DigiTMR

Circuit Breaker Analyzer

Vanguard Instruments Company

www.vanguard-instruments.com

DigiTMR™

Inexpensive and Easy to Use

The DigiTMR is an inexpensive, easy to use, stand-alone, microprocessor-controlled circuit-breaker analyzer. It can fully analyze a circuit-breaker's performance by testing the contact time, stroke, velocity, over-travel, and contact wipe. Contact-motion analysis can be performed for all breaker contact operations (Open, Close, Open – Close, Close – Open, and Open – Close – Open). The DigiTMR's timing window is selectable between 1-second, 10-second, or 20-second periods. The 10-second and 20-second timing windows are ideal for timing long duration events such as circuit-switcher contact testing.

Contact Timing Inputs

Dry-contact input channels are used for timing circuit-breaker contacts. Each contact input channel can detect main contact and insertion-resistor contact times in milli-seconds and cycles. Three contact timing channels are available on the DigiTMR.

Voltage Monitoring Inputs

One analog voltage input channel, designated as V1, is dedicated to monitoring a circuit-breaker's DC power supply or coil voltage (0 – 255 volts, DC or peak AC). A second voltage input channel, designated as V2, is dedicated to detecting the voltage on/off status (presence or absence) of an A/B switch.

Trip/Close Current Monitoring

A built-in Hall-effect current sensor records the Trip/Close current level and duration. The breaker's operating-coil current waveform duration (effectively, a performance "fingerprint" or "current profile") can be used as a diagnostic tool for analyzing a breaker's performance.

Thoroughly

Breaker Stroke and Velocity

One digital travel transducer channel is available on the DigiTMR for measuring circuit-breaker velocity, stroke, over-travel, and bounce-back. Unlike other transducer types, the digital transducer requires neither calibration nor setup. A breaker's contact-velocity is calculated based on the contact's travel distance over a period of time. A special feature is also available to "slow-close" test a breaker and obtain a test result report.

Breaker Initiate Features

A built-in solid-state initiate device is used to operate a breaker from the DigiTMR. The operational modes include Open, Close, Open – Close, Close – Open, and Open – Close – Open. Multiple operations, such as Open – Close and Open – Close – Open, can be initiated by using programmable delay time or by sensing a breaker's contact condition.

Internal Test Record Storage

The DigiTMR can store up to 100 test records in Flash EEPROM. Test records can be retrieved and printed on the built-in thermal printer, or they can be transferred to a PC via the unit's RS-232C interface.

Internal Breaker Test Plan Storage

The DigiTMR can store up to 99 circuit-breaker test plans. Test plans are comprised of all circuit-breaker performance specifications (stroke, velocity, and contact time). A test plan can be used to immediately test a circuit-breaker. A pass/fail report is then generated by comparing actual performance with the specifications in the stored test plan. Test plans can also be generated on a PC and transferred to the DigiTMR via the unit's RS-232C interface.

Computer Interface

The DigiTMR can be computer-controlled via its RS-232C interface. A Windows® XP/Vista-based Breaker-Analysis software application is provided with each unit. Using this software, circuit-breakers can be timed from the PC. Test records can be retrieved from the DigiTMR and then stored on the PC for future analysis and report generation. Circuit-breaker test plans can also be created on the PC and transferred to the DigiTMR. Additionally, test records can be exported in Microsoft® Excel format for further analysis.

Diagnostic Capabilities

The DigiTMR can perform diagnostics on its internal electronics. Diagnostics can be performed to verify contact cable connections and to test the travel transducer's electronics.

User Interface

The DigiTMR features a back-lit LCD screen (20 characters by 4 lines) that is viewable in both bright sunlight and low-light levels. A rugged, 16-key, membrane keypad is used to control the unit.

Built-in Thermal Printer

The DigiTMR's built-in 4.5-inch wide thermal printer can print the breaker contact analysis results in both tabular and graphic formats.

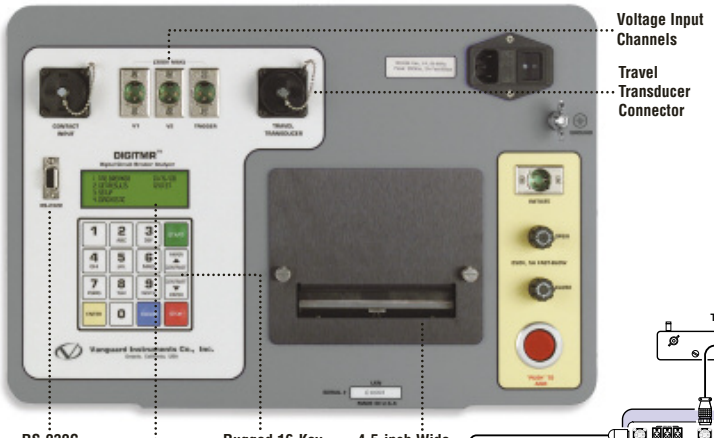
Order Info

DigiTMR CIRCUIT BREAKER TIMER

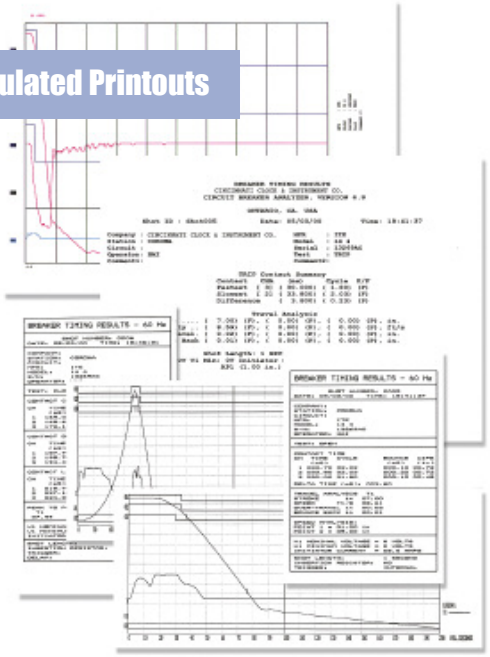
DigiTMR, cables, PC software	Part No: DigiTMR
DigiTMR carrying case	Part No: DigiTMR-CASE
Printer paper, Thermally sensitive	Part No: Paper-TP4

Digital Circuit Breaker Analyzer

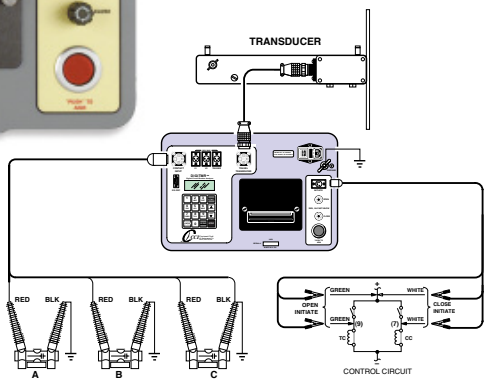
analyze circuit-breaker performance including contact time, stroke, velocity, over-travel, and contact wipe.



Graphic & Tabulated Printouts



Connections



SPECIFICATIONS

TYPE	Circuit-breaker analyzer
PHYSICAL SPECIFICATIONS	18"W x 7"H x 15"D (45.7 cm x 17.8 cm x 38.1 cm); Weight: less than 19 lbs (8.6 kg)
INPUT POWER	3 Amps, 100 – 120 Vac or 200 – 240 Vac (factory pre-set), 50/60 Hz
DRY CONTACT INPUTS	3 dry-input channels; each channel detects main and insertion-resistor contacts
TIMING WINDOWS	1-second, 10-seconds, or 20-seconds
TIMING RESOLUTION	±100 micro-seconds @ 1-second duration, ±1.00 milli-seconds @ 10-second duration, ±2.00 milli-seconds @ 20-second duration
TIMING ACCURACY	0.05% of reading ±0.1 ms @ 1-second duration
DRY CONTACT CHANNEL PROTECTION	Fuses protect all isolated power supplies; all contact inputs are grounded until test; input channels are protected against static discharge
CONTACT DETECTION RANGE	Closed: less than 20 ohms; Open: greater than 5,000 ohms
RESISTOR DETECTION RANGE	50 – 5,000 ohms
TRIGGER INPUT VOLTAGE	Open/Close: 30 – 300V, DC or peak AC
VOLTAGE SENSING INPUT RANGE	V1: analog input; 0 – 255V, DC or peak AC; Sensitivity: ±1V; V2: voltage presence/absence detector input; 30 – 300V, DC or peak AC
BREAKER OPERATIONS	Initiate Open, Close, Open – Close, Close – Open, Open – Close – Open
BREAKER INITIATE CAPACITY	30A, 250 Vac/dc max
INITIATE CURRENT READING RANGE	One, non-contact, Hall-effect sensor, 0 – 20 amp range, dc to 5Khz
TRAVEL TRANSDUCER INPUT	1 digital travel transducer channel; Linear range: 0.0 – 60.0 in (±0.005 in.); Rotary range: 0 – 360 degrees (±0.006 degrees)
CONTACT TRAVEL POINT DIFFERENCE	Measures "slow-close" contact-point distances; results can be printed
DISPLAY	Back-lit LCD Screen (20 characters by 4 lines); viewable in bright sunlight and low-light levels
PRINTER	Built-in 4.5-inch wide thermal printer can print both graphic contact travel waveforms and tabulated test results
INTERNAL TEST RECORD STORAGE	Stores up to 100 test records and 99 breaker test plans
COMPUTER INTERFACE	RS-232C port (19,200 baud)
PC SOFTWARE	Windows® XP/Vista-based Breaker-Analysis software is included with purchase price
SAFETY	Designed to meet UL 61010A-1 and CAN/CSA C22.2 No. 1010.1-92 standards
ENVIRONMENT	Operating: -10°C to 50° C (15°F to +122° F); Storage: -30° C to 70° C (-22°F to +158° F)
HUMIDITY	Operating: -10°C to 50°C (+15°F to +122°F); Storage: -30°C to70°C (-22°F to +158°F)
ALTITUDE	90% RH @ 40˚C (104˚F) non-condensing
OPTIONS	Transportation case (available for the DigiTMR and the travel transducers)
WARRANTY	One year on parts and labor

Note: The above specifications are valid at nominal voltage and ambient temperature of +25°C (+77°F), Specifications are subject to change without notice.

Vanguard Instruments Company
Reliability Through Instrumentation

Vanguard Instruments Company, Inc.

Vanguard Instruments Co., (VIC), was founded in 1991. Currently, our 28,000 square-foot facility houses Administration, Design & Engineering, and Manufacturing operations. From its inception, VIC's vision was, and is to develop and manufacture innovative test equipment for use in testing substation EHV circuit breakers and other electrical apparatus.

The first VIC product was a computerized circuit-breaker analyzer, which was a resounding success. It became the forerunner of an entire series of circuit-breaker test equipment. Since its beginning, VIC's product line has expanded to include microcomputer-based, precision micro-ohmmeters, single and three-phase transformer winding turns-ratio testers, winding-resistance meters, transformer tap-changing controllers, megaohm resistance meters, and a variety of other electrical utility maintenance support products.

VIC's performance-oriented products are well suited for the utility industry. They are rugged, reliable, accurate, user friendly, and most are computer controlled. Computer control, with innovative programming, provides many automated testing functions. VIC's instruments eliminate tedious and time-consuming operations, while providing fast, complex, test-result calculations. Errors are reduced and the need to memorize long sequences of procedural steps is eliminated. Every VIC instrument is competitively priced and is covered by a liberal warranty.

Vanguard products are available from:

Vanguard Instruments Company, Inc.

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