CHEKVOLT®
HIGH IMPEDANCE TECHNICAL NOTE

This document and all calculated values shown also apply to the R-3MT-1K Safe-Test Point™, with the exception of LEDs as the Safe-Test Point™ does not have LED Indication.

ChekVolt™ is designed to enhance safety and productivity within facilities' Lockout/Tagout (LOTO) programs by providing both voltage presence indication and absence of voltage testing capabilities. This high-impedance device allows for safe voltage measurement from outside the panel when a qualified person is using an adequately rated portable test instrument.

When using the **ChekVolt™** to measure voltage, such as in a 480VAC system from Phase L1 to Phase L2, readings from a 10MΩ multimeter will show a slight reduction, indicating a 3% reduction reading of approximately 465V. This device enhances compliance to NFPA 70E & CSA Z462. Always follow the "live-dead-live" test procedure as mandated by OSHA, NFPA 70E (2024), Article 110.4(A)(5), 120.1, Annex G, and CSA Z462. See below for a sample procedure.

SAMPLE PROCEDURE

1) Verify the test instrument is calibrated and properly rated for application.

2) Verify the test instrument to a known voltage source.

3) Verify there is voltage illumination on the voltage indicator.

4) Open the dust cap and insert the test instrument probes into the test point and measure the voltage between phase to phase and phase to ground to verify voltage presence.

5) Open Isolator.

6) Verify there is no LED illumination on the voltage indicator.

7) Re-insert the Test Instrument probes into the test point and measure the voltage between phase to phase and phase to ground to verify voltage absence.

8) Re-verify test Instrument to a known voltage source.

9) Upon completion of work, close the dust cap on the test point, close isolator, and verify proper operation of voltage indicator.

Note: The voltage accuracy of the ChekVolt® is -3% and the test instrument will read small mV due to the high impedance circuit in the test points.

HOW TO CALCULATE EXPECTED READING OF VOLTAGE MEASUREMENTS WITH YOUR MULTIMETER

Step 1 – Obtain multimeter impendence, can be typically found in manufactures manual listed under Specifications Input Impendence (Grace Technologies recommends using CAT III/IV 10MΩ multimeter)

Step 2 – Resistance Calculation (Meter R / Sum R)

Step 3 – Calculate Reduction Voltage (Resistance Calculation * Voltage of system).
- a) Phase to Phase
- b) Phase to Ground

(See examples on back)

1515 East Kimberly Road • Davenport, IA • www.graceport.com • 1.800.280.9517

CALCULATIONS

Calculated Voltage = (Meter R / Sum R) x V

Where,

Meter R = Multimeter Impedance
Sum R = Internal resistance of ChekVolt® + Meter R
V = System Voltage

Example 1: (refer to Figure 1a & 1b)
Using a 10MΩ Multimeter; Measuring Voltage Phase L1 to Phase L3 and Phase to Ground on a 480Y/277V System

Example 1 Calculations:
Calculated Reduction Voltage = (Meter R / Sum R) x V

Step 1 – Meter R = 10MΩ

Step 2 – Resistance Calculation (Meter R / Sum R)
=10MΩ / (164kΩ + 102kΩ + 10MΩ)
=0.97

Step 3a – (Meter R / Sum R) x V (Where, V = 480V)
= 0.97 x 480
= 465V

Step 3b – (Meter R / Sum R) x V (Where, V = 240V)
= 0.97 x 277
= 268V

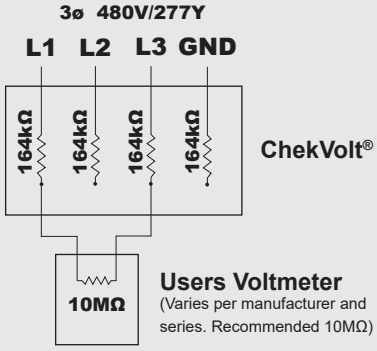

Figure 1a

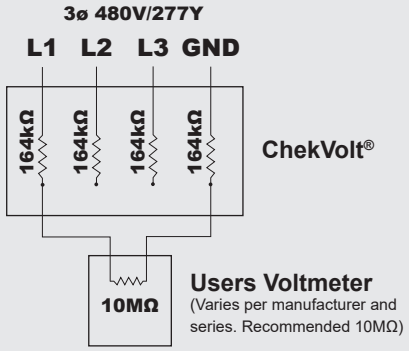

Figure 1b

Example 1 Results:
480Y/277V system measured using ChekVolt® and 10MΩ multimeter will have a 3% reduction voltage reading. Phase to Phase voltage reading will be approximately 465.7V, and Phase to Ground voltage reading will be approximately 268.7V

Example 2: (refer to Figure 2a & 2b)
Using a 1MΩ Multimeter; Measuring Voltage Phase L1 to Phase L3 and Phase to Ground on a 480/240V Delta System

Example 2 Calculations:
Calculated Reduction Voltage = (Meter R / Sum R) x V

Step 1 – Meter R = 1MΩ

Step 2 – Resistance Calculation (Meter R / Sum R)
=1MΩ / (164Ω + 164kΩ + 1MΩ)
=0.75

Step 3a – (Meter R / Sum R) x V (Where, V = 480V)
= 0.75 x 480
= 360V

Step 3b – (Meter R / Sum R) x V (Where, V = 240V)
= 0.77 x 240
= 183V

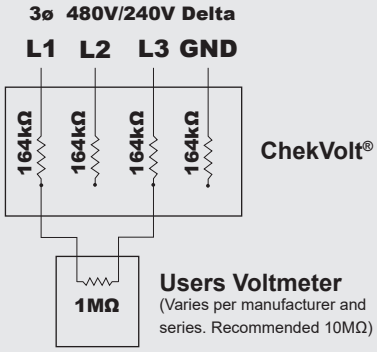

Figure 2a

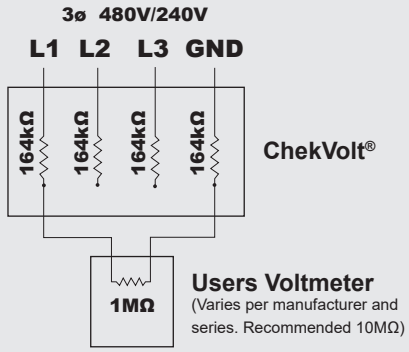

Figure 2b

Example 2 Results:
480/240V Delta System measured using ChekVolt® and 1MΩ multimeter will have a 24% reduction voltage reading. Phase to Phase voltage reading will be approximately 361.4V, and Phase to Ground voltage reading will be approximately 180.7V

ChekVolt® & R-3MT-1K (164kΩ Internal Impedance)

Power Systems	10MΩ Multimeter		1MΩ Multimeter		500kΩ Multimeter	
	3% Voltage Reduction		24% Voltage Reduction		39% Voltage Reduction	
	Phase to Phase	Phase to Ground	Phase to Phase	Phase to Ground	Phase to Phase	Phase to Ground
208Y/120V Wye	201	116	157	90	126	72
480Y/277V Wye	465	268	361	209	290	167
600Y/347V Wye	581	336	452	261	362	210
240V/120V Delta	232	116	181	90	145	72
480V/240V Delta	465	232	361	181	290	145
240V/120V Single Phase	232	116	181	90	145	72
220V Single Phase (Phase to GND)	N/A	213	N/A	166	N/A	133