

# KEMA TYPE TEST CERTIFICATE OF SHORT-CIRCUIT AND SWITCHING PERFORMANCE

**Object** A three-pole solid-dielectric pole-mounted vacuum automatic circuit-recloser **2065-16**

**Type** OSM 38-16-800 **Serial No.** 0800316020787

Rated maximum voltage	38 kV (1)	Rated continuous current	800 A
Rated symmetrical interrupting current	16 kA	Rated frequency	50/60 Hz (2)

(1) See note (2) on page 5.

(2) See note (1) on page 5.

**Manufacturer** NOJA Power Switchgear Pty Ltd.,  
Brisbane, Australia <sup>\*)</sup>

**Client** NOJA Power Switchgear Pty Ltd.,  
Brisbane, Australia

**Tested by** KEMA Nederland B.V.,  
Arnhem, The Netherlands

**Date of tests** 30 and 31 March 2016

The object, constructed in accordance with the description, drawings and photographs incorporated in this Certificate, has been subjected to the series of proving tests in accordance with

**IEC 62271-111 (2012)**  
**IEEE C37.60 (2012)**

subclauses 6.6 (STC), 6.101 (Line charging current and cable charging current interruption tests) and 6.103 (Rated symmetrical interrupting current tests).

The results are shown in the record of proving tests and the oscillograms attached hereto. The values obtained and the general performance are considered to comply with the above standard and to justify the ratings assigned by the manufacturer as listed on page 5.

This Certificate applies only to the object tested. The responsibility for conformity of any object having the same type references as that tested rests with the Manufacturer.

<sup>\*)</sup> as declared by the manufacturer

This Certificate consists of 268 pages in total.



**Laboratories**

Arnhem, 29 April 2016

## INFORMATION SHEET

### 1 KEMA Type Test Certificate

A KEMA Type Test Certificate contains a record of a series of (type) tests carried out in accordance with a recognized standard. The object tested has fulfilled the requirements of this standard and the relevant ratings assigned by the manufacturer are endorsed by DNV GL. In addition, the object's technical drawings have been verified and the condition of the object after the tests is assessed and recorded. The Certificate contains the essential drawings and a description of the object tested. A KEMA Type Test Certificate signifies that the object meets all the requirements of the named subclauses of the standard. It can be identified by gold-embossed lettering on the cover and a gold seal on its front sheet.

The Certificate is applicable to the object tested only. DNV GL is responsible for the validity and the contents of the Certificate. The responsibility for conformity of any object having the same type references as the one tested rests with the manufacturer.

Detailed rules on types of certification are given in DNV GL's Certification procedure applicable to KEMA Laboratories.

### 2 KEMA Report of Performance

A KEMA Report of Performance is issued when an object has successfully completed and passed a subset (but not all) of test programmes in accordance with a recognized standard. In addition, the object's technical drawings have been verified and the condition of the object after the tests is assessed and recorded. The report is applicable to the object tested only. A KEMA Report of Performance signifies that the object meets the requirements of the named subclauses of the standard. It can be identified by silver-embossed lettering on the cover and a silver seal on its front sheet.

The sentence on the front sheet of a KEMA Report of Performance will state that the tests have been carried out in accordance with ..... The object has complied with the relevant requirements.

### 3 KEMA Test Report

A KEMA Test Report is issued in all other cases. Reasons for issuing a KEMA Test Report could be:

- Tests were performed according to the client's instructions.
- Tests were performed only partially according to the standard.
- No technical drawings were submitted for verification and/or no assessment of the condition of the object after the tests was performed.
- The object failed one or more of the performed tests.

The KEMA Test Report can be identified by the grey-embossed lettering on the cover and grey seal on its front sheet.

In case the number of tests, the test procedure and the test parameters are based on a recognized standard and related to the ratings assigned by the manufacturer, the following sentence will appear on the front sheet. The tests have been carried out in accordance with the client's instructions. Test procedure and test parameters were based on ..... If the object does not pass the tests such behaviour will be mentioned on the front sheet. Verification of the drawings (if submitted) and assessment of the condition after the tests is only done on client's request.

When the tests, test procedure and/or test parameters are not in accordance with a recognized standard, the front sheet will state the tests have been carried out in accordance with client's instructions.

### 4 Official and uncontrolled test documents

The official test documents of DNV GL are issued in bound form. Uncontrolled copies may be provided as a digital file for convenience of reproduction by the client. The copyright has to be respected at all times.

### 5 Accreditation of KEMA Laboratories

The KEMA Laboratories of DNV GL are accredited in accordance with ISO/IEC 17025 by the respective national accreditation bodies. KEMA Laboratories Arnhem, the Netherlands, is accredited by RvA under nos. L020, L218, K006 and K009. KEMA Laboratories Chalfont, United States, is accredited by A2LA under no. 0553.01. KEMA Laboratories Prague, the Czech Republic, is accredited by CAI as testing laboratory no. 1035.

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## 1 IDENTIFICATION OF THE OBJECT TESTED

### 1.1 Ratings/characteristics of the object tested

Frequency	50/60 Hz	(1)	
Maximum voltage	38 kV	(2)	
Power-frequency withstand voltage (1 min dry)	70 kV		
Power-frequency withstand voltage (10 s wet)	60 kV		
Lightning impulse withstand voltage	170 kV		
Continuous (normal) current	800 A		
Short-time withstand current	16 kA		X
Peak withstand current	41,6 kA <sub>peak</sub>		X
Duration of short-circuit	3 s		X
Symmetrical interrupting current	16 kA		X
Symmetrical (fault) making current	41,6 kA <sub>peak</sub>		X
Operating sequence	O-0,1 s-CO-1 s-CO-1 s-CO	(3)	X
Cable-charging interrupting current	40 A		X
Line-charging interrupting current	5 A		X
Supply voltage controller cubicle	230 V a.c.	(4)	

- 1) On request of the client the tests have been performed at the frequency of 60 Hz (subclause 6.1.101.4).
- 2) On request of the client the tests have been based on a voltage of 40,5 kV.
- 3) Instantaneous opening (minimum time-delay) for the first, and time-delayed opening (definite time) for the second, third and fourth O-operation.
- 4) Controller disconnected from main supply, operation on battery supply only.

X = This rating has been proved by the tests of this Certificate.

Recloser intended for overhead-line connection. TRV table 6 is applicable.

Recloser intended for application in multi-earthed network systems (clause 6.103.2).

## 1.2 Description of the object tested

A three-pole solid-dielectric pole-mounted vacuum automatic circuit-recloser

Mechanism:

Dependent power closing (solenoid).

Stored energy opening (springs, charged at closing).

Recloser controller cubicle:

Manufacturer: NOJA Power Switchgear Pty Ltd., Australia

Serial No.: 0100116020878

Protection relay:

Manufacturer: NOJA Power Switchgear Pty Ltd., Australia

Type: RC-10

Serial No.: 0311815100427

## 1.3 Travel recorder

No travel recorder fitted.

## 1.4 List of drawings

The manufacturer has guaranteed that the object submitted for tests has been manufactured in accordance with the following drawings and/or documents. KEMA Laboratories has verified that these drawings and/or documents adequately represent the object tested. The manufacturer is responsible for the correctness of these drawings and/or documents and the technical data presented.

The following drawings and/or documents have been included in this Certificate:

Drawing no./document no.	Revision
300-3104, Page 1	0
300-3104, Page 2	0
NOJA-464-32	5

The following drawings and/or documents have been stamped by KEMA Laboratories and returned to the manufacturer:

Drawing no./document no.	Revision
300-3105	0
300-3106	0
115_56063_763	0C
4D 115_56063_700	0A
300-1323	0
300-1072	F
300-1298	0
300-1299	0
300-3024	1
310-1147	0
300-3031	2
300-1096	5
300-1101	1
300-1086	4
300-1154	3
300-1117	6
300-1037	D
NOJA-461-30	4

## 2 GENERAL INFORMATION

### 2.1 The tests were witnessed by

**Name**

Griffiths, S.  
Samarski, O.

**Company**

NOJA Power Switchgear Pty Ltd.,  
Brisbane, Australia

### 2.2 The tests were carried out by

**Name**

Hofstee, A.B. (30 March 2016)  
Dobbe, N. (30, 31 March 2016)  
Ebberts, L.F.H. (31 March 2016)

**Company**

KEMA Nederland B.V.,  
Arnhem, The Netherlands

### 2.3 Accuracy of measurement

The guaranteed uncertainty for the measured voltages and currents taking into account the total measuring system, is less than 5%, unless mentioned otherwise.

### 3 LEGEND

#### Phase indications

If more than one phase is recorded on oscillogram, the phases are indicated by the digits 1, 2 and 3. These phases 1, 2 and 3 correspond to the phase values in the columns of the accompanying table, respectively from left to right.

#### Explanation of the letter symbols and abbreviations on the oscillograms

pu	Per unit (the reference length of one unit is represented by the black bar on the oscillogram)
CS1	Timing signal contact separation
CS2	Timing signal contact separation
CS3	Timing signal contact separation
I1TO	Current through test object
I2TO	Current through test object
I3TO	Current through test object
Itank	Tank current test object
ITOcI	Current closing coil test object
ITOp	Current opening coil test object
U1L	Load voltage
U1S	Supply voltage
U1TO	Voltage across test object
U2L	Load voltage
U2S	Supply voltage
U2TO	Voltage across test object
U3L	Load voltage
U3S	Supply voltage
U3TO	Voltage across test object

## 4 SUMMARY OF TESTS

No-load test							
Test no.		160330 4001					
Operation		CO					
Current closing coil	A	-					
	A	ms	-				
Closing time	B	ms	-				
	C	ms	-				
Current opening coil	A	-					
	A	ms	-				
Opening time	B	ms	-				
	C	ms	-				
Voltage closing coil	Vd.c.	-					
Voltage opening coil	Vd.c.	-					
Gas pressure at 20 °C	MPa	-					
Operating pressure	MPa	-					

Remarks
160330-4001 -

Short-time withstand current and peak withstand current test							
Test no.			160330 4003				
	A	kA	-42,1				
Peak value of current	B	kA	30,0				
	C	kA	34,7				
	A	kA	15,3				
Symmetrical current, beginning	B	kA	15,6				
	C	kA	15,4				
	A	kA	15,1				
Symmetrical current, middle	B	kA	15,3				
	C	kA	15,1				
	A	kA	15,1				
Symmetrical current, end	B	kA	15,3				
	C	kA	15,1				
	A	kA	15,2				
Symmetrical current, average	B	kA	15,4				
	C	kA	15,2				
Average current, three phase		kA	15,3				
	A	s	3,33				
Current duration	B	s	3,33				
	C	s	3,33				
Thermal equivalent			16 kA during 3,03 s				
Gas pressure at 20 °C		MPa	-				

Remarks	
160330-4003	No visible disturbance.

No-load test							
Test no.		160330 4004					
Operation		O					
Current opening coil	A	-					
	A	ms	-				
Opening time	B	ms	-				
	C	ms	-				
Voltage opening coil	Vd.c.	-					
Gas pressure at 20 °C	MPa	-					
Operating pressure	MPa	-					
Operating pressure	MPa	-					

Remarks							
160330-4004 -							



T100								
Test no.			160330 4015	160330 4016	160330 4017	160330 4018	160330 4019	160330 4020
Time interval since previous test		min	-	-	-	-	-	-
Time interval between operations		s	-	0,160	1,06	1,06	-	0,158
Operation			O	CO	CO	CO	O	CO
	A	kV	-	25,0	25,0	25,8	-	24,4
Applied voltage, phase value	B	kV	-	24,6	24,6	25,4	-	24,1
	C	kV	-	24,7	24,8	25,6	-	24,2
Applied voltage, between phases		kV	-	42,9	43,0	44,4	-	42,0
	A	kA	-	-30,4	-38,1	-29,1	-	27,4
Making current, peak	B	kA	-	44,5	45,5	-41,1	-	38,5
	C	kA	-	-39,2	-31,6	44,8	-	-42,5
	A	kA	16,5	16,8	16,9	17,6	16,2	16,1
Breaking current, phase value	B	kA	16,4	16,8	17,0	17,6	16,2	16,1
	C	kA	16,3	16,6	16,8	17,5	16,1	16,0
Average current, three phase		kA	16,4	16,7	16,9	17,6	16,2	16,0
	A	%	15	4	10	2	16	2
Breaking current, DC-component	B	%	6	14	14	11	7	12
	C	%	21	11	5	12	23	14
	A	kV	24,1	24,3	24,5	24,9	23,7	23,6
Recovery voltage, phase value	B	kV	23,8	24,0	24,2	24,8	23,4	23,2
	C	kV	23,4	23,8	24,0	24,9	23,2	23,1
Recovery voltage, between phases		kV	41,2	41,6	41,9	43,1	40,6	40,4
	A	kV	-43,7	-47,1	-46,2	48,2	-43,4	-45,1
TRV, peak	B	kV	78,2	78,9	78,2	-46,6	76,8	75,9
	C	kV	44,3	46,6	46,4	81,5	42,7	45,3
	A	ms	-	-	-	-	-	-
Make time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
	A	ms	5,9	9,2	9,3	8,8	8,3	7,3
Arc duration	B	ms	2,4	4,6	4,8	8,8	4,9	2,6
	C	ms	5,9	9,2	9,3	4,4	8,3	7,3
Opening time		ms	-	-	-	-	-	-
	A	ms	-	-	-	-	-	-
Break time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
Voltage closing coil		Vd.c.	-	-	-	-	-	-
Voltage opening coil		Vd.c.	-	-	-	-	-	-
Gas pressure at 20 °C		MPa	-	-	-	-	-	-
Operating pressure		MPa	-	-	-	-	-	-

Remarks	
160330-4015	Recloser cleared.
160330-4016	Recloser closed and cleared.
160330-4017	Recloser closed and cleared.
160330-4018	Recloser closed and cleared.
160330-4019	Recloser cleared.
160330-4020	Recloser closed and cleared.

T100 (continued)								
Test no.			160330 4021	160330 4022	160330 4023	160330 4024	160330 4025	160330 4026
Time interval since previous test		min	-	-	-	-	-	-
Time interval between operations		s	1,06	1,06	-	0,158	1,06	1,06
Operation			CO	CO	O	CO	CO	CO
	A	kV	24,4	24,5	-	24,3	24,3	24,5
Applied voltage, phase value	B	kV	24,0	24,2	-	23,9	23,9	24,1
	C	kV	23,9	24,1	-	24,0	23,9	24,0
Applied voltage, between phases		kV	41,7	42,0	-	41,7	41,6	41,9
	A	kA	-41,2	44,2	-	-38,3	-24,9	37,3
Making current, peak	B	kA	-25,2	-32,3	-	42,6	-39,0	32,2
	C	kA	41,0	-36,0	-	-27,2	40,6	-44,4
	A	kA	16,3	16,6	16,1	16,1	16,2	16,5
Breaking current, phase value	B	kA	16,2	16,6	16,1	16,1	16,3	16,5
	C	kA	16,1	16,5	16,0	16,0	16,1	16,4
Average current, three phase		kA	16,2	16,5	16,1	16,0	16,2	16,5
	A	%	10	13	14	11	0	8
Breaking current, DC-component	B	%	2	5	6	13	12	7
	C	%	13	9	20	3	12	14
	A	kV	23,7	23,9	23,7	23,6	23,4	23,6
Recovery voltage, phase value	B	kV	23,0	23,6	23,0	23,1	23,3	23,5
	C	kV	23,2	23,2	23,3	23,3	23,3	23,5
Recovery voltage, between phases		kV	40,4	40,9	40,4	40,3	40,5	40,7
	A	kV	-76,1	45,4	-75,6	-76,2	44,8	-45,3
TRV, peak	B	kV	-44,5	-77,5	-43,7	-45,2	-43,1	44,2
	C	kV	43,0	-44,6	42,4	44,0	75,4	-76,5
	A	ms	-	-	-	-	-	-
Make time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
	A	ms	4,0	6,8	3,9	3,3	8,7	10,5
Arc duration	B	ms	8,3	2,7	8,1	8,0	8,7	10,5
	C	ms	8,3	6,8	8,1	8,0	4,3	5,9
Opening time		ms	-	-	-	-	-	-
	A	ms	-	-	-	-	-	-
Break time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
Voltage closing coil		Vd.c.	-	-	-	-	-	-
Voltage opening coil		Vd.c.	-	-	-	-	-	-
Gas pressure at 20 °C		MPa	-	-	-	-	-	-
Operating pressure		MPa	-	-	-	-	-	-

Remarks	
160330-4021	Recloser closed and cleared.
160330-4022	Recloser closed and cleared.
160330-4023	Recloser cleared.
160330-4024	Recloser closed and cleared.
160330-4025	Recloser closed and cleared.
160330-4026	Recloser closed and cleared.

<b>T100 (continued)</b>							
Test no.		160330 4027	160330 4028	160330 4029	160330 4030		
Time interval since previous test	min	-	-	-	-		
Time interval between operations	s	-	0,159	1,06	1,06		
Operation		O	CO	CO	CO		
	A	kV	-	24,3	24,2	24,4	
Applied voltage, phase value	B	kV	-	24,0	23,9	24,0	
	C	kV	-	24,0	23,9	24,0	
Applied voltage, between phases		kV	-	41,7	41,5	41,8	
	A	kA	-	-39,9	-42,7	41,1	
Making current, peak	B	kA	-	41,9	39,0	28,4	
	C	kA	-	-24,5	28,1	-43,9	
	A	kA	16,0	16,1	16,2	16,5	
Breaking current, phase value	B	kA	16,1	16,1	16,2	16,5	
	C	kA	16,0	16,0	16,1	16,4	
Average current, three phase		kA	16,0	16,1	16,2	16,4	
	A	%	9	12	13	10	
Breaking current, DC-component	B	%	14	12	10	4	
	C	%	22	1	3	15	
	A	kV	23,6	23,6	23,6	23,8	
Recovery voltage, phase value	B	kV	23,0	23,1	23,3	23,2	
	C	kV	23,4	23,2	23,1	23,5	
Recovery voltage, between phases		kV	40,4	40,3	40,4	40,7	
	A	kV	-75,9	-76,1	-44,1	76,4	
TRV, peak	B	kV	-43,6	-45,2	75,7	44,5	
	C	kV	42,2	44,3	44,1	-43,8	
	A	ms	-	-	-	-	
Make time	B	ms	-	-	-	-	
	C	ms	-	-	-	-	
	A	ms	3,5	2,7	7,3	4,1	
Arc duration	B	ms	7,4	7,3	3,0	8,4	
	C	ms	7,4	7,4	7,3	8,4	
Opening time		ms	-	-	-	-	
	A	ms	-	-	-	-	
Break time	B	ms	-	-	-	-	
	C	ms	-	-	-	-	
Voltage closing coil	Vd.c.	-	-	-	-		
Voltage opening coil	Vd.c.	-	-	-	-		
Gas pressure at 20 °C	MPa	-	-	-	-		
Operating pressure	MPa	-	-	-	-		

Remarks	
160330-4027	Recloser cleared.
160330-4028	Recloser closed and cleared.
160330-4029	Recloser closed and cleared.
160330-4030	Recloser closed and cleared.

T50								
Test no.			160330 4043	160330 4044	160330 4045	160330 4046	160330 4047	160330 4048
Time interval since previous test		min	-	-	-	-	-	-
Time interval between operations		s	-	0,158	1,06	1,06	-	0,159
Operation			O	CO	CO	CO	O	CO
	A	kV	-	23,7	23,8	24,0	-	24,4
Applied voltage, phase value	B	kV	-	23,3	23,4	23,6	-	24,0
	C	kV	-	23,4	23,5	23,6	-	24,1
Applied voltage, between phases		kV	-	40,7	40,8	41,1	-	41,9
	A	kA	-	-19,2	19,5	-21,0	-	17,0
Making current, peak	B	kA	-	20,6	-11,9	-12,6	-	-21,9
	C	kA	-	-12,6	-18,8	20,9	-	16,9
	A	kA	8,07	8,14	8,17	8,31	8,35	8,39
Breaking current, phase value	B	kA	8,11	8,12	8,19	8,31	8,39	8,37
	C	kA	8,06	8,07	8,14	8,26	8,28	8,32
Average current, three phase		kA	8,08	8,11	8,17	8,29	8,34	8,36
	A	%	8	9	10	10	6	6
Breaking current, DC-component	B	%	13	12	0	2	11	13
	C	%	20	2	10	12	19	6
	A	kV	23,4	23,4	23,5	23,8	24,0	24,0
Recovery voltage, phase value	B	kV	22,8	23,1	23,0	23,5	23,5	23,0
	C	kV	23,0	23,0	23,2	23,3	23,9	23,7
Recovery voltage, between phases		kV	39,9	40,1	40,3	40,7	41,2	40,9
	A	kV	-80,4	-46,1	80,6	-47,8	48,3	48,6
TRV, peak	B	kV	-45,2	80,4	47,2	83,4	-82,9	-82,7
	C	kV	45,0	47,7	-46,2	46,1	-48,4	-48,5
	A	ms	-	-	-	-	-	-
Make time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
	A	ms	3,5	6,4	3,2	5,6	9,4	7,2
Arc duration	B	ms	7,3	2,0	7,5	1,8	4,7	2,7
	C	ms	7,4	6,4	7,5	5,6	9,4	7,2
Opening time		ms	-	-	-	-	-	-
	A	ms	-	-	-	-	-	-
Break time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
Voltage closing coil		Vd.c.	-	-	-	-	-	-
Voltage opening coil		Vd.c.	-	-	-	-	-	-
Gas pressure at 20 °C		MPa	-	-	-	-	-	-
Operating pressure		MPa	-	-	-	-	-	-

Remarks	
160330-4043	Recloser cleared.
160330-4044	Recloser closed and cleared.
160330-4045	Recloser closed and cleared.
160330-4046	Recloser closed and cleared.
160330-4047	Recloser cleared.
160330-4048	Recloser closed and cleared.



T50 (continued)								
Test no.			160330 4049	160330 4050	160330 4051	160330 4052	160330 4053	160330 4054
Time interval since previous test		min	-	-	-	-	-	-
Time interval between operations		s	1,06	1,06	-	0,162	1,07	1,07
Operation			CO	CO	O	CO	CO	CO
	A	kV	24,5	24,8	-	24,4	24,4	23,5
Applied voltage, phase value	B	kV	24,1	24,4	-	24,0	24,0	24,1
	C	kV	24,2	24,4	-	24,1	24,1	23,2
Applied voltage, between phases		kV	42,0	42,4	-	41,9	41,8	40,9
	A	kA	-21,9	14,9	-	-19,0	-16,8	-20,5
Making current, peak	B	kA	17,6	-22,0	-	-15,2	22,1	-13,4
	C	kA	16,5	19,7	-	21,7	-17,3	21,0
	A	kA	8,47	8,59	8,37	8,36	8,42	8,48
Breaking current, phase value	B	kA	8,46	8,61	8,38	8,39	8,44	8,50
	C	kA	8,41	8,55	8,33	8,34	8,35	8,42
Average current, three phase		kA	8,45	8,58	8,36	8,37	8,40	8,47
	A	%	11	4	6	8	6	9
Breaking current, DC-component	B	%	6	13	13	5	13	2
	C	%	6	9	20	12	7	11
	A	kV	24,2	24,6	23,4	24,1	24,2	24,3
Recovery voltage, phase value	B	kV	23,2	24,1	23,5	23,7	23,8	23,9
	C	kV	24,0	23,5	23,7	23,1	23,2	23,3
Recovery voltage, between phases		kV	41,2	41,7	40,7	40,9	41,1	41,3
	A	kV	-48,6	48,8	-82,8	48,0	-47,6	48,8
TRV, peak	B	kV	83,4	-48,0	-47,3	-48,2	47,9	-48,5
	C	kV	47,4	84,0	45,4	82,3	-83,3	82,9
	A	ms	-	-	-	-	-	-
Make time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
	A	ms	6,7	8,6	3,6	8,0	6,7	8,0
Arc duration	B	ms	2,6	8,7	7,5	8,0	6,7	8,0
	C	ms	6,7	4,4	7,5	3,5	2,6	3,4
Opening time		ms	-	-	-	-	-	-
	A	ms	-	-	-	-	-	-
Break time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
Voltage closing coil		Vd.c.	-	-	-	-	-	-
Voltage opening coil		Vd.c.	-	-	-	-	-	-
Gas pressure at 20 °C		MPa	-	-	-	-	-	-
Operating pressure		MPa	-	-	-	-	-	-

Remarks	
160330-4049	Recloser closed and cleared.
160330-4050	Recloser closed and cleared.
160330-4051	Recloser cleared.
160330-4052	Recloser closed and cleared.
160330-4053	Recloser closed and cleared.
160330-4054	Recloser closed and cleared.

T50 (continued)								
Test no.			160330 4055	160330 4056	160330 4057	160330 4058	160330 4059	160330 4060
Time interval since previous test		min	-	-	-	-	-	-
Time interval between operations		s	-	0,164	1,06	1,06	-	0,161
Operation			O	CO	CO	CO	O	CO
	A	kV	-	23,6	24,5	24,6	-	24,4
Applied voltage, phase value	B	kV	-	24,1	23,2	24,2	-	24,0
	C	kV	-	24,2	23,3	24,2	-	24,0
Applied voltage, between phases		kV	-	41,5	41,0	42,2	-	41,8
	A	kA	-	-20,8	-12,6	-22,2	-	-21,8
Making current, peak	B	kA	-	13,4	20,6	17,9	-	18,7
	C	kA	-	19,0	-20,7	16,5	-	15,3
	A	kA	8,37	8,37	8,44	8,55	8,38	8,37
Breaking current, phase value	B	kA	8,38	8,39	8,46	8,53	8,39	8,38
	C	kA	8,33	8,34	8,37	8,49	8,35	8,34
Average current, three phase		kA	8,36	8,37	8,42	8,53	8,37	8,36
	A	%	7	10	1	12	7	12
Breaking current, DC-component	B	%	13	1	11	7	14	7
	C	%	20	8	12	6	21	4
	A	kV	24,0	23,4	24,2	24,4	23,3	23,3
Recovery voltage, phase value	B	kV	23,7	23,8	23,8	23,3	23,5	23,8
	C	kV	23,5	23,8	23,1	24,2	23,8	23,6
Recovery voltage, between phases		kV	41,2	41,0	41,1	41,5	40,8	40,8
	A	kV	-47,1	-82,9	-48,2	-48,4	-83,3	-82,4
TRV, peak	B	kV	83,5	-48,5	47,5	84,1	-47,5	-48,1
	C	kV	47,2	47,3	-82,9	48,2	45,5	47,7
	A	ms	-	-	-	-	-	-
Make time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
	A	ms	5,0	1,0	7,3	7,6	5,1	2,7
Arc duration	B	ms	1,6	5,4	7,3	3,5	9,0	7,3
	C	ms	5,0	5,4	3,0	7,6	9,0	7,3
Opening time		ms	-	-	-	-	-	-
	A	ms	-	-	-	-	-	-
Break time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
Voltage closing coil	Vd.c.		-	-	-	-	-	-
Voltage opening coil	Vd.c.		-	-	-	-	-	-
Gas pressure at 20 °C	MPa		-	-	-	-	-	-
Operating pressure	MPa		-	-	-	-	-	-

Remarks	
160330-4055	Recloser cleared.
160330-4056	Recloser closed and cleared.
160330-4057	Recloser closed and cleared.
160330-4058	Recloser closed and cleared.
160330-4059	Recloser cleared.
160330-4060	Recloser closed and cleared.

T50 (continued)								
Test no.			160330 4061	160330 4062	160330 4063	160330 4064	160330 4065	160330 4066
Time interval since previous test		min	-	-	-	-	-	-
Time interval between operations		s	1,06	1,06	-	0,163	1,06	1,06
Operation			CO	CO	O	CO	CO	CO
	A	kV	24,3	24,4	-	24,4	24,3	24,4
Applied voltage, phase value	B	kV	24,0	23,2	-	24,0	24,0	24,0
	C	kV	24,1	24,2	-	24,1	24,0	24,2
Applied voltage, between phases		kV	41,8	41,5	-	41,8	41,8	41,9
	A	kA	18,5	-20,3	-	-21,5	13,6	-21,9
Making current, peak	B	kA	15,8	21,3	-	16,2	19,5	19,8
	C	kA	-21,9	-12,6	-	17,2	-21,3	14,6
	A	kA	8,40	8,50	8,37	8,36	8,40	8,49
Breaking current, phase value	B	kA	8,43	8,52	8,38	8,37	8,42	8,50
	C	kA	8,38	8,43	8,33	8,33	8,36	8,43
Average current, three phase		kA	8,40	8,48	8,36	8,35	8,40	8,47
	A	%	7	10	7	11	2	12
Breaking current, DC-component	B	%	6	11	13	4	11	8
	C	%	13	1	20	6	12	3
	A	kV	23,3	24,2	24,0	24,1	24,2	24,2
Recovery voltage, phase value	B	kV	23,8	23,1	23,7	23,7	23,7	23,1
	C	kV	23,7	24,1	23,9	23,0	22,9	24,0
Recovery voltage, between phases		kV	40,9	41,2	41,4	40,9	40,9	41,2
	A	kV	82,7	-48,0	-48,3	49,1	-47,9	-48,3
TRV, peak	B	kV	48,2	83,2	83,7	-47,3	47,6	83,3
	C	kV	-46,8	48,7	46,1	82,5	-82,3	47,8
	A	ms	-	-	-	-	-	-
Make time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
	A	ms	2,9	9,2	5,7	9,2	8,9	8,1
Arc duration	B	ms	7,1	4,8	2,3	9,2	8,9	3,9
	C	ms	7,1	9,1	5,7	4,7	4,6	8,1
Opening time		ms	-	-	-	-	-	-
	A	ms	-	-	-	-	-	-
Break time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
Voltage closing coil	Vd.c.		-	-	-	-	-	-
Voltage opening coil	Vd.c.		-	-	-	-	-	-
Gas pressure at 20 °C	MPa		-	-	-	-	-	-
Operating pressure	MPa		-	-	-	-	-	-

Remarks	
160330-4061	Recloser closed and cleared.
160330-4062	Recloser closed and cleared.
160330-4063	Recloser cleared.
160330-4064	Recloser closed and cleared.
160330-4065	Recloser closed and cleared.
160330-4066	Recloser closed and cleared.

T50 (continued)								
Test no.			160330 4067	160330 4068	160330 4069	160330 4070	160330 4071	160330 4072
Time interval since previous test		min	-	-	-	-	-	-
Time interval between operations		s	-	0,163	1,06	1,07	-	0,161
Operation			O	CO	CO	CO	O	CO
	A	kV	-	23,5	24,3	24,5	-	24,3
Applied voltage, phase value	B	kV	-	24,0	24,0	24,1	-	24,0
	C	kV	-	23,3	24,1	24,2	-	24,0
Applied voltage, between phases		kV	-	40,9	41,8	42,1	-	41,8
	A	kA	-	-20,6	14,0	-22,0	-	-21,2
Making current, peak	B	kA	-	-12,4	19,3	19,1	-	15,4
	C	kA	-	20,2	-21,4	15,4	-	17,7
	A	kA	8,34	8,36	8,41	8,52	8,38	8,36
Breaking current, phase value	B	kA	8,38	8,39	8,44	8,50	8,38	8,38
	C	kA	8,34	8,34	8,38	8,45	8,34	8,34
Average current, three phase		kA	8,35	8,36	8,41	8,49	8,37	8,36
	A	%	7	10	2	11	6	11
Breaking current, DC-component	B	%	12	1	10	8	13	3
	C	%	18	10	12	4	19	7
	A	kV	24,1	24,1	24,2	24,2	23,3	24,1
Recovery voltage, phase value	B	kV	23,7	23,7	23,7	23,2	23,5	23,7
	C	kV	23,0	22,9	22,9	24,1	23,7	23,1
Recovery voltage, between phases		kV	40,9	40,8	40,9	41,3	40,7	40,9
	A	kV	48,8	48,5	-48,0	-48,6	-83,0	48,5
TRV, peak	B	kV	-47,2	-47,8	47,9	83,8	-46,6	-47,8
	C	kV	81,5	82,6	-82,4	47,7	46,6	82,5
	A	ms	-	-	-	-	-	-
Make time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
	A	ms	8,3	8,5	8,1	7,3	3,7	8,7
Arc duration	B	ms	8,3	8,5	8,1	3,1	7,6	8,7
	C	ms	3,8	4,0	3,7	7,3	7,6	4,2
Opening time		ms	-	-	-	-	-	-
	A	ms	-	-	-	-	-	-
Break time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
Voltage closing coil		Vd.c.	-	-	-	-	-	-
Voltage opening coil		Vd.c.	-	-	-	-	-	-
Gas pressure at 20 °C		MPa	-	-	-	-	-	-
Operating pressure		MPa	-	-	-	-	-	-

Remarks	
160330-4067	Recloser cleared.
160330-4068	Recloser closed and cleared.
160330-4069	Recloser closed and cleared.
160330-4070	Recloser closed and cleared.
160330-4071	Recloser cleared.
160330-4072	Recloser closed and cleared.



T50 (continued)								
Test no.			160330 4073	160330 4074	160330 4075	160330 4076	160330 4077	160330 4078
Time interval since previous test		min	-	-	-	-	-	-
Time interval between operations		s	1,06	1,07	-	0,161	1,06	1,06
Operation			CO	CO	O	CO	CO	CO
	A	kV	24,4	24,5	-	23,6	24,3	23,5
Applied voltage, phase value	B	kV	24,0	24,1	-	24,0	23,9	24,1
	C	kV	24,0	24,3	-	24,0	23,9	24,1
Applied voltage, between phases		kV	41,8	42,1	-	41,3	41,7	41,4
	A	kA	15,3	-21,7	-	-20,7	-15,8	-21,0
Making current, peak	B	kA	18,3	20,2	-	12,3	21,8	12,6
	C	kA	-21,6	14,1	-	19,9	-18,2	20,0
	A	kA	8,41	8,52	8,33	8,35	8,40	8,48
Breaking current, phase value	B	kA	8,44	8,53	8,37	8,37	8,42	8,47
	C	kA	8,38	8,45	8,32	8,33	8,33	8,43
Average current, three phase		kA	8,41	8,50	8,34	8,35	8,38	8,46
	A	%	3	11	8	10	5	9
Breaking current, DC-component	B	%	9	9	13	0	13	0
	C	%	12	2	19	10	9	10
	A	kV	24,2	24,3	23,3	24,1	24,2	24,2
Recovery voltage, phase value	B	kV	23,7	23,2	23,5	23,7	23,7	23,2
	C	kV	23,0	24,0	23,7	23,0	23,0	23,9
Recovery voltage, between phases		kV	41,0	41,3	40,7	40,9	40,9	41,1
	A	kV	-48,4	-48,0	-82,7	48,8	-47,7	-48,2
TRV, peak	B	kV	47,9	83,5	-46,8	-47,4	47,2	84,2
	C	kV	-82,4	48,6	46,2	82,6	-82,3	47,4
	A	ms	-	-	-	-	-	-
Make time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
	A	ms	8,3	8,2	2,9	8,9	7,0	5,8
Arc duration	B	ms	8,3	3,9	6,9	8,9	7,0	1,9
	C	ms	3,8	8,2	6,9	4,4	2,8	5,8
Opening time		ms	-	-	-	-	-	-
	A	ms	-	-	-	-	-	-
Break time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
Voltage closing coil		Vd.c.	-	-	-	-	-	-
Voltage opening coil		Vd.c.	-	-	-	-	-	-
Gas pressure at 20 °C		MPa	-	-	-	-	-	-
Operating pressure		MPa	-	-	-	-	-	-

Remarks	
160330-4073	Recloser closed and cleared.
160330-4074	Recloser closed and cleared.
160330-4075	Recloser cleared.
160330-4076	Recloser closed and cleared.
160330-4077	Recloser closed and cleared.
160330-4078	Recloser closed and cleared.

T50 (continued)								
Test no.			160330 4079	160330 4080	160330 4081	160330 4082	160330 4083	160330 4084
Time interval since previous test		min	-	-	-	-	-	-
Time interval between operations		s	-	0,161	1,06	1,06	-	0,161
Operation			O	CO	CO	CO	O	CO
	A	kV	-	23,5	24,3	24,4	-	23,6
Applied voltage, phase value	B	kV	-	24,0	24,0	24,1	-	24,0
	C	kV	-	23,2	23,2	24,2	-	24,1
Applied voltage, between phases		kV	-	40,8	41,3	42,0	-	41,4
	A	kA	-	-20,4	14,2	-22,0	-	-21,1
Making current, peak	B	kA	-	-13,0	18,7	17,7	-	-12,8
	C	kA	-	20,7	-21,0	16,5	-	21,1
	A	kA	8,33	8,35	8,40	8,51	8,33	8,36
Breaking current, phase value	B	kA	8,37	8,38	8,42	8,49	8,37	8,38
	C	kA	8,32	8,33	8,37	8,44	8,33	8,34
Average current, three phase		kA	8,34	8,35	8,40	8,48	8,34	8,36
	A	%	8	9	2	11	8	10
Breaking current, DC-component	B	%	12	2	9	6	12	1
	C	%	19	10	11	6	19	11
	A	kV	23,3	24,1	24,2	24,2	23,4	24,1
Recovery voltage, phase value	B	kV	23,5	23,7	23,7	23,2	23,5	23,7
	C	kV	23,7	23,0	23,0	23,9	23,8	22,9
Recovery voltage, between phases		kV	40,7	40,9	40,9	41,2	40,8	40,8
	A	kV	-82,9	48,0	-48,5	-48,3	-82,9	48,0
TRV, peak	B	kV	-47,8	-48,3	47,6	83,8	-48,0	-48,4
	C	kV	45,4	82,4	-112	47,6	45,6	82,1
	A	ms	-	-	-	-	-	-
Make time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
	A	ms	3,3	8,1	8,0	7,2	3,6	8,4
Arc duration	B	ms	7,3	8,1	8,0	3,1	7,5	8,4
	C	ms	7,3	3,6	3,6	7,2	7,5	3,9
Opening time		ms	-	-	-	-	-	-
	A	ms	-	-	-	-	-	-
Break time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
Voltage closing coil		Vd.c.	-	-	-	-	-	-
Voltage opening coil		Vd.c.	-	-	-	-	-	-
Gas pressure at 20 °C		MPa	-	-	-	-	-	-
Operating pressure		MPa	-	-	-	-	-	-

Remarks	
160330-4079	Recloser cleared.
160330-4080	Recloser closed and cleared.
160330-4081	Recloser closed and cleared.
160330-4082	Recloser closed and cleared.
160330-4083	Recloser cleared.
160330-4084	Recloser closed and cleared.

T50 (continued)								
Test no.			160330 4085	160330 4086	160330 4087	160330 4088	160330 4089	160330 4090
Time interval since previous test		min	-	-	-	-	-	-
Time interval between operations		s	1,06	1,06	-	0,163	1,06	1,06
Operation			CO	CO	O	CO	CO	CO
	A	kV	24,4	24,5	-	24,4	24,5	24,6
Applied voltage, phase value	B	kV	23,2	24,1	-	24,0	24,1	23,4
	C	kV	24,1	24,2	-	24,0	23,2	23,4
Applied voltage, between phases		kV	41,4	42,0	-	41,8	41,4	41,2
	A	kA	-13,2	-21,7	-	-21,5	-12,2	-13,3
Making current, peak	B	kA	20,9	16,1	-	16,2	20,4	21,2
	C	kA	-20,3	17,7	-	17,2	-20,9	-20,5
	A	kA	8,41	8,50	8,37	8,35	8,43	8,53
Breaking current, phase value	B	kA	8,43	8,49	8,37	8,37	8,45	8,52
	C	kA	8,34	8,45	8,33	8,33	8,39	8,46
Average current, three phase		kA	8,39	8,48	8,36	8,35	8,43	8,50
	A	%	1	11	7	11	0	1
Breaking current, DC-component	B	%	12	4	13	4	11	12
	C	%	11	7	21	6	11	10
	A	kV	24,2	24,2	24,0	23,4	24,3	24,3
Recovery voltage, phase value	B	kV	23,7	23,2	23,7	23,8	23,8	23,2
	C	kV	23,0	24,1	23,5	23,8	23,2	24,0
Recovery voltage, between phases		kV	40,9	41,3	41,1	41,0	41,2	41,3
	A	kV	-47,5	-46,8	-47,8	-82,5	-48,1	-48,8
TRV, peak	B	kV	48,0	83,9	83,8	-48,3	47,7	83,6
	C	kV	-82,5	49,3	46,5	47,5	-82,7	48,9
	A	ms	-	-	-	-	-	-
Make time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
	A	ms	7,3	6,8	6,0	2,8	8,6	7,7
Arc duration	B	ms	7,3	2,8	2,6	7,3	8,6	3,1
	C	ms	3,0	6,8	6,0	7,3	4,3	7,7
Opening time		ms	-	-	-	-	-	-
	A	ms	-	-	-	-	-	-
Break time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
Voltage closing coil		Vd.c.	-	-	-	-	-	-
Voltage opening coil		Vd.c.	-	-	-	-	-	-
Gas pressure at 20 °C		MPa	-	-	-	-	-	-
Operating pressure		MPa	-	-	-	-	-	-

Remarks	
160330-4085	Recloser closed and cleared.
160330-4086	Recloser closed and cleared.
160330-4087	Recloser cleared.
160330-4088	Recloser closed and cleared.
160330-4089	Recloser closed and cleared.
160330-4090	Recloser closed and cleared.

T50 (continued)								
Test no.			160330 4091	160330 4092	160330 4093	160330 4094	160330 4099	160330 4100
Time interval since previous test		min	-	-	-	-	-	-
Time interval between operations		s	-	0,163	1,06	1,06	-	0,161
Operation			O	CO	CO	CO	O	CO
	A	kV	-	24,4	24,4	24,5	-	24,4
Applied voltage, phase value	B	kV	-	24,0	24,0	24,1	-	24,0
	C	kV	-	24,0	23,2	24,1	-	23,9
Applied voltage, between phases		kV	-	41,8	41,3	42,0	-	41,8
	A	kA	-	-21,7	14,0	-22,0	-	-21,1
Making current, peak	B	kA	-	17,5	19,0	18,7	-	14,6
	C	kA	-	16,3	-21,1	15,7	-	18,2
	A	kA	8,37	8,35	8,40	8,52	8,34	8,36
Breaking current, phase value	B	kA	8,37	8,37	8,43	8,52	8,38	8,38
	C	kA	8,32	8,32	8,37	8,45	8,33	8,33
Average current, three phase		kA	8,35	8,35	8,40	8,49	8,35	8,36
	A	%	7	12	2	11	8	10
Breaking current, DC-component	B	%	13	6	10	7	12	2
	C	%	20	5	11	5	19	7
	A	kV	24,0	23,3	24,2	24,3	23,3	24,1
Recovery voltage, phase value	B	kV	23,7	23,8	23,8	23,2	23,5	23,7
	C	kV	23,5	23,8	23,1	23,9	23,6	23,1
Recovery voltage, between phases		kV	41,1	41,0	41,0	41,2	40,7	41,0
	A	kV	-48,9	-82,5	-47,8	-48,2	-83,1	48,0
TRV, peak	B	kV	83,9	-48,4	47,8	83,8	-48,1	-48,4
	C	kV	46,1	47,4	-82,5	48,4	45,5	82,9
	A	ms	-	-	-	-	-	-
Make time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
	A	ms	5,4	2,6	8,4	7,9	3,5	9,2
Arc duration	B	ms	2,0	7,1	8,4	3,8	7,4	9,2
	C	ms	5,4	7,2	4,0	7,9	7,4	4,7
Opening time		ms	-	-	-	-	-	-
	A	ms	-	-	-	-	-	-
Break time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
Voltage closing coil		Vd.c.	-	-	-	-	-	-
Voltage opening coil		Vd.c.	-	-	-	-	-	-
Gas pressure at 20 °C		MPa	-	-	-	-	-	-
Operating pressure		MPa	-	-	-	-	-	-

Remarks	
160330-4091	Recloser cleared.
160330-4092	Recloser closed and cleared.
160330-4093	Recloser closed and cleared.
160330-4094	Recloser closed and cleared.
160330-4099	Recloser cleared.
160330-4100	Recloser closed and cleared.



<b>T50 (continued)</b>							
Test no.		160330 4101	160330 4102				
Time interval since previous test	min	-	-				
Time interval between operations	s	1,06	1,06				
Operation		CO	CO				
	A	kV	23,5	24,6			
Applied voltage, phase value	B	kV	23,2	24,3			
	C	kV	24,0	24,3			
Applied voltage, between phases		kV	40,8	42,2			
	A	kA	20,5	17,0			
Making current, peak	B	kA	-20,9	17,3			
	C	kA	-12,3	-21,9			
	A	kA	8,44	8,52			
Breaking current, phase value	B	kA	8,45	8,55			
	C	kA	8,37	8,49			
Average current, three phase		kA	8,42	8,52			
	A	%	10	5			
Breaking current, DC-component	B	%	10	7			
	C	%	0	12			
	A	kV	24,1	23,6			
Recovery voltage, phase value	B	kV	23,1	24,1			
	C	kV	23,9	23,9			
Recovery voltage, between phases		kV	41,1	41,4			
	A	kV	48,3	84,0			
TRV, peak	B	kV	-83,0	47,9			
	C	kV	-48,2	-47,9			
	A	ms	-	-			
Make time	B	ms	-	-			
	C	ms	-	-			
	A	ms	8,2	3,2			
Arc duration	B	ms	3,9	7,3			
	C	ms	8,2	7,3			
Opening time		ms	-	-			
	A	ms	-	-			
Break time	B	ms	-	-			
	C	ms	-	-			
Voltage closing coil	Vd.c.	-	-				
Voltage opening coil	Vd.c.	-	-				
Gas pressure at 20 °C	MPa	-	-				
Operating pressure	MPa	-	-				

Remarks	
160330-4101	Recloser closed and cleared.
160330-4102	Recloser closed and cleared.

T20								
Test no.			160331 4005	160331 4006	160331 4007	160331 4008	160331 4009	160331 4010
Time interval since previous test		min	-	-	-	-	-	-
Time interval between operations		s	-	-	0,155	1,06	1,06	-
Operation			O	O	CO	CO	CO	O
	A	kV	-	-	25,1	25,0	25,1	-
Applied voltage, phase value	B	kV	-	-	25,0	24,8	24,9	-
	C	kV	-	-	24,9	24,9	25,1	-
Applied voltage, between phases		kV	-	-	43,3	43,1	43,3	-
	A	kA	-	-	-5,29	-7,68	-5,40	-
Making current, peak	B	kA	-	-	-6,37	5,03	7,79	-
	C	kA	-	-	7,56	6,53	-6,60	-
	A	kA	2,87	2,88	2,89	2,89	2,91	2,89
Breaking current, phase value	B	kA	2,77	2,79	2,80	2,79	2,81	2,80
	C	kA	2,80	2,82	2,84	2,83	2,84	2,83
Average current, three phase		kA	2,81	2,83	2,84	2,83	2,85	2,84
	A	%	1	20	12	38	14	22
Breaking current, DC-component	B	%	3	39	38	8	55	39
	C	%	1	59	49	31	39	60
	A	kV	24,6	24,9	24,9	25,0	25,1	25,0
Recovery voltage, phase value	B	kV	24,4	25,3	25,7	24,8	24,8	24,9
	C	kV	24,6	24,8	24,9	25,0	24,9	24,7
Recovery voltage, between phases		kV	42,5	43,3	43,6	43,2	43,2	43,0
	A	kV	-51,4	47,1	49,2	-77,1	86,5	49,2
TRV, peak	B	kV	87,9	-80,4	-81,2	-55,2	46,9	-52,6
	C	kV	50,4	-46,6	-48,5	49,9	-42,1	68,5
	A	ms	-	-	-	-	-	-
Make time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
	A	ms	12,8	11,5	11,9	4,4	2,3	8,1
Arc duration	B	ms	8,9	5,3	6,0	9,2	4,6	8,1
	C	ms	12,8	11,5	11,9	9,2	4,6	2,5
Opening time		ms	-	-	-	-	-	-
	A	ms	-	-	-	-	-	-
Break time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
Voltage closing coil		Vd.c.	-	-	-	-	-	-
Voltage opening coil		Vd.c.	-	-	-	-	-	-
Gas pressure at 20 °C		MPa	-	-	-	-	-	-
Operating pressure		MPa	-	-	-	-	-	-

Remarks	
160331-4005	Tests to prove the prospective current and TRV. Test performed on an auxiliary breaker of the test plant.
160331-4006	Recloser cleared.
160331-4007	Recloser closed and cleared.
160331-4008	Recloser closed and cleared.
160331-4009	Recloser closed and cleared.
160331-4010	Recloser cleared.

T20 (continued)								
Test no.			160331 4011	160331 4012	160331 4013	160331 4014	160331 4015	160331 4016
Time interval since previous test		min	-	-	-	-	-	-
Time interval between operations		s	0,164	1,07	1,06	-	0,164	1,07
Operation			CO	CO	CO	O	CO	CO
	A	kV	25,2	25,1	25,3	-	25,1	25,0
Applied voltage, phase value	B	kV	25,0	25,0	25,2	-	25,0	24,9
	C	kV	25,0	25,0	25,2	-	25,1	24,9
Applied voltage, between phases		kV	43,4	43,4	43,7	-	43,5	43,2
	A	kA	-7,14	-7,92	-4,84	-	-6,81	-7,64
Making current, peak	B	kA	-4,85	6,04	7,45	-	-5,15	5,14
	C	kA	7,79	5,81	-6,90	-	7,79	6,40
	A	kA	2,89	2,91	2,93	2,88	2,89	2,89
Breaking current, phase value	B	kA	2,80	2,81	2,84	2,79	2,79	2,80
	C	kA	2,83	2,84	2,87	2,83	2,82	2,83
Average current, three phase		kA	2,84	2,85	2,88	2,84	2,84	2,84
	A	%	31	40	7	20	27	37
Breaking current, DC-component	B	%	18	22	49	40	22	10
	C	%	49	19	41	59	50	28
	A	kV	25,0	26,2	25,3	25,0	24,9	25,1
Recovery voltage, phase value	B	kV	24,8	24,9	25,2	24,9	24,8	24,8
	C	kV	24,8	25,1	25,2	24,8	24,7	24,9
Recovery voltage, between phases		kV	43,1	44,0	43,7	43,1	43,0	43,2
	A	kV	50,1	-76,6	-46,4	49,3	49,9	-77,4
TRV, peak	B	kV	-53,0	-56,2	49,9	-52,4	-53,3	-55,4
	C	kV	74,9	50,5	-79,7	69,3	74,4	49,7
	A	ms	-	-	-	-	-	-
Make time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
	A	ms	7,7	4,3	7,7	8,1	7,5	2,9
Arc duration	B	ms	7,7	9,5	7,7	8,1	7,5	7,7
	C	ms	1,9	9,5	3,2	2,6	1,9	7,7
Opening time		ms	-	-	-	-	-	-
	A	ms	-	-	-	-	-	-
Break time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
Voltage closing coil		Vd.c.	-	-	-	-	-	-
Voltage opening coil		Vd.c.	-	-	-	-	-	-
Gas pressure at 20 °C		MPa	-	-	-	-	-	-
Operating pressure		MPa	-	-	-	-	-	-

Remarks	
160331-4011	Recloser closed and cleared.
160331-4012	Recloser closed and cleared.
160331-4013	Recloser closed and cleared.
160331-4014	Recloser cleared.
160331-4015	Recloser closed and cleared.
160331-4016	Recloser closed and cleared.

T20 (continued)								
Test no.			160331 4017	160331 4018	160331 4019	160331 4020	160331 4021	160331 4022
Time interval since previous test		min	-	-	-	-	-	-
Time interval between operations		s	1,06	-	0,164	1,06	1,06	-
Operation			CO	O	CO	CO	CO	O
	A	kV	25,2	-	25,2	25,0	25,2	-
Applied voltage, phase value	B	kV	25,0	-	25,0	24,9	25,0	-
	C	kV	25,0	-	25,0	24,9	25,1	-
Applied voltage, between phases		kV	43,4	-	43,4	43,2	43,5	-
	A	kA	-5,49	-	-7,40	-7,77	-5,50	-
Making current, peak	B	kA	7,81	-	-4,58	5,37	7,78	-
	C	kA	-6,54	-	7,76	6,30	-6,52	-
	A	kA	2,92	2,88	2,89	2,90	2,92	2,89
Breaking current, phase value	B	kA	2,82	2,79	2,79	2,80	2,82	2,80
	C	kA	2,85	2,83	2,82	2,83	2,85	2,83
Average current, three phase		kA	2,86	2,84	2,84	2,84	2,86	2,84
	A	%	15	20	33	38	15	20
Breaking current, DC-component	B	%	53	39	14	13	53	39
	C	%	38	59	48	27	38	59
	A	kV	25,2	25,0	24,9	26,2	25,2	25,0
Recovery voltage, phase value	B	kV	25,1	24,9	24,7	24,8	24,9	24,9
	C	kV	25,0	24,8	24,8	25,0	25,1	24,7
Recovery voltage, between phases		kV	43,4	43,1	43,0	43,9	43,4	43,0
	A	kV	-45,4	49,1	47,3	-76,9	-51,5	49,6
TRV, peak	B	kV	48,6	-52,7	-86,4	-55,8	75,5	-52,5
	C	kV	-80,0	69,2	-46,9	50,2	50,5	69,8
	A	ms	-	-	-	-	-	-
Make time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
	A	ms	6,4	8,0	11,3	3,4	10,4	9,2
Arc duration	B	ms	6,4	8,0	5,7	8,4	4,6	9,2
	C	ms	2,2	2,5	11,3	8,4	10,4	3,6
Opening time		ms	-	-	-	-	-	-
	A	ms	-	-	-	-	-	-
Break time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
Voltage closing coil		Vd.c.	-	-	-	-	-	-
Voltage opening coil		Vd.c.	-	-	-	-	-	-
Gas pressure at 20 °C		MPa	-	-	-	-	-	-
Operating pressure		MPa	-	-	-	-	-	-

Remarks	
160331-4017	Recloser closed and cleared.
160331-4018	Recloser cleared.
160331-4019	Recloser closed and cleared.
160331-4020	Recloser closed and cleared.
160331-4021	Recloser closed and cleared.
160331-4022	Recloser cleared.



T20 (continued)								
Test no.			160331 4023	160331 4024	160331 4025	160331 4026	160331 4027	160331 4028
Time interval since previous test		min	-	-	-	-	-	-
Time interval between operations		s	0,163	1,07	1,06	-	0,158	1,06
Operation			CO	CO	CO	O	CO	CO
	A	kV	25,2	25,1	25,3	-	25,1	25,1
Applied voltage, phase value	B	kV	25,0	25,0	25,1	-	25,0	25,0
	C	kV	25,0	25,1	25,3	-	25,0	25,0
Applied voltage, between phases		kV	43,4	43,4	43,7	-	43,4	43,4
	A	kA	-7,39	-7,93	-4,33	-	-5,43	5,34
Making current, peak	B	kA	-4,19	6,44	7,36	-	7,67	6,38
	C	kA	7,32	5,44	-7,35	-	-6,44	-7,61
	A	kA	2,89	2,90	2,93	2,89	2,89	2,90
Breaking current, phase value	B	kA	2,80	2,80	2,83	2,79	2,79	2,81
	C	kA	2,83	2,84	2,87	2,82	2,82	2,84
Average current, three phase		kA	2,84	2,85	2,88	2,83	2,83	2,85
	A	%	34	40	1	26	14	12
Breaking current, DC-component	B	%	8	28	49	58	52	38
	C	%	42	14	47	31	37	49
	A	kV	24,9	25,1	25,3	25,0	25,0	25,0
Recovery voltage, phase value	B	kV	24,8	25,0	25,0	24,7	24,7	24,9
	C	kV	24,9	25,0	25,1	24,7	24,9	24,9
Recovery voltage, between phases		kV	43,1	43,3	43,5	42,9	43,1	43,2
	A	kV	49,6	-49,0	84,3	-51,2	-51,1	-49,2
TRV, peak	B	kV	-52,9	84,1	46,2	71,5	74,7	52,4
	C	kV	78,1	47,9	-41,9	50,7	50,3	-74,9
	A	ms	-	-	-	-	-	-
Make time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
	A	ms	9,0	6,3	1,8	8,1	7,5	8,0
Arc duration	B	ms	9,0	2,2	4,4	2,3	1,7	8,0
	C	ms	3,4	6,3	4,4	8,1	7,5	2,8
Opening time		ms	-	-	-	-	-	-
	A	ms	-	-	-	-	-	-
Break time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
Voltage closing coil		Vd.c.	-	-	-	-	-	-
Voltage opening coil		Vd.c.	-	-	-	-	-	-
Gas pressure at 20 °C		MPa	-	-	-	-	-	-
Operating pressure		MPa	-	-	-	-	-	-

Remarks	
160331-4023	Recloser closed and cleared.
160331-4024	Recloser closed and cleared.
160331-4025	Recloser closed and cleared.
160331-4026	Recloser cleared.
160331-4027	Recloser closed and cleared.
160331-4028	Recloser closed and cleared.

T20 (continued)								
Test no.			160331 4029	160331 4030	160331 4031	160331 4032	160331 4033	160331 4034
Time interval since previous test		min	-	-	-	-	-	-
Time interval between operations		s	1,07	-	0,159	1,06	1,06	-
Operation			CO	O	CO	CO	CO	O
	A	kV	25,3	-	25,1	25,0	25,0	-
Applied voltage, phase value	B	kV	25,1	-	25,0	24,8	24,9	-
	C	kV	25,3	-	24,9	24,9	25,0	-
Applied voltage, between phases		kV	43,7	-	43,3	43,1	43,2	-
	A	kA	8,02	-	-6,07	-4,22	7,89	-
Making current, peak	B	kA	-7,01	-	7,73	7,21	-5,07	-
	C	kA	-5,01	-	-5,81	-7,23	-6,71	-
	A	kA	2,93	2,88	2,89	2,88	2,90	2,89
Breaking current, phase value	B	kA	2,83	2,78	2,79	2,79	2,80	2,80
	C	kA	2,86	2,82	2,82	2,82	2,83	2,82
Average current, three phase		kA	2,87	2,83	2,83	2,83	2,85	2,84
	A	%	40	27	21	1	39	27
Breaking current, DC-component	B	%	36	59	51	48	8	57
	C	%	7	30	29	47	33	30
	A	kV	25,1	25,0	24,9	24,9	25,0	25,0
Recovery voltage, phase value	B	kV	25,0	24,7	24,8	24,8	24,9	24,7
	C	kV	25,1	24,8	24,8	25,0	24,9	24,8
Recovery voltage, between phases		kV	43,4	43,0	43,0	43,1	43,2	43,0
	A	kV	77,4	-51,9	-81,7	-49,9	46,3	-51,8
TRV, peak	B	kV	56,2	70,7	-51,0	77,0	-86,9	72,5
	C	kV	-50,4	50,8	45,4	49,6	-45,5	50,1
	A	ms	-	-	-	-	-	-
Make time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
	A	ms	5,1	7,9	4,8	10,2	5,2	10,4
Arc duration	B	ms	10,7	2,0	10,7	4,2	2,0	4,6
	C	ms	10,7	7,8	10,7	10,2	5,2	10,3
Opening time		ms	-	-	-	-	-	-
	A	ms	-	-	-	-	-	-
Break time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
Voltage closing coil		Vd.c.	-	-	-	-	-	-
Voltage opening coil		Vd.c.	-	-	-	-	-	-
Gas pressure at 20 °C		MPa	-	-	-	-	-	-
Operating pressure		MPa	-	-	-	-	-	-

Remarks	
160331-4029	Recloser closed and cleared.
160331-4030	Recloser cleared.
160331-4031	Recloser closed and cleared.
160331-4032	Recloser closed and cleared.
160331-4033	Recloser closed and cleared.
160331-4034	Recloser cleared.

<b>T20 (continued)</b>							
Test no.		160331 4035	160331 4036	160331 4037			
Time interval since previous test	min	-	-	-			
Time interval between operations	s	0,157	1,06	1,06			
Operation		CO	CO	CO			
	A	kV	25,1	25,1	25,3		
Applied voltage, phase value	B	kV	25,0	24,9	25,1		
	C	kV	25,0	24,9	25,2		
Applied voltage, between phases		kV	43,3	43,3	43,6		
	A	kA	4,80	7,62	7,02		
Making current, peak	B	kA	6,70	4,26	-7,70		
	C	kA	-7,43	-7,59	4,83		
	A	kA	2,89	2,90	2,93		
Breaking current, phase value	B	kA	2,80	2,80	2,84		
	C	kA	2,82	2,84	2,86		
Average current, three phase		kA	2,84	2,85	2,88		
	A	%	6	36	31		
Breaking current, DC-component	B	%	41	9	48		
	C	%	47	45	16		
	A	kV	24,9	25,0	25,3		
Recovery voltage, phase value	B	kV	24,9	24,9	24,9		
	C	kV	24,9	25,1	25,2		
Recovery voltage, between phases		kV	43,2	43,2	43,5		
	A	kV	-49,7	77,8	52,1		
TRV, peak	B	kV	79,5	53,0	-78,2		
	C	kV	49,0	-47,5	-50,6		
	A	ms	-	-	-		
Make time	B	ms	-	-	-		
	C	ms	-	-	-		
	A	ms	9,0	2,2	9,0		
Arc duration	B	ms	3,0	6,5	3,8		
	C	ms	9,0	6,5	9,0		
Opening time		ms	-	-	-		
	A	ms	-	-	-		
Break time	B	ms	-	-	-		
	C	ms	-	-	-		
Voltage closing coil	Vd.c.	-	-	-			
Voltage opening coil	Vd.c.	-	-	-			
Gas pressure at 20 °C	MPa	-	-	-			
Operating pressure	MPa	-	-	-			

Remarks	
160331-4035	Recloser closed and cleared.
160331-4036	Recloser closed and cleared.
160331-4037	Recloser closed and cleared.

T20								
Test no.			160331 4038	160331 4039	160331 4040	160331 4041	160331 4042	160331 4043
Time interval since previous test		min	-	-	-	-	-	-
Time interval between operations		s	-	0,158	1,06	1,06	-	0,164
Operation			O	CO	CO	CO	O	CO
	A	kV	-	25,2	25,2	25,4	-	25,2
Applied voltage, phase value	B	kV	-	24,9	24,9	25,1	-	24,9
	C	kV	-	25,1	25,0	25,1	-	24,9
Applied voltage, between phases		kV	-	43,4	43,4	43,6	-	43,3
	A	kA	-	-7,01	-5,32	7,51	-	5,53
Making current, peak	B	kA	-	7,47	7,60	-4,38	-	6,27
	C	kA	-	-4,81	-6,47	-7,66	-	-7,61
	A	kA	2,94	2,94	2,95	2,99	2,94	2,94
Breaking current, phase value	B	kA	2,74	2,75	2,76	2,79	2,75	2,75
	C	kA	2,81	2,82	2,83	2,86	2,81	2,82
Average current, three phase		kA	2,83	2,84	2,85	2,88	2,83	2,84
	A	%	23	24	10	27	23	10
Breaking current, DC-component	B	%	63	53	55	6	63	35
	C	%	27	10	34	53	28	52
	A	kV	25,0	24,9	25,1	25,3	25,0	25,0
Recovery voltage, phase value	B	kV	24,5	24,7	24,5	25,1	24,6	24,6
	C	kV	24,8	24,7	24,8	24,8	24,7	24,8
Recovery voltage, between phases		kV	42,9	42,9	42,9	43,4	42,9	43,0
	A	kV	-53,1	-53,8	-54,7	53,8	-53,4	-54,8
TRV, peak	B	kV	46,7	-51,2	49,9	58,9	46,1	55,6
	C	kV	57,7	59,8	57,3	-51,6	-56,4	52,8
	A	ms	-	-	-	-	-	-
Make time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
	A	ms	5,7	4,8	7,9	3,8	8,0	7,8
Arc duration	B	ms	1,8	12,4	3,9	10,2	4,0	3,9
	C	ms	9,8	8,4	11,8	5,8	2,3	11,7
Opening time		ms	-	-	-	-	-	-
	A	ms	-	-	-	-	-	-
Break time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
Voltage closing coil		Vd.c.	-	-	-	-	-	-
Voltage opening coil		Vd.c.	-	-	-	-	-	-
Gas pressure at 20 °C		MPa	-	-	-	-	-	-
Operating pressure		MPa	-	-	-	-	-	-

Remarks	
160331-4038	Recloser cleared.
160331-4039	Recloser closed and cleared.
160331-4040	Recloser closed and cleared.
160331-4041	Recloser closed and cleared.
160331-4042	Recloser cleared.
160331-4043	Recloser closed and cleared.



T20 (continued)								
Test no.			160331 4044	160331 4045	160331 4046	160331 4047	160331 4048	160331 4049
Time interval since previous test		min	-	-	-	-	-	-
Time interval between operations		s	1,06	1,07	-	0,156	1,06	1,07
Operation			CO	CO	O	CO	CO	CO
	A	kV	25,2	25,4	-	25,2	25,2	25,3
Applied voltage, phase value	B	kV	24,9	25,0	-	24,9	24,9	25,0
	C	kV	24,9	25,1	-	24,9	24,9	25,1
Applied voltage, between phases		kV	43,3	43,6	-	43,3	43,3	43,6
	A	kA	7,22	6,92	-	-5,19	5,12	7,99
Making current, peak	B	kA	-3,97	-7,62	-	7,52	6,58	-5,79
	C	kA	-7,74	5,09	-	-6,51	-7,47	-6,11
	A	kA	2,94	2,98	2,94	2,94	2,95	2,98
Breaking current, phase value	B	kA	2,76	2,79	2,75	2,75	2,76	2,78
	C	kA	2,83	2,85	2,81	2,82	2,83	2,85
Average current, three phase		kA	2,84	2,87	2,83	2,84	2,85	2,87
	A	%	25	23	24	9	7	32
Breaking current, DC-component	B	%	1	55	63	54	40	27
	C	%	55	14	26	35	50	31
	A	kV	25,0	25,2	25,0	25,0	25,1	25,2
Recovery voltage, phase value	B	kV	24,8	24,8	24,5	24,5	24,7	24,9
	C	kV	24,7	25,1	24,8	24,7	24,6	25,1
Recovery voltage, between phases		kV	43,0	43,3	42,9	42,8	43,0	43,4
	A	kV	53,4	53,6	-53,3	-54,5	-55,3	52,4
TRV, peak	B	kV	58,2	-50,7	45,7	50,2	53,9	-57,8
	C	kV	-50,5	-59,9	57,8	56,0	-51,0	-56,1
	A	ms	-	-	-	-	-	-
Make time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
	A	ms	1,8	6,8	6,2	5,6	10,6	5,9
Arc duration	B	ms	8,0	3,2	2,3	1,6	6,5	3,3
	C	ms	3,6	10,6	10,3	9,6	3,5	8,7
Opening time		ms	-	-	-	-	-	-
	A	ms	-	-	-	-	-	-
Break time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
Voltage closing coil		Vd.c.	-	-	-	-	-	-
Voltage opening coil		Vd.c.	-	-	-	-	-	-
Gas pressure at 20 °C		MPa	-	-	-	-	-	-
Operating pressure		MPa	-	-	-	-	-	-

Remarks	
160331-4044	Recloser closed and cleared.
160331-4045	Recloser closed and cleared.
160331-4046	Recloser cleared.
160331-4047	Recloser closed and cleared.
160331-4048	Recloser closed and cleared.
160331-4049	Recloser closed and cleared.

Line charging current interrupting tests							
Test no.		160331 4054	160331 4055	160331 4056	160331 4057	160331 4058	160331 4059
Operation		CO	CO	CO	CO	CO	CO
	A	kV	24,3	23,8	23,7	23,7	23,7
Applied voltage, phase value	B	kV	24,0	23,5	23,4	23,4	23,4
	C	kV	24,1	23,6	23,4	23,4	23,4
Applied voltage, between phases		kV	41,8	41,0	40,7	40,7	40,7
	A	ms	-	-	-	-	-
Make time	B	ms	-	-	-	-	-
	C	ms	-	-	-	-	-
Closing time		ms	-	-	-	-	-
	A	A	5,28	5,18	5,14	5,14	5,14
Breaking current, phase value	B	A	5,31	5,20	5,17	5,17	5,17
	C	A	5,30	5,20	5,17	5,17	5,17
Average current, three phase		A	5,30	5,19	5,16	5,16	5,16
	A	kV	24,3	23,8	23,7	23,7	23,7
Test voltage, phase value	B	kV	24,0	23,6	23,4	23,4	23,4
	C	kV	24,1	23,6	23,4	23,4	23,4
Test voltage, between phases		kV	41,8	41,0	40,7	40,7	40,7
Opening time		ms	-	-	-	-	-
	A	ms	2,5	3,4	3,5	3,2	1,1
Arc duration	B	ms	0,5	7,2	0,6	0,9	5,1
	C	ms	2,5	7,2	3,5	3,2	1,1
	A	ms	-	-	-	-	-
Break time	B	ms	-	-	-	-	-
	C	ms	-	-	-	-	-
	A	kV	-66,9	-70,2	-65,0	-65,2	-69,2
Recovery voltage, peak value	B	kV	71,2	-49,9	71,9	72,9	-50,4
	C	kV	67,4	65,9	47,1	49,2	65,4
	A	kV	-34,4	-33,7	-33,5	-33,5	-33,5
Supply voltage, peak value	B	kV	34,0	-33,3	33,1	33,1	-33,1
	C	kV	34,0	33,4	33,2	33,2	33,2
	A	kV	32,5	36,5	31,5	31,7	35,7
Load voltage, peak value	B	kV	-37,3	16,5	-38,9	-39,8	17,2
	C	kV	-33,4	-32,5	-13,9	-16,0	-32,2
Voltage closing coil	Vd.c.	-	-	-	-	-	-
Voltage opening coil	Vd.c.	-	-	-	-	-	-
Gas pressure at 20 °C	MPa	-	-	-	-	-	-
Operating pressure	MPa	-	-	-	-	-	-

Remarks	
160331-4054	Recloser closed and cleared.
160331-4055	Recloser closed and cleared.
160331-4056	Recloser closed and cleared.
160331-4057	Recloser closed and cleared.
160331-4058	Recloser closed and cleared.
160331-4059	Recloser closed and cleared.

Line charging current interrupting tests (continued)								
Test no.			160331 4060	160331 4061	160331 4062	160331 4063	160331 4064	160331 4065
Operation			CO	CO	CO	CO	CO	CO
	A	kV	23,7	23,7	23,7	23,7	23,7	23,7
Applied voltage, phase value	B	kV	23,4	23,4	23,4	23,4	23,4	23,4
	C	kV	23,4	23,4	23,4	23,5	23,4	23,4
Applied voltage, between phases		kV	40,7	40,7	40,7	40,7	40,7	40,7
	A	ms	-	-	-	-	-	-
Make time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
Closing time		ms	-	-	-	-	-	-
	A	A	5,14	5,14	5,14	5,17	5,15	5,15
Breaking current, phase value	B	A	5,17	5,17	5,17	5,17	5,18	5,18
	C	A	5,17	5,17	5,17	5,17	5,17	5,17
Average current, three phase		A	5,16	5,16	5,16	5,17	5,16	5,16
	A	kV	23,7	23,7	23,7	23,7	23,7	23,7
Test voltage, phase value	B	kV	23,4	23,4	23,4	23,4	23,4	23,4
	C	kV	23,5	23,5	23,5	23,5	23,4	23,4
Test voltage, between phases		kV	40,7	40,7	40,7	40,7	40,7	40,7
Opening time		ms	-	-	-	-	-	-
	A	ms	1,1	4,7	3,9	1,0	3,9	3,9
Arc duration	B	ms	3,9	4,7	3,9	2,9	3,8	3,9
	C	ms	3,9	0,7	1,1	2,9	1,2	0,9
	A	ms	-	-	-	-	-	-
Break time	B	ms	-	-	-	-	-	-
	C	ms	-	-	-	-	-	-
	A	kV	-73,6	47,7	49,2	-71,0	47,3	50,1
Recovery voltage, peak value	B	kV	-49,9	-65,4	-65,5	-49,5	-65,4	-65,5
	C	kV	65,3	65,7	72,9	65,3	72,1	73,1
	A	kV	-33,5	33,5	33,5	-33,5	33,5	33,4
Supply voltage, peak value	B	kV	-33,1	-33,2	-33,1	-33,1	-33,2	-33,2
	C	kV	33,2	33,2	33,2	33,2	33,2	33,2
	A	kV	40,2	-14,2	-15,7	37,5	-13,9	-16,6
Load voltage, peak value	B	kV	16,7	32,2	32,3	16,4	32,2	32,3
	C	kV	-32,1	-32,6	-39,7	-32,1	-38,9	-39,9
Voltage closing coil		Vd.c.	-	-	-	-	-	-
Voltage opening coil		Vd.c.	-	-	-	-	-	-
Gas pressure at 20 °C		MPa	-	-	-	-	-	-
Operating pressure		MPa	-	-	-	-	-	-

Remarks	
160331-4060	Recloser closed and cleared.
160331-4061	Recloser closed and cleared.
160331-4062	Recloser closed and cleared.
160331-4063	Recloser closed and cleared.
160331-4064	Recloser closed and cleared.
160331-4065	Recloser closed and cleared.

Line charging current interrupting tests (continued)							
Test no.		160331 4066	160331 4067	160331 4068	160331 4069	160331 4070	160331 4071
Operation		CO	CO	CO	CO	CO	CO
A	kV	23,7	23,7	23,7	23,7	23,7	23,7
Applied voltage, phase value	B	kV	23,4	23,4	23,4	23,4	23,4
C	kV	23,4	23,5	23,4	23,4	23,4	23,4
Applied voltage, between phases	kV	40,7	40,7	40,7	40,7	40,7	40,7
A	ms	-	-	-	-	-	-
Make time	B	ms	-	-	-	-	-
C	ms	-	-	-	-	-	-
Closing time	ms	-	-	-	-	-	-
A	A	5,15	5,15	5,14	5,15	5,15	5,14
Breaking current, phase value	B	A	5,18	5,18	5,17	5,17	5,18
C	A	5,16	5,17	5,17	5,16	5,17	5,17
Average current, three phase	A	5,16	5,16	5,16	5,16	5,16	5,16
A	kV	23,7	23,7	23,7	23,7	23,7	23,7
Test voltage, phase value	B	kV	23,4	23,4	23,4	23,4	23,4
C	kV	23,4	23,5	23,5	23,4	23,4	23,5
Test voltage, between phases	kV	40,7	40,7	40,7	40,7	40,7	40,7
Opening time	ms	-	-	-	-	-	-
A	ms	4,5	1,4	3,7	2,8	5,2	3,8
Arc duration	B	ms	0,9	3,4	3,7	2,8	3,9
C	ms	4,5	3,4	0,9	0,8	1,2	0,6
A	ms	-	-	-	-	-	-
Break time	B	ms	-	-	-	-	-
C	ms	-	-	-	-	-	-
A	kV	65,2	-71,5	49,7	49,3	48,5	43,2
Recovery voltage, peak value	B	kV	-71,5	-46,6	-65,5	-65,4	-65,0
C	kV	-49,8	65,0	73,1	71,0	66,1	66,8
A	kV	33,5	-33,5	33,5	33,4	33,5	33,5
Supply voltage, peak value	B	kV	-33,2	-33,1	-33,1	-33,2	-33,2
C	kV	-33,2	33,2	33,2	33,2	33,2	33,2
A	kV	-31,7	38,0	-16,2	-15,8	-15,0	-9,77
Load voltage, peak value	B	kV	38,4	13,5	32,3	32,2	31,8
C	kV	16,6	-31,8	-39,9	-37,9	-32,9	-33,6
Voltage closing coil	Vd.c.	-	-	-	-	-	-
Voltage opening coil	Vd.c.	-	-	-	-	-	-
Gas pressure at 20 °C	MPa	-	-	-	-	-	-
Operating pressure	MPa	-	-	-	-	-	-

Remarks	
160331-4066	Recloser closed and cleared.
160331-4067	Recloser closed and cleared.
160331-4068	Recloser closed and cleared.
160331-4069	Recloser closed and cleared.
160331-4070	Recloser closed and cleared.
160331-4071	Recloser closed and cleared.



Line charging current interrupting tests (continued)							
Test no.			160331 4072	160331 4073			
Operation			CO	CO			
	A	kV	23,7	23,7			
Applied voltage, phase value	B	kV	23,4	23,4			
	C	kV	23,4	23,4			
Applied voltage, between phases		kV	40,7	40,7			
	A	ms	-	-			
Make time	B	ms	-	-			
	C	ms	-	-			
Closing time		ms	-	-			
	A	A	5,15	5,15			
Breaking current, phase value	B	A	5,17	5,18			
	C	A	5,16	5,17			
Average current, three phase		A	5,16	5,16			
	A	kV	23,7	23,7			
Test voltage, phase value	B	kV	23,4	23,4			
	C	kV	23,4	23,5			
Test voltage, between phases		kV	40,7	40,7			
Opening time		ms	-	-			
	A	ms	2,7	1,1			
Arc duration	B	ms	2,7	3,0			
	C	ms	0,9	3,0			
	A	ms	-	-			
Break time	B	ms	-	-			
	C	ms	-	-			
	A	kV	47,7	-71,6			
Recovery voltage, peak value	B	kV	-65,4	-49,4			
	C	kV	70,1	65,3			
	A	kV	33,5	-33,5			
Supply voltage, peak value	B	kV	-33,2	33,1			
	C	kV	33,2	33,2			
	A	kV	-14,2	38,1			
Load voltage, peak value	B	kV	32,2	16,2			
	C	kV	-37,0	-32,1			
Voltage closing coil	Vd.c.		-	-			
Voltage opening coil	Vd.c.		-	-			
Gas pressure at 20 °C	MPa		-	-			
Operating pressure	MPa		-	-			

Remarks	
160331-4072	Recloser closed and cleared.
160331-4073	Recloser closed and cleared.

Cable charging current interrupting tests							
Test no.		160331 4075	160331 4076	160331 4077	160331 4078	160331 4079	160331 4080
Operation		CO	CO	CO	CO	CO	CO
	A	kV	24,0	23,9	23,8	23,8	23,8
Applied voltage, phase value	B	kV	23,7	23,6	23,6	23,6	23,6
	C	kV	23,7	23,6	23,6	23,6	23,6
Applied voltage, between phases		kV	41,2	41,1	41,0	41,0	41,0
	A	ms	-	-	-	-	-
Make time	B	ms	-	-	-	-	-
	C	ms	-	-	-	-	-
Closing time		ms	-	-	-	-	-
	A	A	42,8	42,6	42,5	42,5	42,5
Breaking current, phase value	B	A	42,9	42,7	42,6	42,6	42,6
	C	A	42,9	42,8	42,6	42,7	42,7
Average current, three phase		A	42,9	42,7	42,6	42,6	42,6
	A	kV	24,1	24,0	23,9	23,9	23,9
Test voltage, phase value	B	kV	23,8	23,7	23,6	23,6	23,7
	C	kV	23,8	23,7	23,7	23,7	23,7
Test voltage, between phases		kV	41,4	41,2	41,1	41,1	41,1
Opening time		ms	-	-	-	-	-
	A	ms	5,3	5,0	5,2	5,4	5,1
Arc duration	B	ms	1,2	5,0	5,2	1,3	5,1
	C	ms	5,3	0,9	1,1	5,4	1,0
	A	ms	-	-	-	-	-
Break time	B	ms	-	-	-	-	-
	C	ms	-	-	-	-	-
	A	kV	62,5	61,1	61,0	62,2	60,7
Recovery voltage, peak value	B	kV	-82,7	-62,5	-62,3	-82,1	-62,5
	C	kV	-61,6	81,8	81,6	-61,3	81,3
	A	kV	34,0	33,9	33,8	33,8	33,8
Supply voltage, peak value	B	kV	-33,6	-33,5	-33,4	-33,4	-33,4
	C	kV	-33,7	33,5	33,4	-33,5	33,4
	A	kV	-28,6	-27,3	-27,3	-28,5	-27,0
Load voltage, peak value	B	kV	49,2	29,0	28,9	48,8	29,2
	C	kV	27,9	-48,3	-48,2	27,8	-47,7
Voltage closing coil	Vd.c.	-	-	-	-	-	-
Voltage opening coil	Vd.c.	-	-	-	-	-	-
Gas pressure at 20 °C	MPa	-	-	-	-	-	-
Operating pressure	MPa	-	-	-	-	-	-

Remarks	
160331-4075	Recloser closed and cleared.
160331-4076	Recloser closed and cleared.
160331-4077	Recloser closed and cleared.
160331-4078	Recloser closed and cleared.
160331-4079	Recloser closed and cleared.
160331-4080	Recloser closed and cleared.

Cable charging current interrupting tests (continued)							
Test no.		160331 4081	160331 4082	160331 4083	160331 4084	160331 4085	160331 4086
Operation		CO	CO	CO	CO	CO	CO
	A	kV	23,8	23,8	23,8	23,8	23,8
Applied voltage, phase value	B	kV	23,6	23,6	23,6	23,5	23,5
	C	kV	23,6	23,6	23,6	23,5	23,5
Applied voltage, between phases		kV	41,0	41,0	41,0	40,9	40,9
	A	ms	-	-	-	-	-
Make time	B	ms	-	-	-	-	-
	C	ms	-	-	-	-	-
Closing time		ms	-	-	-	-	-
	A	A	42,5	42,5	42,5	42,4	42,4
Breaking current, phase value	B	A	42,6	42,5	42,6	42,5	42,5
	C	A	42,6	42,6	42,6	42,6	42,6
Average current, three phase		A	42,6	42,5	42,6	42,5	42,5
	A	kV	23,9	23,9	23,9	23,9	23,9
Test voltage, phase value	B	kV	23,6	23,6	23,7	23,6	23,6
	C	kV	23,7	23,7	23,7	23,6	23,6
Test voltage, between phases		kV	41,1	41,1	41,2	41,1	41,0
Opening time		ms	-	-	-	-	-
	A	ms	5,2	1,9	5,2	1,1	0,9
Arc duration	B	ms	1,1	6,0	1,1	5,2	5,0
	C	ms	5,2	6,2	5,2	5,1	5,0
	A	ms	-	-	-	-	-
Break time	B	ms	-	-	-	-	-
	C	ms	-	-	-	-	-
	A	kV	-62,2	-82,1	-62,0	-82,1	-82,0
Recovery voltage, peak value	B	kV	82,0	-61,4	82,2	-61,4	-61,3
	C	kV	60,8	62,2	61,1	62,2	62,0
	A	kV	-33,7	-33,8	-33,7	-33,8	-33,7
Supply voltage, peak value	B	kV	33,4	-33,4	33,4	-33,4	-33,4
	C	kV	33,5	33,5	33,5	33,5	33,4
	A	kV	28,6	48,4	28,4	48,4	48,4
Load voltage, peak value	B	kV	-48,7	28,0	-48,9	28,0	27,9
	C	kV	-27,4	-28,8	-27,6	-28,8	-28,6
Voltage closing coil	Vd.c.	-	-	-	-	-	-
Voltage opening coil	Vd.c.	-	-	-	-	-	-
Gas pressure at 20 °C	MPa	-	-	-	-	-	-
Operating pressure	MPa	-	-	-	-	-	-

Remarks	
160331-4081	Recloser closed and cleared.
160331-4082	Recloser closed and cleared.
160331-4083	Recloser closed and cleared.
160331-4084	Recloser closed and cleared.
160331-4085	Recloser closed and cleared.
160331-4086	Recloser closed and cleared.

Cable charging current interrupting tests (continued)							
Test no.		160331 4087	160331 4088	160331 4089	160331 4090	160331 4091	160331 4092
Operation		CO	CO	CO	CO	CO	CO
	A	kV	23,8	23,8	23,8	23,8	23,8
Applied voltage, phase value	B	kV	23,5	23,5	23,5	23,5	23,5
	C	kV	23,5	23,6	23,5	23,6	23,6
Applied voltage, between phases		kV	40,9	40,9	40,9	40,9	40,9
	A	ms	-	-	-	-	-
Make time	B	ms	-	-	-	-	-
	C	ms	-	-	-	-	-
Closing time		ms	-	-	-	-	-
	A	A	42,4	42,4	42,4	42,4	42,4
Breaking current, phase value	B	A	42,5	42,5	42,5	42,5	42,5
	C	A	42,5	42,5	42,5	42,6	42,6
Average current, three phase		A	42,5	42,5	42,5	42,5	42,5
	A	kV	23,9	23,9	23,9	23,9	23,9
Test voltage, phase value	B	kV	23,6	23,6	23,6	23,6	23,6
	C	kV	23,6	23,6	23,6	23,7	23,6
Test voltage, between phases		kV	41,0	41,1	41,0	41,1	41,1
Opening time		ms	-	-	-	-	-
	A	ms	5,2	1,2	5,0	1,3	1,2
Arc duration	B	ms	1,1	5,3	1,0	5,3	1,1
	C	ms	5,2	5,5	5,0	5,3	5,4
	A	ms	-	-	-	-	-
Break time	B	ms	-	-	-	-	-
	C	ms	-	-	-	-	-
	A	kV	-61,8	-81,8	-62,0	-81,9	-81,9
Recovery voltage, peak value	B	kV	82,1	-61,1	81,9	-61,3	-61,3
	C	kV	61,0	62,2	60,8	62,1	62,0
	A	kV	-33,7	-33,7	-33,6	-33,7	-33,7
Supply voltage, peak value	B	kV	33,4	-33,4	33,3	-33,4	-33,4
	C	kV	33,4	33,3	33,4	33,4	33,4
	A	kV	28,3	48,2	28,4	48,3	48,3
Load voltage, peak value	B	kV	-48,8	27,8	-48,6	27,9	28,0
	C	kV	-27,6	-28,8	-27,4	-28,7	-28,7
Voltage closing coil	Vd.c.	-	-	-	-	-	-
Voltage opening coil	Vd.c.	-	-	-	-	-	-
Gas pressure at 20 °C	MPa	-	-	-	-	-	-
Operating pressure	MPa	-	-	-	-	-	-

Remarks	
160331-4087	Recloser closed and cleared.
160331-4088	Recloser closed and cleared.
160331-4089	Recloser closed and cleared.
160331-4090	Recloser closed and cleared.
160331-4091	Recloser closed and cleared.
160331-4092	Recloser closed and cleared.



Cable charging current interrupting tests (continued)							
Test no.			160331 4093	160331 4094			
Operation			CO	CO			
	A	kV	23,8	23,8			
Applied voltage, phase value	B	kV	23,5	23,5			
	C	kV	23,5	23,5			
Applied voltage, between phases		kV	40,9	40,9			
	A	ms	-	-			
Make time	B	ms	-	-			
	C	ms	-	-			
Closing time		ms	-	-			
	A	A	42,4	42,4			
Breaking current, phase value	B	A	42,5	42,5			
	C	A	42,6	42,6			
Average current, three phase		A	42,5	42,5			
	A	kV	23,9	23,9			
Test voltage, phase value	B	kV	23,6	23,6			
	C	kV	23,6	23,6			
Test voltage, between phases		kV	41,0	41,0			
Opening time		ms	-	-			
	A	ms	5,2	1,9			
Arc duration	B	ms	1,1	6,0			
	C	ms	5,2	6,0			
	A	ms	-	-			
Break time	B	ms	-	-			
	C	ms	-	-			
	A	kV	-61,9	-82,0			
Recovery voltage, peak value	B	kV	81,9	-61,4			
	C	kV	60,8	62,1			
	A	kV	-33,6	-33,7			
Supply voltage, peak value	B	kV	33,3	-33,3			
	C	kV	33,4	33,4			
	A	kV	28,4	48,4			
Load voltage, peak value	B	kV	-48,7	28,0			
	C	kV	-27,4	-28,7			
Voltage closing coil		Vd.c.	-	-			
Voltage opening coil		Vd.c.	-	-			
Gas pressure at 20 °C		MPa	-	-			
Operating pressure		MPa	-	-			

Remarks	
160331-4093	Recloser closed and cleared.
160331-4094	Recloser closed and cleared.

No-load test							
Test no.		160331 4095					
Operation		CO					
Current closing coil	A	-					
	A	ms	-				
Closing time	B	ms	-				
	C	ms	-				
Current opening coil	A	-					
	A	ms	-				
Opening time	B	ms	-				
	C	ms	-				
Voltage closing coil	Vd.c.	-					
Voltage opening coil	Vd.c.	-					
Gas pressure at 20 °C	MPa	-					
Operating pressure	MPa	-					

Remarks	
160331-4095	-

## 5 NO-LOAD TEST

### Standard and date

Standard IEC 62271-111 / IEEE C37.60

Test date(s) 30 March 2016

### 5.1 Condition before test

Recloser new.

Controller cubicle new.

Protection relay new.

Measurement of resistance:

Pole A: 89,2  $\mu\Omega$

Pole B: 89,7  $\mu\Omega$

Pole C: 89,0  $\mu\Omega$

## 5.2 Photograph before test



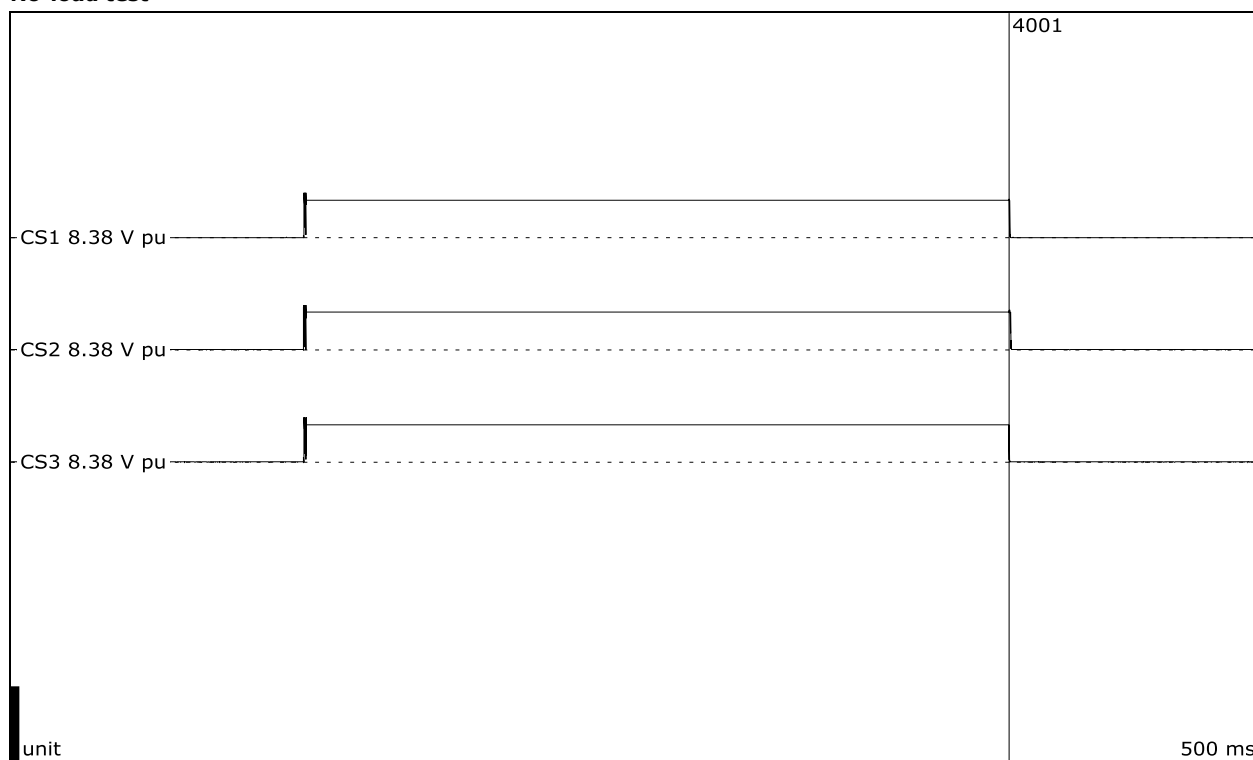
## 5.3 Test results and oscillograms

### Overview of test numbers

160330-4001

### Remarks

-

**No-load test****Test number: 160330-4001**

Operation		CO		
Phase		A	B	C
Current closing coil	A	-		
Closing time	ms	-	-	-
Current opening coil	A	-		
Opening time	ms	-	-	-

Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: -

## 6 SHORT-TIME WITHSTAND CURRENT AND PEAK WITHSTAND CURRENT TEST

### Standard and date

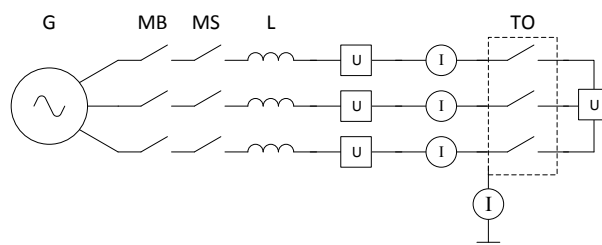
Standard	IEC 62271-111 / IEEE C37.60
Test date(s)	30 March 2016

### 6.1 Condition before test

Recloser in same condition.  
Controller cubicle in same condition.  
Protection relay in same condition.  
Supply to fixed contacts.  
Short-circuit on moving contacts.  
Frame earthed via an earth fault current indicating CT.



## 6.2 Test circuit S01



G	= Generator	TO	= Test Object	U	= Voltage Measurement to earth
MB	= Master Breaker	L	= Reactor	I	= Current Measurement
MS	= Make Switch				
PT	= Power Transformer				

Supply			Load	
Power	MVA	111	Short-circuit point	earthed
Frequency	Hz	60		
Phase(s)		3		
Voltage	kV	4		
Current	kA	16		
Impedance	$\Omega$	0,144		
Power factor		< 0,1		
Neutral		not earthed		

Remarks: -

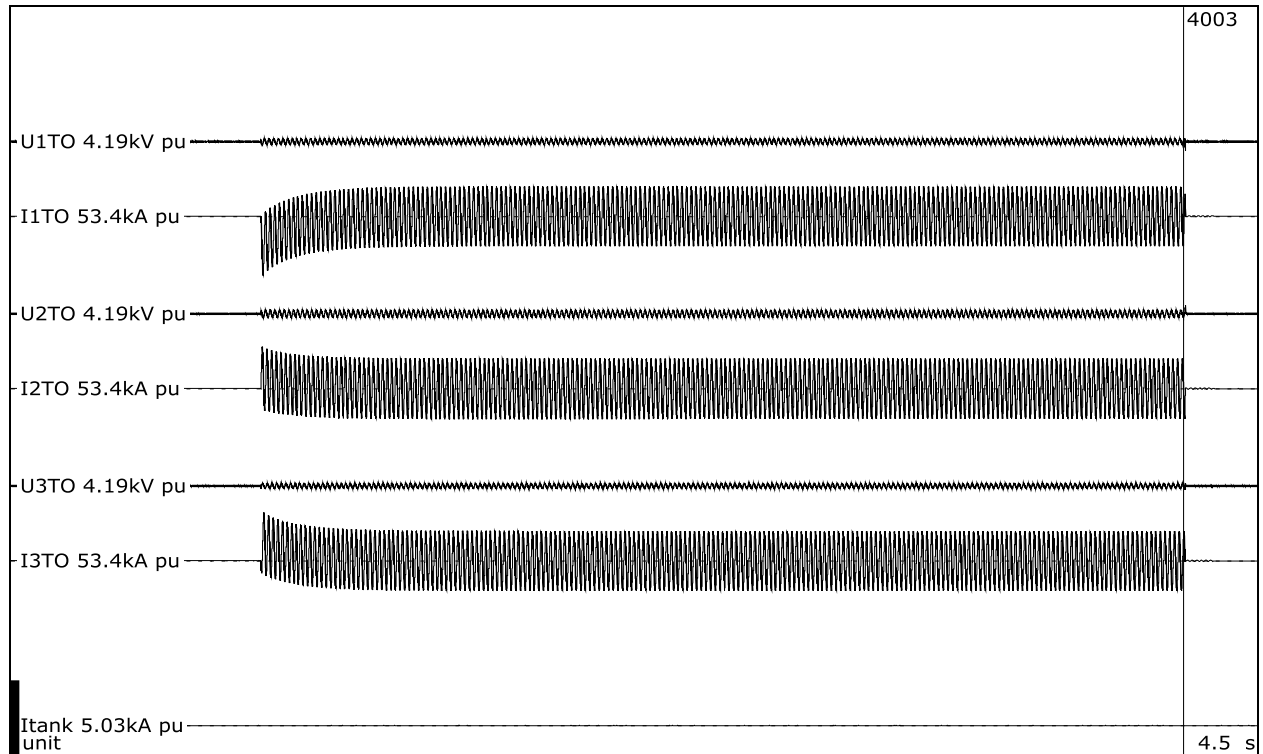
## 6.3 Test results and oscillograms

### Overview of test numbers

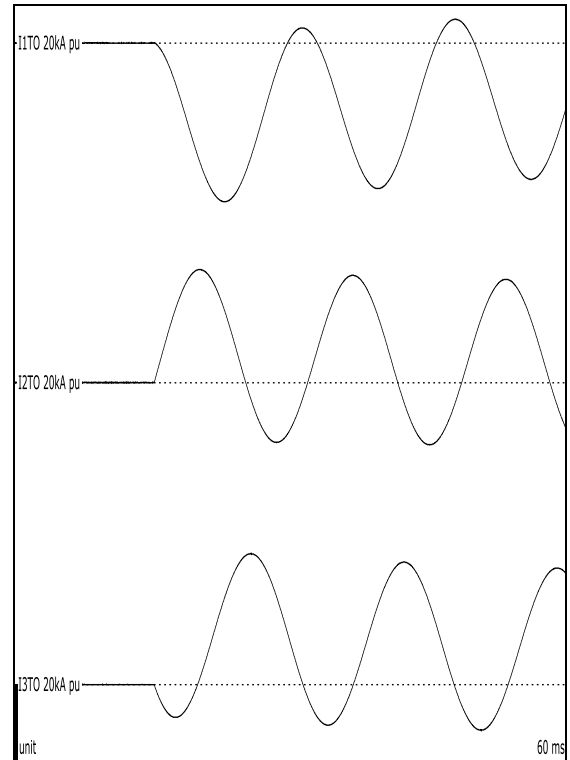
160330-4003

### Remarks

-

**Short-time withstand current and peak withstand current test****Test number: 160330-4003**

Phase		A	B	C
Peak value of current	kA	-42,1	30,0	34,7
Symmetrical current, beginning	kA	15,3	15,6	15,4
Symmetrical current, middle	kA	15,1	15,3	15,1
Symmetrical current, end	kA	15,1	15,3	15,1
Symmetrical current, average	kA	15,2	15,4	15,2
Average current, three phase	kA	15,3		
Current duration	s	3,33	3,33	3,33
Thermal equivalent		16 kA during 3,03 s		



Gas pressure at 20 °C - MPa

Remarks: No visible disturbance.

## 6.4 Condition / inspection after test

Recloser could be tripped freely. See no-load test 160330-4004.

Measurement of resistance:

Pole A: 89,2  $\mu\Omega$

Pole B: 89,7  $\mu\Omega$

Pole C: 89,0  $\mu\Omega$

## 7 NO-LOAD TEST

### Standard and date

Standard IEC 62271-111 / IEEE C37.60

Test date(s) 30 March 2016

### 7.1 Condition before test

Recloser in same condition.

Controller cubicle in same condition.

Protection relay in same condition.

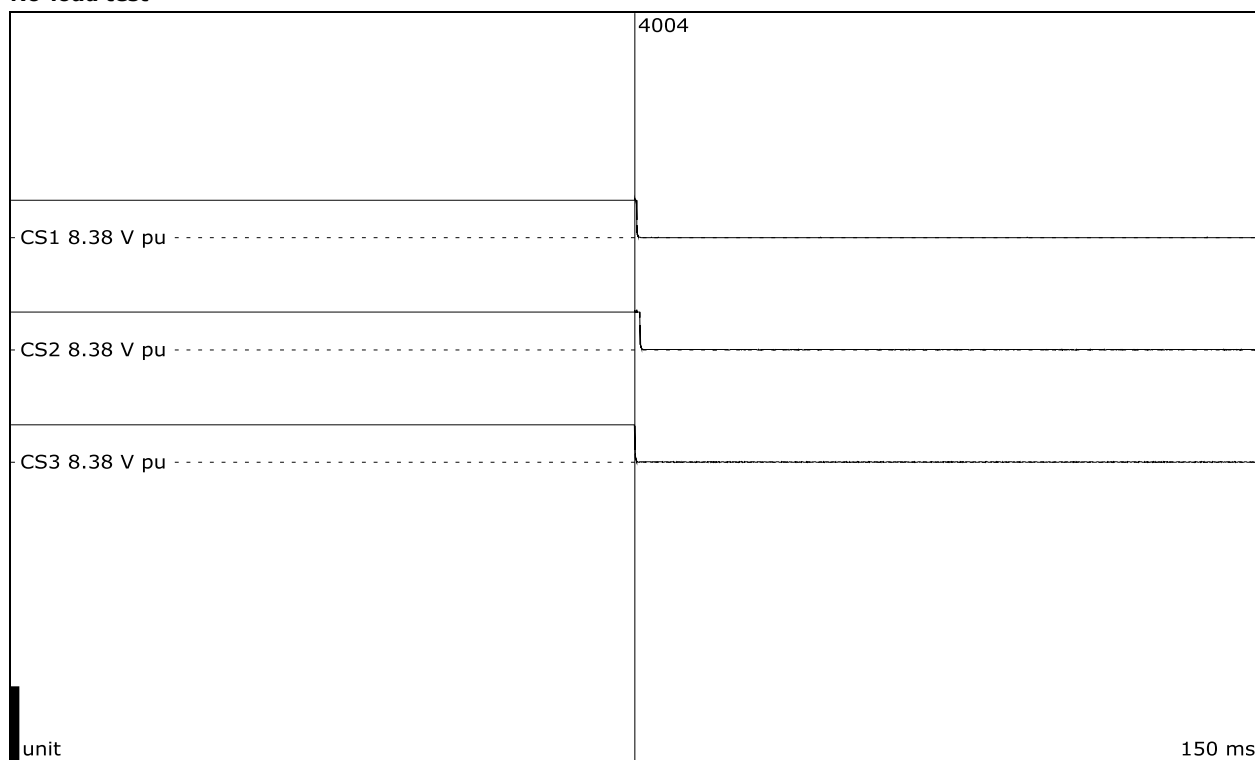
## 7.2 Test results and oscillograms

### Overview of test numbers

160330-4004

### Remarks

-

**No-load test****Test number: 160330-4004**

Operation		O		
Phase		A	B	C
Current opening coil	A	-		
Opening time	ms	-	-	-

Voltage opening coil	- Vd.c.	Gas pressure at 20 °C	- MPa
		Operating pressure	- MPa

Remarks: -

### **7.3 Condition / inspection after test**

Externally no visible change.



## 8 T100

### Standard and date

Standard IEC 62271-111 / IEEE C37.60

Test date(s) 30 March 2016

### 8.1 Condition before test

Recloser in same condition.

Controller cubicle in same condition.

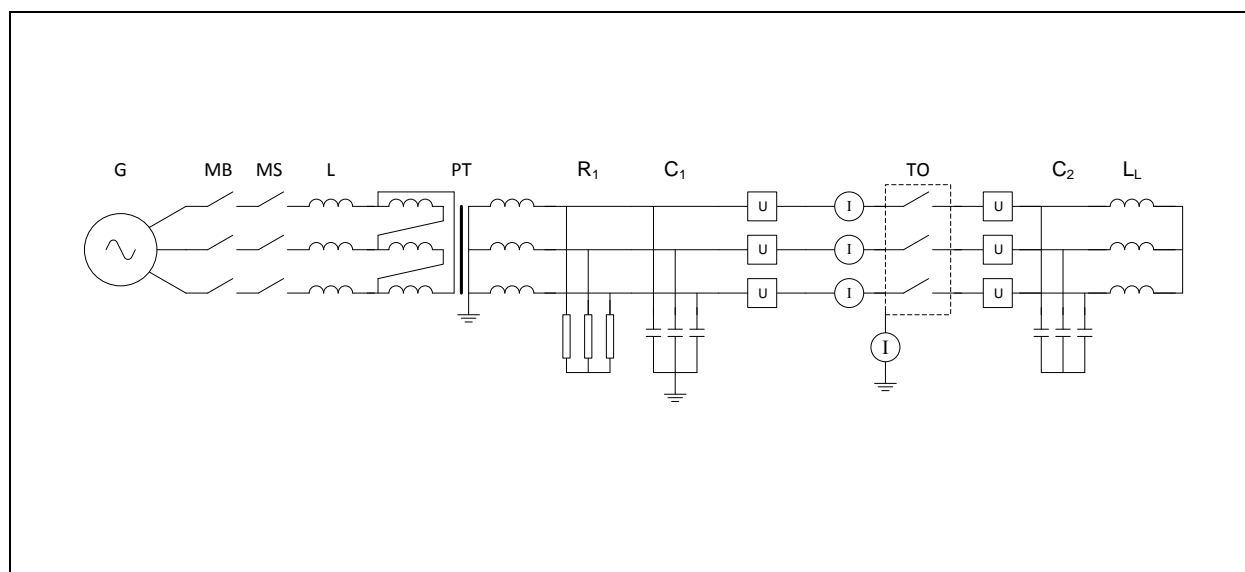
Protection relay in same condition.

Supply to fixed contacts.

Short-circuit on moving contacts.

Frame earthed via an earth fault current indicating CT.

## 8.2 Test circuit S02



G = Generator	TO = Test Object	U = Voltage Measurement to earth
MB = Master Breaker	L = Reactor	I = Current Measurement
MS = Make Switch	R = Resistor	
PT = Power Transformer	C = Capacitor	

Supply		
Power	MVA	1231
Frequency	Hz	60
Phase(s)		3
Voltage	kV	40,5
Current	kA	17,55
Impedance	$\Omega$	1,33
Power factor		< 0,1
Neutral		earthed

TRV control elements added (supply)		
C <sub>1</sub>	$\mu\text{F}$	0,12
R <sub>1</sub>	$\Omega$	2106

Prospective TRV across TO		
u <sub>c</sub>	kV	77,6
t <sub>3</sub>	$\mu\text{s}$	60
t <sub>d</sub>	$\mu\text{s}$	< 9
RRRV	kV/ $\mu\text{s}$	1,29

Load		
Impedance	$\Omega$	0,118
Power factor		< 0,05
Neutral		not earthed

TRV control elements added (load)		
C <sub>2</sub>	$\mu\text{F}$	1,2

Inductive load element (L <sub>L</sub> )		
X <sub>L</sub>	$\Omega$	0,118

Remarks: -

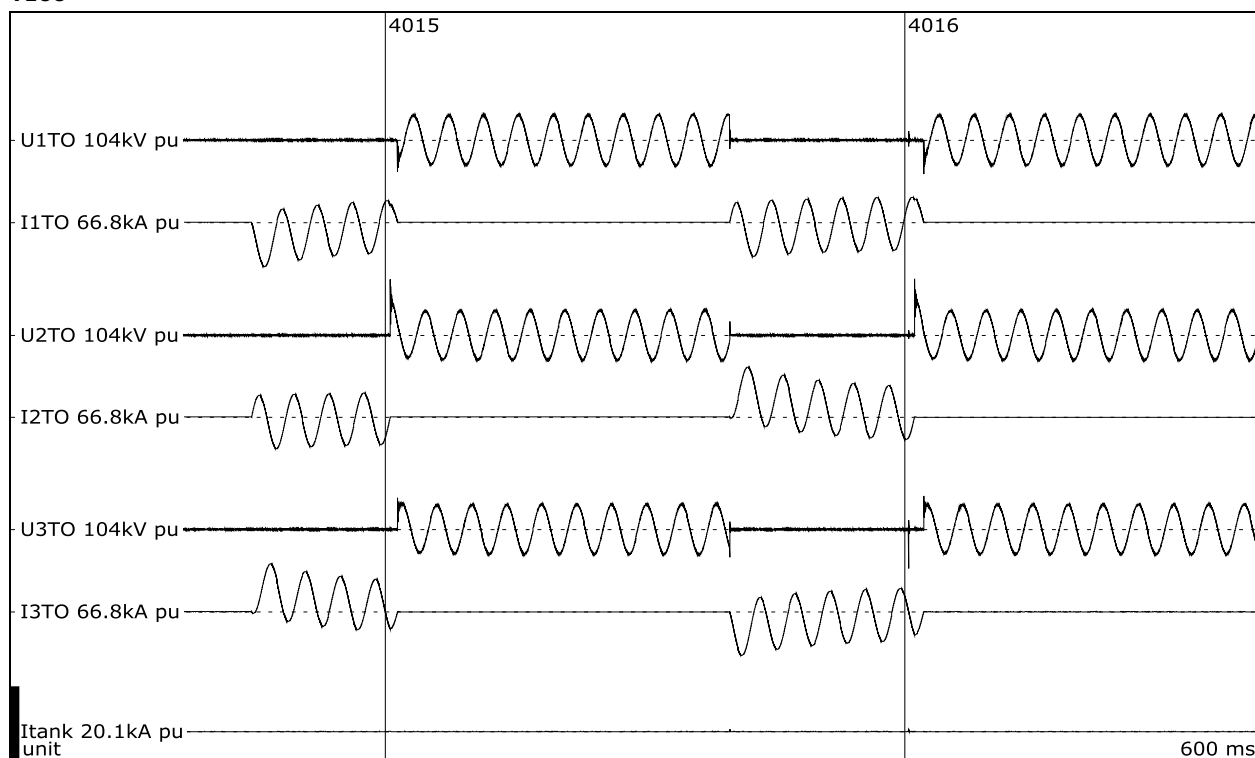
## 8.3 Test results and oscillograms

### Overview of test numbers

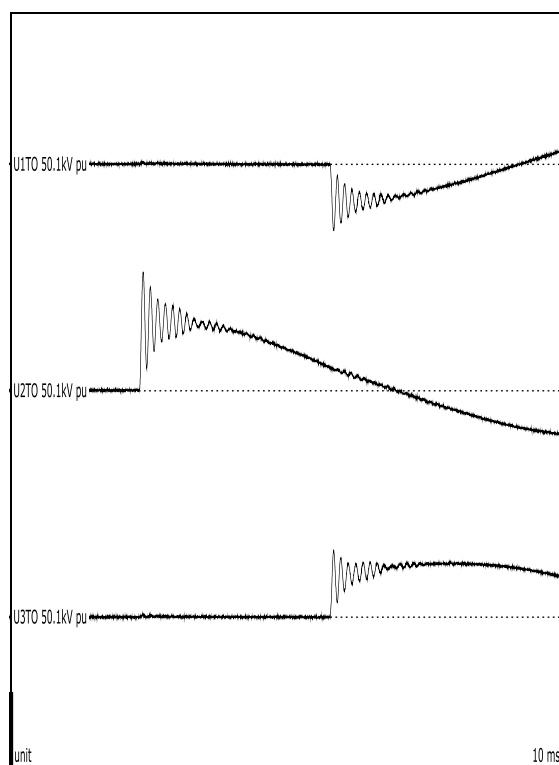
160330-4015 to 4030

### Remarks

-

**T100****Test number: 160330-4015**

Time interval since previous test	min	-		
Operation		O		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Breaking current, phase value	kA	16,5	16,4	16,3
Average current, three phase	kA	16,4		
Breaking current, DC-component	%	15	6	21
Recovery voltage, phase value	kV	24,1	23,8	23,4
Recovery voltage, between phases	kV	41,2		
TRV, peak	kV	-43,7	78,2	44,3
Arc duration	ms	5,9	2,4	5,9
Opening time	ms	-		
Break time	ms	-	-	-



Voltage opening coil - Vd.c.

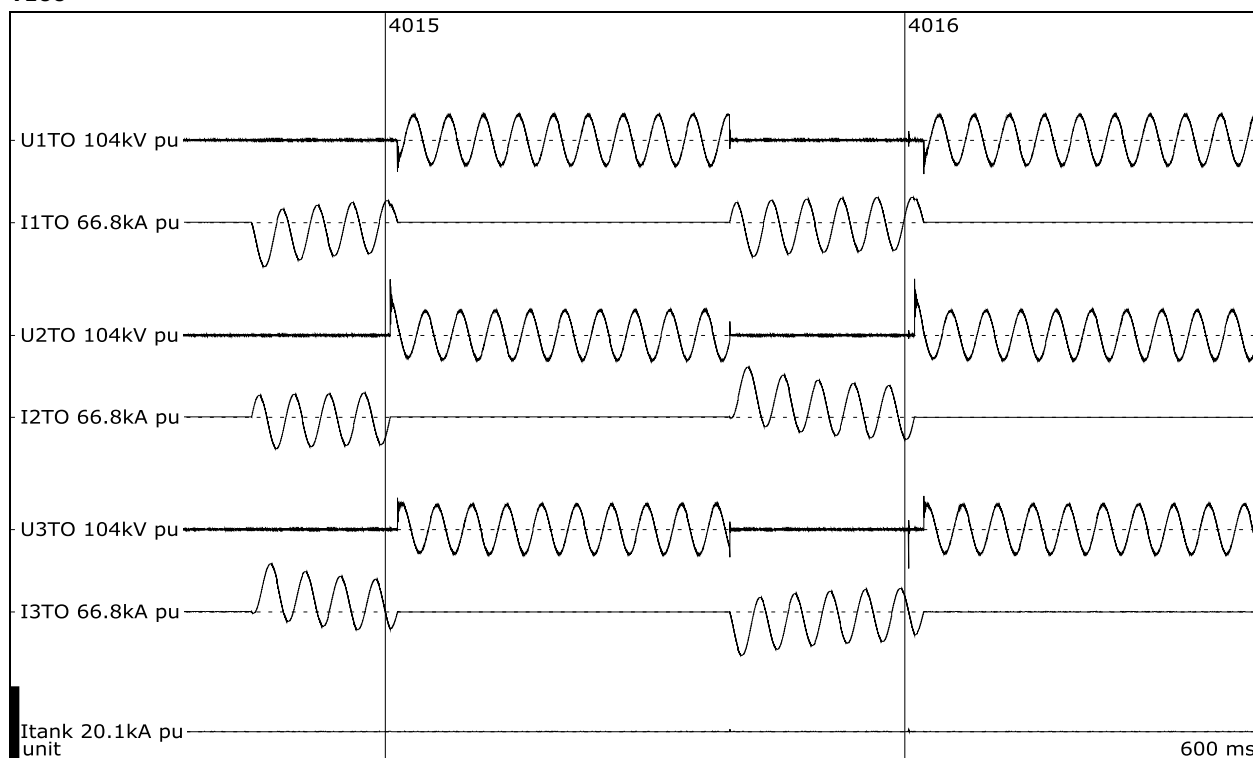
Gas pressure at 20 °C

- MPa

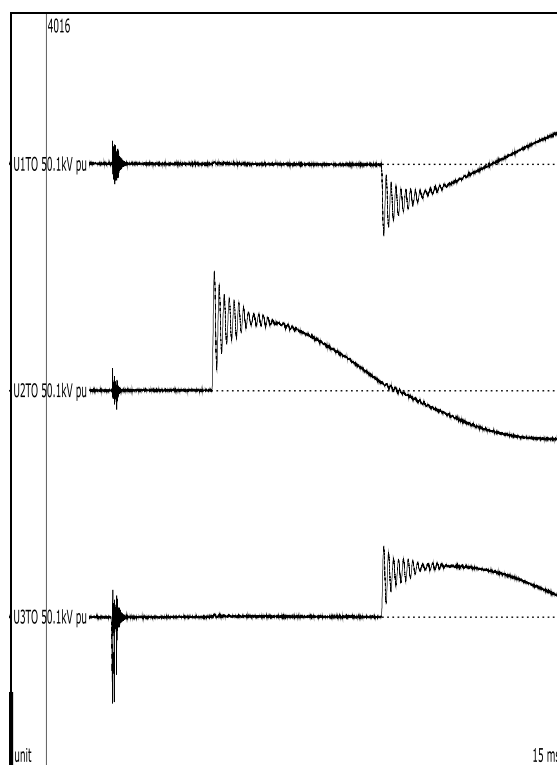
Operating pressure

- MPa

Remarks: Recloser cleared.

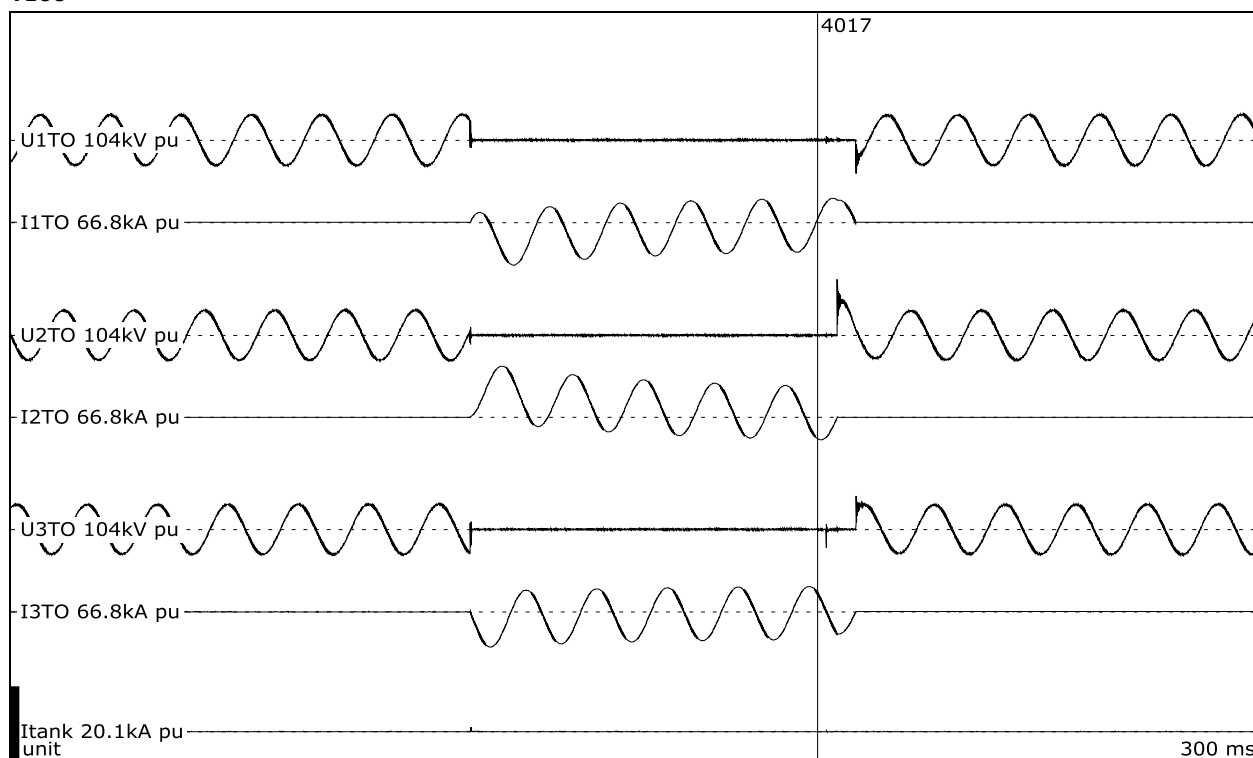
**T100****Test number: 160330-4016**

Time interval since previous test	min	-		
Time interval between operations	s	0,160		
Operation		CO		
Phase		A	B	C
Applied voltage, phase value	kV	25,0	24,6	24,7
Applied voltage, between phases	kV	42,9		
Making current, peak	kA	-30,4	44,5	-39,2
Breaking current, phase value	kA	16,8	16,8	16,6
Average current, three phase	kA	16,7		
Breaking current, DC-component	%	4	14	11
Recovery voltage, phase value	kV	24,3	24,0	23,8
Recovery voltage, between phases	kV	41,6		
TRV, peak	kV	-47,1	78,9	46,6
Make time	ms	-	-	-
Arc duration	ms	9,2	4,6	9,2
Opening time	ms	-		
Break time	ms	-	-	-

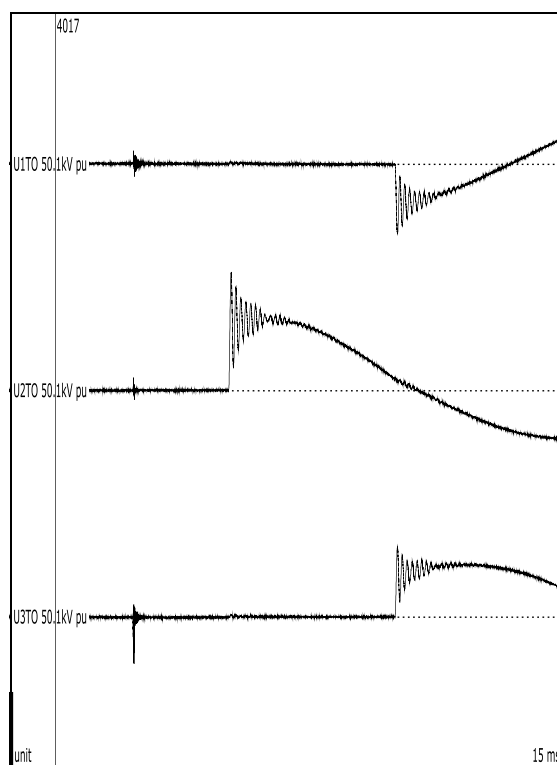


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

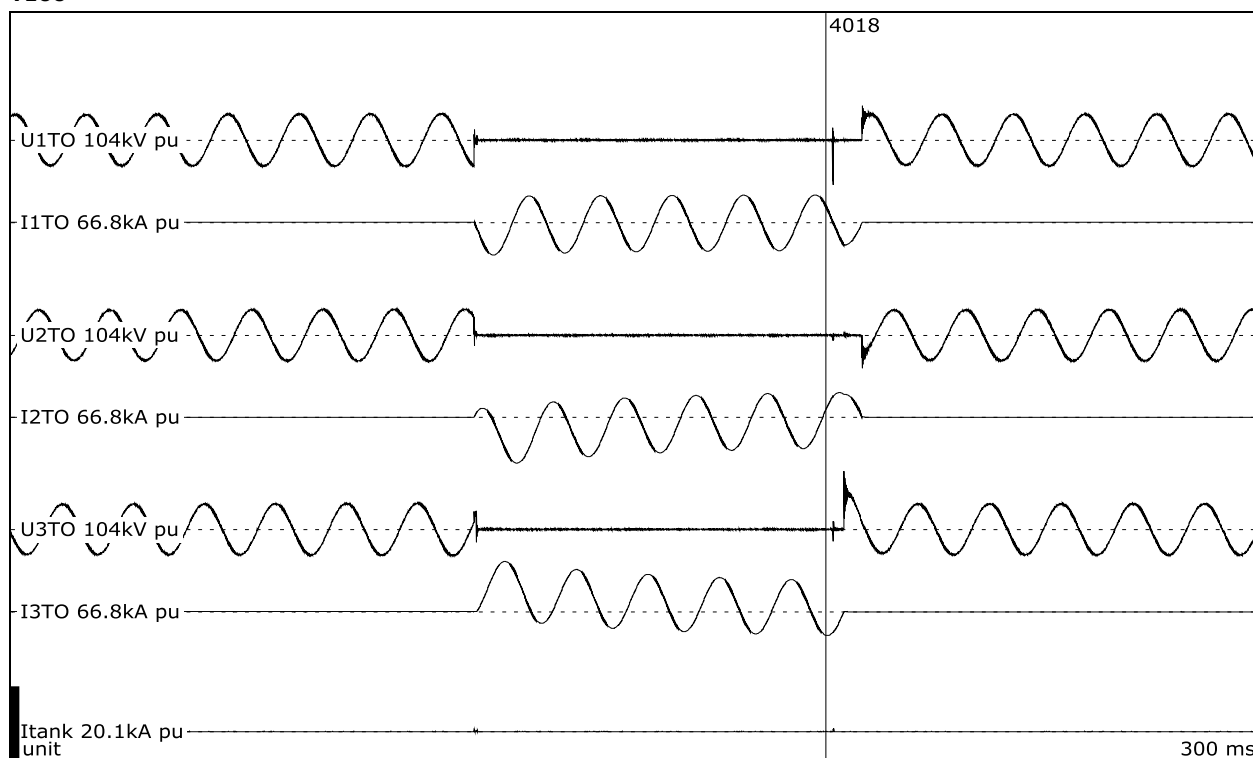
**T100****Test number: 160330-4017**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	25,0	24,6	24,8
Applied voltage, between phases	kV	43,0		
Making current, peak	kA	-38,1	45,5	-31,6
Breaking current, phase value	kA	16,9	17,0	16,8
Average current, three phase	kA	16,9		
Breaking current, DC-component	%	10	14	5
Recovery voltage, phase value	kV	24,5	24,2	24,0
Recovery voltage, between phases	kV	41,9		
TRV, peak	kV	-46,2	78,2	46,4
Make time	ms	-	-	-
Arc duration	ms	9,3	4,8	9,3
Opening time	ms	-		
Break time	ms	-	-	-

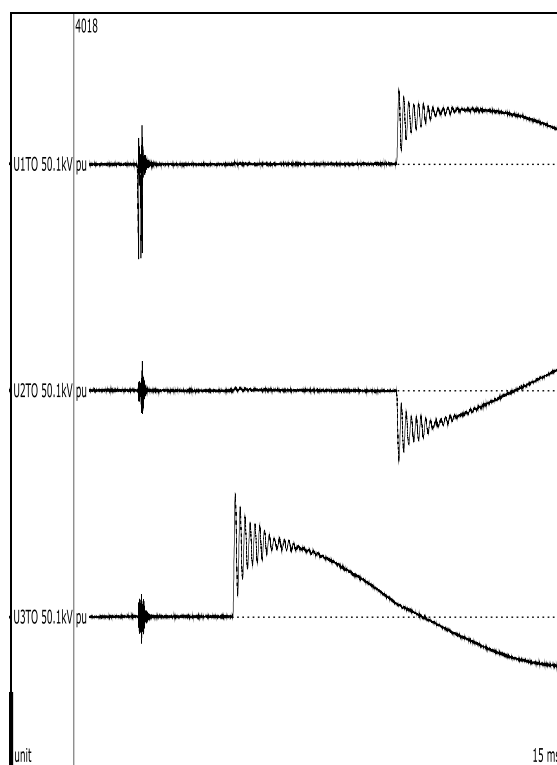


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

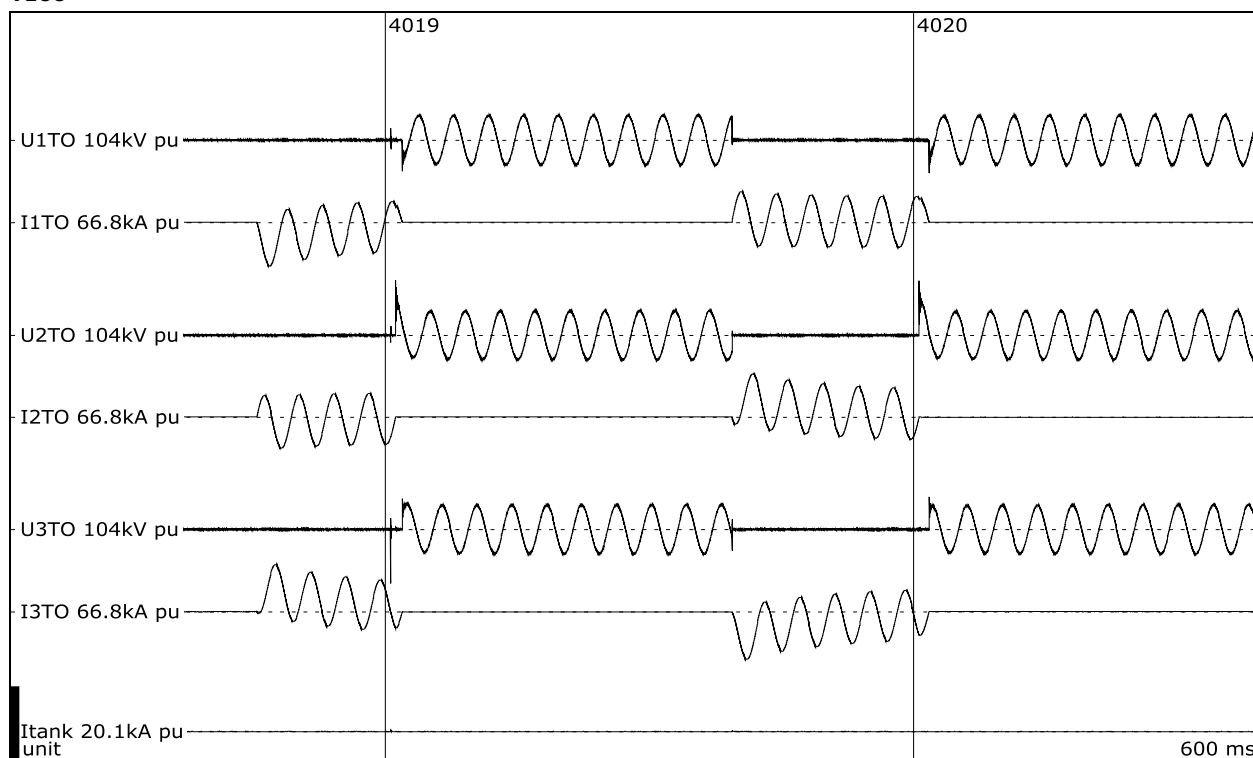
**T100****Test number: 160330-4018**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	25,8	25,4	25,6
Applied voltage, between phases	kV	44,4		
Making current, peak	kA	-29,1	-41,1	44,8
Breaking current, phase value	kA	17,6	17,6	17,5
Average current, three phase	kA	17,6		
Breaking current, DC-component	%	2	11	12
Recovery voltage, phase value	kV	24,9	24,8	24,9
Recovery voltage, between phases	kV	43,1		
TRV, peak	kV	48,2	-46,6	81,5
Make time	ms	-	-	-
Arc duration	ms	8,8	8,8	4,4
Opening time	ms	-		
Break time	ms	-	-	-

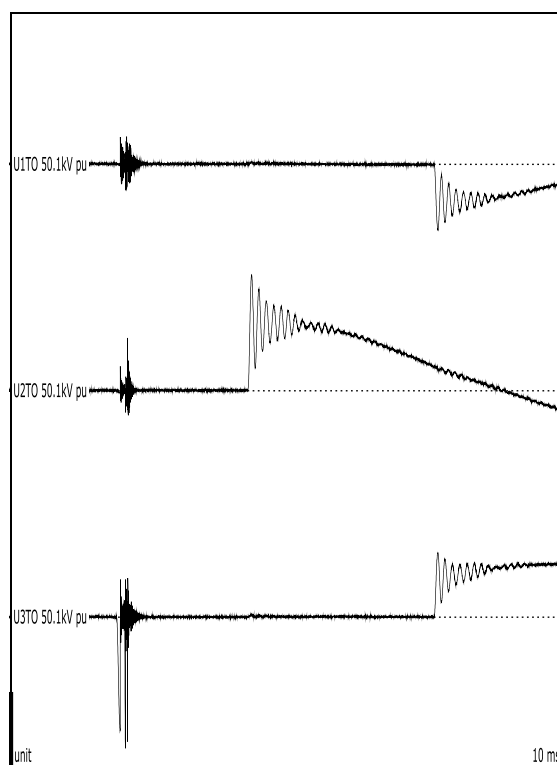


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

**T100****Test number: 160330-4019**

Time interval since previous test	min	-		
Operation		O		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Breaking current, phase value	kA	16,2	16,2	16,1
Average current, three phase	kA	16,2		
Breaking current, DC-component	%	16	7	23
Recovery voltage, phase value	kV	23,7	23,4	23,2
Recovery voltage, between phases	kV	40,6		
TRV, peak	kV	-43,4	76,8	42,7
Arc duration	ms	8,3	4,9	8,3
Opening time	ms	-		
Break time	ms	-	-	-



Voltage opening coil - Vd.c.

Gas pressure at 20 °C

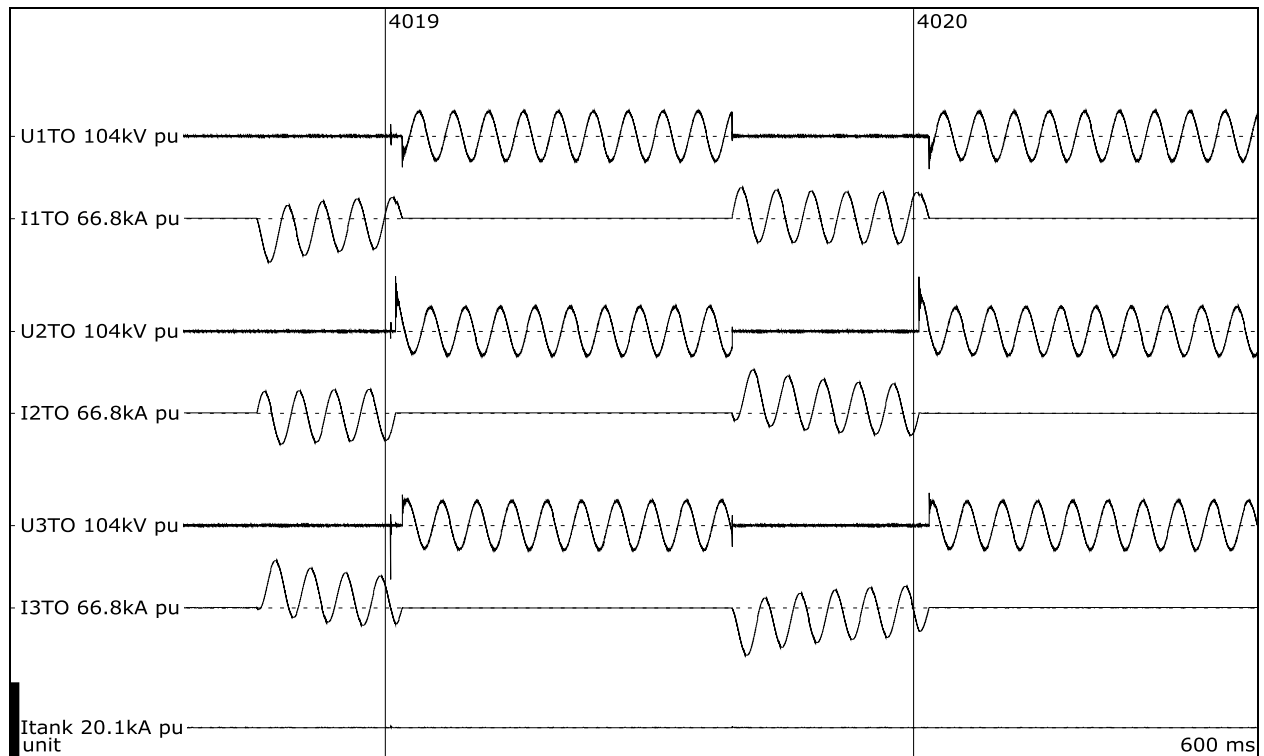
- MPa

Operating pressure

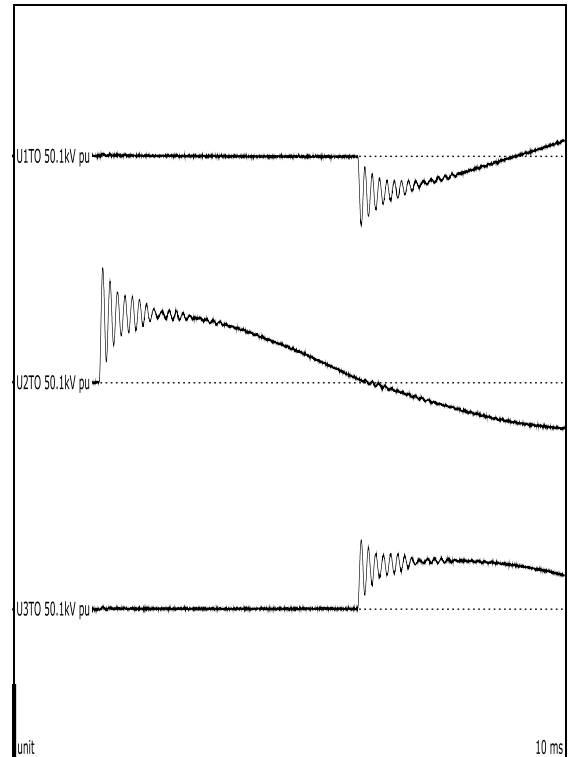
- MPa

Remarks: Recloser cleared.



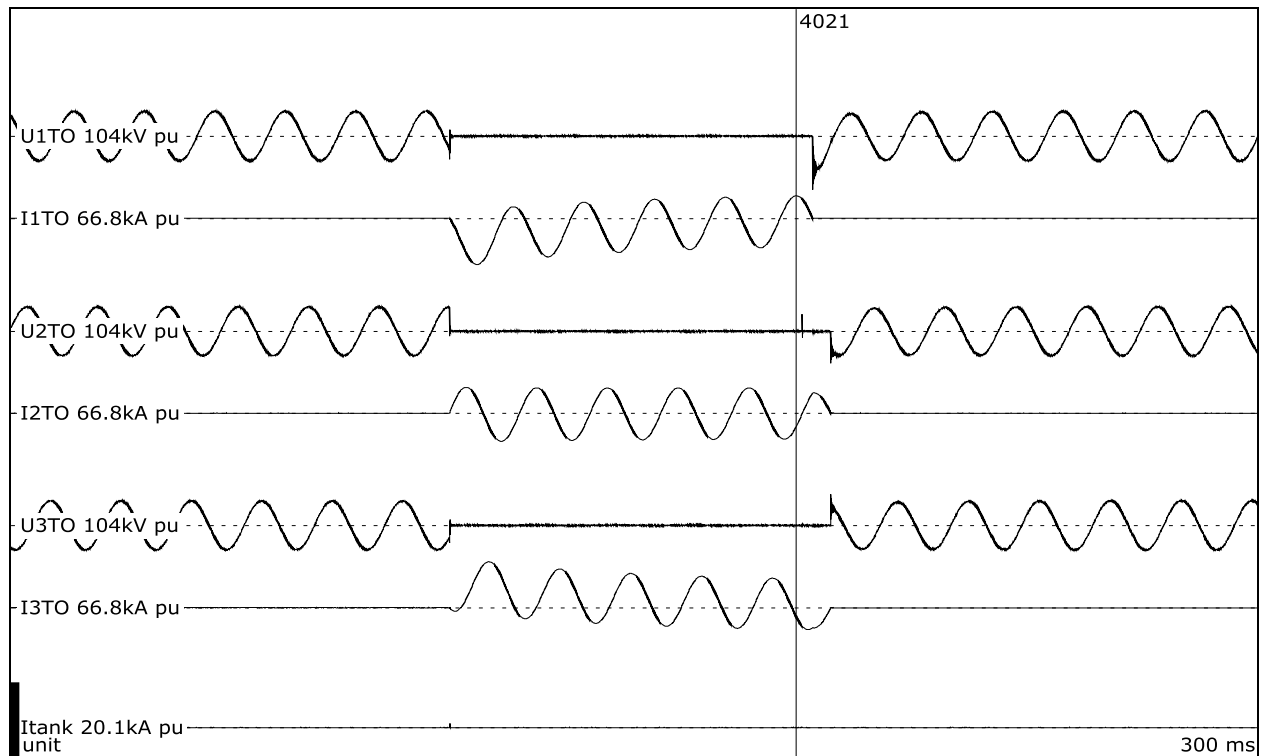
**T100****Test number: 160330-4020**

Time interval since previous test	min	-		
Time interval between operations	s	0,158		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,4	24,1	24,2
Applied voltage, between phases	kV	42,0		
Making current, peak	kA	27,4	38,5	-42,5
Breaking current, phase value	kA	16,1	16,1	16,0
Average current, three phase	kA	16,0		
Breaking current, DC-component	%	2	12	14
Recovery voltage, phase value	kV	23,6	23,2	23,1
Recovery voltage, between phases	kV	40,4		
TRV, peak	kV	-45,1	75,9	45,3
Make time	ms	-	-	-
Arc duration	ms	7,3	2,6	7,3
Opening time	ms	-		
Break time	ms	-	-	-

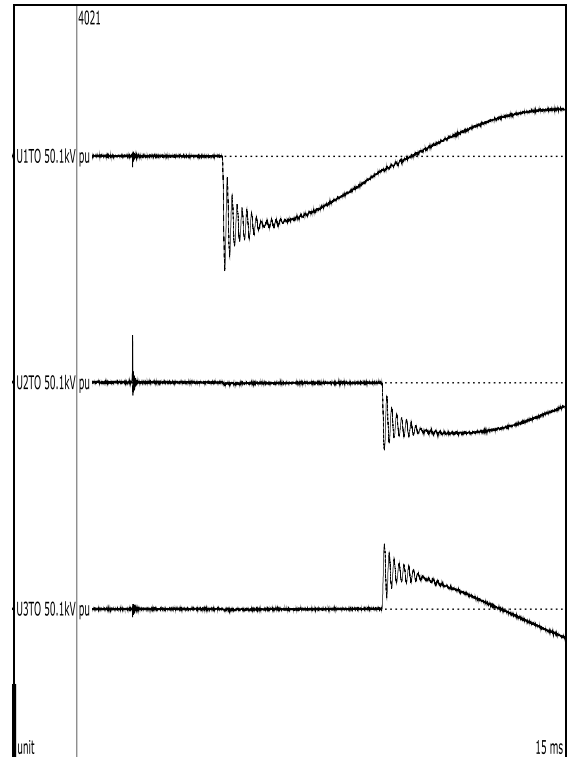


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

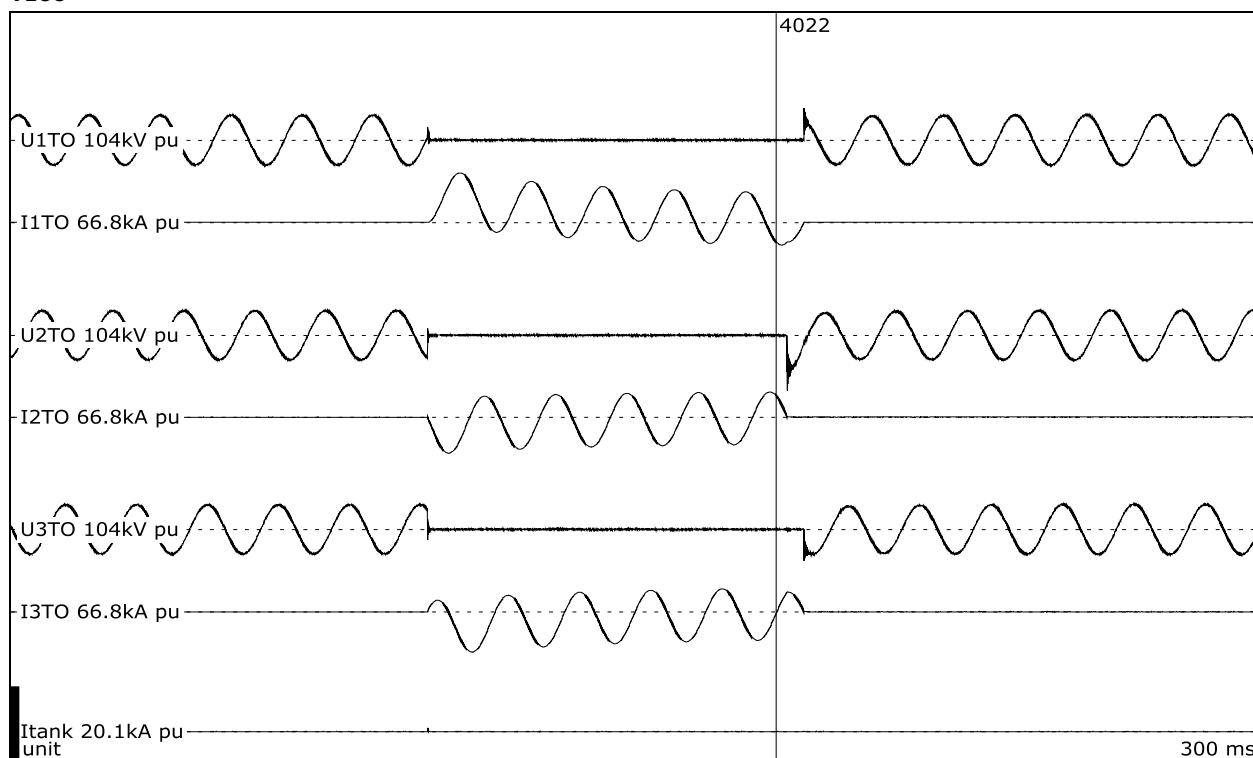
**T100****Test number: 160330-4021**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,4	24,0	23,9
Applied voltage, between phases	kV	41,7		
Making current, peak	kA	-41,2	-25,2	41,0
Breaking current, phase value	kA	16,3	16,2	16,1
Average current, three phase	kA	16,2		
Breaking current, DC-component	%	10	2	13
Recovery voltage, phase value	kV	23,7	23,0	23,2
Recovery voltage, between phases	kV	40,4		
TRV, peak	kV	-76,1	-44,5	43,0
Make time	ms	-	-	-
Arc duration	ms	4,0	8,3	8,3
Opening time	ms	-		
Break time	ms	-	-	-

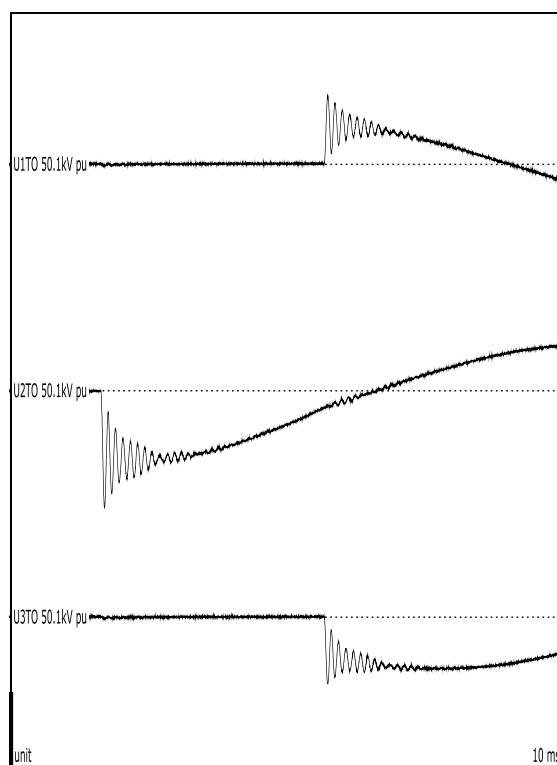


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

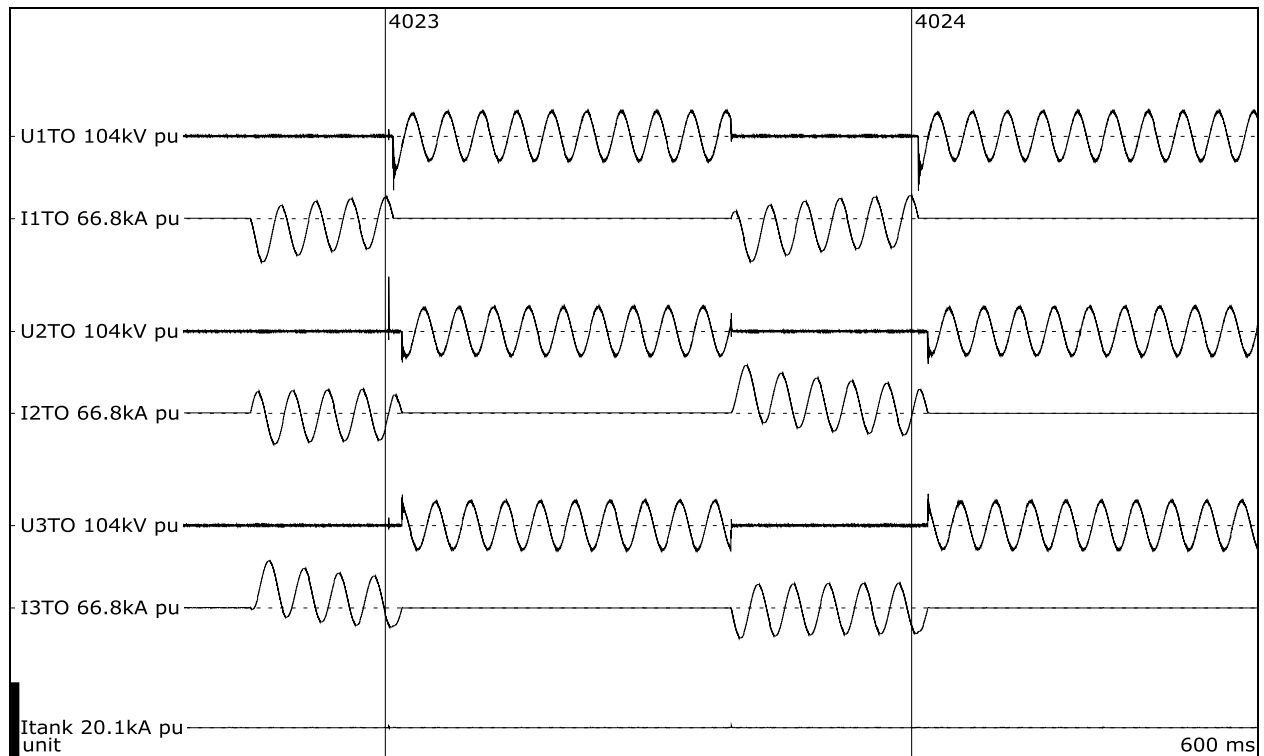
**T100****Test number: 160330-4022**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,5	24,2	24,1
Applied voltage, between phases	kV	42,0		
Making current, peak	kA	44,2	-32,3	-36,0
Breaking current, phase value	kA	16,6	16,6	16,5
Average current, three phase	kA	16,5		
Breaking current, DC-component	%	13	5	9
Recovery voltage, phase value	kV	23,9	23,6	23,2
Recovery voltage, between phases	kV	40,9		
TRV, peak	kV	45,4	-77,5	-44,6
Make time	ms	-	-	-
Arc duration	ms	6,8	2,7	6,8
Opening time	ms	-		
Break time	ms	-	-	-

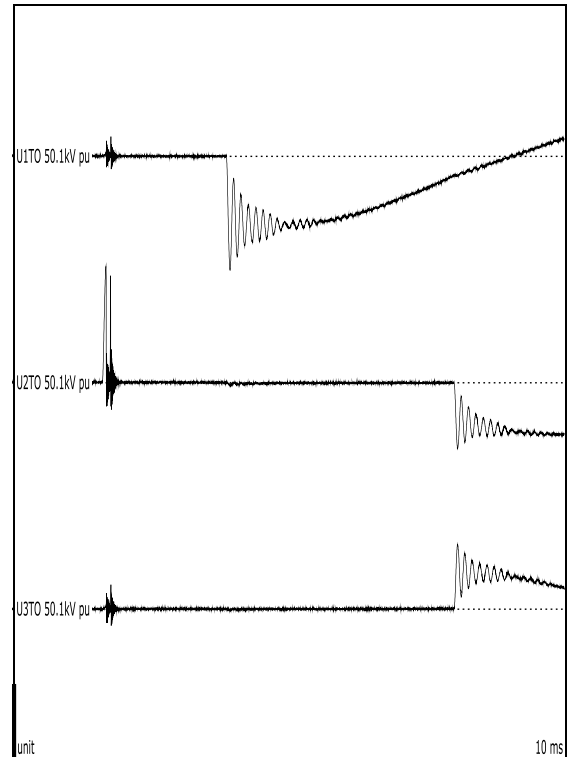


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

**T100****Test number: 160330-4023**

Time interval since previous test	min	-		
Operation		O		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Breaking current, phase value	kA	16,1	16,1	16,0
Average current, three phase	kA	16,1		
Breaking current, DC-component	%	14	6	20
Recovery voltage, phase value	kV	23,7	23,0	23,3
Recovery voltage, between phases	kV	40,4		
TRV, peak	kV	-75,6	-43,7	42,4
Arc duration	ms	3,9	8,1	8,1
Opening time	ms	-		
Break time	ms	-	-	-



Voltage opening coil - Vd.c.

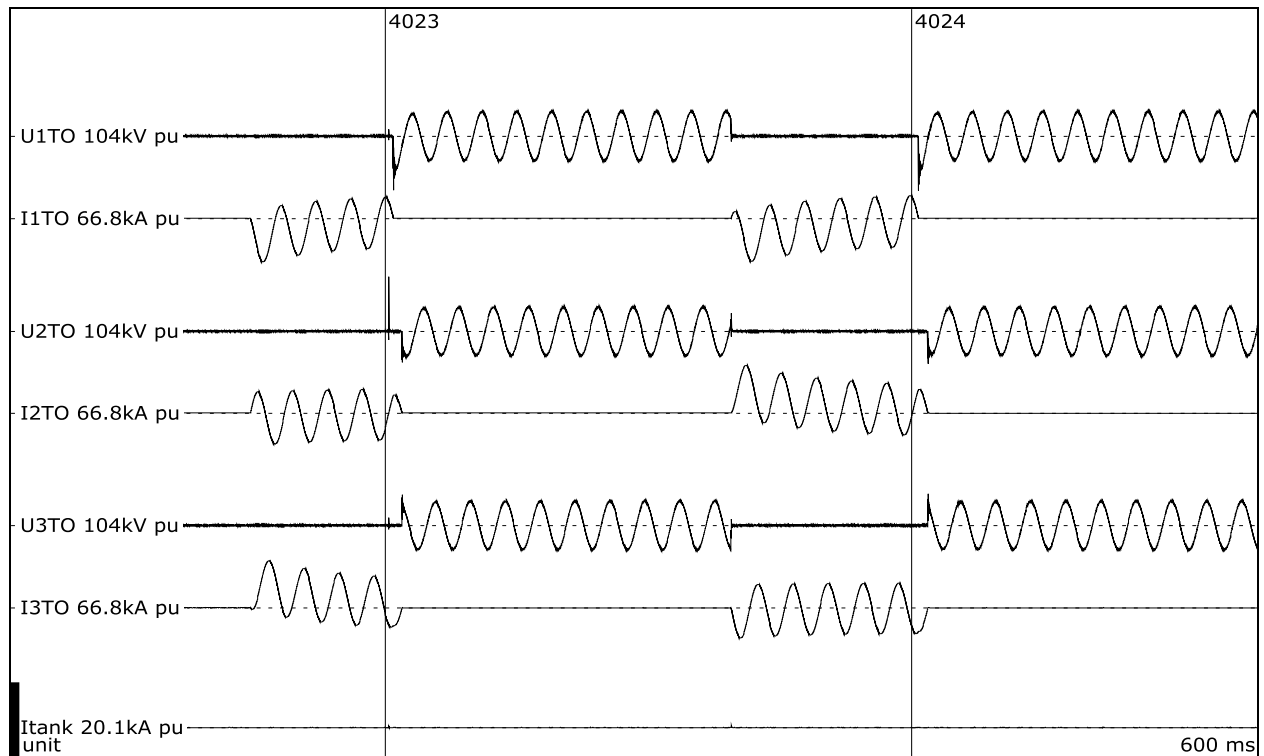
Gas pressure at 20 °C

- MPa

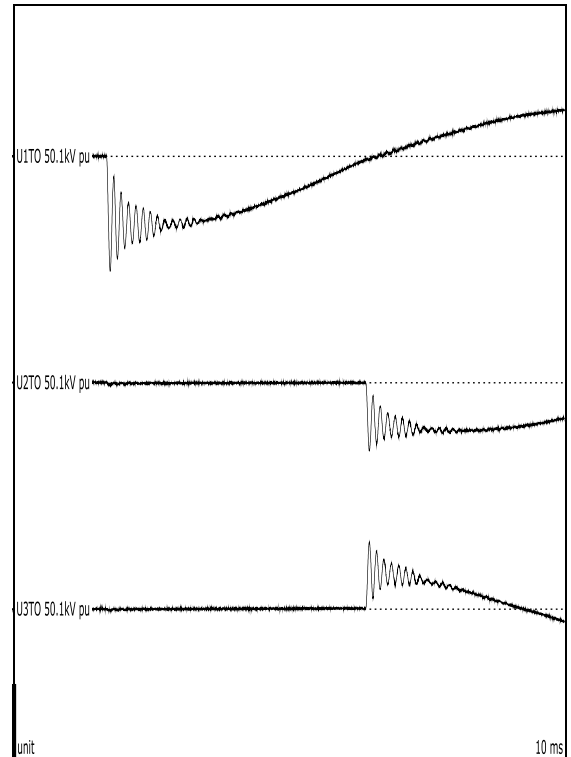
Operating pressure

- MPa

Remarks: Recloser cleared.

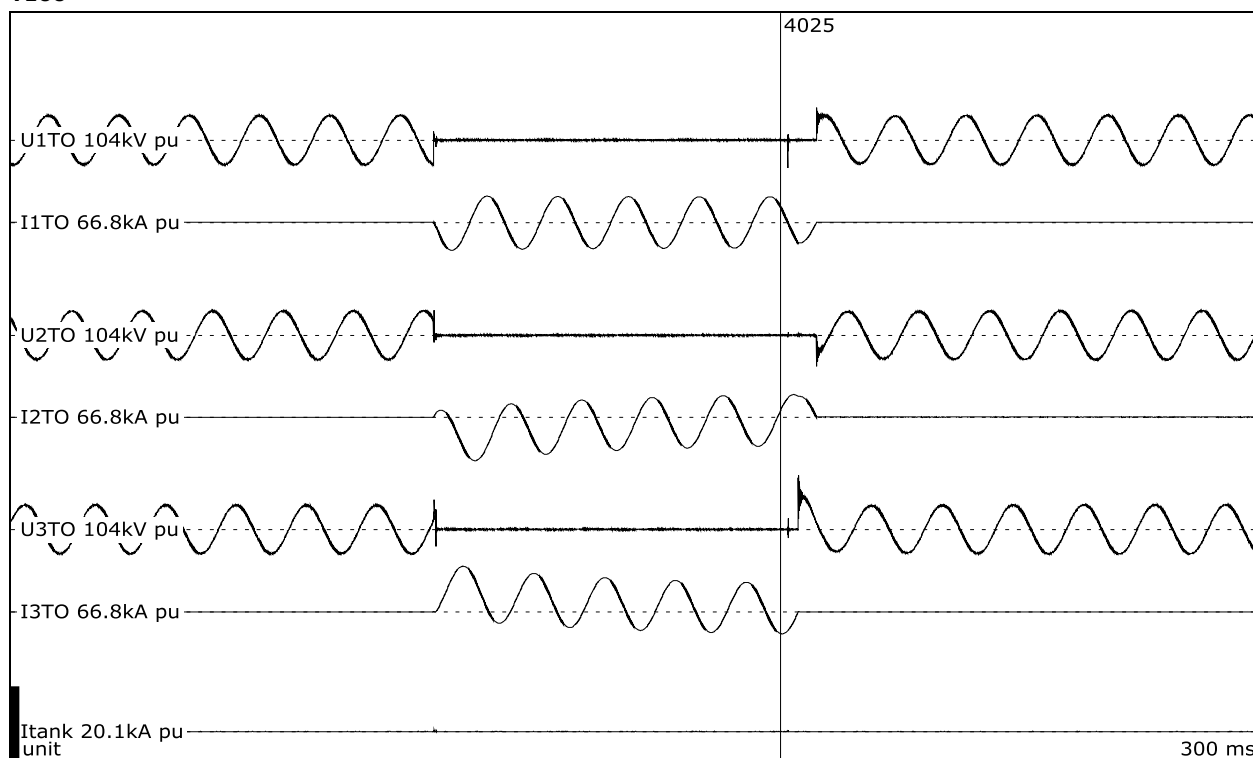
**T100****Test number: 160330-4024**

Time interval since previous test	min	-		
Time interval between operations	s	0,158		
Operation		CO		
Phase		A	B	C
Applied voltage, phase value	kV	24,3	23,9	24,0
Applied voltage, between phases	kV	41,7		
Making current, peak	kA	-38,3	42,6	-27,2
Breaking current, phase value	kA	16,1	16,1	16,0
Average current, three phase	kA	16,0		
Breaking current, DC-component	%	11	13	3
Recovery voltage, phase value	kV	23,6	23,1	23,3
Recovery voltage, between phases	kV	40,3		
TRV, peak	kV	-76,2	-45,2	44,0
Make time	ms	-	-	-
Arc duration	ms	3,3	8,0	8,0
Opening time	ms	-		
Break time	ms	-	-	-

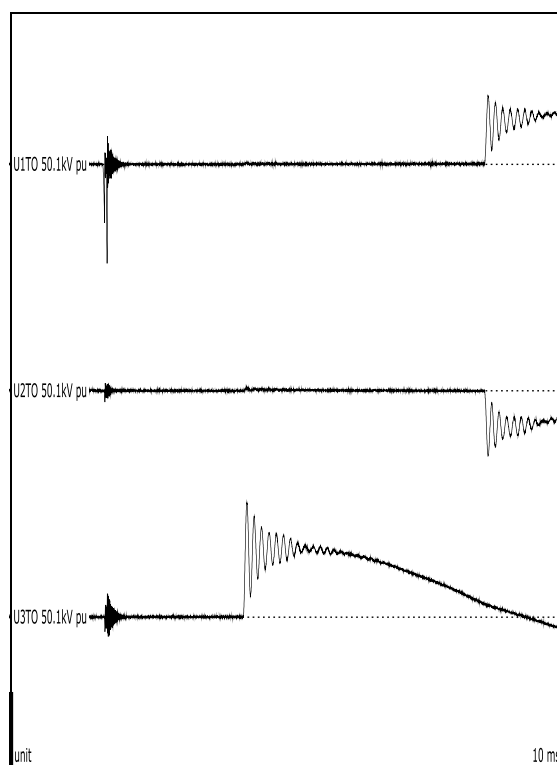


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

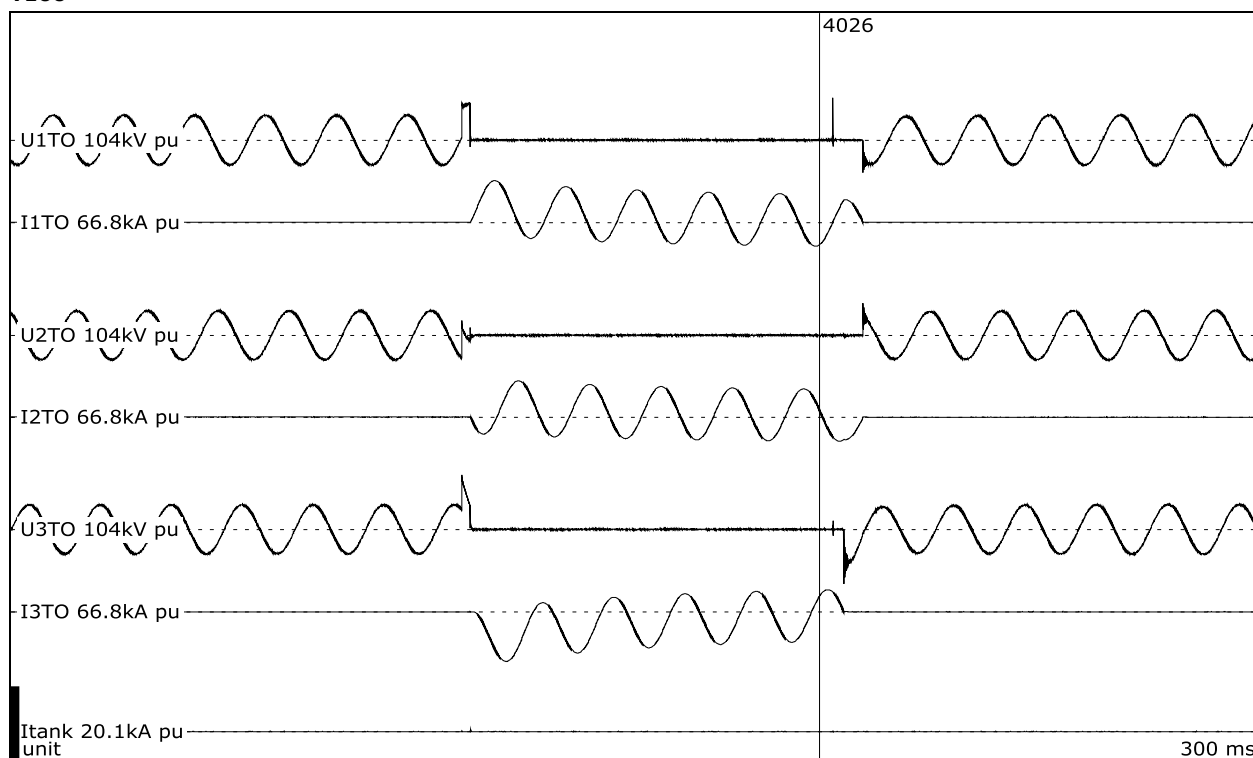
**T100****Test number: 160330-4025**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		A	B	C
Applied voltage, phase value	kV	24,3	23,9	23,9
Applied voltage, between phases	kV	41,6		
Making current, peak	kA	-24,9	-39,0	40,6
Breaking current, phase value	kA	16,2	16,3	16,1
Average current, three phase	kA	16,2		
Breaking current, DC-component	%	0	12	12
Recovery voltage, phase value	kV	23,4	23,3	23,3
Recovery voltage, between phases	kV	40,5		
TRV, peak	kV	44,8	-43,1	75,4
Make time	ms	-	-	-
Arc duration	ms	8,7	8,7	4,3
Opening time	ms	-		
Break time	ms	-	-	-

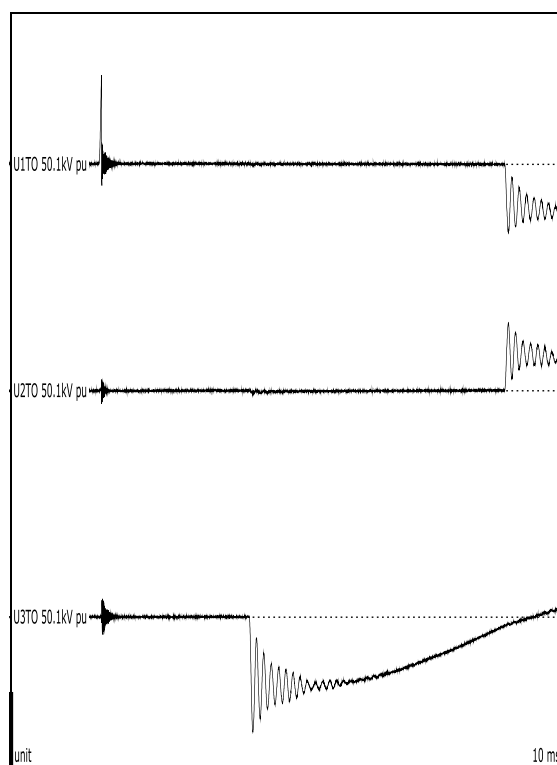


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

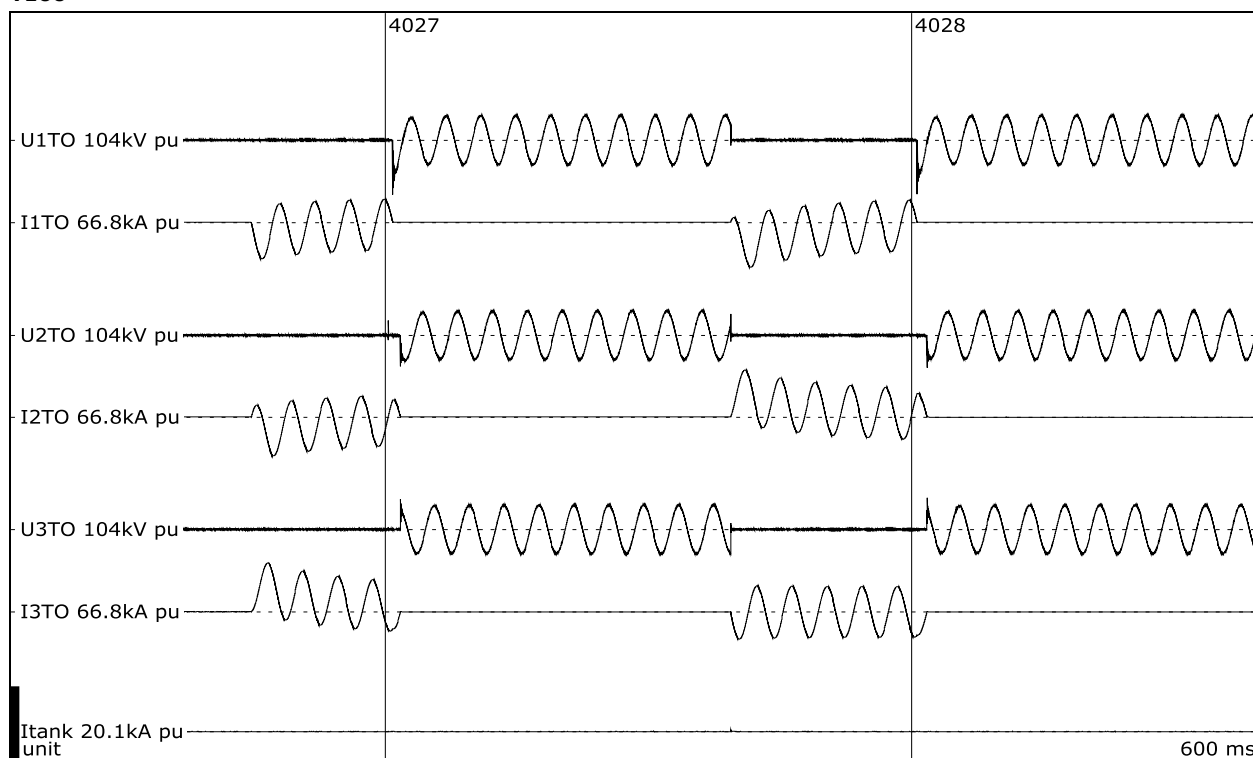
**T100****Test number: 160330-4026**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,5	24,1	24,0
Applied voltage, between phases	kV	41,9		
Making current, peak	kA	37,3	32,2	-44,4
Breaking current, phase value	kA	16,5	16,5	16,4
Average current, three phase	kA	16,5		
Breaking current, DC-component	%	8	7	14
Recovery voltage, phase value	kV	23,6	23,5	23,5
Recovery voltage, between phases	kV	40,7		
TRV, peak	kV	-45,3	44,2	-76,5
Make time	ms	-	-	-
Arc duration	ms	10,5	10,5	5,9
Opening time	ms	-		
Break time	ms	-	-	-

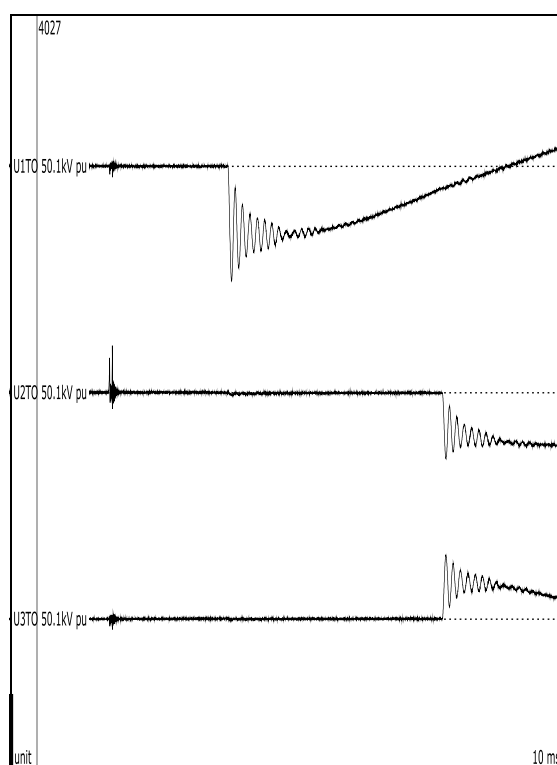


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

**T100****Test number: 160330-4027**

Time interval since previous test	min	-		
Operation		O		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Breaking current, phase value	kA	16,0	16,1	16,0
Average current, three phase	kA	16,0		
Breaking current, DC-component	%	9	14	22
Recovery voltage, phase value	kV	23,6	23,0	23,4
Recovery voltage, between phases	kV	40,4		
TRV, peak	kV	-75,9	-43,6	42,2
Arc duration	ms	3,5	7,4	7,4
Opening time	ms	-		
Break time	ms	-	-	-



Voltage opening coil - Vd.c.

Gas pressure at 20 °C

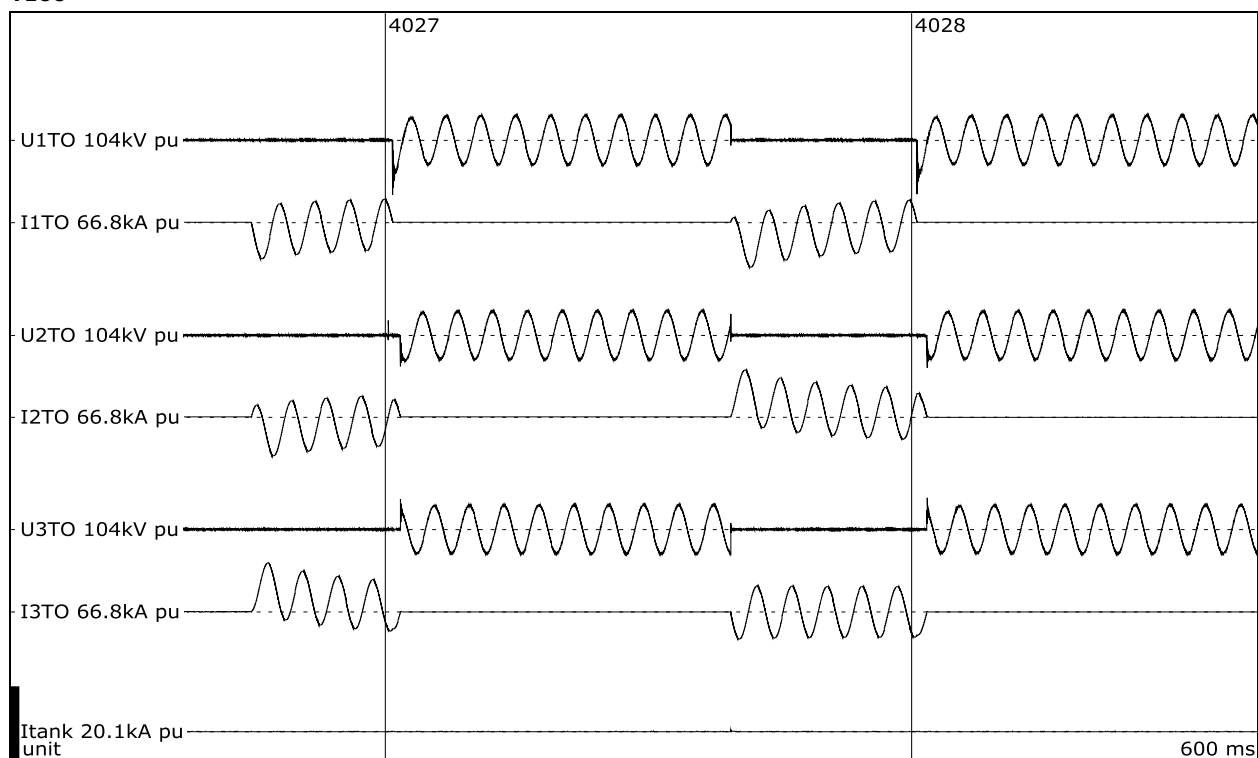
- MPa

Operating pressure

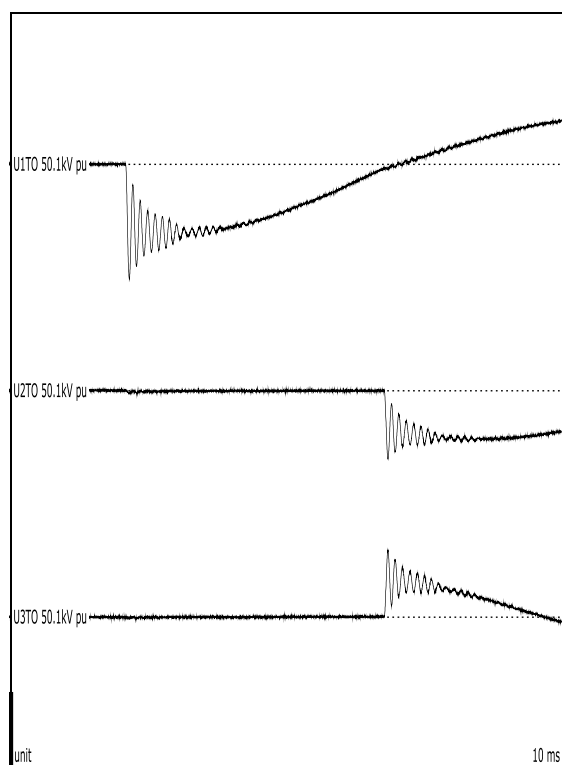
- MPa

Remarks: Recloser cleared.



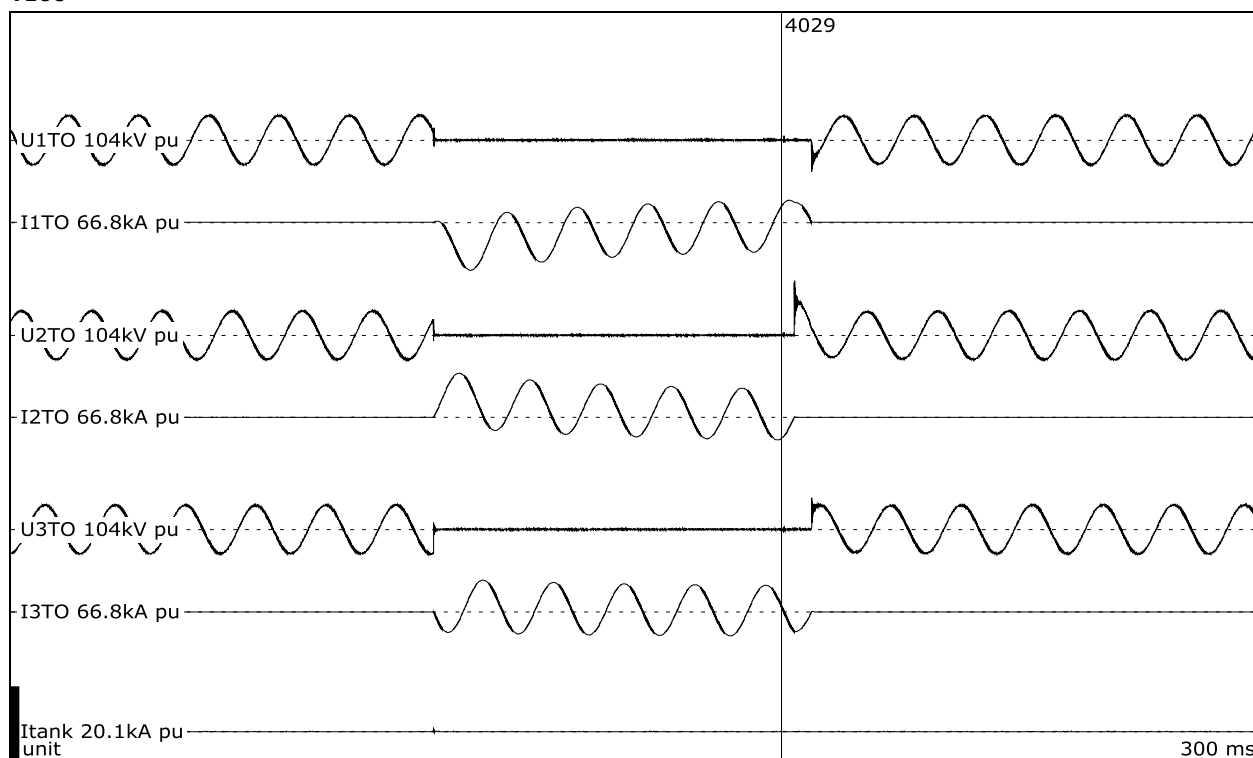
**T100****Test number: 160330-4028**

Time interval since previous test	min	-		
Time interval between operations	s	0,159		
Operation		CO		
Phase		A	B	C
Applied voltage, phase value	kV	24,3	24,0	24,0
Applied voltage, between phases	kV	41,7		
Making current, peak	kA	-39,9	41,9	-24,5
Breaking current, phase value	kA	16,1	16,1	16,0
Average current, three phase	kA	16,1		
Breaking current, DC-component	%	12	12	1
Recovery voltage, phase value	kV	23,6	23,1	23,2
Recovery voltage, between phases	kV	40,3		
TRV, peak	kV	-76,1	-45,2	44,3
Make time	ms	-	-	-
Arc duration	ms	2,7	7,3	7,4
Opening time	ms	-		
Break time	ms	-	-	-

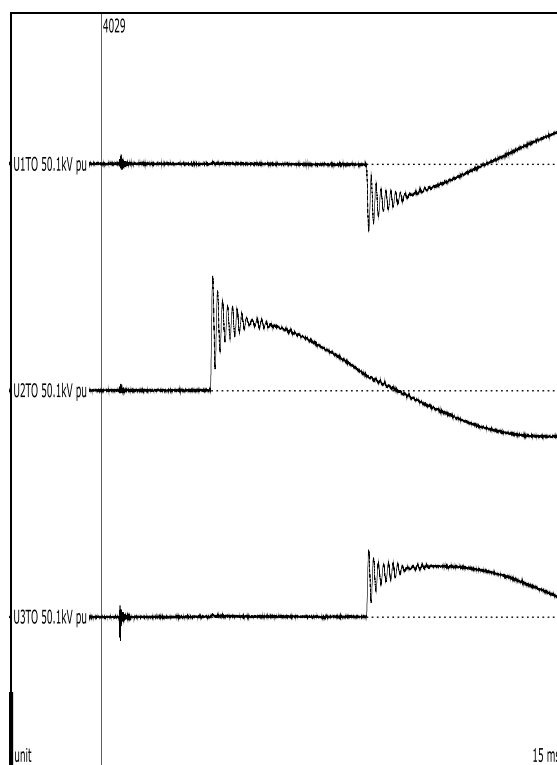


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

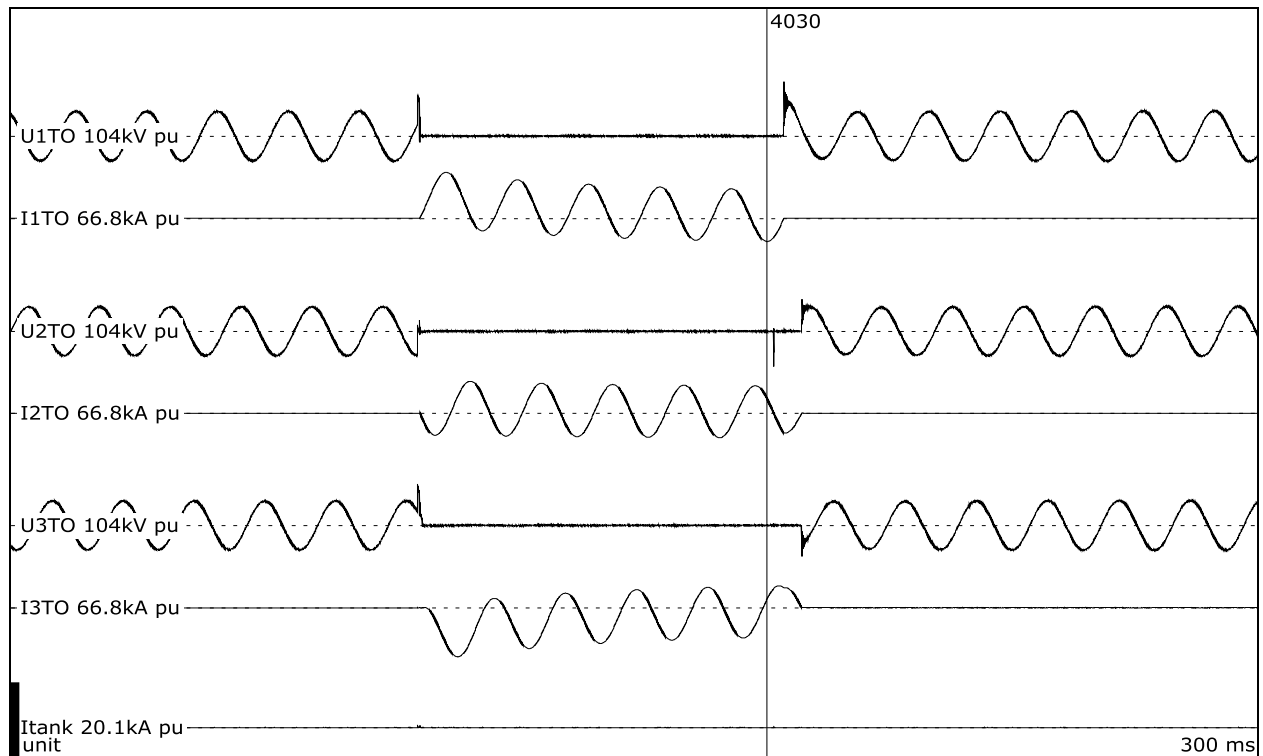
**T100****Test number: 160330-4029**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		A	B	C
Applied voltage, phase value	kV	24,2	23,9	23,9
Applied voltage, between phases	kV	41,5		
Making current, peak	kA	-42,7	39,0	28,1
Breaking current, phase value	kA	16,2	16,2	16,1
Average current, three phase	kA	16,2		
Breaking current, DC-component	%	13	10	3
Recovery voltage, phase value	kV	23,6	23,3	23,1
Recovery voltage, between phases	kV	40,4		
TRV, peak	kV	-44,1	75,7	44,1
Make time	ms	-	-	-
Arc duration	ms	7,3	3,0	7,3
Opening time	ms	-		
Break time	ms	-	-	-

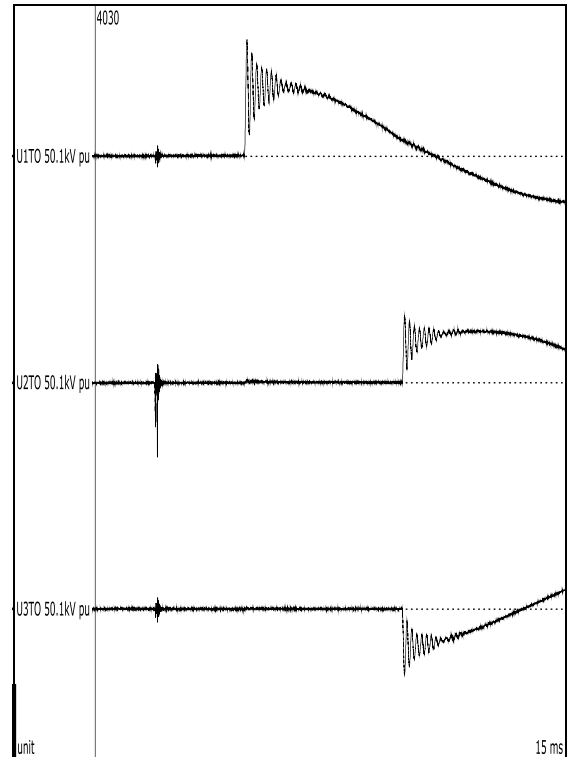


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

**T100****Test number: 160330-4030**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,4	24,0	24,0
Applied voltage, between phases	kV	41,8		
Making current, peak	kA	41,1	28,4	-43,9
Breaking current, phase value	kA	16,5	16,5	16,4
Average current, three phase	kA	16,4		
Breaking current, DC-component	%	10	4	15
Recovery voltage, phase value	kV	23,8	23,2	23,5
Recovery voltage, between phases	kV	40,7		
TRV, peak	kV	76,4	44,5	-43,8
Make time	ms	-	-	-
Arc duration	ms	4,1	8,4	8,4
Opening time	ms	-		
Break time	ms	-	-	-



Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

## 9 T50

### Standard and date

Standard IEC 62271-111 / IEEE C37.60

Test date(s) 30 March 2016

### 9.1 Condition before test

Recloser in same condition.

Controller cubicle in same condition.

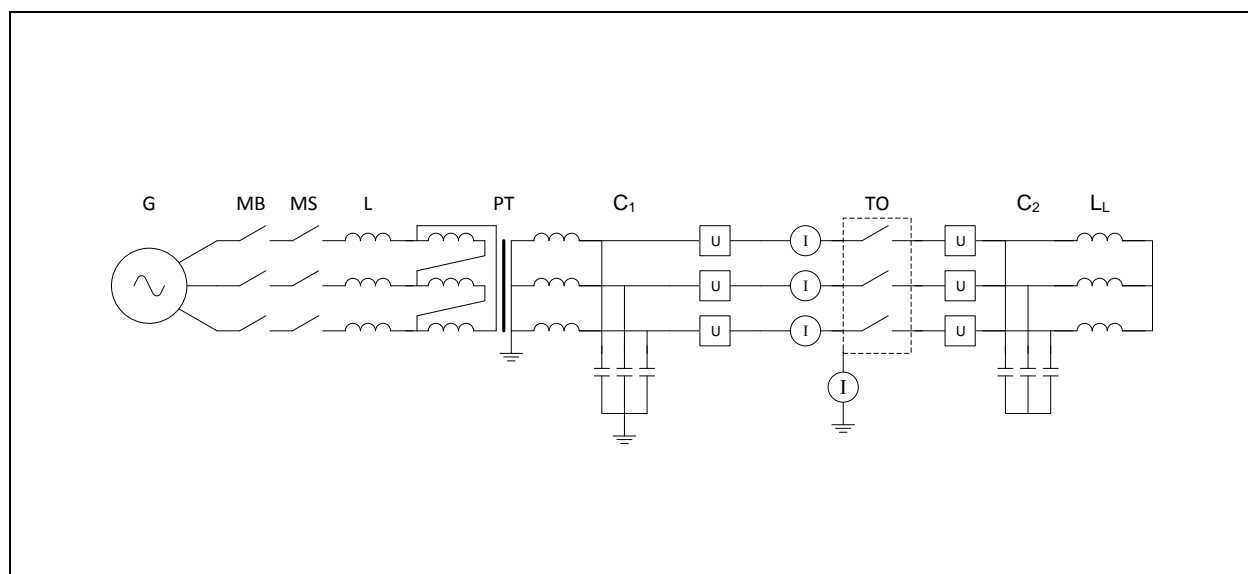
Protection relay in same condition.

Supply to fixed contacts.

Short-circuit on moving contacts.

Frame earthed via an earth fault current indicating CT.

## 9.2 Test circuit S03



G	= Generator	TO	= Test Object	U	= Voltage Measurement to earth
MB	= Master Breaker	L	= Reactor	I	= Current Measurement
MS	= Make Switch	R	= Resistor		
PT	= Power Transformer	C	= Capacitor		

Supply		
Power	MVA	624
Frequency	Hz	60
Phase(s)		3
Voltage	kV	40,5
Current	kA	8,9
Impedance	$\Omega$	2,63
Power factor		< 0,1
Neutral		earthed

TRV control elements added (supply)		
C <sub>1</sub>	$\mu F$	0,013
R <sub>1</sub>	$\Omega$	-
C <sub>s</sub>	$\mu F$	-

Prospective TRV across TO		
u <sub>c</sub>	kV	84
t <sub>3</sub>	$\mu s$	36
t <sub>d</sub>	$\mu s$	< 5
RRRV	kV/ $\mu s$	2,33

Load		
Impedance	$\Omega$	0,29
Power factor		< 0,05
Neutral		not earthed

TRV control elements added (load)		
C <sub>2</sub>	nF	0,23
R <sub>2</sub>	$\Omega$	-

Inductive load element (L <sub>L</sub> )		
L <sub>L</sub>	$\Omega$	0,29

Remarks: -

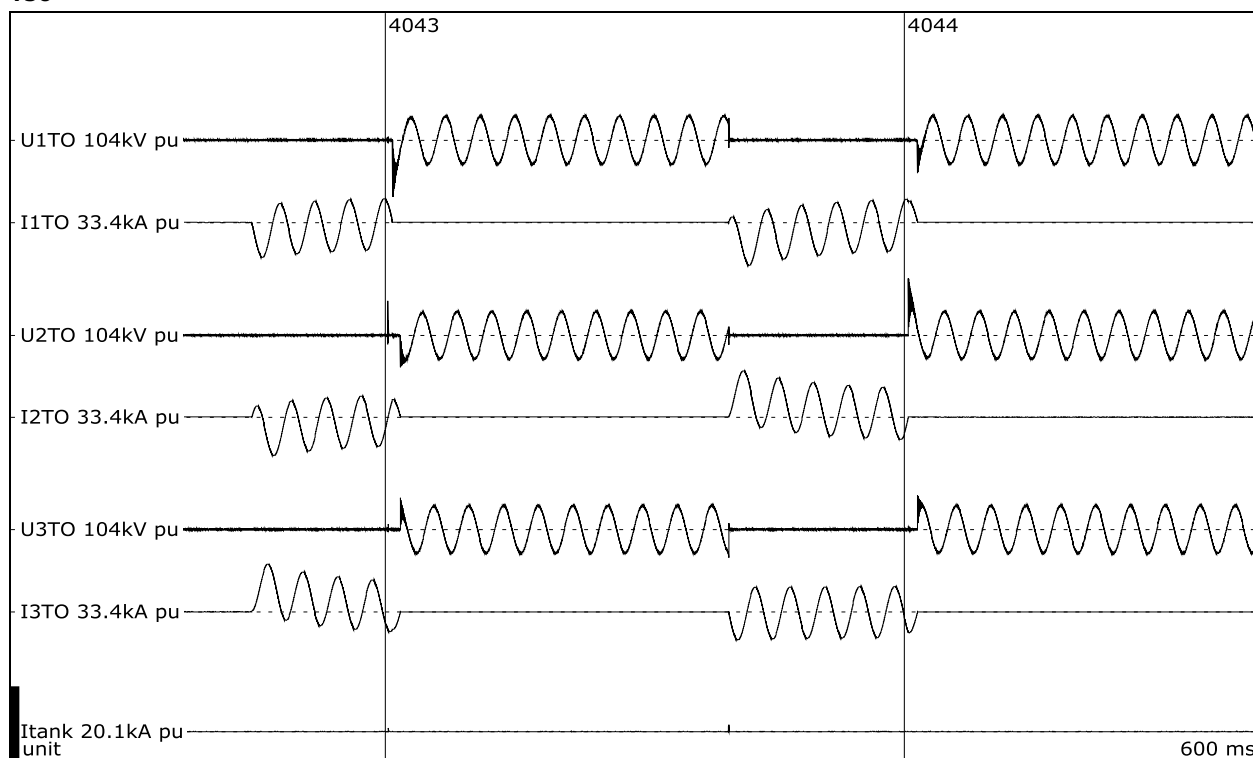
## 9.3 Test results and oscillograms

### Overview of test numbers

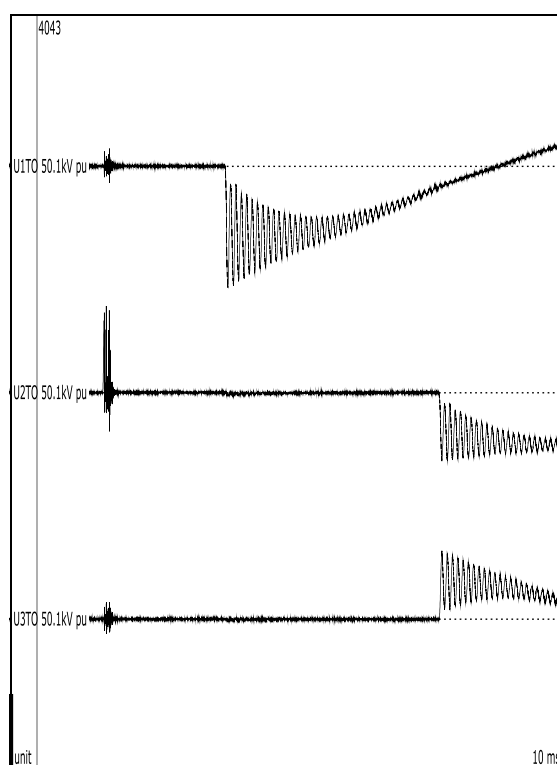
160330-4043 to 4094, 4099 to 4102

### Remarks

-

**T50****Test number: 160330-4043**

Time interval since previous test	min	-		
Operation		O		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Breaking current, phase value	kA	8,07	8,11	8,06
Average current, three phase	kA	8,08		
Breaking current, DC-component	%	8	13	20
Recovery voltage, phase value	kV	23,4	22,8	23,0
Recovery voltage, between phases	kV	39,9		
TRV, peak	kV	-80,4	-45,2	45,0
Arc duration	ms	3,5	7,3	7,4
Opening time	ms	-		
Break time	ms	-	-	-



Voltage opening coil - Vd.c.

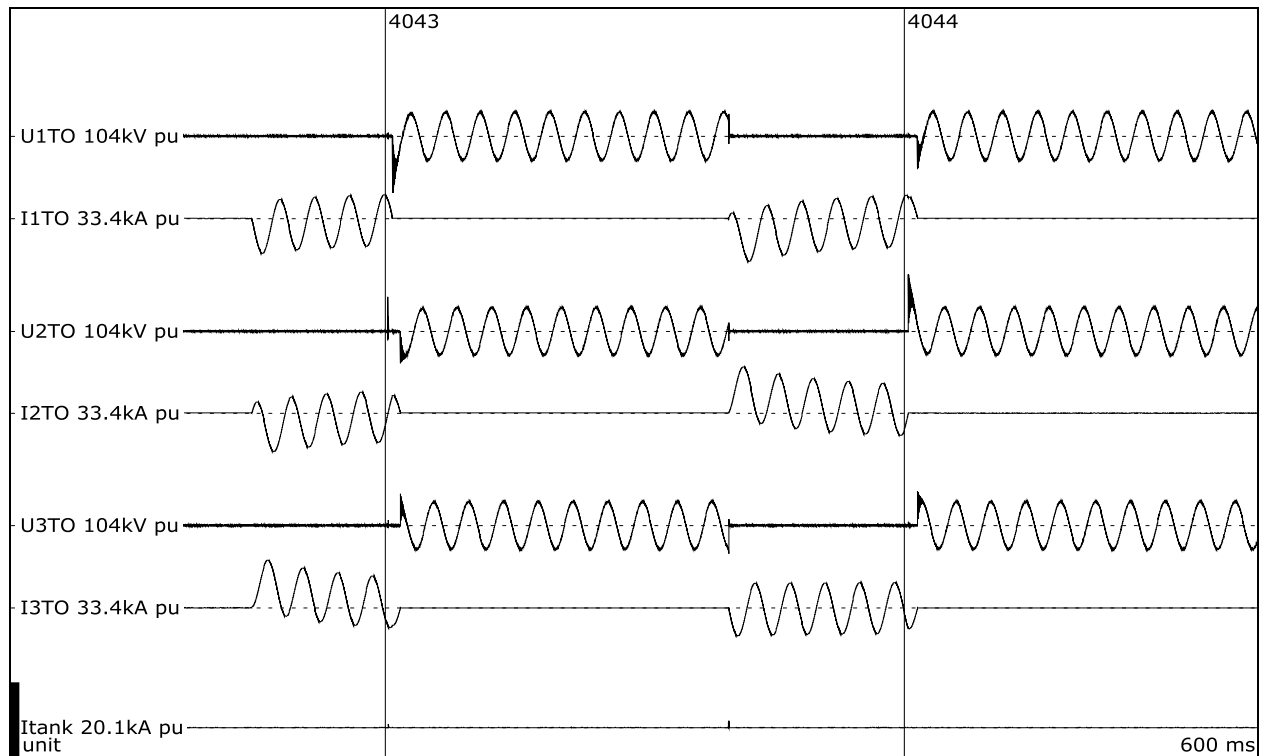
Gas pressure at 20 °C

- MPa

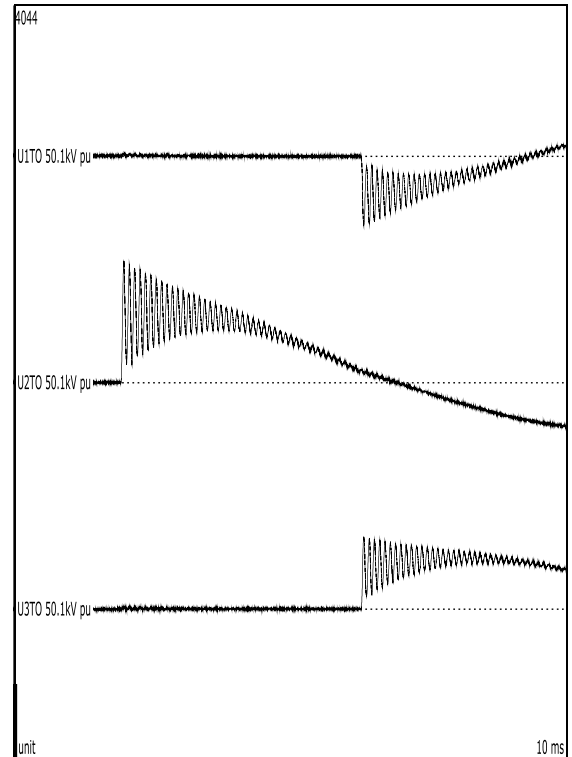
Operating pressure

- MPa

Remarks: Recloser cleared.

**T50****Test number: 160330-4044**

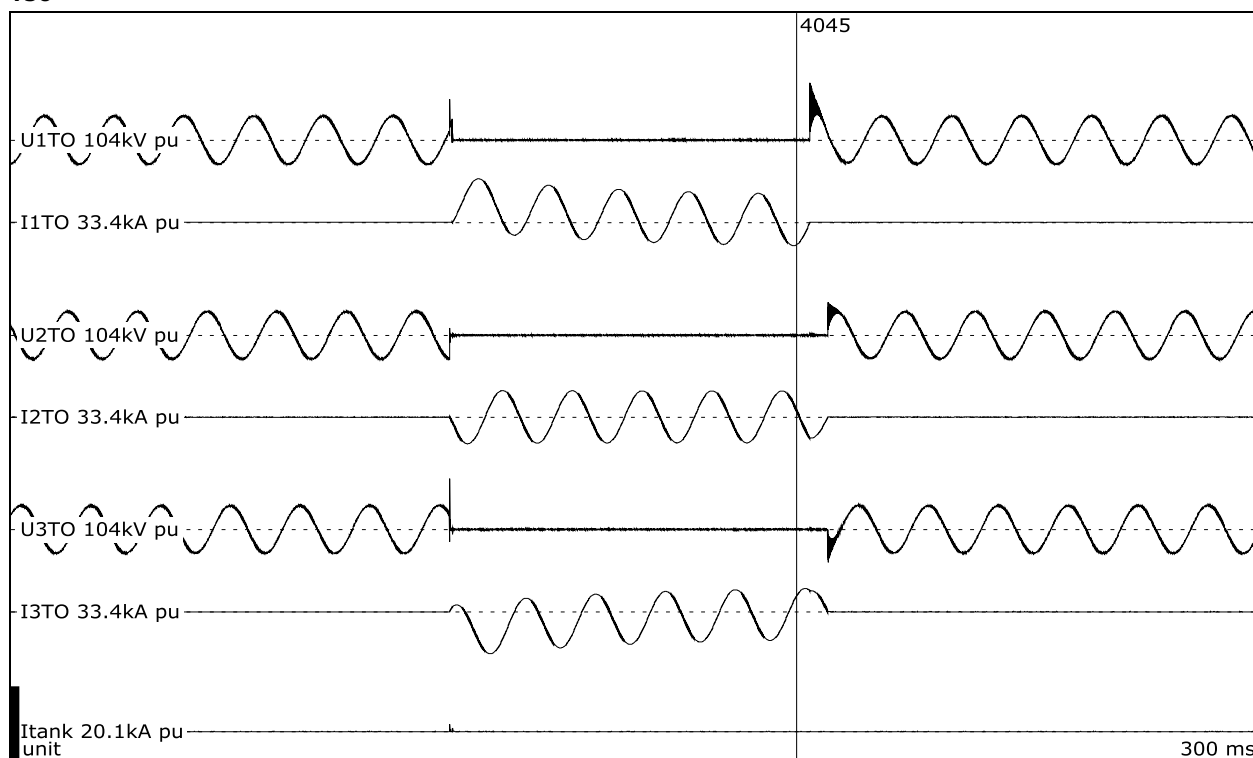
Time interval since previous test	min	-		
Time interval between operations	s	0,158		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	23,7	23,3	23,4
Applied voltage, between phases	kV	40,7		
Making current, peak	kA	-19,2	20,6	-12,6
Breaking current, phase value	kA	8,14	8,12	8,07
Average current, three phase	kA	8,11		
Breaking current, DC-component	%	9	12	2
Recovery voltage, phase value	kV	23,4	23,1	23,0
Recovery voltage, between phases	kV	40,1		
TRV, peak	kV	-46,1	80,4	47,7
Make time	ms	-	-	-
Arc duration	ms	6,4	2,0	6,4
Opening time	ms	-		
Break time	ms	-	-	-



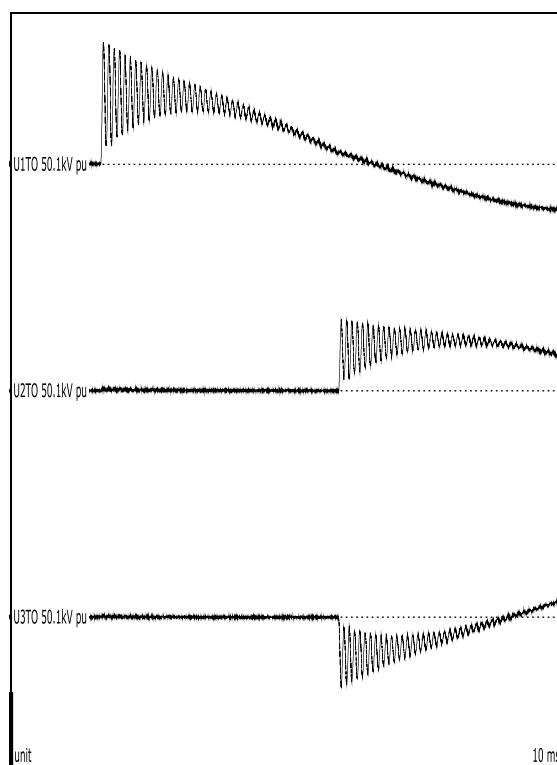
Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.



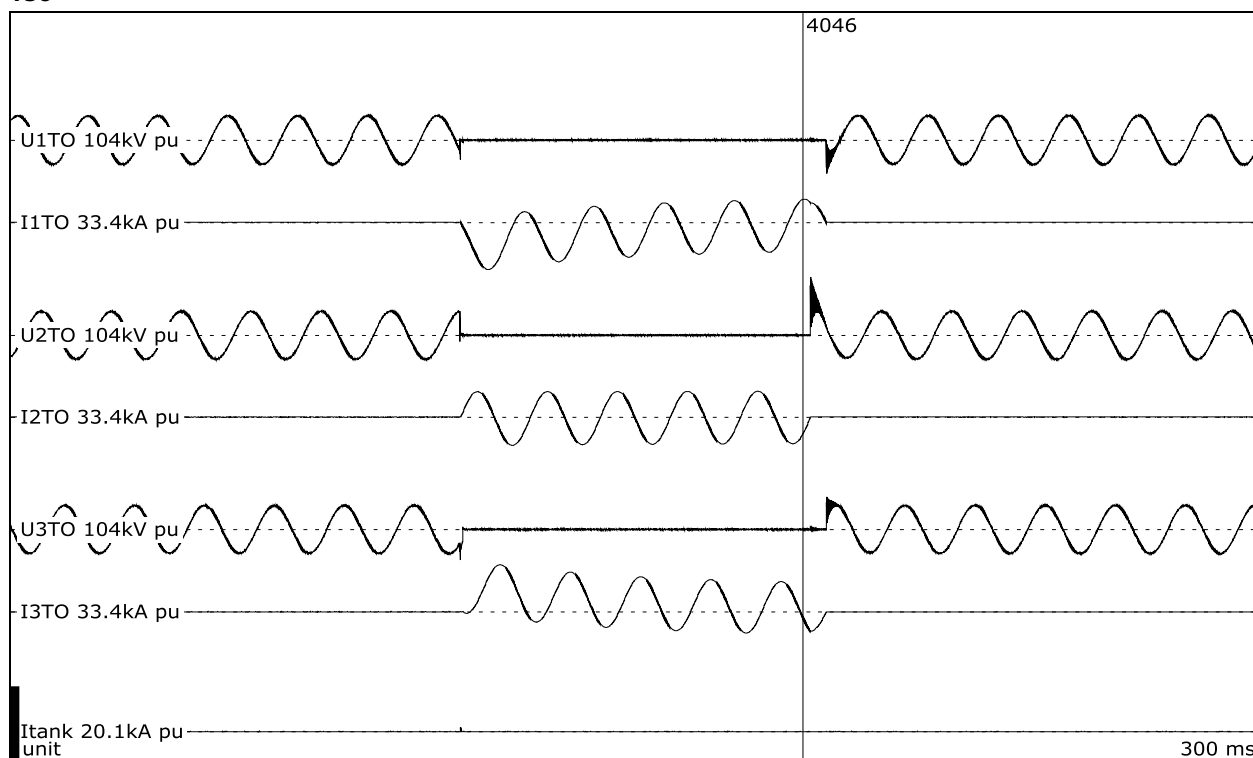
**T50****Test number: 160330-4045**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	23,8	23,4	23,5
Applied voltage, between phases	kV	40,8		
Making current, peak	kA	19,5	-11,9	-18,8
Breaking current, phase value	kA	8,17	8,19	8,14
Average current, three phase	kA	8,17		
Breaking current, DC-component	%	10	0	10
Recovery voltage, phase value	kV	23,5	23,0	23,2
Recovery voltage, between phases	kV	40,3		
TRV, peak	kV	80,6	47,2	-46,2
Make time	ms	-	-	-
Arc duration	ms	3,2	7,5	7,5
Opening time	ms	-		
Break time	ms	-	-	-

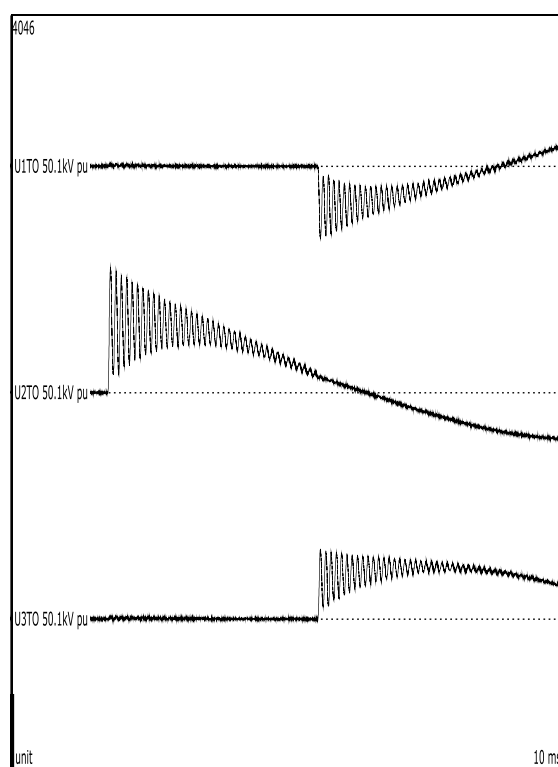


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

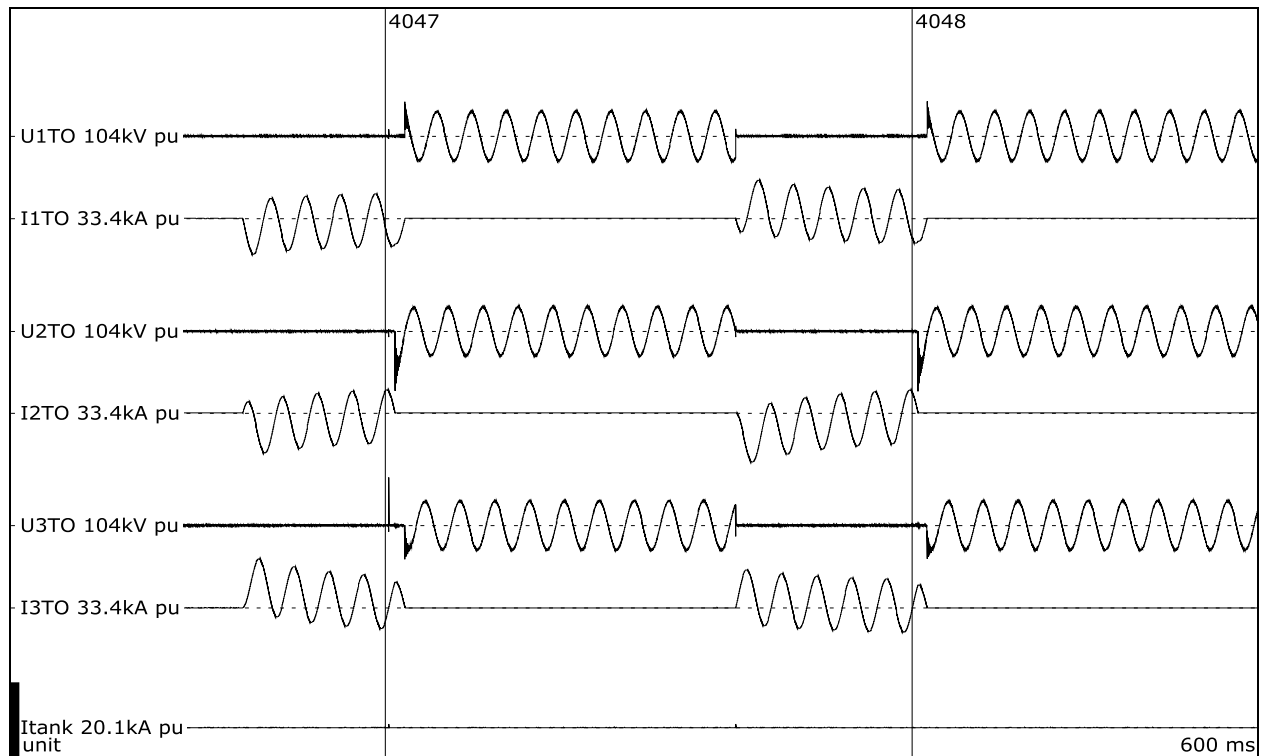
**T50****Test number: 160330-4046**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,0	23,6	23,6
Applied voltage, between phases	kV	41,1		
Making current, peak	kA	-21,0	-12,6	20,9
Breaking current, phase value	kA	8,31	8,31	8,26
Average current, three phase	kA	8,29		
Breaking current, DC-component	%	10	2	12
Recovery voltage, phase value	kV	23,8	23,5	23,3
Recovery voltage, between phases	kV	40,7		
TRV, peak	kV	-47,8	83,4	46,1
Make time	ms	-	-	-
Arc duration	ms	5,6	1,8	5,6
Opening time	ms	-		
Break time	ms	-	-	-

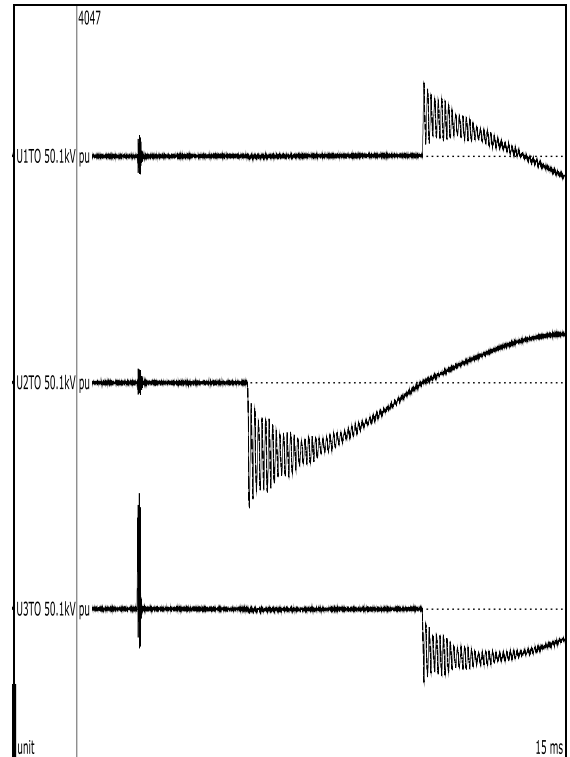


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

**T50****Test number: 160330-4047**

Time interval since previous test	min	-		
Operation		O		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Breaking current, phase value	kA	8,35	8,39	8,28
Average current, three phase	kA	8,34		
Breaking current, DC-component	%	6	11	19
Recovery voltage, phase value	kV	24,0	23,5	23,9
Recovery voltage, between phases	kV	41,2		
TRV, peak	kV	48,3	-82,9	-48,4
Arc duration	ms	9,4	4,7	9,4
Opening time	ms	-		
Break time	ms	-	-	-



Voltage opening coil - Vd.c.

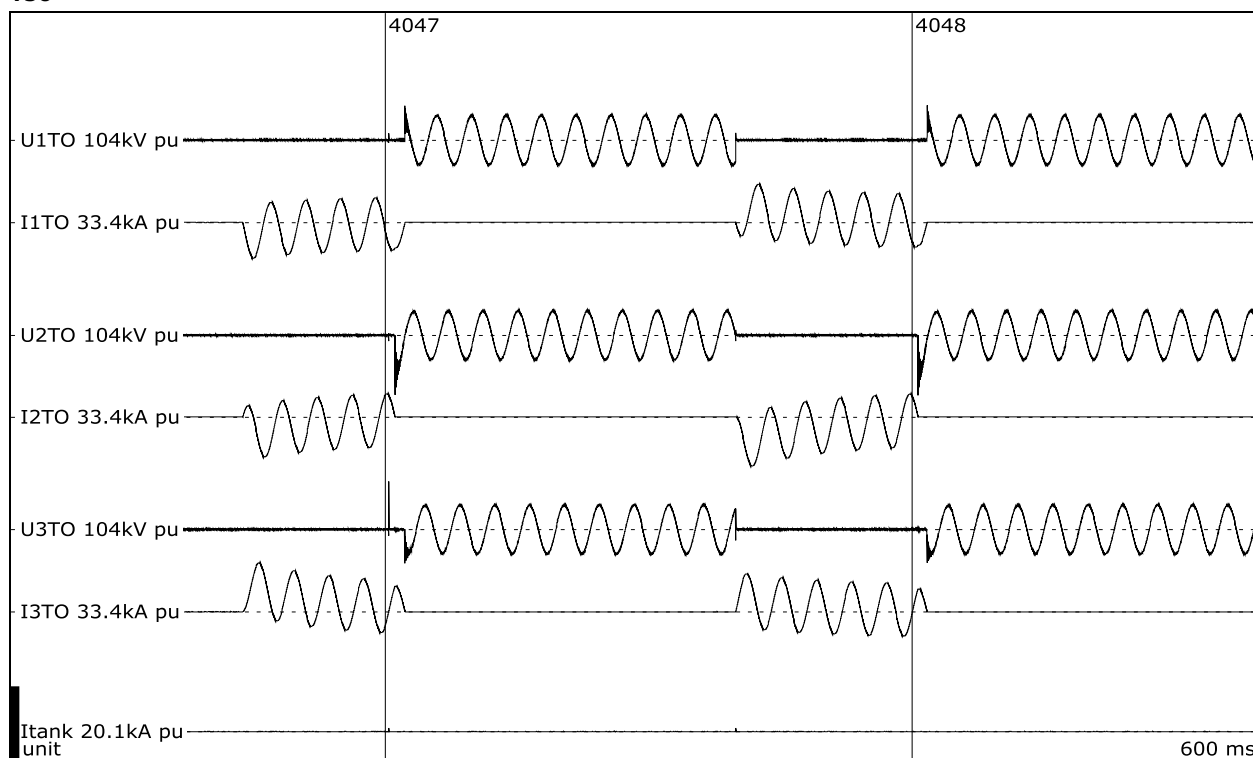
Gas pressure at 20 °C

- MPa

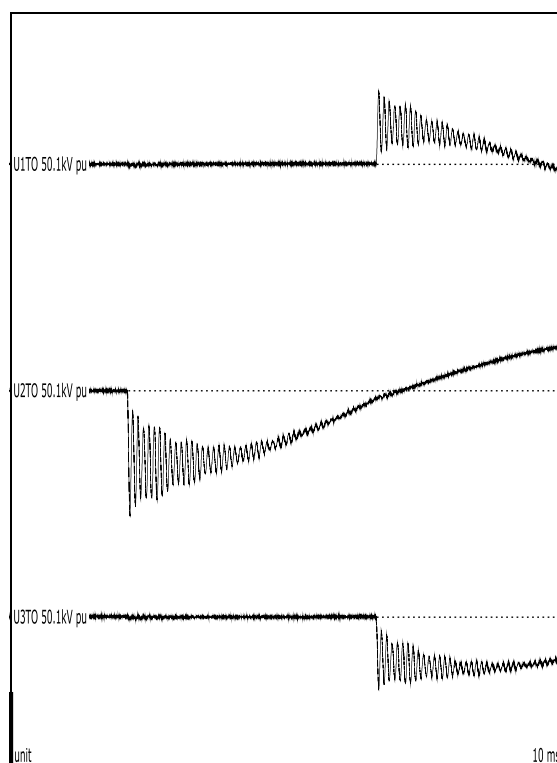
Operating pressure

- MPa

Remarks: Recloser cleared.

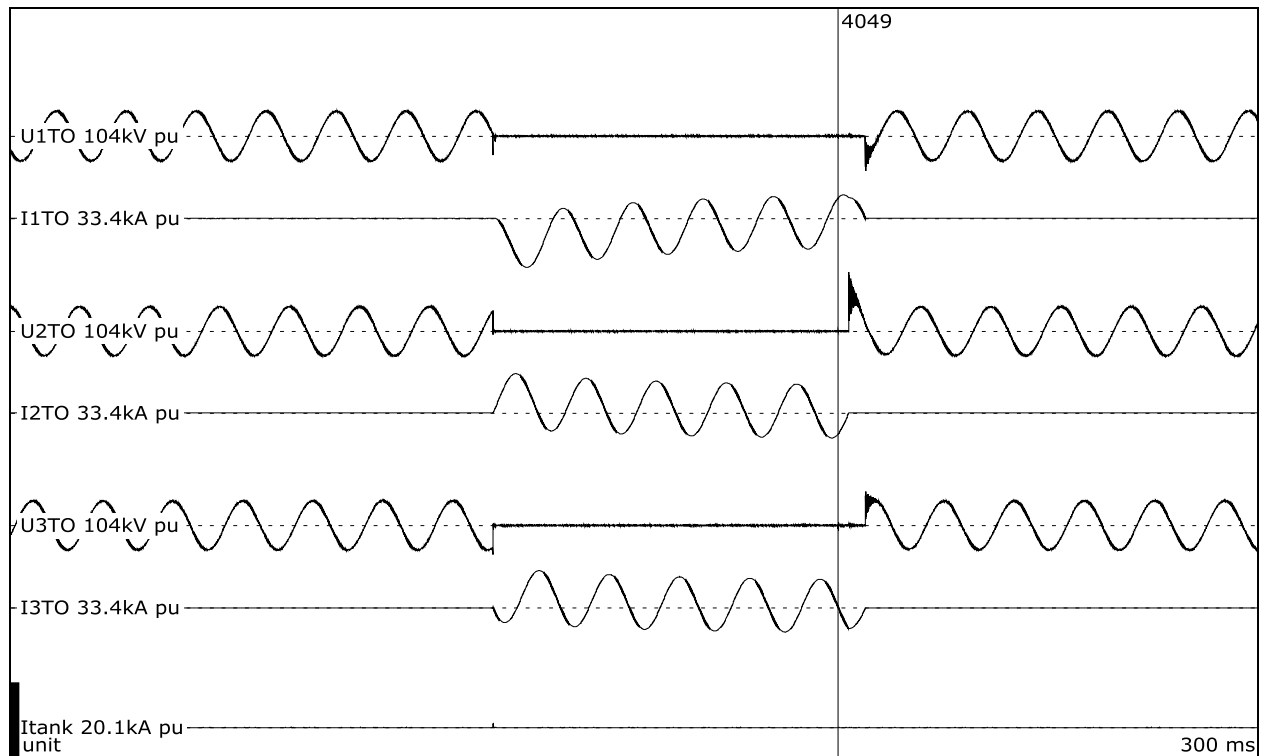
**T50****Test number: 160330-4048**

Time interval since previous test	min	-		
Time interval between operations	s	0,159		
Operation		CO		
Phase		A	B	C
Applied voltage, phase value	kV	24,4	24,0	24,1
Applied voltage, between phases	kV	41,9		
Making current, peak	kA	17,0	-21,9	16,9
Breaking current, phase value	kA	8,39	8,37	8,32
Average current, three phase	kA	8,36		
Breaking current, DC-component	%	6	13	6
Recovery voltage, phase value	kV	24,0	23,0	23,7
Recovery voltage, between phases	kV	40,9		
TRV, peak	kV	48,6	-82,7	-48,5
Make time	ms	-	-	-
Arc duration	ms	7,2	2,7	7,2
Opening time	ms	-		
Break time	ms	-	-	-

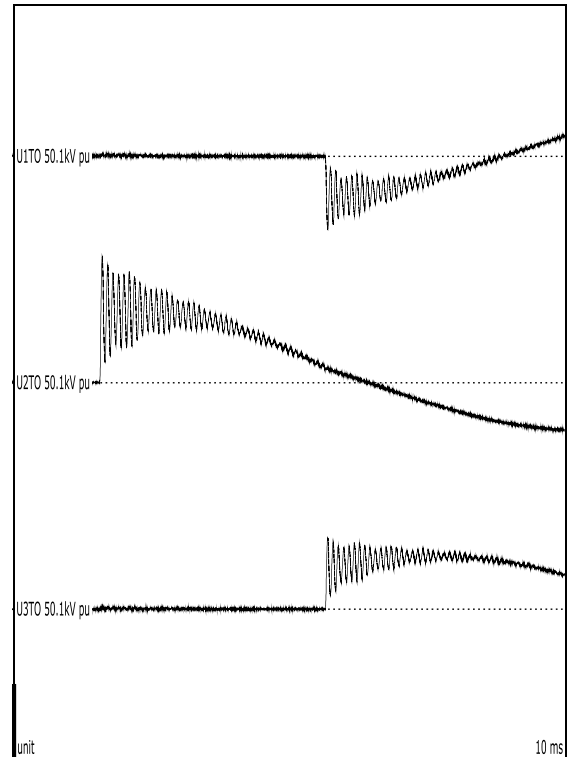


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

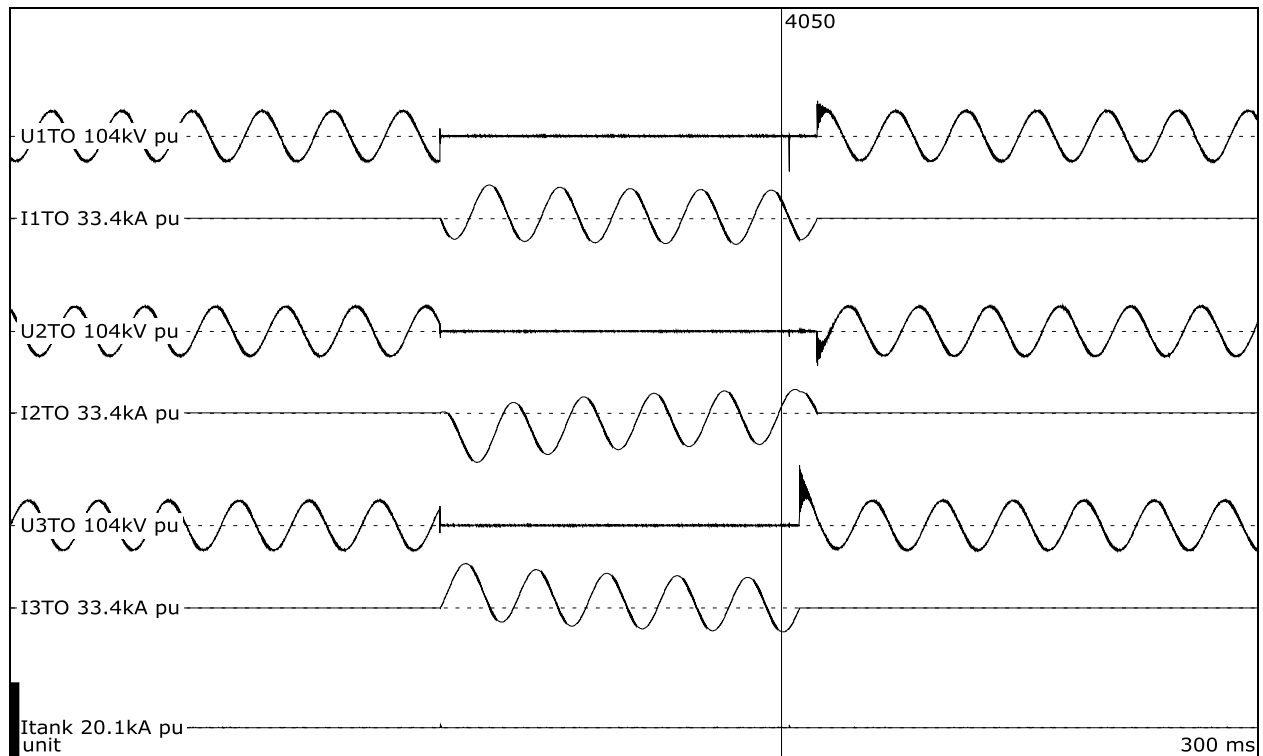
**T50****Test number: 160330-4049**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,5	24,1	24,2
Applied voltage, between phases	kV	42,0		
Making current, peak	kA	-21,9	17,6	16,5
Breaking current, phase value	kA	8,47	8,46	8,41
Average current, three phase	kA	8,45		
Breaking current, DC-component	%	11	6	6
Recovery voltage, phase value	kV	24,2	23,2	24,0
Recovery voltage, between phases	kV	41,2		
TRV, peak	kV	-48,6	83,4	47,4
Make time	ms	-	-	-
Arc duration	ms	6,7	2,6	6,7
Opening time	ms	-		
Break time	ms	-	-	-

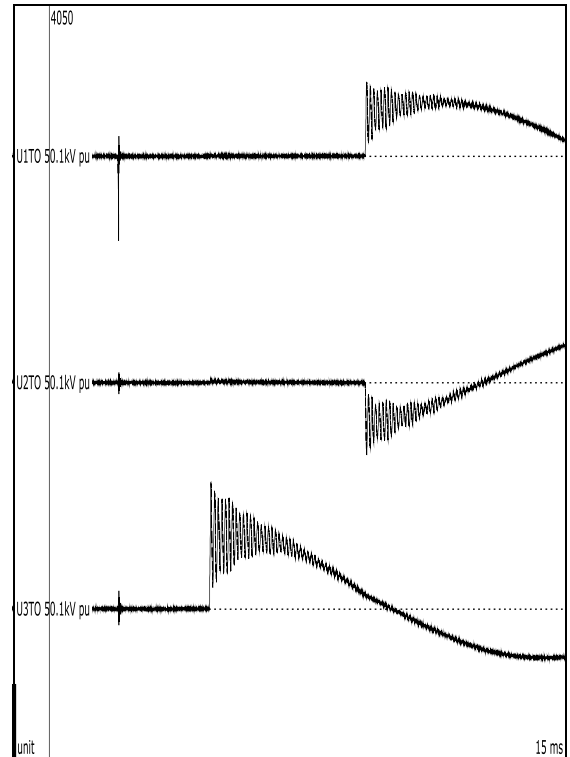


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

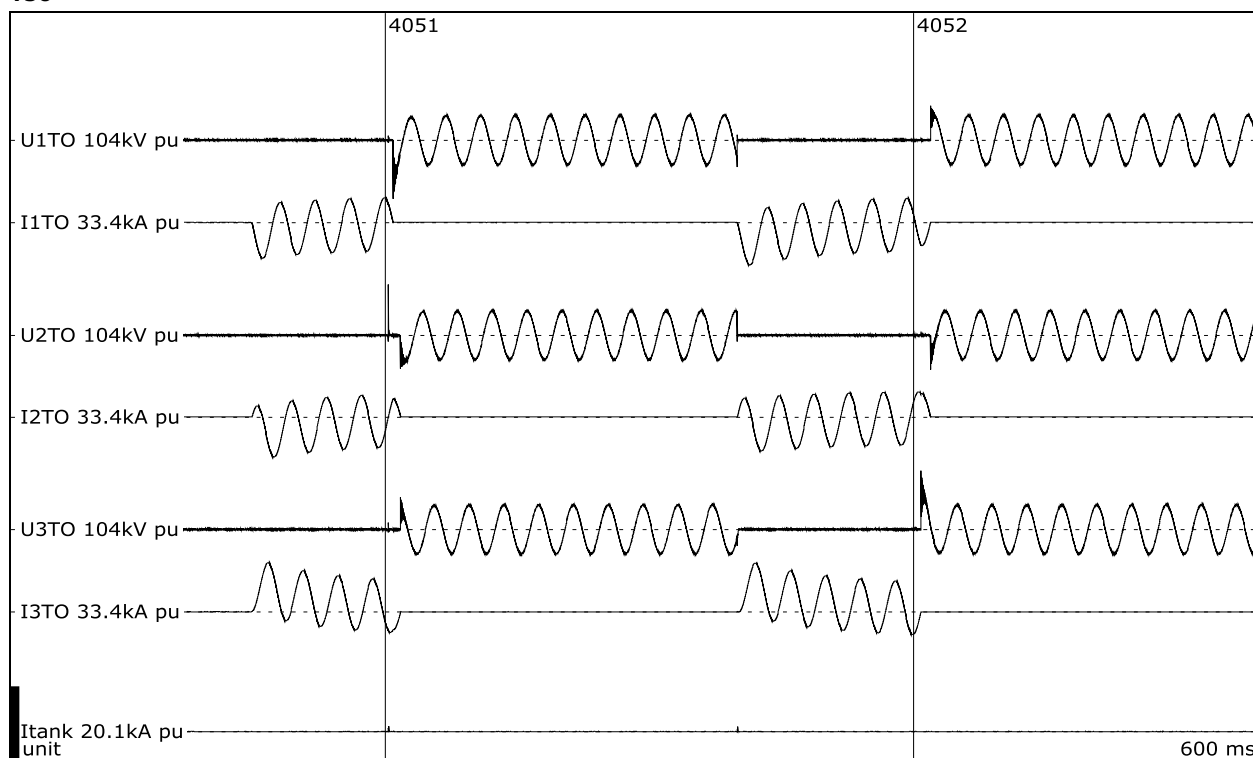
**T50****Test number: 160330-4050**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		A	B	C
Applied voltage, phase value	kV	24,8	24,4	24,4
Applied voltage, between phases	kV	42,4		
Making current, peak	kA	14,9	-22,0	19,7
Breaking current, phase value	kA	8,59	8,61	8,55
Average current, three phase	kA	8,58		
Breaking current, DC-component	%	4	13	9
Recovery voltage, phase value	kV	24,6	24,1	23,5
Recovery voltage, between phases	kV	41,7		
TRV, peak	kV	48,8	-48,0	84,0
Make time	ms	-	-	-
Arc duration	ms	8,6	8,7	4,4
Opening time	ms	-		
Break time	ms	-	-	-

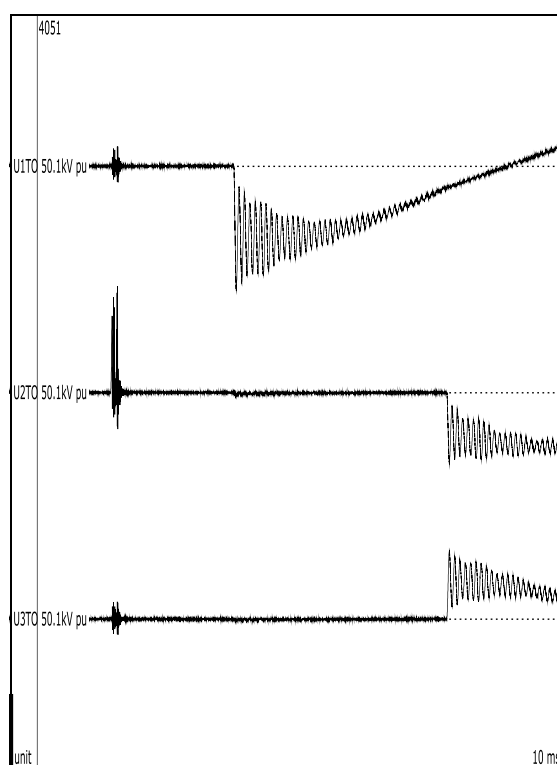


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

**T50****Test number: 160330-4051**

Time interval since previous test	min	-		
Operation		O		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Breaking current, phase value	kA	8,37	8,38	8,33
Average current, three phase	kA	8,36		
Breaking current, DC-component	%	6	13	20
Recovery voltage, phase value	kV	23,4	23,5	23,7
Recovery voltage, between phases	kV	40,7		
TRV, peak	kV	-82,8	-47,3	45,4
Arc duration	ms	3,6	7,5	7,5
Opening time	ms	-		
Break time	ms	-	-	-



Voltage opening coil - Vd.c.

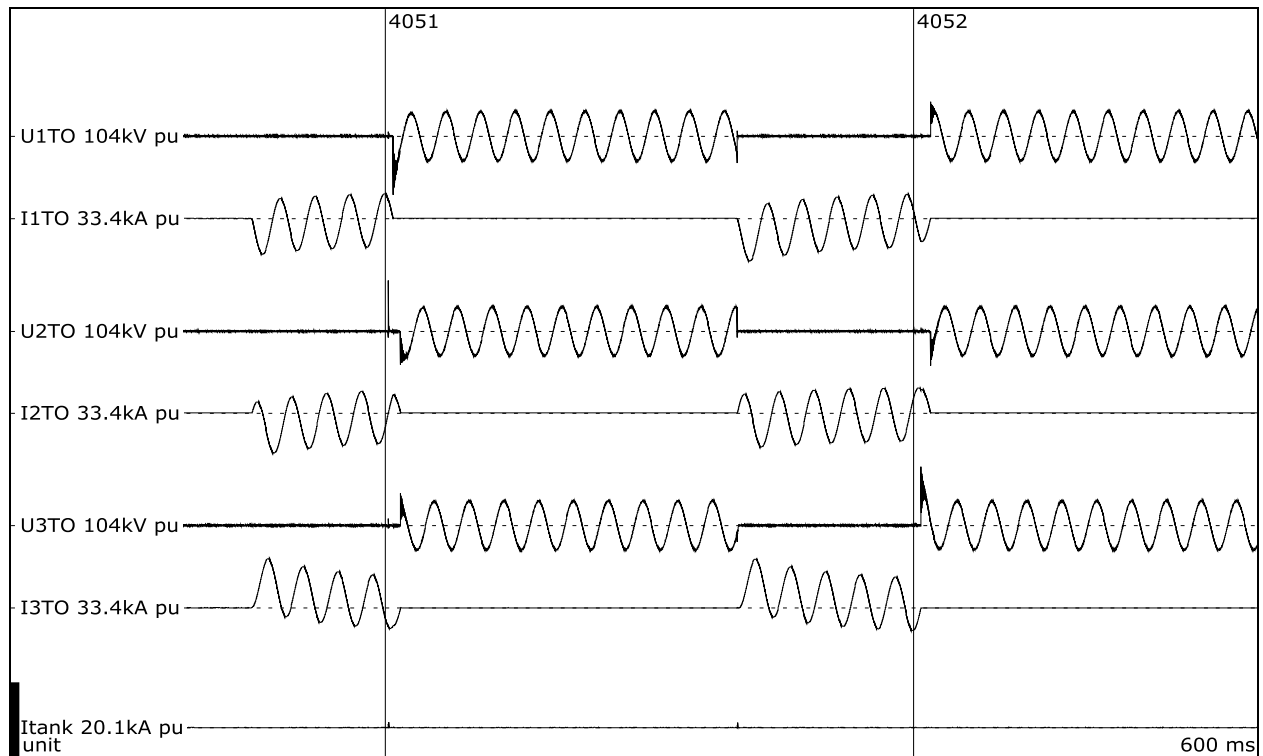
Gas pressure at 20 °C

- MPa

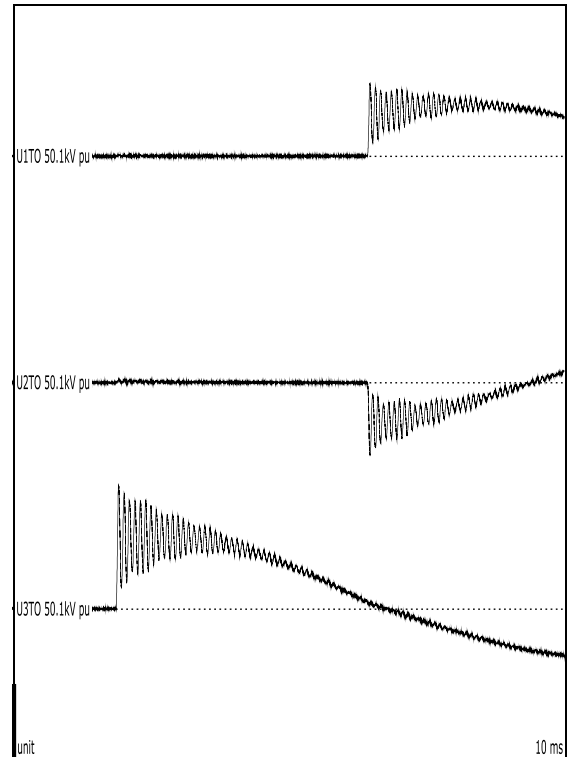
Operating pressure

- MPa

Remarks: Recloser cleared.

**T50****Test number: 160330-4052**

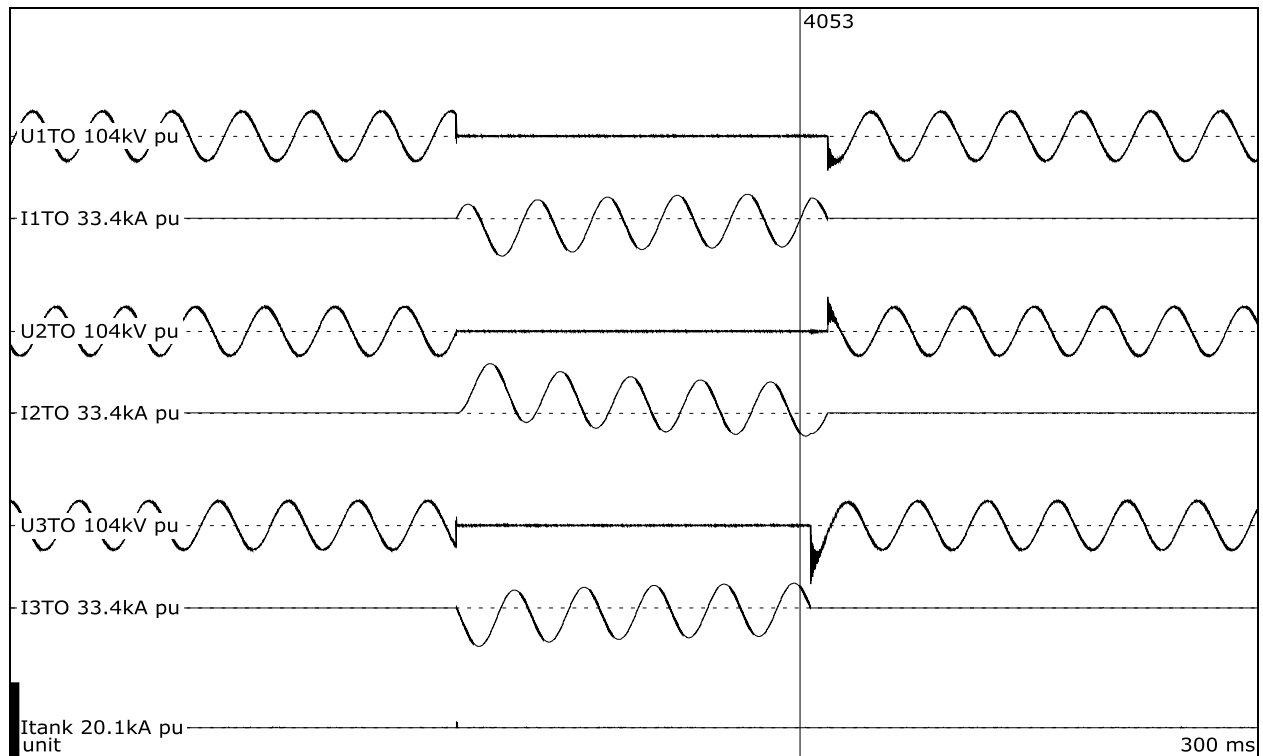
Time interval since previous test	min	-		
Time interval between operations	s	0,162		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,4	24,0	24,1
Applied voltage, between phases	kV	41,9		
Making current, peak	kA	-19,0	-15,2	21,7
Breaking current, phase value	kA	8,36	8,39	8,34
Average current, three phase	kA	8,37		
Breaking current, DC-component	%	8	5	12
Recovery voltage, phase value	kV	24,1	23,7	23,1
Recovery voltage, between phases	kV	40,9		
TRV, peak	kV	48,0	-48,2	82,3
Make time	ms	-	-	-
Arc duration	ms	8,0	8,0	3,5
Opening time	ms	-		
Break time	ms	-	-	-



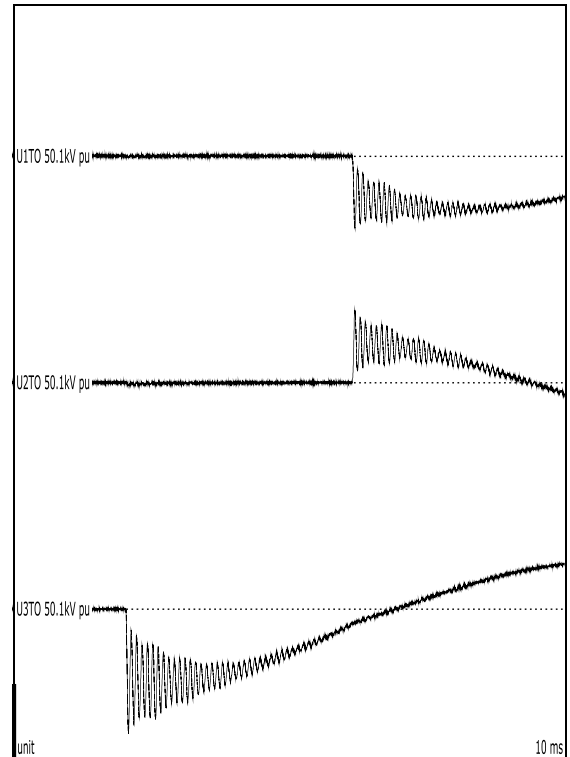
Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.



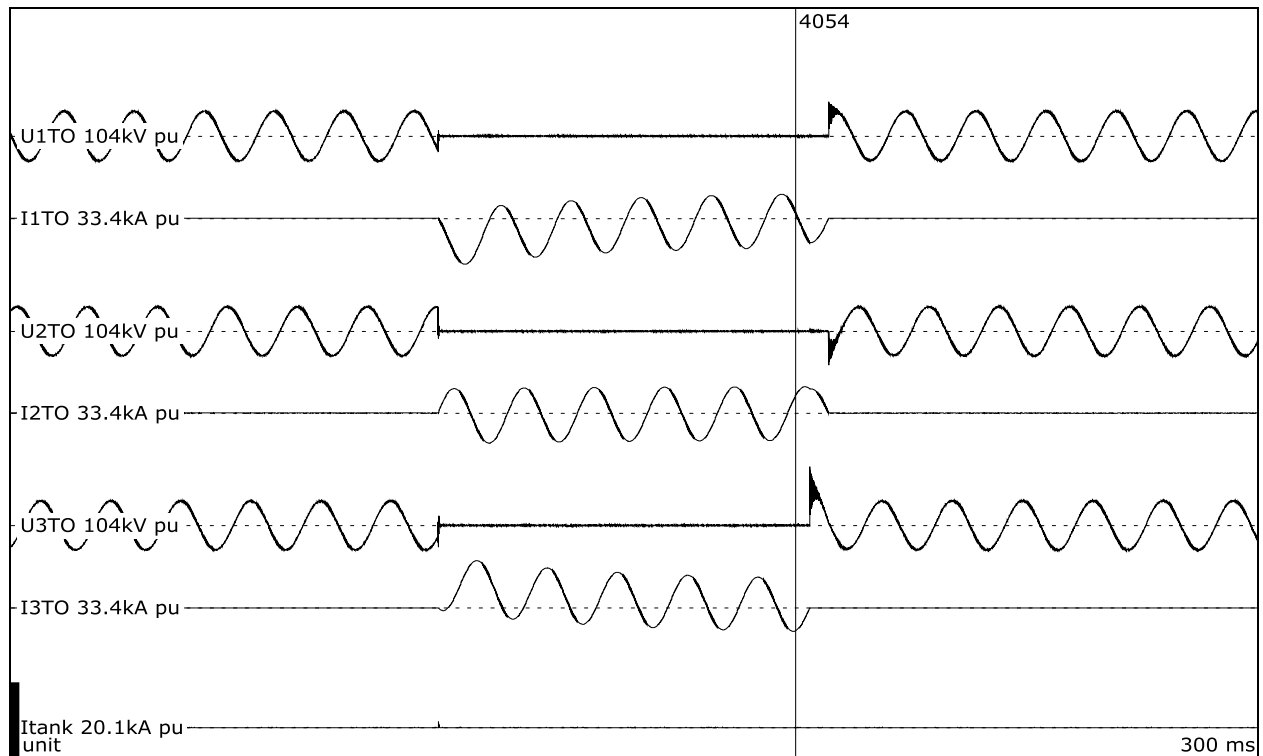
**T50****Test number: 160330-4053**

Time interval since previous test	min	-		
Time interval between operations	s	1,07		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,4	24,0	24,1
Applied voltage, between phases	kV	41,8		
Making current, peak	kA	-16,8	22,1	-17,3
Breaking current, phase value	kA	8,42	8,44	8,35
Average current, three phase	kA	8,40		
Breaking current, DC-component	%	6	13	7
Recovery voltage, phase value	kV	24,2	23,8	23,2
Recovery voltage, between phases	kV	41,1		
TRV, peak	kV	-47,6	47,9	-83,3
Make time	ms	-	-	-
Arc duration	ms	6,7	6,7	2,6
Opening time	ms	-		
Break time	ms	-	-	-

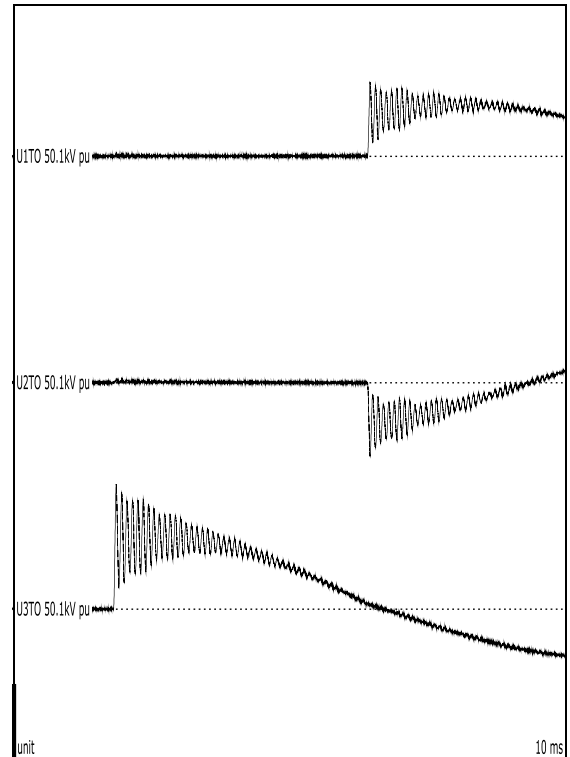


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

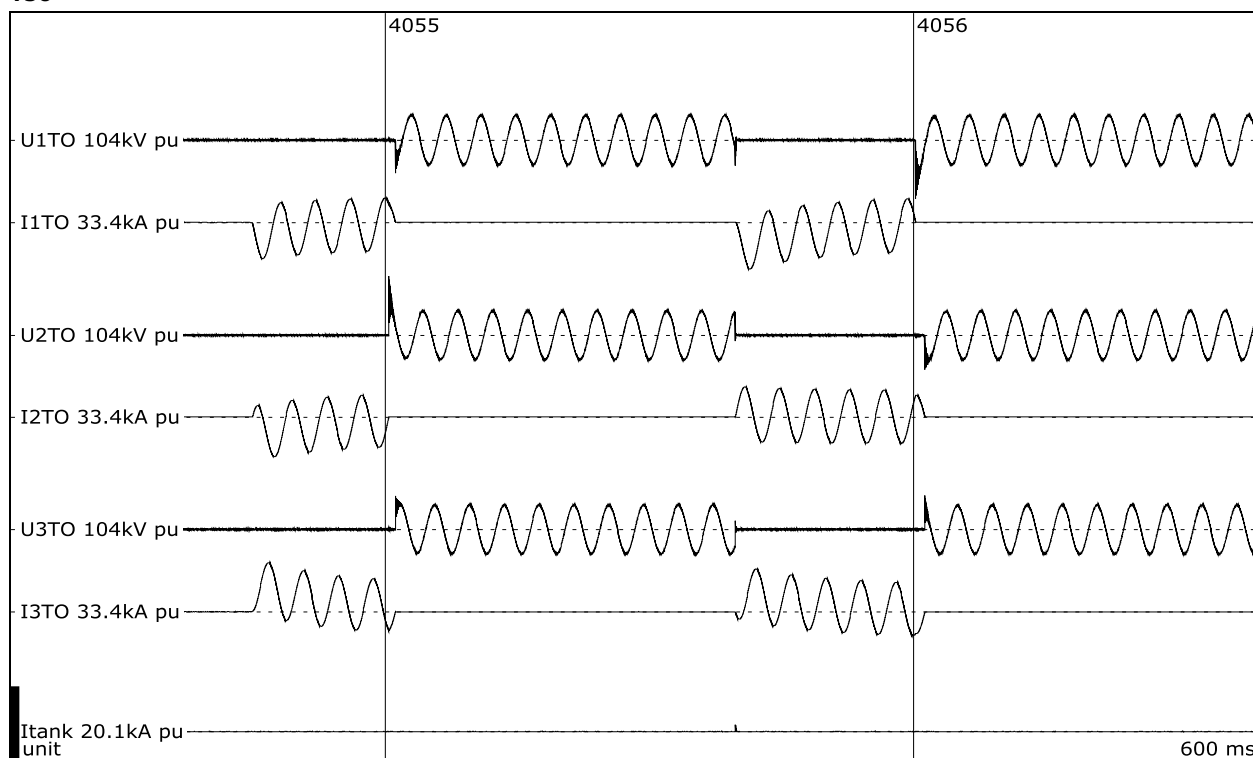
**T50****Test number: 160330-4054**

Time interval since previous test	min	-		
Time interval between operations	s	1,07		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	23,5	24,1	23,2
Applied voltage, between phases	kV	40,9		
Making current, peak	kA	-20,5	-13,4	21,0
Breaking current, phase value	kA	8,48	8,50	8,42
Average current, three phase	kA	8,47		
Breaking current, DC-component	%	9	2	11
Recovery voltage, phase value	kV	24,3	23,9	23,3
Recovery voltage, between phases	kV	41,3		
TRV, peak	kV	48,8	-48,5	82,9
Make time	ms	-	-	-
Arc duration	ms	8,0	8,0	3,4
Opening time	ms	-		
Break time	ms	-	-	-

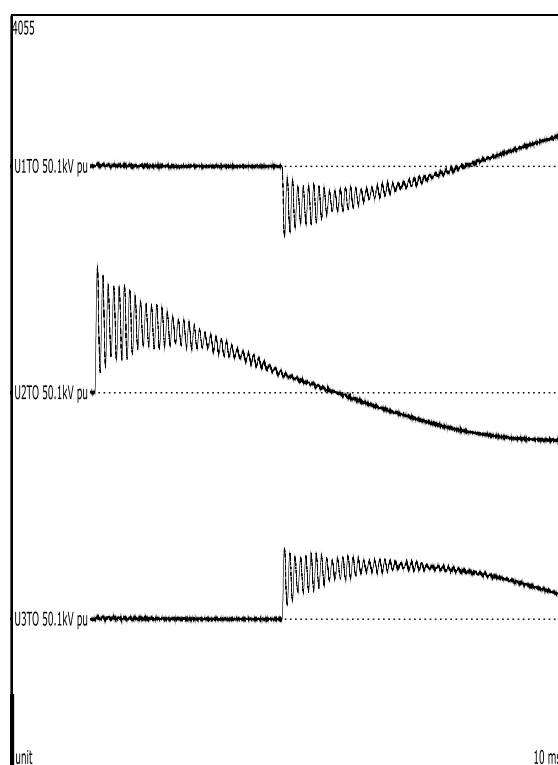


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

**T50****Test number: 160330-4055**

Time interval since previous test	min	-		
Operation		O		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Breaking current, phase value	kA	8,37	8,38	8,33
Average current, three phase	kA	8,36		
Breaking current, DC-component	%	7	13	20
Recovery voltage, phase value	kV	24,0	23,7	23,5
Recovery voltage, between phases	kV	41,2		
TRV, peak	kV	-47,1	83,5	47,2
Arc duration	ms	5,0	1,6	5,0
Opening time	ms	-		
Break time	ms	-	-	-



Voltage opening coil - Vd.c.

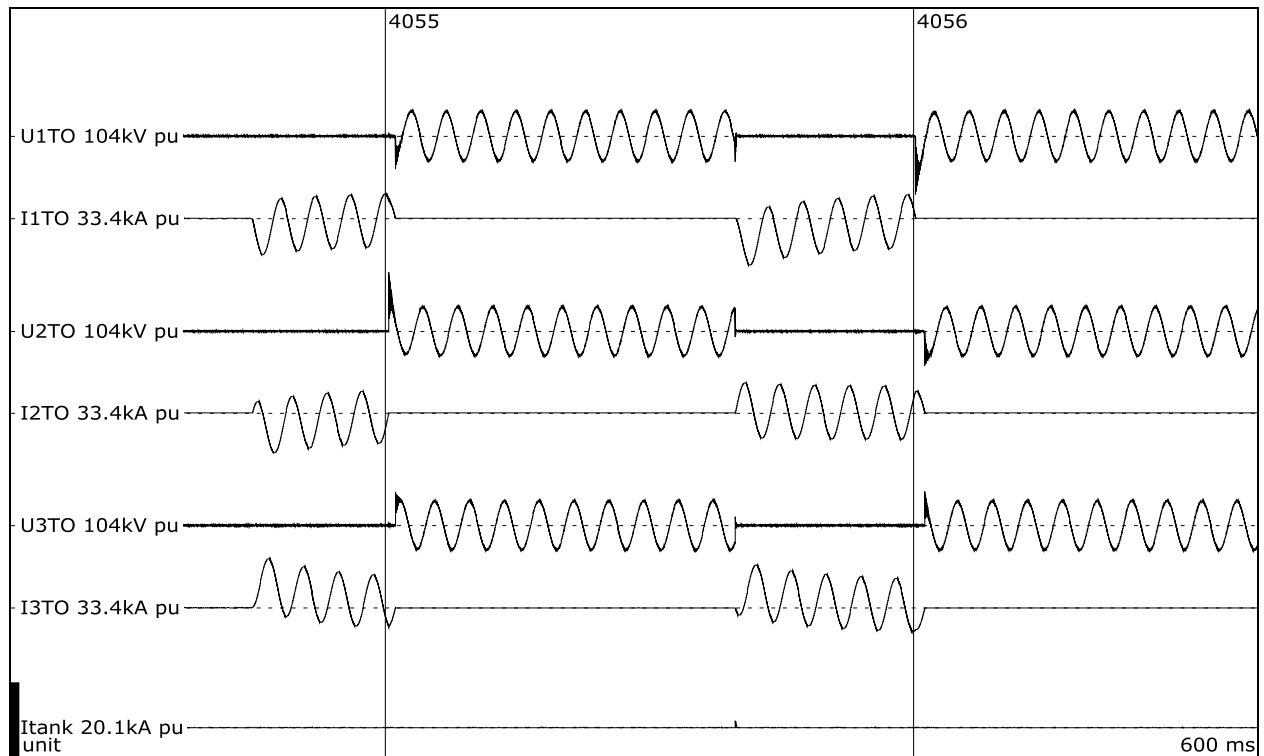
Gas pressure at 20 °C

- MPa

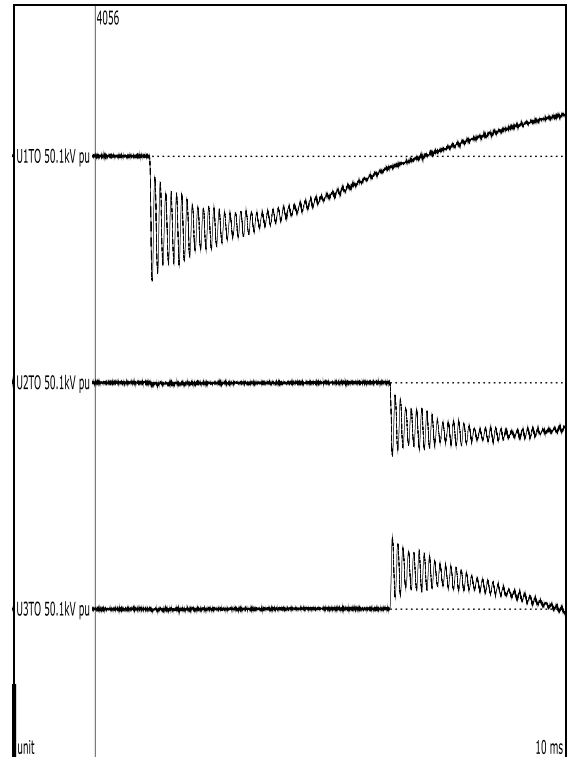
Operating pressure

- MPa

Remarks: Recloser cleared.

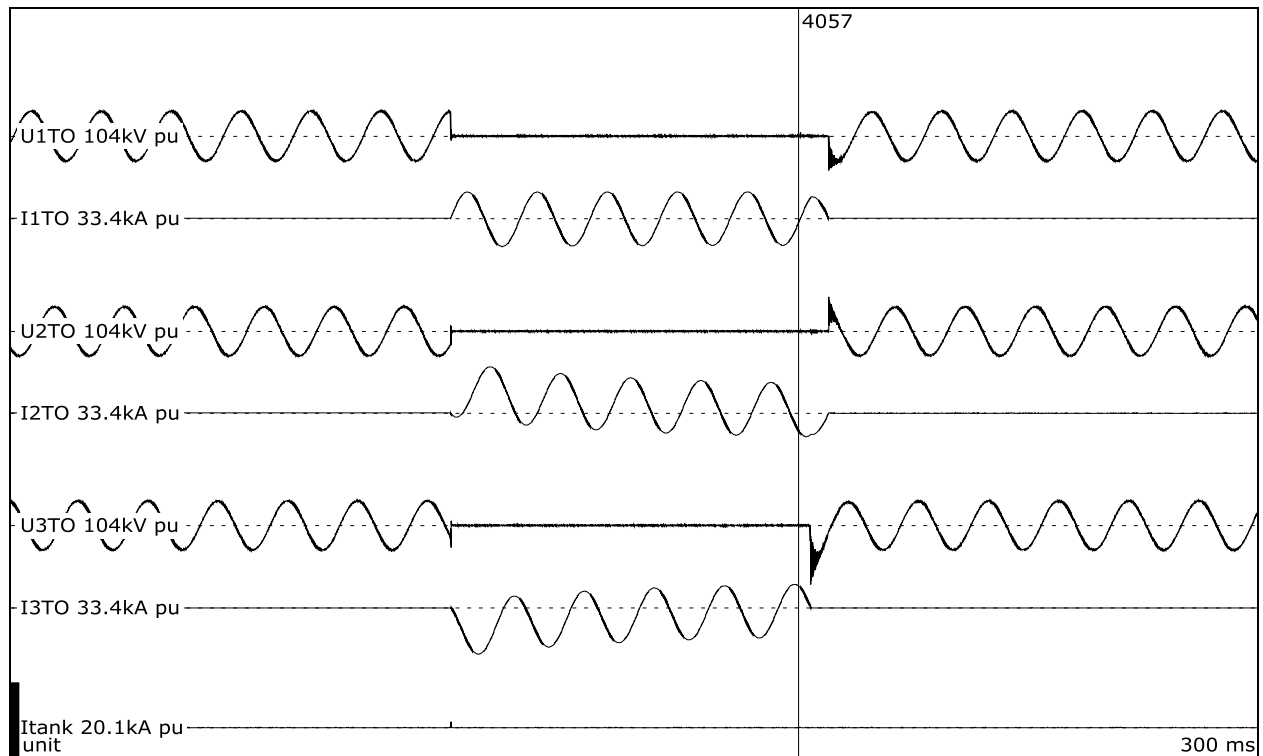
**T50****Test number: 160330-4056**

Time interval since previous test	min	-		
Time interval between operations	s	0,164		
Operation		CO		
Phase		A	B	C
Applied voltage, phase value	kV	23,6	24,1	24,2
Applied voltage, between phases	kV	41,5		
Making current, peak	kA	-20,8	13,4	19,0
Breaking current, phase value	kA	8,37	8,39	8,34
Average current, three phase	kA	8,37		
Breaking current, DC-component	%	10	1	8
Recovery voltage, phase value	kV	23,4	23,8	23,8
Recovery voltage, between phases	kV	41,0		
TRV, peak	kV	-82,9	-48,5	47,3
Make time	ms	-	-	-
Arc duration	ms	1,0	5,4	5,4
Opening time	ms	-		
Break time	ms	-	-	-

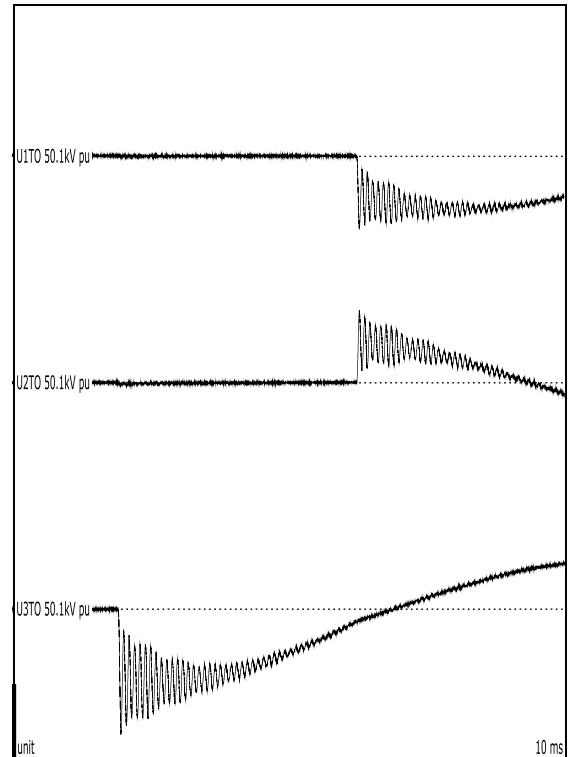


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

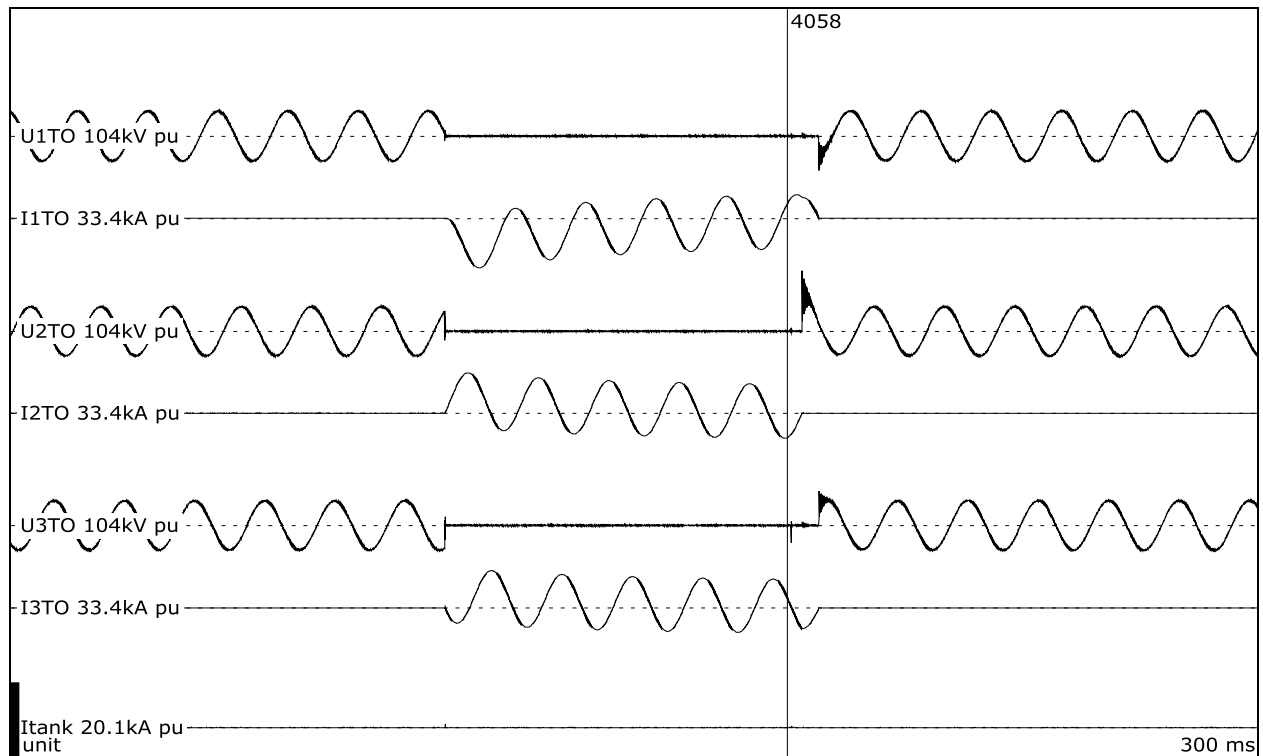
**T50****Test number: 160330-4057**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		A	B	C
Applied voltage, phase value	kV	24,5	23,2	23,3
Applied voltage, between phases	kV	41,0		
Making current, peak	kA	-12,6	20,6	-20,7
Breaking current, phase value	kA	8,44	8,46	8,37
Average current, three phase	kA	8,42		
Breaking current, DC-component	%	1	11	12
Recovery voltage, phase value	kV	24,2	23,8	23,1
Recovery voltage, between phases	kV	41,1		
TRV, peak	kV	-48,2	47,5	-82,9
Make time	ms	-	-	-
Arc duration	ms	7,3	7,3	3,0
Opening time	ms	-		
Break time	ms	-	-	-

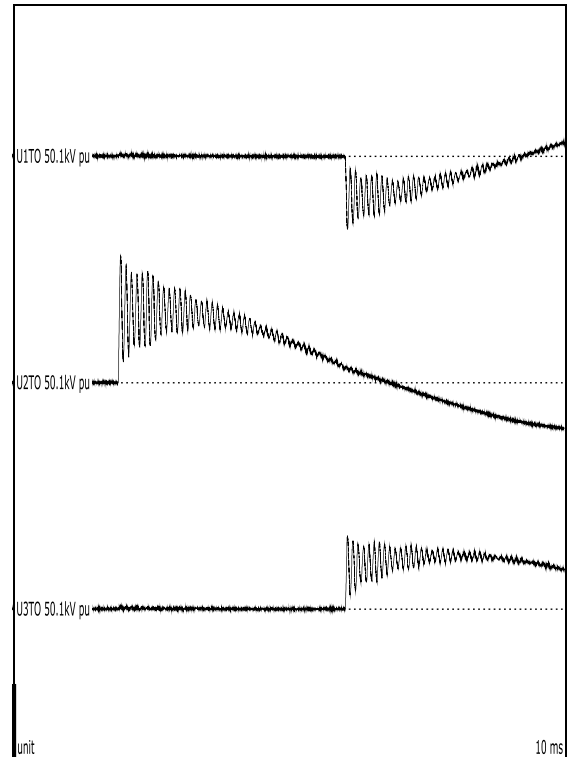


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

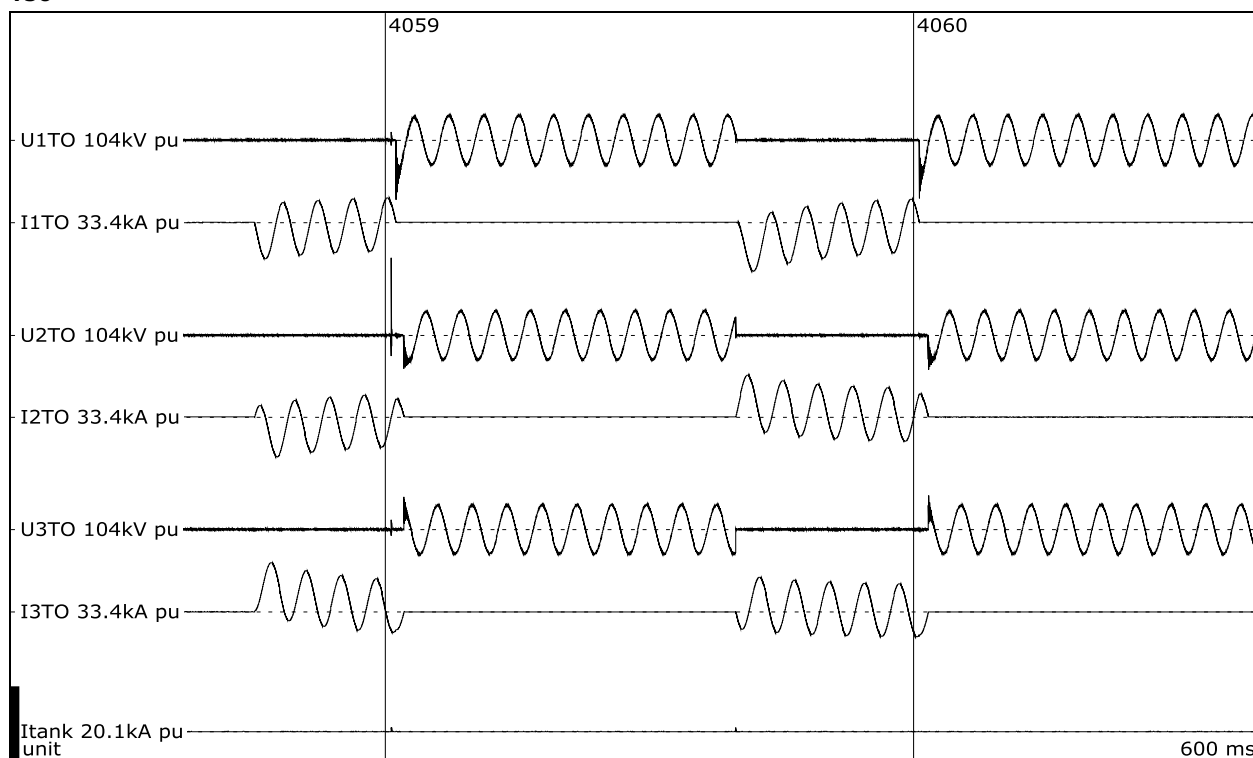
**T50****Test number: 160330-4058**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,6	24,2	24,2
Applied voltage, between phases	kV	42,2		
Making current, peak	kA	-22,2	17,9	16,5
Breaking current, phase value	kA	8,55	8,53	8,49
Average current, three phase	kA	8,53		
Breaking current, DC-component	%	12	7	6
Recovery voltage, phase value	kV	24,4	23,3	24,2
Recovery voltage, between phases	kV	41,5		
TRV, peak	kV	-48,4	84,1	48,2
Make time	ms	-	-	-
Arc duration	ms	7,6	3,5	7,6
Opening time	ms	-		
Break time	ms	-	-	-

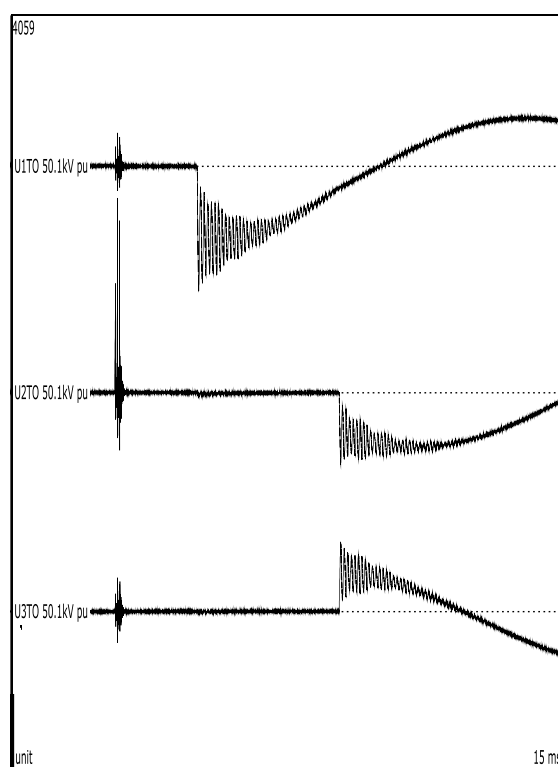


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

**T50****Test number: 160330-4059**

Time interval since previous test	min	-		
Operation		O		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Breaking current, phase value	kA	8,38	8,39	8,35
Average current, three phase	kA	8,37		
Breaking current, DC-component	%	7	14	21
Recovery voltage, phase value	kV	23,3	23,5	23,8
Recovery voltage, between phases	kV	40,8		
TRV, peak	kV	-83,3	-47,5	45,5
Arc duration	ms	5,1	9,0	9,0
Opening time	ms	-		
Break time	ms	-	-	-



Voltage opening coil - Vd.c.

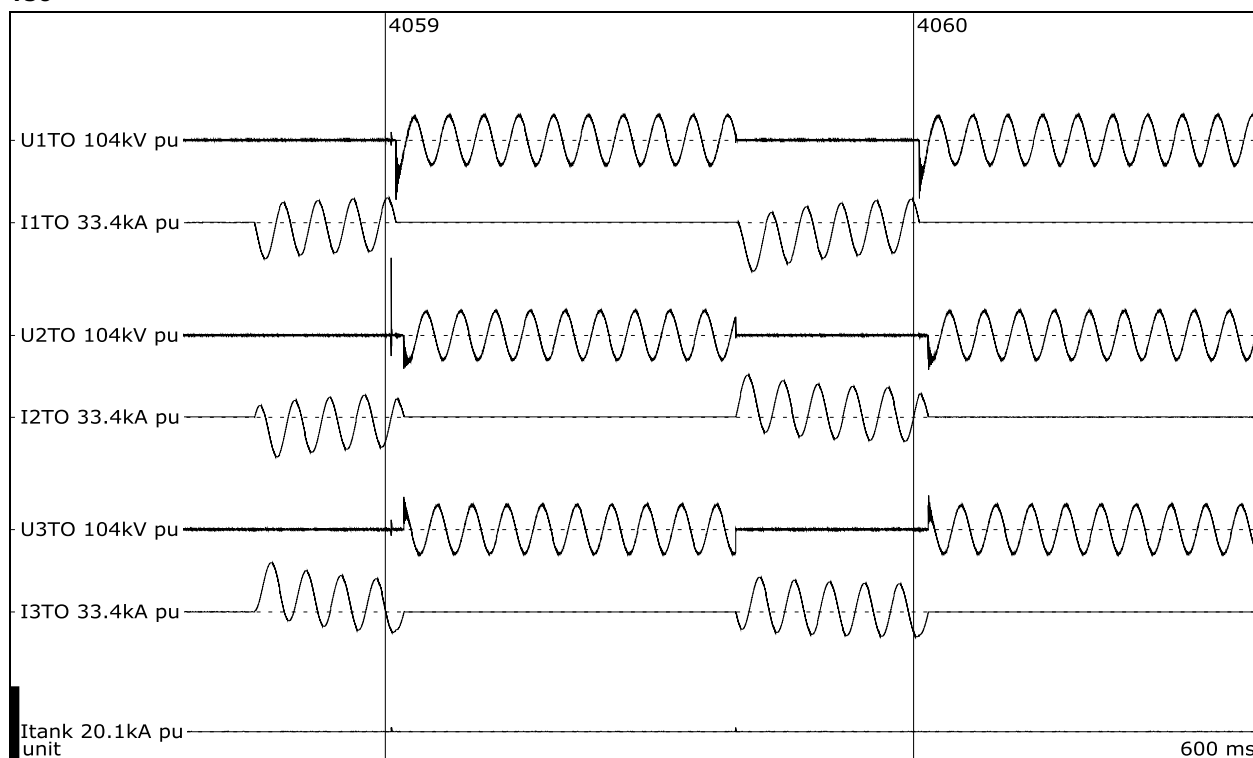
Gas pressure at 20 °C

- MPa

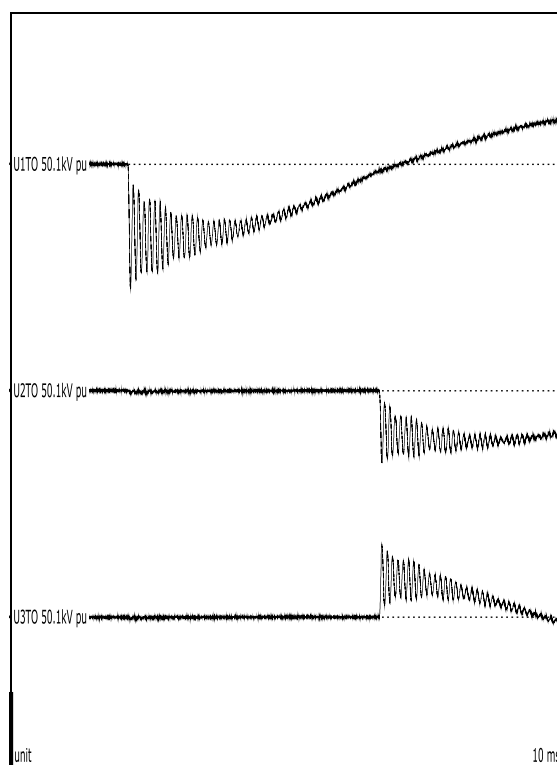
Operating pressure

- MPa

Remarks: Recloser cleared.

**T50****Test number: 160330-4060**

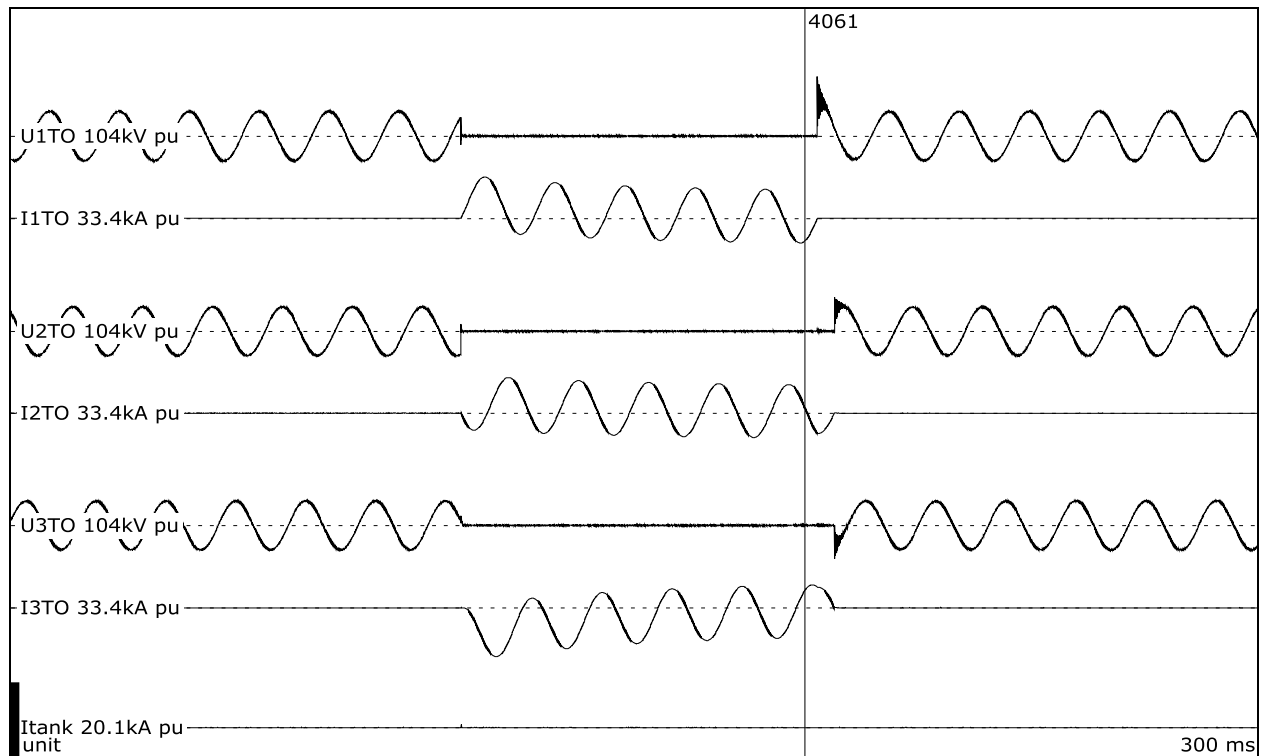
Time interval since previous test	min	-		
Time interval between operations	s	0,161		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,4	24,0	24,0
Applied voltage, between phases	kV	41,8		
Making current, peak	kA	-21,8	18,7	15,3
Breaking current, phase value	kA	8,37	8,38	8,34
Average current, three phase	kA	8,36		
Breaking current, DC-component	%	12	7	4
Recovery voltage, phase value	kV	23,3	23,8	23,6
Recovery voltage, between phases	kV	40,8		
TRV, peak	kV	-82,4	-48,1	47,7
Make time	ms	-	-	-
Arc duration	ms	2,7	7,3	7,3
Opening time	ms	-		
Break time	ms	-	-	-



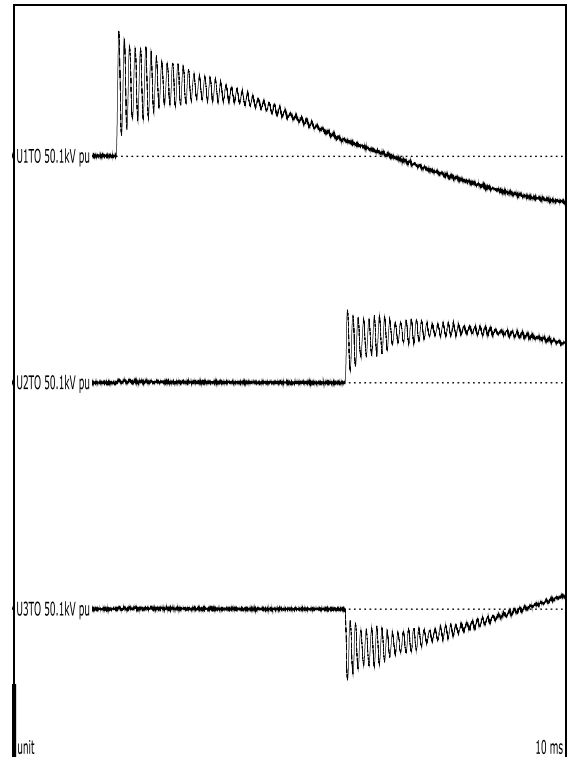
Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.



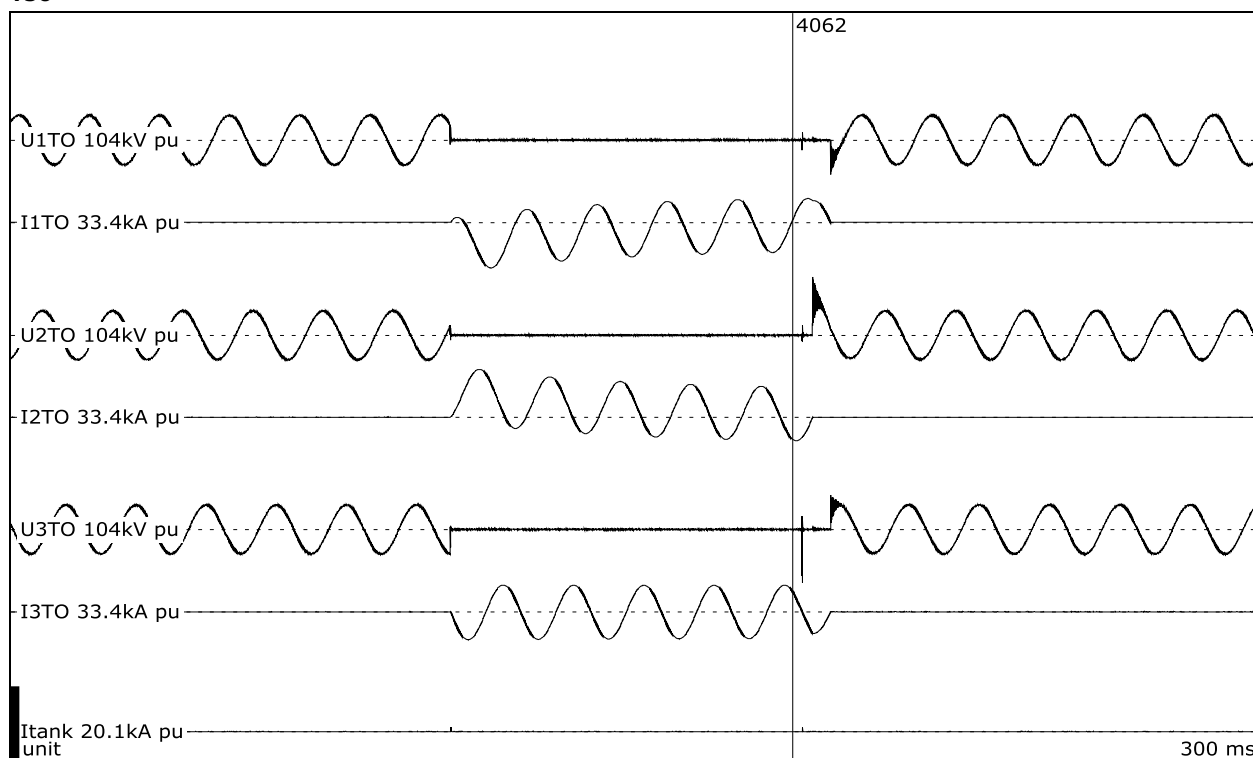
**T50****Test number: 160330-4061**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,3	24,0	24,1
Applied voltage, between phases	kV	41,8		
Making current, peak	kA	18,5	15,8	-21,9
Breaking current, phase value	kA	8,40	8,43	8,38
Average current, three phase	kA	8,40		
Breaking current, DC-component	%	7	6	13
Recovery voltage, phase value	kV	23,3	23,8	23,7
Recovery voltage, between phases	kV	40,9		
TRV, peak	kV	82,7	48,2	-46,8
Make time	ms	-	-	-
Arc duration	ms	2,9	7,1	7,1
Opening time	ms	-		
Break time	ms	-	-	-

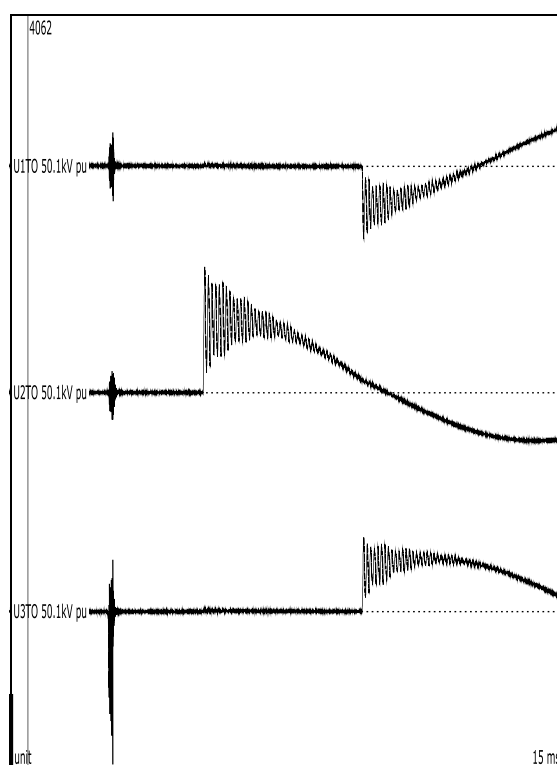


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

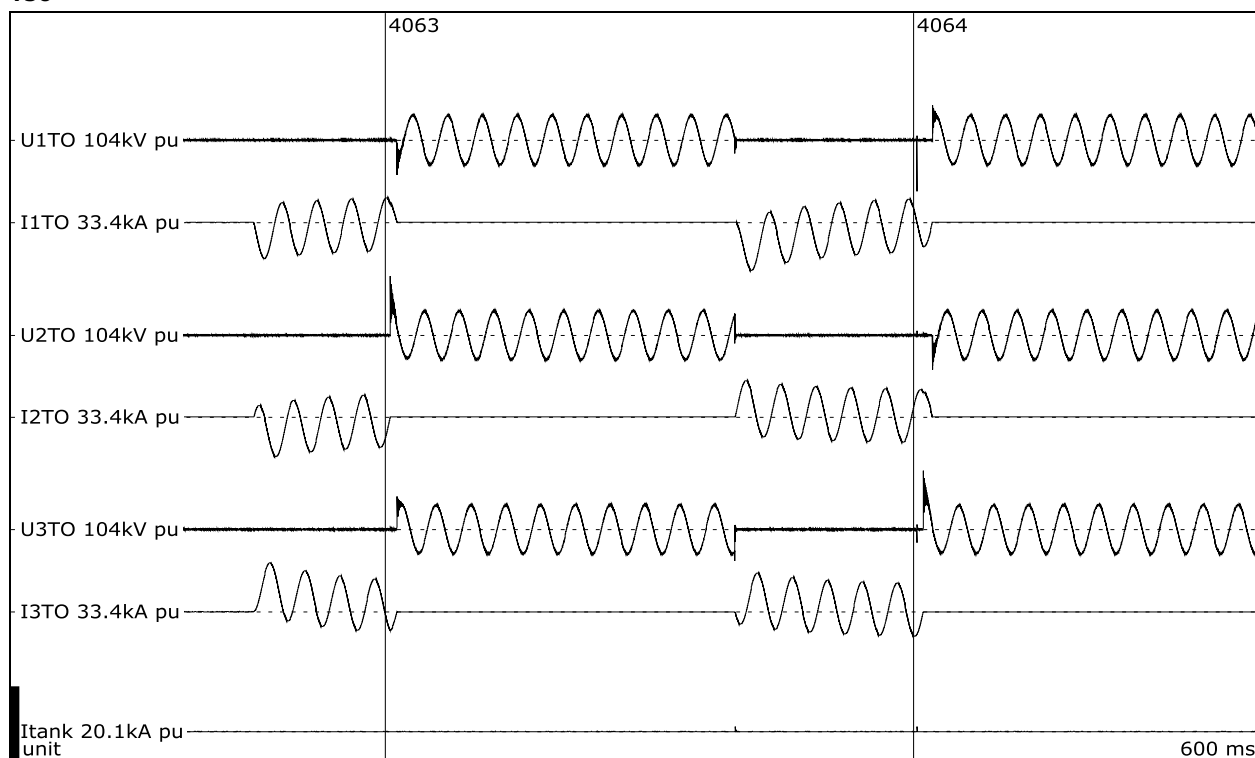
**T50****Test number: 160330-4062**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,4	23,2	24,2
Applied voltage, between phases	kV	41,5		
Making current, peak	kA	-20,3	21,3	-12,6
Breaking current, phase value	kA	8,50	8,52	8,43
Average current, three phase	kA	8,48		
Breaking current, DC-component	%	10	11	1
Recovery voltage, phase value	kV	24,2	23,1	24,1
Recovery voltage, between phases	kV	41,2		
TRV, peak	kV	-48,0	83,2	48,7
Make time	ms	-	-	-
Arc duration	ms	9,2	4,8	9,1
Opening time	ms	-		
Break time	ms	-	-	-

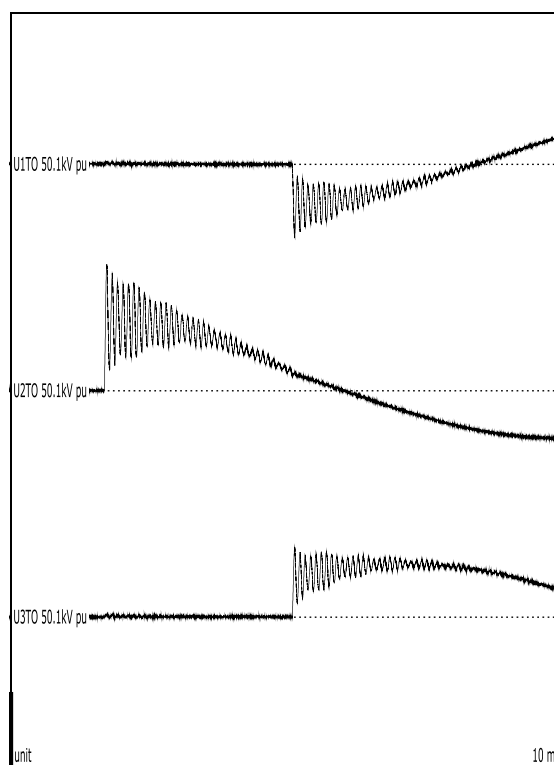


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

**T50****Test number: 160330-4063**

Time interval since previous test	min	-		
Operation		O		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Breaking current, phase value	kA	8,37	8,38	8,33
Average current, three phase	kA	8,36		
Breaking current, DC-component	%	7	13	20
Recovery voltage, phase value	kV	24,0	23,7	23,9
Recovery voltage, between phases	kV	41,4		
TRV, peak	kV	-48,3	83,7	46,1
Arc duration	ms	5,7	2,3	5,7
Opening time	ms	-		
Break time	ms	-	-	-



Voltage opening coil - Vd.c.

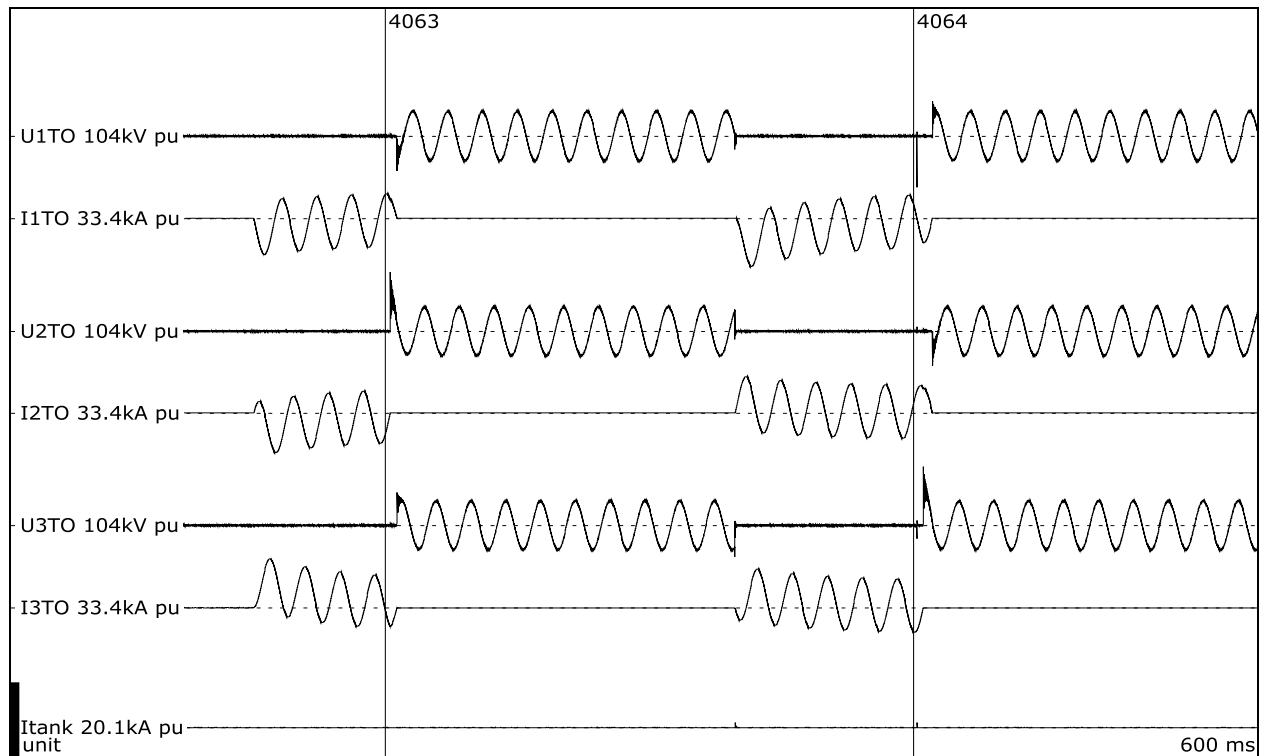
Gas pressure at 20 °C

- MPa

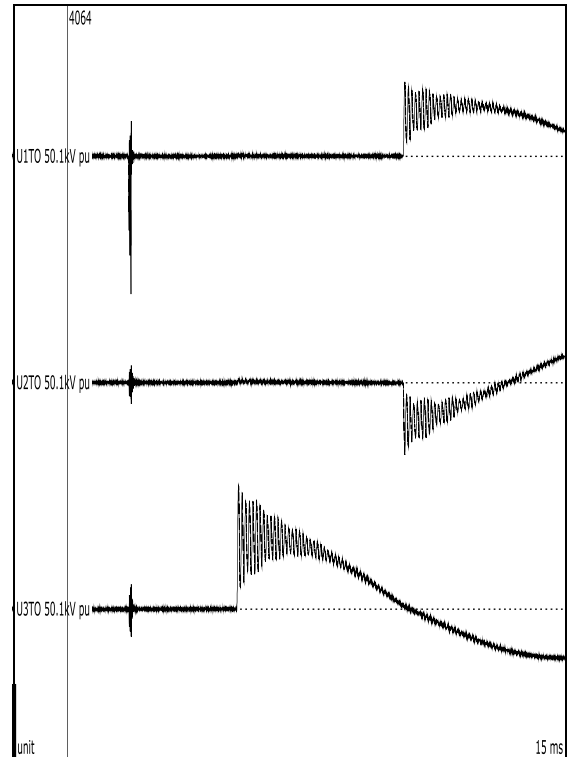
Operating pressure

- MPa

Remarks: Recloser cleared.

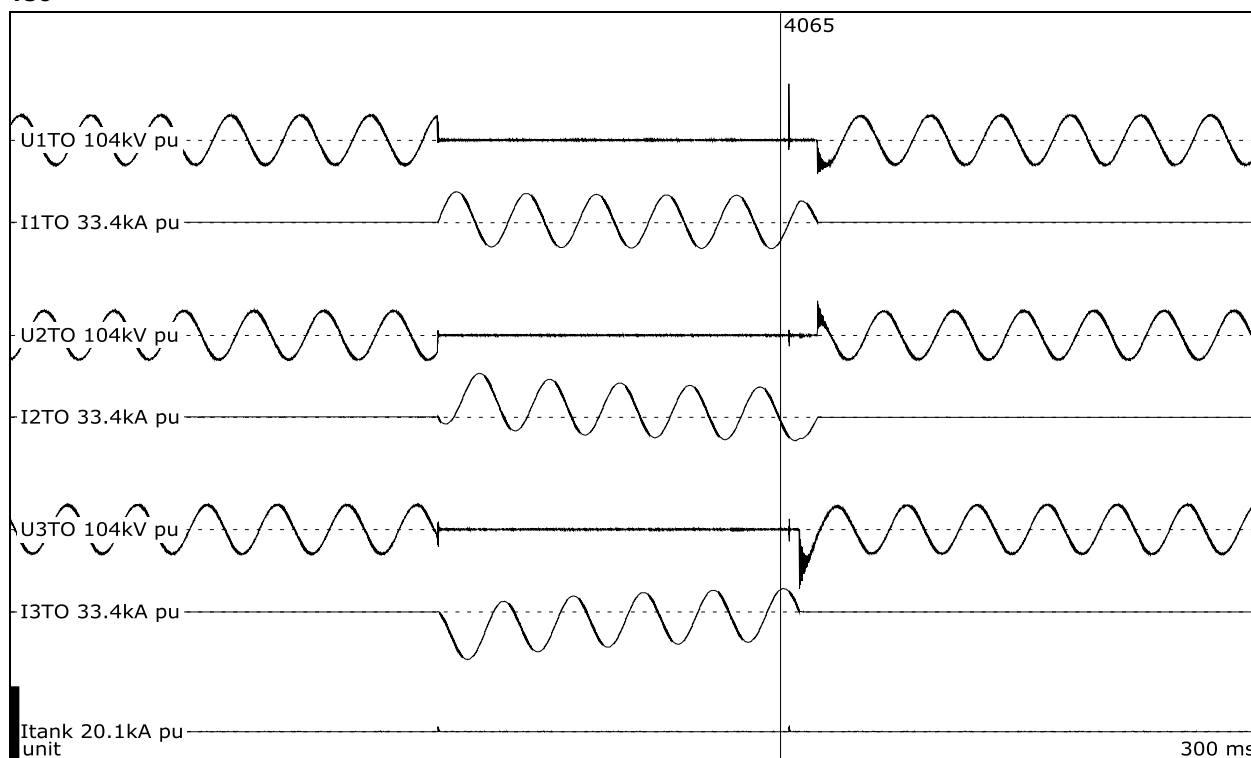
**T50****Test number: 160330-4064**

Time interval since previous test	min	-		
Time interval between operations	s	0,163		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,4	24,0	24,1
Applied voltage, between phases	kV	41,8		
Making current, peak	kA	-21,5	16,2	17,2
Breaking current, phase value	kA	8,36	8,37	8,33
Average current, three phase	kA	8,35		
Breaking current, DC-component	%	11	4	6
Recovery voltage, phase value	kV	24,1	23,7	23,0
Recovery voltage, between phases	kV	40,9		
TRV, peak	kV	49,1	-47,3	82,5
Make time	ms	-	-	-
Arc duration	ms	9,2	9,2	4,7
Opening time	ms	-		
Break time	ms	-	-	-

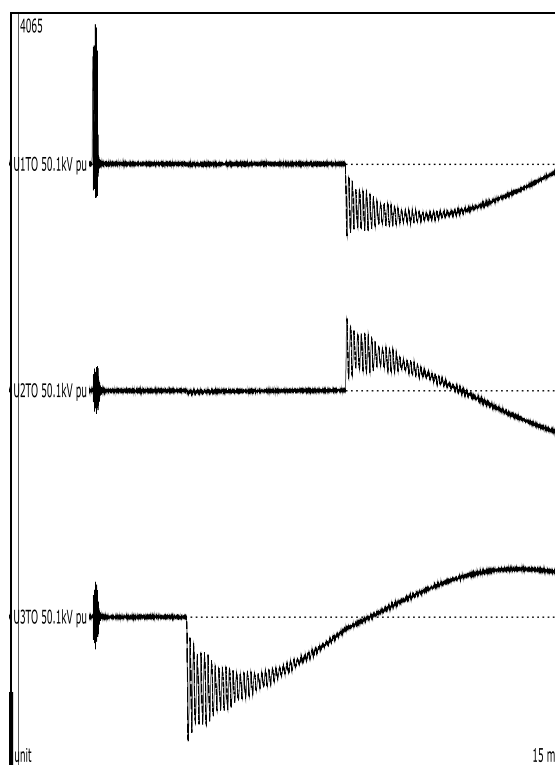


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

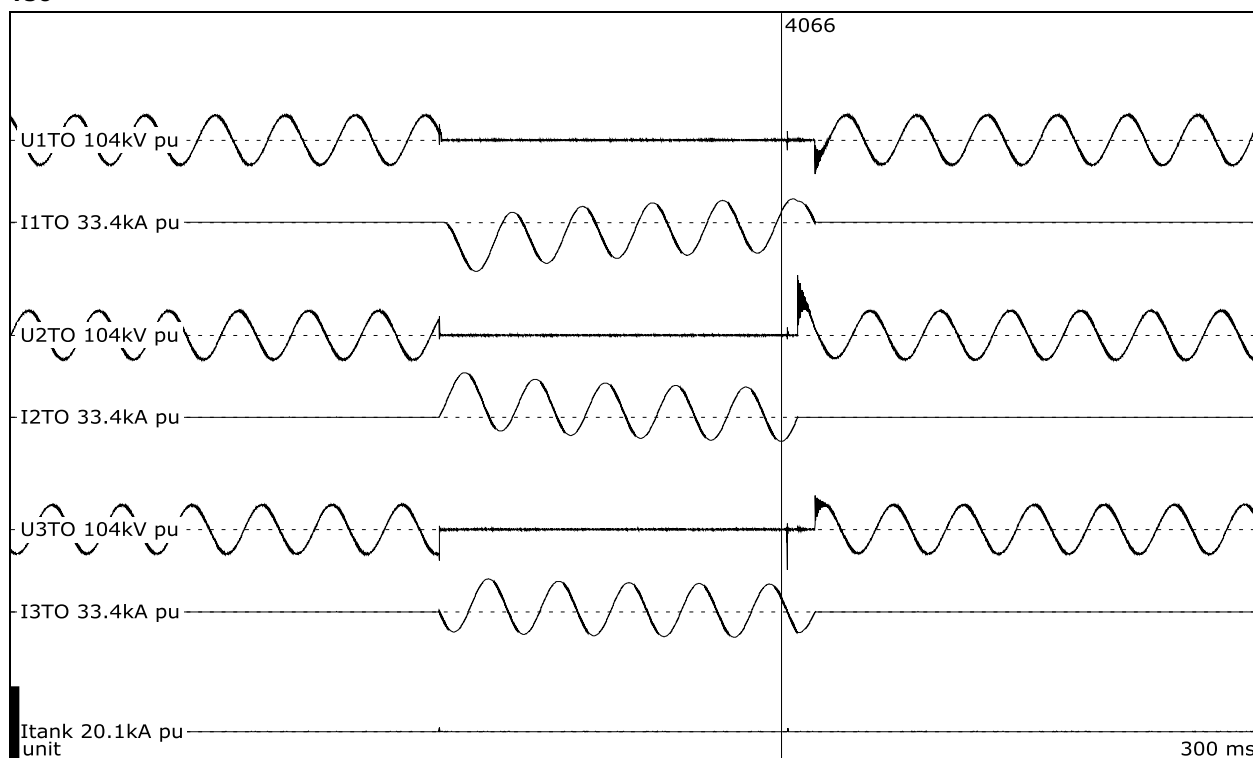
**T50****Test number: 160330-4065**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		A	B	C
Applied voltage, phase value	kV	24,3	24,0	24,0
Applied voltage, between phases	kV	41,8		
Making current, peak	kA	13,6	19,5	-21,3
Breaking current, phase value	kA	8,40	8,42	8,36
Average current, three phase	kA	8,40		
Breaking current, DC-component	%	2	11	12
Recovery voltage, phase value	kV	24,2	23,7	22,9
Recovery voltage, between phases	kV	40,9		
TRV, peak	kV	-47,9	47,6	-82,3
Make time	ms	-	-	-
Arc duration	ms	8,9	8,9	4,6
Opening time	ms	-		
Break time	ms	-	-	-

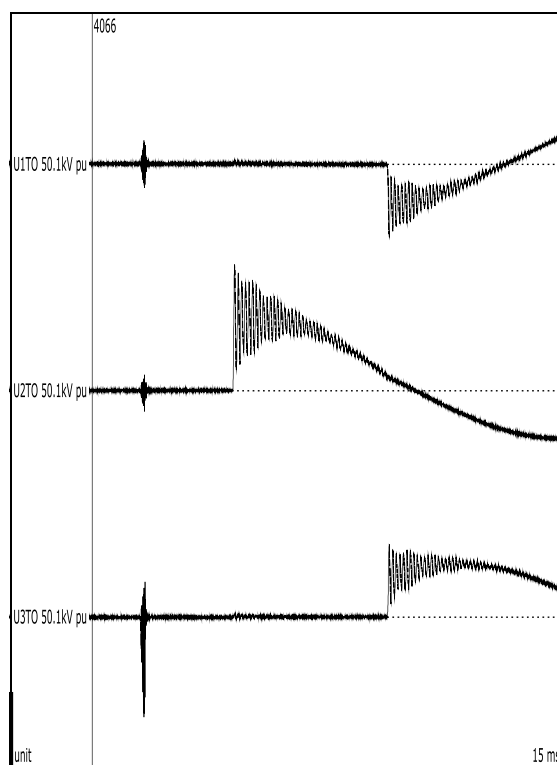


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

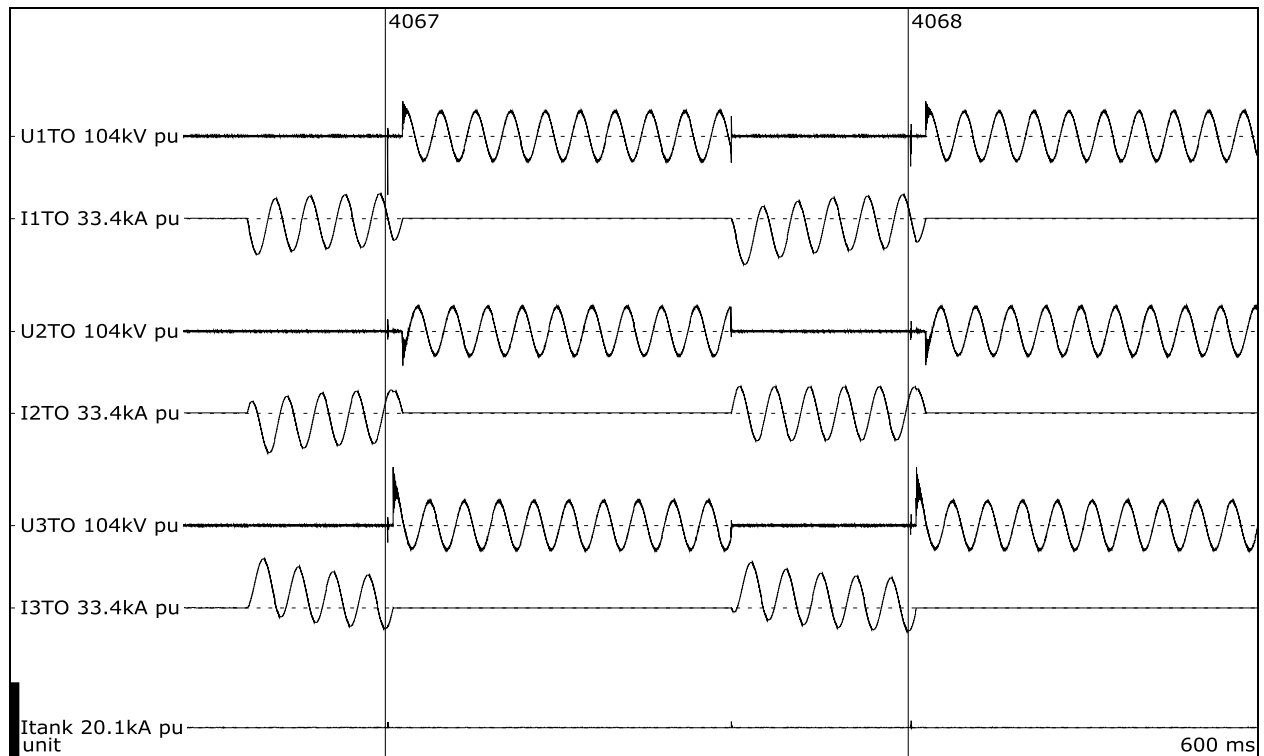
**T50****Test number: 160330-4066**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,4	24,0	24,2
Applied voltage, between phases	kV	41,9		
Making current, peak	kA	-21,9	19,8	14,6
Breaking current, phase value	kA	8,49	8,50	8,43
Average current, three phase	kA	8,47		
Breaking current, DC-component	%	12	8	3
Recovery voltage, phase value	kV	24,2	23,1	24,0
Recovery voltage, between phases	kV	41,2		
TRV, peak	kV	-48,3	83,3	47,8
Make time	ms	-	-	-
Arc duration	ms	8,1	3,9	8,1
Opening time	ms	-		
Break time	ms	-	-	-

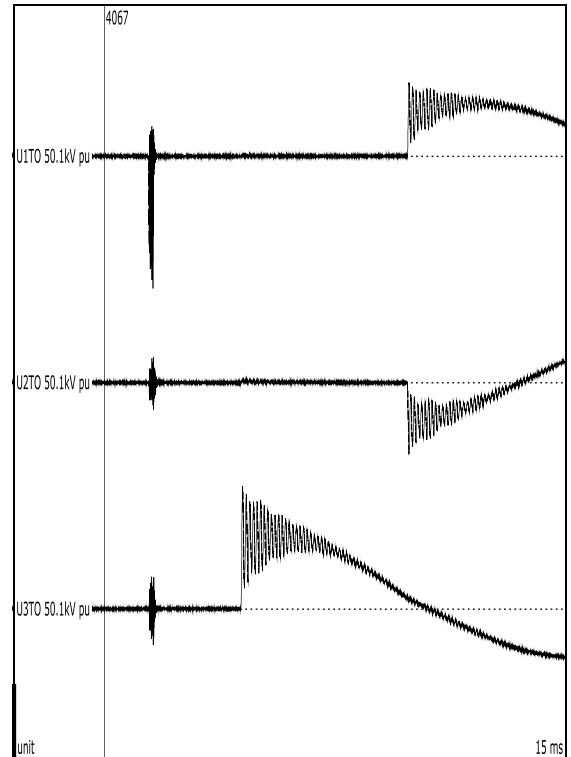


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

**T50****Test number: 160330-4067**

Time interval since previous test	min	-		
Operation		O		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Breaking current, phase value	kA	8,34	8,38	8,34
Average current, three phase	kA	8,35		
Breaking current, DC-component	%	7	12	18
Recovery voltage, phase value	kV	24,1	23,7	23,0
Recovery voltage, between phases	kV	40,9		
TRV, peak	kV	48,8	-47,2	81,5
Arc duration	ms	8,3	8,3	3,8
Opening time	ms	-		
Break time	ms	-	-	-



Voltage opening coil - Vd.c.

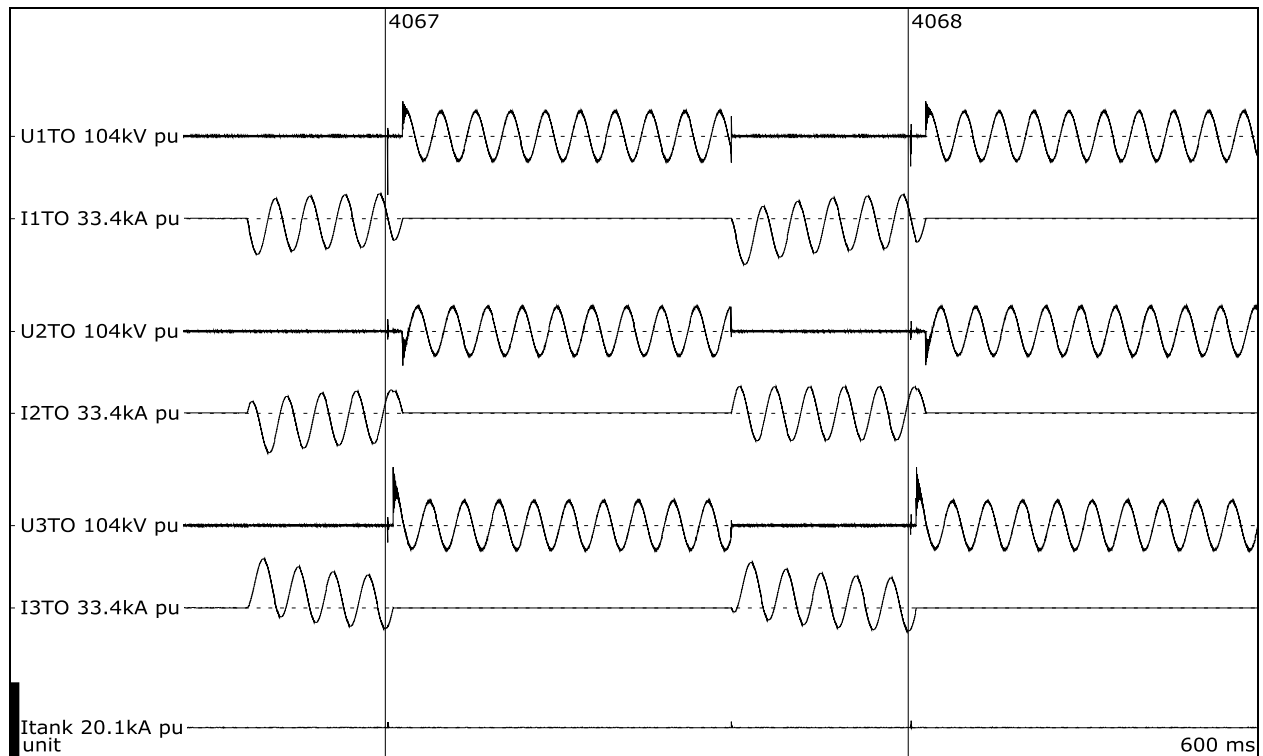
Gas pressure at 20 °C

- MPa

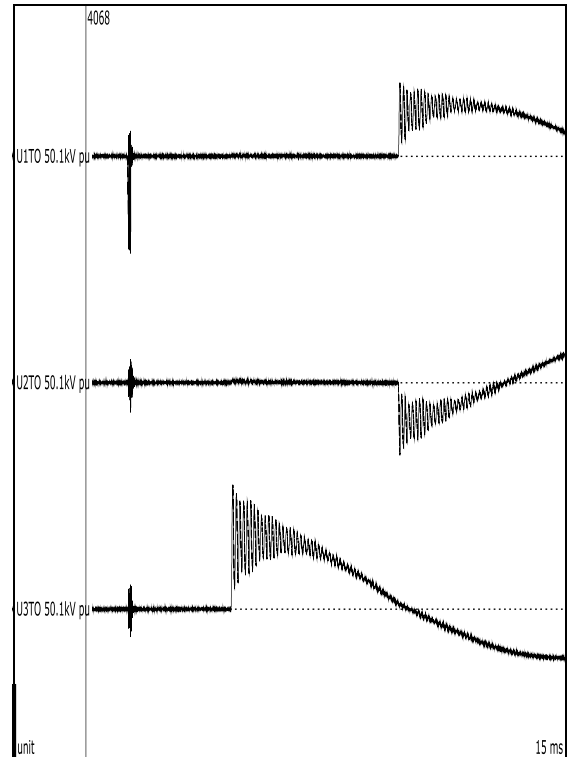
Operating pressure

- MPa

Remarks: Recloser cleared.

**T50****Test number: 160330-4068**

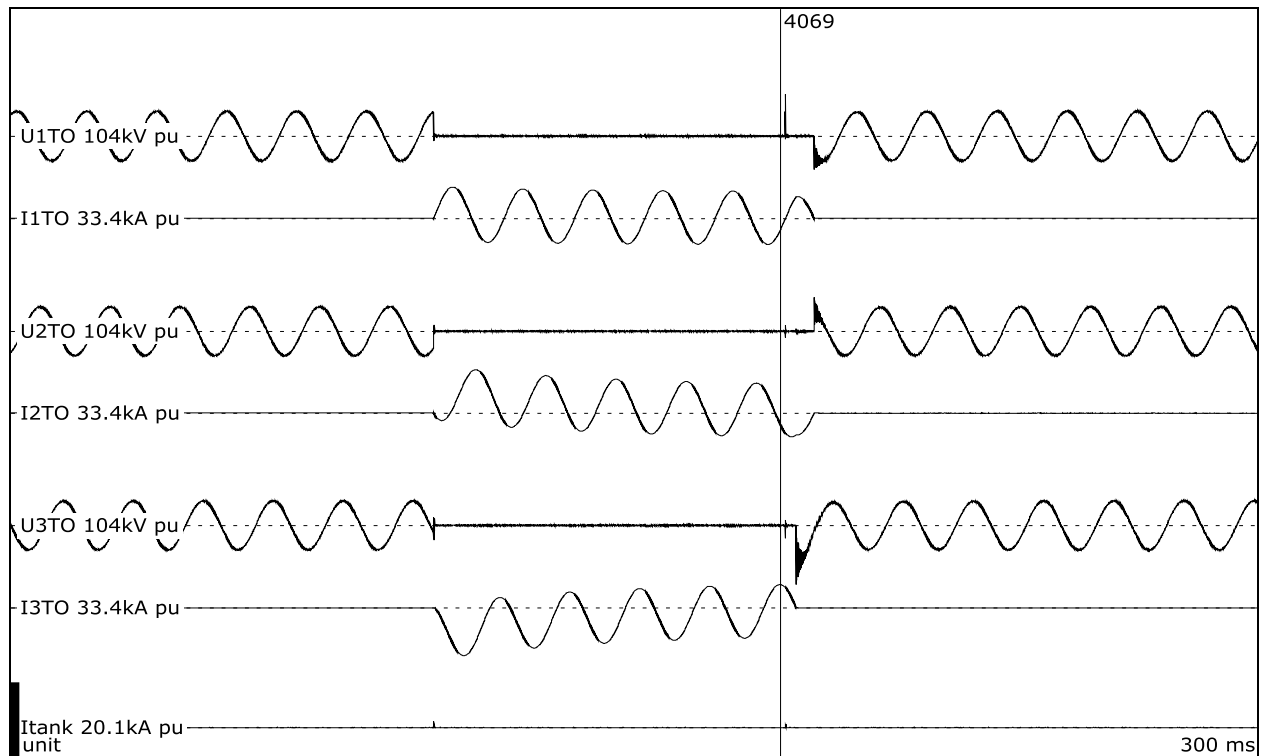
Time interval since previous test	min	-		
Time interval between operations	s	0,163		
Operation		CO		
Phase		A	B	C
Applied voltage, phase value	kV	23,5	24,0	23,3
Applied voltage, between phases	kV	40,9		
Making current, peak	kA	-20,6	-12,4	20,2
Breaking current, phase value	kA	8,36	8,39	8,34
Average current, three phase	kA	8,36		
Breaking current, DC-component	%	10	1	10
Recovery voltage, phase value	kV	24,1	23,7	22,9
Recovery voltage, between phases	kV	40,8		
TRV, peak	kV	48,5	-47,8	82,6
Make time	ms	-	-	-
Arc duration	ms	8,5	8,5	4,0
Opening time	ms	-		
Break time	ms	-	-	-



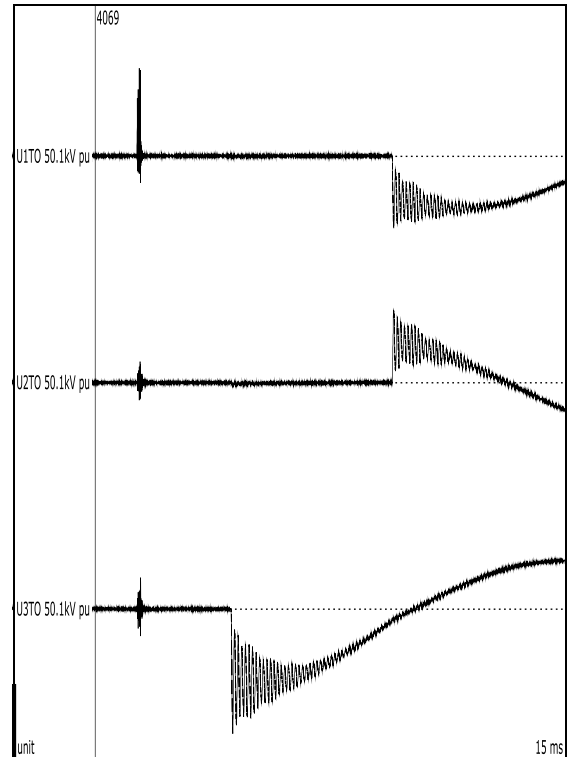
Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.



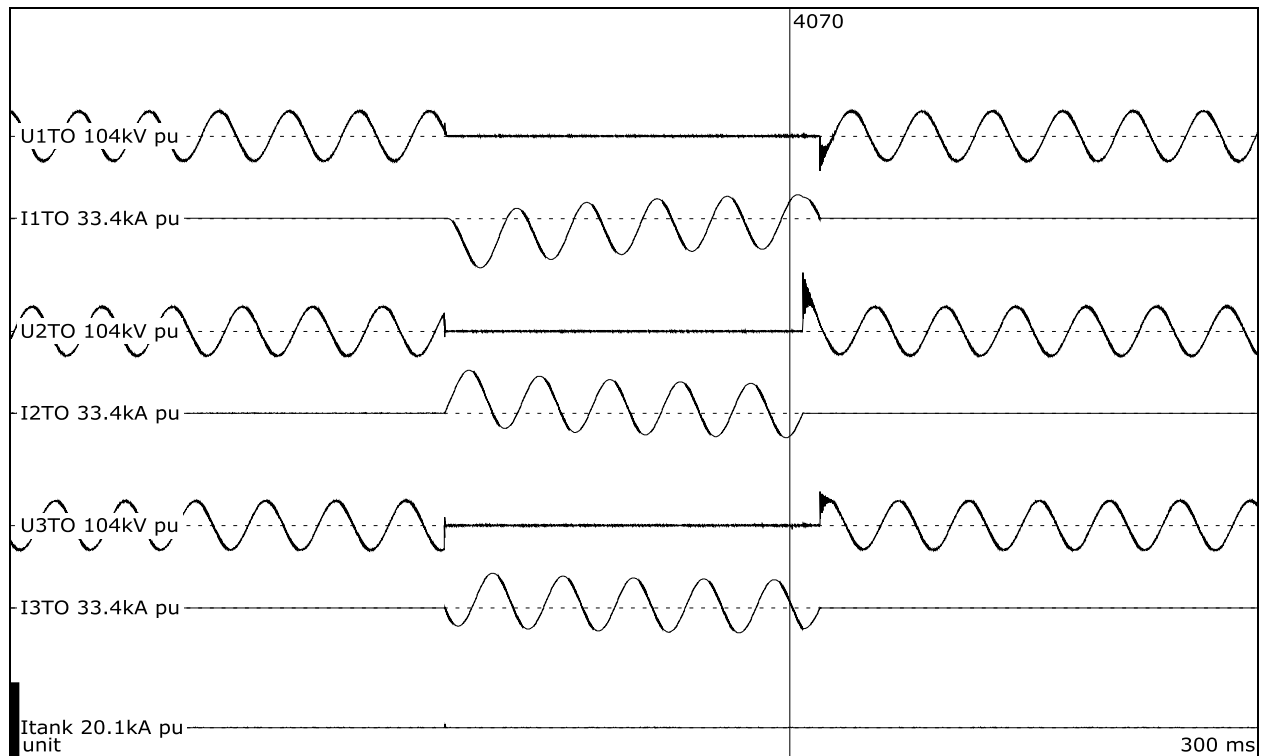
**T50****Test number: 160330-4069**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,3	24,0	24,1
Applied voltage, between phases	kV	41,8		
Making current, peak	kA	14,0	19,3	-21,4
Breaking current, phase value	kA	8,41	8,44	8,38
Average current, three phase	kA	8,41		
Breaking current, DC-component	%	2	10	12
Recovery voltage, phase value	kV	24,2	23,7	22,9
Recovery voltage, between phases	kV	40,9		
TRV, peak	kV	-48,0	47,9	-82,4
Make time	ms	-	-	-
Arc duration	ms	8,1	8,1	3,7
Opening time	ms	-		
Break time	ms	-	-	-

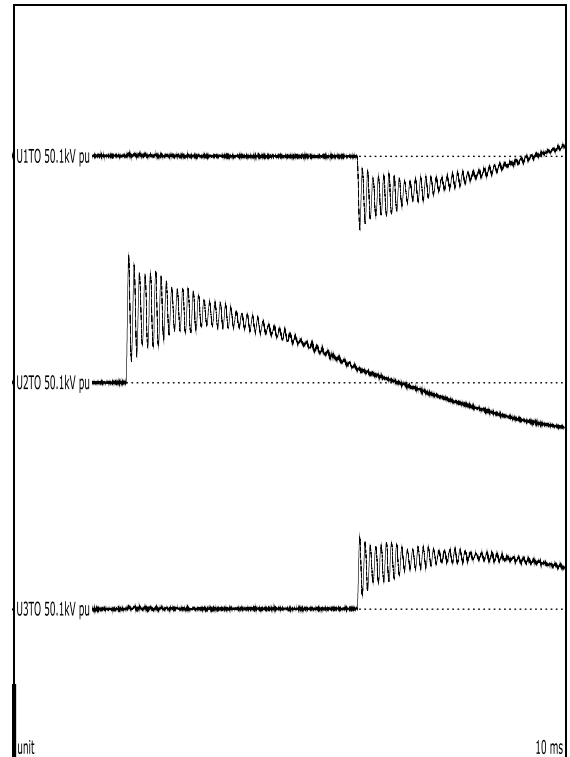


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

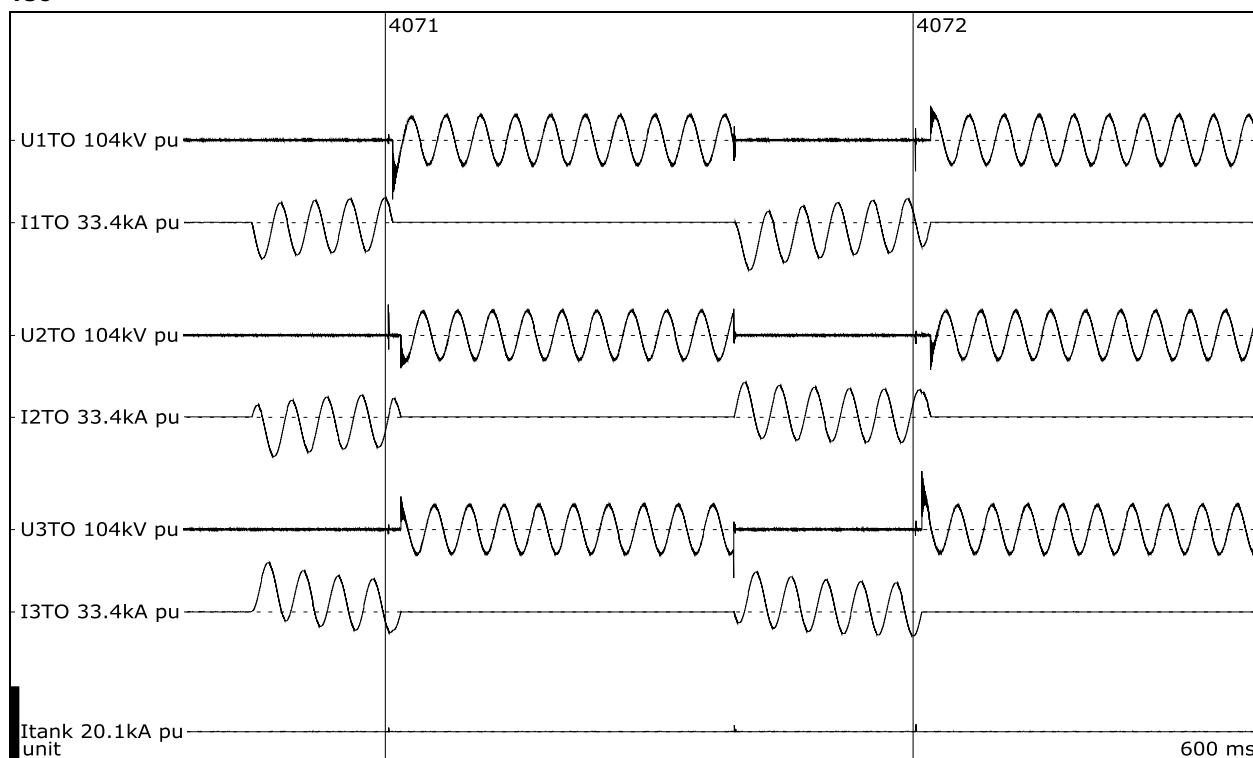
**T50****Test number: 160330-4070**

Time interval since previous test	min	-		
Time interval between operations	s	1,07		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,5	24,1	24,2
Applied voltage, between phases	kV	42,1		
Making current, peak	kA	-22,0	19,1	15,4
Breaking current, phase value	kA	8,52	8,50	8,45
Average current, three phase	kA	8,49		
Breaking current, DC-component	%	11	8	4
Recovery voltage, phase value	kV	24,2	23,2	24,1
Recovery voltage, between phases	kV	41,3		
TRV, peak	kV	-48,6	83,8	47,7
Make time	ms	-	-	-
Arc duration	ms	7,3	3,1	7,3
Opening time	ms	-		
Break time	ms	-	-	-

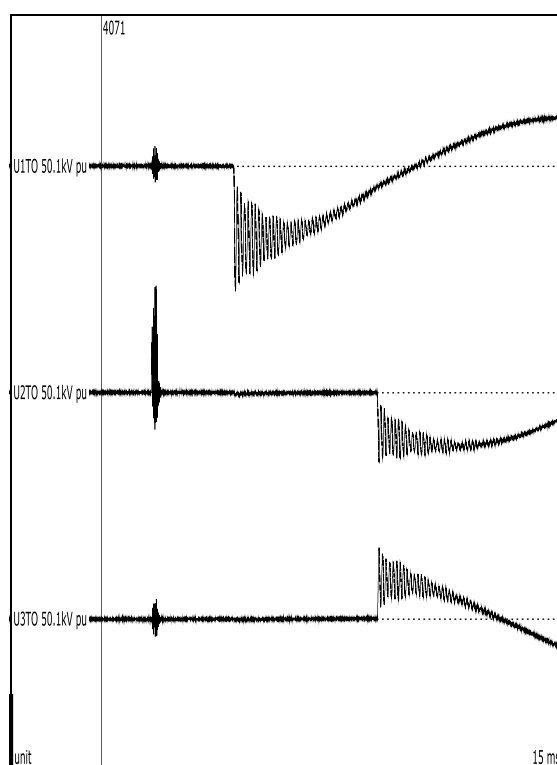


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

**T50****Test number: 160330-4071**

Time interval since previous test	min	-		
Operation		O		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Breaking current, phase value	kA	8,38	8,38	8,34
Average current, three phase	kA	8,37		
Breaking current, DC-component	%	6	13	19
Recovery voltage, phase value	kV	23,3	23,5	23,7
Recovery voltage, between phases	kV	40,7		
TRV, peak	kV	-83,0	-46,6	46,6
Arc duration	ms	3,7	7,6	7,6
Opening time	ms	-		
Break time	ms	-	-	-



Voltage opening coil - Vd.c.

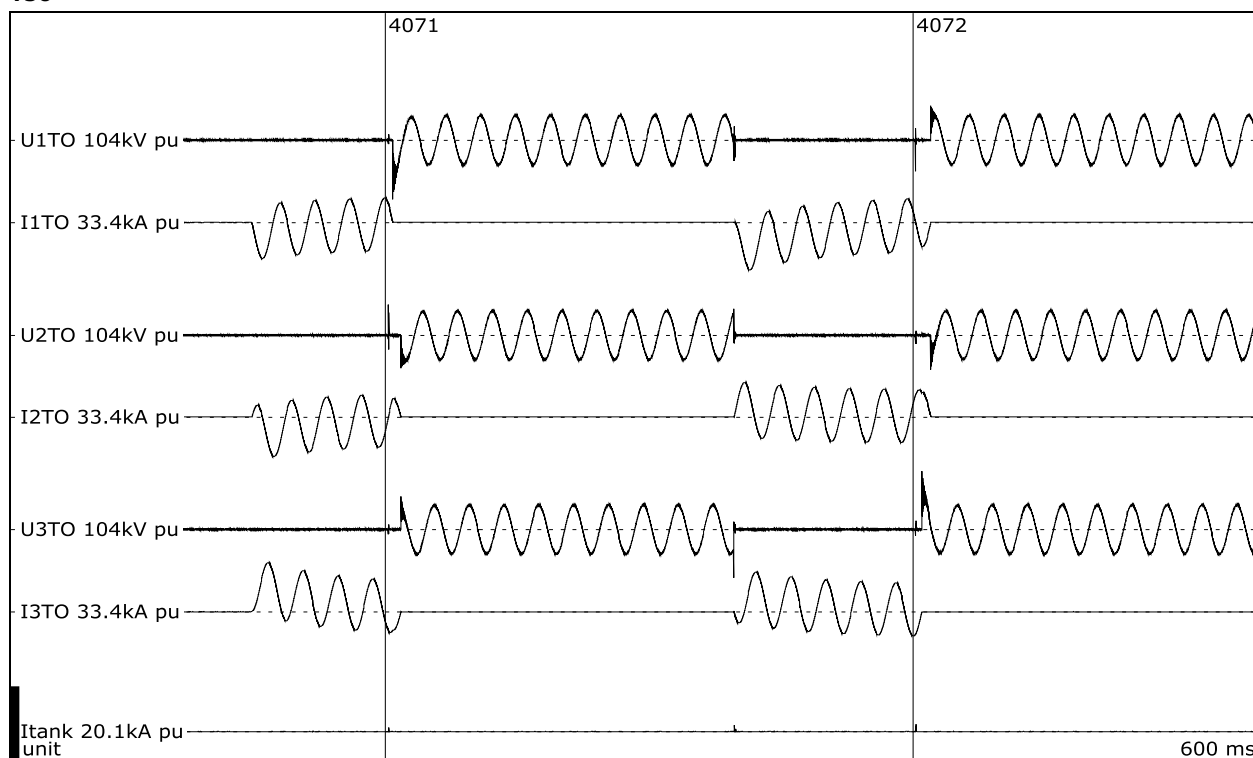
Gas pressure at 20 °C

- MPa

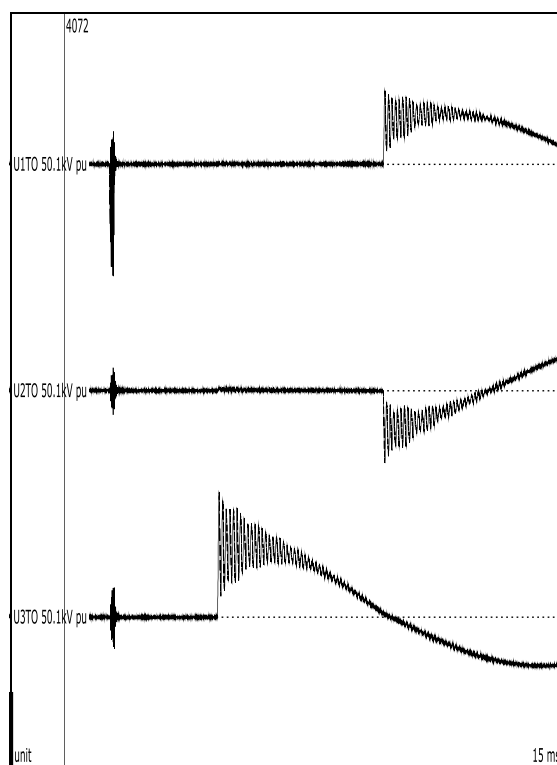
Operating pressure

- MPa

Remarks: Recloser cleared.

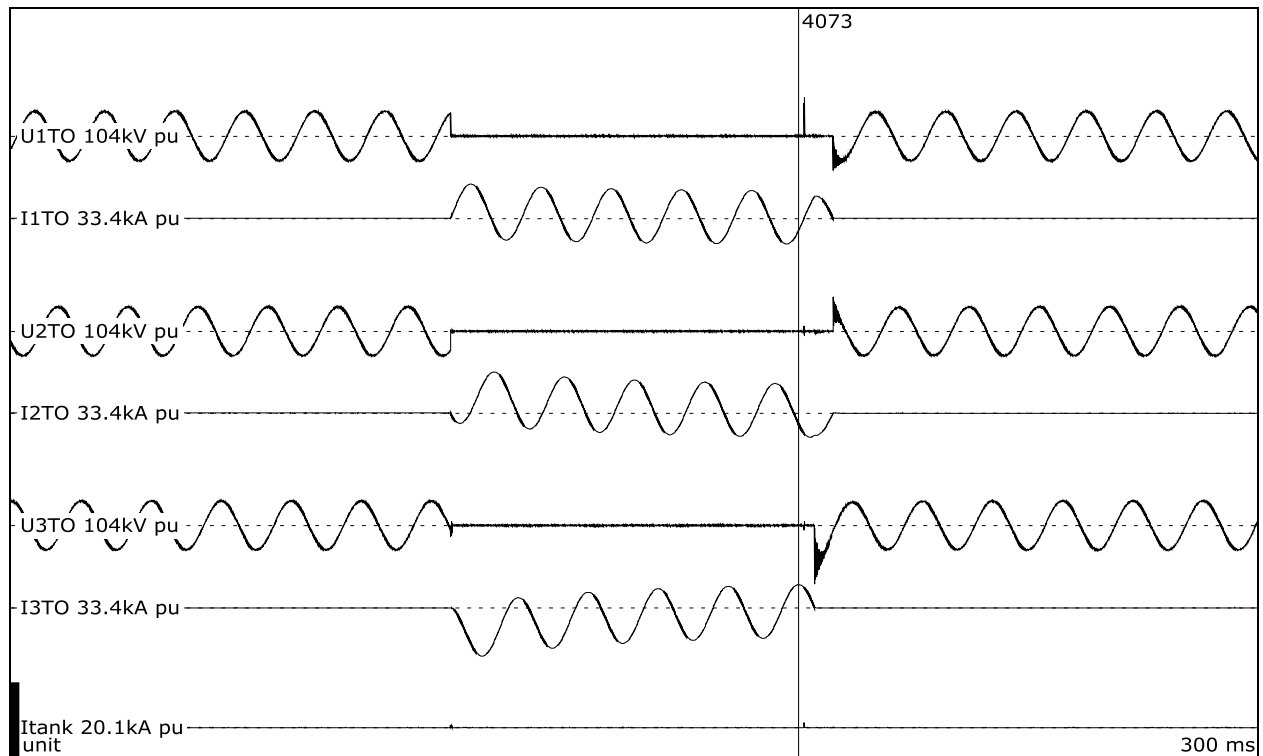
**T50****Test number: 160330-4072**

Time interval since previous test	min	-		
Time interval between operations	s	0,161		
Operation		CO		
Phase		A	B	C
Applied voltage, phase value	kV	24,3	24,0	24,0
Applied voltage, between phases	kV	41,8		
Making current, peak	kA	-21,2	15,4	17,7
Breaking current, phase value	kA	8,36	8,38	8,34
Average current, three phase	kA	8,36		
Breaking current, DC-component	%	11	3	7
Recovery voltage, phase value	kV	24,1	23,7	23,1
Recovery voltage, between phases	kV	40,9		
TRV, peak	kV	48,5	-47,8	82,5
Make time	ms	-	-	-
Arc duration	ms	8,7	8,7	4,2
Opening time	ms	-		
Break time	ms	-	-	-

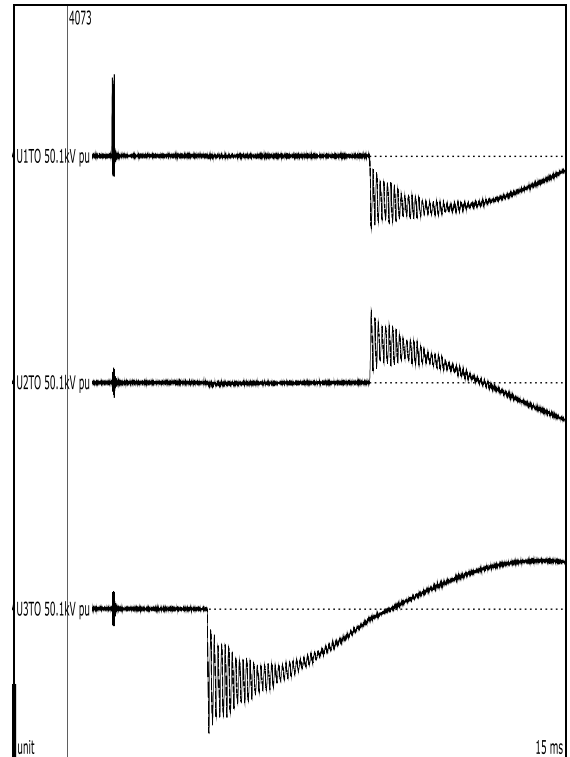


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

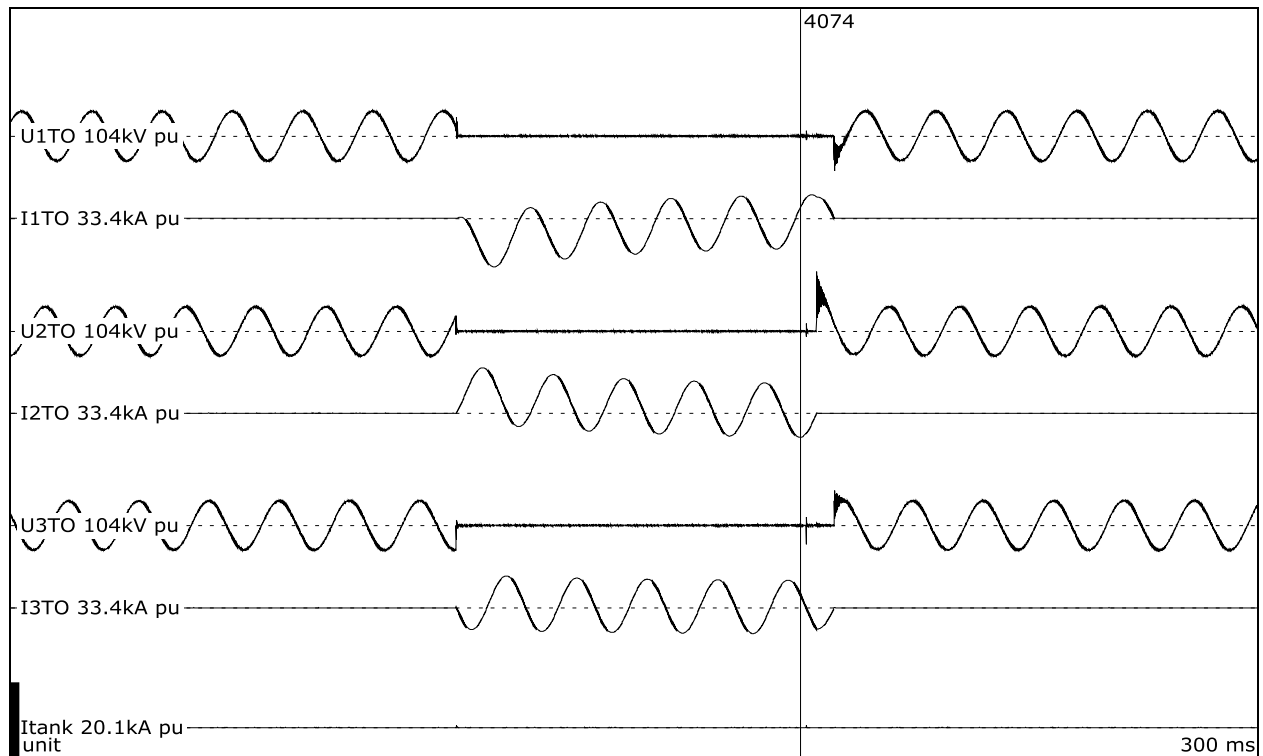
**T50****Test number: 160330-4073**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,4	24,0	24,0
Applied voltage, between phases	kV	41,8		
Making current, peak	kA	15,3	18,3	-21,6
Breaking current, phase value	kA	8,41	8,44	8,38
Average current, three phase	kA	8,41		
Breaking current, DC-component	%	3	9	12
Recovery voltage, phase value	kV	24,2	23,7	23,0
Recovery voltage, between phases	kV	41,0		
TRV, peak	kV	-48,4	47,9	-82,4
Make time	ms	-	-	-
Arc duration	ms	8,3	8,3	3,8
Opening time	ms	-		
Break time	ms	-	-	-

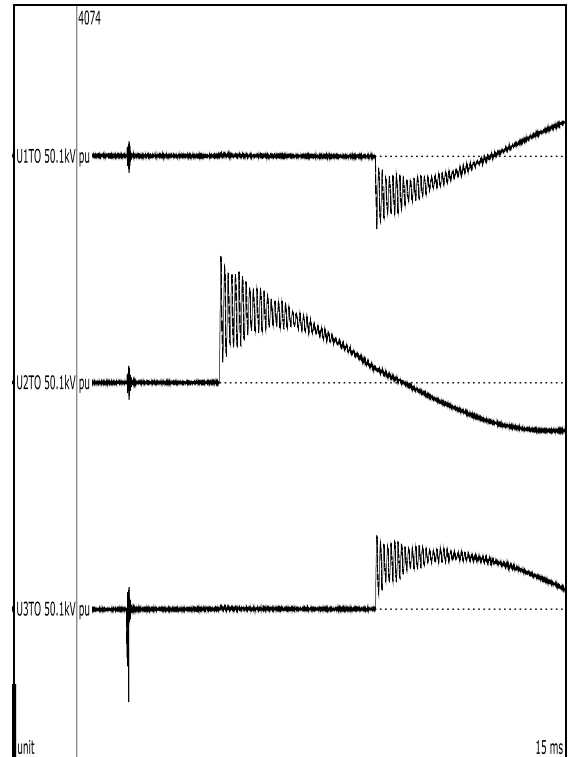


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

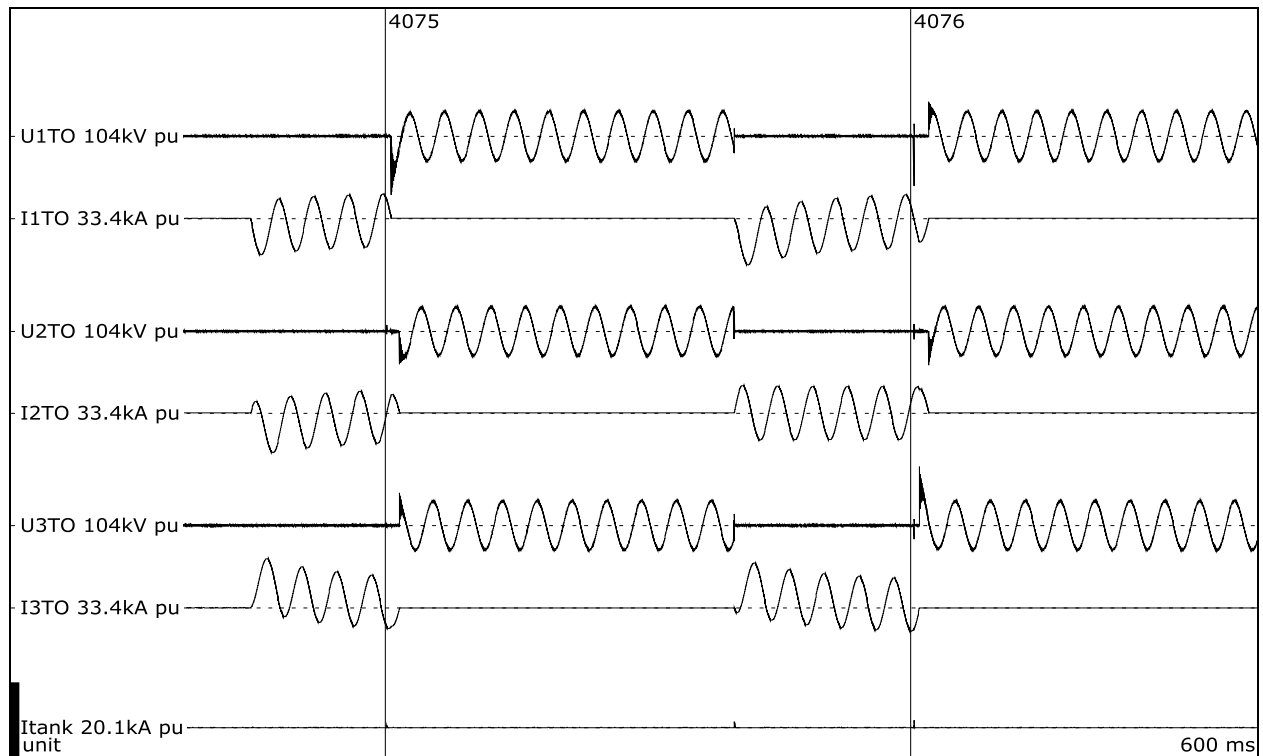
**T50****Test number: 160330-4074**

Time interval since previous test	min	-		
Time interval between operations	s	1,07		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,5	24,1	24,3
Applied voltage, between phases	kV	42,1		
Making current, peak	kA	-21,7	20,2	14,1
Breaking current, phase value	kA	8,52	8,53	8,45
Average current, three phase	kA	8,50		
Breaking current, DC-component	%	11	9	2
Recovery voltage, phase value	kV	24,3	23,2	24,0
Recovery voltage, between phases	kV	41,3		
TRV, peak	kV	-48,0	83,5	48,6
Make time	ms	-	-	-
Arc duration	ms	8,2	3,9	8,2
Opening time	ms	-		
Break time	ms	-	-	-

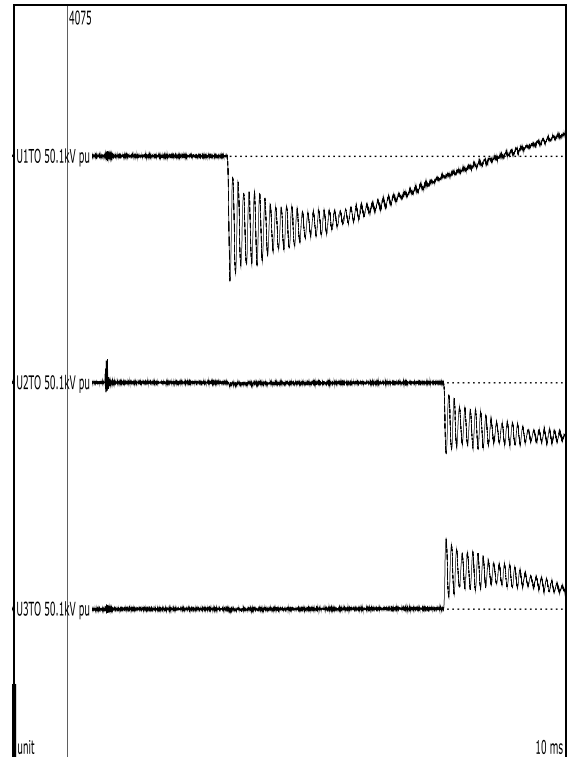


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

**T50****Test number: 160330-4075**

Time interval since previous test	min	-		
Operation		O		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Breaking current, phase value	kA	8,33	8,37	8,32
Average current, three phase	kA	8,34		
Breaking current, DC-component	%	8	13	19
Recovery voltage, phase value	kV	23,3	23,5	23,7
Recovery voltage, between phases	kV	40,7		
TRV, peak	kV	-82,7	-46,8	46,2
Arc duration	ms	2,9	6,9	6,9
Opening time	ms	-		
Break time	ms	-	-	-



Voltage opening coil - Vd.c.

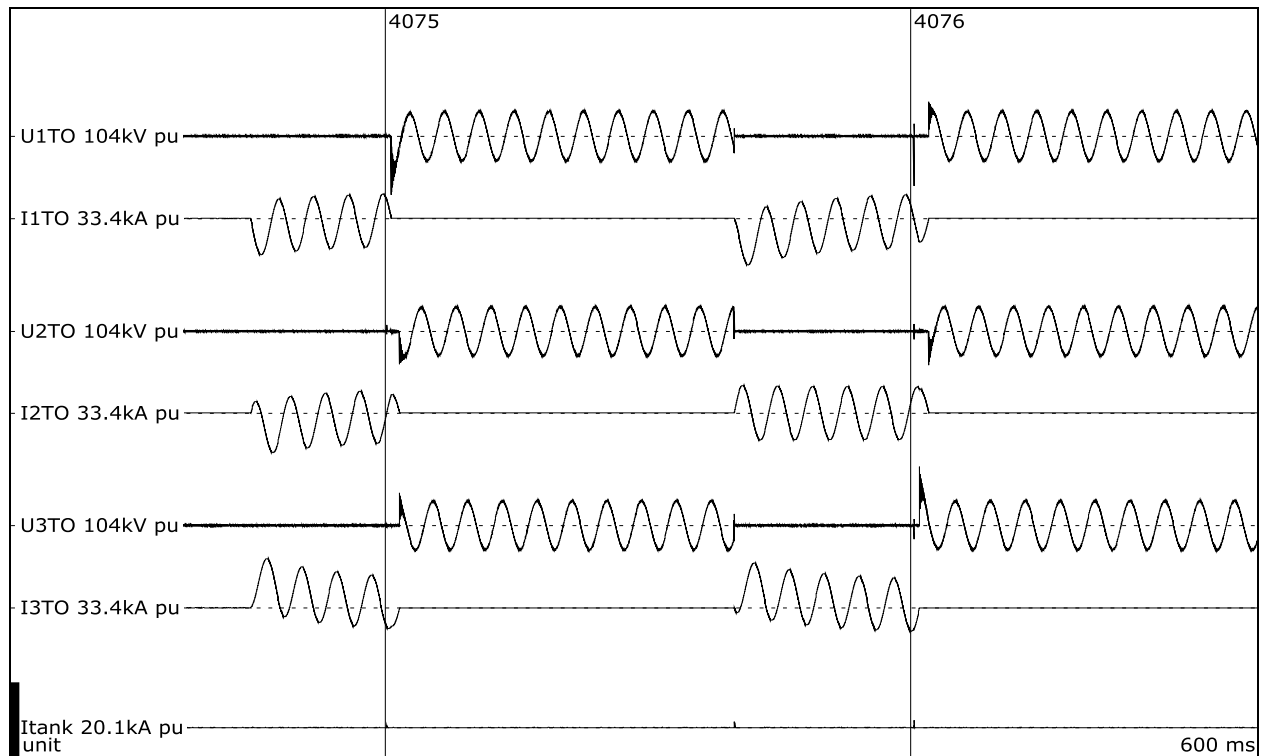
Gas pressure at 20 °C

- MPa

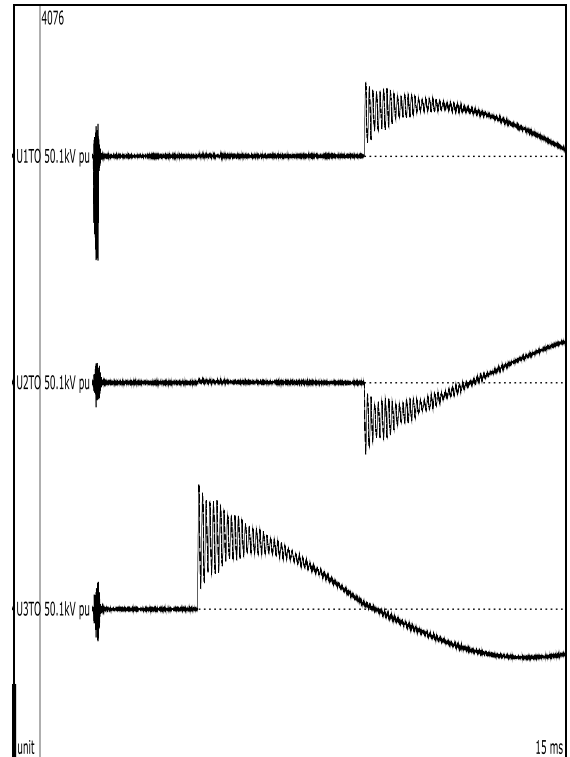
Operating pressure

- MPa

Remarks: Recloser cleared.

**T50****Test number: 160330-4076**

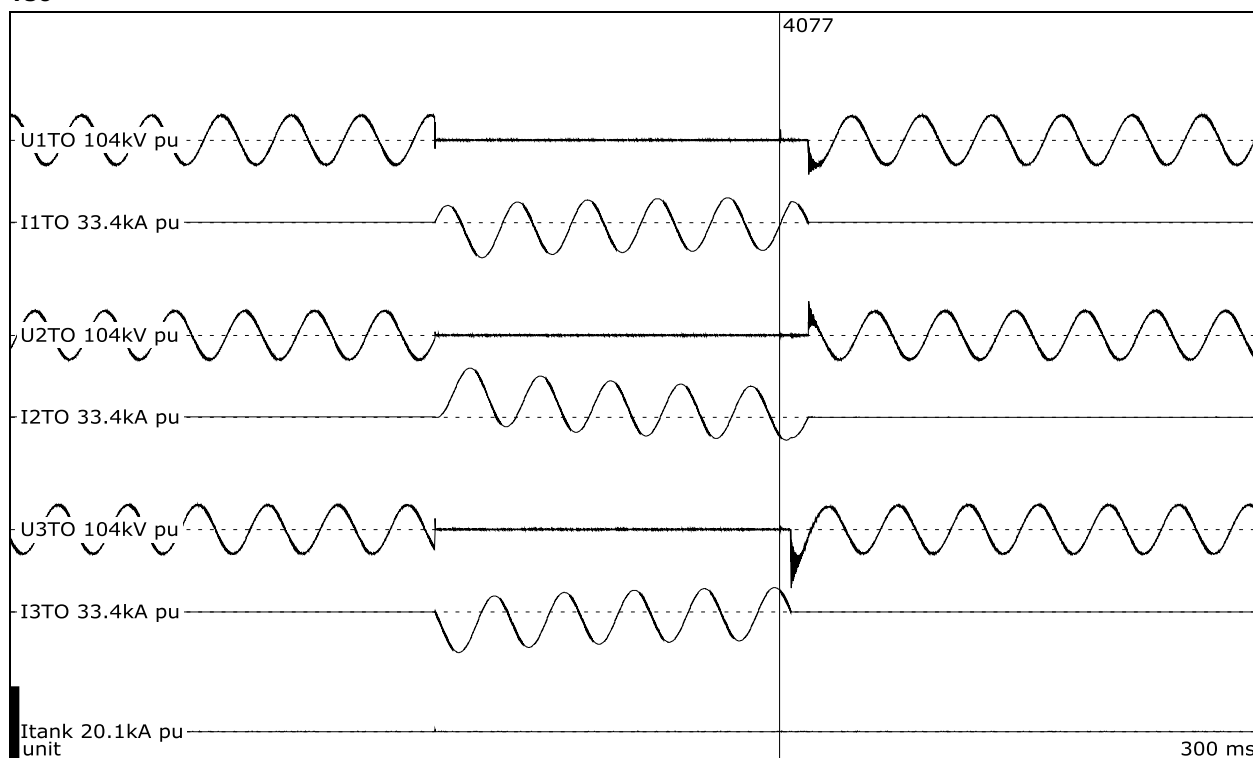
Time interval since previous test	min	-		
Time interval between operations	s	0,161		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	23,6	24,0	24,0
Applied voltage, between phases	kV	41,3		
Making current, peak	kA	-20,7	12,3	19,9
Breaking current, phase value	kA	8,35	8,37	8,33
Average current, three phase	kA	8,35		
Breaking current, DC-component	%	10	0	10
Recovery voltage, phase value	kV	24,1	23,7	23,0
Recovery voltage, between phases	kV	40,9		
TRV, peak	kV	48,8	-47,4	82,6
Make time	ms	-	-	-
Arc duration	ms	8,9	8,9	4,4
Opening time	ms	-		
Break time	ms	-	-	-



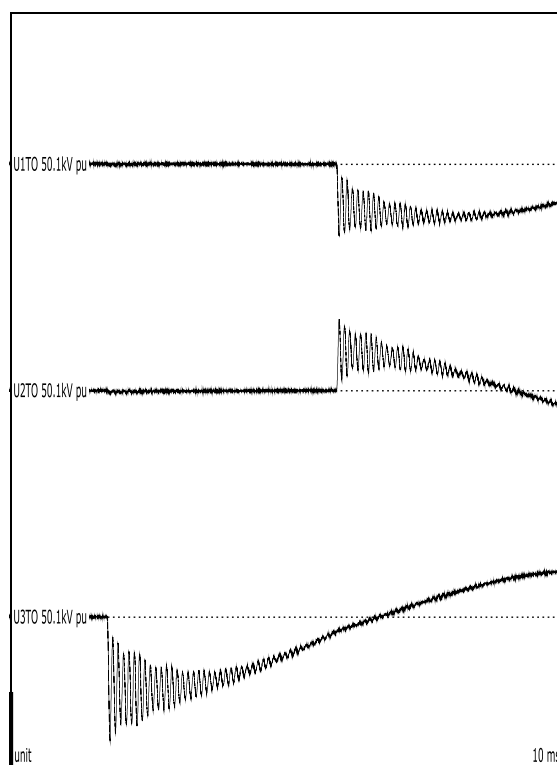
Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.



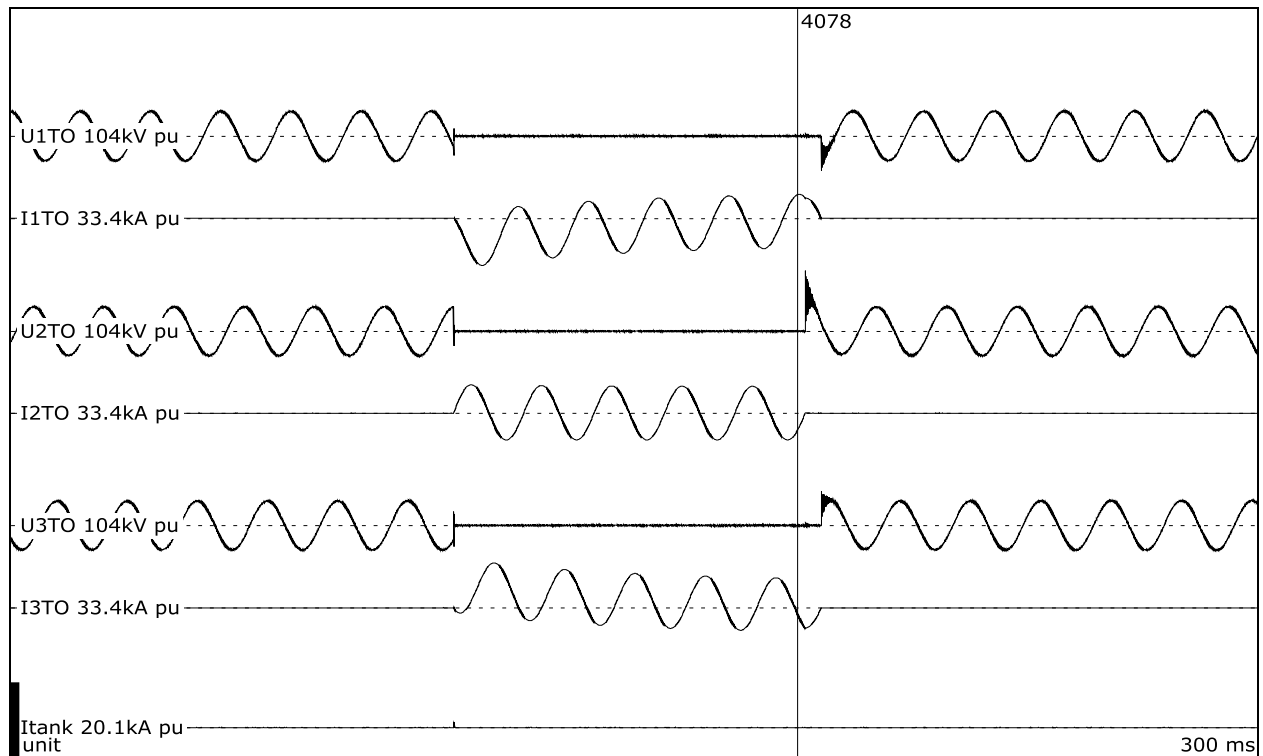
**T50****Test number: 160330-4077**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		A	B	C
Applied voltage, phase value	kV	24,3	23,9	23,9
Applied voltage, between phases	kV	41,7		
Making current, peak	kA	-15,8	21,8	-18,2
Breaking current, phase value	kA	8,40	8,42	8,33
Average current, three phase	kA	8,38		
Breaking current, DC-component	%	5	13	9
Recovery voltage, phase value	kV	24,2	23,7	23,0
Recovery voltage, between phases	kV	40,9		
TRV, peak	kV	-47,7	47,2	-82,3
Make time	ms	-	-	-
Arc duration	ms	7,0	7,0	2,8
Opening time	ms	-		
Break time	ms	-	-	-

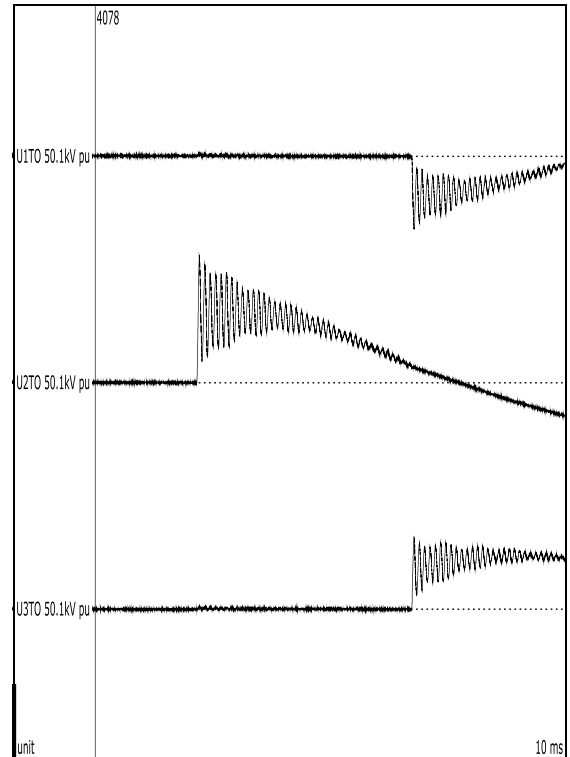


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

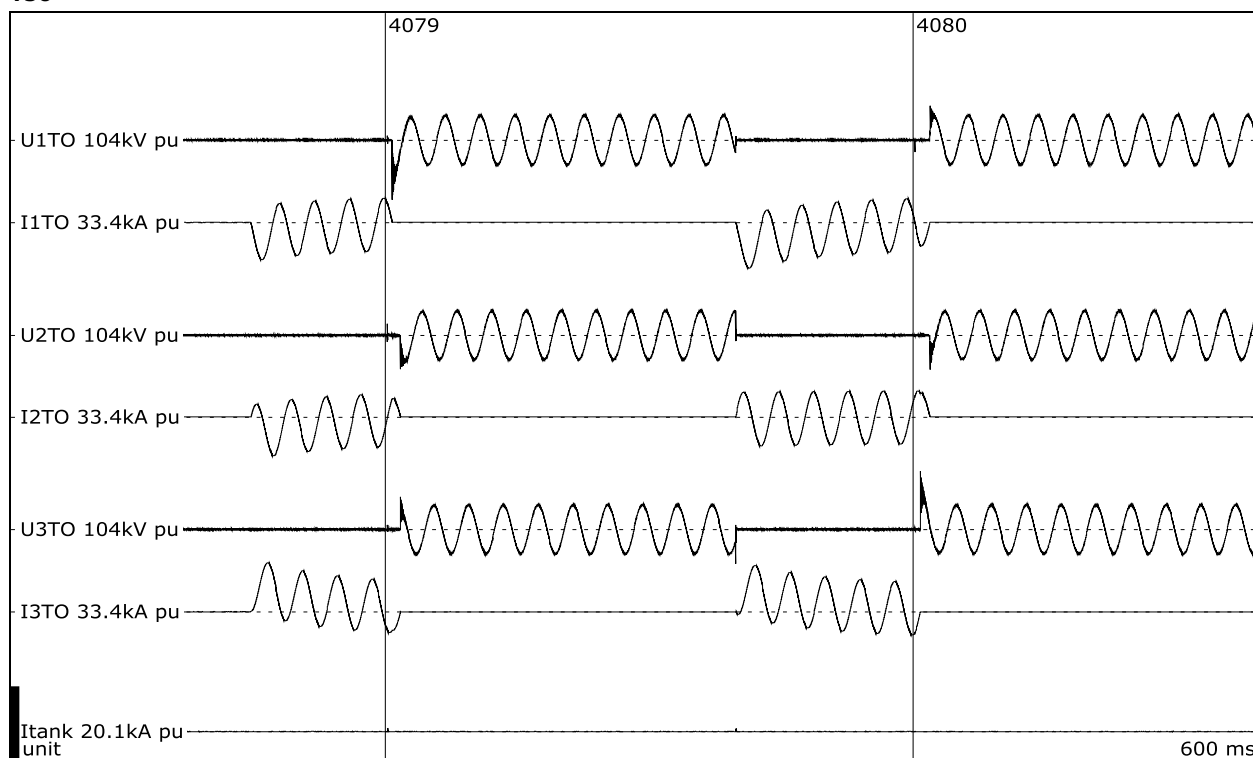
**T50****Test number: 160330-4078**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	23,5	24,1	24,1
Applied voltage, between phases	kV	41,4		
Making current, peak	kA	-21,0	12,6	20,0
Breaking current, phase value	kA	8,48	8,47	8,43
Average current, three phase	kA	8,46		
Breaking current, DC-component	%	9	0	10
Recovery voltage, phase value	kV	24,2	23,2	23,9
Recovery voltage, between phases	kV	41,1		
TRV, peak	kV	-48,2	84,2	47,4
Make time	ms	-	-	-
Arc duration	ms	5,8	1,9	5,8
Opening time	ms	-		
Break time	ms	-	-	-

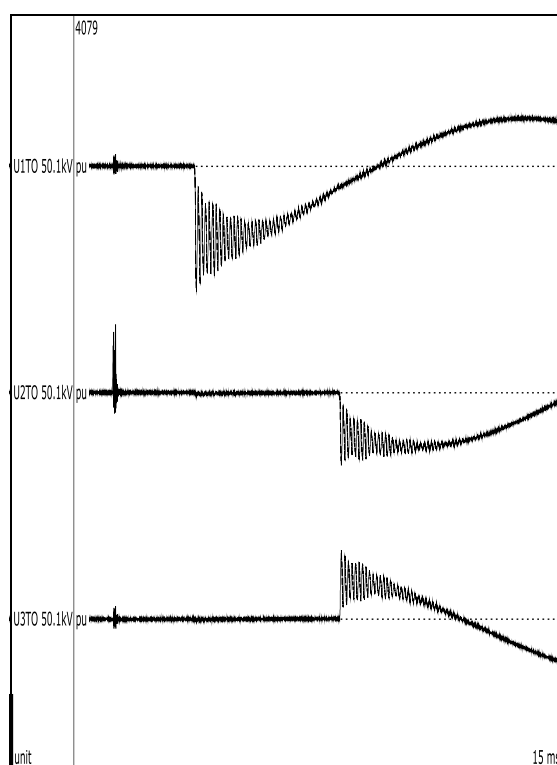


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

**T50****Test number: 160330-4079**

Time interval since previous test	min	-		
Operation		O		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Breaking current, phase value	kA	8,33	8,37	8,32
Average current, three phase	kA	8,34		
Breaking current, DC-component	%	8	12	19
Recovery voltage, phase value	kV	23,3	23,5	23,7
Recovery voltage, between phases	kV	40,7		
TRV, peak	kV	-82,9	-47,8	45,4
Arc duration	ms	3,3	7,3	7,3
Opening time	ms	-		
Break time	ms	-	-	-



Voltage opening coil - Vd.c.

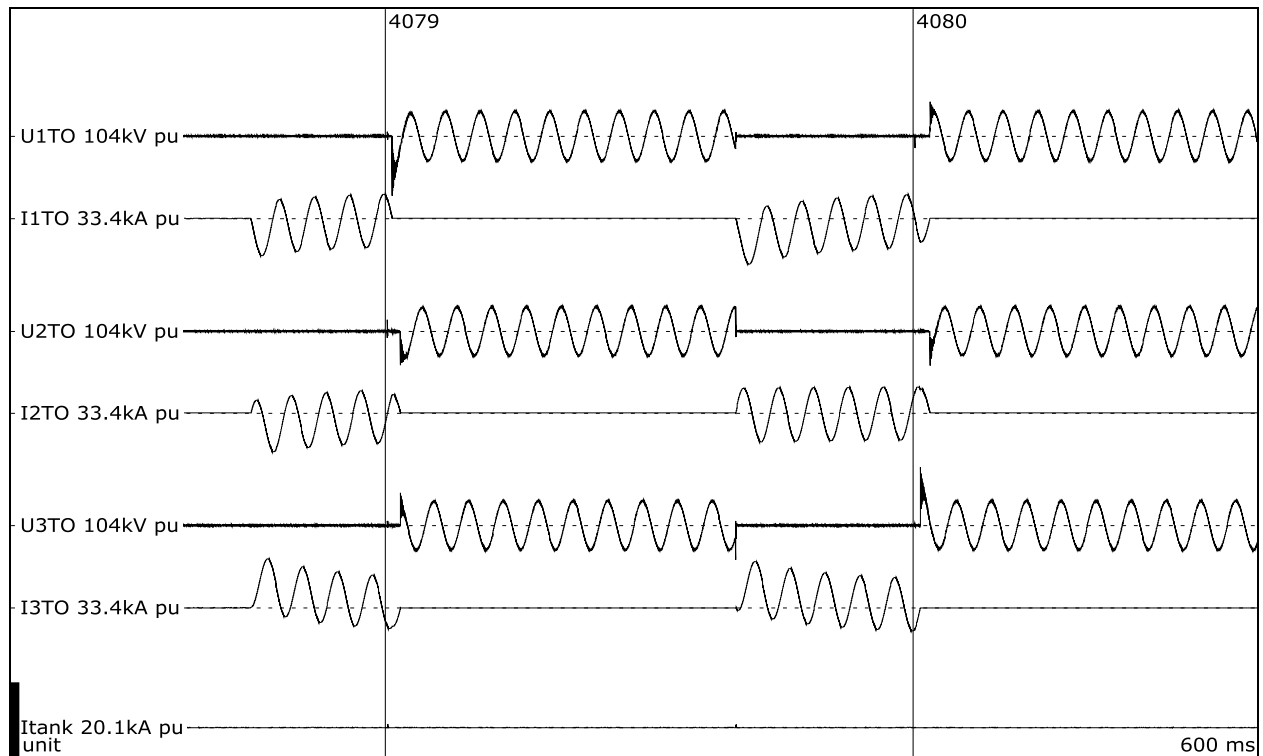
Gas pressure at 20 °C

- MPa

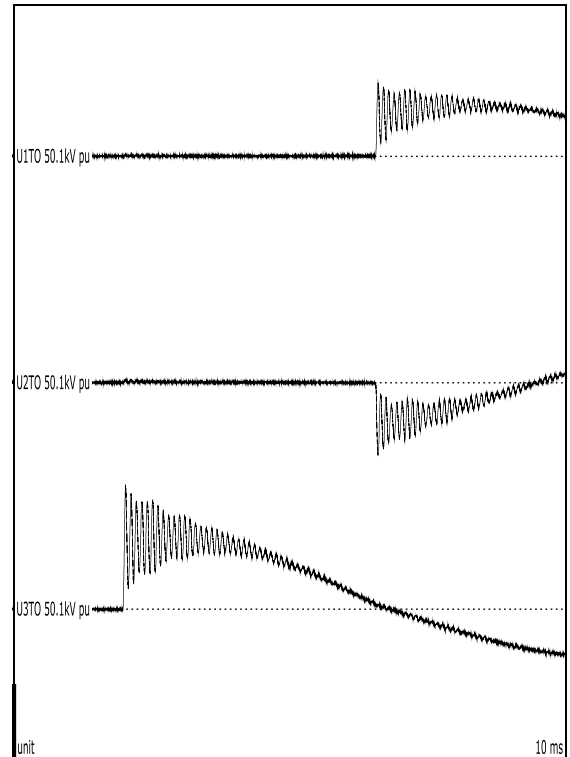
Operating pressure

- MPa

Remarks: Recloser cleared.

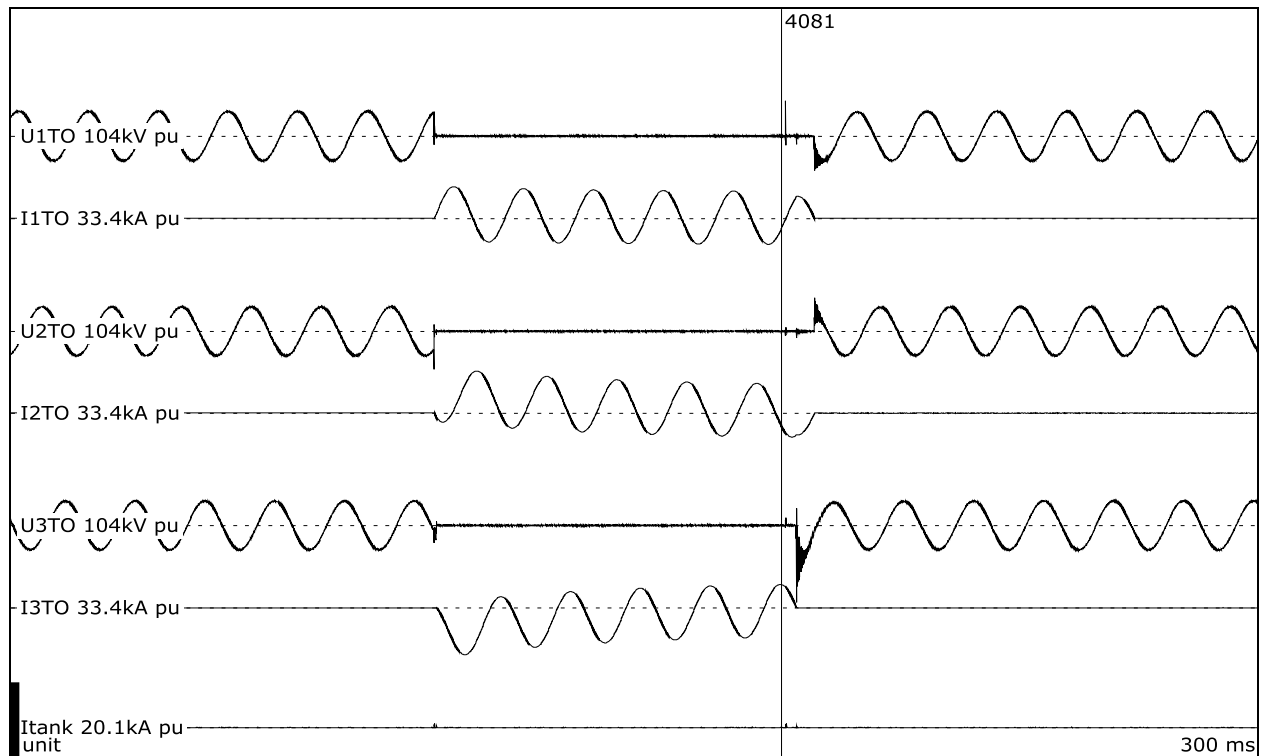
**T50****Test number: 160330-4080**

Time interval since previous test	min	-		
Time interval between operations	s	0,161		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	23,5	24,0	23,2
Applied voltage, between phases	kV	40,8		
Making current, peak	kA	-20,4	-13,0	20,7
Breaking current, phase value	kA	8,35	8,38	8,33
Average current, three phase	kA	8,35		
Breaking current, DC-component	%	9	2	10
Recovery voltage, phase value	kV	24,1	23,7	23,0
Recovery voltage, between phases	kV	40,9		
TRV, peak	kV	48,0	-48,3	82,4
Make time	ms	-	-	-
Arc duration	ms	8,1	8,1	3,6
Opening time	ms	-		
Break time	ms	-	-	-

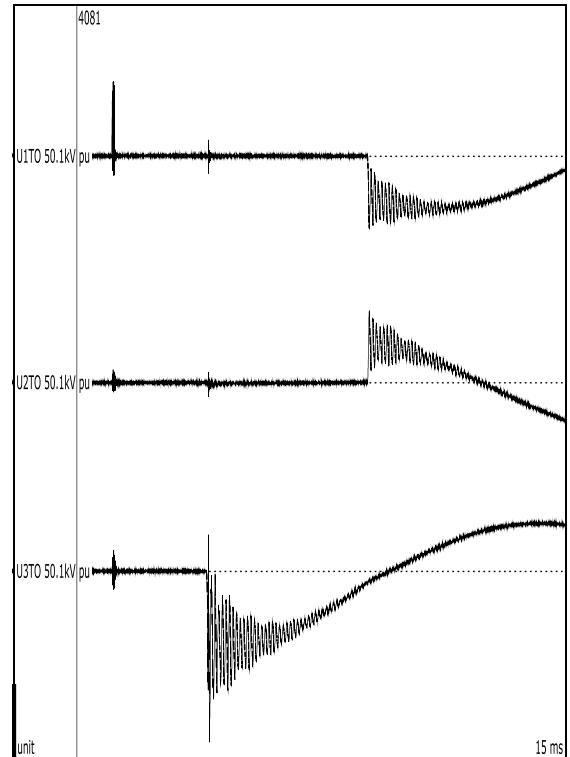


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

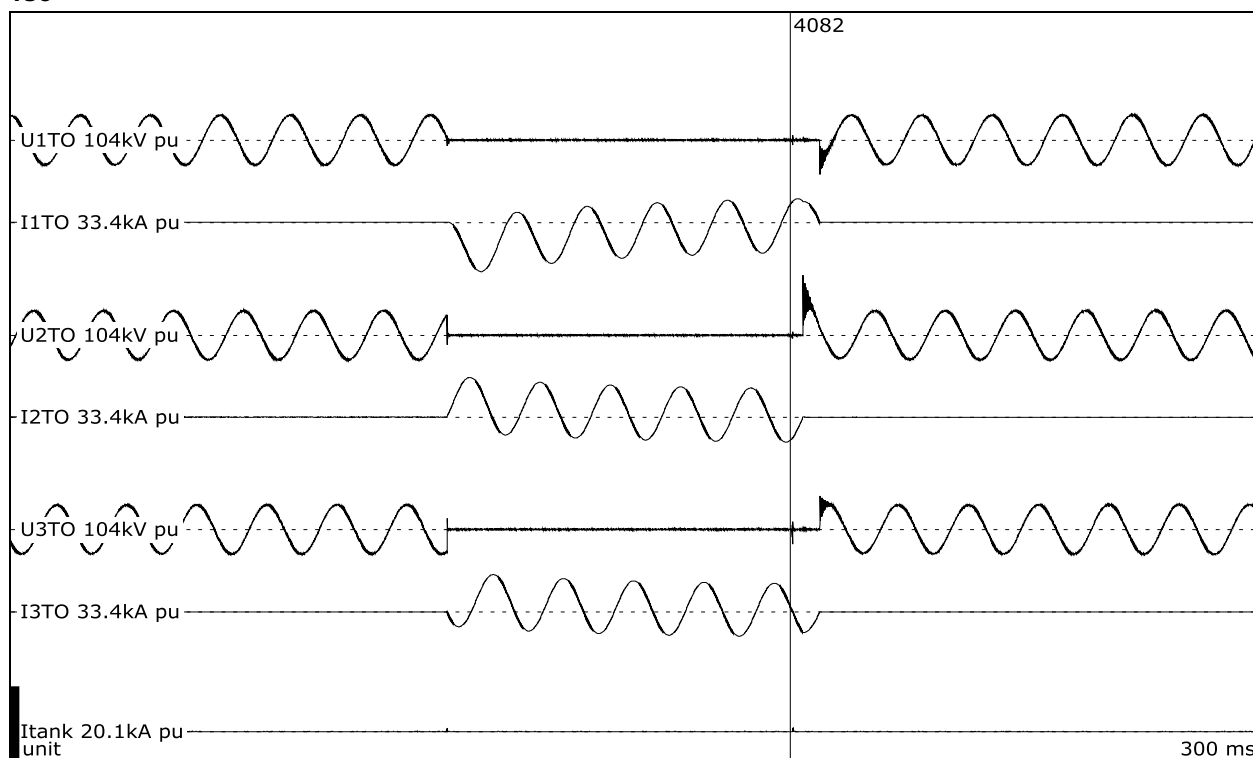
**T50****Test number: 160330-4081**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,3	24,0	23,2
Applied voltage, between phases	kV	41,3		
Making current, peak	kA	14,2	18,7	-21,0
Breaking current, phase value	kA	8,40	8,42	8,37
Average current, three phase	kA	8,40		
Breaking current, DC-component	%	2	9	11
Recovery voltage, phase value	kV	24,2	23,7	23,0
Recovery voltage, between phases	kV	40,9		
TRV, peak	kV	-48,5	47,6	-112
Make time	ms	-	-	-
Arc duration	ms	8,0	8,0	3,6
Opening time	ms	-		
Break time	ms	-	-	-

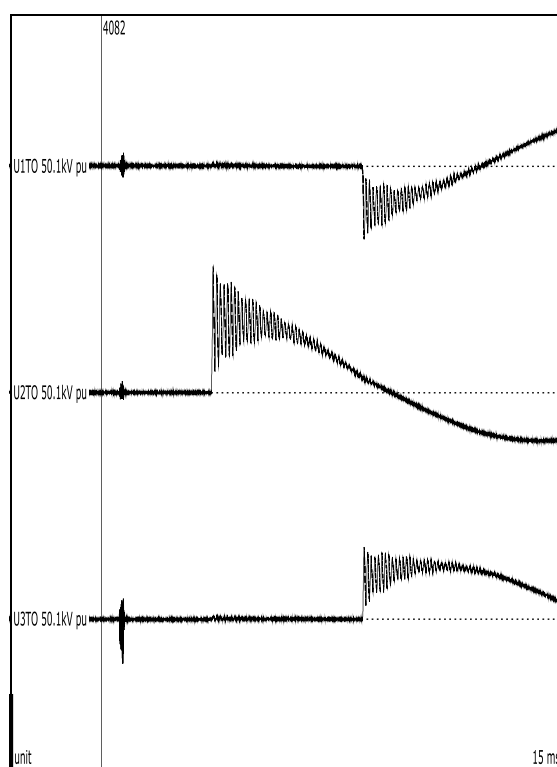


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

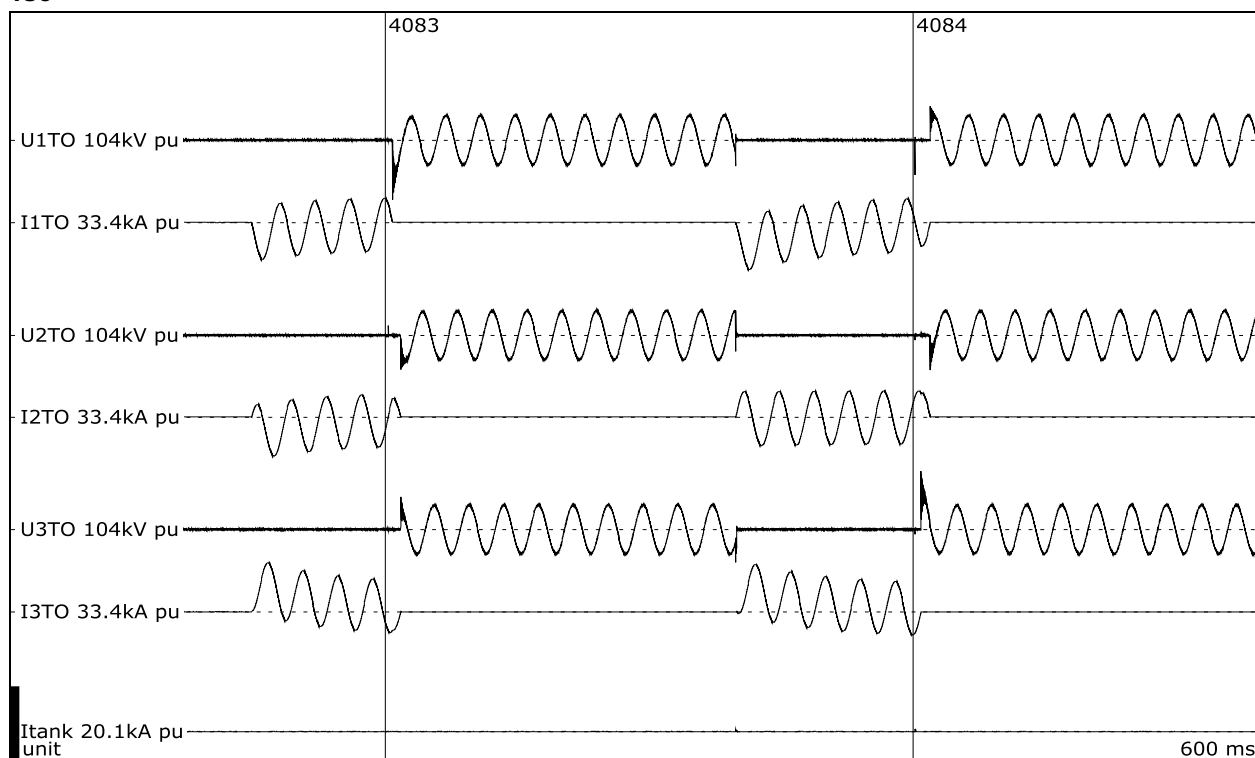
**T50****Test number: 160330-4082**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,4	24,1	24,2
Applied voltage, between phases	kV	42,0		
Making current, peak	kA	-22,0	17,7	16,5
Breaking current, phase value	kA	8,51	8,49	8,44
Average current, three phase	kA	8,48		
Breaking current, DC-component	%	11	6	6
Recovery voltage, phase value	kV	24,2	23,2	23,9
Recovery voltage, between phases	kV	41,2		
TRV, peak	kV	-48,3	83,8	47,6
Make time	ms	-	-	-
Arc duration	ms	7,2	3,1	7,2
Opening time	ms	-		
Break time	ms	-	-	-

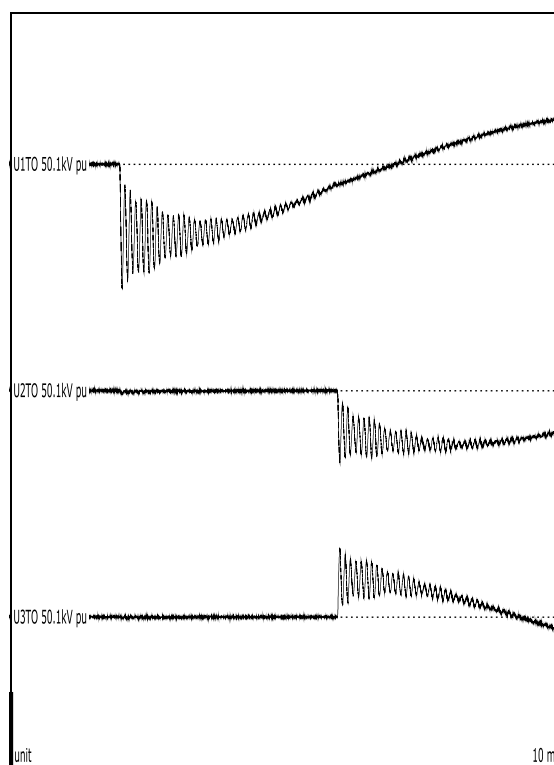


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

**T50****Test number: 160330-4083**

Time interval since previous test	min	-		
Operation		O		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Breaking current, phase value	kA	8,33	8,37	8,33
Average current, three phase	kA	8,34		
Breaking current, DC-component	%	8	12	19
Recovery voltage, phase value	kV	23,4	23,5	23,8
Recovery voltage, between phases	kV	40,8		
TRV, peak	kV	-82,9	-48,0	45,6
Arc duration	ms	3,6	7,5	7,5
Opening time	ms	-		
Break time	ms	-	-	-



Voltage opening coil - Vd.c.

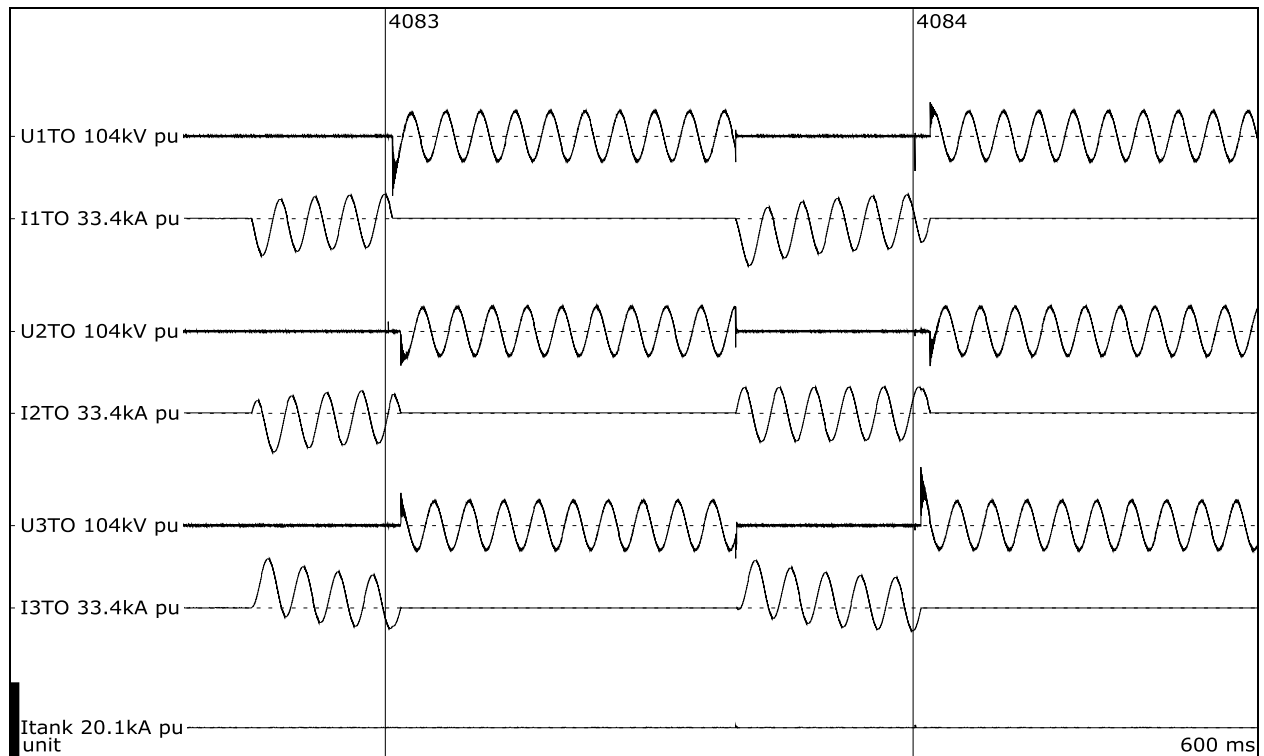
Gas pressure at 20 °C

- MPa

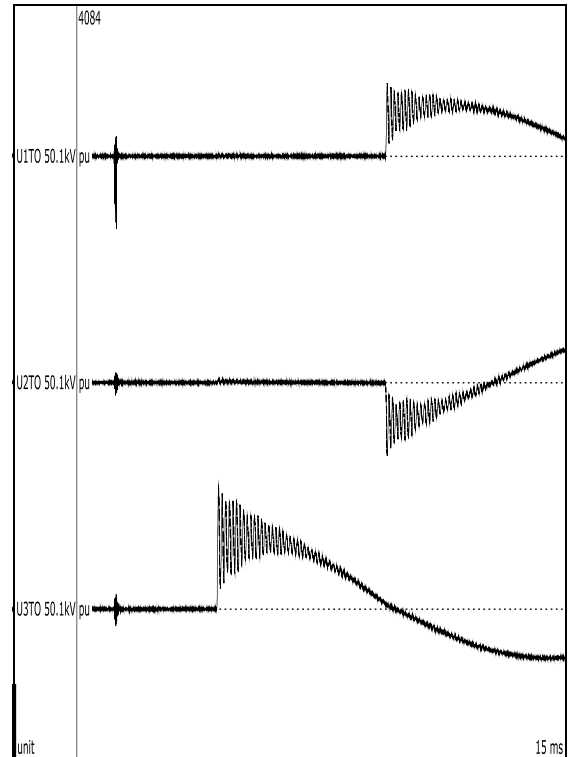
Operating pressure

- MPa

Remarks: Recloser cleared.

**T50****Test number: 160330-4084**

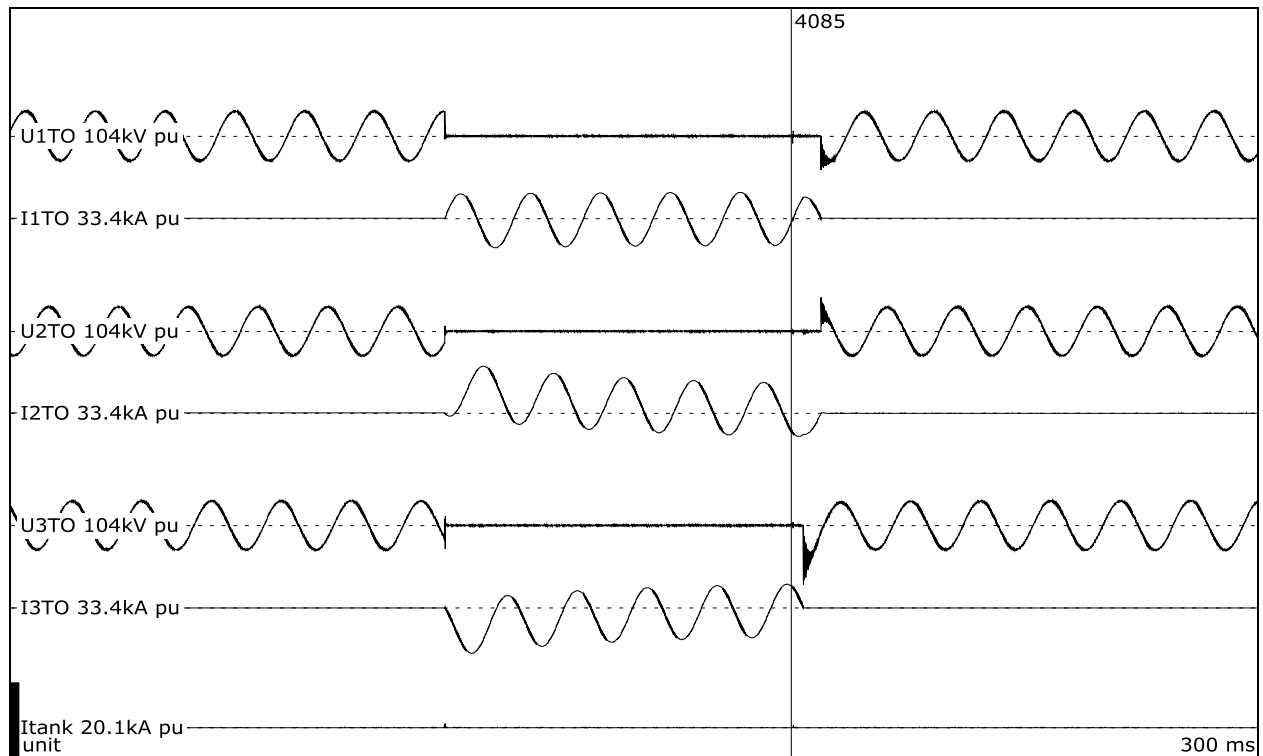
Time interval since previous test	min	-		
Time interval between operations	s	0,161		
Operation		CO		
Phase		A	B	C
Applied voltage, phase value	kV	23,6	24,0	24,1
Applied voltage, between phases	kV	41,4		
Making current, peak	kA	-21,1	-12,8	21,1
Breaking current, phase value	kA	8,36	8,38	8,34
Average current, three phase	kA	8,36		
Breaking current, DC-component	%	10	1	11
Recovery voltage, phase value	kV	24,1	23,7	22,9
Recovery voltage, between phases	kV	40,8		
TRV, peak	kV	48,0	-48,4	82,1
Make time	ms	-	-	-
Arc duration	ms	8,4	8,4	3,9
Opening time	ms	-		
Break time	ms	-	-	-



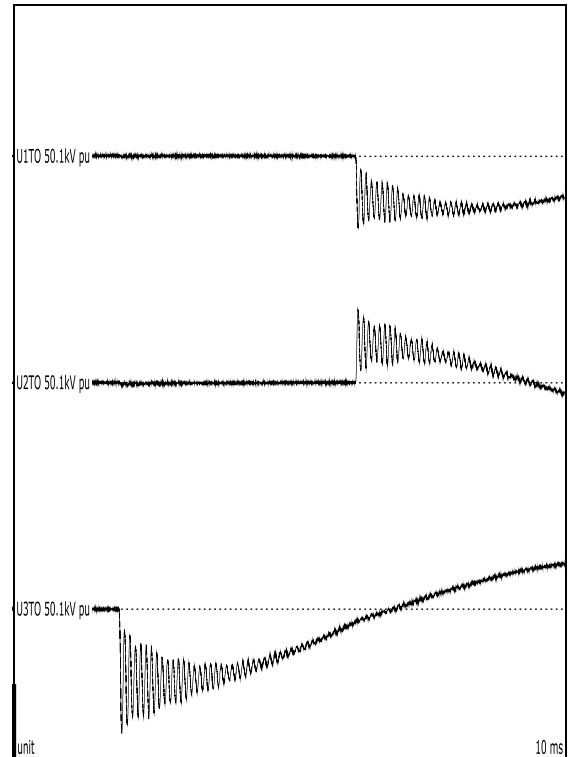
Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.



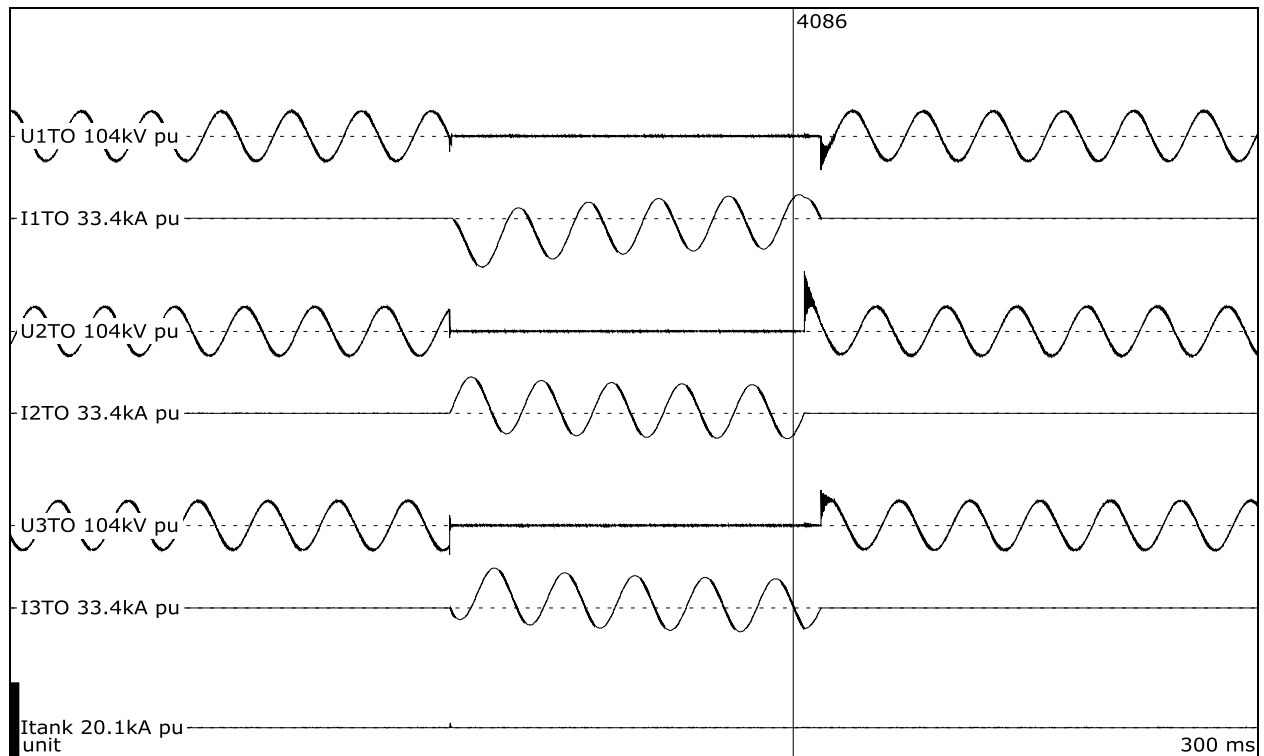
**T50****Test number: 160330-4085**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		A	B	C
Applied voltage, phase value	kV	24,4	23,2	24,1
Applied voltage, between phases	kV	41,4		
Making current, peak	kA	-13,2	20,9	-20,3
Breaking current, phase value	kA	8,41	8,43	8,34
Average current, three phase	kA	8,39		
Breaking current, DC-component	%	1	12	11
Recovery voltage, phase value	kV	24,2	23,7	23,0
Recovery voltage, between phases	kV	40,9		
TRV, peak	kV	-47,5	48,0	-82,5
Make time	ms	-	-	-
Arc duration	ms	7,3	7,3	3,0
Opening time	ms	-		
Break time	ms	-	-	-

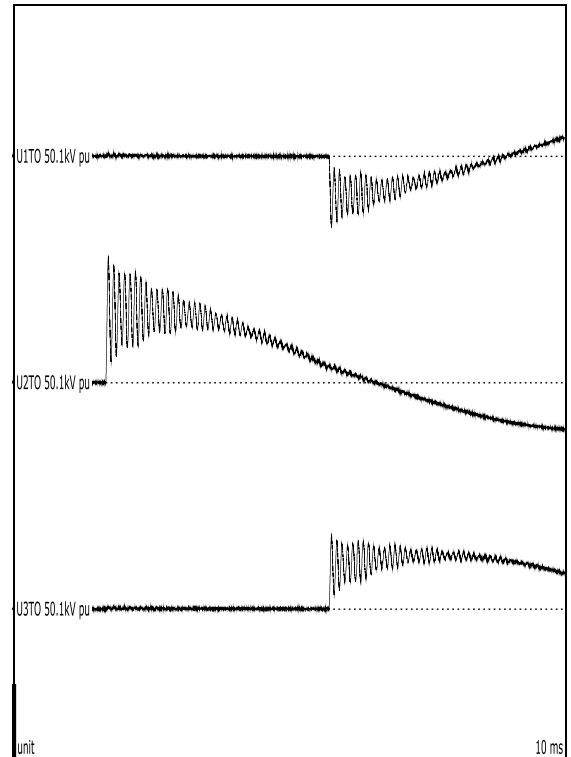


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

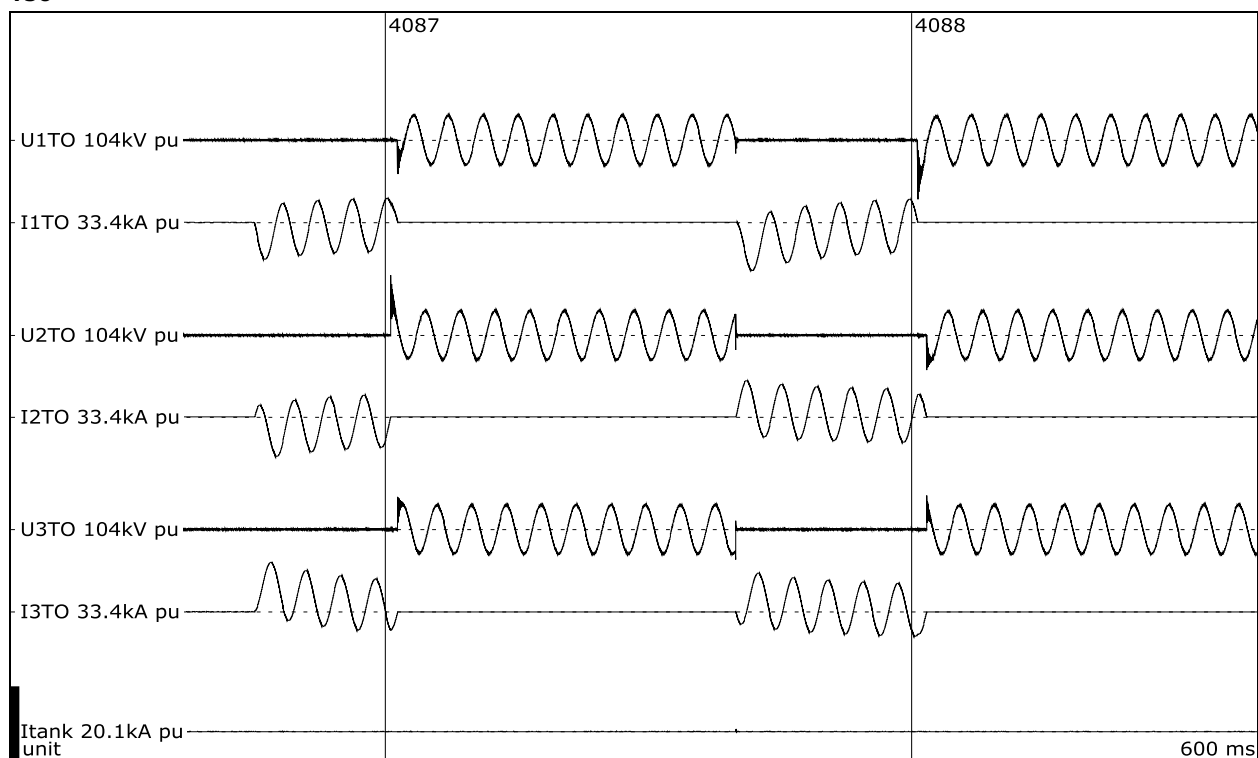
**T50****Test number: 160330-4086**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,5	24,1	24,2
Applied voltage, between phases	kV	42,0		
Making current, peak	kA	-21,7	16,1	17,7
Breaking current, phase value	kA	8,50	8,49	8,45
Average current, three phase	kA	8,48		
Breaking current, DC-component	%	11	4	7
Recovery voltage, phase value	kV	24,2	23,2	24,1
Recovery voltage, between phases	kV	41,3		
TRV, peak	kV	-46,8	83,9	49,3
Make time	ms	-	-	-
Arc duration	ms	6,8	2,8	6,8
Opening time	ms	-		
Break time	ms	-	-	-

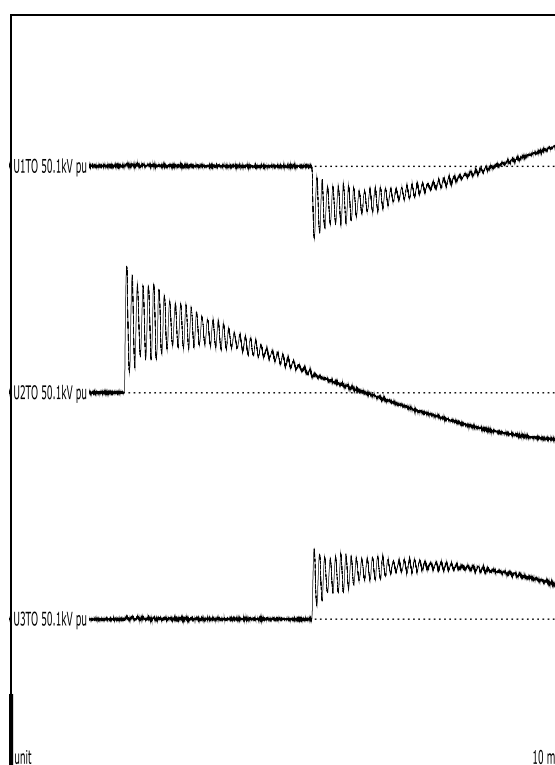


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

**T50****Test number: 160330-4087**

Time interval since previous test	min	-		
Operation		O		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Breaking current, phase value	kA	8,37	8,37	8,33
Average current, three phase	kA	8,36		
Breaking current, DC-component	%	7	13	21
Recovery voltage, phase value	kV	24,0	23,7	23,5
Recovery voltage, between phases	kV	41,1		
TRV, peak	kV	-47,8	83,8	46,5
Arc duration	ms	6,0	2,6	6,0
Opening time	ms	-		
Break time	ms	-	-	-



Voltage opening coil - Vd.c.

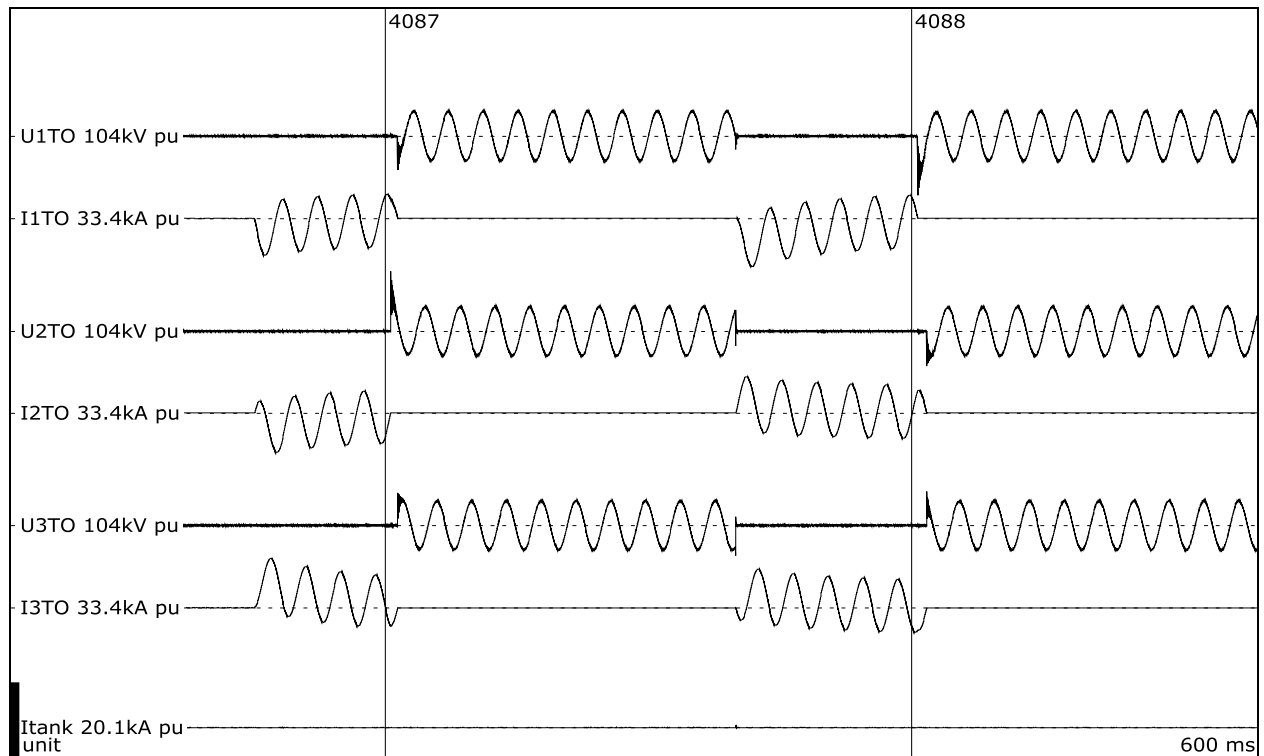
Gas pressure at 20 °C

- MPa

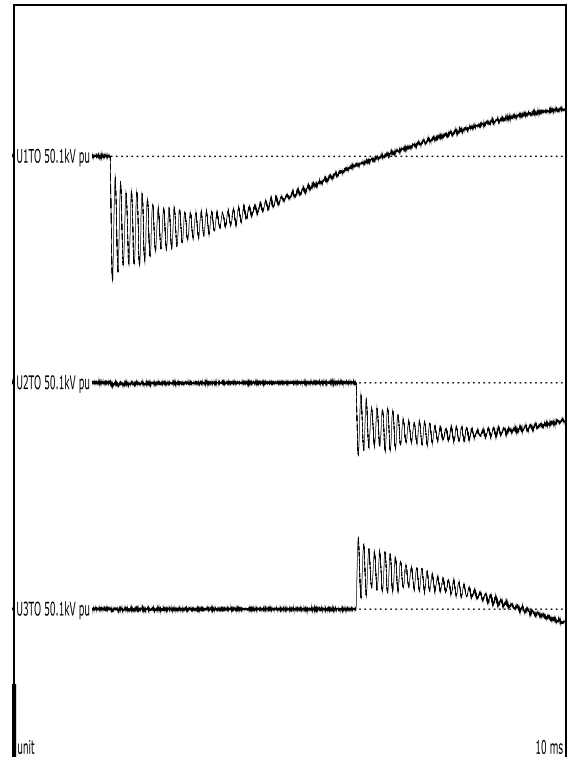
Operating pressure

- MPa

Remarks: Recloser cleared.

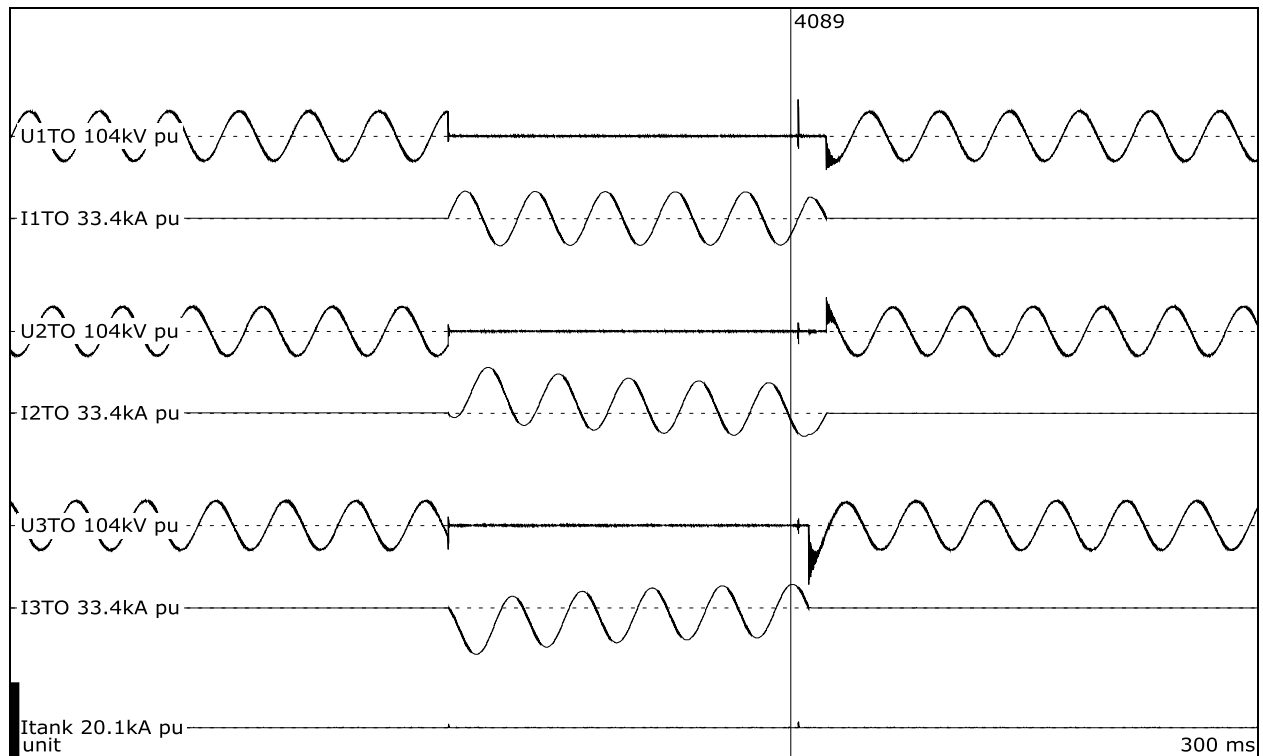
**T50****Test number: 160330-4088**

Time interval since previous test	min	-		
Time interval between operations	s	0,163		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,4	24,0	24,0
Applied voltage, between phases	kV	41,8		
Making current, peak	kA	-21,5	16,2	17,2
Breaking current, phase value	kA	8,35	8,37	8,33
Average current, three phase	kA	8,35		
Breaking current, DC-component	%	11	4	6
Recovery voltage, phase value	kV	23,4	23,8	23,8
Recovery voltage, between phases	kV	41,0		
TRV, peak	kV	-82,5	-48,3	47,5
Make time	ms	-	-	-
Arc duration	ms	2,8	7,3	7,3
Opening time	ms	-		
Break time	ms	-	-	-

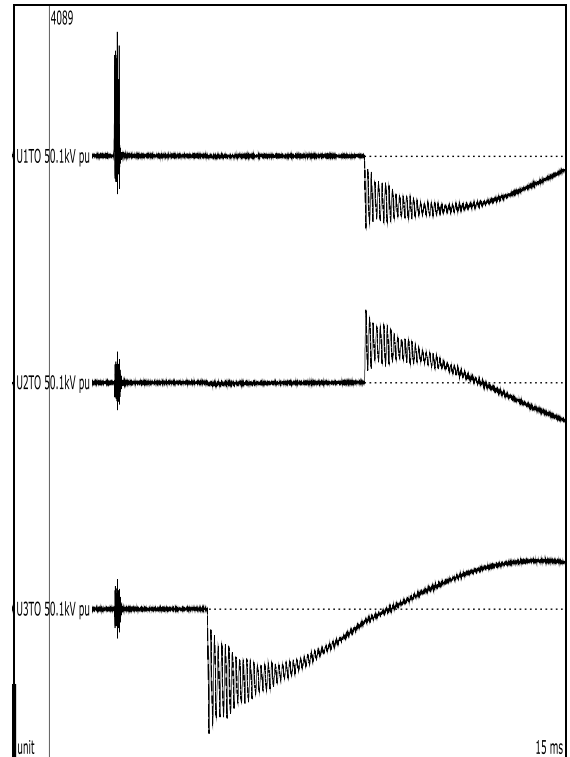


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

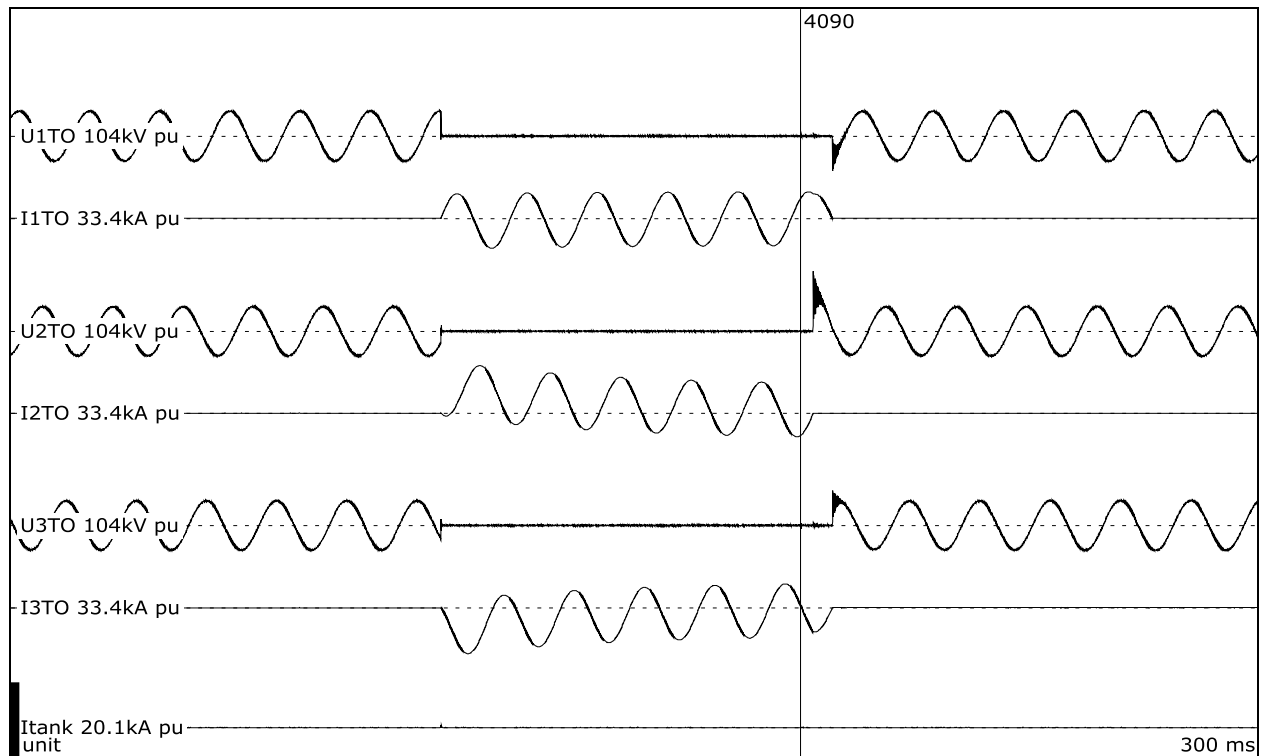
**T50****Test number: 160330-4089**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,5	24,1	23,2
Applied voltage, between phases	kV	41,4		
Making current, peak	kA	-12,2	20,4	-20,9
Breaking current, phase value	kA	8,43	8,45	8,39
Average current, three phase	kA	8,43		
Breaking current, DC-component	%	0	11	11
Recovery voltage, phase value	kV	24,3	23,8	23,2
Recovery voltage, between phases	kV	41,2		
TRV, peak	kV	-48,1	47,7	-82,7
Make time	ms	-	-	-
Arc duration	ms	8,6	8,6	4,3
Opening time	ms	-		
Break time	ms	-	-	-

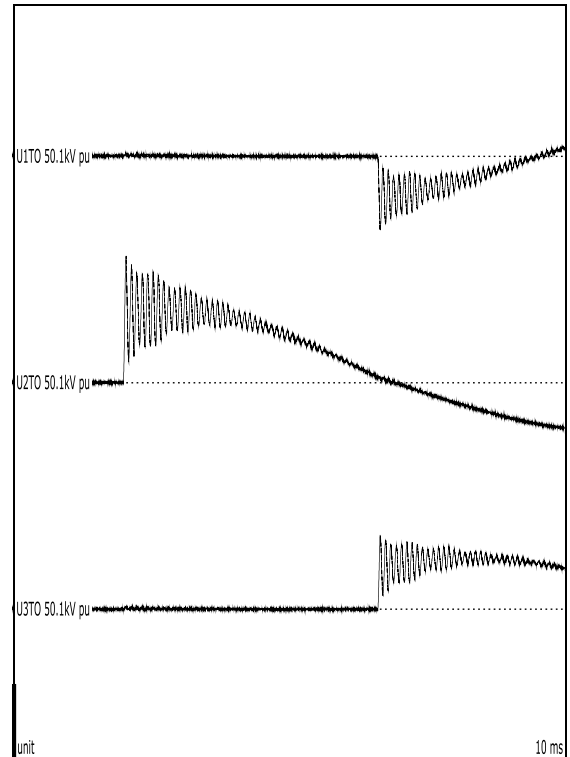


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

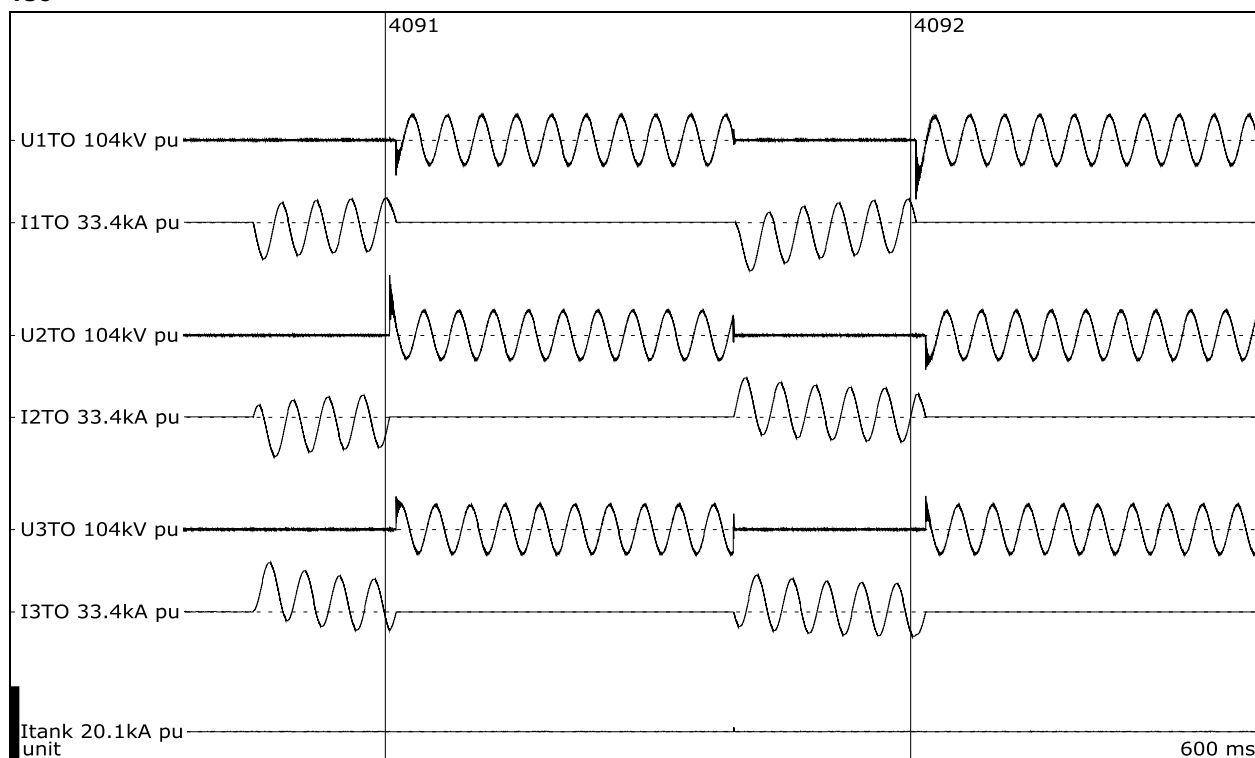
**T50****Test number: 160330-4090**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,6	23,4	23,4
Applied voltage, between phases	kV	41,2		
Making current, peak	kA	-13,3	21,2	-20,5
Breaking current, phase value	kA	8,53	8,52	8,46
Average current, three phase	kA	8,50		
Breaking current, DC-component	%	1	12	10
Recovery voltage, phase value	kV	24,3	23,2	24,0
Recovery voltage, between phases	kV	41,3		
TRV, peak	kV	-48,8	83,6	48,9
Make time	ms	-	-	-
Arc duration	ms	7,7	3,1	7,7
Opening time	ms	-		
Break time	ms	-	-	-

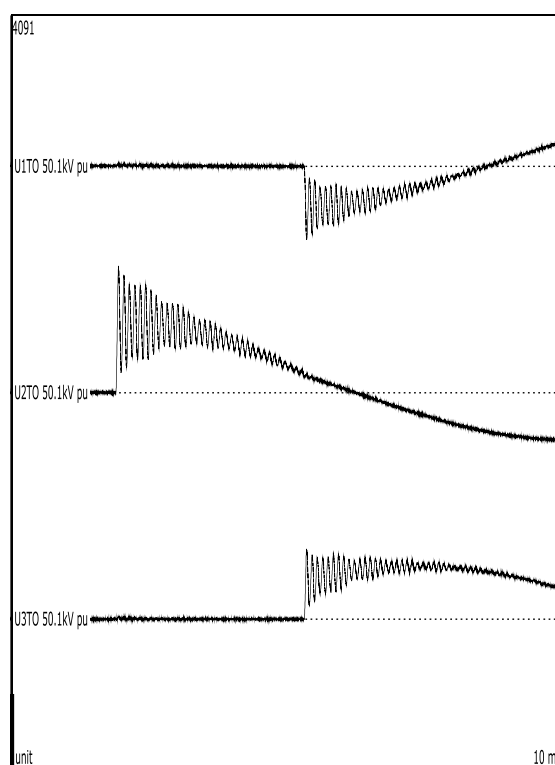


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

**T50****Test number: 160330-4091**

Time interval since previous test	min	-		
Operation		O		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Breaking current, phase value	kA	8,37	8,37	8,32
Average current, three phase	kA	8,35		
Breaking current, DC-component	%	7	13	20
Recovery voltage, phase value	kV	24,0	23,7	23,5
Recovery voltage, between phases	kV	41,1		
TRV, peak	kV	-48,9	83,9	46,1
Arc duration	ms	5,4	2,0	5,4
Opening time	ms	-		
Break time	ms	-	-	-



Voltage opening coil - Vd.c.

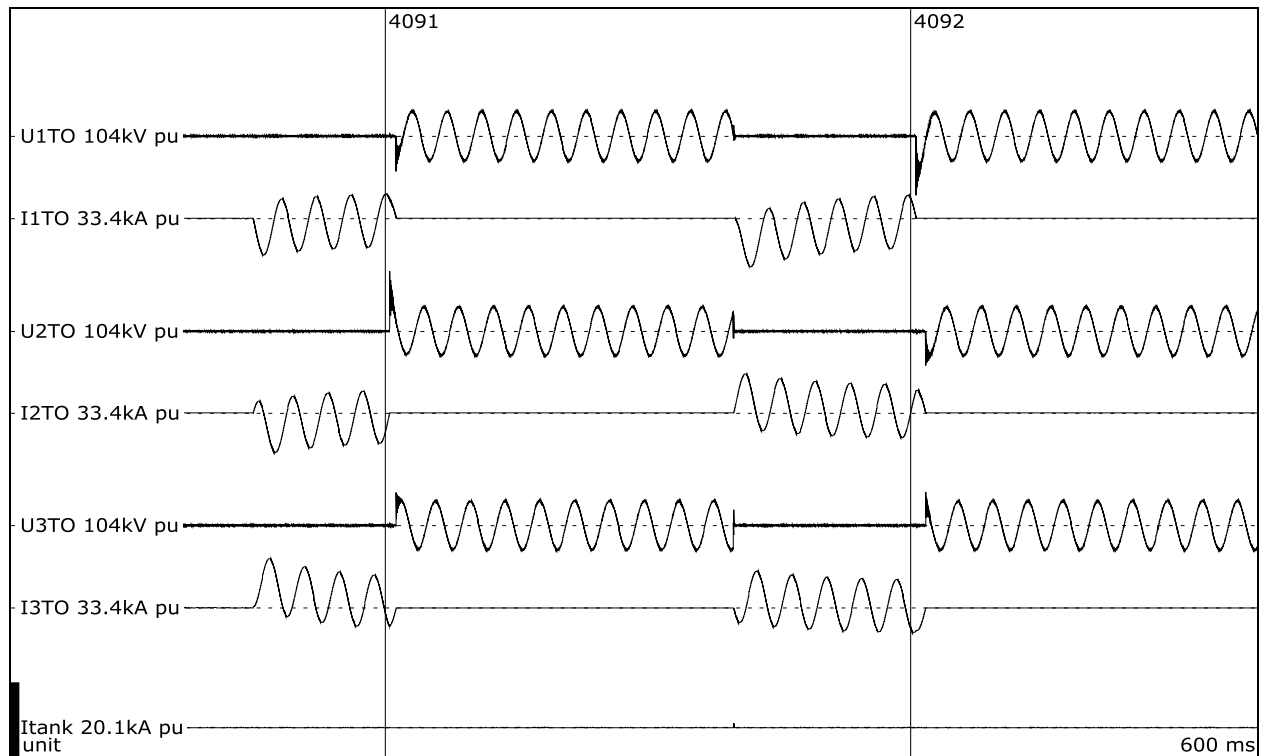
Gas pressure at 20 °C

- MPa

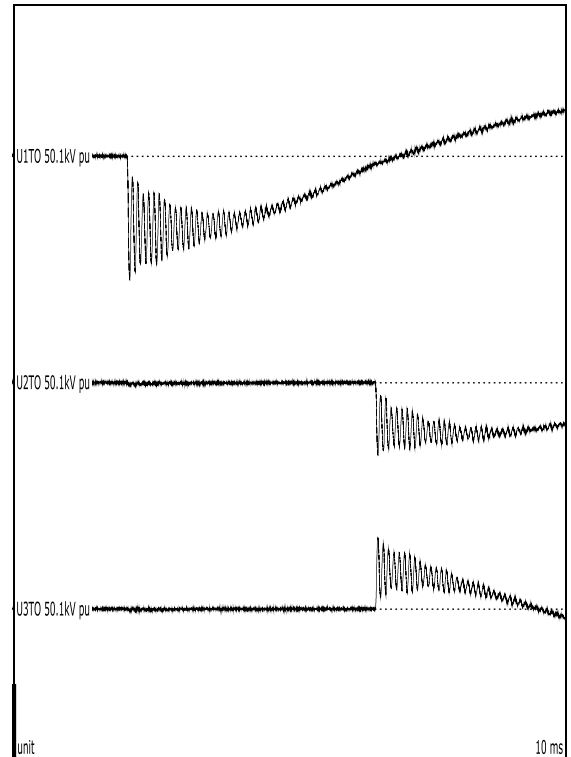
Operating pressure

- MPa

Remarks: Recloser cleared.

**T50****Test number: 160330-4092**

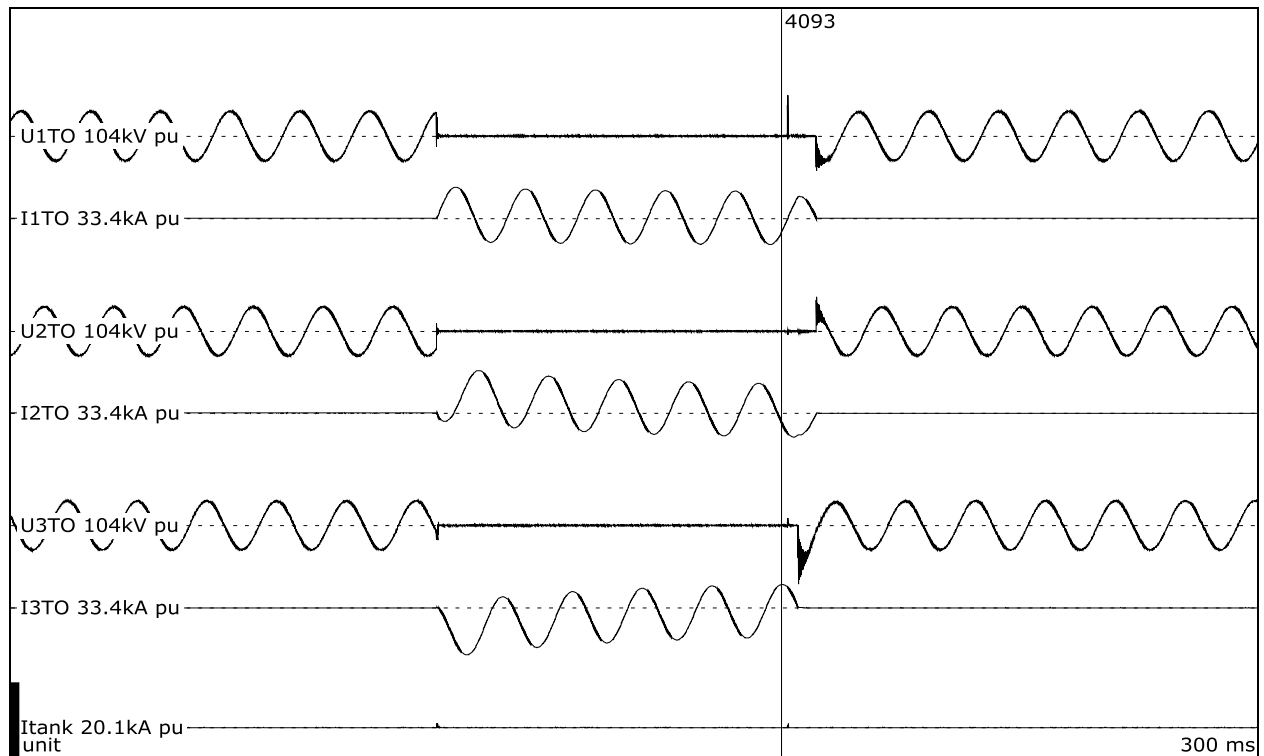
Time interval since previous test	min	-		
Time interval between operations	s	0,163		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,4	24,0	24,0
Applied voltage, between phases	kV	41,8		
Making current, peak	kA	-21,7	17,5	16,3
Breaking current, phase value	kA	8,35	8,37	8,32
Average current, three phase	kA	8,35		
Breaking current, DC-component	%	12	6	5
Recovery voltage, phase value	kV	23,3	23,8	23,8
Recovery voltage, between phases	kV	41,0		
TRV, peak	kV	-82,5	-48,4	47,4
Make time	ms	-	-	-
Arc duration	ms	2,6	7,1	7,2
Opening time	ms	-		
Break time	ms	-	-	-



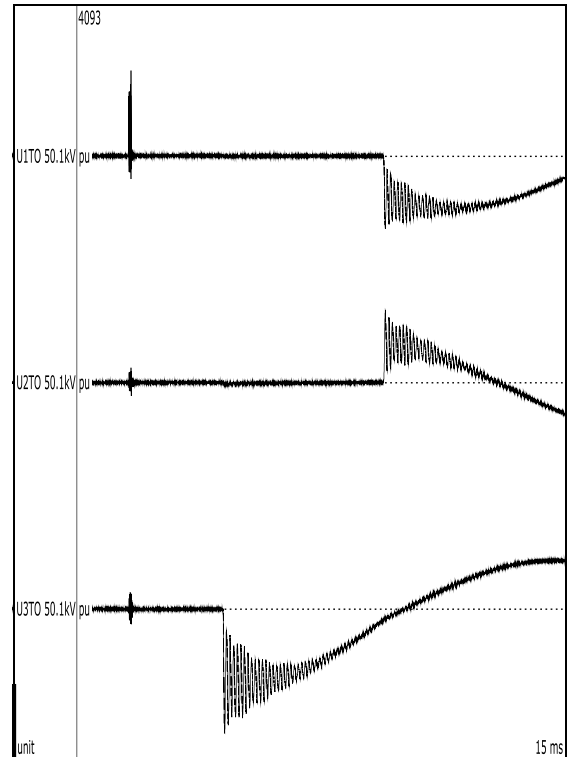
Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.



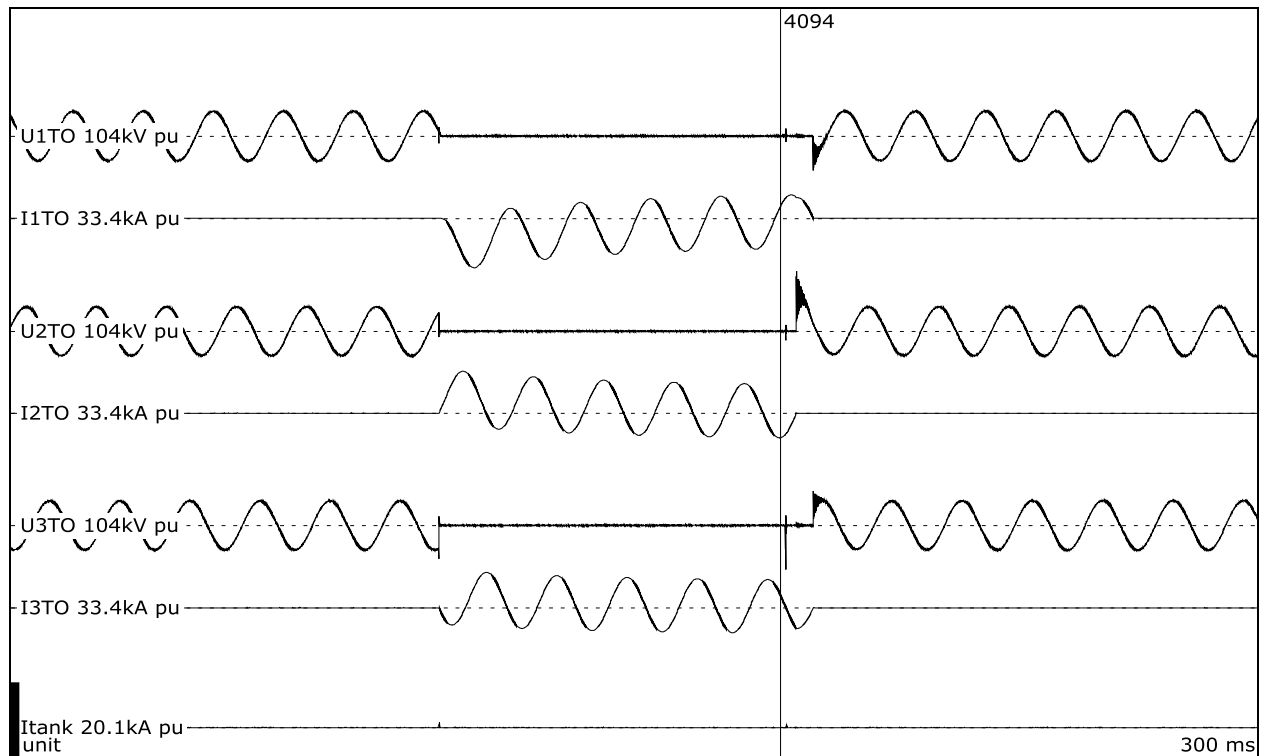
**T50****Test number: 160330-4093**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,4	24,0	23,2
Applied voltage, between phases	kV	41,3		
Making current, peak	kA	14,0	19,0	-21,1
Breaking current, phase value	kA	8,40	8,43	8,37
Average current, three phase	kA	8,40		
Breaking current, DC-component	%	2	10	11
Recovery voltage, phase value	kV	24,2	23,8	23,1
Recovery voltage, between phases	kV	41,0		
TRV, peak	kV	-47,8	47,8	-82,5
Make time	ms	-	-	-
Arc duration	ms	8,4	8,4	4,0
Opening time	ms	-		
Break time	ms	-	-	-

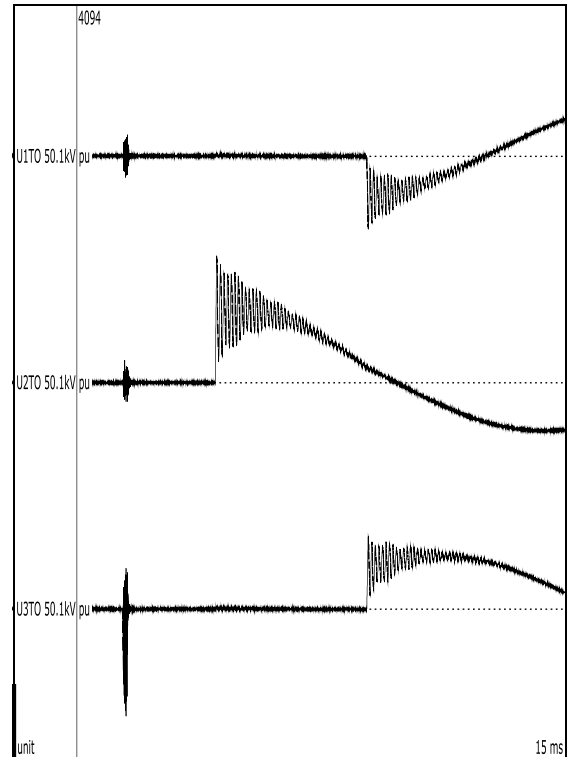


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

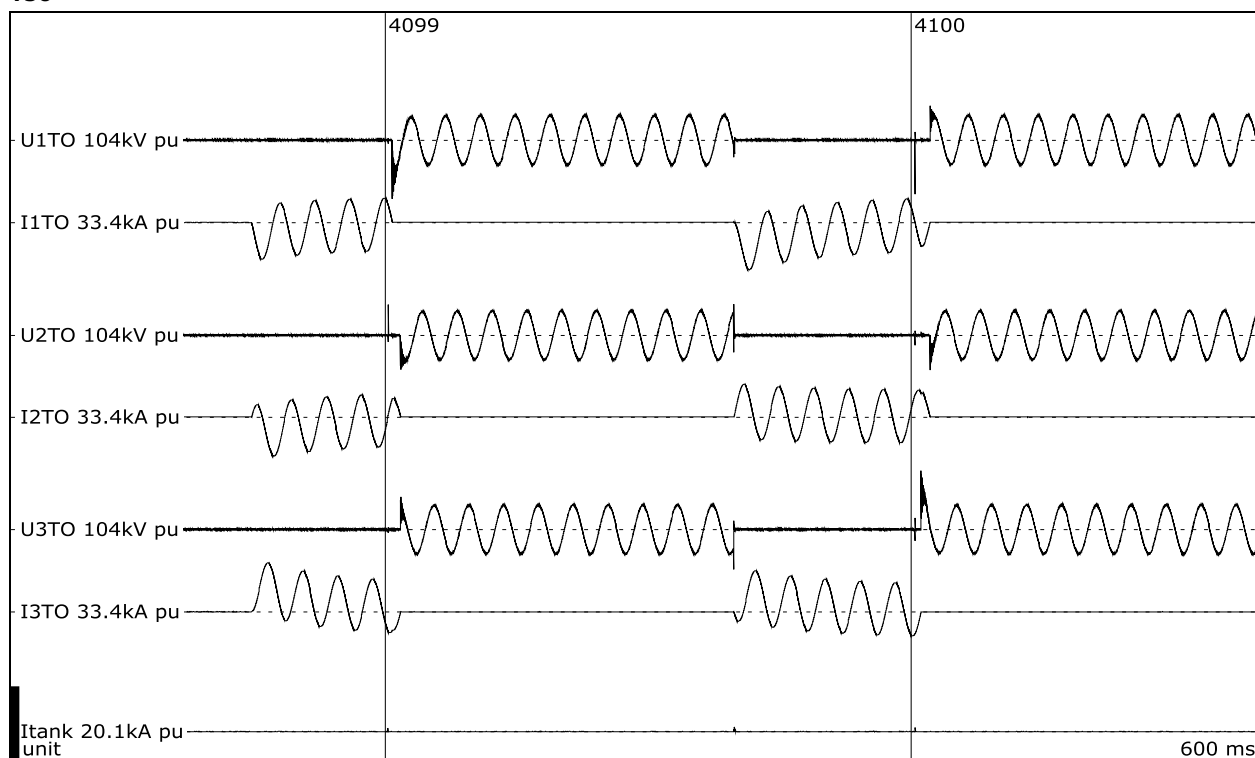
**T50****Test number: 160330-4094**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,5	24,1	24,1
Applied voltage, between phases	kV	42,0		
Making current, peak	kA	-22,0	18,7	15,7
Breaking current, phase value	kA	8,52	8,52	8,45
Average current, three phase	kA	8,49		
Breaking current, DC-component	%	11	7	5
Recovery voltage, phase value	kV	24,3	23,2	23,9
Recovery voltage, between phases	kV	41,2		
TRV, peak	kV	-48,2	83,8	48,4
Make time	ms	-	-	-
Arc duration	ms	7,9	3,8	7,9
Opening time	ms	-		
Break time	ms	-	-	-

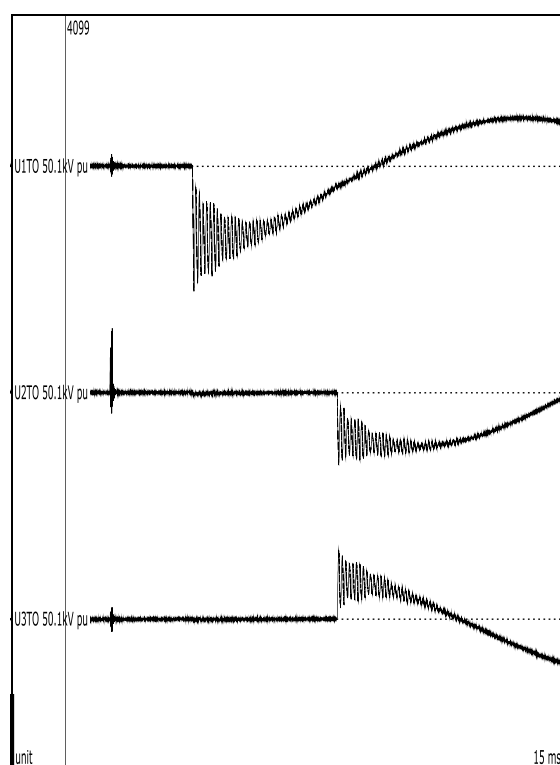


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

**T50****Test number: 160330-4099**

Time interval since previous test	min	-		
Operation		O		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Breaking current, phase value	kA	8,34	8,38	8,33
Average current, three phase	kA	8,35		
Breaking current, DC-component	%	8	12	19
Recovery voltage, phase value	kV	23,3	23,5	23,6
Recovery voltage, between phases	kV	40,7		
TRV, peak	kV	-83,1	-48,1	45,5
Arc duration	ms	3,5	7,4	7,4
Opening time	ms	-		
Break time	ms	-	-	-



Voltage opening coil - Vd.c.

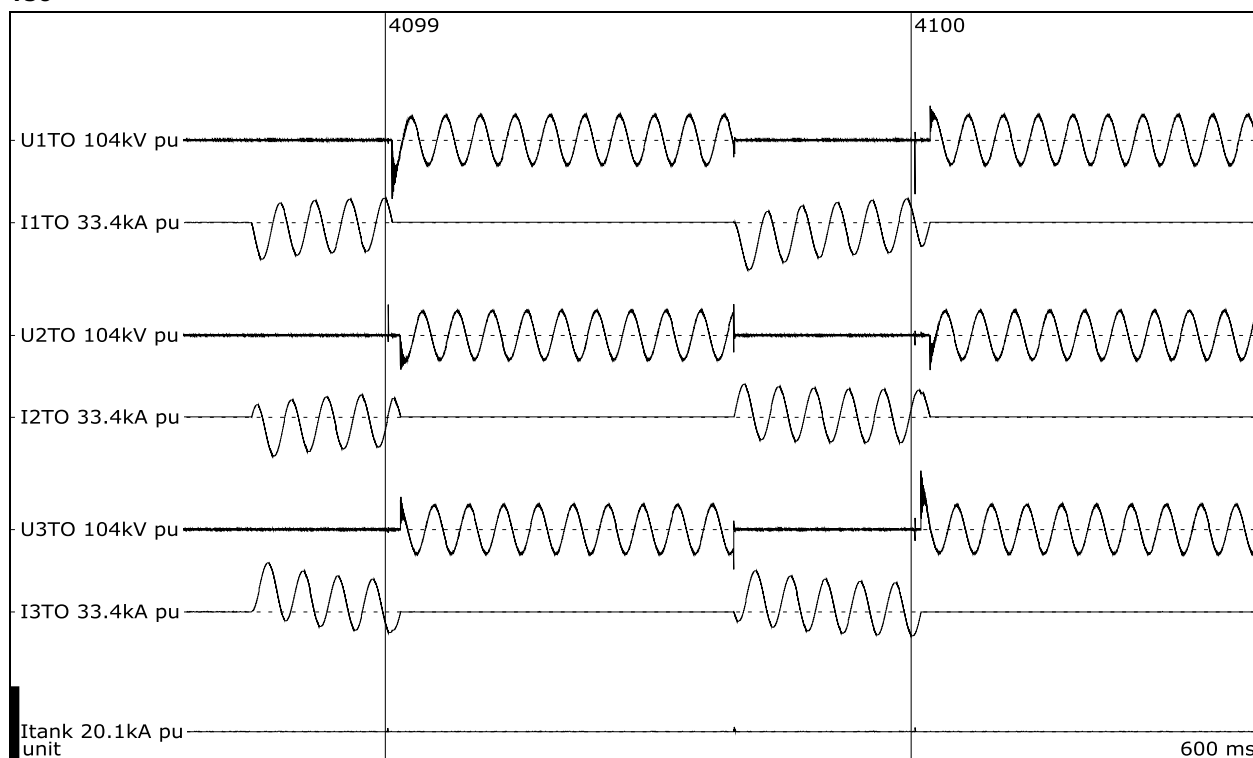
Gas pressure at 20 °C

- MPa

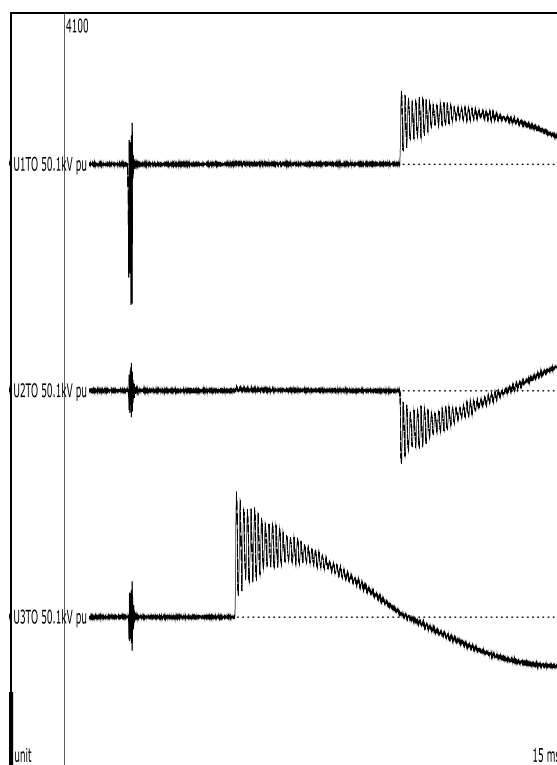
Operating pressure

- MPa

Remarks: Recloser cleared.

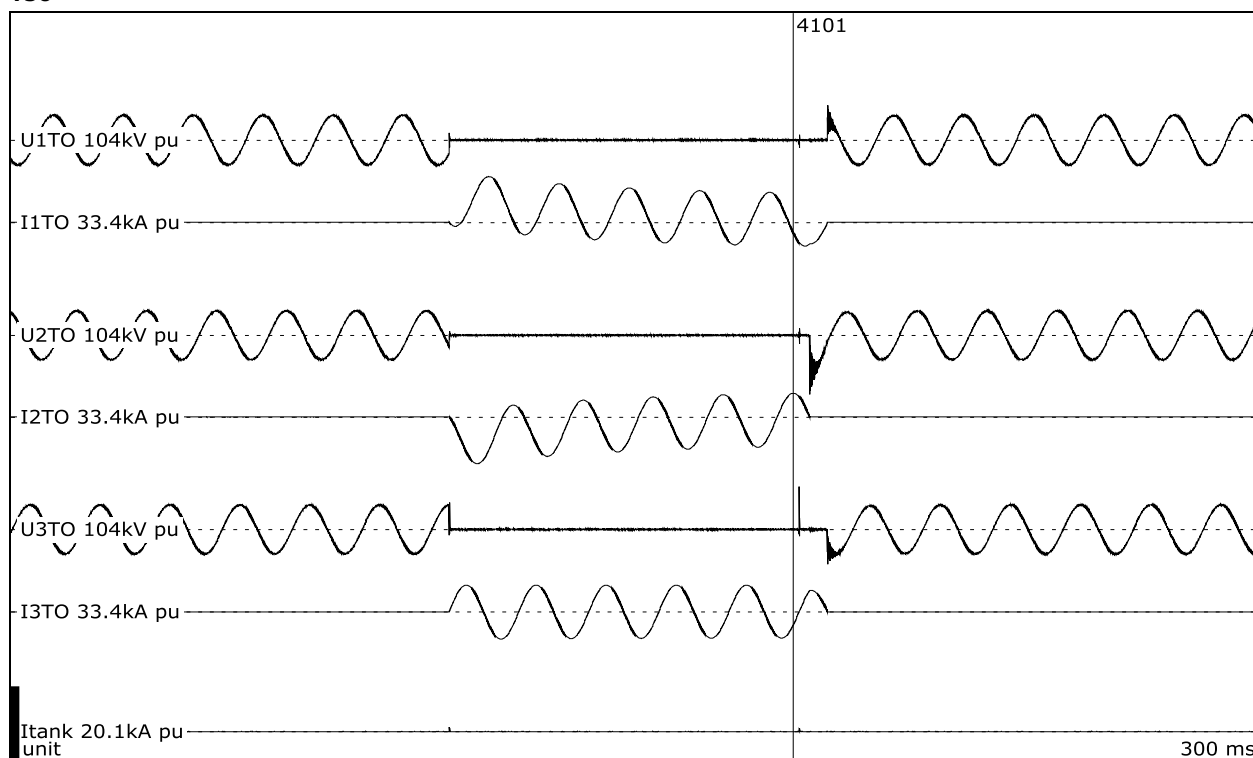
**T50****Test number: 160330-4100**

Time interval since previous test	min	-		
Time interval between operations	s	0,161		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,4	24,0	23,9
Applied voltage, between phases	kV	41,8		
Making current, peak	kA	-21,1	14,6	18,2
Breaking current, phase value	kA	8,36	8,38	8,33
Average current, three phase	kA	8,36		
Breaking current, DC-component	%	10	2	7
Recovery voltage, phase value	kV	24,1	23,7	23,1
Recovery voltage, between phases	kV	41,0		
TRV, peak	kV	48,0	-48,4	82,9
Make time	ms	-	-	-
Arc duration	ms	9,2	9,2	4,7
Opening time	ms	-		
Break time	ms	-	-	-

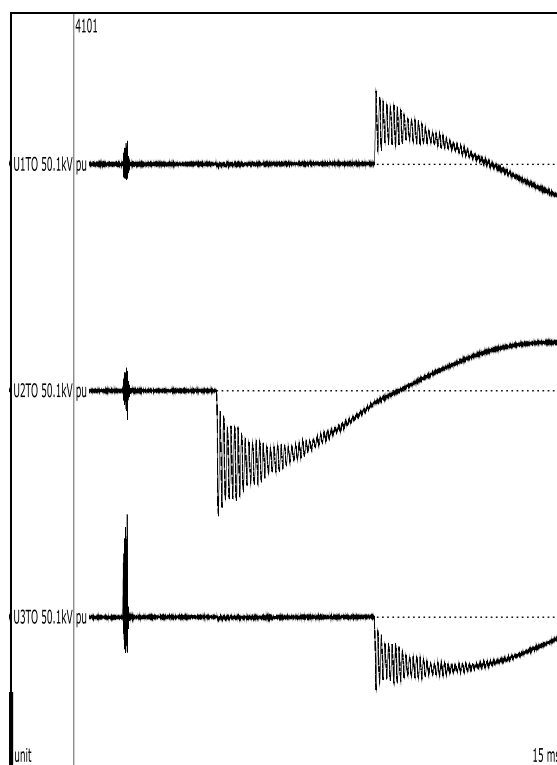


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

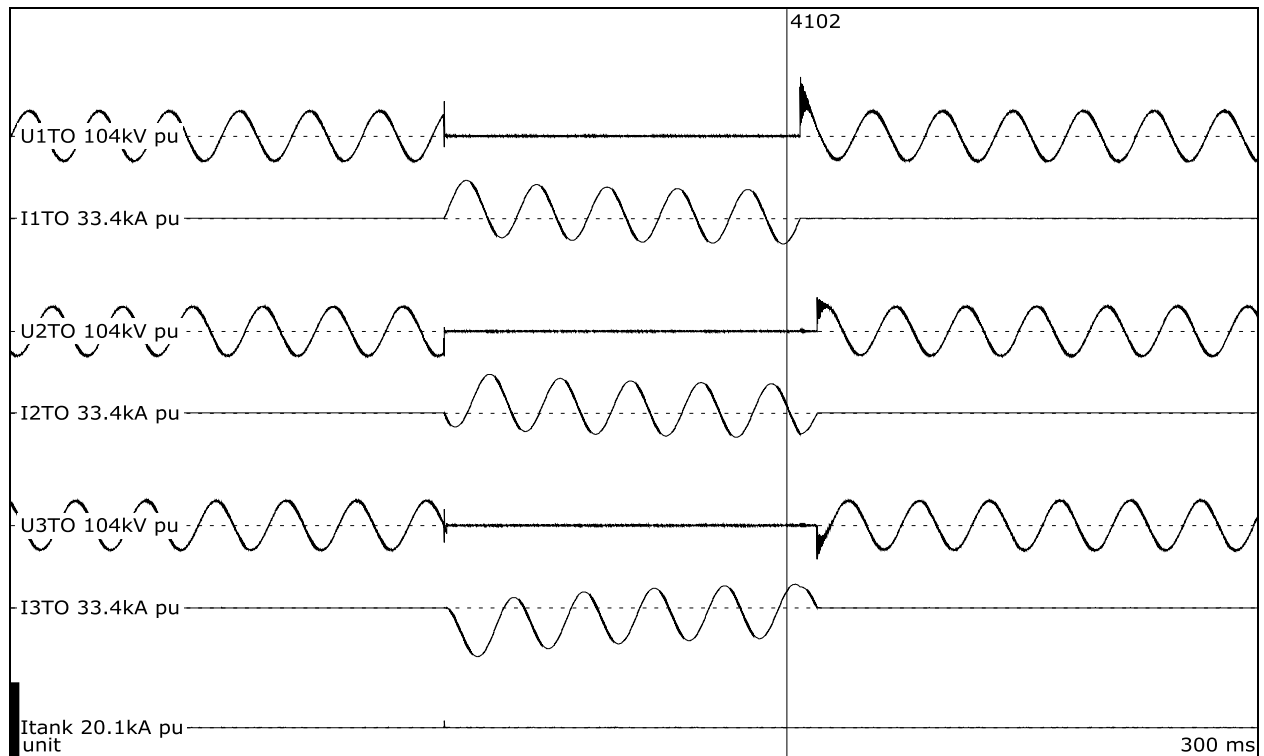
**T50****Test number: 160330-4101**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		A	B	C
Applied voltage, phase value	kV	23,5	23,2	24,0
Applied voltage, between phases	kV	40,8		
Making current, peak	kA	20,5	-20,9	-12,3
Breaking current, phase value	kA	8,44	8,45	8,37
Average current, three phase	kA	8,42		
Breaking current, DC-component	%	10	10	0
Recovery voltage, phase value	kV	24,1	23,1	23,9
Recovery voltage, between phases	kV	41,1		
TRV, peak	kV	48,3	-83,0	-48,2
Make time	ms	-	-	-
Arc duration	ms	8,2	3,9	8,2
Opening time	ms	-		
Break time	ms	-	-	-

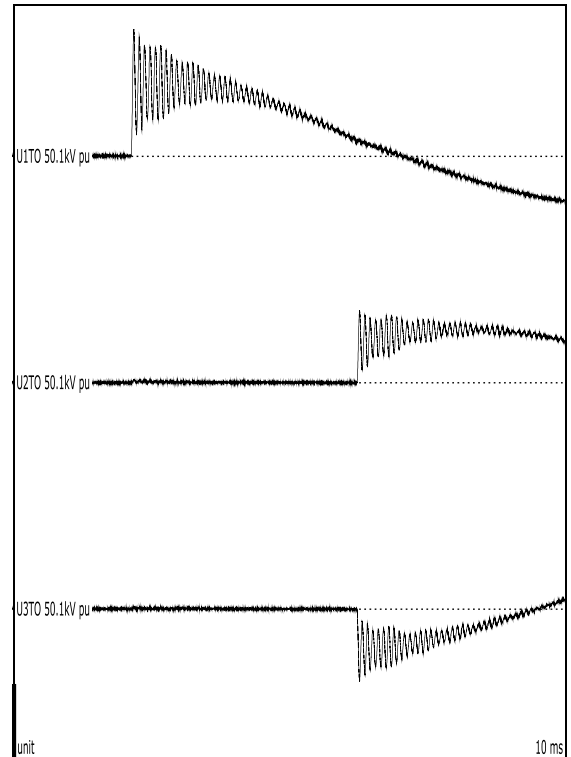


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

**T50****Test number: 160330-4102**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	24,6	24,3	24,3
Applied voltage, between phases	kV	42,2		
Making current, peak	kA	17,0	17,3	-21,9
Breaking current, phase value	kA	8,52	8,55	8,49
Average current, three phase	kA	8,52		
Breaking current, DC-component	%	5	7	12
Recovery voltage, phase value	kV	23,6	24,1	23,9
Recovery voltage, between phases	kV	41,4		
TRV, peak	kV	84,0	47,9	-47,9
Make time	ms	-	-	-
Arc duration	ms	3,2	7,3	7,3
Opening time	ms	-		
Break time	ms	-	-	-



Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

## 10 T20

### Standard and date

Standard IEC 62271-111 / IEEE C37.60

Test date(s) 31 March 2016

### 10.1 Condition before test

Recloser in same condition.

Controller cubicle in same condition.

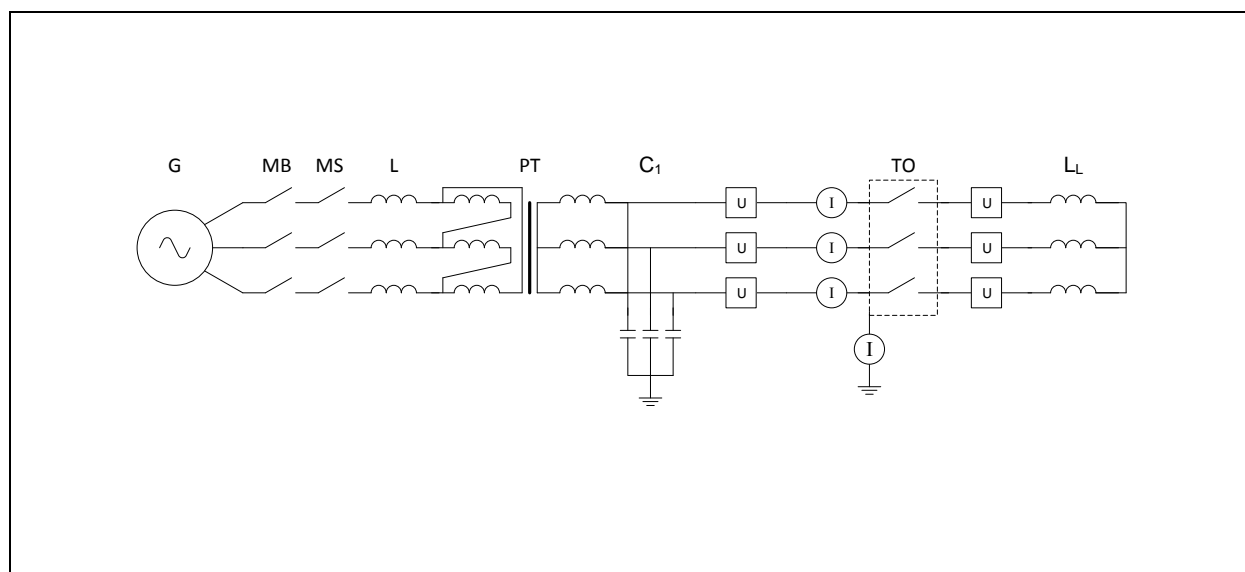
Protection relay in same condition.

Supply to fixed contacts.

Load on moving contacts.

Frame earthed via an earth fault current indicating CT.

## 10.2 Test circuit S04



G	= Generator	TO	= Test Object	U	= Voltage Measurement to earth
MB	= Master Breaker	L	= Reactor	I	= Current Measurement
MS	= Make Switch	R	= Resistor		
PT	= Power Transformer	C	= Capacitor		

Supply		
Power	MVA	701
Frequency	Hz	60
Phase(s)		3
Voltage	kV	40,5
Current	kA	10
Impedance	$\Omega$	2,34
Power factor		< 0,1
Neutral		not earthed

TRV control elements added (supply)		
C <sub>1</sub>	$\mu\text{F}$	0,008

Prospective TRV across TO		
u <sub>c</sub>	kV	87,8
t <sub>3</sub>	$\mu\text{s}$	25
t <sub>d</sub>	$\mu\text{s}$	< 3
RRRV	kV/ $\mu\text{s}$	3,51

Load		
Impedance	$\Omega$	6
Power factor		< 0,1
Neutral		not earthed

Inductive load element (L <sub>L</sub> )		
X <sub>L</sub>	$\Omega$	6,3

Remarks: -



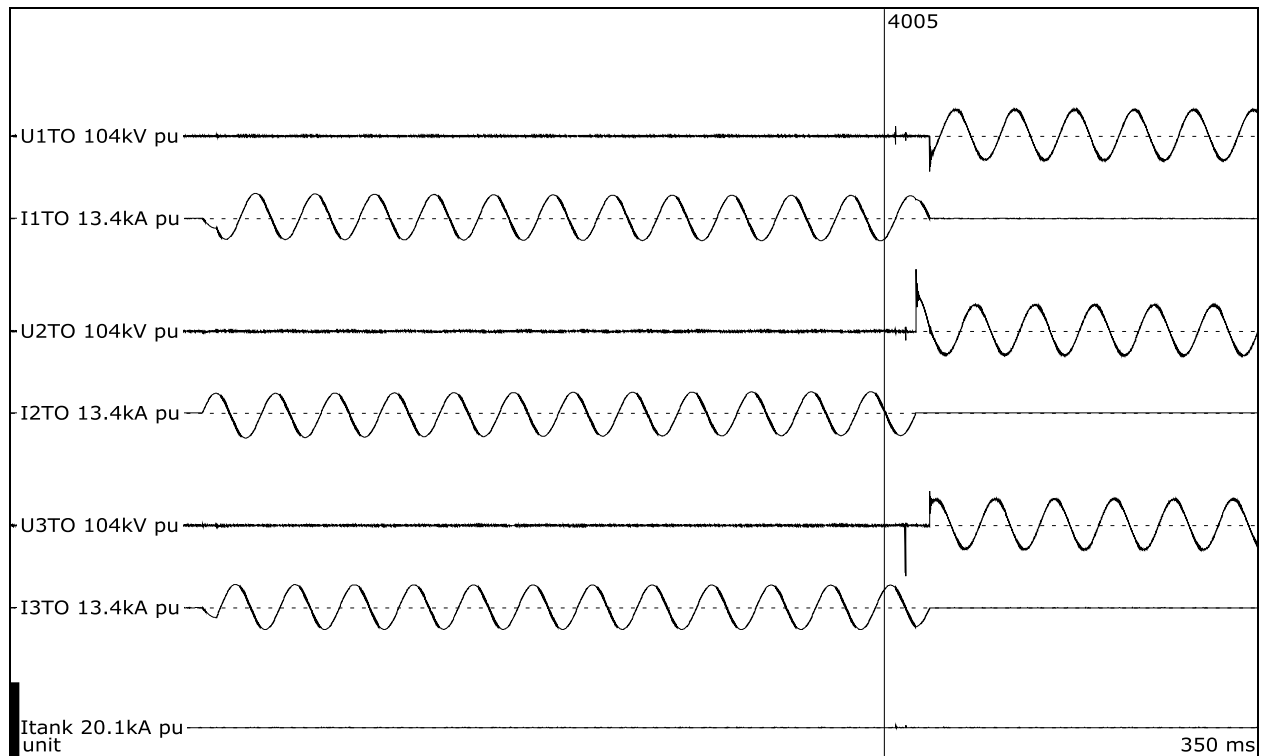
## 10.3 Test results and oscillograms

### Overview of test numbers

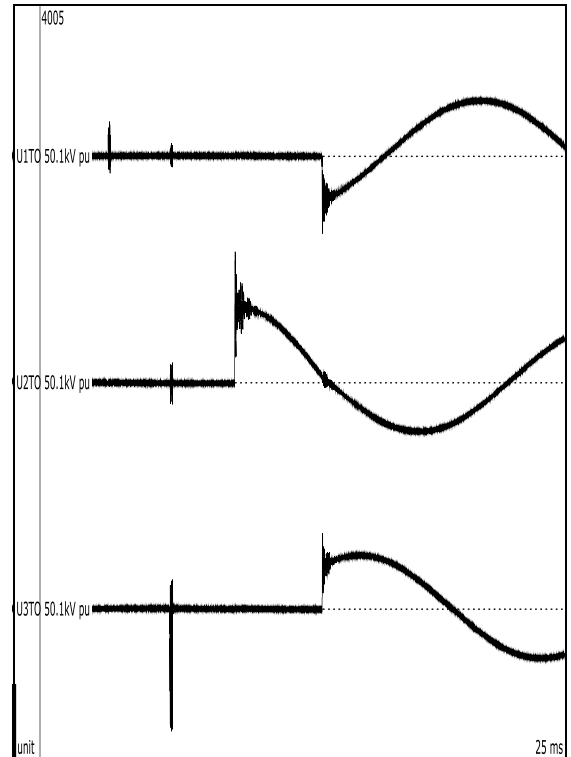
160331-4005 to 4037

### Remarks

Test 160331-4005: prospective current and TRV on auxiliary breaker.

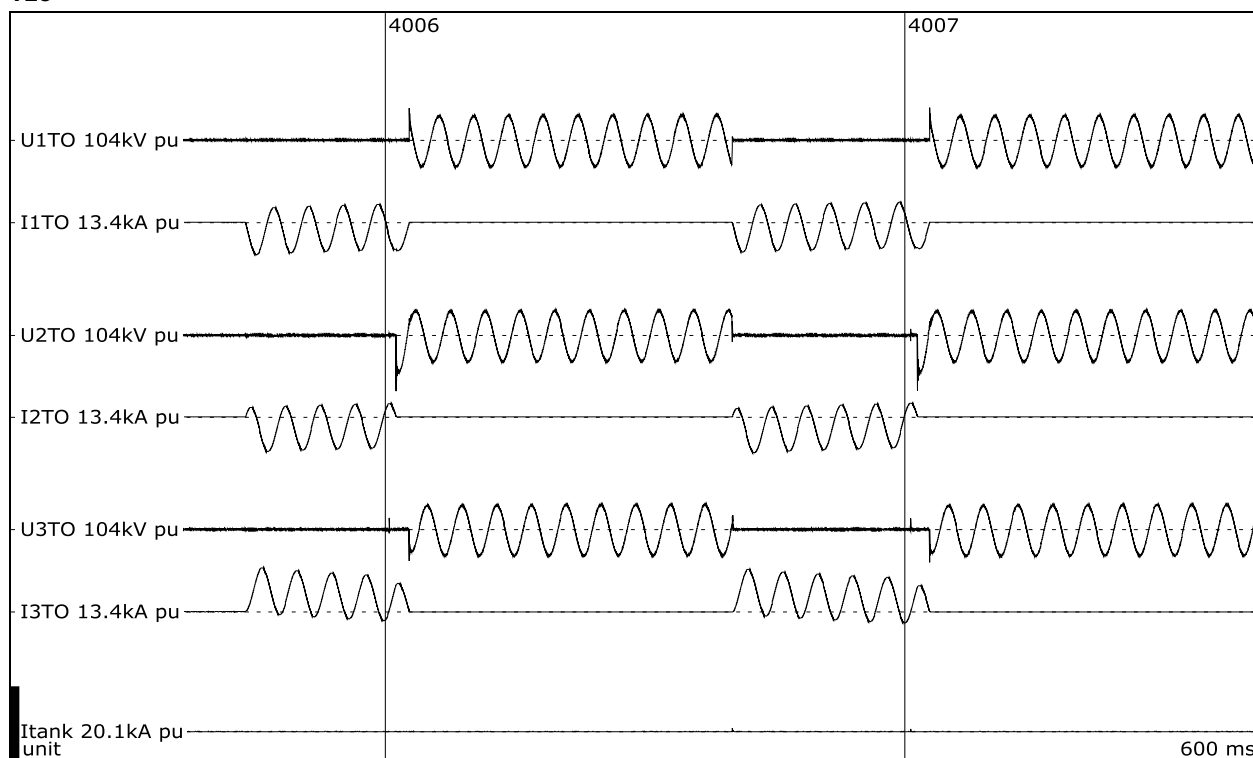
**T20****Test number: 160331-4005**

Time interval since previous test	min	-		
Operation		O		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Breaking current, phase value	kA	2,87	2,77	2,80
Average current, three phase	kA	2,81		
Breaking current, DC-component	%	1	3	1
Recovery voltage, phase value	kV	24,6	24,4	24,6
Recovery voltage, between phases	kV	42,5		
TRV, peak	kV	-51,4	87,9	50,4
Arc duration	ms	12,8	8,9	12,8
Opening time	ms	-		
Break time	ms	-	-	-

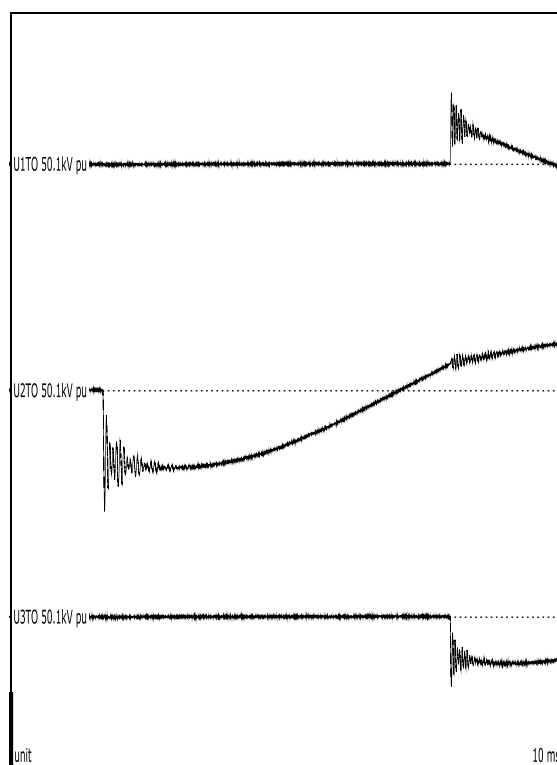


Voltage opening coil	- Vd.c.	Gas pressure at 20 °C	- MPa
		Operating pressure	- MPa

Remarks: Tests to prove the prospective current and TRV.  
Test performed on an auxiliary breaker of the test plant.

**T20****Test number: 160331-4006**

Time interval since previous test	min	-		
Operation		O		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Breaking current, phase value	kA	2,88	2,79	2,82
Average current, three phase	kA	2,83		
Breaking current, DC-component	%	20	39	59
Recovery voltage, phase value	kV	24,9	25,3	24,8
Recovery voltage, between phases	kV	43,3		
TRV, peak	kV	47,1	-80,4	-46,6
Arc duration	ms	11,5	5,3	11,5
Opening time	ms	-		
Break time	ms	-	-	-



Voltage opening coil - Vd.c.

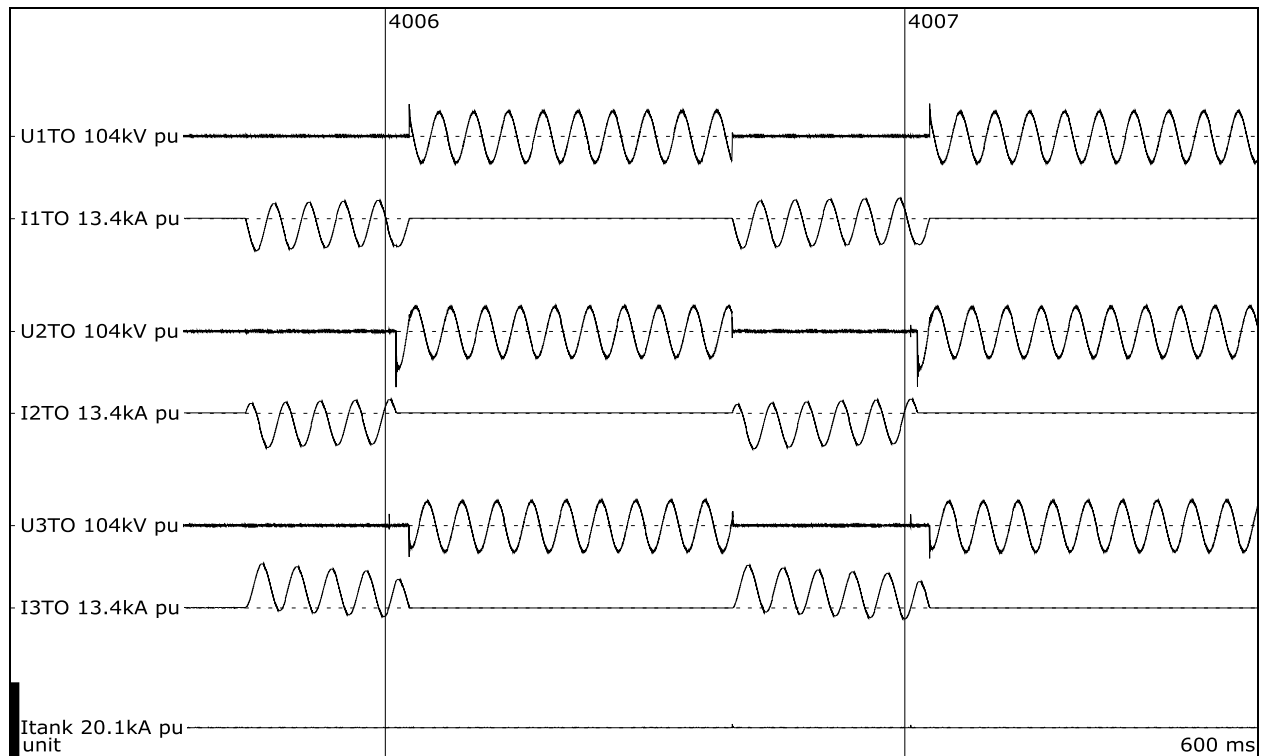
Gas pressure at 20 °C

- MPa

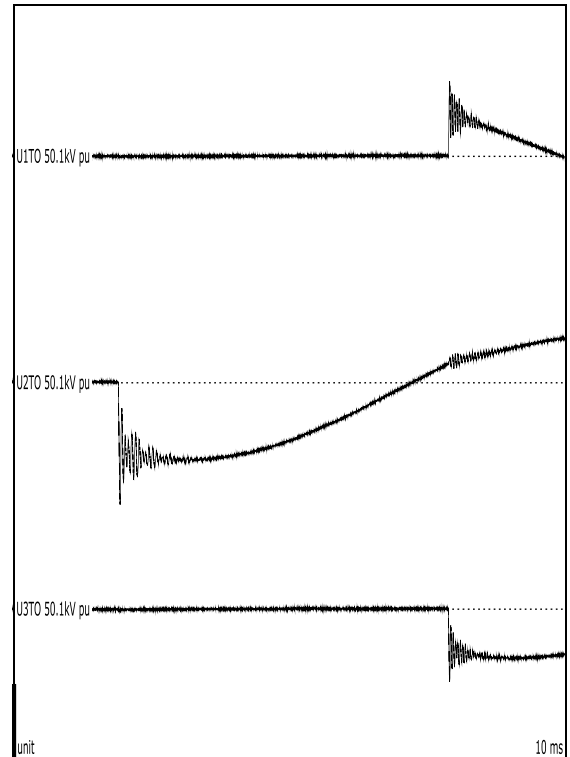
Operating pressure

- MPa

Remarks: Recloser cleared.

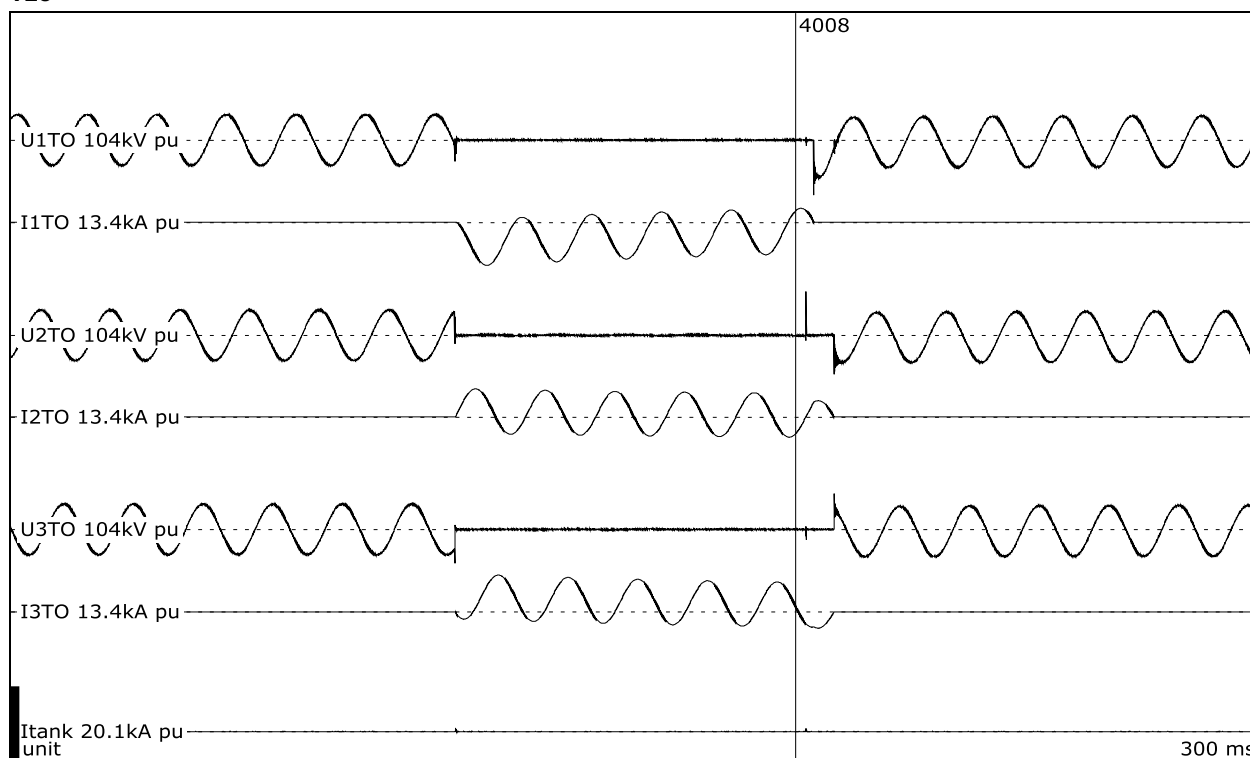
**T20****Test number: 160331-4007**

Time interval since previous test	min	-		
Time interval between operations	s	0,155		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	25,1	25,0	24,9
Applied voltage, between phases	kV	43,3		
Making current, peak	kA	-5,29	-6,37	7,56
Breaking current, phase value	kA	2,89	2,80	2,84
Average current, three phase	kA	2,84		
Breaking current, DC-component	%	12	38	49
Recovery voltage, phase value	kV	24,9	25,7	24,9
Recovery voltage, between phases	kV	43,6		
TRV, peak	kV	49,2	-81,2	-48,5
Make time	ms	-	-	-
Arc duration	ms	11,9	6,0	11,9
Opening time	ms	-		
Break time	ms	-	-	-

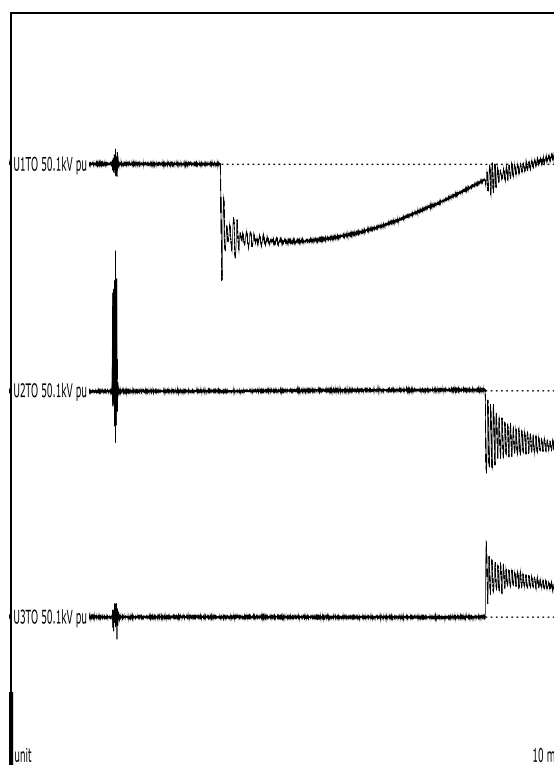


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

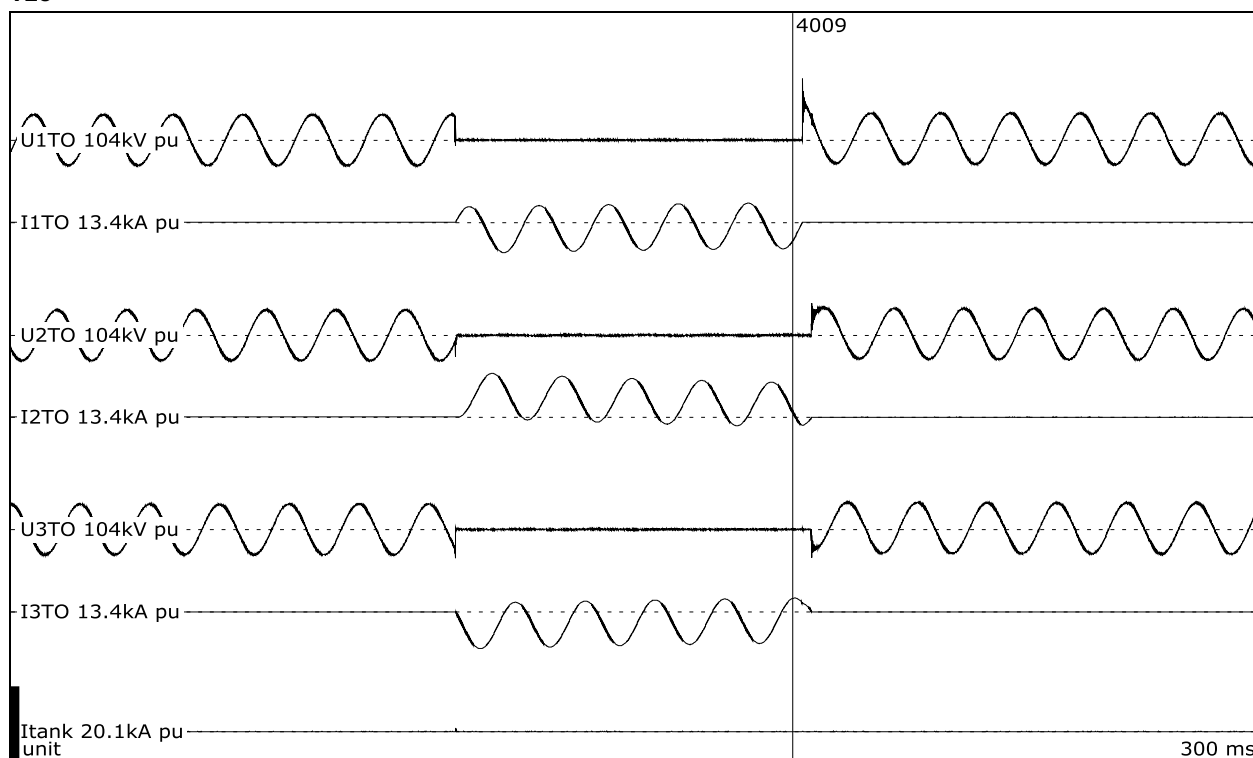
**T20****Test number: 160331-4008**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		A	B	C
Applied voltage, phase value	kV	25,0	24,8	24,9
Applied voltage, between phases	kV	43,1		
Making current, peak	kA	-7,68	5,03	6,53
Breaking current, phase value	kA	2,89	2,79	2,83
Average current, three phase	kA	2,83		
Breaking current, DC-component	%	38	8	31
Recovery voltage, phase value	kV	25,0	24,8	25,0
Recovery voltage, between phases	kV	43,2		
TRV, peak	kV	-77,1	-55,2	49,9
Make time	ms	-	-	-
Arc duration	ms	4,4	9,2	9,2
Opening time	ms	-		
Break time	ms	-	-	-

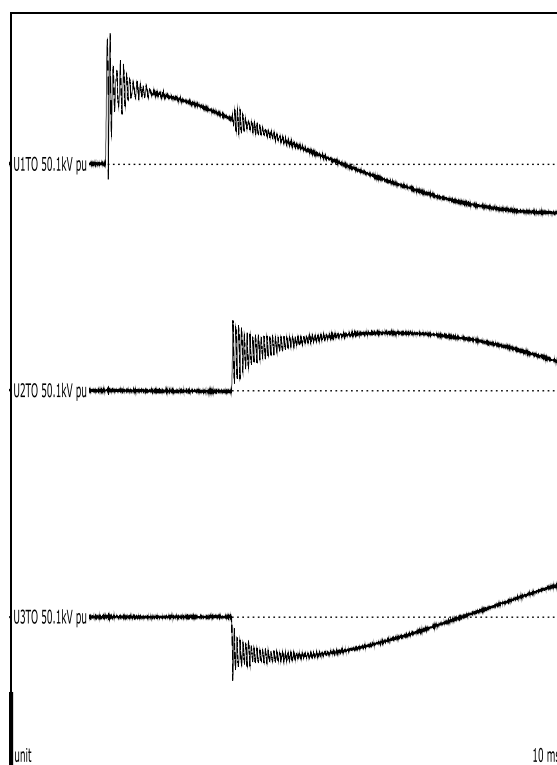


Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.

**T20****Test number: 160331-4009**

Time interval since previous test	min	-		
Time interval between operations	s	1,06		
Operation		CO		
Phase		<b>A</b>	<b>B</b>	<b>C</b>
Applied voltage, phase value	kV	25,1	24,9	25,1
Applied voltage, between phases	kV	43,3		
Making current, peak	kA	-5,40	7,79	-6,60
Breaking current, phase value	kA	2,91	2,81	2,84
Average current, three phase	kA	2,85		
Breaking current, DC-component	%	14	55	39
Recovery voltage, phase value	kV	25,1	24,8	24,9
Recovery voltage, between phases	kV	43,2		
TRV, peak	kV	86,5	46,9	-42,1
Make time	ms	-	-	-
Arc duration	ms	2,3	4,6	4,6
Opening time	ms	-		
Break time	ms	-	-	-



Voltage closing coil	- Vd.c.	Gas pressure at 20 °C	- MPa
Voltage opening coil	- Vd.c.	Operating pressure	- MPa

Remarks: Recloser closed and cleared.