

VISIT OF THE SUBSTATION IN ARNHEM 4.12.15

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Report of the visit of the substation in Arnhem.

Analysis of a first trolley with failure:

Problem summary: magnetic closing device doesn't come back after tripping (manual or overcurrent).

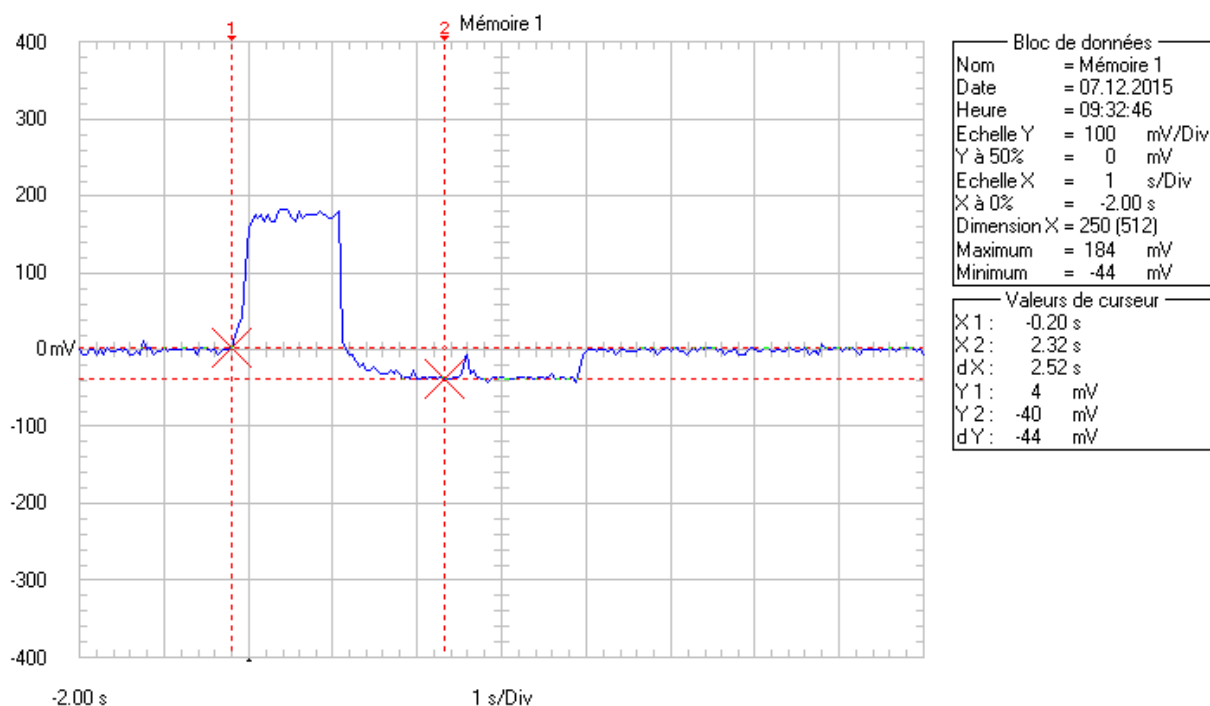
S/N of breaker:



First we measured the current into the coil with the scope meter with a current probe 10mV/A = the current was at the maximum (4.4 A).

This was due to a bad adjustment of the serial resistor (7.2 instead of 9.4 Ohms).

See table here bellow for 48 V coil.



B.3.1 Typical values for the closing coils

Coil characteristics				Closing Pulse 0,5 to 1 [s]				E type holding				M type opening Pulse 0,5 to 1 [s]				
U_{nom}	U_{min}	U_{max}	R_{nom}	I_{nom}	$I_{min E}$	$I_{min M}$	I_{max}	R1	I_{nom}	I_{min}	I_{max}	R_s	R_p	I_{nom}	I_{min}	I_{max}
[V]	[V]	[V]	[Ω]	[A]	[A]	[A]	[A]	[Ω]	[A]	[A]	[A]	[Ω]	[Ω]	[A]	[A]	[A]
24	16.8	30.0	0.575	41.7	22.5	25.0	70.9	11.4	2.00	1.38	2.54	2.38	1.33	6.07	3.81	8.49
36	25.2	45.0	1.10	32.7	17.7	19.6	55.6	25.0	1.38	0.95	1.74	5.30	2.99	4.31	2.73	5.98
48	33.6	60.0	2.30	20.9	11.3	12.5	35.4	45.7	1.00	0.69	1.27	9.40	5.35	3.05	1.90	4.27
64*	44.8	80.0	3.84	17.6	9.5	10.6	29.9	79.4	0.77	0.53	0.97	17.20	9.00	2.30	1.45	3.20
72	50.4	90.0	4.40	16.4	8.8	9.8	27.8	100.0	0.69	0.48	0.87	21.20	11.97	2.16	1.36	2.98
110	77.0	137.5	9.40	11.7	6.3	7.0	19.9	210.0	0.50	0.35	0.63	40.00	20.00	1.61	1.01	2.26
125*	87.5	156.3	11.95	10.5	5.6	6.3	17.8	272.0	0.44	0.30	0.56	52.00	26.00	1.42	0.89	1.99
220	154.0	275.0	37.60	5.9	3.2	3.5	9.9	840.0	0.25	0.17	0.32	160.0	80.00	0.81	0.50	1.13
Power consumption [W]				1300	400	400	2200	55	2.3	1.2	3.6	200	15	25	12	38

Then we checked the air gap in the coil and found out that it was set to an electrical holding type (that's why we have to turn back the cover for approximately $\frac{3}{4}$ turn).

E.3.3 Procedure 3: adjusting the rated gap

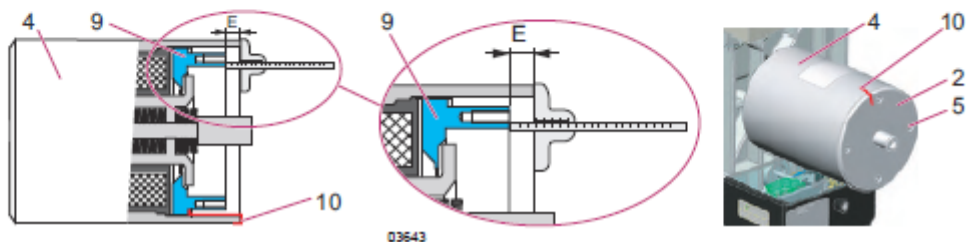
- a) Remove the four screws (5) and remove the cover (2).
- b) Rotate the flange (9) until the following E dimensions are obtained:
 - $E = 10 \pm 0.1$ mm for type E (electric hold)
 - $E = 8.5 \pm 0.1$ mm for type M (magnetic hold)
- c) Mark the new point (10) corresponding to the rated gap on the body (4).



Important!

Do not turn the flange (9) after this adjustment.

- d) Insert the cover (2) and tighten the four screws (5) to a torque of 9 Nm.
- e) Mark the cover (2), with a extension of the marking (10) on the body (4) to indicate the position of the flange (9).



Final test: First with external power supply to check the minimum opening current (see table 1.9 A). It was ok.

Then we checked in the normal service with the trolley inside cubical. It was also ok.

Analysis of a second trolley with an intermittent failure.



S/N of breaker:

First we checked the current and the resistor value: It was ok.

Then we checked the gap. It was ok (8.5mm)

Then we disassembled the closing device, to clean up the touching surface of the moving core from old dry grease. Reassembled the closing device and cleaned up also the fork from old grease and put new grease instead.

Installation of the new isolation caps on closing devices to decrease the risk of the flash over to the ground.

Action: 6 new washers (9AVA330-12 WASHER ELA TYP SK 8.2/16.2x1.4-SS A4) have to be installed on the oldest breaker, because the diameter of existing ones is too big.

3 caps HSBR430706P0001 SOCKET B 17.2/25x33 M8 PROTECTION-PA 66 SA

