# Network Communications Interface
## for DC-AC Inverters

**This user's information manual is applicable for the following inverter Models:**

**1785-xxx-120-60-P**

**1786-xxx-120-60-P**

**1787-xxx-120-60-P**

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NOTE: For physical setup and operational instructions see the user information manual that was included with your inverter.

# Network Communications Interface for DC-AC Inverters

# 1 Network Communications Interface

The Wilmore Network Communications Interface allows you to monitor your Wilmore DC-AC inverter through a web interface, SNMP (Simple Network Management Protocol), serial terminal port and web service API (Application Programming Interface). This unit uses a standard RJ45 Ethernet connection to allow monitoring through its web interface, SNMP, and web service API. Serial terminal monitoring is supported using an external USB port.

Overview of general information that can be monitored (via web interface, SNMP, serial terminal, and web service API):

- Unit Description
- Model Number
- Serial Number
- DC Input Voltage
- AC Output Frequency
- AC Output RMS Voltage
- AC Output RMS Current
- Real AC Output Power
- Apparent AC Output Power
- AC Output Power Factor

Overview of warning information that can be monitored (via web interface, SNMP, serial terminal, and web service API):

- Low DC Input Voltage
- High DC Input Voltage
- Abnormal AC Voltage from Inverter
- Output Overload

Additional Information that can be monitored (via SNMP, serial terminal, and web service API only):

- Peak Positive AC Output Voltage
- Peak Negative AC Output Voltage
- Peak Positive AC Output Current
- Peak Negative AC Output Current
- AC Output Reactive Power

# 1.1 Serial Port Drivers and Network Support

This chart details the current driver and features supported on the Wilmore Network Communications Interface for the Microsoft Windows and GNU Linux platforms.

| Features and Application Support | | | | | |
| --- | --- | --- | --- | --- | --- |
| | Serial Terminal | Wilmore Configuration Application | Web Page | Web Service API | SNMP |
| Windows 7/8 | * Requires Additional Drivers | * Requires Additional Drivers | ✓ | ✓ | ✓ |
| Windows 10/11 | ✓ | ✓ | ✓ | ✓ | ✓ |
| Linux | ✓ | ✗ | ✓ | ✓ | ✓ |

Requires a USB Connection          Requires a Network Connection

**\* Additional Drivers (Microsoft Windows 7 / 8 Only): ST Micro provides the COM port drivers for the module used in this unit which can be downloaded from the ST Micro website at: https://www.st.com/en/development-tools/stsw-stm32102.html.**

## 1.1.1 Pre-Install Notes

**Local Configuration Only:** The Wilmore Network Communications Interface requires a **USB 2.0 Type B** to **USB 2.0 Type A** cable (physically connected to the unit) for initial setup and configuration.

**Network Connection is for Remote Monitoring:** The internal web interface and SNMP protocol are strictly for information monitoring only, configuration via these interfaces is not allowed.

**Disconnect Serial port after Configuration:** Wilmore encourages the removal of the USB connection after completing configuration to avoid unwanted configuration changes.

**Offsite / Remote Access:** It is recommended that this unit not be exposed directly on the internet. If you require an external offsite connection for monitoring, please consider using a VPN (Virtual Private Network) for a more secure connection.

# 1.2 Wilmore Communications Configuration Application

This unit should be configured using the Wilmore Communications Configuration application before monitoring information via the web interface, SNMP, or query the web service API. A Windows system is required for the initial configuration of this unit.

## 1.2.1 System Requirements

*Table 1: System Requirements*

| Wilmore Communications Configuration Application System Requirements | | |
|---|---|---|
| Operating System | Windows 7 Service Pack 1 | Windows Server 2012 |
| | Windows 8.1 | Windows Server 2016 |
| | Windows 10 | Windows Server 2019 |
| | Windows 11 (or later) | Windows Server 2022 (or later) |
| Physical Connections | An available USB 2.0 or 3.0 Type A port. | |
| | An available RJ45 network connection. | |
| Drivers | Installation of virtual COM port drivers (Windows 8.1 or later). | |
| Software | The .NET Framework Version 4.6.2 (or later) | |
| Processor | 1 GHz (.NET framework minimum requirement) | |
| RAM | 512 MB (.NET framework minimum requirement) | |
| Disk Space | 4.5 GB (.NET framework minimum requirement) | |

### 1.2.1.1 Installing the .NET Framework

The Microsoft .NET 4.8 Framework should already be installed if you are running a fully updated Windows 7, Windows 8.1, or Windows 10 system (or later). If the .NET 4.8 Framework is not installed via Windows update, it can be installed manually using the ".NET 4.8 Framework Offline Installer" available from Microsoft.

NOTE: To install the .NET 4.8 framework one of the following minimum Windows versions are required: Windows 7 SP1, Windows 8.1, or Windows 10 version 1607.

## 1.2.2 Installation of the Communications Configuration Application

The configuration application can be installed with the "Wilmore Communications Config Setup.msi" installer available on our website at: https://www.wilmoreelectronics.com/wilmore/support/downloads.php.

*Figure 1: Wilmore Communications Config Setup MSI Installer*



*Figure 2: Wilmore Communications Config Setup – Main Window*



*Figure 3:Wilmore Communications Config Setup – Select Install Location*
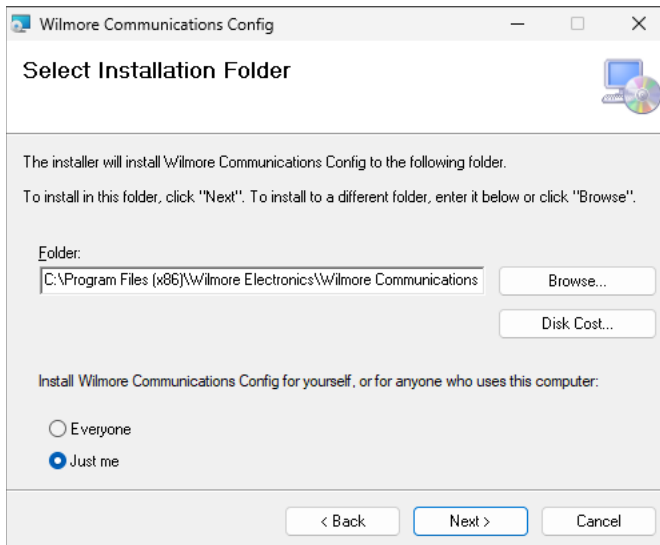


1. Download and extract the Wilmore Communications Configuration application (Wilmore-Communications-Config-Setup-(v2.×.×).zip) available on our website and start the installer (Wilmore Communications Config Setup.msi).

2. Click next to start the Wilmore Communications Config installation wizard.

3. Select the folder location where you would like to install the Wilmore Communications Config software.

1.2.2 Installation of the Communications Configuration Application

*Figure 4: Wilmore Communications Config Setup –*
*Confirm Installation*
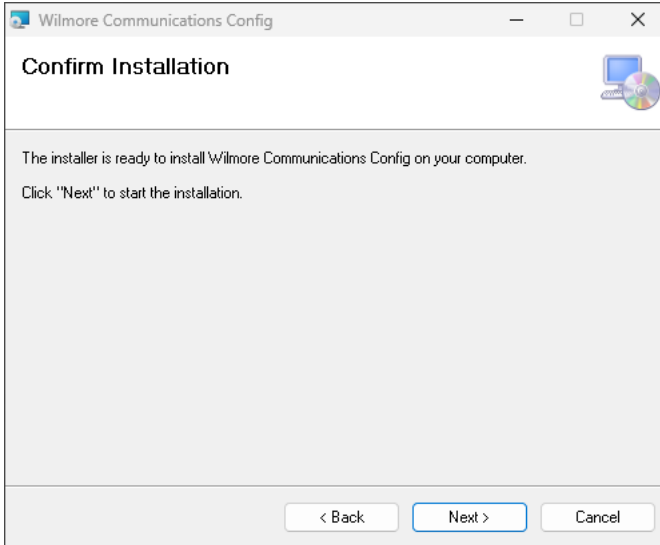


4. Click the next button to install the Wilmore Communications Config software to the desired location.

*Figure 5: Wilmore Communications Config Setup – Finish*
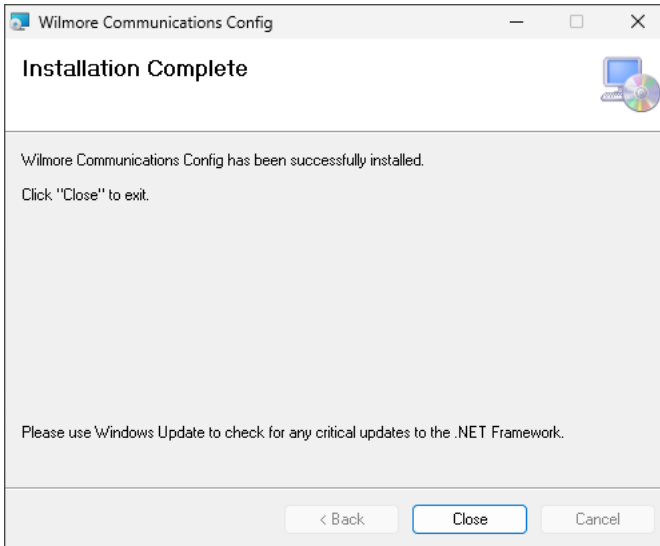


5. Click the close button to finish the installation wizard.

*Figure 6: Wilmore Communications Config Setup – Start Menu Application Launcher*
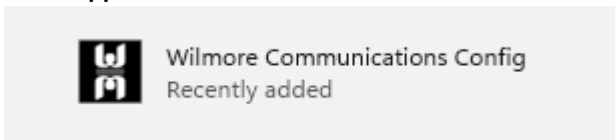


6. Start the Wilmore Communications Config application using the start menu search function or start menu entry.

1.2.2 Installation of the Communications Configuration Application

*Figure 7: Wilmore Communications Configuration Application – Main Window*

## 1.2.3 Configuration Options

*Table 2: Configuration Options for the **Wilmore Communications Configuration** Application*

| Configuration Setting | Description | Example Values |
|---|---|---|
| **(1) Serial Port Connection Settings** | | |
| Check Ports | Button used to refresh the list of available serial port connections on this system. | N / A |
| Serial Port Selection List | A drop-down list of available Wilmore power conversion products connected to this system. Products will be listed by the (Windows assigned) serial COM port number followed by the Wilmore serial number. | COM17 – Wilmore Serial #: 11230205 |
| Serial Connection Status | The connection status of the serial port on this system to the unit. | CONNECTED |
| Connect | Button used to initiate a connection to this unit. | N / A |
| Disconnect | Button used to stop the connection to this unit. | N / A |
| **(2) General Information** | | |
| Wilmore Product Type | This will list the type of Wilmore power product that the application is connected to (DC-DC Converter or DC-AC Inverter). | DC-AC Inverter |
| Model Number | The Wilmore assigned model number of this unit. | 1786-130-120-60-P |
| Serial Number | The Wilmore assigned serial number of this unit. | 11230205 |
| MAC ID | The Wilmore assigned MAC (Media Access Control) ID of this unit. | 70-B3-D5-ED-40-0A |
| Read Current Values | Button used to populate the "Current Values" column with the most recent configuration values of this unit. | N / A |
| **(3) Network Settings** | | |
| Ethernet Connection (Status) | This section displays the connection status of the Ethernet port on the Wilmore Inverter. The status window will display green when an active Ethernet connection is detected and red when it is disconnected. |  |
| Use DHCP (Checkbox) | Enables or disables DHCP (Dynamic Host Control Protocol).<br><br>(Disable if a static IP address is needed) | Disabled |
| IP Address | Displays user input of the IP address and its current value. (Only configurable if DHCP is disabled) | 192.168.0.114 |

## 1.2.3 Configuration Options

| Configuration Setting | Description | Example Values |
|---|---|---|
| Subnet Mask | Displays user input of the subnet mask address and its current value. (Only configurable if DHCP is disabled) | 255.255.255.0 |
| Default Gateway | Displays user input of the default gateway and its current value. (Only configurable if DHCP is disabled) | 192.168.0.1 |
| DNS Server | Displays user input of the DNS server address and its current value. (Only configurable if DHCP is disabled) | 192.168.0.1 |
| Open Webpage in Browser | This button will open the web interface of the Wilmore power inverter in your default web browser using the current IP address. | N / A |
| **(4) SNMP Settings** | | |
| Enable SNMP (Checkbox) | Enables or disables Simple Network Management Protocol. | Enabled |
| System Description (optional) | An administrator defined text description of the unit. Maximum Field Length: 20 characters | DCAC Inverter 1 |
| System Contact (optional) | An administrator defined contact for the unit, including information on how to contact them. Maximum Field Length: 32 characters | John Smith username@example.com |
| System Name (optional) | An administrator defined hostname for this unit. Typically, the FQDN (Fully-Qualified Domain Name) of the unit. Maximum Field Length: 20 characters | hostname.example.com |
| System Location (optional) | The physical location of this unit. Maximum Field Length: 20 characters | Wiring closet, 1st floor |
| Read Community Name (required) | A password that allows read-only SNMP access to the device. Maximum Field Length: 20 characters | READ PUBLIC |
| Write Community Name (optional) | A password that allows SNMP write access to the device. Maximum Field Length: 20 characters | READ PRIVATE |
| **(5) SNMP Trap Settings** | | |
| Enable SNMP Trap (Checkbox) | Enables or disables SNMP Traps. | Disabled |
| Trap Period (Sec) | The time in seconds in between trap messages. Minimum Value: 5 seconds Maximum Value: 86,400 seconds (approximately 24 hours) | 5 |

## 1.2.3 Configuration Options

| Configuration Setting | Description | Example Values |
|---|---|---|
| Trap Manager IP Address | The IP address for the network management server where the SNMP trap message will be received. | 192.168.0.100 |
| **(6) Configuration Settings** | | |
| Save Settings | Button that saves the user's network and SNMP configuration settings to this unit. | N / A |
| Save as CSV File | This button will save all configured settings to a CSV file. Additional entries are appended when they are saved to the same CSV file. This is useful when the user desires to save multiple unit configurations. | N / A |
| Reset to Factory Values | This button will reset all user configured settings back to the Wilmore Factory defaults. **Note: To make the factory reset permanent, you must click the save settings button.** | N / A |
| Firmware Version | The version number of the software currently installed on the Wilmore inverter. | 1.20230303 |

# 1.2.4 Network Communications Interface Initial Configuration

## *1.2.4.1 DHCP IP Address Configuration*

This section describes the steps for configuring your Wilmore inverter with DHCP (Dynamic Host Configuration Protocol).

NOTE: The DHCP address assigned to the inverter may change on startup depending on the DHCP lease time configured on your DHCP server (typically 24 hours). However, you may configure your DHCP server to reserve a static DHCP lease (based on its MAC address) that will assign the same IP address every time to the inverter.

*Table 3: Required Materials for DHCP Configuration*

| Description | Quantity |
|---|---|
| Wilmore DC-AC Inverter | 1 |
| Straight-through Ethernet Cable with T568A or T568B wiring standard | 2 |
| USB 2.0 A to B Cable (Included) | 1 |
| Network router or switch configured as a DHCP server. | 1 |
| Windows 7/8/10/11 PC | 1 |
| Wilmore Communications Configuration Application (Downloaded) | 1 |

1.2.4.1 DHCP IP Address Configuration

1. Download and install the Wilmore Communications Configuration application available on our website.

   **Example Filename:** Wilmore-Communications-Config-Setup-(v2.×.×).zip

   **Download URL:** https://www.wilmoreelectronics.com/wilmore/support/downloads.php

   Skip this step if you have already installed the configuration application using the instructions in Section 1.2.2, page 6.

*Figure 8: Wilmore Inverter USB and Network Connections – DHCP Server*



Wilmore DC - AC Inverter
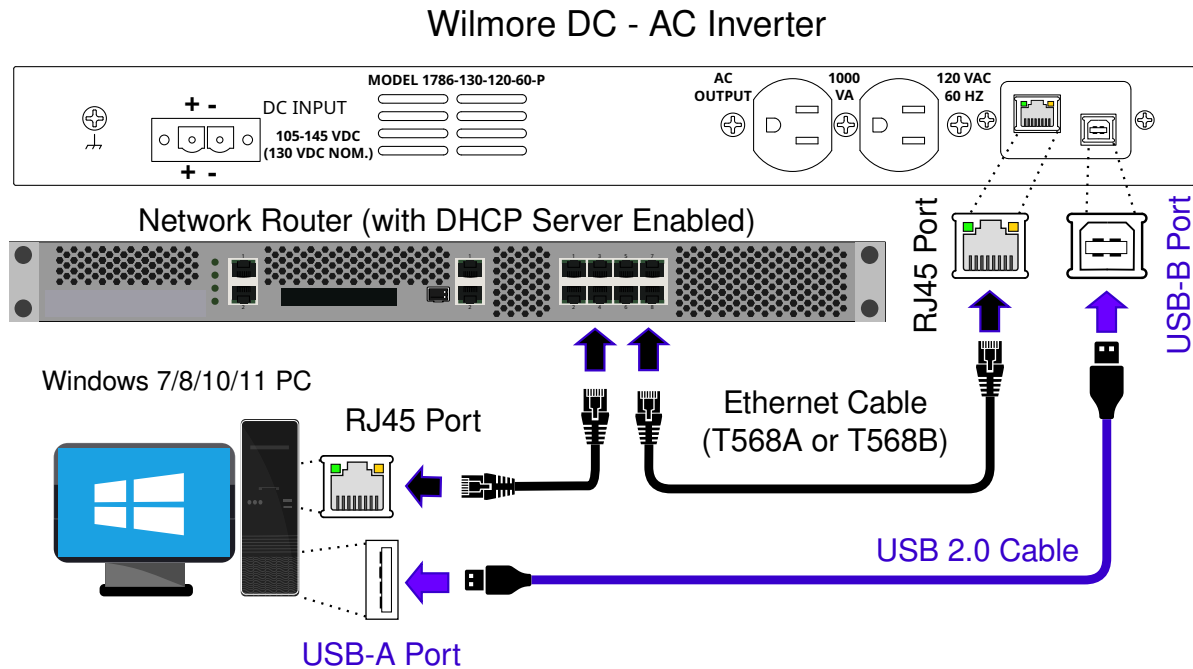
2. Make all USB and Ethernet connections according to the diagram above (Figure 8)

3. Connect the correct DC input power source according to the model of inverter purchased (12, 24, 48, or 130 volts) to the Wilmore DC–AC Inverter and power the unit on.

1.2.4.1 DHCP IP Address Configuration

4. Open the Wilmore Communications Configuration application using the Windows start menu entry or start menu search function (Wilmore Communications Config).

*Figure 9: Wilmore Configuration Application – Serial Port Connection*
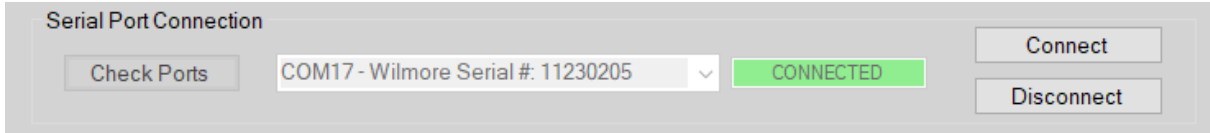


NOTE: **The configuration application will automatically connect to the first Wilmore power product detected via the USB serial port. If you have multiple units connected you can select other units via the serial port drop down list.**

**The "Check Ports" button and serial port drop down list will only function while the application is disconnected.**

5. In the Network Settings section, enable the "Use DHCP" checkbox (default: unchecked).

6. Click on the "Save Settings" button to write the network settings to the unit.

**Allow 15 seconds for the settings to be saved to the unit.**

The inverter will save all network and SNMP settings entered and disconnect the serial interface.

7. Power-cycle the Wilmore inverter and reconnect via the Wilmore Communications Configuration application to verify your settings have been saved.

8. Test connectivity to the unit by clicking on the "Open Webpage in Browser" button in the configuration application.

## *1.2.4.2 Static IP Address Configuration*

This section describes the steps for configuring your Wilmore inverter with a static network address configuration.

*Table 4: Required Materials for Static IP Address Configuration*

| Description | Quantity |
| --- | --- |
| Wilmore DC-AC Inverter | 1 |
| USB 2.0 A to B Cable (Included) | 1 |
| Network switch (Optional) | 1 |
| Straight-through Ethernet Cable with T568A or T568B wiring standard | 2 |
| Windows 7/8/10/11 PC | 1 |
| Wilmore Communications Configuration Application (Downloaded) | 1 |

1.2.4.2 Static IP Address Configuration

1. Download and install the Wilmore Communications Configuration application available on our website.

   **Example Filename:** Wilmore-Config-Setup-(v2.×.×).zip

   **Download URL:** https://www.wilmoreelectronics.com/wilmore/support/downloads.php

   Skip this step if you have already installed the configuration application using the instructions in .

2. **Configure your network and USB connections using one of the following methods:**

   2.1 **Connect directly using an Ethernet cable (Figure 10):**

   Make all USB and Ethernet connections according to the diagram below (Figure 10)

*Figure 10: Wilmore Inverter USB and Network Connections – Direct*
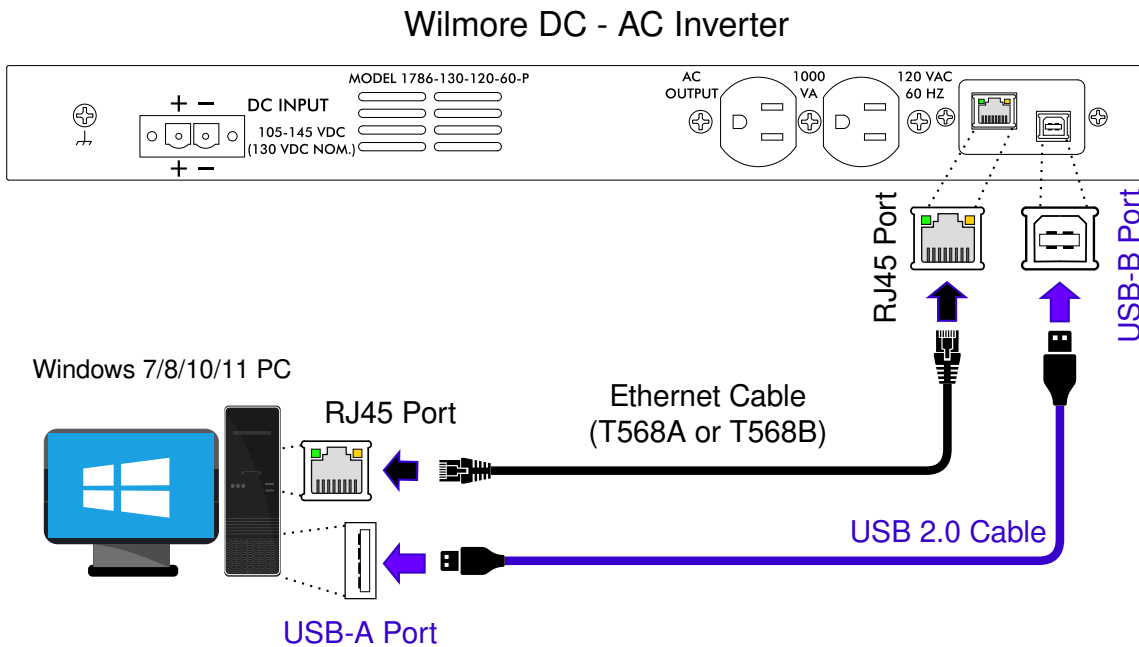


**Ethernet Cable Requirements:** The Wilmore Network Communications Interface supports *MDIX* (Medium Dependent Interface Crossover) and therefore does not require an Ethernet crossover cable.

1.2.4.2 Static IP Address Configuration

2.2 **Connect using an Ethernet switch (Figure 11):**

Make all USB and Ethernet connections according to the diagram below (Figure 11).

*Figure 11: Wilmore Inverter USB and Network Connections – Ethernet Switch*
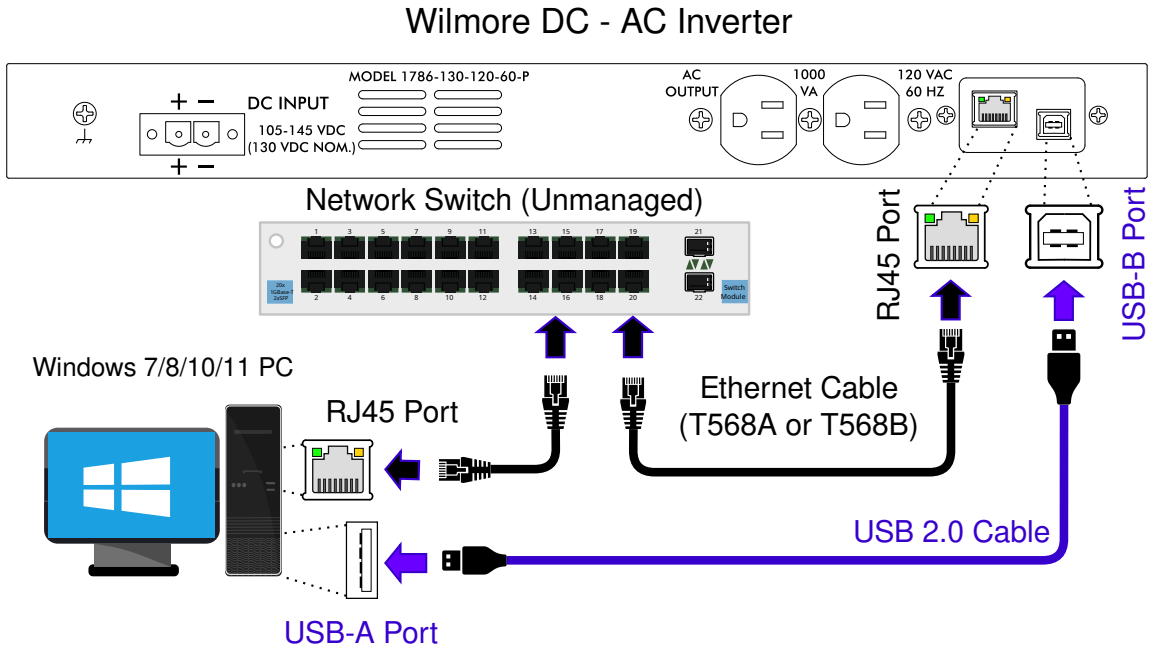


3. Connect the correct DC input power source according to the model of inverter purchased (12, 24, 48, or 130 volts) to the Wilmore DC–AC Inverter and power the unit on.

4. Open the Wilmore Communications Configuration application using the Windows start menu entry or start menu search function (Wilmore Communications Config).

*Figure 12: Wilmore Configuration Application – Serial Port Connection*
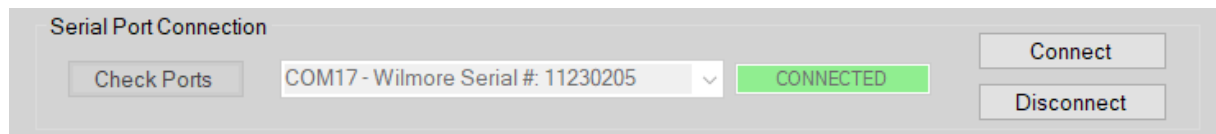


**NOTE: The configuration application will automatically connect to the first Wilmore power product detected via the USB serial port. If you have multiple units connected you can select other units via the serial port drop down list.**

**The "Check Ports" button and serial port drop down list will only function while the application is disconnected.**

1.2.4.2 Static IP Address Configuration

*Figure 13: Wilmore Inverter – IP Address Configuration*

| DC - AC Inverter Network Settings | | Windows PC Network Settings | |
|---|---|---|---|
| IP Address: | 192.168.0.114 | IP Address: | 192.168.0.100 |
| Subnet Mask: | 255.255.255.0 | Subnet Mask: | 255.255.255.0 |
| Default Gateway: | 192.168.0.1 | Default Gateway: | 192.168.0.1 |
| DNS Server: | 192.168.0.1 | DNS Server: | 192.168.0.1 |



Wilmore DC - AC Inverter

Windows 7/8/10/11 PC

Ethernet Cable

USB 2.0 Cable
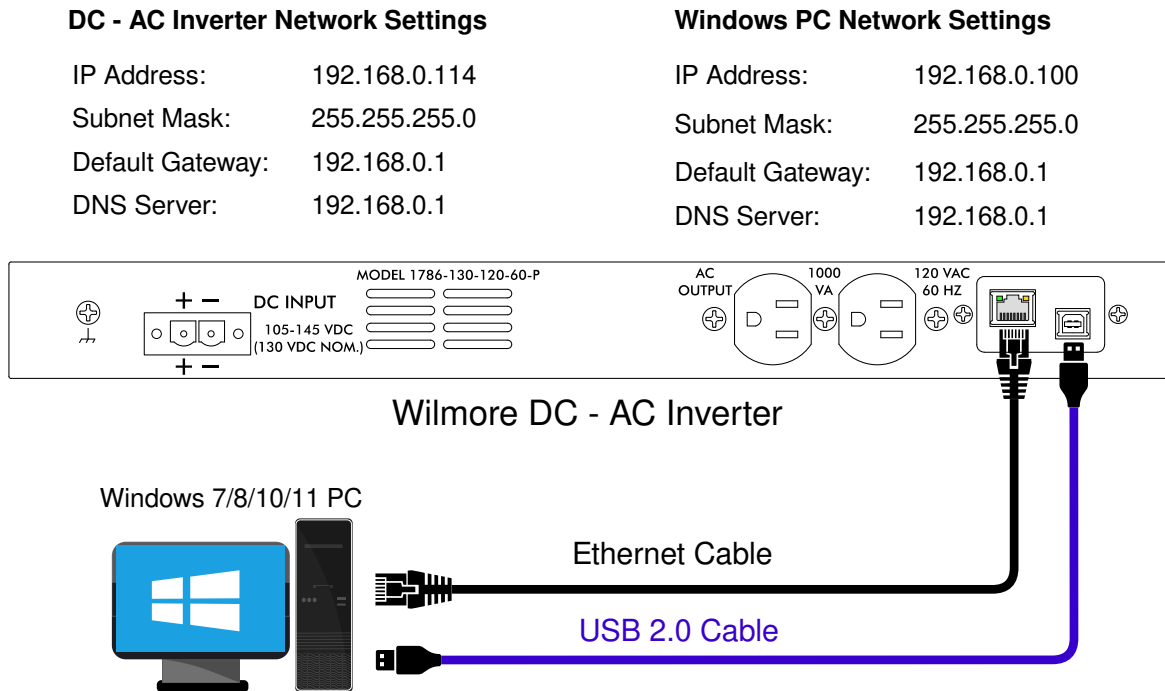
5.  In the example above (Figure 13), we are configuring the unit with a static IP address so the checkbox next to "Use DHCP" should be unchecked (default: unchecked).

    **NOTE:** If connecting the Ethernet cable directly from the Wilmore inverter to the PC, you must assign a static IP address to the PC that is within the same network range that you assign to the inverter. For example, an address within the range of 192.168.0.1 to 192.168.0.254 with a subnet mask of 255.255.255.0 is a valid IP address (as long as all connected devices have unique IP addresses).

     5.1 (Required) Enter a valid IP v4 address.

     5.2 (Required) Enter the subnet mask for your network.

     5.3 Enter the default gateway (typically your router's IP address).

     5.4 Enter a DNS server address (usually your router's IP address).

6.  Click on the "Save Settings" button to write the network settings to the unit.

    **Allow 15 seconds for the settings to be saved to the unit.**

    The inverter will save all network and SNMP settings entered and disconnect the serial interface.

7.  Power-cycle the Wilmore inverter and reconnect via the Wilmore Communications Configuration application to verify your settings have been saved.

8.  Test connectivity to the unit by clicking on the "Open Webpage in Browser" button in the configuration application.

# 2 Web Interface Monitoring

The Wilmore Network Communications Interface allows for monitoring of key information via its web interface. Available information varies by model and type. In order to monitor information from the web interface, an Ethernet cable must be connected, and the unit must be configured with a valid IP v4 address.

The web interface is supported by most major browsers; including Firefox, Chrome, and Edge.

*Figure 14: Wilmore Inverter – Web Interface*

Wilmore®
Ver. 1.20230303

| | DC-AC Inverter | |
|---:|:---:|:---|
| Model Number | 1786-130-120-60-P | |
| Serial Number | 11230203 | |
| DC Input Voltage | 129.3 | V |
| Frequency | 60.0 | Hz |
| AC Volts | 116.0 | Vrms |
| AC Current | 11.0 | Arms |
| Real Power | 1265 | Watts |
| Apparent Power | 1276 | VA |
| Power Factor | 0.99 | |

WARNING TEXT IS DISPLAYED HERE

# 2.1 Web Interface Information

*Table 5: Web Interface Information*

| Name | Description | Example Value * |
|---|---|---|
| **General Information** | | |
| Version Number | Defines the firmware version number of this unit. | 1.20230303 |
| Unit Description | Defines the type of Wilmore power product. | DC-AC Inverter |
| Model Number | The Wilmore assigned model number of this unit. | 1786-130-120-60-P |
| Serial Number | The Wilmore assigned serial number of this unit. | 11230205 |
| **Electrical Information** | | |
| DC Input Voltage | The DC input voltage in real-time, displayed in volts (V). | 129.3 |
| Frequency | The AC output frequency for the preferred AC source in real-time, displayed in hertz (Hz). | 60.0 |
| AC Volts | The AC output RMS voltage for the preferred AC source in real-time, displayed in volts (V). | 116.0 |
| AC Current | The AC output RMS current in real-time, displayed in amps (A). | 11.0 |
| Real Power | The AC output real power value in real-time, displayed in watts (W). | 1265 |
| Apparent Power | The AC output apparent power in real-time, displayed in volt-amperes (VA). | 1276 |
| Power Factor | The AC output's power factor in real-time (with a range between 0 and 1). | 0.99 |

* Displayed values are for example purposes only. Actual general and electrical information values may vary.

## 2.2 Warnings

The web interface displays the following warning messages when the unit has entered an abnormal state of operation. **Warning messages are displayed with a yellow border.**

*Table 6: Web Interface Warnings*

| Name | Description |
|---|---|
| **General Warnings** | |
| WARNING: LOW DC Input Voltage | Warning text displays when the unit detects the DC input voltage approaching its lower limit. |
| WARNING: HIGH DC Input Voltage | Warning text displays when the unit detects the DC input voltage approaching its upper limit. |
| WARNING: Abnormal AC Output Voltage | Warning text displayed when the unit detects an abnormal AC output voltage, higher or lower than the unit's normal operating range. |
| WARNING: Output Overload | Warning text displays when the unit detects an apparent load that is above its rated capacity. |

# 3 SNMP Monitoring

The Wilmore Network Communications Interface (NCI) supports network monitoring through SNMP (Simple Network Management Protocol) polling or traps. Polling allows the SNMP server to request information from the device at regular intervals, such as uptime or input voltage. When using a trap the unit will notify the SNMP server when it encounters certain error conditions.

This unit supports SNMP version 1.

## 3.1 SNMP Configuration

**Figure 15: SNMP Configuration Settings**



NOTE: The minimum requirements to configure SNMP are an IP address and a read community name.

1.  Connect the correct DC input power source according to the model of inverter purchased (12, 24, 48, or 130 volts) to the Wilmore DC–AC Inverter and power the unit on.

2.  Plug in the included USB-A to USB-B cable from the Wilmore inverter to your Windows PC.

3.  Open the Wilmore Communications Configuration application (Wilmore Communications Config) that was downloaded previously in Section 1.2.2, page 6.

4.  Make sure the "Enable SNMP" box is checked (default: checked).

5.  (Optional) Enter the desired "System Description" or a general text description of the unit.

    **Maximum Field Length:** 20 characters

3.1 SNMP Configuration

6.  (Optional) Enter the administrators "System Contact" information, the name of the system administrator and how to contact them (email, phone number etc…).

    **Maximum Field Length:** 32 characters

7.  (Optional) Enter the "System Name", generally the hostname associated with the unit's IP address or fully qualified domain name of the unit.

    **Maximum Field Length:** 20 characters

8.  (Optional) Enter the "System Location", the physical location of this unit (e.g. 'wiring closet, 1st floor').

    **Maximum Field Length:** 20 characters

9.  (Required) Enter a "Read Community Name", the password for read-only SNMP access.

    **Maximum Field Length:** 20 characters

10. (Optional) Enter a "Write Community Name", the password for read-write SNMP access.

    **Maximum Field Length:** 20 characters

11. Click on the "Save Settings" button to write the SNMP settings to the unit.

    **Allow 15 seconds for the settings to be saved to the unit.**

    The inverter will save all network and SNMP settings entered and disconnect the serial interface.

12. Power-cycle the Wilmore inverter and reconnect via the Wilmore Communications Configuration application to verify your settings have been saved.

13. Test SNMP polling via any of the freely available SNMP browsers on the web.

## 3.1.1 SNMP Trap Configuration

*Figure 16: SNMP Trap Settings Configuration Window*



1. Connect the correct DC input power source according to the model of inverter purchased (12, 24, 48, or 130 volts) to the Wilmore DC–AC Inverter and power the unit on.

2. Plug in the included USB cable from the Wilmore inverter to your Windows PC.

3. Open the Wilmore Communications Configuration application (WilmoreCommConfig.exe) that was downloaded previously in Section 1.2.2, page 6.

4. Make sure the "Enable SNMP Trap" box is checked (default: unchecked).

5. Enter the desired trap send period (in seconds).

    **Minimum:** 5 seconds.

    **Maximum:** 86,400 seconds (approximately 24 hours)

6. Enter your SNMP trap manager's IP address.

7. Click on the "Save Settings" button to write the SNMP settings to the unit.

    **Allow 15 seconds for the settings to be saved to the unit.**

    The inverter will save all network and SNMP settings entered and disconnect the serial interface.

8. Power-cycle the Wilmore inverter and reconnect via the Wilmore Communications Configuration application to verify your settings have been saved.

9. (Optional) Test the receipt of SNMP trap messages using an in-house SNMP trap receiver or via any of the freely available SNMP browsers on the web (section 3.2.6, pg. 30).

# 3.2 SNMP OIDs

SNMP OIDs (Object Identifiers) are numbers used to uniquely identify information that can be monitored on a device. The OID numbers for Wilmore DC-AC inverters are listed in the tables below.

## 3.2.1 MIB Files

An MIB (Management Information Base) file is a text file that describes the properties of an SNMP device. This MIB file translates each OID to a user-friendly text description for each SNMP property.

We provide MIB files in two formats for all Wilmore power products that can be downloaded from our website at:

https://www.wilmoreelectronics.com/wilmore/support/downloads.php

Choose from one of the following MIB file formats:

**SMIv1 Format:** WILMORE-MIB-SMIv1.mib

**SMIv2 Format:** WILMORE-MIB.mib

NOTE: The SMIv1 format should work for most applications, we provide the SMIv2 format in case your application requires it.

## 3.2.2 System OIDs

*Table 7: Table 8: SNMP System OID Information ([RFC 1213](#) Specification)*

| OID | MIB Variable | Description |
| --- | --- | --- |
| .1.3.6.1.2.1.1.1 | sysDescr | A textual description of the entity. Maximum Field Length: 20 characters |
| .1.3.6.1.2.1.1.2 | sysObjectID | The vendor's authoritative identification of the network management subsystem contained in the entity. |
| .1.3.6.1.2.1.1.3 | sysUpTime | The time (in hundredths of a second) since the network management portion of the system was last re-initialized. |
| .1.3.6.1.2.1.1.4 | sysContact | The textual identification of the contact person for this managed node, together with information on how to contact this person. Maximum Field Length: 32 characters |
| .1.3.6.1.2.1.1.5 | sysName | An administratively-assigned name for this managed node. By convention, the node's fully-qualified domain name. Maximum Field Length: 20 characters |
| .1.3.6.1.2.1.1.6 | sysLocation | The physical location of this node (e.g., 'telephone closet, 3rd floor'). Maximum Field Length: 20 characters |
| .1.3.6.1.2.1.1.7 | sysServices | A value which indicates the set of services that this entity primarily offers. |

*These are standard OIDs included in the SNMP specification and are not assigned by Wilmore Electronics.*

*Table 9: SNMP Generic Traps ([RFC 3418](#) Specification)*

| OID | MIB Variable | Description |
| --- | --- | --- |
| .1.3.6.1.6.3.1.1.5.1 | coldStart | A cold start trap signifies that the SNMP entity, supporting a notification originator application, is re-initializing itself and that its configuration may have been altered. |

## 3.2.3 Wilmore Root OID

*Table 10: Wilmore Electronics Root OID assigned by the Internet Assigned Numbers Authority (IANA)*

| OID | MIB Variable | Description |
| --- | --- | --- |
| .1.3.6.1.4.1.54581 | wilmoreElectronics | The root OID number assigned to Wilmore Electronics. |

## 3.2.4 DC-AC Inverter OIDs

*Table 11: Wilmore Electronics Inverter SNMP OIDs*

| OID | MIB Variable | Type | Description |
|---|---|---|---|
| **System Information** | | | |
| .1.3.6.1.4.1.54581.1.1.1 | sysModelNumber | DisplayString | The Wilmore assigned model number of this unit. |
| .1.3.6.1.4.1.54581.1.1.2 | sysSerialNumber | DisplayString | The Wilmore assigned serial number of this unit. |
| .1.3.6.1.4.1.54581.1.1.3 | sysTrapFrequency | Integer32 | The time in seconds in between trap messages. Minimum Value: 5 seconds Maximum Value: 86,400 seconds (approximately 24 hours) |
| .1.3.6.1.4.1.54581.1.1.4 | sysTrapTargetIP | IPADDRESS | Displays the IP address for the network management server where the SNMP trap should be received. |
| **Electrical Information** | | | |
| .1.3.6.1.4.1.54581.1.2.1 | pwrInputVoltage | Integer32 | The most recent value of the DC input voltage ([1] Volts × 10). |
| .1.3.6.1.4.1.54581.1.2.4 | pwrWarningText | DisplayString | A text listing of the most recent Warnings. |
| **Electrical Information for DC-AC Inverters** | | | |
| .1.3.6.1.4.1.54581.1.2.3.7 | pwrACCurrent | Integer | The most recent value of the AC output RMS current ([1] Amps × 10). |
| .1.3.6.1.4.1.54581.1.2.3.8 | pwrRealPower | Integer | The most recent value of the real output power ([1] Watts × 10). |
| .1.3.6.1.4.1.54581.1.2.3.9 | pwrApparentPower | Integer | The most recent value of the apparent output power ([1] Volt-Amperes × 10). |

### 3.2.4 DC-AC Inverter OIDs

| OID | MIB Variable | Type | Description |
| --- | --- | --- | --- |
| .1.3.6.1.4.1.54581.1.2.3.10 | pwrPowerFactor | Integer | The most recent value of the unit's power factor ([1] Power Factor × 100). |
| .1.3.6.1.4.1.54581.1.2.3.34 | pwrReactivePower | Integer | The most recent value of the reactive output power ([1] Volt-Amperes × 10). |
| .1.3.6.1.4.1.54581.1.2.3.35 | pwrACFrequency | Integer32 | The most recent value of the AC output frequency (Hertz × 10). |
| .1.3.6.1.4.1.54581.1.2.3.36 | pwrACRMSVoltage | Integer32 | The most recent value of the AC output RMS voltage ([1] Volts × 10). |
| .1.3.6.1.4.1.54581.1.2.3.37 | pwrACPeakVoltagePositive | Integer32 | The most recent value of the peak positive output voltage ([1] Volts × 10). |
| .1.3.6.1.4.1.54581.1.2.3.38 | pwrACPeakVoltageNegative | Integer32 | The most recent value of the peak negative output voltage ([1] Volts × 10). |
| .1.3.6.1.4.1.54581.1.2.3.39 | pwrACPeakCurrentPositive | Integer32 | The most recent value of the peak positive output current ([1] Amps × 10). |
| .1.3.6.1.4.1.54581.1.2.3.40 | pwrACPeakCurrentNegative | Integer32 | The most recent value of the peak negative output current ([1] Amps × 10). |

[1] Because SNMP does not support decimal values, all Integer values returned are multiplied by 10 (except for power factor which is multiplied by 100).

## 3.2.5 Wilmore Specific Trap OIDs

SNMP traps (or notifications) can be configured to notify a network monitoring server or MIB browser of the following events:

*Table 12: Wilmore Electronics Inverter SNMP Traps*

| OID | MIB Variable | Type | Description |
| --- | --- | --- | --- |
| .1.3.6.1.4.1.54581.1.0.101 | trapAbnormalACOutputV | Enterprise | A trap message sent when the unit detects an abnormal AC output voltage, higher or lower than the unit's normal operating range. |
| .1.3.6.1.4.1.54581.1.0.104 | trapHighInputV | Enterprise | A trap message sent when the unit detects a DC input voltage approaching its upper limit. |
| .1.3.6.1.4.1.54581.1.0.105 | trapLowInputV | Enterprise | A trap message sent when the unit detects a DC input voltage approaching its lower limit. |
| .1.3.6.1.4.1.54581.1.0.107 | trapOutputOverload | Enterprise | A trap message sent when the unit detects an apparent load that is above its rated capacity. |

## 3.2.6 MIB Browsers

In order to use an MIB file it must first be loaded into an MIB browser, an SNMP command line client, or an NMS (Network Monitoring Server). MIB browsers provide a user-friendly desktop application to query SNMP enabled devices and are suited for use on smaller networks. A few examples of MIB browsers are listed below.

*Figure 17: iReasoning MIB Browser*
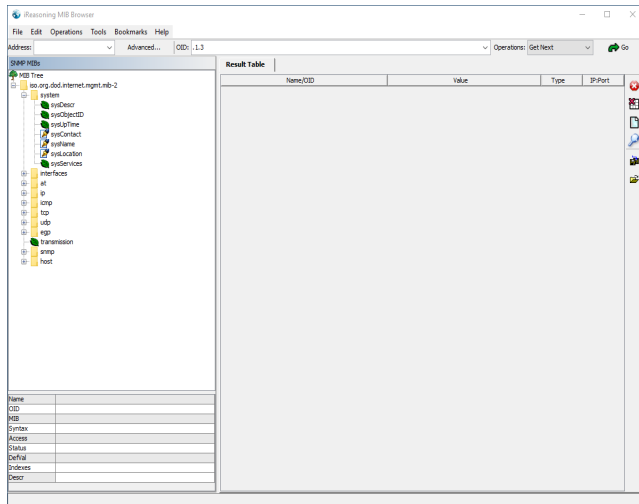


*Figure 18: Paessler SNMP Tester*
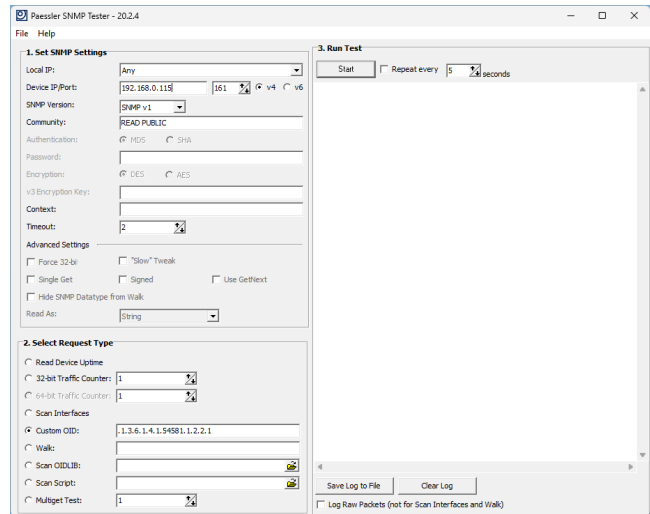


## 3.2.7 Network Monitoring Servers

If you are monitoring multiple devices on a large network, a network monitoring server may be preferred over an MIB browser. Network monitoring servers allow you to receive alerts the instant your network connected devices encounter problems or stop responding. A few examples of network monitoring servers are listed below.
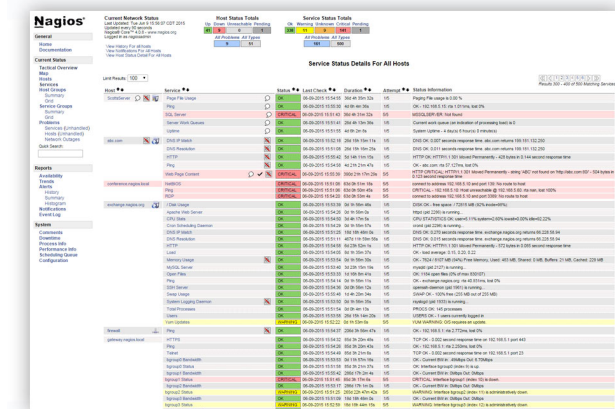
**Figure 19: Nagios Core – NMS**



**Figure 20: Zabbix – NMS**
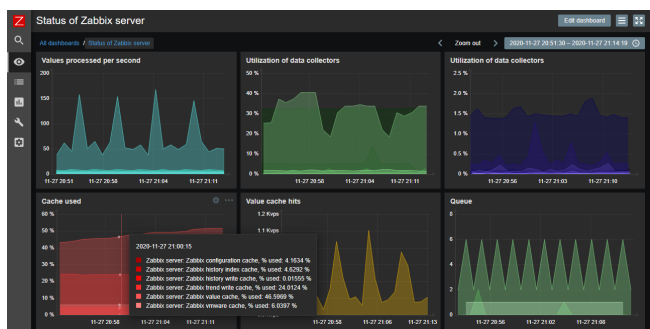
## 3.3 SNMP Firewall Settings

If you are unable to reach the desired host (and a firewall exists in between the MIB browser or network monitoring server and this unit) you may need to open UDP port 161 on the firewall for SNMP polling support.

In order to receive any SNMP trap messages (or notifications), the PC or server running the MIB browser or network monitoring server must have UDP port 162 open on its firewall.

**NOTE: It is not recommended to open the SNMP ports on your internet gateway's firewall to the world. If you require external access to this unit, consider routing SNMP traffic over a VPN connection.**

*Table 13: SNMP Firewall Settings*

| SNMP Notification Type | Port Type | Port Number |
|---|---|---|
| SNMP Polling | UDP | 161 |
| SNMP Traps | UDP | 162 |

# 4 Serial Terminal Monitoring / Web Service Monitoring

The unit can monitor general information, electrical information and warning messages from the serial terminal console and web service API (Application Programming Interface). However, no configuration options can be set via the web service API, all configuration is done in the Wilmore Communications Config application. It is recommended to remove serial connection to avoid unauthorized configuration changes.

For further information on the Wilmore web service see Section 4.4, pg. 35.

## 4.1 Default Terminal Settings

You may use any serial terminal program to connect to this unit. The default serial terminal settings to connect to Wilmore power products are listed in the table below:

*Table 14: Default Terminal Settings*

| Configuration Option | Value |
| --- | --- |
| Port | COM8 (This should match the port detected in Section 1.2.4.1, pg. 14) |
| Speed (Baud) | 115200 |
| Data Bits | 8 |
| Stop Bits | 1 |
| Parity | None |
| Flow Control | None |
| New-Line Transmit | CR+LF |
| Local Echo | Enabled |

## 4.2 Serial Terminal Connection with PuTTY

*Figure 21: PuTTY Main Window*
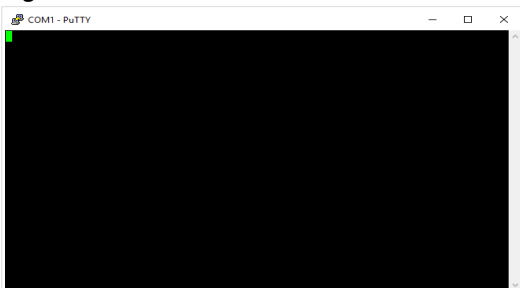


This section describes setting up a serial terminal session to the Wilmore inverter with PuTTY. PuTTY is a free and open source multi-platform serial terminal application that can be downloaded from:

https://putty.org/

## 4.2 Serial Terminal Connection with PuTTY

**Figure 22: PuTTY Session Settings**



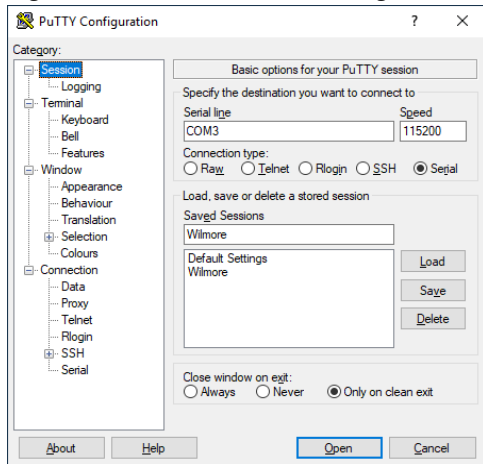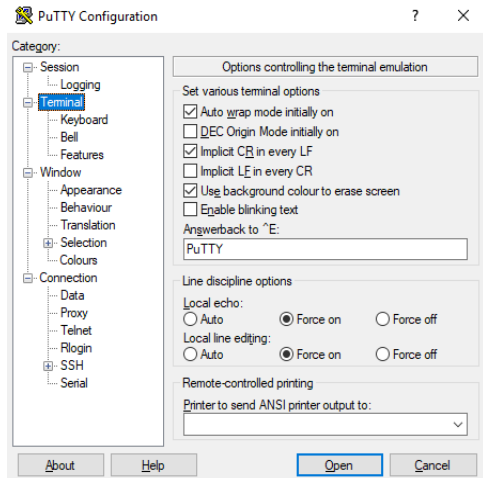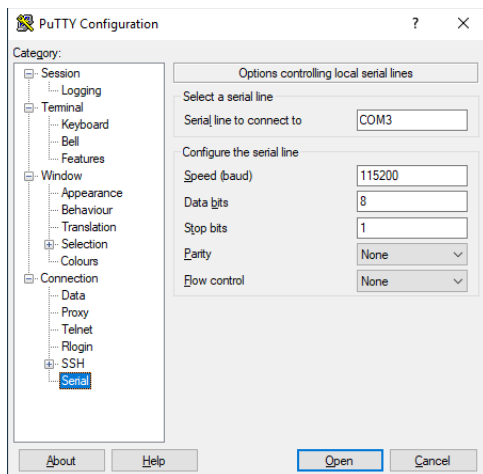**Figure 23: PuTTY Terminal Settings**



**Figure 24: PuTTY Serial Connection Settings**



1. Ensure your Wilmore power inverter is powered on.

2. Plug in the included USB cable from the power inverter to your Windows PC.

3. Launch the PuTTY serial terminal application.

4. On the session settings page, change the connection type to Serial.

5. Change the Serial line to the USB COM port of the unit, this should match the port detected in <u>Section 1.2.4.1, pg. 14</u>.

6. Change the speed (baud rate) to 115200.

7. On the terminal settings page, enable the "Implicit CR in every LF option".

   NOTE: This option will force the cursor to return to the left side of the screen with every newline and prevent a stair stepping effect.

8. In the line discipline options section, change the "Local Echo" and "Local line editing" to "Force on".

   NOTE: The local echo option forces characters to be displayed in the local terminal as you type them. The local line editing option forces the terminal to send a command only when the enter key has been pressed.

9. On the connection settings page under serial settings, ensure the "Speed (baud)" is set to 115200.

10. Click on the "Flow control" drop-down and select "None".

11. Return to the session settings page (**displayed in Figure 22**) and input a name for your saved session and click save. This will save your session settings for future use.

12. Click on the "Open" button to start the serial terminal session.

## 4.3 Serial Terminal Command Syntax

To query values using the serial terminal, the "!GETVALUE" command is used followed by any of the value names displayed in Section 4.5, pg. 36.

To query values using the serial terminal, commands must follow the command structure as defined in figure 25.

The minimum required information to query the serial terminal:

- The text string "!GETVALUE" followed by a space.

- At least one value as defined in the Serial Terminal / Web Service Values table.

You may query a single value or multiple values from the serial terminal. If you are requesting multiple values in a single query, the requested values must be comma separated.

*Figure 25: Serial Terminal Command Syntax*

```
!GETVALUE SERIALNO,DCVIN,ACI,ACRMSV,ACFRQ
```

The serial terminal command example displayed above will return the values in the format shown below (though the actual values displayed may vary).

*Figure 26: JSON Example Output from a Serial Terminal Command*

```
GETVALUE| [{ "SERIALNO": "11230205" }, { "DCVIN": "129.3" }, { "ACI":
"11.0" },{ "ACRMSV": "116.0" }, { "ACFRQ": "60.0" }]
```

Responses are displayed as a single string of text in a JSON (JavaScript Object Notation) array.

## 4.4 Web Service API Syntax

This unit also provides a web service API (Application Programming Interface) to query for any of the values listed in Table 14: Serial Terminal / Web Service Values in <u>Section 4.5, pg. 36</u>.

The web service query commands must follow the command structure defined in figure 27.

The minimum required information to query the web service:

- The Wilmore Inverters IP Address

- The text string "`/WilmoreService?F=GETVALUE&KEY=`"

- At least one value as defined in the <u>Serial Terminal / Web Service Values</u> table.

You may query a single value or multiple values from the web service. If you are requesting multiple values in a single query, the requested values must be comma separated.

***Figure 27: Web Service API Query Syntax***

```
http://192.168.0.114/WilmoreService?F=GETVALUE&KEY=SERIALNO,DCVIN,DCVOUT,DCIOUT,DCPOUT
```

The above example command will return the information displayed in figure 28. The query is returned in JSON (*JavaScript Object Notation*) format and is displayed in a web browser as a single string.

The API query can be displayed in a custom-built web application or collected for later use in network logging software.

***Figure 28: JSON Example Output from a Web Service API Query***

```
[
    {
        "SERIALNO": "07190203"
    },
    {
        "DCVIN": "129.3"
    },
    {
        "ACI": "11.0"
    },
    {
        "INVRMSV": "116.0"
    },
    {
        "INVFRQ": "60.0"
    }
]
```

# 4.5 Serial Terminal / Web Service Values

*Table 15: Available Serial Terminal and Web Service Commands for Wilmore Inverters*

| Value Name | Description | Example Response * |
|---|---|---|
| **General Information** | | |
| UNITDSC | Defines the type of Wilmore power product. | [{ "UNITDSC": "DC-AC Inverter" }] |
| MODELNO | The Wilmore assigned model number of this unit. | [{ "MODELNO": "1786-130-120-60-P" }] |
| SERIALNO | The Wilmore assigned serial number of this unit. | [{ "SERIALNO": "11230205" }] |
| MACID | The Wilmore assigned MAC Address of this unit. | [{ "MACID": "70-B3-D5-ED-40-0A" }] |
| STRTCNT | The startup count of this unit. | [{ "STRTCNT": "1" }] |
| SWVER | The version number of the software installed on this unit. | [{ "SWVER": "1.20230303" }] |
| **Network Information** | | |
| USEDHCP | Denotes whether DHCP is enabled or disabled. | [{ "USEDHCP": "NO" }] |
| IPADD | The static or dynamic IP address assigned to this unit. | [{ "IPADD": "192.168.0.114" }] |
| SUBNET | This unit's assigned subnet mask address. | [{ "SUBNET": "255.255.255.0" }] |
| DFLTGTWY | This default gateway assigned to this unit. | [{ "DFLTGTWY": "192.168.0.1" }] |
| DNSADD | This DNS server address assigned to this unit. | [{ "DNSADD": "192.168.0.1" }] |
| **SNMP Information** | | |
| USESNMP | Denotes whether SNMP is enabled or disabled. | [{ "USESNMP": "YES" }] |
| SYSDESC | An administrator defined text description of this unit. | [{ "SYSDESC": "WILMORE HW" }] |

| Value Name | Description | Example Response * |
|---|---|---|
| SYSOBID | ID that uniquely identifies Wilmore power products. (Not user Configurable) | [{ "SYSOBID": "1.3.6.1.4.1.54581.1" }] |
| UPTIME | System uptime since startup (in hundredths of a second). | [{ "UPTIME": "186446.38" }] |
| SYSCNTC | Displays the administrator's contact information for this unit, including information on how to contact them. | [{ "SYSCNTC": "username@example.com" }] |
| SYSNAME | Displays the hostname for this unit. Typically, the fully-qualified domain name (FQDN) of the unit. | [{ "SYSNAME": "myhost.example.com" }] |
| SYSLOC | Displays the physical location of the unit. | [{ "SYSLOC": "Wiring closet 4B" }] |
| SYSSVCS | A value which indicates the set of services that this entity primarily offers. | [{ "SYSSVCS": "72" }] |

**Electrical Information**

| | | |
|---|---|---|
| DCVIN | The most recent value of the DC input voltage (Volt). | [{ "DCVIN": "129.3" }] |
| ACFRQ | The most recent value of the AC output frequency in hertz (Hz). | [{ "ACFRQ": "60.0" }] |
| ACRMSV | The most recent value of the AC output RMS voltage in volts (V). | [{ "ACRMSV": "116.0" }] |
| ACPKVPOS | The most recent value of the peak positive output voltage in volts (V). | [{ "ACPKVPOS": "164.0" }] |
| ACPKVNEG | The most recent value of the peak negative output voltage in volts (V). | [{ "ACPKVNEG": "-164.0" }] |
| ACI | The most recent value of the AC output RMS current in amps (A). | [{ "ACI": "11.0" }] |
| ACPKIPOS | The most recent value of the peak positive output current in amps (A). | [{ "ACPKIPOS": "15.5" }] |
| ACPKINEG | The most recent value of the peak negative output current in amps (A). | [{ "ACPKINEG": "-15.5" }] |

| Value Name | Description | Example Response * |
|---|---|---|
| REALPWR | The most recent value of the real output power in watts (W). | [{ "REALPWR": "1265" }] |
| APRTPWR | The most recent value of the apparent output power in volt-amperes (VA). | [{" "APRTPWR": "1276" }] |
| REACTVPWR | The most recent value of the reactive output power in volt-amperes (VA). | [{ "REACTVPWR": "166.1" }] |
| PWRFCTR | The most recent value of the unit's power factor (range is between 0 and 1). | [{ "PWRFCTR": "0.99" }] |
| WARNING | A text listing of the most recent warnings. | [{ "WARNING": "Output Overload" }] |
| **SNMP Trap Information** | | |
| USETRAP | Denotes whether SNMP traps are enabled or disabled. | [{ "USETRAP": "NO" }] |
| TRAPFRQ | The time in seconds in between trap messages.<br><br>Minimum Value: 5 seconds<br><br>Maximum Value: 86,400 seconds (approximately 24 hours) | [{ "TRAPFRQ": "5" }] |
| TRAPTGT | Displays the IP address for the network management server where the SNMP trap should be received. | [{ "TRAPTGT": "192.168.0.100" }] |

* Displayed values are for example purposes only. Actual serial terminal command response values may vary.