ARGUS

RSM 48/7.5-15 (120V Input 65degC) Switched Mode Rectifier / Eliminator

010-036-B2

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Power

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Argus Technologies Ltd.

Visit **www.argus.ca**

Burnaby, British Columbia. Telephone: 604 436 5900 Fax: 604 436 1233

RSM 48/7.5-15 (120V INPUT 65degC) SWITCHED MODE

RECTIFIER / ELIMINATOR

#010-036-B2

Serial #_____

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

- Specifications, RSM 48/7.5-15 (120V Input): 010-036-B1 Rev D
- Warranty Policy: 048-507-10
- Installation and Operation Instructions: 010-024-C0 Rev I
- Application Note: 010-024-C1
- Schematic Drawing: 010-036-05
- Outline Drawing: 010-036-06
- Customer Connection: 010-024-08
- Factory Service Information: 048-527-10

SPECIFICATIONS FOR ARGUS TECHNOLOGIES' SWITCH MODE RECTIFIER MODEL RSM 48/7.5-15

Module Output:

Voltage	48 - 56 VDC
Current	7.5A DC nominal/module
Power	420W Continuous/module
Regulation	+/-0 .1% line and load (static) 2% deviation for 50 to 100% load step (dynamic)
Response Time	2 msec. to 0.1% of output for 50 to 100% load step
Time Stability	0.1% per year
Temp. Stability	<100ppm/ C over the operating range
Noise	Less than 24 dBrnc (Voice Band) <10mV rms to 10MHz <150 mV p-p 10MHz to 100 MHz
EMI	The unit meets requirements of: FCC Part 15 Subpart B Class A
Fuse Rating	15A, 60 VDC.

In Accordance with FCC requirements, we provide the following statement as specified in the FCC guidelines for conformance to Part 15 Subpart J, Level A:

WARNING: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. 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 communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Module Input

Voltage	96 - 132 VAC (57-63 Hz)
Current	5.6A (120V Nominal) at 420 W/module
Power Factor	> 0.90 Displacement, Lagging (0 - 100% load) > 0.95 True (25 - 100% load) UPF Module only
T.I.F.(Current)	Less than 200 at 100% load
Efficiency	80% min. 50-100% load
Hold-over time	20 msec from loss of Nominal line
Source Impedance	< 5% inductive or resistive
Rec'd Feeder Breaker	15A or greater (up to 2 modules)
Fuse Rating	10A, 10,000A interrupting capacity at 250 VAC

Load Disconnect (Option)

Current Capability	20A DC
Disconnect Voltage(Option)	42 - 48 VDC
Fuses	0 - 10A DC 8 GMT Fuses

Extended Monitor/Control (Option)

Adjustment Ranges

Overvoltage Shutdown:	54 - 61 VDC
Low Voltage Alarm:	42 - 48 VDC
Low Volt. Alarm Hysteresis:	+1.5 VDC
Low Voltage Disconnect:	42 - 48 VDC
Low Volt. Disc. Hysteresis:	Variable +8 VDC(42) to +4 VDC(48)

Miscellaneous:

Acoustic Noise:	45 dBA at three feet
Weight:	20 lbs (9.1 kg) [Complete system of 2 modules]
Size:	3.5" H x 17"W x 12" D (89mm H x 432mm W x 305mm D)

Recommended Connection Wire Sizes (as per UL / CSA):

Ambient Temp=30 C (86 F):	Input: 2.5 mm^2 (#14 AWG) Output: 6 mm^2 (#10 AWG)
Ambient Temp=65 C (149 F):	Input: 4 mm^2 (#12 AWG) Output: 10 mm^2 (#8 AWG)

Environmental:

Temperature:	-40 to 65 C (-40 to 149°F) [operating] -40 to 70°C (-40 to 158°F) [storage]
Humidity:	0 to 90% non-condensing
Elevation:	-500 to 2800 m (-1640 to 9180 ft) (Derate Max. Ambient to +40 linearly at 3100 m)

(Specifications are subject to change without notice)

MANUAL ADDENDUM

Unit Description:
Applies to Manual P/N and Rev:

RSTs	010-016-B0 Rev A	**SDs**	018-007-B0 Rev D
	010-019-B0 Rev A		018-008-B0 Rev C
	010-020-B0 Rev A		018-011-B0 Rev C
	010-007-B0 Rev A		018-016-B0 Rev C
	010-013-B0 Rev B		
	010-015-B0 Rev A	**RCS**	030-527-B2 Rev P/A
	010-006-B0 Rev A		
	010-002-B0 Rev B		
	010-023-B0 Rev A		
	010-008-B0 and B2 Rev A		
RSMs	010-510-B2 Rev C		010-030-B2 Rev B
	010-525-B2 Rev P/A		010-505-B2 Rev C
	010-511-B2 Rev P/A		010-024-B2 Rev C
	010-528-B2 Rev A		010-036-B2 Rev C
	010-529-B2 Rev A		010-028-B2 Rev B
	010-522-B2 Rev B		010-034-B2 Rev B
	010-512-B2 Rev A		010-037-B2 Rev A
	010-503-B2 Rev A		010-035-B2 Rev A
	010-510-B2 Rev B		010-038-B2 Rev A
	010-029-B2 Rev B		010-039-B2 Rev A

NOTE: THIS ADDENDUM SHEET IS TO BE INSERTED IN ALL OF THE ABOVE LISTED PRODUCT MANUALS. THIS ADDENDUM REPLACES THE ADDENDUM "ADDNEW.DOC" INCLUDED WITH DOCUMENT 022-000-C1.

EXPLANATION:

The market shift from vented or "wet cell" to valve regulated lead acid (VLRA) batteries has prompted Argus to update its factory default settings to accomodate the requirements of these batteries.

The changes listed below are being implemented immediately as new factory default settings in all Argus power products. However, as always, customer requested settings will take precedent over factory defaults.

This addendum is to accompany all new Argus user manuals. Questions about the new factory default settings should be directed to our toll free ***1-888-GO ARGUS Technical Support line.***

TABLE 1-1: RSM/RST/RCS SYSTEMS (excluding RSM 48/7.5 and 24/15)

Function	12 volt systems (nom)	24 volt systems (nom)	48 volt systems (nom)
Float	13.5	27	54
Equalize	13.8	27.5	55
OVP	14.5	29	57
LVA	11	22	44
HVA	14	28	55.5

TABLE 1-2: RSM 48/7.5 and 24/15 (module) @ 25°C (77°F)

MANUAL ADDENDUM

Function	24 volt systems (nom)	48 volt systems (nom)
Float	27	54

TABLE 1-3: RSM 48/7.5 and 24/15 SUPERVISORY/CONTROL MODULE

Function	24 volt systems (nom)	48 volt systems (nom)
LVD	21	42

TABLE 1-4: SUPERVISORY/CONTROL SYSTEMS (SD-02,03,04,05)

Function	12 volt systems (nom)	24 volt systems (nom)	48 volt systems (nom)
Load Out	10.5	21	42
Load In	12.5	25	50
LVA	12	24	48
HVA	14	28	55.5
HVSD	n/a	29.5	58

NOTE: THIS ADDENDUM SHEET IS TO BE INSERTED IN ALL OF THE ABOVE LISTED PRODUCT MANUALS. THIS ADDENDUM REPLACES THE ADDENDUM “ADDNEW.DOC” INCLUDED WITH DOCUMENT 022-000-C1.

RSM (48/7.5) (24/15) QUICK SETUP CARD

1) MOUNTING CABINET:

- UNPACK CABINET.
- FOR 23" RACKS, FLIP MOUNTING BRACKETS ON CABINET.
- MOUNT CABINET IN RACK WITH 4 X #12-24 1/2" PANHEAD SCREWS.

2) AC POWER:

- (NOTE: ALL WIRING SHOULD COMPLY WITH LOCAL CODES AND ORDINANCES)
- IF CABINET HAS 120VAC LINE CORD, GO TO #3.
- LOCATE AC FEEDER BREAKER FOR CABINET AND ROUTE AC WIRING TO LEFT REAR OF CABINET.
- PREPARE END OF AC CABLE ASSEMBLY AS IN CUSTOMER CONNECTION DRAWING IN MANUAL.
- ATTACH AC CABLE TO AC INPUT TERMINAL.
- DO NOT TURN ON POWER.

3) DC POWER:

- PREPARE END OF DC CABLE AND ALARM CABLE ASSEMBLIES AS IN CUSTOMER CONNECTION DRAWING IN MANUAL.
- CONFIRM THAT AC POWER IS TURNED OFF.
- IF THERE IS DC VOLTAGE ON THE CABLE (DUE TO BATTERY OR OTHER RECTIFIER PRESENT) BE SURE TO CHECK THAT THE 'RECTIFIER FAIL' LED ILLUMINATES WHEN PLUGGING IN MODULE TO CONFIRM POLARITY WHEN DC POWER IS PRESENT.
- CONNECT DC CABLE TO DC INPUT TERMINALS (OBSERVE POLARITY!) AND ALARM CABLES TO ALARM TERMINALS. REFER TO CUSTOMER CONNECTION DRAWING IN MANUAL.

4) POWERING UP MODULES:

4A) SINGLE MODULE:

- CONFIRM THAT THE POWER MODULE IS PROPERLY SEATED IN THE CARD-EDGE CONNECTORS PRIOR TO APPLYING POWER.
- IF THERE IS EXTERNAL DC POWER PRESENT CONFIRM THAT THE 'RECTIFIER FAIL' LED

IS ILLUMINATED.

- APPLY AC POWER TO CABINET VIA THE FEEDER BREAKER (OR BY PLUGGING THE AC LINE CORD IN IF SO EQUIPPED).
- CONFIRM THAT THE 'POWER ON' LED ILLUMINATES.
- THE 'RECTIFIER FAIL' LED SHOULD GO OUT AFTER THE 5 SECOND START DELAY PROVIDED THERE IS SUFFICIENT OUTPUT VOLTAGE.
- ADJUST OUTPUT VOLTAGE AS DESIRED. ACCOUNT FOR THE DIODE DROP IF VOLTAGE IS

MEASURED AT FRONT TEST POINTS. SEE PARAGRAPH 3.3.2.11 IN MANUAL.

4B) TWO PARALLELED MODULES IN SINGLE CABINET:

- SET SLOPE CONTROL TO VERTICAL (12 'OCLOCK) POSITION ON BOTH MODULES.
- PLUG THE FIRST MODULE INTO THE CABINET. IF THERE IS EXTERNAL DC POWER PRESENT CONFIRM THAT THE 'RECTIFIER FAIL' LED IS ILLUMINATED. APPLY AC POWER TO CABINET VIA THE FEEDER BREAKER (OR BY PLUGGING THE AC LINE CORD IN IF SO EQUIPPED). CONFIRM THAT THE 'POWER ON' LED ILLUMINATES. THE 'RECTIFIER FAIL' LED SHOULD GO OUT AFTER THE 5 SECOND START DELAY PROVIDED THERE IS SUFFICIENT OUTPUT VOLTAGE. ADJUST OUTPUT VOLTAGE AS DESIRED. PLUG IN THE SECOND MODULE. REPEAT THE 'POWER ON' LED AND 'RECTIFIER FAIL' LED CHECK AS ABOVE. ADJUST THE VOLTAGE ON THE SECOND MODULE TO MATCH THE FIRST MODULE BY BALANCING THE CURRENT EQUALLY BETWEEN THE TWO MODULES.

4C) MULTIPLE PARALLELED UNITS IN MULTIPLE CABINETS:

- REPEAT 4B) FOR EACH CABINET WITH THE CHANGE THAT THE VOLTAGE SHOULD BE ADJUSTED TO MATCH THE MODULES THAT ARE ALREADY POWERED UP SO THE CURRENT IS SHARED EQUALLY.

Troubleshooting guide for Argus RSM-48/7.5 and RSM-24/15-30 Rectifiers

1.0 Scope

This troubleshooting guide is intended to assist the user in determining whether the rectifier is malfunctioning due to circumstances external to the unit such as installation errors, to user setup errors, or to failure of the unit. The former two can be rectified by the user while the latter will require that the unit be sent back to the Argus factory. This troubleshooting guide will NOT assist the user in fixing and/or repairing the unit.

2.0 Problem Determination Procedure:

2.1 Two module systems: is AC ON indicator illuminated on both modules ?
One module systems: is AC ON indicator illuminated on the module when plugged into either slot?
Yes - go to 3.1 No - go to 2.2

2.2 AC ON indicator not illuminated on module:
Measure voltage at AC input of rectifier cabinet (TB1-1 and TB1-2). Confirm that AC input voltage is within specifications (see beginning of manual). Is AC within specifications?
Yes - go to 2.4 No - go to 2.3

2.3 AC input voltage not within specifications:
Fix AC supply. If AC supply is then within specifications, go back to 2.1. Otherwise go to 9.7.

2.4 AC input voltage within specifications, AC ON indicator not illuminated on one or both modules:
Unplug both modules and check fuse F1 (located at left rear of module PCB for non-UPF power modules and on input filter PCB for UPF power modules) on both modules. Also check that the input AC surge varistors (line-line and line-ground located on power PCB for non-UPF power modules and on input filter PCB for UPF power modules) are not shorted and replace if necessary. Is the fuse blown?
Yes - go to 2.5 No - go to 2.6

2.5 Fuse F1 blown: replace fuse and go to 2.1. If fuse blows again, go to 9.9.

2.6 Fuse good: there is a problem in the AC connection between the shelf backplane PCB and the rectifier modules. If other shelves are available (of the same part number), the modules can be unplugged from the suspect shelf and plugged into the second shelf to confirm that the modules work. Go to 9.9.

3.1 AC ON indicator illuminated on module:
Is there DC voltage present at the output (E1 and E2)?
Yes - go to 3.8 No - go to 3.2

3.2 AC ON indicator illuminated, no DC output:
Is FUSE FAIL indicator illuminated ? If yes, remove module and check fuse F2 (located at right middle rear of module). Is the fuse blown?
Yes - go to 3.3 No - go to 3.4

3.3 Fuse F2 blown: replace fuse, remove load connected to unit, and connect a dummy load of not more than the rated capacity of the unit, and apply power. If fuse does not blow, disconnect the dummy load, reconnect the original load, and apply power. Does fuse blow?
Yes - go to 9.7 No - go to 3.1

3.4 AC ON indicator illuminated, no DC output, fuse F2 OK:
Is the MOD FAIL indicator illuminated?
Yes - go to 3.6 No - go to 3.5

3.5 AC ON indicator illuminated, no DC output, fuse F2 OK, no MOD FAIL:
There is likely to be a problem in the DC connection between the shelf backplane PCB and the rectifier modules. If other shelves are available (of the same part number), the modules can be unplugged from the suspect shelf and plugged into the second shelf to confirm that the modules work. Go to 9.9.

3.6 **AC ON indicator illuminated, no DC output, fuse F2 OK, MOD FAIL on:**
Is OVP TRIP indicator illuminated ?
Yes - go to 3.7 No - go to 9.8

3.7 **An over-voltage condition exists or had existed on the output of the unit. Press the reset button (between AC ON and OVP TRIP indicators) or remove and re-insert the module to reset the latched OVP TRIP alarm. If the MOD FAIL and OVP TRIP indicators illuminate again, power down the unit, remove load connected to unit as well as any other paralleled sources, and connect a dummy load of not more than the rated capacity of the unit, and apply power. If MOD FAIL and OVP TRIP illuminate, go to 9.8. If MOD FAIL and OVP TRIP do not illuminate and there is DC output voltage present, go to 9.7.**

3.8 **AC ON indicator illuminated, DC voltage present:**
Are there any RED indicators on ?
Yes - go to 3.9 No - go to 5.1.

3.9 **AC ON indicator illuminated, DC voltage present, one or more red indicators illuminated:**

If the LVA indicator (if so equipped) is illuminated, the output is at a lower than expected voltage. Power down the unit, remove load connected to unit as well as any other paralleled sources, and connect a dummy load of not more than the rated capacity of the unit, and apply power. Check the LVA setting and rotate it to minimum for testing purposes. If the LVA indicator is still illuminated, go to 9.5 otherwise go to 9.7.

If the LVD indicator (if so equipped) is illuminated, the load has been disconnected from the unit. Power down the unit, remove load connected to unit as well as any other paralleled sources, and connect a dummy load of not more than the rated capacity of the unit, and apply power. Check the LVD setting and rotate it to minimum for testing purposes. If the LVD indicator is still illuminated, go to 9.5 otherwise go to 9.7.

If the AC FAIL indicator (if so equipped) is illuminated, there may be a problem on the backplane PCB. Go to 9.9.

If the DIST FUSE indicator (if so equipped) is illuminated, one or more fuses in the DC distribution fuse block are blown and should be replaced. DC output will be present at terminals E1 and E2 but not at the distribution output terminals for those terminals connected to blown fuses. Change the blown fuses. If the DIST FUSE indicator is still illuminated, go to 9.5 otherwise go to 5.1.

5.1 **Are there any alarm relays in the ON state (TB2, customer connections)?**
Yes - go to 5.2 No - go to 9.6

5.2 **Check the proper positions of the jumpers for P1, P2, P3, P4, and P7 on the backplane. Are they OK?**
Yes - go to 9.9 No - go to 5.3

5.3 **Install the jumpers in the proper positions. Are there any alarm relays still in the ON state?**
Yes - go to 9.9 No - go to 9.6

9.5 **It is advised to return the shelf, module(s), and supervisory module to the factory for repair.**

9.6 **No problem apparent.**

9.7 **Problem has been diagnosed as not likely related to the unit.**

9.8 **It is advised to return the module to the factory for repair.**

9.9 **It is advised to return the shelf and module(s) to the factory for repair. If the modules are working, there is no need to return the modules with the shelf, however it is desirable to do such so the factory can ship the unit(s) back as a complete working system.**

WARRANTY AND 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 at +1-888-GO-ARGUS (+1-888-462-7487) 7:30 am to 5:00 pm Pacific Standard Time.

For emergencies, call +1-888-GO-ARGUS (+1-888-462-7487) 24 hours a day, seven days a week.
Customers outside Canada and the USA, call +1-604-436-5547 for technical support.

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 in the Service Centers document.

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.

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

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

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

Return Material Policy

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

To obtain an SRO 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. 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. Both the shipping documents and the outside of the box must have the SRO # 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 SRO number.

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]

C US NRTL/C

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

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)

c UL US

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

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

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)

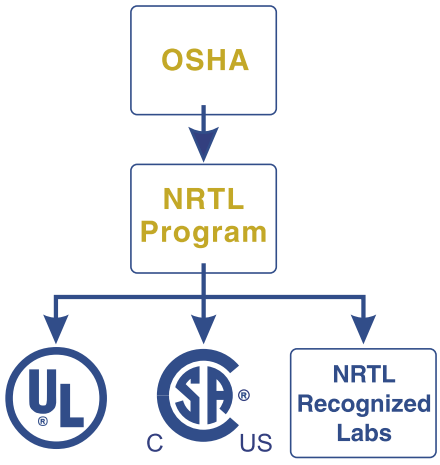
The NRTL determines that a product meets the requirements of an appropriate consensus-based product safety standard either by successfully testing the product itself, or by verifying that a contract laboratory has done so, and the NRTL certifies that the product meets the requirements of the product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

Table of Contents

IMPORTANT SAFETY INSTRUCTIONS

This manual contains important safety and operating instructions for battery charger models RSM 48/7.5-15 and RSM 24/15 (two and three module versions).

1. **Before using battery charger, read all instructions and cautionary markings on (1) battery charger, (2) battery, and (3) product using battery.**

2. **CAUTION - To reduce risk of injury, charge only lead-acid type rechargeable batteries. Other types of batteries may burst causing personal injury and damage.**

3. **Do not expose charger to rain or snow.**

4. **Use of an attachment not recommended or sold by the battery charger manufacturer may result in a risk of fire, electric shock, or injury to persons.**

5. **Do not operate charger if it has received a sharp blow, been dropped, or otherwise damaged in any way; take it to a qualified service center.**

6. **Do not disassemble charger; 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.**

2.0 Documentation - Part number information

2.1 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 underlined.

2.2 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 i.e. 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 i.e.:

- 05 .....Schematic
- 06 .....Outline Drawing
- 08 .....Customer Connections
- 20 .....Bill of Material

ARGUS Technologies 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 in this manual.

2.3 Terminology

Argus Technologies uses the following terms:

'Positive Ground Output', sometimes referred to as 'Negative Output', is used in Argus bills of materials and manuals. 'Positive Ground Output' means that the interrupting device (such as a circuit breaker) is located in the hot side of the output and that the grounded side of the output is positive with respect to the hot side of the input.

In all cases, if DC circuit breakers are present, they are installed on the 'hot' side of the input or output.

3.0 GENERAL

3.1 Scope

This instruction manual covers the installation and operation of the Argus Technologies RSM 48/7.5-15 & 24/15-30 series of switched mode rectifier/battery eliminator.

3.2 Introduction

The RSM series of rectifiers employs a high frequency switched mode conversion technique to provide a fully regulated and isolated DC output from the AC mains. The 48 volt rectifiers are intended to be used in a positive ground configuration, however 24 volt units can be ordered for use in either positive or negative ground configuration. The units are fully functional battery eliminators and therefore do not require a external battery to meet the performance requirements as outlined in the specification section of this manual.

The RSM-48/7.5 and RSM-24/15 units are available with the following part numbers and list options:

RSM-48/7.5-15 (120VAC) 010-024-20
RSM-48/7.5-15 (240VAC) 010-034-20
RSM-24/15-30 (120VAC) 010-028-20
RSM-24/15-30 (240VAC) 010-035-20
RSM-48/7.5-15 (120VAC Fan Cooled) 010-036-20
RSM-48/7.5-15 (120VAC Fan Cooled with removable fan) 010-513-20
RSM-48/7.5-15 (240VAC Fan Cooled) 010-037-20
RSM-48/7.5-15 (240VAC Fan Cooled with removable fan).....TBA
RSM-24/15-30 (120VAC Fan Cooled) 010-038-20
RSM-24/15-30 (120VAC Fan Cooled with removable fan).....TBA
RSM-24/15-30 (240VAC Fan Cooled) 010-039-20
RSM-24/15-30 (240VAC Fan Cooled with removable fan).....TBA
RSM-48/7.5-15 (120VAC Front Access Distribution) 010-503-20
RSM-48/7.5-15 (240VAC Front Access Distribution)..... TBA
RSM-24/15-30 (120VAC Front Access Distribution)..... TBA
RSM-24/15-30 (240VAC Front Access Distribution)..... TBA
RSM-48/7.5-15 (120VAC Fan Cooled Front Access Distribution).....TBA
RSM-48/7.5-15 (240VAC Fan Cooled Front Access Distribution).....TBA
RSM-24/15-30 (120VAC Fan Cooled Front Access Distribution).....TBA
RSM-24/15-30 (240VAC Fan Cooled Front Access Distribution).....TBA
RSM-48/7.5-22.5 (120VAC Fan Cooled) 010-512-20
RSM-24/15-45 (120VAC Fan Cooled) 010-517-20

1-3/4" Rack Space Mounting.....List 19/23
1" Rack Space Mounting.....List 20/24
Low Voltage Disconnect (includes List 81 and 82)..... List 36
Low Voltage Disconnect - Feed A (Front Access models only) .....List 36
Low Voltage Disconnect - Feed B (requires List 36)..... List 37
Standard Temperature Operation (non-fan cooled models only) .....List 40
Low Temperature Operation (non-fan cooled models only) .....List 42
Blue/Gray Epoxy Finish.....List 55
Temperature Compensation Module .....List 70
Power Module (non-UPF) .....List 80
Supervisory and Control Module .....List 81
Distribution Fuse Module .....List 82
Positive Ground (Standard on 48V models) .....List 84

120VAC Line Cord (120V models only) .....List 85
Negative Ground (24V models only) .....List 86
Supervisory Control Blank Plate (required if no List 81).....List 90
Distribution Fuse Blank Plate (required if no List 82) .....List 91
Temperature Compensated Supervisory and Control Module.....List 92
Second Fuse Distribution PCB (Front Access Dist. only).....List 93
Distribution Fuse Feed B Blank Plate (Front Access Dist. only) .....List 94
Power Module with Unity Power Factor .....List 100

When the Temperature Compensation Module (TCM) option is ordered (List 70), the operation of the TCM is dependent on the following list options:

Temperature Sensor with 12 foot cable 1/4" lug.....List 72
Temperature Sensor with 12 foot cable 3/8" lug.....List 88
2.5mV/degC/cell compensation slope .....List 74
3.5mV/degC/cell compensation slope .....List 75
4.5mV/degC/cell compensation slope .....List 76
0degC compensation break point.....List 77
-20degC compensation break point .....List 78
-40degC compensation break point .....List 79

The combination of List 76 and List 79 (Temperature Compensation options) is not available as the excessive voltage variation would compromise system and rectifier reliability.

3.3 Features

3.3.1 Cabinet Features

The Cabinet encloses the power system and features include remote alarm connections, and output voltage sensing.

3.3.1.01 Cabinet Alarms

The unit's alarms (Module Fail A/B , AC Fail, Low Voltage (optional), Temperature Compensation (units with List 70), and Fan Fail (if equipped)) are extended via form "C" contacts for remote monitoring. All alarms are "real time" and therefore do not latch. The module fail alarm contacts are "fail safe" and therefore will extend an alarm without a source of DC present (i.e. a battery). However, the module indicators may not remain illuminated unless there is DC power available (i.e. a battery or a second operational unit in parallel).

3.3.1.02 Sensing

The power module sense leads are connected to the unit's output studs, and will regulate voltage at this point.

3.3.1.03 Cooling Fan (65degC Fan Cooled Models only)

A cooling fan is incorporated into the cabinet design on fan cooled models which allows the unit to operate in ambient temperatures up to +65degC and allows the units to be stacked without rack spaces between them. The fan is located immediately behind the center cabinet support and provides a greater airflow effect than achieved with natural convection cooling. The cooling air is directed inwards on the left side of the cabinet front and outwards on the right side of the cabinet front. The speed of the fan is variable and is dependent on the ambient temperature. The fan is powered by a regulator which operates from the output of the cabinet. If an AC Fail condition is detected the fan will be turned off to prevent draining the battery.

3.3.1.04 Cooling Fans (3 module type cabinets only)

Two cooling fans are incorporated into the cabinet design on models that are capable of holding 3 power modules. The fans are located on the front right of the cabinet (as viewed from the front) and provide a greater airflow effect than achieved with natural convection cooling. The cooling air is directed inwards on the left side of the cabinet front and outwards on the right side of the cabinet front. The speed of the fans are variable and is dependent on the ambient temperature. The fans are powered by a regulator which operates from the output of the cabinet. If an AC Fail condition is detected the fans will be turned off to prevent draining the battery. A Fan Fail alarm LED indicator and associated contacts are provided.

3.3.2 Power Module Features

The Power Module converts 120 VAC or 240 VAC Line Voltage to DC Battery Voltage (48/24 VDC). The features of the power module include indicators, alarm controls, protection, adjustment as described below.

3.3.2.01 Indicators

The indicators provide visual indication of operational status and alarms. The indicators and associated colors are:

AC On .....Green
Fusec Fail.....Red
Module Fail.....Red
Current Limit.....Last Green Bargraph segment
OVP Trip.....Red

When AC power is present, the module is installed, and input fuse is intact, the AC On indicator will light. The indicator will not illuminate if the AC input is removed. Remaining indicators are described below.

3.3.2.02 Bargraph Ammeter

The Bargraph Ammeter is located on the front panel of the unit. When the first LED is lit, there is in excess of 1A (2A for 24V) of output current. As the output current exceeds another amp (2A for 24V), the next led will light until a maximum of 8A (15A for 24V). Further current draw will cause the unit to go into current limit, then the last LED will light.

3.3.2.03 Module Fail Alarm

The Module Fail alarm indicates that the module's ability to maintain output voltage has failed. The detection circuit monitors the voltage before the paralleling diode and when this voltage drops below 45V (22.5V on 24V unit), the alarm indicator will light and the remote contacts on the alarm relay will de-energize. If this condition is corrected the alarm will clear. A Module Output fuse fail will also cause a Module Fail Alarm.

3.3.2.04 Fuse Fail Alarm

If the Module output fuse fails, the fuse alarm led will light when powered by an external battery or another module. The fuse alarm extends an alarm via the module fail alarm LED and relay contacts. The module will continue to run but cannot provide power until the output fuse is replaced.

3.3.2.05 Overvoltage Shutdown

There are two OVP control features built into this rectifier system.

(1) OVP protection built into the power module adjusted with jumper J6 (see below).

(2) OVP protection built into the optional supervisory module adjusted with the OVP potentiometer (see section 3.3.3.03).

The overvoltage protection feature electronically shuts down the module when a high voltage condition on the output of the module is identified. Shutdown indication is provided by a front panel LED. The level of the high voltage shutdown is set by the overvoltage jumper (P6). Overvoltage settings ensure the malfunctioning module (supplying power via it's paralleling diode) amongst a group of modules in parallel, would be shutdown. When the optional adjustable supervisory OVP is used the power module(s) overvoltage jumper (P6) on the module(s) should be set to high.

The OVP shutdown is of a latched type and can be reset by removing input power until the power-on LED extinguishes or by pressing the reset switch with an insulated tweaker.

Jumper P6 is located near the front middle of the power module.

Non UPF Power Modules: locate LED DS3 (Module Fail LED) and then move towards the rear of the module approximately 1 inch where P6 can be found just in front of electrolytic capacitor C15. P6 pin 1 is on the left and P6 pin 4 is on the right.

Selected OVP Level	24V Unit	48V Unit	Jumper Setting
Low	29.0V	58.0V	Pin 1,2 on P6
Med	30.0V	60.0V	Pin 2,3 on P6
High	31.5V	63.0V	Pin 3.4 on P6

3.3.2.06 Output Slope

RSM rectifiers use “output slope” or “regulation offset” to accomplish load sharing. When the rectifiers are run in parallel it is necessary to adjust the units to track to each other (thus sharing the load) over the output current range of the units. Output slope adjustment alters the regulation curve of the rectifier. The output slope adjustment control reduces the regulation of the rectifier by a value of 0 to 2%. Slope adjustment allows the RSM series to be used with any other manufacturer's units in a parallel system and the regulation of the RSM can be adjusted to match the parallel unit.

3.3.2.07 Input/Output Fuses

Every unit is equipped with fuses. Excessive input current will blow the input fuse causing the green “AC On” LED to extinguish. Disconnect AC Input Power when replacing fuse. Excessive output current will blow the indicating fuse, this will light the Fuse Fail LED (with external battery or paralleled supply) and extend a Module Fail alarm. The appropriate module must be removed to replace the appropriate fuse.

3.3.2.08 Front to Top Ventilation

Cooling of the unit is achieved via front to top convection cooling. Cool air is drawn in via the grill in the front and sides of the unit. Air flows through the heatsinks and out via the top grill. The cooling fan on three-module type units and on fan cooled models will cause the airflow to be directed inwards on the left side of the unit via the grill and outwards on the right side of the unit via the grill.

3.3.2.09 Over Temperature Protection

The unit is protected in the event that it is operated in an excessive ambient environment or if the cooling air flow is compromised. Under these conditions the unit's output current capability will be reduced to keep the temperature of the power semiconductors within limits. Normal capacity will be returned automatically if the ambient temperature is reduced or the restriction of the airflow is removed. When over-temperature protection is in effect, current limit will occur before nominal full load at approximately 55 deg. C.

3.3.2.10 Battery Eliminator Operation

The unit maintains all specifications with or without a battery attached to the output. However if a battery or another unit operating in parallel is not present, the alarms may not illuminate in a failed condition.

3.3.2.11 Voltage Test Points

Module voltage test points monitor the voltage before the output fuse and paralleling diode. To accurately measure the voltage in either module a high impedance digital voltmeter (DVM) should be used. The meter's impedance should be at least 10 Mega Ohms.

3.3.2.12 Paralleling Diode

The power module comes with a series paralleling diode as standard. This assures isolation of a failed module from the load even for battery-less applications.

3.3.2.13 Current Limit

Each Power Module has a non-adjustable current limit of approximately 8A (48V unit) or 16A (24V unit). Maximum Power Module Current Output is constant up to short circuit conditions. Current Limit level will be reduced if ambient temperature is increased above 50 Deg. C. Near short circuit conditions the bargraph display may change to Dot Mode and the module may cycle.

3.3.3 Supervisory and Control Module (Optional)

The Supervisory and Control Module option provides additional alarm indication and control features.

3.3.3.01 Indicators

The indicators provide visual indication of alarms. The indicators, which are all red, are:

AC Fail	No AC Input Voltage	**Dist. Fuse**	Distribution Fuse Alarm
O.V.P.	Overvoltage Protection	**L.V.A.**	Low Voltage Alarm
L.V.D.	Low Voltage Disconnect (load)	**Test**	Test Mode Activated

The Distribution Fuse Alarm LED indicator is located near the Distribution Fuses on the Front Access and three-module cabinet units.

3.3.3.02 Test Mode

Selection of the “Test” mode is via the mode switch on the front panel. When in the “Test” mode the unit's alarm and control levels can be set without disturbing the load. Selection of this mode transfers the alarm/control circuit sensing to the front panel “Test” supply input jacks. A external isolated power supply connected to these points is then used to adjust the alarm set points. “Test” mode is indicated by illumination of the “Test” indicator. The “Low Voltage Alarm” and “Low Voltage Disconnect” indicators will also illuminate if the “Test” supply is not present or voltage is too low. When in the “Test” mode the “LVA”, “LVD”, and “OVP” are the only active indicators. Corresponding output relays and control circuits are not active. If the “Load Disconnect” option is installed the contactor will remain closed (load in circuit).

3.3.3.03 Adjustable Overvoltage Shutdown

The overvoltage shutdown feature electronically shuts down the module that is causing an overvoltage (the module providing greater than 5% rated output current) when a high voltage condition occurs on the unit output. Indication (latching) is provided via the appropriate module OVP LED. When the adjustable OVP is used, the module(s) OVP jumper should be set to the high position.

3.3.3.04 Low Voltage Alarm

The low voltage alarm monitors the output voltage and extends an alarm when the output voltage drops below the set point. This feature may be used to give advance warning of load disconnect (if so equipped).

3.3.3.05 Low Voltage Disconnect

This feature must be used in conjunction with the low voltage disconnect/fuse distribution option. The low voltage disconnect circuitry monitors the output voltage and will provide a signal to disconnect the load to protect the battery from being excessively discharged by the load during an extended power outage. The load will be automatically reconnected once power is restored.

3.3.4 Low Voltage Disconnect / Fuse Distribution Option Features

The Low Voltage Disconnect and Distribution Option includes fuses and a fuse alarm relay. The low voltage disconnect (if so equipped) will prevent the battery being excessively discharged.

3.3.4.01 LVD and Distribution Fuse Fail Alarms

The alarms for LVD (Low Voltage Disconnect) and Distribution Fuse Fail are real time. The LVD alarm is fail safe, of Form C type, and will extend an alarm without power available. The Fuse Fail indicator requires a source of power (Module or Battery). When equipped with the low voltage disconnect option, the Fuse Fail alarm will not be activated if the disconnect contactor is not energized when a distribution fuse fails (Low Voltage Disconnect LED will be on).

3.3.4.02 LVD Control

To operate the LVD at a designated battery voltage requires the use of the Supervisory and Control Module option.

3.3.4.03 LVD Distribution Fuses

The fuse distribution option can power up to 8 individual loads via a indicating fuse. If the Front Access model is used, either 10 (List 36 - Feed A) or 20 (List 36 & 37 - Feed A & B) individual loads can be connected. These fuses are “GMT” type and accessible from the rear of the unit (or from the front in the case of the Front Access models). The maximum current capacity of any single fused line is 10A since that is the maximum fuse rating available in the GMT type fuses used. If more than 10A is desired, the stud on the LVD/Distribution PCB (near the upper left corner) is provided for that purpose.

3.3.5 Battery Temperature Compensation

Battery life expectancy and performance is directly related to “battery ambient temperature”. The optimum temperature for battery operation is 25degC (77degF). Without compensation, battery *life* is seriously compromised at temperatures above 25degC, while battery *performance* is reduced below it.

Making adjustments to the battery’s float voltage to correspond with temperature fluctuations will ensure maximum battery performance and life expectancy. This may be accomplished by one of the following methods.

For non-fluctuating temperatures – manually adjust the rectifier float voltage control to match the battery manufacturer’s recommended setting for the specific battery ambient temperature.

For fluctuating temperatures – automatically adjust the rectifier float voltage using the temperature compensation module (option). This feature automatically adjusts battery float voltage based on the temperature reading from a sensor mounted on the battery string.

3.3.5.1 Temperature Compensation Module

The TCM PCB connects to the backplane of the RSM-48/7.5-15 and RSM-24/15-30 rectifiers and provides the compensation necessary to vary the output voltage of the rectifiers over a wide ambient temperature range as desired for a battery string.

When a battery string is connected, the desired charging voltage of the battery string will increase as the temperature decreases. The TCM monitors the battery temperature and internally adjusts the sense voltage that is sent to the rectifier module's sense input. The sense voltage adjustment is dependent on the temperature coefficient reading obtained from the remote temperature sensor that is mounted on the battery string. When the temperature drops, the temperature compensation module will drive the rectifier's sense input such that the rectifier's output voltage increases to the appropriate setting.

The TCM incorporates fail-safe circuitry (including temperature sensor fail circuitry) in its design to prevent the TCM from causing the rectifier to be set at a voltage higher than is suitable for the battery at its current temperature which could result in damage.

Temperature compensation occurs at standard rates commonly referred to as “Slope” settings. For maximum performance, it’s important to match the compensation slope with the slope recommended by the battery manufacturer. The optional supervisory module offers three different slope settings: **2.5mV per cell per degC**; **3.5mV per cell per degC**; and **4.5mV per cell per degC**. The slope setting is determined at time of ordering by option choice List 74 (2.5mV), List 75 (3.5mV) or List 76 (4.5mV).

In order to prevent excessive load voltages at low battery temperatures, the output voltage will be prevented from increasing further at either 0degC (32degF) or -20degC (-4degF) or -40degC (-40degF) depending on the temperature range option ordered (List 77, 78, or 79). The temperature compensation value is factory set by a 'plug-in' resistor. The compensation break point temperature is internally adjusted. Consult the factory if information is desired regarding changing the compensation value or break point of the TCM.

If the temperature sensor fails for some reason such as a broken or shorted connection or sensor element then the sensor input will be outside the expected range and temperature compensation will not occur.

A remote temperature compensation override input is provided on the backplane (TB2-4). When the override input is connected to ground, the temperature compensation is disabled.

4.0 INSTALLATION INSTRUCTIONS

4.1 Tools Required

Nut driver (for 7/16 " nut)
Slotted screw driver (Blade size 1/4")
Slotted screw driver (Blade size 1/8")
Slotted screw driver (Blade size .09" x .02") or tweaker
4 1/2 Digit Digital Voltmeter, High Impedance (10 Meg ohm)
Adjustable resistive load 24/48 volts
Adjustable DC lab supply 0-60 V 0-1 A

4.2 Inspection

All Argus products are shipped in rugged, double walled boxes and have molded foam shock absorbing to minimize shock that may occur during transporting. Packaging assemblies and methods are tested to National Safe Transit Association standards.

Prior to uncrating, note any damage to the shipping container. Uncrate the rectifier and inspect the exterior. If any damage is observed, contact the carrier immediately.

Open the front panel of the unit and continue the inspection for any internal damage. In the unlikely event of internal damage please inform the carrier and contact Argus Technologies for advice on the impact of any damage.

4.3 Preparation/Mounting

The unit has been designed for mounting in a 19" or 23" EIA standard relay rack. Separate mounting brackets are available for 1" or 1 3/4" spacing. All mounting brackets are reversible for 19" or 23" mounting configurations. Individual units shipped from the factory are arranged for 19" center mounting. To adapt to 23" mounting, remove the four attaching screws, then flip the brackets so that the small flange is against the rectifier chassis, reattach with mounting screws. The brackets may also be relocated for flush mounting of the unit in a rack. To flush mount the unit, move the brackets to the front mounting position from the mid mounting arrangement (factory arrangement).

The unit must be mounted in a clean and dry environment. Sufficient access to an uninterrupted air source must also be allowed for in front of the unit. Allow at least 1.75 inches of free space above the unit when a unit is stacked directly above. All models should have at least 3 inches of clearance in front of the unit. Allow room behind the unit to access the input, output, alarm wiring.

The unit should be mounted to the rack using two #12 -24 x 1/2" screws in each bracket. A captive type of drive such as Philips head is preferred to eliminate the possibility of slippage and scratching of the units exterior.

4.4 Input Connections

4.4.1 Grounding

4.4.1.01 Grounding Instructions

This rectifier should be connected to a grounded, metal, permanent wiring system; and an equipment grounding conductor should be run with circuit conductors and connected to grounding terminal of the rectifier. Connections to the rectifier should comply with all local codes and ordinances.

4.4.1.02 System Reference Ground (Recommended)

The rectifier system's common load termination point (or "battery return") should be connected to the building ground system (i.e. A water main or ground grid). For example, in a -48 VDC system, connect the battery positive (+) to the building ground system. This provides a ground reference for the system as well as a path for line transients, noise and surges. The system's grounded output termination stud may be used for this purpose.

4.4.2 A.C. Input

4.4.2.1 A.C. Feeder Protection/Sizing

Each cabinet should have a dedicated protection breaker if possible. The feeder breaker should have the next highest rating from the Module's input fuse, or equal to combined Module input fuse rating if 2 modules are used. See specifications for recommended feeder protection and input wire gauge.

4.4.2.2 AC Connections

Confirm the AC input voltage before proceeding.

WARNING: AC power must be removed from the unit by disconnecting at the source before attempting to install the rectifier.

If the unit is supplied with a optional line cord please ignore the following section and proceed to section 4.5. This option is only available for 120 VAC units.

WARNING: Ensure that the input and output power is off prior to any work being performed on the AC or DC connections.

AC input wires should be tightly bundled and routed as far away as possible from the power PCB to minimize EMI pickup on the AC feed wires.

Input wires must be routed through the access hole located on the left rear side of the unit. The access hole is designed for 1/2" conduit. Attach a cable clamp to the access hole.Insert the AC cable through the cable clamp. Note the length of cable to be used as indicated in the Customer Connections drawing (refer to the title page of this manual for the correct drawing number which will end in a -08). Drop down the rear panel and pull the AC cable assembly through the hole for the input. Secure and route the cable as required.

Route the remaining input leads to AC input terminal block. Insert the wire ends behind the lug body of the terminal. Tighten the terminal screws until the connection is snug. Ensure that the ground lead of the AC cable is connected to the ground terminal of the input terminal block (marked with the ground symbol).

4.5 Output Connections

DC output wire must be UL approved File # B64801, XHHW or RHH/RHW (Canadian users; RW90 Type). Control and sense wires must be UL approved Style 1015 (Canadian users; TEW type). See specifications for recommended output wire gauge.

Wires should be tightly bundled and routed as far away as possible from the power PCB to minimize EMI pickup.

4.5.1 Battery Connection

WARNING: Leave cables disconnected at battery and verify output polarity using a hand-held voltmeter. Make final connections only after all wiring is completed.

WARNING: Observe the correct polarity of output cable connections when terminating.

Route the battery cables from the battery to the output terminaton studs on the rectifier cabinet. Crimp on the appropriate lugs. Secure the positive and negative cable to the output post of the same polarity (i.e. -V and +V). Install the washers and nuts on top of the lugs in the same order in which they were shipped from the factory. Tighten the post nuts until the connection is snug.

WARNING: Over tightening of the post nuts may result in damage to the PC board.

4.5.2 Load Connections

Feed the load cables through the access hole in the cabinet. Refer to customer connection drawing contained in this manual for connection details.

WARNING: Ensure that load terminals are loosened sufficiently to ensure that wire can be inserted into the saddle of the terminal. A loose connection will result if care is not used.

4.5.3 Alarm Connections

Route the alarm cables through the access hole in the cabinet. Refer to customer connection drawing contained in this manual for connection details.

Close and secure the rear cover in preparation for normal operation.

LVD and FA alarms use Form “C” relays for both NC and NO operation. LVA, AC FAIL, MOD FAIL A/B use jumper selectable form A/B (NO/NC). Jumpers are used to select the appropriate contact. Refer to customer connection drawing contained in this manual for connection details.

NOTE: The module fail relays are energized when the module is operating normally (i.e. No alarm). A NC contact will close and the NO contact will open when the Module Fail alarm becomes active.

4.6 Temperature Compensation Sensor Connection

Mount the temperature sensor to the negative battery post of the battery string. Be sure there is good thermal contact and that there is no excessive contact with outside temperature sources such as cool drafts, etc. Route the temperature sensor cable to the right side (or left side if desired) of the RSM cabinet and through the cable access hole in the side of the chassis. Connect the sensor to TB2 according to the following table:

Positive Lead (Red).....TB2-3
Negative Lead (Black).....TB2-2

4.7 Power Module Installation and Removal

4.7.1 De-energized Module Installation and Removal

The preferred procedure to change a power module is to de-energize the unit by turning off the input power or unplugging the input power cord. Allow the module to discharge for approximately 2 minutes (assure Power On LED is extinguished). Open the front panel. Remove module by pulling on the white module handle (or pull out the handle located betwen the power PCB and the chassis for UPF units). When replacing the module, slide the module into the card guides (assure module chassis is properly engaged in slides) and apply pressure on the handles (not components) to engage the connector in its receptacle. Close the front panel and re-apply input power**.**

4.7.2 Energized Module Installation and Removal

WARNING: MODULE CHANGING CAN BE DONE WITH THE CABINET ENERGIZED BY QUALIFIED PERSONNEL FAMILIAR WITH LINE AND BATTERY VOLTAGE. IT IS RECOMMENDED THAT THE AC LINE BE DE-ENERGIZED BEFORE REMOVAL AND INSTALLATION :WARNING

WARNING:KEEP FINGERS CLEAR OF LIVE ELECTRIC PARTS WHILE UNIT IS ENERGIZED. SHOCK AND HIGH VOLTAGE HAZARD:WARNING

Open the front panel. Disengage Module from connector by approximately 2" by pulling the module on the white module handle (or pull out the handle located betwen the power PCB and the chassis for UPF units), and allow to discharge for 2 minutes (LED's extinguished) before removing the module from the cabinet. Module replacement is the same as in 4.6.1.01 above, with the exception that the input power is already present.

4.8 Supervisory Module Installation and Removal

The Supervisory Module may be installed or removed in either the energized or de-energized state, although the de-energized state is preferred.

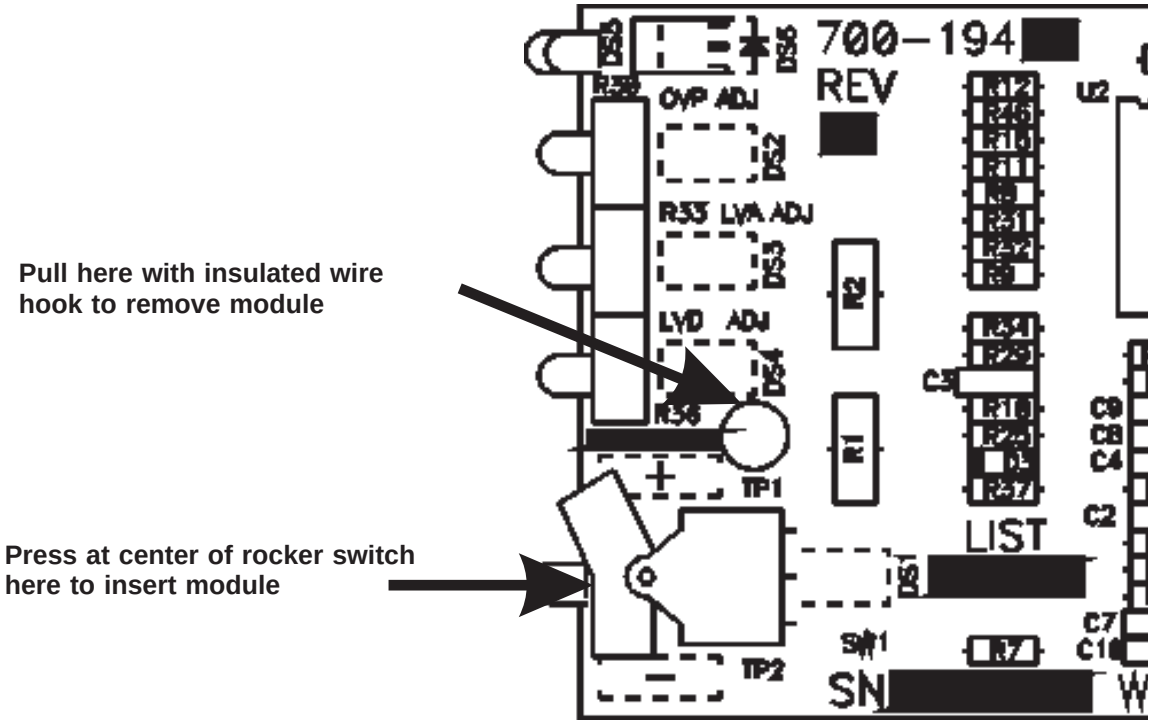


Figure 1 – Installation/Removal of Supervisory Module

To remove the Supervisory Module, open the front panel and remove the module using a hook made from stiff INSULATED wire. Insert the hook in the hole provided - see Figure . Do NOT attempt to remove the Supervisory Module by pulling on any component or damage may result. Close and secure the front panel.

To install a Supervisory Module, open the front panel and carefully position the Supervisory Module in the two card guides provided. Push on the CENTRE of the TEST/NORM rocker switch until the Supervisory Module is installed all the way in and is securely seated in its receptacle. Refer to Figure . Do NOT attempt to install the Supervisory Module by pressing on any other component or damage may result.

WARNING: DO NOT FORCE THE MODULE IF IT DOES NOT SEAT PROPERLY! MODULES ARE KEYED TO ENSURE THAT THE CORRECT VERSION OF SUPERVISORY MODULE IS USED. :WARNING

NOTE: Complete adjustment of the Supervisory Module is required after installation.

4.9 Initial Start-up

Confirm the AC input voltage matches the specified operating voltage before proceeding.

WARNING : On units without a external power source confirm that the output polarity connection is correct to prevent damage to the load. : WARNING

To adjust all settings the use of a small pocket screw driver or tweaker is recommended. For all controls, to increase a level, the corresponding adjustment control is rotated clockwise. To decrease a level the corresponding adjustment control is rotated counter-clockwise. See adjustments section.

4.9.1 AC Start-up

Apply AC power via the feeder breaker. The AC ON (and possibly MOD FAIL indicators) should be lit. The rectifier will not start until the five second start-delay has elapsed. The MOD FAIL LED should extinguish when sufficient output voltage is present.

5.0 OPERATION

5.1 Shutdown

The unit may be shut down by removing the AC input or removing the power module as per procedure in section 4.7.1 and 4.7.2.

5.2 Start-up

To start the unit after a repair or for the first time, the procedure as outlined in the initial start-up section of this manual should be followed. Routine start-up is accomplished by first applying the AC input. This sequence is not critical but it allows a more controlled charging of the DC output filter capacitors.

5.3 Normal Mode

The “power on” indicator will be illuminated. The current bargraph meter will be indicating the output current. Depending on the current limit setting or load, the current limit indicator may be “on”. The Under Voltage/Mod Rect Fail Alarm and the OVP (selectable) circuitry are enabled in this mode.

5.4 Fuse Replacement.

WARNING: AC power to the unit must be removed by disconnecting at the source before blown fuses can be replaced.

WARNING: DC power may be stored up to five minutes at some points inside the unit.

5.4.1 Module Fuse Replacement.

The fuses are located at the rear of the power board. Under normal circumstances the fuses will not be stressed. Only under a severe situation, will the fuses blow. Module fuse may be replaced by removing module as per procedure 4.6.1 and replacing the appropriate fuse. Ensure fuse is replaced with the same type as indentified in the specifications.

5.4.2 Distribution Fuse Replacement.

Distribution fuses(if so equipped) may be replaced using an insulated hook. Access is from the front or rear of the unit. Check load and replacement fuse size before replacement of fuse.

5.5 OVP Resetting

OVP may be reset by two methods, either de-energize unit and wait until OVP LED extinguishes before re-energizing unit or remove module per procedure 4.6.1 and wait for OVP LED to extinguish. Some units also have a recessed OVP reset switch which can be depressed using an insulated tweeker.

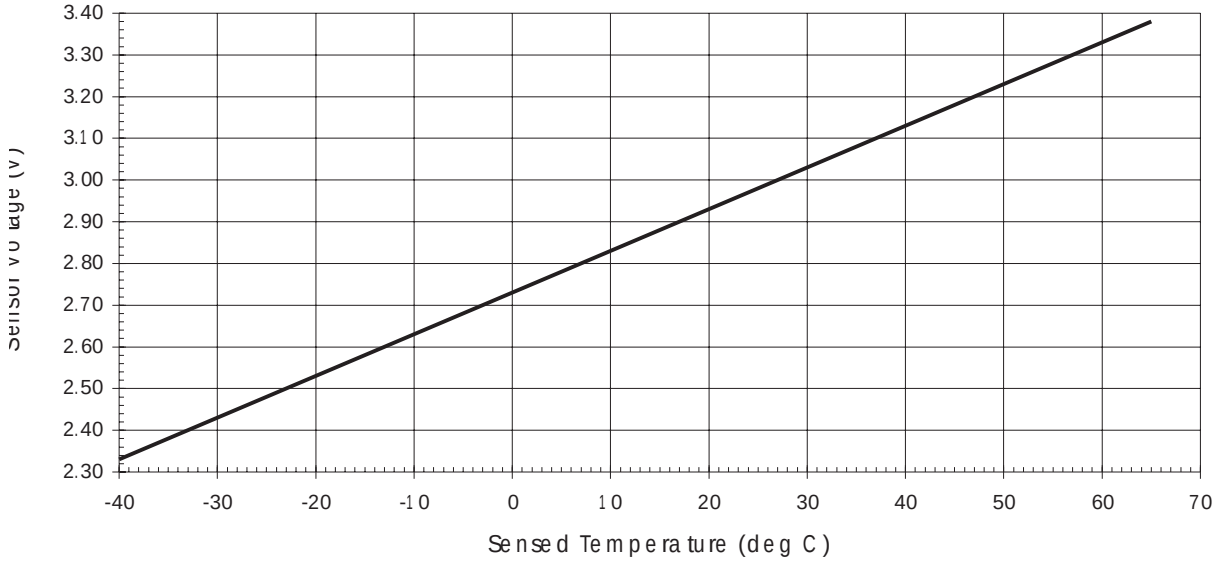
5.6 Check of Temperature Sensor (Temperature Compensation Option)

Read the voltage between the sensor positive and ground connections with a DMM. Refer to Figure (deg C) or Figure (deg F) (Temperature Sensor Voltage) to determine the actual temperature measured by the sensor. Alternatively use the following formula to determine the temperature:

Sensor Temperature (in deg C) = [(Sensor Voltage) - 2.73V] x 100 degC / Volt
Sensor Temperature (in deg F) = [(Sensor Voltage) - 2.73V] x 180 degF / Volt + 32degF

Confirm that the sensor voltage reading corresponds approximately to the current temperature.

Figure 2 – Temperature Sensor



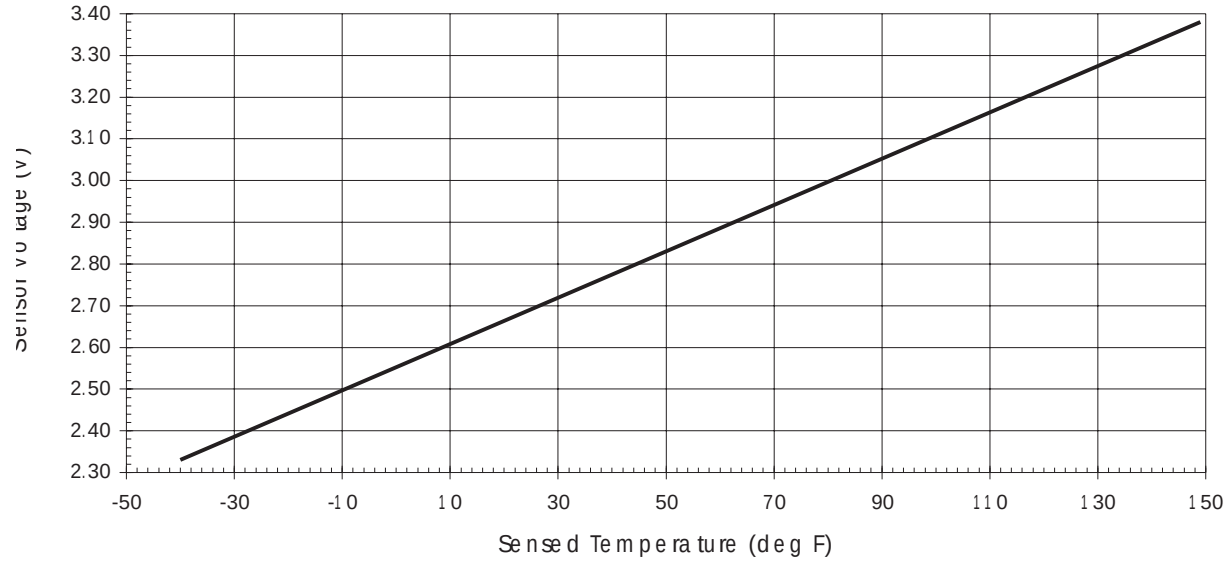


Figure 3 – Temperature Sensor Voltage

6.0 Adjustments

6.1 Factory Settings/Ranges

48 VOLT UNITS

Function	Range	List Options	Factory Setting
Power Module:			
Float Voltage	48 to 56 VDC	All	54V @ 25 degC (77 degF)
Output Slope	0 to 2%	All	1%
OVP	**58V, 60V, 63V**		
		No L70 or 81	58V
		No L70,Yes 81	63V
		L70, 74, 77, 81	60V
		L70, 74, 78, 81	60V
		L70, 74, 79, 81	63V
		L70, 75, 77, 81	60V
		L70, 75, 78, 81	63V
		L70, 75, 79, 81	63V
		L70, 76, 77, 81	60V
		L70, 76, 78, 81	63V
		L70, 76, 79, 81	N/A
Supervisory and Control Module:			
LVA	42 to 48 VDC	All	48.0 V
LVD	42 to 48 VDC	All	44.0 V
OVP	**54 to 61 VDC**		
		No L70	57.0V
		L70, 74, 77	56.5V
		L70, 74, 78	57.8V
		L70, 74, 79	59.0V
		L70, 75, 77	57.2V
		L70, 75, 78	58.9V
		L70, 75, 79	60.6V
		L70, 76, 77	57.8V
		L70, 76, 78	60.0V
		L70, 76, 79	N/A

24 VOLT UNITS

Function	Range	List Options	Factory Setting
Power Module			
Float Voltage	24 to 28VDC	All	27V @ 35 degC (77 degF)
Output Slope	0 to 2%	All	1%
OVP	**29V, 30V, 31.5V**		
		No L70 or 81	29.0V
		No L70,Yes 81	31.5V
		L70, 74, 77, 81	30.0V
		L70, 74, 78, 81	30.0V
		L70, 74, 79, 81	31.5V
		L70, 75, 77, 81	30.0V
		L70, 75, 78, 81	31.5V
		L70, 75, 79, 81	31.5V
		L70, 76, 77, 81	30.0V
		L70, 76, 78, 81	31.5V
		L70, 76, 79, 81	N/A
Supervisory and Control Module:			
LVA	21 to 24 VDC	All	24.0 V
LVD	21 to 24 VDC	All	22.0 V
OVP	**27 to 30.5 VDC**		
		No L70	28.50V
		L70, 74, 77	28.25V
		L70, 74, 78	28.85V
		L70, 74, 79	29.45V
		L70, 75, 77	28.55V
		L70, 75, 78	29.39V
		L70, 75, 79	30.23V
		L70, 76, 77	28.85V
		L70, 76, 78	29.93V
		L70, 76, 79	N/A

To adjust all settings the use of a small pocket screw driver or tweaker is recommended.

For all controls, to increase a particular level the corresponding adjustment control is rotated clockwise. To decrease a level the corresponding adjustment control is rotated counter-clockwise.

6.2 Output Slope

6.2.1 All Rectifers are RSM Type

Adjust slope setting on all modules to the same value. 1% (twelve o'clock) is suggested. THIS value ensures good load sharing characteristics and minimal voltage drop from no load to full load.

6.2.2 RSM-Type in Parallel with other Rectifier types

Preferably wait at one half hour from power-up so that the rectifiers can reach their operating temperature. Ensure that the slope controls of the Argus units are at the twelve o'clock position and adjust the"Volt adj" controls for the desired "loaded" output voltage and proper current sharing of all the rectifiers.

To check that the Argus units are set at a slope that matches the "fixed slope" units, it is necessary to vary the load by using a variable resistive load or for "battery plant" loads by turning off the AC to temporarily discharge the batteries and re-applying it to get a high load condition. If the Argus units' output current varies less than the "fixed slope" units then the slope of the Argus units is too high. Conversely if the output current of the Argus units' varies more htan the "fixed slope" units the Argus units need more slope. Decrease or increase the slope of the Argus units, readjust the "Volt adj" controls of the Argus units for proper load current sharing, and re-verify the correct current sharing with other loads. Repeat until satisfactory current sharing is achieved. Fine tweak the slope control of the Argus units for correct current sharing among the Argus units if necessary.

6.3 Output Voltage

Voltage should be measured at the unit output with an external meter. With the extended monitor/control, the meter may be connected to test jacks with "test/normal" switch in "normal".

Adjustment of output voltage via the "volt adj" control potentiometer. The output voltage level should not be adjusted while the module is in current limit. The Output Voltage will need to be adjusted for all modules in the system.

CAUTION: Do not measure power module output voltage directly at the module. This reading will be approximately 0.8VDC higher than the output voltage due to the paralleling diodes.

6.3.1 Output Voltage Adjustment (No Temperature Compensation)

Adjust the voltage potentiometers on each of the power modules until the output voltage – as measured at the battery (or supervisory module test jacks if equipped) – is the correct value and the load is shared evenly between the power modules as measured by the bar graph ammeters.

If there is no load on the system, the power modules may be balanced by monitoring battery voltage and adjusting each rectifier and verifying that the voltages at each of the power modules is the same and the battery voltage is at the correct value.

WARNING: Power module voltage is not equal to system output voltage. Measure output voltage at the supervisory panel test jacks or directly at the battery.

6.3.2 Output Voltage Adjustment (With Temperature Compensation)

During the initial installation and for maintenance purposes, adjustments to the rectifier float voltage are needed to optimize battery life and performance. The procedure below explains how to adjust battery float voltage with the temperature compensation option.

(1) Determine list options by checking the label on your equipment.

(2) Match your list options with the Slope Setting and Breakpoints in Table 1 and 2:

TABLE 1 – SLOPE SETTINGS

LIST OPTION	SLOPE SETTING
74	2.5 mV/cell/°C
75	3.5 mV/cell/°C
76	4.5 mV/cell/°C

TABLE 2 – BREAKPOINTS

LIST OPTION	TEMPERATURE °C (°F)
77	0 (32)
78	-20 (-4)
79	-40 (-40)

NOTE: The "breakpoint" is the point at which temperature compensation of battery float voltage ceases in the system. This prevents excessive voltages from being applied to sensitive loads. Temperatures below the specified breakpoint will not cause a further increase in rectifier ouput voltage because it will remain fixed at the corresponding breakpoint value. Breakpoints are factory set. Refer to Table 1-3 or 1-4 (24V or 48V). Obtain the battery manufacturer's recommended float voltage setting for 25°C (77°F) operation. Then select the column that corresponds to the correct battery float voltage (BFV).

---

(3) Identify the column corresponding to your list option Slope Setting (i.e. 2.5mV, 3.5mV or 4.5mV). Next, from the "Temperature" column, identify the breakpoint (i.e. 0, -20, or -40°C) which corresponds to your list option. This voltage is the maximum float voltage applied to the battery.

(4) Match the current ambient battery temperature (as measured with a thermometer placed on the temperature compensation sensor) with the correct float voltage setting in Table 3 or 4 below.

(5) If rectifier float voltage does not equal the correct level specified in the table, adjust to match.

(6) Test performance of temperature compensator by cooling and heating the probes to simulate temperature changes.

(7) If changes are made to the float voltage, the optional supervisory OVP control may have to be adjusted to a new value. There should be at least 1V between the highest anticipated float voltage (at low temperatures) and the OVP setpoint.

WARNING: If the float voltage is adjusted higher than the factory default, the OVP must also be readjusted higher so that "nuisance" tripping of the OVP does not occur.

TABLE 3: 24V TEMPERATURE COMPENSATED BATTERY FLOAT VOLTAGE

TEMPERATURE* °C	°F	BFV**=27V@25°C (77°F)			BFV=27.25V@25°C(77°F)			BFV=27.5V@25°C(77° F)		
		2.5 mV (volts)	3.5 mV (volts)	4.5 mV (volts)	2.5 mV (volts)	3.5 mV (volts)	4.5 mV (volts)	2.5 mV (volts)	3.5 mV (volts)	4.5 mV (volts)
-40	**-40**	28.95	29.73	30.51	29.20	29.98	30.76	29.45	30.23	31.01
-35	**-31**	28.80	29.52	30.24	29.05	29.77	30.49	29.30	30.02	30.74
-30	**-22**	28.65	29.31	29.97	28.90	29.56	30.22	29.15	29.81	30.47
-25	**-13**	28.50	29.10	29.70	28.75	29.35	29.95	29.00	29.60	30.20
-20	**-4**	28.35	28.89	29.43	28.60	29.14	29.68	28.85	29.39	29.93
-15	**5**	28.20	28.68	29.16	28.45	28.93	29.41	28.70	29.18	29.66
-10	**14**	28.05	28.47	28.89	28.30	28.72	29.14	28.55	28.97	29.39
-5	**23**	27.90	28.26	28.62	28.15	28.51	28.87	28.40	28.76	29.12
0	**32**	27.75	28.05	28.35	28.00	28.30	28.60	28.25	28.55	28.85
5	**41**	27.60	27.84	28.08	28.60	28.09	28.33	28.10	28.34	28.58
10	**50**	27.45	27.63	27.81	27.70	27.88	28.06	27.95	28.13	28.31
15	**59**	27.30	27.42	27.54	27.55	27.67	27.79	27.80	27.92	28.04
20	**68**	27.15	27.21	27.27	27.40	27.46	27.52	27.65	27.71	27.77
25* **	**77**	27	27	27	27.25	27.25	27.25	27.5	27.5	27.5
30	**86**	26.85	26.79	26.73	27.10	27.04	26.98	27.35	27.29	27.23
35	**95**	26.70	26.58	26.46	26.95	26.83	26.71	27.20	27.08	26.96
40	**104**	26.55	26.37	26.19	26.80	26.62	26.44	27.05	26.87	26.69
45	**113**	26.40	26.16	25.92	26.65	26.41	26.17	26.90	26.66	26.42
50	**122**	26.25	25.95	25.65	26.50	26.20	25.90	26.75	26.45	26.15
55	**131**	26.10	25.74	25.38	26.35	25.99	25.63	26.60	26.24	25.88
60	**140**	25.95	25.53	25.11	26.20	25.78	25.36	26.45	26.03	25.61
65	**149**	25.80	25.32	24.84	26.05	25.57	25.09	26.30	25.82	25.34

TABLE 4: 48V TEMPERATURE COMPENSATED BATTERY FLOAT VOLTAGE

TEMPERATURE* °C	°F	BFV**=54V@ 25°C(77°F)			BFV=54.5V@25°C (77°F)			BFV =55V@ 25°C (77°F)		
		2.5 mV (volts)	3.5 mV (volts)	4.5 mV (volts)	2.5 mV (volts)	3.5 mV (volts)	4.5 mV (volts)	2.5 mV (volts)	3.5 mV (volts)	4.5 mV (volts)
-40	-40	57.90	59.46	61.02	58.40	59.96	61.52	58.90	60.46	62.02
-35	-31	57.60	59.04	60.48	58.10	59.54	60.98	58.60	60.04	61.48
-30	-22	57.30	58.62	59.94	57.80	59.12	60.44	58.30	59.62	60.94
-25	-13	57.00	58.20	59.40	57.50	58.70	59.90	58.00	59.20	60.40
-20	-4	56.70	57.78	58.86	57.20	58.28	59.36	57.70	58.78	59.86
-15	5	56.40	57.36	58.32	56.90	57.86	58.82	57.40	58.36	59.32
-10	14	56.10	56.94	57.78	56.60	57.44	58.28	57.10	57.94	58.78
-5	23	55.80	56.52	57.24	56.30	57.02	57.74	56.80	57.52	58.24
0	32	55.50	56.10	56.70	56.00	56.60	57.20	56.50	57.10	57.70
5	41	55.20	55.68	56.16	55.70	56.18	56.66	56.20	56.68	57.16
10	50	54.90	55.26	55.62	55.40	55.76	56.12	55.90	56.26	56.62
15	59	54.60	54.84	55.08	55.10	55.34	55.58	55.60	55.84	56.08
20	68	54.30	54.42	54.54	54.80	54.92	55.04	55.30	55.42	55.54
25***	77	54	54	54	54.5	54.5	54.5	55	55	55
30	86	53.70	53.58	53.46	54.20	54.08	53.96	54.70	54.58	54.46
35	95	53.40	53.16	52.92	53.90	53.66	53.42	54.40	54.16	53.92
40	104	53.10	52.74	52.38	53.60	53.24	52.88	54.10	53.74	53.38
45	113	52.80	52.32	51.84	53.30	52.82	52.34	53.80	53.32	52.84
50	122	52.50	51.90	51.30	53.00	52.40	51.80	53.50	52.90	52.30
55	131	52.20	51.48	50.76	52.70	51.98	51.26	53.20	52.48	51.76
60	140	51.90	51.06	50.22	52.40	51.56	50.72	52.90	52.06	51.22
65	149	51.60	50.64	49.68	52.10	51.14	50.18	52.60	51.64	50.68

NOTES:
These tables are provided as a guideline only. If battery temperature falls between values on the above scale, estimate the voltage setting based on the closest numerical values.

* Refers to ambient temperature at the battery terminal posts.

** BFV refers to “Battery Float Voltage” Check battery manufacturer's recommended settings.

*** Refers to “Nominal Battery Temperature.” This is the optimum temperature for battery operation. No compensation occurs at this temperature (use as a reference point).

6.4 Test Mode

The “Test” mode is entered via the front panel switch. A external isolated “Test” supply is required to perform adjustments with this feature. When the control is activated the “Test” mode indicator will illuminate. If the external test supply is not on or has a low voltage the “Low voltage alarm” and “Low voltage disconnect” may activate. Indication of OVP can also occur if the test supply voltage is higher than the present setting.

NOTE: When operating the rectifier system in the test mode, alarms and control features can be checked without activating the alarm relays or control function.

6.5 Over Voltage Protection [OVP](Adjustable Option)

Set the OVP setting to the maximum limit.

Select the “Test” mode for adjustment of the alarm. Connect an external isolated test supply and then adjust the test supply voltage to the desired level. Monitor the test supply voltage using a DVM connected to the supervisory module voltage test points. Adjust the test supply voltage to the desired OVP trip level.

Decrease the OVP level until the OVP circuit activates and the OVP LED illuminates. Reduce the test supply voltage. Return the unit from “Test” mode to the “Normal” mode.

To confirm the setting, decrease the external supply voltage level, then place the unit in the “Test” mode. Increase the test supply voltage. The OVP LED should illuminate at the level as set in step 6.5 paragraphs 2 and 3. Reduce the test supply voltage and return the unit to “Normal” mode.

6.6 Low Voltage Alarm (Option)

Decrease the Low voltage alarm level to the minimum setting.

Select the “Test” mode for adjustment of the alarm. Connect a external isolated test supply and then adjust the test supply voltage to the desired level for the under voltage alarm to occur. Monitor the output voltage via a separate DVM connected to the voltage test jacks.

Increase the low voltage alarm level until the under voltage alarm occurs (the front panel LED will indicate the alarm has been activated). Reset the alarm by increasing the test supply voltage. The alarm will reset when the test voltage is greater than the alarm voltage.

To confirm the setting, decrease the Test level and monitor the point at which the alarm trips. Increase the test supply voltage and monitor the point at which the alarm clears. Return the unit from “Test” mode to the “Normal” mode.

6.7 Low Voltage Disconnect (Option)

The low voltage disconnect is controlled by the low voltage disconnect control. To adjust the LVD, follow the same procedure detailed in section **6.6.**

6.8 OVP and LVA Adjustment (No External Power Supply Available)

Both the OVP and LVA may also be adjusted without the presence of an external power supply.

WARNING: On line adjustments will result in the load receiving the adjusted output voltage of the rectifiers. Check your equipment specifications before proceeding. The power modules will interact with each other and adjustment of both modules may be required. Checking the OVP will result in the power modules shutting off, system should be equipped with battery backup to ensure uninterrupted operation of the load.

6.8.1 Over Voltage Protection (On Line)

Set the OVP setting to the maximum limit.

Select the normal mode for adjustment of the alarm. Adjust the power module voltage to the desired level. For very high OVP setting levels, you may not be able to adjust the voltage up high enough to trip the OVP. In such cases, temperature sensors can be cooled to boost output voltage to a higher level. Monitor the power module voltage using a DVM connected to the supervisory module voltage test points. Adjust the power module voltage to the desired OVP trip level.

Decrease the OVP level until the OVP circuit activates, the modules shut off and the OVP LED illuminates. Reduce the power module voltage. Reset the OVP on the power modules.

To confirm the setting, increase the power module voltage. The OVP LED should illuminate at the level as set in step 6.5 paragraphs 2 and 3. Reset the OVP and reduce the power module votages to the correct output voltage.

6.8.2 Low Voltage Alarm (On Line)

Decrease the Low voltage alarm level to the minimum setting.

Select the normal mode for adjustment of the alarm. Adjust the power module voltage to the desired level for the under voltage alarm to occur. If batteries are connected to the system, there may be some delays as the batteries discharge. Monitor the output voltage via a separate DVM connected to the supervisory module voltage test jacks.

Increase the low voltage alarm level until the under voltage alarm occurs (the front panel LED will indicate the alarm has been activated). Reset the alarm by increasing the power module voltage. The alarm will reset when the power module voltage is greater than the alarm voltage. To confirm the setting, decrease the power module voltage and monitor the point at which the alarm trips. Increase the power module voltage and monitor the point at which the alarm clears.

RSM 48/7.5-15 and RSM 24/15-30 Modular Rectifier Systems may be used in parallel redundant applications requiring load disconnect. Examples of hookup's are shown below, these include:

Option 1. One unit equipped with load disconnect.

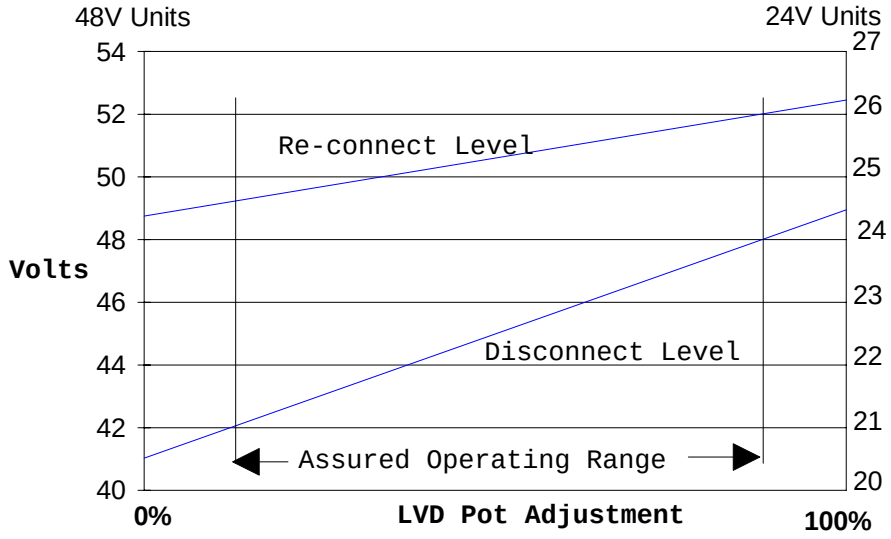
Option 2. Multiple units with one or more internal load disconnect.

Option 3. Multiple units with external load disconnect for greater load capability.
(Recommended for Multiple Units)

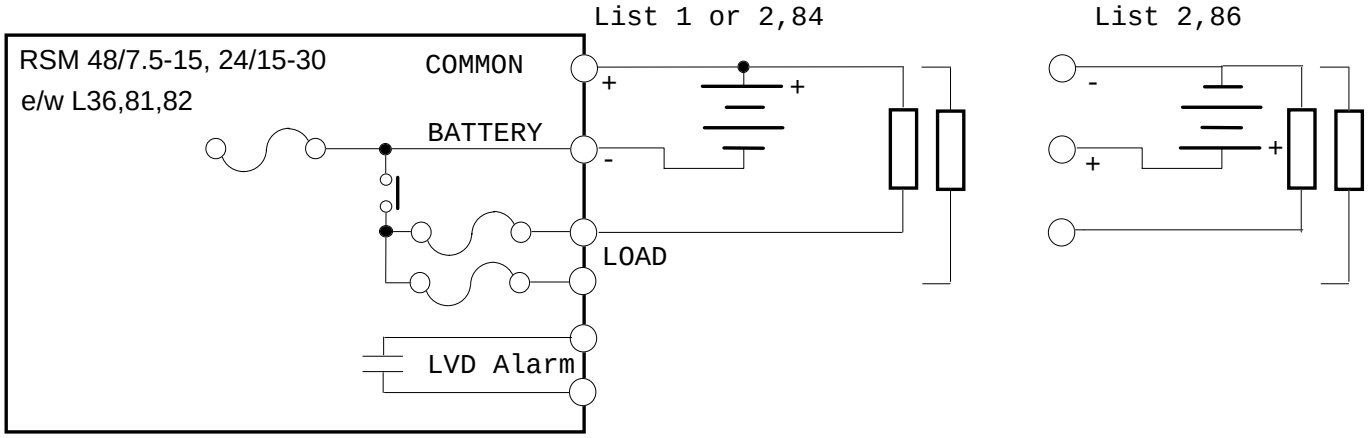
True redundancy exists only when two or more load disconnect contactors are used, whether these are internal to the unit or external. When there are variations in disconnect level, the redundancy ensures the load will remain connected.

When using load disconnects, the operator should be aware of the relationship between disconnect and reconnect levels. The graph below shows the relationship between load disconnect and reconnect levels. The hysteresis (voltage difference) between these levels is not constant. The nominal voltages shown will differ between units, and must be compensated for in redundant systems. Adjustment Ranges will exceed the shown assured range, but it is not recommended to be operating outside the assured operating range.

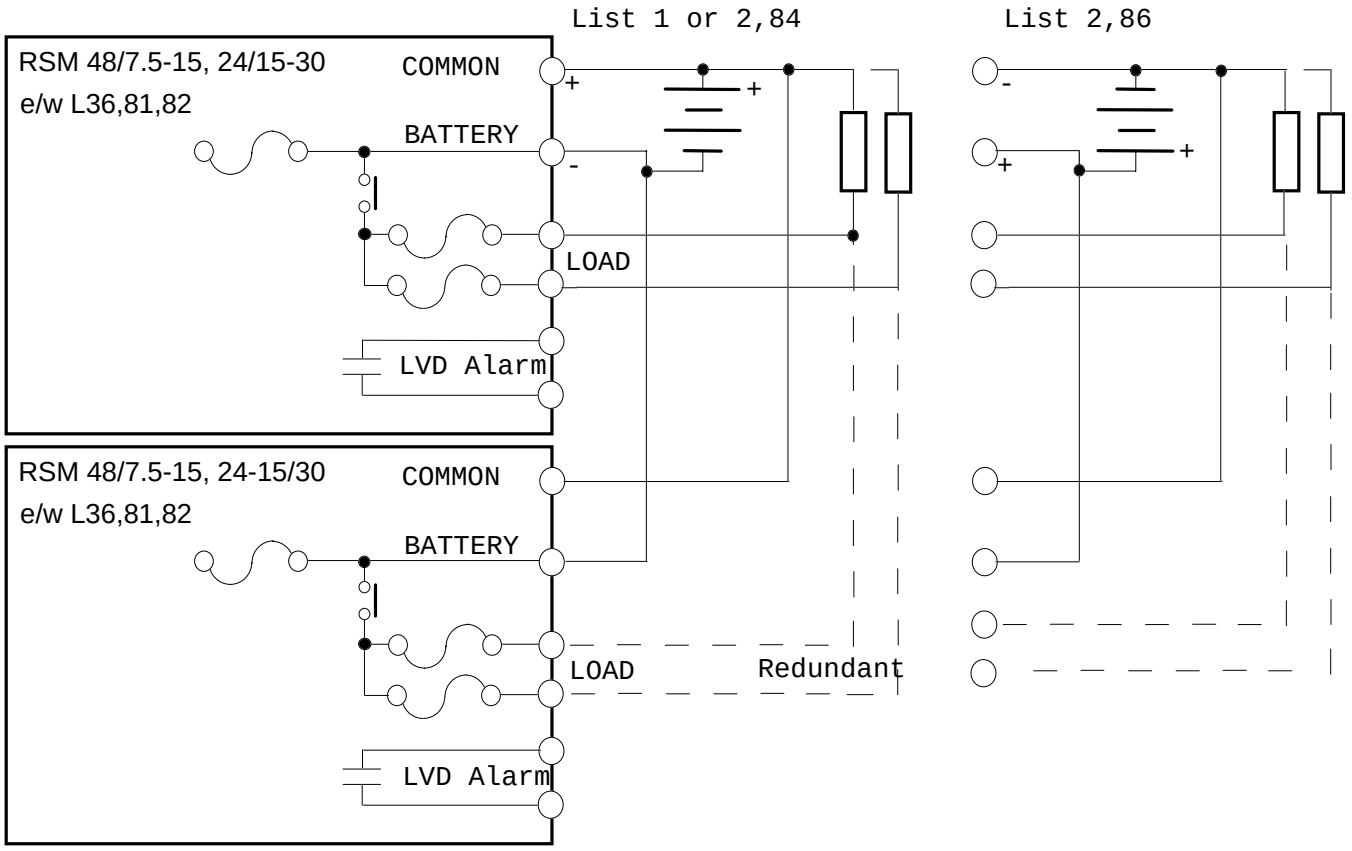
RSM Low Voltage Disconnect Levels



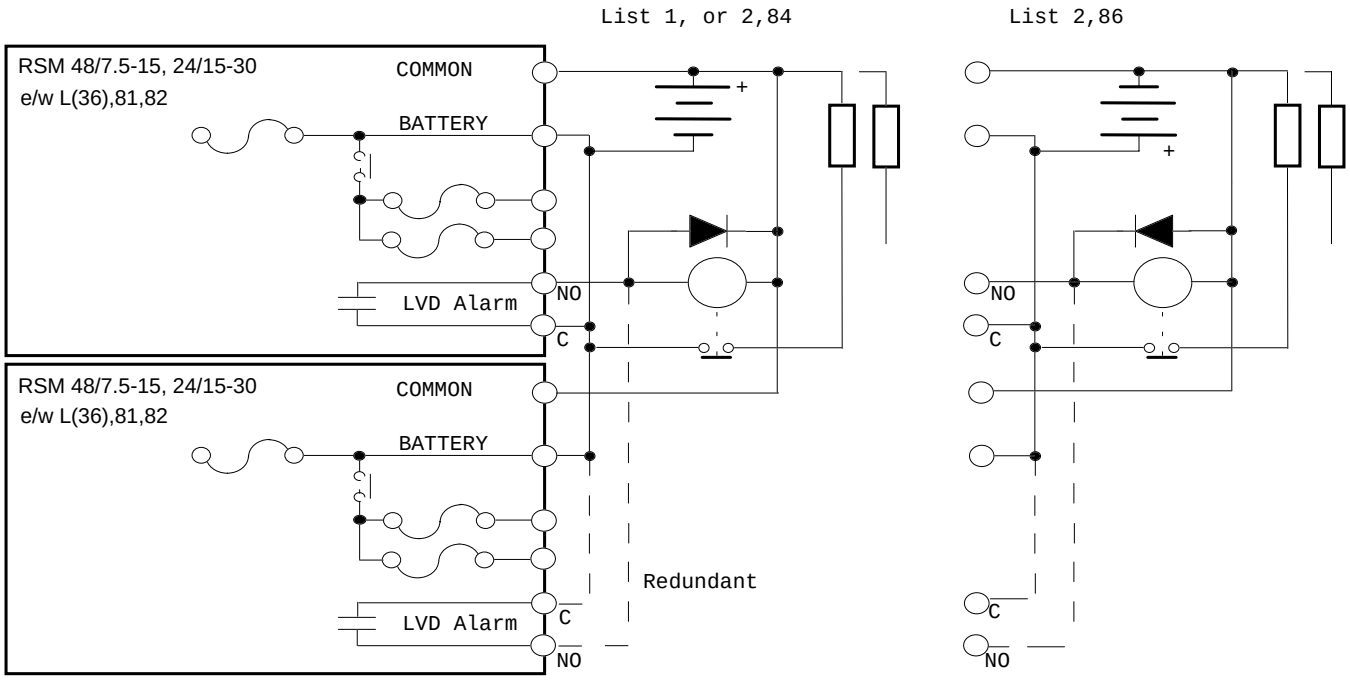
OPTION 1-One unit utilizing internal Low Voltage Disconnect
RSM 48/7.5 List 1 - Load Maximum of 20 Amps total (Fuse determines individual circuit limit)
RSM 24/15 List 2, 84 or 2, 86 - Load Maximum of 30 Amps total (Fuse determines individual circuit limit)



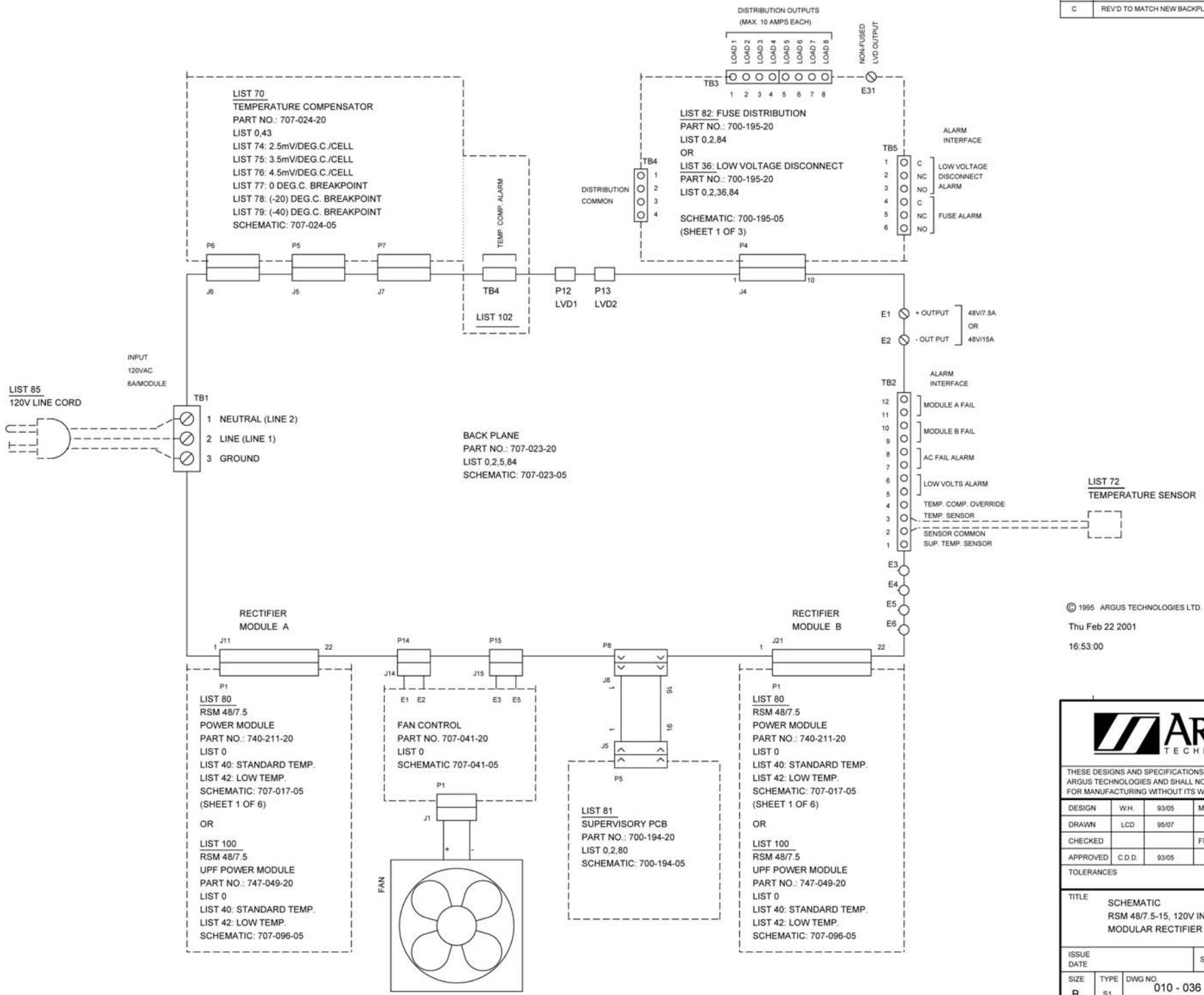
OPTION 2-Two Units in parallel redundancy utilizing internal Low Voltage Disconnect
RSM 48/7.5 List 1 - Load Maximum of 20 Amps total (Fuse determines individual circuit limit)
RSM 24/15 List 2, 84 or 2, 86 - Load Maximum of 30 Amps total (Fuse determines individual circuit limit)



OPTION 3-Unit(s) utilizing external Low Voltage Disconnect Relay
Redundancy exists to connection of external relay (Recommended)



REVISIONS			
LTR	DESCRIPTION	DATE	APPD
B	REV'D PER EO 010-036-KO A6	94/05	C.D.D.
C	REV'D TO MATCH NEW BACKPLANE PCB	95/07	



Thu Feb 22 2001

16:53:00

ARGUS TECHNOLOGIES

DESIGN	W.H.	93/05	MATERIAL
DRAWN	LCD	95/07	
CHECKED			FINISH
APPROVED	C.D.D.	93/05	
TOLERANCES			SCALE N/A

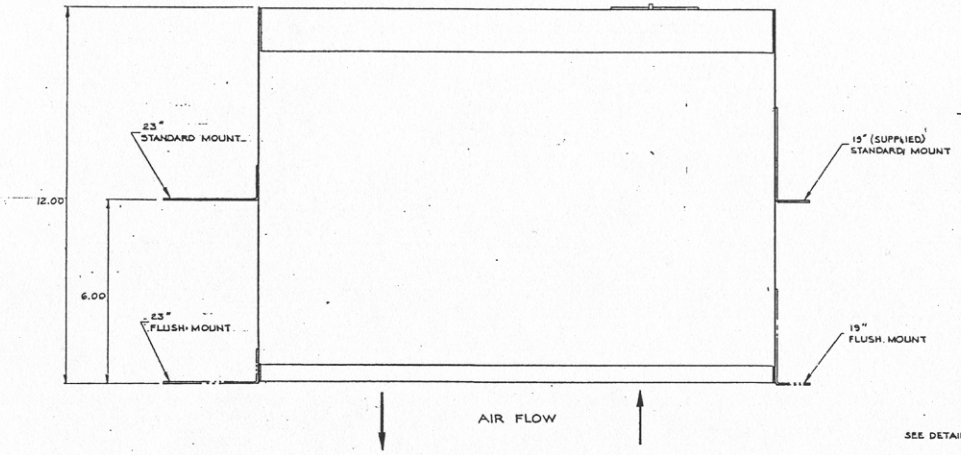
TITLE
SCHEMATIC
RSM 48/7.5-15, 120V INPUT, FAN COOLED
MODULAR RECTIFIER SYSTEM

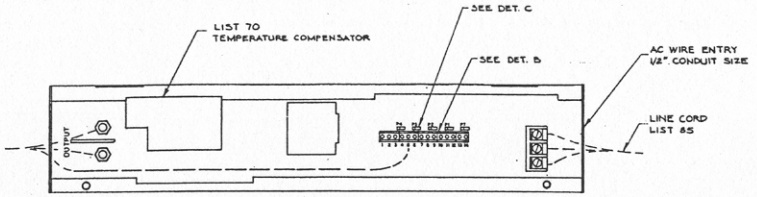
ISSUE DATE

SHEET 1 OF 1

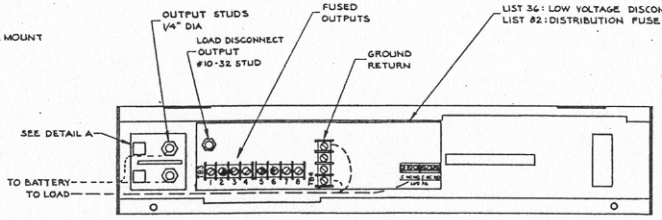
SIZE	TYPE	DWG NO.	REV
B	S1	010 - 036 - 05	C

REVISIONS.			
LTR	DESCRIPTION	DATE	APP
B	REV'D BACKPLANE P.C.B.	3/5/03	JL

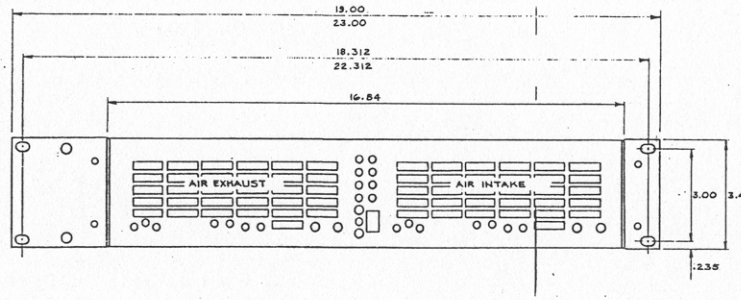


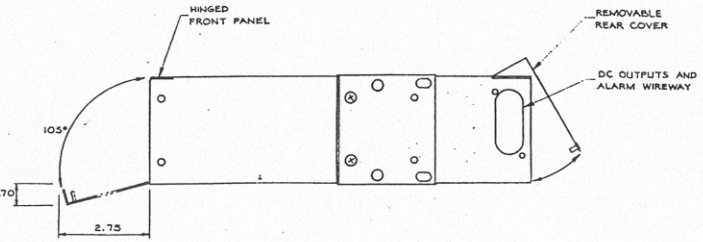


REAR VIEW; (COVER REMOVED) - CUSTOMER CONNECTIONS LIST 0



REAR VIEW (COVER REMOVED) - CUSTOMER CONNECTIONS LIST 36/82



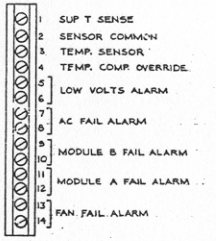


DETAIL A
OUTPUT CONNECTIONS

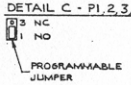
LIST 84 POSITIVE GROUND OUTPUT

LIST 86 NEGATIVE GROUND OUTPUT

DETAIL B - TB2
INTERFACE CONNECTIONS



DETAIL C - P1,2,3,4,7



LTR	DESCRIPTION	QTY
	FINISHED HOLE LEGEND	

argus TECHNOLOGIES

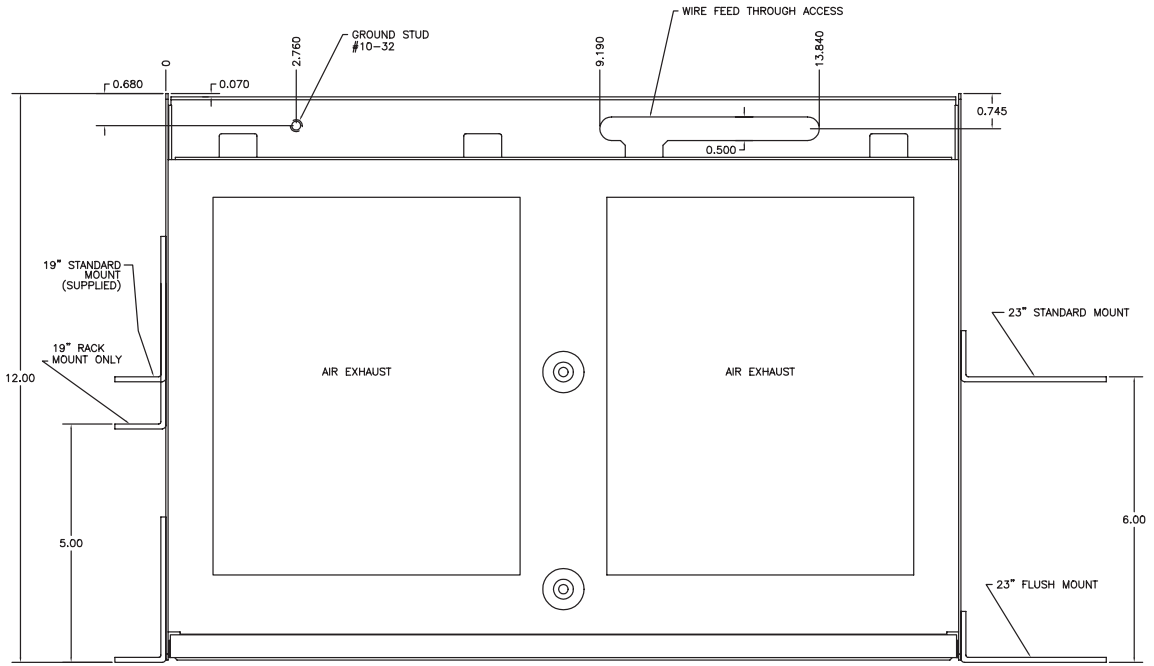
DESIGN	C.D.D.	93/04	MATERIAL
DRAWN	T.B.D.	93/05	
CHECKED	W.W.	93.05.10	FINISH
APPROVED	DD	93.05.10	
TOLERANCES			SCALE 1:2

TITLE: OUTLINE DRAWING
RSM 48/15, 24/30
FAN COOLED

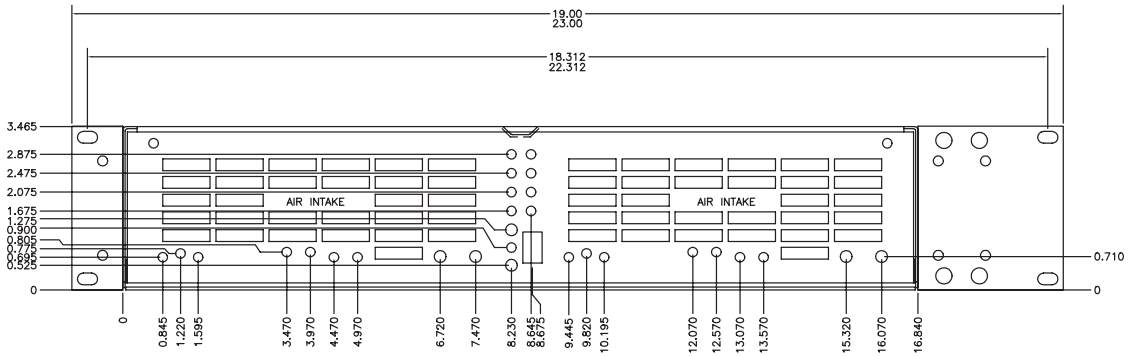
ISSUE DATE | SHEET 1 OF 1

SIZE D | DWG NO 010-036-06 | REV B

REVISIONS			
LTR	DESCRIPTION	DATE	APPD
B	REV'D BACKPLANE PCB	95/03	C.D.D.
C	REV'D PER EO'S	95/05	



PLAN VIEW
BACK COVER REMOVED



FRONT VIEW

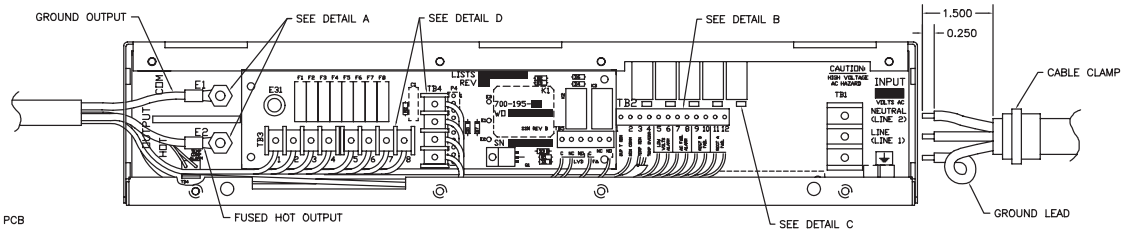
LTR	DESCRIPTION	QTY
	FINISHED HOLE LEGEND	

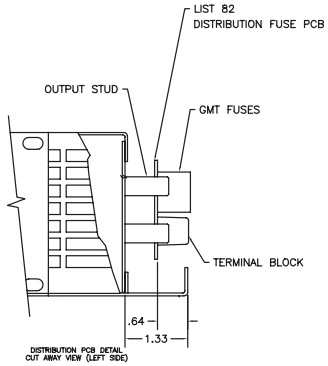
DESIGN	C.D.D.	93/10	MATERIAL
DRAWN	W.Y.	93/10	
CHECKED	W.Y.	93/10	FINISH
APPROVED	C.D.D.	93/10	
TOLERANCES	.xx ± 0.020" .xxx ± 0.010"		SCALE N.T.S.

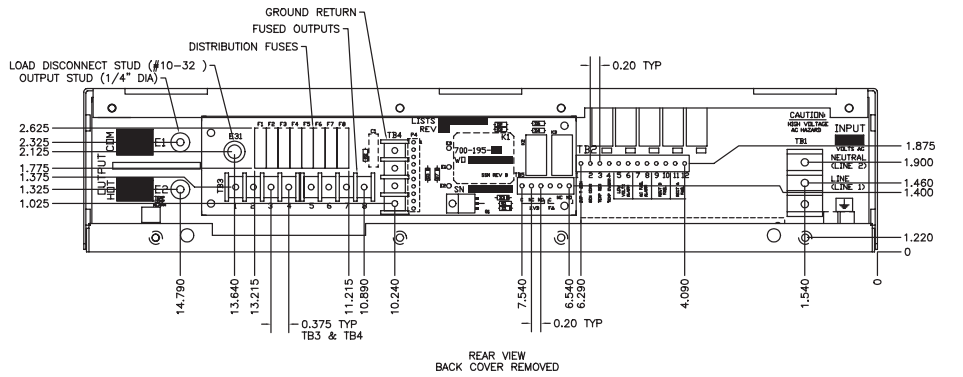
TITLE
RSM 48/7.5-15 CABINET
CUSTOMER CONNECTIONS

ISSUE DATE	SHEET 1 OF 2	
SIZE B	DWG NO. 010 - 024 - 08	REV C

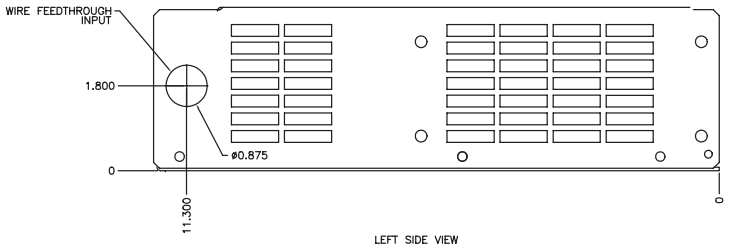
REVISIONS			
LTR	DESCRIPTION	DATE	APPD



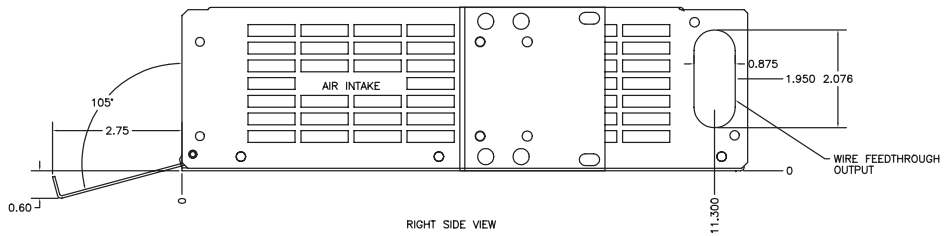




REAR VIEW
BACK COVER REMOVED



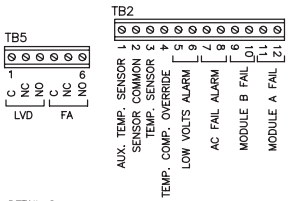
LEFT SIDE VIEW



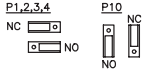
RIGHT SIDE VIEW

DETAIL A
OUTPUT CONNECTIONS

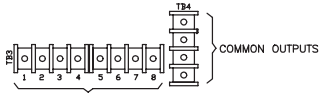
DETAIL B
INTERFACE CONNECTIONS



DETAIL C
PROGRAMABLE JUMPER



DETAIL D
LIST 82; DISTRIBUTION FUSE PCB



LTR	DESCRIPTION	QTY
	FINISHED HOLE LEGEND	

argus TECHNOLOGIES

DESIGN	C.D.D.	93/10	MATERIAL
DRAWN	W.Y.	93/10	
CHECKED	W.Y.	93/10	FINISH
APPROVED	C.D.D.	93/10	
TOLERANCES	.xx ± 0.020" .xxx ± 0.010"		SCALE N.T.S.

TITLE
RSM 48/7.5-15 CABINET
CUSTOMER CONNECTIONS

ISSUE DATE		SHEET 2 OF 2	
SIZE	DWG NO.		REV
B	010 – 024 – 08		c

Service Centers

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

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

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,
1407l Argentina
Tel: +54 (11) 4672 4821
Fax: +54 (11) 4504 4698
Cell: +54 9 (11) 4993 9996
Email: lkleiman@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

Brazil
Argus Brasil Serviços e Comércio Ltda
Rua: Constituição,145/147 - Santos
São Paulo – Brasil 11015-471
Tel: +55 (13) 3234 2469
Fax: +55 (13) 3234 2469
Cell: +55 (13) 7806 1438
Email: argusbrasil@bignet.com.br

Canada
Compower Systems Inc.
118 Tiffield 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

Romania
Alphapower SRL
Str. Paul Constantinescu nr.5
Timisoara, Romania
Tel: +40 21 569 1214
Cell: +40 31 816 1491

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

Turkey
IPC Enerji Elk San ve TIC AS
Inonu cad. Kanarya sok. No:20
Yenisahra - Kadikoy
Istanbul, Turkey
Tel: +90 216 317 41 42
Fax: +90 216 472 90 66

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