ARGUS

CS15 DC-DC Converter 012-547-B2





Visit us at www.argus.ca

ARGUS®

This page intentionally left blank.

Visit www.argus.ca

CS15 DC-DC CONVERTER

#012-547-B2

SERIAL # _____

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

- Specifications: 012-547-B1 Rev B
- CSA/NRTL Equivalence: 048-554-10
- Warranty Policy: 048-507-10
- Important Safety Instructions
- Installation and Operation Instructions: 012-547-C0 Rev A
- Factory Service Information: 048-527-10

Printed in Canada. Copyright © 2002 Argus Technologies Ltd. ARGUS is a registered trademark of Argus Technologies Ltd. All Rights Reserved.

SPECIFICATIONS FOR ARGUS TECHNOLOGIES' DC-DC CONVERTER CS15

Module Output

Output Voltage:	$160VDC \pm 10V$
Output Current:	0.50 Amps DC maximum
Power:	80W maximum
Regulation:	Less than \pm 2VDC line Less than \pm 3VDC load
Protection:	Short circuit, OVP, output fuse to open above 0.5A
Transient Response:	Less than 5ms to \pm 0.5VDC Deviation is less than \pm 5VDC for 50 – 100% load step
Temperature Coefficient:	Less than 250ppm/°C
EMI:	The unit meets the requirements of: FCC 47 CFR Part 15:1998 Class B ENV 50204-1996 EN 55022:1994 Class B EN 61000, parts 4-2 to 4-4 and 4-6

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

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the 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.

<u>Standards</u>

Designed to meet:

Bellcore GR-63-CORE:1995 Vibration & Shock, (Transport / Shock Packaged) Category A, (4.3.1 and 4.4.4)



c standards met.

Safety:

SPECIFICATIONS FOR ARGUS TECHNOLOGIES' DC-DC CONVERTER CS15

Module Input

Input Voltage:	20 – 60VDC nominal				
Power:	95W maximum				
Input Current:	5Amps DC maximum				
Efficiency:	Greater than 82% for 50 – 100% load				
Protection:	Input fuses / Reverse polarity protection				
Recommended Feeder Breaker:	10A				
Over-voltage:	Up to 80VDC; no damage to unit				
Noise:	Less than 150mV_{p-p} to 100MHz Less than 10mV_{RMS} to 10MHz Less than 22dB_{rus} with battery source (> 30 Ab)				
<u>Environmental</u>					
Temperature:	0 to 50°C (32 to 122°F)				
Humidity:	0 to 95% relative non-condensing				
Elevation:	-500 to 3000m (-1640 to 9843 ft)				
<u>Connections</u>					
DC Input:	2 position, right angle, terminal block, standard screw, 0.438" spacing				
DC Output:	IEC 320 connector with AC line cord soldered to CS15 PCB				
Recommended Input Connection Wire Size (as per UL/CSA)					

	Temperature Range	Minimum Wire Size
	0 to 50°C (32 to 122°F)	0.75mm² (#18 AWG)
Fu	sing	
	Input Fuse:	Two 5A Slow Blow 250V, Littlefuse 313005 or equiv.
	Output Fuse:	One 0.5A Slow Blow 250V, Littlefuse 313-1/2 or equiv.
Mi	<u>scellaneous</u>	
	Size:	56mm H x 81mm W x 213mm D (2.2" H x 3.2" W x 8.4" D)
	Weight:	1.1kg (2.4 lb.)
	Mounting (option):	2RU, 19"/23" flush mounted with Argus Network Connector

The above information is valid at the time of publication. Consult factory for up-to-date ordering information. Specifications are subject to change without notice.

WARRANTY AND REPAIR INFORMATION

Warranty Policy

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

Argus reserves the right to void the warranty if:

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

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

Freight Policy

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

Terms of Payment (North America)

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

Terms of Payment (International)

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

Return Material Policy

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

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

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

Business Hours

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

Canada and Internatio

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 ATTN, INVA 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 Dongguan City, Guangdong Province, an, Liaobu Town 523400 China +86 755 8895 3310 +86 755 8895 3307 Tel:

Authorized Service Cente

Argentina Argus Technologies de Argentina Belen 315, Capital Federal, Buenos Aires, 1407l Argentina Tel: +54 (11) 4672 4821 +54 (11) 4504 4698 +54 9 (11) 4993 9996 Fax: Cell Email: Ikleiman@argus.ca

Asia

Argus Technologies Asia Pte Ltd
 Blk 6 Tagore Lane #160

 Singapore 787570

 Tel:
 +65 6458 8900

 Fax:
 +65 6458 2122

Australia

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

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 & Servic 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 Fax:

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

Mexico & Central America Technologies Argus First De Mexico SA de CV Anatole France No. 17 Col. Polanco
 Mexico
 City, 11560
 Mexico

 Tel:
 +52
 55
 5280
 6990

 Fax:
 +52
 55
 5280
 6585

South America

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

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 Fax:

CSA/NRTL — MARKS — BACKGROUND

What are the CSA and NRTL?

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

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

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

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

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

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

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



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



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



IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS:

This manual contains important safety and operating instructions for the Argus CS15 DC-DC Converter.

- 1. Before using the converter, read all instructions and cautionary markings on: (1) converter and (2) product using converter.
- 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 equipment.
- 3. Do not expose the converter to rain or snow.
- 4. **CAUTION** Unless otherwise noted, use of an attachment not recommended or sold by the converter manufacturer may result in a risk of fire, electric shock, or injury to persons.
- 5. **CAUTION** Do not operate the converter if it has received a sharp blow, been dropped, or otherwise damaged in any way return it to a qualified service center for repair.
- 6. **CAUTION** Do not disassemble the converter call our qualified service centers for servicing. Incorrect reassembling may result in a risk of electrical shock or fire.

CONTENTS

1			
	1.1	Scope of the Manual	. 1
	1.2	Part Numbers and List Options	. 1
2	FEATURES		2
	2.1	Power Indicator	. 2
	2.2	Connections	. 2
	2.3	Protection	. 2
3	INSPI	ECTION	3
	3.1	Packing Materials	. 3
	3.2	Check For Damage	. 3
4	1 INSTALLATION		4
	4.1	CS15 Mounting Pad Assembly (for Network Connector)	. 4
	4.2	CS15 and Network Connector Chassis Assembly	. 5
5	WIRING		6
	5.1	Tools Required	. 6
	5.2	Ground Connection	. 6
	5.3	Power Connections	. 7
6	6 MAINTENANCE		8
	6.1	Fuse Replacement	. 8
7	7 Argus Conventions		10
	7.1	Numbering System	10
	7.2	Acronyms and Definitions	10

FIGURES

1 INTRODUCTION

1.1 Scope of the Manual

This instruction manual explains the installation, interconnection and operation of Argus Technologies' CS15 DC-DC converter module.

The CS15 is a component of the Argus Network Connector 02. Please refer also to the manuals supplied with the complete system for further definition of features.

1.1.1 Product Overview

The CS15 (see Figure 1) is a non-isolated DC-DC converter with 160 VDC output. It was designed to provide power, derived from rectifier or battery system voltage¹, to a "book" size computer for use in the Argus Network Connector 02. This will negate the use of AC power and an AC UPS needed to run the computer during an AC failure when monitoring is most critical.



Figure 1–Front view of CS15 converter

Powered by the CS15 and operating in a controlled environment, the computer will run the Argus SNMP Agent Software translating Argus SM02 data back to the customer's network operations center (N.O.C.).

1.2 Part Numbers and List Options

The CS15 is available as a list option with the Argus Network Connector 02. Please refer to the Network Connector manual or consult the factory for up-to-date ordering information.

For more information on the complete system, refer to the Argus Network Connector 02 documentation.

¹ Most commonly, the rectifier/battery power source will be 24VDC or 48VDC. The CS15 will accept either voltage.

2 FEATURES

2.1 Power Indicator

The front panel LED provides an indication of converter status. Under normal operating conditions the LED will be on. When the LED is off there may be a blown fuse, unit failure or simply no input power.

2.2 Connections

A terminal block, line cord and chassis lug can found at the rear of the converter housing (see Figure 2). These provide connections for DC input system voltage, DC output power and system grounding respectively.



Figure 2–Rear view of CS15 converter

2.3 Protection

The input fuses will open under the following conditions:

- Input reverse polarity
- Over-voltage condition greater than ~2 seconds

The output fuse will open for output current exceeding 0.5 A.

The output voltage will be limited to ~ 200 V for a short period by a MOV. The MOV and input fuses will blow for over-voltage conditions (> ~ 2 sec).

The converter housing can be removed to access the fuses for replacement.

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 standards.

Products are also packaged with Cortex. This plastic wrap contains a corrosive 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.



Figure 3-CS15 and mounting pad for use in the Network Connector



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

4 INSTALLATION

The CS15 is designed for mounting within the Argus Network Connector chassis, which is then secured to a 19" or 23" EIA relay rack.

4.1 CS15 Mounting Pad Assembly (for Network Connector)

- 1. Screw PEM to front of mounting pad (see Figure 4).
- 2. Align notch on converter (below the front panel LED) with PEM.
- 3. Slide the two pieces together and secure at the back with the screw provided.



Figure 4–CS15 and mounting pad assembly



Figure 5-CS15 with mounting pad ready to install in the Network Connector

The CS15 must be mounted in a clean and dry environment.

4.2 CS15 and Network Connector Chassis Assembly

- 1. Remove the front panel of the Network Connector chassis.
- 2. Note any cable routing and be careful not to damage the cable insulation.
- 3. Align the feet of the converter mounting pad with notches in the Network Connector chassis (see Figure 6).
- 4. Slide the CS15 back into position.
- 5. Reassemble the front panel of the Network Connector chassis (see Figure 7).



Figure 6–CS15 and Network Connector chassis assembly





5 WIRING

WARNING Ensure that input power and output power is removed before attempting work on the CS15's wiring connections.

WARNING For safety reasons, ensure the CS15's cabinet is properly bonded to the buildings ground grid.

5.1 Tools Required

- Slotted screwdriver (blade size 1/4")
- Slotted screwdriver (blade size 1/8")
- #2 Phillips screwdriver (tip size 3/16")
- Cutters and wire strippers (#14 to #22 AWG) [0.34 to 2.5 mm²].

5.2 Ground Connection

Connect the ground wire (see Figure 8) between the CS15 and Network Connector chassis and place excess wire under the CS15.



Figure 8–CS15 and Network Connector ground connection assembly

Connections to the unit should comply with all local electrical codes and ordinances.



5.3 **Power Connections**

All wiring connections are accessible at the rear of the unit. All cables should be routed through the access holes, bundled together with clips and clamped directly into applicable terminal blocks.

5.3.1 Module Input

Terminal blocks can accommodate wire sizes per the specifications section near the front of this manual. Power must be connected as follows:

- 1. Connect system (+) power bus lead to (+) terminal of converter
- 2. Connect system (-) power bus lead to (-) terminal of converter
- 3. Secure leads with cable-ties to the CS15 chassis.

System can operate from a 24 or 48VDC input with no configuration required.

5.3.2 Module Output

Connect the output cable from the CS15 to the "book" size computer (see Figure 9).



Figure 9–CS15 and Network Connector power connection assembly

Reference: drawings supplied with the Network Connector 02.

6 **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 all system connections (re-torque as necessary)	
Verify alarm/control settings	
Verify alarm relay operation	

6.1 Fuse Replacement

- 1. Shut unit power off
- 2. Remove four screws of unit top cover (see Figure 10)
- 3. Locate fuse at front of unit (see Figure 11)
- 4. Remove blown fuse and replace with same type.

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





Figure 11-Top view of CS15, cover removed to show fuses

7 ARGUS CONVENTIONS

7.1 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.

7.2 Acronyms and Definitions

- AC Alternating current
- DC Direct current
- LED Light emitting diode
- MOV Metal oxide varistor
- OVP Over-voltage protection
- RU Rack unit (1.75")

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 gualified 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.

Canada and International

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

USA

Argus Technologies Inc ATTN: RMA Returns 3116 Mercer Avenue Bellingham, WA, 98225 USA +1-360 756 4904 +1-360 647 0498 Fax: 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 Cente

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: Ikleiman@argus.ca

Asia

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

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

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 Stree Carole Park QLD 4300 Australian Sales & Service Tel: +61 07 3361 6587 Fax: +61 07 3361 6705 Fax: New Zealand Sales & Service

Tel: +64 9 978 6689 +64 9 978 6677 Fax: Canada

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

Europe Alpha Technologies Europe Ltd. Aipha lechnologies 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 +52 55 5280 6585 Fax:

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 Enerii 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

This page intentionally left blank.