# DC Digital Voltmeter

## Introduction

Any company or building with a large battery bank or solar power storage or involvement in the manufacture or storage of batteries needs this sensor.

Our Digital Voltmeter can measure DC voltage in the range 0 to 60 volt or -60 to 0 volts. The web interface for our DC Voltage Sensor is very flexible and easy to use. Readings are available as absolute values and as a percentage of full scale. All readings are given with a resolution of one decimal point.

If you want to measure a DC voltage greater than +/-60V, you can find a DC Voltage Transducer that suits your purpose, and integrate it into the unit as a "**custom sensor**". You can use a transducer with a 4-20mA output and connected to our 4-20mA converter; or with an analogue DC output signal connected to our DC Voltage Sensor. Once connected, our web interface allows you to display the readings as their measured values (i.e. 0 -1000V).

One popular OID for the Digital Voltmeter is the current reading. For a Digital Voltmeter plugged into RJ45#1 that OID is **.1.3.6.1.4.1.3854.1.2.2.1.17.1.3.0**

**Specifications & Features:**

- Measurement range - 0 to +60V or -60 to 0V

- Overvoltage protection: A relay within the Digital Voltmeter will protect the unit.

- Status range - High Warning, Low Warning, High Critical, Low Critical

- Communications cable - RJ-45 jack to sensor using UTP Cat 5 wire, Maximum extension cable length 15 foot with approved low capacitance shielded cable or UTP.

- Resolution - 10 bit A/D converter

- Accuracy - ±1%

- Power source: powered by the unit. No additional power needed.

- The unit auto detects the presence of the Digital Voltmeter

- Measurement rate - multiple readings every second

- Full Autosense including disconnect alarm

## Configuring the Digital Voltmeter

**a)** Plug the sensor into one of the RJ45 ports on the rear panel of the unit.

**b)** Now point your browser to the IP address of the unit (default, 192.168.0.100). Next you need to login as the administrator using your administrator password (default is "public"). You will then be taken to the summary page.

**c)** From the summary page you need to select the sensors tab. The layout of the next page will vary depending on your unit so please refer to your units manual.

**d)** You should now be able to setup the thresholds for your sensor. The low critical, low warnings, normal, high warnings, high critical values can be set from this page.

*Now we will cover the settings that are specific to your sensor.*

**Current Reading:** The percentage or absolute value of DC voltage is displayed in this field. This is a read-only field.  This value can be polled via SNMP, and the data can be used for graphing. The value range is set by the base and max scale fields in the Custom Digital Voltmeter Settings Section.

**Status:** The current reading is compared to the thresholds of Critical High, Warning High, Critical Low, and Warning Low that the user has set. From this, the status is then formed, and emails, traps are sent if necessary.

**Critical High, Warning High, Warning Low, and Critical Low:** These thresholds should be re-entered every time there is a change in the type of scale (whether an absolute value or a percentage value is used)

## Using the Digital Voltmeter to integrate custom sensors

The unit has the ability to integrate with custom sensors via our Digital Voltmeter or 4-20mA Converter.  For integration with custom sensors, the unit text can be customized to whatever you would like; this text is reflected on the summary page of the web interface.  All numbers are displayed in decimal format.  The external sensor used should have an output as a linearized DC voltage (integrate with Digital Voltmeter) or 4-20mA signal (use 4-20mA Converter).

**EXAMPLE:** consider a pressure sensor, measuring range 0-500MPa, sensor output 0-12VDC signal.

Connect to the securityProbe with our Digital Voltmeter.

On the DC Voltage Sensor Settings page, in the **Custom Digital Voltmeter Settings** section, enter MPa as the Display Units.

Enter the following settings:

| | |
|---|---|
| **Selected Scale (jumper 0):** | 20V |
| **Max Scale of Sensor in Volts:** | 12 |
| **Base Scale of Sensor in Volts:** | 0 |
| **How Many MPa at 12V (Max Scale):** | 500 |
| **How Many MPa at 0V (Base Scale):** | 0 |

Now, sensor readings will be displayed in MPa, with the configured scaling – i.e. an input signal of 6V will be displayed as 250MPa.

These units will be displayed on graphs, sensor notifications, summary page etc.

**Display Units:** This field should be entered with an appropriate unit of the measured entity when the Digital Voltmeter is used with the custom sensor.  For example, this filed might be entered with Pounds or Lbs then the Digital Voltmeter is used with the custom pressure sensor or Volts for an absolute value of measured DC voltage.

**Type of scale:** This field is used to select whether to display the current reading as an absolute value or a percentage.

**Selected Scale (Jumper 0):** This field should be set accordingly to the same value that is physically set by the jumper on the Digital Voltmeter.  This field can be set to 60, 40, 30, 20, 10, -10, -20, -30, -40 or -60. You should select the jumper value nearest to the maximum value inserted to the Digital Voltmeter in order to achieve the maximum resolution.

**Max scale of sensor in volts:** This field should be entered with the maximum value of the voltage that is input to the Digital Voltmeter. For example, if the Digital Voltmeter is used to measure the voltage in a range of 0 to 50 volts, this filed should be filled in with 50. Or, if the Digital Voltmeter is used to integrate with the custom sensor, this filed should be set to the maximum output voltage of the custom sensor. Note that the voltage range inside the bracket located behind the field name is changed accordingly to the value selected in the "Selected Scale (Jumper 0)" field.

**How many percent or How many unit (max scale):** The field name is changed accordingly to the selected type of scale (absolute value or percentage). When the type of scale is set to Absolute, this field should be set to the maximum absolute value that can be measured by the DC Voltage or the custom sensor. In the Digital Voltmeter case, the value in this field should be the same as that in the "Max scale of sensor in volts" field.

**Base scale of sensor in volts:** This field should be entered with the minimum value of the voltage that is input to the Digital Voltmeter. For example, if the Digital Voltmeter is used to measure the voltage in a range of 0 to 50 volts, this filed should be filled in with 0. Or, if the Digital Voltmeter is used to integrate with the custom sensor, this filed should be set to the minimum output voltage of the custom sensor. Note that the voltage range inside the bracket located behind the field name is changed accordingly to the value selected in the "Selected Scale (Jumper 0)" field.

**How many percent or How many unit (base scale):** The field name is changed accordingly to the selected type of scale (absolute value or percentage). When the type of scale is set to Absolute, this field should be set to the minimum absolute value that can be measured by the DC Voltage or the custom sensor. In the Digital Voltmeter case, the value in this field should be the same as that in the "Base scale of sensor in volts" field.


## Polarity Switch and Jumper

The Digital Voltmeter has a polarity switch to select whether it is used to measure the DC voltage in positive (+) or negative (-) value. Moreover, there is a jumper to set the expected range of input voltages. This can be set to 10, 20, 30, 40 or 60V. Both a polarity switch and a jumper are used together to determine the range of the measurement.