SPECIFICATIONS

MODEL: MT 165E — MT 265E

Input Power 115 vac 60 hz - 230 vac 50 hz

Surge Test

Maximum voltage (volts)	15,000
Maximum current (amps)	1,500
Maximum stored energy (joules)	11.3
Minimum test inductance (microhenries)	25

Ranges:

- 500 v/cm
- 1000 v/cm
- 2000 v/cm
- 5000 v/cm

Bar To Bar Armature Test

Maximum voltage (volts)	1,900
Maximum current (amps)	5,000
Maximum stored energy (joules)	11.3
Minimum test inductance (microhenries)	0.4
Maximum test inductance (microhenries)	20

Ranges

- 50 v/cm
- 100 v/cm
- 200 v/cm
- 500 v/cm

High Potential Test

Maximum voltage (volts)	15,000
Maximum current (microamps)	5,000

Ranges:

- 5 microamps/cm
- 50 microamps/cm
- 500 microamps/cm

(Automatic over current protection tripping occurs at 10 times the current range selected.)

Weight

123 Pounds - 56 KG

SURGE COMPARISON TESTING

The Baker Surge Comparison Testers use the principle of impedance balance to test windings. Most all electrical windings are made up of several identical coils or phases. The surge tester compares the impedance of these windings to detect faults.

The test instrument applies a series of brief surges to two matched windings by capacitor discharge. The resulting "ringing" pattern of each of the two windings is then displayed on the instrument's cathode ray tube (CRT). If the windings are without faults, and are electrically/magnetically the same (impedance balance), the two patterns will be identical or compare. One wave pattern will be superimposed over the other so that a single wave pattern will appear on the instrument's CRT.

If one of the windings has an insulation fault or winding error, its CRT pattern will not be the same as the compared good winding. So, two patterns will show on the CRT. The comparison presentation allows for easy detection of a faulty winding.

Every winding has a particular ringing pattern, but in most cases the pattern is similar to the examples presented within this instruction book.

The most important concept of surge comparison testing is that it tests the turn-to-turn, coil-to-coil, and phase-to-phase insulation, as in the example of a three phase motor. While most other insulation test are performed only to determine the ground insulation integrity. The SURGE COMPARISON TESTER is testing the copper-to-copper insulation.

The surge comparison test potential is a series of pulses. The voltage of the pulses rises very quickly (approximately one micro second). As this pulse propagates along the winding, it produces a voltage gradient across the turns within the coil. When the voltage difference is greater then the voltage withstand at some point on the failing turn insulation, a low energy-arc over will occur. The arc-over, or shorted winding when compared to a sound coil will not compare on the CRT. In addition, the shorted winding will almost always give an unstable, or flickering pattern. The flickering is caused by the arcing within the winding. The unstable, flickering CRT pattern enhances the detection of a faulted winding.

The above example best describes a turn-to-turn type failure. Similar results will be noted for other copper-to-copper failures.

INTRODUCTION

Prior to surge testing the most common electrical test for motors was a low potential test of the windings to ground (frame). It is now known that the motor ground failure often starts as a **copper-to-copper fault.**

Therefore, a method was developed to detect the **copper-to-copper** incipient failure. The equipment required for the detection of the ungrounded fault was the **SURGE COMPARISON TESTER.**

The **MT165/265** is one of a family of surge testers developed by the **Baker Instrument Company.** The **MT 165/265** is designed for the comprehensive electrical testing of a large range of electrical apparatus. Tests which this instrument can perform are: **Surge Comparison, Surge, High Potential,** and **Armature Bar-To-Bar,** all with the flip of a switch. Very low inductance devices, such as a single interpole from a dc machine, can be surge tested in the Armature Test configuration.

The **Armature Bar-To-Bar Test** is a **Surge Test** as opposed to a **Surge Comparison Test.** Details of the two methods of testing are discussed in the following sections of this instruction book.