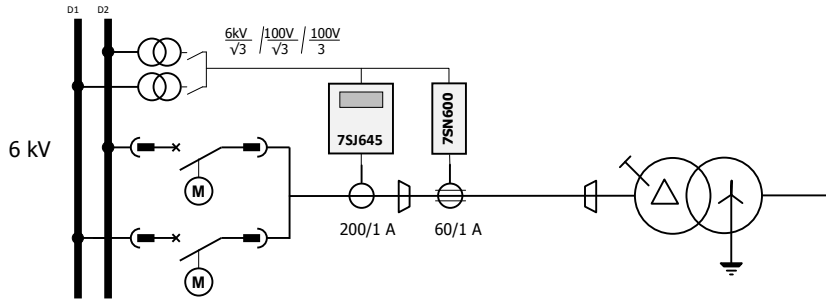


Switchgear: **STATION MIDDLE**  
 Panel: **SH012 -F31**  
 Description: **Transformator A | 6000/400 V**  
 Protection Device: **7SJ6452-5EB92-1FB0 +L0S** V4.92.03

**i** Corresponding Grading Diagram **Page 4**

**E** Data marked with this sign is estimated

**STATION MIDDLE**



**Transformer A**  
 $S_{nT} = 1.4 \text{ MVA}$   
 $U_{nT} = 6/0.4 \text{ kV}$   
 $U_k = 6.06 \%$   
 $U_r = 0.9 \%$   
 $I_{rT} = 135/2021 \text{ A}$

ADDRESS	SETTINGS NAME	SETTINGS RANGE	PRIMARY VALUES SECONDARY VALUES
<b>DEVICE CONFIGURATION</b>			
0103	Setting Group Change Option	Disabled Enabled	Disabled
0104	Oscillographic Fault Records	Disabled Enabled	Enabled
0112	DMT / IDMT Phase	Disabled Definite Time only Time Overcurrent Curve IEC Time Overcurrent Curve ANSI User Defined Pickup Curve User Defined Pickup and Reset Curve	Time Overcurrent Curve IEC
0113	DMT / IDMT Earth	Disabled Definite Time only Time Overcurrent Curve IEC Time Overcurrent Curve ANSI User Defined Pickup Curve User Defined Pickup and Reset Curve	Disabled
0127	DMT 1Phase	Disabled Enabled	Disabled
0117	Cold Load Pickup	Disabled Enabled	Disabled
0122	2nd Harmonic Inrush Restraint	Disabled Enabled	Enabled
0131	(sensitive) Earth fault	Disabled Definite Time only Time Overcurrent Curve IEC Time Overcurrent Curve ANSI User Defined Pickup Curve Logarithmic Inverse A Logarithmic Inverse B	Disabled
0130	(sens.) Earth fault dir. characteristic	$\cos \phi$ / $\sin \phi$ measurement (standard) U0/I0 phase angle measurement	$\cos \phi$ / $\sin \phi$ measurement (standard)
0134	Dir. Intermittent earth fault protection	Disabled Enabled	Disabled
0140	Unbalance Load (Negative Sequence)	Disabled Time Overcurrent Curve ANSI Time Overcurrent Curve IEC Definite Time only	Disabled
0142	Thermal Overload Protection	Disabled Without ambient temperature measurement With ambient temperature measurement	Disabled
0170	Breaker Failure Protection	Disabled Enabled enabled with 3I0>	Disabled
0172	Circuit Breaker Wear Monitoring	Disabled I <sub>x</sub> -Method 2P-Method I2t-Method	Disabled
0182	Trip Circuit Supervision	Disabled with 2 Binary Inputs with 1 Binary Input	Disabled
0190	External Temperature Input	Disabled Port C	Disabled
0191	Ext. Temperature Input Connection Type	6 RTD simplex operation 6 RTD half duplex operation 12 RTD half duplex operation	6 RTD simplex operation

ADDRESS	SETTINGS NAME	SETTINGS RANGE	PRIMARY VALUES SECONDARY VALUES
<b>POWER SYSTEM DATA 1</b>			
0214	Rated Frequency	50 Hz 60 Hz	50 Hz
0209	Phase Sequence	L1 L2 L3 L1 L3 L2	L1 L2 L3
0276	Unit of temperature measurement	Degree Celsius Degree Fahrenheit	Degree Celsius
0201	CT Starpoint	towards Line towards Busbar	towards Busbar
0280	Holmgreen-conn. (for fast sum-i-monit.)	NO YES	NO
0251A	CT Connection	IL1, IL2, IL3, (IE) IL1, IE2, IL3, IE; IL2 calc. with IE IL1, IE2, IL3, IE; IL2 calc. with IE2	IL1, IL2, IL3, (IE)
0213	VT Connection, three-phase	U1E, U2E, U3E U12, U23, UE U12, U23, Ux U1E, U2E, U3E, UE U1E, U2E, U3E, USYN U1E, U2E, U3E, Ux	U1E, U2E, U3E, UE
0240	VT Connection, single-phase	NO U1E U2E U3E U12 U23 U31	NO
0235A	Storage of th. Replicas w/o Power Supply	NO YES	NO
0250A	Time Overcurrent with 2 phase prot.	ON OFF	<b>OFF</b>
0281A	Change switch.authority via binary input	NO YES	NO
0282A	Interlocking on or off via binary input	NO YES	NO
0204	CT Rated Primary Current	10...50000 A;	200 A
0205	CT Rated Secondary Current	1A 5A	1A
0217	IE-CT rated primary current	1...50000 A;	60 A
0218	IE-CT rated secondary current	1A	1A
0202	Rated Primary Voltage	0.10...800.00 kV;	6.00 kV
0203	Rated Secondary Voltage (L-L)	100...225 V;	100 V
0206A	Matching ratio Phase-VT To Open-Delta-VT	0.10...3.00	1.73
0210A	Minimum TRIP Command Duration	0.01...32.00 sec;	0.50 sec
0211A	Maximum Close Command Duration	0.01...32.00 sec;	1.00 sec
0212	Closed Breaker Min. Current Threshold	0.04...1.00 A;	0.04 A

8 A

Switchgear: **STATION MIDDLE**  
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 Protection Device: **7SJ6452-5EB92-1FB0 +LOS** V4.92.03



Corresponding Grading Diagram **Page 4**



Data marked with this sign is estimated

ADDRESS	SETTINGS NAME	SETTINGS RANGE	PRIMARY VALUES SECONDARY VALUES
<b>SETTING GROUP A</b>			
<b>POWER SYSTEM DATA 2</b>			
1101	Measurement: Full Scale Voltage (100%)	0.10...800.00 kV;	6.00 kV
1102	Measurement: Full Scale Current (100%)	10...50000 A;	135 A
1108	P,Q operational measured values sign	not reversed reversed	not reversed
<b>DMT / IDMT PHASE/EARTH OVERCURRENT 50/51</b>			
1201	Phase Time Overcurrent	ON OFF	<b>ON</b>
1213A	Manual Close Mode	I>>> instantaneously I>> instantaneously I> instantaneously Ip instantaneously Inactive	Inactive
1215A	Dropout Time Delay DMT Phase	0.00...60.00 sec;	0.00 sec
2201	Inrush Restraint	OFF ON	<b>ON</b>
1219A	I>>> measurement of	Fundamental component True RMS Instantaneous values	Fundamental component
1216A	I>>> active	Always with Auto Redose active	Always
1217	I>>> Pickup	1.00...35.00 A; oo	oo A
1218	T I>>> Time Delay	0.00...60.00 sec; oo	oo sec
1220A	I>> measurement of	Fundamental component True RMS	Fundamental component
1214A	I>> active	Always with Auto Redose active	Always
1202	I>> Pickup	0.10...35.00 A; oo	14.00 A <span style="float:right">2800 A</span>
1203	T I>> Time Delay	0.00...60.00 sec; oo	0.01 sec
1221A	I> measurement of	Fundamental component True RMS	Fundamental component
1204	I> Pickup	0.10...35.00 A; oo	3.50 A <span style="float:right">700 A</span>
1205	T I> Time Delay	0.00...60.00 sec; oo	0.60 sec
1222A	Ip measurement of	Fundamental component True RMS	Fundamental component
1207	Ip Pickup	0.10...4.00 A;	0.81 A <span style="float:right">162 A</span>
1208	T Ip Time Dial	0.05...3.20 sec; oo	2.50 sec
1210	Drop-Out Characteristic	Instantaneous Disk Emulation	Disk Emulation
1211	IEC Curve	Normal Inverse Very Inverse Extremely Inverse Long Inverse	Extremely Inverse
1223	Voltage Influence	NO Voltage controlled Voltage restraint	NO
1224	U< Threshold for Release Ip	10.0...125.0 V;	75.0 V
2202	2nd. harmonic in % of fundamental	10...45%;	15 %
2203	Cross Block	NO YES	NO
2204	Cross Block Time	0.00...180.00 sec;	0.00 sec
2205	Maximum Current for Inrush Restraint	0.30...25.00 A;	11.20 A <span style="float:right">2240 A</span>

ADDRESS	SETTINGS NAME	SETTINGS RANGE	PRIMARY VALUES SECONDARY VALUES
<b>MEASUREMENT SUPERVISION</b>			
5301	Fuse Fail Monitor	OFF on (solid grounded power system) on (Peterson-Coil grounded / isolated)	<b>OFF</b>
5310	Block protection by FFM	NO YES	YES
8101	Measurement Supervision	OFF ON	<b>ON</b>
5201	VT broken wire supervision	ON OFF	<b>OFF</b>
5302	Zero Sequence Voltage	10...100 V;	30 V <span style="float:right">1.8 kV</span>
5303	Residual Current	0.10...1.00 A;	0.10 A <span style="float:right">20 A</span>
5308A	Delta Current Threshold (3phase)	0.05...1.00 A;	0.10 A <span style="float:right">20 A</span>
8102	Voltage Threshold for Balance Monitoring	10...100 V;	50 V <span style="float:right">3.0 kV</span>
8103	Balance Factor for Voltage Monitor	0.58...0.90	0.75
8104	Current Balance Monitor	0.10...1.00 A;	0.50 A <span style="float:right">100 A</span>
8105	Balance Factor for Current Monitor	0.10...0.90	0.50
8110A	T Balance Factor for Voltage Monitor	0...100 sec;	5 sec
8111A	T Current Balance Monitor	0...100 sec;	5 sec
5202	Threshold voltage sum	1.0...100.0 V;	8.0 V <span style="float:right">0.5 kV</span>
5203	Maximum phase to phase voltage	1.0...100.0 V;	16.0 V <span style="float:right">1.0 kV</span>
5204	Minimum phase to phase voltage	1.0...100.0 V;	16.0 V <span style="float:right">1.0 kV</span>
5205	Symmetry phase to phase voltages	10.0...200.0 V;	16.0 V <span style="float:right">1.0 kV</span>
5206	Minimum line current	0.04...1.00 A;	0.04 A <span style="float:right">8 A</span>
5208	Alarm delay time	0.00...32.00 sec;	1.25 sec
<b>ENERGY</b>			
8315	Meter resolution	Standard Resolution Factor 10 Resolution Factor 100	Standard
<b>DEVICE</b>			
0610	Fault Display on LED / LCD	Display Targets on every Pickup Display Targets on TRIP only	Display Targets on TRIP only
0611	Spontaneous display of ft.annunciations	YES NO	NO
0617A	T103-transfer limited to 16 meas. values	YES NO	NO
0625A	Minimum hold time of latched LEDs	0...60 min; oo	0 min
0700	GOOSE-Stop	YES NO	NO
<b>OSCILLOGRAPHIC FAULT RECORDS</b>			
0401	Waveform Capture	Save with Pickup Save with TRIP Start with TRIP	Save with Pickup
0402	Scope of Waveform Data	Fault event Power System fault	Fault event
0403	Max. length of a Waveform Capture Record	0.30...5.00 sec;	2.00 sec
0404	Captured Waveform Prior to Trigger	0.05...0.50 sec;	0.25 sec
0405	Captured Waveform after Event	0.05...0.50 sec;	0.10 sec
0406	Capture Time via Binary Input	0.10...5.00 sec; oo	0.50 sec

Switchgear: **STATION MIDDLE**  
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 Protection Device: **7SJ6452-5EB92-1FB0 +L0S** V4.92.03



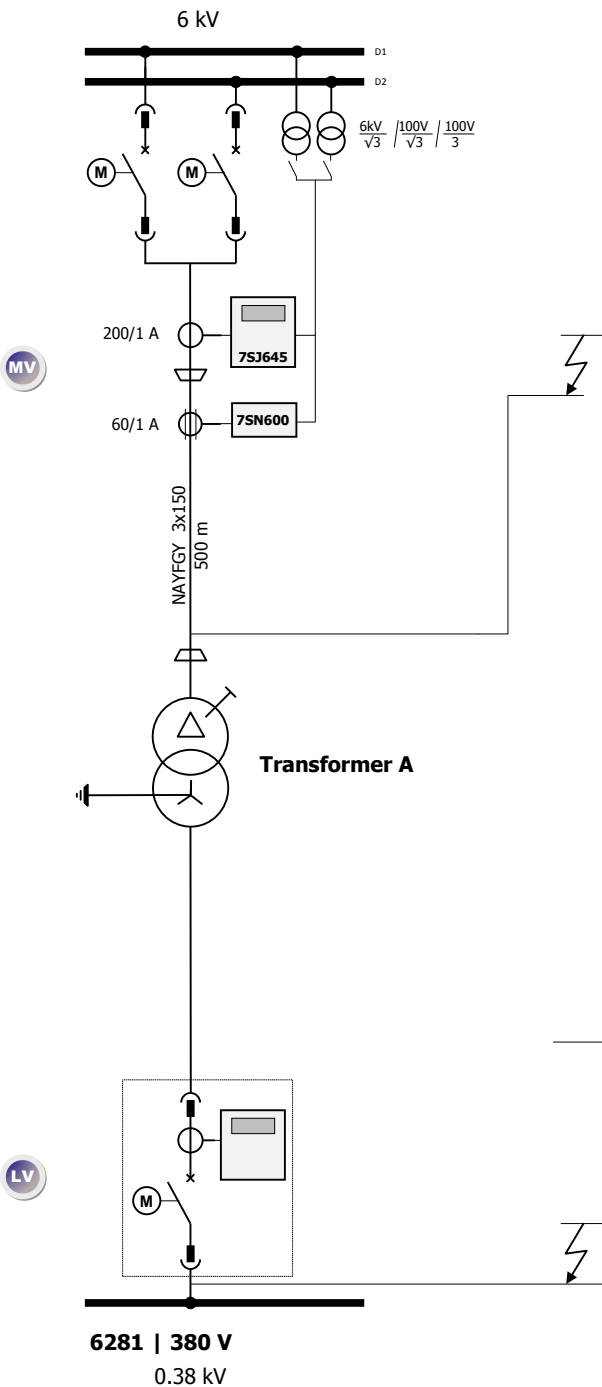
$I_n = 1 \text{ A}$  Relay rated current

Switchgear: **6281 | 380 V**  
 Panel: **Transformator A**  
 Description: **Incoming Feeder**  
 Protection Device: **Unknown**



$I_n = 2500 \text{ A}$  Relay rated current

**STATION MIDDLE**



Current	Result	BASED ON CT MV
$I_{kmax}$	17.10 kA	85.5
$I_{kmin 3P}$	6.80 kA	34.0
$I_{kmin 2P}$	5.90 kA	29.5
$I_{kmin 1P}$	-	-

PARAMETER	VALUE	DESCRIPTION
$S_{nT}$	1.4 MVA	Rated apparent power
$U_{nTHV}$	6 kV	Rated voltage at high voltage side
$U_{nTLV}$	0.4 kV	Rated voltage at low voltage side
$u_k$	6.06 %	Reference short-circuit voltage
$u_r$	0.9 %	Rated resistance voltage drop
Vector group	Dyn11	Vector group
$I_{rush}$	-	Rush current
$t_{rush}$	-	Time for rush

CURRENT	RESULT	BASED ON CT MV	BASED ON IN LV
$I_r$	135 A	0.7	-
$I_{st}$	337 A	1.7	-
$I_{kmax}$	2.05 kA	10.2	-
$I_{kmin 3P}$	1.52 kA	7.6	-
$I_{kmin 2P}$	1.52 kA	7.6	-
$I_{kmin 1P}$	0.97 kA	4.8	-
$I_r$	2021 A	-	-
$I_{st}$	5052 A	-	-
$I_{kmax}$	30.70 kA	-	12.3
$I_{kmin 3P}$	22.80 kA	-	9.1
$I_{kmin 2P}$	19.70 kA	-	7.9
$I_{kmin 1P}$	25.10 kA	-	10.0

6 kV  
0.4 kV

Switchgear: **STATION MIDDLE**  
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 Description: **Transformator A | 6000/400 V**  
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