Isolated DC to DC Converter

Model DC/DC-1.6H-24V-LV (low voltage)
DC/DC-1.6H-24V-FVL (fixed voltage - low)
DC/DC-1.6H-24V-FVH (fixed voltage - high)

Rev 081114

Please contact Customer Support at 1-800-24VOLTS for further information.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABOUT NEXTEK POWER SYSTEMS</td>
<td>3</td>
</tr>
<tr>
<td>INTRODUCTION / OVERVIEW</td>
<td>4</td>
</tr>
<tr>
<td>1.0 SAFETY</td>
<td>5</td>
</tr>
<tr>
<td>2.0 STANDARDS &amp; REQUIREMENTS</td>
<td>10</td>
</tr>
<tr>
<td>3.0 REGULATORY INFORMATION</td>
<td>11</td>
</tr>
<tr>
<td>4.0 TRAINING</td>
<td>11</td>
</tr>
<tr>
<td>5.0 FEATURES</td>
<td>12</td>
</tr>
<tr>
<td>6.0 TECHNICAL SPECIFICATIONS</td>
<td>13</td>
</tr>
<tr>
<td>7.0 GENERAL REQUIREMENTS</td>
<td>15</td>
</tr>
<tr>
<td>8.0 INSTALLATION PROCEDURE</td>
<td>16</td>
</tr>
<tr>
<td>8.1 Preparing the DC/DC for Mounting</td>
<td>16</td>
</tr>
<tr>
<td>8.2 Mounting Requirements</td>
<td>16</td>
</tr>
<tr>
<td>8.3 Wall or I-beam mounting</td>
<td>17</td>
</tr>
<tr>
<td>8.4 Grounding</td>
<td>17</td>
</tr>
<tr>
<td>8.5 Wiring the Unit</td>
<td>19</td>
</tr>
<tr>
<td>8.6 Connecting Multiple Units</td>
<td>23</td>
</tr>
<tr>
<td>8.7 Power the Unit</td>
<td>23</td>
</tr>
<tr>
<td>9.0 FAULT INDICATORS</td>
<td>27</td>
</tr>
<tr>
<td>10.0 INSPECTION AND MAINTENANCE</td>
<td>28</td>
</tr>
<tr>
<td>11.0 TROUBLESHOOTING</td>
<td>29</td>
</tr>
<tr>
<td>12.0 NOTES</td>
<td>31</td>
</tr>
</tbody>
</table>
ABOUT NEXTEK POWER SYSTEMS

Nextek Power Systems AC/DC integration technology represents a breakthrough in on-site electrical management, combining the availability of AC power with the quality and efficiency of a DC supply.

NEXTEK PRODUCT BENEFITS

- Easy conversion of AC lighting fixtures to DC-powered units
- Easy conversion of AC grid power into DC power for commercial building applications
- Highly efficient management of peak loads
- Future-proof lighting and other systems to be developed
- Nextek Power Systems Direct Coupling® Technology, directly connects clean power generated at a building to its electronic loads inside cutting down on overall power consumption, boosts electricity generated and stored on-site, and delivers a robust renewable energy ready network.

DISCLAIMER

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INTRODUCTION

DC to DC Converter

A DC to DC Converter is an electronic circuit that converts a source of Direct Current (DC) from one voltage level to another. DC/DC power converters are employed in a variety of applications, including power supplies for personal computers, office equipment, spacecraft power systems, laptop computers, and telecommunications equipment, as well as DC motor drives. The input to a DC/DC converter is an unregulated DC voltage.

The Nextek isolated DC/DC converter is a step-down converter producing a lower regulated output voltage (24 VDC) from a higher varying input voltage (70-430 VDC). Also, the Nextek DC/DC converter is isolated, resulting in the prevention of DC back feeding from the input to the output.
1.0 SAFETY

1.1 SAVE THESE INSTRUCTIONS– This manual contains important safety and operating instructions for the Nextek DC to DC Converter (DC/DC), Models DC/DC-1.6H-24V-LV (low voltage), DC/DC-1.6H-24V-FVL (fixed voltage- low), and DC/DC-1.6H-24V-FVH (fixed voltage- high) that shall be followed during installation and maintenance of the converter.

CONSERVEZ CES INSTRUCTIONS - Ce manuel contient des consignes de sécurité importantes ainsi que les instructions d'utilisation pour le régulateur de poursuite du point de puissance maximale isolé, (DC/DC) Nextek, modèles DC/DC-1.6H-24V-LV, DC/DC-1.6H-24V-FVL, and DC/DC-1.6H-24V-FVH qui doivent être suivies lors de l'installation et de l'entretien du convertisseur.

The following symbols are used throughout this manual to indicate potentially dangerous conditions or mark important safety instructions:

Les symboles suivants sont utilisés dans ce manuel pour indiquer des conditions potentiellement dangereuses ou marquent des instructions de sécurité importantes:

**DANGER/DANGER:**
Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

Indique une situation extrêmement dangereuse qui, si elle n'est pas évitée, entraînera la mort ou des blessures graves.

**WARNING/MISE EN GARDE:**
Indicates a potentially dangerous condition. Use extreme caution when performing this task.

Indique une situation potentiellement dangereuse. Soyez extrêmement prudent lorsque vous effectuez cette tâche.

**CAUTION/ATTENTION:**
Indicates a critical procedure for safe and proper operation of the controller.

Signale une procédure essentielle pour le fonctionnement sûr et correct du régulateur.

**NOTE/REMARQUE:**
Indicates a procedure or function that is important for the safe and proper operation of the controller.

Indique une procédure ou une fonction qui est importante pour le fonctionnement sûr et adéquat du régulateur.
1.0 SAFETY

1.2 Before using the DC/DC, read all instructions and cautionary markings.
Avant d’utiliser le DC/DC, lisez toutes les instructions et les avertissements.

1.3 Electrical hazards are probably the most common hazards throughout the industry. Virtually all workplaces have electrical installations and use electricity.
Les risques électriques sont les dangers les plus communs dans l'industrie. Presque tous les lieux de travail disposent d'installations électriques et se servent d’électricité.

1.4 It is very important that all industry employees be familiar with electrical hazards and know how to protect themselves when working on, near, or with electricity.
In most cases, industry electrical and electronic equipment is designed for both maximum safety and efficiency. However, potentially hazardous conditions such as inadvertent contact with hazardous voltages may exist while performing servicing and maintenance, handling materials, or cleaning.
Il est très important que tous les employés de l’industrie se familiarisent avec les risques électriques et savent comment se protéger lors de travailler sur, près de ou avec l'électricité. Dans la plupart des cas, l'équipement de l'industrie électrique et électronique est conçu à la fois pour un maximum de sécurité et d'efficacité. Cependant, les conditions potentiellement dangereuses telles que tout contact accidentel avec des tensions dangereuses peuvent exister lors de l'exécution d'entretien et de service, la manutention des matériaux, ou le nettoyage.

1.5 The improper use of electrical extension cords and portable electrical equipment can result in hazardous exposure.
L'utilisation incorrecte de rallonges électriques et des appareils électriques portatifs peut entraîner une exposition dangereuse.

1.6 **WARNING - RISK OF ELECTRICAL SHOCK.** Do not remove main cover. No user serviceable parts inside. Refer servicing to qualified service personnel. Normally grounded conductors may be ungrounded and energized when a ground-fault is indicated.
**MISE EN GARDE - RISQUE DE CHOC ÉLECTRIQUE.** Ne retirez pas cette couverture. Aucune pièce réparable par l'utilisateur. Confiez l'entretien à du personnel qualifié. Conducteurs normalement à la terre peuvent être mis à la terre et sous tension quand un défaut à la terre est indiqué.

1.7 **DANGER – TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, CAREFULLY FOLLOW THESE INSTRUCTIONS**
**DANGER - POUR RÉDUIRE LE RISQUE D'INCENDIE OU CHOC ÉLECTRIQUE, SUIVEZ ATTENTIVEMENT CES CONSIGNES**

1.7.1 Do not disassemble or attempt to repair the controller. The only user serviceable part inside the Nextek DC/DC are the Input and Ground Fault...
1.0 SAFETY

Fuses under the front cover.
Ne pas démonter ou tenter de réparer le régulateur. Les seules pièces réparables par l'utilisateur à l'intérieur du DC/DC sont les fusibles d'entrée et de défaut de la mise à terre sous le couvercle avant.

1.7.2 Disconnect power to the unit before installing, removing, cleaning or otherwise maintaining the unit.
Coupez l'alimentation au réceptacle avant l'installation ou l'enlèvement de l'unité.

1.7.3 A disconnect device shall be incorporated in field wiring.
Un dispositif de déconnexion doit être incorporé dans le câblage.

1.7.4 For use in a controlled area free of contaminants, please refer to Section 1.8 for environmental conditions.
Pour une utilisation dans une zone contrôlée exempte de contaminants, veuillez vous référer à la section 1.8 pour les conditions environnementales.

1.7.5 This unit is provided with an internal DC ground fault detector/interrupter. Refer to installation instructions for proper fuse selection.
CAUTION: DISCONNECT SUPPLY BEFORE CHANGING FUSE.
Cet appareil est muni d’un défaut à la terre DC détecteur / interrupteur interne. Reportez-vous aux instructions d'installation pour la sélection de fusible approprié.

ATTENTION: Débrancher l'alimentation avant de changer le fusible.

NOTE: When removing access cover and screws, be careful not to let cover and screws fall across terminals or circuit board.
REMARQUE: En retirant le couvercle d’accès et les vis, veillez à ne pas laissez le couvercle et les vis tomber entre les bornes ou sur la carte de circuit.

1.8 INSTALLATION SAFETY PRECAUTIONS
CONSIGNES DE SECURITÉ D’INSTALLATION

1.8.1 Mount the DC/DC indoors. Prevent exposure to the elements and do not allow water to enter the controller.
Montez le DC/DC à l'intérieur seulement. Éviter l'exposition aux éléments et ne pas laisser l'eau pénétrer dans le régulateur.

1.8.2 Power connections must remain tight to avoid excessive heating from a loose connection.
Les raccordements de puissance doivent rester étanche pour éviter un échauffement excessif résultant d'un raccord desserré.

1.8.3 Use properly sized conductors and circuit interrupters.
Use Copper, Copper-Clad Aluminum, or Aluminum Conductors.
1.0 SAFETY

Utilisez des conducteurs et interrupteurs de circuit de taille appropriée.
Utilisez cuivre, aluminium plaqué cuivre, ou en aluminium.

1.8.4 The DC/DC is to be connected to DC circuits only.
Le DC/DC doit être raccordé uniquement à des circuits à courant continu.

1.9 Installers should be advised:
Les installateurs doivent être informés:

1.9.1 These installation instructions are for use by qualified personnel only.
Ces instructions d’installation sont destinées uniquement à un personnel qualifié.

1.9.2 The equipment contains DC voltages.
When the photovoltaic array is exposed to light, it supplies a DC voltage to this equipment.
L'équipement contient des tensions CC.
Lorsque le générateur photovoltaïque est exposée à la lumière, il fournit une tension continue à cet équipement.

NOTE: Installers must reference the National Electric Code (NEC) sections 250 or 690, when required, to ensure proper system wiring and grounding compliance. In addition, all state and federal Occupational Safety and Health Administration (OSHA) guidelines and regulations must be followed.

REMARK: Les installateurs doivent référence le Code National Electrique (NEC) articles 250 ou 690, lorsque nécessaire, pour assurer le câblage correct du système et la conformité de la mise à la terre. En outre, tous les lignes directrices et les règlements gouvernementaux (OSHA) doivent être respectés.

NOTE: Installers must reference the specific site scope and project drawings for additional information and considerations, including the system layout and any related electrical drawings.

REMARK: Les installateurs doivent faire référence à la portée du site spécifique et les dessins du projet pour obtenir des informations et des considérations supplémentaires, y compris la configuration du système et les schémas électriques liés.

1.9.3 The mounting location is important to the performance and operating life of the controller. The environment must be dry and protected from water ingress. If required, the controller may be installed in a ventilated enclosure with sufficient air flow. Never install the DC/DC in a sealed enclosure.
L'emplacement de montage est important pour la performance et la durée de fonctionnement du régulateur. L'environnement doit être sec et protégé contre la pénétration de l'eau. Si nécessaire, le régulateur peut être installé dans une enceinte ventilée avec un débit d'air suffisant. Ne jamais installer le DC/DC dans une enceinte étanche.
1.0 SAFETY

1.9.4 The installation is straightforward, but it is important each step is done correctly and safely. A mistake can lead to dangerous voltage and current levels. Be sure to carefully follow each instruction in this section. Read all instructions first before beginning installation.

L'installation est assez simple, mais il est important que chaque étape est faite correctement et en toute sécurité. Une erreur peut conduire à des niveaux de tension et de courant dangereux. Assurez-vous de suivre attentivement chaque instruction dans cette section. Lisez toutes les instructions avant de commencer l'installation.

1.9.5 The installation instructions are for installation of a negative grounded system. National Electrical Code (NEC) requirements are noted on occasion for convenience, however the installer should have a complete understanding of NEC and UL requirements for photovoltaic installations.

Les instructions d'installation sont pour l'installation sur des sources à masse négative. Les exigences National Electrical Code (NEC) sont notées à l'occasion pour plus de commodité, mais l'installateur doit avoir une compréhension complète des exigences NEC et UL pour les installations photovoltaïques.

WARNING - Shock Hazard

1.10 Disconnect all power sources to the controller before removing the wiring box cover. Never remove the cover when voltage exists on any of the DC/DC power connections.

Déconnectez toutes les sources d'alimentation du régulateur avant de retirer le couvercle de la boîte de câblage. Ne retirez jamais le couvercle lorsque la tension n'existe sur aucune des connexions de puissance DC/DC.

1.11 An AC powered Nextek Power Server Module (PSM) must be connected to the output and powered up prior to any solar being connected to the DC/DC input, in order for the DC/DC to function.

Un module serveur de puissance (PSM) Nextek alimenté en CA doit être connecté à la sortie et sous tension avant qu’aucune solaire ne soit reliée à l’entrée du DC/DC, pour que le DC/DC fonctionne.

1.12 The DC/DC is designed to keep its external surface temperature from rising more than 30°C above the ambient temperature.

Le DC/DC est conçu pour que sa température à la surface externe ne dé passe pas la température ambiante de plus de 30° C.

1.13 Treat any conductors and parts of electric equipment as energized that have been de-energized, but have not been properly locked or tagged out and tested to a zero energy state. LOCKOUT/TAGOUT MUST ALWAYS BE USED.
1.0 SAFETY

Traitert tous les conducteurs et pièces d'équipement électrique comme sous tension qui ont été mis hors tension, mais n'ont pas été correctement verrouillés ou étiquetés et testé à un niveau d'énergie nulle.**VERROUILLAGE/ÉTIQUETAGE DOIT TOUJOURS ÊTRE UTILISÉ.**

1.14 The Nextek DC/DC does not come with the DC supply cable. Refer to Table 1.1 for list of acceptable equivalent cabling.

Le DC/DC Nextek ne vient pas avec le câble d'alimentation CC. Se reporter au tableau 1.1 pour la liste des cordons équivalents acceptables.

1.14.1 Do not connect the polarity incorrectly, as it will damage the DC/DC and void the warranty on the unit.

Ne branchez pas la polarité incorrectement, car cela endommagerait le DC/DC et annulera la garantie de l'unité.

1.14.2 Use all NEC requirements when installing the DC/DC into a system.

Utilisez toutes les exigences NEC lors de l'installation du DC/DC dans un système.

<table>
<thead>
<tr>
<th>Basic Cable Type</th>
<th>Other Suitable Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>TS</td>
<td>TST</td>
</tr>
<tr>
<td>SP-2</td>
<td>SPE-2, SPT-2</td>
</tr>
<tr>
<td>SP-3</td>
<td>SPE-3, SPT-3</td>
</tr>
<tr>
<td>SV</td>
<td>SVE, SVO, SVOO, SVT, SVTO, SVTOO</td>
</tr>
<tr>
<td>SJ</td>
<td>SJE, SJO, SJOO, SJT, SJTO, SJTOO</td>
</tr>
<tr>
<td>SE</td>
<td>SE, SO, SOO, ST, STO, STOO</td>
</tr>
</tbody>
</table>

**Table 1.1 Suitable Cord Types**

1.15 Suitable for use in air-handling spaces.

Convient pour une utilisation dans des espaces de traitement d'air.

Suitable for use in other environmental air space in accordance with section 300.22(c) of the National Electrical Code, or equivalent.

Convient pour une utilisation dans un autre espace de l'air ambiant conformément à l'article 300.22 (c) du Code national de l'électricité, ou l'équivalent.

2.0 STANDARDS AND REQUIREMENTS

2.1 All DC cable types must meet all local and national codes.

2.2 Shut off all external DC circuit breakers feeding this unit.
3.0 REGULATORY INFORMATION

NOTE: This section contains important information for safety and regulatory requirements.

3.1 The DC/DC controller should be installed by a qualified technician according to the electrical rules of the country in which the product will be installed.

3.2 A means shall be provided to ensure all the poles are disconnected from the power supply. A two-pole switch incorporated into the fixed wiring is required for the PV input.

3.3 Installer should provide a permanent and reliable means for grounding using the DC/DC grounding terminal or stud (in the wiring compartment). The clamping of the ground shall be secured against accidental loosening.

3.4 The entry openings to the DC/DC wiring compartment shall be protected with conduit or with a bushing. To comply with the National Electric Code (NEC), the current rating of the controller must be equal to or greater than 125% of the solar array's short circuit output (Isc).

3.5 FCC Requirements:
This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
Changes or modifications not expressly approved by Nextek Power Systems, Inc. for compliance could void the user’s authority to operate the equipment.

Note:
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures:
• Reorient or relocate the receiving antenna.
• Increase the separation between the equipment and receiver.
• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
• Consult the dealer or an experienced radio/TV technician for help.

4.0 INSTALLATION QUALIFICATIONS

4.1 Installation work and electrical wiring of permanently-connected power units must be performed only by qualified service personnel in accordance with all applicable codes and standards, including fire-rated construction.
5.0 DC/DC FEATURES

- Green LED - Run (Flashing)
- Red LED - Fault
- Yellow LED - Wireless Communication

- Wiring box (shown with cover removed)
- Input terminal J13 (PV negative)
- Input terminal J12 (PV positive)
- Ground Stud
- Keyhole mounting slot
- Knockouts
- Output terminal J16 (positive)
- Output terminal J15 (negative)
- Ground terminal J14
- Lower mounting hole
- Wireless antenna
- Cooling Vents
6.0 TECHNICAL SPECIFICATIONS

**UL1741**: Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources.

- **EMerge Alliance® Registered**: ROHS Compliant Negative ground PV only

### MECHANICAL

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>DC/DC-1.6H-24V-LV, FVL, FVH</th>
</tr>
</thead>
<tbody>
<tr>
<td>H: 16.498&quot;/419 mm</td>
<td></td>
</tr>
<tr>
<td>W: 5.508&quot;/140 mm</td>
<td></td>
</tr>
<tr>
<td>D: 3.406&quot;/87 mm</td>
<td></td>
</tr>
</tbody>
</table>

| Weight                  | 12.0 lbs.                   |

| Mounting Orientation    | Horizontal mount            |

| Audible Noise           | Less than 15 dBA            |

<table>
<thead>
<tr>
<th>Operational Environmental Limits</th>
<th>DC/DC-1.6H-24V-LV, FVL, FVH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature Range: 0° to 49°C</td>
<td></td>
</tr>
<tr>
<td>Humidity: 90% RH non-condensing</td>
<td></td>
</tr>
<tr>
<td>Vibration: Low-Frequency 10-55 Hz</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Storage Environmental Limits</th>
<th>DC/DC-1.6H-24V-LV, FVL, FVH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature Range: -40° to 85°C</td>
<td></td>
</tr>
<tr>
<td>Humidity: 95% RH non-condensing (transport and storage in protective container)</td>
<td></td>
</tr>
<tr>
<td>Vibration: Low-Frequency 10-55 Hz</td>
<td></td>
</tr>
</tbody>
</table>

| Construction               | Made of 20 gauge steel, manufactured in U.S.A. |

| Installation               | In proximity to associated load; minimize wiring loss between output and load |

<table>
<thead>
<tr>
<th>Solar Terminals min/max wire size</th>
<th>DC/DC-1.6H-24V-LV, FVL, FVH</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/14 AWG</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Output Terminals min/max wire size</th>
<th>DC/DC-1.6H-24V-LV, FVL, FVH</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/4 AWG</td>
<td></td>
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</tbody>
</table>

| Recommended Torque                | Input: 20 inch-pounds (2.26 Nm); Output: 50 inch-pounds (5.65 Nm) |

| Knockouts (trade sizes)           | 1"                          |

### ELECTRICAL

<table>
<thead>
<tr>
<th>Output Voltage (VDC)</th>
<th>DC/DC-1.6H-24V-LV, FVL, FVH</th>
</tr>
</thead>
<tbody>
<tr>
<td>24.5</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Maximum Continuous Output Current (ADC)</th>
<th>DC/DC-1.6H-24V-LV, FVL, FVH</th>
</tr>
</thead>
<tbody>
<tr>
<td>63</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maximum Continuous Output Power (W)</th>
<th>DC/DC-1.6H-24V-LV, FVL, FVH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1600</td>
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<table>
<thead>
<tr>
<th>Maximum Operating Current (ADC)</th>
<th>DC/DC-1.6H-24V-LV, FVL, FVH</th>
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<tbody>
<tr>
<td>7.6</td>
<td></td>
</tr>
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<table>
<thead>
<tr>
<th>Range of Operating Input Voltage (VDC)</th>
<th>DC/DC-1.6H-24V-LV, FVL, FVH</th>
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</thead>
<tbody>
<tr>
<td>70-240</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>The Maximum Size Input Circuit Overcurrent Protection Available for this Unit (ADC)</th>
<th>DC/DC-1.6H-24V-LV, FVL, FVH</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Efficiency</th>
<th>DC/DC-1.6H-24V-LV, FVL, FVH</th>
</tr>
</thead>
<tbody>
<tr>
<td>97.5% peak at approx 60% load</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Quiescent Power (W)</th>
<th>DC/DC-1.6H-24V-LV, FVL, FVH</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.7</td>
<td></td>
</tr>
</tbody>
</table>
6.0 TECHNICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>STATUS INDICATORS</th>
<th>DC/DC-1.6H-24V-LV, FVL, FVH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Running Status</td>
</tr>
<tr>
<td>Red</td>
<td>Fault Indicator</td>
</tr>
<tr>
<td>Yellow</td>
<td>Communication Indicator</td>
</tr>
</tbody>
</table>

**DC/DC Voltage Range** (Low Voltage and High Voltage)

The Nextek isolated DC/DC converter is a step-down converter producing a lower regulated output voltage (24 VDC) from a higher varying input voltage (70-400 VDC). Also, the Nextek DC/DC converter is isolated, resulting in the prevention of DC back feeding from the input to the output.

<table>
<thead>
<tr>
<th>OFF</th>
<th>MICROCONTROLLER TURNS ON</th>
<th>DC/DC-1.6H-24V-LV LOW VOLTAGE</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>0VDC</td>
<td>60VDC</td>
<td>70VDC</td>
<td>240VDC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Minimum Operating Voltage</td>
<td>Maximum Operating Voltage</td>
</tr>
</tbody>
</table>

*If Voc is required to be greater than 240VDC please contact Nextek Power Systems, Inc.

<table>
<thead>
<tr>
<th>OFF</th>
<th>MICROCONTROLLER TURNS ON</th>
<th>DC/DC-1.6H-24V-FVL FIXED VOLTAGE LOW</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>0VDC</td>
<td>60VDC</td>
<td>350VDC</td>
<td>400VDC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Minimum Operating Voltage</td>
<td>Maximum Operating Voltage</td>
</tr>
</tbody>
</table>

*If Voc is required to be greater than 400VDC please contact Nextek Power Systems, Inc.

<table>
<thead>
<tr>
<th>OFF</th>
<th>MICROCONTROLLER TURNS ON</th>
<th>DC/DC-1.6H-24V-FVH FIXED VOLTAGE HIGH</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>0VDC</td>
<td>60VDC</td>
<td>370VDC</td>
<td>430VDC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Minimum Operating Voltage</td>
<td>Maximum Operating Voltage</td>
</tr>
</tbody>
</table>

*If Voc is required to be greater than 430VDC please contact Nextek Power Systems, Inc.

Table 6.1
7.0 GENERAL REQUIREMENTS

7.1 Recommended Tools

7.1.1 Standard construction and electrical tools along with basic electrical safety and testing instruments are required for the installation of the combiner box. This installation requires the following:

- #2 and #0 Phillips screwdriver
- Slotted screwdriver
- Wire strippers
- Wire cutters
- Pliers
- Level
- Hack saw (for cutting conduit, if necessary)
8.0 INSTALLATION PROCEDURE

**WARNING - Shock Hazard**
Always use bushings, connectors, clamp connectors, or wire glands in the knockout openings to protect wiring from sharp edges. 3/4” bushing is required for this unit.

**MISE EN GARDE - RISQUE DE CHOC ÉLECTRIQUE**
Utilisez toujours des bagues, des connecteurs ou des connecteurs de serrage dans les débouchures pour protéger le câblage des arêtes vives. Une bague de 17mm est requise pour cet appareil.

8.1 Preparing the DC/DC for Mounting

Turn off all main power before starting this project, using the Lock Out Tag Out method. Refer to the facility electrical drawings to identify the mounting locations and any specific electrical location requirements or special instructions.

8.1.1 Use a #2 Phillips screwdriver to remove the four (4) screws that secure the wiring box cover. Remove the cover and place it aside.

8.2 Mounting requirements

Place the DC/DC on a horizontal surface protected from direct sun, high temperatures, and water. The DC/DC requires at least 6" (150 mm) of clearance above and below, and at least 1" (25 mm) on each side for proper air flow as shown in Figure 8.1 below.
8.0 INSTALLATION PROCEDURE

The unit should be mounted in a horizontal orientation. A horizontal orientation will restrict heat flow and will damage the unit. The unit may be mounted on an angled orientation of up to 60° from horizontal.

8.3 Mounting Surface Options

8.3.1 Mounting into Wood

8.3.1.1 Slotted mounting holes for the DC/DC are located on the flanges that protrude from the bottom of the unit housing.

8.3.1.2 Place a mark on the mounting surface at the top of the keyholes.

8.3.1.3 Remove the DC/DC and drill a 3/32" (2.5 mm) hole at the drill mark.

8.3.1.4 Insert a #10 wood screw (1 5/8") into the top pilot holes. Do not tighten the screws completely. Leave a 1/4" (6 mm) gap between the mounting surface and screw heads.

8.3.1.5 Carefully align the keyholes on the DC/DC with the screw heads. Slide the DC/DC down over the keyholes.

8.3.1.6 Check for horizontal plumb with a level.

8.3.1.7 Mark two (2) mounting hole locations at the bottom of the DC/DC.

8.3.1.8 Remove the DC/DC and drill 3/32" (2.5 mm) holes at the drill marks.

8.3.1.9 Carefully align the keyholes on the DC/DC with the screw heads. Slide the DC/DC down over the keyhole.

8.3.1.10 The pre-drilled pilot holes should align with the mounting holes at the bottom of the unit. Secure the controller with two (2) #10 (1 5/8") wood screws.

8.3.1.11 Tighten all four (4) screws.

8.3.2 Mounting into Drywall

8.3.2.1 Slotted mounting holes for the DC/DC are located on the flanges that protrude from the bottom of the unit housing.

8.3.2.2 Place a mark on the mounting surface at the top of the keyholes.

8.3.2.3 Remove the DC/DC and drill a 3/32" (2.5 mm) hole at the drill mark.

8.3.2.4 Insert a #10 wall anchor into the top pilot holes. Tap the anchors
8.0 INSTALLATION PROCEDURE

gently with a hammer until they are flush to the mounting surface. Insert the screws, but do not tighten the screws completely. Leave a 1/4" (6 mm) gap between the mounting surface and screw heads.

**NOTE:** Use a heavyweight metal wall anchor for mounting the DC/DC. Do not use a lightweight or plastic anchor, as this may provide insufficient support.

8.3.2.5 Carefully align the keyholes on the DC/DC with the screw heads. Slide the DC/DC down over the keyholes.

8.3.2.6 Check for horizontal plumb with a level.

8.3.2.7 Mark two (2) mounting hole locations at the bottom of the DC/DC.

8.3.2.8 Remove the DC/DC and drill 3/32" (2.5 mm) holes at the drill marks and insert two (2) anchors as in step 8.3.2.4.

8.3.2.9 Carefully align the keyholes on the DC/DC with the screw heads. Slide the DC/DC down over the keyhole.

8.3.2.10 The anchor screw holes should align with the mounting holes at the bottom of the unit. Secure the controller with the remaining two (2) screws.

8.3.2.11 Tighten all four (4) screws.

8.3.3 Mounting into Cement

8.3.3.1 Slotted mounting holes for the DC/DC are located on the flanges that protrude from the bottom of the unit housing.

8.3.3.2 Place a mark on the mounting surface at the top of the keyholes.

8.3.3.3 Remove the DC/DC and drill a 3/32" (2.5 mm) hole at the mark with a concrete-rated drill bit. Blow out the masonry dust from the hole.

8.3.3.4 Insert a #10 lead masonry wall anchor into the top pilot holes. Tap the anchors gently with a hammer until they are flush to the mounting surface. Insert the screws, but do not tighten the screws completely. Leave a 1/4" (6 mm) gap between the mounting surface and screw heads.

**NOTE:** Use a heavyweight metal lead masonry anchor for mounting the DC/DC. Do not use a lightweight or plastic anchor, as this may provide insufficient support.
8.0 INSTALLATION PROCEDURE

8.3.3.5 Carefully align the keyholes on the DC/DC with the screw heads. Slide the DC/DC down over the keyholes.

8.3.3.6 Check for horizontal plumb with a level.

8.3.3.7 Mark two (2) mounting hole locations at the bottom of the DC/DC.

8.3.3.8 Remove the DC/DC and drill 3/32" (2.5 mm) holes at the drill marks. Blow out the masonry dust from the hole and insert two (2) anchors as in step 8.3.3.4.

8.3.3.9 Carefully align the keyholes on the DC/DC with the screw heads. Slide the DC/DC down over the keyhole.

8.3.3.10 The pre-drilled pilot holes should align with the mounting holes at the bottom of the unit. Secure the controller with the remaining two (2) screws.

8.3.3.11 Tighten all four (4) screws.

8.3.4 Mounting into Metal

8.3.4.1 Slotted mounting holes for the DC/DC are located on the flanges that protrude from the bottom of the unit housing.

8.3.4.2 Place a mark on the mounting surface at the top of the keyholes.

8.3.4.3 Remove the DC/DC and drill a 3/32" (2.5 mm) hole at the mark with a steel-rated drill bit. Blow out any metal dust from the hole.

8.3.4.4 Insert a #10 metal screw (1 5/8") into the top pilot holes. Do not tighten the screws completely. Leave a 1/4" (6 mm) gap between the mounting surface and screw heads.

NOTE: Use a carbon-steel or carbon-steel self-tapping screw for mounting the DC/DC. Do not use another type of screw, as this may provide insufficient support.

8.3.4.5 Carefully align the keyholes on the DC/DC with the screw heads. Slide the DC/DC down over the keyholes.

8.3.4.6 Check for horizontal plumb with a level.

8.3.4.7 Mark two (2) mounting hole locations at the bottom of the DC/DC.

8.3.4.8 Remove the DC/DC and drill 3/32" (2.5 mm) holes at the drill marks. Blow out any metal dust from the hole and insert two (2) screws as in step 8.3.4.4.

8.3.4.9 Carefully align the keyholes on the DC/DC with the screw heads. Slide the DC/DC down over the keyhole.
8.0 INSTALLATION PROCEDURE

8.3.4.10 The pre-drilled pilot holes should align with the mounting holes at the bottom of the unit. Secure the controller with the remaining two (2) screws.

8.3.4.11 Tighten all four (4) screws.

8.3.5 If mounting into any material other than above, please contact Nextek Power Systems.

8.4 Grounding

8.4.1 The photovoltaic system grounding shall be installed per the requirements of sections 690.41 through 690.47 of the National Electric Code, ANSI/NPA 70, and is the responsibility of the installer. In addition, all state and federal Occupational Safety and Health Administration (OSHA) guidelines and regulations must be followed.

> NOTE: Conductors identified by the color combination green/yellow shall only be used for grounding conductors.

> NOTE: The following ground symbol is used: ⬇️

> NOTE: No ground is required between the DC/DC output and the load. The DC output shall not be grounded.

8.4.2 Do not connect the Photovoltaic (PV) negative conductor to the ground terminal. The DC/DC includes an internal ground fault fuse through which the negative is grounded.

8.4.2.1 The minimum size of the copper grounding wire should match the current carrying conductors from the PV array to the DC/DC. See Step 8.5.4.1 for information on using a junction box to step down wire size into the DC/DC. Refer to Tables 8.1 and 8.2 in section 8.5.6 for wire gauge sizes that can be used over certain distances.

8.4.2.2 Ground may be bonded to the circuit board with 16-12 AWG wire. Wire larger than that can be bonded to the ground stud on the inside of the cover.

8.4.3 Ground Fault Current Interrupt Fuse

**WARNING: Risk of Fire**

Per NEC, DO NOT CONNECT PV negative with ground at the DC/DC controller.
8.0 INSTALLATION PROCEDURE

MISE EN GARDE: RISQUE D'INCENDIE
Selon NEC, NE CONNECTEZ PAS le photovoltaïque négatif avec la mise à la terre au niveau du régulateur DC/DC.

8.4.3.1 The ground fault fuse in the Nextek DC/DC controller performs the functions required by the National Electrical Code (NEC) Article 690.5A:

8.4.3.2 The GFCI fuse is in series with the DC system grounding circuit. If a ground fault occurs (and ground fault current exceeds the fuse rating), the fuse will open.

8.4.3.3 The DC/DC converter then detects voltage across the fuse and disables itself.

8.4.3.4 The converter indicates the problem by flashing the red indicator LED, and showing the disabled state by flashing one time, pausing and then flashing four more times: ⚠⚠⚠⚠.

CAUTION: RISK OF ELECTRIC SHOCK
Normally grounded conductors may be ungrounded and energized when a ground fault is indicated.

MISE EN GARDE - RISQUE DE CHOC ÉLECTRIQUE
Conducteurs normalement mise à la terre peuvent être non mise à la terre et sous tension quand un défaillance à la terre est indiqué.

8.4.3.5 If a ground fault occurs, carefully measure voltage from string (+) to ground and string (-) to ground to locate the position of the fault.

8.4.3.6 Disable the PV array according to NEC 690.18 Installation and Service of an Array, and then locate the fault.

8.4.3.7 A ground fault is typically caused by insulation damage in the array wiring, but can also be due to a faulty PV module.

8.4.3.8 Once the ground fault is detected and remedied, the GFCI fuse can be replaced.

8.4.3.9 Use only a 1 Amp type ATMR-1 class CC fuse in the GFCI fuseholder.

8.4.4 Input Fuse

8.4.4.1 The input fuse is used to protect the DC/DC unit from a short circuit, and to not allow more than 15 amps to be drawn from a large solar array.
8.0 INSTALLATION PROCEDURE

8.4.4.2 Use only a 15 Amp type KLM-15 midget fuse.

8.5 Wiring the Unit

8.5.1 Warnings

**WARNING: Shock Hazard**
Fuses, circuit breakers, and disconnect switches should never open grounded system conductors. Only GFCI devices are permitted to disconnect grounded conductors.

*MISE EN GARDE - RISQUE DE CHOC ÉLECTRIQUE*
Fusibles, disjoncteurs et sectionneurs ne doivent jamais ouvrir des conducteurs du réseau à la terre. Seuls les appareils GFCI sont autorisés à déconnecter les conducteurs à la terre.

**WARNING: Shock Hazard**
The solar PV array can produce open-circuit voltages in excess of 100 VDC when in sunlight. Verify that the solar input breaker or disconnect has been opened (on BOTH conductors) before installing the system wires.

*MISE EN GARDE - RISQUE DE CHOC ÉLECTRIQUE*
La matrice photovoltaïque solaire peut produire des tensions en circuit ouvert de plus de 100 VCC quand au soleil. Vérifiez que le disjoncteur d'entrée solaire ou déconnexion a été ouvert (sur les deux conducteurs) avant d'installer les câbles du système.

**WARNING: Risk of Damage**
Be very certain that the load connection is made with correct polarity. Turn on the load breaker/disconnect and measure the voltage on the open load wires BEFORE connecting to the DC/DC.

*MISE EN GARDE : Risque de dommage*
Soyez bien certain que la connexion de charge est faite en respectant la polarité. Allumez le disjoncteur/sectionneur de coupure en charge et mesurez la tension sur les fils de charge ouverts AVANT la connexion au DC/DC.

8.5.2 Notes

**NOTE:** To comply with the NEC, the DC/DC must be installed using wiring methods in accordance with the latest edition of the National Electric Code, NFPA 70.
8.0 INSTALLATION PROCEDURE

NOTE: A two-pole disconnect is required for the solar circuits to provide a means for removing power from the DC/DC.

8.5.3 Wire Size

8.5.3.1 Use 12/14 AWG wire for the input terminals. The terminals are rated for copper conductors. Use UL-listed Class B 600 Volt stranded wire only. Good system design generally requires large conductor wires for the solar and load connections that limit voltage drop losses to 3% or less. Refer to Table 8.2.

8.5.3.2 Use 2 or 4 AWG wire for the output terminals. The terminals are rated for copper conductors. Use UL-listed Class B 600 Volt stranded wire only. Good system design generally requires large conductor wires for the solar and load connections that limit voltage drop losses to 3% or less. Refer to Table 8.1.

8.5.3.3 The NEC requires that the wires carrying the system current never exceed 80% of the conductor's current rating. Tables 8.1 and 8.2 provide the minimum size of copper wire allowed by NEC for the DC/DC when the current equals the full nameplate rating.

8.5.3.4 Confirm that the system input and output disconnect switches are both turned off before connecting the power wires to the controller. There are no disconnect switches inside the DC/DC.

8.5.3.5 Strain relief in the bottom knockouts must be used.

8.5.4 Input Wiring Procedure From Photovoltaic (PV) Array

8.5.4.1 Both the positive and negative wires coming from the PV should be pulled into the bottom of the DC/DC into the wiring box.

NOTE: Input wire sizes larger than 12 AWG (4.0mm²) must be terminated at a junction box located outside of the DC/DC wiring box. Use 12 AWG (2.5mm²) or smaller wire to connect to the DC/DC junction box. Refer to Tables 8.1 and 8.2 in section 8.5.6 for wire gauge sizes that can be used over certain distances.

8.5.4.2 Connect maximum 12 AWG Photovoltaic (PV) wires (red) to the positive (+) INPUT terminal J12 and (black) to the negative (-) INPUT terminal J13. See Figure 8.2 at right. Confirm polarity prior to connection.

Figure 8.2
8.0 INSTALLATION PROCEDURE

8.5.5 Output Wiring Procedure

8.5.5.1 Connect maximum 2 AWG wires to the positive (+) OUTPUT terminal J16 and the negative (-) OUTPUT terminal J15. See Figure 8.2.

**NOTE**: Output wire sizes larger than 2 AWG (35mm²) must be terminated at a junction box located outside of the DC/DC wiring box. Use 2 AWG (35mm²) or smaller wire to connect to the DC/DC junction box. Refer to Tables 8.1 and 8.2 in section 8.5.6 for wire gauge sizes that can be used over certain distances.

8.5.5.2 Replace the access cover on the DC/DC wiring box and secure with four (4) screws.

8.5.6 Wire Gauge Guide Tables

Recommended one-way wire distance for a .3V voltage drop, assuming 67A current with 24VDC

<table>
<thead>
<tr>
<th>Wire Gauge</th>
<th>Distance (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>1/0</td>
<td>23</td>
</tr>
</tbody>
</table>

*Table 8.1*

Recommended one-way wire distance for a 3% voltage drop, assuming 10A current with input voltage as follows:

<table>
<thead>
<tr>
<th>INPUT VOLTAGE</th>
<th>70V</th>
<th>170V</th>
<th>240V</th>
<th>300V</th>
<th>360V</th>
<th>420V</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWG</td>
<td>WIRE LENGTH IN FEET</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>13</td>
<td>105</td>
<td>215</td>
<td>330</td>
<td>475</td>
<td>650</td>
</tr>
<tr>
<td>12</td>
<td>29</td>
<td>170</td>
<td>340</td>
<td>530</td>
<td>760</td>
<td>1050</td>
</tr>
<tr>
<td>10</td>
<td>46</td>
<td>275</td>
<td>540</td>
<td>840</td>
<td>1200</td>
<td>1650</td>
</tr>
<tr>
<td>8</td>
<td>73</td>
<td>430</td>
<td>850</td>
<td>1350</td>
<td>1950</td>
<td>2600</td>
</tr>
<tr>
<td>6</td>
<td>115</td>
<td>680</td>
<td>1350</td>
<td>2100</td>
<td>3100</td>
<td>4200</td>
</tr>
</tbody>
</table>

*Table 8.2*
8.0 INSTALLATION PROCEDURE

8.5.7 Tightening torque, allowable wire size and type for the field wiring terminals.

<table>
<thead>
<tr>
<th><strong>DC Input Connections</strong></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tightening Torque</strong></td>
<td>20 in./lbs.</td>
<td></td>
</tr>
<tr>
<td><strong>Wire Size</strong></td>
<td>12 AWG - 16 AWG</td>
<td></td>
</tr>
<tr>
<td><strong>Wire Type</strong></td>
<td>Rated 90C, copper conductors only</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>DC Output Connections</strong></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tightening Torque</strong></td>
<td>50 in./lbs. for 2 AWG - 3 AWG</td>
<td></td>
</tr>
<tr>
<td><strong>Tightening Torque</strong></td>
<td>45 in./lbs. for 4 AWG - 6 AWG</td>
<td></td>
</tr>
<tr>
<td><strong>Wire Type</strong></td>
<td>Rated 90C, copper conductors only</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Grounding Electrode Terminal</strong> (PV Circuit Terminal on PCB)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tightening Torque</strong></td>
<td>20 in./lbs.</td>
<td></td>
</tr>
<tr>
<td><strong>Wire Size</strong></td>
<td>12 AWG - 16 AWG</td>
<td></td>
</tr>
<tr>
<td><strong>Wire Type</strong></td>
<td>Copper conductors only</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Grounding Electrode Terminal</strong> (Hex nut on threaded stud terminal on enclosure)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tightening Torque</strong></td>
<td>75 in./lbs. for 8 AWG - 18 AWG</td>
<td></td>
</tr>
<tr>
<td><strong>Tightening Torque</strong></td>
<td>110 in./lbs. for 4 AWG - 6 AWG</td>
<td></td>
</tr>
<tr>
<td><strong>Tightening Torque</strong></td>
<td>150 in./lbs. for 1 AWG - 3 AWG</td>
<td></td>
</tr>
</tbody>
</table>

Table 8.3

8.6 Connecting Multiple Units

8.6.1 Contact Nextek Power Systems if multiple DC/DC installation is required

8.7 Power the Unit

**WARNINGS: Risk of Damage**

Connecting the solar array or load connection with reverse polarity will permanently damage the DC/DC.

Raccordement de la matrice solaire ou de la charge avec inversion de polarité endommagera de façon permanente le DC/DC.

8.7.1 Turn the load disconnect switch on first.

D'abord activez le disjoncteur/sélecteur de coupure en charge.

8.7.2 There is no power switch for the DC/DC. The unit operates automatically at the voltages indicated in Table 6.1 on Page 12. The Green LED flashes when the unit is distributing power.

Il n'y a pas d'interrupteur d'alimentation pour le DC/DC. L'appareil
8.0 INSTALLATION PROCEDURE

fonctionne automatiquement aux tensions indiquées dans le tableau 6.1 à la page 12. La DEL verte clignote quand l'unité distribue la puissance.

8.7.3 Turn the solar disconnect on. If the solar array is in full sunlight, the DC/DC will begin operating.

Activez le sélecteur solaire. Si la matrice solaire est en plein soleil, le DC/DC commencera à fonctionner.
9.0 FAULT INDICATORS

9.1 The Nextek DC/DC includes important protections and automatic recovery features that ensure the safe operation of the system. The DC/DC features real-time self diagnostics that report Fault conditions as they occur.

Faults are events or conditions that require the DC/DC to cease operation. A Fault usually occurs when a limit such as voltage, current, or temperature has been surpassed. Fault conditions are indicated with unique LED sequences.

9.2 Fault Indications

Key: = LED flash; — pause

<table>
<thead>
<tr>
<th>INPUT FAULTS</th>
<th>OUTPUT FAULTS</th>
<th>CONTROL STATE FAULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>••</td>
<td>•—</td>
<td>••••••</td>
</tr>
<tr>
<td>Vin less than the input Vmin setpoint</td>
<td>Vout less than the output Vmin setpoint</td>
<td>Temperature is greater than ShutdownTemp setpoint</td>
</tr>
<tr>
<td>••••</td>
<td>••—</td>
<td>••••••</td>
</tr>
<tr>
<td>Iin greater than the input Imax setpoint</td>
<td>Iout greater than the output Imax setpoint</td>
<td>Negative current: both Iin and Iout are less than -3amp or -30 counts</td>
</tr>
<tr>
<td>•••••</td>
<td>••••—</td>
<td>••••••</td>
</tr>
<tr>
<td>Vin greater than the input Vmax setpoint</td>
<td>Vout greater than the output Vmax setpoint</td>
<td></td>
</tr>
<tr>
<td>••••••</td>
<td>•••••••—</td>
<td>••••••</td>
</tr>
<tr>
<td>Ground fault voltage is out of range (-10v to 10v)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: First LED flashes are long, followed by a pause, then followed by short flashes.

NOTE: When the sun goes down and no solar is available, the input voltage will drop below Vin low setpoint, and display the following fault:

•— Vin less than the input Vmin setpoint

For Troubleshooting, see Section 11 on Page 29.
10.0 INSPECTION AND MAINTENANCE

10.1 The following inspections are recommended twice a year for best performance.

10.1.1 System Inspection

10.1.1.1 Confirm the controller is securely mounted in a clean and dry environment.

10.1.1.2 Confirm that the air flow around the controller is not blocked. Clean the heat sink of any dirt or debris.

10.1.1.3 Inspect all exposed conductors for insulation damage due to sun damage, rubbing on nearby objects, dry rot, insects, or rodents. Repair or replace conductors as necessary.

10.1.1.4 Tighten all power connections per the manufacturer’s recommendations.

10.1.1.5 Verify the LED indications are consistent with the equipment operation. Note any fault or error indications. Take corrective action if necessary.

10.1.1.6 Inspect the system earth grounding for all components. Verify all grounding conductors are appropriately secured to earth ground.

10.1.2 Inside the DC/DC Wiring Box

WARNING: Shock Hazard

MISE EN GARDE - RISQUE DE CHOC ÉLECTRIQUE

Disconnect all power sources to the controller before removing the wiring box cover. Never remove the cover when voltage exists on the DC/DC power connections.

Déconnectez toutes les sources d'alimentation pour le régulateur avant de retirer le couvercle de la boîte de câblage. Ne retirez jamais le couvercle lorsque la tension n'existe sur aucune des connexions de puissance DC/DC.

10.1.2.1 Check all wire terminals. Inspect connections for corrosion, damaged insulation, signs of high temperature or burning/discoloration. Tighten the terminal screws to the recommended torque.

Vérifiez toutes les cosses de câbles. Inspectez les raccords pour la corrosion, l'isolant endommagé, des signes de haute température ou de brûlure / décoloration. Serrez les vis de borne au couple recommandé.

10.1.2.2 Inspect for dirt, nesting insects, and corrosion. Clean as required.

Inspectez pour la saleté, la nidification d'insectes et la corrosion. Nettoyez au besoin.
## 11.0 TROUBLESHOOTING

<table>
<thead>
<tr>
<th>FAULT</th>
<th>PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INPUT FAULTS</strong></td>
<td></td>
</tr>
</tbody>
</table>
| No LED indications, converter does not appear to be operating in sunlight conditions | 1. With a multi-meter, check the voltage at the input terminals on the DC/DC.  
A. Input voltage must be 60 VDC or greater.  
a. If the voltage on the input terminals of the converter is greater than 60 VDC and no LEDs are flashing, contact Nextek Customer Service. See warranty information.  
b. If no voltage is measured, check wiring connections, fuses, and circuit breakers. |
| Vin exceeded the specified limit | 1. Open the wiring compartment.  
2. Measure the voltage across the input terminals.  
A. If the voltage is greater than 60 VDC one of the LEDs should be flashing. If none are flashing, the user should check the following:  
a. Open circuit voltage of panel is within range.  
b. Check wiring and connections are correct.  
c. Make sure circuit breaker has not tripped.  
B. If the voltage is less than 60VDC the LEDs should not flash. |
| Vin less than the input Vmin setpoint |  |
| Vin greater than the input Vmax setpoint |  |
| Tin exceeded the specified limit | 1. Open the wiring compartment and turn OFF the input circuit breaker.  
2. Make sure no voltage is present on the input terminals.  
3. Make sure the resistance between input terminals is in kilo-ohms.  
4. Check that wiring and connections are correct. |
| Tin greater than the input Imax setpoint |  |
| Ground fault voltage is out of range (-10v to 10v) | Refer to Manual Section 9.4.3. |
| **OUTPUT FAULTS** |  |
| Vout exceeded the specified limit | 1. Open the wiring compartment.  
2. Make sure the voltage across the output terminals is within range.  
3. Make sure the resistance between output terminals is in kilo-ohms.  
4. Check that wiring and connections are correct. |
| Vout greater than the output Vmax setpoint |  |
| Iout exceeded the specified limit | 1. Open the wiring compartment and turn OFF the input and output circuit breaker.  
2. Make sure no voltage is present on the output terminals.  
3. Make sure the resistance between output terminals is in kilo-ohms.  
4. Check that wiring and connections are correct. |
| Iout greater than the output Imax setpoint | }
### 11.0 TROUBLESHOOTING

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>CONTROL STATE FAULTS</strong></td>
<td></td>
</tr>
<tr>
<td>Temperature is greater than ShutdownTemp setpoint</td>
<td>Check that the ambient temperature is within range.</td>
</tr>
<tr>
<td>PID control state greater than 90K Hz</td>
<td>Contact Nextek Customer Service.</td>
</tr>
<tr>
<td>PID control state less than 20K Hz</td>
<td></td>
</tr>
<tr>
<td>Setpoint version or magic number is wrong</td>
<td></td>
</tr>
<tr>
<td>Negative current: both I_in and I_out are less than -3amp or -30 counts</td>
<td></td>
</tr>
<tr>
<td>Wireless communication LED (Yellow) indicates no activity</td>
<td>1. Check that the antenna is not blocked. 2. Open the wiring compartment. 3. Make sure the voltage across the output terminal is within range and that any of the 3 LEDs flashes.</td>
</tr>
</tbody>
</table>