



Training on Various IED (Intelligent Electronic Device) Relay Control Wiring from VCB to Control & Relay Panel.

INDEX

1. Code of Practice
2. ANSI standard device numbers
3. Existing IED Relays Make wise
4. Block Diagram of Schneider -Vamp 255
5. Block Diagram of Schneider – Easergy P3U30
6. Block Diagram of Schneider -Easergy-P3T32
7. Block Diagram of ABB – RET/REF -615
8. BHEL outdoor VCB to Easergy IED Relay wiring diagram
9. Stelmec outdoor VCB to Easergy IED Relay wiring diagram
10. BHEL outdoor VCB to ABB IED Relay wiring diagram
11. Phase sequence mismatch PT Circuit
12. 33kV and 11kV Indoor and Outdoor Panels Drawings with RTU

I. Code of Practice: Protection

1. Circuitry: -

- The entire wiring of circuitry for indications, alarms, metering and protection should be permanent wiring.
- The leads should be identified by ferrules near terminals.
- Every lead should end at a terminal point and no junctions by twisting is allowed. If two wires are to be terminated at same terminal they may be connected at two different terminals and a loop provided.
- The wiring should be by copper leads for C.T secondaries for all cores (i.e.) metering as well as protection.
- The wiring should be by copper leads for PT secondaries also wherever they are intended for protection.
- The copper lead for CT and PT secondary wiring should be multi-stranded.
- The terminations should be lugged by ring shape 'O' lugs. 'U' shape lugs should be avoided.
- For CT Secondary terminations, two nuts with one spring washer and two flat washers to be compulsorily used.
- The terminal strips should be stud type with nuts and not screw-in-type.
- D.C and A.C supplies should not be taken through different cores of the same cable.
- When CBs have two trip coils, both main protection and backup protection will energize both the trip coils.
- Independent D.C cables should be run to every equipment in the yard and looping of D.C supply either in the yard or in the control room from one equipment to the other is not permitted
- For indications, alarms, annunciators, controls (closing coil, trip coil, etc. negative (-ve) is always given direct and positive (+ve) is supplied only 'on commands' like close, trip, relay trip, etc.
- Where D.C protection supply is at 24 volts, the battery units should be very near the equipment and not in the control rooms.

2. Standard Ferrule Numbers: -

J Series	D.C Incoming	J1, J2, etc.
K Series	Control - Closing, Tripping, etc.	K1, K2, K3 etc.
L Series	Alarms, indications and annunciations	L1, L2, L3, etc.
E Series	Potential transformer secondaries	E1, E2, E3, etc.
H Series	LT A.C Supply	H1, H2, H3, etc.
A Series	C.T secondary for special protection	A1, A2, A3, etc.
B Series	Bus bar protection	B1, B2, B3, etc.
C Series	Protection Circuits	C1, C2, C3, etc.
D Series	Metering Circuits	D1, D2, D3, etc.

- Wherever CT cores are not used “SHORTING LOOPS” should be provided near CT secondary terminals and not in marshalling boxes or at panels.
- The Cable entries near equipment, marshalling boxes and panels should be by use of appropriate size glands.
- The Wiring inside the panels should be clear and neatly fastened avoiding loose wires.
- All wires not in use should not only be disconnected but removed from panels.

3. **STANDARD LEAD NUMBERS: -**

Certain lead numbers are standardised as follows and should be compulsorily adopted with ferrules at terminations.

J1 – DC Positive

J2 - DC Negative

K1- DC Positive Outgoing

K2- DC Negative Outgoing

Local Close – K5

Local Trip - K3

CB ON Indication – L3

CB OFF Indication -L5

CB Spring Charge – L7

CB Trip circuit Healthy – K3A

II. ANSI standard device numbers: -

SL. NO	ANSI STANDARD ABBREVIATION	ANSI STANDARD DEVICE NUMBER
1	Master Element	1
2	Time-delay Starting / Closing relay	2
3	Checking / Interlocking Relay	3
4	Master Protection	4
5	Undervoltage Relay	27
6	Phase Undervoltage	27P
7	DC undervoltage Relay	27S
8	Annunciator Relay	30
9	Directional Power Relay	32
10	Reverse Power	32R
11	End Fault Protection	50EF
12	Ground Instantaneous Overcurrent	50G
13	Neutral Instantaneous Overcurrent	50N
14	Phase Instantaneous Overcurrent	50P
15	Sensitive Ground Instantaneous Overcurrent	50SG
16	Negative Sequence Instantaneous Overcurrent	50Q
17	Instantaneous / Time-delay Overcurrent Relay	50/51
18	Phase Time Overcurrent	51P
19	AC circuit breaker	52
20	AC circuit breaker position (contact open when circuit breaker open)	52a
21	AC circuit breaker position (contact closed when circuit breaker open)	52b
22	Power Factor Relay	55
23	Phase Overvoltage	59P
24	Neutral Overvoltage	59N
25	Neutral Voltage Unbalance	59NU
26	Negative Sequence Overvoltage	59Q
27	Rheostat	70
28	DC Circuit Breaker	72
29	Alarm Relay	74
30	DC Overcurrent Relay	76
31	Frequency Relay	81
32	Over Frequency	81O
33	Lock-Out Relay; Master Trip Relay	86
34	Differential Protective Relay	87
35	Transformer Differential	87T
36	Anti pumping Relay	94

III. Existing IED Relays Make wise in APEPDCL: -

1. Make: Schneider Type: **Vamp 255**



Main features: -

- Fully digital signal handling with a powerful 16-bit microprocessor, and high measuring accuracy on all the setting ranges due to an accurate 16-bit A/D conversion technique.
- Freely configurable display with six measurement values.
- Freely configurable interlocking schemes with basic logic functions.
- Recording of events and fault values into an event register from which the data can be read via a keypad and a local HMI or by means of a PC based VAMPSET user interface.
- Built-in, self-regulating ac/dc converter for auxiliary power supply from any source within the range from 40 to 265 Vdc or Vac. The alternative power supply is for 18 to 36 Vdc.
- Built-in disturbance recorder for evaluating all the analogue and digital signals.
- Eight (8) programmable stages for alarming or protection purposes

2. Make: Schneider Type: **Easergy P3U30**



Main features: -

- A complete set of protection functions, related to the application
- Arc detection (Easergy P3 Advanced)
Dedicated circuit breaker control with single-line diagram, push buttons, programmable function key and LEDs, and a customizable alarm
- Multilingual HMI for customized messaging
Settings tool relay management software for setting parameters, configuring, and network fault simulation
Both serial and Ethernet communication, including redundancy
- IEC 61850 standard Ed.1 & Ed.2

3. Make: ABB Type: **REF 615**



Main features: -

- Directional and non-directional overcurrent and earth-fault protection, voltage, frequency and power-based protection and measurement functionality

- Optional advanced and fast fault location of short circuits and earth faults, arc protection and high-speed outputs
- Supports IEC 61850 Editions 1 and 2, including HSR and PRP, GOOSE messaging and IEC 61850-9-2 LE for less wiring and supervised communication

4. Make: Schneider Type: **P3T32**



Main features: -

- The relay is a transformer protection relay
- The relay has an optional interface for connecting four arc flash point sensors.
- The relay has optional arc flash communications and high-speed outputs to allow for simple arc flash system configuration.
- 128 x 128 LCD matrix Display
- IEC61850

IV. 1. Block Diagram of VAMP-255

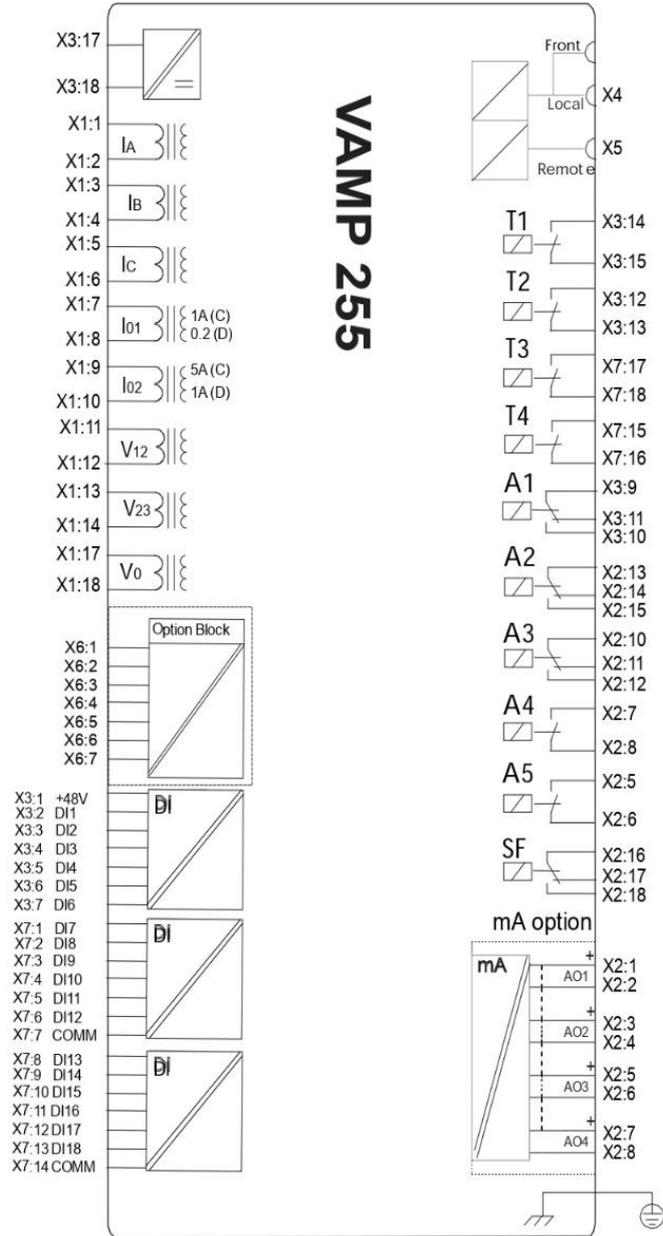
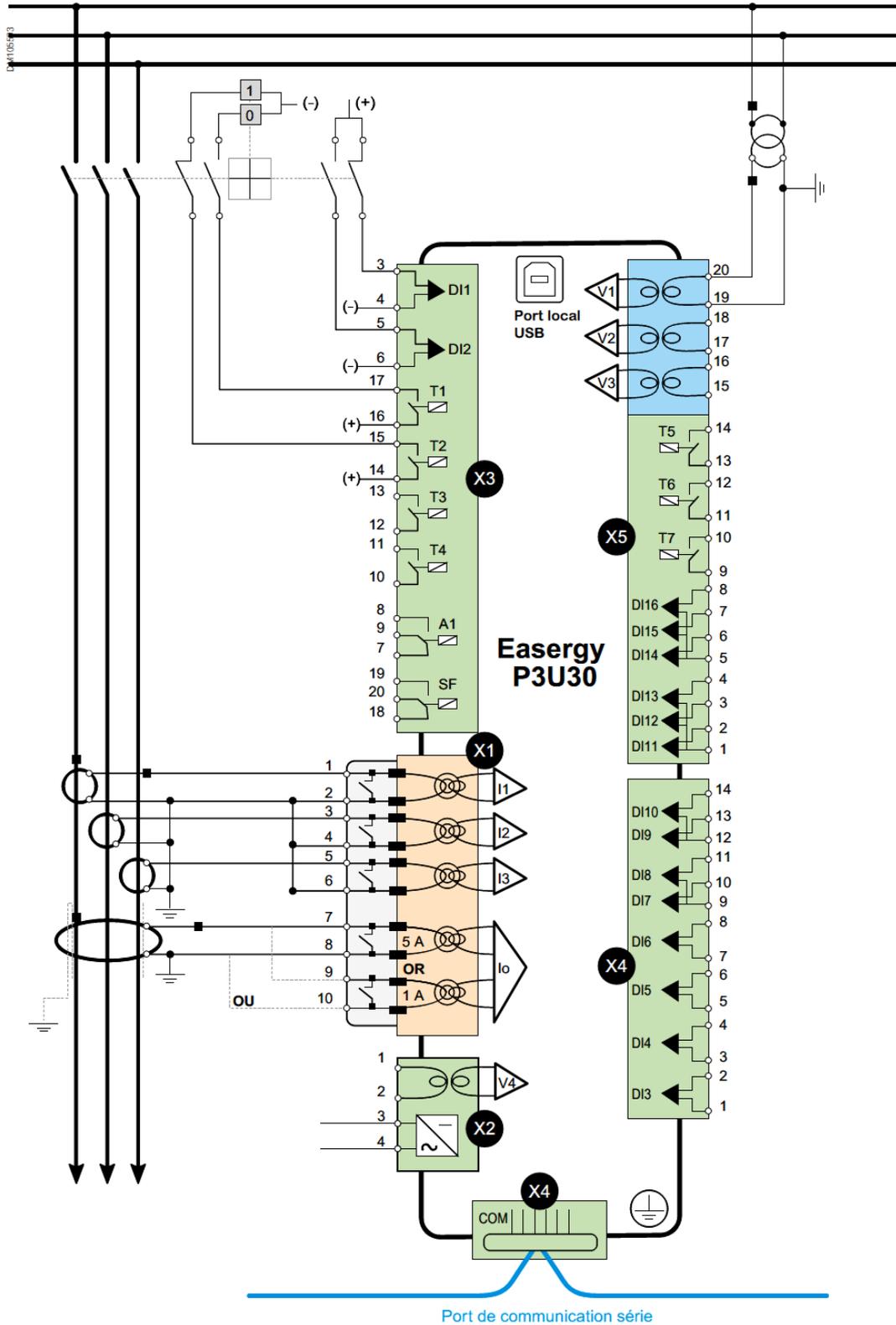
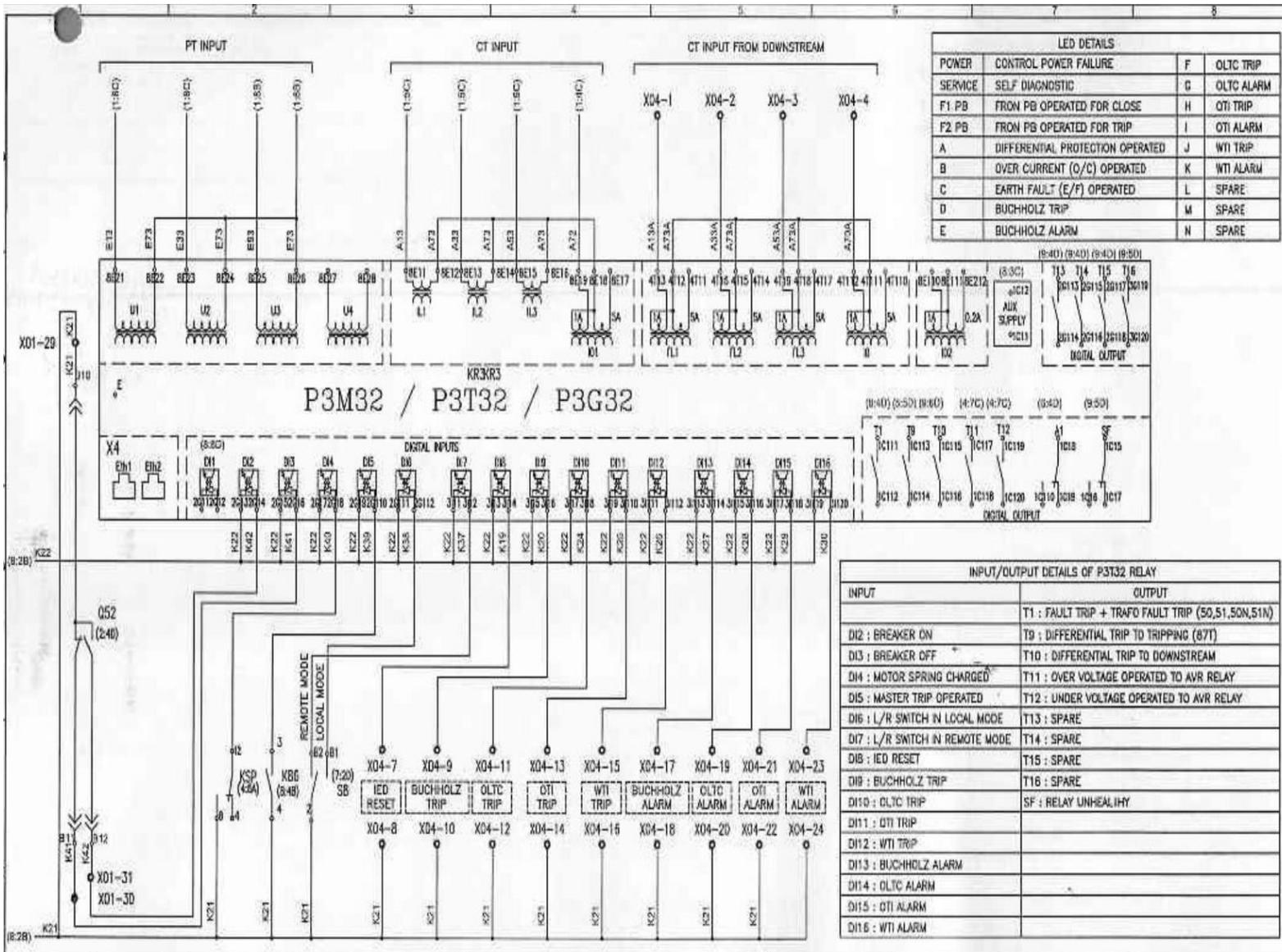


Figure 11.12: Block diagram of VAMP 255, with the mA-option included.

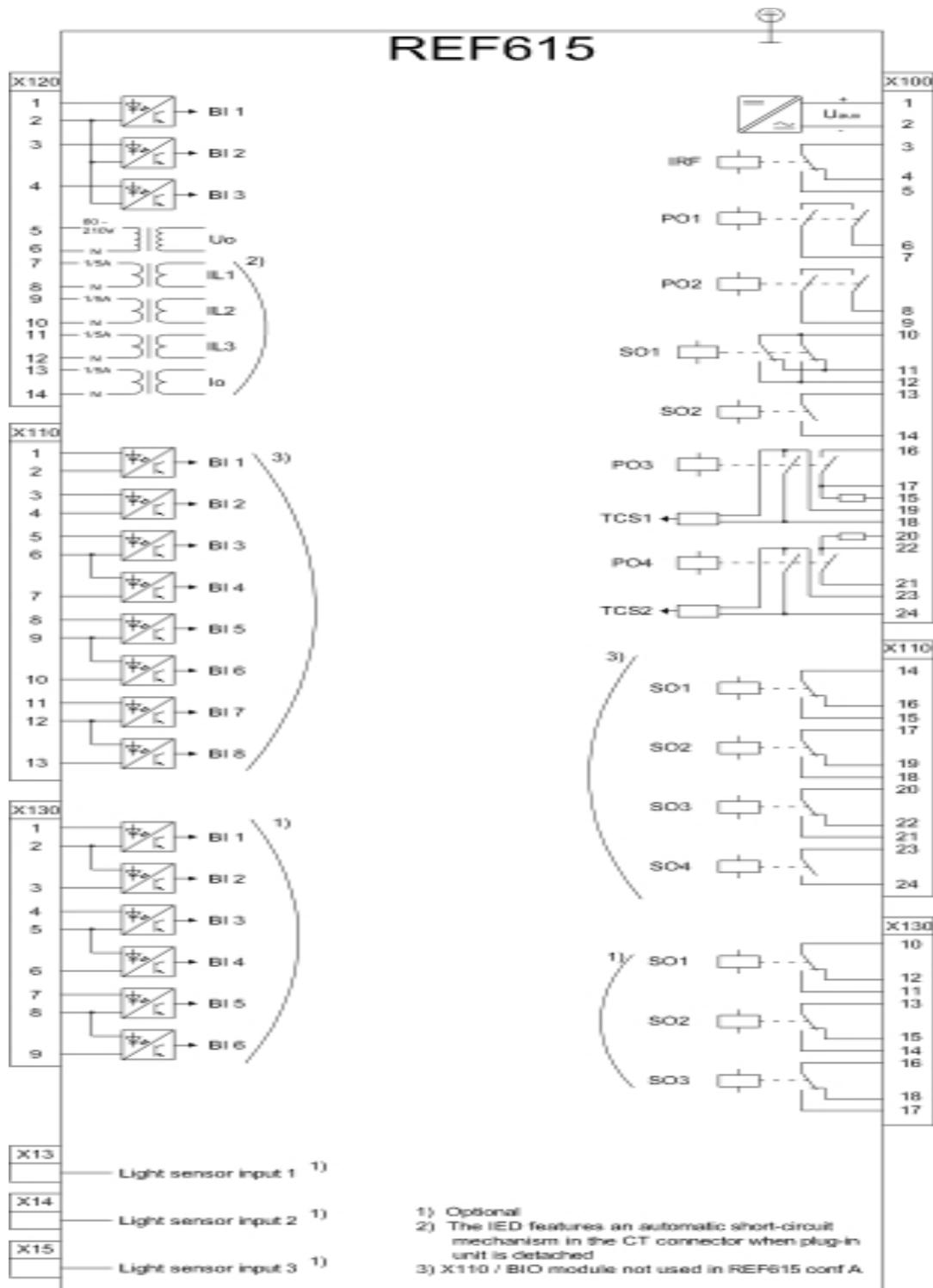
V. Block Diagram of Easergy P3U30



VI. Block Diagram of Easergy P3T32: -

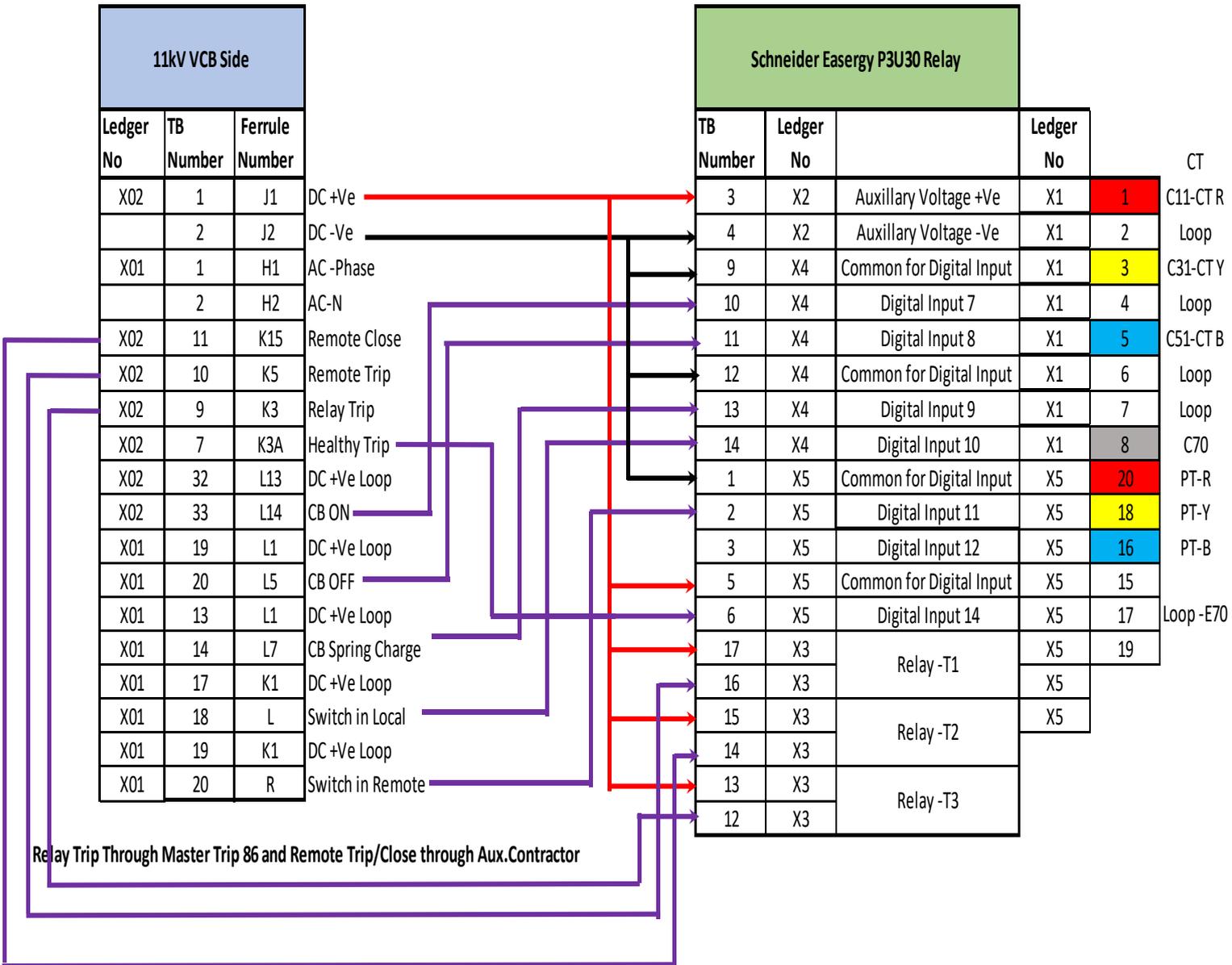


VII. Block diagram of ABB REF 615: -



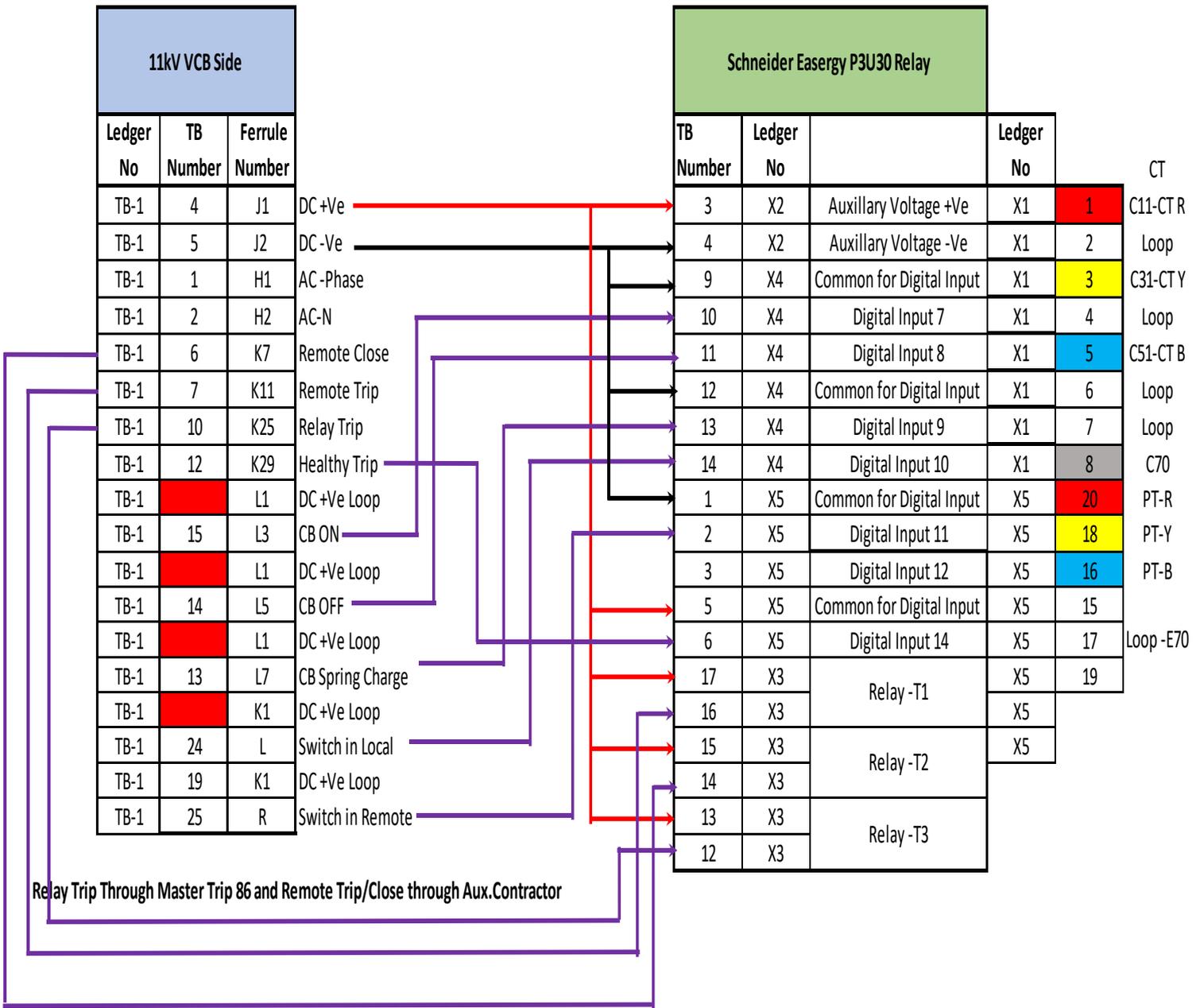
VIII. 11kV BHEL Make VCB to Easegy P3U30 Connection Diagram

11kV BHEL Make VCB to Easegy P3U30 Connection diagram



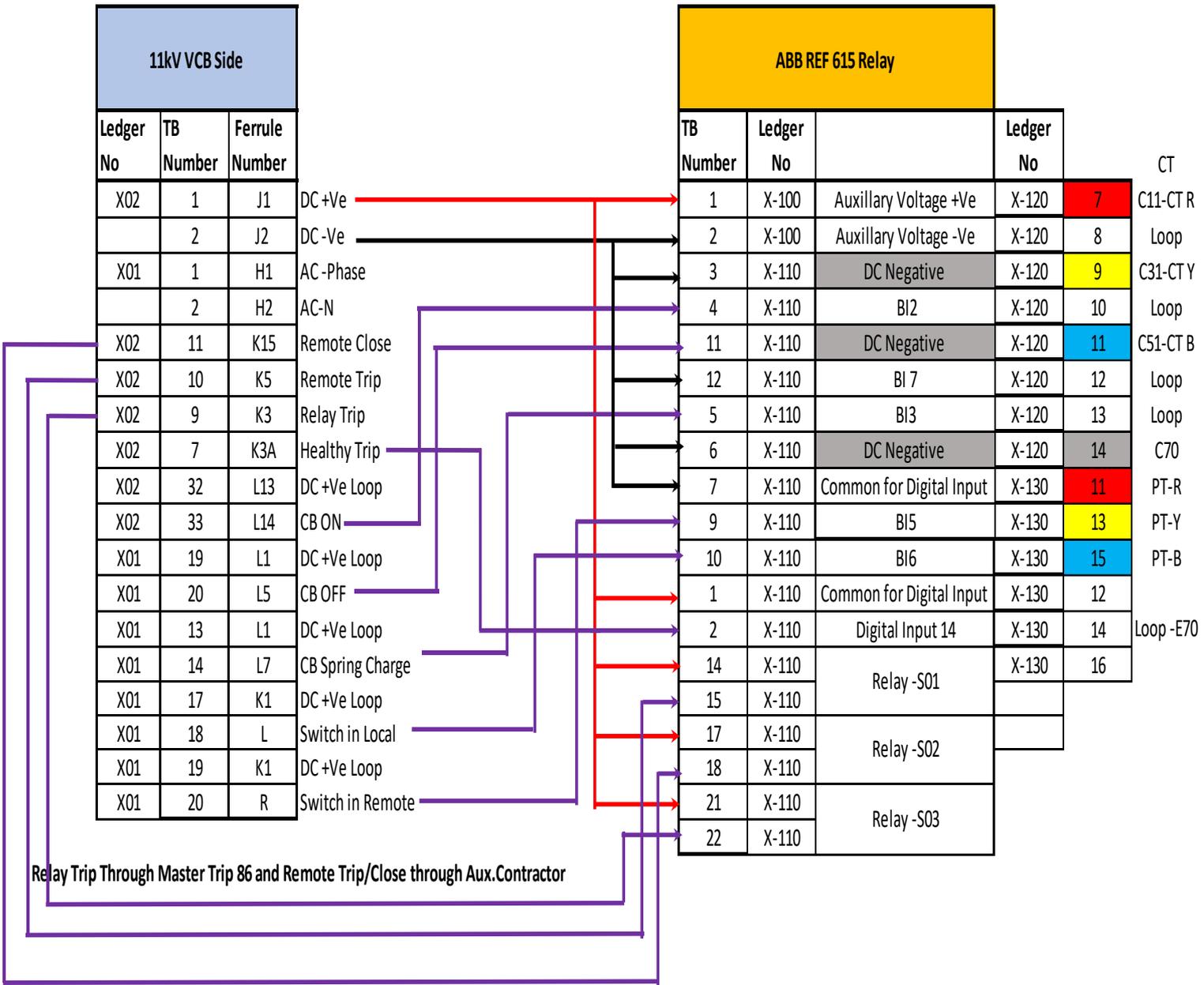
IX. 11KV Stelmac Make VCB to Easegy P3U30 Connection Diagram

11kV STELMEC Make VCB to Easery P3U30 Connection diagram



X. 11KV BHEL Make VCB to ABB REF 615 Connection Diagram

11kv BHEL Make VCB to ABB REF 615 Connection diagram



Drawings

35620061774

DRAWING NO.

SCHEME OF OUTDOOR CONTROL AND RELAY PANELS FOR 11KV PTR LV OUTDOOR CIRCUIT BREAKER OF APEPDCL VISHAKHAPATNAM

TABLE-1

WO	CUSTOMER PO.NO.	VCB Unit sl. Nos.	QTY	CT DETAILS	GOVT. SCHEME
97050A47601	CGM/P&MM/EPDCL/P4/VSP/CEMPT/-50/17-18/PM-4970/17, DT: 23.12.2017	9146812 to 9146839	28	11 kV O/D LV CT RATIO 600-300/1-1A CORE-I:15VA,5P10,CORE-II:5VA, 0.2S	-
97056A47601	CGM/P&MM/EPDCL/P4/VSP/CEMPT/-50/17-18/EXTN.PM(1)-4970/17, DT: 22.01.2018	8217382 to 8217385	4	11 kV O/D LV CT RATIO 600-300/1-1A CORE-I:15VA,5P10,CORE-II:5VA, 0.2S	IPDS
97056A47601	CGM/P&MM/EPDCL/P4/VSP/CEMPT/-50/17-18/EXTN.PM(1)-4970/17, DT: 22.01.2018	8217386 to 8217389	4	11 kV O/D LV CT RATIO 600-300/1-1A CORE-I:15VA,5P10,CORE-II:5VA, 0.2S	DDUGJY

WO_NO : REFER TABLE-1

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	DEPT. SWE	 BHARAT HEAVY ELECTRICALS LTD. BHOPAL	OUTDOOR CRP FOR 11KV VCB APEPDCL VISHAKHAPATNAM				
		CHECKED			CHECKED			CODE 409							
		APPROVED			APPROVED										
ZONE			ZONE			ZONE			DRN. NAME N.M.	SIGN	DATE 24/02/18	NO. OF VAR	TITLE	DRAWING NO.	REV
									APPD. M.A.K.		24/02/18		OUTDOOR CONTROL & RELAY PANEL TITLE SHEET	35620061774	00
												SHT. NO. 01	NO OF SHEETS 15		

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INVENTORY NO.

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SHEET NO.	TITLE
1	TITLE SHEET
2	CONTENTS
3	3-LINE DIAGRAM-CT CONNECTIONS & AC SCHEME-NR RELAY
4	3-LINE DIAGRAM-CT CONNECTIONS
5	METERING CIRCUIT
6	240V AC SUPPLY DISTRIBUTION
7	24V DC SUPPLY DISTRIBUTION
8	TRIP CONDITIONS (86) & DC SCHEME-NR
9	PROTECTION CIRCUIT
10	LED INDICATIONS
11	CB CONTROL-CLOSE & TRIP COIL
12	CB CONTROL-CLOSE & TRIP COIL
13	ALARM CANCELLATION SCHEME
14	ALARM ANNUNCIATOR
15	CONTACT DISTRIBUTION & SWITCH DETAIL

NOTE : 1. CONTACTS OF MAIN NUMERICAL RELAY & TRIP RELAY IS REPRESENTATIVE ONLY , AVAILABLE CONTACTS FROM THE RESPECTIVE MANUFACTURER WILL BE UPDATED IN THE AS BUILT DRAWINGS.
 2. TERMINAL NOS. MAY CHANGE AFTER FINALIZING OF MAKE OF EACH ITEM AND WILL BE REFLECTED IN AS BUILT DAWINGS.

REF. DRG. NO.
SIGN & DATE

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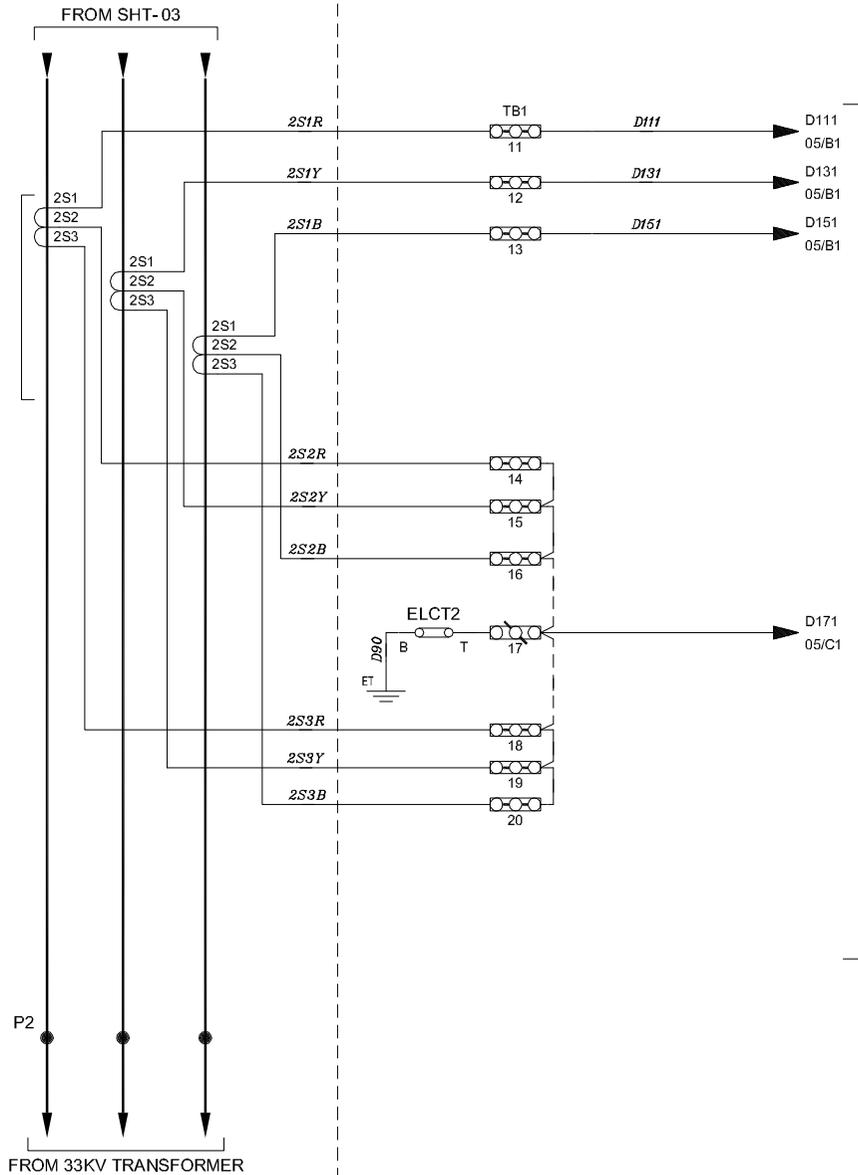
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		APPROVED				APPROVED				APPROVED		409							
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												M.H.N.			24/02/18		CONTENTS		
												M.A.K.			24/02/18			SHT. NO. 02	NO OF SHEETS 15

35620061774

DRAWING NO.

REMOTE SIDE

CT CORE-2
(FOR CT DETAILS REFER TABLE-1)



FOR METERING

NOTE:-

CT CONNECTIONS ARE SHOWN FOR HIGHER TAB

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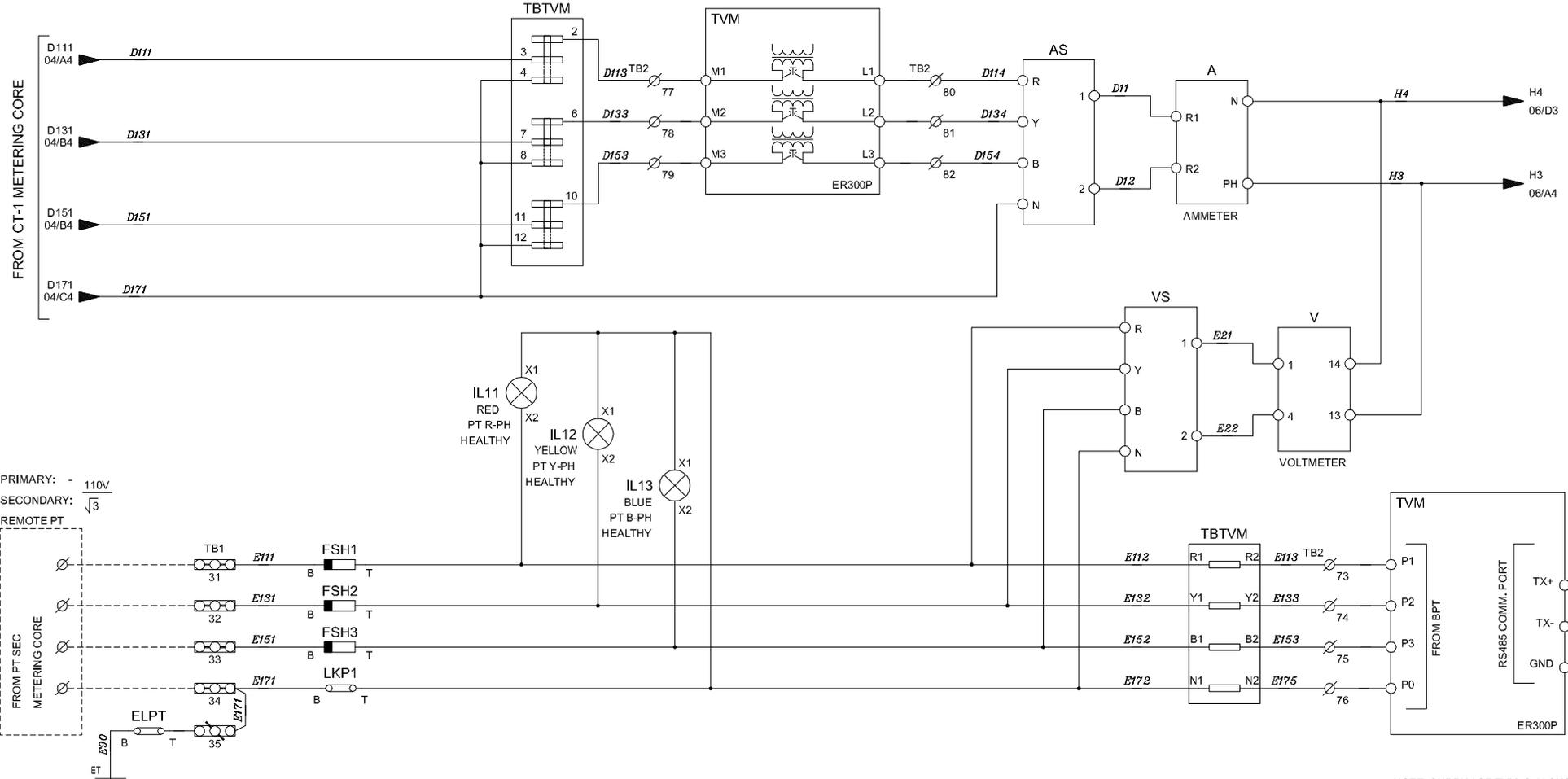
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				APPROVED						APPROVED					APPROVED

DEPT. SWE		BHARAT HEAVY ELECTRICALS LTD.		OUTDOOR CRP FOR 11KV VCB	
CODE 409		BHOPAL		APEPDCL VISHAKHAPATNAM	
DRN. N.M.	NAME N.M.	SIGN	DATE 24/02/18	NO. OF VAR	TITLE
CKD. M.H.N.	NAME M.H.N.	SIGN	DATE 24/02/18	NO. OF VAR	OUTDOOR CONTROL & RELAY PANEL 3-LINE DIAGRAM-CT CONNECTIONS
APPD. M.A.K.	NAME M.A.K.	SIGN	DATE 24/02/18	NO. OF VAR	
DRAWING NO. 35620061774				REV 00	
SHT. NO. 04		NO OF SHEETS		15	

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PRIMARY: - 110V
SECONDARY: $\frac{110}{\sqrt{3}}$
REMOTE PT

FROM PT SEC METERING CORE

NOTE: SUPPLY OF TVM IS IN CUSTOMER SCOPE.

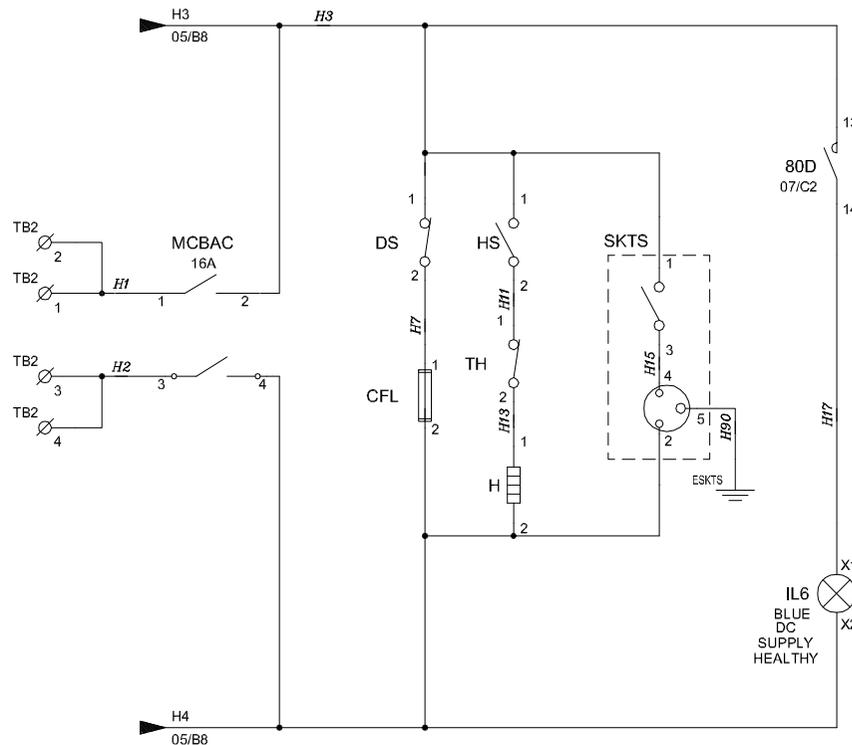
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SINGLE PH.
240V AC
SUPPLY
FROM ACDB



REF. DRG. NO.

SIGN & DATE

INVENTORY NO.

REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHECKED			CHECKED
		APPROVED			APPROVED

DEPT.	SWE
CODE	409



BHARAT HEAVY ELECTRICALS LTD.
BHOPAL

OUTDOOR CRP FOR 11KV VCB
APEPDCL VISHAKHAPATNAM

ZONE		ZONE		ZONE	

DRN.	NAME	SIGN	DATE	NO. OF	TITLE
	N.M.		24/02/18	VAR	
CKD.	M.H.N.		24/02/18		
APPD.	M.A.K.		24/02/18		

OUTDOOR CONTROL & RELAY PANEL
240V AC SUPPLY DISTRIBUTION

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SHT. NO. 06	NO OF SHEETS 15

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A

B

C

D

E

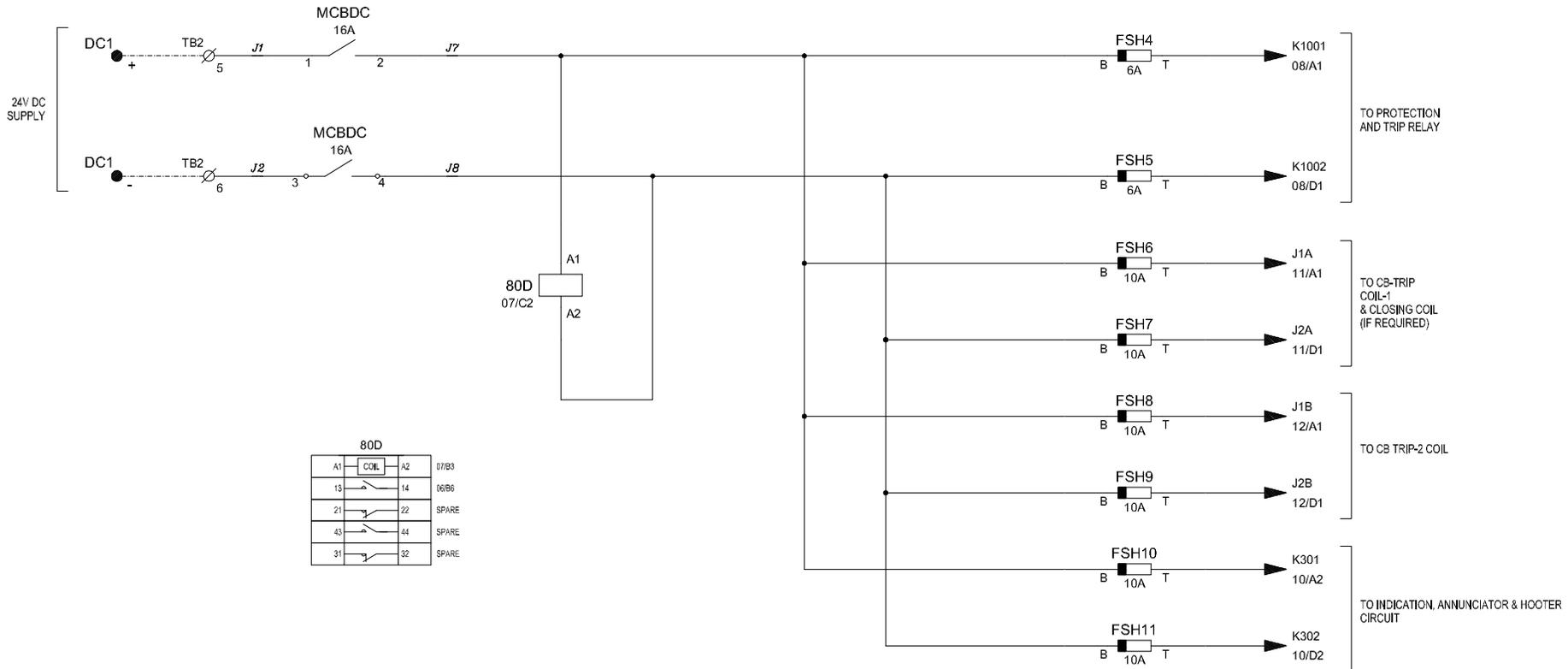
A

B

C

D

E



80D			
A1	COIL	A2	07/B3
13		14	06/B6
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43		44	SPARE
31		32	SPARE

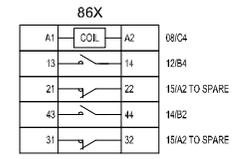
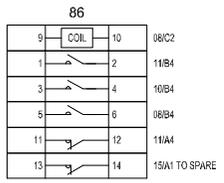
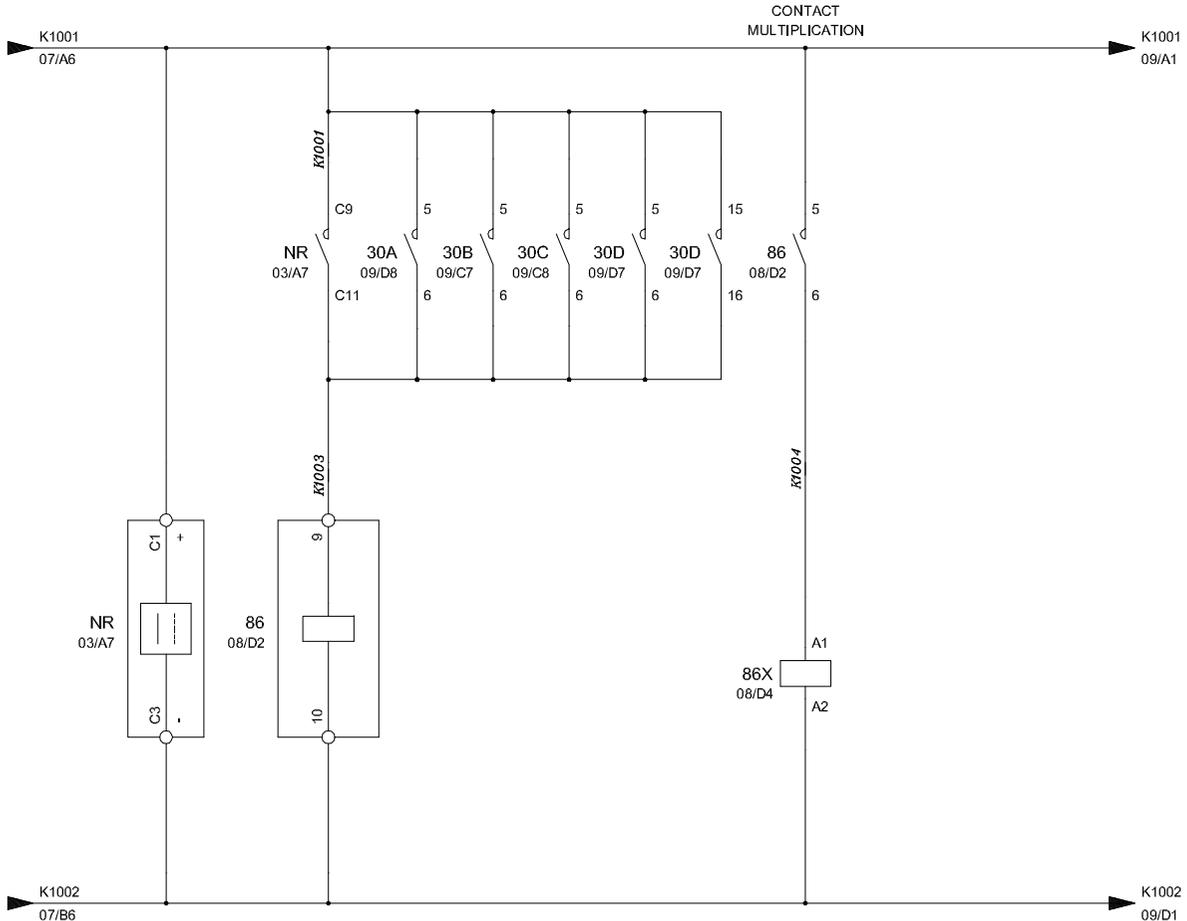
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				APPROVED				APPROVED				APPROVED				

DRN.	NAME	SIGN	DATE	NO. OF	TITLE	DRAWING NO.	REV
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APPD.	M.A.K.		24/02/18			SHT. NO. 07	NO OF SHEETS 15

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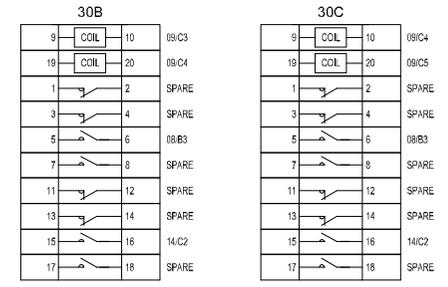
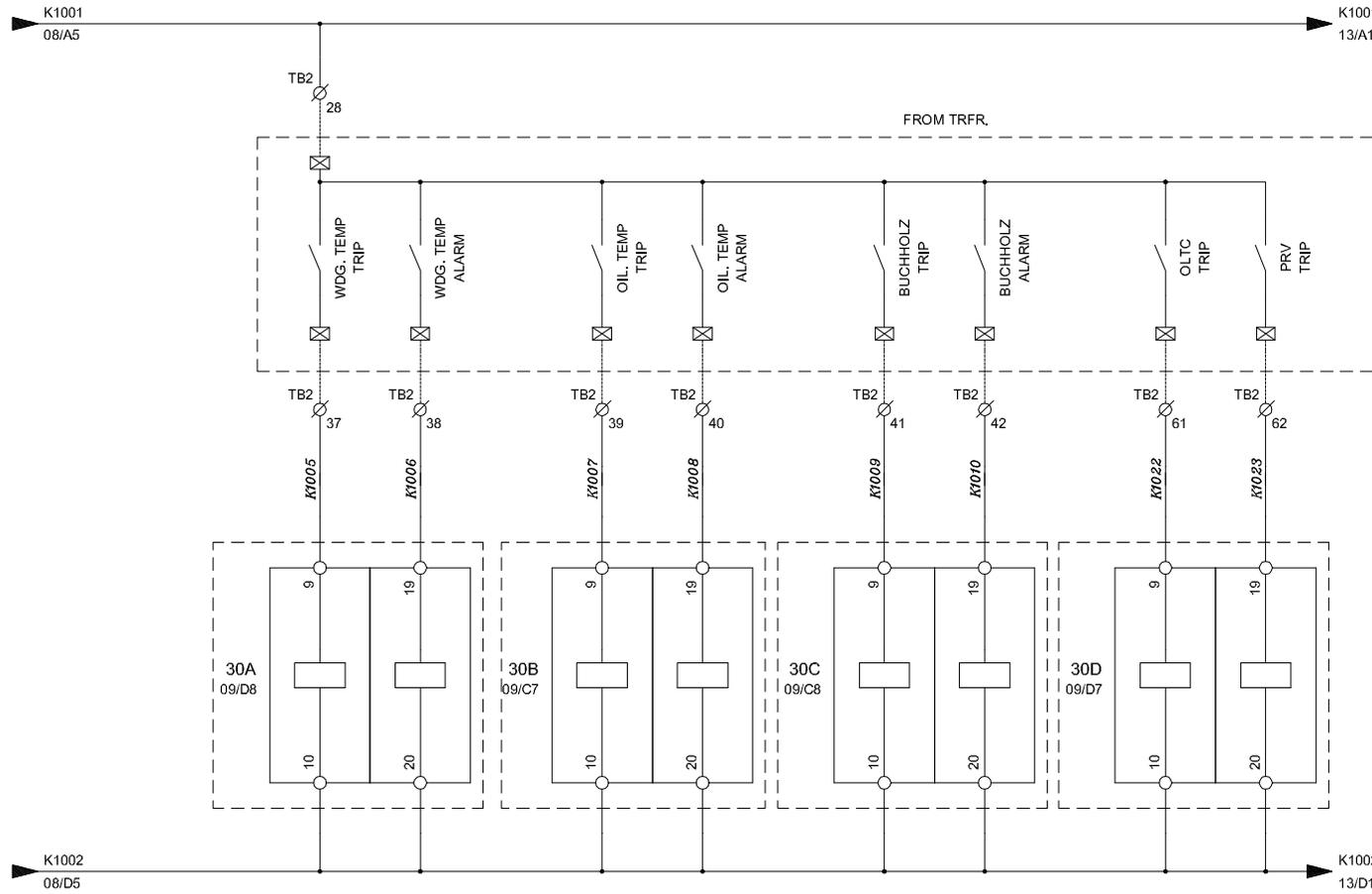
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		APPROVED			APPROVED			APPROVED								
ZONE			ZONE			ZONE			DRN. N.M.	NAME N.M.	SIGN	DATE 24/02/18	NO. OF VAR	TITLE	DRAWING NO. 35620061774	REV 00
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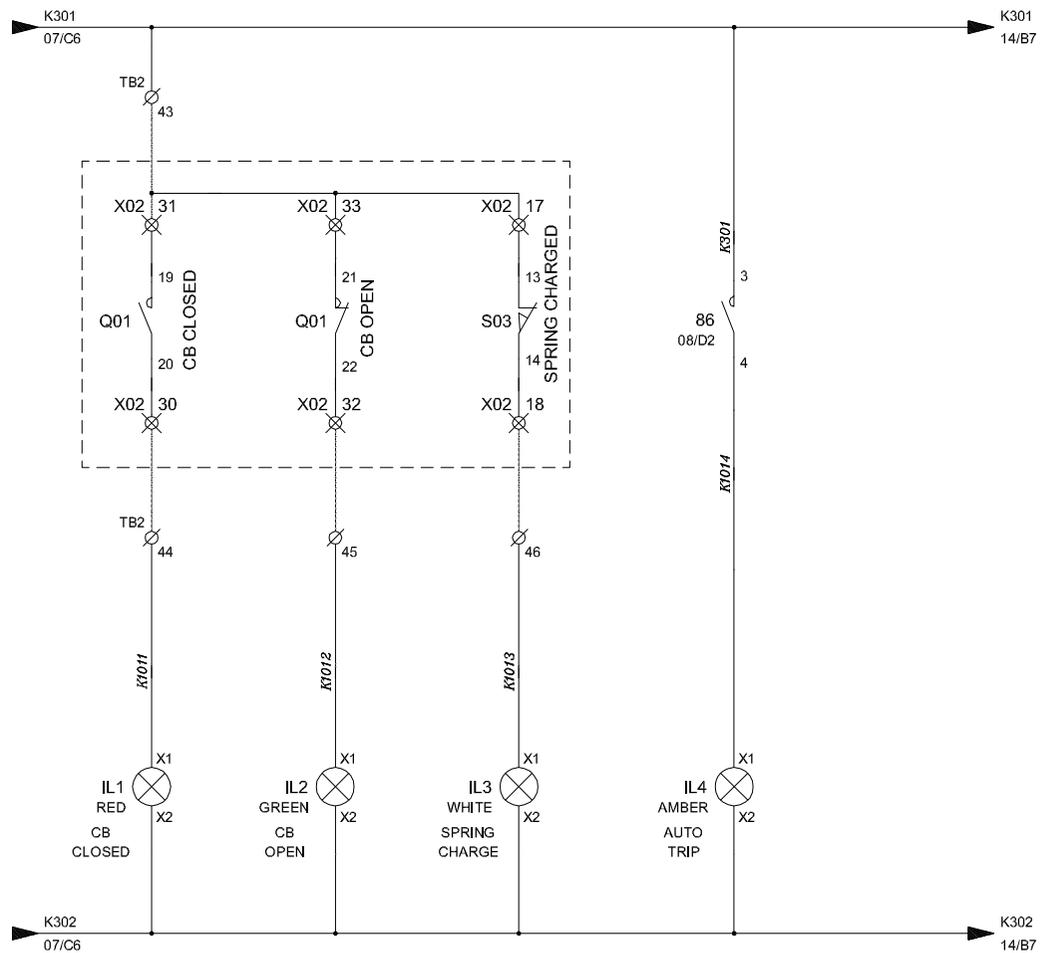
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												409		

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DRN.	NAME	SIGN	DATE	NO. OF	TITLE	DRAWING NO.	REV						
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APPD.	M.A.K.		24/02/18			SHT. NO. 09	NO OF SHEETS	15					

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REF. DRG. NO.

SIGN & DATE

INVENTORY NO.

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHECKED			CHECKED			CHECKED
		APPROVED			APPROVED			APPROVED

DEPT.	SWE
CODE	409



BHARAT HEAVY ELECTRICALS LTD.
BHOPAL

OUTDOOR CRP FOR 11KV VCB
APEPDCL VISHAKHAPATNAM

ZONE	ZONE	ZONE

DRN.	NAME	SIGN	DATE	NO. OF	TITLE
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CKD.	M.H.N.		24/02/18		
APPD.	M.A.K.		24/02/18		

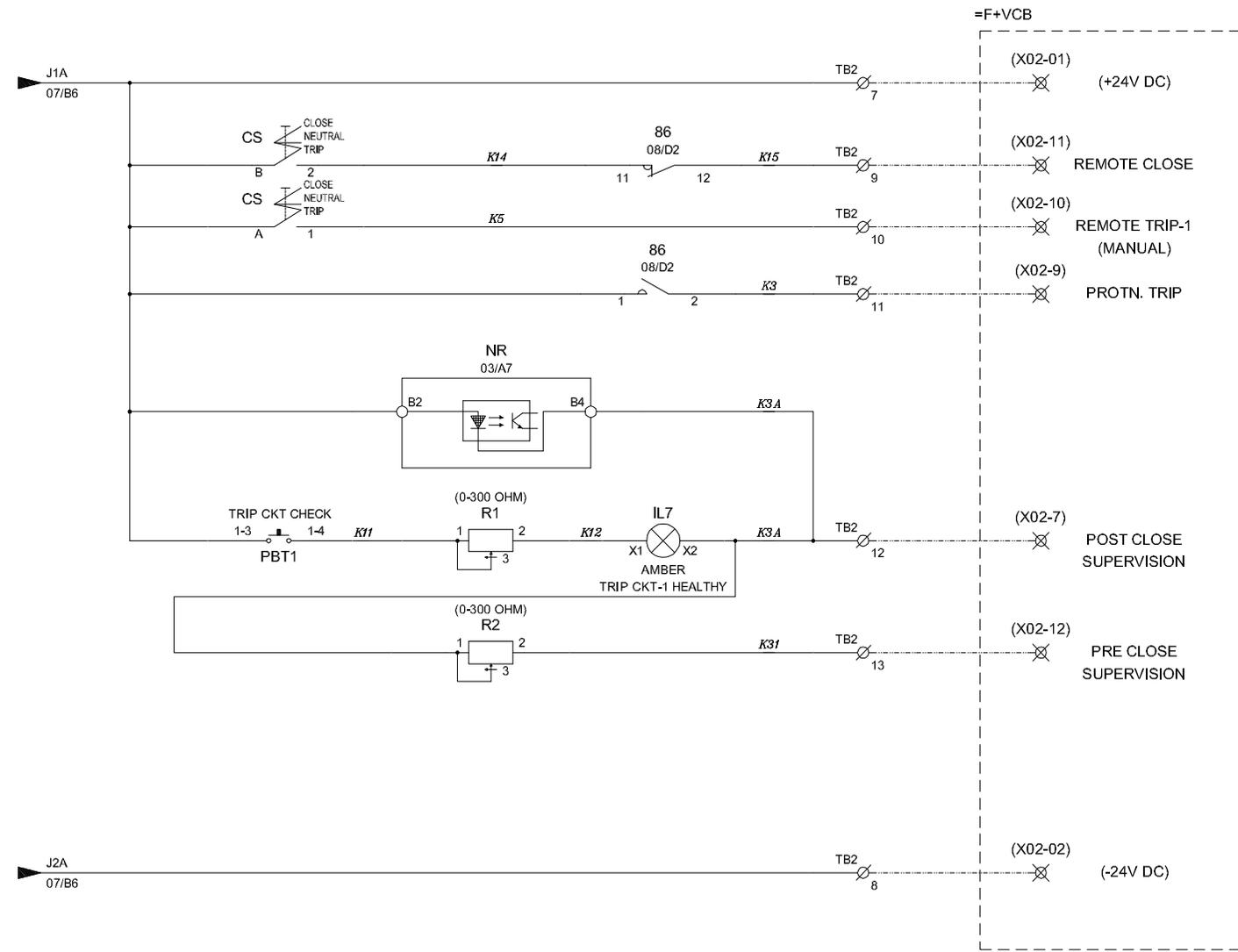
OUTDOOR CONTROL & RELAY PANEL
LED INDICATIONS

DRAWING NO.	REV
35620061774	00
SHT. NO. 10	NO OF SHEETS 15

35620061774

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		CHECKED			CHECKED			CHECKED	CODE 409						
		APPROVED			APPROVED			APPROVED							
ZONE			ZONE			ZONE			DRN. NAME N.M.	SIGN	DATE 24/02/18	NO. OF VAR	TITLE	DRAWING NO. 35620061774	REV 00
									CKD. M.H.N.		24/02/18		OUTDOOR CONTROL & RELAY PANEL CB CONTROL-CLOSE & TRIP COIL	SHT. NO. 11	NO OF SHEETS 15
									APPD. M.A.K.		24/02/18				

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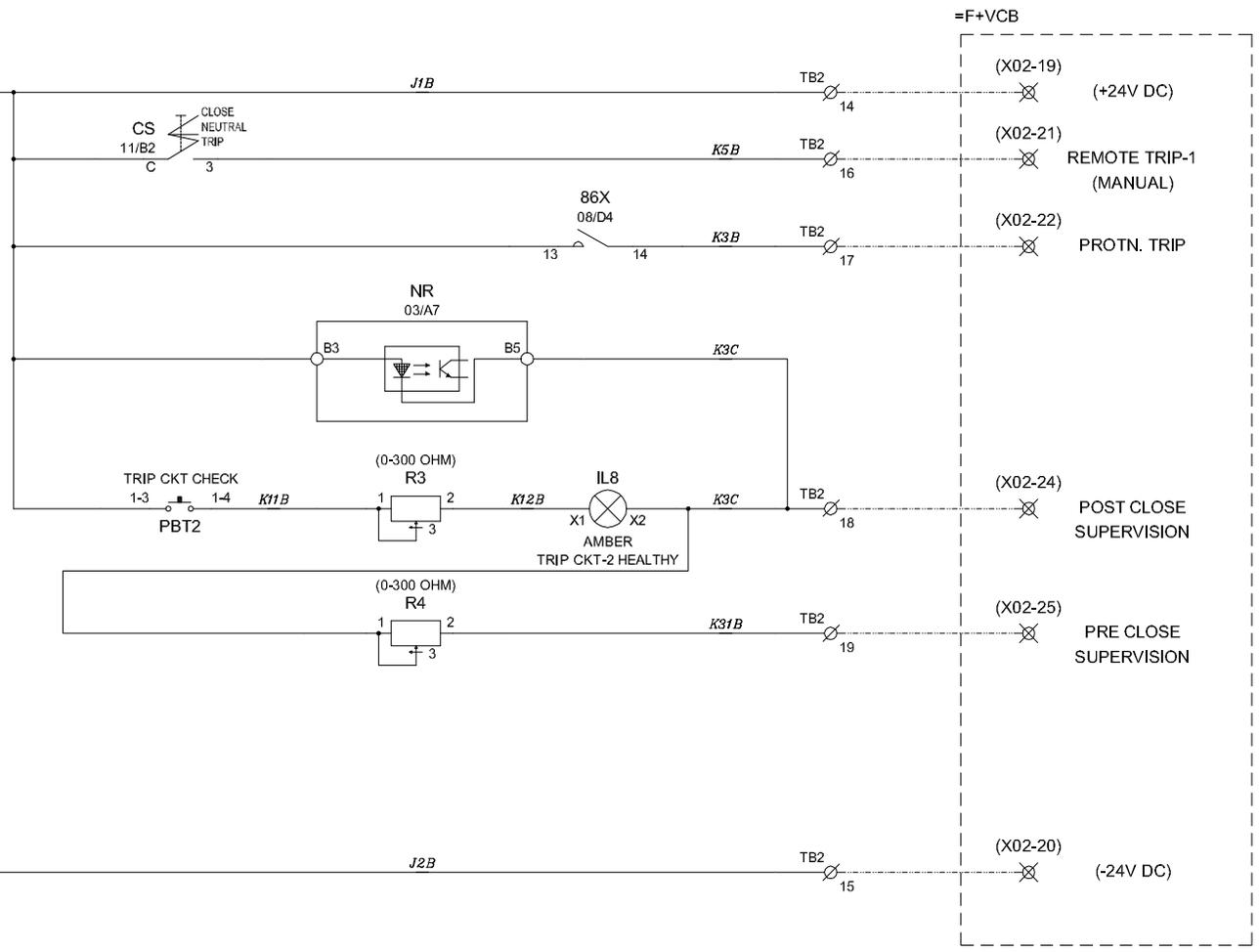
REF. DRG. NO.

SIGN & DATE

INVENTORY NO.

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07/B6

J2B
07/C6

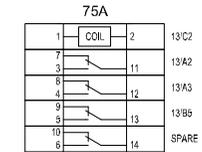
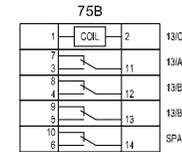
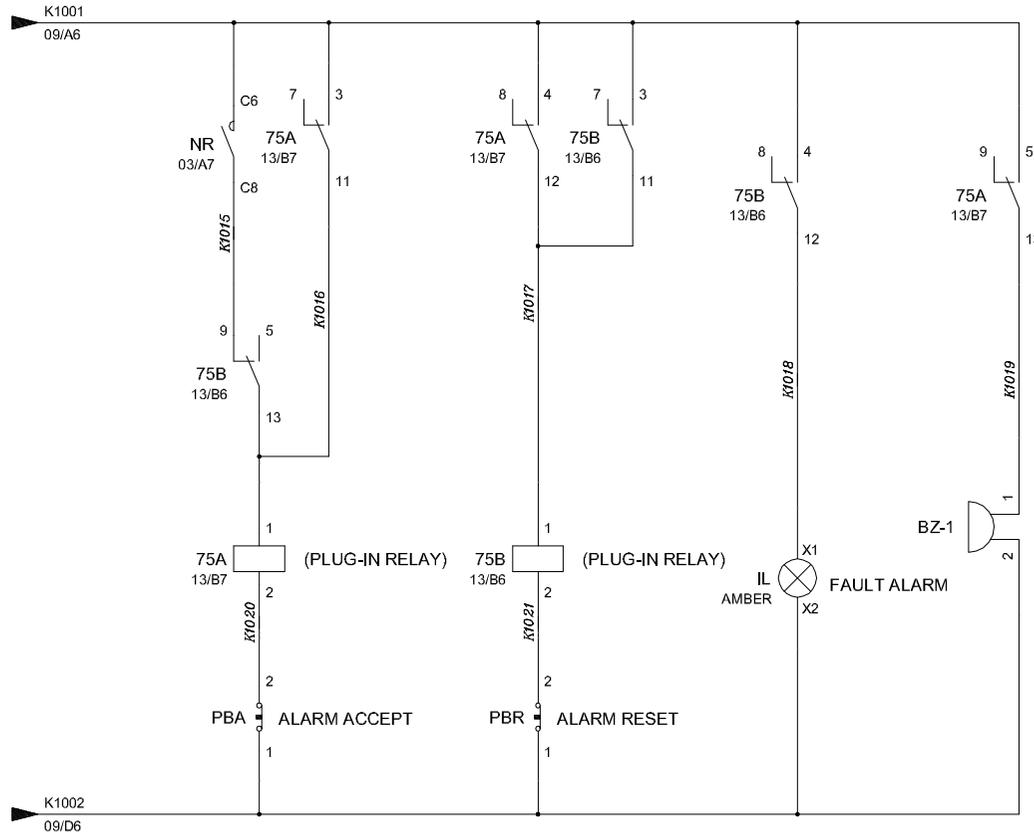


REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	DEPT.	BHARAT HEAVY ELECTRICALS LTD. BHOPAL	OUTDOOR CRP FOR 11KV VCB APEPDCL VISHAKHAPATNAM					
		CHECKED			CHECKED			SWE								
		APPROVED			APPROVED			CODE 409								
ZONE			ZONE			ZONE			DRN.	NAME	SIGN	DATE	NO. OF VAR	TITLE	DRAWING NO.	REV
									M.H.N.			24/02/18		OUTDOOR CONTROL & RELAY PANEL CB CONTROL-CLOSE & TRIP COIL	35620061774	00
									M.A.K.			24/02/18			SHT. NO. 12	NO OF SHEETS 15

35620061774

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REF. DRG. NO.

SIGN & DATE

INVENTORY NO.

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	DEPT.
		CHECKED			CHECKED			CHECKED	SWE
		APPROVED			APPROVED			APPROVED	CODE 409



BHARAT HEAVY ELECTRICALS LTD.
BHOPAL

OUTDOOR CRP FOR 11KV VCB
APEPDCD VISHAKHAPATNAM

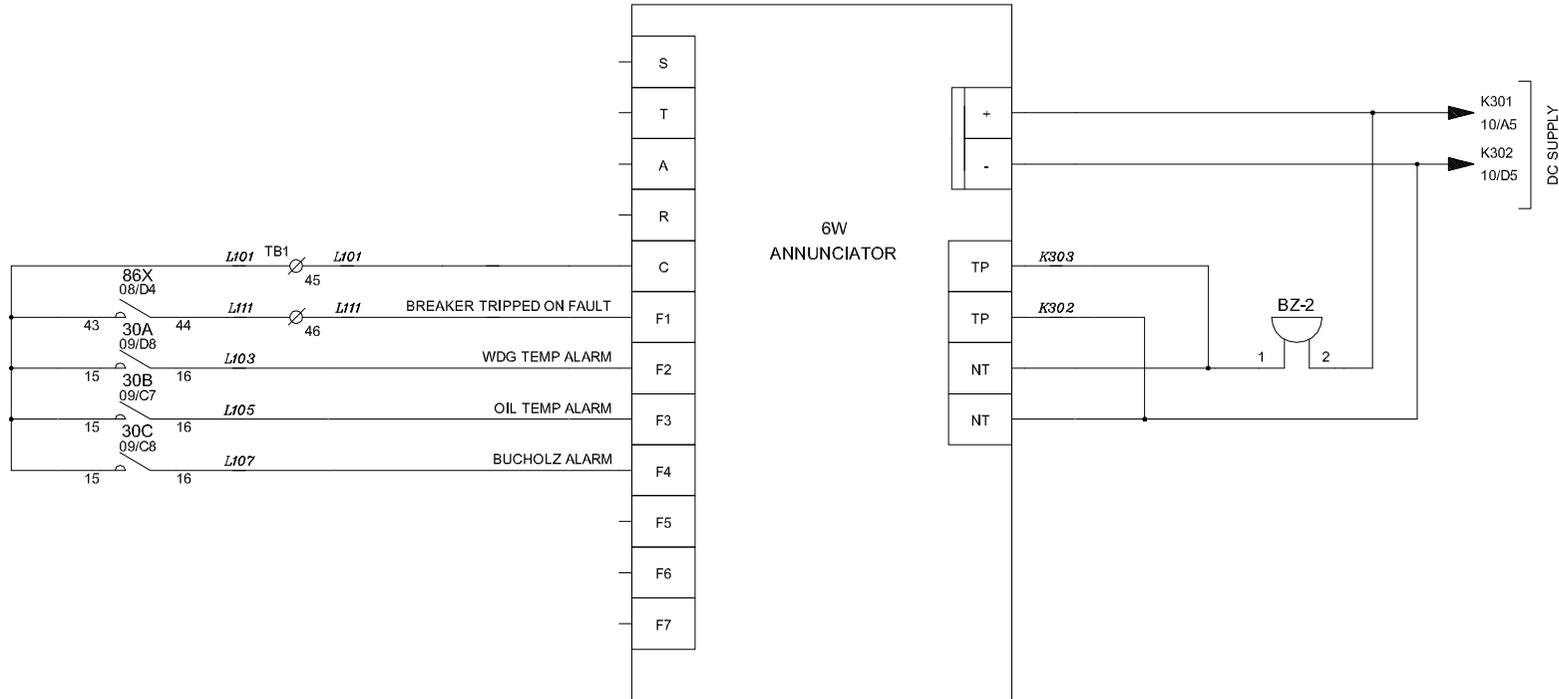
ZONE	DATE	NAME	SIGN	DATE	NO. OF VAR	TITLE	DRAWING NO.	REV
	24/02/18	N.M.		24/02/18		OUTDOOR CONTROL & RELAY PANEL ALARM CANCELLATION SCHEME	35620061774	00
	24/02/18	M.H.N.		24/02/18				
	24/02/18	M.A.K.		24/02/18				

SHT. NO.	NO OF SHEETS	REV
13	15	00

35620061774

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ANNUNCIATOR WINDOW DETAILS

F1 BREAKER TRIPPED ON FAULT	(T)	F5 SPARE
F2 WDG TEMP ALARM	(NT)	F6 SPARE
F3 OIL TEMP ALARM	(NT)	F7 SPARE
F4 BUCHOLZ ALARM	(NT)	

REF. DRG. NO.
SIGN & DATE
INVENTORY NO.

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	DEPT. SWE	BHARAT HEAVY ELECTRICALS LTD. BHOPAL	OUTDOOR CRP FOR 11KV VCB APEPDCL VISHAKHAPATNAM				
		CHECKED			CHECKED			CHECKED	CODE 409						
		APPROVED			APPROVED			APPROVED							
ZONE			ZONE			ZONE			DRN. NAME N.M.	SIGN	DATE 24/02/18	NO. OF VAR	TITLE	DRAWING NO. 35620061774	REV 00
									CKD. M.H.N.		24/02/18		OUTDOOR CONTROL & RELAY PANEL ALARM ANNUNCIATOR	SHT. NO. 14	NO OF SHEETS 15
									APPD. M.A.K.		24/02/18				

35620061774

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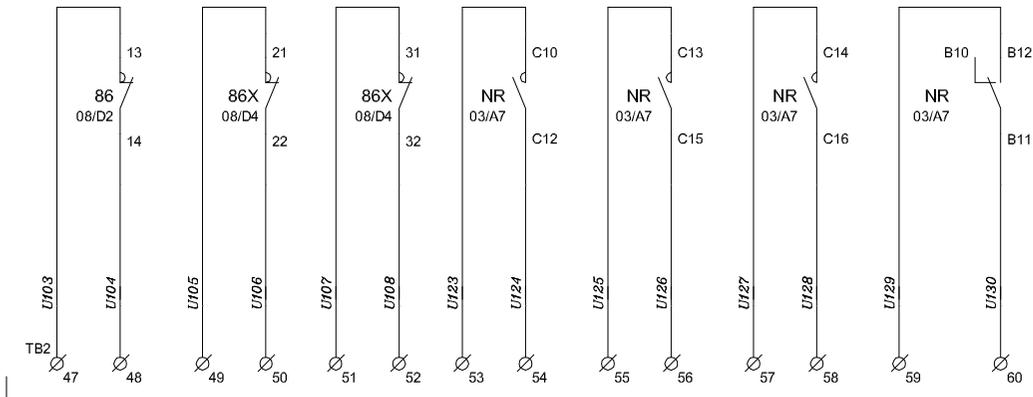
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SPARE

REF. DRG. NO.

SIGN & DATE

INVENTORY NO.

REV.	DATE	ALTERED		REV.	DATE	ALTERED		REV.	DATE	ALTERED		DEPT. SWE	 BHARAT HEAVY ELECTRICALS LTD. BHOPAL	OUTDOOR CRP FOR 11KV VCB APEPDCL VISHAKHAPATNAM						
		CHECKED				CHECKED				CHECKED		CODE 409								
		APPROVED				APPROVED				APPROVED										
ZONE				ZONE				ZONE				DRN. N.M.	NAME M.H.N.	SIGN	DATE 24/02/18	NO. OF VAR	TITLE OUTDOOR CONTROL & RELAY PANEL CONTACT DISTRIBUTION & SWITCH DETAIL	DRAWING NO. 35620061774	REV 00	
												APPD. M.A.K.			DATE 24/02/18			SHT. NO. 15	NO OF SHEETS	15

35620061775

DRAWING NO.

SCHEME OF OUTDOOR CONTROL AND RELAY PANELS FOR 11KV LV VCB WITH DIFFERENTIAL PROTECTION OF APEPDCL VISHAKHAPATNAM

TABLE-1

WO	CUSTOMER PO.NO.	VCB Unit sl. Nos.	QTY	CT DETAILS	GOVT. SCHEME
97050A47601	CGM/P&MM/EPDCL/P4/VSP/CEMPT/-50/17-18/PM-4970/17, DT: 23.12.2017	8217228 to 8217276	49	11 kv O/D LV CT RATIO 600-300/1-1-0.5775 A ,CORE-I:15VA,5P10,CORE-II:5VA, 0.2S CORE-III: CL-PS,VK>=40I(RCT+RL), IM<=30MA at Vk/4	-
97056A47601	CGM/P&MM/EPDCL/P4/VSP/CEMPT/-50/17-18/EXTN.PM(1)-4970/17, DT: 22.01.2018	8217390 to 8217394	5	11 kv O/D LV CT RATIO 600-300/1-1-0.5775 A ,CORE-I:15VA,5P10,CORE-II:5VA, 0.2S CORE-III: CL-PS,VK>=40I(RCT+RL), IM<=30MA at Vk/4	IPDS

WO_NO : REFER TABLE-1

REV.	DATE	ALTERED		REV.	DATE	ALTERED		REV.	DATE	ALTERED		DEPT.	 BHARAT HEAVY ELECTRICALS LTD. BHOPAL	OUTDOOR CRP FOR 11KV VCB APEPDCL VISHAKHAPATNAM						
		CHECKED				CHECKED			CODE											
		APPROVED				APPROVED			409											
ZONE				ZONE				ZONE				DRN.	NAME	SIGN	DATE	NO. OF	TITLE	DRAWING NO.	REV	
												APPD.	MAK		16/02/18	VAR	OUTDOOR CONTROL & RELAY PANEL TITLE SHEET	35620061775	00	
																		SHT. NO. 01	NO OF SHEETS	16

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REF. DRG. NO.

SIGN & DATE

INVENTORY NO.

35620061775

DRAWING NO.

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SHEET NO.	TITLE
1	TITLE SHEET
2	CONTENTS
3	3-LINE DIAGRAM-CT CONNECTIONS & AC SCHEME-NR RELAY
4	3-LINE DIAGRAM-CT CONNECTIONS
5	3-LINE DIAGRAM-CT CONNECTIONS
6	METERING CIRCUIT
7	240V AC SUPPLY DISTRIBUTION
8	24V DC SUPPLY DISTRIBUTION
9	TRIP CONDITIONS (86) & DC SCHEME-NR
10	PROTECTION CIRCUIT
11	LED INDICATIONS
12	CB CONTROL-CLOSE & TRIP COIL
13	CB CONTROL-CLOSE & TRIP COIL
14	ALARM CANCELLATION SCHEME
15	ALARM ANNUNCIATOR
16	CONTACT DISTRIBUTION & SWITCH DETAIL

NOTE : 1. CONTACTS OF MAIN NUMERICAL RELAY & TRIP RELAY IS REPRESENTATIVE ONLY , AVAILABLE CONTACTS FROM THE RESPECTIVE MANUFACTURER WILL BE UPDATED IN THE AS BUILT DRAWINGS.
2. TERMINAL NOS. MAY CHANGE AFTER FINALIZING OF MAKE OF EACH ITEM AND WILL BE REFLECTED IN AS BUILT DAWINGS.

REF. DRG. NO.
SIGN & DATE
INVENTORY NO.

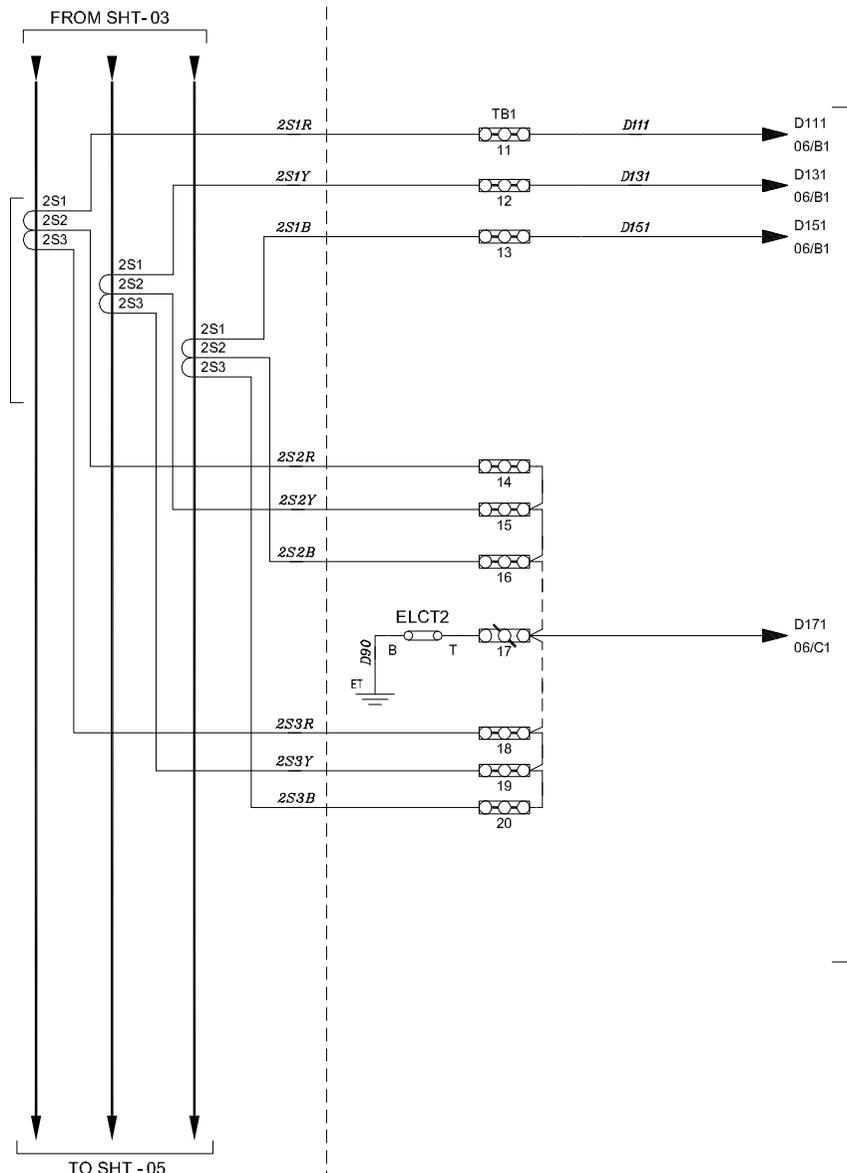
REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	DEPT.	 BHARAT HEAVY ELECTRICALS LTD. BHOPAL	OUTDOOR CRP FOR 11KV VCB APEPDCL VISHAKHAPATNAM					
		CHECKED			CHECKED			SWE								
		APPROVED			APPROVED			CODE 409								
ZONE			ZONE			ZONE			DRN.	NAME	SIGN	DATE	NO. OF VAR	TITLE	DRAWING NO.	REV
									APPD.	MAK		16/02/18		OUTDOOR CONTROL & RELAY PANEL CONTENTS	35620061775	00
												16/02/18			SHT. NO. 02	NO OF SHEETS 16

35620061775

DRAWING NO.

REMOTE SIDE

CT CORE-2



FOR METERING

NOTE:-

CT CONNECTIONS ARE SHOWN FOR HIGHER TAB

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REF. DRG. NO.

SIGN & DATE

INVENTORY NO.

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHECKED			CHECKED			CHECKED
		APPROVED			APPROVED			APPROVED

ZONE		ZONE		ZONE	

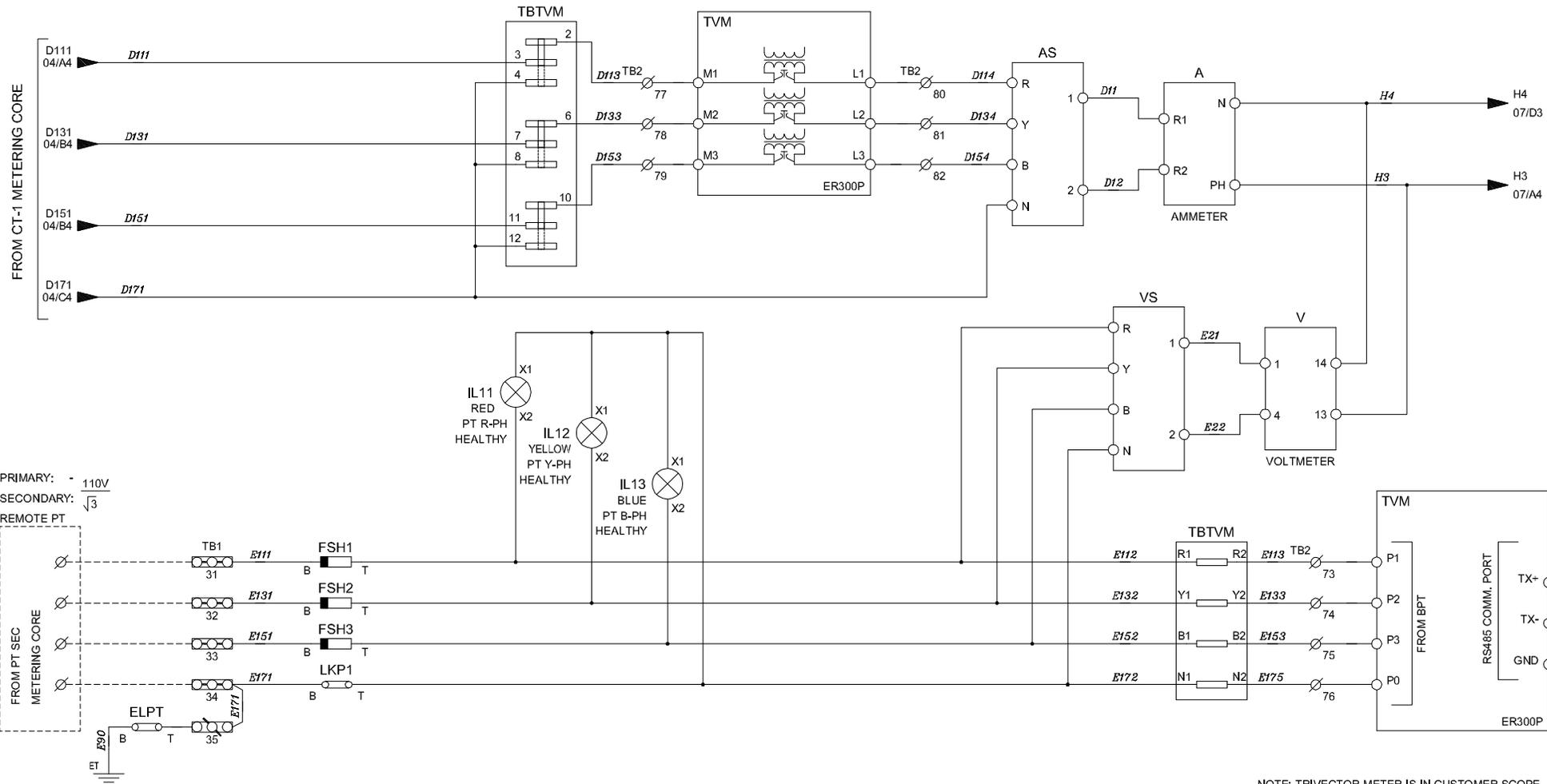
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CODE 409				

DRN. NM	NAME SIGN	DATE 16/02/18	NO. OF VAR	TITLE	DRAWING NO. 35620061775	REV 00
CKD. MHN		16/02/18		OUTDOOR CONTROL & RELAY PANEL 3-LINE DIAGRAM-CT CONNECTIONS		
APPD. MAK		16/02/18			SHT. NO. 04	NO OF SHEETS 16

35620061775

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PRIMARY: - 110V
SECONDARY: $\frac{110}{\sqrt{3}}$
REMOTE PT

FROM PT SEC METERING CORE

IL11 RED PT R-PH HEALTHY
IL12 YELLOW PT Y-PH HEALTHY
IL13 BLUE PT B-PH HEALTHY

NOTE: TRIVECTOR METER IS IN CUSTOMER SCOPE.

REF. DRG. NO.

SIGN & DATE

INVENTORY NO.

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	DEPT. SWE	BHARAT HEAVY ELECTRICALS LTD. BHOPAL	OUTDOOR CRP FOR 11KV VCB APEPDCL VISHAKHAPATNAM	
		CHECKED			CHECKED			CHECKED	CODE 409			
		APPROVED			APPROVED			APPROVED				
ZONE			ZONE			ZONE			DRN. NAME SIGN	DATE	NO. OF VAR	TITLE
									CDK. MHN	16/02/18		OUTDOOR CONTROL & RELAY PANEL METERING CIRCUIT
									APPD. MAK	16/02/18		DRAWING NO. 35620061775
											SHT. NO. 06	NO OF SHEETS 16

REV 00

35620061775

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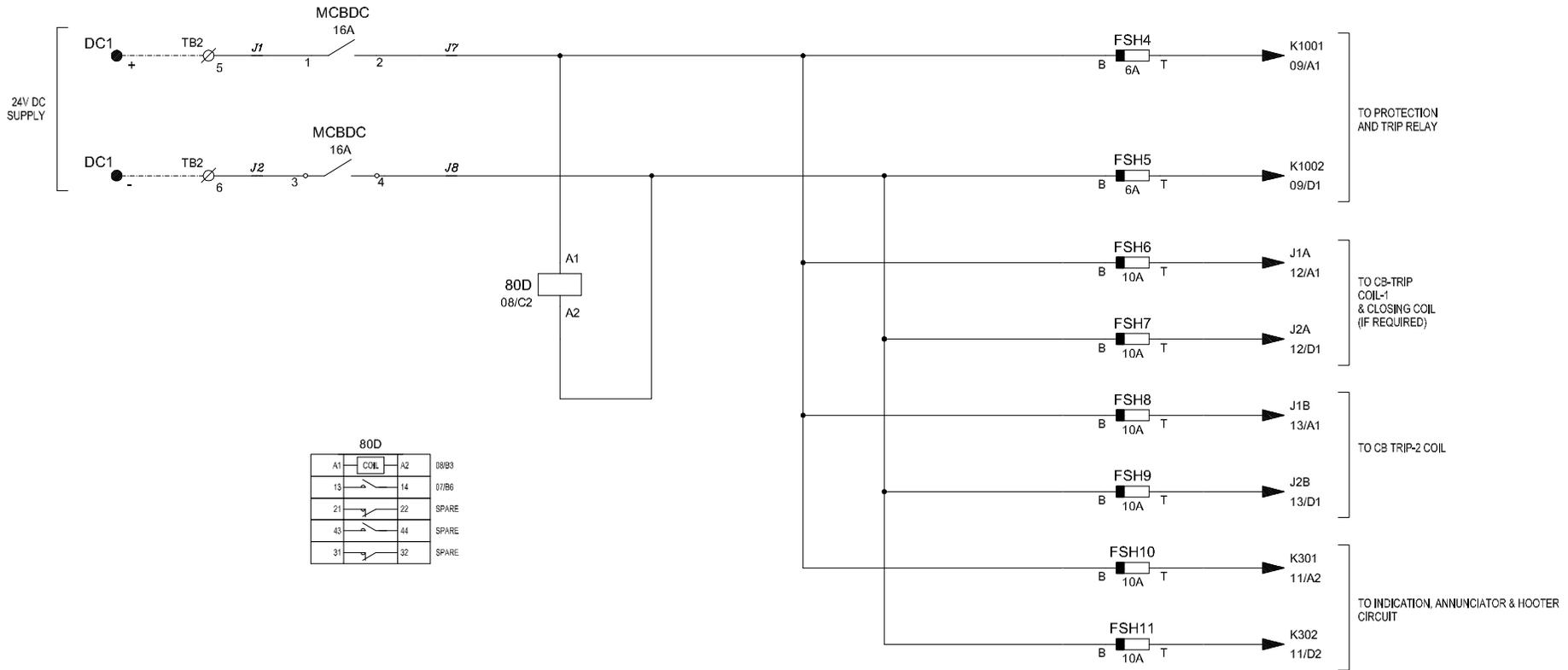
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80D		DBB3	
A1	COIL	A2	DBB3
13		14	07B6
21		22	SPARE
43		44	SPARE
31		32	SPARE

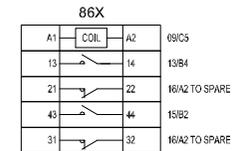
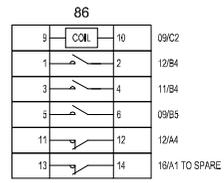
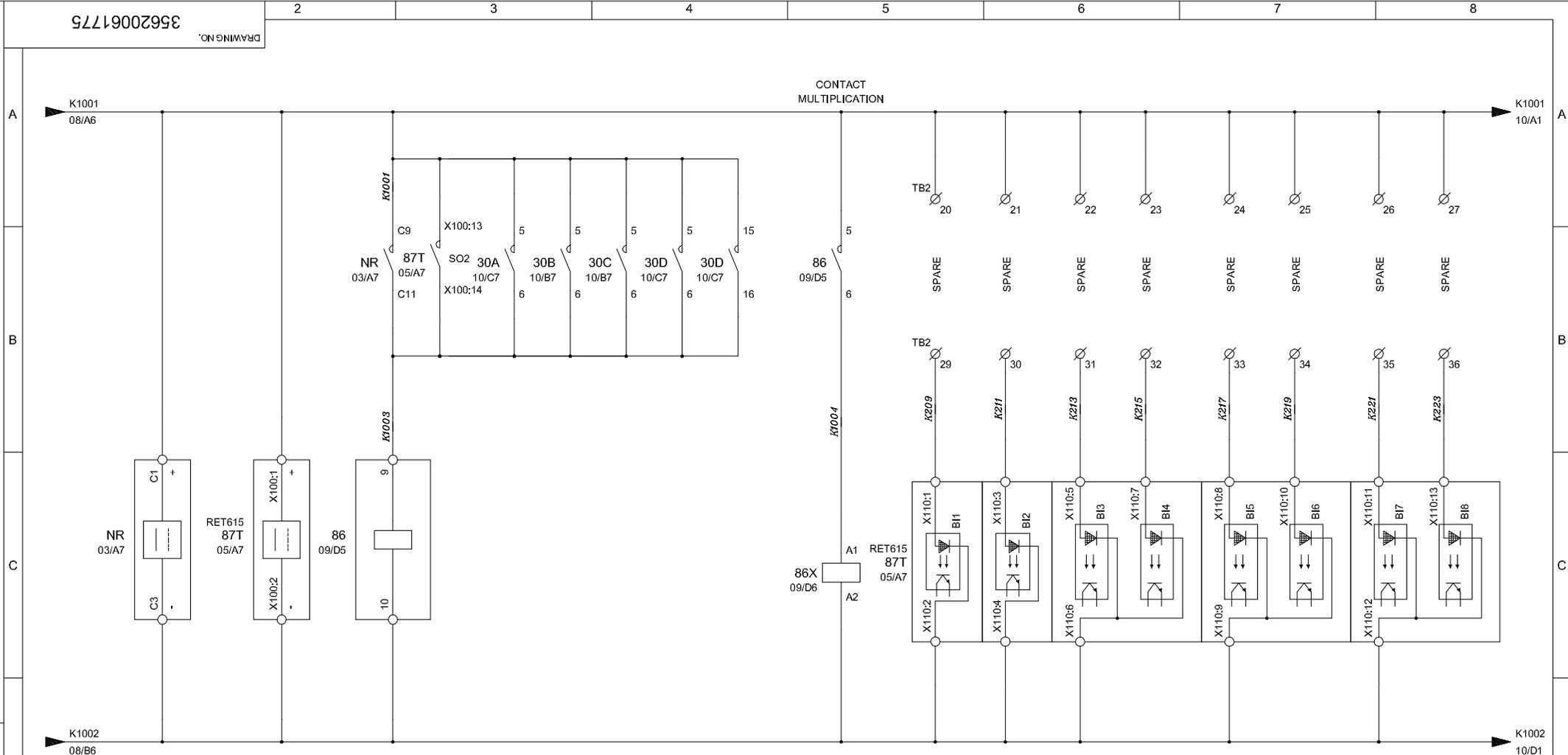
INVENTORY NO.	ZONE	REV.	DATE	ALTERED		REV.	DATE	ALTERED		REV.	DATE	ALTERED		DEPT.	BHARAT HEAVY ELECTRICALS LTD. BHOPAL	OUTDOOR CRP FOR 11KV VCB APEPDCL VISHAKHAPATNAM
				CHECKED				CHECKED				CHECKED		SWE		
				APPROVED				APPROVED				APPROVED		CODE		
														409		

DRN.	NAME	SIGN	DATE	NO. OF	TITLE	DRAWING NO.	REV
CKD.	MHN		16/02/18	VAR	OUTDOOR CONTROL & RELAY PANEL 24V DC SUPPLY DISTRIBUTION	35620061775	00
APPD.	MAK		16/02/18			SHT. NO. 08	NO OF SHEETS 16

35620061775

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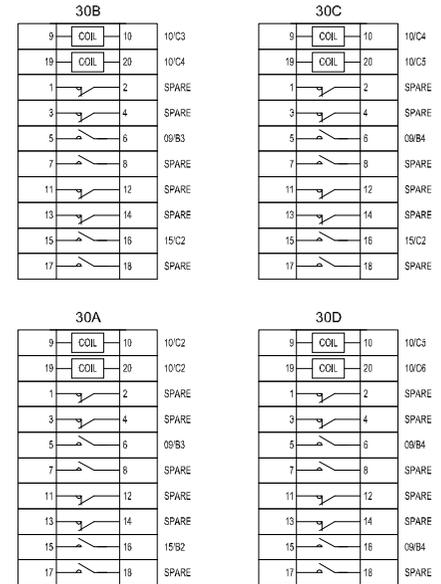
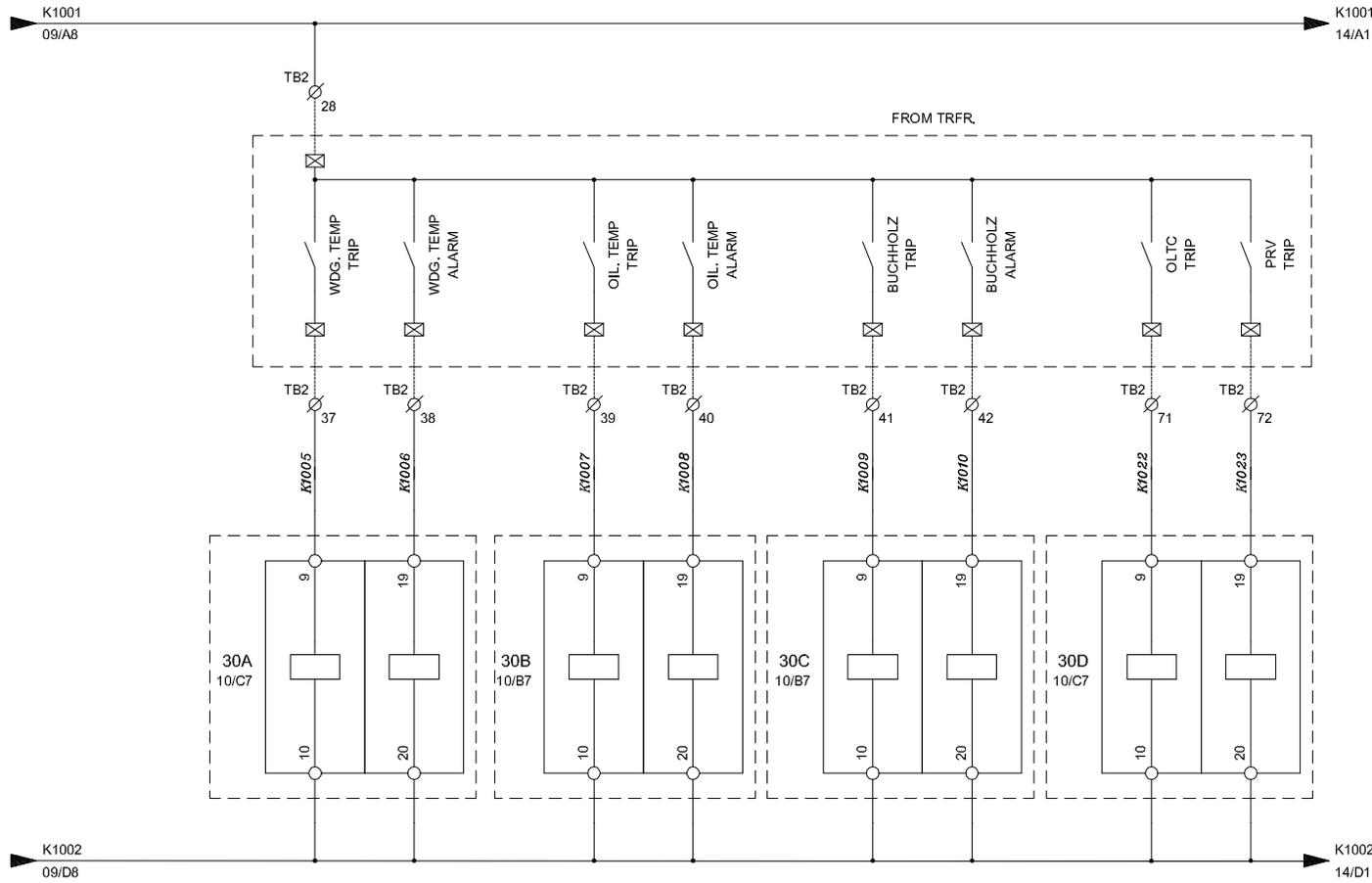


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INVENTORY NO.	ZONE	ZONE	ZONE	ZONE	ZONE	ZONE	ZONE	ZONE	ZONE	DRN. NM	NAME	SIGN	DATE	NO. OF VAR	TITLE	DRAWING NO.	REV
													SHT. NO. 09	NO OF SHEETS	16		

35620061775

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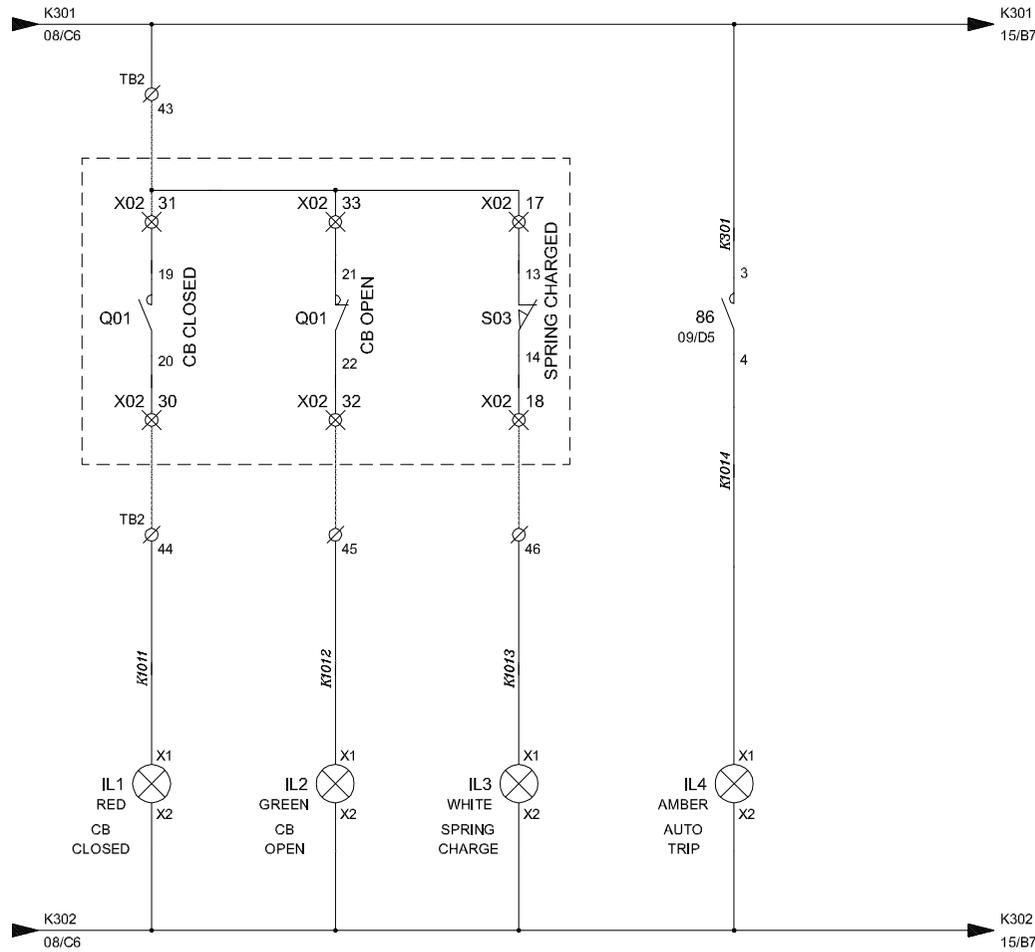
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REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	DEPT. SWE	BHARAT HEAVY ELECTRICALS LTD. BHOPAL	OUTDOOR CRP FOR 11KV VCB APEPDCI VISHAKHAPATNAM					
		CHECKED			CHECKED			CHECKED	CODE 409							
		APPROVED			APPROVED			APPROVED								
ZONE			ZONE			ZONE			DRN. NM	NAME NM	SIGN	DATE 16/02/18	NO. OF VAR	TITLE OUTDOOR CONTROL & RELAY PANEL PROTECTION CIRCUIT	DRAWING NO. 35620061775	REV 00
									APPD. MAK			DATE 16/02/18			SHT. NO. 10	NO OF SHEETS 16

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INVENTORY NO.

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
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		APPROVED			APPROVED			APPROVED

DEPT.	SWE
CODE	409



BHARAT HEAVY ELECTRICALS LTD.
BHOPAL

OUTDOOR CRP FOR 11KV VCB
APEPDCL VISHAKHAPATNAM

ZONE	ZONE	ZONE

DRN.	NAME	SIGN	DATE	NO. OF VAR
CKD.	MHN		16/02/18	
APPD.	MAK		16/02/18	

TITLE
**OUTDOOR CONTROL & RELAY PANEL
LED INDICATIONS**

DRAWING NO.	REV
35620061775	00
SHT. NO. 11	NO OF SHEETS 16