

ARGUS<sup>™</sup>

# CSM30 Modular Switched Mode Converter / Limiter System

012-544-B2



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# *Power*

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**CSM30 MODULAR SWITCHED MODE  
D.C. TO D.C. CONVERTER / LIMITER SYSTEM**

**#012-544-B2**

**Serial # \_\_\_\_\_**

The following documents and drawings are included in this manual to provide the necessary information required for routine installation, operation and fault diagnosis of the unit.

- Specifications, 137VDC Converter: 012-544-B1 Rev B
- Warranty Policy: 048-507-10
- Installation and Operation instructions: 012-544-C0 Rev B
- Outline Drawings: 030-588-06, 030-579-06
- Sample Power Node 7.5 kW/-48VDC System Drawing: 023-842-05
- Factory Service Information: 048-527-10

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## SPECIFICATIONS FOR ARGUS TECHNOLOGIES' SWITCH MODE DC-DC CONVERTER CSM 30

### Outputs:

Output Voltage:	2 x -137 VDC or $\pm 137$ VDC
Current:	Up to 1A (x 2) DC maximum per module
Power:	2 x 100W continuous per module
Voltage Regulation:	< -0.5% load (static) < $\pm 0.05\%$ line (static) <3% for 0 to 100% load step (dynamic)
Current Limit:	0.70 to 0.73A folding forward to 1A @ 80 Volts
Short Circuit Current:	100 to 150mA
Time Stability:	0.1% per year
Temperature Stability:	<100ppm/°C over the operating range
Response Time:	2 ms to 0.1% of output for 50% to 100% load step
Noise:	<100mV RMS (10kHz to 10MHz) [wide band] <1V pk to pk (10kHz to 100MHz)
Output Transient Protection:	Meets requirements of GR-1089-CORE
EMI:	This system meets the requirements of: Bellcore TR-NWT-000499 Bellcore GR-1089-CORE
Output Fuse:	4 x 2.5A @ 250V, slow-blow type (2AG)

### Input:

Voltage:	-40 to -60 VDC, positive earthed
Current:	4.4A @ 52 VDC maximum
Efficiency:	88% minimum @ full load
Soft Start and Inrush Delay:	2 to 5 seconds
Input Transient Suppression:	Meets Bellcore GR 1089-CORE

Recommended Feeder Breaker:	80A (13 module 19" cabinet) 100A (16 module 23" cabinet)
Power Module Input Fuse:	7A @ 65V, slow-blow type
RCM Input Fuse:	1A @ 125V, very-fast blow type

#### **Miscellaneous:**

Cabinet Size:	(19") 132mm H x 432mm W x 305mm D (5.2" H x 17" W x 12" D)  (23") 132mm H x 533mm W x 305mm D (5.2" H x 21" W x 12" D)
Module Size:	114mm H x 32mm W x 254mm D (4.5" H x 1.25" W x 10" D)
Mounting:	19" or 23" flush or offset mounting (19" cabinet) 23" flush or offset mounting (23" cabinet)
Weight:	(19") 11.5 kg (25.3 lb.) (equipped with 13 modules) (23"): 13.8 kg (30.4 lb.) (equipped with 16 modules)
Acoustic Noise:	<45 dBa at 1m (3 ft)
Alarm Connection Ratings:	60 VDC, 0.5A maximum

#### **Recommended Connection Wire Sizes:**

Ambient Temperature = 40 °C

19" cabinet:	Input: 2 x 10 mm <sup>2</sup> (#8 AWG) per feed Output: 0.34 mm <sup>2</sup> (#22 AWG)
23" cabinet:	Input: 2 x 10 mm <sup>2</sup> (#8 AWG) per feed Output: 0.34 mm <sup>2</sup> (#22 AWG)

#### **Environmental:**

Temperature:	-40 to 40°C (-40 to 104°F) [natural convention] -40 to 65°C (-40 to 149°F) [with fan cooling]
Humidity	5% to 95% non-condensing
Elevation	-500 to 2800 m (-1640 to 9186 ft)

(Specifications are subject to change without notice)

# WARRANTY AND REPAIR INFORMATION

## Warranty Policy

Argus Technologies Ltd. warrants all equipment manufactured by it to be free from defects in parts and labor, excluding third party OEM materials (example: air conditioners, batteries), for a period of two years from the date of shipment from the factory. For third party products the OEM's warranty shall apply. The liability of Argus applies solely to repairing, replacing or issuing credit (at Argus' sole discretion) for any equipment manufactured by it and returned by the customer during the warranty period. The terms of the warranty are Ex Works (EXW) from Argus' factory service location.

Argus reserves the right to void the warranty if:

- (1) identification marks or serial numbers are removed or altered in any way,
- (2) invoice is unpaid, or
- (3) defect is the result of misuse, neglect, improper installation, environmental conditions, non-authorized repair, alteration or accident.

Argus shall not be liable to the customer or other parties for any loss of profits, loss of use, costs for removal or installation of defective equipment, damages or consequential damages based upon equipment failure during or after the warranty period. There shall be no other obligations either expressed or implied. Argus will not honor warranties for batteries and other third party products without prior written Argus authorization.

## Freight Policy

Customer is responsible for all shipping and handling charges (COD and freight collect will not be accepted without prior approval from Argus Technologies).

## Terms of Payment (North America)

Payment terms are net 30 days subject to prior credit approval. All other orders require payment before shipping.

## Terms of Payment (International)

Payment terms are subject to prior approval and are typically through Tele-Transfer.

## Return Material Policy

Our RMA policy is designed to ensure prompt, efficient and high quality factory service. A Return Material Authorization (RMA) number must be obtained before products can be accepted for servicing by the Argus factory. For returns to an authorized service center (refer to "Authorized Service Centers" for locations), please consult the individual service center for specific return policies and instructions.

To obtain a RMA number for a factory return, customers must call the appropriate location with the product serial and model number, as well as a brief description of the problem, shipment instructions and billing details.

The original packing container should be used whenever possible. Both the shipping documents and the outside of the box must have the RMA # clearly marked and the product shipped prepaid to the Argus factory service center. Argus will endeavor to repair products within five working days of receipt. Repairs to the returned product are warranted for a period of six months. A service charge may be applied if no fault is found in the returned product. Argus will not accept products without an RMA number.

## Business Hours

Argus North American office hours are 7:30 am to 5:00 pm (Pacific Standard Time) Monday to Friday.

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#### Canada and International

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# CSA/NRTL — MARKS — BACKGROUND

## What are the CSA and NRTL?

CSA (Canadian Standards Association also known as CSA International) was established in 1919 as an independent testing laboratory in Canada. CSA received its recognition as an NRTL (Nationally Recognized Testing Laboratory) in 1992 from OSHA (Occupational Safety and Health Administration) in the United States of America (Docket No. NRTL-2-92). This was expanded and renewed in 1997, 1999, and 2001. The specific notifications were posted on OSHA's official website as follows:

Federal Register #: 59:40602 - 40609 [08/09/1994]  
 Federal Register #: 64:60240 - 60241 [11/04/1999]  
 Federal Register #: 66:35271 - 35278 [07/03/2001]

When these marks appear with the indicator "C and US" or "NRTL/C" it means that the product is certified for both the US and Canadian markets, to the applicable US and Canadian standards. (1)

Argus rectifier and power system products, bearing the aforementioned CSA marks, are certified to CSA C22.2 No. 950 and UL 1950, or CSA/UL 60950.

As part of the reciprocal, US/Canada agreement regarding testing laboratories, the Standards Council of Canada (Canada's national accreditation body) granted Underwriters Laboratories (UL) authority to certify products for sale in Canada. (2)

Only Underwriters Laboratories may grant a licence for the use of this mark, which indicates compliance with both Canadian and US requirements. (3)



The product on which either of these marks appear has been certified by CSA as meeting applicable Canada/US standards.



The product on which this mark appears has been certified by UL as meeting applicable Canada/US standards.

## What are NRTLs and what do they do?

NRTLs are third party organizations recognized by OSHA, US Department of Labor, under the NRTL program.

The testing and certifications are based on product safety standards developed by US based standards developing organizations and are often issued by the American National Standards Institute (ANSI). (4)

The NRTL determines that a product meets the requirements of an appropriate consensus-based product safety standard either by successfully testing the product itself, or by verifying that a contract laboratory has done so, and the NRTL certifies that the product meets the requirements of the product safety standard. (4)

## When was the NRTL started and who governs it?

In 1983, in a suit brought on by an independent testing laboratory, OSHA was court ordered to remove specific references to UL (Underwriters Laboratories) and FMRC (Factory Mutual Research Corporation) from its regulations.

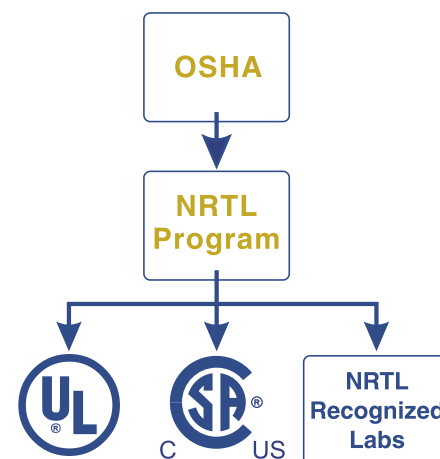
In 1988, OSHA revised its regulations to remove those references and the NRTL program was established.

The NRTL Program is both national and international in scope with foreign labs permitted.

## References:

Information in this document has been developed from the official websites of the respective organizations.

- (1) [www.csa-international.org](http://www.csa-international.org)
- (2) [www.scc.ca](http://www.scc.ca)
- (3) [www.ulc.ca](http://www.ulc.ca)
- (4) [www.osha.gov](http://www.osha.gov)





# **IMPORTANT SAFETY INSTRUCTIONS**

**SAVE THESE INSTRUCTIONS** - This manual contains important safety and operating instructions for CSM 30/31/32/33 DC-DC Converters.

- 1. Before using converter, read all instructions and cautionary markings on: (1) converter and (2) product using converter.**
- 2. Do not expose converter to rain or snow.**
- 3. Use of an attachment not recommended or sold by the converter manufacturer may result in a risk of fire, electric shock, or injury to persons.**
- 4. Do not operate converter if it has received a sharp blow, been dropped, or otherwise damaged in any way; take it to a qualified service center.**
- 5. Do not disassemble converter; take it to a qualified service center when service or repair is required. Incorrect reassembling may result in a risk of electrical shock or fire.**

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## 1.0 DOCUMENTATION/PART NUMBERS

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### 1.1 Introduction

Please read this manual thoroughly prior to use in order to become familiar with the unit's numerous features and operating procedures. To obtain a maximum degree of safety, follow the prescribed sequences as outlined.

This manual incorporates warnings and notes to the user. Points that are vital to the proper operation or safety of the operator are indicated by the heading: **WARNING**. Points that are important to the performance or ease of use of the equipment are covered by a notation that is in bold italics.

### 1.2 Argus Numbering system

Argus Technologies uses a eight digit drawing number system which is broken into three blocks. The first three digits describe the category of the product e.g. rectifier or fuse panel. The next three digits indicate the sequence in which the product number was allocated in a particular category. The last two digits indicate the type of drawing e.g.:

- 05 .....Schematic
- 06 .....Outline Drawing
- 20 .....Main Assembly

Argus uses a eight digit part numbering system for all components and sub assemblies. Each part is covered by its own unique number. Due to the quantity categories will not be listed within this manual.

## **2.0 GENERAL INFORMATION**

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### **2.1 Scope of the Manual**

This instruction manual covers the installation, and operation of Argus Technologies' CSM 30/31/32/33 modular switched mode DC to DC converter systems. Both the converter modules and the accompanying cabinets are covered in this manual.

### **2.2 Product Description**

The CSM 30/31/32/33 converters employ a high frequency switched mode conversion technique to provide two fully regulated DC outputs isolated from the DC inputs. Each module plugs into a common cabinet. The cabinet provides external connections for input, output and alarm interfaces. Additional modules can be plugged into the converter cabinet to increase the system capacity and redundancy.

A complete converter system consists of one or more converter modules and a Redundancy Control Module or an Alarm Module (CSM 31/33 only) installed in a common cabinet. Additional converter modules can be added to the cabinet at time of ordering or at a later time after the system has been installed.

The part numbers required for ordering converter systems or modules are as follows:

<b>Description</b>	<b>Part Number</b>
CSM 30 Converter Cabinet, 23", -48V to 137V .....	030-579-20
CSM 30 Converter Cabinet, 19", -48V to 137V .....	030-588-20
CSM 31 Converter Cabinet, 19", -48V to 137V .....	030-597-20
CSM 31 Converter Cabinet, 23", -48V to 137V .....	030-600-20
CSM 32 Converter Cabinet, 23", -48V to 137V .....	030-609-20
CSM 33 Converter Cabinet, 23", -48V to 137V .....	030-610-20
CSM 30 Converter Power Module .....	012-544-20
CSM 31 Converter Power Module .....	012-520-20
CSM 32 Converter Power Module .....	012-545-20
CSM 33 Converter Power Module .....	012-546-20
Redundancy Control / Alarm Module (CSM 30-33)...	018-535-20
CSM 30-33 Converter Blank Module .....	747-101-20
Spare Parts List (CSM 30/32) .....	012-544-G0
Spare Parts List (CSM 31/33) .....	012-520-G0

The above information is accurate at time of publication. Consult factory for up-to-date ordering information.

## **2.3 Converter Cabinet Features**

The converter cabinet accommodates up to 13 converter modules in the 19" cabinet (CSM 30/31 only) and up to 16 modules in the 23" cabinet, plus the Alarm/Redundancy Control Module. The following sections cover the various features available on the converter cabinet.

### **2.3.1 Redundancy Option (CSM 30/32 only)**

The cabinet provides an N+1 redundancy option. The rightmost power module position can be configured for normal converter module operation, or as a redundant module via placement of a jumper on the cabinet's backplane. See section 2.5 and drawings 030-588-06, 030-579-06, 030-609-06 for more information.

### **2.3.2 Redundant Input Feeds**

Each cabinet includes two independent input terminals (Feed A and B). This provides redundancy protection to each converter module in the event of an input power failure.

### **2.3.3 Alarm Contacts**

The converter cabinet has terminal blocks for the following Form C alarm contacts:

- Major Fail Alarm
- Minor Fail Alarm

The alarm contacts are controlled by the alarm/redundancy control module.

#### **2.3.3.1 Major Fail Alarm, Redundant Operation (CSM 30/32 only)**

The Major Fail relay will be de-energized under any one of the following conditions:

- When no power modules are installed except for the redundant slot,
- When one power module is installed and there is no redundant module,
- When one power module is installed and the redundant module has failed,
- When a power module is overloaded,
- When more than one power module has failed,
- When both of the cabinet's input feeds are below the normal operating voltage,
- When one of the cabinet's input feeds are above the normal operating voltage.

#### **2.3.3.2 Major Fail Alarm, Non-Redundant Operation**

The Major Fail relay will be de-energized under any one of the following conditions:

- When no power modules are installed,
- When a power module is overloaded,
- When a power module has failed,
- When both of the cabinet's input feeds are below the normal operating voltage,
- When one of the cabinet's input feeds are above the normal operating voltage.

---

**NOTE: The normally closed (NC) contact for Major Fail Alarm closes during alarm conditions.**

---

### **2.3.3.3 Minor Fail Alarm**

The Minor Fail relay will be energized under any one of the following conditions:

- When one of the cabinet's input feeds are below the normal operating voltage,
- When the internal ambient temperature is above or below specified limits,
- When in redundant mode, no normal power modules have failed and the redundant module is not installed or functional,
- When in redundant mode (CSM 30/32 only), if one of the normal power modules have failed and transferred to an installed and functional module in the redundant slot.

The Minor Fail relay will not energize if a Major Fail condition exists.

---

**NOTE: The normally open (NO) contact for Minor Fail Alarm closes during alarm conditions.**

---

## **2.4 Converter Module Features**

The following sections will cover the various features and options available on the CSM 30/31/32/33 converter modules.

### **2.4.1 Module Microcontroller**

The microcontroller monitors both the inputs and outputs of the converters, turns the converters on and off and generates a module fail alarm if required.

### **2.4.2 Module Indicators**

Two indicators (three on the CSM 30/32) are provided on the converter module to provide visual indication of operational status of the module. The conditions and associated colors are:

Converter Module Power On (PWR) .....	Green
Converter Module Fail (FAIL).....	Red
Redundant Converter Switched In (REDUND) .....	Yellow (CSM 30/32 only)

#### **2.4.2.1 Power Indicator**

The PWR LED indicator illuminates when the converter module is getting power from the cabinet and is not in a fail condition.

#### **2.4.2.2 Converter Fail Indicator**

The FAIL LED indicator illuminates when the converter module is in a fail condition. The indicator flashes at 2Hz when one of the converter outputs is in an overload condition.

#### **2.4.2.3 Converter Redundant Indicator (CSM 30/32 only)**

The REDUND LED indicator illuminates when the module is in a fail condition and its output has been transferred to the redundant converter module.

---

**NOTE: Only one converter module in a cabinet can connect to the redundant power module at any one time.**

---

#### **2.4.3 Converter Fail Alarm**

The converter module is equipped with a converter fail alarm which is extended to the alarm/redundant control module. Converter fail alarm discrimination circuitry is factory set. The alarm is 'real time' and therefore does not latch. The alarm will be extended if the input or output voltages of the unit falls outside factory set limits, input or output fuses fail, the OVP shutdown operates, or if the internal regulation fails. An output short circuit will also trigger this alarm. If the unit returns to normal regulation the alarm will clear.

#### **2.4.4 Over Voltage Protection and Shutdown (OVP)**

The over voltage protection (OVP) feature safeguards the load from a converter over voltage condition. If a over voltage condition is detected on a converter output, the OVP will shutdown that module. Shutdown indication is provided by the FAIL LED. The OVP shutdown level is factory set. Once an over voltage condition is sensed, the module will attempt to recover from the condition up to seven times in a one minute period, after which it will shutdown. To reset the module after such a shutdown, remove it from the cabinet back-plane and wait for the LEDs to extinguish. Re-insert the module.

#### **2.4.5 Power/Current Limit**

The power/current limiting function provides a primary response to output overload situations. When the converter module is in power/current limit mode, its front panel FAIL LED flashes and a major alarm extends to the alarm/redundant control module. When the power output of the module reaches the preset level of 100W, the output voltage starts to decrease, thereby limiting the power output of the unit. As the current increases to 1A, the output voltage is reduced to 80V. Below 80V, the available output current is reduced to less than 0.2A. Below 20V, the module's output short circuit protection engages and shuts down the unit resulting in a FAIL alarm. The module will continue to try to restart.

#### **2.4.6 Inrush Current Control and Soft Start**

Each converter module features inrush current and soft start control to eliminate a rapid increase in input current when a module is plugged in or when the cabinet is powered up.

The input voltage of the converter input capacitors is gradually ramped up from 0V to the full input voltage. This ramping is accomplished by current limiting the input with a series resistor. The resistor is bypassed as the module is fully inserted into the cabinet. The output current is then gradually ramped up from 0A to full operating load. The converter module reaches full output current in two to five seconds from when input voltage is first applied depending upon load capacity.

#### **2.4.7 Paralleling Diodes (CSM 31/33 Only)**

Diodes in series with the negative output are used in the CSM 31/33 to provide feedback protection when the converter outputs are paralleled.

#### **2.4.8 Input/Output Fuses**

Each converter module is equipped with input and output fuses. Abnormal or fault conditions may blow the input or output fuses causing the FAIL LED to illuminate.

#### **2.4.9 Input High/Low Voltage Shutdown**

The converter module is electronically protected from low voltages at the inputs by fault detection circuitry. If the input to the converter module falls below the lower DC input limit (see specifications), the module will shut down and enter converter fail mode. Similarly, the converter is also protected against a continuous high voltage at the module inputs. Such a condition will trigger a converter fail alarm and eventually cause the module to shut down. The converter module will automatically resume normal operation upon restoration of normal input conditions.

#### **2.4.10 Over Temperature Protection**

The converter module is protected in the event that it is operated in excessive ambient temperatures or if the cooling air flow is compromised such as that caused by air flow obstruction or operation at high altitudes. Under these conditions the module will shutdown and enter FAIL mode. Normal output will be returned automatically if the ambient temperature is reduced.

#### **2.4.11 Ventilation**

Cooling of the converter module is achieved via bottom to top natural convection and/or forced air cooling. To maintain proper operation over the full temperature range (see specifications), allow at least one rack space above and below the converter cabinet with air flow baffles deflecting cooling air downwards to prevent lower units from heating upper units.

### **2.5 Alarm/Redundancy Control Module Features**

The following sections cover the various features available in the alarm module:

#### **2.5.1 Alarm Module Indicators**

Three indicators are provided on the alarm/redundancy control module to provide visual indication of its operational status. The conditions and associated colors are:

Module Power On (PWR ON) .....	Green
Major Alarm (MJR ALM).....	Red
Minor Alarm (MIN ALM) .....	Yellow



#### **2.5.1.1 Power On Indicator**

Illuminates when the cabinet is powered up. It will flash when the module is first powered up, or if one or both (Feed A or B) cabinet inputs are in an over voltage condition.

#### **2.5.1.2 Major Alarm Indicator, Redundant Operation**

Illuminates under any one of the following conditions:

- When no power modules are installed except for the redundant slot,
- When one power module is installed and there is no redundant module,
- When one power module is installed and the redundant module has failed,
- When a power module is overloaded,
- When more than one power module has failed,
- When both of the cabinet's input feeds are below the normal operating voltage,
- When one of the cabinet's input feeds are above the normal operating voltage.

#### **2.5.1.3 Major Alarm Indicator, Non-Redundant Operation**

Illuminates under any one of the following conditions:

- When no power modules are installed,
- When a power module is overloaded,
- When a power module has failed,
- When both of the cabinet's input feeds are below the normal operating voltage,
- When one of the cabinet's input feeds are above the normal operating voltage.

#### **2.5.1.4 Minor Alarm Indicator**

Illuminates under any one of the following conditions:

- When a converter module has failed,
- When one or both of the cabinet inputs are below the specified limits,
- When the internal ambient temperature is above or below specified limits.

### **2.5.2 Alarm/Redundancy Control Module Protective Features**

The alarm/redundancy control module is protected from input under voltage, over voltage, reverse polarity and transients to the same level as the converter modules. Additionally, it is protected from short circuit by a fuse. The PWR ON LED is an indication of correct input voltage polarity on installation (see section 4.9).

## **2.5.3 Redundancy Features**

### **2.5.3.1 Automatic Redundant Switching (CSM 30/32 Only)**

This feature provides redundancy protection to the load without any operator intervention. In the event of a converter module failure, the redundancy control module will automatically switch the output of the redundant module (located in the rightmost position) to the failed converter module's output. For the CSM 31/33 version, the alarm module extends an alarm and LED — no redundant switching occurs.

For this feature to work, the jumper located on the cabinet's backplane (J1) must be in the redundant "on" position. In such a situation, the output connector for the rightmost module should not be used (position #13 in the 19" cabinet; or position #16 in the 23" cabinet).

### **2.5.3.2 Manual Bypass (CSM 30/32 Only)**

The redundancy controller module includes a manual bypass connector on its front panel which can be used for bypassing a failed module without disturbing the load. This is accomplished by routing the load output from a patch panel to the alarm module's manual bypass connector. This connector will be energized when the failed module is removed.

## **2.5.3 RS-485 Communications (future option)**

The converter system has the ability to report the following alarms to a connected supervisory unit via the RS-485:

#### **From Alarm/Redundancy Control Module:**

- Input A overvoltage
- Input A undervoltage
- Input B overvoltage
- Input B undervoltage
- Ambient overtemperature
- Ambient undertemperature
- Power module minor alarm
- Power module major alarm
- Redundant module fail
- Redundant module not installed
- Redundant mode selected
- Operating in redundant mode
- Redundant module switched to front panel connector

#### **From Power Module Alarms:**

- Turn on error
- Turn on fail
- Output OVP
- Output 1 overload
- Output 2 overload
- Output 1 short
- Output 2 short
- Output 1 fuse fail
- Output 2 fuse fail
- Input overvoltage
- Input undervoltage
- Input fuse fail
- Converter overtemperature
- Converter fail
- Converter on/off

## 4.0 INSTALLATION

---

### 4.1 Inspection

All Argus products are shipped in rugged, double-walled boxes and suspended via solid inserts to minimize shock that may occur during transportation. Package assemblies and methods are tested to National Safe Transit Association (NSTA) standards.

Before uncrating the converter, look for signs of damage to the shipping container. Next, uncrate the unit and inspect the exterior. If any damage is observed, contact the carrier immediately. Continue the inspection for internal damage. In the unlikely event of internal damage, please inform the carrier and contact Argus Technologies for advice on the impact of the damage.

---

**NOTE: Save the original shipping container. If the unit needs to be returned for service, it should be packaged in its original shipping container. If the original container is unavailable, make sure the unit is packed with at least three inches of shock-absorbing material to prevent shipping damage. Argus Technologies is not responsible for damage caused by the improper packaging of returned units.**

---

### 4.2 Preparation/Mounting

The 19" converter cabinet has been designed for mounting in a 19" or 23" EIA standard relay rack (23" cabinet for 23" rack only). Universal mounting brackets accommodate both 1" and 1-3/4" spacing. Units can be arranged in several different rack mounting configurations:

**2" offset rack mounting** – All loose units shipped from the factory are arranged for 2" offset rack mounting as shown in the outline drawing enclosed.

**Flush rack mounting** – Remove the three attaching screws, move the brackets to the front-mounting position and re-attach as shown in the outline drawing enclosed.

**5" offset rack mounting** – Remove the three attaching screws, move the brackets to the mid-mounting position and re-attach as shown in the outline drawing enclosed.

The converter cabinet should be mounted to the rack using two, #12 – 24 x 1/2" screws in each bracket. A Philips screwdriver should be used to eliminate the possibility of slippage and scratching of the unit's exterior.

The unit must be mounted in a clean and dry environment. Allow at least 1.75" of free space above and below the unit for uninterrupted airflow.

In addition to rear access holes, the CSM 30/31/32/33 cabinet incorporates side access holes for routing wiring cables. To use these side holes, remove the blanking plates by unscrewing the top and bottom screws immediately above and below the holes. Reposition the blank plates to the rear holes. Lastly, remove the grounding strip from the back cover and move to the side plates.

### **4.3      Grounding**

---

**NOTE:** Connections to the converter system should comply with all local codes and ordinances.

---

#### **4.3.1      Chassis Ground (Required)**

**WARNING:** The converter cabinet (or “chassis”) should be connected to the service ground for safety.

### **4.4      DC Input Connections**

**WARNING:** The converter cabinet may be supplied from two independent feeds.

**WARNING:** Ensure that the converter cabinet feeder breakers are in the “off” position prior to any work being performed on the input connections.

**WARNING:** Do not attempt to connect or disconnect energized battery or live cables. Doing so can be extremely dangerous.

---

**NOTE:** The size of the common connections should be equal to the size of the line feeds.

---

We recommend that each converter cabinet have two dedicated input feeder breakers. See specifications section for recommended input feeder breaker ratings and wire gauges. Circuit breakers should be placed in the off state when connecting cables.

DC output wire must be UL approved File # B64801, XHHW or RHH/RHW (for Canadian users; RW90 Type). Lugs required should be Amp #324061 or equivalent for #8 AWG. Use suitable type for #10 and #12 AWG.

Remove the rear panel from the converter cabinet to expose the terminals for the input cables. Insert the input cables through the cabinet's rear wireway. Secure the DC input cables to the input terminal of the correct polarity. See outline drawings at the rear of the manual to determine the correct polarity of the input posts.

**WARNING:** Observe the correct polarity of input cables. Over tightening of the terminal screws may result in damage to the input connectors.

**INPUT FEEDER BREAKER RATINGS AND WIRE GAUGES;  
TABLE 1: FULL CABINET AND 10KW LOAD, (RECOMMENDED)**

TB1 INPUTS	DESIGNATION	CIRCUIT BREAKER	AWG WIRE SIZE
1	FEED A	80A	#8
2			#8
3	CHASSIS GROUND	N/A	#8
4	COMMON RETURN	N/A	#8
5			#8
6	FEED B	80A	#8
7			#8

**TABLE 2: 12 MODULES MAX. OR 6KW MAX. LOAD, (OPTIONAL)**

TB1 INPUTS	DESIGNATION	CIRCUIT BREAKER	AWG WIRE SIZE
1	FEED A	60A	#10
2			#10
3	CHASSIS GROUND	N/A	#10
4	COMMON RETURN	N/A	#10
5			#10
6	FEED B	60A	#10
7			#10

**TABLE 3: 10 MODULES MAX. OR 5KW MAX. LOAD, (OPTIONAL)**

TB1 INPUTS	DESIGNATION	CIRCUIT BREAKER	AWG WIRE SIZE
1	FEED A	50A	#12
2			#12
3	CHASSIS GROUND	N/A	#12
4	COMMON RETURN	N/A	#12
5			#12
6	FEED B	50A	#12
7			#12

**TABLE 4: 6 MODULES MAX. OR 3KW MAX. LOAD, (OPTIONAL)**

TB1 INPUTS	DESIGNATION	CIRCUIT BREAKER	AWG WIRE SIZE
1	FEED A	30A	#10
2			N/A
3	CHASSIS GROUND	N/A	#10
4	COMMON RETURN	N/A	#10
5			N/A
6	FEED B	30A	#10
7			N/A

## **4.5      DC Output Connections**

**WARNING:** Ensure that the input feeder breakers to the converter cabinet are turned “OFF” before attempting to work on the output connectors.

### **4.5.1      CSM 30/32 Output Connections**

On the CSM 30/32, remove the rear panel from the converter cabinet to expose the connectors for the module outputs. Insert the output cables through the wireway of the cabinet. Connect the output cables to the output terminals using a 4-pin ribbon or wire cable assembly. Refer to drawings 030-588-06, 030-579-06 or 030-609-06.

---

**NOTE:** The two lower output connectors of each power module can be selected for either positive or negative ground output, depending on the placement of a jumper located on the converter module PCB. The factory default is selected for positive ground output.

---

### **4.5.2      CSM 31/33 Output Connections**

For the CSM 31/33, there is only one output terminal (TB3) for paralleled output. Insert the output cables through the wireway of the cabinet and attach to TB3. Use #10 AWG cable (minimum) with suitable lugs. NB- use Amp 324061 with #8 AWG. Refer to drawings 030-597-06, 030-600-06 or 030-610-06.

## **4.6      Alarm Connections**

Alarm cables should be bundled and routed through the rear holes of the cabinet. Insert each wire into the appropriate terminal on the termination block and secure the wires by tightening the terminal screw.

The Major Fail Alarm and the Minor Fail Alarm terminals are connected to relay contacts in the alarm/redundant control module and both normally open or normally closed contacts are available.

---

**NOTE:** The Major Alarm relay is de-energized and the Minor Alarm relay is energized during alarm conditions.

---

#### **4.7 Converter Module Installation**

**WARNING: HIGH VOLTAGE AND SHOCK HAZARD.** Only qualified personnel familiar with line and battery voltage should attempt to change modules while the converter cabinet is energized. Remove rings, watches and other jewelry before performing this procedure. Keep fingers clear of live electric parts while unit is energized.

**WARNING: Do not force a module into position if it does not seat properly! The rightmost module position is reserved for the alarm module.**

Engage the converter module PCB in the guides provided in the converter cabinet. Gently slide the converter module into the converter cabinet and engage the plastic latch into the bottom rail of the cabinet. Snap the latch into position. Make sure the bottom pin engages correctly in the cabinet (do not force latch closed).

#### **4.8 Module Fuse Replacement**

The output fuses are located on the power module's PCB. Remove the power module as outlined above and replace blown fuse(s). ***Ensure fuse is replaced with the same type as identified in the specifications section of this manual.***

#### **4.9 Initial Startup**

Disengage all modules from their sockets in the converter cabinet by pulling out at least one inch.

Confirm that the DC input cables are connected to the terminal of the correct polarity. Apply DC power to the converter cabinet by turning on the input feeder breakers. Plug in the alarm/redundant control module. The PWR LED should flash. After three seconds, it should become steady and the FAIL LED will extinguish. If not, turn off the feeder breakers and check all connections for correct polarity.

Plug in one converter module. Confirm that the PWR ON LED indicator illuminates. The FAIL indicator will illuminate for up to five seconds. If not, immediately turn off power to the cabinet and check all DC input connections for correct polarity.

Plug in the remaining converter modules following the steps above.

## **5.0 OPERATION**

---

### **5.1 Converter Shutdown**

Disengage any converter module by pulling down on the plastic latch. To shut down a complete system disconnect the input power source.

### **5.2 Normal Mode of Operation**

Normal operation of the converter system will be indicated by the illumination of the PWR LED indicators on each converter module and the absence of the illumination of the FAIL LED indicator on each module.

---

**NOTE: To reset a power module after an OVP condition, disengage it from the cabinet and wait for all LEDs to extinguish before re-inserting.**

---

### **5.3 Failed Converter Replacement or Manual Bypass (CSM 30/32 Only)**

At the patch panel\* use the pigtail provided to jumper from the number of the failed module position to the manual bypass connector on the front of the redundancy controller module. This will route the load output from the patch panel to the alarm module's manual bypass connector. This connector will be energized when the failed module is removed.

Disengage the failed module by pulling down on the plastic latch. Replace the failed module with a new module. Confirm that its green PWR ON LED indicator illuminates and red FAIL LED indicators are not illuminated or extinguish by expiry of the ONU startup time. Immediately remove the manual bypass connector at the redundancy controller module to complete this procedure.

\* See information provided with patch panel for additional details.



## 6.0 MAINTENANCE

---

Although very little maintenance is required with Argus systems, routine checks and adjustments are recommended to ensure optimum system performance. Repairs should be done by qualified service personnel.

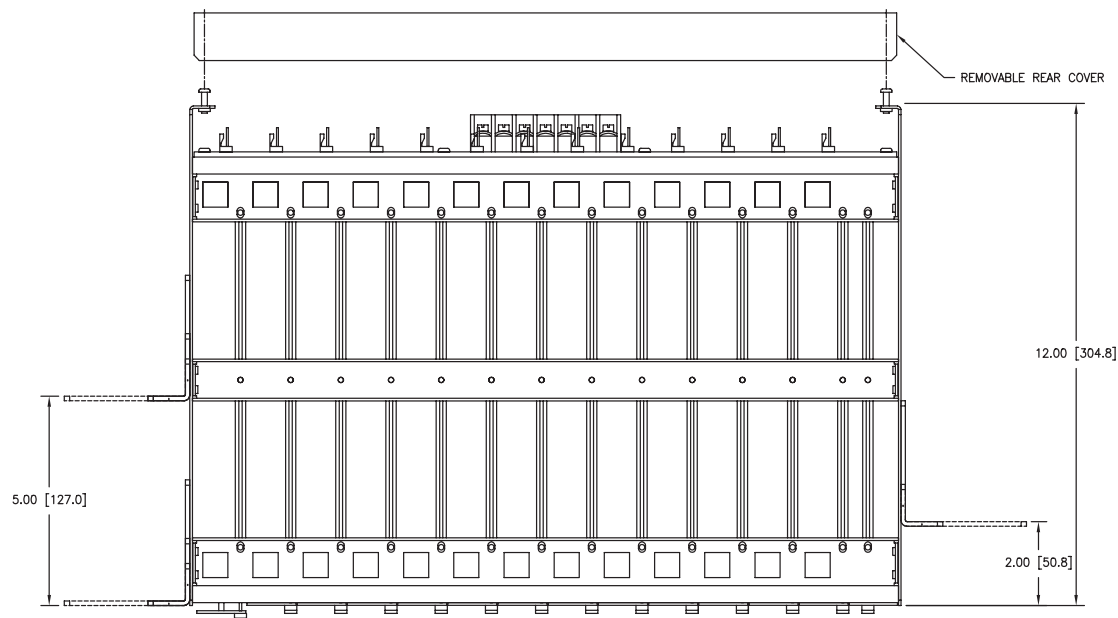
The following table outlines several maintenance procedures for this system. These procedures should be performed at least once a year.

**WARNING: Use extreme care when working inside the cabinet while the system is energized. Do not make contact with live components or parts. HIGH VOLTAGE AND SHOCK HAZARD.**

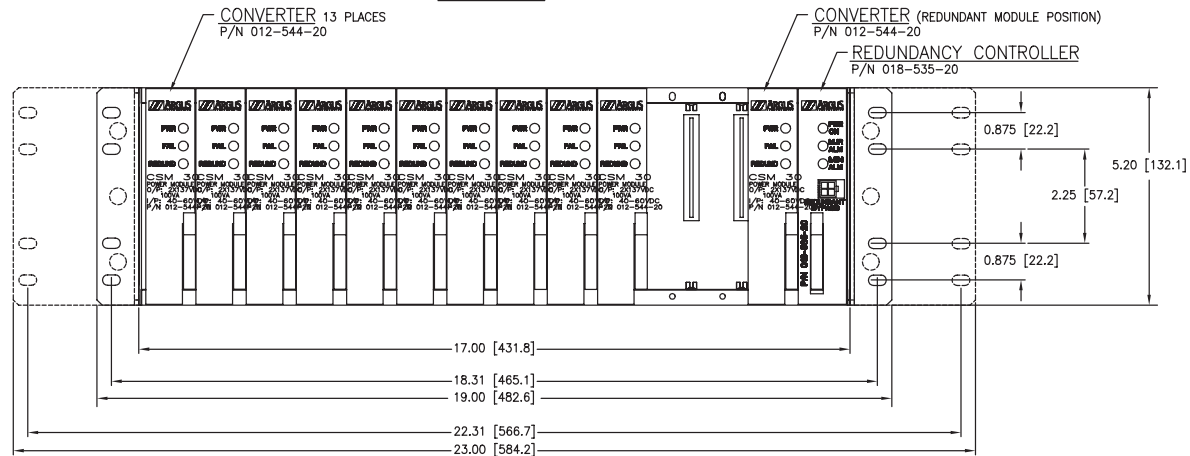
**WARNING: Ensure redundant modules or batteries are used to eliminate the threat of service interruptions while performing maintenance on the system's alarms and control settings.**

<u>Procedure</u>	<u>New Setting</u>	<u>Date</u>
Clean ventilation openings		
Inspect all system connections (retorque as necessary)		
Verify alarm/control settings		

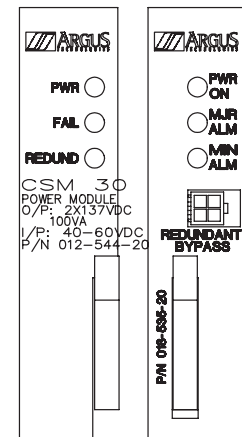
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C	UPDATED, SEE HISTORY		



TOP VIEW



FRONT VIEW

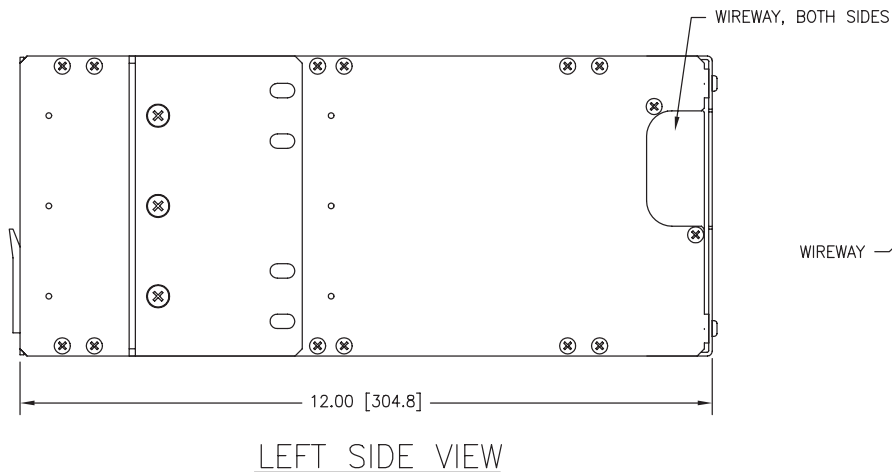
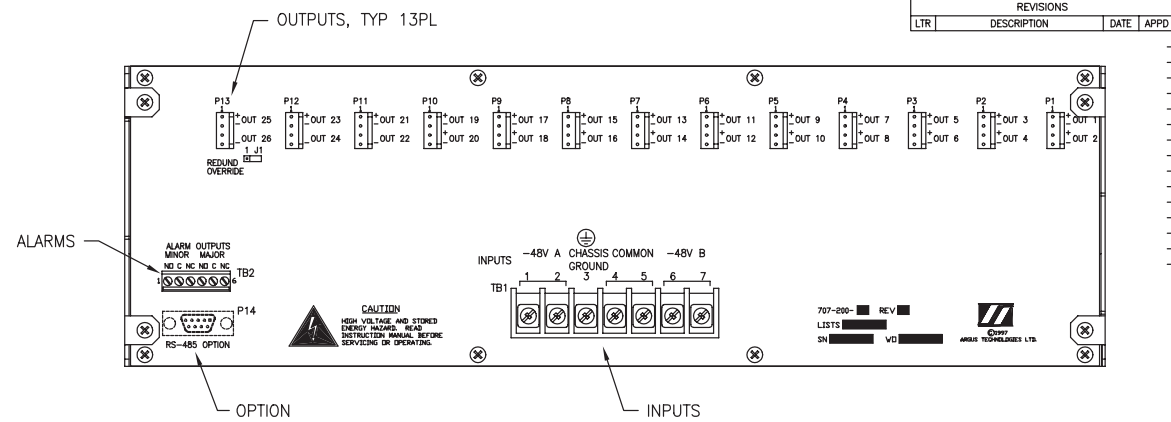


CONVERTER REDUNDANCY CONTROLLER


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THESE DESIGNS AND SPECIFICATIONS ARE THE PROPERTY OF ARGUS TECHNOLOGIES AND SHALL NOT BE COPIED OR USED FOR MANUFACTURING WITHOUT ITS WRITTEN CONSENT.		
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DRAWN	PDS 97/10	
CHECKED	PDM 97/10	FINISH
APPROVED	LRD 97/10	
TOLERANCE	SCALE	N.T.S.
TITLE OUTLINE DRAWING 19" CSM 30 CABINET		
ISSUE DATE	SHEET 1 OF 3	
SIZE DWG NO. B 030 - 588 - 06	TYPE A1	REV c

DIMENSIONS IN INCHES WITH METRIC IN BRACKETS: INCHES [MM].



REVISIONS		
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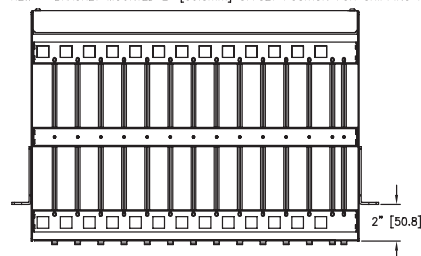
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TITLE					
OUTLINE DRAWING					
19" CSM 30 CABINET					
ISSUE DATE		SHEET 2 OF 3		REV	
SIZE	DWG NO.	B 030 - 588 - 06		TYPE	REV
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REVISIONS			
LTR	DESCRIPTION	DATE	APPD

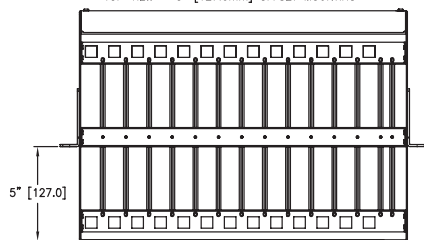
# LIST 18 – UNIVERSAL MOUNTING BRACKET – DEFAULT

TOP VIEW – BRACKET MOUNTED 2" [50.8mm] OFFSET POSITION FOR SHIPPING PURPOSES



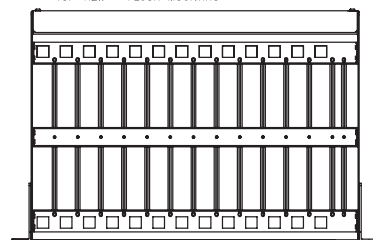
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TOP VIEW – 5" [127.0mm] OFFSET MOUNTING



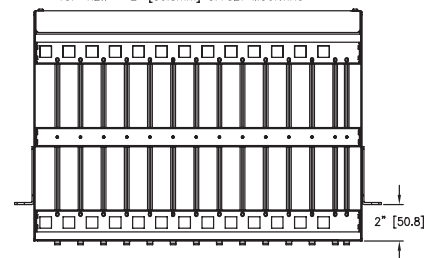
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TOP VIEW – FLUSH MOUNTING



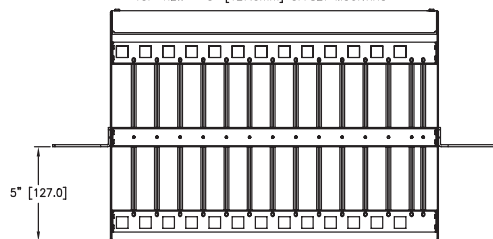
## LIST 22 (INTERNAL USE ONLY)

TOP VIEW – 2" [50.8mm] OFFSET MOUNTING



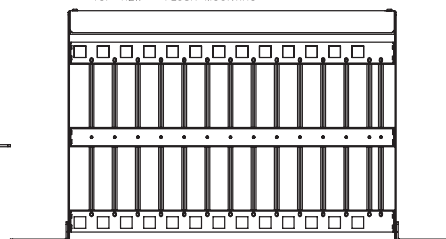
## LIST 24 (INTERNAL USE ONLY)

TOP VIEW – 5" [127.0mm] OFFSET MOUNTING



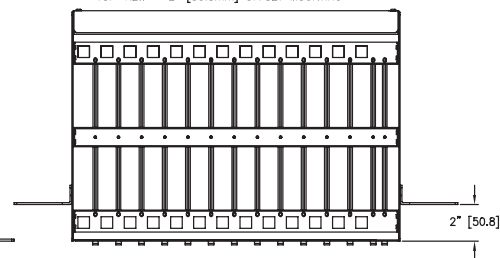
## LIST 25 (INTERNAL USE ONLY)

TOP VIEW – FLUSH MOUNTING




## LIST 26 (INTERNAL USE ONLY)

TOP VIEW – 2" [50.8mm] OFFSET MOUNTING

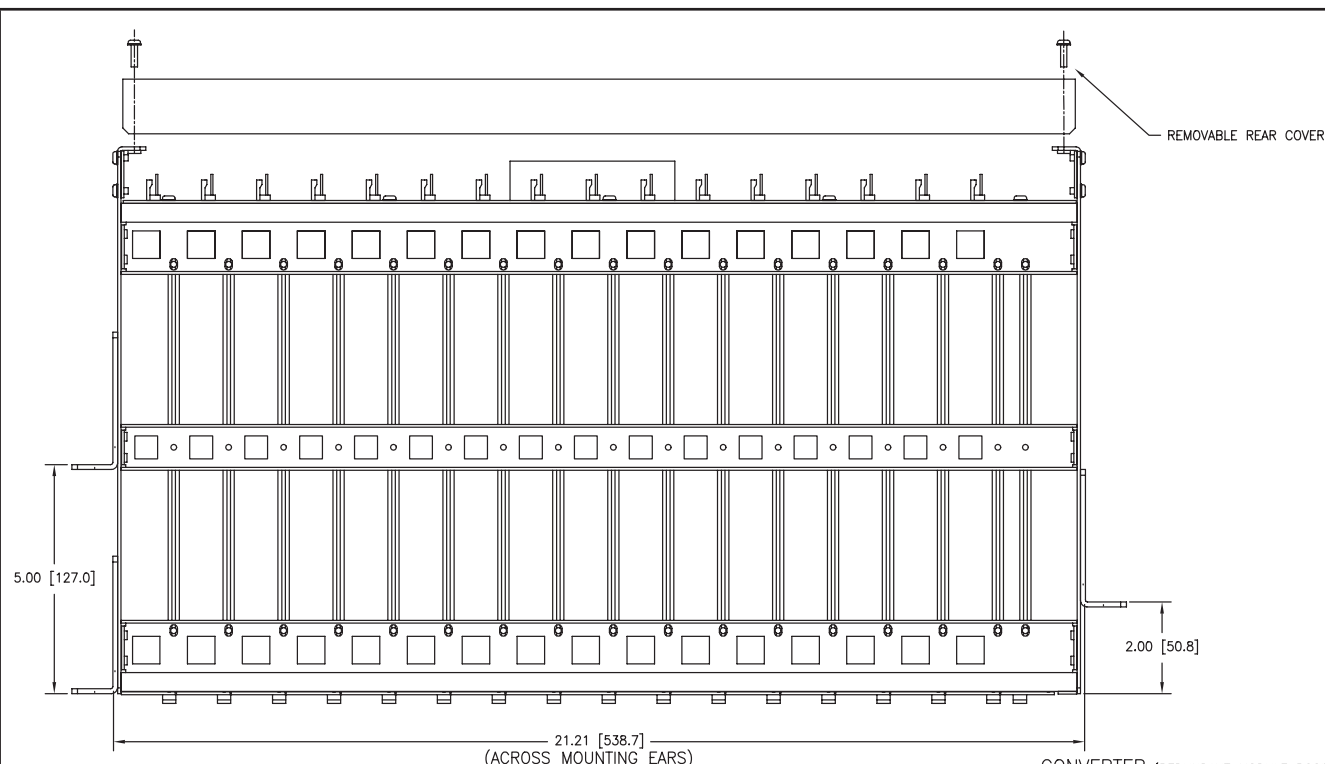


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TOLERANCE	SCALE		
		N.T.S.	
TITLE			
OUTLINE DRAWING			
19" CSM 30 CABINET			
ISSUE	SHEET		OF
DATE	3		3
SIZE	DWG NO.	TYPE	REV
B	030 - 588 - 06	A1	C

DIMENSIONS IN INCHES WITH METRIC IN BRACKETS: INCHES [MM].

REVISIONS			
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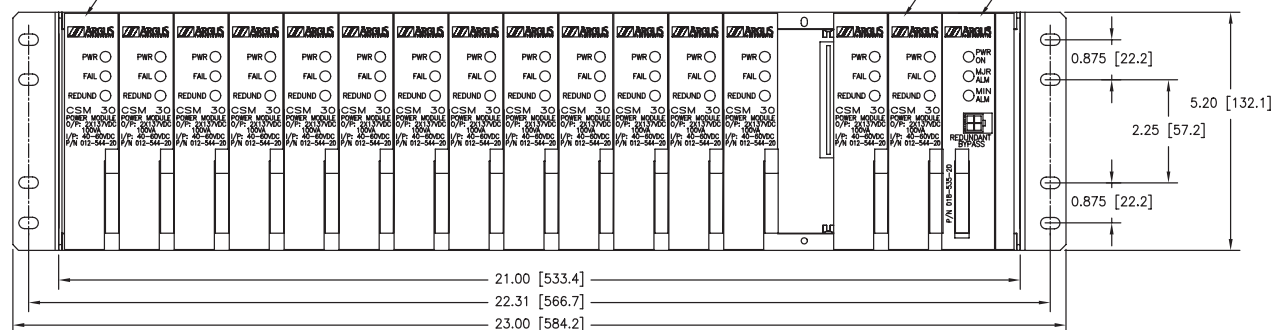


TOP VIEW

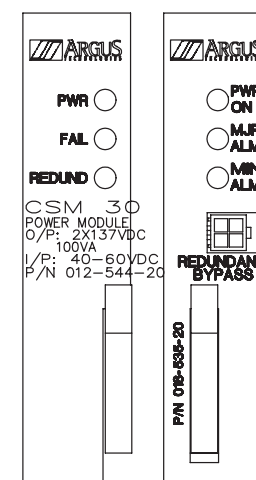
CONVERTER 16 PLACES  
P/N 012-544-20

CONVERTER (REDUNDANT MODULE POSITION)  
P/N 012-544-20

REDUNDANCY CONTROLLER  
P/N 018-535-20



FRONT VIEW



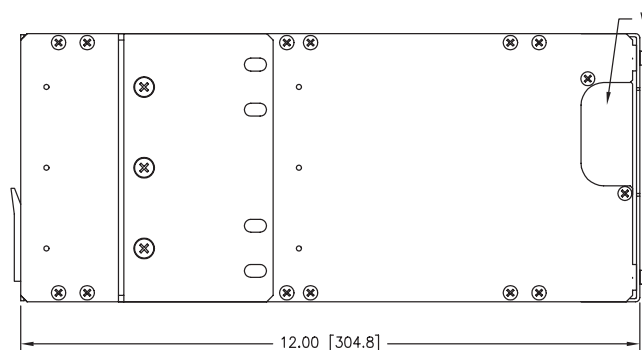
CONVERTER

REDUNDANCY CONTROLLER

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OUTLINE DRAWING 23" CSM 30 CABINET		
ISSUE DATE	SHEET 1 OF 2	
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B		A1 B

DIMENSIONS IN INCHES WITH METRIC IN BRACKETS: INCHES [MM].

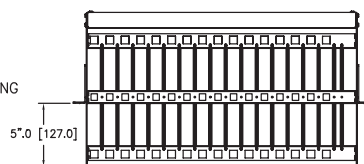


LEFT SIDE VIEW

#### LIST OPTION 20

(INTERNAL USE ONLY)

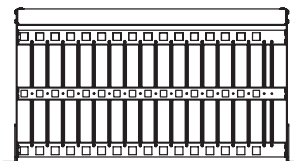
TOP VIEW:  
5" [127.0mm] OFFSET MOUNTING



#### LIST OPTION 21

(INTERNAL USE ONLY)

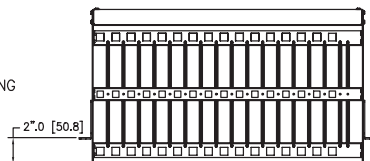
TOP VIEW:  
FLUSH MOUNTING



#### LIST OPTION 22

(INTERNAL USE ONLY)

TOP VIEW:  
2" [50.8mm] OFFSET MOUNTING

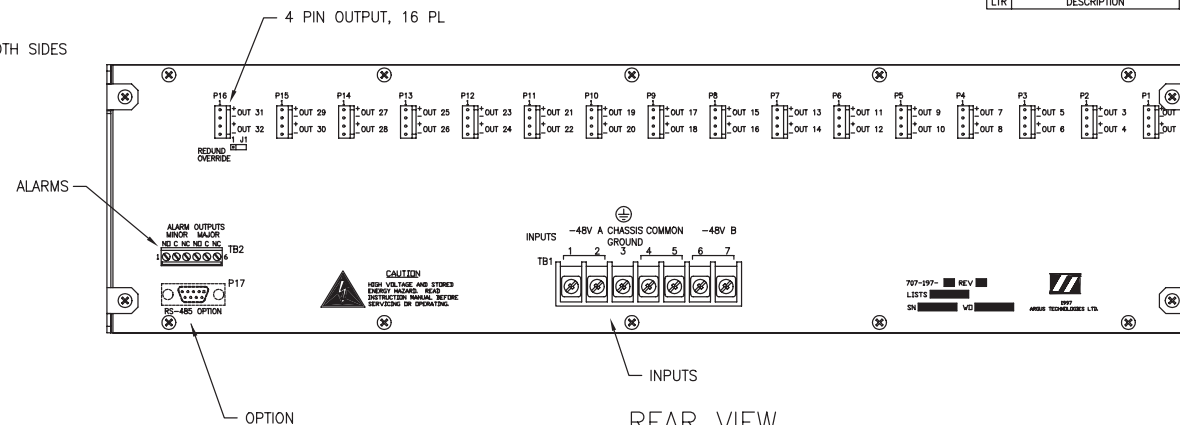
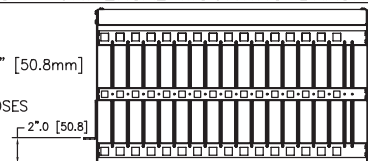


### BRACKET MOUNTING OPTIONS

#### LIST OPTION 18 – UNIVERSAL MOUNTING BRACKET

##### DEFAULT

TOP VIEW:  
BRACKET MOUNTED 2" [50.8mm]  
OFFSET POSITION  
FOR SHIPPING PURPOSES




REAR VIEW  
(COVER REMOVED)

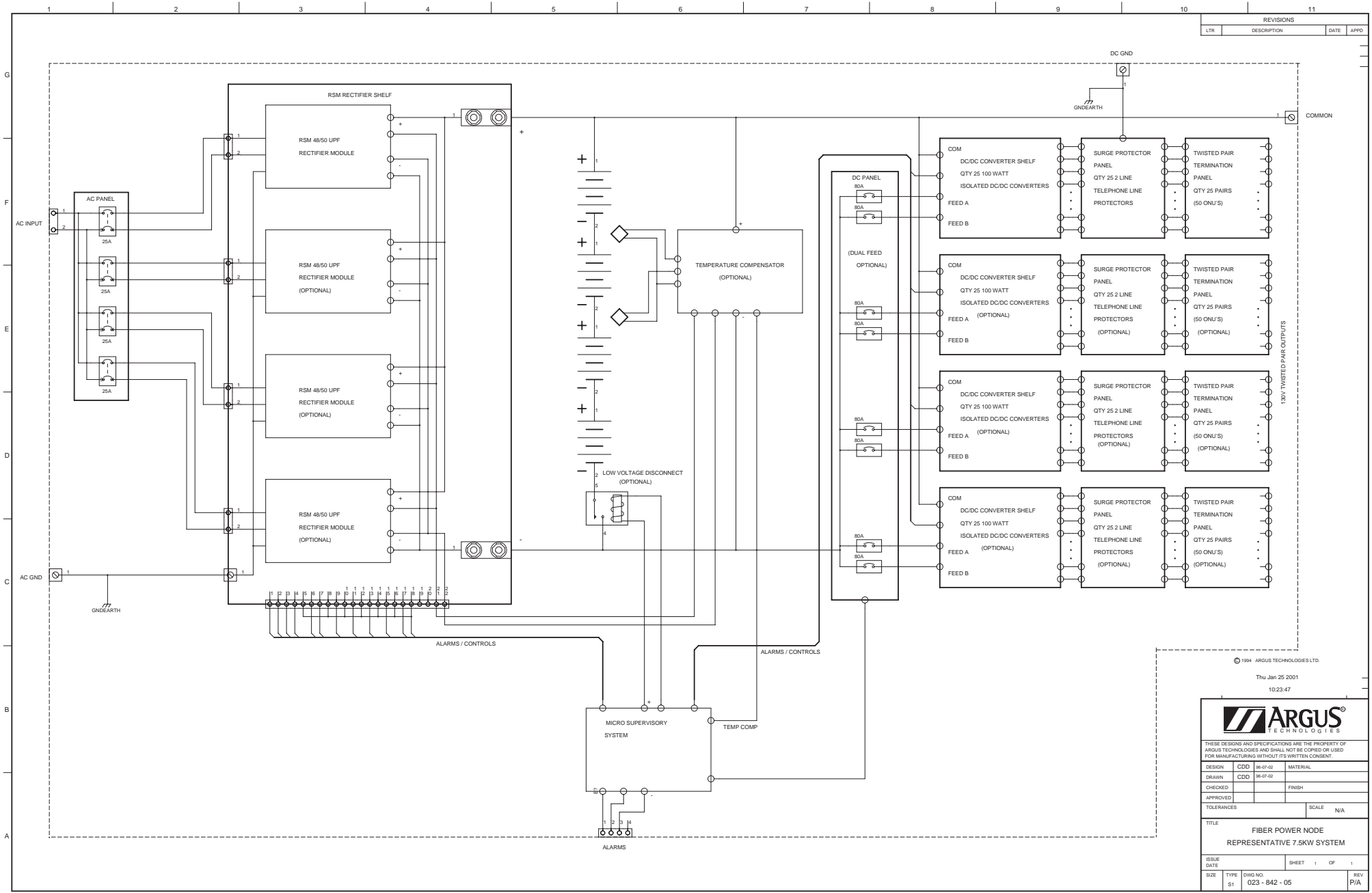


REAR VIEW  
(COVER INSTALLED)

REVISIONS			
LTR	DESCRIPTION	DATE	APPD

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OUTLINE DRAWING 23" CSM 30 CABINET			
ISSUE	SHEET		2 OF 2
DATE			
SIZE	DWG NO.	TYPE	REV
B	030 - 579 - 06	A1	B

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LTR	DESCRIPTION	DATE	APPRO

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TITLE  
**FIBER POWER NODE  
REPRESENTATIVE 7.5KW SYSTEM**

ISSUE	DATE	SHEET	1	OF	1
SIZE	TYPE	DWG NO.	REV		
	ST	023 - 842 - 05	P/A		

# FACTORY SERVICE INFORMATION

## Technical Support

Technical support staff are available for answering general questions related to installation, operation and maintenance of Argus products. In Canada and the USA, call Argus toll free 7:30 am to 5:00 pm Pacific Standard Time at:

**+1-888 GO ARGUS**

(+1-888-462-7487)

For emergencies, call +1-888-GO-ARGUS 24 hours a day, seven days a week.  
Customers outside Canada and the USA, call +1-604-436-5547 for technical support.

## Training

Argus offers various levels of product and technical training. These workshops provide a mix of theory and hands on application for qualified customers. Please consult your sales representative for course schedules, locations and costs, or visit our website at [www.argusdcpower.com](http://www.argusdcpower.com).

## Factory Repair and Servicing

All service, beyond initial adjustments, should be carried out by qualified factory service personnel. For these procedures, please contact Argus Technologies at the locations listed to the right.

## Product Returns

Before returning any product for service, please obtain a Return Material Authorization (RMA) number from an Argus factory service representative. The representative will require the model and serial number, as well as a brief description of the problem prior to issuing the RMA number. All material must be pre-authorized before being returned.

See document 048-507-10 "Warranty and Repair Information" for more details.

## Moving and Storage

Units must be suitably packed in the original shipping container (or equivalent) prior to re-shipping. The box should be completely enclosed and constructed of wood or double-wall, corrugated cardboard. At least 3" of foam or shock absorbing packing material must surround the unit.

### Factory Service Centers

#### Canada and International

Argus Technologies Ltd.  
ATTN: RMA Returns  
7033 Antrim Avenue  
Burnaby, BC, V5J 4M5 Canada  
Tel: +1 604 436 5900  
Fax: +1 604 436 1233  
Email: [returns@argusdcpower.com](mailto:returns@argusdcpower.com)

#### USA

Argus Technologies Inc.  
ATTN: RMA Returns  
3116 Mercer Avenue  
Bellingham, WA, 98225 USA  
Tel: +1-360 756 4904  
Fax: +1-360 647 0498  
Email: [returns-usa@argusdcpower.com](mailto:returns-usa@argusdcpower.com)

#### Asia-Pacific

PCM Electronics (Dong Guan) Co., Ltd.  
Hongli Industrial Area, Miaobian, Liaobu Town,  
Dongguan City, Guangdong Province,  
523400 China  
Tel: +86 755 8895 3310  
Fax: +86 755 8895 3307

#### Authorized Service Center

##### Argentina

Argus Technologies de Argentina  
Belen 315, Capital Federal, Buenos Aires,  
14071 Argentina  
Tel: +54 (11) 4672 4821  
Fax: +54 (11) 4504 4698  
Cell: +54 9 (11) 4993 9996  
Email: [ikleiman@argus.ca](mailto:ikleiman@argus.ca)

##### Asia

Argus Technologies Asia Pte Ltd  
Blk 6 Tagore Lane #160  
Singapore 787570  
Tel: +65 6458 8900  
Fax: +65 6458 2122

##### Australia

CPS National  
8/376 Newbridge Rd  
Moorebank, NSW, 2170 Australia  
Tel: +61 02 9822 8977  
Fax: +61 02 9822 8077

##### Australia/New Zealand

Alpha Power Systems Pty Ltd  
Unit 3, 30 Heathcote Road  
Moorebank, NSW, 2170 Australia  
Tel: +61 02 9602 8331  
Fax: +61 02 9602 9180

##### Century Yuasa

37 - 65 Colbalt Street  
Carole Park QLD 4300  
Australian Sales & Service  
Tel: +61 07 3361 6587  
Fax: +61 07 3361 6705  
New Zealand Sales & Service  
Tel: +64 9 978 6689  
Fax: +64 9 978 6677

##### Canada

Compower Systems Inc.  
118 Tiffind Road  
Toronto, ON, M1V 5N2 Canada  
Tel: +1 416 293 3088  
Fax: +1 416 293 0671

##### Europe

Alpha Technologies Europe Ltd.  
Cartel Business Estate  
Edinburgh Way  
Harlow, Essex, CM20 2DU UK  
Tel: +44 1279 422110  
Fax: +44 1279 423355

##### Mexico & Central America

Technologies Argus First De Mexico SA de CV  
Anatole France No. 17  
Col. Polanco  
Mexico City, 11560 Mexico  
Tel: +52 55 5280 6990  
Fax: +52 55 5280 6585

##### South America

Argus Technologies Argentina  
Santo Tome 2573, Capital Federal  
Buenos Aires, 1416 Argentina  
Tel: +54 11 4504 4698  
Cell: +54 9 11 4993 9996  
E-pager: [541149939996@nextel.net.ar](mailto:541149939996@nextel.net.ar)

##### Turkey

IPC Enerji Elk San ve TIC AS  
Inonu cad. Kanarya sok. No:20  
Yenisahra - Kadikoy  
Istanbul, Turkey  
Tel: +90 216 317 41 42  
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