

TDR9000 CIRCUIT BREAKER TEST SYSTEM

Technical Data Sheet

Configuration

TDR9000 is available in many configurations. TDR9000 has six modules and the type and number of modules per instrument is user selectable. The following figure shows the generic layout of TDR9000 with six total modules.

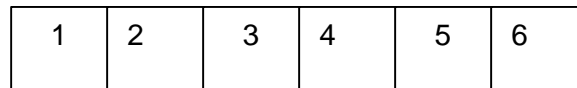


Figure 1. Generic Layout of TDR9000

Module number six is always the system module. The type of module for positions 1 to 5 is user selectable. If the user has not selected the module for a position, a blanking plate is provided. The module selection table shown below indicates the types of modules and their possible positions in the TDR9000 instrument.

Table 1. Module Selection Table

Module Name	Functions	Possible Position	Remarks
OCB	Main And Resistor Switch Contact Timing Of Dead Tank Circuit Breaker	1	Optional
OCB + Motion	Main And Resistor Switch Contact Timing Of Dead Tank Circuit Breaker With 3 Or 6 Contact Motion Recording Channels	1	Optional, Specify Requirements For 3 Or 6 Motion Recording Channels
Motion	3 Or 6 Contact Motion Recording Channels	1	Optional, Specify Requirements For 3 Or 6 Motion Recording Channels
EHV	Main And Resistor Switch Contact Timing Of Live Tank Circuit Breakers. 2 Breaks Per Phase Can Be Measured With This Module.	2,3,4,5	Optional, Total Of 6 Breaks Per Modules Can Be Measured. Up to 4 Modules per configuration dependent upon the number of other Module Types
Event Module	3 Analog And 3 Auxiliary Contact Channels (3A+3X)	1,2,3,4,5	Optional, Specify The Number Of Channels. Up to 5 Modules per configuration dependent upon the number of other Module Types
System	Communication Interface To PC, Power In, and Safety Switch. Trip Close, Trigger In/Trigger Out Functions.	6	Mandatory Optional

TDR9000 can be delivered with only the currently required modules, and can then be upgraded at a future date to accommodate the changing needs of the user.

The following figures indicate some of the valid combinations of the TDR9000 instrument.

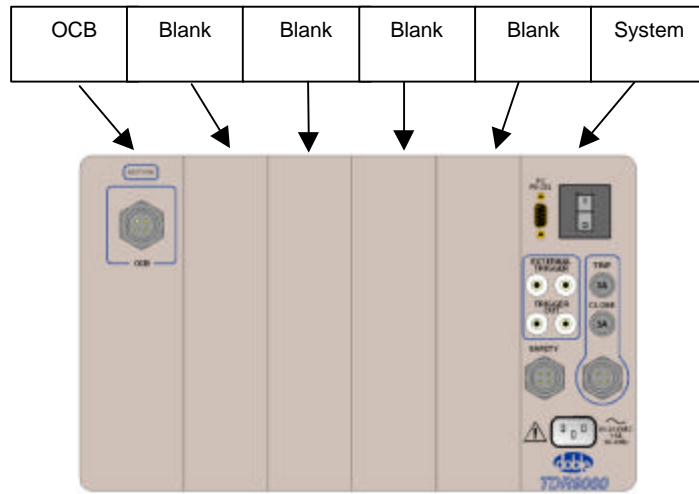


Figure 2. Minimum Configuration for Circuit Breakers

The configuration shown in Figure 2 is the minimum configuration for testing Oil Circuit Breakers.

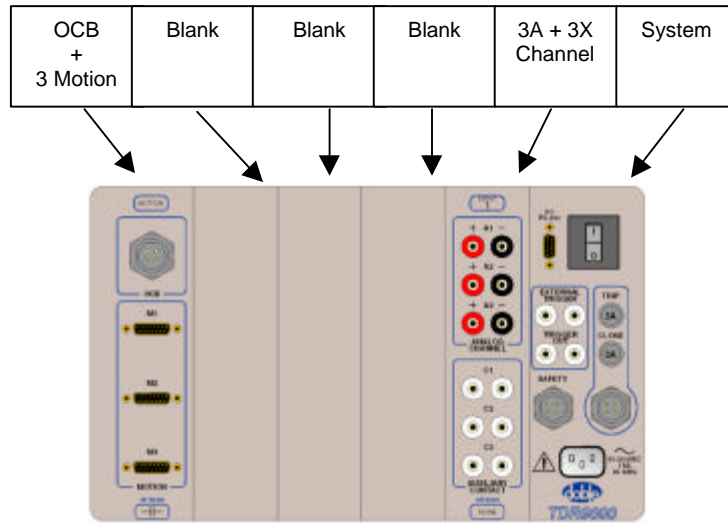


Figure 3. Minimum Configuration for Oil Circuit Breakers adding three Motion Channels, three Analog Channels and three Auxiliary Contact Channels

The configuration shown in Figure 3 is the configuration for testing Oil Circuit Breakers with three Motion Recording Channels and with three Analog and three Auxiliary Contact Channels.

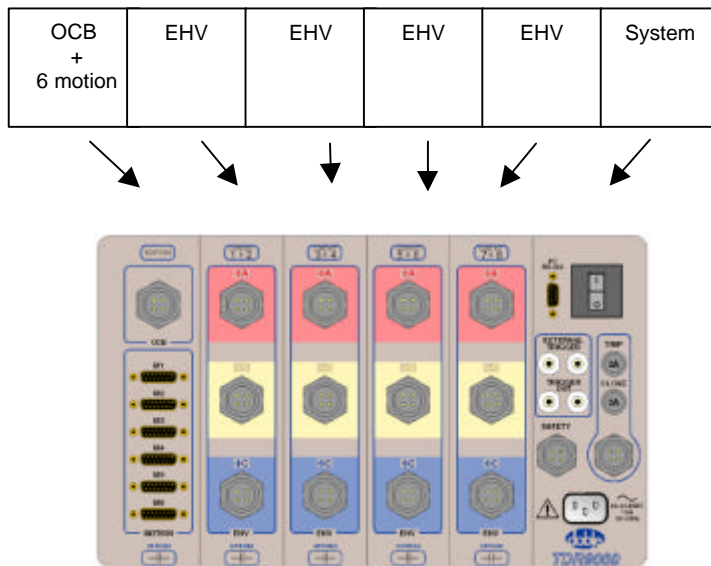


Figure 4. OCB or EHV Live Tank Breaker Configuration

The above configuration allows testing of Oil Circuit Breakers (one break per phase) or EHV live tank breakers, measuring two breaks per phase for each EHV module. Four modules of EHV are used to provide testing of eight breaks per phase for 24 total breaks. Pre-insertion resistor value measurement is optional.

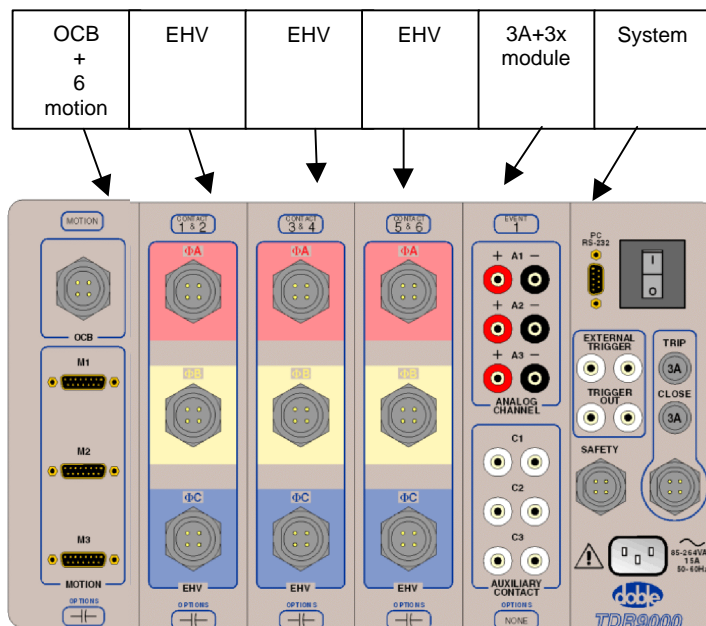


Figure 5. OCB or EHV Breakers

The above configuration, measures two breaks per phase per EHV module. Three modules are used to provide testing of six breaks per phase for 18 total breaks. Three Analog and three Auxiliary Contact Channel modules provide recording of Analog and Auxiliary Channels.

The technical specification of each of the module is detailed in the following pages.

OCB Module

This module measures the timing of EHV operation during closing or opening of an Oil Circuit Breaker. This module also measures the value of pre-insertion resistors, if the resistance value option is present.

Close And Open Timing Resolution:	100 microseconds
Close And Open Timing Accuracy:	± 100 microseconds
Minimum Contact Bounce Measurement:	60 microseconds
Pre-Insertion Resistor Value Range:	10-400 Ohms or 300 - 7000 Ohms
Resistor Value Measurement Accuracy:	± 10 % of measurement

Motion Module

This module records the motion of the Circuit Breaker contacts through a Doble Digital Rotary or Linear Transducer. The input connection for the digital transducer is through a 15-pin "D" connector.

Number Of Motion Recording Channels:	3 or 6
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Table 2. Motion Transducer Specification

	Linear Motion	Rotary Motion
Range	0.0 to 40.0"	0.0 to 2880.0 deg
Accuracy	+/-0.1% of measured value +/-0.1" max error	+/-0.1% of measured value +/-0.1 deg max error
Measurement Resolution	0.00125"	0.09 deg
Display Resolution	0.002"	0.1 deg
Velocity	50 ft/sec max	120 rev/sec max
Acceleration	1200g for 50 µSec max	30 x 10 ⁶ deg/sec ² max

EHV Module

This module measures timing of the EHV operation during closing or opening of Circuit Breaker. It measures two breaks per phase for three-phases of the breaker. This module also measures the value of pre-insertion resistors, if present. if the resistance value option is present.

Number of Breaks Per Phase:	2
Number of Phases:	3
Close and Open Timing Resolution:	100 microseconds
Close and Open Timing Accuracy:	± 100 microseconds
Minimum Contact Bounce Measurement:	60 microseconds Minimum
Pre-Insertion Resistor Value Range:	10-300 Ohms Or 200 - 500 Ohms
Resistor Value Measurement Accuracy:	± 10 % of measurement

Event Module

Number of Analog Channels:	3
Voltage Measurement Range:	± 300 Volts ac/dc Peak
Isolation Voltage to Ground:	300 V Volts
Analog Signal Bandwidth:	dc to 5 kHz
Accuracy:	± 1 % of full scale
Number of Auxiliary Contact Channels:	3
Sense Mode:	Voltage Sense/Contact Sense
Contact Sense Mode Test Voltage:	27 Volts dc
Voltage Sense Mode Input:	0 - 300 Vdc

System Module

The System Module is always resident in position six of the TR9000. It provides the communication interface to the PC, along with the input power, the Trip/Close Function, the Trigger-in/Trigger-out Function, the safety switch and the fuses.

At a minimum, select one of these optional Functions:

Trip Close Function

Optional

	Trip	Close
Peak Voltage:	300	300 Vdc
Maximum Current Non-Repetitive:	100	20 (A dc, Pulse)
Maximum Turn On Time:	10	10 (uSec)
Maximum Turn Off Time:	10	10 (uSec)

Trigger-in Function

Optional

Sense Mode:	Voltage Sense/Contact Sense
Contact Sense Mode Test Voltage:	27 Volts
Voltage Sense Mode Input:	0-600 Vdc

Trip/Close Test

The following tests can be carried out using PC and TRX Field software system

- Trip
- Close
- Trip Free - Standing
- Trip Free - Delay
- Trip Free - Contact 1 Make
- Reclose - Standing
- Reclose - Delay
- O-C-O Standing
- O-C-O Delay
- O-C-O Contact 1 Make

TDR9000 supports the following Signal Parameters:

Trip/Close Command

Pulse Width: 8.0 to 1600 mSec / 0.5 to 96 cycles
Resolution: 0.1 mSec / 0.1 cycle
Trip Command Current Range: 2/5/20/100 A
Close Command Current Range: 0.2/1/5/20 A.

Delay

Duration: 0 to 1600 mSec/ 0 to 96 cycles
Resolution: 0.1 mSec / 0.1 cycle

Recording Length

Circuit Breaker: 1.6 Seconds

Environmental

Storage Temperature Range -25°C to +70°C
Operating Temperature Range 0°C to +50°C
Storage Humidity 95%, non-condensing
Transport Shock High impact, molded, flame retardant
ABS - meets National Safe Transit Association testing specification No. 1A for immunity to severe shock and vibration.

Electro Static Discharge: IEC 1000-4-2 Level 4
(formerly IEC 801-2)

Physical

Maximum Weight: 30 lbs.(13.6 kg)
Dimensions: 10.0"H x 16.0" W x 15.5" D
(25.4cm x 40.6cm x 39.4cm)
Supply Voltage: 85-264 VAC 50/60 Hz

The main power cable, a safety ground cable, and a safety switch are supplied with the TDR9000.

Note: All specifications are subject to change without notice.

For More Information Contact:

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