



## Operating Bulletin



# Model BB9-232 USB Multi-Drop Box

*The Fastest Flow Controller Company in the World!*

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# Alicat BB9-232 Multi-Drop Box Operating Bulletin

## Introduction

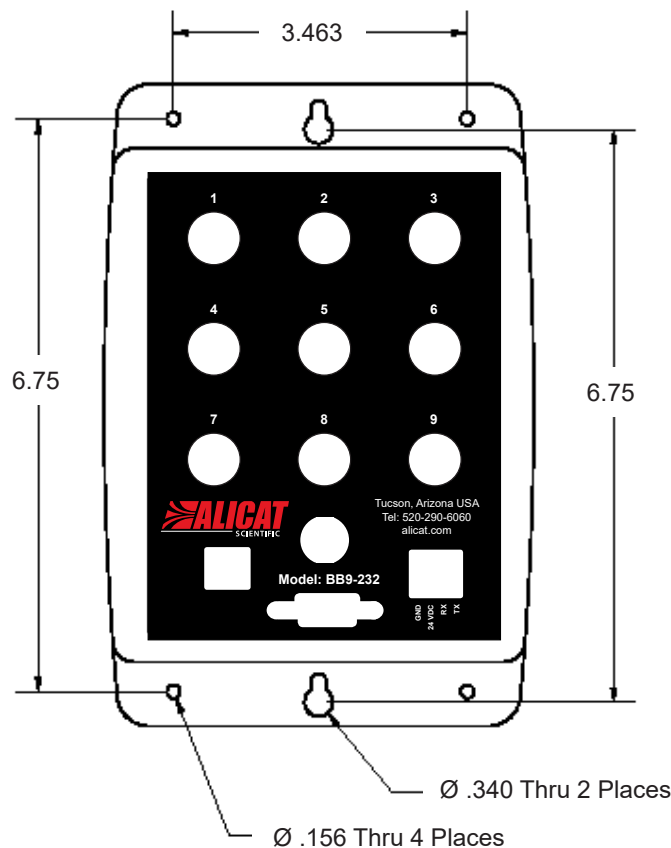
The Multi-Drop Box makes it convenient to connect multiple flow and/or pressure devices to a single USB port. The Multi-Drop Box has nine 8 pin mini-DIN ports available (the Multi-Drop Box may also be ordered for use with 6 pin Locking Industrial Connectors). The ports are to be used either with a standard double ended 8 pin mini-DIN (DC-62) style cable or, if so configured, a 6 pin Locking Industrial (IC-102) style cable going from the box to each flow or pressure device.

The BB9-232 multi-drop box connects to your computer's USB port via the provided USB cable. All of the flow and/or pressure devices are powered via a terminal block on the front of the box, or by connecting a single flow or pressure device to a PVPS24U power supply, or by connecting a PVPS24U power supply to the available jack on the BB9-232.

If more than nine devices will be required, additional Multi-Drop Boxes can be daisy chained together with a double ended 8 pin mini-DIN (or 6 pin Locking Industrial) cable plugged into any receptacle on both boxes (page 6).

## Mounting

The Multi-Drop Box can be vertically mounted in any convenient orientation or placed on a horizontal surface where risk of exposure to liquids is minimal. To mount the box on a vertical surface, place two screws, with heads that are not larger than about 3/16 (0.312) of an inch in diameter, 6.75" apart in a vertical line.



## **Connecting the BB9-232 Multi-Drop Box to a Computer for Serial Communications**

The BB9-232 is a USB 2.0 full speed device.

If a Windows® computer is connected to the internet it should be able to find and automatically install the required drivers. For Linux, MacOS 10.3, or Windows® drivers visit: <http://www.ftdichip.com/Drivers/VCP.htm>

It is recommended that all the units that are to be attached are connected before initiating communication.

### **To connect a wire to the terminal block:**

1. Strip approximately 3/16 (0.188) of an inch of insulation from the end of the wire.
2. Turn the screw on the socket to which you will be attaching the wire counter-clockwise.
3. Turn the screw until the socket is opened enough to fit the stripped end of the wire into the socket.
4. Insert the wire into the open socket and gently turn the screw clockwise until it is snug.
5. Visually inspect the connection to make sure the socket is closed on the conductive part of the wire and not on the insulation.
6. Gently tug the wire to make sure it does not come out.

### **Power Requirements**

All of the devices attached to the BB9-232 are normally powered through a common power bus applied to the terminal block on the front of the box (recommended), or by connecting a single flow or pressure device to a PVPS24U power supply, or by connecting a PVPS24U power supply to the available jack on the BB9-232.

**When power is supplied through the 4-pin terminal block, the input current must not exceed 10 amps.**

**If power is being supplied through a connected device or the available jack on the BB9-232, the input current must not exceed 2 amps.**

The terminal block requires DC VOLTAGE, appropriate for the devices hooked up to the box and of sufficient current to run all of the devices. (See table below.)

Positive DC voltage must be applied to the socket labeled “24VDC” and the power ground must be applied to the socket labeled “GND”. Connect the wires to the terminal block by following the six steps previously listed.

<b>Device</b>	<b>Voltage (Vdc)</b>	<b>Nominal Current (mA)</b>
<u>Meters and Gauges (all ranges and types)</u>	7-30	60 mA each
<u>Small Valve Controllers:</u> 0-20 slpm Mass Flow Controllers PC, PCD-Series Pressure Controllers 0-500 ccm Liquid Controllers	12-30	250 mA each
<u>Large Valve Controllers:</u> 20+ to 1500 slpm Mass Flow Controllers PCR-Series Pressure Controllers 1 lpm to 5 lpm Liquid Controllers	24-30	750 mA each
<u>PAR Controllers</u>	24-30	1.0 Amp
<u>MCRH Controllers</u>	24-30	2.0 Amp

**BB9 Power Supply for Large Valve Controllers:** The PS24VHC (Power Supply 24Vdc High Current) is a 6.5Amp 24Vdc power supply designed for running multiple large valve controllers on a BB9. The 6.5Amp power supply can run as many as eight large valve controllers or small valve / large valve combinations.



**CAUTION! Do not apply AC voltage to the Multi-Drop Box terminal block or to individual units as immediate damage will occur!**

**Do Not power units individually through their AC/DC adapter jacks. Potential differences between units could damage the power bus in the Multi-Drop Box or damage individual units which may be supplied too much voltage.**

**Troubleshooting:**

If the BB9 box comes up as a Windows® mouse follow the steps below.

1. Go to Start Menu > Device Manager > Ports > USB Serial Port and choose properties.
2. Go to Port Settings/Advanced
3. Under Miscellaneous Options deselect “Serial Enumerator”

## **Assigning Individual Addresses to Flow or Pressure Devices**

In order to communicate with multiple units through a single RS-232 serial port, ***each unit must have a unique address.***

***On units with a standard display and manufactured after November 2005***, the device address can be changed via the RS-232 Communication menu on the front panel of the device as outlined below.

Change the address from the front panel of a flow or pressure device as follows:

1. Push the MODE button until the SELECT MENU screen is shown.
2. Push the lower left button dynamically labeled "Comm. RS-232".
3. Push the upper left button dynamically labeled "Select" once to move the selection arrow down one line to "Unit ID (Current Address)...(New Address)
4. The default address is A.
5. Use the lower left and middle button dynamically labeled "UP" or "DOWN" to change the address to any letter between A and Z that is unique from other units you intend to connect to the Multi-Drop Box.
6. The new address is shown at the end of the dotted line.
7. When the desired new address is shown at the end of the dotted line, press the MODE button to exit the screen and make the address change take affect.
8. It is recommended to place an external label on the device that denotes its address. This can also be checked at any time by visiting the "Comm. RS-232" screen.

***On units manufactured prior to November 2005 and all units without the standard display***, it is necessary to first connect each unit individually (one at a time) to a computer and assign a unique address. Then connect all of the units to the Multi-Drop Box.

Assign each flow or pressure device a unique address as follows:

1. Make sure the Multi-Drop Box is connected to appropriate power and to the computer.
2. Connect a DC-62 (or IC-102) cable between the device and any port on the Multi-Drop Box.
3. If the unit has a display, check to make sure the device powers up properly.
4. Make sure ONLY the unit you want to change is connected.
5. Establish serial communication as outlined in the operating manual for the flow or pressure device.
6. With the flow or pressure device in polling mode, type `*@=NEWADDRESS` followed by the Enter key where NEWADDRESS is any capital letter A thru Z. (e.g. `*@=B` followed by the Enter key)

7. To test that the address has been accepted, type the new address followed by the Enter key. The computer should respond with the new address followed by one line of data.
8. It is recommended to place an external label on the device that denotes its address. If you forget the device's address, you will have to check the device individually (with all other units disconnected).
9. Remove the device from the Multi-Drop Box and connect the next device to be addressed. Repeat until all of the units have a unique address.

### **Daisy Chaining Multi-Drop Boxes For More Than Nine Devices**

**Note:** When daisy chaining BB9 boxes for the purposes of facilitating connection to more than nine Alicat devices, you would use one BB9-232 as the primary BB9 box connected to the computer, and additional BB9-232 for the boxes further down the chain.

Up to 26 flow and/or pressure devices can be attached to a single RS-232 port by cabling up to four Multi-Drop Boxes together. Valid RS-232 addresses for our flow and pressure instruments are the 26 letters of the alphabet, A-Z.

To daisy chain Multi-Drop Boxes when only ***metering*** and/or ***gauging*** devices are being used, simply use a double ended DC-62 type 8 pin mini-DIN (or 6 pin Locking Industrial) cable to connect any port on one box to any port on another.

To daisy chain Multi-Drop Boxes when ***high current (large valve)*** devices are being used, use a double ended DC-62 type 8 pin mini-DIN (or 6 pin Locking Industrial) cable to connect any port on one box to any port on another. It is also necessary to daisy chain additional wires of sufficient gauge (to power the extra units) between the power and ground sockets on the terminal blocks of the Multi-Drop Boxes.



**CAUTION: Failure to provide proper wire gauge for the expected load between boxes may result in damage and possible fire!**