

Circuit breaker
Mechanism:

LTB123D1/B
FSA1

Order No: KD0001445/1
Serial No: 1HSB02045073

Customer
ABB POWER GRIDS DENMARK A/S

Customer reference
6500001132

Country
DENMARK

Standard
IEC 62271-100

Test completed
2020-12-11

	<i>Serial number</i>	<i>ABB reference</i>	<i>Project</i>
<i>Circuit breaker</i> LTB123D1/B	1HSB02045073	KD0001445/1	K10018754
<i>Mechanism</i> FSA1	1HSB02045073-B1	KD0001445/1	K10018754

We hereby certify that the above objects have passed all routine tests in accordance with the standard referred to in above and with the terms of the contract.

ABB AB
High Voltage Products/Circuit Breakers
Quality



Date: 2020-12-11

Tobias Pettersson

Test witnessed by

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.....

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ABB AB

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Rated data

Rated filling pressure for operation: 0,70 MPa(abs)

Check of rating plates

Approved: Q34

MECHANISM RESULTS

Resistance in ohms of auxiliary circuits

Description	Mechanism No. 1HSB02045073-B1	Mechanism No.	Mechanism No.
Closing coil 1	25	-	-
Opening coil 1	24	-	-
Opening coil 2	24	-	-
Antipumping relay 1	8390	-	-
Extra relay 1	8400	-	-
Density blocking relay 1	8560	-	-
Density blocking relay 2	8320	-	-
Heater anticondense	700	-	-
Heater total	237	-	-

All resistances checked

Approved Q34

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Check of

Approved

Wiring acc. To circuit diagram	Q34
Local/remote operation	Q34
Blocking relays	Q34
Antipumping relays	Q34
Extra relays	Q34
On-line-motor starter does not trip for 10 consecutive operations	Q34
Auxiliary contacts	Q34
Thermostat settings	Q34
Counter	Q34
All adjustments and paint marking	Q34

Settings

Description	Unit	Mech. 1	Mech. 2	Mech. 3
Thermostat	°C	10,0	-	-
Close spring setting	mm	55	-	-
Trip spring setting	mm	74,0	-	-
Damp device Open	mm	7,0	-	-

Approved: Q34

Spring charge at nominal voltage

Description	Unit	Mech. 1	Mech. 2	Mech. 3
Charging time	s	9	-	-
Motor current	A	3,8	-	-

Approved: Q34

Lowest operating voltage

Description	Unit	Mech. 1	Mech. 2	Mech. 3
Close coil 1	VDC	45	-	-
Trip coil 1	VDC	63	-	-
Trip coil 2	VDC	63	-	-

Approved: Q34

Power frequency test of auxiliary circuits

1 second 50 Hz 1,0 kV
- second 50 Hz - kV, motor

Approved: Q34
Approved: -

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POLE RESULTS

Resistance in main circuit

Phase	Unit	Part 1	Part 2	Part 3	Part 4
A	μOhm	38			
B	μOhm	38			
C	μOhm	38			

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Power frequency test performed at 0,60 MPa(abs)

60 seconds 50 Hz across open switching device: 275 kV

60 seconds 50 Hz to earth: 275 / kV

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Approved: Q34

Overpressure test on each pole

10 minutes duration 1,15 MPa(abs)

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Tightness test on each pole

Approved: Q34

OPERATING TEST

Test assumptions

Technical provision: 1HSB425452-41 REV.M

Conversion table: CSB0_1

Fill pressure: 0,70 MPa(abs)

Operations	Voltage level	Motor VAC	Close 1 VDC	Close 2 VDC	Trip 1 VDC	Trip 2 VDC	Trip 3 VDC
5 Close and Open	Min	196	94		77	77	
5 Close and Open	Max	253	121		121	121	
5 Close and Open	Nom	230	110		110	110	
5 Close-Open	Nom	230	110		110	110	
5 Open-0.3s-Close	Nom	230	110		110	110	

Operating test

At least 25 operations as above

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Test Samples

Oper.	Oper. No.	Volt Level	Cc	Tc	Operation times pole			Cont. stroke	Cont. speed 1	Cont. speed 2	Over travel	Re-bounce	Damp time	Time difference	
					A	B	C							a	b
					ms	ms	ms	mm	m/s	m/s	mm	mm	ms	ms	ms
Close	5	Min.	1	-	69,9	71,0	70,3	85,4	1,6		6,4	0,6		12,4	-23,2
Open	6	Min.	-	1	46,8	47,1	47,7	85,4	2,3		2,8	0,3	22,2	-18,6	14,3
Close	15	Max.	1	-	66,9	68,0	67,4	85,5	1,6		6,5	0,7		12,1	-22,5
Open	16	Max.	-	1	40,5	40,7	41,3	85,4	2,3		2,8	0,4	22,2	-18,6	12,2
Close	25	Nom.	1	-	67,7	68,9	68,2	85,5	1,6		6,4	0,7		12,6	-23,0
Open	26	Nom.	-	1	41,6	41,8	42,5	85,4	2,3		2,8	0,4	22,1	-18,6	13,9
Open	41	Nom.	-	2	41,3	41,6	42,1	85,4	2,3		2,8	0,4	22,2	-18,1	14,8

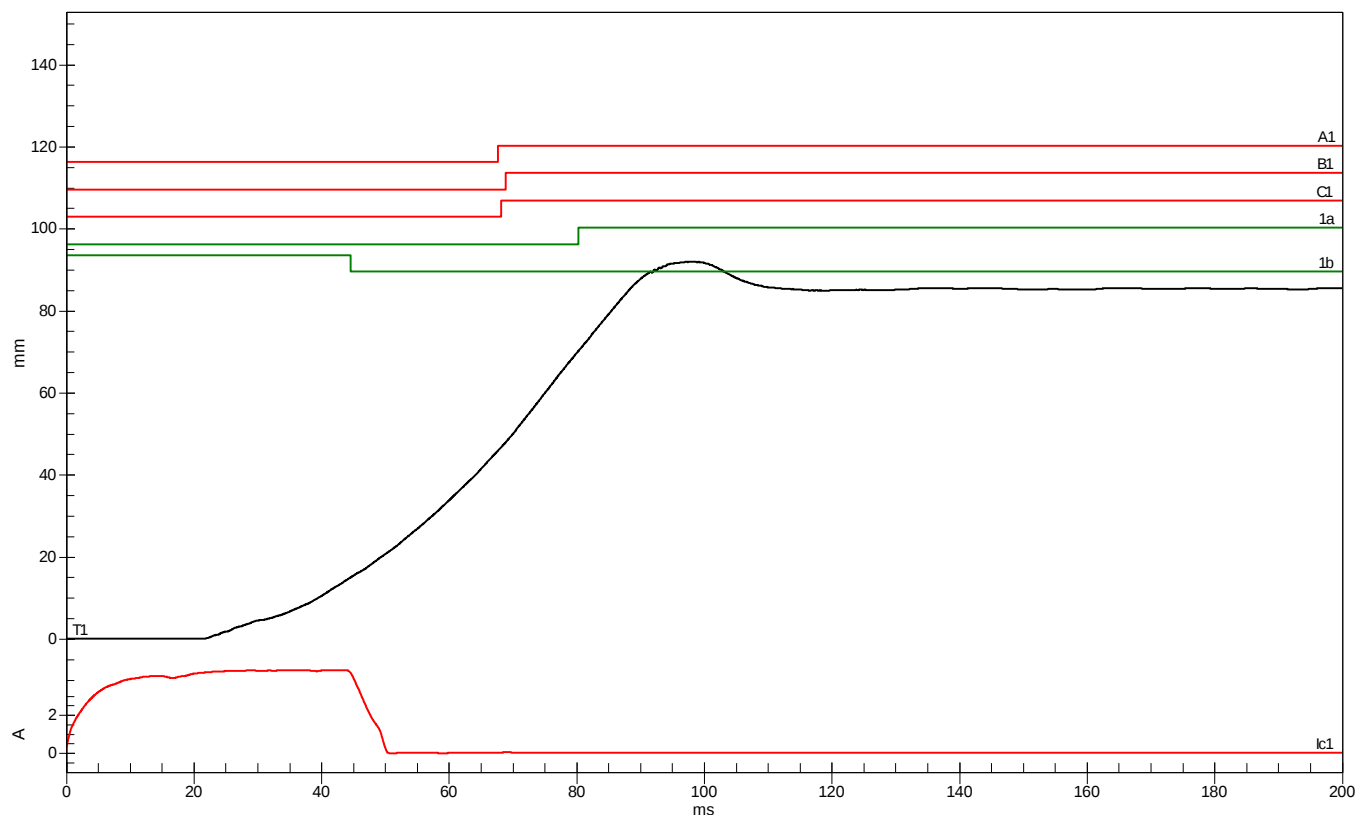
Oper.	Oper. No.	Volt Level	Cc	Tc	Interval times 1 pole			Interval times 2 pole			Time difference	
					A	B	C	A	B	C	a	b
					ms	ms	ms	ms	ms	ms	ms	ms
C-O	31	Nom.	1	1	58,3	57,5	59,1				12,3	-23,3
O-C-O	37	Nom.	1	1	276,5	277,2	276,1	58,7	57,8	59,2	-18,1	12,6

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Main Test sequence: Close Nom. Operation No 25



Operation data

Motor	Close coil 1	Trip coil -
230 VAC	110 VDC	-

Contact times in ms

Main	Contact time	Close/Open interval		Close/Open interval
A1	67,7	(0,0 - 75,0)		
B1	68,9	(0,0 - 75,0)		
C1	68,2	(0,0 - 75,0)		
Aux.	Contact time	Close/Open	Close/Open	Aux-Main
1a	80,3			12,6
1b	44,7			-23,0

Travel parameters

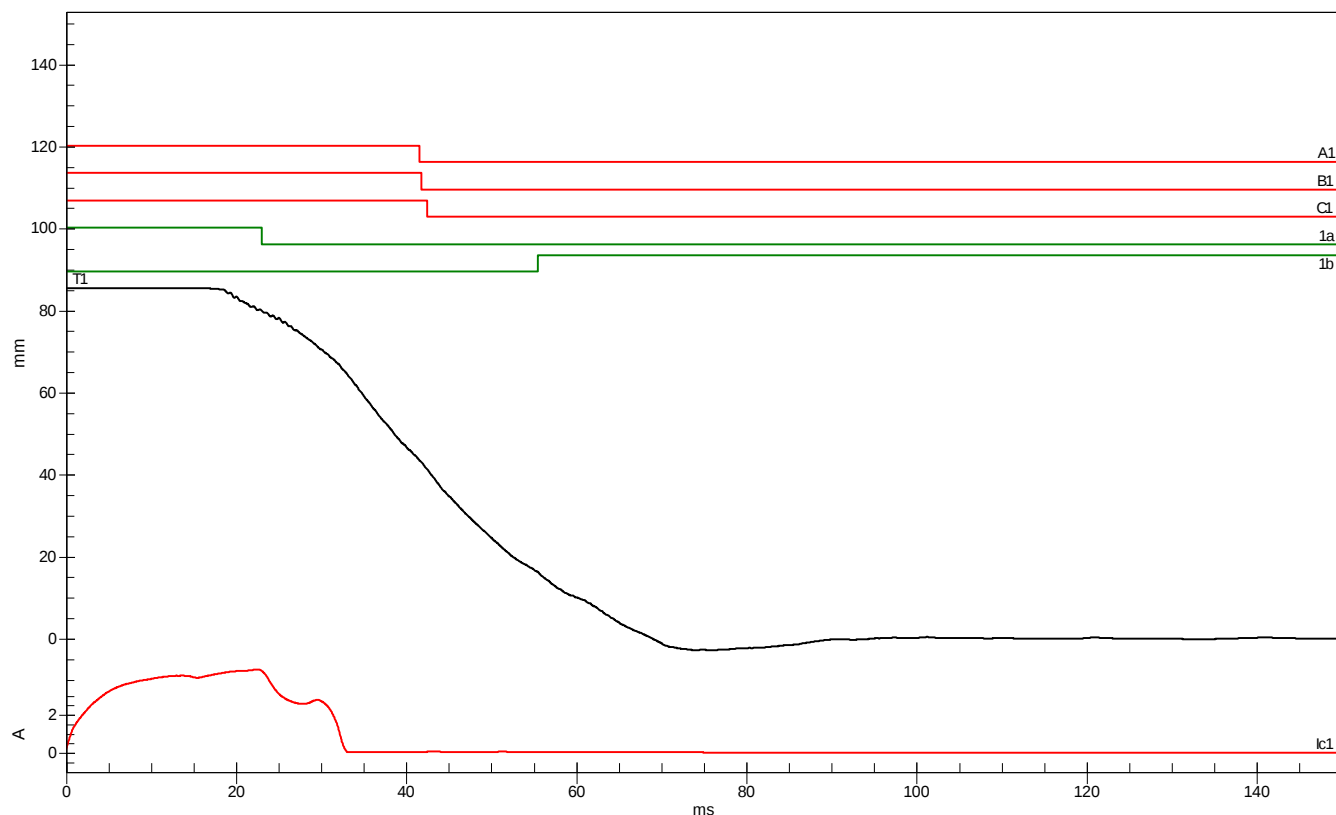
Description	Unit	T1		Limits
Travel speed 1	m/s	1,6		(1,5 - 1,8)
Contact Stroke	mm	85,5		(84,0 - 87,0)
OverTravel	mm	6,4		(0,0 - 9,0)
Rebounce	mm	0,7		

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Main Test sequence: Open Nom. Operation No 26



Operation data

Motor	Close coil -	Trip coil 1
230 VAC	-	110 VDC

Contact times in ms

Main	Contact time	Close/Open interval	Close/Open interval
A1	41,6 (35,0 - 45,0)		
B1	41,8 (35,0 - 45,0)		
C1	42,5 (35,0 - 45,0)		
Aux.	Contact time	Close/Open	Close/Open
1a	23,0		-18,6
1b	55,5		13,9

Travel parameters

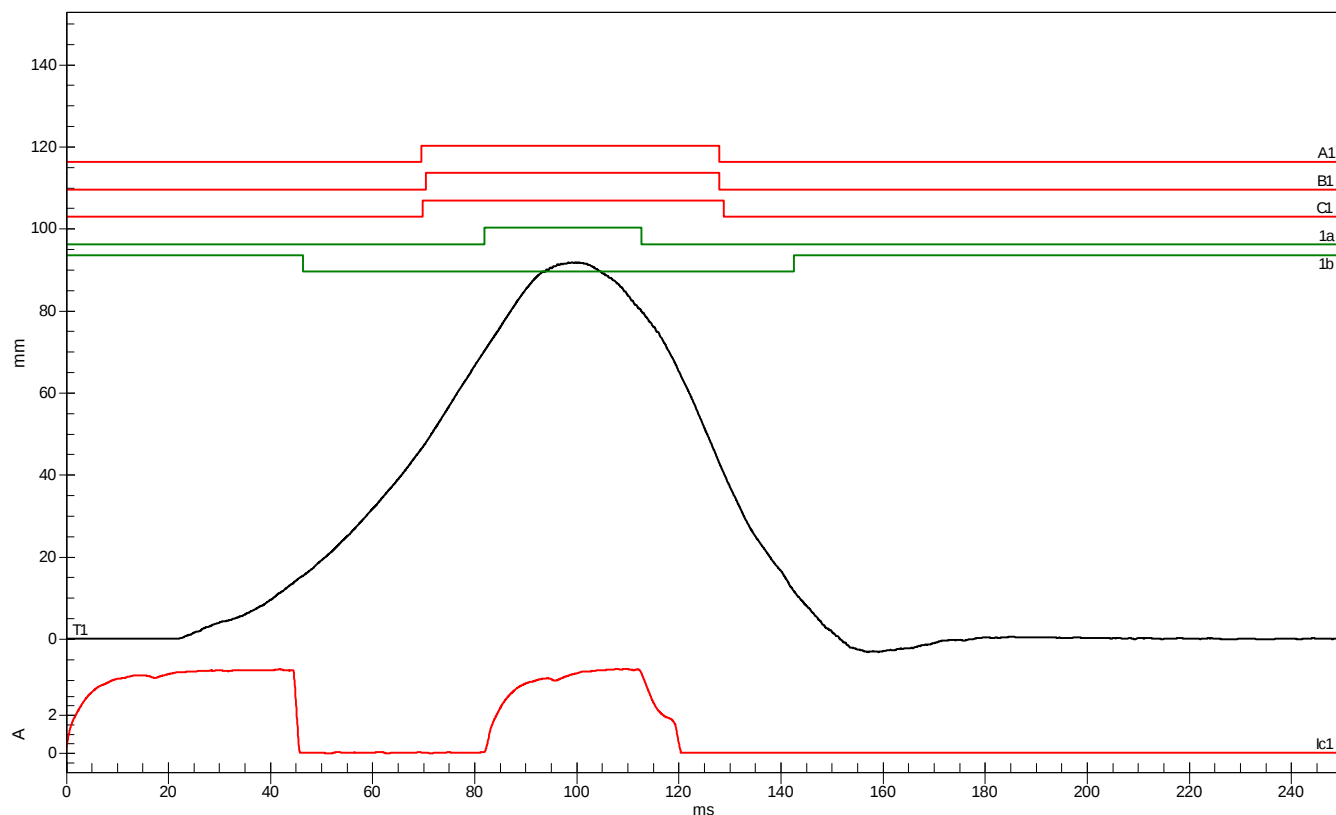
Description	Unit	T1		Limits
Travel speed 1	m/s	2,3		(2,2 - 2,5)
Contact Stroke	mm	85,4		(84,0 - 87,0)
OverTravel	mm	2,8		(0,0 - 7,0)
Rebounce	mm	0,4		
Damping time	ms	22,1		(15,0 - 25,0)

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Main Test sequence: Close-Open Nom. Operation No 31



Operation data

Motor	Close coil 1	Trip coil 1
230 VAC	110 VDC	110 VDC

Contact times in ms

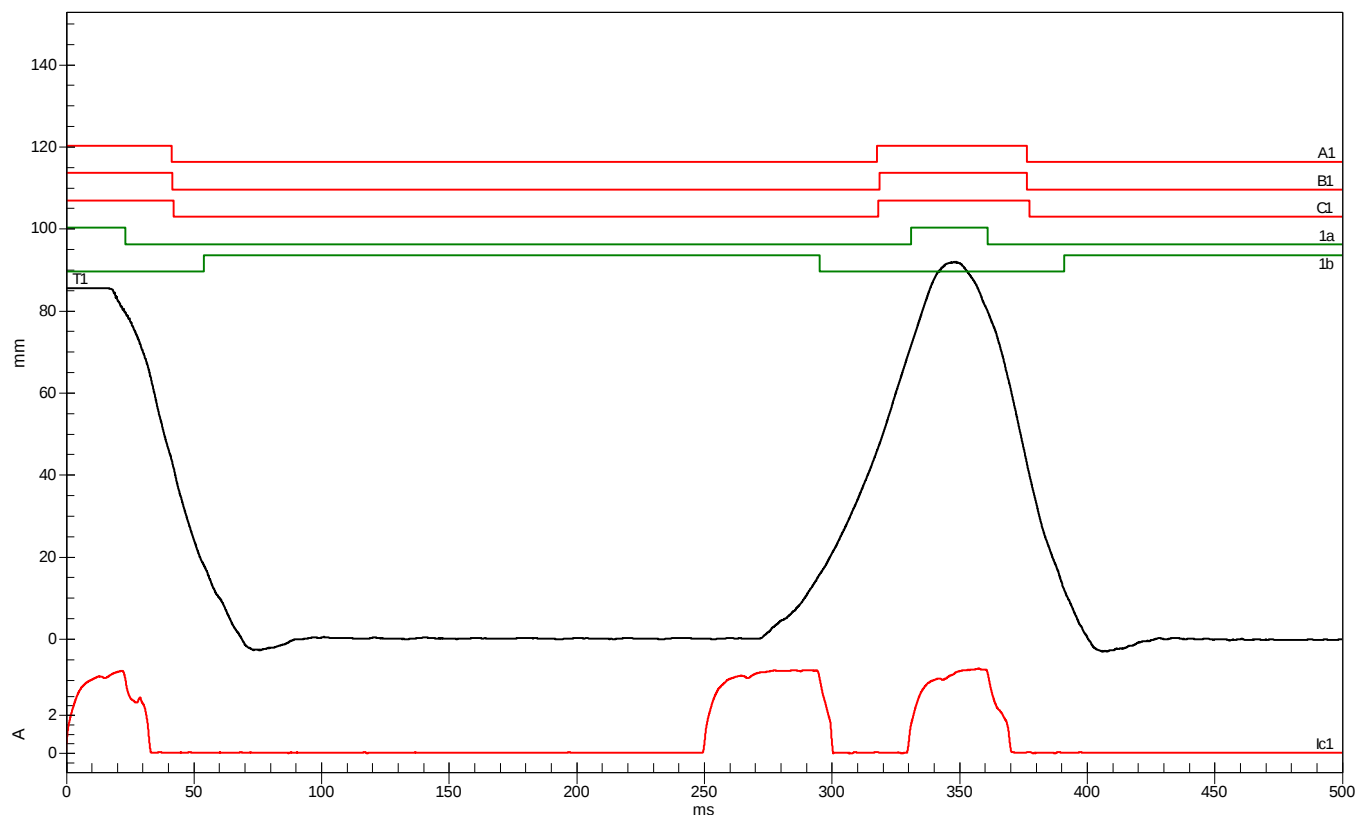
Main	Contact time	Close/Open interval		Close/Open interval
A1	69,7 (0,0 - 75,0)	58,3	(0,0 - 70,0)	
B1	70,6 (0,0 - 75,0)	57,5	(0,0 - 70,0)	
C1	69,9 (0,0 - 75,0)	59,1	(0,0 - 70,0)	
Aux.	Contact time	Close/Open	Close/Open	Aux-Main
1a	82,0	30,8		12,3
1b	46,4	96,2		-23,3

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Main Test sequence: Open-0.3s-Close-Open Nom. Operation No 37



Operation data

Motor	Close coil 1	Trip coil 1
230 VAC	110 VDC	110 VDC

Contact times in ms

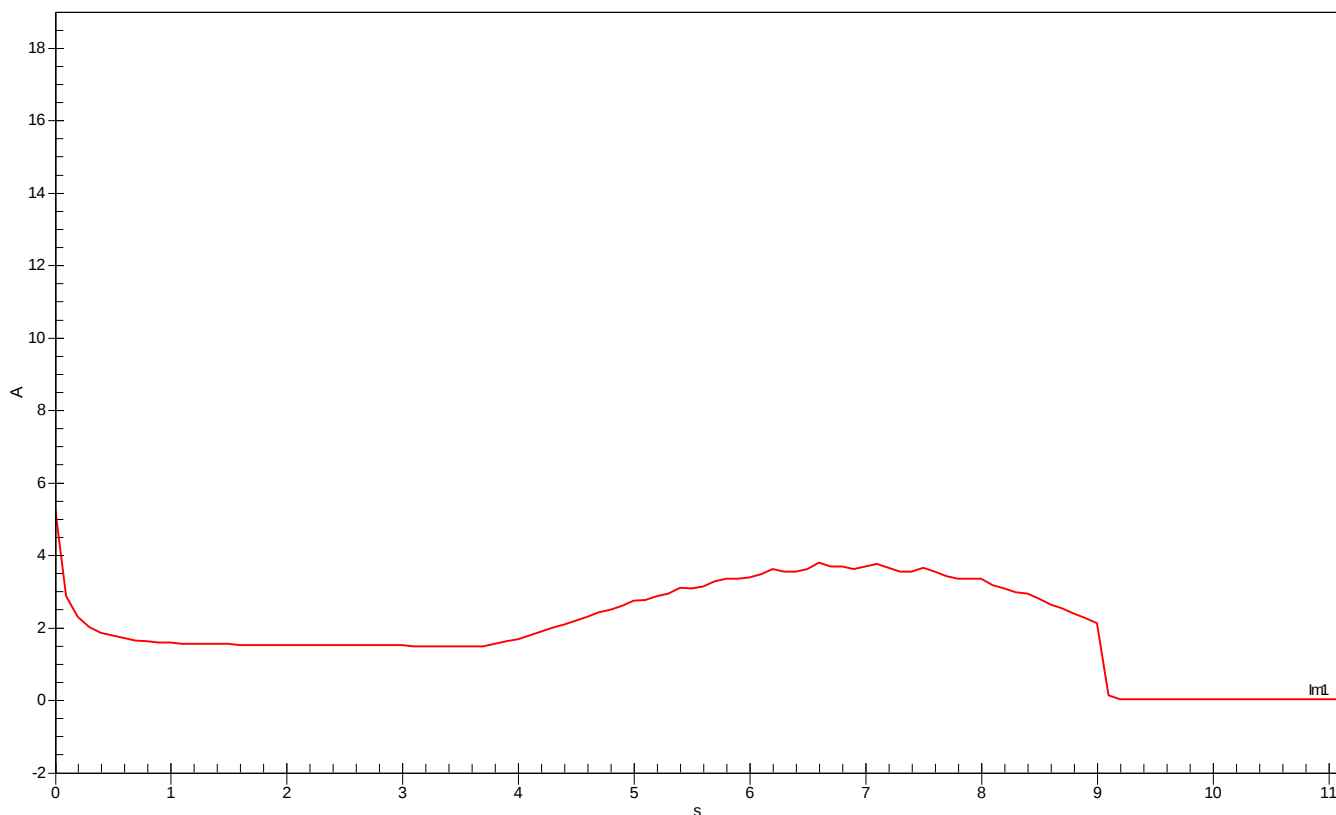
Main	Contact time	Close/Open interval		Close/Open interval
A1	41,5 (35,0 - 45,0)	276,5	58,7	(0,0 - 70,0)
B1	41,7 (35,0 - 45,0)	277,2	57,8	(0,0 - 70,0)
C1	42,3 (35,0 - 45,0)	276,1	59,2	(0,0 - 70,0)
Aux.	Contact time	Close/Open	Close/Open	Aux-Main
1a	23,4	307,8	30,1	-18,1
1b	54,1	241,4	95,8	12,6

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Free Test: Spring charge Nom. Mechanism No 1 Operation No 1



Operation data

Motor	Close coil 1	Trip coil -
230 VAC	110 VDC	-

Spring charge for mechanism 1

Description	Unit	Result	Limits
Charge current	A	3,8	
Charge time	s	9	(0 - 15)