

OPERATING INSTRUCTIONS MODEL TI-DM200 DIGITAL MULTIMETER

PLEASE READ THESE OPERATING INSTRUCTIONS CAREFULLY

Misuse and/or abuse of these instruments cannot be prevented by any printed word and may cause injury and/or equipment damage. Please follow all these instructions and measurement procedures faithfully and adhere to all standard industry safety rules and practices.



RAIN BIRD

Rain Bird Corporation / 970 West Sierra Madre Avenue
Azusa, CA 91702 / www.rainbird.com / 800-247-3782

WARRANTY ONE YEAR LIMITED WARRANTY

Rain Bird will repair or replace this test instrument if it fails in normal use within one year from retail purchase. You must return the product to the dealer or distributor where it was purchased. Product failures due to acts of God including without limitation, lightning and flooding, are not covered by this warranty. This commitment to repair or replace is Rain Bird's sole and total warranty. Rain Bird will not, under any circumstances be liable for incidental or consequential damages, no matter how they occur.

Sec. 1 DESCRIPTION

These DMMs offer a powerhouse of measurement capability in a small self-contained housing. It is designed for the professional at work in the field or in the laboratory, yet simple enough to operate making it perfect for the hobbyist too. Safety was a prime consideration in the design of this DMM. Housed in shock resistant ABS plastic, this instrument stands up to the use and abuse of everyday service,

and electrically insulates the user from potential shock hazards. Electronic overload protection against accidental application of voltage to resistance and continuity circuits, combined with it's rugged construction make it durable and reliable instrument.

Sec. 2 FEATURES

- UL listed to both US and Canadian standards
- Designed to Cat. II 600V
- Pocket-size
- Simple operation
- Recessed safety designed input terminals
- Overload protection on all ranges
- Diode test function
- Continuity

Sec. 3 SPECIFICATIONS

Display:	3-1/2 digit LCD, 0.625" numerals, maximum reading1999 with automatic sign.
Overrange Indication:	*1" most significant digit shows.
Sampling Rate:	3 times per second.
Operating Environment:	0° to 50°C (32° to 122°F), Max RH 80% to 31°C decreasing linear to 50% RH at 40°C.
Storage Environment:	-20° to 60°C (-4° to 140°F) at <80% relative humidity.
Power Source:	One (1) 9V Transistor Type Battery (NEDA #1604).
Power Consumption:	30mW typical.
Battery Life:	200 hours typical with zinc carbon.

Fuse:	Part F-14; 0.2A, 250V, 5x20mm, fast acting.
Dimensions:	5.1"H x 2.8"W x 1.1"D (130 x 72 x 28 mm).
Weight:	Approximately 5.0 oz. (146g) including battery.

Instrument complies with insulation category (over voltage category) II, Industrial use. Pollution degree 2 in accordance with IEC-664. Altitude up to 2000M. Indoor use. If the equipment is used in a manner not specified, the protection provided by the equipment may be impaired.

DOUBLE INSULATION

WARNING: TO AVOID ELECTRIC SHOCK DISCONNECT MEASURING TERMINALS BEFORE REMOVING BATTERY COVER.

CAUTION: FOR CONTINUED PROTECTION AGAINST FIRE, REPLACE ONLY WITH FUSE OF THE SPECIFIED VOLTAGE, CURRENT AND RUP-TURE SPEED RATINGS.

DC Voltage	
	15 Range, 6 Function TI-DM200
Range	2/20/200/600V
Basic Accuracy	1.50%
Resolution	1mV
Input Impedance	10 Mohm
Overload Protection	600VDC or peak AC on all ranges

AC Voltage	
	15 Range, 6 Function TI-DM200
Range	200/600V
Basic Accuracy	1.50%
Resolution	100mV
Input Impedance Response	10 Mohm
Frequency Response	50-60 Hz
Overload Protection	600VDC or peak AC on all ranges

Resistance	
	15 Range, 6 Function TI-DM200
Range	0-200/2K/20K/200K/2M
Basic Accuracy	1.50%
Resolution	0.1 ohm
Overload Protection	250 VDC or Peak AC on all ranges

Diode Test	
	TI-DM200
Test Current	1 +/- .6 mA
Test Voltage	3.2V
Battery Test	
	TI-DM200
Battery Test	1.5V/9V

- Remove the battery from the compartment and unsnap the battery connector.
- Replace the battery with a 9V transistor type battery (NEDA #1604). For maximum battery life, alkaline cells are recommended.
- Reverse the above procedure to complete battery replacement.

Sec. 7 FUSE REPLACEMENT

A 0.2A, 250V, 5 x 20mm fast acting fuse, is installed in the instrument and used to protect the ampere ranges along with other solid state components.

WARNING

Before attempting to replace the fuse, disconnect the test leads from any energized circuit and then disconnect the test leads from the instrument. Replace the fuse with approved equal only. Always use fast acting, high interrupting type fuses

- Disconnect the test leads from any energized circuit and then from the instrument.
- Turn the range selector switch to the "OFF" position.
- Remove screws and open the back case.
- Remove the fuse from the clip on the end of the PCB.
- Install the replacement fuse being certain it meets the specifications in Sec. 3.
- Replace the back case.

Sec. 8 OPERATION

Before making any measurements always examine the instrument and accessories used with the instrument for damage, contamination (excessive dirt, grease, etc.) and defects. Examine the test leads for cracked or frayed insulation and make sure the lead plugs fit snugly into the instrument jacks. If any abnormal conditions exist do not

attempt to make any measurements. Instead refer to sec.14 Return for Repairs.

Sec. 8.1 VOLTAGE MEASUREMENTS

- Insert the black and red test leads into the respective "COM" and "V-Ω" jacks.
- Place the range selector switch into the 600DCV/600ACV position if a dc voltage is to be measured or into the position if an ac voltage is to be measured. Always start in the highest range of the function to be measured.

CAUTION

To avoid possible electric shock, instrument damage and/or equipment damage, do not attempt to take any voltage measurements if the voltage is above 600Vdc or if the voltage is unknown. 600Vdc is the maximum voltages that this instrument is designed to measure. The "COM" terminal potential should not exceed 600V measured to ground.

- Apply the test leads to the two points at which the voltage reading is to be taken. Be careful not to touch any energized conductors with any parts of your body.
- Turn the range selector switch to the next lower range for a more accurate reading only if the reading is within that next lower range.
- When measurements are completed, disconnect the test leads from the circuit under test. Remove the test leads from the instrument.

Sec. 8.2 RESISTANCE AND DIODE MEASUREMENTS

- Insert the black and red test leads into the respective "COM" and "V-Ω" terminals.
- Place the range selector switch into the Ω range desired for a measurement. (The test range measures resistance from 000 up to 1999 and is used to test the

forward resistance value of diodes. The diode check entails injecting a given current into the diode junction to be tested and reading the voltage drop across the diode.

CAUTION

All resistance and diode measurements should be taken on de-energized circuits only. To avoid possible electrical shock, instrument damage and/or equipment damage do not connect the "COM" and "V-Ω" terminals to circuits having a potential difference exceeding 250Vdc/ac. Do not connect the "COM" terminal to potentials exceeding 500V to ground.

- Completely de-energize the circuit or device which is to be measured. Connect the test leads to the device (the red test lead is positive with respect to the black test lead). When measuring a diode, connect the "V-Ω" terminal to the anode. A reading of indicates an overrange condition. This will occur with the test leads open on all resistance ranges. If overrange occurs when taking a reading, switch to the next highest range.

NOTE: On the diode test range, a [1] reading indicates a resistance greater than 2K which normally means a defective open circuit diode. Be certain the diode anode is connected to the V-Ω terminal.

Sec. 8.3 BATTERY TEST MEASUREMENTS

- Insert the black and red test leads into the respective "COM" and "V" terminals for 1.5Vdc and 9Vdc.
- Place the range selector switch into the 1.5V or 9V battery test range.

CAUTION

To avoid electric shock, instrument damage and/or equipment damage, do not exceed 10Vdc while set to take measurements in the battery test range.

- Connect the test leads to the 1.5Vdc battery under test. Normally a good 1.5Vdc battery will read above

80.0mA. Normally a good 9Vdc battery will read above 22.0mA. Consult the battery manufacturer for complete battery specifications to determine actual battery life remaining and condition of battery.

Sec. 9 MAINTENANCE

Maintenance consists of periodic cleaning, battery replacement, fuse replacement and recalibration.

Sec. 9.1 CLEANING

The exterior of the instrument can be cleaned with a soft clean dry cloth to remove any oil, grease or grime from the exterior of the instrument. Never use liquid solvents or detergents. If the instrument gets wet for any reason, dry the instrument using low pressure "clean" air at less than 25 PSI. Use care and caution around the LCD display protector and areas where water or air could enter the interior of the instrument while drying.

Sec. 10 ACCESSORIES

The following accessory is available C-37 Carrying Case

Sec. 11 CALIBRATION

Calibration on these meters should be performed every year. This can be done by sending the instruments prepaid to:

Rain Bird Test Instrument Service Center
Customer Service Department
245 Marcus Blvd.
Hauppauge, NY 11788

Specify in writing that calibration is necessary. The instrument will be returned to you normally within one week. Estimates will be furnished upon request.

CAUTION

The following procedures should performed by persons trained and qualified in electronics and electronic equipment service. DO NOT attempt this procedure if not qualified.

WARNING
Do not attempt calibration or service unless another person capable of rendering first aid and resuscitation is present.

Sec. 12 RETURN FOR REPAIRS

Before returning your digital multimeter for repair be sure to check that the failure to operate properly is not due to the following:

- Weak battery
- Open fuse
- Open, loose or intermittent test leads

If these conditions do not exist and the instrument fails to operate properly, return the instrument and accessories prepaid to:

Rain Bird Test Instrument Service Center
Customer Service Department
245 Marcus Blvd.
Hauppauge, NY 11788

State in writing what is wrong with the instrument. All warranty repairs must include proof of purchase in the form of a legible original copy of the sales receipt clearly identifying the distributor, model number and date of purchase. Repair estimate will be furnished if requested for out of warranty instruments. Be sure to include all accessories which may be related to the problem and a note describing the malfunction you observed.

los golpes, soporta el uso y el abuso del servicio diario y a la electrónica al usuario de riesgos de choque eléctrico potenciales. La protección electrónica contra sobrecargas por aplicación accidental de tensión a los circuitos para medición de resistencia y continuidad, combinada con su construcción reforzada, hacen de él un instrumento duradero y confiable.

Sección 2 CARACTERÍSTICAS

- Répertoire UL selon les normes américaines et canadiennes
- Conçu pour la catégorie II 600 V
- Tamaño de bolsillo
- Operación sencilla
- Terminales de entrada empotrados, diseñados para brindar seguridad
- Protección contra sobrecargas en todas las escalas
- Función de prueba de diodos
- Continuidad

Sección 3 ESPECIFICACIONES

Indicador	LCD (pantalla de cristal líquido) de 3-1/2 dígitos, números de 16 mm y lectura máxima de 1999 con signo automático
Indicaci—n de escala excedida	Muestra "1" como dígito más significativo
Velocidad de muestreo	Tres veces por segundo
Ambiente para operación	0 a 50 °C, máxima humedad relativa 80% a 31 °C, decreciendo linealmente a 50% con 40 °C

Ambiente para almacenamiento	-20 a 60 °C con humedad relativa inferior a 80%
Alimentación	Una pila de 9 V, apta para transistores (N° NEDA 1604).
Requisitos de potencia	Normal: 30 mΩ (típicos)
Vida útil de la pila	Normal: 200 horas con pila de zinc-carbón
Fusible	N° de pieza AWS F-14; 0,2 A, 250 V, 5 x 20 mm, acción rápida.
Dimensiones	130 (l) x 72 (a) x 28 (p) mm
Peso	Aproximadamente 146 g con la pila

L'instrument se conforme aux installations de catégorie II (catégorie surtension). Pour usage industriel. Niveau de pollution 2 en conformat avec IES-664. Altitude atteignant 2000m. Utilisation interne. Si el equipo se utiliza en una forma no especificada, la protección provista puede quedar reducida.

DOBLE AISLACIÓN

ADVERTENCIA: PARA EVITAR CHOQUES ELÉCTRICOS, ANTES DE SACAR LA TAPA DE LA PILA DESCONECTE LOS TERMINALES DE MEDICIÓN.

PRECAUCIÓN: PARA TENER PROTECCIÓN CONTINUA CONTRA INCENDIOS, REEMPLACE EL FUSIBLE SOLAMENTE POR OTRO QUE SATISFAGA LOS REQUERIMIENTOS DE TENSION, CORRIENTE Y VELOCIDAD DE RUPTURA ESPECIFICADOS.

Tensión Continua	
	Range 15, 6 Funciones TI-DM200
Rango	2/20/200/600V
Precisión Básica	1.50%
Resolución	1 µ V
Impedancia de Entrada	10 Mohmios
Protección Contra Sobrecarga	600VCC o CA Pico por 1 min
Tensión Alterna	
	Range 15, 6 Funciones DM-220A
Rango	200/600V
Precisión Básica	1.50%
Resolución	100mV
Impedancia de Entrada	10 Mohmios
Frequency Response	50-60 Hz
Protección Contra Sobrecarga	600VDC o CA Pico por 1 min

Resistencia	
	Range 15, 6 Funciones TI-DM200
Rango	0-200/2K/20K/200K/2M
Precisión Básica	1.50%
Resolución	0.1 ohmios
Protección Contra Sobrecarga	250 VCC o CA Pico por 1 min
Diode	
	TI-DM200
Corriente de Prueba	1 +/- .6 mA
Tensión de Prueba	3.2V
Prueba de Batería	
	TI-DM200
Prueba de Batería	1.5V/9V

Sección 4 REGLAS DE SEGURIDAD

- Antes de operar su multímetro digital, lea estas instrucciones en forma completa y atenta. Preste atención particular a las ADVERTENCIAS y a las PRECAUCIONES que informan sobre procedimientos potencialmente peligrosos. Estas instrucciones deben ser respetadas.
- Antes de cada uso, verifique siempre que los cables de prueba y los accesorios no tengan signos de daño o de anomalía. Si existe alguna condición anormal (por ejemplo, puntas de prueba rotas, caja rajada, pantalla sin lecturas, etc.), no intente efectuar

ninguna medición. Consulte la sección 12. Devolución para reparaciones.

- Quando emplee instrumentos eléctricos, nunca se conecte a tierra. No toque caños metálicos expuestos, tomacorrientes, herrajes, etc., que puedan tener igual potencial que la tierra. Mantenga su cuerpo aislado de tierra usando ropa seca, zapatos con suela de goma, alambros de goma o cualquier material aislante aprobado.
- Quando intente efectuar mediciones, nunca toque cables expuestos, conexiones o conductores de circuitos alimentados (vivos).
- Nunca reemplace el fusible protector dentro del multímetro digital por alguno que no sea la pieza con el numero especificado por Sec. 3 u otro aprobado como equivalente.
- Recuerde: Piense en la seguridad y actee seguramente.
- Quando pruebe si hay tensión presente, asegúrese de que la función medición de tensión funcione correctamente leyendo una tensión conocida en esa gama, antes de suponer que una lectura de cero indica una condición de sin tensión.
- Las calibraciones y las reparaciones sólo deben ser efectuadas por personal de servicio calificado.
- No intente realizar la calibración o el servicio del instrumento, a menos que esté presente otra persona capaz de prestar primeros auxilios y aplicar técnicas de reanimación.
- No instale piezas substitutas ni efectúe modificaciones no autorizadas en el instrumento. Para asegurar que se mantengan las características de seguridad, envé el instrumento a Rain Bird Test Instrument Service Center para su servicio y reparación.

Sec. 4 SAFETY RULES

- Read these operating instructions thoroughly and completely before operating your DMM. Pay particular attention to WARNINGS and CAUTIONS which will inform you of potentially dangerous procedures. These instructions must be followed.
- Always inspect your DMM, test leads and accessories for any sign of damage or abnormally before every use. If any abnormal conditions exist (e.g. broken test leads, cracked cases, display not reading, etc.), do not attempt to take any measurements. Refer to section 12 Return for Repair.
- Never ground yourself when taking electrical measurements. Do not touch exposed metal pipes, outlets, fixtures, etc., which might be at ground potential. Keep your body isolated from ground by using dry clothing, rubber shoes, rubber mats, or any approved insulating material.
- Never touch exposed wiring, connections or any live circuit conductors when attempting to take measurements.
- Never replace the protective fuse inside the DMM with any other than as specified in Sec. 3 or approved equal.
- Remember: Think Safety and Act Safely.
- When testing for the presence of voltage, make sure the voltage function is operating properly by reading a known voltage in that range before assuming that a zero reading indicates a no-voltage condition.
- Calibration and repair should be performed by qualified maintenance personnel only.
- Do not attempt calibration or service unless another person, capable of rendering first aid and resuscitation is present.
- Do not install substitute parts or perform any unau-

thorized modification of the instrument. Return the instrument to Rain Bird Test Instrument Service Center for service and repair to insure that safety features are maintained.

- To avoid electric shock use CAUTION when working with voltages above 40Vdc or 20Vac. Such voltages pose a shock hazard.
- Do not operate this instrument in an explosive atmosphere (i.e. in the presence of flammable gases or fumes, vapor or dust).

Sec. 5 PREPARATION FOR USE

Sec. 5.1 UNPACKING AND CONTENTS CHECK

The DMM's come complete and ready to use. Check the following contents list when unpacking. If any pieces are missing notify the distributor you purchased the instrument from of Rain Bird Corporation.

- Operating Instructions #314
- Test Leads TL-76 (one black, one red)
- 9V Transistor Type Battery
- One Fuse installed
- Irrigation Troubleshooting Guide

Sec. 5.2 PRE-OPERATION PROCEDURE

- Install the 9V transistor type battery.
- Inspect the instrument for any external defects by comparing with the diagram on page 1. If any abnormal conditions exist, do not attempt to take any measurements. Refer to sections 9 (Maintenance) and 12 (Return for Repairs).
- Insert the test leads into the "COM" and "V-Ω" jacks. Connect the two ends of the test leads together.
- Place the range selector switch into the off position. Nothing will appear on the display. Place the range

selector switch into the following ranges shown in the chart below. Check for the appropriate meter response.

Range	Display	Reading
600DCV	000	+/-4 digits
200DCV	00.0	*
20DCV	0.00	*
2DCV	0.000	*
200	1. _ _	*
2K	1. _ _	*
20K	1. _	*
200K	1. _ _	*

- As you can see, the decimal point moves as the ranges are changed. The maximum display reading is 1999. The 200DCV range will actually only read 199.9Vdc. We call this the 200DCV range for convenience only.
- You can now check the decimal point on each range by referring to sec. 3 Specifications where the ranges are all listed. Refer to the Range and Resolution columns to compute the decimal point location.
- If any abnormal conditions exist, do not attempt to take any electrical measurements. Instead refer to sec. 12 Return for Repairs.

Sec. 6 BATTERY REPLACEMENT

The DMM's have a self-contained power supply consisting of One 9V Transistor Type Battery (NEDA #1604).

WARNING

Before attempting to replace the battery, first disconnect the test leads from any energized circuit and then disconnect the test leads from the instrument.

- Disconnect the test leads from any energized circuit and then from the instrument.
- Turn the range switch to the "OFF" position.
- Remove screws and open the back case.

GARANTÍA GARANTÍA LIMITADA DE UN AÑO

Si este instrumento falla antes de un año de la fecha de adquisición por parte de comprador final original, Rain Bird lo reparará o reemplazará. Usted debe devolver el producto al distribuidor donde el producto fue comprado. Las faltas de producto causadas por actos de Dios que incluyen sin limitación, relámpago o diluvio, no son cubiertas por esta garantía. Este compromiso de reparar o reemplazar es la garantía única y total de Rain Bird. De ninguna maera será responsable Rain Bird por daños accidentales o consecuentes sin importancia de cómo ocurran.

Sección 1 DESCRIPCIÓN

Este instrumento ofrece una poderosa habilidad de medición dentro de un alojamiento pequeño. Está diseñado para el profesional que trabaja en el terreno o en el laboratorio, pero es suficientemente simple de operar, por lo que resulta ideal para el aficionado. La seguridad fue una consideración primordial en su diseño. Este instrumento está alojado en una caja de plástico ABS resistente a

Advertencia
Antes de intentar reemplazar la pila, desconecte primero las puntas de prueba de cualquier circuito alimentado y luego desconéctelas del instrumento.

- Desconecte las puntas de prueba de cualquier circuito alimentado y luego desconéctelas del instrumento.
- Gire el conmutador de escalas a la posición "OFF" (desconectado).
- Saque los tornillos y abra la parte posterior de la caja del instrumento.
- Saque la pila de su compartimiento y desprendra su conector.
- Reemplace la pila con otra de 9 V apta para transistores (N° NEDA 1604). Para obtener la máxima vida de la pila, se recomienda usar pilas del tipo celda alcalina.
- Para completar el reemplazo de la pila, efectúe el procedimiento previo en orden inverso.

Sección 7 REEMPLAZO DEL FUSIBLE

En el instrumento hay instalado un fusible de 0.2 A, 250 V, 5 x 20 mm, de acción rápida, que se emplea para proteger las escalas de medición de intensidad de corriente junto con otros componentes de estado sólido.

ADVERTENCIA

Antes de intentar el reemplazo del fusible, desconecte las puntas de prueba de cualquier circuito alimentado y luego desconéctelas del instrumento. Reemplace el fusible sólo por un equivalente autorizado.

- Desconecte las puntas de prueba de cualquier circuito alimentado y luego desconéctelas del instrumento.

INSTRUCCIONES DE OPERACIÓN MODELO TI-DM200 MULTIMETRO DIGITAL POR FAVOR LEA ESTAS INSTRUCCIONES DE OPERACIÓN CUIDADOSAMENTE

El mal uso o abuso de estos instrumentos no puede ser evitado mediante ninguna instrucción escrita y puede causar lesiones y/o daños al equipo. Por favor siga fielmente estas instrucciones y los

