ARGUS

Pathfinder 48V-4kW Modular Switched Mode Rectifier System

010-562-B2

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Power

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Argus Technologies Ltd.

Visit **www.argus.ca**

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Pathfinder 48V-4kW
Modular Switched Mode Rectifier System

010-562-B2

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

- **Specifications:** 010-562-B1
- **Warranty Policy:** 048-507-10
- **CSA/NRTL Equivalence:** 048-554-10
- **Installation and Operation Instructions:** 010-562-C0
- **Outline Drawings, Power Module:** 010-562-06
- **Outline Drawings, Shelf (23" typical):** 030-681-06
- **Customer Connections:** 030-681-08
- **Factory Service Information:** 048-527-10

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SPECIFICATIONS FOR ARGUS' SWITCHED MODE RECTIFIER MODEL PATHFINDER 48V-4KW

Power Module Output

Voltage:	48 to 56VDC (standard) 42 to 60VDC (extended)
Current:	75ADC nominal (80ADC maximum)
Maximum Power:	4050W continuous/module
Regulation:	±25mV line and load (0% minimum slope) ≤3% deviation for 10 for 90% load step <2% deviation for 50 for 100% load step
Response Time:	≤2ms to 0.1% of output for 50% to 100% load step
Time Stability:	≤0.2% per year
Temperature Stability:	≤100ppm/°C over the operating range
Electrical Noise:	≤26dBrnC (voice band) without battery ≤22dBrnC (voice band) with battery ≤10mV$_{RMS}$ to 10MHz (wide band) ≤150mV$_{p-p}$ to 100MHz
Acoustic Noise:	<60dBa @ 1m (3ft.) @ 30°C (86°F) [individual module] <65dBa @ 1m (3ft.) @ 30°C (86°F) [four modules]
EMI (See Standards for more EMC):	The unit meets requirements of ICES-003 Class A
Fuse-Type/Rating:	Bussman or Edison Type 100LET, rated 100A, 140VDC

In Accordance with FCC requirements, we provide the following statement as specified in the FCC guidelines for conformance to part 15, Class A:

> **NOTE: 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 in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:**
>
> - Reorient or relocate the receiving antenna.
> - Increase the separation between the equipment and receiver.
> - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
> - Consult the dealer or an experienced radio/TV technician for help.

Any changes or modifications to this equipment not expressly described in this manual could void the FCC compliance.

SPECIFICATIONS FOR ARGUS' SWITCHED MODE RECTIFIER MODEL PATHFINDER 48V-4KW

Power Module Input

Nominal Voltage:	187-275VAC
Extended Operation:	Low: 186 to 90VAC (derated output power) High: 275 to 288VAC (derated power factor) [289 to 312 VAC for short term emergency derated power factor]
Frequency:	50/60Hz nominal (45 to 70Hz)
Current:	22-19A (208-240VAC)
Recommended Feeder Breaker:	30A
Power Factor:	>0.99 (50-100% load); >0.95 (25-50% load)
T.I.F. (Current):	<120 at 100% load
T.H.D. (Current):	<5% at 100% load
Efficiency:	>91% at 50-100% load, typical >92% >88% at 25-50% load @ 208VAC input
Source Impedance:	≤2.5% inductive or 5% resistive
Soft Start:	Approx. 12.5% per second
Input Transient Suppression:	See Standards
Input Leakage Current:	<3.5mA @ 265VAC 60Hz

Miscellaneous

MTBF:	200,000 hours (excluding field-serviceable MOV's, fuses and fans)
Module Size:	178mm H x 133mm W x 356mm D [7" H (4RU) x 5.25" W x 14" D]
Module Weight:	8kg (18lb.)
Cabinet Size:	178mm H x 432/533mm W x 381mm D [7" H (4RU) x 17"/21" W x 15" D]
Cabinet Mounting:	19"/23" flush/offset mounting
Bus Bar Distance:	15" (List Option 80) or 16" (List Option 81) from front face
Alarm Connection Ratings:	60VDC, 0.5A maximum

Environmental

Operating Temperature:	0 to +65°C (32 to 149°F), List Option 40 -40 to +65°C (-40 to 149°F), List Option 42 [Emergency temperature range to +75°C (167°F) with derated output power]
Storage Temperature:	-55 to +85°C (-67 to 185°F)
Humidity:	0 to 95% non-condensing
Elevation:	-500 to +2000 m (-1640 feet to 6562 feet); to +4000m @ 50°C (122°F)

Recommended Connection Wire Sizes

NOTE: Check with local and/or national electrical codes for specific input wiring requirements, including temperature de-rating factors, etc.

For operation e/w 30A feeder breaker @ 30°C:

Number of Power Modules	Minimum Module Input Wire Size
1 – 4	6 mm^2 (10 AWG) for each module

NOTE: Each feeder breaker serves as a disconnect device for its associated module.

Standards

Safety; module will be certified by CSA NRTL/C program and will meet the requirements of:

CSA	C22.2 N° 60950-00
UL	Std 60950-2000 (under NRTL program)
CE	EN60950-1993 with Amendments 1-4, with deviation for Germany (CB Scheme)

Electromagnetic Compatibility:

EN300-386-1.3.1:2001	EMC and RSM; Telecommunication Network Equipment
ENV 50204-1996	Radiated Electromagnetic Immunity Digital Radio
EN 55022 (CISPR 22):1994	Class A Radiated & Conducted
EN 61000-3-2:1995	Harmonic Current Emissions
EN 61000-4-2:1995	ESD Immunity
EN 61000-4-3:1996	Radiated Electromagnetic Immunity
EN 61000-4-4:1995	Electrical Fast Transients Burst Immunity
EN 61000-4-5:1995	Power Line Surge Immunity Installation Class 4
EN 61000-4-6:1997	Conducted Electromagnetic Immunity
EN61000-4-8:1994	Power Frequency Magnetic Field Immunity Level 3
EN 61000-4-11:1994	Voltage Dips, Short Interruptions, Variations
FCC 47 CFR Part 15:1998	Class A Radiated & Conducted
IEEE/ANSI C62.41:1991	Location Category B3, Lightning and powerline surges

General:

Bellcore GR-947-CORE:1996	Telecomunications Switchmode Rectifier/Power Supply, meets applicable sections
Bellcore GR-63-CORE:1995	Vibration & Shock, Transport / Shock Packaged Category A, 4.3.1 and 4.4.4
Bellcore GR1089-CORE:1999	EMC and Electrical Safety
Bellcore TA-NWT-000043:1992	Generic Requirements for Telecommunication Huts
Bellcore TA-NWT-000406:1993	DC Bulk Power System for Confined Locations

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.

Factory Service Centers

Canada and International
Argus Technologies Ltd.
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Burnaby, BC, V5J 4M5 Canada
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ATTN: RMA Returns
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Fax: +1-360 647 0498
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048-507-10-I1 Rev S (09/2007)

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)

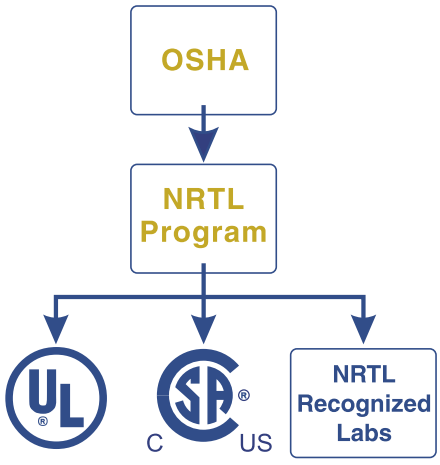
The NRTL determines that a product meets the requirements of an appropriate consensus-based product safety standard either by successfully testing the product itself, or by verifying that a contract laboratory has done so, and the NRTL certifies that the product meets the requirements of the product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

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This manual contains important safety and operating instructions for the Argus Pathfinder 4kW rectifier series.

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

2. This manual provides warnings and special notes for the user:
    a. Points that are vital to the proper operation or safety of the operator are indicated by the heading: **WARNING**.

    b. A notation that is in ***Bold Italic*** typeface covers points that are important to the performance or ease of use of the rectifier.

3. Before using the rectifier, read all instructions and cautionary markings on the rectifier and any equipment connected to the rectifier.

4. Do not expose the rectifier to rain or snow.

5. **CAUTION** – Unless otherwise noted, use of an attachment not recommended or sold by the rectifier manufacturer may result in a risk of fire, electric shock, or injury to persons.

6. **CAUTION** – Do not operate the rectifier if it has received a sharp blow, been dropped, or otherwise damaged in any way – return it to a qualified service center for repair.

7. **CAUTION** – Do not disassemble the rectifier – call our qualified service centers for servicing. Incorrect reassembling may result in a risk of electrical shock or fire.

CONTENTS

FIGURES

TABLES

1 INTRODUCTION

To aid the user with installation, frequent reference is made to foldout drawings located at the rear of the manual.

1.1 Scope of the Manual

This instruction manual explains the installation, interconnection and operation of Argus Technologies' Pathfinder 4kW modular, switched mode rectifier systems.

NOTE: All references to the Pathfinder 48V-4kW (i.e. 48 VDC output) rectifier system within this manual also include the Pathfinder 24V-4kW (i.e. 24 VDC output) rectifier system, unless specified otherwise.

1.2 Product Overview

The Pathfinder 4kW rectifier modules use a high frequency, switched mode conversion technique to provide a fully regulated and isolated DC output from the AC mains. Rectifier power modules are "hot swappable" meaning they can be inserted or removed from the cabinet without cutting power to or from the system or the load. Additional power modules can be included with the system at time of ordering or added after the cabinet has been installed.

A complete rectifier system consists of one or more power modules in a common cabinet enclosure. The cabinet has connections for AC inputs, DC output, and system communications.

The Pathfinder 4kW rectifier system is designed to operate with the Argus SM series of system controllers via RS-485 cabinet connectors for communications. This allows the user to setup, control and monitor the entire power system and ancillary components from one central, easy-to-use source.

Pathfinder power modules can be adjusted and monitored locally via the front panel control-key interface option and LCD display options.

Manuals with a revision P/ designation are at a preliminary stage of development. Instructions and specifications are subject to change.

Figure 1–Front view of Pathfinder 4kW system (23"; 2 modules w/ optional LCD)

1.3 Part Numbers and List Options

The Pathfinder 4kW is available to order under the following part numbers and list options:

Description	Part Number/List Option
Pathfinder 48V-4kW power module	010-562-20
Pathfinder 24V-4kW power module	010-563-20
Basic module	*List 0
Standard temperature, 0 to +65 deg.C	List 40
Extended temperature, -40 to +65 deg.C	List 42
Gray finish	*List 55
No LCD display/ keypad	List 80
With LCD display/ keypad	List 81
With LCD display only	List 82
Fan filter	List 87
Pathfinder 4kW 19” cabinet	030-680-20
24 VDC output	List 1
48 VDC output	List 2
Universal mount	*List 18
6” offset mount	List 23
Flush mount	List 25
Gray finish	*List 55
15” deep output bus bar adapters	List 80
16” deep output bus bar adapters	List 81
Power module blank plate	List 91
Pathfinder 4kW 23” cabinet	030-681-20
24 VDC output	List 1
48 VDC output	List 2
Universal mount	*List 18
6” offset mount	List 23
Flush mount	List 25
Gray finish	*List 55
15” deep output bus bar adapters	List 80
16” deep output bus bar adapters	List 81
Power module blank plate	List 91

* Default option

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

2 FEATURES, ALARMS AND CONTROLS

The Pathfinder's 4 R.U., 23" mount cabinet contains connections for up to four rectifier power modules (up to three rectifiers for the 19"/23" mount), AC input, DC output, and RS-485 communications. When the power modules are removed from the cabinet, all cabling connections to the cabinet are front-accessible.

2.1 Cabinet Descriptions

A brief description* of each cabinet feature is show below:

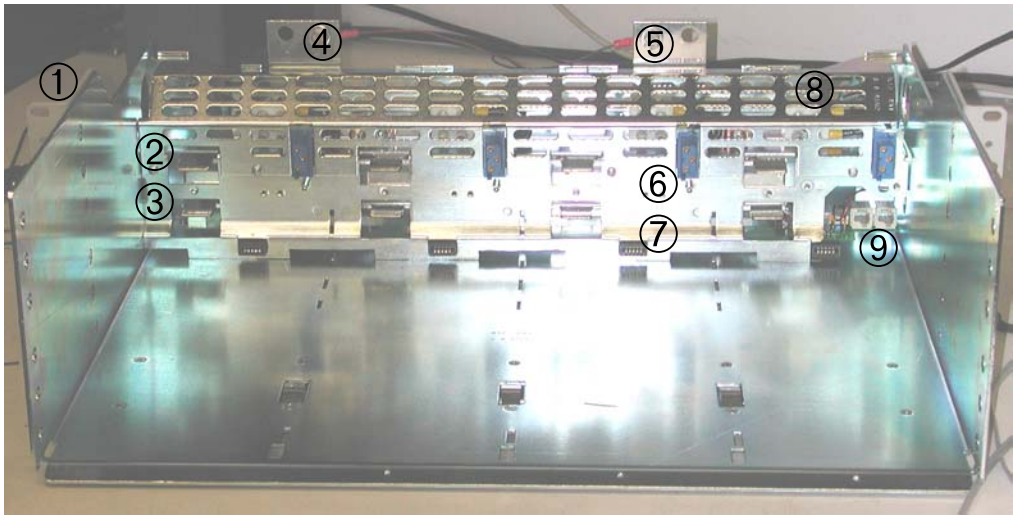


Figure 2–Front view of Pathfinder 4kW 23" cabinet (modules removed)

1. Universal Mounting Bracket (x2)
2. Module Bus Bar Hot Connection (x4)
3. Module Bus Bar Common Connection (x4)
4. System Bus Bar Hot Connection
5. System Bus Bar Common Connection
6. Module AC Input Connectors (x4)
7. Module Control/Alarm Connectors (x4)
8. AC Wireway Cover (removable)
9. RS-485 Connectors (x2)

** Not all features appear as displayed on all models.*

2.1.1 Remote Monitoring and Control

All local controls and monitoring are accessible via the RS-485 serial communications interface. The Pathfinder cabinet provides two connections for serial communications with other rectifier cabinets as well as supervisory and control panels. This allows RS-485 cables to be "daisy-chained" from rectifier cabinet to rectifier cabinet.

2.2 Power Module Features

The power module converts AC line voltage (refer to the specifications near the front of this manual) to nominal 24 or 48VDC output. The following section details the various features of the power modules:

2.2.1 LED Indicators

The LED indicators provide visual indication of module operational status and alarms. The indicators and associated colors are as follows:

2.2.1.1 MAIN AC (LED #1, Green)

This indicator illuminates when AC input to the Pathfinder is within the valid range. It will flash when out of the normal range but still in operational range as below.

The module will continue to operate down to 90VAC (current limit gradually reduces automatically to approx. 25% of max. load). At a lower input AC voltage, the module will shutdown, indicating an AC FAIL condition and the MAIN AC LED will extinguish.

2.2.1.2 RECTIFIER OK (LED #2, Green)

The RECTIFIER OK LED illuminates when the module is running and sourcing power normally. The indicator will turn off if the module is shut down for any reason.

The RECTIFIER OK LED flashes if the User pushes the OFF/ON button momentarily (<1 second) during normal operation. It will then flash for every 20% (approx.) of maximum rated output current.

SYSTEMS WITH EXTERNAL CONTROLLER (e.g. SM02): the RECTIFIER OK LED flashes if a MANUAL INVENTORY AQUIRE is initiated from the system controller.

2.2.1.3 RECTIFIER FAIL (LED #3, Red)

This indicator illuminates if the module is unable to source power as a result of any of the following conditions:

- Remote or local shutdown
- Input or output fuse blown
- AC Mains Input Fail
- High voltage shutdown
- Thermal shutdown
- UPF fail
- Module fail (ramp test fail)
- Start delay
- Module off.

If the unit output is not connected to a battery or parallel rectifier, this LED may extinguish if no AC power is present.

The RECTIFIER FAIL LED will flash if the modules output capability has been reduced or a minor component failure is detected during the following **Minor Alarm** conditions:

- VAC meter fail
- AC mains input low
- AC mains input high
- Fan fail
- Fan speed error
- High temperature foldback
- Low output voltage
- Current limit (programmable option)
- Power limit (programmable option)
- Temperature sense fail
- High output voltage
- Low output current (programmable option)
- Soft start operation.

2.2.2 OFF/ON (O/I) Button

The front panel off/on button can shut down the module's output power. This button is also used to read the module's output current. To shut the module down, press and hold the button for 3 seconds and release. To get a reading of output current, quickly press and release the power button (<1 second). LED #2 (green) will flash for every 20% (approx.) of maximum rated output current.

Figure 3–Pathfinder 4kW module (with display and keypad options)

*In this chapter, references to and procedures for **menu navigation** are the same for both the Pathfinder rectifier (equipped with the Control Buttons and LCD options) and the SM series supervisory panel.*

2.2.3 Liquid Crystal Display (Optional)

Pathfinder modules can be equipped with 2 x 16 character liquid crystal display (LCD) panel for monitoring DC bus voltage, output current, active alarms and serial number.

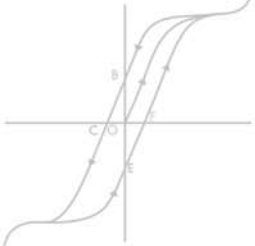
2.2.4 Control Buttons (Optional Keypad for LCD Equipped Modules)

Pathfinder modules, with the LCD option, can also be equipped with three control buttons located on the front panel for local control and monitoring. This allows the user to adjust the rectifier without an external SM series system controller.

The buttons are labeled with an up arrow, down arrow and a curved arrow (enter key). The up and down arrow buttons allow the user to scroll through the software menus and adjust values, whereas, the curved arrow button allows the user to enter functions and switch between Float and Equalize modes.

2.2.5 True Module Fail Alarm

The power modules have a "true" fail alarm. This provides a true indication of the power module's ability to source current. When the module's output current drops below 2.5% of the rated output a low output current condition is detected and the Module Fail detection circuit is activated. This circuit momentarily ramps up the output voltage to determine if the module will source current. If no increase in current is detected, the Module Fail alarm is activated. The module will test once every 60 seconds for the condition until current is detected. Output voltage ramping will cease upon detection of current. A minimum 2.5% load is required to avoid the Ramp Test Fail alarm; this can typically be provided with the parallel system battery. Activation of this alarm could indicate a failed module or a failed load.



NOTE: A battery connected to the output of the rectifier will draw current when the voltage ramp occurs. Therefore the rectifier fail alarm will not be generated with a battery connected.

2.2.6 Thermal Protection

2.2.6.1 Thermal Shutdown

A module will shut down and extend an alarm if the internal ambient temperature exceeds 80°C (176°F). The module will restart when the ambient internal temperature drops below 70°C (158°F). The module will also shut down if the heatsink temperature exceeds 130°C (266°F). When the heatsink temperature is less than 100°C (212°F) it will restart. The fan continues to operate during these shutdown conditions, unless the ambient temperature exceeds 85°C (185°F).

2.2.6.2 Over Temperature

Each module is protected in the event of an excessive increase in ***heatsink*** temperature due to fan failure or cooling airflow blockage. When the heatsink temperature exceeds normal maximum, the module's output current is reduced by 7% of maximum output current per deg.C to keep the temperature of the power semiconductors within operating limits until a maximum reduction at 125°C (257°F). Beyond this point the module goes into thermal shutdown and turns off. Normal capacity will be returned automatically when the heatsink temperature is reduced below 100°C (212°F).

2.2.7 Wide AC Range

A minor alarm is generated when the AC input voltage drops below specification. In this situation, current limit setting is reduced (in accordance with the input VAC) initially to 90% of the max. output current @185 VAC and at a linear rate down to approximately 25% at 90VAC. At a lower voltage the module will shutdown and will not restart until the AC is greater than or equal to 187VAC.

2.2.8 Current Limit/Short Circuit Protection

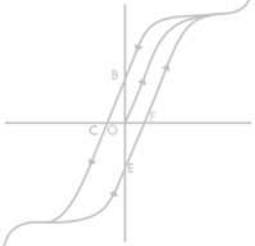
Each module has an adjustable current limit. The current limit function determines the maximum output current limit of the module, regardless of output voltage or power. Maximum output current is limited to a constant value down to short circuit condition. Current limiting can be used to mate the rectifier output current ampacity to the needs of the load and parallel battery to minimize excessive battery recharge current.

2.2.9 Power Limiting

Each module is designed to limit power output to the module specification. This enables more current to be supplied at lower output voltages, and allows matching of output to the demand of constant power loads, normally seen with telecom equipment. ***This feature may also be used for a faster recharge of flooded batteries paralleled with the load.***

2.2.10 Soft Start

To eliminate an instantaneous demand on the AC source, a soft start feature is employed. Soft Start, sometimes referred to as "current walk-in", works by gradually ramping the current limit up from zero to the actual or defined customer setting. The output voltage is ramped up from the minimum voltage to the float voltage. The output current then increases at a rate of 10% of maximum per second.



NOTE: Current limiting overrides the power-limiting feature.

2.2.11 High Voltage Shutdown (HVSD)

This feature provides protection to the load from over voltage conditions originating from the rectifiers. It operates by shutting down the offending rectifier module when a high output voltage condition occurs. Indication is through the red Module Fail LED. Modules will restart automatically; however, if more than three over voltage conditions occur in one minute, the module will latch off and remain shut down until it is reset. Pressing and releasing the O/I button will restart the module.

2.2.12 AC Inrush/Transient Suppression

The modules' inrush current is limited to less than one times the nominal peak line current to prevent surge on the AC line. Modules are also protected from input lightning and transient surges in accordance with IEEE/ANSI C62.41 Category B3.

2.2.13 Input/Output Fuses

Each module is equipped with high interrupting capacity fuses. Abnormal or fault conditions may blow the input or output fuse causing the red ***RECTIFIER FAIL LED*** to illuminate. The Rectifier Fail LED will not illuminate in this case if no parallel battery or load is connected and the AC has failed.

2.2.14 Forced Cooling

Each module is equipped with a front-mounted fan. Cooling of the module is front-to-rear with the hot exhaust exiting at the back.

2.2.15 Battery Eliminator Operation

Modules maintain all specifications (except where indicated) with or without a battery attached in parallel to the output; however, if a battery or another module supplying DC voltage in parallel is not present, there will be no monitoring or control activity if there is an AC power failure or input fuse failure.

2.2.16 Start Delay

The modules are equipped with a delay timer in order to stagger start a series of modules to prevent excessive loading of generators upon start up. The built-in timer delays the turn on of the module depending on the value selected via the front panel or remote controller. A minimum one-second delay is preset to allow charging of the input capacitors.

2.2.17 Security Access Codes

An adjustable three-digit security code is programmed into the Pathfinder modules to prevent access to critical control functions by unauthorized users.

2.2.18 Rectifier Voltage Modes

Modules can operate in one of four modes at any given time:

2.2.18.1 Float Mode

The Float mode is the default-operating mode, where the rectifiers are supplying normal output voltage to the load and/or batteries.

2.2.18.2 Equalize Mode

The Equalize mode is used when it is desired to increase the charging to the batteries to equalize cell voltages.

2.2.18.3 Test Mode

The Test mode offers an extended voltage range for testing functions (such as SYSTEM ALARMS).

2.2.18.4 Battery Test Mode

The Battery Test mode offers an extended voltage range that can be used to check battery performance in conjunction with the SM02 system controller.

2.3 Module Fail Alarms

The alarm conditions listed under this section signify a complete failure or shutdown of the module.

2.3.1 Remote Shutdown

A module will turn off and extend an alarm when it receives a remote shutdown signal from the system controller.

2.3.2 Output Fuse Open

This alarm indicates the module's output fuse has blown.

2.3.3 Input Fuse Open

This alarm indicates that one or more of the module's input fuses have blown.

2.3.4 AC Mains Fail

This alarm is generated when the AC input voltage drops below 88V.

2.3.5 High Voltage Shutdown

This alarm is generated when the module enters HVSD mode.

2.3.6 Thermal Shutdown

A module will shutdown and extend an alarm if the internal ambient temperature exceeds 75°C (167°F).

2.3.7 UPF Fail / Primary Power Circuit Shutdown

This alarm is generated when the UPF section fails or primary power circuit goes into thermal shutdown.

2.3.8 Ramp Test Fail
This alarm is generated when the module ceases to source current for any reason and the Ramp Test fails to indicate that the module can source output current.

2.3.9 Local Shutdown
This alarm is generated when the module is shut down from the local off/on button.

2.3.10 Programmable Start Delay
This alarm is generated when the rectifier is in the start delay mode after a power failure.

2.4 Minor Alarms

The alarms listed under this section signify conditions not immediately affecting basic operation of the unit, and have no immediate affect on module output. A flashing red FAIL LED signifies a minor alarm. Output capacity may be reduced during some general alarm conditions.

2.4.1 VAC Meter Fail
This alarm indicates that the internal AC meter may have failed. A failed meter condition must exist for at least 10 seconds before the alarm is activated.

2.4.2 AC Mains Low
This alarm occurs when the AC input voltage is lower than the specified operating range.

2.4.3 AC Mains High
This alarm occurs when the AC input voltage is higher than the specified operating range.

2.4.4 Fan Fail
This alarm is generated when the fan has failed. The condition must exist for 20 seconds before the alarm is extended.

2.4.5 Fan Speed Error
This alarm is generated when the fan is sending an incorrect speed signal; e.g., from excessive fan bearing wear. This alarm provides a warning that the fan may need to be replaced. The Pathfinder module will continue to run normally during this condition as long as temperature remains within limits.

2.4.6 High Temperature Foldback
This alarm is generated when the rectifier temperature exceeds the maximum normal range and the output current capacity of the module is reduced.

2.4.7 Low Output Voltage
This alarm is generated when the DC output voltage drops below the LVA setting. The alarm will clear when the voltage is 1V above the LVA setting.

2.4.8 Temperature Sense Fail
This alarm is generated if any of the DC/DC converter's internal temperature sensors fail.

2.4.9 High Output Voltage
This alarm is generated when the DC output voltage increases above the HVA setting. The alarm will clear when the voltage drops 1V below the HVA setting.

3 INSPECTION

3.1 Packing Materials

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

Products are also packaged with Cortex. This plastic wrap contains an inhibitor that protects the system from corrosion for up to two years.

3.1.1 Returns for Service

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***.

3.2 Check for Damage

Prior to unpacking the equipment, note any damage to the shipping container. Unpack the equipment and inspect the exterior for damage. If any damage is observed contact the carrier immediately.

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.

Verify that you have all the necessary parts per your order for the proper assembly of your system.

4 INSTALLATION

The Pathfinder 4kW must be mounted in a clean and dry environment.

This chapter is provided for qualified personnel to install the Pathfinder 4kW.

4.1 Safety Precautions

WARNING

Hazardous voltages are present at the input of rectifier systems. The DC output from the rectifiers and the battery system though not dangerous in voltage has a high short circuit current capacity that may cause severe burns and electrical arcing.

Before working with any live battery or power system/distribution center, the following precautions should be followed:

- Remove all metallic jewelry; e.g. watches, rings, eyeglasses, necklaces.
- Wear safety glasses with side shields at all times during installation.
- Use insulated hand tools.

The installer should follow all applicable local rules and regulations for electrical and battery installations; i.e., CSA, UL, CEC, NEC, and local fire codes.

4.2 Tools Required

See Outline drawings 030-680-06 and 030-681-06.

Various tools are essential for product installation. Use this list as a guide:

- Philips head screwdriver, #1 (tip size 5/32")
- Philips head screwdriver, #2 (tip size 3/16")
- Slot head screwdriver (blade size 1/4")
- Digital voltmeter equipped with test leads
- Cutters and wire strippers (#10 to #22AWG) [6 to 2.5mm^2]
- Adjustable 24/48VDC load (optional)
- Crimper (optional for large gauge wire)
- Socket and rachet set (Imperial measure).

4.3 Preparation/Mounting

The rectifier cabinet has been designed for mounting in a standard 19" (19" cabinet option only) or 23" EIA relay rack. Mounting brackets accommodate either 1" or 1-3/4" rack spacing. The cabinet should be mounted to the rack using four #12 – 24 x 1/2" screws in each bracket. Philips-type screws and screwdriver should be used to eliminate the possibility of slippage and scratching of the unit's exterior. Washers (such as internal tooth) or special screws that are designed to cut through the painted surface should be used under the mounting screws to ensure a good chassis ground.

The Pathfinder cabinet should be mounted in a clean and dry environment. Also, make sure there is sufficient space (approx. 3") in front of and behind the unit for ease of access and unrestricted cooling airflow.

5 CABINET GROUNDING, WIRING AND CONNECTIONS

Refer to the previous (Installation) chapter for safety precautions and tools required.

This chapter provides cabling details and notes on cable sizing for DC applications with respect to the Argus Pathfinder 4kW.

5.1 Safety Precautions

WARNING

Hazardous AC voltages may be present. Ensure power at the AC service panel is off before attempting work on the AC connections. Use a voltmeter to verify the absence of voltage. Clearly mark the correct polarity of the battery leads before commencing work on DC connections.

The installer should follow all applicable local rules and regulations for electrical and battery installations; i.e., CSA, UL, CEC, NEC, and local fire codes.

Please refer to Customer Connections drawing 030-681-08.

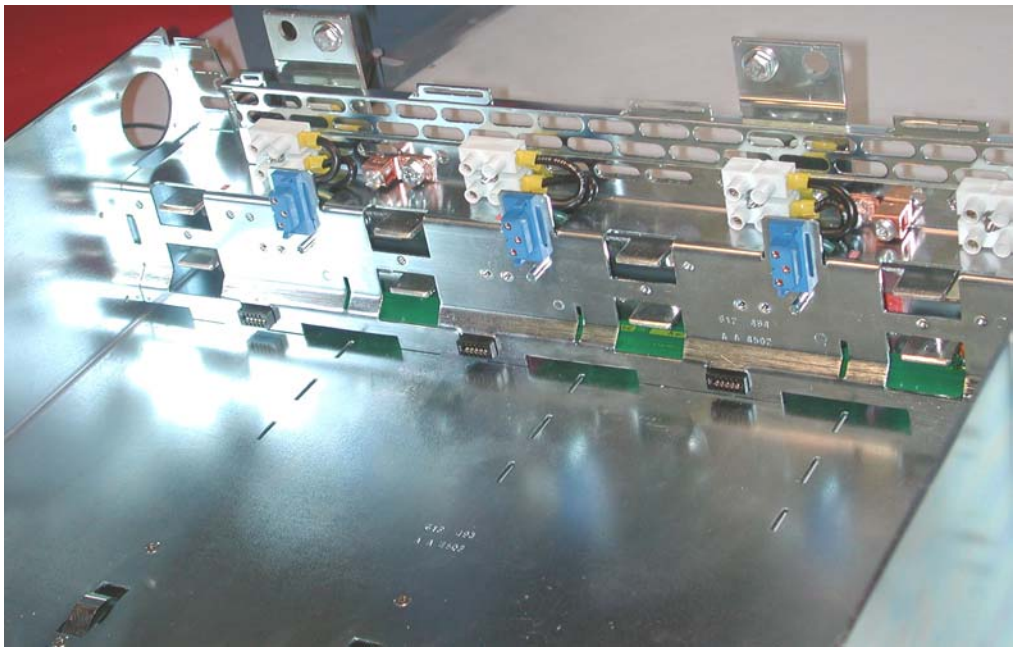


Figure 4–Pathfinder 4kW cabinet (AC wireway cover removed)

5.2 AC Feeder Protection/Sizing

To maximize system reliability each power module must be fed from a dedicated protection feeder breaker located at the AC distribution panel. The feeder breaker can also act as the disconnect device for the connected module.

See specifications section at the beginning of the manual for recommended feeder breaker and wire gauge sizes.

5.3 Chassis Ground Connection

The rectifier cabinet (or "chassis") must be connected to the AC service ground for safety. This is accomplished by connecting the ***ground "green"*** or ***"green - yellow"*** lead of the AC input cable(s) to the box-type terminals (see Figure 5) marked with the ground symbols.

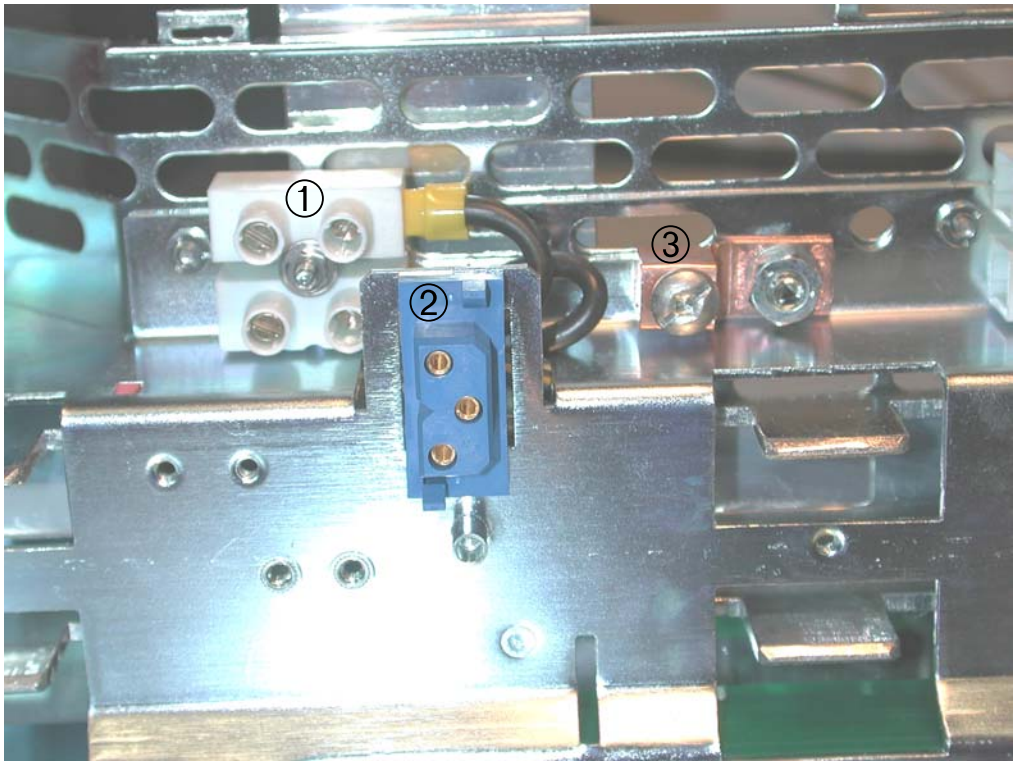


Figure 5–Pathfinder 4kW cabinet ground connection (AC wireway cover removed)

1. AC Input Terminal Blocks (x4)
2. Module AC Input Connectors (x4)
3. Chassis Ground Terminals (x4)

5.4 AC Input Connections

CAUTION: AC input wires should be routed in flexible or rigid conduit as far away as possible from the DC power wires to minimize EMI disturbances.

Ensure all modules are removed from the cabinet. Remove the metal cover from the inside of the cabinet backplane to expose the AC wireway for input terminal blocks TB1, TB2, TB3 and TB4 (for 23" cabinets). Each AC input terminal block and associated chassis ground terminal relates to an individual power module.

The wireway is designed for a customer-supplied 1.25" conduit fitting for AC supply (wiring for max. four rectifiers) located on the left side of the cabinet and a 1" conduit fitting on the right side (wiring for max. two rectifiers). Attach the conduit retainers to the wireway hole(s) and route the AC cables through. Secure the wires to the AC input and chassis ground terminals for each of the modules.

5.5 DC Output Connections

The common output leg of the rectifier system should be connected to ground. This is typically done at the load common termination point.

WARNING: Leave cables or bus bars disconnected at battery and verify output polarity using a voltmeter. Make battery connections only after all other wiring is completed. See Initial Startup chapter.

NOTE: DC output wire must be UL approved XHHW or RHH/RHW; for Canadian users, RW90 Type. Control and sense wires must be UL approved Style 1015; for Canadian users, TEW type.

DC output cables can be connected through the rear of the cabinet; see Figure 6.

DC connections can also be made at the rear of the cabinet to easily accommodate direct connections to vertical bus bars (not shown).

Terminate cables leads with appropriate crimp lugs. Secure the positive and negative to the cabinet output post of the correct polarity; i.e., +Vcable to +Vpost.

WARNING: If a user-provided bolt is used instead of the bolt supplied by Argus Technologies, ensure that the bolt is not too long.

Ensure the washers are on the bolts in the same order in which they were shipped from the factory. Tighten the bolts as per customer connections drawing in the back of this manual.

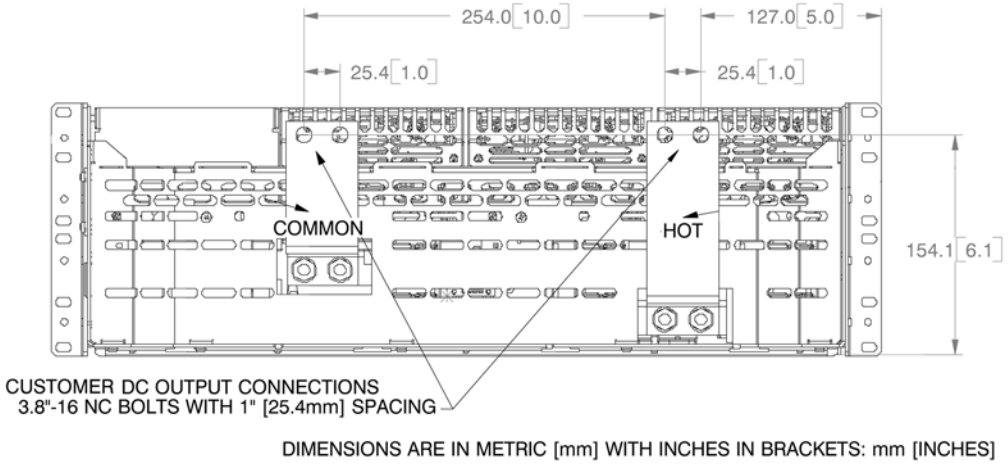


Figure 6–Rear view of Pathfinder 4kW cabinet

5.6 Remote Communications Connections

All alarming and control is accomplished via the RS-485 communications bus.

Two ports (requiring straight through RJ11 interconnect cable) are provided for RS-485 serial communications. See **Remote Communications** chapter for details.

6 INITIAL STARTUP AND CHECKOUT

After completing the system wiring and installation, perform the following startup and test procedure to ensure proper operation:

1. Ensure all power modules are removed from the cabinet. Verify correct load and battery polarity using a voltmeter, and connect battery (if used) to the output of the system.
2. Verify correct output voltage rating of power module(s).
3. Remove output terminal covers from the position(s) where module(s) will be installed.
4. Install power modules. Verify that the ***Module Fail LED(s)*** illuminate (assuming a battery is connected to the system providing backup power). This indicates correct output polarity.
5. Verify AC input voltage is correct and turn on each AC input feeder breaker(s). The ***AC and ON LED(s)*** should illuminate and system will begin charging batteries (If connected).
6. Test functionality of various module alarms and controls (see **Operations and Adjustments** chapter for details). In addition, perform a load test with the system using a resistive loadbox if available.
7. In the adjustments menu, set float and equalize voltage to the levels specified by the battery manufacturer (see **Operations and Adjustments** chapter for details on float adjustment).

7 OPERATION AND ADJUSTMENTS

7.1 Startup and Reset Procedure (after initial system installation)

When the Pathfinder module is powered-up or reset, the optional LCD will display the product serial number and various identification messages. The three front panel LEDs will illuminate, however the FAIL LED should extinguish after the system has finished its start delay and soft start procedure. Next, the LCD (if fitted) will display the module's parameters. See the figure below for a sample screen.

7.2 Module Installation and Removal

WARNING: Do not force a module into position if it does not seat properly. All modules are keyed to ensure that the correct module type is used.

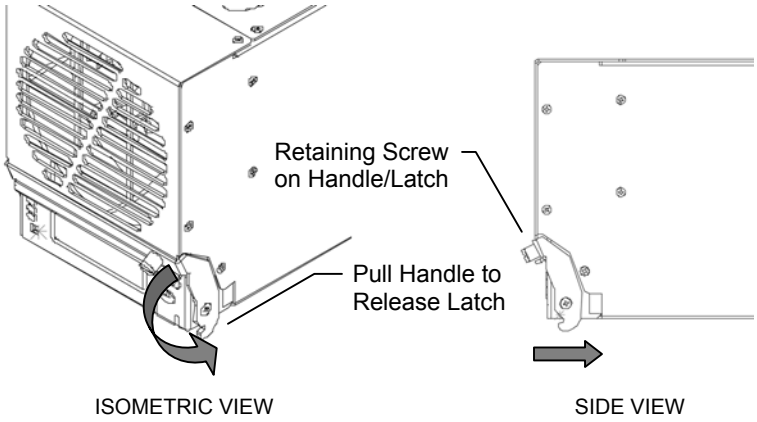


Figure 7–Pathfinder 4kW module installation and removal

7.2.1 Installing Power Modules

Remove output terminal covers from the position(s) where module(s) will be installed. To insert a power module, place it on the cabinet bottom and slide the module into the rear connectors (inside of the cabinet). Rotate the module handle/latch up against the module face assuring the bottom flanges of the handle lock into the cabinet. Tighten the retaining screw (handle to module face) to complete the installation.

7.2.2 Removing Power Modules

Press and hold the O/I button for at least three seconds – this shuts down the module's output power. Loosen the retaining screw on the module handle/latch. Rotate the module handle downwards to release the bottom flanges of the handle from the cabinet. Use the handle to slide the module away from the rear connectors of the cabinet. ***Wait five minutes for all LEDs to extinguish before handling.***

7.2.3 Blank Panel Installation/Removal

The blank panel is held in position with tabs at the top right and bottom left. A thumbscrew at the front of the panel secures the placement.

Insert the tab on the right side of the blank panel into the notch inside the right of the cabinet or module (in the right-most position). Then insert the tab on the bottom left

of the blank panel into the notch in the topside of the cabinet's bottom pan. Secure placement with a thumbscrew (front of the blank panel) into the cabinet's front edge.

Remove the blank panel following the preceding steps in reverse order.

7.3 Default Operating Mode

The Pathfinder's default operation is in Float mode. The module ON LED and AC LED is illuminated and various identification messages are displayed on the (optional) LCD. See Figure 8 below for a sample screen.

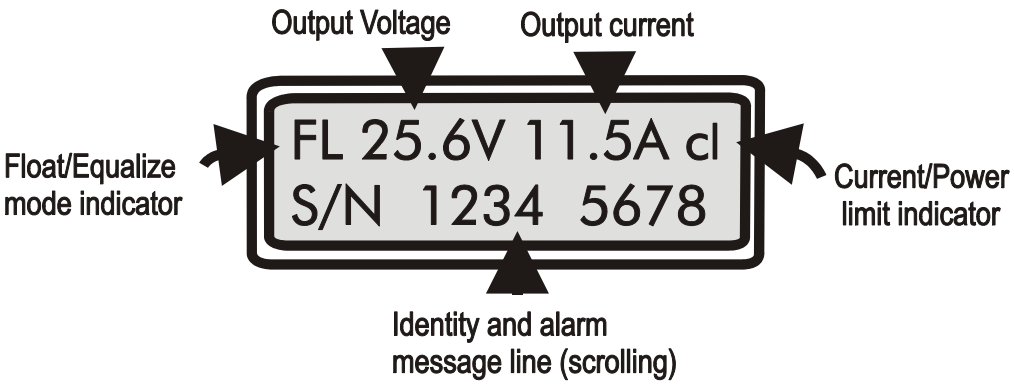


Figure 8–Pathfinder optional LCD in normal mode

To display output current, depress O/I button momentarily to cause the POWER ON LED to flash (20% output current per flash).

If equipped with both the front panel Control Buttons and LCD options, you may enter the Equalize mode by holding down the module's enter key until the "FL" indicator changes to "EQ."

NOTE: Refer to Sections 7.5.2.2 and 7.5.4 regarding other modes of operation.

7.4 Menu Structure

On the Pathfinder version with no LCD, the menu interface is only available remotely through the SM series supervisory panel or a computer terminal emulation program (refer to these product manuals for more information on the user interface; e.g., 034-036-B2 for SM02 Software).

*In this chapter, references to and procedures for **menu navigation** are the same for both the Pathfinder rectifier (equipped with the Control Buttons and LCD options) and the SM series supervisory panel.*

In both the Pathfinder LCD and no LCD version, the menu structure consists of two basic components: ***Menu Categories*** and ***Sub-Menu Items***. To scroll through these items, press the front panel up and down keys to display the correct item and then the enter key to select that item/enter a submenu. ***NB-refer to side bar note.***

When a user attempts to scroll through the menu, he will be prompted to enter a password before entering some submenus. Once the correct password is verified, access will be granted. If no password is entered, the user will not gain access.

7.5 Menu Descriptions

The following section describes each of the Pathfinder's menu items, including alarms, controls and configuration items. They are arranged, as they would appear in the LCD menu. For a graphical representation of the Pathfinder software, command and menu structure, refer to the "menu tree" that follows in Figure 9.

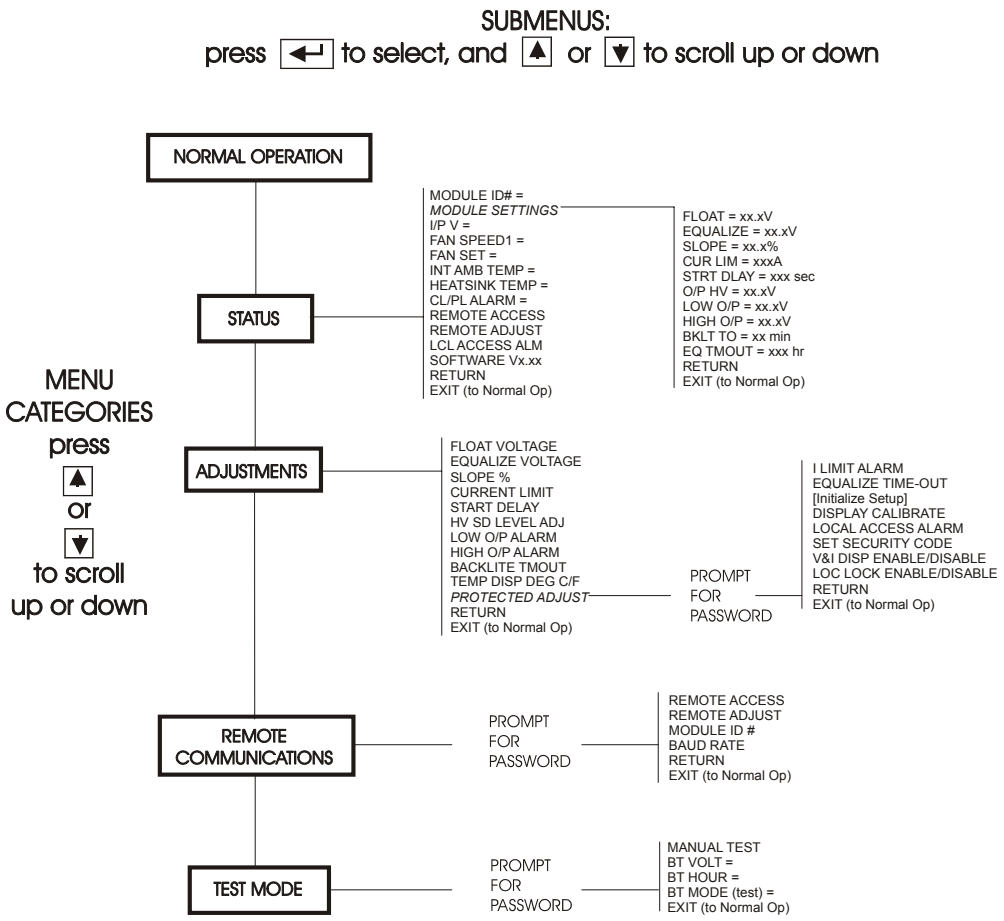


Figure 9–Pathfinder menu tree

7.5.1 Status Menu

This menu category is used for reviewing module setup and status information.

7.5.1.1 Module ID

Displays the assigned module identification number. Modules with the LCD option are assigned a factory default identification number of 01. The ID number is used for remote communications only. No user intervention is required for systems using the SM series supervisory panel.

7.5.1.2 Module Settings (Float, Equalize, Slope, Current Limit, etc.)

This function allows the user to scroll through the various power system parameters.

7.5.1.3 Input Voltage (I/P V)

Displays the AC input voltage to the module.

7.5.1.4 Fan Speed

Displays the off/on status of the fan speed function.

NOTE: To ensure accurate float voltage setting, it is recommended that the float voltage be measured at the battery posts.

7.5.1.5 Fan Set
Displays the off/on status of the fan.

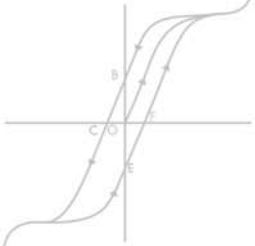
7.5.1.6 Internal Ambient Temperature (INT AMB TP)
Displays the internal air temperature of the module.

7.5.1.7 Heatsink Temperature (HSNK TEMP)
Displays the converter's heatsink temperature.

7.5.1.8 Current Limit / Power Limit Alarm (CL/PL ALRM)
Displays the enable/disable status of the current limit / power limit alarm.

7.5.1.9 Remote Access
Displays the enable/disable status of the remote access function. This function is always enabled if no LCD is installed.

7.5.1.10 Remote Adjust (REMOTE ADJ ACCES)
Displays the enable/disable status of the remote adjust function. This function is always enabled if no LCD is installed.



7.5.1.11 Local Access Alarm (LCL ACC ALM)
Displays the enable/disable status of the local access alarm. Setting has no effect if no LCD is installed.

7.5.1.12 Software Version
Displays the current software version onboard the power module.

7.5.2 Adjustments Menu
This menu category consists of functions that can be adjusted by the user. It includes float and equalize voltage, slope, current limit, alarms, etc. See Tables A and B for default settings and ranges for each item below.

NOTE: Set slope before float or equalize adjustments.

7.5.2.1 Float Voltage
This is the module's default mode at startup and during normal system operation. The "FL" on the LCD's upper left corner indicates this mode. The float voltage cannot be changed when a module is off or in Equalize mode. Similarly, it cannot be increased while the module is in current or power limit – an error message will result.

Float voltage should be adjusted to the level recommended by the battery manufacturer.

NOTE: All modules are connected in parallel. Local adjustment will cause interaction between modules.

To adjust float voltage follow the steps below:

1. Measure the battery voltage with a multimeter (or with the power system's meter) at the battery output posts or on system charge bars.
2. Scroll to the float voltage item in the ADJUSTMENTS menu (ensure the module is in Float mode).
3. Using the arrow keys, adjust each module's float voltage up or down until the battery voltage is set to the desired level. Avoid putting the modules in current limit during this procedure.
4. Once the battery voltage is correct, fine-tune each module's output voltages to balance the current outputs of different units equally.
5. With the multimeter, check that the battery voltage is correct.

7.5.2.2 Equalize Voltage

The Equalize mode is used to equalize or "boost charge" a battery string. It is indicated by the "EQ" on the LCD's left corner. This mode can be selected by pushing the enter key and holding (for more than 3 seconds) while in normal operating mode, or via a remote command through the serial port.

Scroll to the Equalize item in the ADJUSTMENTS menu and follow the same series of steps as described above for the float voltage.

NOTE: If a battery is connected across the load, it may be necessary to wait until the voltage has increased to allow equalize adjustment.

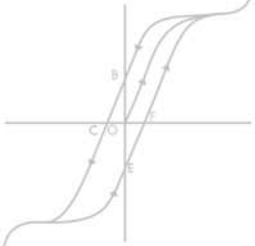
7.5.2.3 Slope %

This function allows the user to adjust the slope percentage. Output slope is a method of load sharing which operates by altering the output voltage regulation of the Pathfinder module. Output slope is factory default at 1% and it is recommended to leave it at that value. Slope settings should be the same value for all rectifiers in a system.

NOTE: Set slope before float or equalize adjustments.

7.5.2.4 Current Limit

This function allows the user to program the setting at which the current limit function engages. If the output current reaches this level, the output voltage will decrease and subsequently limit the output current of the module. A current limit alarm will also be extended. If the module is driven far into current limit, the output voltage may decrease to the point of a LOW O/P VOLTAGE alarm. During a MODULE FAIL condition, the CURRENT LIMIT alarm may be activated. This may indicate a high current condition inside the module.



NOTE: The equalize voltage cannot be changed if the module is off and cannot be increased while in current or power limit – an error message will result.

7.5.2.5 Start Delay

The modules are equipped with a delay timer in order to stagger start a series of modules to prevent excessive loading of standby generators upon start up. The timer delays the AC start of the module depending on the value programmed. Delay time range from 1 - 250 seconds in 5-second increments. A minimum one-second delay is preset to allow for charging of the capacitors. Delay is initiated upon application of AC. At the end of the delay period Soft Start is initiated and the module goes into Float mode by default. When active, the message START DELAY and the time remaining are displayed on the LCD. The START DELAY message is extended remotely in the Operation Status section of the Status screen. There is no delay when the module is returning to operation after a remote shutdown signal removal. The count can be aborted locally by pressing the enter key (local entry of equalize is inhibited during delay start). Toggling the remote shutdown control signal can also remotely activate the count.

7.5.2.6 High Voltage Shutdown Level Adjust (HV SD Level ADJ)

This feature provides protection to the load from over voltage conditions originating from the power system. HV SD cannot be adjusted while the Pathfinder is operating in current limit or power limit. Minimum HV SD adjustment is either the Float or Equalize level plus 1.0V, whichever is higher. HV SD trigger hysteresis is 1.0V. The Module Fail LED will turn on and the Module Fail Relay will de-energize. The O/P HV SHUTDOWN and MODULE FAIL alarms will be extended remotely. The over voltage shutdown feature of the Pathfinder is selective and operates at 5% higher voltage in a less than 2.5% load condition.

7.5.2.7 Low O/P Alarm

This function allows the user to program the setting for the low output voltage alarm. When the output of the module drops below this level, the LOW O/P VOLTAGE alarm will be extended remotely. The alarm has a fixed hysteresis of 1.0V. When the output rises above the hysteresis voltage level, the alarm extinguishes.

7.5.2.8 High O/P Alarm

This function allows the user to program the setting for the high output voltage alarm. When the output voltage of the module rises above this level, the HIGH O/P VOLTAGE alarm will be extended remotely. The alarm has a fixed hysteresis of 1.0V. When the output level falls below the hysteresis voltage, the alarm extinguishes.

7.5.2.9 Backlight Timeout (LCD option)

This function allows the user to adjust the duration that the LCD backlight stays on after the last keypress.

7.5.2.10 Temperature Display C/F

This function allows the user to toggle the display of ambient and heatsink temperature values between the Celsius and Fahrenheit scales.

7.5.2.11 Protected Adjustments

This function allows the user to enter a list of password-protected settings.

7.5.2.12 Power Limit / Current Limit Alarm

When enabled, power limit and current limit conditions cause the General Alarm to be activated. The POWER LIMIT and CURRENT LIMIT alarms are extended remotely. This control toggles between the enabled and disabled states; setting does not affect flashing "pl" & "cl" indicators, which are always enabled.

7.5.2.13 Equalize Timeout

This adjusts the maximum time that the module will remain in Equalize mode when it is selected locally or from the equalize key on the SM series front panel. Equalize time-out is overridden by the remote equalize signal.

7.5.2.14 Display Calibrate

This function allows increases/decreases to output voltage display calibration offset.

7.5.2.15 Local Access Alarm

When this function is enabled, activity of the module control keys in the ADJUSTMENTS, REMOTE COMMUNIC and TEST MODE menus causes the Minor Alarm to be activated. The control toggles between the enabled and disabled states.

7.5.2.16 Set Security Code

This function allows the user to set the security codes for access to the Protected Adjust, Remote Communication and TEST menus. The security code is set one digit at a time with the up or down keys until the desired number is displayed and the enter key is used to select the number. Anytime a menu item that requires a password is selected, the message SECURITY = - - - will show and the first dash will be replaced with a zero as the first digit.

7.5.3 Remote Communications

This menu category consists of functions and controls related to remote communications between the module and a SM series supervisory panel, a computer terminal emulation program, etc.

7.5.3.1 Remote Access

This function allows the user to enable/disable access to the module from a remote site. It is always enabled on modules with no LCD.

When set to LOCKOUT: All remote communications are disabled by this selection. If baud rate is set correctly, the module always responds "REMOTE LOCKOUT" to any received communication.

7.5.3.2 Remote Adjust

This function allows the user to enable/disable remote adjustment control from specific menus. It is always enabled on modules with no LCD.

When set to ACCESS: Full access is granted to all Setup, Adjustment and Remote Communication menu items.

When set to LOCKOUT: Access is allowed only to the Status menu; accessing the Status menu causes the Status screen to be transmitted. Access is not allowed to the Adjustments and Test Mode menus; accessing these menus causes the Pathfinder to respond with "ADJUST LOCKOUT".

Access must be allowed to the Remote Communications menu. The Pathfinder security code is required to make any changes.

7.5.3.3 Module ID#

This control allows the user to set the module ID#. In order for a module to be correctly identified for remote communications, every module on the same RS-485 bus must be assigned a unique identification number. If two modules have the same ID#, a line conflict will occur which will result in garbled communications (this is not applicable to SM series controller communications).

7.5.3.4 Baud Rate

This control allows the user to set the baud rate for communications between the module and a remote site.

7.5.4 Test Mode

This menu category consists of the manual test function and the battery test function. To activate, scroll to the relevant menu item and press enter or use the SM controller.

7.5.4.1 Manual Test

The simulated output voltage is adjusted by pressing the up and down buttons on the front panel. The “MT” beside the output voltage display indicates manual test mode. The purpose of this function is to provide an extended operating voltage range for testing power system parameters.

> **CAUTION: Exercise caution when using the Manual Test function in this mode. Adjustments in this mode will directly affect the module’s output voltage and could result in a disruption of service. For example, decreasing the voltage below the LVD setting may engage the LVD and potentially cut power to the load.**

7.5.4.2 BT Mode (requires SM02 – see manual 034-036-B2)

This function allows the user to activate/deactivate the BT Mode. When activated, the rectifier will lower its output setting to the BT Volt value allowing the battery to discharge into the load. Data is gathered by the SM02 where battery performance is evaluated.

7.5.4.3 BT Volt

This voltage setting is the set point where the automatic battery test function terminates.

7.5.4.4 BT Hour

This setting is a fail-safe override setting that will terminate the battery test where the time has expired if the voltage setting has not been reached.

7.6 Miscellaneous Defaults/Adjustments/Controls

7.6.1 Adjusting the LCD Viewing Angle (e/w Control Buttons option)

Adjustment of the viewing angle/LCD contrast is made by pressing and holding the enter key and the up key together. Next, adjust the angle to setting desired using the up and down keys and then press the enter key to return to normal mode. The unit should be in the normal (or START) operating mode.

7.7 Pathfinder Module Factory Defaults and Ranges

Submenu Item	Programmable Range	Default Setting (24VDC Systems)	Default Setting (48VDC Systems)
Float Voltage	24.0 – 29.0 (24V) 48.0 – 58.0V (48V)	27.0V	54.0V
Equalize Voltage	25.0 – 30.0V (24V) 50.0 – 60.0V (48V)	27.5V	55.0V
Test Voltage	21.0 – 30.0V (24V) 42.0 – 60.0V (48V)	27.0V	54.0V
Battery Test Voltage	21.0 – 30.0V (24V) 42.0 – 60.0V (48V)	22.5V	45.0V
Over Voltage	27.0 – 31.0V (24V) 54.0 – 63.0V (48V)	28.5V	57.0V
High Voltage	26.0 – 31.0V (24V) 52.0 – 63.0V (48V)	28.0V	55.5V
Low Voltage	21.0 – 26.0V (24V) 42.0 – 52.0V (48V)	22.0V	44.0V
Current Limit	40 – 160A (24V) 20 – 80A (48V)	160A	80A

Table A–Adjustments menu defaults

Submenu Item	Programmable Range	Default Setting (24VDC Systems)	Default Setting (48VDC Systems)
Remote Access	Enable/Disable	Enable	Enable
Remote Adjust	Enable/Disable	Enable	Enable
Module ID #	01 – 99	01	01
Baud Rate	2400 – 38400 baud	9600 baud	9600 baud

Table B–Remote communications menu defaults

8 REMOTE COMMUNICATIONS

The Pathfinder rectifier system is optimized for remote communications. It can be controlled, monitored and tested via the SM series intelligent supervisory panel or via an ASCII display terminal.

8.1 Multiple Cabinet Connections (RS-485)

Rectifier cabinets can be daisy-chained together via the RS-485 interface. Refer to the customer connection drawings 030-681-08 for locations and pinout details of the serial communications interface (SCI) connectors. The interconnect cable is an RJ11 telephone-type connector with an offset locking pin. Plug the cable from one connector labeled RS-485 to another connector labeled RS-485 on the next shelf.

8.2 Connecting the SM Series Panel (RS-485)

Local control and monitoring can be accomplished by connecting to the SM series RS-485 interface. Connect the straight through RJ11 interconnect cable to the SM series RS-485 port from one of the available Pathfinder cabinet's RS-485 port.

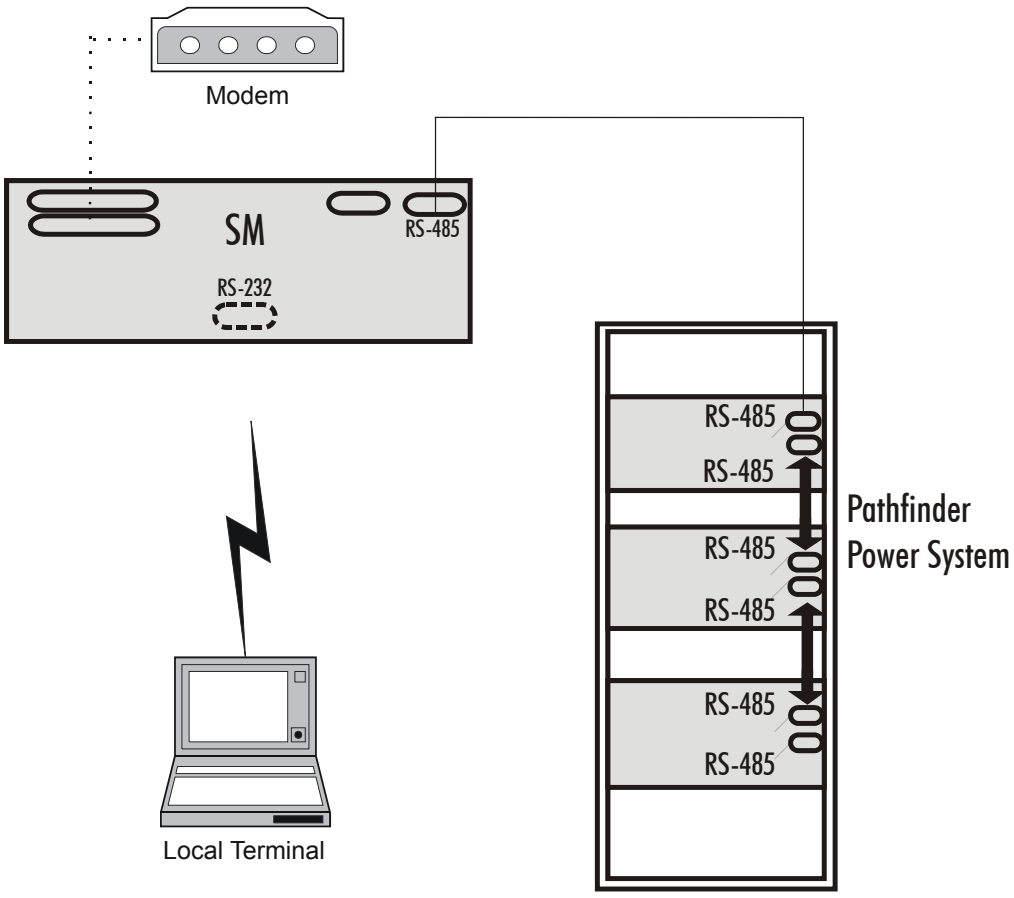


Figure 10–Pathfinder communications connections

8.3 Communications using a PC/Terminal

A terminal may also be connected to the rectifier RS-485 bus to perform monitoring and control. A RS-485 to RS-232 converter may be required.

The Pathfinder is designed to communicate directly with an ANSI terminal to eliminate the need for additional software. Communication with a PC is also possible with a terminal emulation program such as PROCOMM or TELIX. Display information and setup parameters are virtually identical to that available from the built-in front panel keyboard and LCD.

Before connecting the host equipment, ensure the communications access parameters, including default baud rate of your terminal, are set to match the Pathfinder module. The default parameters are set to ***8 data bits, 1 stop bit, and no parity***. The remote terminal must be capable of handling continuous communications at the Pathfinder's specified baud rate. Set the remote terminal for Half Duplex (Local Echo) communications in order to view commands entered.

Once all hardware is setup and a communications link is established, you will need to know how to talk to the Pathfinder modules. There has to be DC power present at the output for the remote communications to function. There are five commands available for navigating the Pathfinder menus and retrieving status information. The up and down commands are used to scroll through menu items and change module settings. The enter command is used to select menu items and accept changes. The status command causes a formatted screen of information to be sent from the module containing the module settings and operating status. The Display command causes the Pathfinder to respond with the 2-line x 16-character display information as found on the power module. Commands are not case sensitive and can be sent as either upper or lower case characters.

Command String format:

[.....command initiator character
##..Module ID# '01' - '99'; use 00 to broadcast the command to all modules
@..remote command character
] .....command terminator character

Command	Definition	Description	Command Example
U	Up	Scroll up or increase setting	[01U]
D	Down	Scroll down or decrease setting	[01D]
E	Enter	Select menu item or accept module setting	[00E]
S	Status	Send status screen	[10S]
?	Display	Send display information	[08?]

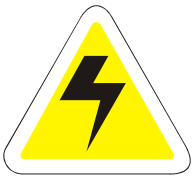
Table C–Navigation and status commands

9 MAINTENANCE AND SERVICE

9.1 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 lists a few 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.

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.

Procedure	Date Completed
Clean ventilation openings	
Inspect fans	
Inspect all system connections (re-torque as necessary)	
Inspect batteries (consult battery manufacturer's recommended procedure)	
Verify alarm/control settings	
Verify float voltage	

Table D–Sample maintenance log

9.2 Service

9.2.1 Tools Required

Refer to the specification section at the front of this manual for replacement parts.

- Philips head screwdriver, #1 (tip size 5/32")
- Slot head screwdriver (blade size 3/8")
- Nut driver, 3/8", or socket, ratchet and extension

9.2.2 Module Removal

1. Press and hold the O/I button for at least three seconds – this shuts down the module's output power.
2. Loosen the retaining screw on the module handle/latch that secures the power module to the cabinet.
3. Rotate the module handle downwards to release the bottom flanges of the handle from the cabinet.
4. Slide the module 10 cm (4") out of the cabinet and wait five minutes for module capacitors to discharge.

9.2.3 Fan Replacement

1. Follow the Module Removal procedure.
2. Remove the two screws that secure the fan grill to the module chassis and lift the grill out of the retaining slots.
3. Disconnect the fan power lead wires from the PCB connector and lift the fan out (note the direction of airflow).
4. Install the replacement fan following the preceding steps in reverse order.

CAUTION: Use care with the fan wire so that the insulation is not damaged – observe routing so that the lead wires are below the fan when it is reinstalled.

9.2.4 Fuse Replacement

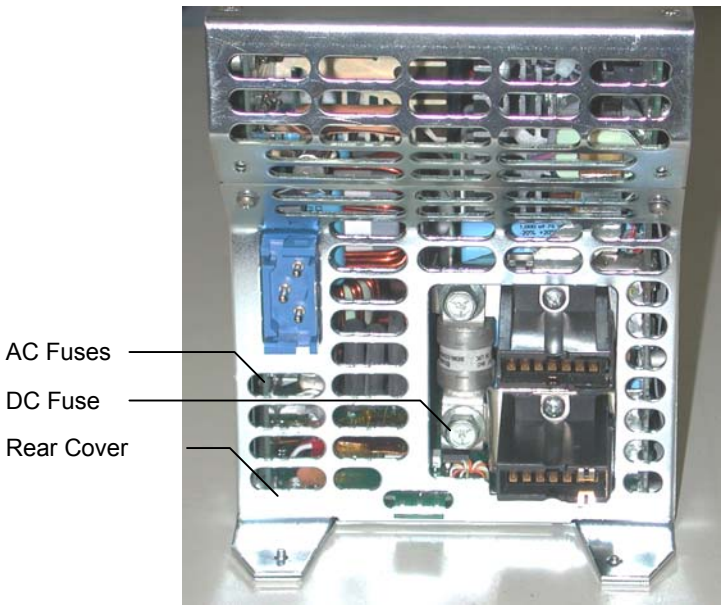


Figure 11–Rear view of Pathfinder 4kW module

9.2.4.1 AC Fuse Replacement

1. Follow the Module Removal procedure.
2. Turn the module around to face the back of the unit and remove the four screws securing the bottom rear cover.
3. Remove the cover and locate the AC fuses on the vertical printed circuit board to the left side of the module, they are the round cartridge fuses in the clip-style holder.
4. Remove the fuse(s); an insulated screwdriver may be used to lift one end from the fuse clip.
5. Install the new fuse(s), then replace the cover and secure with the screws and re-install the module.

9.2.4.2 DC Fuse Replacement

1. Follow the Module Removal procedure.
2. Turn the module around to face the back of the unit.
3. Locate and remove the DC fuse on the left of the main DC output socket using a 3/8” nut driver or socket set.
4. Install the new fuse and screws and retighten snugly. Re-install the module.

10 ARGUS CONVENTIONS

10.1 Numbering System

Argus Technologies uses an 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, for example:

"-05" Schematic

"-06" Outline Drawing

"-20" Main Assembly

Argus uses an 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.

10.2 Acronyms and Definitions

AC Alternating current

ANSI American national standards institute

ASCII American standard code for information interchange

AWG American wire gauge

DC Direct current

EIA Electronic Industries Association

HVSD High voltage shutdown

IEEE Institute of Electrical and Electronics Engineers

LCD Liquid crystal display

LED Light emitting diode

LVD Low voltage disconnect

NC Normally closed

NO Normally open

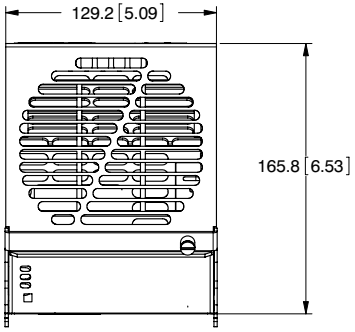
NSTA National Safe Transit Association

OVP Over-voltage protection

RU Rack unit (1.75")

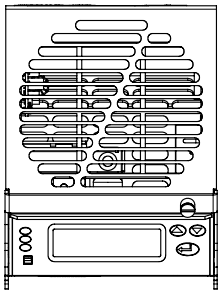
SCI Serial communication interface

UPF Unity power factor; also known as Power Factor Correction (PFC)



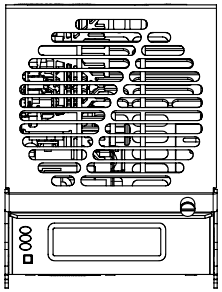
FRONT VIEW

LIST 55, 80 - NO LCD DISPLAY



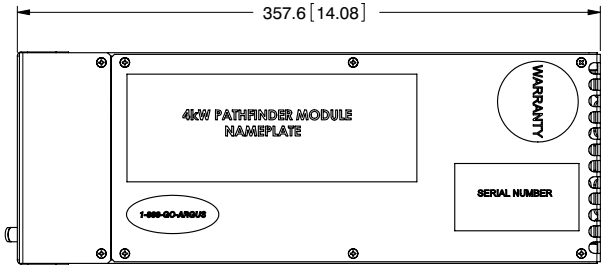
FRONT VIEW

LIST 55, 81- WITH LCD DISPLAY AND CONTROL BUTTONS

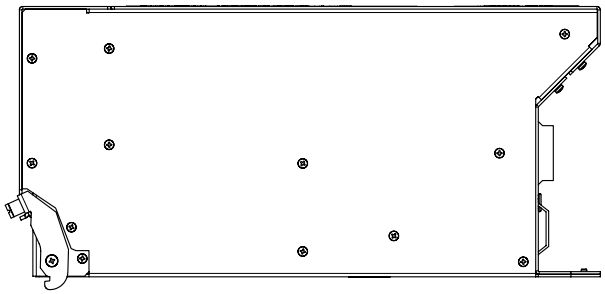


FRONT VIEW

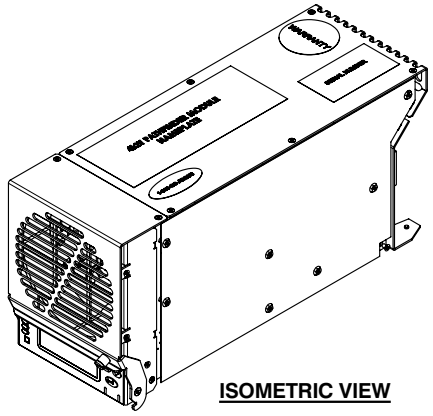
LIST 55, 82- WITH LCD DISPLAY, NO CONTROL BUTTONS



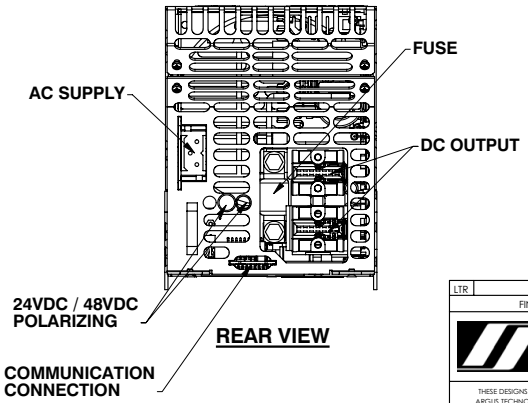
TOP VIEW



RIGHT SIDE VIEW



ISOMETRIC VIEW



REAR VIEW

REVISIONS			
LTR	DESCRIPTION	DATE	APPD
A	PRODUCTION RELEASE	07/01	GS
B	UPDATED VIEWS	07/02	

DIMENSIONS ARE IN METRIC [mm] WITH INCHES IN BRACKETS: mm [INCHES]

LTR	DESCRIPTION	QTY
	FINISHED HOLE LEGEND	

ARGUS TECHNOLOGIES

DESIGN	J.U.	2003/01	MATERIAL
DRAWN	J.U.	2003/01	
CHECKED			
APPROVED	CDD	2003/01	FINISH

TOLERANCES: X.X ±0.04" [X] ±1mm; X.XX ±0.02" [X.X] ±0.5mm; X.XXX ±0.01" [X.XX] ±0.25mm

PER P.O. and Doc. 070-024-83

SCALE N.T.S.

TITLE: OUTLINE, MODULE PATHFINDER 4kW

ISSUE DATE

SHEET 1 OF 1

SIZE	TYPE	DWG NO.	REV
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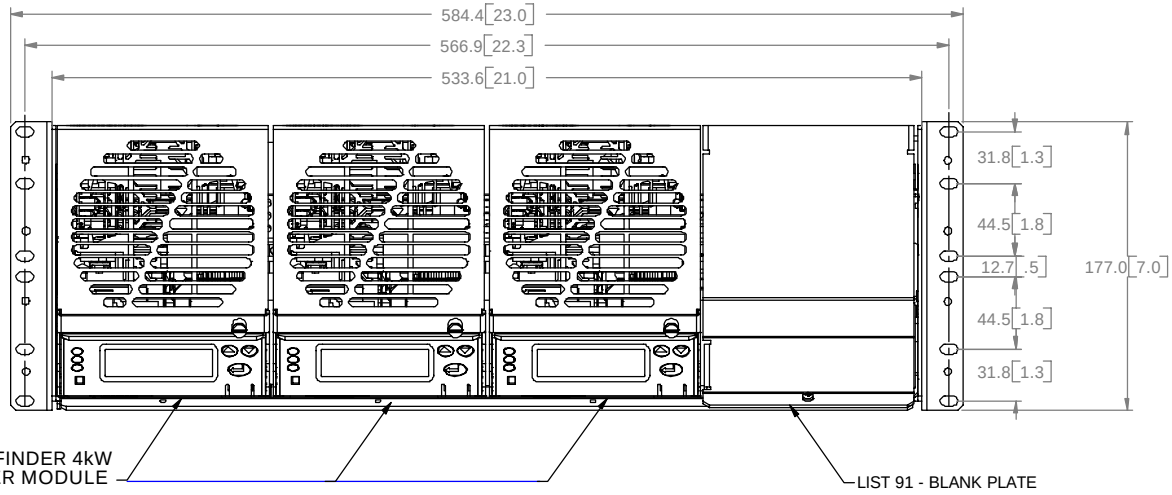
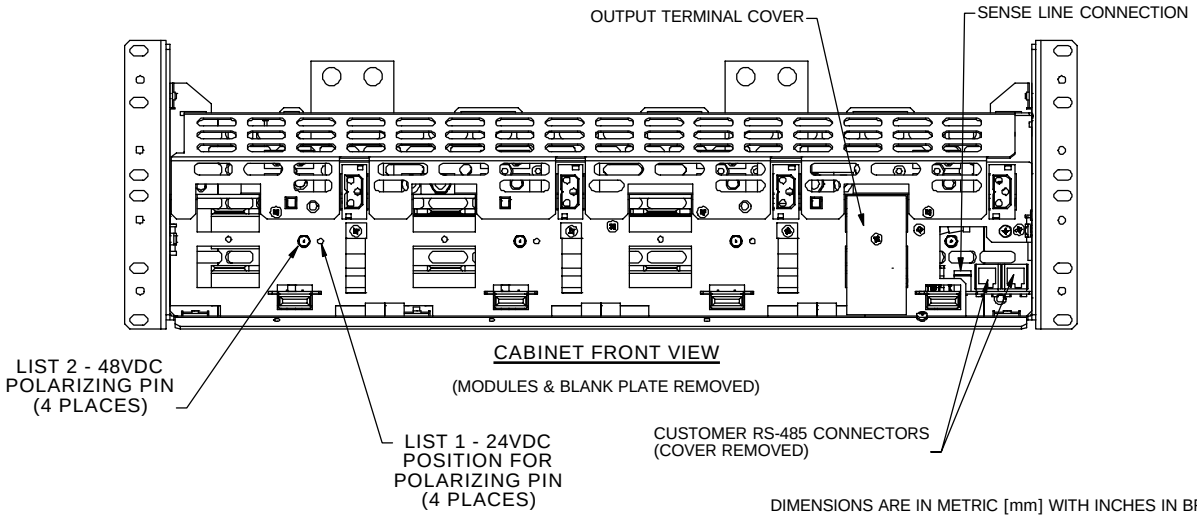
REVISIONS			
LTR	DESCRIPTION	DATE	APPD
A	ASSEMBLY UPDATED, LIST 82 ADDED		2003/04



FRONT VIEW WITH 3 MODULES

LIST 23 & 25 DIMENSIONS



CABINET FRONT VIEW

(MODULES & BLANK PLATE REMOVED)

DIMENSIONS ARE IN METRIC [mm] WITH INCHES IN BRACKETS: mm [INCHES]

LTR	DESCRIPTION	QTY
	FINISHED HOLE LEGEND	

ARGUS TECHNOLOGIES

DESIGN	J.U.	2003/01	MATERIAL
DRAWN	J.U.	2003/01	
CHECKED			
APPROVED	C.A.	2003/01	FINISH

TOLERANCES
X.X ±0.04" [X] ±1mm
X.XX ±0.02" [X.X] ±0.5mm
X.XXX ±0.01" [X.XX] ±0.25mm

PER P.O. and Doc. 070-024-83

SCALE N.T.S.

TITLE

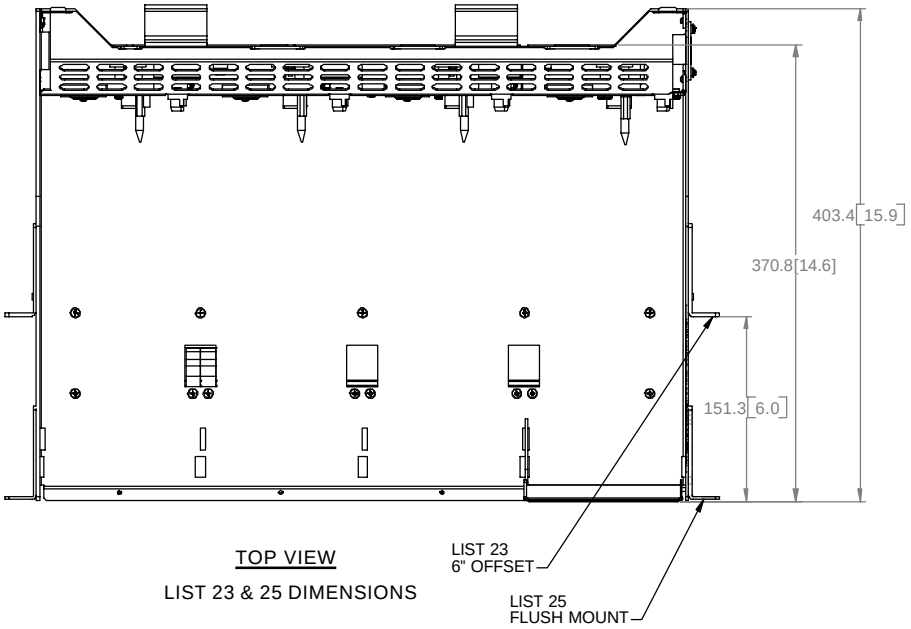
OUTLINE, 23" CABINET
PATHFINDER 4kW

ISSUE DATE

SHEET 1 OF 3

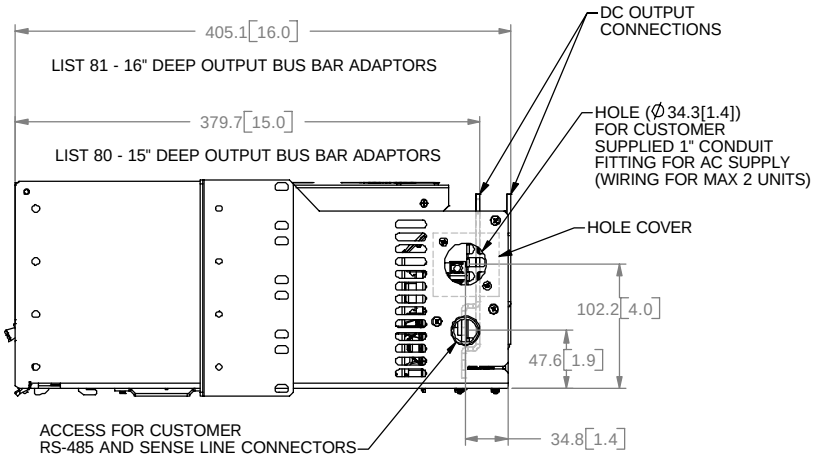
SIZE	TYPE	DWG NO.	REV
B	D2	030-681-06	B

REVISIONS			
LTR	DESCRIPTION	DATE	APPD

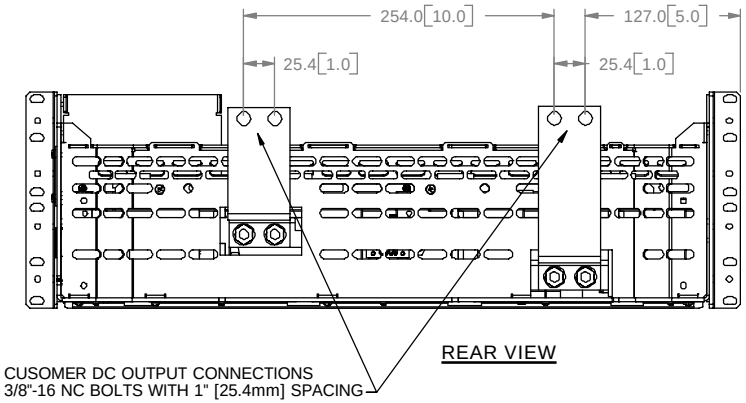


TOP VIEW

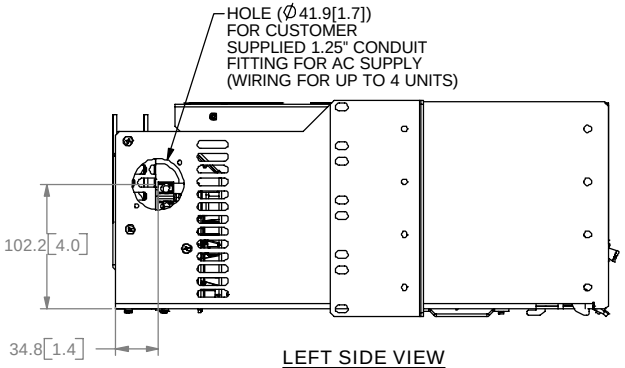
LIST 23 & 25 DIMENSIONS



RIGHT SIDE VIEW



REAR VIEW



LEFT SIDE VIEW

LIST 80 & 81 BUS BAR ADAPTORS

DIMENSIONS ARE IN METRIC [mm] WITH INCHES IN BRACKETS: mm [INCHES]

LTR	DESCRIPTION	QTY
	FINISHED HOLE LEGEND	

ARGUS TECHNOLOGIES

DESIGN	J.U.	2003/01	MATERIAL
DRAWN	J.U.	2003/01	
CHECKED			
APPROVED			FINISH

PER P.O. and Doc. 070-024-83

TOLERANCES
X.X ±0.04" [X] ±1mm
X.XX ±0.02" [X.X] ±0.5mm
X.XXX ±0.01" [X.XX] ±0.25mm

SCALE N.T.S.

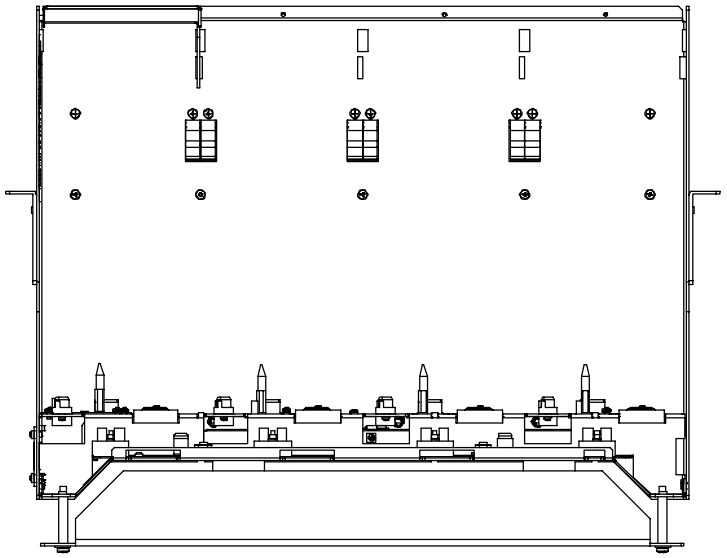
TITLE
OUTLINE, 23" CABINET
PATHFINDER 4kW

ISSUE DATE

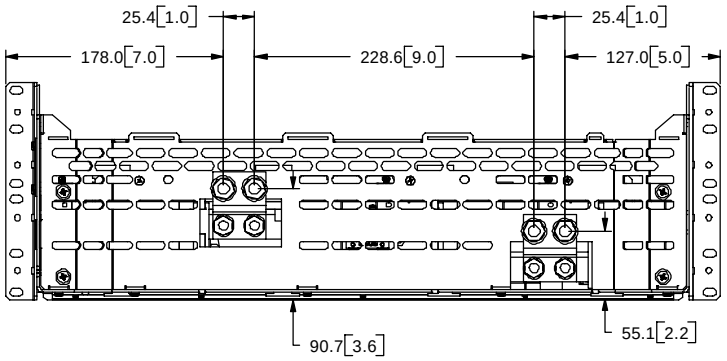
SHEET 2 OF 3

SIZE	TYPE	DWG NO.	REV
B	D2	030-681-06	B

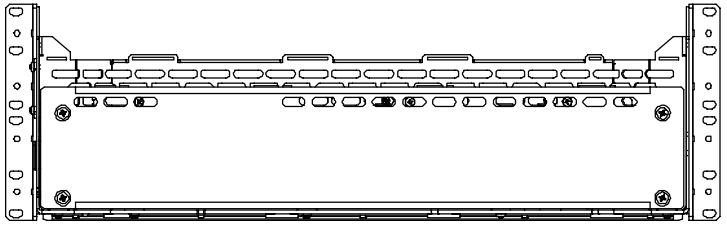
REVISIONS			
LTR	DESCRIPTION	DATE	APPD



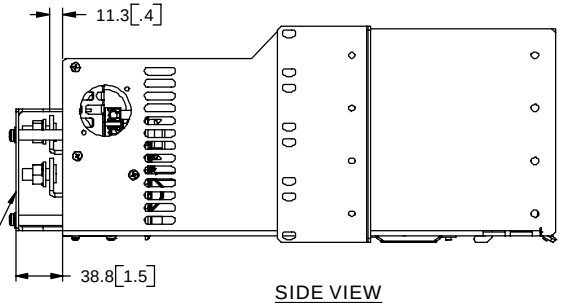
TOP VIEW



REAR VIEW
(COVER NOT SHOWN)



REAR VIEW



SIDE VIEW

NON CONDUCTIVE COVER

LIST 82 - ADAPTOR FOR CABLE CONNECTION

DIMENSIONS ARE IN METRIC [mm] WITH INCHES IN BRACKETS: mm [INCHES]

LTR	DESCRIPTION	QTY
	FINISHED HOLE LEGEND	

ARGUS TECHNOLOGIES

DESIGN	J.U.	2003/01	MATERIAL
DRAWN	J.U.	2003/01	
CHECKED			
APPROVED			FINISH

PER P.O. and Doc. 070-024-83

TOLERANCES
X.X ±0.04" [X] ±1mm
X.XX ±0.02" [X.X] ±0.5mm
X.XXX ±0.01" [X.XX] ±0.25mm

SCALE N.T.S.

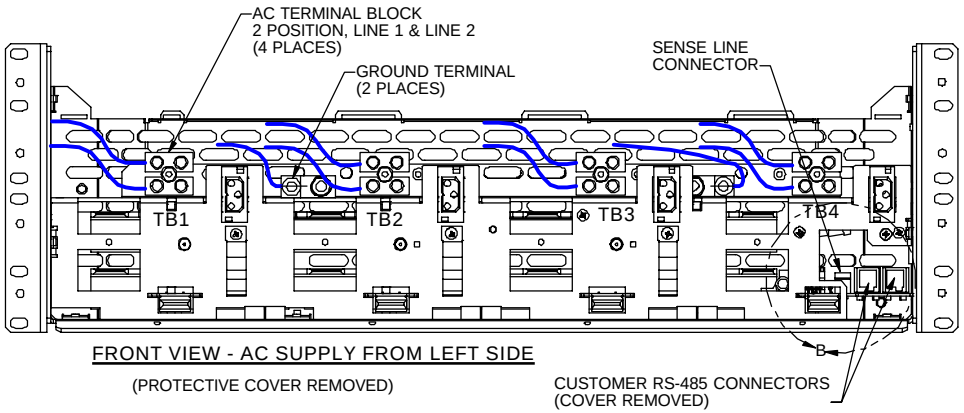
TITLE
OUTLINE, 23" CABINET
PATHFINDER 4kW

ISSUE DATE

SHEET 3 OF 3

SIZE	TYPE	DWG NO.	REV
B	D2	030-681-06	B

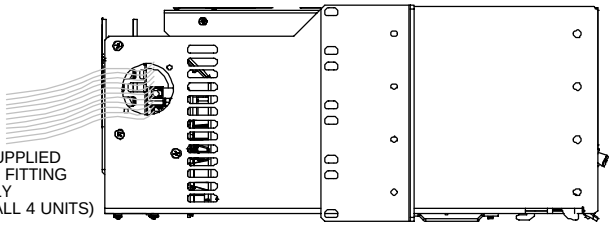
REVISIONS			
LTR	DESCRIPTION	DATE	APPD
B	ASSEMBLY UPDATED, LIST 82 ADDED		2003/04



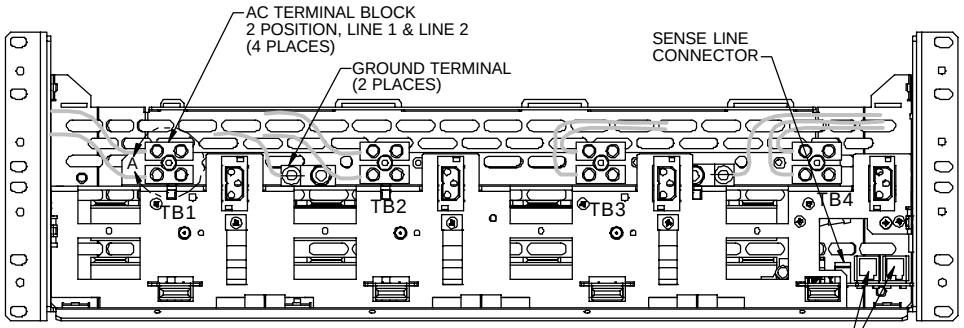
FRONT VIEW - AC SUPPLY FROM LEFT SIDE

(PROTECTIVE COVER REMOVED)

CUSTOMER RS-485 CONNECTORS
(COVER REMOVED)



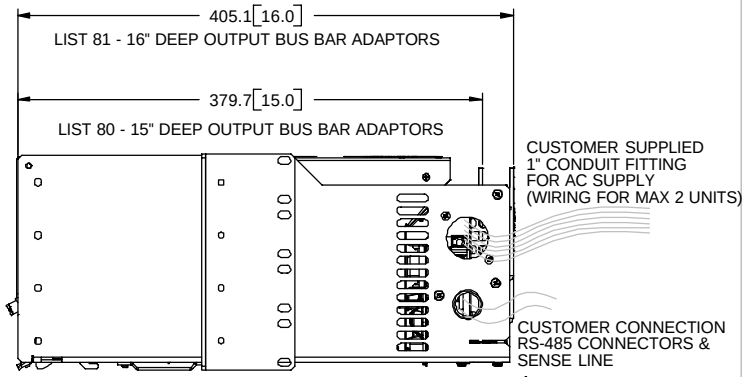
LEFT SIDE VIEW



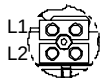
FRONT VIEW - AC SUPPLY FROM BOTH SIDES

(PROTECTIVE COVER REMOVED)

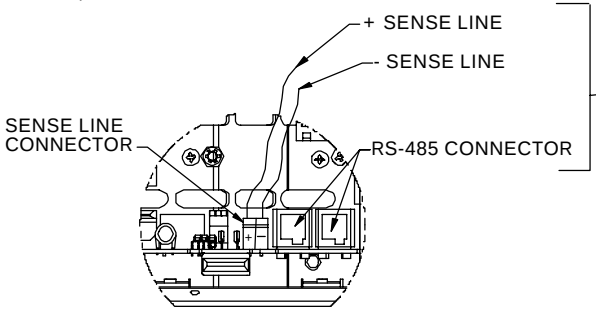
CUSTOMER RS-485 CONNECTORS
(COVER REMOVED)



RIGHT SIDE VIEW



DETAIL A
TB1 - 4



DETAIL B
SCALE 1 : 2

DIMENSIONS ARE IN METRIC [mm] WITH INCHES IN BRACKETS: mm [INCHES]

LTR	DESCRIPTION	QTY
	FINISHED HOLE LEGEND	

ARGUS TECHNOLOGIES

DESIGN	J.U.	2003/01
DRAWN	J.U.	2003/01
CHECKED		
APPROVED	C.A.	2003/01

MATERIAL

FINISH
PER P.O. and Doc. 070-024-83

TOLERANCES
X.X ±0.04" [X] ±1mm
X.XX ±0.02" [X.X] ±0.5mm
X.XXX ±0.01" [X.XX] ±0.25mm

SCALE N.T.S.

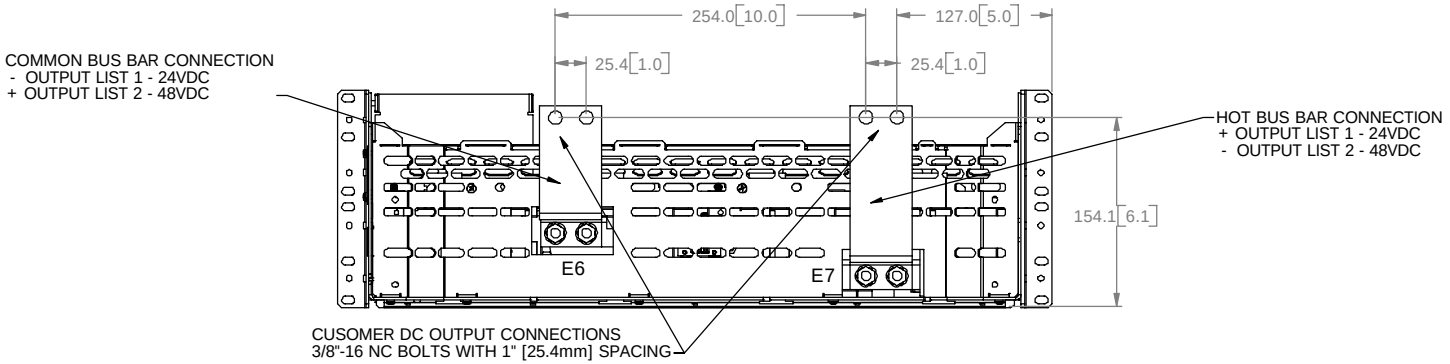
TITLE
CUSTOMER CONNECTION, 23" CABINET, PATHFINDER 4kW

ISSUE DATE

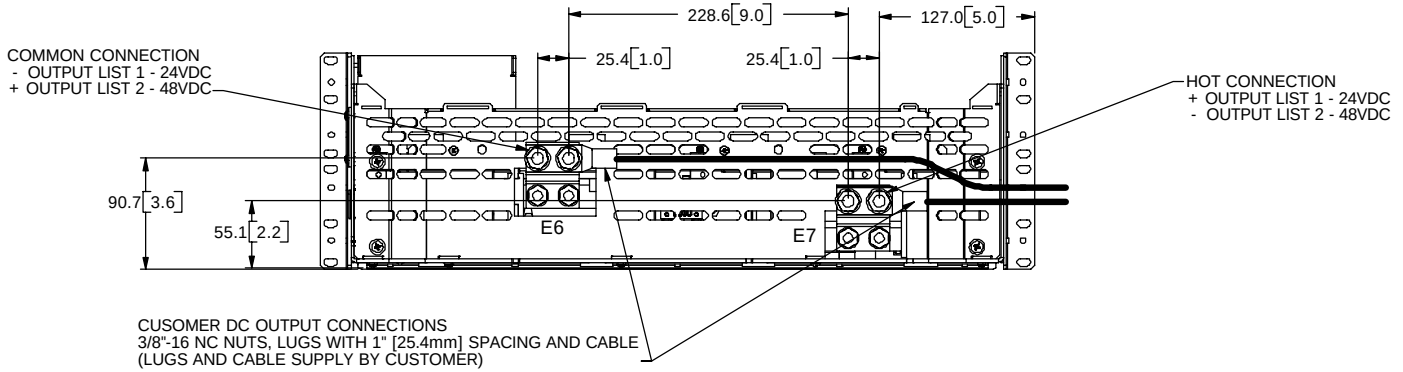
SHEET 1 OF 2

SIZE	TYPE	DWG NO.	REV
B	D2	030-681-08	B

REVISIONS			
LTR	DESCRIPTION	DATE	APPD



REAR VIEW
LIST 80, 15" DEEP BUS BAR ADAPTOR
LIST 81, 16" DEEP BUS BAR ADAPTOR



REAR VIEW
LIST 82, ADAPTOR FOR CABLE CONNECTION
(BUS BAR COVER NOT SHOWN)

DIMENSIONS ARE IN METRIC WITH INCHES IN BRACKETS: mm [INCHES]

LTR	DESCRIPTION	QTY
	FINISHED HOLE LEGEND	

ARGUS TECHNOLOGIES

DESIGN	J.U.	2003/01	MATERIAL
DRAWN	J.U.	2003/01	
CHECKED			
APPROVED			FINISH

TOLERANCES
X.X ±0.04" [X] ±1mm
X.XX ±0.02" [X.X] ±0.5mm
X.XXX ±0.01" [X.XX] ±0.25mm

PER P.O. and Doc. 070-024-83

SCALE N.T.S.

TITLE
CUSTOMER CONNECTION,
23" CABINET, PATHFINDER 4kW

ISSUE DATE

SHEET 2 OF 2

SIZE	TYPE	DWG NO.	REV
B	D2	030-681-08	B

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***.

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

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,
1407I 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
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Fax: +65 6458 2122

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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 Tiffield Road
Toronto, ON, M1V 5N2 Canada
Tel: +1 416 293 3088
Fax: +1 416 293 0671

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

Mexico & Central America
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Anatole France No. 17
Col. Polanco
Mexico City, 11560 Mexico
Tel: +52 55 5280 6990
Fax: +52 55 5280 6585

South America
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Buenos Aires, 1416 Argentina
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