Diagnostic Cards
-
ABB UZ - models B, C, D, E and F

Version 0 **Rev.0**

December 17, 2009

Cette version est une version préliminaire et temporaire pour **diffusion très limitée**.
Cette version fait référence au logiciel DIAC dont le développement est arrêté par Hydro-Québec.

Le logiciel OpenZen - Zensol (issu de nos logiciels existants CbaWin, GenWin, CbvWin, etc., copyright 1992 à 2009) remplacera DIAC totalement à court terme.

Il sera donc nécessaire de réviser et de corriger cette version, en supprimant notamment toutes les références à DIAC et en les remplaçant par les références équivalentes à OpenZen.

Merci de me contacter directement pour tout commentaire (bon ou mauvais), toute nouvelle idée, ainsi que toute suggestion d'amelioration de ce document ou du logiciel OpenZen et ces documents associés, dans le but ultime de l'obtention d'un logiciel et d'une documentation claire et pratique pour vous et tous nos utilisateurs. Tous vos retours d'information seront très appréciées.
Vous remerciant par avance pour votre collaboration,

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This version is a draft and temporary version for **limited distribution ONLY**.
This version refers to DIAC software whose development by Hydro-Québec is stopped.

The OpenZen – Zensol software (based on our existing softwares CbaWin, GenWin, CbvWin, etc., copyright 1992-2009) will completely replace DIAC in the short term.

This version needs to be reviewed and corrected by Tap-Changer specialists. Among other things, all references to DIAC software will be replaced by their equivalents in the OpenZen Software.

Text in red requires special attention and will be corrected.
If you want the original version of this text, please download the French document.

Please do not hesitate to contact me directly for any comment (good or bad), any new idea, or any suggestion regarding the improvement of this document or the improvement of the OpenZen software and any of its related documents, in order to ultimately obtain clear and useful documentations for you and all of our users. All of your feedbacks will be appreciated.

Thank you for your cooperation.

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Diagnostic Cards
-
ABB UZ - models B, C, D, E and F

The following diagnostic cards focus on the symptoms of the main problems of tap changers (OLTP) of the ABB UZ family, models B, C, D, E, and F, as seen by their acoustic signatures. It is important to note that several of the anomalies illustrated here do not show up in the tabular report of the DIAC software.

The cards are prepared as a support for the visual analysis of the signature; they are complementary tools to the report available in DIAC. Each card shows the anomaly as seen on the signature, the malfunction of the OLTP associated with this trace, and the necessary adjustment for its compensation.

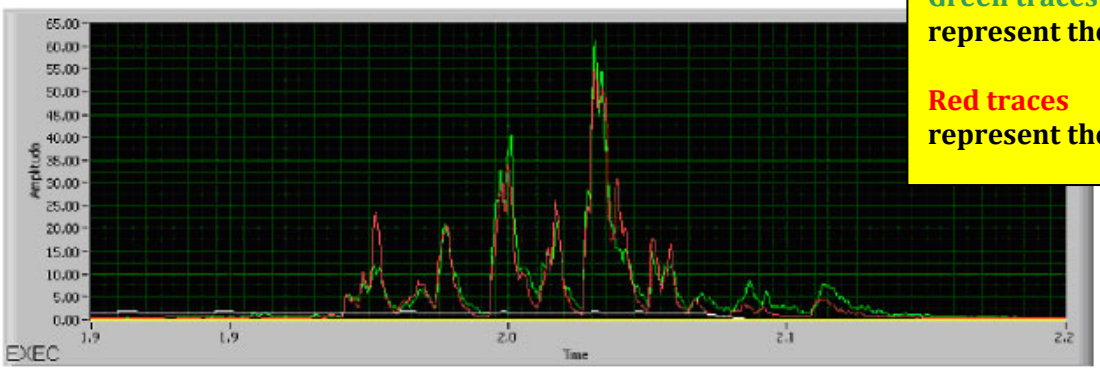
Table of Contents

Card 1: Wear of contacts

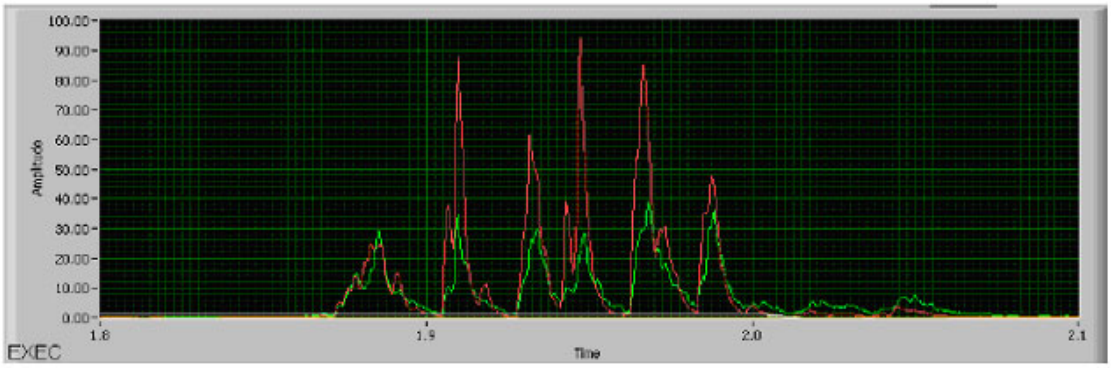
Models :
All

Green traces represent the LF.

Red traces represent the HF.



a) New contacts (October 21, 2002)

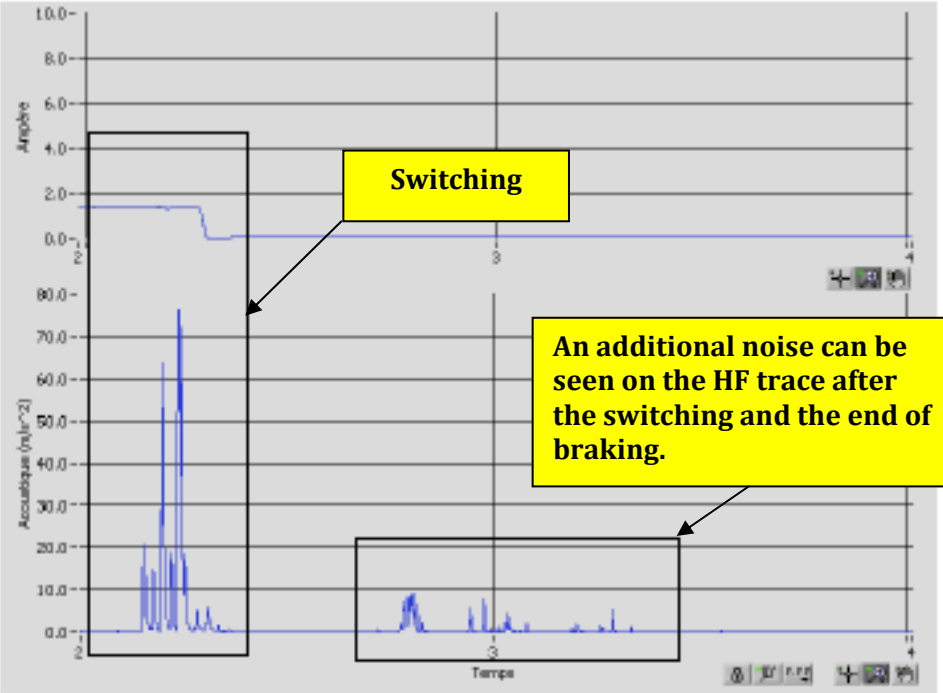


b) Worn contacts (October 1, 2002)

Wear of the switch contacts appears on the acoustic signatures by a gap between the amplitudes of the traces of HF and LF.

Card 2: Faulty brakes

Models :
All



The braking system of the ABB UZ is mechanical, by pressure pads on the inertial flywheel. These systems have experienced failures in the past, including the presence of grease on the surface, which caused malfunctions. In this case, the rotating mechanism continues its momentum and triggers the cascading of operations beyond the position required to stop at one of the extreme positions (1 or 17).

The noise measured on the figure above is caused by the impact of moving contacts on adjacent fixed positions. At this stage, the tap changer takes the position sought by the force of the springs. If the brake problem worsens, the movement keeps engaging and beyond a point of no return, a command forces automatically the next operation.

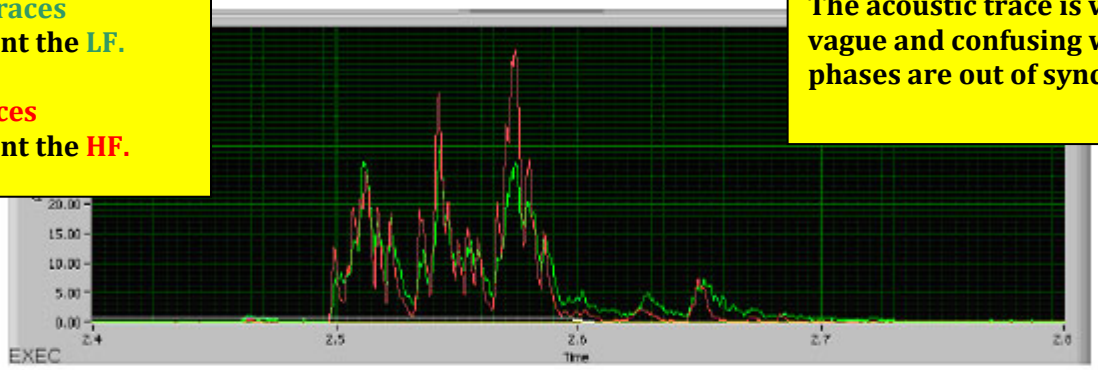
Card 3: Desynchronization between phases

Models :
All

Green traces represent the LF.

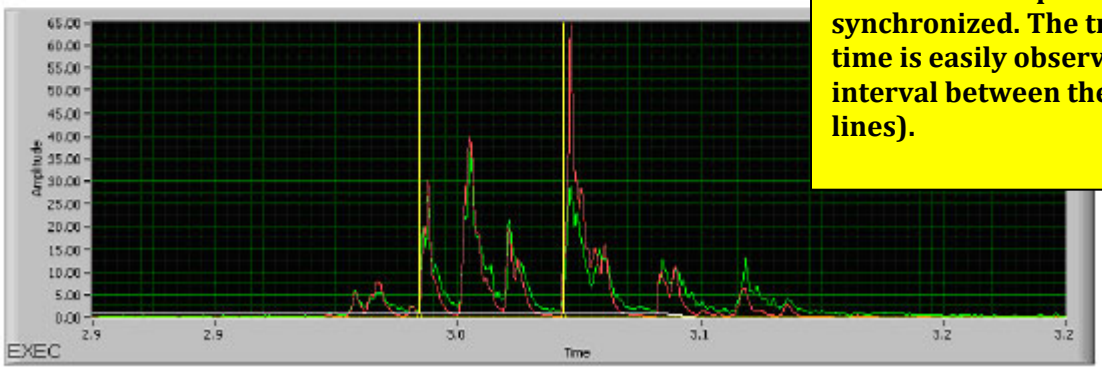
Red traces represent the HF.

The acoustic trace is very vague and confusing when the phases are out of sync.

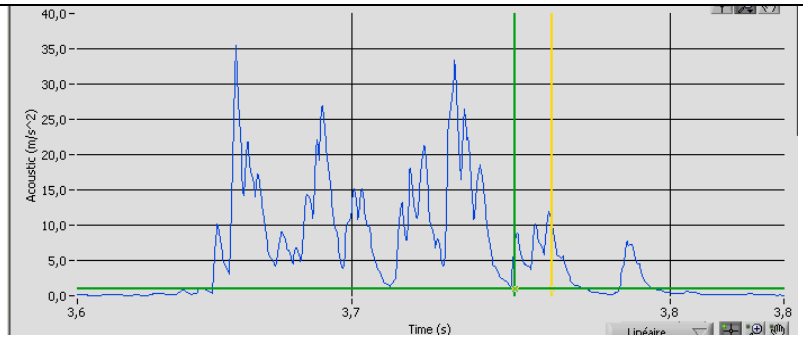


a) Desynchronization in the high frequencies

The acoustic trace is very clear when the phases are synchronized. The transition time is easily observed (the interval between the yellow lines).



b) Perfect synchronization in the lower frequencies

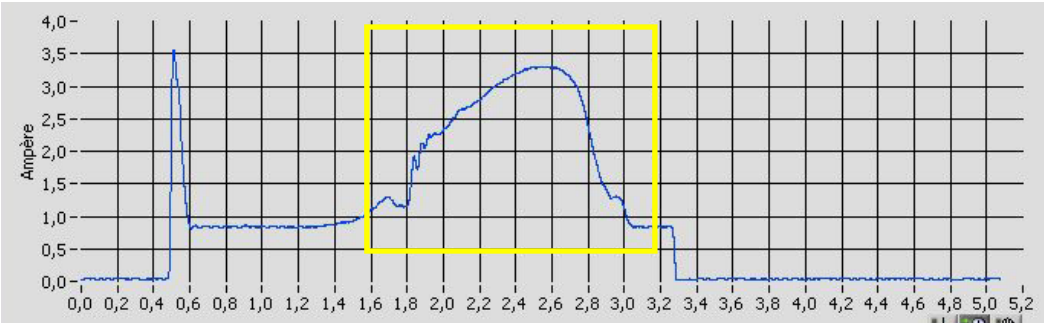


The delay between the three phases can sometimes be measured (11 ms in this example)

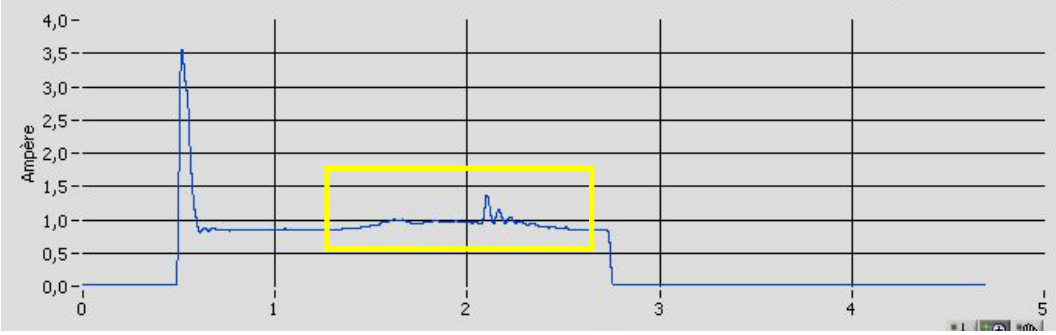
When the three mechanisms are out of sync, the acoustic trace becomes very confusing and it becomes difficult to distinguish between the switching elements and the transition time. The desynchronization may be due to a poor adjustment of the assembly shaft or due to a slack that is developed in the assembly. This type of degradation is harmful in rare cases (broken bolts in the drive shaft). Even if the manufacturer does not provide the criteria, by experience is assessed that the maximum time between phases of a well adjusted mechanism should not be as noticeable as the example above, we suggest a maximum of 5 ms.

Card 4: Lack of lubrication

Models :
UZB and UZC



Signature before lubrication



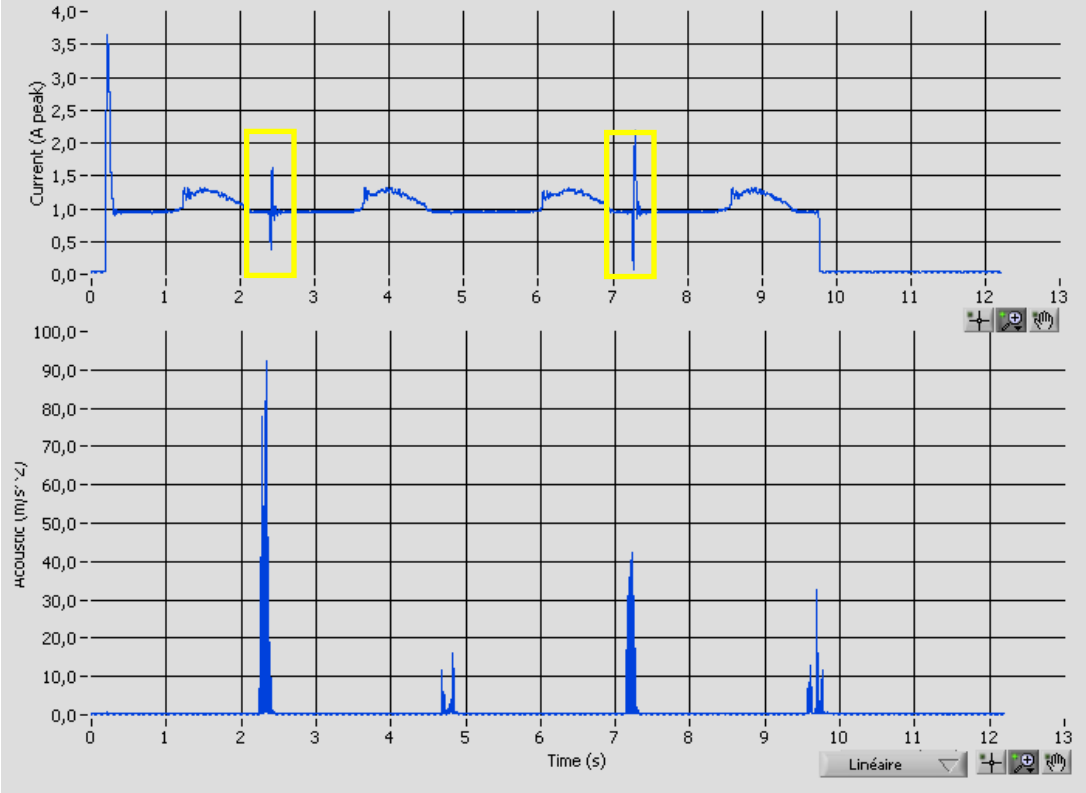
Signature after lubrication - It may be noted that high currents are substantially reduced and the operating time are slightly decreased

Damage at the cross may result from a lack of lubrication

The trace of the motor current shows obvious fluctuations towards the end of the operation. There is a lack of lubrication of the drive mechanism. The lack of lubrication of the drive mechanism has a significant effect on the stress of the motor and sometimes causes a refusal to operate followed by the start of the motor protection.

Card 5: Faulty control relay

Models :
All



It is to note that sometimes with multiple operations there are important current fluctuations. These phenomena are due to a malfunction of the control relay. Usually a minor problem that can be tuned either by adjusting or replacing the defective relay.