014050227A (Fujimoto)	Japan	March 17, 2014
JPS52135081A (Sakatani)	Japan	November 11, 1977
JPS585292Y2 (Kono)	Japan	January 29, 1983
JPH0684410A (Takahashi)	Japan	March 25, 1994
EP0136154A2 (Hajek)	European Patent Office	April 3, 1985
U.S. Patent No. 8207637B2 (Marroquin)	United States	June 26, 2012
U.S. Patent No. 9502879B2 (Takasu)	United States	April 9, 2015
JP4169490B2 (Tokita)	Japan	Oct. 22, 2008
U.S. Patent App. Pub. No. 2011/0174521 (Hernandez)	United States	July 21, 2011
CN104464920B/CN104464920A (Liu)	China	February 1, 2017
CN204760094U (Yang)	China	November 11, 2015
U.S. Patent No. 4077697A (Yates)	United States	March 7, 1978
JP2009148010A (Inaba)	Japan	July 2, 2009
U.S. Patent App. Pub. No. 2016/0149539A1 (Franke)	United States	May 26, 2016
JP4926340B2 (Tamura 340)	Japan	May 9, 2012
JPH09245533A (Sasaki)	Japan	September 19, 1997
CN2660691Y (Chen)	China	December 1, 2004
U.S. Patent No. 3852516A (Vander Ploog)	United States	December 3, 1974
U.S. Patent No. 8227696B2 (Pullium)	United States	July 24, 2012
JPH09261835A / JP1997261835A (Narumi)	Japan	Oct. 3, 1997
DE202008016324U1 (Blitzstrom)	Germany	March 19, 2009
JP1998135499A / JPH10135499A (Machida)	Japan	May 22, 1998
U.S. Patent No. 6265665B1 (Zahnen)	United States	July 24, 2001
CN103000468A (Casimiro)	China	March 27, 2013
CN201518320U (Li)	China	June 30, 2010

U.S. Patent No. 7445488B2 (Feldmeier)	United States	November 4, 2008
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Voltage further identifies all prior art cited by the Examiner during the prosecution of the application leading to allowance of the Asserted Patents and the parent applications of the Asserted Patents (U.S. Patent No. 10,992,254 (“’254 Patent”) and U.S. Patent No. 11,689,153 (“’153 Patent”)), including references identified by the Examiner to meet certain dependent claims and for which the applicant did not rebut. In particular, but without limitation, Defendants identify the Ramsey, Hernandez, Vander Ploog, Solon 642, Solon 741, and Jonczyk references identified above, in addition to the below patents and patent publications:

Patent/Publication No.	Country of Origin	Date of Issue/Publication ³
U.S. Patent App. Pub. No. 2009/0300909A1 (Kummer)	United States	
U.S. Patent No. 5,316,789 (Ookuma)	United States	

2. Identification of Prior Art Publications

Title, Author(s), and Publisher	Date of Publication
Helukabel “Cable systems for photovoltaic installations” and product disclosures (Helukabel)	June 2011
Amphenol, “Solar Line – Photovoltaic Interconnections System” and product disclosures (Amphenol)	November 2012
Sunnector, “Sunnector Solar Assemblies & Harnesses” and product disclosures (Sunnector)	2011
IEC 60050-461	June 2008

B. Anticipation and Obviousness (L.P.R. 103.3(b))

Subject to Voltage’s reservation of rights, Voltage attaches claim charts hereto that are directed to the prior art references that anticipate the claims of the Asserted Patents under 35 U.S.C.

³ For any patent that claims the benefit of provisional application(s), Meridian may rely on the provisional application(s), for purposes of establishing invalidity. Meridian may also rely upon the date of filing of any issued patent or patent application to show the priority of that reference.

§ 102(a), either expressly or inherently, and/or the prior art references that, in the alternative, would have rendered the Asserted Claims obvious under 35 U.S.C. § 103. *See* Exhibits A-1 through A-42 and B-1 through B-42. Any combinations contained or reference cited herein may be combined with any other reference to demonstrate the invalidity of any of the Asserted Claims, as set forth below and in Exhibits A-1 through A-42 and B-1 through B-42.

To the extent any claim limitation is construed to have a similar meaning, or to encompass similar feature(s) and/or function(s), as any other claim limitation, the citations to prior art references for each of those claim limitations in Voltage's claim charts are incorporated by reference with respect to each other.

Voltage's claim charts provide exemplary citations to the prior art references that teach or suggest every element of certain claims of the Asserted Patents. To the extent that an element of a claim is not shown in a chart, the claim would have been obvious based on a combination of one or more other prior art references, as set forth below in Exhibits A-1 through A-42 and B-1 through B-42, or in view of the knowledge of one of ordinary skill in the art.

Much of the art cited in these Invalidity Contentions reflects common knowledge and the state of the art at the time of the earliest filing date of the Asserted Patents. Voltage may rely on additional citations, references, expert testimony, and other material to provide context or to aid in understanding the cited portions of the references and/or cited features of the systems. Voltage also may rely on expert testimony explaining relevant portions of references, relevant hardware or software products or systems, and other discovery regarding these subject matters. Additionally, Voltage may rely on other portions of any prior art reference or other references relied on by the same authors or describing the same systems for purposes of explaining the background and general technical subject matter of the reference.

Where an individual reference is cited with respect to all elements of an Asserted Claim, Voltage contends that the reference anticipates the claim under 35 U.S.C. § 102(a) and also renders obvious the claim under 35 U.S.C. § 103, both by itself and in view of the knowledge of a person of ordinary skill in the art and in combination with the other cited references to the extent the reference is not found to disclose one or more claim elements. A single prior art reference, for example, can establish obviousness where the differences between the disclosures within the reference and the claimed invention would have been obvious to one of ordinary skill in the art. For example, “[c]ombining two embodiments disclosed adjacent to each other in a prior art patent does not require a leap of inventiveness.” *Boston Scientific Scimed, Inc. v. Cordis Corp.*, 554 F.3d 982, 991 (Fed. Cir. 2009). To the extent Shoals contends that an embodiment within a particular item of prior art does not fully disclose all limitations of a claim, Voltage accordingly reserves its rights to rely on other embodiments in that prior art reference, or other information, to show single reference obviousness under 35 U.S.C. § 103.

A patent may not issue where “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” 35 U.S.C. § 103. That is, the claimed invention must be nonobvious. The legal test to determine the question of obviousness is expansive and flexible, and there is “need for caution in granting a patent based on the combination of elements found in the prior art.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 415 (2007). The Supreme Court’s *KSR* decision established the proper analysis for obviousness. *Id.* The Court loosened the standard for showing the obviousness of combining prior art references by overturning the Federal Circuit’s teaching- suggestion- motivation test as too rigid and narrow and reaffirming the Graham factors. *Id.* at 415, 419-21. In

place of the teaching-suggestion-motivation test, the Court held that a more expansive and flexible approach should be applied. *Id.* at 415. “Obviousness is a question of law based on underlying findings of fact.” *In re Kubin*, 561 F.3d 1351, 1355 (Fed. Cir. 2009). The underlying factual inquiries are: (1) the scope and content of the prior art; (2) the differences between the prior art and the claims at issue; (3) the level of ordinary skill in the pertinent art; and (4) secondary considerations of non-obviousness. *See KSR*, 550 U.S. at 399 (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966)).

In defining the obviousness standard, the Supreme Court stressed that “the results of ordinary innovation are not the subject of exclusive rights under the patent laws. Were it otherwise patents might stifle, rather than promote, the progress of useful arts.” *KSR*, 550 U.S. at 427; *see also id.* at 402 (“Granting patent protection to advances that would occur in the ordinary course without real innovation retards progress and may, for patents combining previously known elements, deprive prior inventions of their value or utility.”) The Court also emphasized that its long-standing precedents confirm that “[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *Id.* at 416-17 (citing *Anderson’s-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62 (1969); *Sakraida v. Ag Pro, Inc.*, 425 U.S. 273, 282 (1976); *United States v. Adams*, 383 U.S. 39, 50-51 (1966)). Thus, the operative question when assessing whether a claimed invention would have been obvious is “whether the improvement is more than the predictable use of prior art elements according to their established functions.” *KSR*, 550 U.S. at 417. Significantly, “[a] person of ordinary skill is also a person of ordinary creativity, not an automaton.” *Id.* at 421. Indeed, beyond simple cases that merely require the combination of two prior art references, “a person of ordinary skill [often] will be able to fit the teachings of multiple patents together like pieces of a puzzle.” *Id.* at 420.

The rationale to combine prior-art references can come from a variety of sources and is not limited to the prior art itself or the specific problem the patentee was trying to solve. *Id.* at 420. Furthermore, the Supreme Court’s expansive approach in *KSR* encourages, rather than restricts, the use of common sense when addressing obviousness. *Id.* at 421. The references themselves need not provide a specific hint or suggestion of the alteration needed to arrive at the claimed invention; the analysis “may include recourse to logic, judgment, and common sense available to the person of ordinary skill that do not necessarily require explication in any reference or expert opinion.” *Perfect Web Techs. v. InfoUSA, Inc.*, 587 F.3d 1324, 1329 (Fed. Cir. 2009). And the “reason, suggestion, or motivation to combine may be found explicitly or implicitly: (1) in the prior art references themselves; (2) in the knowledge of those of ordinary skill in the art that certain references, or disclosures in those references, are of special interest or importance in the field; or (3) from the nature of the problem to be solved” *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 665 (Fed. Cir. 2000). A claim can also be proven obvious by showing that the combination of elements was “obvious to try” – for example, “[w]hen there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious under § 103.” *KSR*, 550 U.S. at 421. And “[i]f a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability.” *Id.* at 417.

Applying the obviousness test is particularly straightforward in cases that involve “the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement.” *Id.* at 417. In such cases, the simple substitution

of a single element must achieve unexpected results in order to patentable – that is, “when a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result.” *Id.* at 416 (citing *Adams*, 383 U.S. at 50-51)).

C. Claim Charts (L.P.R. 103.3(c))

Voltage attaches the following claim charts.

1. The '375 Patent

Claim Chart Exhibit	Prior Art Reference
A-1	Shao
A-2	Yamawaki
A-4	Fujimoto
A-5	Hajek
A-6	Solon 741
A-7	Liu
A-8	Yang
A-9	Yates
A-10	Tanaka
A-11	Inaba
A-12	Jonczyk
A-13	Franke
A-14	Tamura
A-15	IEC
A-17	Burndy
A-18	Takahashi
A-19	Tamura 340
A-20	Kim
A-21	Sasaki
A-22	Tokita
A-23	Chen
A-24	Vander Ploog
A-25	Pullium
A-26	Helukabel
A-27	Amphenol
A-28	Kono
A-29	Narumi
A-31	Ji
A-32	Blitzstrom
A-33	Sunnector

A-34	Machida
A-35	Solon 642
A-36	Takasu
A-37	Marroquin
A-38	Sakatani
A-39	Zahnen
A-40	Casimiro
A-41	Li
A-42	Feldmeier

2 The '376 Patent

Claim Chart Exhibit	Prior Art Reference
B-1	Shao
B-2	Yamawaki
B-4	Fujimoto
B-5	Hajek
B-6	Solon 741
B-7	Liu
B-8	Yang
B-9	Yates
B-10	Tanaka
B-11	Inaba
B-12	Jonczyk
B-13	Franke
B-14	Tamura
B-15	IEC
B-17	Burndy
B-18	Takahashi
B-19	Tamura 340
B-20	Kim
B-21	Sasaki
B-22	Tokita
B-23	Chen
B-24	Vander Ploog
B-25	Pullium
B-26	Helukabel
B-27	Amphenol
B-28	Kono
B-29	Narumi
B-31	Ji
B-32	Blitzstrom
B-33	Sunnector
B-34	Machida

B-35	Solon 642
B-36	Takasu
B-37	Marroquin
B-38	Sakatani
B-39	Zahnen
B-40	Casimiro
B-41	Li
B-42	Feldmeier

As an initial matter, all portions of each prior art reference cited in each of the attached claim charts are relied upon to support the disclosure of each patent claim limitation, as all portions provide general support. Representative descriptions and supporting citations are nevertheless provided, but are merely exemplary; they do not necessarily reflect every instance where a particular claim term or claim limitation may be disclosed in or taught by the prior art reference. References to figures or drawings refer to the figures/drawings themselves, as well as to any accompanying text or text necessary to understand the figures or drawings. References to the text refers to the text itself, as well as the accompanying figures or drawings that accompany the text.

Voltage reserves the right to rely on additional or different portions of the prior art references, other publications, and expert testimony to establish what these references would have taught one of ordinary skill in the art, or in what manner they would have motivated a particular combination of references. Moreover, in certain instances, representative documents for certain prior art systems are cited, but, again, are merely exemplary; they do not necessarily reflect or include every document relating to the prior art system that exists and that discloses or teaches a particular claim term or claim limitation. Voltage reserves the right to rely on any and all documents that describe or relate to prior art systems, including relying on the system itself. Voltage also reserves the right to rely on the testimony of the authors, named inventors, or anyone

else with knowledge of the prior art references and systems identified herein, as well as expert testimony regarding any such references or systems.

D. Obviousness and Motivation to Combine (L.P.R. 103.3(b))

The primary references identified above and as further described in Exhibits A-1 through A-42 and B-1 through B-42 each discloses, either expressly or inherently, every element of the claims of the Asserted Patents, thereby anticipating those claims. To the extent Shoals contends that any primary reference does not anticipate the claims of the Asserted Patents, it would have been obvious to combine or modify the primary references with concepts from other prior art.

Each prior art reference, action, knowledge, and/or prior invention identified in the accompanying claim charts may be combined with other prior art references, actions, knowledge, and/or prior inventions therein or with other prior art references identified in the claim charts to render obvious the claims of the Asserted Patents. Prior art disclosures also may be combined with information known to persons skilled in the art at the time of the alleged invention, and understood and supplemented in view of the common sense of persons skilled in the art at the time of the alleged invention.

All of the prior art to the Asserted Patents is related to an assembly including a cable joined to another cable at a nexus. As shown in Voltage's claim charts, these specific structural features of a nexus were known and existed in assemblies both in solar and other applications. Voltage's combinations and motivations to combine are disclosed below. For example, to the extent any of the prior art references did not explicitly disclose one or more of these structural characteristics, the paragraphs below describe the one or more other prior art references that may have been combined with the reference and motivations to combine the reference with the other references to render obvious such limitations. Modifying the structure would be nothing more than a simple

substitution of known elements or combination of prior art elements according to known methods to yield no more than their predictable results and commonly understood benefits.

To the extent limiting, the claims of the Asserted Patents recite “a lead assembly” and the claim requires a feeder cable electrically coupled to one or more drop lines at a nexus, where the drop lines are configured to receive power from solar panels for combination with the feeder cable at the nexus. For example, as shown in exemplary references Ji and Yamawaki references, a cabling system connecting a plurality of solar panels to transmit that power to an inverter was well known before the Asserted Patents. Ji discloses a photovoltaic power supply system integrated harness. Yamawaki disclosed cable assemblies for use in solar energy installation.

To the extent a reference does not expressly disclose an application of cable assemblies for use in a solar power system comprising a wire harness configured to receive power from a plurality of solar panels, it would have been obvious to use the assemblies disclosed therein in such applications, as shown by the disclosures in exemplary references Ji, Yamawaki, Jonczyk, Kim, Marroquin, Fujimoto, Solon 741, Solon 642, Tokita, and Tamura. A POSITA would have been motivated to combine the aforementioned references with a reference that does not expressly disclose an application of cable assemblies for use in a solar power system because they address the same problem of needing improved cable junctions that provide increased reliability, protection against the heat and moisture of the environment, and reduced complexity, and do so in the same field of endeavor of electrical systems. Applying a cable assembly for a solar power system would have been a straightforward task for a POSITA at the time of the alleged invention with a reasonable expectation of success, and a simple substitution to yield a predictable result.

To the extent a reference does not disclose a second drop line in a cable assembly, one of ordinary skill in the art would have been motivated to improve it to disclose a second drop line,

such as in exemplary references Kim, Shao, Hajek, Tanaka, Takahashi, Kono, and Takasu to reduce the amount of wire needed for a solar installation, and streamline the installation process for solar panel arrays.

To the extent a reference does not disclose a drop line extend parallel to the feeder cable within the nexus or generally, one of ordinary skill in the art would have been motivated to improve it to place the drop line to be parallel to the feeder cable as disclosed in exemplary references such as Kim, Tanaka, Marroquin, and Hajek for efficient wiring installation for solar systems.

To form a cable assembly for solar power system, it would have been necessary for a POSITA to include a drop line connector and a feeder cable connector. To the extent a reference does not disclose a drop line connector and a feeder cable connector, one of ordinary skill in the art would have been motivated to improve it to disclose such connectors, as disclosed in exemplary references such as Yamawaki and Jonczyk.

To the extent a reference does not disclose a drop line or a feeder cable which includes a section of exposed wire at the nexus, it would have been obvious for a POSITA to include a section of exposed wire at the nexus, as disclosed in exemplary references such as Kim, Shao, and Jurchen, as it would have been obvious for a POSITA that to form a cable assembly with a nexus electrically coupling the feeder cable and the drop line, it would have been necessary to have a section of exposed wire on each cable in order to connect the cables.

To the extent a reference does not disclose a mold that encapsulates the nexus, one of ordinary skill in the art would have been motivated to improve it to use a mold to encapsulate the nexus to substantially seal the nexus from external environmental conditions, as disclosed in references such as Shao, Solon 642, Solon 741, and Kim, as a simple substitution or the use of a known technique to increase protection from external environmental conditions and to reduce

maintenance costs of the lead assemblies, and which would have yielded no more than predictable results.

To the extent a reference does not disclose lead assembly comprising a feeder cable and a drop line terminating at a drop line connector configured to be capable of detachable connection to a wire harness having a central trunk and a plurality of branches that are each configured to receive electrical power generated by a corresponding photovoltaic (PV) panel resulting in combined electrical power at the drop line connector, one of ordinary skill in the art would have been motivated to improve it as disclosed in references such as Ji, Sakatani, Solon 642, Yamawaki, and Tokita, to save costs due to ease of implementation.

To the extent a reference does not disclose design choice limitations for a solar cable assembly such as a feeder cable with a current rating of 30 amps, a voltage rating of 600 VDC, 1000 VDC, or 1500 VDC, it would have been obvious for a POSITA to combine the reference with Yamawaki, Jonczyk, Solon 642, and Solon 741 as it is obvious to use a known technique to improve similar devices in the same way.

As noted above, during prosecution of the patents, including the parent applications of the Asserted Patents, the Examiner cited to certain prior art for proposed dependent claim limitations that were unrebutted by the Applicant.

For example, in the January 12, 2024 office action during the prosecution of the '375 Patent and the January 29, 2024 office action during the prosecution of the '376 Patent, the Examiner identified the following:

For claim 4 of the '375 Patent and claim 4 of the '376 Patent, the Examiner identified Jonczyk and found it would have been obvious for a person having ordinary skill in the art to include a crimp, solder portion or splice in the nexus to provide electrical connection between such

cables and lines. For claim 3 of the '376 Patent, the Examiner found it would have been obvious for a POSITA to form an electrical connection between a drop line and a feeder cable by forming a region which includes a section of exposed wire of the drop line and a section of exposed wire of the feeder cable in view of Jonczyk. For claim 6 of the '376 Patent, the Examiner found it would have been obvious for a POSITA to form an electrical connection between a drop line and a feeder cable by arranging at least a portion of the drop line to be parallel to at least a portion of the feeder cable in a region in view of Jonczyk. For claims 7 and 9 of the '376 Patent, the Examiner found Jonczyk teaches that it would have been obvious for a POSITA to use a drop line having a second diameter smaller than a first diameter of the feeder cable, and to form drop lines to have a wire of 10 or 12 gauges. In Applicant's response to the Office Action, Applicant did not rebut the Examiner's arguments.

For claims 8, 17, 18, and 20 of the '375 patent, the Examiner identified Solon 642 and found that it would have been obvious "for a person having ordinary skill in the art to connect more than one drop line at a junction as a matter of design." The Examiner also found that "a skilled artisan would also form two or more drop line pathways that are each configured to allow the two drop lines to extend partially through the primary mold according to an obvious design," in view of Solon 642. In Applicant's response to the Office Action, Applicant did not rebut the Examiner's arguments. For claim 13 of the '375 Patent, the Examiner found that it would have been obvious for a person having ordinary skill in the art to use a wire with a suitable gauge of 8 or 12 gauge in view of Solon 642. In Applicant's response to the Office Action, Applicant did not rebut the Examiner's argument.

For claim 14 of the '375 patent and claim 10 of the '376 patent, the Examiner identified Kummer and Hernandez as teaching the 1000 MCM wire, and Ramsey as teaching "that the gauge

of a wire can be varied according to the current being carried on the wire,” and therefore it would have been obvious for a person having ordinary skill in the art to “vary the size of the wire that forms the feeder cable according to the current being carried on the wire.” In Applicant’s response to the Office Action, Applicant did not rebut the Examiner’s argument.

For claim 19 of the ’375 patent, the Examiner identified Ookuma and found it would have been obvious for “a person having ordinary skill in the art to form an overmold encapsulating the primary mold” “forming an undermold-overmold interface at an outer surface of the primary mold in order to double waterproof the joint.” In Applicant’s response to the Office Action, Applicant did not rebut the Examiner’s argument.

For claim 21 of the ’375 patent, the Examiner identified Solon 741 and found it would have been obvious to form a lead assembly to carry a voltage of 1500 VDC. In Applicant’s response to the Office Action, Applicant did not rebut the Examiner’s argument.

For example, in the May 13, 2020 office action during the prosecution of the ’254 Patent, the examiner identified the following relevant to the Asserted Claims of the Asserted Patents:

The Examiner identified Avrutsky and found that it teaches a combiner box in a solar installation may be omitted if desired. In Applicant’s response to the Office Action, Applicant did not rebut the Examiner’s argument.

The Examiner found that it would have been obvious for a POSITA to modify the lead assembly to include a section of exposed wire at the nexus, an endpiece, a drop line which terminates in a drop line connector, a feeder cable which terminates in a feeder cable connector, a drop line which includes an 18 to 4 gauge wire, and a first nexus surrounded by a compression lug, as taught by Jonczyk. In Applicant’s response to the Office Action, Applicant did not rebut the Examiner’s argument.

For example, in the March 3, 2023 office action during the prosecution of the '153 Patent, the examiner identified Vander Ploog and found it would have been obvious “for a person having ordinary skill in the art to form sections of exposed wire, as Vander Ploog shows that such exposure is necessary for electrical connection at a nexus.” In Applicant’s response to the Office Action, Applicant did not rebut the Examiner’s argument.

The Asserted Patents and file histories admit that several limitations recited in the claims were commercially available and known prior to its alleged priority date. For example, throughout the specification and file history are references to the commercial availability and established knowledge surrounding most, if not all, of the claimed elements by the time of the claimed invention. This includes statements regarding solar panels coupled using wire harnesses, drop line connectors, feeder cable connectors, and mold.

1. Exemplary Obviousness Combinations

The exemplary combinations of references in non-limiting Groups A, B, C, and D render the claims of the '375 and the '376 Patents obvious under 35 U.S.C. §103:

Group A	Group B	Group C	Group D
Yamawaki	Shao	Yamawaki	Shao
Jonczyk	Tanaka	Jonczyk	Solon 642
Solon 642	Kono	Solon 642	Solon 741
Solon 741	Takahashi	Solon 741	Kim
Marroquin	Hajek	Marroquin	Chen
Tamura	Takasu	Fujimoto	Takasu
Kim	Kim	Ji	Tamura
Fujimoto	Chen	Sakatani	Ji
Tokita	IEC 60050-461	Kono	Hajek
Ji	Vander Ploog	Takahashi	Kono
	Marroquin	Tokita	Yamawaki
	Tamura		Sakatani
			IEC 60050-461
			Tanaka
			Vander Ploog

Voltage’s invalidity contentions are provided without prejudice to Voltage’s rights

pursuant to the Scheduling Order to serve expert witness reports providing additional analysis and supporting detail.

2. Exemplary Motivations to Combine

Voltage's combinations and motivations to combine are disclosed below. For example, to the extent any of the prior art references does not explicitly disclose certain claimed limitations, the paragraphs below describe the one or more other prior art references that may have been combined with the reference and motivations to combine the reference with the other references to render obvious such limitations.

To the extent a reference does not explicitly disclose an application of cable assemblies for use in a solar power system it would have been obvious to use the assemblies disclosed therein in such applications, as shown by the disclosures in exemplary references in Group A (as listed above) because they address the same problem of needing improved cable junctions that provide increased reliability, protection against the heat and moisture of the environment, and reduced complexity, and do so in the same field of endeavor of electrical systems. Applying a cable assembly for a solar power system would have been a straightforward task for a POSITA at the time of the alleged invention with a reasonable expectation of success, and a simple substitution to yield a predictable result.

To the extent a reference does not disclose drop line(s) that extend parallel to the feeder cable, one of ordinary skill in the art would have been motivated to improve the reference by adding such features, as shown by the disclosures in exemplary references in Group B (as listed above) to implement alternative design driven by different manufacturing or design considerations, such as potentially wanting both drop lines be on the same side of the feeder cable, as opposed to opposite sides of the feeder cable, or a result of ease of manufacturing where bringing two lines in

parallel is easier than bringing two lines perpendicular, particularly where the wire gauge is large/heavy. It would have been a straightforward task for a POSITA at the time of the alleged invention to place the cables to be aligned to be parallel to each other with a reasonable expectation of success, and a simple substitution of known methods to yield a predictable result.

To the extent a reference does not disclose lead assembly comprising a feeder cable and a drop line terminating at a drop line connector configured to be capable of detachable connection to a wire harness having a central trunk and a plurality of branches that are each configured to receive electrical power resulting in combined electrical power at the drop line connector, one of ordinary skill in the art would have been motivated to improve it as disclosed in exemplary references in Group C (as listed above), to save production cost and ease of installation by, for example, enabling a more easily scalable modular system. Connecting a drop line connector of a drop line with another wire harness would be nothing more than a combination of prior art elements according to known methods to yield no more than their predictable results and commonly understood benefits.

To the extent a reference does not disclose a mold that encapsulates the nexus, one of ordinary skill in the art would have been motivated to improve it to use a mold to encapsulate the nexus to substantially seal the nexus from external environmental conditions, as disclosed in exemplary references in Group D (as listed above), as a simple substitution or the use of a known technique to improve protection from external environmental conditions, to prevent harm to users from exposure to uninsulated electrical wires, to reduce maintenance costs of the lead assemblies, and which would have yielded no more than predictable results.

Voltage's invalidity contentions are provided without prejudice to Defendants' rights pursuant to the Procedural Schedule to serve expert witness reports providing additional analysis and supporting detail.

3. Secondary Considerations of Non-Obviousness

To date, Shoals has not identified any purported secondary considerations. Nor did Shoals identify any such secondary considerations during the examination process that led to the issuance of the Asserted Patents. Nor is Voltage otherwise aware of any relevant secondary considerations – much less secondary considerations with a nexus to the claim elements that Shoals added during examination.

As reflected in the preceding subsections and in the accompanying exhibits, these features were documented in numerous prior art references (including multiple indisputable prior art references under § 102) and do not constitute a material difference as between the claimed invention and the other prior art references.

To the extent Shoals may cite alleged commercial success and/or industry praise of products purportedly implementing the claimed limitations, any evidence of commercial success and/or industry praise would need to be tied to the claimed apparatus and method themselves rather than unpatented features. *See, e.g., In re Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011) (“Where the offered secondary consideration actually results from something other than what is both claimed and novel in the claim, there is no nexus to the merits of the claimed invention.”); *Cot’n Wash, Inc. v. Henkel Corp.*, 56 F. Supp. 3d 626, 651 (D. Del. 2014) (no nexus between claimed invention and industry praise where “the claimed invention was not specifically praised, the entire product in general was praised”); *see also Allergan, Inc. v. Apotex Inc.*, 754 F.3d 952, 965 (Fed. Cir. 2014) (reversing trial court and holding that claims were obvious as a matter of law: “It is the established

rule that “objective evidence of non-obviousness must be commensurate in scope with the claims which the evidence is offered to support.”).

For instance, generic evidence or assertions concerning Shoals’ BLA product – without a nexus to the Asserted Claims – is not probative. *See, e.g., Therasense, Inc. v. Becton, Dickinson & Co.*, 593 F.3d 1289, 1299 (Fed. Cir. 2010) (“This is not a situation where the success of a product can be attributed to a single patent....”), opinion vacated, 374 F. App’x 35 (Fed. Cir. 2010), and opinion reinstated in relevant part, 649 F.3d 1276 (Fed. Cir. 2011); *Polaroid Corp. v. Eastman Kodak Co.*, 641 F. Supp. 828, 833 (D. Mass. 1985) (holding in multi-patent suit that commercial success could not be credited, as evidence was “inadequate to permit [the court] to assign to any one patent credit for the commercial success of the whole.”), *aff’d*, 789 F.2d 1556 (Fed. Cir. 1986); *see also* 2 Chisum on Patents § 5.05[2][f] (“When more than one patent covers a commercially successful product or process, proving nexus becomes more difficult.”).

To the extent Shoals may cite its infringement allegations as purported evidence of “copying,” such theories would contradict controlling law that “[n]ot every competing product that arguably falls within the scope of a patent is evidence of copying. Otherwise every infringement suit would automatically confirm the nonobviousness of the patent.” *Id.* at 1325. Instead, as copying requires “evidence of efforts to replicate a specific product.” *Tokai Corp. v. Easton Enters., Inc.*, 632 F.3d 1358, 1370 (Fed. Cir. 2011). And as with other secondary considerations, there must be “a nexus between the [alleged] copying and the novel aspects of the claimed invention.” *Wm. Wrigley Jr. Co. v. Cadbury Adams USA*, 683 F.3d 1356, 1362 (Fed. Cir. 2012). No such evidence exists here.

To the extent Shoals may cite a purported “long-felt problem or need,” the prior art identified and discussed herein and in the accompanying exhibits discloses all the elements of the

Asserted Claims. *See, e.g., Geo M. Martin Co. v. Alliance Machine Sys. Int'l LLC*, 618 F.3d 1294, 1304-05 (Fed. Cir. 2010) (no long-felt but unsolved need where the identified need “had been met by [the] prior art”).

To the extent Shoals may cite purported “skepticism” and/or “surprise,” the prior art identified and discussed herein and in the accompanying exhibits confirms that a POSITA would have been well aware of the benefits of each and every element of the claimed invention.

Indeed, as reflected in the preceding subsections, incorporated materials, and in accompanying exhibits, these limitations were documented in numerous prior art references (including multiple indisputable prior art references) and do not constitute a material difference from the alleged claimed inventions. Accordingly, even if there were significant secondary considerations (despite the lack of any such suggestion in the record), such considerations would not be sufficient to overcome the compelling obviousness case based on the primary *Graham* factors as reflected above. *See, e.g., Nalpropion Pharms., Inc. v. Actavis Lab'ys FL, Inc.*, 934 F.3d 1344, 1355 (Fed. Cir. 2019) (reversing district court and holding that claims were invalid as obvious despite alleged failure of others); *Leapfrog Enters. Inc. v. Fisher-Price Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007) (finding that evidence of commercial success, industry praise, and long-felt need was insufficient to overcome strong evidence of obviousness).

Voltage reserves the right to supplement its responses and rely on expert testimony in the event Shoals is permitted to identify secondary considerations purportedly relevant to the Asserted Patents.

II. INVALIDITY UNDER 35 U.S.C. § 112 (L.P.R. 103.3(d))

The claims of the Asserted Patents are invalid under 35 U.S.C. § 112 for indefiniteness and/or lack of written description, including Claim 1 and all claims depending from Claim 1 of the

'375 Patent; and Claims 1 and 14, and all claims depending from Claims 1 and 14 of the '376 Patent based upon the claim limitations requiring “wherein the one or more drop line pathways and the feeder pathway extend parallel to one another within the nexus” (Claim 1, '375 Patent); “wherein, in the region of electrical interconnection, the first drop line and the second drop line extend in opposite directions along a longitudinal axis that is parallel to a longitudinal axis of the feeder cable” (Claim 1, '376 Patent); and “wherein the drop line and the feeder cable extend parallel to one another within the region of electrical interconnection” (Claim 14, '376 Patent). These limitations each require that certain wires, cables, or their respective pathways, extend parallel to one another “[in/within] the region of electrical interconnection” or “within the nexus.” With no written description for the metes and bounds of the “drop line(s)” or their respective pathways “[in/within] the region of electrical connection” or “within nexus,” one of ordinary skill would not be able to determine the invention’s scope with reasonable certainty. Further, to the extent Plaintiff maintains a position that any, even miniscule or infinitesimal, portion of the certain wires/cables/pathways within the “region of electrical connection” or “nexus” may be elected and compared to any other, even miniscule or infinitesimal, portion of the certain wires/cables/pathways for parallelism to satisfy the claim limitation, such a position additionally renders meaningless a claim limitation that was added by amendment to overcome prior art, and which resulted in allowance of the claims.

III. DOCUMENT PRODUCTION PURSUANT TO L.P.R. 103.4

Voltage intends to rely on documents previously produced in the related co-pending proceeding *In re Certain Photovoltaic Trunk Bus Cable Assemblies and Components Thereof*, Inv. No. 337-TA-1438 (U.S.I.T.C.).

This the 21st day of July, 2025

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CERTIFICATE OF SERVICE

I hereby certify that on this day, the 21st of July, 2025, I caused to be served the foregoing Preliminary Invalidity Contentions on all counsel of record via electronic mail.

Dated: July 21, 2025

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