

# DRANETZ HDPQ-DN



## *Quick Reference Guide*

### **HDPQ DataNode with Terminal Blocks** (Dranetz Model HDPQ-DN-MVS)

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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 70-2023) 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-2021) of USA and any additional workplace safety requirements applicable to your installation.

## **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 70-2023) 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-2021) 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 70-2023) 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-2021) 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 70-2023) 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."

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-2021) 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 MVS, also called HDPQ-DN-MVS, 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-MVS can monitor and record data on four voltage channels as well as four current channels simultaneously.

Dranetz HDPQ-DN-MVS 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-MVS 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-MVS 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 MVS with Terminal Block connectors. Other models are available that support different types of physical circuit connections.

## GETTING STARTED

### *Connecting to Power Source*

<b>Power Specifications</b>	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.
<b>CAUTION</b>	<b>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.</b>
<b>PRECAUCION</b>	<b>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.</b>
<b>MISE EN GARDE</b>	<b>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.</b>
<b>VORSICHT</b>	<b>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.</b>



**Safety  
Disconnects**

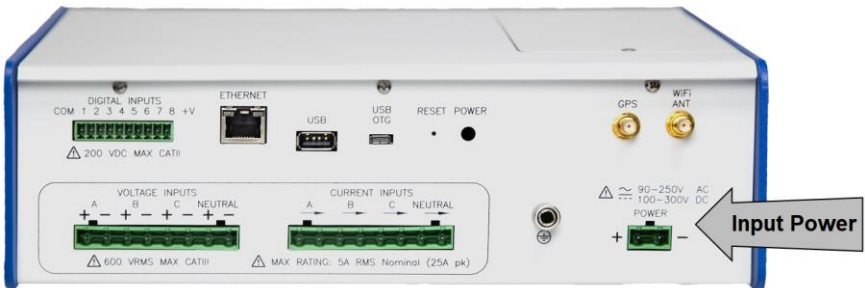
The mains supply power to the HDPQ DataNode must be installed downstream from a switched current limiting device. The circuit protection device should be 20 Amps or less, and must be rated for the available voltage and fault current; 5 Amps fuses are preferred.

**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-MVS 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.

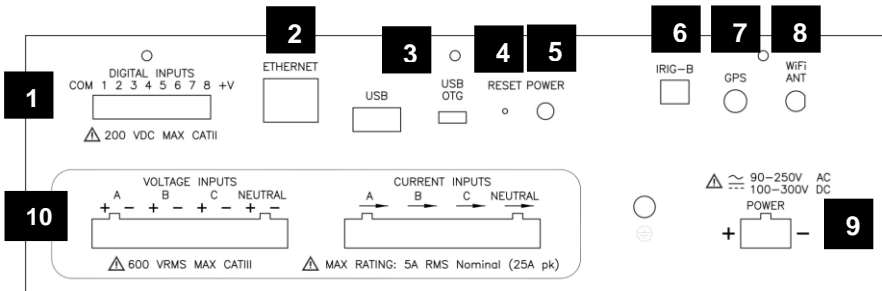


**Battery Indicator**      LED will light steadily when operating on battery backup.



## Rear View

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



- 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 to connect terminal blocks (included) for voltage and 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.

<b>Step</b>	<b>Action</b>
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. 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.

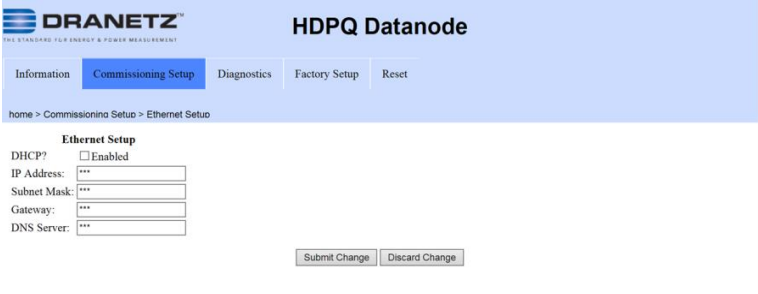
The next sections describe how to connect to the HDPQ DataNode via:

- 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="303 1026 866 1404"></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
<p><b><u>PRE-REQUISITE STEPS FOR FIRST TIME CONNECTION TO WiFi:</u></b></p> <p>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.</p> <p><b>Refer to the previous section Connecting via Wired Ethernet Connection on page 14 and follow Steps 1 to 5.</b></p> <p>Once the HDPQ DataNode Home Page is displayed, follow the steps below to set up WiFi connection to the instrument.</p>	
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	<p>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.</p> <p>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.</p>
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 <b>CONNECTED</b> . Otherwise, the instrument will prompt you to <b>RESTART</b> .

## 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.

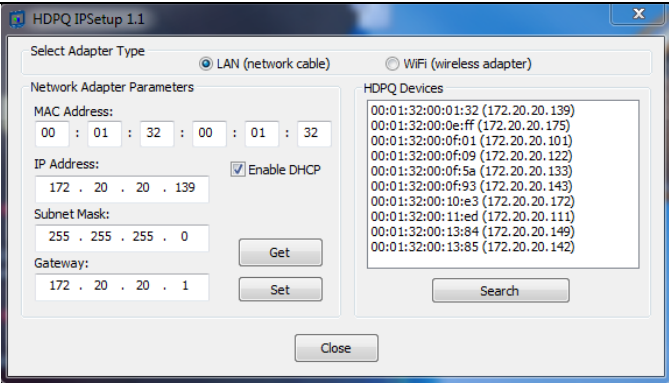
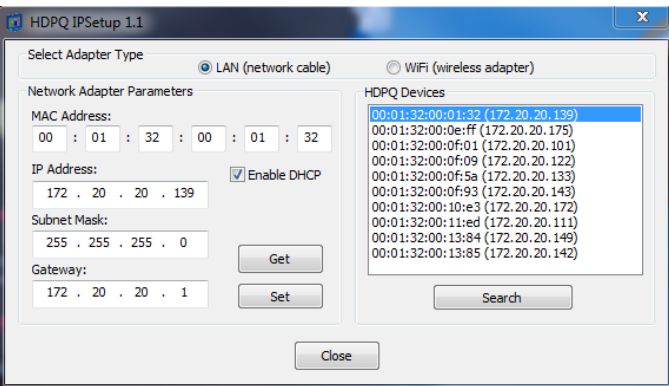
### System PC Requirements

<b>Operating System</b>	Windows® 10, Windows® 8 Professional
<b>Category 5e Cable</b>	Standard RJ45 connector, cross-over cable (Not Included)
<b>Internet Browser</b>	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.

Step	Action
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.

 **DRANETZ™**  
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## HDPQ Datanode

Information

Commissioning Setup

Diagnostics

Factory Setup

Reset

home > Commissioning Setup > Ethernet Setup

**Ethernet Setup**

DHCP? ☐ Enabled

IP Address:

Subnet Mask:

Gateway:

DNS Server:

Submit Change

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**

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### **WARNUNG**

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## Connecting the Voltage and Current Connectors

The Dranetz Model HDPQ-DN-MVS 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  $\pm \text{Neutral}$ .

**Current** Four (4) 5 Amp Current inputs labelled  $\pm A$ ,  $\pm B$ ,  $\pm C$  and  $\pm \text{Neutral}$ .

## Connection Guidelines

Refer to the appropriate connection diagram on pages 24 to 30 to connect to the voltage/current input connections.

Step	Action
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	Connect A, B and C plus Neutral (if applicable) CT secondaries to the current input connection. The HDPQ-DN-MVS is designed to connect to CTs with 5 Amp nominal secondaries. (10 mA - 5 ARMS up to #12 AWG wire) Be sure to observe the current specifications, as well as the arrow indicating the direction of current flow.
7	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.

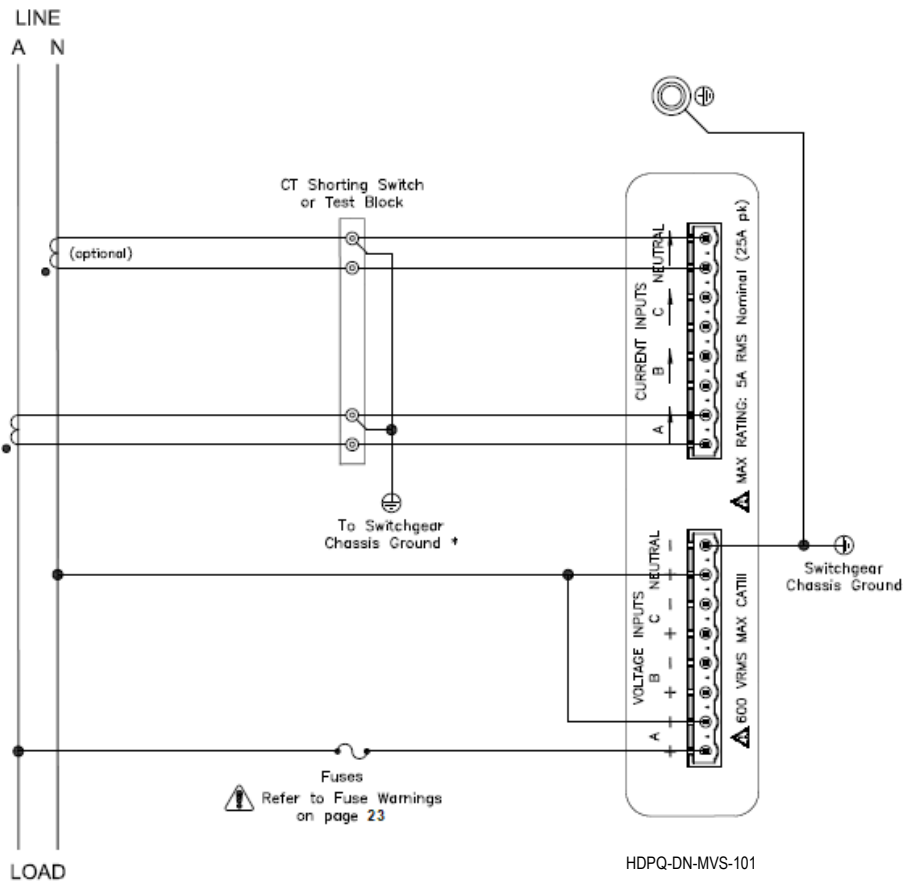
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Dranetz Model HDPQ-DN-MVS can monitor the following power configurations:

- 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 and Neutral currents. Neutral to ground measurements are important but optional.



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

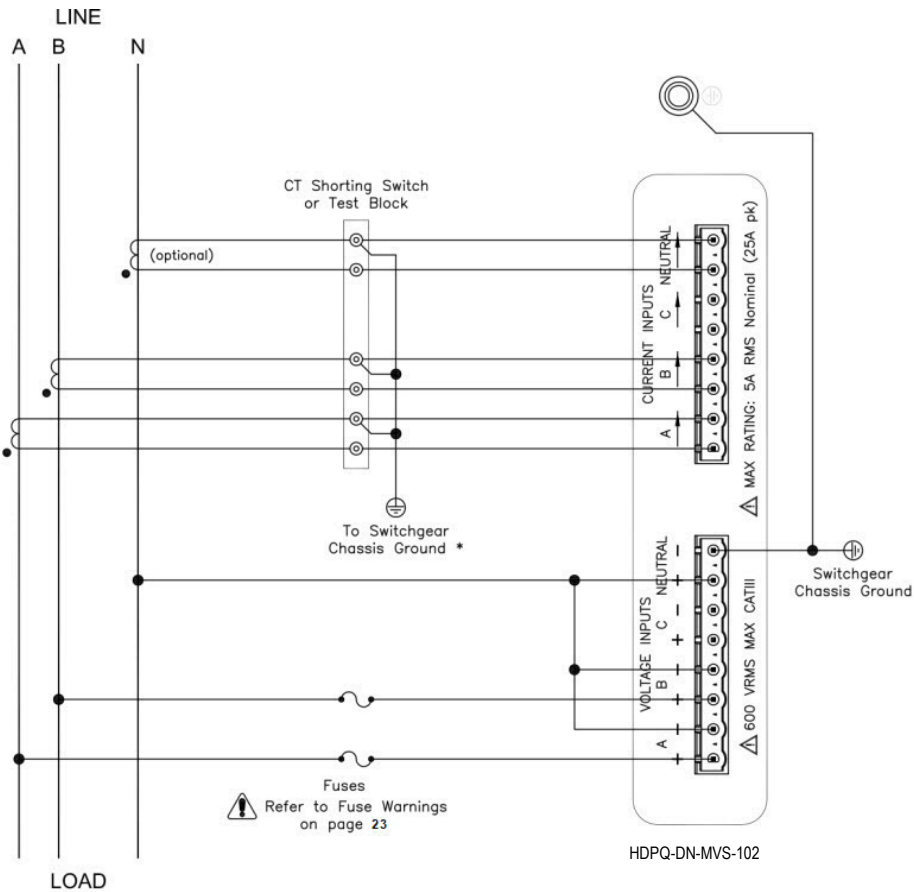
**\*NOTE** Connections of the CT leg to ground is recommended, but not required for proper operation.

**Phasor Diagrams**  $\xrightarrow{V_A}$   $\xrightarrow{I_A}$



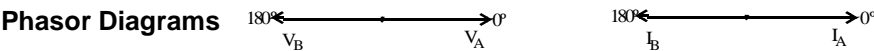
# Split Phase

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 and Neutral currents. Neutral to ground measurements are important but optional.



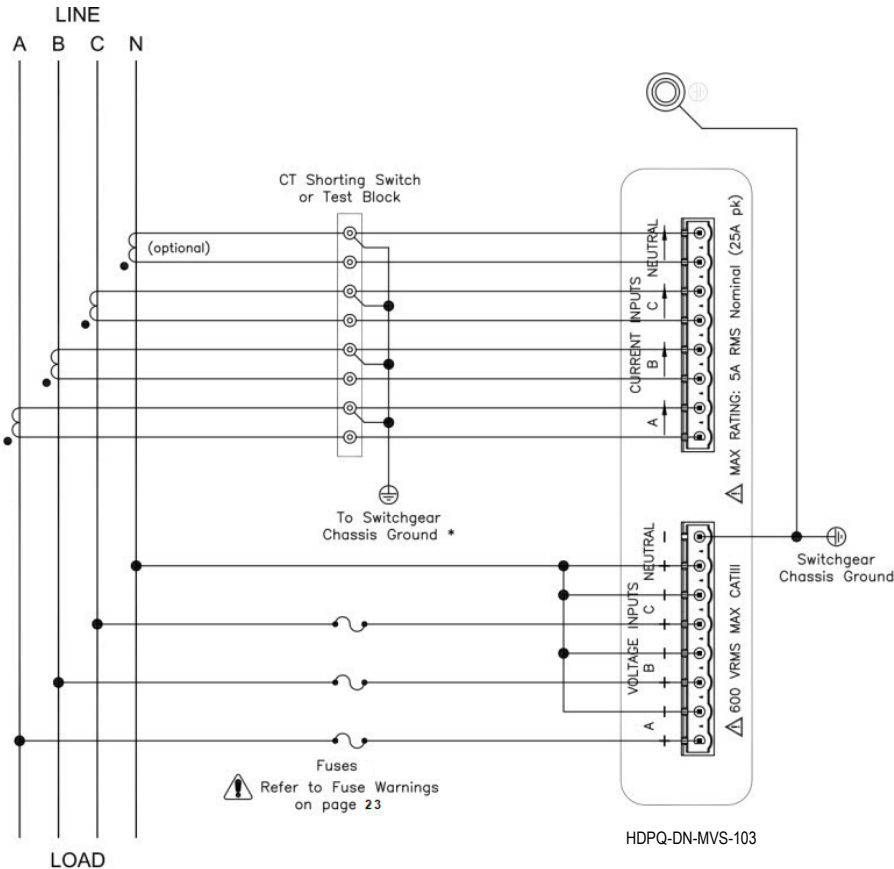
**CAUTION** Connections must be performed in compliance with all safety requirements applicable to your installation.

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



### 3 Phase, Four Wire Wye

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



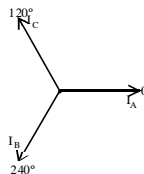
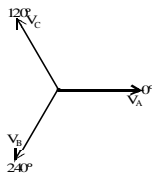
#### CAUTION

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

#### \*NOTE

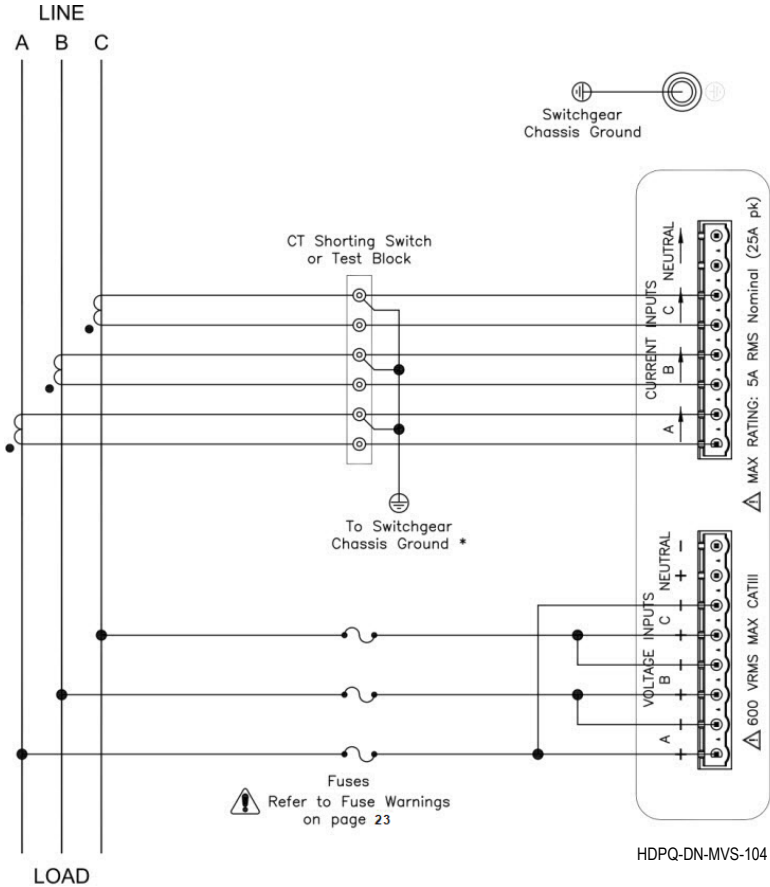
Connections of the CT leg to ground is recommended, but not required for proper operation.

#### 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.



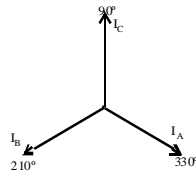
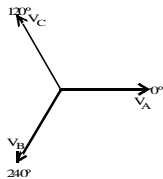
#### CAUTION

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

#### \*NOTE

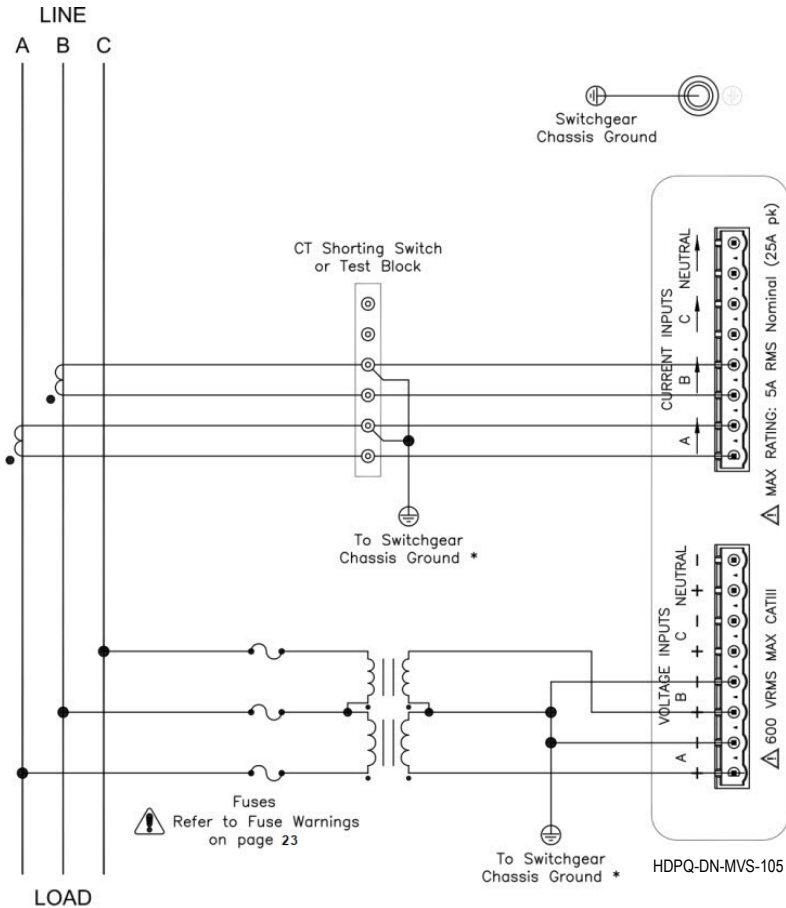
Connections of the CT leg to ground is recommended, but not required for proper operation.

#### Phasor Diagrams



### 3 Phase, 2-Watt Delta

The figure below shows the 3 Phase 2-Watt delta connection using phase channels A-B and C-B. Phase B is the reference. Current inputs are connected to measure line currents A and B.



#### CAUTION

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

#### \*NOTE

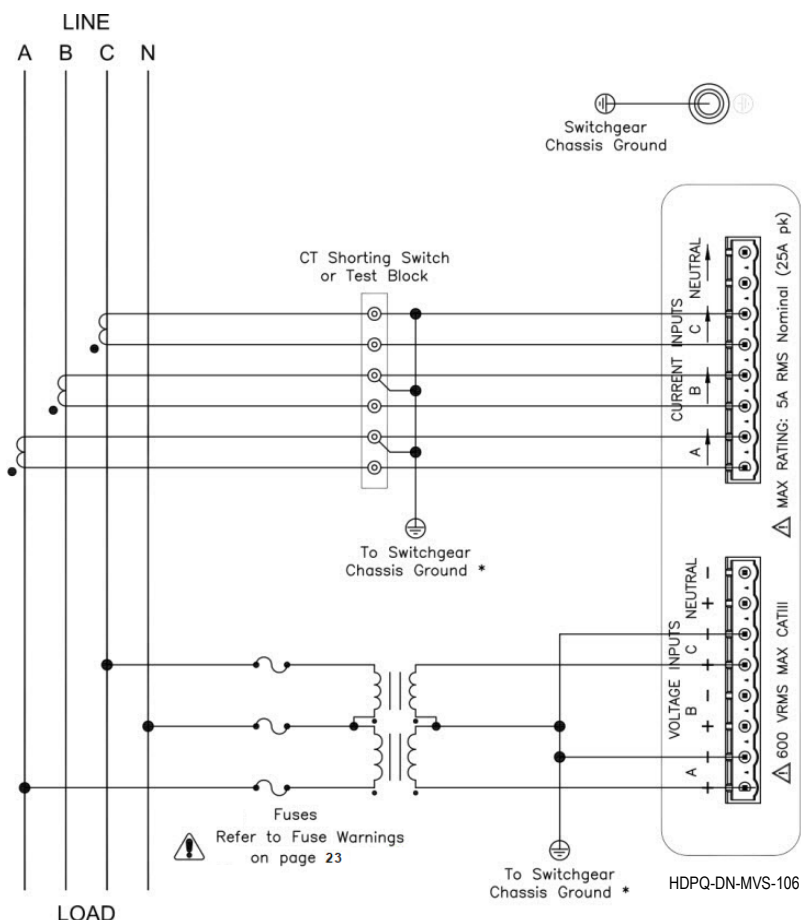
Connections of the CT leg to ground is recommended, but not required for proper operation.

#### Phasor Diagrams



## 2 ½ Element Without Voltage Channel B

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



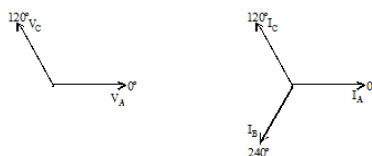
### CAUTION

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

### \*NOTE

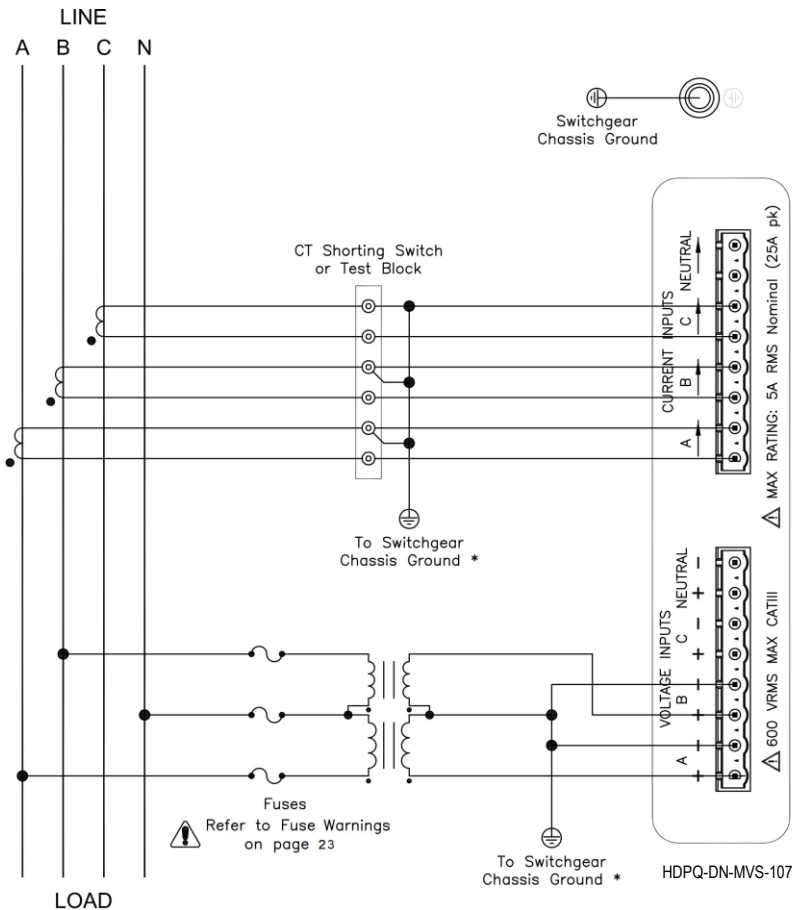
Connections of the CT leg to ground is recommended, but not required for proper operation.

### Phasor Diagrams



# 2 ½ Element Without Voltage Channel C

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



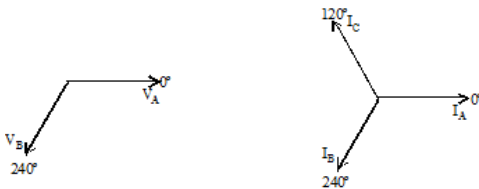
## CAUTION

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

## \*NOTE

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-MVS.

Qty.	Description	Part Number
1	Terminal Block, 2 Position <i>Use for the input power connector.</i>	902388-LF
2	Terminal Block, 8 Position <i>One connector is used for voltage inputs and one for current inputs.</i>	902389-LF
1	HDPQ DataNode with Terminal Blocks Quick Reference Guide	QR-HDPQ-DN-MVS

### Optional Accessories

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

Description	Part Number
Fuse Voltage Adapter, for single phase connection	FVA-1K1
Fuse Voltage Adapter, for three phase connection	FVA-1K4
Wireless (WiFi), includes 1-inch antenna (not user installable) <i>Use for wireless connectivity.</i>	HDPQ-DN-WIFI
IRIG-B Input Connector <i>Use as external time sync signal.</i>	HDPQ-DN-IRIGB
GPS Input Connector <i>Use as input connector for GPS antenna.</i>	HDPQ-DN-GPS
Digital Input Connector <i>Use to monitor on/off-type digital signals, such as breaker or switch position indicators.</i> <i>For more information, see next section Digital Inputs HDPQ-DN-MDIN (optional).</i>	HDPQ-DN-MDIN

## 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.

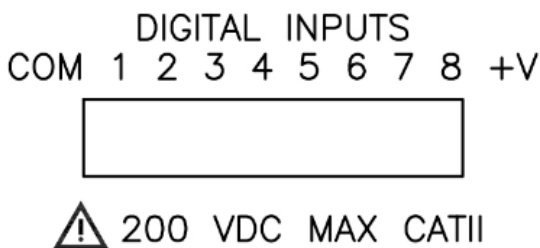
A logical HI condition is when the voltage level goes above 3.0 volts and a logical LO condition is when the voltage level goes below 1.0 volts. The maximum input signal level is 200VDC.

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*



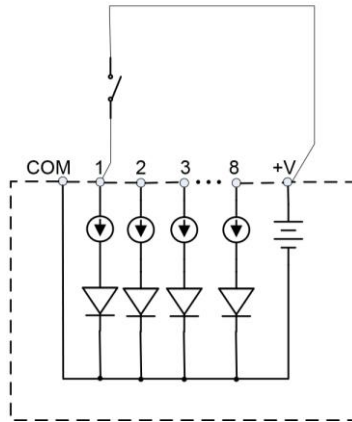
**CAUTION** The +V output terminal is rated +5V, 100 mA Max



## Internal Supply

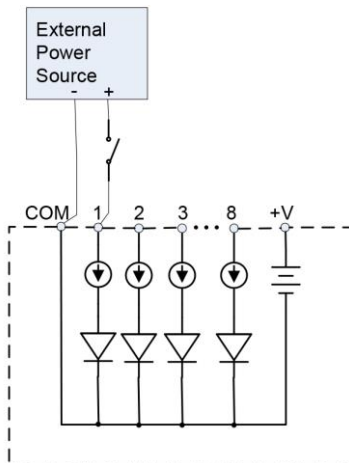
Each channel 1 through 8 is referenced to the “COM” terminal.

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

**Dimensions**      Size: 11" Width x 3.5" Height x 8.5" Depth  
28cm x 9cm x 22cm

Weight: 4.5 pounds

**Power Consumption** 25 watts max

**Environmental**

Operating:	0 to +55 °C (32 to 131 °F)
Storage:	-40 to +70 °C (-40 to 158 °F)
Humidity:	5% to 95% non-condensing

**Altitude** 2000m (6560 ft) maximum

Installation categories	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.

### **Notice Regarding Proprietary Rights**

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