DRANETZ
BMI

Series 5500 DualNode
User's Guide

WARNING

Death, serious injury, or fire hazard could result from improper connection of this instrument. Read and understand this manual before connecting this instrument. Follow all installation and operating instructions while using this instrument.

Connection of this instrument must be performed in compliance with the National Electrical Code (ANSI/NFPA 70-2002) of USA and any additional safety requirements applicable to your installation.

Installation, operation, and maintenance of this instrument must be performed by qualified personnel only. The National Electrical Code defines a qualified person as "one who has the skills and knowledge related to the construction and operation of the electrical equipment and installations, and who has received safety training on the hazards involved."

Qualified personnel who work on or near exposed energized electrical conductors must follow applicable safety related work practices and procedures including appropriate personal protective equipment in compliance with the Standard for Electrical Safety Requirements for Employee Workplaces (ANSI/NFPA 70E-2000) of USA and any additional workplace safety requirements applicable to your installation.

Dranetz-BMI • 1000 New Durham Road • Edison, New Jersey 08818-4019
Telephone 1-800-372-6832 or 732-287-3680
Fax 732-248-1834 • www.dranetz-bmi.com

Published by Dranetz-BMI
1000 New Durham Road
Edison, NJ 08818-4019 USA
Telephone: 1-800-372-6832 or 732-287-3680
Fax: 732-248-1834
Web site: www.dranetz-bmi.com

Printed in the United States of America.

P/N UG-5590 Rev. C

US Pat Nos. 4,694,402, 5,481,468, 5,574,654, 5,933,092, 5,862,391, 5,764,155, 5,696,501, 5,768,148

ADVERTENCIA

Una conexión incorrecta de este instrumento puede producir la muerte, lesiones graves y riesgo de incendio. Lea y entienda este manual antes de conectar. Observe todas las instrucciones de instalación y operación durante el uso de este instrumento.

La conexión de este instrumento debe ser hecha de acuerdo con las normas del Código Eléctrico Nacional (ANSI/NFPA 70-2002) de EE. UU., además de cualquier otra norma de seguridad correspondiente a su establecimiento.

La instalación, operación y mantenimiento de este instrumento debe ser realizada por personal calificado solamente. El Código Eléctrico Nacional define a una persona calificada como "una que esté familiarizada con la construcción y operación del equipo y con los riesgos involucrados."

AVERTISSEMENT

Si l'instrument est mal connecté, la mort, des blessures graves, ou un danger d'incendie peuvent s'en suivre. Lisez attentivement ce manuel avant de connecter l'instrument. Lorsque vous utilisez l'instrument, suivez toutes les instructions d'installation et de service.

Cet instrument doit être connecté conformément au National Electrical Code (ANSI/NFPA 70-2002) des Etats-Unis et à toutes les exigences de sécurité applicables à votre installation.

Cet instrument doit être installé, utilisé et entretenu uniquement par un personnel qualifié. Selon le National Electrical Code, une personne est qualifiée si "elle connaît bien la construction et l'utilisation de l'équipement, ainsi que les dangers que cela implique."

WARNUNG

Der falsche Anschluss dieses Gerätes kann Tod, schwere Verletzungen oder Feuer verursachen. Bevor Sie dieses Instrument anschliessen, müssen Sie die Anleitung lesen und verstanden haben. Bei der Verwendung dieses Instruments müssen alle Installation- und Betriebsanweisungen beachtet werden.

Der Anschluss dieses Instruments muss in Übereinstimmung mit den nationalen Bestimmungen für Elektrizität (ANSI/NFPA 70-2002) der Vereinigten Staaten, sowie allen weiteren, in Ihrem Fall anwendbaren Sicherheitsbestimmungen, vorgenommen werden.

Installation, Betrieb und Wartung dieses Instruments dürfen nur von Fachpersonal durchgeführt werden. In dem nationalen Bestimmungen für Elektrizität wird ein Fachmann als eine Person bezeichnet, welche "mit der Bauweise und dem Betrieb des Gerätes sowie den dazugehörigen Gefahren vertraut ist."

Safety Summary

Definitions

WARNING statements inform the user that certain conditions or practices could result in loss of life or physical harm.

CAUTION statements identify conditions or practices that could harm the Series 5500, its data, other equipment, or property.

NOTE statements call attention to specific information.

Symbols

The following International Electrotechnical Commission (IEC) symbols are marked on the top and rear panel in the immediate vicinity of the referenced terminal or device:


Caution, refer to accompanying documents (this manual).


Alternating current (ac) operation of the terminal or device.


Direct current (DC) operation of the terminal or device.


Protective conductor terminal.

Definiciones

Las ADVERTENCIAS informan al usuario de ciertas condiciones o prácticas que podrían producir lesiones mortales o daño físico.

Las PRECAUCIONES identifican condiciones o prácticas que podrían dañar la Series 5500, sus datos, otros equipos o propiedad.

Las NOTAS llaman la atención hacia la información específica.

Símbolos

Los siguientes símbolos de la Comisión Internacional Electrotécnica (IEC) aparecen marcados en el panel superior y el posterior inmediatos al terminal o dispositivo en referencia:


Precaución, consulte los documentos adjuntos (este manual).


Operación de corriente alterna (ca) del terminal o dispositivo.


Operación de corriente continua (CC) del terminal o dispositivo.


Terminal de protección del conductor.

Safety Summary

Définitions

Les messages d'AVERTISSEMENT préviennent l'utilisateur que certaines conditions ou pratiques pourraient entraîner la mort ou des lésions corporelles.

Les messages de MISE EN GARDE signalent des conditions ou pratiques susceptibles d'endommager "Series 5500", ses données, d'autres équipements ou biens matériels.

Les messages NOTA attirent l'attention sur certains renseignements spécifiques.

Symboles

Les symboles suivants de la Commission électrotechnique internationale (CEI) figurent sur le panneau arrière supérieur situé à proximité du terminal ou de l'unité cité:


Mise en garde, consultez les documents d'accompagnement (ce manual).


Fonctionnement du terminal ou du dispositif sur le courant alternatif (c.a.).


Fonctionnement du terminal ou de l'unitécourant continu (CC).


Borne conductrice de protection.

Definitionen

WARNUNGEN informieren den Benutzer darüber, daá bestimmte Bedingungen oder Vorgehensweisen körperliche oder tödliche Verletzungen zur Folge haben können.

VORSICHTSHINWEISE kennzeichnen Bedingungen oder Vorgehensweisen, die zu einer Beschädigung von Series 5500, seiner Daten oder anderer Geräte bzw. von Eigentum führen können.

HINWEISE machen auf bestimmte Informationen aufmerksam.

Symbole

Die folgenden Symbole der Internationalen Elektrotechnischen Kommission (International Electrotechnical Commission; IEC) befinden sich auf der Abdeck- und Seitenplatte unmittelbar am betreffenden Terminal oder Gerät.


Vorsichtshinweis, siehe Begleitdokumente (dieses Handbuch).


Wechselstrombetrieb des Terminals bzw. Geräts.


Gleichstrombetrieb im Terminal oder Gerät.


Terminal-Schutzleiter.

Safety Summary

Safety Precautions

The following safety precautions must be followed whenever any type of connection is being made to the instrument.

- ☐ Connect the green safety (earth) ground first, before making any other connections.
- ☐ When connecting to electric circuits or pulse initiating equipment, open their related breakers. DO NOT install any connection of the instrument on live power lines.
- ☐ Connections must be made to the instrument first, then connect to the circuit to be monitored.
- ☐ Wear proper Personal Protective Equipment, including safety glasses and insulated gloves when making connections to power circuits.
- ☐ Hands, shoes and floor must be dry when making any connection to a power line.
- ☐ Make sure the unit is turned OFF before connecting probes to the rear panel.
- ☐ Before each use, inspect all cables for breaks or cracks in the insulation. Replace immediately if defective.

Medidas de seguridad

Las medidas de seguridad siguientes deberán observarse cuando se realice cualquier tipo de conexión al instrumento.

- ☐ Antes de hacer cualquier conexión, deberá enchufarse el conector de seguridad verde a tierra.
- ☐ Cuando se haga conexiones a circuitos eléctricos o a equipo de activación por pulso, deberá abrirse sus respectivas cajas de seguridad. NO deberá hacerse ninguna conexión del instrumento en líneas eléctricas bajo tensión.
- ☐ Las conexiones deberán hacerse primero al instrumento y, luego, al circuito a ser monitorizado.
- ☐ Al hacer conexiones a circuitos eléctricos, deberá utilizar anteojos y guantes protectores.
- ☐ Sus manos, zapatos y el piso deberán estar secos en todo momento en que se haga una conexión a un cable eléctrico.
- ☐ Verifique que la unidad esté DESACTIVADA antes de conectar sondas en el panel posterior.
- ☐ Previo a cada uso, deberá verificarse que los cables no estén rotos y que el material aislante no tenga rajaduras. Reemplace de inmediato cualquier parte defectuosa.

Mesures de Sécurité

Les mesures de sécurité suivantes doivent être prises chaque fois qu'un type de connexion quelconque est effectué sur l'instrument.

- ☐ Connecter d'abord la prise de terre de sécurité verte (terre) avant d'effectuer toute autre connexion.
- ☐ Ouvrir les disjoncteurs correspondants lors d'une connexion à des circuits électriques ou à des équipement de génération d'impulsions. NE PAS effectuer de connexion d'instrument sur des lignes électriques sous tension.
- ☐ Une fois toutes les connexions de l'instrument effectuées, connecter au circuit à contrôler.
- ☐ Porter des lunettes de protection et des gants isolants pour effectuer des connexions aux circuits électriques.
- ☐ S'assurer que les mains, les chaussures et le sol soient secs lors de connexions à une ligne électrique.
- ☐ S'assurer que l'unité est ÉTEINTE avant de connecter les sondes au panneau arrière.
- ☐ Inspecter tous les câbles, avant chaque utilisation, pour s'assurer que les isolants ne sont pas coupés ou fendus. Remplacer immédiatement tous les équipements défectueux.

Sicherheitsvorkehrungen

Die folgenden Sicherheitsvorkehrungen sind immer dann zu befolgen, wenn eine Verbindung zum Instrument hergestellt wird.

- ☐ Schließen Sie zuerst die grüne Sicherheits-/Erdleitung an, bevor Sie eine andere Verbindung herstellen.
- ☐ Öffnen Sie beim Anschluß an elektrische Stromkreise oder Impulsauslösungseinrichtungen die entsprechenden Unterbrecher. Es dürfen KEINE Anschlüsse an das Instrument unter stromführenden Spannungsleitungen montiert werden.
- ☐ Die Verbindungen müssen zuerst am Instrument und danach an der zu überwachenden Schaltung hergestellt werden.
- ☐ Tragen Sie Schutzbrillen und Isolierhandschuhe, wenn Sie Anschlüsse an den Stromkreisen vornehmen.
- ☐ Hände, Schuhe und Fußboden müssen trocken sein, wenn Sie Anschlüsse an den Stromkreisen durchführen.
- ☐ Stellen Sie sicher, daß das Gerät AUSgeschaltet ist, bevor Sie an der rückwärtigen Konsole Meßfühler anschließen.
- ☐ Prüfen Sie vor jedem Gebrauch alle Kabel auf Bruchstellen und Risse in der Isolierung. Wechseln Sie schadhafte Kabel sofort aus.

FCC Statement

This device has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

Warranty

Dranetz-BMI warrants that the Series 5500 will be free from defects in workmanship and materials for a period of one year from the date of purchase. Dranetz-BMI will, without charge, replace or repair, at its option, any warranted product returned to the Dranetz-BMI factory service department.

Dranetz-BMI shall not be held liable for any consequential damages, including without limitation, damages resulting from loss of use, or damages resulting from the use or misuse of this product. Some states do not allow limitations of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific rights and you may also have rights which vary from state to state.

Exclusions: *This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized repairs or alterations.*

Need Help?

How to Contact Dranetz-BMI

Regardless of your location, Dranetz-BMI sales and product support are within easy reach through an established network of representatives and distributors worldwide.

For Sales, Technical Support, or the name of a Dranetz-BMI Sales Representative in your area, call:

1-800-372-6832 or 732-287-3680

Fax: 732-248-1834

Web site: www.dranetz-bmi.com

Welcome to the Series 5500 DualNode

Congratulations on your purchase of the Series 5500 DualNode - Models 5590, 5592 and 5593.

The 559X DualNode combines functionalities of the InfoNode® and the EPQ DataNode®. It performs power quality monitoring and energy management with analysis, notification, and web server functions into a single unit. By logging into the InfoNode from any PC having Internet access (or access to the network in which the system operates) or via modem, users can obtain extensive monitoring data, information and answers from the DualNode's triggering and database management techniques. The user interface is a conventional Internet browser, with access restricted only to those users with the correct password. No additional software is required on the user's PC.

Please read this and all user's guides carefully to obtain the greatest value from your power monitoring equipment and to avoid damage and injury that can occur from misuse and improper connection.

Contents

Preface
Safety Summary iii
FCC Statement..... ix
Warranty..... x
Need Help? x
Welcome to the Series 5500 DualNode..... xi

1 Series 5500 DualNode Overview
Series 5500 DualNode Description..... 1-1
Features and Highlights..... 1-1
DualNode Models 5590, 5592 and 5593 Front Panel 1-2
DualNode Model 5590 Rear Panel 1-3
DualNode Model 5592 Rear Panel 1-4
DualNode Model 5593 Rear Panel 1-5

2 Preparation for use
Connections for Voltage and Current 2-1

3 Specifications
Series 5500 DualNode Specifications..... 3-1

4 Operation
Data Generation..... 4-1

Appendix A DualNode Model 5593: Ratio and Magnitude Correction for Standard Dranetz-BMI Probes

Series 5500 DualNode Overview

1

The Series 5500 DualNode includes DualNode Models 5590, 5592 and 5593. This manual contains the following information about the Dranetz-BMI Series 5500 DualNode: functional description, features and highlights, front and rear panel description, voltage/current connections, specifications, and data generation.

Series 5500 DualNode Description

DualNode Models 5590, 5592 and 5593 each performs the combined functions of the InfoNode® and the EPQ DataNode®. The DualNode monitors and acquires power quality data, then converts and manages data into information. Each DualNode model performs power quality monitoring and energy management combined with analysis, notification, and web server functions all in one.

DualNode Models 5590, 5592 and 5593 are designed using the same physical enclosure as shown below. Each model, however, features different voltage and current connectors in the rear panel (see pages 1-3 to 1-5). The different connectors provide wider options for DualNode to interface with various Dranetz-BMI power monitoring equipment and accessories.

Front panel of DualNode Models 5590, 5592 and 5593

The InfoNode provides the user interface for each 559X through a self-contained web server. See the *Series 5500 InfoNode User's Guide* (P/N UG-INODE5500) for the various tab menu information and instructions.

The following items are included with the 5590 DualNode as standard accessories:

Power cord	P/N 900744 (USA only)
	P/N 115369-G1 (Euro only)
	P/N 115368-G2 (UK only)
User's Guide	P/N UG-5590

Features and Highlights

- No specialized software or hardware necessary. The 559X DualNode visualization and analysis tools, as well as standard or customized reports, are integrated into the InfoNode tab pages accessible through a web browser.

- Advanced triggering and database management capture all critical information - from submicrosecond transients to long duration interruptions.

- Adaptive sampling techniques provide min/max/avg RMS values, updated every half cycle, along with up to 22 continuous waveform cycles of event data.

- Harmonic, interharmonic, and power parameters are calculated using internationally recognized standard algorithms.

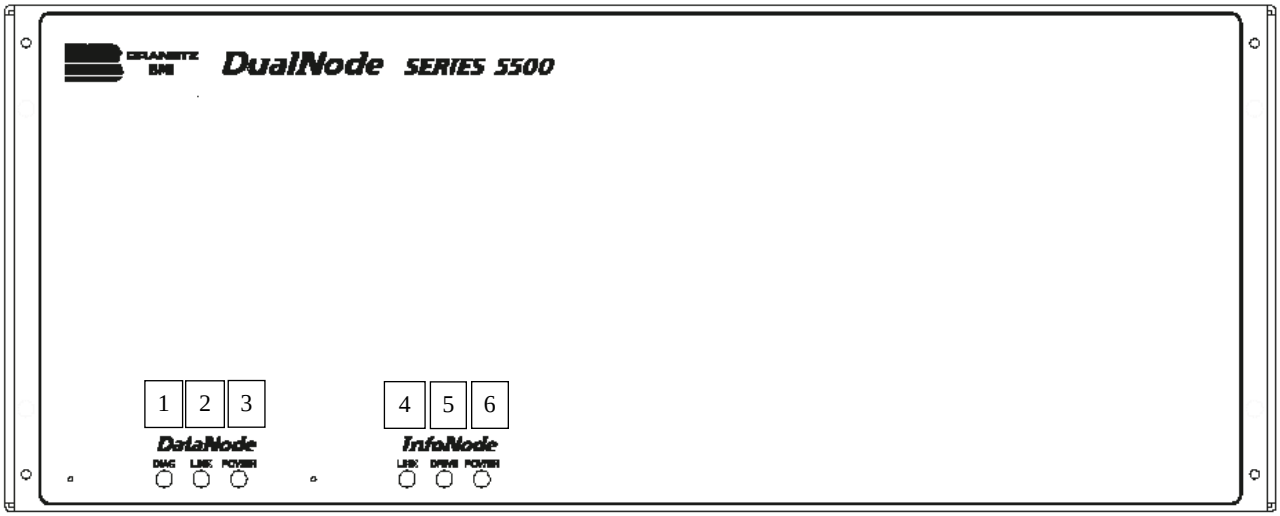
- An internal UPS keeps the 559X collecting critical data, even when power is interrupted due to fault conditions.

- Options such as GPS time synch and cross triggering can expand the functionality of the 559X into a larger scale system.

- Data can be permanently archived or uploaded via NodeLink® for additional analysis in DranView®.

1 Series 5500 DualNode Overview

DualNode Models 5590, 5592 and 5593 Front Panel



DataNode

1 **DIAG** - Indicator lamp will be on during start-up and periodic healthcheck diagnostics.

2 **LINK** - Indicator lamp will flash when the unit is responding to network requests. (Except when connected via AUI port.)

3 **POWER** - Indicator lamp will flash in a heartbeat fashion when the unit is operating normally.

NOTE: *All three lamps will flash simultaneously when the unit is in Administrator mode.*

InfoNode

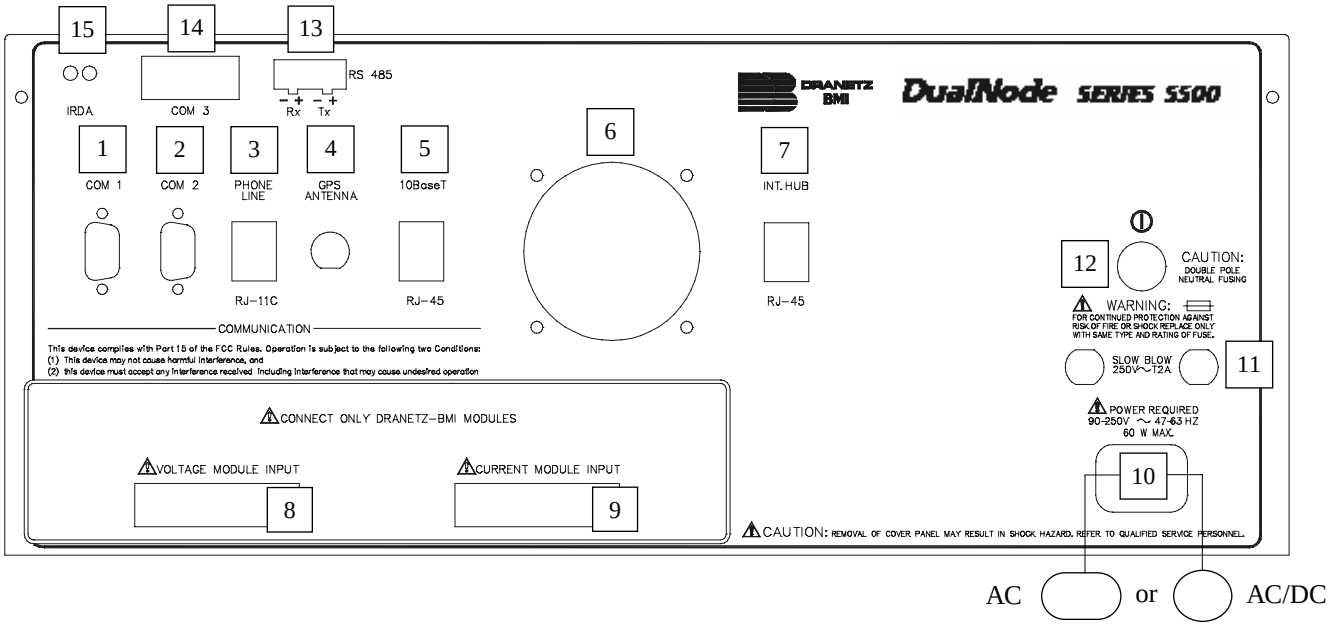
4 **LINK** - Indicator lamp will flash when the unit is responding to network requests.

5 **DRIVE** - Indicator lamp will flash when the unit's database is being read or written to.

6 **POWER** - Indicator lamp will flash in a heartbeat fashion when the unit is operating normally.

NOTE: *All three lamps will flash simultaneously when the unit is in Administrator mode.*

DualNode Model 5590 Rear Panel



1 **COM 1** - Serial communications port 1. **Use for connection to set InfoNode IP.** See Chapter 2, Preparation for Use, of the *Series 5500 InfoNode User's Guide* (P/N UG-INODE5500).

2 **COM 2**- Serial communications port 2.

3 **Phone Line (RJ-11C)** - Allows modem communication via telephone line if optional modem is installed.

4 **GPS Antenna** - Allows connection of GPS antenna if optional GPS is installed.

5 **10BaseT (RJ-45)** - Allows connection to Ethernet.

6 **Cooling Fan** - Runs continuously while unit is on.

7 **Internal Hub (RJ-45)** - Allows connection to another EPQ DataNode, such that data from two DataNodes can be processed by the InfoNode utilizing a single Ethernet connection.

8 **Voltage Pod** - Allows connection to voltage pod via interface cable (as in DataNode 5510/5530).

9 **Current Pod** - Allows connection to current pod via interface cable (as in DataNode 5510/5530) or optional CT adapter (BNCTO55, TRTO55).

10 **Line Power**
AC only power version - 90-250V ac, 47-63 Hz.
AC/DC power version - 90-250V ac, 47-63 Hz. and 105-125V dc, 60W max.

11 **Fuses** - Slow blow, 250V ac T2A.

12 **Power Switch** - Press to turn unit power on or off. Power indicator lamp on front panel will glow while unit is on.
NOTE: *Power indicator lamp will glow for approximately 5 seconds after unit is powered off.*

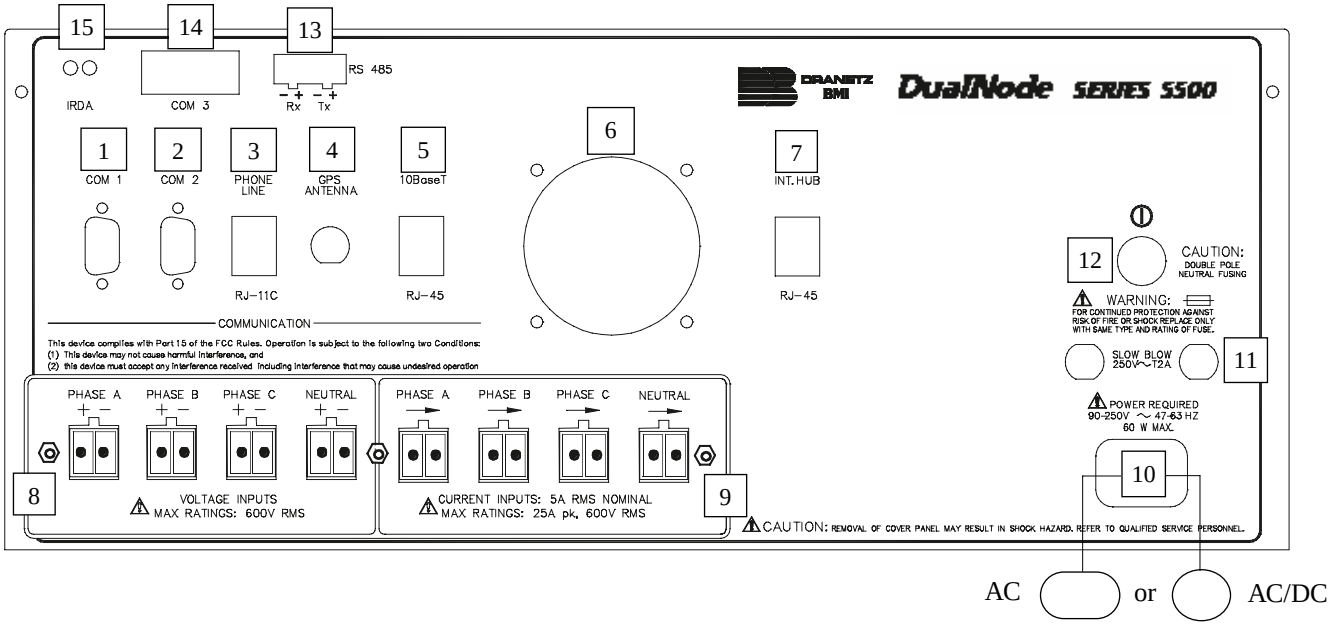
13 **RS 485** - Not activated at this time.

14 **COM 3** - Serial communications port 3. **Use for connection to set DataNode IP.** See Chapter 2, Preparation for Use, of the *EPQ DataNode User's Guide* (P/N UG-DNODE5500).

15 **IRDA** - Not activated at this time.

Series 5500 DualNode Overview

DualNode Model 5592 Rear Panel



1 **COM 1** - Serial communications port 1. **Use for connection to set InfoNode IP.** See Chapter 2, Preparation for Use, of the *Series 5500 InfoNode User's Guide* (P/N UG-INODE5500).

2 **COM 2**- Serial communications port 2.

3 **Phone Line (RJ-11C)** - Allows modem communication via telephone line if optional modem is installed.

4 **GPS Antenna** - Allows connection of GPS antenna if optional GPS is installed.

5 **10BaseT (RJ-45)** - Allows connection to Ethernet.

6 **Cooling Fan** - Runs continuously while unit is on.

7 **Internal Hub** - Allows connection to another EPQ DataNode, such that data from two DataNodes can be processed by the InfoNode utilizing a single Ethernet connection.

8 **Voltage Channels** - Phases A, B, C and Neutral input connectors (as in DataNode 5520).

9 **Current Channels** - Phases A, B, C and Neutral current probe connectors (as in DataNode 5520).

10 **Line Power**
AC only power version - 90-250V ac, 47-63 Hz.
AC/DC power version - 90-250V ac, 47-63 Hz. and 105-125V dc, 60W max.

11 **Fuses** - Slow blow, 250V ac T2A.

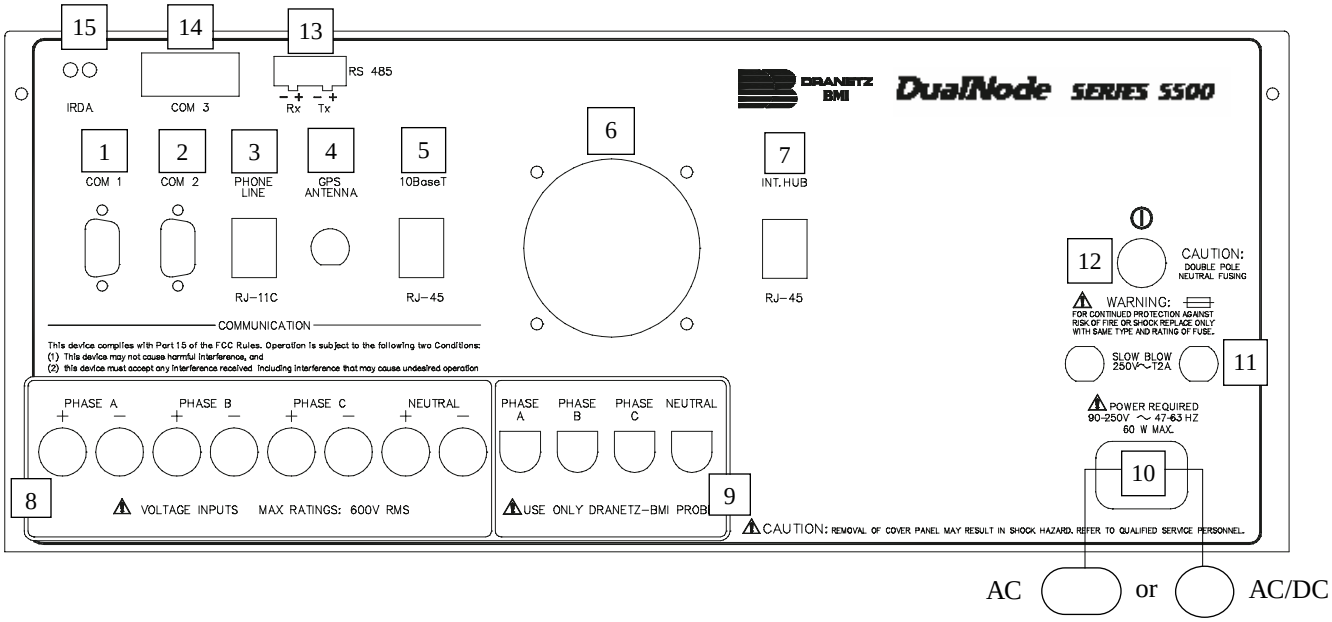
12 **Power Switch** - Press to turn unit power on or off. Power indicator lamp on front panel will glow while unit is on. **NOTE:** *Power indicator lamp will glow for approximately 5 seconds after unit is powered off.*

13 **RS 485** - Not activated at this time.

14 **COM 3** - Serial communications port 3. **Use for connection to set DataNode IP.** See Chapter 2, Preparation for Use, of the *EPQ DataNode User's Guide* (P/N UG-DNODE5500).

15 **IRDA** - Not activated at this time.

DualNode Model 5593 Rear Panel



1 **COM 1** - Serial communications port 1. **Use for connection to set InfoNode IP.** See Chapter 2, Preparation for Use, of the *Series 5500 InfoNode User's Guide* (P/N UG-INODE5500).

2 **COM 2**- Serial communications port 2.

3 **Phone Line (RJ-11C)** - Allows modem communication via telephone line if optional modem is installed.

4 **GPS Antenna** - Allows connection of GPS antenna if optional GPS is installed.

5 **10BaseT (RJ-45)** - Allows connection to Ethernet.

6 **Cooling Fan** - Runs continuously while unit is on.

7 **Internal Hub** - Allows connection to another EPQ DataNode, such that data from two DataNodes can be processed by the InfoNode utilizing a single Ethernet connection.

8 **Voltage Channels** - Phases A, B, C and Neutral input connectors (as in DataNode 5513).

9 **Current Channels** - Phases A, B, C and Neutral current probe (TR25XX Series) connectors (as in DataNode 5513).

10 **Line Power**
AC only power version - 90-250V ac, 47-63 Hz.
AC/DC power version - 90-250V ac, 47-63 Hz. and 105-125V dc, 60W max.

11 **Fuses** - Slow blow, 250V ac T2A.

12 **Power Switch** - Press to turn unit power on or off. Power indicator lamp on front panel will glow while unit is on. **NOTE:** *Power indicator lamp will glow for approximately 5 seconds after unit is powered off.*

13 **RS 485** - Not activated at this time.

14 **COM 3** - Serial communications port 3. **Use for connection to set DataNode IP.** See Chapter 2, Preparation for Use, of the *EPQ DataNode User's Guide* (P/N UG-DNODE5500).

15 **IRDA** - Not activated at this time.

This page intentionally left blank.

Connections for Voltage and Current

WARNING!

To avoid the risk of electric shock or burns, always connect the safety (or earth) ground before making any other connections.

WARNING!

To reduce the risk of fire, electrical shock, or physical injury it is strongly recommended to fuse the voltage measurement inputs.
Fuses must be located as close to the load as possible to maximize protection.

WARNING!

For continued protection against risk of fire or shock hazard replace only with same type and rating of recommended fuse.
Use only fast blow type fuse which is rated 600 V. Recommended fuse type is Littelfuse, part number KLKD0.30 rated 600 V AC/DC, 0.3A fast blow.

WARNING!

Do not replace fuse again if failure is repeated. Repeated failure indicates a defective condition that will not clear with replacement of the fuse. Refer condition to a qualified technician.

Safety Precautions:

The following safety precautions must be followed whenever any type of connection is being made to the instrument.

Connect the green safety (earth) ground first before making any other connections.

When connecting to electric circuits or pulse initiating equipment, open their related breakers. DO NOT install any connection of the instrument on live power lines.

Connections must be made to the instrument first, then connect to the circuit to be monitored.

Wear proper Personal Protective Equipment, including safety glasses and insulated gloves when making connections to power circuits.

Hands, shoes and floor must be dry when making any connection to a power line.

Make sure the unit is turned OFF before connecting probes to the rear panel.

Before each use, inspect all cables for breaks or cracks in the insulation. Replace immediately if defective.

For connection guidelines - Refer to the EPQ DataNode Series User's Guide UG-DNODE5500 supplied at the back portion of this User's Guide.

DualNode 5590 rear panel voltage and current pod connectors are the same as that of DataNode 5510/5530. See pages 1-6 to 1-7 and 2-12 to 2-26 of the EPQ DataNode Series User's Guide (UG-DNODE5500) supplied at the back portion of this User's Guide.

DualNode 5592 rear panel voltage and current connectors are the same as that of DataNode 5520. See pages 2-2 to 2-11 of the EPQ DataNode Series User's Guide (UG-DNODE5500) supplied at the back portion of this User's Guide.

DualNode 5593 rear panel voltage and current probe connectors are the same as that of DataNode 5513. See pages 2-27 to 2-36 of the EPQ DataNode Series User's Guide (UG-DNODE5500) supplied at the back portion of this User's Guide.

For user information and unit operation - Refer to the Series 5500 InfoNode User's Guide UG-INODE5500 supplied at the back portion of this User's Guide.

2 Preparation for Use

This page intentionally left blank.

Series 5500 DualNode Specifications

Configurations	External CT and voltage pods; 1A/5A current with 5x overcurrent.
Measurements	160 parameters, including true 1/2 cycle RMS sags & swells, interruptions, microsecond transients, kVA, KW, true PF, DPF, KVAR, kWhr, kVAR and other power related parameters, TIF, K-factor, THD, individual harmonics through 50th, 45-65 Hz phase locked sampling. Up to 22 cycles of waveform per event.
Voltages	4 channels, accuracy +/- 0.1% of reading, +/- 0.1% FS.
Currents	4 channels, accuracy +/- 0.1% of reading, +/- 0.1% FS.
Instrument Power	90-250Vac, 50/60Hz; optional 105-125Vdc; built-in UPS with 4-year battery life.
Enclosure/Environments	17"w x 7"h x 8"d. Rack, desktop, wall mount; 0 - 55 deg C standard. **IMPORTANT:** When the 559X DualNode is placed inside another sealed enclosure such as the NEMA 4X fiber glass enclosure, the maximum temperature in which the 559X DualNode is expected to operate normally is scaled down to 45 deg C. This new limit in operating environment compensates for the increase in the internal temperature of the enclosure, which is approximately 12 deg C higher than the outside ambient temperature after sustained operation.
Communications	Access through Internet, Intranet, dial-up or wireless telephone line.
Additional Features	Notification (e-mail, pager, contact closure); remote firmware update; cross triggering, 10 msec accuracy with optional GPS, Answer Modules, including Sag Direction, Radial Fault locator, Capacitor Switching Transient with Directivity, Energy Usage and Expense Reporting.

3 Specifications

This page intentionally left blank.

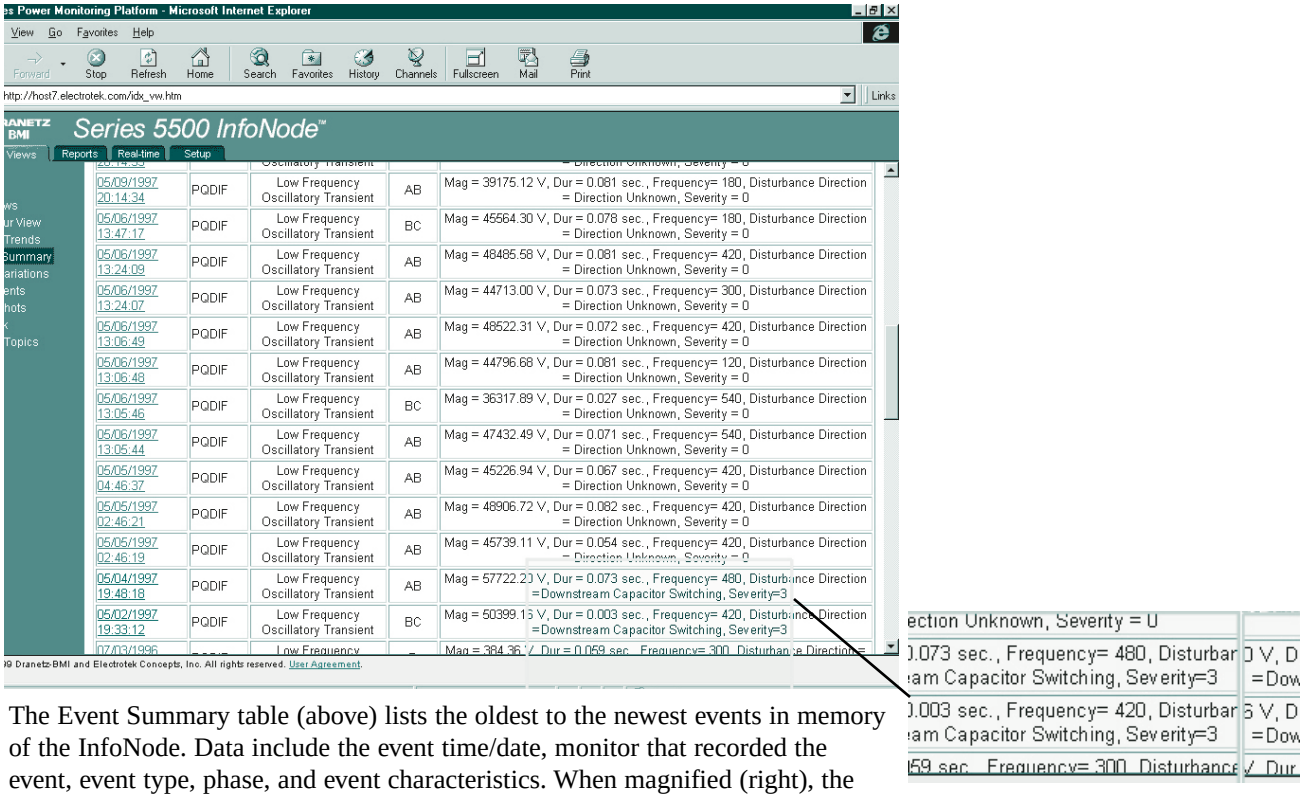
Data Generation

DualNode Models 5590, 5592 and 5593 are designed with the integrated functions of the EPQ DataNode and InfoNode to serve applications with a limited number of monitoring points or to facilitate short-term audits. Whether serving as a service entrance monitor for a facility that is just beginning a power quality program or providing monthly audits from various points within a facility or a service territory, the 559X provides the complete set of capabilities needed for determining power quality compatibility and energy usage.

General process on how the 559X DualNode converts data to knowledge:

- **Data** is gathered in state-of-the-art data acquisition devices;
- **Information** is assembled and delivered in intuitive and useful formats;
- **Answers** to complex problems such as the location of a disturbance or when to shed load are provided by proprietary AnswerModules®, smart tools for data interpretation and analysis incorporating hundreds of monitoring years worth of data;
- **Knowledge** obtained enables users to establish a baseline needed to improve performance and lower operating and maintenance costs.

The InfoNode displays data on the web browser captured by the 5590 DualNode. The sample Smart View screen display below has been pre-filtered or specified based on the 5590 DualNode measurement capabilities.



The Event Summary table (above) lists the oldest to the newest events in memory of the InfoNode. Data include the event time/date, monitor that recorded the event, event type, phase, and event characteristics. When magnified (right), the DualNode provides up-to-the-second information about the power quality event accessible through a web browser.

4 Operation

This page intentionally left blank.

DualNode Model 5593: Ratio and Magnitude Correction for Standard Dranetz-BMI Probes

5593 PROBE Ratios						
Probe	Rating [Amps RMS]	Output Signal (mV/A)		Transducer Ratios*		Magnitude Correction*
		mV	A	Primary	Secondary	
TR2019B	1-300	5	1	300	1.50	1
TR2022	10-1000	0.5	1	1000	0.50	1
TR2023	10-3000	0.5	1	3000	1.50	1
TR2500	10-500	3	1	500	1.50	1
TR2510	0.1-10	150	1	10	1.50	1
TR2520	300-3000	0.5	1	3000	1.50	1
RR3000 LEMFLEX	300	10	1	300	3.00	1
	3000	1	1	3000	3.00	1
RR3035A / DRANFLEX 24, 36, 48 Inches	300	5	1	300	1.50	1
	3000	0.5	1	3000	1.50	1
RR3035 LEMFLEX	1-30	100	1	30	3.00	1
	300	10	1	300	3.00	1
	3000	1	1	3000	3.00	1
RR3035A LEMFLEX	1-30	50	1	30	1.50	1
	300	5	1	300	1.50	1
	3000	0.5	1	3000	1.50	1
RR6035A / DRANFLEX 24, 36, 48 Inches	600	2.5	1	600	1.50	1
	6000	0.25	1	6000	1.50	1
RR6035 LEMFLEX	1-60	50	1	60	3.00	1
	600	5	1	600	3.00	1
	6000	0.5	1	6000	3.00	1
RR6035A LEMFLEX	1-60	25	1	60	1.50	1
	600	2.5	1	600	1.50	1
	6000	0.25	1	6000	1.50	1
PR150 LEMPROBE	150	10	1	150	1.50	1
PR1500 LEMPROBE	1500	1	1	1500	1.50	1
ISO-65X-5	10	300	1	5	1.50	1

*Input these settings into the InfoNode/DataNode setup page when connecting the probe directly to the buss being measured.

DualNode Model 5593: Ratio and Magnitude Correction for Standard Dranetz-BMI Probes (continued)

5593 PROBE Ratios						
Probe	Rating [Amps RMS]	Output Signal (mV/A)		Transducer Ratios**		Magnitude Correction**
		mV	A	Primary	Secondary	
TR2019B	1-300	5	1	1	1	200.00
TR2022	10-1000	0.5	1	1	1	2000.00
TR2023	10-3000	0.5	1	1	1	2000.00
TR2500	10-500	3	1	1	1	333.33
TR2510	0.1-10	150	1	1	1	6.67
TR2520	300-3000	0.5	1	1	1	2000.00
RR3000 LEMFLEX	300	10	1	1	1	100.00
	3000	1	1	1	1	1000.00
RR3035A / DRANFLEX 24, 36, 48 Inches	300	5	1	1	1	200.00
	3000	0.5	1	1	1	2000.00
RR3035 LEMFLEX	1-30	100	1	1	1	10.00
	300	10	1	1	1	100.00
	3000	1	1	1	1	1000.00
RR3035A LEMFLEX	1-30	50	1	1	1	20.00
	300	5	1	1	1	200.00
	3000	0.5	1	1	1	2000.00
RR6035A / DRANFLEX 24, 36, 48 Inches	600	2.5	1	1	1	400.00
	6000	0.25	1	1	1	4000.00
RR6035 LEMFLEX	1-60	50	1	1	1	20.00
	600	5	1	1	1	200.00
	6000	0.5	1	1	1	2000.00
RR6035A LEMFLEX	1-60	25	1	1	1	40.00
	600	2.5	1	1	1	400.00
	6000	0.25	1	1	1	4000.00
PR150 LEMPROBE	150	10	1	1	1	100.00
PR1500 LEMPROBE	1500	1	1	1	1	1000.00
ISO-65X-5	10	300	1	1	1	3.33

** When connecting the probe to the secondary of a substation's CT, the transducer ratio column values shown in the table above (1 / 1) should be replaced by the actual substation CT primary and secondary turns ratios (e.g. 400 / 5) and input into the InfoNode/DataNode setup page. The value shown in the magnitude correction factor column in the table should be entered in the same named fields in the InfoNode/DataNode setup page. The magnitude correction factor accounts for the probe specific scale factor.

Current Probe Inputs - Differential
- 1.5V RMS
- Crest Factor = 3
- Input Impedance
  - 900K Ohms to Ground
  - 1.8M Ohms Line to Line