

# DRANETZ HDPQ<sup>®</sup>-DN



## *Quick Reference Guide*

### **HDPQ DataNode with Terminal Block Voltage and Hypertronic Current Connectors (Dranetz Model HDPQ-DN-MVSTR)**

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## **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 70-2017) 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-2015) of USA and any additional workplace safety requirements applicable to your installation.

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Printed in the United States of America.

## **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 a un sistema eléctrico se debe realizar en conformidad con el Código Eléctrico Nacional (ANSI/NFPA 70-2017) de los E.E.U.U., 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."

El personal cualificado que trabaja encendido o acerca a los conductores eléctricos energizados expuestos debe seguir prácticas y procedimientos relacionados seguridad aplicable del trabajo incluyendo el equipo protector personal apropiado en conformidad con el estándar para los requisitos de seguridad eléctricos para los lugares de trabajo del empleado (ANSI/NFPA 70E-2015) de los E.E.U.U. y cualquier requisito de seguridad adicional del lugar de trabajo aplicable a su instalación.

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## **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 70-2017) 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".

Le personnel qualifié qui travaillent dessus ou s'approchent des conducteurs électriques activés exposés doit suivre des pratiques en matière et des procédures reliées par sûreté applicable de travail comprenant le matériel de protection personnel approprié conformément à la norme pour des conditions de sûreté électriques pour les lieux de travail des employés (ANSI/NFPA 70E-2015) des Etats-Unis et toutes les conditions de sûreté additionnelles de lieu de travail applicables à votre installation.

## **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 70-2017) 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 den 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."

Qualifiziertes Personal, das an bearbeiten oder herausgestellte angezogene elektrische Leiter sich nähern, muß anwendbare Sicherheit bezogener Arbeit Praxis und Verfahren einschließlich passende persönliche schützende Ausrüstung gemäß dem Standard für elektrische Sicherheitsauflagen für Angestellt-Arbeitsplätze (ANSI/NFPA 70E-2015) der Vereinigten Staaten und alle zusätzlichen Arbeitsplatzsicherheitsauflagen folgen, die auf Ihre Installation anwendbar sind.

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## **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 instrument, 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.

## Safety Precautions

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

- Connect the 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 instrument 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.
- If the equipment is used in a manner not specified in this reference guide, the protection provided by the equipment may be impaired. These safety precautions are repeated where appropriate throughout this manual.

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## INTRODUCTION

The Dranetz HDPQ DataNode - Model MVSTR, also called HDPQ-DN-MVSTR, is an eight-channel power quality and energy instrument that can be installed in a permanent or temporary installation. All user interactions are performed remotely by using compatible server software, either through a wired Ethernet or Wireless (WiFi) (optional) connection. The HDPQ-DN-MVSTR can monitor and record data on four voltage channels as well as four current channels simultaneously.

Dranetz HDPQ-DN-MVSTR is designed to meet both the IEEE 1159 and IEC 61000-4-30 Edition 3 Class A standards for accuracy and measurement requirements. It can do PQ-optimized acquisition of power quality related disturbances and events. Compliance standards such as EN50160 are also supported.

The HDPQ-DN-MVSTR allows you to customize threshold settings for power quality, energy and demand. It can monitor power quality and energy/demand phenomena for troubleshooting and/or compliance purposes. It can also record inrush conditions, carry out long-term statistical studies to establish performance baselines, and perform field-based equipment testing and evaluation for commissioning and maintenance. The HDPQ-DN-MVSTR firmware integrates an intuitive instrument setup procedure to ensure the capture of all relevant data for additional post process analysis, report writing, and data archiving using the Dranetz PQView® DE or PQView® web-enabled applications.

### ***This Quick Reference Guide***

This Quick Reference Guide contains instructions for the basic operation of the Dranetz HDPQ DataNode - Model MVSTR with Terminal Block voltage connectors and Hypertronic current connectors. Other models are available that support different types of physical circuit connections.

## GETTING STARTED

### *Connecting to Power Source*

**Power Specifications** The power supply inputs are rated 90–250 VAC 50/60 Hz and 100-300 VDC. A screw terminal block is used to connect up to #12 AWG gauge wire for the power input connections. The positive and negative inputs are fused internally and the fuses are not user - replaceable.

**CAUTION** Operation of the HDPQ DataNode from a voltage source other than the rated voltage input stated on the unit nameplate can cause damage to the unit.

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**PRECAUCION** La operación del HDPQ DataNode desde una fuente de voltaje de ca que no sea la entrada de voltaje nominal indicada en la placa de identificación de la unidad puede causar daños a la unidad.

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**MISE EN GARDE** Le fonctionnement du HDPQ DataNode à partir d'une source de tension alternative autre que l'entrée de tension nominale indiquée sur la plaque signalétique de l'unité peut endommager l'unité.

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**VORSICHT** Der Betrieb des HDPQ DataNode von einer Wechselspannungsquelle, die nicht dem auf der Namensplatte der Einheit aufgeführten Nennspannungseingang entspricht, kann zur Beschädigung der Einheit führen.



## Safety Disconnects

The mains supply power to the HDPQ DataNode must be installed downstream from a switched current limiting device. The circuit protection device should be 20 Amps or less, and must be rated for the available voltage and fault current; 5 Amps fuses are preferred.

## WARNING

All mains supply conductors connected to the HDPQ DataNode must originate at circuit breakers or fuses rated 20 Amps or less.

You must provide a method for manually removing power from the HDPQ DataNode such as a clearly labeled circuit breaker or a fused disconnect switch.

The AC/DC power input is found at the rear panel of the unit. The rear panel for DataNode Model HDPQ-DN-MVSTR is shown below.



## Power Source

The rear panel marking provides information about the input power rating.

- Voltage range: 90-250 VAC, 100-300 VDC
- Frequency: 50/60 Hz.
- Power Consumption: 25 W.

Step	Action
1	With all power OFF, connect the green ground wire to Safety (Earth) ground first before making any other connections.
2	Connect the positive (+) terminal of the mains supply to the positive (+) terminal of the instrument, AC or DC using the appropriate color coding and wire up to #12 AWG wire.
3	Connect the negative (-) terminal of the mains supply to the negative (-) terminal of the instrument, AC or DC using the appropriate color coding and wire up to #12 AWG wire.
4	Turn the power switch of the instrument to ON position.

## ***Controls, Indicators and Connectors***

### **Top View and Front View**



#### **Top Panel**

The top panel shows the user replaceable Battery compartment.

**Internal Battery**      Sealed, rechargeable NiMH (Nickel Metal Hydride) cell

The unit will always operate on the normal power source 50/60Hz, 90-250VAC or 100-300VDC. In the event of loss of power, the unit will seamlessly switch to the internal battery backup and will switch back to the normal power source when restored.

#### **Front Panel**

The front panel shows the following three (3) LED indicators:

**Status Indicator**      LED will blink in a heartbeat fashion when power switch is turned on and the unit is operating normally.



**Monitoring On Indicator**      LED will light steadily if monitoring is on. Monitoring is off when light is off.

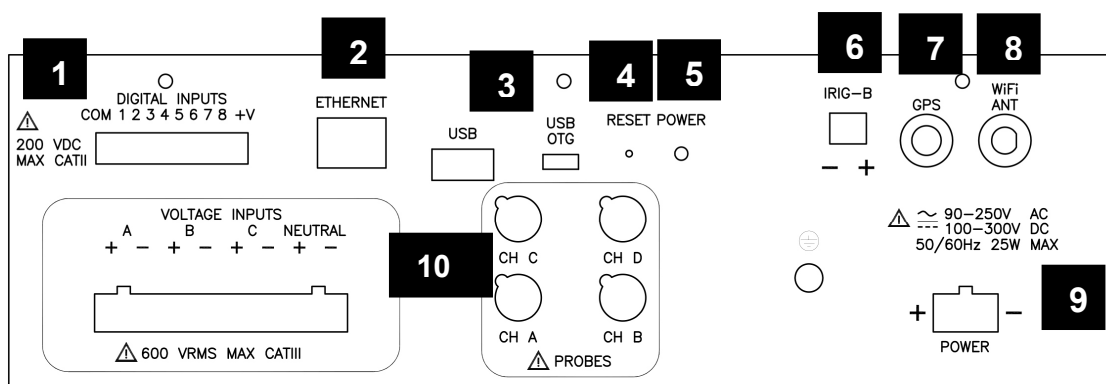


**Battery Indicator**      LED will light steadily when operating on battery backup.



## Rear View

This section describes the rear view panel of the HDPQ-DN-MVSTR.



- 1 Digital Input (optional)** – use to monitor on/off-type digital signals, such as breaker or switch position indicators.
- 2 Ethernet Port** – use to connect a wired Ethernet (RJ45) network. An Ethernet cross over cable may be required to connect directly to a computer when not using a network.
- 3 USB/Micro-USB Port** – use for file transfer to a USB flash drive or directly to a computer.
- 4 Reset Button** – use to reset the instrument settings to factory defaults. See section Reset to Factory Defaults for details on how to manually reset the instrument to factory configuration.
- 5 Power Switch** – use to turn unit power on or off. Power indicator lamp on front panel flashes when unit is on.
- 6 IRIG-B Input (optional)** – use as external time sync signal.
- 7 GPS Port (optional)** – input for GPS antenna for time sync.
- 8 WiFi Antenna (optional)** – use for wireless connectivity via a factory-installed WiFi card (not user installable).
- 9 Power Input** – use to connect AC/DC power.
- 10 Voltage/Current Input Connectors** – use terminal block connectors for voltage inputs and Hypertronic cables and probes for current inputs. See section Connecting the Voltage and Current Connectors for circuit connection details.

## ***Reset to Factory Defaults***

Resetting the instrument to factory defaults will erase all user data, communication settings, including recorded logs and events, reports and instrument setup files.

The steps below show how to manually reset the HDPQ DataNode to factory configuration.

**NOTE:** The reset button is recessed and can be found at the rear panel of the instrument. A paper clip, pin or similar item is needed to press in the reset button.

Step	Action
1	Unfold the paper clip to form at least a 1-inch long straight line wire.
2	<p>Gently insert the paper clip (or other tool) into the “Reset” button hole at the rear panel of the HDPQ DataNode.</p> <p>Press in the internal reset button and hold for ten (10) seconds.</p> <p>Continue to hold until the Status LED indicator at the front panel stops blinking which indicates that the reset and reboot process has been initiated. If you let go before 10 seconds, the unit will reboot but it will not reset.</p>
3	<p>Once reboot is completed, the Status LED indicator will blink in a heartbeat fashion to indicate that the unit has returned to normal operation.</p> <p>At this point, the instrument has been reset to factory configuration, including the following default connection settings:</p> <p>Default User name: <b>admin</b></p> <p>Default Password: <b>Dranetz</b></p> <p>Wired Ethernet IP address will be fixed at <b>192.168.0.30</b>.</p> <p><b>NOTE:</b> All saved data and setups will be lost when you reset the instrument settings to factory defaults.</p>

## ***Connecting to the HDPQ DataNode***

PQView® DE is web-enabled server software that serves as the primary user interface for monitoring systems that include the HDPQ DataNode.

PQView® DE is used for monitoring setups and automatically communicates with the HDPQ DataNode and other instruments, downloads recorded data, and is able to display charts, graphs and reports.

The HDPQ DataNode has an administrative web interface for communications and other instrument configurations. This web interface is used to properly configure the instrument for use on the network in order to establish communications with the server software. Refer to the procedures in the next sections to connect to the HDQP DataNode to change communication and other settings.


In order to connect to the HDPQ DataNode, you must know the IP address and the password of the instrument. Both your computer and the instrument must be properly configured for use in the intended networks. Once properly configured, connecting is a matter of launching the web browser on your computer, entering the IP address, then entering the user name and password when prompted.

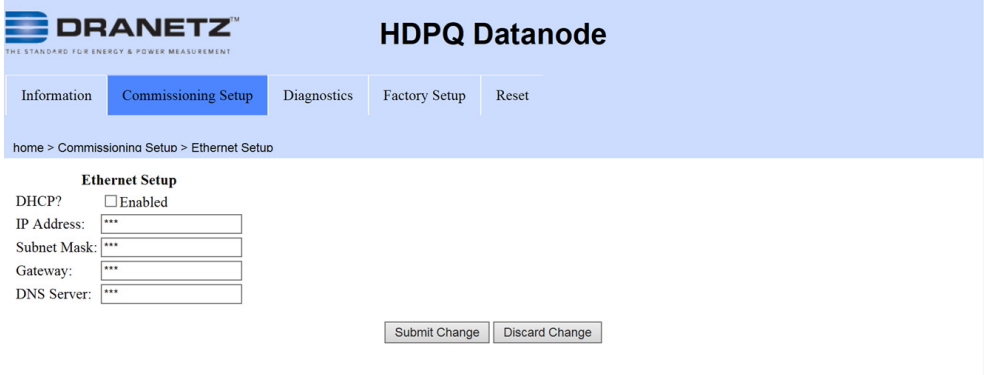
The next sections describe how to connect to the HDPQ DataNode via:

- Wired Ethernet connection
- Wireless (WiFi) connection (available as an option)
- A proprietary Dranetz HDPQ IP Setup utility program if the IP Address is not known

## Connecting via Wired Ethernet Connection

The steps below show how to connect to the HDPQ DataNode via a wired Ethernet connection.

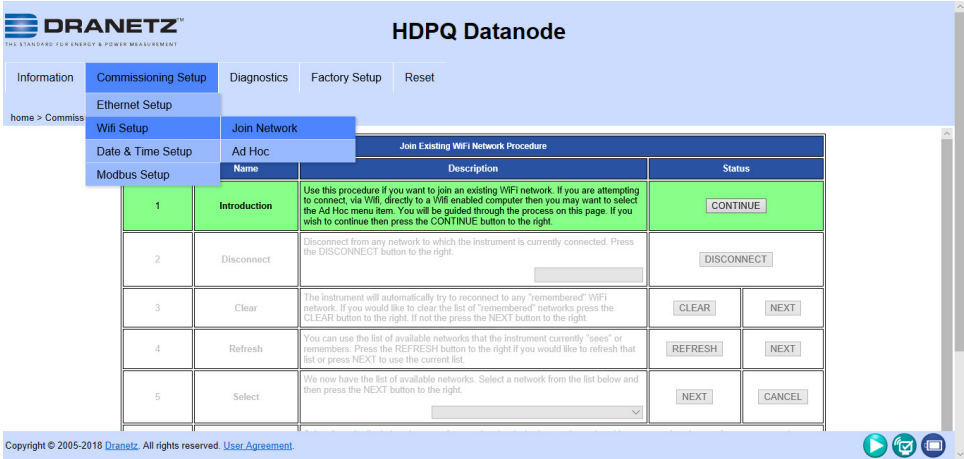
Step	Action
1	Connect an Ethernet cable between your Windows®-enabled computer and the Ethernet port at the rear panel of the instrument. An Ethernet cross-over cable may be needed if the computer cannot auto-detect direct cabling.
2	Connect the power source at the rear panel of the instrument.
3	Power ON the computer and then press the power switch of the HDPQ DataNode located at the rear panel to turn the instrument ON.
4	<p>In order to complete the Ethernet connection, the computer IP address needs to be changed to be in the same range as the HDPQ DataNode address.</p> <p>Once the computer is fully running and the IP address has been configured, open the Internet browser and enter the following into the web browser: <a href="http://192.168.0.30/index.html">http://192.168.0.30/index.html</a>.</p>
5	<p>If communications to the instrument are working properly, the window below will be displayed prompting you to enter the user name and password.</p> <p>Enter the default User name: <b>admin</b></p> <p>Enter the default Password: <b>Dranetz</b></p> <p>User name and password are case sensitive, and must be entered as shown.</p> <div data-bbox="516 1320 1226 1810"></div> <p>When done entering the user name and password, click on the <b>OK</b> button.</p>

Step	Action
6	<p>The HDPQ DataNode Administrative Home Page will be displayed.</p> <p>Click the <b>Commissioning Setup</b> tab and select <b>Ethernet Setup</b>.</p> <p><u>Result:</u> The following screen is displayed.</p> 
7	<p>On the <b>Commissioning Setup - Ethernet Setup</b> screen, enter the applicable setting changes and then click on the <b>Submit Change</b> button to connect to the instrument.</p>

## Connecting via Wireless (WiFi) Connection

The steps below show how to connect to the HDPQ DataNode via a Wireless (WiFi) connection.

**NOTE:** The steps below can be done only if the WiFi option is installed and a WiFi antenna is connected to the rear panel of the HDPQ instrument. WiFi is an optional feature and must be factory-installed (not user installable).

Step	Action
<b><u>PRE-REQUISITE STEPS FOR FIRST TIME CONNECTION TO WiFi:</u></b>  For first-time configuration of Wireless (WiFi) settings, it is necessary to connect to the HDPQ DataNode via Wired connection first to enable and to set up the WiFi connection to the instrument.  <b>Refer to the previous section Connecting via Wired Ethernet Connection on page 14 and follow Steps 1 to 5.</b>  Once the HDPQ DataNode Home Page is displayed, follow the steps below to set up WiFi connection to the instrument.	
1	<p>From the HDPQ DataNode Home page, click the <b>Commissioning Setup</b> tab and select <b>WiFi Setup &gt; Join Network</b>.</p> <p><u>Result:</u> The following screen is displayed.</p>  <p>To join an existing WiFi network click on the <b>CONTINUE</b> button to the right, and proceed to the next steps outlined in this procedure.</p> <p><b>NOTE:</b> If you want to connect directly to a computer via WiFi, select <b>WiFi Setup &gt; Ad Hoc</b> menu instead. The instrument will prompt you through the next steps.</p>



Step	Action
2	Disconnect from any network to which the instrument is currently connected by pressing the <b>DISCONNECT</b> button to the right.
3	The instrument will attempt to connect to any “remembered” WiFi networks. To clear the list of “remembered” networks, click on <b>CLEAR</b> . Otherwise click on the <b>NEXT</b> button to the right.
4	The list of detected WiFi networks is shown. If your desired wireless network is not found, click on the <b>REFRESH</b> button to the right. Otherwise click on <b>NEXT</b> .
5	Select the network you wish to connect from the available WiFi networks on the dropdown menu and then click on the <b>NEXT</b> button to the right.
6	Provide the required credentials for the WiFi network you are connecting to. Wireless network Authentication and Encryption must be obtained depending on the network you want to connect to. Contact your network administrator for assistance if necessary. Once you have selected the Encryption method, click on the <b>NEXT</b> button to the right.
7	Enter the Security Key for the WiFi network when prompted and then click on the <b>CONNECT</b> button to the right.
8	If connection to your chosen wireless network is successful, you should see the status change to CONNECTED. Otherwise, the instrument will prompt you to RESTART.

## **HDPQ IP Setup Program**

A proprietary Dranetz setup utility program (HDPQIPSetup.exe) is designed to scan the local network to find and detect HDPQ DataNode units. This allows you to discover HDPQ DataNodes on your network when you do not know the instrument's IP address. The IP Setup program may be downloaded from the Dranetz website.

The utility program "HDPQIPSetup.exe" is particularly useful when the network is configured for DHCP and the IP address cannot be known until the network DHCP server assigns the IP after initial connection to the network. In this case, the only way to discover the IP address is through the use of the HDPQIPSetup tool.

### **System PC Requirements**

**Operating System**      Windows® 10, Windows® 8 Professional

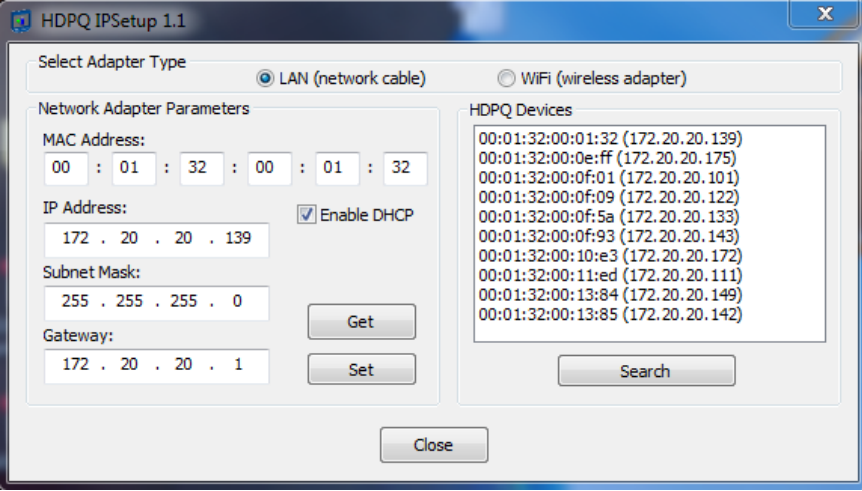
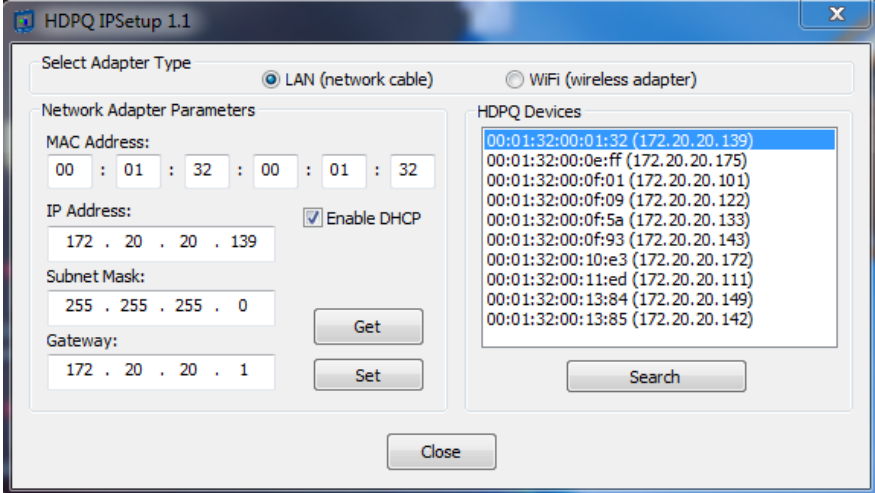
**Category 5e Cable**      Standard RJ45 connector, cross-over cable  
(Not Included)

**Internet Browser**      Internet Explorer® 11.x, Edge, Firefox, etc.

Follow these steps to use the HDPQIPSetup utility to locate the HDPQ DataNode on your network.

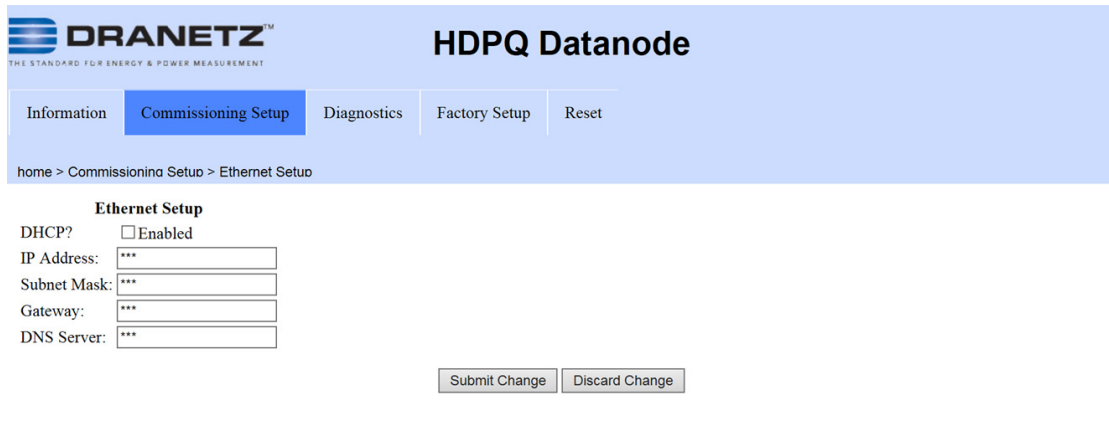
**NOTE:** You may need Administrator privileges on your computer to run the program since it is an executable (.exe) file.

<b>Step</b>	<b>Action</b>
1	Copy the HDPQIPSetup.exe program to your Windows® computer. <b>NOTE:</b> The HDPQIPSetup utility program only runs on Windows® operating systems.
2	Connect the HDPQ DataNode to your computer directly with a cross-over cable via the Ethernet port on the rear panel of the instrument or connect to the same local area network (LAN) of your computer via a router or hub.
3	Double click on the HDPQIPSetup executable file to run the program. <u>Result:</u> The following screen opens.

Step	Action
	
4	<p>Locate the MAC address of your HDPQ DataNode and click on that line in the HDPQ Device box.</p> <p><b>NOTE:</b> A label on the HDPQ DataNode enclosure contains the MAC address.</p>
5	<p>Click on the Get button to populate the left fields with your HDPQ Ethernet Settings.</p> <p><u>Result:</u> The following screen opens.</p> 
6	<p>If you wish to change any of the setting, you can edit the field and then click on Set.</p> <p><b>NOTE:</b> The MAC address cannot be changed.</p>
7	<p>Press the Close button when done or Exit using the Close (X) icon found on the upper right corner of the screen.</p>

Once the HDPQ DataNode is set up, connect to the instrument to verify the settings.

**NOTE:** You may have to change the Internet settings on your computer to connect.



The screenshot displays the DRANETZ HDPQ Datanode web interface. At the top left is the DRANETZ logo with the tagline "THE STANDARD FOR ENERGY & POWER MEASUREMENT". The main title "HDPQ Datanode" is centered at the top. Below the title is a navigation bar with five tabs: "Information", "Commissioning Setup" (which is highlighted in blue), "Diagnostics", "Factory Setup", and "Reset". A breadcrumb trail below the navigation bar reads "home > Commissioning Setup > Ethernet Setup". The main content area is titled "Ethernet Setup" and contains the following configuration options: "DHCP?" with an unchecked checkbox and the label "Enabled"; "IP Address:" with a text input field containing three asterisks; "Subnet Mask:" with a text input field containing three asterisks; "Gateway:" with a text input field containing three asterisks; and "DNS Server:" with a text input field containing three asterisks. At the bottom right of the form are two buttons: "Submit Change" and "Discard Change".

## **MAKING MEASUREMENT CONNECTIONS**

### **WARNING**

Death, serious injury, or fire hazard could result from improper connection of this instrument. Read and understand the warnings in the beginning of this guide before connecting this instrument.

### **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.

### **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.

### **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.

## ***Connecting the Voltage and Current Connectors***

The Dranetz Model HDPQ-DN-MVSTR offers the following circuit connection interfaces:

- Voltage** Four (4) channel differential AC/DC Voltage Terminal Block Connectors labelled  $\pm A$ ,  $\pm B$ ,  $\pm C$  and  $\pm$ Neutral.
- Current** Four (4) channel Hypertronic connectors labelled CH A, CH B, CH C, and CH D for connecting to current inputs.
- Typical current probes available from Dranetz are described on page 24.

## **Connection Guidelines**

Refer to the appropriate connection diagram on pages 26 to 32 to connect to the voltage/current input connections.

<b>Step</b>	<b>Action</b>
1	Make sure all circuits are de-energized before making connections.
2	Connect the data cables. Plug the cables into the appropriate connectors on the rear panel of the instrument.
3	Route power wires in a safe manner in accordance with good practice and local codes.
4	Connect the ground wire first, before making any other connections.
5	Connect monitored voltages to the appropriate Voltage Input connections. Attach phases A, B and C plus Neutral, if applicable, to the screw terminals on the voltage input terminal block(s) (5-600 Vrms, up to #12 AWG wire). Be sure to observe the voltage specifications.
6	Turn the instrument on by pushing the power switch.

- WARNING** To reduce the risk of fire, electric shock, or physical injury, it is strongly recommended that connections be made with all circuits de-energized and current carrying conductors fused. If it is necessary to make connections on energized circuits, these must be performed by Qualified Personnel ONLY with proper Personal Protective Equipment.
- 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 circuit connection 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 600V. Recommended fuse type is Littelfuse, part number KLKD.300 rated 600V AC/DC, 0.3A fast blow or Dranetz Fuse Voltage Adapter FVA-1K.
- 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.

## **Connecting Current Probes**

### **Types of current probes**

A variety of current measurement probes are available.

The two main types of current probes are listed below. Each type is available in a variety of sizes:

- TR (B Series) clamp-on current probes that provide a broad range of current measurements
- Multiple DRANFLEX (XLB and MHB Series) models powered by the instrument

Probe positioning: The arrow marking on the current probe should be pointed in the direction of current flow and towards the load. In order to reduce measurement errors, it is always 'best practice' to center the conductor in the probe. Correct position of the probe is necessary for correct power measurements, where in-phase voltage and current measurements are necessary.

Use only Dranetz current probes and adapter cables for proper operation. Do not exceed the marked maximum ratings.

Be sure to observe the current specifications, as well as the arrow indicating the direction of current flow.

Contact the Dranetz Customer Support at (732) 287-3680 or 1-800-372-6832 for information on availability and pricing of current probes.

### **Safety Precautions**

The following safety precautions apply to current probe connections.

- DO NOT attempt to measure current in any circuit in which the circuit to ground voltage exceeds the insulation rating of the current probe (600 Vrms max).
- Make sure the jaws of the current probe are tightly closed. Keep mating surfaces clean and free from foreign matter.



- WARNING** DO NOT USE non-insulated current probe cores around a non-insulated wire. Probes of this type are designed for use around insulated wires only. Use only completely insulated probe cores with no exposed conductive areas of the core around non-insulated wires.
- ADVERTENCIA** NO UTILIZAR transformadores de corriente sin material aislante al rededor de conductores sin material aislante. Los Transformadores de corriente de este tipo están diseñados para ser utilizados solamente con conductores con aislamiento eléctrico. Utilizar transformadores de corriente completamente aislados alrededor de conductores sin aislamiento.
- AVERTISSEMENT** N'EMPLOYEZ PAS les noyaux courants non-isolés de sonde autour d'un fil non isolé. Des sondes de ce type sont conçues pour l'usage autour des fils isolés seulement. L'utilisation seulement a complètement isolé des noyaux de sonde sans des secteurs conducteurs exposés du noyau autour des fils non-isolés.
- WARNUNG** VERWENDEN Sie keine Stromzangen mit nicht isolierten Ferritkernen bei Messungen an nicht isolierten Leitungen. Stromzangen dieses Typs sind nur für Messungen an isolierten Leitern geeignet. Bitte verwenden Sie zur Messung an nicht isolierten Leitungen Stromzangen mit vollständig isoliertem Kernmaterial

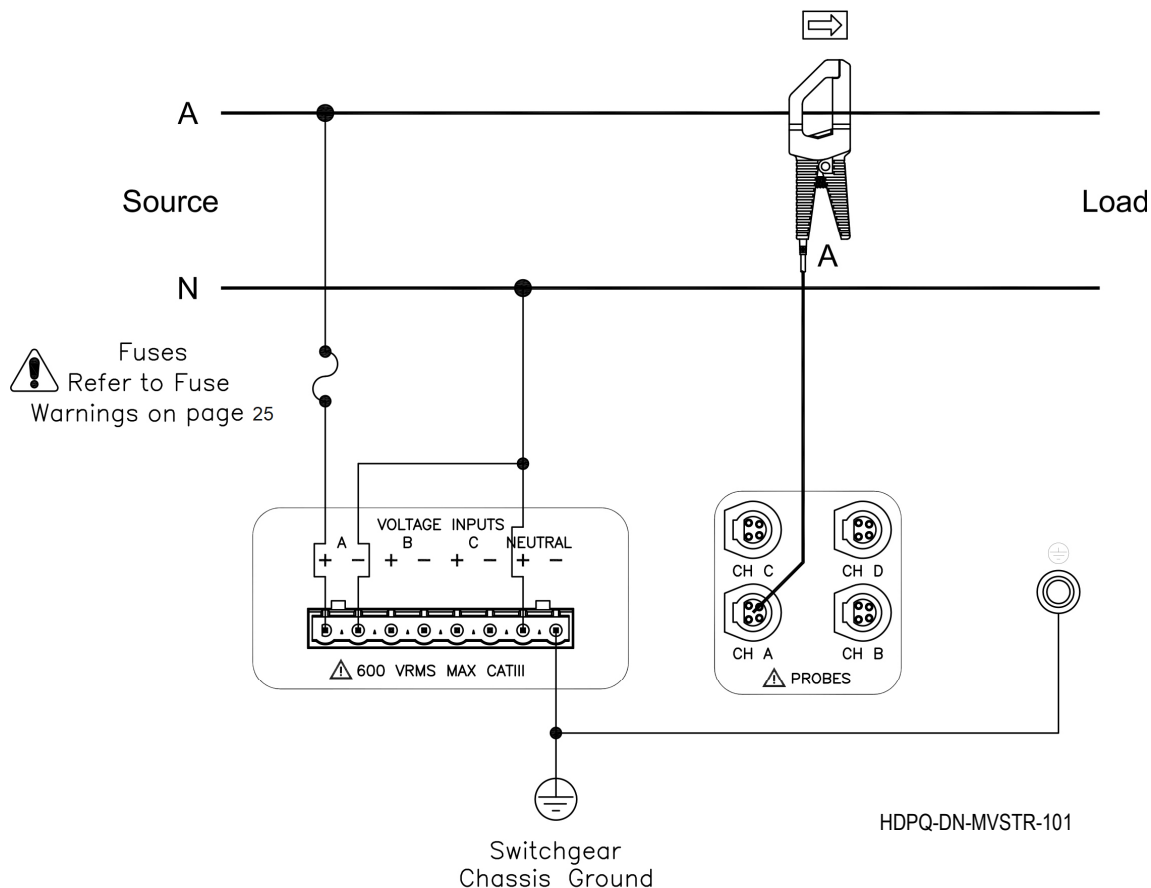
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Dranetz Model HDPQ-DN-MVSTR can monitor the following power configurations:

- Single Phase
- Split Phase
- 3 Phase, Four Wire Wye
- 3 Phase (Floating or Grounded) Delta
- 3 Phase, 2-Watt Delta
- 2 ½ Element Without Voltage Channel B
- 2 ½ Element Without Voltage Channel C

## Single Phase

When making connections to a single phase circuit, connect the voltage and current as shown below. The figure also includes monitoring the Neutral to Ground voltage. Neutral to ground measurements are important but optional.



### CAUTION

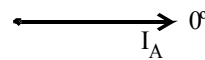
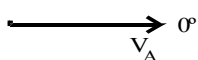
Connections must be performed in compliance with all safety requirements applicable to your installation.

### NOTE

Be sure to connect the current probe with the arrow on the handle pointing towards the load or an erroneous power reading will result.

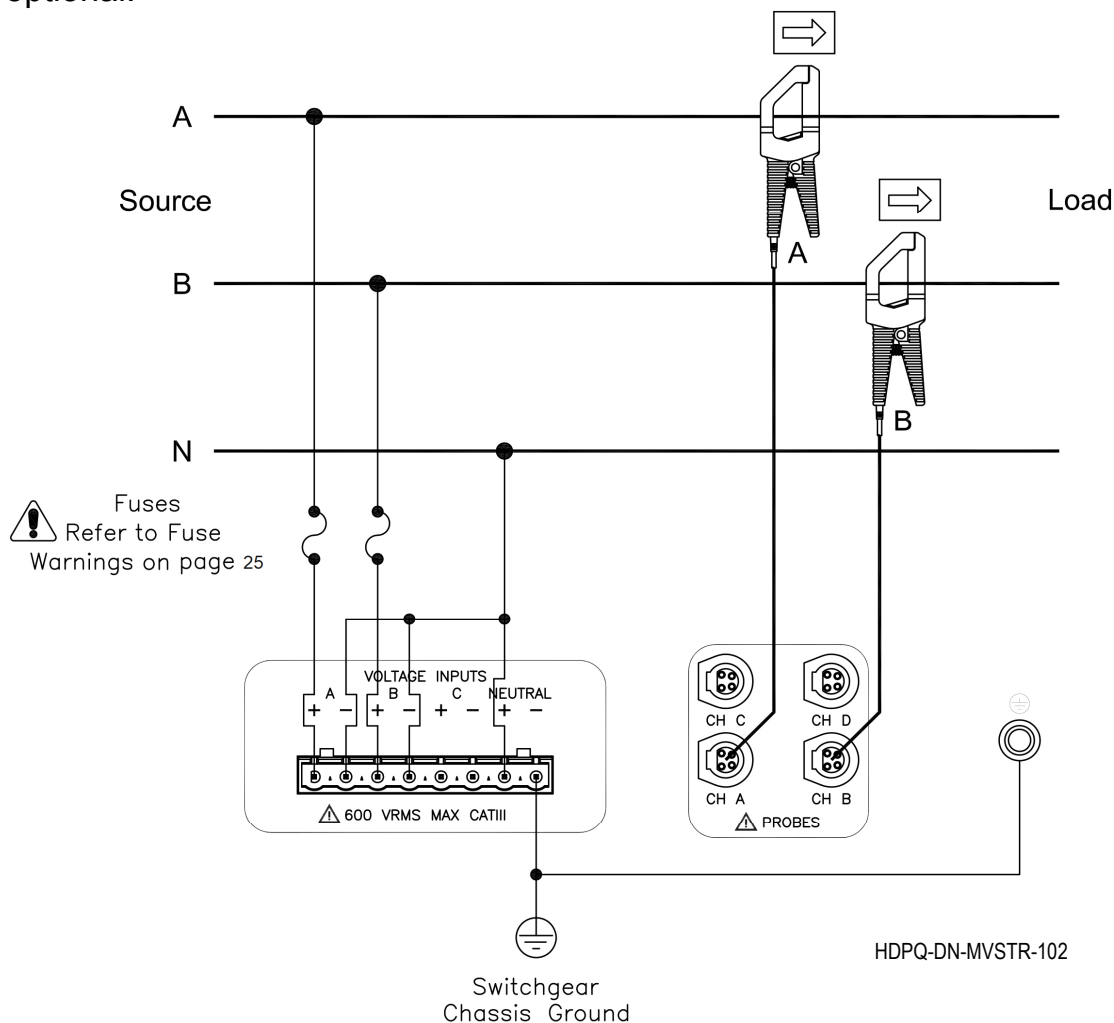
Connections of the CT leg to ground is recommended, but not required for proper operation.

### Phasor Diagrams



## Split Phase

When making split phase measurements, connect the voltage and current as shown below. The Neutral is chosen as the reference for measurement purposes. The figure also includes monitoring the Neutral to Ground voltage. Neutral to ground measurements are important but optional.



### CAUTION

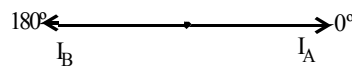
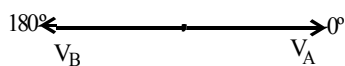
Connections must be performed in compliance with all safety requirements applicable to your installation.

### NOTE

Be sure to connect the current probe with the arrow on the handle pointing towards the load or an erroneous power reading will result.

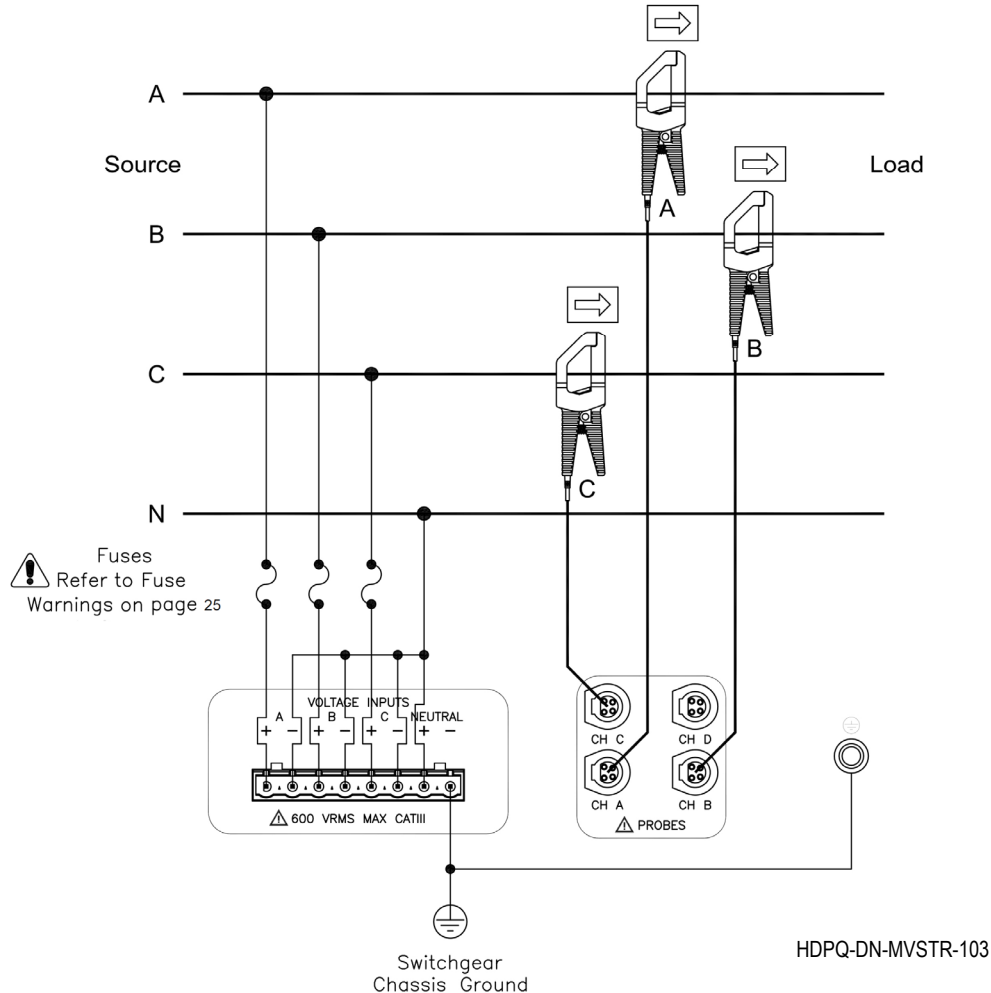
Connections of the CT leg to ground is recommended, but not required for proper operation.

### Phasor Diagrams



### 3 Phase, Four Wire Wye

Channels A, B, and C are connected to the voltage and current inputs. The neutral is connected to common and is the reference for all three voltage channels. The figure also includes monitoring the Neutral to Ground voltage. Neutral to ground measurements are important but optional.



#### CAUTION

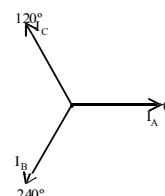
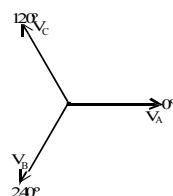
Connections must be performed in compliance with all safety requirements applicable to your installation.

#### NOTE

Be sure to connect the current probe with the arrow on the handle pointing towards the load or an erroneous power reading will result.

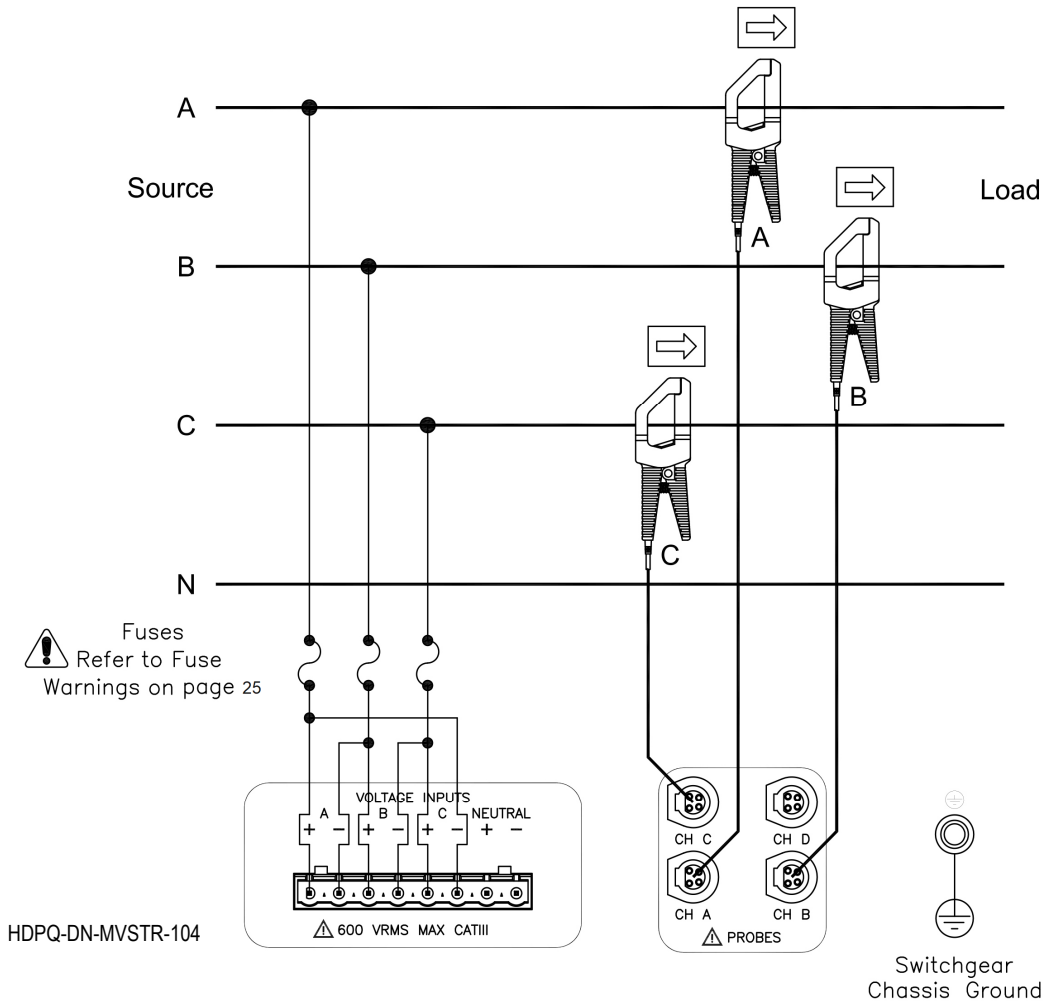
Connections of the CT leg to ground is recommended, but not required for proper operation.

#### Phasor Diagrams



### 3 Phase (Floating or Grounded) Delta

In this connection, the instrument uses voltage channels A, B, and C as differential inputs with channel A monitoring phase A-B, channel B monitoring phase B-C, and channel C monitoring phase C-A. Current inputs are connected to line currents A, B, and C.



#### CAUTION

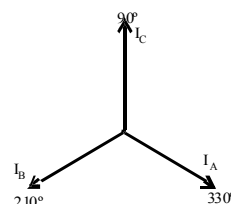
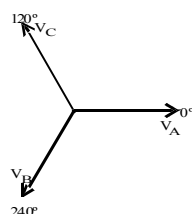
Connections must be performed in compliance with all safety requirements applicable to your installation.

#### NOTE

Be sure to connect the current probe with the arrow on the handle pointing towards the load or an erroneous power reading will result.

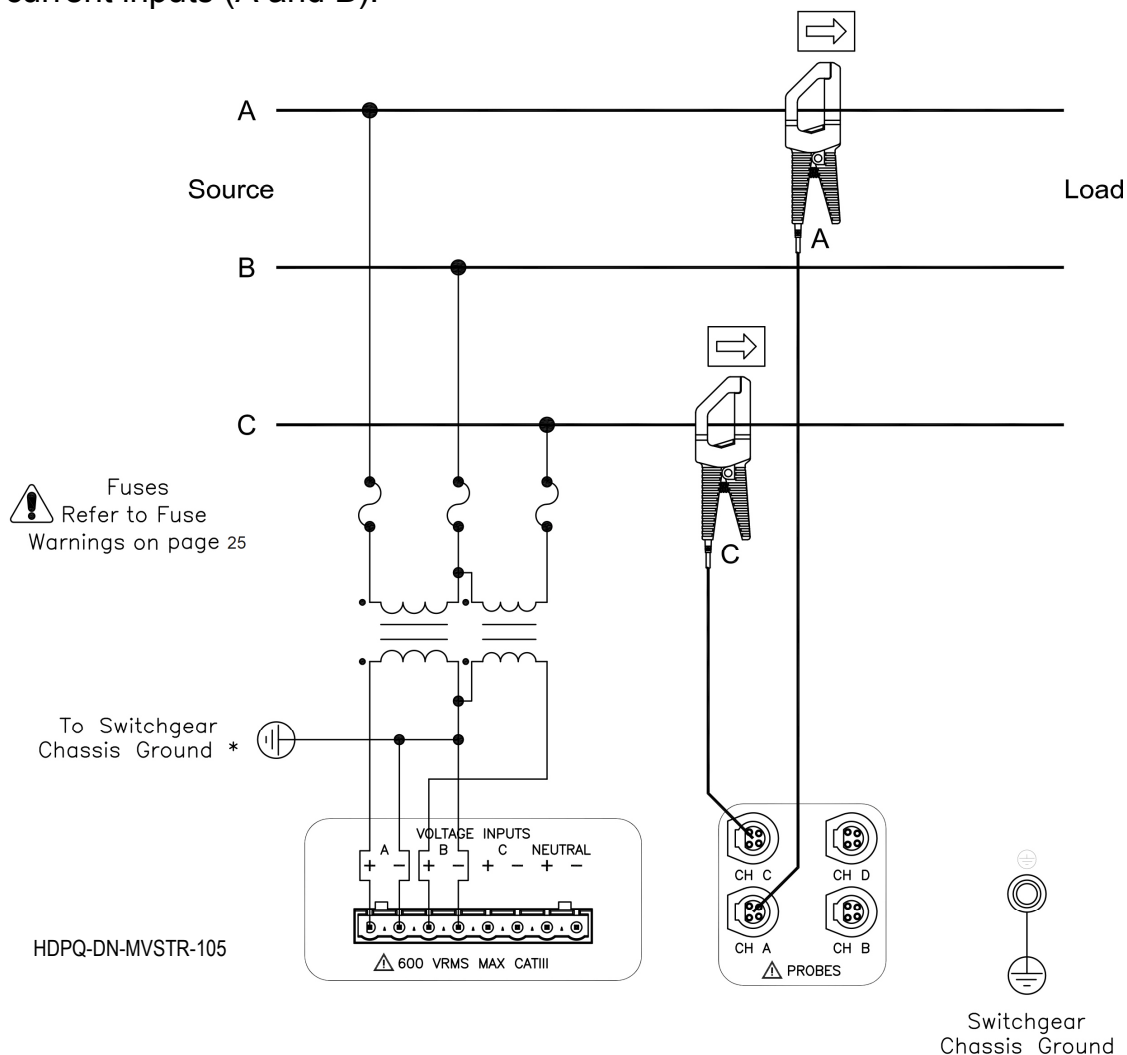
Connections of the CT leg to ground is recommended, but not required for proper operation.

#### Phasor Diagrams



### 3 Phase, 2-Watt Delta

The figure below shows the 3 Phase 2-Watt delta connection using phase B as the reference channel . The Source voltage and current inputs (A and C) are measured by the instrument using voltage and current inputs (A and B).



#### CAUTION

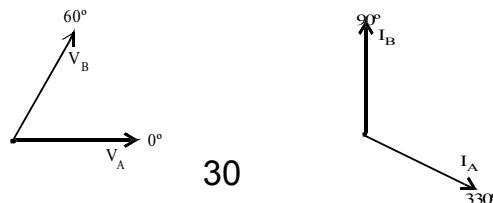
Connections must be performed in compliance with all safety requirements applicable to your installation.

#### NOTE

Be sure to connect the current probe with the arrow on the handle pointing towards the load or an erroneous power reading will result.

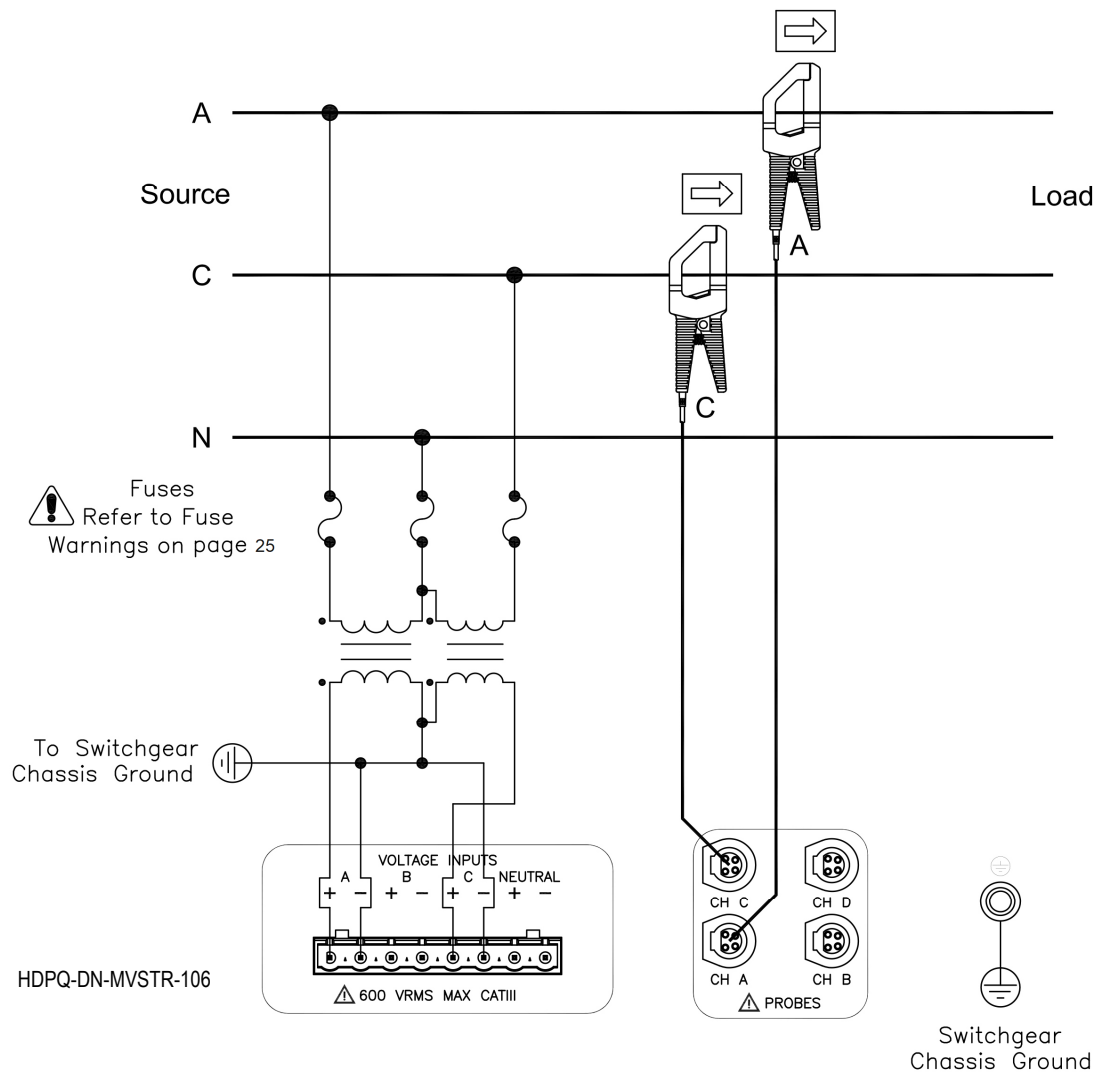
Connections of the CT leg to ground is recommended, but not required for proper operation.

#### Phasor Diagrams



## 2 ½ Element Without Voltage Channel B

Channels A and C are connected to the voltage and the current sources. The neutral is connected to common and is the reference for the three channels.



### CAUTION

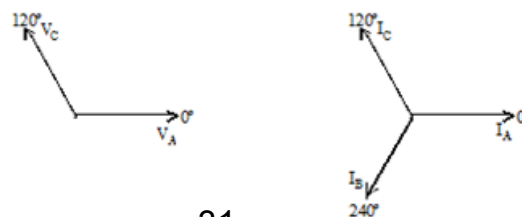
Connections must be performed in compliance with all safety requirements applicable to your installation.

### NOTE

Be sure to connect the current probe with the arrow on the handle pointing towards the load or an erroneous power reading will result.

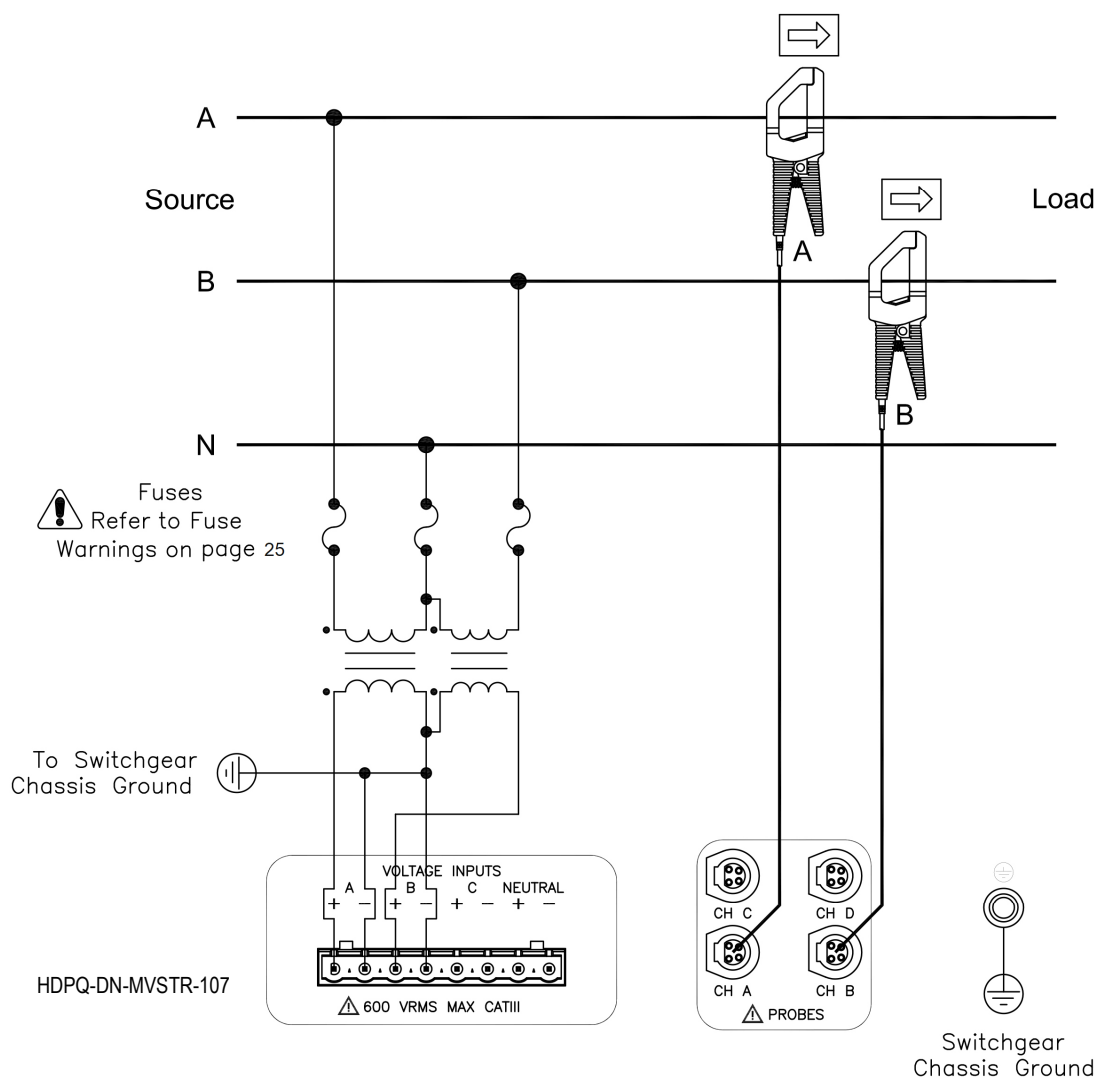
Connections of the CT leg to ground is recommended, but not required for proper operation.

### Phasor Diagrams



## 2 1/2 Element Without Voltage Channel C

Channels A and B are connected to the voltage and the current sources. The neutral is connected to common and is the reference for the three channels.



## CAUTION

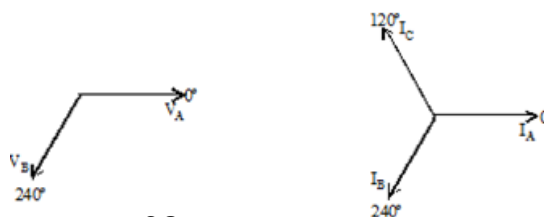
Connections must be performed in compliance with all safety requirements applicable to your installation.

**\*NOTE**

Be sure to connect the current probe with the arrow on the handle pointing towards the load or an erroneous power reading will result.

Connections of the CT leg to ground is recommended, but not required for proper operation.

## Phasor Diagrams





## ACCESSORIES LIST

### ***Standard Accessories***

The following table lists the standard accessories for Dranetz HDPQ-DN-MVSTR.

Qty.	Description	Part Number
1	Terminal Block, 2 Position <i>Use for the input power connector.</i>	902388-LF
1	Terminal Block, 8 Position <i>Use for voltage inputs.</i>	902389-LF
1	HDPQ DataNode with Terminal Block Voltage and Hypertronic Current Connectors Quick Reference Guide	QR-HDPQ-DN-MVSTR

### ***Optional Accessories***

The following table lists the optional accessories for Dranetz HDPQ-DN-MVSTR.

Description	Part Number
<b><i>Voltage Accessories</i></b>	
Fuse Voltage Adapter, for single phase connection	FVA-1K1
Fuse Voltage Adapter, for three phase connection	FVA-1K4
<b><i>Current Probe Accessories</i></b>	
TR Series Current Probes	
TR-2501B, 100mA to 1.2A	118283-G1
TR-2500B, 10A to 500A	118284-G1
TR-2510B, 1A to 10A	118285-G1
TR-2520B, 100A to 3000A	118286-G1
TR-2530B, 20A to 300A	118287-G1
TR-2540B, 10A to 1000A	118288-G1
TR-2550B, 1A to 100A	118289-G1
DRANFLEX XLB & MHB Series Probes	
<i>For Single Phase (XLB Series)</i>	
DRANFLEX3000XLB, 30A/300A/3000A, 24"	118433-G1
DRANFLEX3000XLB, 30A/300A/3000A, 36"	118434-G1
DRANFLEX3000XLB, 30A/300A/3000A, 48"	118435-G1
DRANFLEX6000XLB, 60A/600A/6000A, 24"	118439-G1
DRANFLEX6000XLB, 60A/600A/6000A, 36"	118440-G1
DRANFLEX6000XLB, 60A/600A/6000A, 48"	118441-G1

Description	Part Number
<p><i>For Three Phase (XLB Series)</i></p> <p>DRANFLEX3003XLB, 30A/300A/3000A, 24"</p> <p>DRANFLEX3003XLB, 30A/300A/3000A, 36"</p> <p>DRANFLEX3003XLB, 30A/300A/3000A, 48"</p> <p>DRANFLEX6003XLB, 60A/600A/6000A, 24"</p> <p>DRANFLEX6003XLB, 60A/600A/6000A, 36"</p> <p>DRANFLEX6003XLB, 60A/600A/6000A, 48"</p>	<p>118436-G1</p> <p>118437-G1</p> <p>118438-G1</p> <p>118442-G1</p> <p>118443-G1</p> <p>118444-G1</p>
<p><i>For Single Phase (MHB Series)</i></p> <p>DRANFLEX300MHB, 3A/30A/300A, 6"</p> <p>DRANFLEX300MHB, 3A/30A/300A, 8"</p> <p>DRANFLEX300MHB, 3A/30A/300A, 12"</p>	<p>118430-G1</p> <p>118431-G1</p> <p>118432-G1</p>
<p><b><i>Input Connector Accessories (factory installed)</i></b></p>	
<p>Wireless (WiFi), includes 1-inch antenna (not user installable)</p> <p><i>Use for wireless connectivity.</i></p>	<p>HDPQ-DN-WIFI</p>
<p>IRIG-B Input Connector</p> <p><i>Use as external time sync signal.</i></p>	<p>HDPQ-DN-IRIGB</p>
<p>GPS Input Connector</p> <p><i>Use as input connector for GPS antenna.</i></p>	<p>HDPQ-DN-GPS</p>
<p>Digital Input Connector</p> <p><i>Use to monitor on/off-type digital signals, such as breaker or switch position indicators.</i></p> <p><i>For more information, see next section Digital Inputs HDPQ-DN-MDIN (optional).</i></p>	<p>HDPQ-DN-MDIN</p>

## DIGITAL INPUTS HDPQ-DN-MDIN (optional)

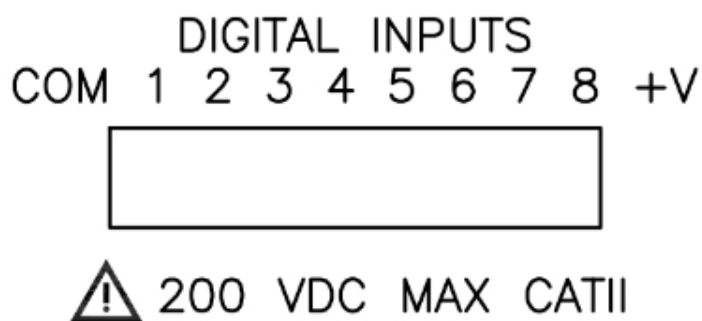
The factory-installed digital input option HDPQ-DN-MDIN is an eight channel, digital input module, providing users with the capability to monitor on/off-type digital signals, such as breaker or switch position indicators.

A logical HI condition is when the voltage level goes above 3.0 volts and a logical LO condition is when the voltage level goes below 1.0 volts. The maximum input signal level is 200VDC.

All logic transitions are time stamped to the millisecond and available for simultaneous comparison to all other data collected by the instrument. An "event" can be either set to occur on the change of state (edge-triggered) or at a particular state, HI/LO (level-triggered). Such events can be used to cross-trigger other instruments to also record data.

The Meter screens will report the present state of the inputs.

### *Connecting to Digital Inputs*

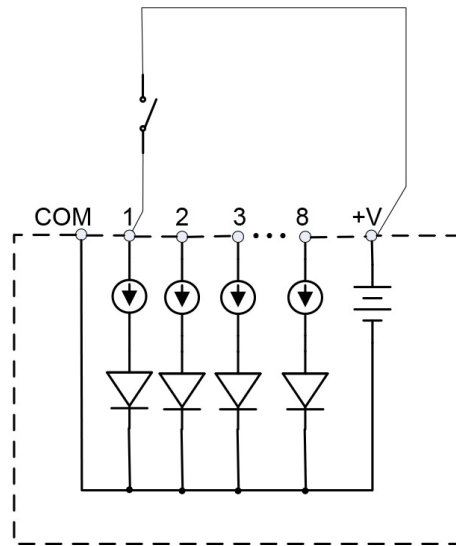


**CAUTION** The +V output terminal is rated +5V, 100 mA Max

### Internal Supply

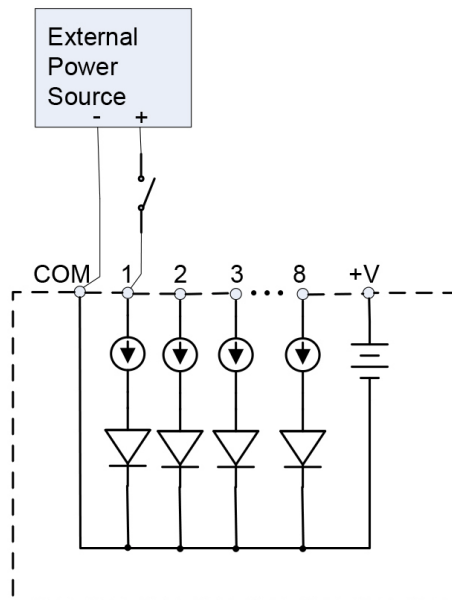
Each channel 1 through 8 is referenced to the “COM” terminal.

Individual channels can be connected between the “COM” to the “–” terminal of your monitoring source which serves as the reference. Each “+” terminal (1,2,3,4,5,6,7,8) of the instrument connects to the “+” terminal of your monitoring source.



### External Supply

If an external voltage supply is used instead of the +V output, the “COM” terminal must be connected to the external common of the digital power source.



## GENERAL SPECIFICATIONS

<b>Dimensions</b>	Size: 11" Width x 3.5" Height x 8.5" Depth 28cm x 9cm x 22cm
	Weight: 4.5 pounds
<b>Power Consumption</b>	25 watts max
<b>Environmental</b>	Operating: 0 to +55 °C (32 to 131 °F)
	Storage: -40 to +70 °C (-40 to 158 °F)
	Humidity: 5% to 95% non-condensing
<b>Altitude</b>	2000m (6560 ft) maximum
<b>Installation categories</b>	Mains supply: Installation Category II, Pollution Degree 2
	Measurement inputs: Installation Category III, Pollution Degree 2
	Digital Inputs Installation Category II, Pollution Degree 2

## **STATEMENTS AND NOTICES**

### **Statement of Warranty**

All Dranetz manufactured portable instruments and accessories are warranted to the original purchaser against defective material and workmanship for a period of three years from the date of invoice. User replaceable instrument batteries are warranted for a period of one year from the date of invoice. Certain Dranetz branded accessories, such as current transformers and other accessories not manufactured by Dranetz, are warranted to the original purchaser against defective material and workmanship for a period of one year from the date of invoice. Warranties for products and accessories sold by, but not branded as Dranetz, are covered by their respective manufacturer's warranties and are not warranted by Dranetz. Dranetz will repair or replace, at its option, all defective equipment that is returned, freight prepaid, during the warranty period. There will be no charge for repair, provided there is no evidence that the equipment has been mishandled or abused. This warranty shall not apply to any defects resulting from improper or inadequate maintenance, buyer-supplied hardware/software interfacing, unauthorized modification or misuse of the equipment, operation outside of environmental specifications, or improper site preparation or maintenance.

## **Statements and Notices (cont.)**

### **Statement of Reliability**

The information in this Quick Reference Guide has been reviewed and is believed to be entirely reliable. However, no responsibility is assumed for any inaccuracies. All material is for informational purposes only, and is subject to change without prior notice.

### **Notice Regarding FCC Compliance**

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.

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