TITLE : SCHEMATIC DIAGRAM OF 30MVA TRANSFORMER OLTC CONTROL BOARD =TK03+W03

QUANTITY : 01

CUSTOMER : SHANGHAI ELECTRIC POWER TRANS. & DIST. ENGG. CO. LTD

PROJECT : SUPPLY AND INSTALLATION 132/11kV SUBSTATION AT FAHL D

Rev	Date	Description	Drawn	Approved
00	31/03/2016	FOR APPROVAL	DOSS	AMG

MINISTRY OF ELECTRICITY & WATER
STATE OF KUWAIT

CONTRACT NO. MEW/C/4913 - 2014/15

Project

SUPPLY AND INSTALLATION 132/11kV SUBSTATION AT FAHL D

Contractor

SHANGHAI ELECTRIC POWER TRANS. & DIST. ENGG. CO. LTD

Customer	SHANGHAI ELECTRIC POWER TRANS. & DIST. ENGG. CO. LTD	Offer No.	Job No.	Item No.
Project	SUPPLY AND INSTALLATION 132/11kV SUBSTATION AT FAHL D	2304-14	SO-2905	

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DRAWN BY	DOSS	31/03/2016	APPROVED BY	MR	31/03/2016

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IEPC ● INDUSTRIAL ELECTRICAL PROJECTS Co. (k.s.c.) Closed
P.O.Box 195, Dasman 15453 Kuwait, Tel: (+965)
Fax: (+965) , Website :

Title : SCHEMATIC DIAGRAM OF 30MVA TRANSFORMER OLTC CONTROL BOARD =TK03+W03

Title page / cover sheet

DWG. No : 237G0139	Rev No. 00	Sh. Size A3	Sh No. 1 OF 36

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6	WIRING DETAILS	*										
7	220V DC AUXILIARY SUPPLY	*										
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Title : SCHEMATIC DIAGRAM OF 30MVA TRANSFORMER OLTC CONTROL BOARD =TK03+W03 INDEX

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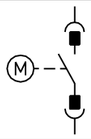
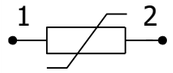
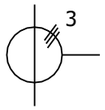
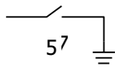
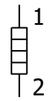
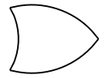
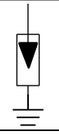
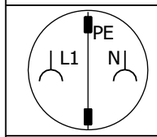
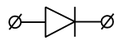
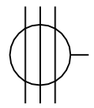
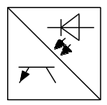
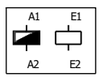
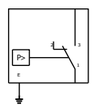
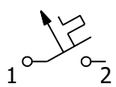
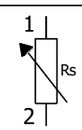
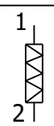
Title : SCHEMATIC DIAGRAM OF 30MVA TRANSFORMER OLTC CONTROL BOARD =TK03+W03 INDEX

DWG. No : 237G0139 | Rev No. 00 | Sh. Size A3 | Sh No. 3 OF 36

Rev.	Zone	Disctription	Date	By	Approv

SYMBOLS LEGEND

	WITHDRAWABLE & MOTORIZED VACUUM CIRCUIT BREAKER	PB1 	PUSH BUTTON		METROSIL	PL1 	ILLUMINATION TUBE LIGHT
	CURRENT TRANSFORMER		CURRENT TRANSFORMER SECONDARY WINDING	TB 	ISOLATING CONTACT		AND
	EARTHING SWITCH		COMPARTMENT / MOTOR HEATER		DISCONNECTING TYPE TERMINAL BLOCK		OR
	POWER TRANSFORMER		GROUND		FEED THROUGH TYPE TERMINAL BLOCK	 SA	SURGE ARRESTOR
	NORMALLY OPEN CONTACT		POWER SOCKET OUTLET		DIODE TYPE TERMINAL BLOCK		MOTOR
	NORMALLY CLOSE CONTACT		LED INDICATION LAMP		CAPACITIVE INSULATOR		CORE BALANCE CURRENT TRANSFORMER
	LIMIT SWITCH NORMALLY OPEN		BINARY INPUT OF PROTECTION RELAY		LATCHING CONTACTOR		PRESSURE SWITCH
	LIMIT SWITCH NORMALLY CLOSE		MINIATURE CIRCUIT BREAKER		AUXILIARY CONTACTOR		PVC CONNECTOR
	CHANGE OVER CONTACT		VARIABLE STABILIZING RESISTOR		RESISTOR		

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REFERENCE DRAWINGS

1) REFERENCE DRAWINGS:

- GENERAL ARRANGEMENT OF 30MVA TRANSFORMER OLTC CONTROL BOARD - DRAWING NO. 236G0089

Rev.	Zone	Disctription	Date	By	Approv

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Title : SCHEMATIC DIAGRAM OF 30MVA TRANSFORMER OLTC CONTROL BOARD =TK03+W03 REFERENCE DRAWINGS

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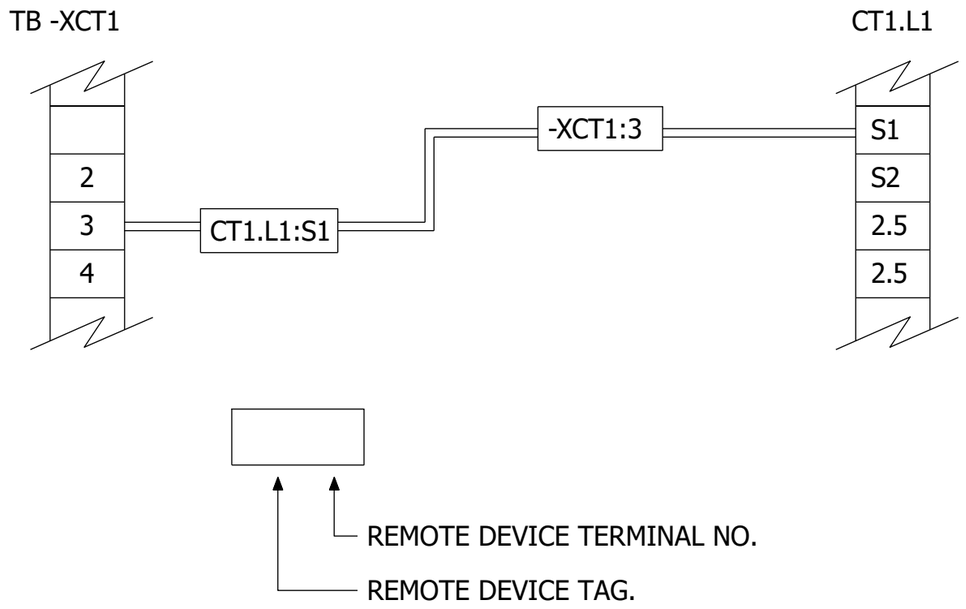
1. CABLE COLOR & SIZE:

CIRCUIT		CABLE SIZE (mm^2)	BUS WIRE SIZE (mm^2)	COLOR
CT	R-PHASE	2.5	-	RED
	Y-PHASE	2.5	-	YELLOW
	B-PHASE	2.5	-	BLUE
	NEUTRAL	2.5	-	BLACK
VT	R-PHASE	2.5	2.5	RED
	Y-PHASE	2.5	2.5	YELLOW
	B-PHASE	2.5	2.5	BLUE
	NEUTRAL	2.5	2.5	BLACK
AC (3-PHASE)	R-PHASE	4.0	4.0	RED
	Y-PHASE	4.0	4.0	YELLOW
	B-PHASE	4.0	4.0	BLUE
	NEUTRAL	4.0	4.0	BLACK
AC (1-PHASE)	PHASE	2.5	4.0	BLACK
	NEUTRAL	2.5	4.0	BLACK
DC	TRIP CKT. *	2.5	2.5	BLACK
	OTHER CKT.	2.5	2.5	GREY
EARTH	EARTH	2.5	-	G/Y

* TRIP CKT. CABLE SHALL BE FITTED WITH RED "TRIP" FERRULE AS APPLICABLE

2. CABLES IDENTIFICATION & FERRULING:



3. TYPE OF WIRES: 600 VOLTS TROPICAL GRADE PVC INSULATED CABLE

Rev.	Zone	Disctription	Date	By	Approv

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Title : SCHEMATIC DIAGRAM OF 30MVA TRANSFORMER OLTC CONTROL BOARD =TK03+W03 WIRING DETAILS

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30MVA TRANSFORMER No.3 OLTC CONTROL PANEL
=TK03+W03

CONTROL & AUX. CIRCUIT	ALARM CIRCUIT	INDICATION CIRCUIT

-XSUD 2 / 4

-XSUD 1 / 3

C1+

C1-

+220V DC CONTROL AUXILIARY SUPPLY

-XSUD 2 / 4

-XSUD 1 / 3

MCB2
16 A, 2P
3 / 1 / 12 14 / 4 / 2 / 11
23/13.D

MCB3
6 A, 2P
3 / 1 / 12 14 / 4 / 2 / 11
24/10.D

MCB4
6 A, 2P
3 / 1 / 12 14 / 4 / 2 / 11
23/14.D

C2+ 9/4.E

C2- 9/4.F

A+ 23/2.B

A- 23/2.G

S+ 11/2.B

S- 11/2.E

30MVA TRANSFORMER No.2 OLTC CONTROL PANEL
=TK02+W02

30MVA TRANSFORMER No.4 OLTC CONTROL PANEL
=TK04+W04

Customer	SHANGHAI ELECTRIC POWER TRANS. & DIST. ENGG. CO. LTD		Offer No.	Job No.	Item No.
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Title : SCHEMATIC DIAGRAM OF 30MVA TRANSFORMER OLTC CONTROL BOARD =TK03+W03 220V DC AUXILIARY SUPPLY

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30MVA TRANSFORMER No.3 OLTC CONTROL PANEL
=TK03+W03

	LIGHTING	HEATER	POWER SOCKET	

30MVA TRANSFORMER No.2 OLTC CONTROL PANEL
=TK02+W02

30MVA TRANSFORMER No.4 OLTC CONTROL PANEL
=TK04+W04

30MVA TRANSFORMER
TAP CHANGER -3

-XSUA 2 — -XSUA 1 — R — -XSUA 2 — -XSUA 1
-XSUA 4 — -XSUA 3 — Y — -XSUA 4 — -XSUA 3
-XSUA 6 — -XSUA 5 — B — -XSUA 6 — -XSUA 5
-XSUA 8 — -XSUA 7 — N — -XSUA 8 — -XSUA 7

-XC 66 → AC+ / 24/9.C
-XC 67 → AC- / 24/9.G

MCB6
16 A, 2P
1, 3, 2, 4, 12, 14, 11
23/15.D

LS1
14, 12, 11

TH1
THERMOSTAT
1, 2

H1
SPACE HEATER
1, 2

CFL
1, 2

W1
L, N

GND 1

TPI
6, 1, 15, 3, 16, 10

TAPTD
13, 2, 3, 1, 14, 10, 12

-XTR
2, 3, 1 — 1, 2, 3

Customer	SHANGHAI ELECTRIC POWER TRANS. & DIST. ENGG. CO. LTD			Offer No.	Job No.	Item No.
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Title : SCHEMATIC DIAGRAM OF 30MVA TRANSFORMER OLTC CONTROL BOARD =TK03+W03 240V AC AUXILIARY SUPPLY

DWG. No : 237G0139 | Rev No. 00 | Sh. Size A3 | Sh No. 8 OF 36

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30MVA TRANSFORMER No.3 OLTC CONTROL PANEL
=TK03+W03

	TEST BLOCK	VOLTAGE REGULATOR RELAY	VOLTMETER	AUTO / HAND SWITCH CONTACT UTILIZATION	

11kV REMOTE CONTROL & RELAY PANEL FOR 30MVA TRANSFORMER
=K24+WR24
DWG.NO. 237G0075
SHEET NO. 11 OF 45

VT.L1-L3
11500V/√3
110V/√3
CLASS : 1
BURDEN: 100VA

-XVTR
-XVTM

TTB1
2RMLG
1 2
3 4
5 6
7 8

43AH
9/12.C
AUTO 2
HAND 4

VSS
9 3 13 21
OFF
RY RN
YB YN
BR BN
8 24

V
17 V 18
0-15KV

C2+ / 7/7.G → C2+ / 10/2.B
C2- / 7/8.G → C2- / 10/11.F

TTB1
2RMLG
13 14
15 16

AVR
X2 MIO
VT I/P
L+
N(L-)

AUTO HAND

43AH

12/8.D	3	1	12/8.D
9/7.D	4	2	9/7.D
12/15.D	7	5	12/15.D
12/12.D	8	6	12/12.D
15/8.D	11	9	15/8.C
15/11.D	12	10	15/11.C
22/8.E	15	13	22/8.D
	16	14	
	19	17	
22/10.E	20	18	22/10.D
	23	21	
	24	22	

TTB1
2RMLG

9/5.B	1 2	9/6.B
9/5.B	3 4	9/6.B
9/5.C	5 6	9/6.C
9/5.C	7 8	9/6.C
12/12.E	9 10	12/12.E
12/12.G	11 12	12/12.F
9/5.G	13 14	9/6.G
9/5.G	15 16	9/6.G
12/13.G	17 18	12/13.F
	19 20	
	21 22	
	23 24	
	25 26	
	27 28	
	E	

AVR
TAPCON-230 BASIC

X1
1
2
3
4

X2 MIO

9/7.F	1	VT I/P
9/7.G	2	
9/7.G	3	L+
9/7.G	4	N(L-)

X3

LOWER	1	12/13.E
	2	
	3	12/13.F
RAISE	4	12/12.E
	5	
	6	12/12.F
STATUS	10	
	11	23/17.D
	12	23/17.D

X4

U> / U< / I?	1	23/4.D
	2	
		23/4.D

INPUT

GPI1	13	15/12.E
GND	19	15/9.F
GND	20	15/8.F
AUTO	21	15/11.E
MANUAL	22	15/8.E

Customer	SHANGHAI ELECTRIC POWER TRANS. & DIST. ENGG. CO. LTD		Offer No.	Job No.	Item No.
Project	SUPPLY AND INSTALLATION 132/11kV SUBSTATION AT FAHL D		2304-14	SO-2905	

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DRAWN BY	DOSS	31/03/2016	APPROVED BY	MR	31/03/2016

Title : SCHEMATIC DIAGRAM OF 30MVA TRANSFORMER OLTC CONTROL BOARD =TK03+W03 METERING & AVR RELAY

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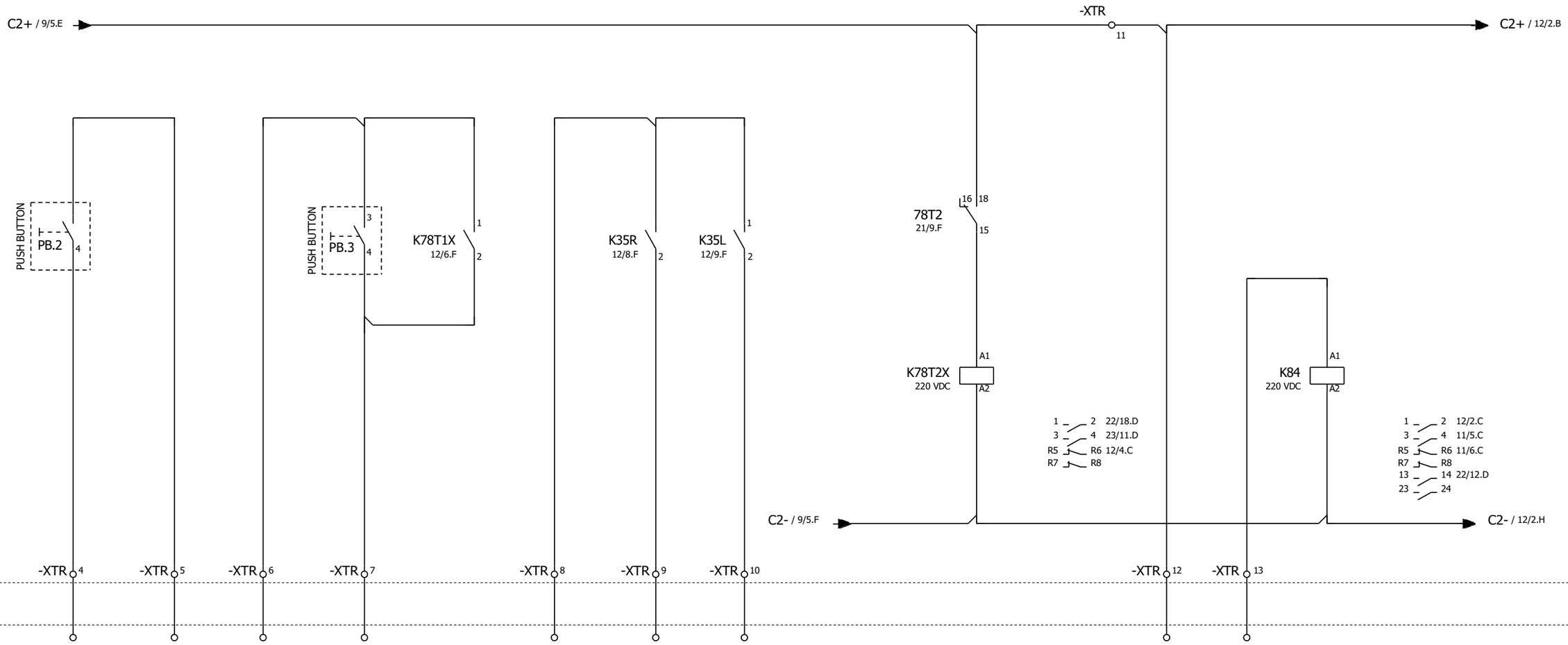
DWG. No : 237G0139 | Rev. No. 00 | Sh. Size A3 | Sh No. 9 OF 36

Rev.	Zone	Disctription	Date	By	Approv

30MVA TRANSFORMER No.3 OLTC CONTROL PANEL
=TK03+W03

COUNTER RESET	EMERGENCY TRIP	RUNNING TIME EXCEEDED	RAISE	LOWER	OUT OF STEP	TAP CHANGER IN PROGRESS	



30MVA TRANSFORMER
TAP CHANGER -1

Rev.	Zone	Disctription	Date	By	Approv

Customer	SHANGHAI ELECTRIC POWER TRANS. & DIST. ENGG. CO. LTD			Offer No.	Job No.	Item No.	
Project	SUPPLY AND INSTALLATION 132/11kV SUBSTATION AT FAHL D			2304-14	SO-2905		
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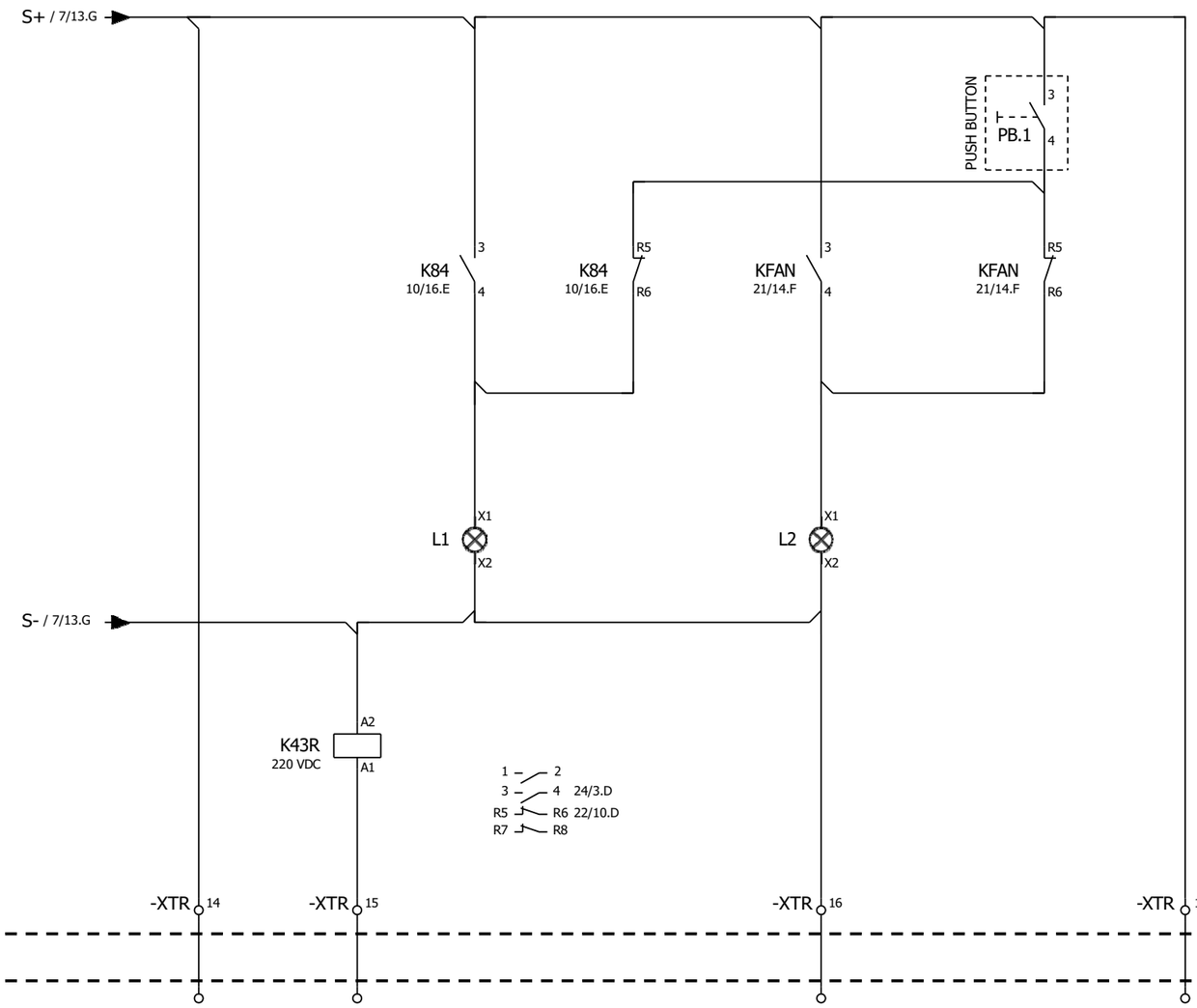
Title : SCHEMATIC DIAGRAM OF 30MVA TRANSFORMER OLTC CONTROL BOARD =TK03+W03 REMOTE CONTROL

DWG. No : 237G0139 | Rev No. 00 | Sh. Size A3 | Sh No. 10 OF 36

30MVA TRANSFORMER No.3 OLTC CONTROL PANEL
=TK03+W03

TAP CHANGER LOCAL SELECTED	TAP CHANGER IN PROGRESS	FAN RUNNING	LAMP TEST	



30MVA TRANSFORMER
TAP CHANGER -1

Customer	SHANGHAI ELECTRIC POWER TRANS. & DIST. ENGG. CO. LTD		Offer No.	Job No.	Item No.
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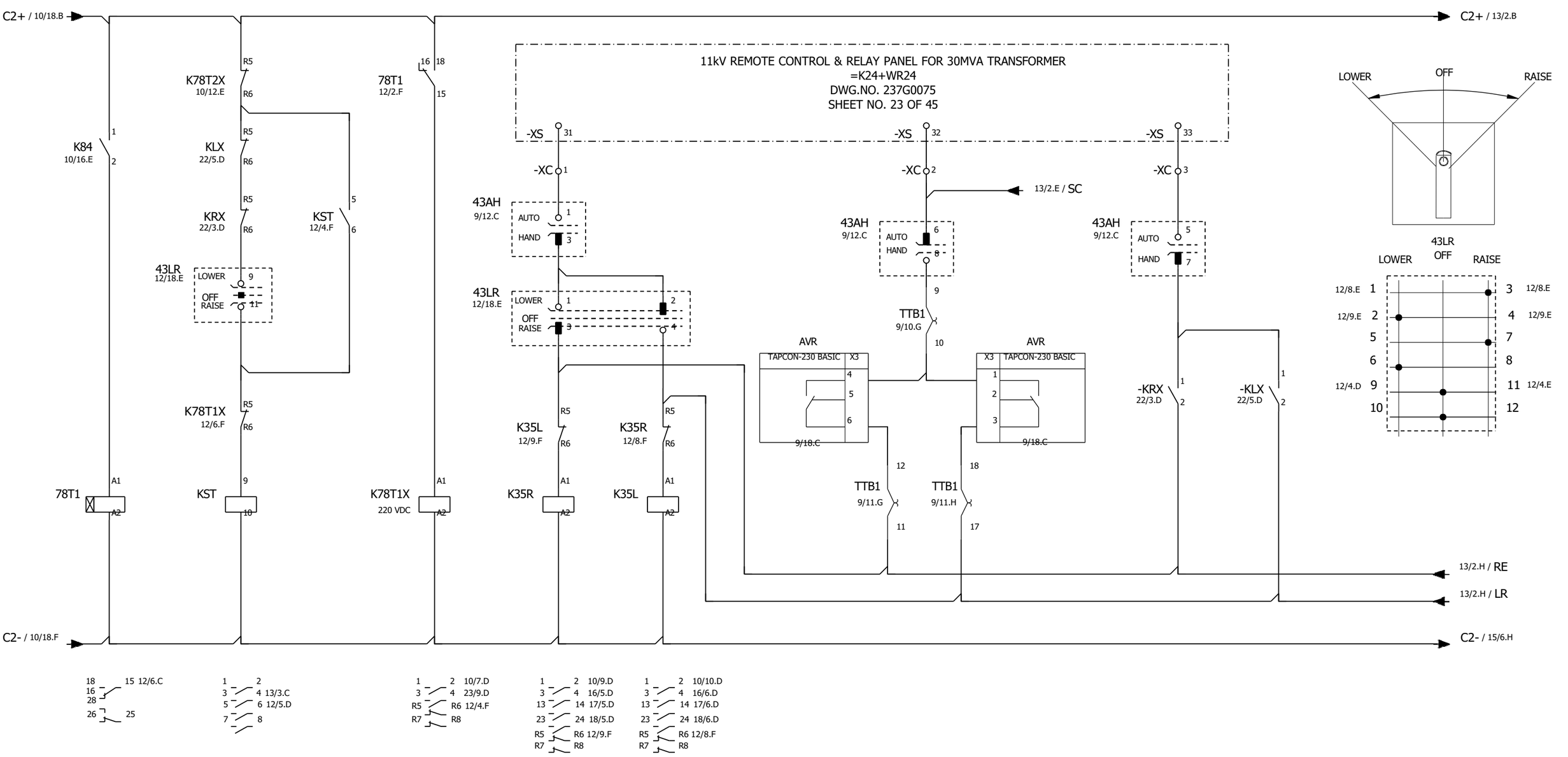
DWG. No : 237G0139 | Rev No. 00 | Sh. Size A3 | Sh No. 11 OF 36

Rev.	Zone	Disctription	Date	By	Approv

30MVA TRANSFORMER No.3 OLTC CONTROL PANEL
=TK03+W03

RUNNING TIME SUPERVISION	STEP BY STEP	HAND		AUTO		SUPERVISORY		LOWER / OFF / RAISE SWITCH CONTACT UTILIZATION
		RAISE	LOWER	RAISE	LOWER	RAISE	LOWER	



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Title : SCHEMATIC DIAGRAM OF 30MVA TRANSFORMER OLTC CONTROL BOARD =TK03+W03 CONTROL CIRCUIT

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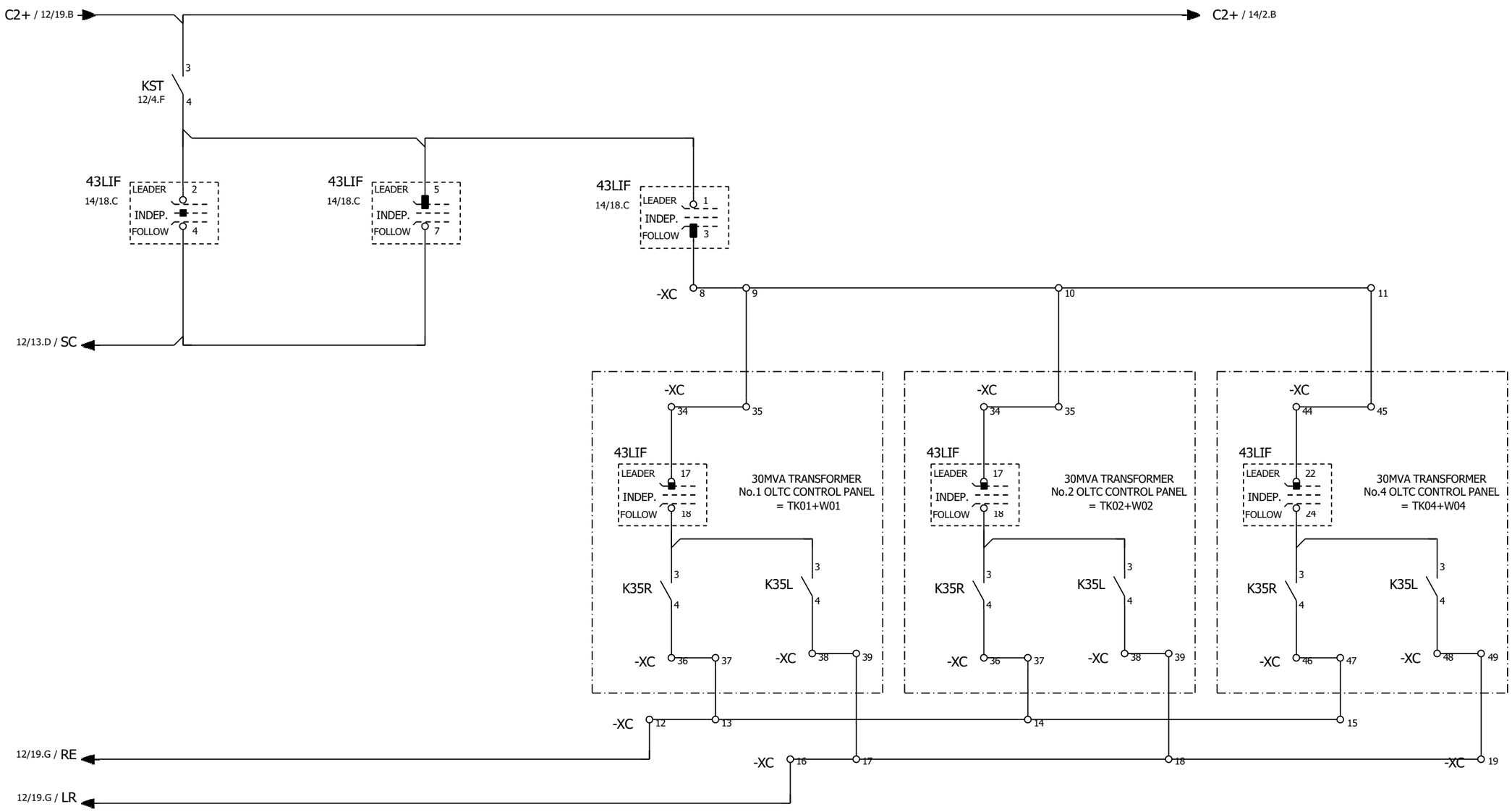
Rev.	Zone	Disctription	Date	By	Approv

30MVA TRANSFORMER No.3 OLTC CONTROL PANEL
=TK03+W03

TR3 INDEPENDENT SELECTED	TR3 LEADER SELECTED	TR3 FOLLOWER SELECTED					
		TR1 LEADER		TR2 LEADER		TR4 LEADER	
		RAISE	LOWER	RAISE	LOWER	RAISE	LOWER



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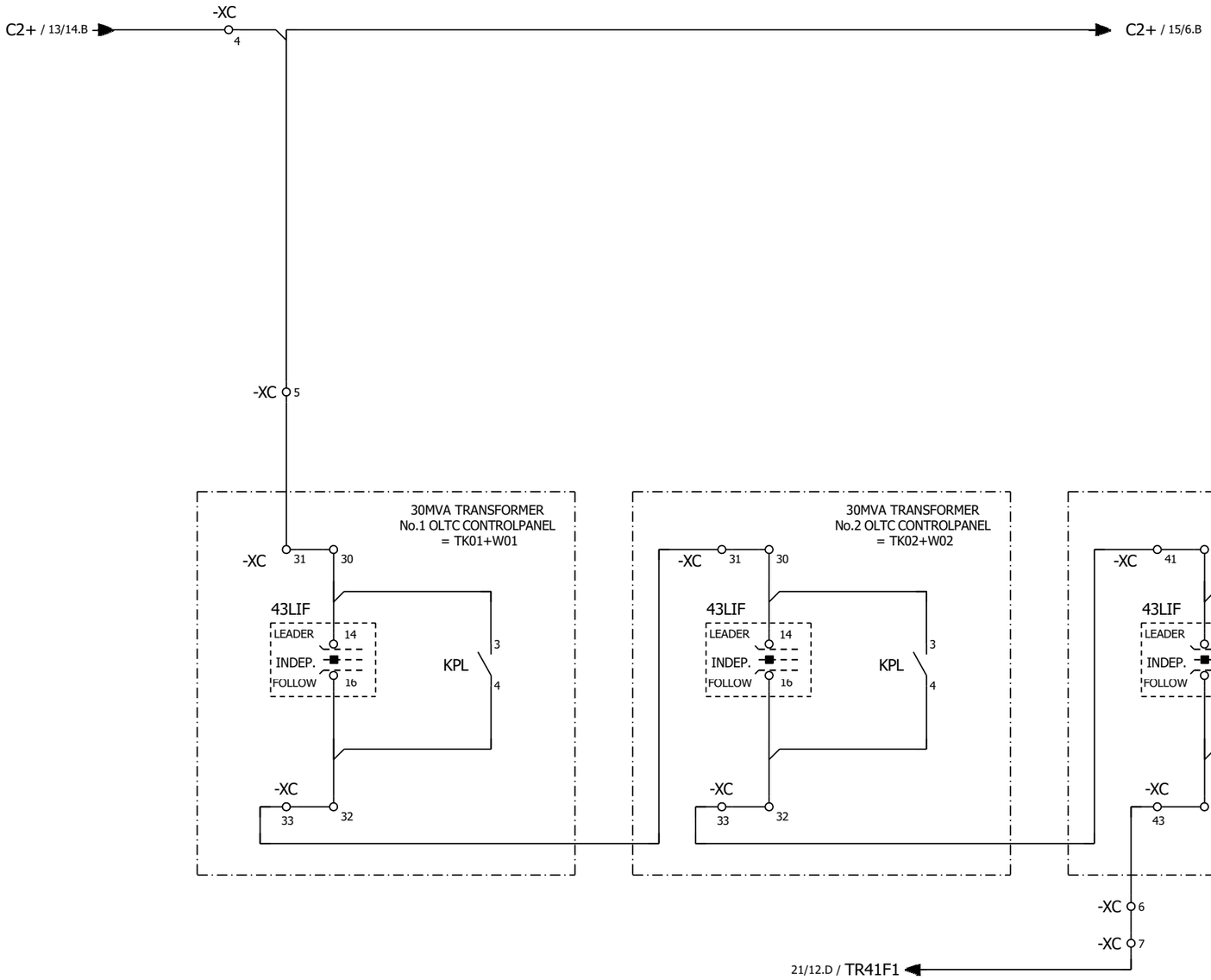
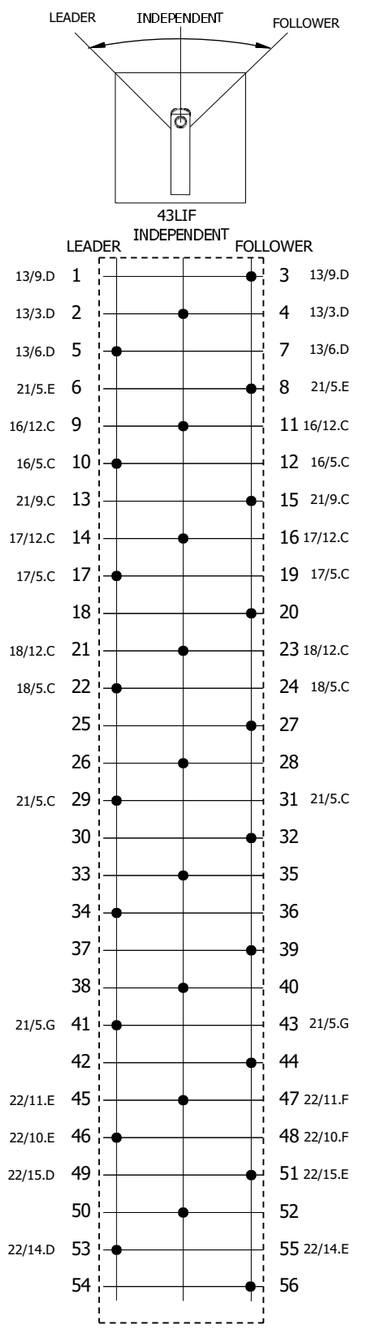
DWG. No : 237G0139 | Rev No. 00 | Sh. Size A3 | Sh No. 13 OF 36

Rev.	Zone	Disctription	Date	By	Approv

30MVA TRANSFORMER No.3 OLTC CONTROL PANEL
=TK03+W03

	TR3 LEADER					
	TR1 INDEPENDENT SELECTED	TR1 FOLLOWER SELECTED	TR2 INDEPENDENT SELECTED	TR2 FOLLOWER SELECTED	TR4 INDEPENDENT SELECTED	TR4 FOLLOWER SELECTED





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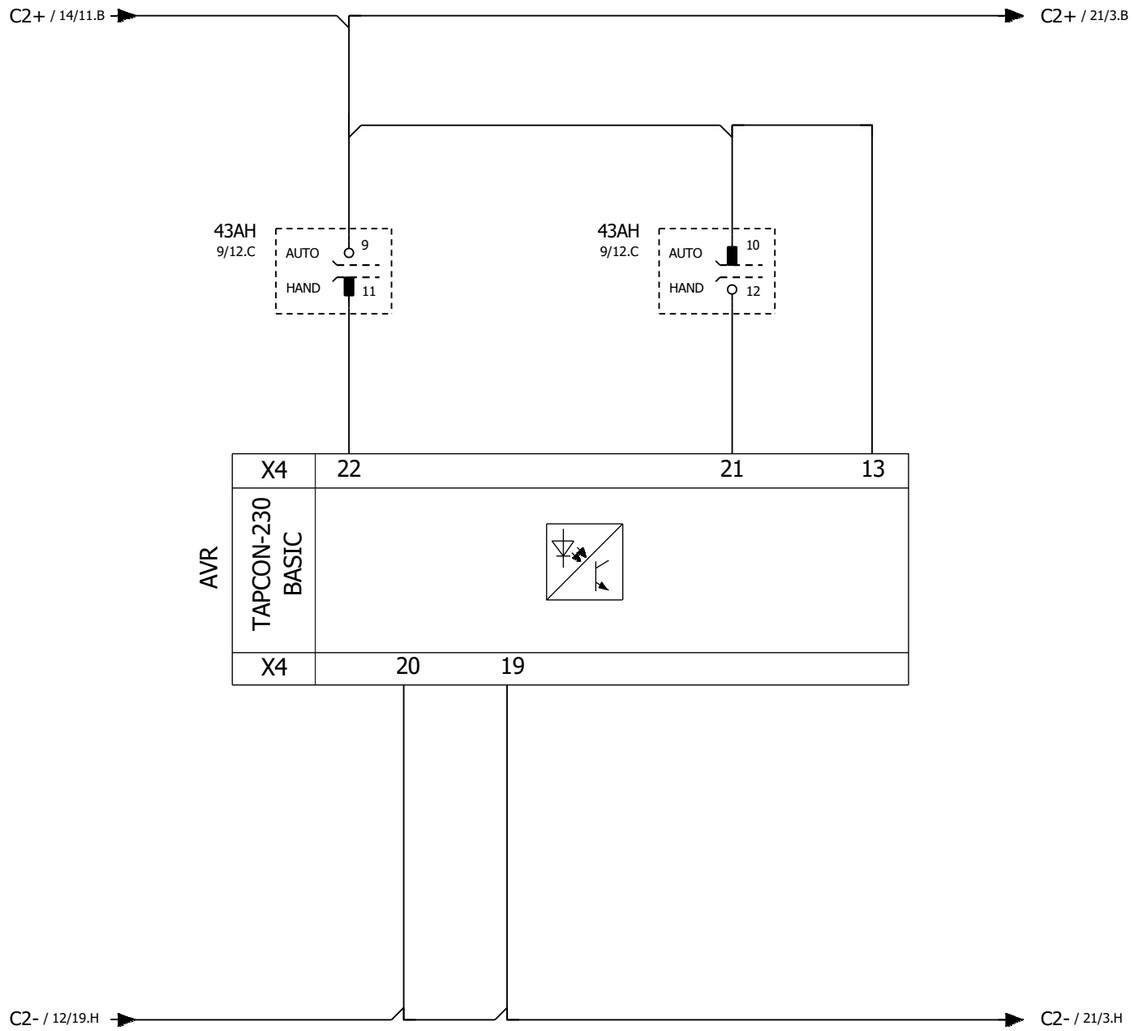
Rev.	Zone	Disctription	Date	By	Approv

30MVA TRANSFORMER No.3 OLTC CONTROL PANEL
=TK03+W03

AVR (TAPCON-230 BASIC)	
HAND	AUTO



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