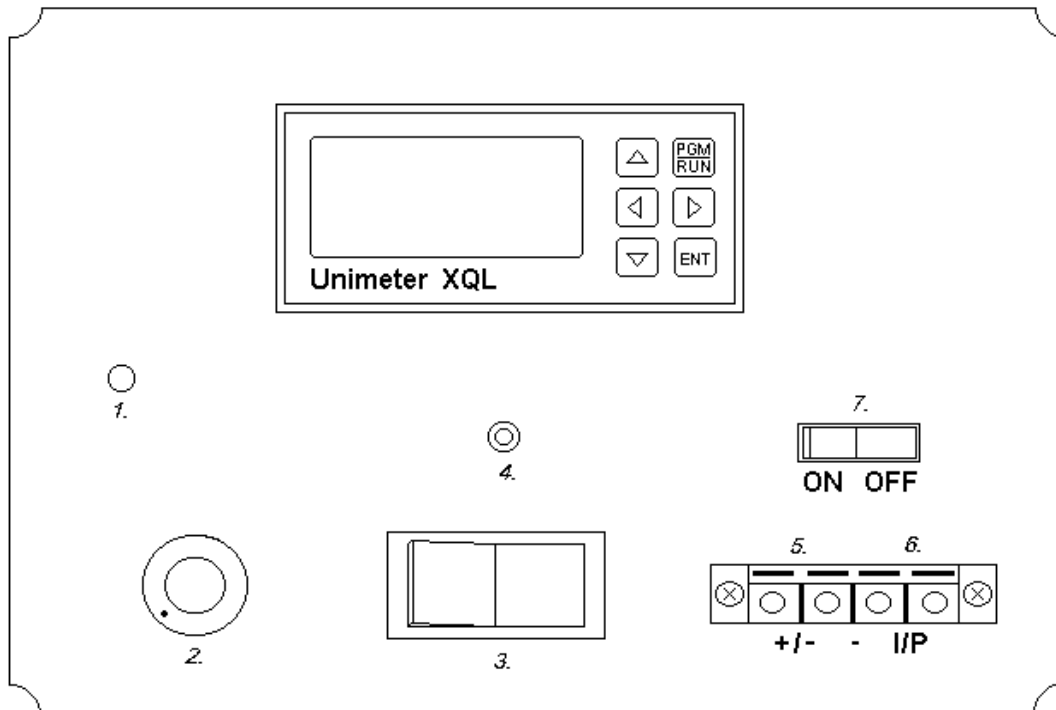


# UniTrain Instructions



## **UniTrain Components:**

1. RS485 Input terminal; via 3.5mm mono jack (Centre Negative). RS485 input allows communication with a PC using an AS4000 adapter and Unimeter Software.
2. 10K Pot. Used to vary the Unimeter input voltage between 0 and approximately 9 Volts DC. (Function 64).
3. Internal Circuitry Switch, toggles the internal circuitry between 0-9V Pot and Oscillator.
4. Oscillator LED. This Led flashes when the internal Oscillator is switched on. The Unimeter measures the rate at which this Led flashes. (Function 95).
5. User Power Supply Output. This terminal is connected directly to the P/S output terminal of the Unimeter. It constantly has a potential difference of either 5, 10, 15 or 24 Volts whilst the Unimeter is powered up. For more information on the User Power Supply see function 235 in the Unimeter XQL Manual. \*Note: Maximum loading on this terminal is 50mA
6. Unimeter Input terminal. This terminal is connected directly to the Unimeter Input. This allows external inputs, such as thermocouples, to be used with the Unimeter in UniTrain. \*Note when applying an external Input the On/Off switch must be switched Off.

7. ON / OFF Switch. This Switch enables and disables the connection between the internal circuitry and the Unimeter Input terminal. I.e. when using either the Pot or Oscillator the switch must be in the ON position. When using an external input via the input terminals the switch must be in the OFF position. If the switch is not in the OFF position when applying an external input, interference with the internal circuitry will result in incorrect readings.

## **Introduction**

Unitrain is a general purpose kit, designed to demonstrate just three of Unimeter's extensive range of functions. However many more functions can be easily demonstrated with the use of the External input terminal of UniTrain. The three functions to be demonstrated are:

### *1. Function 64 - Process Monitor*

Function 64 Measures an input voltage of 0-10Vdc and displays a value of 0 – 100%, where 0% represents 0V input and likewise 100% represents 10V input. The Process Monitor function can be used to monitor anything with an output range of 0-10Vdc and with the use of Setpoints can become a very reliable monitoring system.

### *2. Function 95 - Rate Monitor*

Function 95 measures pulses per minute (ppm) in which an oscillator of some kind is applied directly to the input of the Unimeter. The displayed value will be in pulses per minute, where the maximum range is 1 to 20000 ppm.

### *3. Function 57 – Temperature Monitor*

Function 57 is a temperature monitor that uses the internal cold junction temperature of the Unimeter and displays its operating temperature. This is just another example of the Unimeter's Versatility.

## **Procedures**

Before programming a Unimeter it is advisable to reset it to factory settings by setting the Unimeter to function 25.

### **Function 64 Process Monitor.**

This demonstration uses the built in 9V power supply and Pot to vary the input to the Unimeter between 0 and 9Volts. This procedure will explain all the steps necessary to; Configure the Unimeter to display the input voltage as a scale of 0 to 100%, convert this display value into Volts, set an upper setpoint so that a trigger is set off when the input exceeds a certain value, and set a lower setpoint, so that a second trigger is set off when the input drops below a certain value.

In order to configure UniTrain so that the Unimeter can read the input voltage using the Pot. Firstly the internal circuitry switch must be set so that the Led does not flash. Then the ON/OFF switch must be in the ON position to allow the Pot to be connected to the Unimeter input. Ensure that there are no external input connections at the input terminal.

Configuring the Unimeter to display input voltage:

1. Power up the UniTrain.
2. Press the PGM/RUN Button on the Unimeter.
3. Using the Arrow keys change the value on the display to 64. \*Note decimal values can be neglected in setting the Unimeter functions.
4. Once the value has been changed to 64, press the ENT button. This will reset the cursor and remove any decimal points.
5. Press PGM/RUN and the Unimeter will then perform function 64.

The Unimeter will then display a value between 0 and 100 representing the input voltage as a percentage of 10Volts. This is the default Unimeter setting. Rotate the pot and you will notice that the value changes as the input voltage varies.

Configuring the Unimeter to display Volts.

A percentage display is not the most ideal display to read as it is somewhat informative. Therefore it would be better if the Unimeter could display the input in common units such as volts. To do this we simply program the Unimeter so that it divides the display value by 10, hence converting a 0-100 scale to a 0-10 scale. In order to do this we must set what is called the span divisor to 10. This will program the Unimeter to divide the display value by 10.

6. Press the PGM/RUN Button.
7. Change to display value from 64 to 3. This will load the span divisor setting and display it to the screen.
8. Once again after changing the value to 3, press ENT. The Unimeter will then display the span divisor value which is initially set to the default setting of 1.00.
9. Change this value to 10.00, press ENT then PGM/RUN. When setting Span Divisors, Multipliers or Setpoint values the decimal points are valid and must be set also. (Upon entering 10 in the Span divisor, the Unimeter will divide all values displayed by 10 for all functions.) The Unimeter will then return to function 64 and display Volts.

Setting an Upper Setpoint

Now that we have the Unimeter displaying the input as volts we now want to set a setpoint so that at a specific value, the meter will trigger a relay in the Unimeter, which can be connected to some sort of alarm. For example we want to set the setpoint to 8V so that when the Unimeter input exceeds 8V and trigger is set. This is done in the following way:

10. Change the Unimeter to function 6.
11. The Unimeter will display the default Setpoint1 value of 19999. Change this value to 8.00, taking note of the decimal points.
12. Press ENT then PGM/RUN and the setpoint1 is set.

On the Unimeter vary the input voltage by turning the Pot and notice that over 8.00V the SP1 will be illuminated showing that the setpoint1 has been triggered. Under 8.00V the setpoint1 will turn off.

### Setting a Lower Setpoint

In order to set a lower setpoint so that the Unimeter triggers below a certain value, firstly the setpoint value must be set, then it must be inverted. I.e. We want the Unimeter to trigger when the input voltage drops below 3 Volts, as well as over 8 Volts. So we set setpoint2 to 3 Volts. Setting Setpoint2 to 3V will program the Unimeter to trigger SP2 once 3V is exceeded, hence we want to invert the trigger so that it is OFF over 3V and ON under 3V.

13. Change the Unimeter the function 7.

14. Change the Setpoint2 value to 3.00V, press ENT then PGM/RUN

Setpoint2 is now set to 3V, and now it must be inverted and so the Invert Setpoint2 function (Function 18) must be used.

15. Check this by varying the input voltage, and notice that SP2 is triggered in excess of 3Volts.

16. Goto function 18 on the Unimeter.

Invert Setpoint functions only have two states 0 & 1 for OFF and ON. Hence to enable the invert setpoint2 function the value must be set to 1.

17. Set the function 18 value to 1.

Now setpoint2 is set that when the input value drops below 3V SP2 is triggered.

Vary the input voltage using the Pot and notice that under 3V SP2 is triggered and over 8V SP1 is triggered.

Your Unimeter is now configured and ready to use.

### Function 95 Rate Monitor

(\*Note enter function 25 to reset factory settings before continuing)

This demonstration utilizes a simple oscillator circuit inside the box connected to the Unimeter input. To configure UniTrain for this demo the ON/OFF switch must be on the ON position, no external inputs should be connected to the kit and the Internal Circuitry Switch should be a position which causes the LED to flash.

To configure the Unimeter to display the rate at which the LED is flashing is a very simple process.

1. Power up the Unimeter

2. Press the PGM/RUN Button

3. Change the Unimeter display value to read function 95

4. Press ENT then PGM/RUN.

The Unimeter will no display the rate at which the LED flashed in pulses per minute. To convert this to a more common frequency value, Hertz (Pulses per second), the span divisor must be set to 60 to divide the reading by 60 and so converting to pulses per second.

5. Enter function 3 in the Unimeter

6. Change to Span divisor from 1 to 60, press ENT then PGM/RUN

The Unimeter will then display the frequency of the flashing LED in Hertz or Pulses per second.

**Function 57 Temperature Monitor (Ambient)**

This function displays the Unimeter's ambient temperature in degrees Celsius using the internal cold junction temperature sensor. To do this simply enter function 57 into the Unimeter and the temperature will then be displayed.