

## Resistance Ranger™ RangerTWO Constant Monitor - CM1602

### Dependable, and Accurate Resistance Based

### Constant Monitor for One Operator & Work Surface

Transforming Technologies' RangerTWO constant monitor provides continuous protection against failing dual wire wrist straps and a ESD work surface. A constant pulse of an ultra-low voltage signal measures the electrical resistance of the wrist band and work surface and alarms if there is a problem.

The RangerTWO is an extremely sensitive and reliable ground monitoring instrument. Audible and visible alarms are triggered if the operator's resistance exceeds 35 megohm (factory default). Low resistance of 1.8 megohm also triggers an alarm event. Mat alarm limits are set at 100 meg ohm.

The RangerTWO saves time by eliminating the time consuming testing of grounding products. The system uses special dual wire wrist band sets that contain two independent elements which provide fail-safe protection. The series can be used with most common dual wire wrist straps available. Transforming Technologies offers both fabric and metal wrist bands paired with cords in either 5, 10, or 20 feet lengths.

Meets or exceeds requirements of ANSI ESD-S20.20 and ESDA Standard 1.1-2006

### Applications:

**ESD constant monitors reduce production costs by eliminating the time spent on testing wrist straps. Further savings may be realized by reduced ESD damage from broken wrist straps and work surface failures. Resistance based monitors are the most accurate technology available**

This document is prepared for our customers as a service, and is to the best of our knowledge true and accurate. However, it is understood and agreed by the users of this document that we will accept no liability for the conclusions reached. Users of this document may therefore wish to perform additional testing before determining that products mentioned are suitable.

RESISTANCE  
**RANGER**



### Features

- Monitors One Dual Wire Wrist Strap and ESD Work Surface
- Accurate Dual Conductor Resistance Monitoring Technology
- Ultra-Low Voltage Signal
- Conductive ESD-Safe Case



## RangerTWO CM1602

### The Superior Resistance Monitoring System

Workstations using resistance monitors are almost never at risk for a failed ground connection. This type of monitor is used with a two-wire (dual conductor) wrist strap. When a person is wearing a wrist strap, the monitor observes the resistance of the loop, consisting of a wire, a person, a wristband, and a second wire. If any part of the loop should open (become disconnected or have out of limit resistance), the circuit will go into the alarm state.

An important feature of the dual wire wrist strap is that even if one conductor is severed, the operator has reliable path-to-ground with the other wire.

Basic systems use impedance technology and single wire wrist straps which can be easily fooled. If a wrist strap is worn incorrectly, the monitor can still register a "pass" condition or if the wire of the wrist strap is severed the workstation could be put at risk for ESD damage.



Each monitor uses a dual conductor wrist strap sets, WB5000, WB7000, WB2595P, WB2850 from Transforming Technologies, although other compatible wrist strap sets may be substituted. Dual conductor wrist straps enable efficient, accurate resistance monitoring and grounding redundancy.

| Model CM1602                            | Specifications   |
|---|--|
| <b>DC Power Supply:</b>                 | 7-15 VDC, 100mA.   |
| <b>AC Input:</b>                        | 100-240 VAC, 1A.   |
| <b>Temperature limits:</b>              | 50° F (10°C) to 122° F (50°C)                              |
| <b>Adjustments:</b>                     | No serviceable components; see periodic verification tools |
| <b>Dimensions:</b>                      | 3" W x 2" D x 1" H   |
| <b>Weight:</b>                          | 6.8oz  |
| <b>Monitoring Capabilities</b>          | 1 wrist strap and 1 work surface                           |
| <b>Alarm Limits</b>                     |  |
| <b>Wrist Strap</b>                      |  |
| <b>Low Resistance:</b>                  | 1.8 megohm.  |
| <b>High Resistance:</b>                 | 35 meg ohm.  |
| <b>Mat Resistance:</b>                  | 100 meg ohm.   |
| <b>Typical Operator Voltage at 10M:</b> | max 0.1V (100mV)   |
| <b>Max Mat Voltage (open circuit):</b>  | 0.2V (200mV)   |
| <b>Max Mat Voltage (alarm at 100M):</b> | 0.15V (150mV)  |
| <b>Unit Accessories</b>                 |  |
| <b>FM1515</b>                           | Work Surface Ground Cable                                  |
| <b>FM1515CM</b>                         | Monitor Ground Cable                                       |
| <b>FM1515NR</b>                         | Monitor To Work Surface Cable                              |
| <b>CM2800-REMOTE</b>                    | Remote Jack Replacement                                    |
| <b>CM-REMOTE-IR</b>                     | Proximity Sensing Remote                                   |

CYCLOPS™ protects ESD safe workstations by sensing when an operator is within the protected work area and alarms if a wrist strap is not connected.



The alarm continues until compliance is achieved, preventing isolated operators from damaging ESD sensitive devices.

### About Transforming Technologies

Since 1998, Transforming Technologies has helped electronic manufacturing facilities to protect their products and processes from the many serious problems associated with static electricity.

Transforming Technologies offers a wide range of unique and outstanding products to detect, protect, eliminate and monitor electrostatic charges. Our products are integral components of an effective static control program.