

JOB AID

OpenZen - TAP

March 7th, 2013

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Toolbar Philosophy

8				40	• 🔳 👀 🗶 🗱	# 5	
	Files manipulation		Test plan configuration		In the field executions		Data analysis tools
Ś	Assistant mode		Test configuration		Check setup	#	Previous graphic page
6	Open plan	i	Informations	+	Previous Test	*	Next graphic page
**	Save raw data only	\rightarrow	Analog inputs	•	Next Test		Examine time/amplitude
	Save Hydro-Quebec envelopes only	Σ	Processing		Connections / information		Expand timing scale
5	Export			8-8	Test link	11011	Vertical scale
4	Print displayed report			×	Execute test	ア	Graphic report design
					Execute batch test	ADV.	Advanced graphic report design
						×	Export to excel

TAP-4 CONFIGURATION



- FILE MANIPULATION -

JOB AID N# 1

LOADING A TEST PLAN (3 methods)



Method 3:

😪 Ze	ensol Automation Inc OpenZen		
File	Plan config Reports Tests Bate	ch Diagi	
	Assistant Mode	1	
	New plan	-	
	Open plan		File> Open plan
	Save plan as		
	Open data Save data as Save Hydro-Québec envelopes as		All the files (test plans and test data) are contained in the « example » folder of OpenZen- TAP.
	Print graphic report Print tabular report Print notes		Note: Our test plans always have the same extension: .wcf . This extension is automatically added.
	Import	+	
	Export	+	
	Preferences	+	
	Exit		

- FILE MANIPULATION -

JOB AID N# 2

TEST PLAN (.WCF)

With **OPENZEN-TAP**, the extension of a **TEST PLAN** is **.WCF** (example: zensol<u>.wcf</u>). A test plan is the configuration of a series of tests and is empty of data (as shown in the picture). There is no signal recorded inside. The configuration of a test plan is defined through the green buttons.



- FILE MANIPULATION -

JOB AID N# 3

DATA FILE/RAW DATA (.WDT)

With **OPENZEN-TAP**, the extension of a **DATA FILE** is **.WDT** (example: zensol<u>.wdt</u>). A data file (or RAW DATA) is the results of tests that have been performed with the TAP-4 with a specific test plan that the user chose.

In the following picture, you can see raw data recorded with the TAP-4:



Tap-4 Wed Jan 25 12:16:13 2012

- FILE MANIPULATION -

JOB AID N# 4

ENVELOPE FILE (_ENV.WDT)

With **OPENZEN-TAP**, the extension of a **ENVELOPE FILE** is **_ENV.WDT** (example: zensol<u>_env.wdt</u>). An envelope file is the results of the extraction of the envelopes from the RAW DATA.

In the following picture, you can see envelopes extracted from RAW DATA:



- FILE MANIPULATION -



- FILE MANIPULATION -

JOB AID N# 6

SAVING ALL YOUR TESTS						
	🥋 Z	ensol Automatic	on Inc O	penZen		
	File	Plan config	Reports	Tests	Batch	Diag
		Assistant Mode	2			
		New plan				
To save all your raw data, click on this icon		Open plan	-			F
The extension for raw data is " wdt"		Save plan as				
The extension for faw data is .wut.		Open data	-			
Vou can also save the data by going through the many $File > Save data as$	-	Save data as				
Tou can also save the data by going through the menu File> Save data as		Save Hydro-Qu	iébec env	elopes a:	5	
Note: Save your data after each test (Keen the same filename). This way, you will not lose all		Print graphic re	eport			
Note. Save your data after each test (Keep the same menane). This way, you will not lose an		Print tabular re	port			
your data in case of problem.		Print notes				
		Import				
		Export				-
11		Preferences				•
IN		Exit				
To save the envelopes, click on this icon into the menu						

The envelopes always have the extension "_env.wdt".

Note: From raw data files, you can also extract the test plan by going into the menu:

File, then Save plan as...-

- FILE MANIPULATION -

JOB AID N# 7

EXPORT





You can do an export of the graphic report, the test data and the tabular report in different type file like BMP, TXT, HTM, XLS.

- FILE MANIPULATION -

JOB AID N# 8

PRINTING GRAPHICAL



When you want to print anything that is presented on the screen, (a graphical report or a tabular report) you can do it with this

	4
icon.	

You can also print at anytime by using the menu:

	🇞 Ze	ensol Automat	ion Inc C	OpenZei	n	
	File	Plan config	Reports	Tests	Batch	Diagi
		Assistant Mod	le			
		New plan				
		Open plan				ł
		Save plan as				
		Open data				
\mathbf{i}		Save data as				
		Save Hydro-Q	uébec env	elopes/	as	
	X	Print graphic	report			
		Print tabular r	eport			
		Print notes				
		Import				- +
		Export				+
		Preferences				+
		Exit				

JOB AID N# 9

TEST PLAN GENERATOR



To generate a test plan, click on the Assistant Mode button, then select the option Test plan generator.

ſ	OpenZen	
	Welcome to OpenZen! What do you want to do?	
	C Load an existing test plan.	
+	C Load and analyse test data.	
	? Continue	ŀ

Fill the test plan generator window with all the required information (*) and click OK.

The test plan will be generated automatically depending on the number of taps, if the tests are performed OFFLINE or ONLINE and the start position.

OLTC Informations		
) *ID Number:) Name of the location:) Equipment number:) OLTC Manufacturer:) OLTC Type:	 Taps names (€ 1, 2, 3, 4 (C 1 → 2, 2 → 3, 3 → 4, 	
) *Number of taps: 0		
Tests Informations		
9) Operation counter: 0	These tests are done:	
10) *Start position:	After inspection	After a breakdown
11) Oil temperature (°C): 0	Channen ander	
12) Date of the test: 06-02-2012_14h06	Lubrication	Mechanical adjustments
*Test Type © Online	Contacts changes	
C Offline (All Taps)	Notes Details	
C Offline (Only some Taps) 14) Nb of Taps: 0		A T
Acquisition Type	Connections	
 Acquisition with TRIG Start: 2.0) A End: 0.5 A	operator_e.wcf
C Acquisition in secs:	ACC2	ACC3

JOB AID N# 10

FIND THE TRIG VALUES

Load the test plan "**DEFAULT_CHECK_OLTC.wcf**" and run the test 1.

While the test 1 is running (10s tests), change a tap position. You should obtain a current signature as follow:

	M Identification
	CLTC Informations
	1) *ID Number: Taps names 2) Location Image: Comparison of the second s
	5) OLTC Type:
	Tests Informations 9) Operation counter: 0 9) Operation counter: 0 10) "Start position: Image: Casual test
CURRENT SIGNATURE	11) Oil temperature (*C): 0 12) Date of the test: 07-07-2011_15h33
	C Offine (All Taps) Contacts changes Contacts Contacts
s manipulation is useful to choose the start (\mathbf{X}) and end TRIG values.	C Offline (Only some Taps) 14) Nb of Taps: 0
er values lower than \mathbf{X} and \mathbf{Y} in the test plan generator	V V V
ndow.	Acquisition in secs: O
Acquisition Type	OK
Acquisition with TRIG Start: 2.0 A End: 0.5 A	Click OK and begin you

JOB AID N# 11 (1/2)

ANALOG INPUTS



CURRENT

In the **"Properties"** of input #1, click on the **«Cal»** button and then enter the desired values into the textboxes. For the AC/DC current clamp, set on the 20A range and enter 100mV for 1 amp.

nalog inputs (transducer	rs) - Channels 1-4	age 1 Enveloper - File 2011		Analog Input Prop.: Channel 1
Ch. 1 I ✓ Ch. 2 ACC ✓ Ch. 3 A3 ✓ Ch. 4 A4 ✓	Prop. Prop. Prop.	anel		Signal identification Symbol I Transducer properties Min. (-10 V): Max. (+10 V): Unit: -100.2180 100.2320 Cal Amp Invert Identification Capteur de courant interne (fermeture) Signal appearance
	Canal 1	libration information	OK Cancel	Autoampin: V Prop. Space: 12 Relative: Filtering: 0 Signal color Color code: 000080 ? 0k
1: 2: 0.00	-3: -4: 2.00	cer sensitivity ducer identification eur de courant interne (fermeture) Dint 1 D000000 100.00000 1.000000 	min(c) , viter mv Amp Direct reading in volts	DOOD US EXAMPLE TO MONTH AND ADDRESS AC CURRENT PROP OUTPUT: 20 A Range : 100 mV/A AC

JOB AID N# 11 (2/2)

ANALOG INPUTS



ACCELEROMETERS

You can change the name of the signal (A1) and the sensitivity of each accelerometer using the calibration card shown below.



JOB AID N# 12

PROCESSING



In the window Processing, you define calculus file and excel report that you want to use.

Traitements	x
Répertoire de Travail C:\Users\Sandrine\Desktop\Zensol software\O	penZ
Sélection Fichiers Traitement Fichier Calcul:	70
Fichier Rapport Tabulaire:	_
TAP-Report_English.xls	
Variables <u>M</u> in./Max. Conc. rapp. <u>g</u> raph	iques
Variables de calcul Signaux <u>T</u> raité	s
? <u>Ok</u> <u>Ann</u>	uler

You can also :

-create personalized variables for calculus.

-have access to the Graphic Report Design window.

-activate virtual signals.

JOB AID N# 13

CHECK SETUP



In this Check Setup window, once the "Verification" button is pressed, the software connects to your instrument, reads the calibration data and applies it to your test plan.

Check Setup	Check Setup	
Instrument Identification	Instrument Identification	ZENSOL AUTOMATION INC tel:(514) 333-3488 zensol@zensol.com www.zensol.com
Verification There are no serial number in this file Here are the calibration values of the active inputs: Ch 1 Min=-10.0000 Max=10.0000 Ch 2 Min=-5.0000 Max=5.0000 Ch 3 Min=-5.0000 Max=5.0000 Ch 4 Min=-5.0000 Max=5.0000	Verification TAP-4 S/N: 230908ZEN Ch 1 Min=-9.9976 Max=9.9963 Ch 2 Min=-5.0305 Max=5.0199 Ch 3 Min=-5.0445 Max=5.0088 Ch 4 Min=-5.0458 Max=4.9905 H8Slave 19 0A, 15/06/09 PCBBoard 51 Ver.01, 26/06/09 FPGA-Ver.01 Rev.0A, 09/09/09	S/N 230908ZEN MODEL TAP-4 VOLTS AC-DC AMPS HERTZ 120 AC 8 50-60 MADE IN CANADA
Transducers Calibration	Transducers Calibration	
Current transducers calibration: Current: Min=0.0 mv/A Max=0.0 mv/A Accelerometer 1: Min=0.0 mv/g Max=0.0 mv/g Accelerometer 2: Min=0.0 mv/g Max=0.0 mv/g Accelerometer 3: Min=0.0 mv/g Max=0.0 mv/g	Current transducers calibration: Current: Min=0.0 mv/A Max=100.0 mv/A Accelerometer 1: Min=0.0 mv/g Max=96.5 mv/g Accelerometer 2: Min=0.0 mv/g Max=0.0 mv/g Accelerometer 3: Min=0.0 mv/g Max=0.0 mv/g	
OK Annuler	OK Annuler	

JOB AID N# 14

VERIFYING THE COMMUNICATION



To make sure that your ZENSOL unit is properly connected to your computer, please click on the above icon.

It will test the USB link. If everything is good, a message will display the success of the operation.



JOB AID N# 15

CONNECTIONS AND INFORMATION





JOB AID N# 16

PERFORMING A TEST



• To start the current test, click on this button:

To change tests, click on the **blue arrows** (not to be confused with the red arrows)

• To launch the tests, you can also use the Quick Batch Test . It will execute the tests automatically.

A window will open: choose in this list the first test to begin with:

B	Batch Wizard										
Γ											
	Delay between the tests (in seconds):										
	Start with the test:										
	Save automatically after each : 5 tests										
	Save data in file : Browse										
	OK Cancel										

All the other tests will then be done one after the other. For example if you select to start at test #3, the following tests will be 4, 5, 1 and 2.



Note: You can also launch the quick batch from the main menu through: **Batch** \rightarrow **QuickBatch**

JOB AID N# 17

GRAPHIC NAVIGATION TOOLS



You can browse your results on 10 different graphical pages. The **red** arrows let you navigate through all these pages. They can be configured using this button: It means that you can show any channels you want on your page.

Graphics Report Designer
- Signals
Show All Signals Clear All Signals
Samples Superposition
0 to 10000000 Max Enable:
Navigation ? Ok Cancel

JOB AID N# 18

RAW DATA VS ENVELOPES



RAW DATA Signals:

- 1: Current input
- 2: Accelerometer 1 input
- 3: Accelerometer 2 input
- 3: Accelerometer 2 input

ENVELOPES Signals:

- 100: Current envelope
- 101: High Frequency Accelerometer 1 envelope
- 102: Low Frequency Accelerometer 1 envelope
- 103: High Frequency Accelerometer 2 envelope
- 104: Low Frequency Accelerometer 2 envelope
- 105: High Frequency Accelerometer 3 envelope
- 106: Low Frequency Accelerometer 3 envelope

JOB AID N# 19 (1/2)

VERTICAL CURSOR (EXAMINE) TOOL



JOB AID N# 19 (2/2)

VERTICAL CURSOR (EXAMINE) TOOL



If you click the spacebar on your keyboard, you will have a second vertical cursor.



JOB AID N# 20

SCALE EXPANSION TOOL



The scaling buttons serve to **analyze** a signal. Correctly used, they can help you better interpret your results.



JOB AID N# 21

GRAPHIC REPORT DESIGN



Available signals:

- 1 Current clamp
- 2 Accelerometer 1
- **3** Accelerometer 2
- 4 Accelerometer 3
- **100** Current Envelope
- 101 HF Accelerometer 1 Envelope
- 102 BF Accelerometer 1 Envelope
- 103 HF Accelerometer 2 Envelope
- 104 BF Accelerometer 2 Envelope
- 105 HF Accelerometer 3 Envelope
- 106 BF Accelerometer 3 Envelope
- 61 Digital output (Step up)
- 62 Digital output (Step down)

Graphics Report Designer
Identification Page No. 1 Title All channels
Signals
Show All Signals Clear All Signals
Superposition
0 to 1000000 Max Enable:
Navigation Navigation Qk Cancel

JOB AID N# 22

ADVANCED GRAPHIC REPORT DESIGN



With this window, you can do superposition between signals. These signals are taken from tests that can come either from an external file, or from another test. Select the external file you want and compare the tests that will make your analysis relevant.



You can do a superposition, choose the color of the signals and

Ext st file	Color		Title:	Envelo	pes								-
Ext st file	Color												
st file		Time						_			Evel C	alar	Time
	Color	shift (ms)		Sig	Test	Ext file	Color	Time shift (ms)	Sig	Test	file C	olor	shift (ms)
		0.000		0	1			0.000	0	1			0.000
		0.000	1	0	1			0.000	0	1			0.000
		0.000	1	0	1			0.000	0	1			0.000
		0.000	1	0	1			0.000	0	1			0.000
		0.000]	0	1			0.000	0	1			0.000
		0.000]	0	1			0.000	0	1		ļ	0.000
		0.000]	0	1			0.000	0	1			0.000
	-	0.000	1	0	1			0.000	0	1		I	0.000
	-	0.000	1	0	1			0.000	0	1		ļ	0.000
	-	0.000	1	0	1			0.000	0	1			0.000
							_	Clear time shi	ifts :	Show All	Signals	Cle	ar All Signals
		P	age opt	tions —			- Ex	ternal File Selected					
to	10000	000	Su	perpositio	on:)			- 1					
			Sp	ecific Te	st:	_	IL-	Browse					Clear File
				Navigation Specific Test.									
	to	to 100000	Image: constraint of the second se	Image: constraint of the second se	Image: constraint of the second se	Image: constraint of the second se	Image: constraint of the second se	Image: constraint of the second se	Image: Coord of the second	Image: Constraint of the second se	Image: constraint of the second se	Image: construction of the second of the	Image: Construction of the second of the

Here is an example of superposition between two tests where we changed the color signals.

JOB AID N# 23

ADVANCED SIGNAL SUPERPOSITION 1



Adva	anced Gr	aphics F	Repor	t Desigi	ner	-	10074	68. ⁷ .		۶								x
Г	Identificat	ion —	,			Title	Envelo										_	
	Page No.	11				nue.	Enveid	pes										
	Signais -	Test	Ext file	Color Color	Time shift (ms)	- •	Sig	Test	Ext file	Color Color	Time shift (ms)	s 1	Sig -	Test	Ext (file (Color Color	Time shift (ms)	-
	0	1			0.000		0	1			0.000		0	1			0.000	-
	0	1	Γ		0.000		0	1			0.000		0	1			0.000	
	0	1			0.000	1	0	1			0.000	Γ	0	1			0.000	
	0	1			0.000		0	1			0.000		0	1			0.000	
	0	1	Γ		0.000		0	1			0.000		0	1			0.000	
	0	1	Γ		0.000		0	1	Γ		0.000		0	1			0.000	
	100	1	Г	-	0.000			1			0.000	Γ	0	1			0.000	
	101	1	$\overline{\mathbf{v}}$	-	1.900		0	1			0.000		0	1	Г		0.000	
	102	1	Γ	-	0.000		0	1			0.000	Γ	0				0.000	
											Clear time	shifts	Sho	ow All	Signals	С	lear All Signals	3
Ιſ	Samples -				P	age op	ions —				aernal File Selec	cted						
	0	t	0	100000	000	Su	perpositi	on:			Browse	le\Deskto	ip\∠ens	SOLSOT	tware\0	pen∠e	Clear Fi	.i_C
	Navigatio	n ———				Sp	ecific Te	st:	~			_					Joanna	
	-	•				Sper	cific Colo	ors:	~		Clear A	II Fields				Ok	Cance	el
	()					Spe	cific Colo	ors:	~		Clear A	II Fields				Ok	Cance	el

Select the signals you want to superimpose, in which test it is located, which one comes from the external file.

Then, check "superposition" and the "specific test" box at the bottom of the dialog and "specific colors" if you want to change the color.

JOB AID N# 24 (1/2)

ADVANCED SIGNAL SUPERPOSITION 2



This example uses two signals. Up to twenty signals may be compared using this tool.

- 1. Click the Advanced Report Designer button:
- 2. Enter the signals you want to compare (example 101).
- 3. Select the tests you want to compare (example 1 and 3).
- 4. Select the specific test and specific color options.
- 5. Change the color of the second signal click the colored line and select a contrasting color.
- 6. Click Select Time Shifts.
- 7. You are allowed to use the buttons highlighted in green (Examine and Scale) in the button bar to zoom in and select the time references.



- 8. Zoom in to the area of interest and use the Examine tool to select the first time reference.
- 9. You will note that the time indication at the bottom left corner of the display is highlighted in green. Click on it to open the time shift notepad window.





JOB AID N# 24 (2/2)

ADVANCED SIGNAL SUPERPOSITION 2



- 10. Enter the time shown in the box corresponding to the signal. 11. Click the Next Time button (not the OK button yet).
- 12. Repeat this for the second signal to compare. This may be done as many times as necessary to compare all the desired signals. Be sure to click the Next Time button between each time reference selection.
- 13. Click OK once you have selected all the time references.



- 14. The Advanced Graphic Report window will reappear so you can review the settings.
- 15. Select the Superposition option.
- 16. Click OK to apply the settings.

The signals are now superimposed and aligned in time.







JOB AID N# 25

EXCEL EXPORT EXAMPLE



- 1. Load the file "ABB UCBRN_env.wdt" that is located in the folder \examples\ of OpenZen-TAP.
- 2. Export the results to Excel by going into **Processing** and choose the excel file "**TAP-Report_English.xls**".
- 3. The Excel file specified in the processing window is automatically filled with results.

FICHIER EXCEL VIDE

1st page

FICHIER DE DONNÉES EXPORTÉ

A	B C	D E	F G	H I	J K L M	A	В	C D E	F G	H I	J	K L M			
2	Test S	ummary - 1	TAP-4			1 2	Test Summary - TAP-4								
3 @LR0	20	@LR4	@R4	Test time	Values lower then threshold	3 Default Test Plan for	@R0	Compteur	59189	Test time		Values lower then threshold			
4 @LR1	@R1	@LR5	@R5		Values in the average	4 Exploitation	T(# Série	@R5			Values in the average			
5 @LR2	win2	@LR6	@R6	@R8	Values higher then threshold	5 Inventaire	10-0000	Temp. Huile	30	@R8		Values higher then threshold			
6 @LR3	@R3	@LR7	@R7			6 Poste	MONTMORENCY	69 KV Type Essai	HORS_SERVIC	6					
8 Length Summary 9						8 Length Summary 9									
10 Average operation length:	#DIV/0	ms Total number of	of operations:	0		10 Average operation length:	623	38 ms Total numb	er of operations:	32					
11 Fastest operation: 12 Slowest operation:	#N/A 0	ms Operations 30	% faster then avera	age: U		11 Fastest operation:	-2 549	95 ms Operations	30% faster then ave	rage: 0					
13	inter c	ing operations so	No Slower alen ave	inge.		12 Slowest operation:	+10 11	90 ms Operations	30% slower then av	erage: 4	4				
14						14					4				
15 Current average S	mmary					15 Current average S	iummary								
17 Current Average:	#DIV/0	Amp Total number of	of operations:	0		16		· · · · · ·			4				
18 Lowest current:	#N/A 0.00	Amp Currents 30%	lower then average	e: 0		17 Current Average:	+3 1.3	0 Amp Lotal numb	er of operations: % lower then average	32					
19 Highest current	#N/A 0.00	Amp Currents 30%	higher then averag	ge: 70		19 Highest current:	+10 1.3	1 Amp Currents 30	% higher then average	ide: 0					
20						20			-						
22 Inrush Summary						21									
23						22 Inrush Summary	┘┏━━┛				l				
24 Inrush Average: 25 Lewestienusb:	#DIV/0	Amp Total number of	of operations:	. 0		24 Inrush Average:	4.5	4 Amp Total numb	er of operations:	32					
26 Highest inrush	#N/A 0.00	Amp Inrushs 30% h	igher then average.	e [.] 70		25 Lowest inrush:	+7 4.3	3 Amp Inrushs 309	6 lower then average	e: 0					
27			·			26 Highest inrush:	-16' 4.7	0 Amp Inrushs 309	6 higher then averag	je: O					
28						27					4				
29 End of operation S	ummary					20 End of operation S	umiany				-				
24 Ford of Toot summary	Tan datain 97	· · · · · · · · · · · · · · · · · · ·				30	anniary				l				
Prêt Référence circulaire : G59					Nb (non vides) :	Test summary	Tap details	·····			1				
					▼		•								
			T	1 ((1 / 447									

Exemple: "@R1" sera remplacé par "T6"

FICHIER EXCEL VIDE

FICHIER DE DONNÉES EXPORTÉ

			_	1 221																	
A	В	С	D	E	F	G H		J	K	T 🔽	А	В	С	D	E	F	G	Н	- I	J	К
1				Docult						1					Posult						
2										2					Resulta	5 - TAF -4					
3 @LR0		@R0		@LR4		@R4		Test time		3	Default Test F	lan for	@R0		Comptour		59189		Test time		
1 0101		0.04		01.05		0.05				Ĭ	Dolutin		e		Comptour						
4 @LR1		@R1		@LK5		@K5	-	@R8		4	Exploitation		T6		# Série		@R5				
5 @LR2		@R2		@LR6		@R6	-	ee		5	Inventaire		1U-0080		Temp. Huile		30			@R8	
6 @LR3		@R3		@LR7		@R7	-			6	Poste		MONTMORENC	Y 69 KV	Type Essai		HORS SERVICE				
/	Tan name		0	CU	IRRENT		A	CELEROME	IER1	7					CUR	RENT			ACCELEROMETER1		
o rest num.	Tap name	Uperation length	Current average	Current in Amr	Current delta	Time in me	HF MAA	LF MAA	n G	8	Test num	Tan name	Operation length	Current average	Inrush	Current delta	nd of operation tir	mo	ΗΕ ΜΔΧ	ΙΕΜΔΧ	HE/LE RATIO
10	Averages:	0.00	0	To Content in Any	0	0	#DIV/01	#DIV/01	#DIV/01	q		Tup hanto	Time in ms	Guiront aronago	Current in Amns	c	Time in ms		A	coleration in	G
11 1	@NomTest[1]	@DureeOperat	@Movenne[1]	@Inrush[1]	@Delta[1]	@TFrein[1]	@HfMax1[1	1 @LfMax1[1	1 #VALEUR!	10		Averages:	6237.81	1 299904281	4 543144906	0 1532005	1145 206284		22 12062856	26 66349572	0 842457293
12 2	@NomTest[2]	@DureeOperat	@Moyenne[2]	@Inrush[2]	@Delta[2]	@TFrein[2]	@HfMax1[2	@LfMax1[2	#VALEUR!	11	1	+9	5510.00	1 209956	4 397579	0.107729	761 100098		22 269593	24 573019	0.00622120
13 3	@NomTest[3]	@DureeOperat	@Moyenne[3]	@Inrush[3]	@Delta[3]	@TFrein[3]	@HfMax1[3] @LfMax1[3	#VALEUR!	12	2	10	11195.00	1 20212	4.600044	0.260252	765 000701		22.200333	29.720622	0.70520114
14 4	@NomTest[4]	@DureeOperat	@Moyenne[4]	@Inrush[4]	@Delta[4]	@TFrein[4]	@HfMax1[4] @LfMax1[4	#VALEUR!	12	2	+10	11100.00	1.00210	4.66044	0.000000	762.5		22.032031	20.750033	0.74061067
15 5	@NomTest[5]	@DureeOperat	@Moyenne[5]	@Inrush[5]	@Delta[5]	@TFrein[5]	@HfMax1[5] @LfMax1[5	#VALEUR!	13	3	+10	5525.00	1.303207	4.00041	0.332341	102.0	-	22.030751	29.704477	0.74001907
16 6	@NomTest[6]	@DureeOperat	@Moyenne[6]	@Inrush[6]	@Delta[6]	@TFrein[6]	@HfMax1[6] @LfMax1[6	#VALEUR!	14	4	+11	5525.00	1.300699	4.383917	0.103456	1133.799805	-	20.001513	21.398794	0.93470282
17 7	@NomTest[7]	@DureeOperat	@Moyenne[7]	@Inrush[7]	@Delta[7]	@TFrein[7]	@HfMax1[7] @LfMax1[7	#VALEUR!	15	5	+12	5520.00	1.300251	4.668955	0.11078	770.5		29.452614	27.467167	1.07228438
18 8	@NomTest[8]	@DureeOperat	@Moyenne[8]	@Inrush[8]	@Delta[8]	@TFrein[8]	@HfMax1[8] @LfMax1[8	#VALEUR!	16	6	+13	5515.00	1.300914	4.517586	0.104677	1135.300293		16.676355	23.110386	0.72159569
19 9	@NomTest[9]	@DureeOperat	@Moyenne[9]	@Inrush[9]	@Delta[9]	@TFrein[9]	@HfMax1[9] @LfMax1[9	#VALEUR!	17	7	+14	5510.00	1.29969	4.514534	0.107118	766.900391		20.454306	32.237839	0.6344813
20 10	@NomTest[10]	@DureeOperat	@Moyenne[10]	@Inrush[10]	@Delta[10]	@TFrein[10]	@HfMax1[1	0 @LfMax1[1	0 #VALEUR!	18	8	+15	5540.00	1.298238	4.407111	0.112001	1142.200195		21.842251	25.167408	0.86787845
21 11	@NomTest[11]	@DureeOperat	@Moyenne[11]	@Inrush[11]	@Delta[11]	@TFrein[11]	@HfMax1[1	1 @LfMax1[1	1 #VALEUR!	19	9	+16	5520.00	1.297831	4.636606	0.112001	762.799805		24.977577	23.334448	1.07041645
22 12	@NomTest[12]	@DureeOperat	@Moyenne[12]	@Inrush[12]	@Delta[12]	@Threin[12]	@HfMax1[1	2 @LfMax1[1	2 #VALEUR!	20	10	+17	5540.00	1.297187	4.662852	0.111391	1129.800293		21.83136	26.560022	0.82196317
23 13	@NomTest[13]	@DureeOperat	@Moyenne[13]	@Inrush[13]	@Delta[13]	@TFrein[13]	@HfMax1[1	3 @LfMax1[1	3 #VALEUR!	21	11	-16'	5615.00	1 299633	4 700084	0 444648	1222		25 383692	28 282507	0 89750502
24 14	@NomTest[14]	@DureeOperat	@Moyenne[14]	@Inrush[14]	@Delta[14]	@1Frein[14]	@HfMax1[1	4 @LtMax1[1	4 #VALEUR!	22	12	15	5505.00	1 2083/0	4 498665	0.065003	15/1 200195		17 33/539	20 381037	0.58000071
25 15	@NomTest[15]	@DureeOperat	@Moyenne[15]	@Inrush[15]	@Delta[15]	@TFrein[15]	@HfMax1[1	5 @LfMax1[1	5 #VALEUR!	22	12	14	5505.00	1 20007	4.652006	0.003003	1210 000600		20.042524	21 522272	0.00104000
26 16	@INOM est 16	@DureeOperat	@Woyenne[16]	@Inrush[16]	@Delta[16]	@1Frein[16]	@HIMax1[1	6 @LIMax1[1	#VALEUR!	23	13	-14	5520.00	1.20001	4.000000	0.077621	1213.039009	-	20.043024	21.023273	0.00504045
2/ 17	@Nomlest[1/	@DureeOperat	@Moyenne[1/]	@Inrush[1/]	@Delta[17]	@1Frein[1/]	@HffMax1[1	7 @LfMax1[1	#VALEUR!	24	14	-13	5525.00	1.301432	4.549935	0.080262	1542.899902	-	22.3/1288	36.919823	0.60594245
28 18	@ivomTest[18	@DureeOperat	@Woyehne[18]	@inrush[18]	@Delta[18]	@TFrein[18]	@HitMax1[1	6 @LftVlax1[1	#VALEUR!	25	15	-12	5525.00	1.302139	4.499275	0.067445	1217.899902		20.847973	19.618738	1.06265617
29 19	@NomTest[19	@DureeOperat	@Woyenne[19]	@inrush[19]	@Detta[19]	@TFrein[19]	@HftVlax1[1	9 @LftVlax1[1	9 #VALEUR!	26	16	[-11	5530.00	1.302726	4.472419	0.084535	1543.299805		18.990116	24.902889	0.76256678
30 20	summary Tap		roomovermet 201	normusm201	100 Deman201		Tool IIV ax 112	u iwiliwiax 112	#VALEUR!	i a	→ > Test su	mmary Tap de	tails	4 004057	14 550704	0.074700	14004 5	14	05 00004	104 40 4070	0.04000000
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Note: If you need a customized Excel model, contact us and we will be glad to help you.

JOB AID N# 26

CALCULATION EXPLANATIONS



JOB AID N# 27

COMMON ABBREVIATIONS

Here are the most common abbreviations encountered in the OpenZen software with the standard calculation files cbacal7.cal and cbacal70.

Abbréviation	Définition
ZAN	Signal average
РРК	Peak-to-peak value
RMS	Signals RMS value (in volts)
SSB	Noise of the signal (in dB)
ENV	Envelope of a signal
MAX	Maximum value of the signal
AVR	Average motor current between inrush and breaking
DLT	Delta between inrush and breaking
BRK	Time gap between the end of tap changing and the end of the motor current