

Project:
Location:
Contract:
Engineer:
Filename: tes

ETAP
12.6.0H
Study Case: SM

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Electrical Transient Analyzer Program

Short-Circuit Analysis

**ANSI Standard
3-Phase, LG, LL, & LLG Fault Currents
1/2 Cycle Network**

	<u>Swing</u>	<u>V-Control</u>	<u>Load</u>	<u>Total</u>
Number of Buses:	1	0	1	2

	<u>XFMR2</u>	<u>XFMR3</u>	<u>Reactor</u>	<u>Line/Cable</u>	<u>Impedance</u>	<u>Tie PD</u>	<u>Total</u>
Number of Branches:	1	0	0	0	0	0	1

	<u>Synchronous Generator</u>	<u>Power Grid</u>	<u>Synchronous Motor</u>	<u>Induction Machines</u>	<u>Lumped Load</u>	<u>Total</u>
Number of Machines:	0	1	0	1	0	2

System Frequency: 50.00 Hz
Unit System: English
Project Filename: tes
Output Filename: C:\ETAP 1260\tes\Untitled.SQ1

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Adjustments

<u>Tolerance</u>	<u>Apply Adjustments</u>	<u>Individual /Global</u>	<u>Percent</u>
Transformer Impedance:	Yes	Individual	
Reactor Impedance:	Yes	Individual	
Overload Heater Resistance:	No		
Transmission Line Length:	No		
Cable Length:	No		

<u>Temperature Correction</u>	<u>Apply Adjustments</u>	<u>Individual /Global</u>	<u>Degree C</u>
Transmission Line Resistance:	Yes	Individual	
Cable Resistance:	Yes	Individual	

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Bus Input Data

Bus					Initial Voltage	
ID	Type	Nom. kV	Base kV	Sub-sys	%Mag.	Ang.
Bus1	SWNG	63.000	70.000	1	111.11	0.00
Bus2	Load	6.600	6.600	1	100.00	-30.00

2 Buses Total

All voltages reported by ETAP are in % of bus Nominal kV.
Base kV values of buses are calculated and used internally by ETAP.

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Branch Connections

CKT/Branch		Connected Bus ID		% Impedance, Pos. Seq., 100 MVAb			
ID	Type	From Bus	To Bus	R	X	Z	Y
T1	2W XFMR	Bus1	Bus2	0.97	26.54	26.56	

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Power Grid Input Data

Power Grid ID	Connected Bus ID	Rating		% Positive Seq. Impedance 100 MVA Base			Grounding Type	% Zero Seq. Impedance 100 MVA Base		
		MVA/SC	kV	X/R	R	X		X/R	R0	X0
U1	Bus1	63.000	70.000	1.00	112.23920	112.23920	Wye - Solid	1.00	99.428500	99.42850

Total Power Grids (= 1) 63.000 MVA

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Induction Machine Input Data

Induction Machine			Rating (Base)			Positive Seq. Imp.				Grounding			Zero Seq. Imp.		
ID	Type	Qty	kVA	kV	RPM	X"/R	% R	% X"	% X'	Conn.	Type	Amp	X/R	% R0	% X0
Mtr1	Motor	1	2857.38	6.600	1500	33.81	0.455	15.38	23.08	Wye	Open		33.81	0.455	15.38

Total Connected Induction Machines (= 1): 2857.4 kVA

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SHORT- CIRCUIT REPORT

Fault at bus: **Bus2**

Prefault voltage = 6.600 kV = 100.00 % of nominal bus kV (6.600 kV)
 = 100.00 % of base kV (6.600 kV)

Contribution		3-Phase Fault		Line-To-Ground Fault					Positive & Zero Sequence Impedances Looking into "From Bus"			
From Bus ID	To Bus ID	% V From Bus	kA Symm. rms	% Voltage at From Bus			kA Symm. rms		% Impedance on 100 MVA base			
				Va	Vb	Vc	Ia	3I0	R1	X1	R0	X0
Bus2	Total	0.00	6.251	0.00	93.04	81.78	8.644	8.644	7.02E+001	1.21E+002	9.72E-001	2.65E+001
Bus1	Bus2	16.48	4.884	69.19	111.11	48.07	7.362	8.644 *	1.13E+002	1.39E+002	9.72E-001	2.65E+001
Mtr1	Bus2	100.00	1.624	100.00	100.00	100.00	1.497	0.000	1.59E+001	5.38E+002		
U1	Bus1	100.00	0.461	100.00	100.00	100.00	0.368	0.000	1.12E+002	1.12E+002	9.94E+001	9.94E+001

Indicates fault current contribution is from three-winding transformers

* Indicates a zero sequence fault current contribution (3I0) from a grounded Delta-Y transformer

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Short-Circuit Summary Report

1/2 Cycle - 3-Phase, LG, LL, & LLG Fault Currents

Prefault Voltage = 100 % of the Bus Nominal Voltage

Bus		3-Phase Fault			Line-to-Ground Fault			Line-to-Line Fault			*Line-to-Line-to-Ground		
ID	kV	Real	Imag.	Mag.	Real	Imag.	Mag.	Real	Imag.	Mag.	Real	Imag.	Mag.
Bus2	6.60	3.135	-5.408	6.251	4.025	-7.650	8.644	4.683	2.715	5.414	2.020	9.146	9.367

All fault currents are symmetrical momentary (1/2 Cycle network) values in rms kA

* LLG fault current is the larger of the two faulted line currents

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Short-Circuit Summary Report

Bus		Positive Sequence Imp. (ohm)			Negative Sequence Imp. (ohm)			Zero Sequence Imp. (ohm)		
ID	kV	Resistance	Reactance	Impedance	Resistance	Reactance	Impedance	Resistance	Reactance	Impedance
Bus2	6.600	0.30574	0.52735	0.60957	0.30574	0.52735	0.60957	0.00424	0.11563	0.11571

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Sequence-of-Operation Event Summary Report

Symmetrical 3-Phase Fault between Bus2 and Mtr1. Adjacent to Bus2.

<u>Time (ms)</u>	<u>ID</u>	<u>If (kA)</u>	<u>T1 (ms)</u>	<u>T2 (ms)</u>	<u>Condition</u>
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