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## Fused Electrical Disconnect (**FEED**)

*A Fully Integrated add-on product for adding Fused Protection and Manual Disconnects to your ALENCON Converter.*

INSTALLATION, OPERATION AND MAINTENANCE MANUAL FOR  
USE WITH SPOT OR BOSS PRODUCTS



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## 2 General Information

All efforts have been made to ensure the accuracy of material provided in this document at the time of release. Items are subject to continuous development and improvements. All specifications and descriptions are subject to change without notice.

### 2.1 Purpose

This manual provides information about installing, operating, maintaining, and troubleshooting the Alencon's BOSS PV Harvesting System.

#### Who Should Read this Manual?

This manual should be read by anyone who needs to:

- Understand the product
- Plan the installation
- Install the product
- Commission the product
- Operate the product
- Maintain the product, if necessary

### 2.2 Glossary

Word(s)/Acronyms	Definition
<b>FEED</b>	Fused Electrical Disconnect
<b>BOSS</b>	Bi-directional Optimizer for Storage Systems
<b>SPOT</b>	String Power Optimizer and Transmitter

## 2.3 Product Warranty

Alencon Systems warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for three years from the date of purchase. Extended warranties of an additional five (5), ten (10) and twenty (20) years are also available for purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Alencon System, or which have been subject to misuse, abuse, accident or improper installation. This warranty does not cover the repair or replacement of any goods which fail as a result of damage in transit, misuse, neglect, accident, Act of God, abuse, improper handling, misapplication, modification, improper storage, excessive stress, faulty or improper installation, testing or repair, negligent maintenance or failure to comply with the written instructions for installation, testing, use or maintenance (if any) provided by Alencon Systems. Alencon Systems assumes no liability under the terms of this warranty as a consequence of such events.




Because of Alencon Systems' high quality-control standards and rigorous testing, most of our customers never need to use our warranty service. If an Alencon Systems product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult Alencon Systems for more details. If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, issues you are encountering in your PV array or battery system) Note anything abnormal when the problem occurs.
2. Call Alencon Systems or your licensed Alencon Systems dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your Alencon Systems. This allows us to process your return more quickly.
4. Carefully pack the defective product (preferably in the original packaging material it was shipped in), a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number

## 2.4 Technical Support and Assistance

1. Visit the Alencon Systems web site at [www.alenconsystems.com](http://www.alenconsystems.com) where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Alencon Systems' customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
  - Product name, LIN and serial number (see section 6.5 for more information the location of the LIN and serial number)
  - Description of your peripheral attachments including fusing and cables

## 2.5 Warnings, Cautions and Notes

	<b>Warning!</b>	<i>Warnings indicate conditions, which if not observed, can cause personal injury!</i>
	<b>Caution!</b>	<i>Cautions are included to help you avoid damaging hardware or losing data.</i>
	<b>Note!</b>	<i>Notes provide optional additional information.</i>

### 3 IMPORTANT SAFETY INSTRUCTIONS



**WARNING!**

**SAVE THESE INSTRUCTIONS**– This manual contains important instructions for use with the BOSS or SPOT 600, 1000 and 1500 that shall be followed during installation and maintenance of these devices.



Figure 1: The graphic above indicates that the BOSS or SPOT is a grounding conductor.



**WARNING!**

Always ground the BOSS or SPOT chassis before energizing the unit. Use the Ground Lug shown in Figure 23 below to ground the unit safely.



Figure 2: Ground Lug located on the BOSS or SPOT Unit with FEED



**WARNING!**

A BATTERY CAN PRESENT A RISK OF ELECTRICAL SHOCK, BURN FROM HIGH SHORT-CIRCUIT CURRENT, FIRE OR EXPLOSION FROM VENTED GASES. OBSERVE PROPER PRECAUTIONS.



Figure 3: The graphic above indicates that the converter acts as a direct current supply.



Installation of this equipment must be performed by an authorized electrician in accordance with the local and NEC ANSI/NFPA 70 and OSHA requirements. Follow CSA C22.1 when installed in Canada.

1. Before installing and using the FEED, read all instructions presented in this manual and the cautionary markings shown on the enclosures.
2. During operation, hazardous voltages and currents may be present. Only authorized and qualified personnel should perform servicing/installation.
3. The metallic enclosure surface may become hot during certain operation circumstances.
4. Test any wire or terminal for voltage before touching them. Disconnect all input and output terminals before performing any work on the equipment.
5. Use only accessories recommended or approved by the manufacturer.
6. Ensure that wiring is in good conditions and that all wiring is sized accordingly. Ignoring to do so may result in a risk of fire.
7. PV modules produce electrical energy when exposed to light and thus can create an electrical shock hazard. Wiring of the PV modules should only be performed by qualified personnel.
8. Always have this manual as well as the relevant converter manual in hand.

#### **4 FEED – General Information**

The Alencon Fused Electrical Disconnect (FEED) is the ideal companion to your deployment of Alencon's SPOT or BOSS products. The FEED provides a convenient, load break DC-disconnect on the input of the SPOT and BOSS. For the BOSS, it can be used on the output as well. It can also come pre-installed with appropriately rated fusing for your needs.

Based on your application and needs, the FEED can be provided with a fuse to ground. The FEED comes pre-wired and mounted on-top of the BOSS or SPOT. It is available either with individual string connections or lug inputs or a combination of the two based on your applications requirements. Please see the configuration matrix for specific options.

The FEED configuration matrix below shows how the FEED can be accessorized for use with the SPOT or BOSS, depending on your specific requirements.

Please consult your Alencon technical sales consultant for assistance in determining which FEED configuration is right for your needs. The FEED is available for use with SPOT and BOSS Versions 6 or newer.



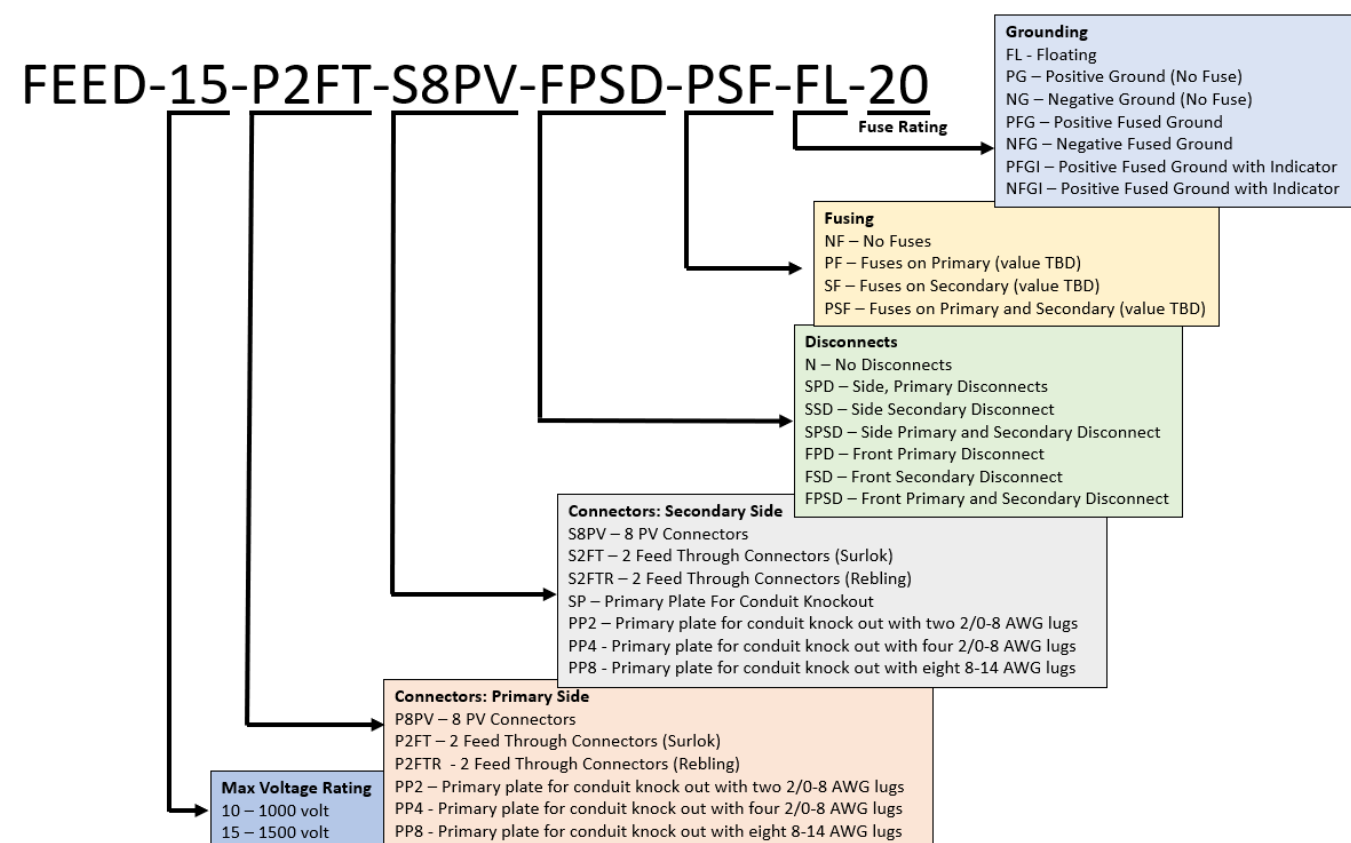


Figure 4: FEED Configuration Matrix

## 5 FEED Specifications

Device	FEED 1000	FEED 1500	
Max Operating Voltage	1000 VDC	1250 VDC	1500 VDC
Max Number of Inputs*	4	4	
Max Number of Outputs*	4	4	
Max Load Break Current at Operating Voltage	120 A	84 A	52 A
Rating	IP65		
Fusing	10A, 15A, 20A, 30A – as required by application		
Dimensions (H*W*D)	130 mm * 440mm * 530mm (5" * 17" * 21")		
Weight	14 Kg		
Storage Temp	-40°C to 80°C		
Operating Temp	-40°C to 70°C		
Closure Type	Latch openable, field serviceable		

\*when four inputs and/or outputs are specified, unit will use Amphenol H4 connectors. When single input and/or output is specified an appropriately Surlok connectors or Rebling connectors can be used.

## 6 FEED Features

There are 4 main features that can be incorporated into the FEED product, depending on the desired configuration:

- Manual Disconnect Switches
- Protective Fuses
- Grounding / Ground Fault indication
- Front Panel – Variable Connectors

See two configuration possibilities in figures 5 and 6.

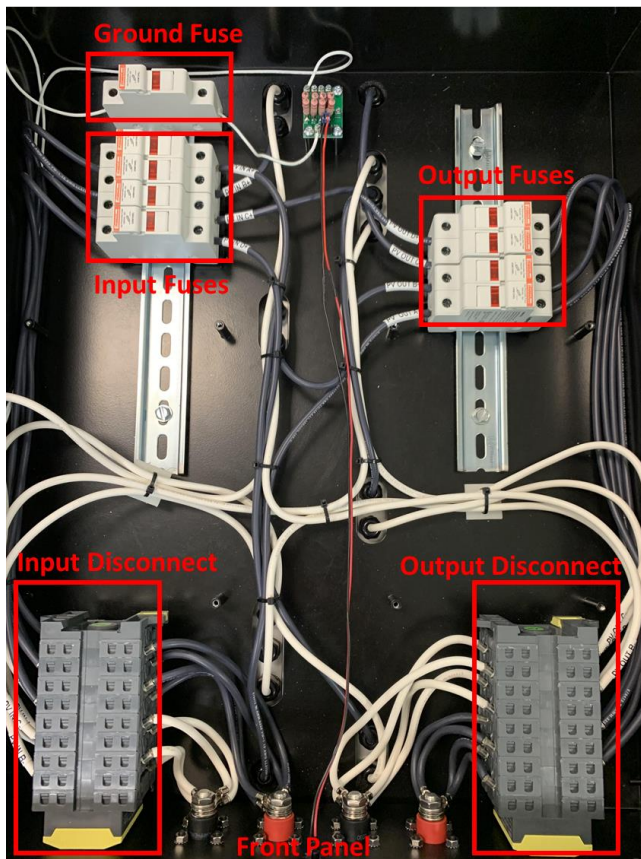


Figure 5: FEED Interior Layout A

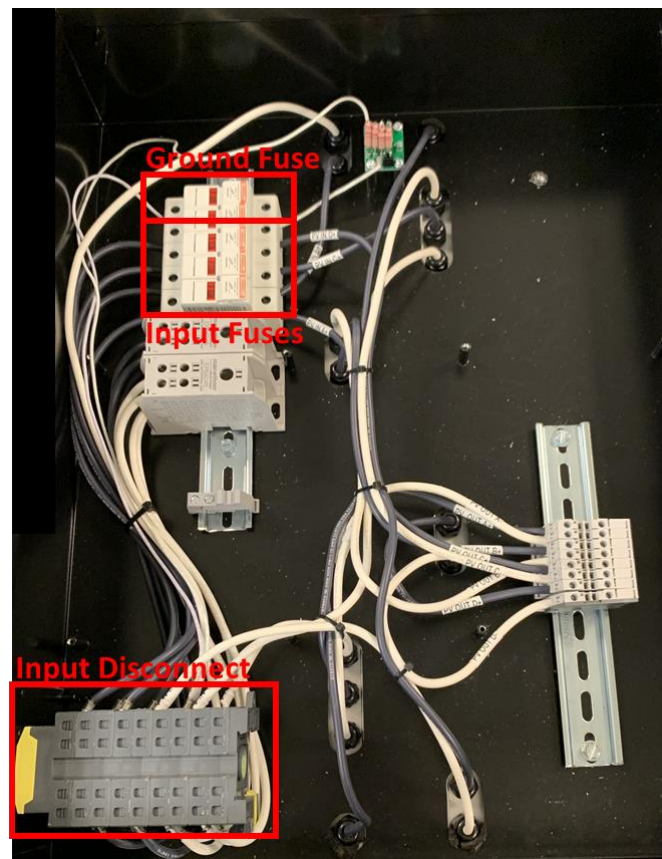


Figure 6: FEED Interior Layout B

### 6.1 Manual Disconnect Switches

Input and output switches are available on the FEED to disconnect the SPOT or BOSS from a power source on either side. Disconnect switches can be installed on the front-face or along the sides of the FEED unit as shown in figures 5 and 6 respectively.

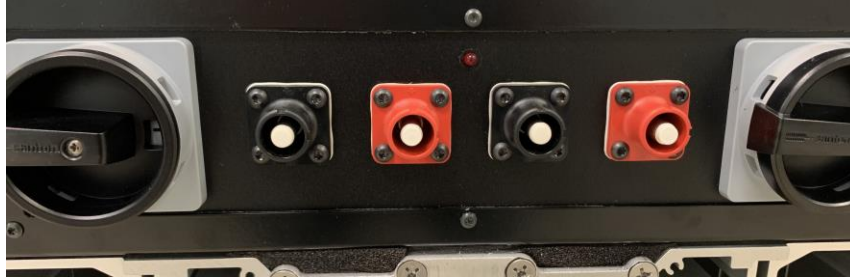
### 6.2 Protective Fuses

Input and output fusing options are available for both the BOSS or SPOT converters. Fuse rating information can be found on the FEED product label. Fuses that are blown, can be replaced in the field following the instructions in section 7. See FEED fuses as installed in figures 5 and 6.

### 6.3 Grounding/Ground Fault Indication

Ground fault detection is now available with the Alencon FEED. A fused connection between main earth ground and input voltage will blow in the case of a ground fault and a bright red indicator LED will turn on to show the fault occurrence (see figure 7). This fused connection can be used to bond the positive or negative input to GND, depending on the desired grounding scheme.

Note that this feature is only available for grounded SPOT units, a FEED with floating SPOT or BOSS units will not have this feature.



**Figure 7: FEED Front Panel with Ground Fault Indicator LED**

Ground fault fuse can be replaced in the field after ground leak has been located and repaired. Indicator LED will then turn back off. See figures 5 and 6 for an example of where the ground fault fuse can be found within the FEED.

### 6.4 Front Panel – Variable Connectors

There are multiple options for front panel connections that can be selected independently for both input and output to the FEED. Those options are:

- 8 Amphenol H4 PV Connectors (figure 11-A and 12 – A)
  - Each channel will have separate connection to the FEED front panel, female receptacle for the negative line and male for the positive. Customer will be responsible to source the corresponding plugs (see figure 8).



**Figure 8: Amphenol H4 Connectors**

- 2 Feed Through SurLok Connectors (figure 11-B and 12 – B)
  - All 4 converters will have bonded input or output, red receptacle for the positive line and black receptacle for the negative. Customer will be responsible to source the corresponding plugs (See figure 9).
  - Additionally, you can specify higher current rebling connectors (not pictured here)



**Figure 9: Amphenol SurLok Connectors**

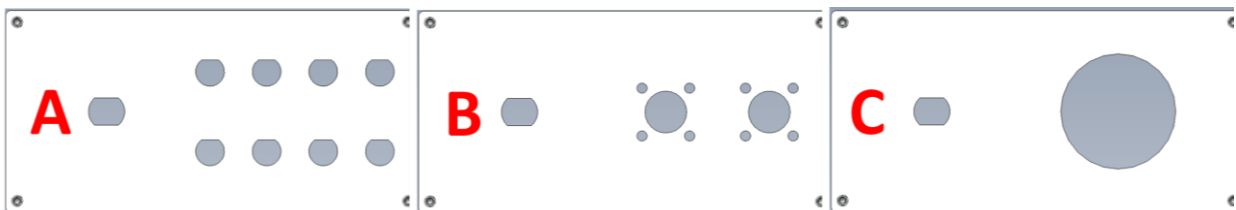
- Conduit Knock Out with DIN mounted Lugs (figure 11-C and 12 – C)
  - Lugs will be mounted internal to the feed, input and/or output cable can be brought in through conduit and bonded to the lugs (see figure 10)



**Figure 10: Marathon EPBAD45 Lug**



**Figure 11: Front Panel Plate Options - Actual**



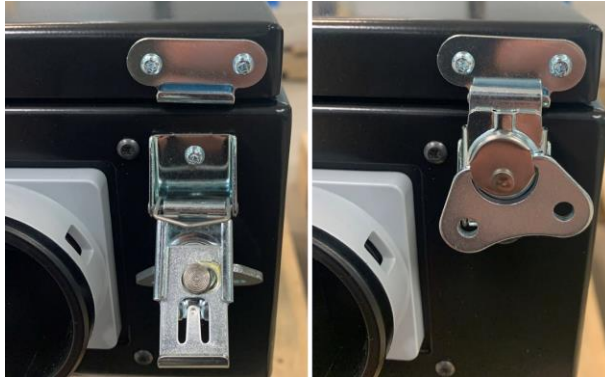
**Figure 12: Front Panel Plate Options - Drawn**



## 7 Maintenance and Field Service

The replacement of fuses in the FEED can be done on-site or deployment to avoid returning the product to Alencon facilities. To replace a fuse within the FEED:

1. Open both disconnect switches to isolate the FEED unit
2. Remove power cables from the FEED front panel (ensure there is no current or voltage on these lines before disconnecting)
3. Open 4 corner clasps to remove FEED cover (see figure 13)



**Figure 13: FEED Clasp - Opened (left) and Closed (right)**

4. Remove the FEED Cover and set it aside (see figure 14)



**Figure 14: Removing the FEED Cover**

5. Open corresponding fuse holder (all will be labeled inside the FEED)
6. Remove the dead fuse (a continuity test can be conducted to ensure the fuse has blown)
7. Install new fuse and close the fuse-holder.
8. Check continuity over the new fuse
9. Reattach FEED cover, closing all 4 clasps
10. Reconnect power cables to the front panel
11. Close the disconnect switches so that power can pass through the FEED again

For further assistance with this process, please contact Alencon technical support at [support@alenconsystems.com](mailto:support@alenconsystems.com) or call +1 (215) 816-3366

For any other required maintenance, the FEED and converter will need to be returned to Alencon facility for servicing and repair.

## 8 Installation

The FEED comes pre-wired and mounted on-top of the BOSS or SPOT. The FEED can be installed in both vertical rail mounted as well as horizontal rack mounted applications. See the BOSS or SPOT manual for more information on mounting the full unit. See figure 15 below for the dimensions of a FEED with SPOT or BOSS.

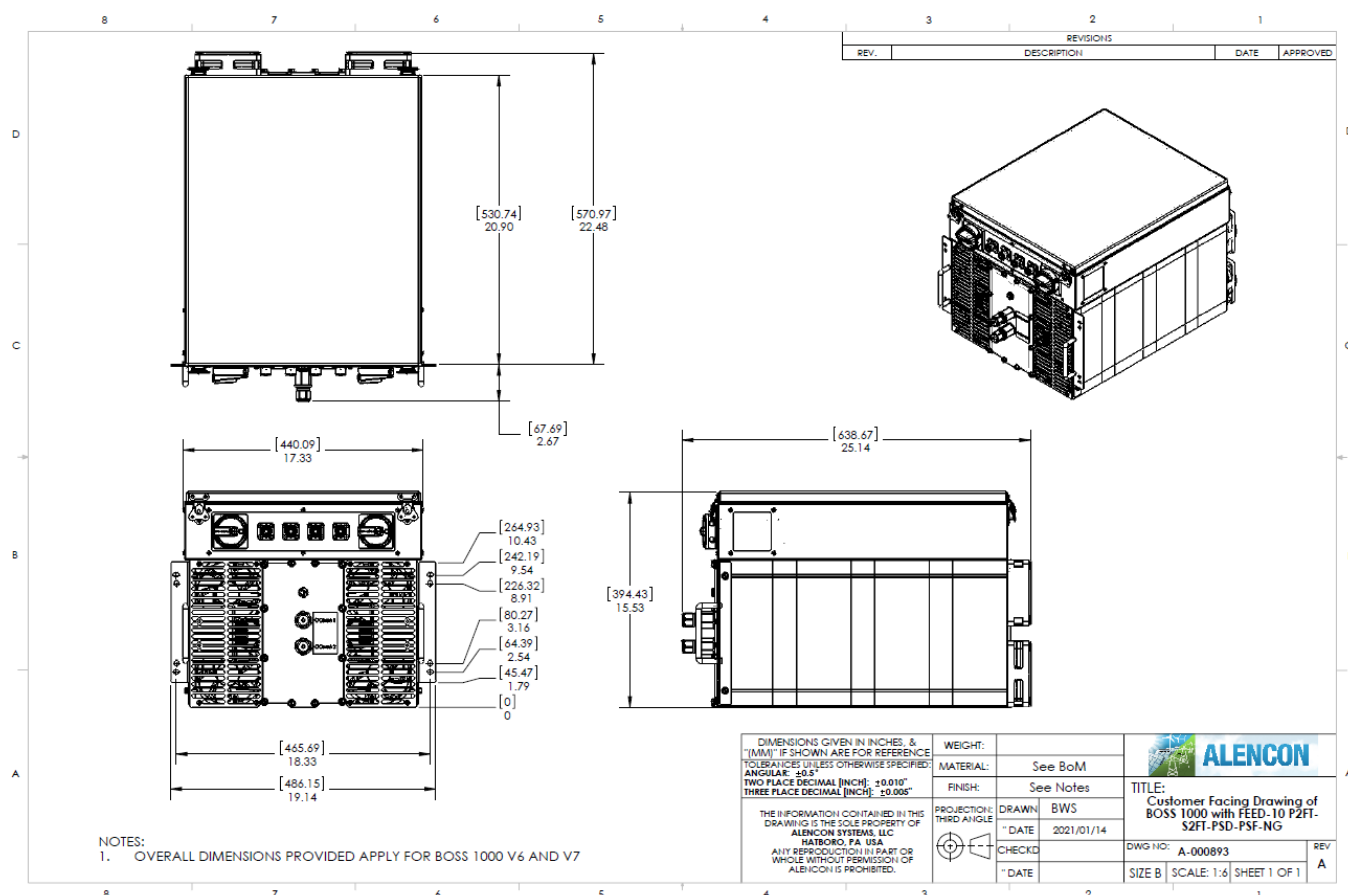


Figure 15: FEED Dimensions with SPOT or BOSS V7

## 9 Further information

For more information on DC-Coupled products and solutions, please visit <https://alenconsystems.com/>

Contact us @ <https://alenconsystems.com/alencon-and-you/>

For technical support please email: [support@alenconsystems.com](mailto:support@alenconsystems.com) or call +1 (215) 816-3366