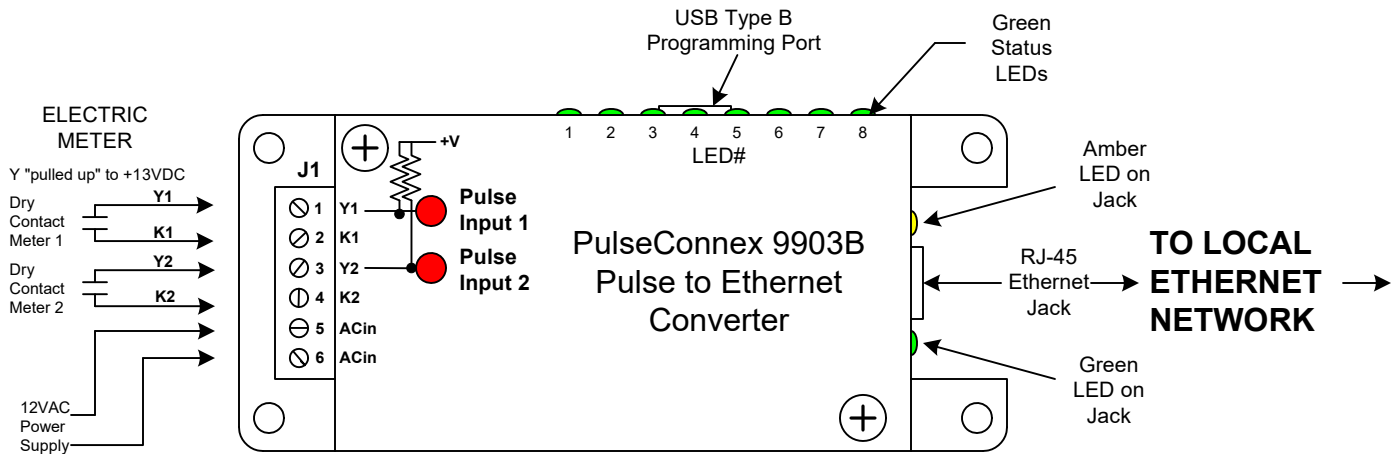


# INSTALLATION INSTRUCTION SHEET

## PulseConnex 9903B Pulse-to-Ethernet Converter



**MOUNTING POSITION** - The PulseConnex 9903B can be mounted in any position. Four mounting holes are provided.

**POWER INPUT** - The PulseConnex 9903B is powered by an AC voltage of 12 volts. Connect the 12 VAC source to terminals 5 and 6 of the J1 connector.

**METER INPUT** - The PulseConnex 9903B has two 2-Wire (Form A) pulse inputs. Connect the 9903B's "K1" and "Y1" input terminals to the meter's "K" and "Y" output terminals. Connect meter #2 to the K2 and Y2 terminals. The two inputs are configured to accept dry contact switches or pulse outputs meaning that no external voltage is required. A "pulled up" +13VDC wetting voltage is supplied internally on each Y terminal. The 9903B's "K" terminals are the common return. Each closure of the meter's K-Y output will "pull down" the input line to the common return. Each time a pulse is received, the RED LED on the cover corresponding to that input will light indicating that the pulse input is active. The 9903B is compatible with either fixed width "momentary" pulses or 50/50 duty-cycle "toggle" pulses. Depending on the length of the fixed time pulse width, you may not be able to see the LED light. The minimum "on" pulse width is 20mS. A toggle pulse mode is generally more desirable. The absolute maximum pulse rate on each pulse input is 10 pulses per second. A good rule of thumb is to program the meter with a pulse constant that gives approximately 2 pulses per second at maximum demand and at least one pulse every 4 seconds at the minimum demand.

**OUTPUT** - The 9903B is configured as a web client, not a server. It sends data every 5 seconds to the PulseConnex cloud server. It does not respond to queries. Plug a standard ethernet cable into the 9903B's RJ-45 jack. Connect the other end of the cable into your network's router, switch or hub. The 9903B's default network mode is DHCP. When it is connected to an ethernet network (and powered up), the network's router will assign it a dynamic IP address. Once the 9903B is reporting to the PulseConnex server you can now set up an account. Make note of the 9903B's MAC address. This is a 12-digit number which starts with 0090C2 or 00C033. You will need this number for setting up your account if it has not already been set up by the factory. The PulseConnex can also be configured with a static IP address using the USB Serial Port.

**OPERATION** - All operational settings are programmed into the 9903B from the [www.pulseconnex.com](http://www.pulseconnex.com) website. The 9903B will report the power use information to the PulseConnex service every 5 seconds. You can observe this if desired by viewing the Yellow LED on the RJ-45 Ethernet jack and the 8 Green LEDs on the side of the PulseConnex unit. The communications are very short so you may have to look very closely to see the Yellow LED light. (Also see Diagnostic LED's on Troubleshooting page.)

**NOTICE** - The 9903B **MUST** be operating and communicating with the PulseConnex Server before setting up your account, unless this has already been done at the factory.



## SOLID STATE INSTRUMENTS

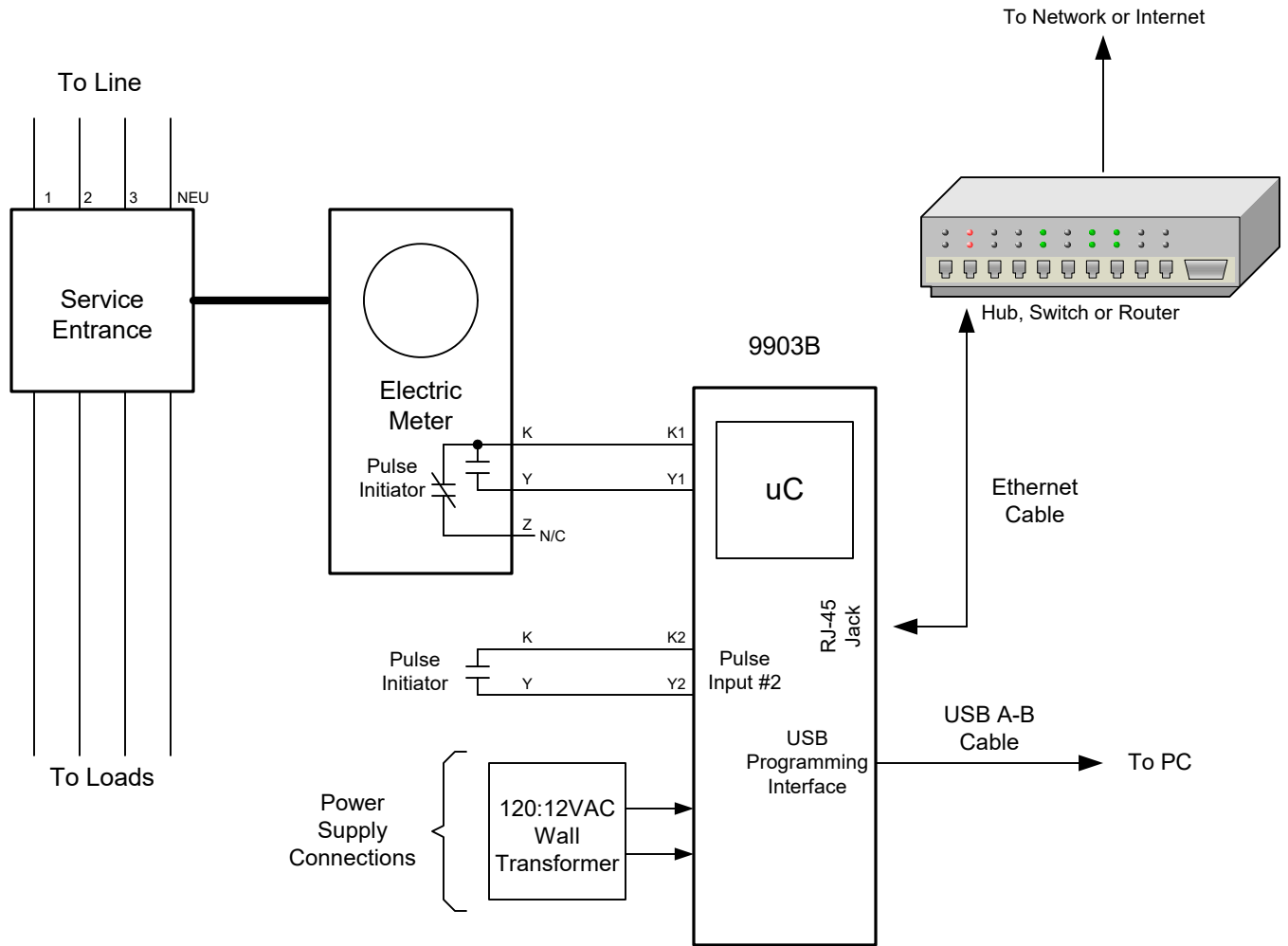
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# PulseConnex 9903B Wiring Diagram



PulseConnexWiringDiagram.vsd

|                                     |         |           |       |
|-------------------------------------|---------|-----------|-------|
| PulseConnex 9903B<br>Wiring Diagram |         | REVISIONS |       |
|                                     |         | NO.       | DATE  |
| DATE ORIGINAL                       | SCALE   |           |       |
| 07/20/24                            | N/A     |           |       |
| LATEST REVISION                     | JOB NO. | CHECKED   | DRAWN |
|                                     |         |           | WHB   |

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## Setting up the PulseConnex 9903B Module

**Your account has been set up at the factory. Your 9903B PulseConnex Device's packaging should have included a credentials sheet with your username and password.**

Go to the PulseConnex Login page at [www.pulseconnexlogin.com](http://www.pulseconnexlogin.com). DHCP is the default network configuration.

Enter your **Username** and **Password**. Once you have logged in, your device should be showing in the "Devices" window menu in the upper left corner of the page. Assuming your PulseConnex device is communicating with the server you will see the Real Time Graphing updating every 5 seconds. If not connected to the server proceed to the Troubleshooting page.

Device Configuration - Press the **Device Config** button at the top of the page. All of the data in the 9903B device will be uploaded from the device and shown on the Configuration Page, now on your screen. The first three boxes should already be populated with the Device Serial Number, Software Version, and Subscription Expiration Date. Enter the following information:

- 1.) Enter a more descriptive name in the Device Name box if desired. This could be the company name or address or whatever you like. This name must be unique from any other PulseConnex 9903B devices that may be operating on your network.
- 2.) Select the time zone you are located in and select Automatic daylight saving time adjust if your area uses daylight saving time.
- 3.) Enter the Pulse Constant for Meter #1. This parameter is in kilowatt-hours per pulse (kWh) and may be a number like .03 kWh/pulse (or 30 watthours per pulse). If this pulse constant is an industry standard 3-wire (Form C) number, you can enter it directly as a 3-wire number, even though you are only using two wires. If you wish to enter it as a 2-wire number (Form A), select 2-wire and enter the true 2-wire pulse constant (if actually a two-wire value) or double the 3-wire number to get the equivalent 2-wire number.
- 4.) If you wish to try to use PulseConnex to do some demand limiting, enter the desired Demand Limit.
- 5.) Enter the Demand Average Interval used by your utility, normally 15, 30 or 60 minutes. 15 Minute Demand Interval is most common.
- 6.) Enter the Fast Instantaneous as Yes. If you find that your instantaneous fluctuates widely with lots of spikes, you can filter this out by using Fast Instantaneous = No. This may depend on the brand of the meter sending the pulses.
- 7.) Enable the desired Alarm Notification parameters. These combine to filter out most nuisance alarms. Check Averaging Increasing and Instantaneous Above Limit. Check and set "Average at Limit" in < 3:00, and "Average is > 95% of Limit". See how the combination of these parameters and the Demand Limit work for your situation. If you do not want to use the alarm options, uncheck all the alarm parameters.
- 8.) Notification Frequency - set to 5 minutes. Again, see how this works for your building and application.
- 9.) Text Message Recipients and Email Recipients - add the mobile phone number and/or email address as desired.
- 10.) Add the information for Channel 2 if used or desired.

Once your changes are complete, click on the **Update** button. All data will be uploaded to the PulseConnex Server, and then downloaded and implemented by the PulseConnex 9903B. This may take 15 to 30 seconds. This will then return you to the main PulseConnex Real Time Graphing page.

Real Time Graphing - Click on **RT Graphing**. You should see the Instantaneous and Average Demand lines starting to move in the real time graph. In 15 minutes (or the selected Averaging Interval), the average will be accurate. Upon start-up, the average demand is not accurate until a complete interval's data has been recorded. From then on, the Instantaneous and Average will be updated every 5 seconds.

Load Profile History - Click on **Profile History**. The current day's profile information will be immediately shown. Select the date of data that you wish to display using the arrows or the calendar, and then click on Profile History again to update the display with the selected information. Because the startup is normally not synchronized with the quarter hour, the first 15 minute interval datapoint will be inaccurate and as such, it is ignored. Therefore, the first accurate 15 minute interval datapoint will occur sometime within the first thirty minutes of start up. Upon the PulseConnex server receiving the second 15 minute interval datapoint, the Profile History Graphing will begin. Therefore, you may not be seeing the Profile history for up to 45 minutes after startup.

All parameters will be saved in non-volatile Flash memory. Flash memory uses no batteries for backup so all parameters will never be lost. In the event that internet connectivity is lost, but power to the unit is still on, the PulseConnex 9903B will continue to gather and record data for up to 24 hours. Once the internet connection is restored, all data will be uploaded to the PulseConnex server over the next hour.

## Troubleshooting the 9903B

- 1.) Your PulseConnex Model 9903B should be communicating with the server almost immediately after power-up. Check the dashboard boxes for Instantaneous, Average and Peak Demands. Click on the **RT Graphing** button to check your device's Real Time Graphing mode. It should be updating and the graph should be moving from right to left about every 5 seconds.
- 2.) If there is no graph or no movement on a graph that is visible, check the following:
  - a.) Power is on to the unit;
  - b.) The RJ-45 Ethernet Jack is connected to a switch or router;
  - c.) The Green LED on the RJ-45 jack is on solid (meaning the Ethernet cable is connected on both ends);
  - d.) The Amber LED on the RJ-45 jack is flashing about every 5 seconds showing communications activity.
- 3.) Make sure Port 80 is open and the network configuration is DHCP. The PulseConnex system is designed to emulate a browser on Port 80 and eliminate any firewall issues.
- 4.) Insure that you have entered the correct MAC address (Device Serial Number) in your account page.
- 5.) The Model 9903B PulseConnex Device has 8 diagnostic LED's on the side to help diagnose any connectivity problems.  
LED #1 is the one closest to the Pulse Inputs. LED #8 is the one closest to the RJ-45 Jack. All are sequentially numbered in between. Here is the meaning of each LED. They are designed to provide a checklist in sequential order of the device status:
  - LED#1: Power is on to the 9903B.
  - LED#2: Slow, then fast flash while intentionally delay, then flickers during normal operation.
  - LED#3: A local DHCP server has assigned the 9903B an IP address to use. (Dynamic IP address obtained)
  - LED#4: The 9903B has successfully contacted the DNS server.
  - LED#5: The DNS Server has given the 9903B the IP address of the PulseConnex Server.
  - LED#6: The 9903B is preparing a packet of information to be sent to the PulseConnex server.(Every 5 seconds.)
  - LED#7: The 9903B has sent the packet of information to the PulseConnex server.
  - LED#8: The PulseConnex server has received the packet and sent back an acknowledgment.

Each LED in this "chain" is sequential and cumulative. LED#1 must be on before LED#2. LED #2 must be on before LED #3. Once LED #1 through #5 are on, they will remain continuously ON (lit) with the exception of the flickering of #2. Every 5 seconds LED#6 will blink, followed by #7, and #8 in sequence and then go out. This indicates that a packet has been prepared, sent to the server and the server has acknowledged receipt.

- 6.) Make sure that your switch or router is not blocking any outgoing Port 80 traffic. In rare cases, the router will not allow a DHCP configuration of a device. If DHCP is not allowed or active, the 9903B may be configured for a **Static IP address**. See Page 5 for the procedure to configure a static IP address. Contact your IT department or service provider to get a static IP address. In some network configurations, a "Reserved DHCP IP Address" is used. This is much like a static IP address but uses the PulseConnex Device's MAC address to allow a designated IP address to always be assigned by the router to the PulseConnex device. Contact your IT department for details on which method they will use.

Contact Tech Support at Brayden Automation Corp. at the number below for troubleshooting assistance.

### Technical Support

Contact Brayden Automation Corp. Tech Support at 888-BRAYDEN (888-272-9336) if you need assistance on the application of the PulseConnex 9903B or the PulseConnex Website.

## Configuring with Static IP Address

- 1.) If your network will not allow DHCP, the PulseConnex Model 9903B may be configured for a Static IP using the USB Serial Port. Using a PC with a USB Type A to Type B connector, plug the USB-B Connector into the USB Type B jack on the PulseConnex Device.
- 2.) Using TeraTerm or another ASCII Terminal Program (such as Putty, Hyperterminal or Procomm), configure a COM port for
  - 57,600 baud
  - 8 Data Bits
  - No Parity
  - 1 Stop Bit
  - No Flow Control
- 3.) Once you've made the serial connection with your PulseConnex Device you should see several lines of data being sent by the PulseConnex every 5 seconds. Click on "x" to exit the operational mode and enter the data entry mode. The PulseConnex Device should send the complete command list.
- 4.) In the section called **Network Commands**, you will see the commands for Static IP address, Gateway, Netmask and DNS servers, as well as the command to enable or disable DHCP.
- 5.) Enter a0 or A0 and <Enter> to disable DHCP. The PulseConnex device will return a message indicating that DHCP is disabled and you will be using a Static IP address.
- 6.) Use the b or B letter to enter the Static IP address desired in the following format: **bxxx.xxx.xxx.xxx <Enter>**  
No dots are necessary as they are entered automatically as you enter the Static IP address.
- 7.) Use the c or C letter to enter the Gateway IP address in the following format: **cxxx.xxx.xxx.xxx <Enter>**
- 8.) Use the d or D letter and the Netmask desired in the following format: **dxxx.xxx.xxx.xxx <Enter>**
- 9.) Use the e and f (E and F) letters to Enter the DNS Servers desired.
- 10.) Click on the letter q or Q to return all the current system settings.
- 11.) To exit the data entry mode, click on x or X and <Enter> and the unit should connect to the internet and begin sending data to the PulseConnex server. You should see several lines of data being outputted every 5 seconds indicating that the PulseConnex is communicating with the server and operating normally.

Contact Tech Support at Brayden Automation Corp. at the number below for troubleshooting assistance.

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## Getting Interval Data from PulseConnex

Your PulseConnex unit collects and stores interval data for each channel on the PulseConnex server for each 15 minute demand interval. PulseConnex will automatically send you an export file in .csv format each night after midnight. The export file contains 96 data points for the 96 15-minute periods that occurred in the previous day. Each data point has a date and time stamp along with the number of kilowatt-hours that were consumed during that 15-minute interval. If both pulse input channels were selected for export on the configuration page, there will be 192 data points in the file.

- 1.) Go to the Device Config tab.
  - a.) Scroll to the bottom of the page
  - b.) Select Channel 1, Channel 2 or both by checking the check box desired.
  - c.) Select Military time if desired.
  - d.) Enter the email address of the desired email recipient of the daily export file.
  - e.) Click on "Update".
  
- 2.) Interval data is collected from the quarter hour mark plus 1 second, to the next quarter hour mark. For example, the first interval of the day is from midnight plus one second - 00:00:01 (12:00:01AM) to 00:15:00 (12:15:00AM). The second interval of the day is from 00:15:01 to 00:30:00. All times are in military time. The last interval of the day is from 23:45:01 to 00:00:00, midnight of the next day. This format is used since it clearly describes that the energy in the interval was used in the 15-minute interval **ENDING** at the time described by the time stamp.
  
- 3.) To compute the average demand of any or all intervals, simply divide the number of kWh's in the interval by .25 hours. (This is the same as multiplying by 4, but dividing by .25 is technically correct to remove the time integral (hours) and be left with kW or demand. For example, if a building used 10kWh's in one interval, the demand would be  $10 \text{ kilowatt-hours} / .25 \text{ hours} = 40 \text{ kilowatts (kW)}$ ).

Contact Tech Support at Brayden Automation Corp. at the number below for troubleshooting assistance.

### Technical Support

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## COM Port Command List

Using TeraTerm or another ASCII Terminal Program (such as Putty, Hyperterminal or Procomm), configure a COM port for

57,600 baud  
8 Data Bits  
No Parity  
1 Stop Bit  
No Flow Control

### General Commands

=====

g<cr> Reset network  
q<cr> display all settings  
v<cr> Display firmware version  
?<cr> Display command list  
x<cr> Exit serial data entry  
r<cr> reset PCX  
z<cr> Set factory defaults

### Network Commands

=====

a0<cr> Disable DHCP  
a1<cr> Enable DHCP  
bxxx.xxx.xxx.xxx<cr> Enter static IP, example: b192.168.1.1<cr>  
cxxx.xxx.xxx.xxx<cr> Enter gateway, example: c192.168.1.1<cr>  
dxxx.xxx.xxx.xxx<cr> Enter netmask IP, example d255.255.255.1<cr>  
exxx.xxx.xxx.xxx<cr> Enter DNS1 IP, example: e8.8.8.8<cr>  
fxxx.xxx.xxx.xxx<cr> Enter DNS2 IP, example: f8.8.1.1<cr>

### Proxy Server Commands

=====

h0<cr> Disable Proxy Server  
h1<cr> Enable Proxy Server  
mxxx.xxx.xxx.xxx<cr> Enter Proxy Server IP, example: m15.15.15.12<cr>  
nxxxxx<cr> Enter a proxy server port number 1-65535 example: n81<cr>

o<username><cr> Enter username for proxy server auth, example: mmyname<cr>  
p<password><cr> Enter password for proxy server auth,example: pmypassword<cr>

s0<cr> Don't include domain name in proxy request  
s1<cr> Include domain name in proxy request  
t0<cr> Don't include password in proxy request  
t1<cr> Include password in proxy request  
u0<cr> Don't send password in the clear  
u1<cr> Send password in the clear

Press x <CR> to exit data entry mode.  
Press '?' <CR> to see commands.

### Technical Support

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