WHAT ARE THE EXISTING METHODS TO TEST OLTCs?

ZENSOL TESTS

DIAGNOSTIC METHOD	OLTC TYPE	PROBLEMS	Linkage/Gears	Timing/Sequence	Control/Relays	Motor	Brake	Lubrication	Contacts alignment	Arcing	Overheating/Coking	Contact wear	Transition
VIBRO-ACCOUSTIC	Vacuum		G	G	E	G	E	E	G				
	Reactor		G	E		G	E		G	E	L	L	
	Resistor		G	E		G	E		G	E	L	L	
MOTOR	All		G	E		G	E		G	E	L	L	
DYNAMIC RESISTANCE	All		G	E		G	E		G	E	L	L	
DISOLVED GAS ANALYSIS	Vacuum		G	E		G	E		G	E	L	L	
	Reactor		G	E		G	E		G	E	L	L	
	Resistor		G	E		G	E		G	E	L	L	
IR THERMOGRAPHY	In-Tank		G	E		G	E		G	E	L	L	
	Compartment		G	E		G	E		G	E	L	L	

L-Low
M-Moderate
G-Good
E-Excellent

Widest detection spectrum

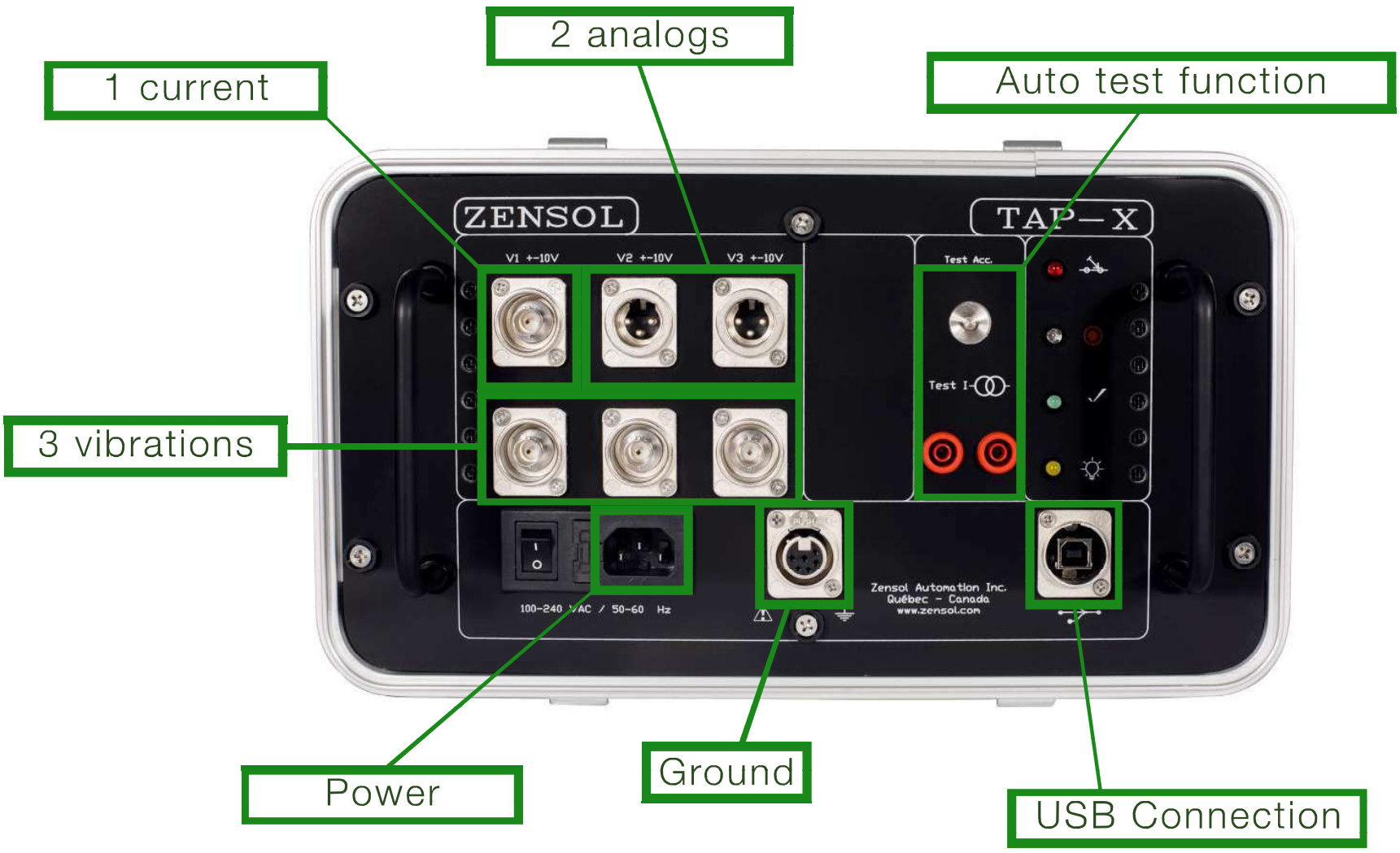
TAP-4

TAP-4-PLUS

Table from CIGRÉ A2.34
Vibro-accoustic monitoring also recommended by IEEE.PC57.143

WHAT IS THE TAP-4-PLUS?

The TAP-4-PLUS is the newest instrument by Zensol for OLTC testing. It has 2 more analog inputs than the TAP-4. The TAP-4-PLUS with TAP-DRM accessory can perform dynamic resistance and vibration recordings at the same time. Doing so will allow you to easily understand the vibration impacts.



CHARACTERISTICS COMPARISON: TAP-4, TAP-4-PLUS, OTM-X

	TAP-4	TAP-4-PLUS	OTM-X
Sampling frequency	100 kHz	100 kHz	100 kHz and less
Sampling time microseconds (µs)	10 µs	10 µs	10 µs and more
Analog inputs (-10V to +10V)	1	3	3
Accelerometer inputs	3	3	3
External Trigger	YES	YES	YES
Dynamic Resistance capability (DRM)	NO	YES	YES
Standalone	NO	NO	YES

Very precise measurements (100kHz) allow the very fast sampling time (10 µs) required for fine analysis of the vibrations.

TAP-4-PLUS

IS A TAP-4 WITH 2 ADDITIONAL ANALOG INPUTS

We added 2analog inputs to give the capacity to the TAP-4 to do DRM (Dynamic resistance measurement) test. By combining DRM and Vibro we get the best of each method.

VIBRO-ACOUSTIC WHY?

TAP-4-PLUS

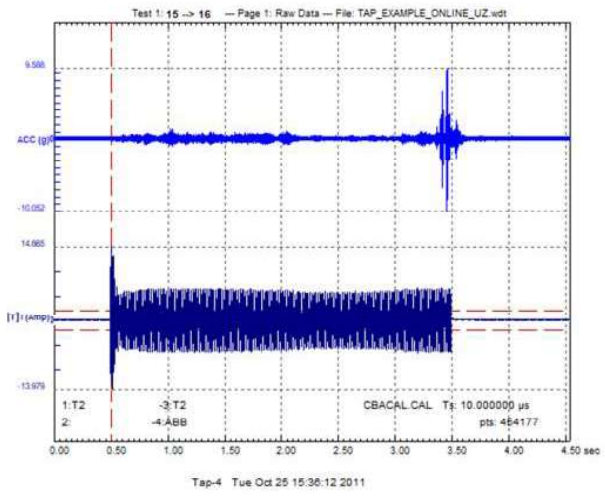
OTM-X

TAP-4

Accelerometer
(10g and 50g)

Mounting base

· Non-intrusive
· Identify problems that classical tests cannot detect
·On-line/Off-line
·Adaptable to all OLTC types



DYNAMIC RESISTANCE
DRM

This accessory used with TAP-4-PLUS allows you to do DRM testing.
Easy correlation between vibro-acoustic, DRM and motor current

MR OLTC

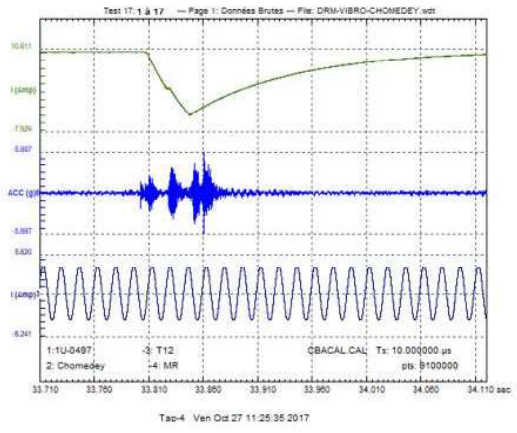
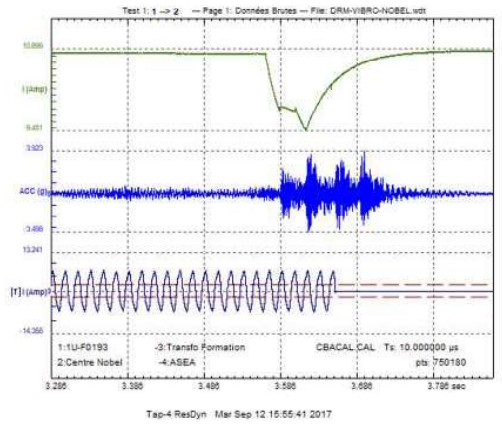


ABB OLTC

DRM →

VIBRO →

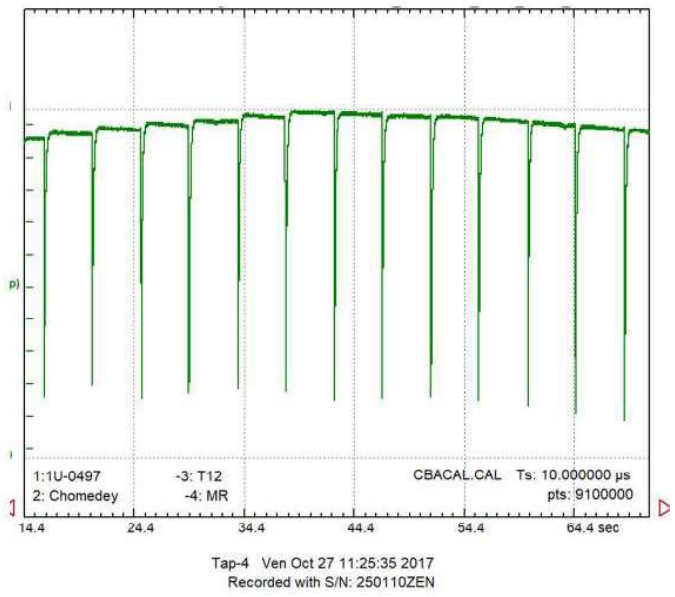
MOTOR CURRENT →



DYNAMIC RESISTANCE DRM WHY?

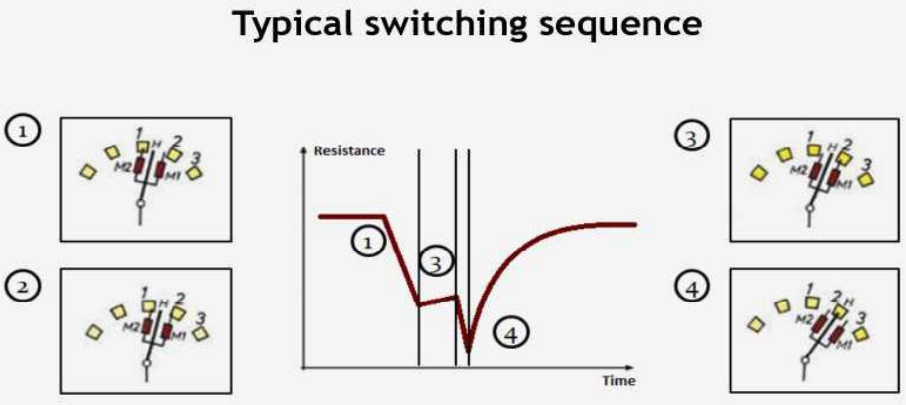
Malfunctions detected by DRM

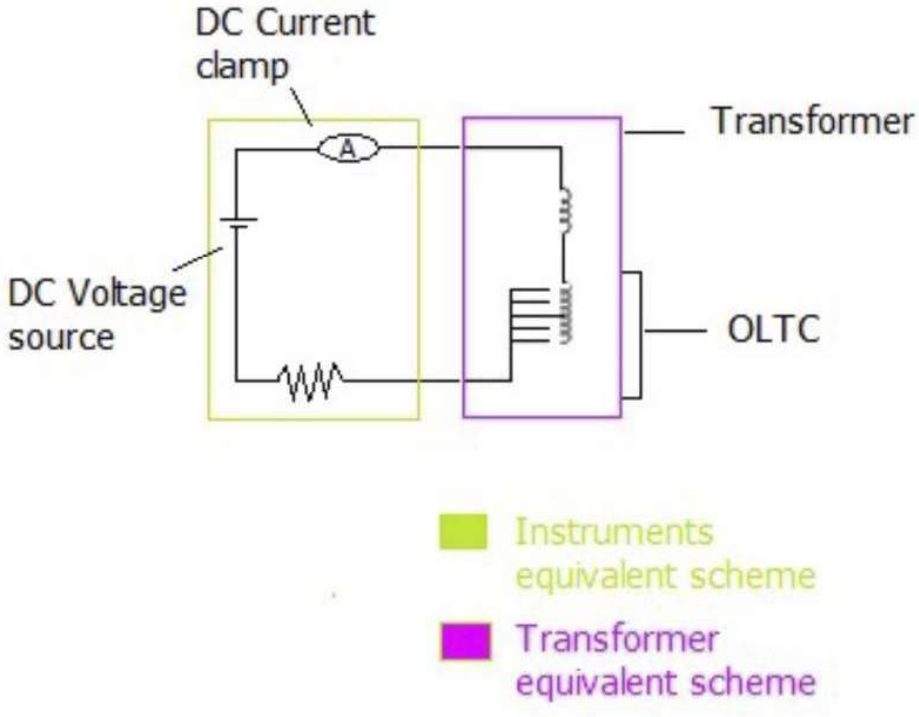
According to CIGRE A2.34, the dynamic resistance measurements or DRM (OFFLINE test) offers diagnostics for several diverter or selector switch malfunctions such as: contact problems, broken springs, broken transition resistors, poor contact pressure, inadequate transition time, momentary open circuit, and synchronism motion issues.



Zensol's DRM principle

Tap windings are powered with a DC voltage source. The current fluctuations are recorded during the switching process. The schematic below shows the principle of the dynamic resistance measurement.





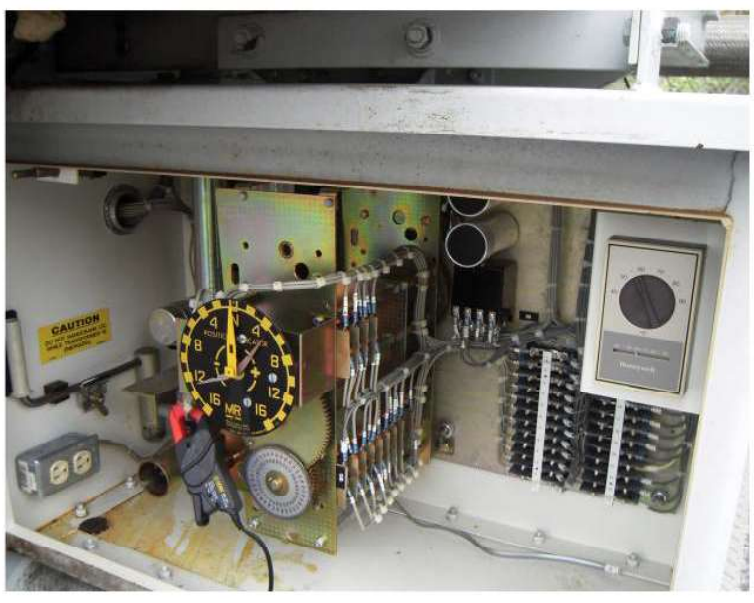
Test set up

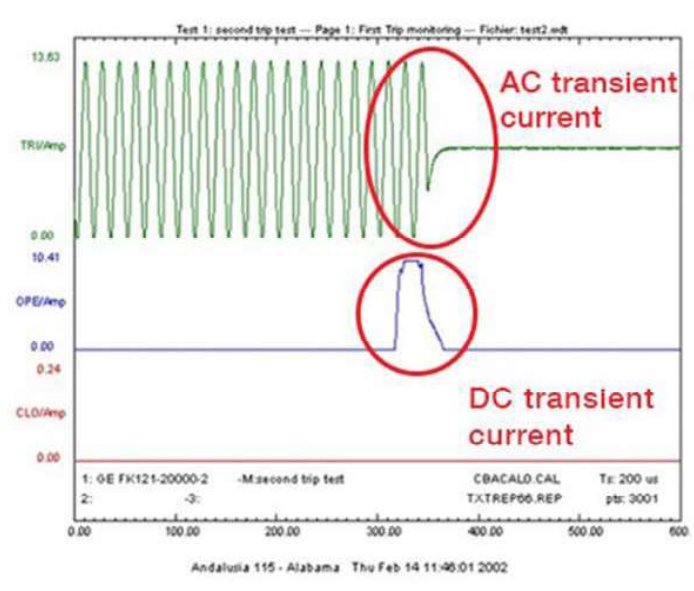
CURRENT TRANSDUCER
AC or AC/DC CLAMP

AC CLAMP

AC/DC CLAMP

Starts and stops a recording during a tap transition for AC or DC motor drive





VOLTAGE TRANSDUCER
ZVS-300V

Input voltage (-300V to +300V)
Analog output (-10V to +10V)

Used to record transient signals