

Trouble shooting

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1. _____

가

가 3
3

2. _____

3. _____

, P.U , %
%

1) %

Z [] E[V]
가 I[A]가
ZI[V] 가
ZI[V]가 E[V] [%]
가 E[V] ZI[V]

$$\%Z = \frac{Z [] \times I[A]}{E[V]} \times 100[\%]$$

2) %

3)

$$\%Z = \frac{Z \times Pb}{10 \times E^2} [\%]$$

$$\%Z' = \%Z \times \frac{Pa}{Pb} [\%]$$

$$Is = \frac{Pa \times 100}{\sqrt{3 \times E \times \%Z}} \times K \times 10^{-3} [KA]$$

%Z : %
Z :
Pb : [KVA]
E : [KV]
K : [K=1.25(), K=1.1()]
%Z': %Z Pa %
Pa : [10,000KVA]
Is : [KA]

4)

(1)

(2)

(3) % %

(4)

(5)

(6)

4.3 _____

3

10MVA

, CT,

%

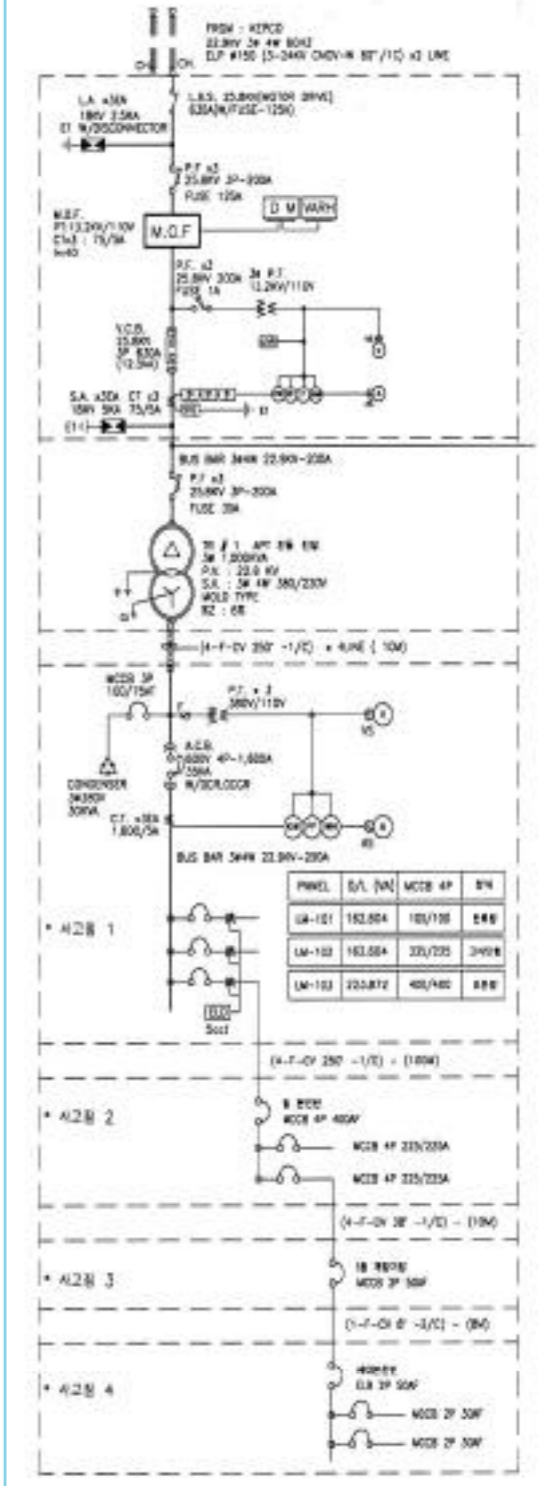
10,000KVA

%

1)

	22.9KV-Y VCB 520MVA	
	3 4 22.9KV/380/220V 1,000KVA	
	ACB 4P 1,600A (CV 250mm2/1C x 4 x 4 -10m)	1
	MCCB 4P 400A (CV 250mm2/1C x 4 -100m)	2
1	MCCB 4P 50A (CV 38mm2/1C x 4 -10m)	3
	MCCB 2P 50A (CV 8mm2/2C x 1 -8m)	4

[1]



Trouble shooting

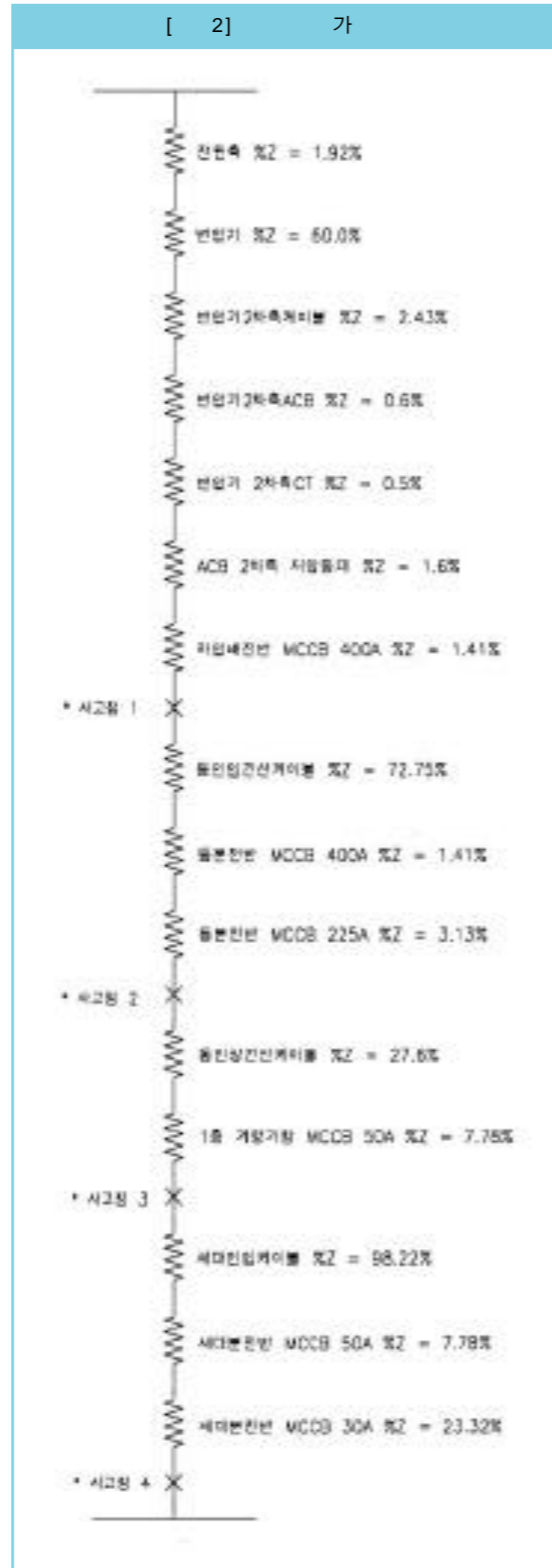
2) %

	%	
	$\%Z = \frac{10,000[] \times 100}{520[] \times 1,000} \times [1.92\%]$	
	$\%Z = 6.0[\%]$	
2	$\%Z = \frac{0.97[] \times \%Z/m \times 10[]}{4[]} \times 2.43[\%]$	
2 ACB	$\%Z = 0.6[\%]$	
2 CT	$\%Z = 0.5[\%]$	
ACB 2	$\%Z = 0.8[] \times \%Z/m \times 2[] = 1.6[\%]$	
MCCB 400A	$\%Z = 1.41[\%]$	
	$\%Z = 0.97[] \times \%Z/m \times 75[] = 72.75[\%]$	
	$\%Z = 1.41[\%] - 400A \text{ MCCB}$ $\%Z = 3.13[\%] - 225A \text{ MCCB}$	
	$\%Z = 3.45[] \times \%Z/m \times 8[] = 27.6[\%]$	
1	$\%Z = 7.78[\%] - 50A \text{ MCCB}$	
	$\%Z = 16.37[] \times \%Z/m \times 6[] = 98.22[\%]$	
	$\%Z = 7.78[\%] - 50AF \text{ ELB}$ $\%Z = 23.32[\%] - 30AF \text{ MCCB}$	

3) %

	%	
	$\%Z = 1.92[\%]$	
	$\%Z' = 6.0 \times \frac{10,000}{1,000} = 60.0[\%]$	
2	$\%Z = 2.43[\%]$	
2 ACB	$\%Z = 0.6[\%]$	
2 CT	$\%Z = 0.5[\%]$	
ACB 2	$\%Z = 1.6[\%]$	
	$\%Z = 1.41[\%] - \text{MCCB } 400A$	
	$\%Z = 70.75[\%]$	
	$\%Z = 1.41[\%] - 400A \text{ MCCB}$ $\%Z = 3.13[\%] - 225A \text{ MCCB}$	
	$\%Z = 27.6[\%]$	
1	$\%Z = 7.78[\%] - 50AF \text{ MCCB}$	
	$\%Z = 98.22[\%]$	
	$\%Z = 7.78[\%] - 50AF \text{ ELB}$ $\%Z = 23.32[\%] - 30AF \text{ MCCB}$	

[2] 가



4) %

	%	
1	$\%Z' = \frac{1.92 + 60.0 + (2.43 + 0.6 + 0.5 + 1.6 + 1.41)}{2} + \frac{ACB + CT + MCCB}{2}$	
2	$\%Z' = \frac{1.92 + 60.0 + (2.43 + 0.6 + 0.5 + 1.6 + 1.41) + 72.75 + (1.41 + 3.13)}{2} + \frac{ACB + CT + MCCB}{2}$	
3	$\%Z' = \frac{1.92 + 60.0 + (2.43 + 0.6 + 0.5 + 1.6 + 1.41) + 72.75 + (1.41 + 3.13) + 27.6 + 7.78}{2} + \frac{ACB + CT + MCCB}{2}$	
4	$\%Z' = \frac{1.92 + 60.0 + (2.43 + 0.6 + 0.5 + 1.6 + 1.41) + 72.75 + (1.41 + 3.13) + 27.6 + 7.78 + 98.22 + (7.78 + 23.32)}{2} + \frac{ACB + CT + MCCB}{2}$	

5)

1	$I_s = \frac{10,000 \times 100}{\sqrt{3} \times 0.38 \times 68.46} \times 1.25 \times 10^{-3} = 27.74[\text{KA}]$
2	$I_s = \frac{10,000 \times 100}{\sqrt{3} \times 0.38 \times 145.75} \times 1.1 \times 10^{-3} = 11.47[\text{KA}]$
3	$I_s = \frac{10,000 \times 100}{\sqrt{3} \times 0.38 \times 181.13} \times 1.1 \times 10^{-3} \times 0.87 = 8.03[\text{KA}]$
4	$I_s = \frac{10,000 \times 100}{\sqrt{3} \times 0.38 \times 310.45} \times 1.1 \times 10^{-3} \times 0.87 = 4.68[\text{KA}]$
1)	
2) 1	$\frac{\sqrt{3}}{2} = 0.87$

6)

MCCB : 100AF -

225AF - 400AF -

5. %

1)			
(1)		%	(= %Z)
(2)	(= P)		10,000kVA ,
(3)	(= V)		가
		600V CV	600V가
		, 3 4 380/220V	380V가 , 3 3
		220V	220V가
(4)		60Hz	
2)			

	kVA]	%]		
3	500	1.56	4.76	5.0
22.9kV / 380V [] 5.5	750	1.4	4.8	5.0
	1,000	1.26	4.84	5.0
	1,500	1.2	5.37	5.5
5.393	2,000	1.1	5.39	5.5
	500	1.0	5.92	6.0
	750	0.9	5.93	6.0
22.9kV / 380V []	1,000	0.8	5.95	6.0
	1,500	0.75	6.96	7.0
	2,000	0.7	6.96	7.0

1.	가	가
(1) <	> % Imp ()	
(2) %	(= %R) % (= %X)	
<	> [W]	100
%R	%X (%Z² %R²)	
2.	가	(10 ~ 15)

Trouble shooting

3) %

(1) 600V CV 1C

(:) < 380V, 10,000kVA>

[mm]		%		
CV 2.0	S = D	64,090	1,270	64,103
CV 3.5	S = D	36,010	1,170	36,029
CV 5.5	S = D	23,080	1,130	23,080
CV 8.0	S = D	16,020	1,070	16,020
CV 14	S = D	9,070	1,010	9,126
CV 22	S = D	5,760	970	5,841
CV 38	S = D	3,330	900	3,449
CV 60	S = D	2,120	873	2,293
CV 100	S = D	1,270	859	1,533
CV 150	S = D	853	824	1,186
CV 200	S = D	646	824	1,047
CV 250	S = D	528	810	967
CV 325	S = D	415	789	891

- S D, S=D
-
- 20 27 37 1/2
- 600V

(2) 600V CV 3C

(:) < 380V, 10,000kVA>

[mm]		%		
CV 2.0	-	65,180	824	65,185
CV 3.5	-	36,720	762	36,728
CV 5.5	-	23,570	762	23,582
CV 8.0	-	16,350	720	16,366
CV 14	-	9,290	688	9,315
CV 22	-	5,870	681	5,909
CV 38	-	3,410	641	3,470
CV 60	-	2,160	639	2,253
CV 100	-	1,300	646	1,452
CV 150	-	869	621	1,068
CV 200	-	663	630	915
CV 250	-	541	616	820
CV 325	-	426	602	737

- 20
- 2C

4) %

(:) < 380V, 10,000kVA>

[mm]		%		
6 x 50	7.5 cm	414	916	1,005
	10 cm	414	1,090	1,166
	12.5 cm	414	1,190	1,260
	15 cm	414	1,320	1,383
	20 cm	414	1,430	1,489
	25 cm	414	1,570	1,624
6 x 75	7.5 cm	276	773	821
	10 cm	276	916	957
	12.5 cm	276	1,030	1,066
	15 cm	276	1,090	1,124
	20 cm	276	1,250	1,280
	25 cm	276	1,360	1,388
6 x 100	7.5 cm	207	615	649
	10 cm	207	744	772
	12.5 cm	207	844	869
	15 cm	207	959	981
6 x 100 (2)	20 cm	207	1,090	1,109
	25 cm	207	1,200	1,218
6 x 150	7.5 cm	104	572	581
	10 cm	104	687	695
	12.5 cm	104	773	780
	15 cm	104	873	879
6 x 150 (2)	20 cm	104	1,030	1,035
	25 cm	104	1,160	1,165
	7.5 cm	138	515	533
	10 cm	138	630	645
	12.5 cm	138	730	743
	15 cm	138	787	799
	20 cm	138	930	940
	25 cm	138	1,030	1,039
	7.5 cm	69	458	463
	10 cm	69	572	576
	12.5 cm	69	658	662
	15 cm	69	744	747
	20 cm	69	887	890
	25 cm	69	1,000	1,002

- 1 km
- 103%

5) Busduct %

(: LG) < 380V, 10,000kVA>

[A]	[mm]	%		
200	AL 6 x25	1,340	1,040	1,696
400	AL 6 x50	1,360	755	1,556
600	AL 6 x75	455	598	751
800	AL 6 x125	280	429	512
1,000	AL 6 x150	238	374	443
1,200	AL 6 x100 x2	172	733	753
1,500	AL 6 x125 x2	139	657	672
2,000	AL 6 x150 x2	92	489	498
200	CU 3 x25	1,670	1,090	1,994
400	CU 6 x40	520	848	995
600	CU 6 x50	420	756	865
800	CU 6 x75	285	598	662
1,000	CU 6 x100	218	499	545
1,200	CU 6 x125	181	425	462
1,500	CU 6 x150	153	373	403
2,000	CU 6 x125 x2	89.3	657	663

6) ACB %

(:) < 380V, 10,000kVA>

		%	
20 kA	100 AF	32.9	32.9
	200 AF	5.01	5.0
	600 AF	2.43	2.4
40 kA	200 AF	5.01	5.0
	600 AF	2.43	2.4
70 kA	1,000 AF	0.859	0.9
	2,000 AF	0.572	0.6

7) MCCB %

(:) < 380V, 10,000kVA>

MCCB		%	
	15 AF	49.5	0.859
	20 AF	36.3	0.859
	30 AF	23.3	0.859
	50 AF, 75AF	7.73	0.859
	100 AF ~ 150 AF	5.44	0.859
	175 AF ~ 225 AF	3.01	0.859
	250 AF, 300 AF	1.43	0.859
	350 AF, 400 AF	1.12	0.859
	500 AF, 600 AF	0.572	0.859
	700 AF, 800 AF	0.544	0.859

8) CT %

(:) < 380V, 10,000kVA>

CT		%	
	100 A	24.9	24.90
	150 A	12.5	12.50
	200 A	6.65	6.65
	250 A	4.57	4.57
	300 A	3.49	3.49
	400 A	2.24	2.24
	500 A	1.5	1.50
	600 A	1.33	1.33
	800 A	0.831	0.83
	1,000 A ~ 4,000 A	0.499	0.50

9) % (:)

< : , : >

	%	
	20	20
	25	25
	15 ~ 20	15 ~ 20

1. 1.5