

1 2 3 4 ▼ 5 6 7 8

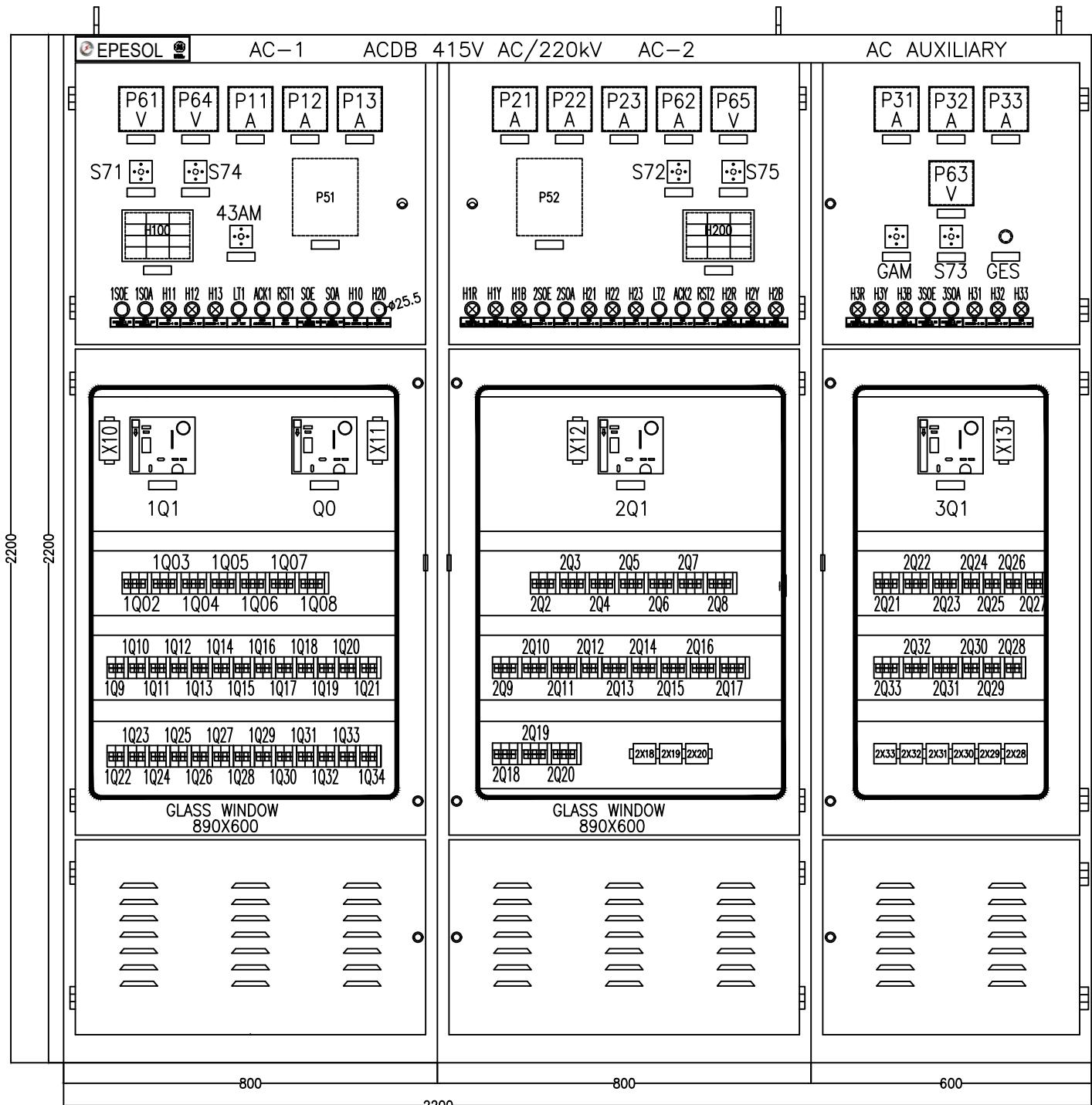
LAYOUT DRAWING OF 415-240 VAC AUXILIARY SUPPLY DISTRIBUTION BOARD FOR 220kV EQUIPMENT

| APPROVED | CHECKED | DRAWN | PROJECT: PO. NO. 6019415518 DATED 16.04.2018 220/132kV CONTROL, PROTECTION & ACDC PANEL GHAZI ROAD PROJECT | TITLE: COVER SHEET 415-240 VAC AUXILIARY SUPPLY 220VAC DISTRIBUTION BOARD FOR 220kV EQUIPMENT | DWG# EPE/ENU-18/P1455 | SHT: 01 OF 04 |
|----------|---------|-------|---|--|-----------------------|---------------|
| NAH | ABA | MSC | | | DATE:20.12.2018 | AS BUILT |



E P E S O L **P v t . L t d .**
71-B Garden Block, New Garden Town, Lahore, Pakistan

REV: 0

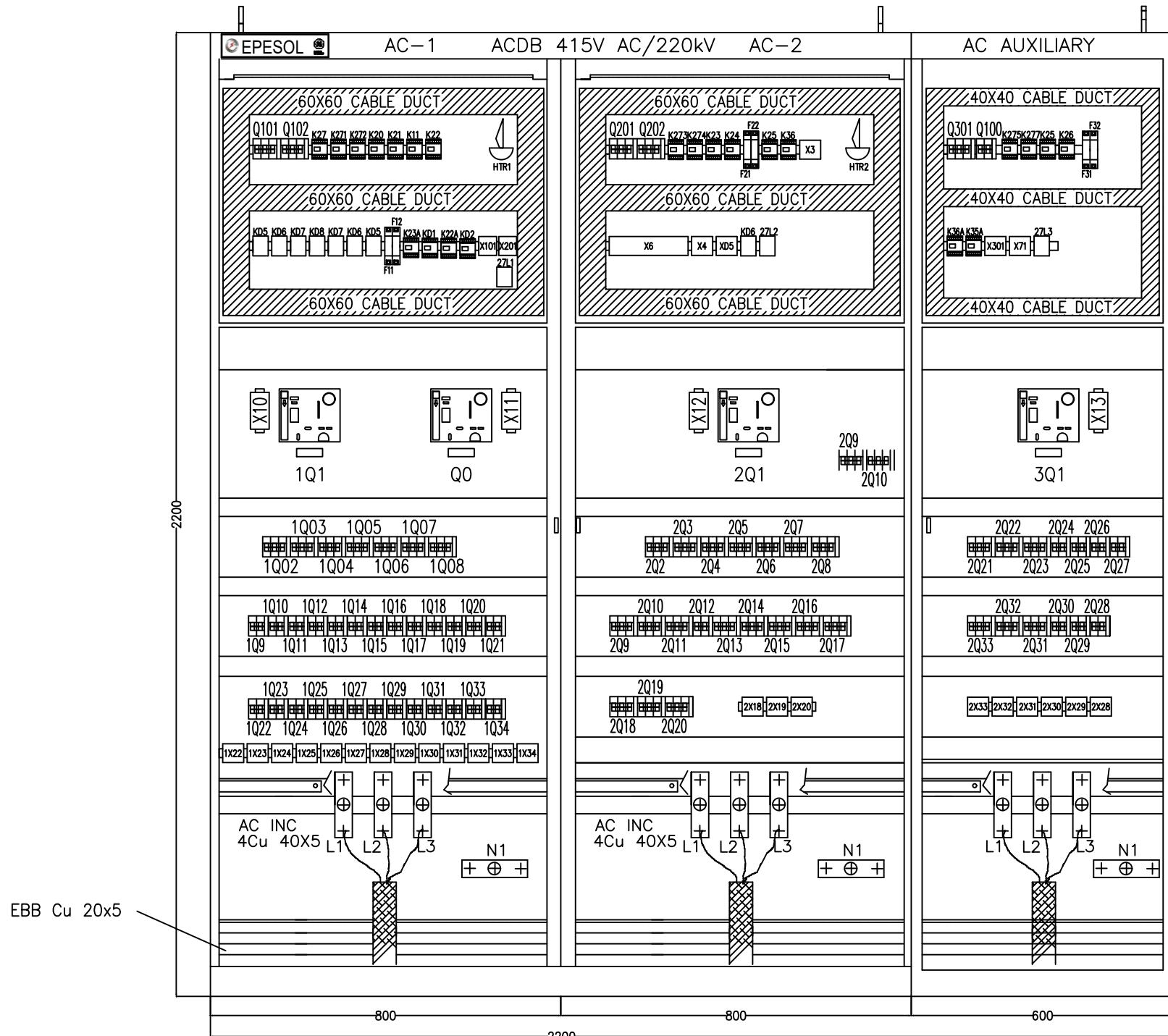


FRONT VIEW WITH DOOR

ALL MCCB'S ARE BEHIND
THE HINGED PLEXI GLASS WINDOW.
THE DOOR CAN BE READILY
OPENED/CLOSED TO ACCESS
THE MCCBS.

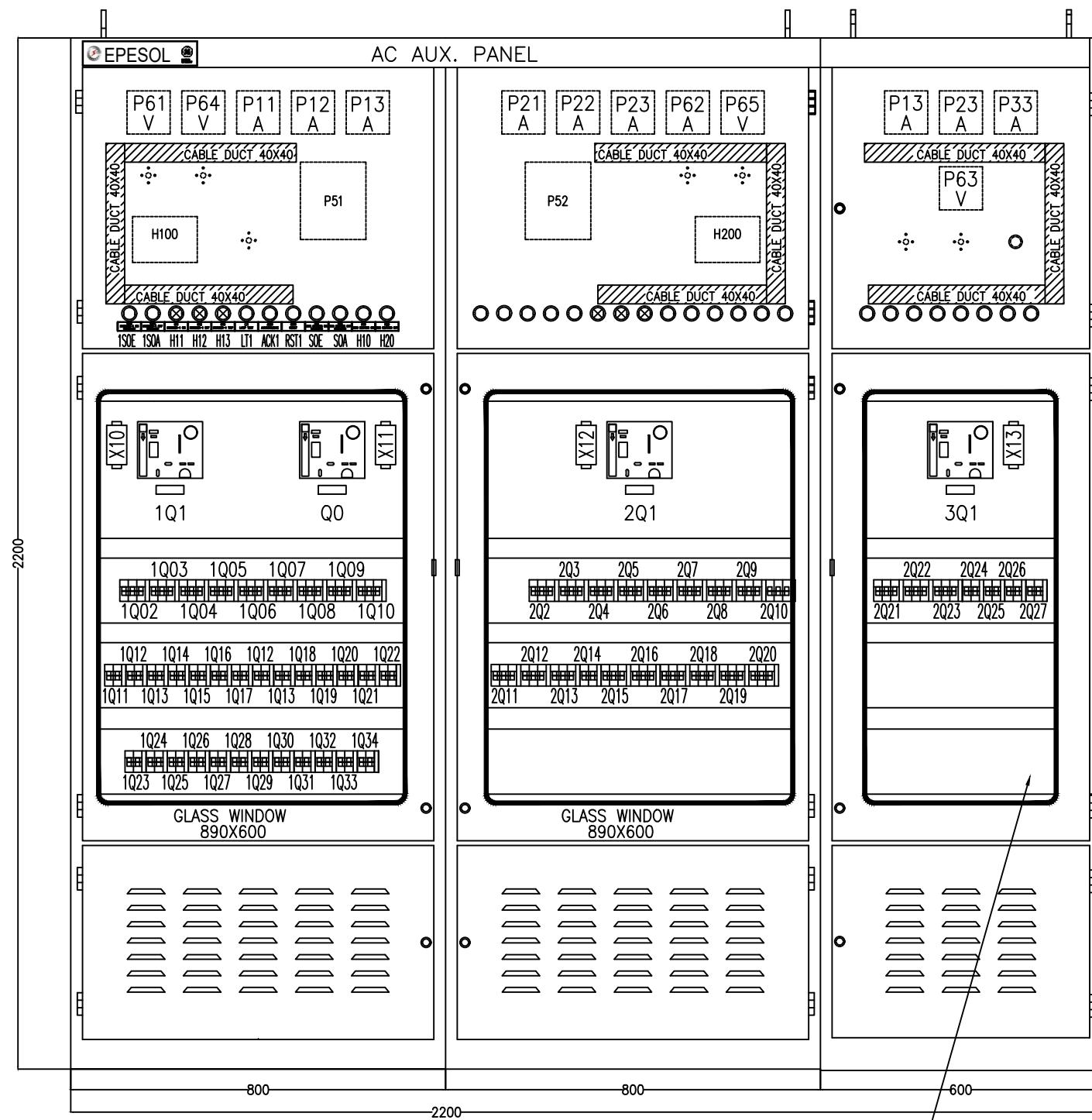
NOTES

- COLOR: RAL7032
- CONTROL PANEL: (2x800+600)x600x2200 mm (WIDTHxDEPTHxHEIGHT)
- FACE SHEET: (2x800+600)x2200 mm (WIDTHxHEIGHT)
- EARTHING BUSBAR 25x5 mm²
- FLEXIBLE EARTHING STRIP 16mm²



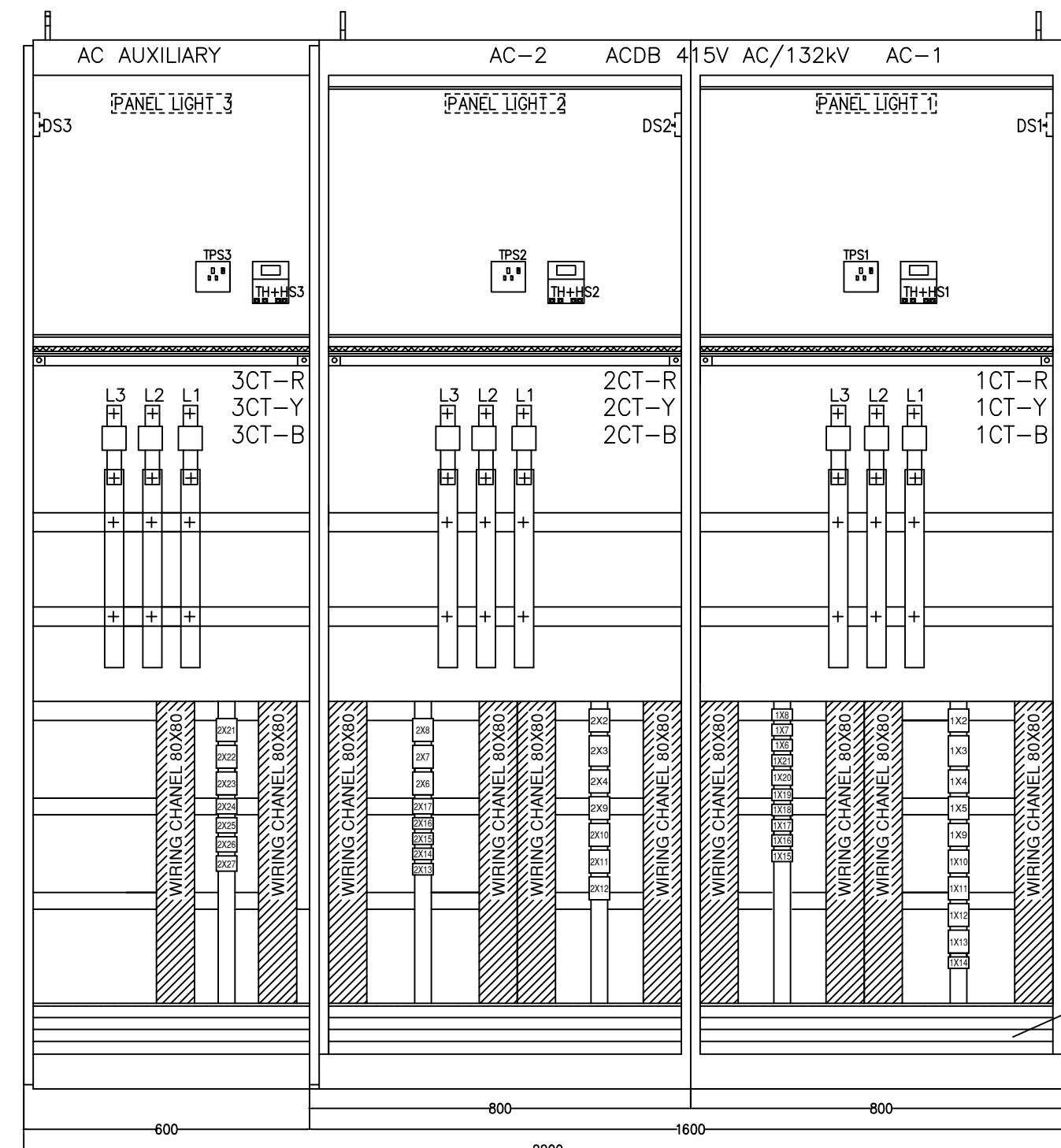
FRONT VIEW WITHOUT DOOR

| APPROVED | CHECKED | DRAWN | PROJECT: | TITLE: | EPE SOL Pvt. Ltd. | DWG# EPE/ENU-18/P1455 | SHT:02 OF 04 |
|----------|---------|-------|---|--|--|-----------------------|--------------|
| NAH | ABA | MSC | PO. NO. 6019415518 DATED 16.04.2018 220/132kV CONTROL, PROTECTION & ACDC PANEL GHAZI ROAD PROJECT | GENERAL ARRANGEMENT 415-240 VAC AUXILIARY SUPPLY 220VAC DISTRIBUTION BOARD FOR 220kV EQUIPMENT | EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan | DATE:20.12.2018 | AS BUILT |



FRONT VIEW WITH DOOR

ALL MCCB'S ARE BEHIND
THE HINGED PLEXI GLASS WINDOW
THE DOOR CAN BE READILY
OPENED/CLOSED TO ACCESS
THE MCCBS

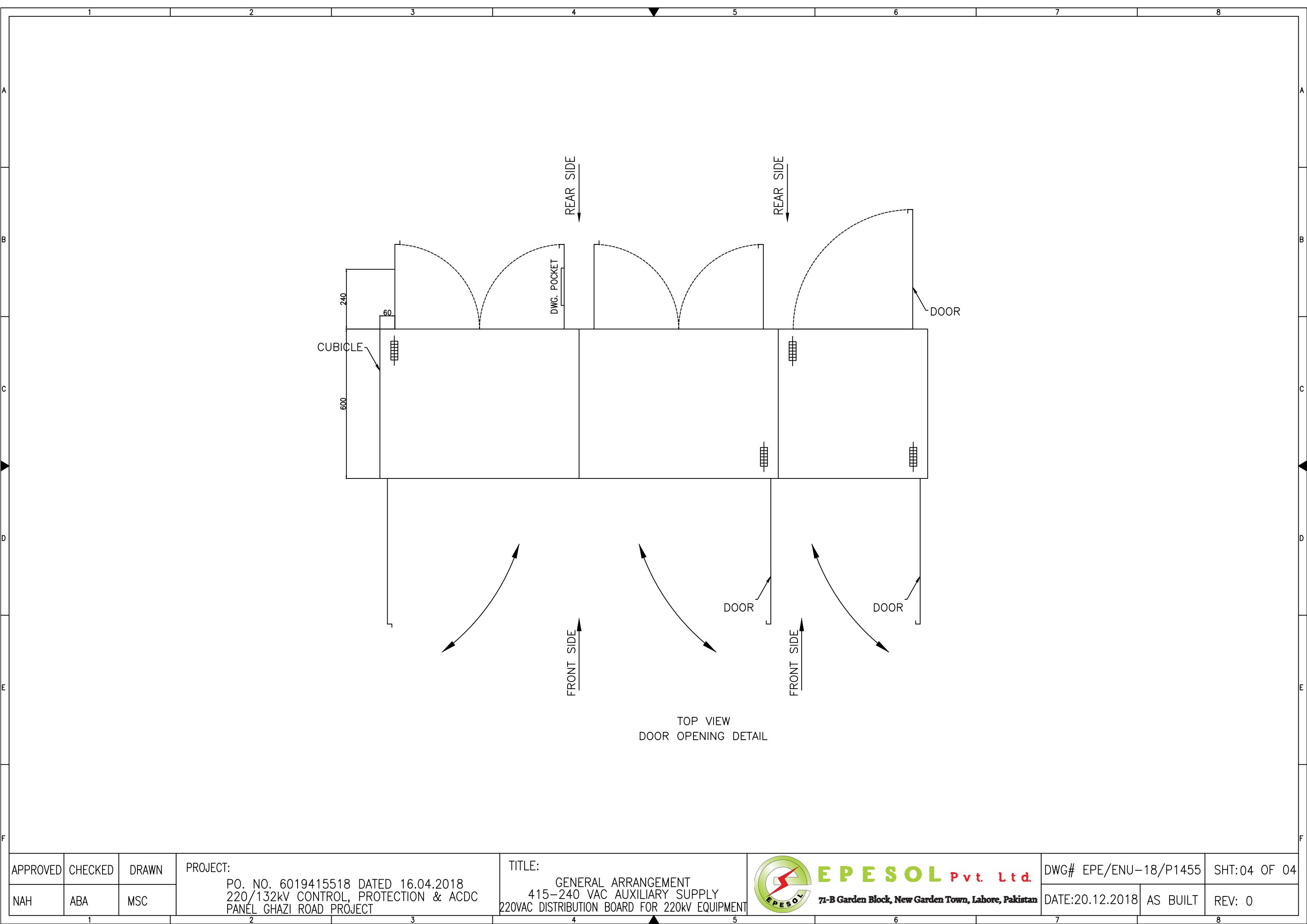


REAR VIEW WITHOUT DOOR

NOTES

- THE MCCBS
1. COLOR: RAL7032
 2. CLASS OF PROTECTION: IP51
 2. CONTROL PANEL: (2x800+600)x600x2200 mm (WIDTHxDEPTHxHEIGHT)
 3. FACE SHEET: (2x800+600)x2200 mm (WIDTHxHEIGHT)
 5. EARTHING BUSBAR 20x5 mm²
 6. FLEXIBLE EARTHING STRIP 16mm²

| | | | | | | | |
|----------|---------|-------|---|--|--|-----------------------|--------------|
| APPROVED | CHECKED | DRAWN | PROJECT: PO. NO. 6019415518 DATED 16.04.2018 220/132kV CONTROL, PROTECTION & ACDC PANEL GHAZI ROAD PROJECT | TITLE: GENERAL ARRANGEMENT 415-240 VAC AUXILIARY SUPPLY 220VAC DISTRIBUTION BOARD FOR 220kV EQUIPMENT |  EPESOL PVT. LTD. 71-B Garden Block, New Garden Town, Lahore, Pakistan | DWG# EPE/ENU-18/P1455 | SHT:03 OF 04 |
| NAH | ABA | MSC | | | | DATE:20.12.2018 | AS BUILT |



LIST OF APPARATUS

415-240 VAC AUXILIARY SUPPLY

DISTRIBUTION BOARD FOR 220kV EQUIPMENT

| APPROVED | CHECKED | DRAWN | PROJECT: | TITLE: | | DWG# | SHT: 01 OF 04 |
|----------|---------|-------|---|--|---|------------------|---------------------------------|
| NAH | ABA | MSC | PO. NO. 6019415518 DATED 16.04.2018 220/132kV CONTROL, PROTECTION & ACDC PANEL GHAZI ROAD PROJECT | COVER SHEET 415-240 VAC AUXILIARY SUPPLY 220VAC DISTRIBUTION BOARD FOR 220kV EQUIPMENT |  EPESOL Pvt. Ltd. 71-B Garden Block, New Garden Town, Lahore, Pakistan | EPE/ENU-18/P1456 | DATE:20.12.2018 AS BUILT REV: 0 |

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | |
|----------|------------------|-------------------------------|---|---|--|------------|---|-------------------|------------------------------|---------------|
| SR. # | ITEM DESIGNATION | | DESCRIPTION | | QTY | TYPE | MAKE | COUNTRY OF ORIGIN | ORDERING INFORMATION | SHEET NO |
| A | 1 | 1Q1, 2Q1, Q0 | TRIPLE POLE MCCB RATED CURRENT 320-400 Amp, Icu=50 KAmp AT 415 VOLTS WITH ELECTRICAL OPERATOR UNIT, ONE NORMALLY OPEN TRIP CONTACT, AND 2NO+3NC AUXILIARY CONTACTS | | 3 | FG400 | GE | POLAND | FGN37DA400LF(1)+FABAT10(1) | A |
| | 2 | 3Q1 | TRIPLE POLE GEN. MCCB RATED CURRENT 200 Amp, Icu=50 KAmp AT 415 VOLTS WITH ELECTRICAL OPERATOR UNIT, ONE NORMALLY OPEN TRIP CONTACT, AND 2NO+3NC AUXILIARY CONTACTS | | 1 | FE250 | GE | POLAND | FEN36TD200KF(1)+FABAT10(1) | |
| B | 3 | (1Q2~1Q7),(2Q2~2Q9) | TRIPLE POLE MCB RATED CURRENT 100 Amp, Icu = 18 KAmp | | 14 | FD160 | GE | POLAND | FDC35TE100GD+FAS01R(1) | |
| | 4 | (1Q8~1Q10),(2Q10~2Q12) | TRIPLE POLE AC MCB RATED CURRENT 63 Amp, Icu = 6 KAmp | | 6 | G60 | GE | HUNGARY | G63C63+CAH(1) | |
| C | 5 | 2Q13 | TRIPLE POLE AC MCB RATED CURRENT 32 Amp, Icu = 6 KAmp | | 1 | G60 | GE | HUNGARY | G63C32+CAH(1) | C |
| | 6 | (1Q11~1Q17), (2Q14) | DOUBLE POLE MCB,s RATED CURRENT 32 Amp, Icu = 6 KAmp | | 8 | G60 | GE | HUNGARY | G62C32+CAH(1) | |
| D | 7 | 2Q15~2Q23 | TRIPLE POLE AC MCB RATED CURRENT 16 Amp, Icu = 6 KAmp | | 9 | G60 | GE | HUNGARY | G63C16+CAH(1) | |
| | 8 | (1Q18~1Q34),(2Q24~2Q27) | DOUBLE POLE MCB,s RATED CURRENT 16 Amp, Icu = 6 KAmp | | 21 | G60 | GE | HUNGARY | G62C16+CAH(1) | |
| E | 9 | Q102, Q202, | TRIPLE POLE MCB,s RATED CURRENT 06 Amp, Icu = 6 KAmp | | 2 | G60 | GE | HUNGARY | G61C06+CAH(1) | E |
| | 10 | Q101, Q201, Q301 | TRIPLE POLE MCB,s RATED CURRENT 06 Amp, Icu = 6 KAmp WITH 4 C/O CONTACTS | | 3 | G60 | GE | HUNGARY | G61C06+CAH(4) | |
| F | 10 | Q100 | ELCB, 2-POLE, RATINGS: 16A, 30mA, 230VAC, WITH 1 C/O | | 1 | DM100 | GE | HUNGARY | DM100C16/030+CAH(1) | |
| | 11 | P11, P12, P13, P21, P22, P23 | AMPERE METERS QUADRANT SCALE (0-500Amp) CT RATIO 400/5Amp ACCURACY CLASS 1.5 | | 9 | IF96F-A | FRER | ITLAY | | |
| G | 12 | 1CT-R, 1CT-Y, 1CT-B | CURRENT TRANSFORMERS, 400/5 Amp, CLASS 0.5, 5VA | | 9 | GA | GE/HOBUT/EQ | USA | GA40-401 | G |
| | 13 | 2CT-R, 2CT-Y, 2CT-B | | | | | | | | |
| H | 14 | 3CT-R, 3CT-Y,3CT-B | | | | | | | | H |
| | 15 | P61, P62, P63, P64, P65 | VOLT METER QUADRANT SCALE 0-500VOLT AC 50 Hz | | 5 | 1F96EV | FRER | ITLAY | 1F96EV-500 | |
| I | 16 | S71, S72, S73, S74, S75 | SEVEN POSITION VOLT METER SELECTOR SWITCH POSITION MARKING R-N,Y-N,B-N,OFF,R-Y,Y-B,B-R | | 5 | P0 | GGT | ITLAY | PO-160023R001 | I |
| | 17 | P51, P52 | ENERGY METER (KWh+KVarh+MDI) 3,PHASE, 4 WIRE 3x240/415 VOLT AC, CT RATIO 400/5 Amp, | | 2 | ZMG405 | LANDIS GYR | CHINA | ZMG405 | |
| J | 18 | H100, H200 | CLASS 0.5,MDI PROGRAMMABLE TIME ANNUNCIATOR TWELVE WINDOWS 220 VOLT DC | | 2 | AM-101 | ELABS | PAKISTAN | | J |
| | 19 | LT1, ACK1, RST1, | PUSH BUTTON FOR ANNINCIATOR LAMP TEST ACKNOWLEDGE AND RESET WITH 5 NO CONTACT EACH, | | 6 | YSAP1 | | SOUTH KOREA | | |
| K | 20 | LT2, ACK2, RST2 | COLORS RED, GREEN AND YELLOW RESPECTIVELY | | | | | | | K |
| | 21 | KD1, KD2, KD5, KD6, KD3, KD4, | TIMERS 230 VOLT AC, TWO CHANGE OVER CONTACTS, TIME RANGE (0-60Sec) | | 8 | ATEI-60S | AUTONICS | KOREA | | |
| L | 22 | KD7, KD8 | | | | | | | | L |
| | 23 | K34, K35, K36, K34A, K35A, | K36A PRC4M40ANL, COIL VOLATAGE: 230VAC, 4 C/O Contacts | | 6 | PRC4M40ANL | GE | | PRC4M40ANL | |
| M | 24 | 27L1, 27L2, 27L3 | THREE PHASE UNDER VOLTAGE RELAY, ONE CHANGE OVER CONTACT RATED PHASE-PHASE | | 3 | VP-002 | CAMSCO | TAIWAN | VP-002-3 | M |
| | 25 | | 380 VOLTS | | | | | | | |
| N | 26 | K271, K272 | AC CONTACTOR RATED VOLTAGE 230 VOLTS AC WITH 2NO+2NC CONTACTS AND ONE AUX. CONTACT | | 2 | MCRA022ATN | GE | HUNGARY | MCRA022ATN(2) + MARN211AT(2) | N |
| | 27 | | BLOCK (1NO+1NC) | | | | | | | |
| APPROVED | CHECKED | DRAWN | PROJECT: PO. NO. 6019415518 DATED 16.04.2018 220/132kV CONTROL, PROTECTION & ACDC PANEL GHAZI ROAD PROJECT | | TITLE: LIST OF APPARATUS 415-240 VAC AUXILIARY SUPPLY 220VAC DISTRIBUTION BOARD FOR 220KV EQUIPMENT | |  E P E S O L P v t . L t d . 71-B Garden Block, New Garden Town, Lahore, Pakistan | | DWG# EPE/ENU-18/P1456 | SHT: 02 OF 04 |
| NAH | ABA | MSC | | | | | | | DATE:20.12.2018 | AS BUILT |

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | |
|----------|---------------------------------|-------|---|---|--|------------|---|-------------------|-----------------------|---------------|
| SR. # | ITEM DESIGNATION | | DESCRIPTION | | QTY | TYPE | MAKE | COUNTRY OF ORIGIN | ORDERING INFORMATION | SHEET NO |
| A | 22 K11,K12,K20,K21,K22,K23,K24 | | AC CONTACTOR RATED VOLTAGE 230 VOLTS AC WITH 2NO+2NC CONTACTS | | 16 | MCRA022ATN | GE | HUNGARY | MCRA022ATN(13) | A |
| | K25,K26,K273,K274,K275,K277 | | | | | | | | | |
| B | 23 H12,H13,H22,H23,H32,H33,H20 | | INDICATION FOR BREAKER ON POSITION COLOR RED 230 VOLTS AC | | 10 | YSPL | YONGSUNG | SOUTH KOREA | YS-PL-2-AL22RW | B |
| | H1R, H2R, H3R | | | | | | | | | |
| C | 24 H11,H21,H31,H10 | | INDICATION FOR BREAKER ON POSITION COLOR GREEN 230 VOLTS AC | | 4 | YSPL | YONGSUNG | SOUTH KOREA | YSPL-2-DL12GW | C |
| | | | | | | | | | | |
| D | 25 43AM, GAM | | AUTO - OFF - MANUAL SELECTOR SWITCH WITH THREE CHANGE OVER CONTACTS | | 2 | YSAK | YONGSUNG | SOUTH KOREA | YSAK2344D | D |
| | | | | | | | | | | |
| E | 26 1SOE, 1SOA, 2SOE, 2SOA, SOE | | PUSH BUTTON FOR INCOMER, BUS SECTION, GENERATOR & BREAKER ON/OFF | | 8 | YSAP1 | YONGSUNG | SOUTH KOREA | YS-AP1-2-40-B-DW | E |
| | SOA, 3SOE, 3SOA | | CONTROL 2NO CONTACT EACH | | | | | | | |
| F | 27 GES | | EMERGENCY PUSH BUTTON FOR GENERATOR OFF | | 1 | PPFN1RN | CGT | ITALY | PPFN1RN | F |
| | | | | | | | | | | |
| G | 28 TH+HS-1,TH+HS-2,TH+HS-3 | | THERMOSTAT AND HUMIDSTAT | | 3 | ELH-220 | E-LABS | PAKISTAN | | G |
| | | | | | | | | | | |
| H | 29 SH1, SH2, SH3 | | SPACE HEATER (60W) | | 3 | ELH-220 | E-LABS | PAKISTAN | | H |
| | | | | | | | | | | |
| I | 30 DS1, DS2, DS3 | | DOOR SWITCH | | 3 | YSP-YSMS | YONGSUNG | SOUTH KOREA | YSP3315GW-+YSMS-C | I |
| | | | | | | | | | | |
| J | 31 IL1, IL2, IL3 | | CUBICLE LIGHTING, 5W, 220 VOLT AC | | 3 | YST8 | YONGSUNG | SOUTH KOREA | YST8-30-5W | J |
| | | | | | | | | | | |
| K | 32 TPS1, TPS2, TPS3 | | THREE PIN SOCKET 240 VAC, 16Amp | | 3 | - | LEAR | CHINA | | K |
| | | | | | | | | | | |
| L | 33 F11, F12, F21, F22, F31, F32 | | FUSE 6Amp | | 6 | - | HAGER/ABB/EQ | HUNGARY | | L |
| | | | | | | | | | | |
| M | 34 HTR1, HTR2 | | HOOTER FOR ALARM FUNCTIONS, DC 220 VOLTS | | 2 | - | E-LABS | PAKISTAN | | M |
| | | | | | | | | | | |
| N | 35 1X2...1X10, 2X2...2X12 | | TERMINAL BLOCKS SUITABLE FOR 50mm ² CABLE | | 60 | CBD-35 | CABUR | ITALY | | N |
| | | | | | | | | | | |
| O | 36 1X1, 2X1, 3X1 | | TERMINATION PADS (40X5 mm) FOR INCOMING CABLES | | 12 | - | | | | O |
| | | | | | | | | | | |
| P | 37 1X11...1X17, 2X13...2X14 | | TERMINAL BLOCKS SUITABLE FOR 35mm ² CABLE | | 40 | CBD | CABUR | ITALY | | P |
| | | | | | | | | | | |
| Q | 38 1X18...1X34, 2X23...2X26 | | TERMINAL BLOCKS SUITABLE FOR 16mm ² CABLE | | 42 | CBD-16 | CABUR | ITALY | | Q |
| | | | | | | | | | | |
| R | 39 X3 | | TERMINAL BLOCK FOR COMPARTMENT HEATING CIRCUIT | | 8 | CBD-4 | CABUR | ITALY | | R |
| | | | | | | | | | | |
| S | 40 X4 | | TERMINAL BLOCK FOR INTERFACING | | 4 | CBD-4 | CABUR | ITALY | | S |
| | | | | | | | | | | |
| T | 41 X6 | | TEMINAL BLOCK FOR ANNUNCIATION | | 40 | CBD-4 | CABUR | ITALY | | T |
| | | | | | | | | | | |
| APPROVED | CHECKED | DRAWN | PROJECT: PO. NO. 6019415518 DATED 16.04.2018 220/132kV CONTROL, PROTECTION & ACDC PANEL GHAZI ROAD PROJECT | | TITLE: LIST OF APPARATUS 415-240 VAC AUXILIARY SUPPLY 220VAC DISTRIBUTION BOARD FOR 220KV EQUIPMENT | |  E P E S O L P v t . L t d . 71-B Garden Block, New Garden Town, Lahore, Pakistan | | DWG# EPE/ENU-18/P1456 | SHT: 03 OF 04 |
| NAH | ABA | MSC | | | | | DATE:20.12.2018 | AS BUILT | REV: 0 | |

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | |
|----------|------------------|---------------|---|---|--|-------|--|-------------------|-----------------------|---------------|
| SR. # | ITEM DESIGNATION | | DESCRIPTION | | QTY | TYPE | MAKE | COUNTRY OF ORIGIN | ORDERING INFORMATION | SHEET NO |
| A | 42 | X10 | TERMINAL BLOCK FOR MULTIPLICATION | | 14 | CBD-4 | CABUR | ITALY | | A |
| | 43 | X11 | TERMINAL BLOCK FOR MULTIPLICATION | | 10 | CBD-4 | CABUR | ITALY | | |
| | 44 | X12 | TERMINAL BLOCK FOR MULTIPLICATION | | 10 | CBD-4 | CABUR | ITALY | | |
| | 45 | X13 | TERMINAL BLOCK FOR MULTIPLICATION | | 10 | CBD-4 | CABUR | ITALY | | |
| B | 46 | X71 | TERMINAL BLOCK FOR GENERATOR REMOTE START/STOP | | 8 | CBD-4 | CABUR | ITALY | | B |
| | 47 | X101 | DISCONNECTING TERMINAL BLOCK (SCREW TYPE) FOR CT WITH SHORTENING ARRANGEMENT | | 10 | SCB-6 | CABUR | ITALY | | |
| | 48 | X201 | DISCONNECTING TERMINAL BLOCK (SCREW TYPE) FOR CT WITH SHORTENING ARRANGEMENT | | 10 | SCB-6 | CABUR | ITALY | | |
| | 49 | X301 | DISCONNECTING TERMINAL BLOCK (SCREW TYPE) FOR CT WITH SHORTENING ARRANGEMENT | | 8 | SCB-6 | CABUR | ITALY | | |
| C | 50 | H1Y, H2Y, H3Y | INDICATION LAMP FOR PHASE HEALTHY STATUS COLOR YELLOW 230VAC | | 3 | YSPL | YONGSUNG | SOUTH KOREA | YS-PL-2-AL22YW | C |
| | 51 | H1B, H2B, H3B | INDICATION LAMP FOR PHASE HEALTHY STATUS COLOR BLUE 230VAC | | 3 | YSPL | YONGSUNG | SOUTH KOREA | YS-PL-2-AL22NW | |
| D | | | | | | | | | | D |
| E | | | | | | | | | | E |
| F | | | | | | | | | | F |
| APPROVED | CHECKED | DRAWN | PROJECT: PO. NO. 6019415518 DATED 16.04.2018 220/132kV CONTROL, PROTECTION & ACDC PANEL GHAZI ROAD PROJECT | | TITLE: LIST OF APPARATUS 415-240 VAC AUXILIARY SUPPLY 220VAC DISTRIBUTION BOARD FOR 220kV EQUIPMENT | |  EPESOL Pvt. Ltd. 71-B Garden Block, New Garden Town, Lahore, Pakistan | | DWG# EPE/ENU-18/P1456 | SHT: 04 OF 04 |
| NAH | ABA | MSC | | | | | DATE:20.12.2018 | AS BUILT | REV: 0 | |

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SCHEMATIC DIAGRAMS

415-240 VAC AUXILIARY SUPPLY

DISTRIBUTION BOARD FOR 220kV EQUIPMENT

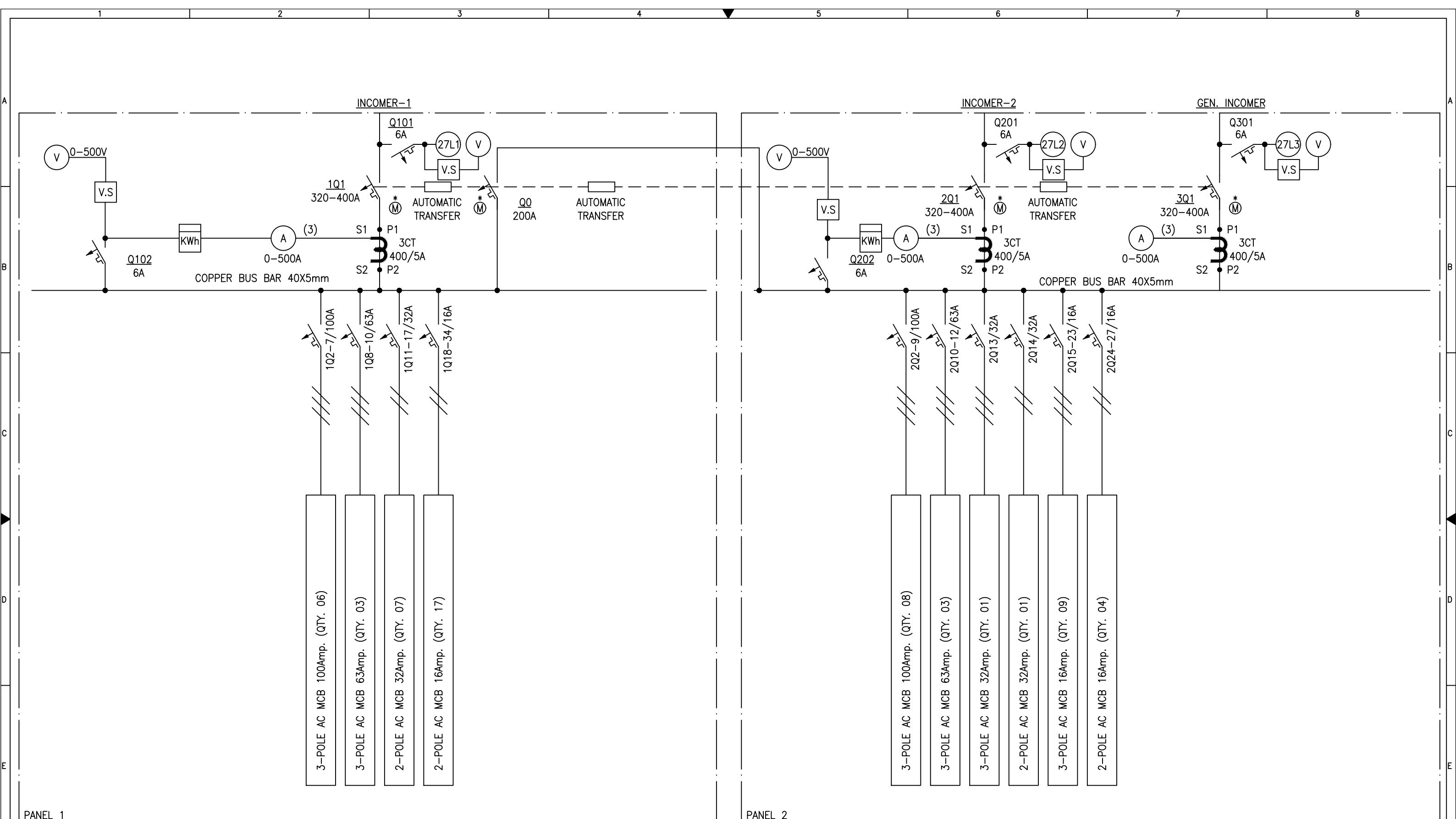
| APPROVED | CHECKED | DRAWN | PROJECT: PO. NO. 6019415518 DATED 16.04.2018 220/132kV CONTROL, PROTECTION & ACDC PANEL GHAZI ROAD PROJECT | TITLE: COVER SHEET 415-240 VAC AUXILIARY SUPPLY 220VAC DISTRIBUTION BOARD FOR 220kV EQUIPMENT | E P E S O L P v t . L t d . 71-B Garden Block, New Garden Town, Lahore, Pakistan | DWG# EPE/ENU-18/P1457 | SHT: 01 OF 29 | |
|----------|---------|-------|---|--|---|-----------------------|---------------|--------|
| NAH | ABA | MSC | | | | DATE:20.12.2018 | AS BUILT | REV: 0 |

| DESCRIPTION | SHEET NO |
|---|----------|
| COVER SHEET | 01 |
| LIST OF CONTENTS | 02 |
| LIST OF SYMBOLS | 03 |
| SINGLE LINE DIAGRAM | 04 |
| BUS-1 AC SUPPLY DISTRIBUTION | 05 |
| BUS-1 AC SUPPLY DISTRIBUTION | 06 |
| BUS-1 AC SUPPLY DISTRIBUTION | 07 |
| BUS-1 AC SUPPLY DISTRIBUTION | 08 |
| BUS-1 AC SUPPLY DISTRIBUTION | 09 |
| BUS-1 METERING CIRCUIT | 10 |
| BUS-2 AC SUPPLY DISTRIBUTION | 11 |
| BUS-2 AC SUPPLY DISTRIBUTION | 12 |
| BUS-2 AC SUPPLY DISTRIBUTION | 13 |
| BUS-2 AC SUPPLY DISTRIBUTION | 14 |
| BUS-2 AC SUPPLY DISTRIBUTION | 15 |
| BUS-2 AC SUPPLY DISTRIBUTION | 16 |
| SUPPLY CHANGEOVER AND INDICATION CIRCUIT | 17 |
| INDICATION CIRCUIT | 18 |
| CONTROL & INTERLOCKING SCHEME FOR (INCOMER-1 & BUS SECTION) | 19 |
| CONTROL & INTERLOCKING SCHEME FOR (INCOMER-2 & GEN) | 20 |
| ANNUNCIATOR CIRCUIT | 21 |

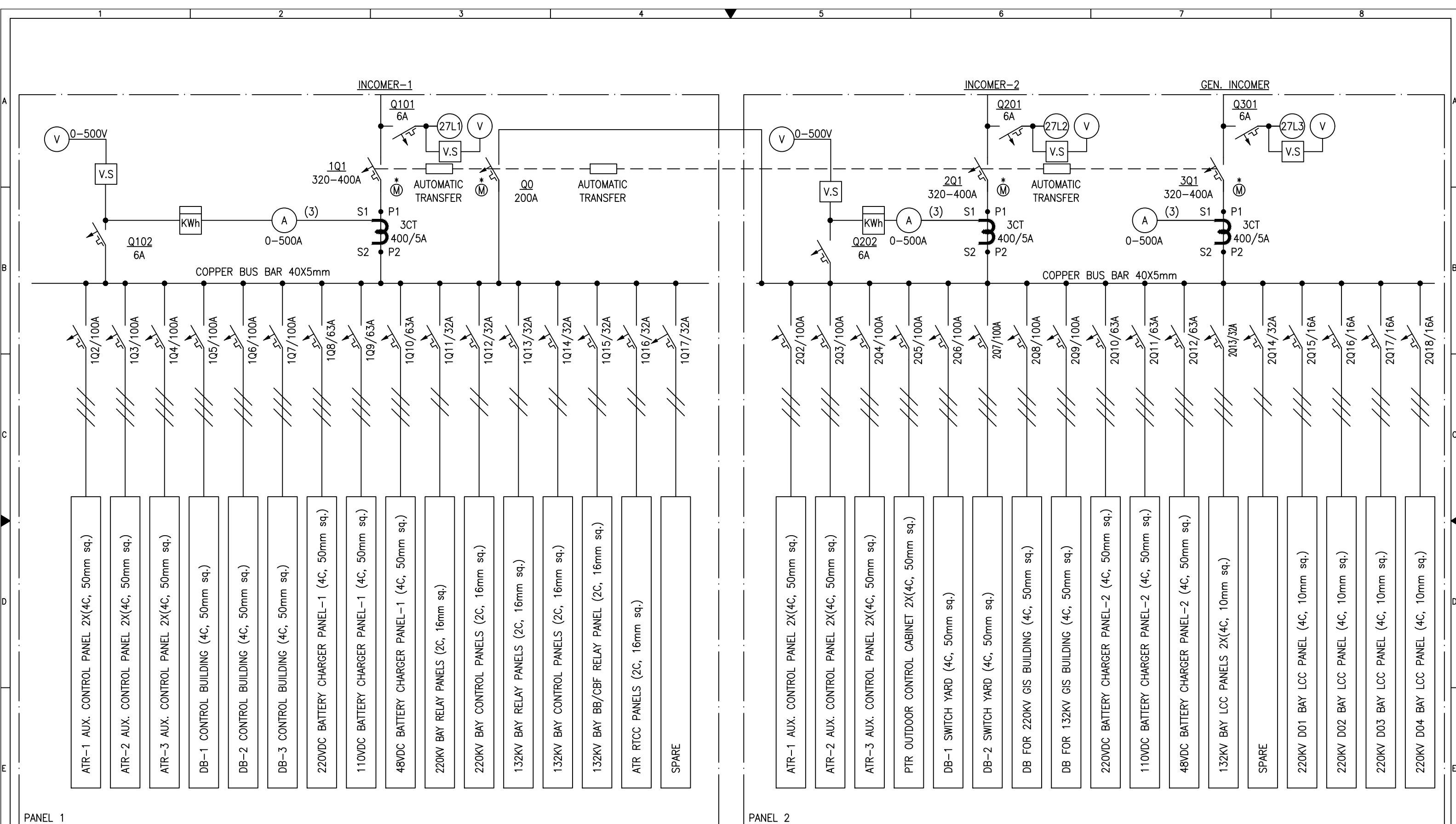
| DESCRIPTION | SHEET NO |
|---|----------|
| ANNUNCIATOR CIRCUIT | 22 |
| MCB ALARMS | 23 |
| HEATING, LIGHTING CIRCUIT | 24 |
| INCOMER-1 CLOSING & OPENING LOGIC DIAGRAM | 25 |
| INCOMER-2 CLOSING & OPENING LOGIC DIAGRAM | 26 |
| BUS SECTION CLOSING & OPENING LOGIC DIAGRAM | 27 |
| INCOMER-3 CLOSING & OPENING LOGIC DIAGRAM | 28 |

| LIST OF SYMBOLS | |
|-----------------|------------------------------|
| | RELAY PANEL TERMINAL BLOCK |
| | CONTROL PANEL TERMINAL BLOCK |
| | EARTH CONNECTION |
| | NORMALLY CLOSED CONTACT |
| | NORMALLY OPEN CONTACT |
| | CONTACT FOR TRIPPING |
| | TIME DELAY PICKUP |
| | CHANGE OVER CONTACT |
| | MCB/MCCB |
| | INDICATION BULB/LED |
| | THREE PIN SOCKET |
| | SPACE HEATER |
| | COIL |
| | EQUIPMENT WITHIN PANEL |
| | INDEPENDENT PANEL |
| | INDEPENDENT PANEL |
| | FUSE |
| | TIME DELAYED CONTACTOR/TIMER |

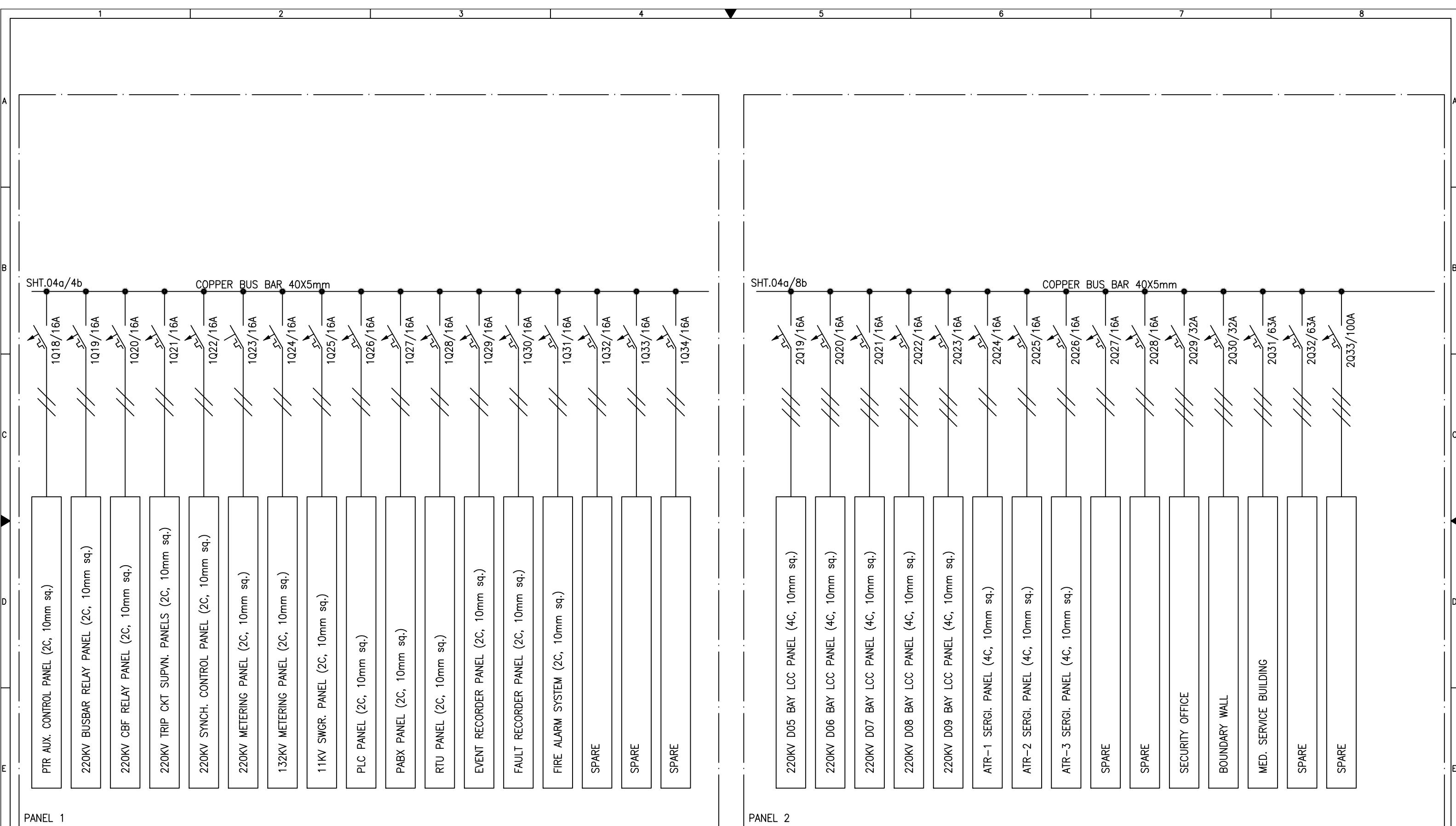
| LIST OF SYMBOLS | |
|-----------------|---------------------|
| | PUSH BUTTON |
| | TWO POSITION SWITCH |
| | AC BELL |



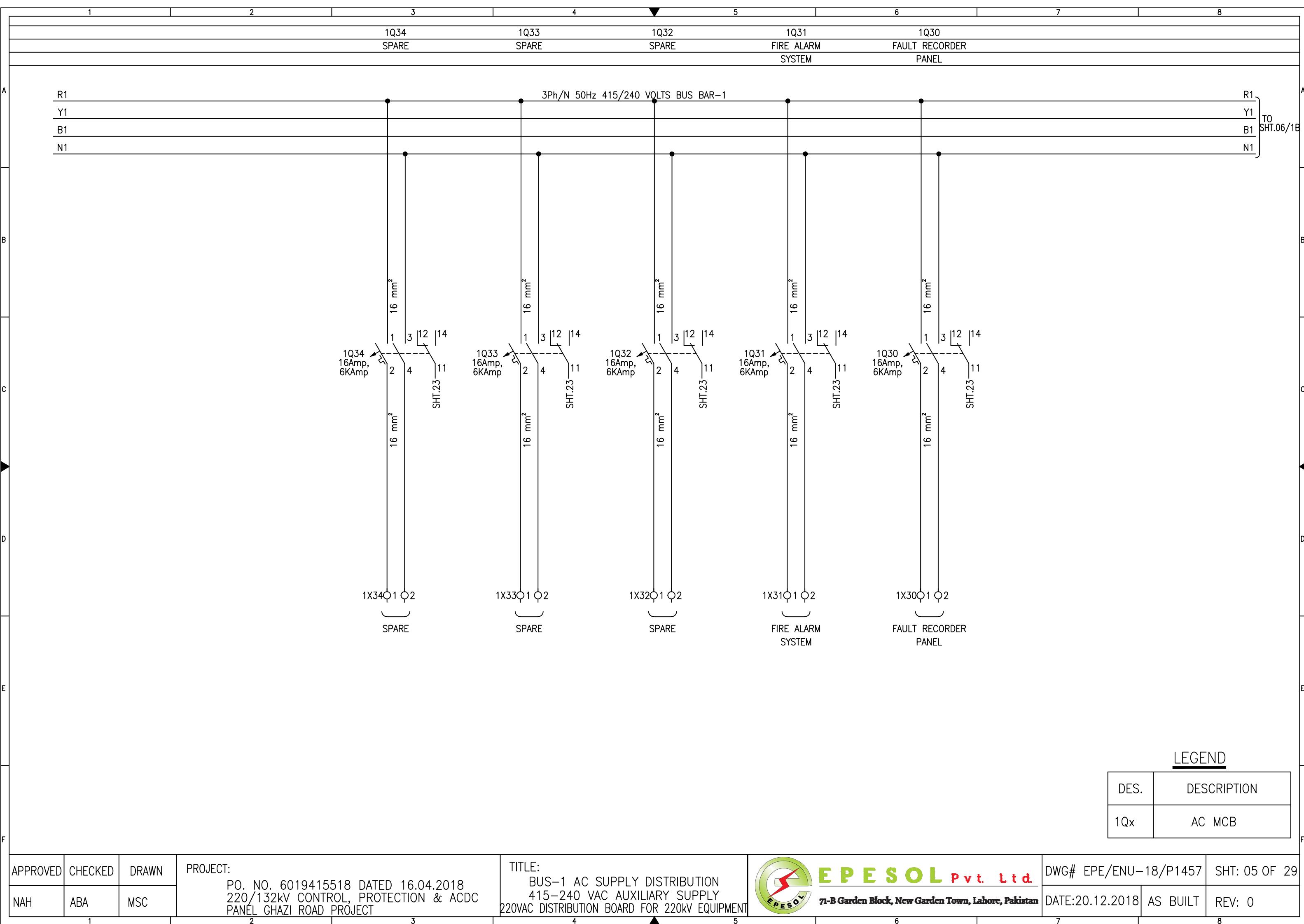
| APPROVED | CHECKED | DRAWN | PROJECT: PO. NO. 6019415518 DATED 16.04.2018 220/132kV CONTROL, PROTECTION & ACDC PANEL GHAZI ROAD PROJECT | TITLE: SINGLE LINE DIAGRAM 415-240 VAC AUXILIARY SUPPLY 220VAC DISTRIBUTION BOARD FOR 220kV EQUIPMENT | EPE SOL Pvt. Ltd. 71-B Garden Block, New Garden Town, Lahore, Pakistan | DWG# EPE/ENU-18/P1457 | SHT: 04 OF 29 |
|----------|---------|-------|---|---|---|-----------------------|---------------|
| NAH | ABA | MSC | | | | DATE: 20.12.2018 | AS BUILT |

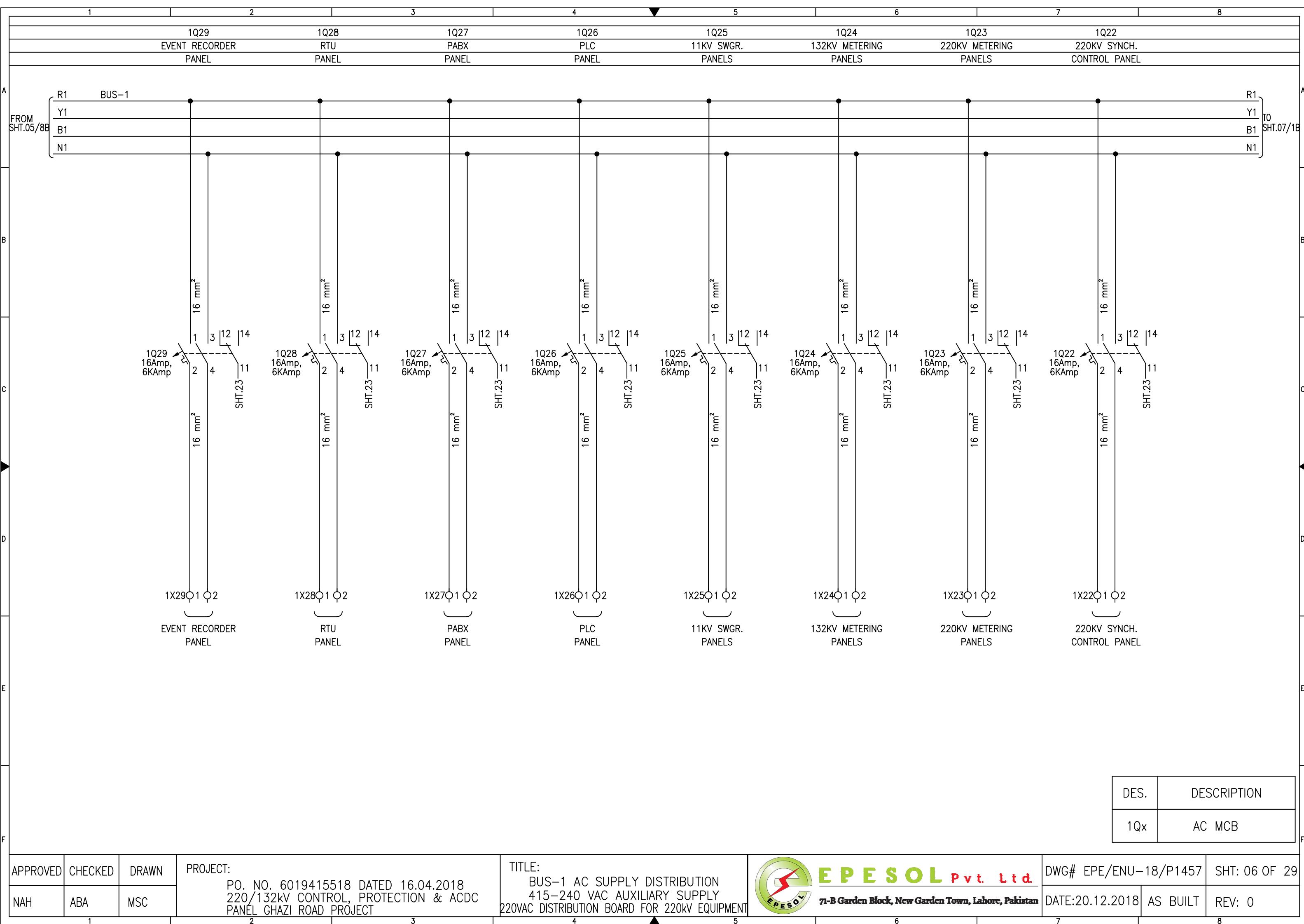


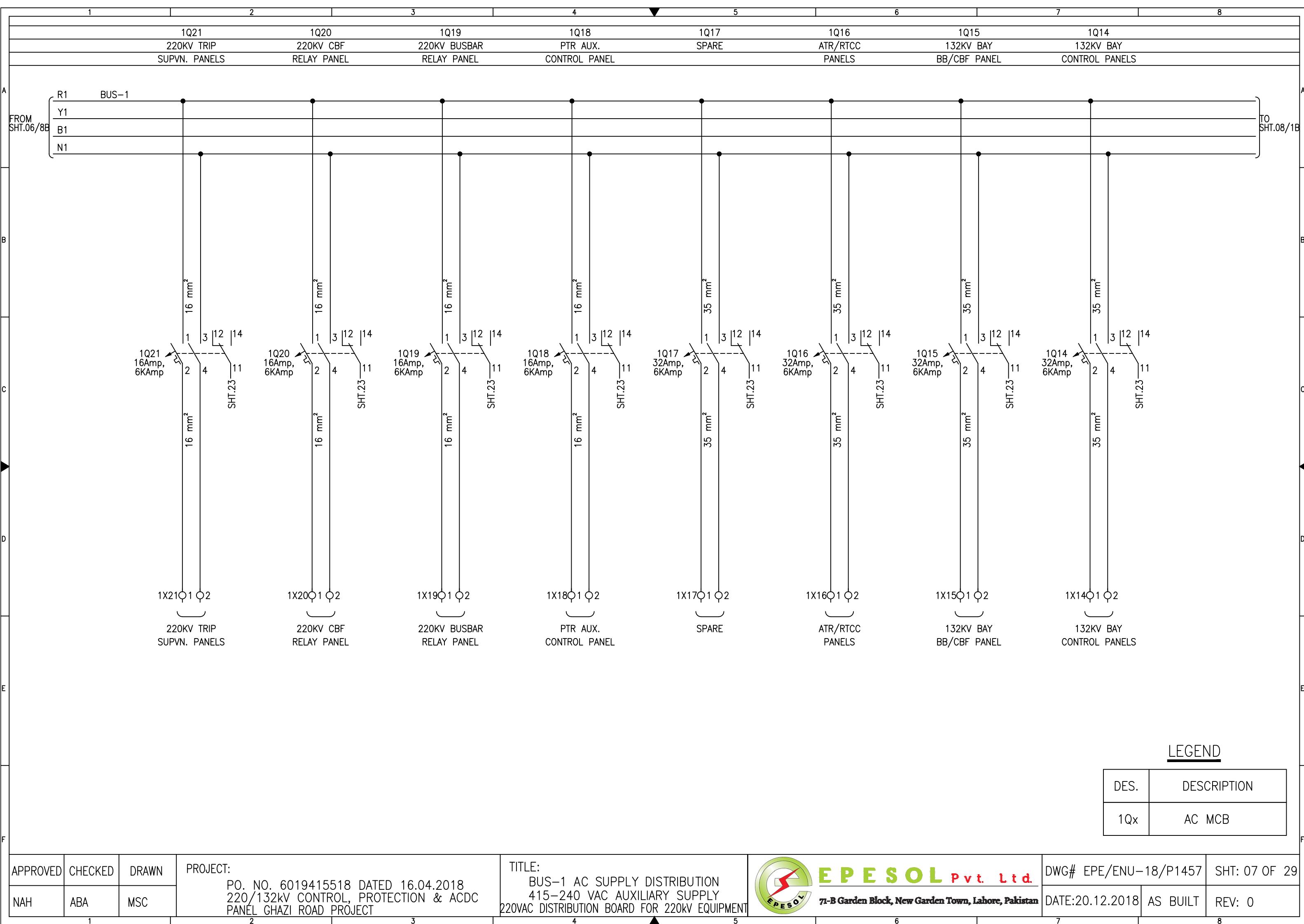
| APPROVED | CHECKED | DRAWN | PROJECT: PO. NO. 6019415518 DATED 16.04.2018 220/132kV CONTROL, PROTECTION & ACDC PANEL GHAZI ROAD PROJECT | TITLE: SINGLE LINE DIAGRAM 415-240 VAC AUXILIARY SUPPLY 220VAC DISTRIBUTION BOARD FOR 220KV EQUIPMENT | DWG# EPE/ENU-18/P1457 | SHT:04aOF 29 |
|----------|---------|-------|---|--|---|---------------------------------|
| NAH | ABA | MSC | | | EPE SOL Pvt. Ltd. 71-B Garden Block, New Garden Town, Lahore, Pakistan | DATE:20.12.2018 AS BUILT REV: 0 |



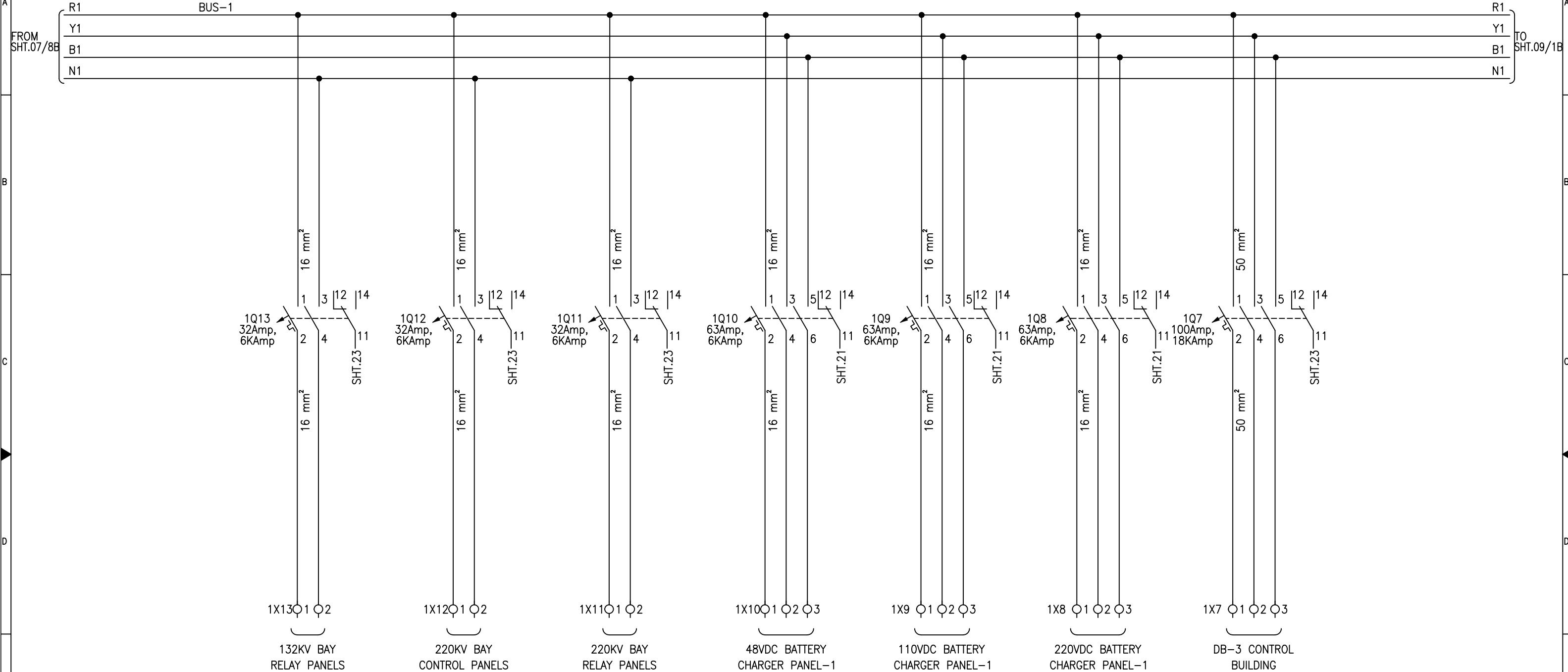
| APPROVED | CHECKED | DRAWN | PROJECT: PO. NO. 6019415518 DATED 16.04.2018 220/132kV CONTROL, PROTECTION & ACDC PANEL GHAZI ROAD PROJECT | TITLE: SINGLE LINE DIAGRAM 415-240 VAC AUXILIARY SUPPLY 220VAC DISTRIBUTION BOARD FOR 220KV EQUIPMENT | EPE SOL Pvt. Ltd. 71-B Garden Block, New Garden Town, Lahore, Pakistan | DWG# EPE/ENU-18/P1457 | SHT:04b OF 29 |
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| NAH | ABA | MSC | | | | DATE: 20.12.2018 | AS BUILT |







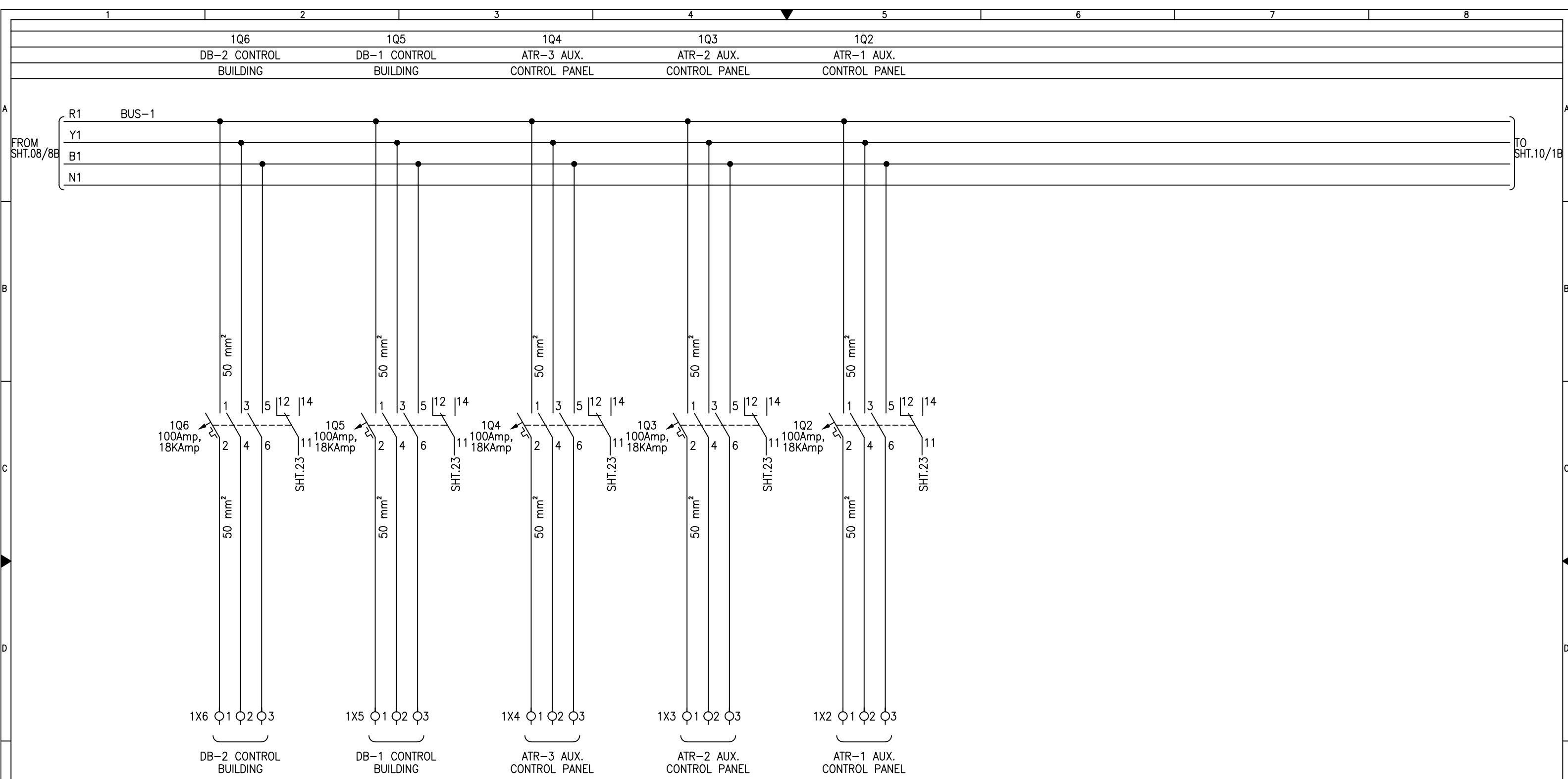
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-----------------------------------|-------------------------------------|-----------------------------------|--|--|--|---------------------------------|---|
| 1Q13 132KV BAY RELAY PANELS | 1Q12 220KV BAY CONTROL PANELS | 1Q11 220KV BAY RELAY PANELS | 1Q10 48VDC BATTERY CHARGER PANEL-1 | 1Q9 110VDC BATTERY CHARGER PANEL-1 | 1Q8 220VDC BATTERY CHARGER PANEL-1 | 1Q7 DB-3 CONTROL BUILDING | |
| | | | | | | | |



LEGEND

| DES. | DESCRIPTION |
|------|-------------|
| 1Qx | AC MCB |

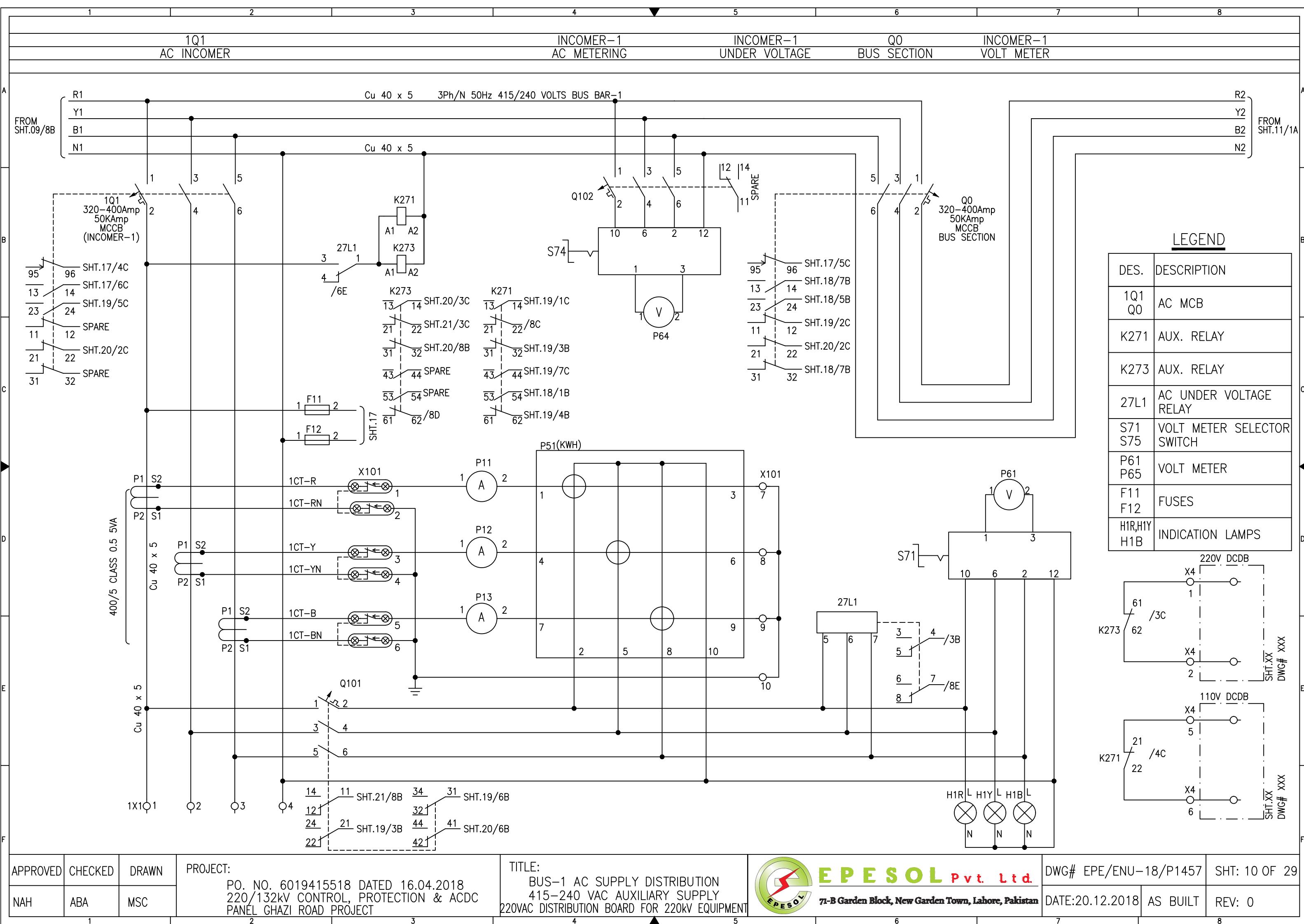
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| APPROVED | CHECKED | DRAWN | PROJECT: PO. NO. 6019415518 DATED 16.04.2018 220/132kV CONTROL, PROTECTION & ACDC PANEL GHAZI ROAD PROJECT | TITLE: BUS-1 AC SUPPLY DISTRIBUTION 415-240 VAC AUXILIARY SUPPLY 220VAC DISTRIBUTION BOARD FOR 220KV EQUIPMENT |  EPE SOL Pvt. Ltd. 71-B Garden Block, New Garden Town, Lahore, Pakistan | DWG# EPE/ENU-18/P1457 | SHT: 08 OF 29 |
| NAH | ABA | MSC | | | | DATE: 20.12.2018 | AS BUILT |

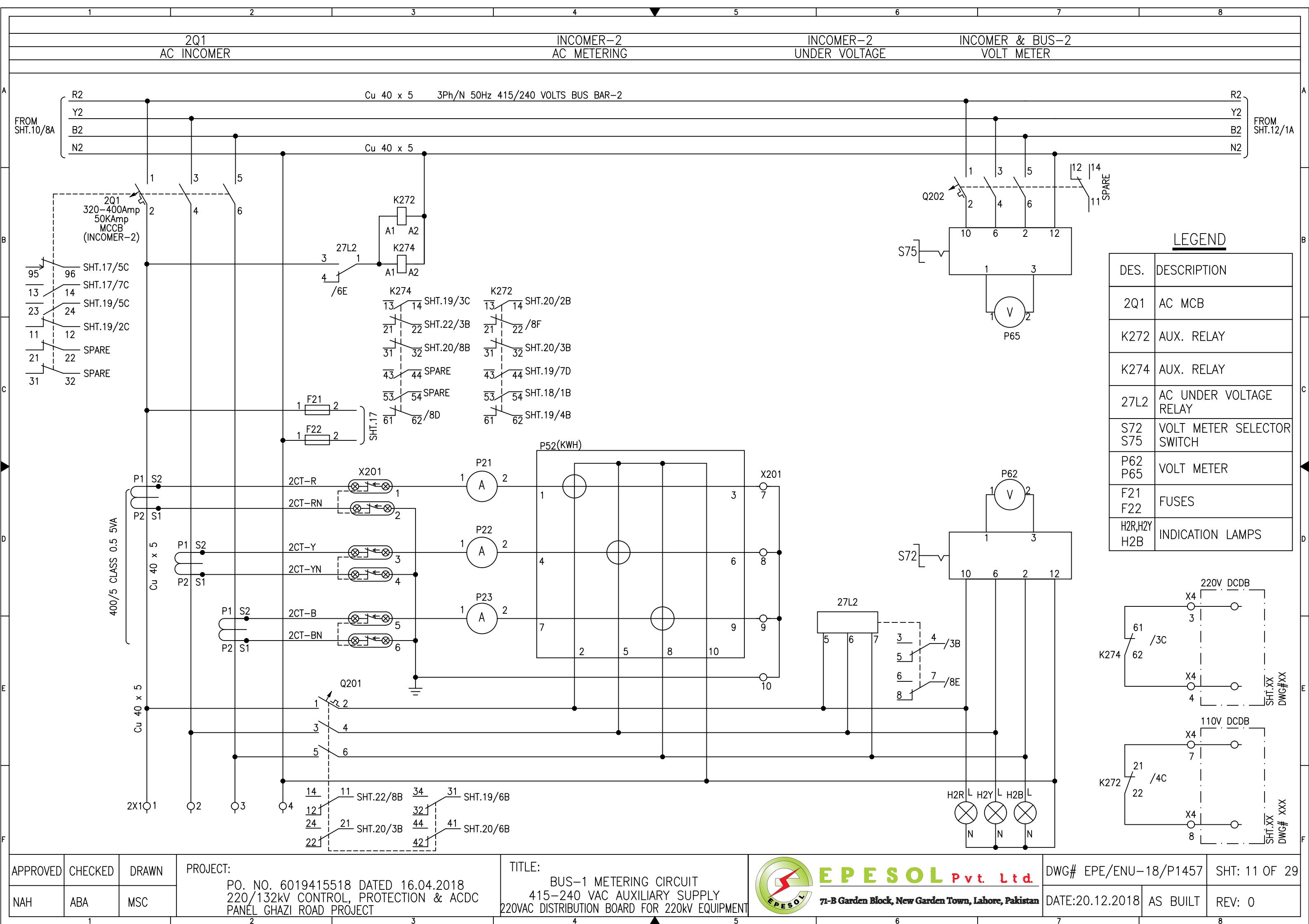


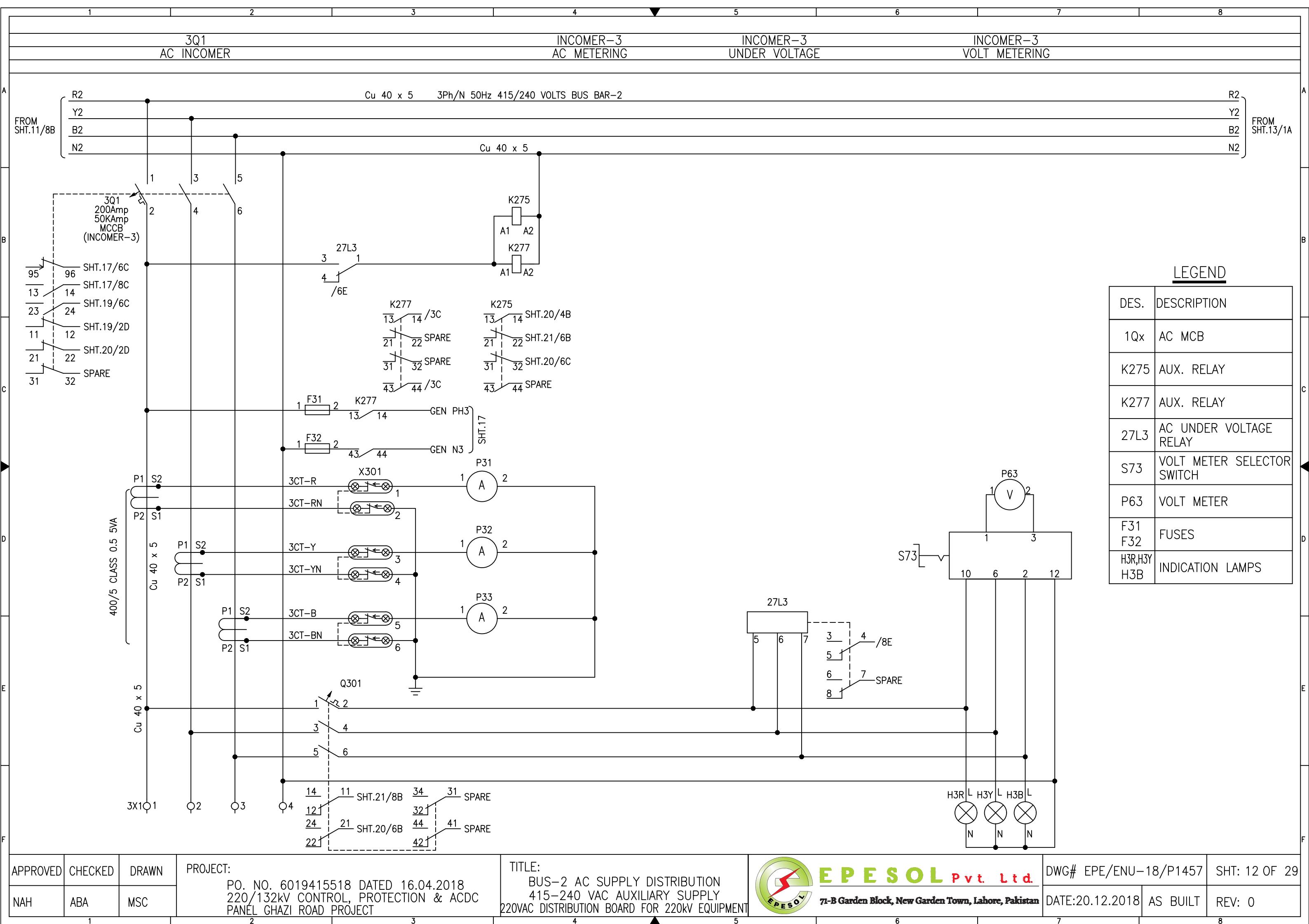
LEGEND

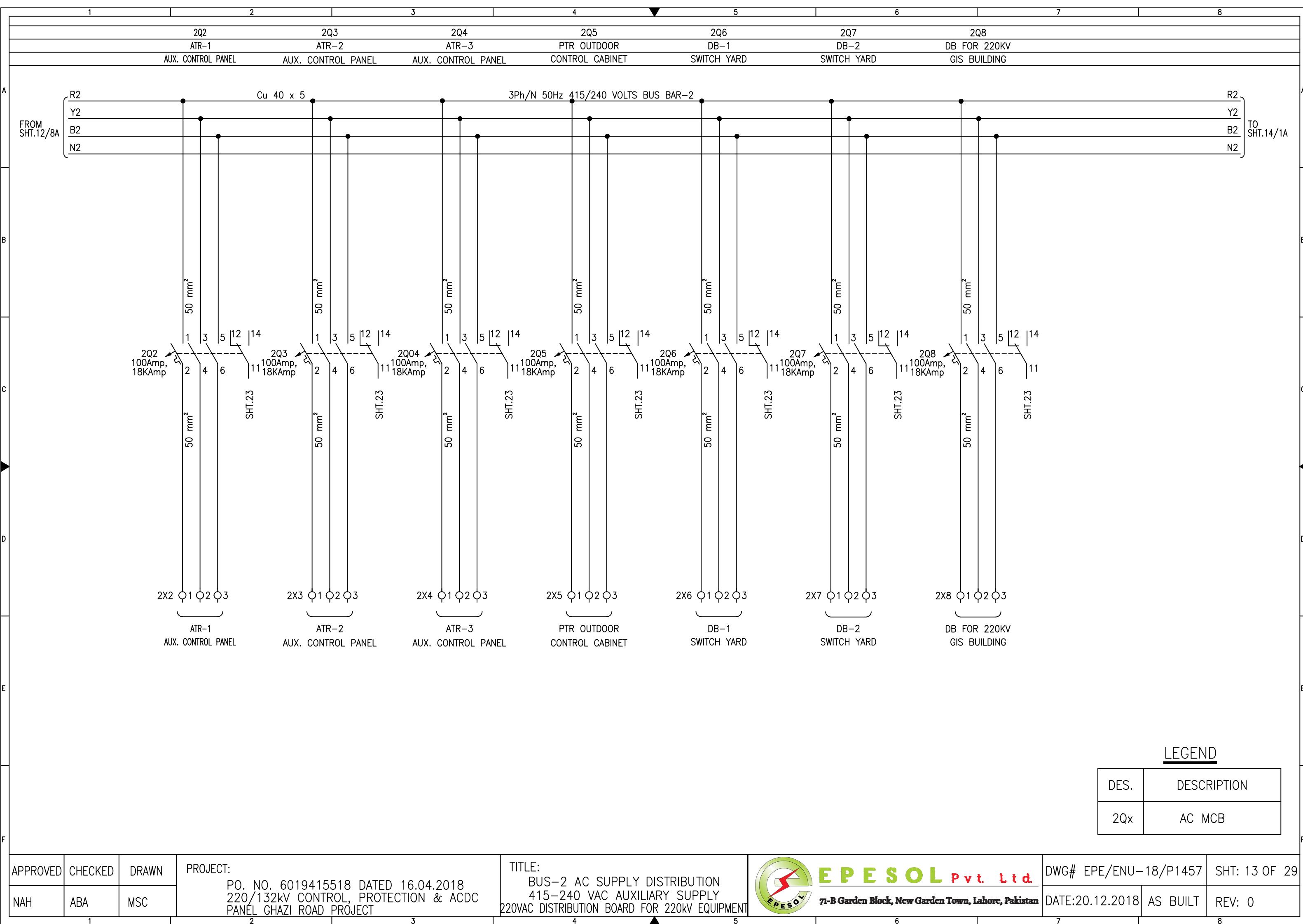
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|------|-------------|
| 1Qx | AC MCB |

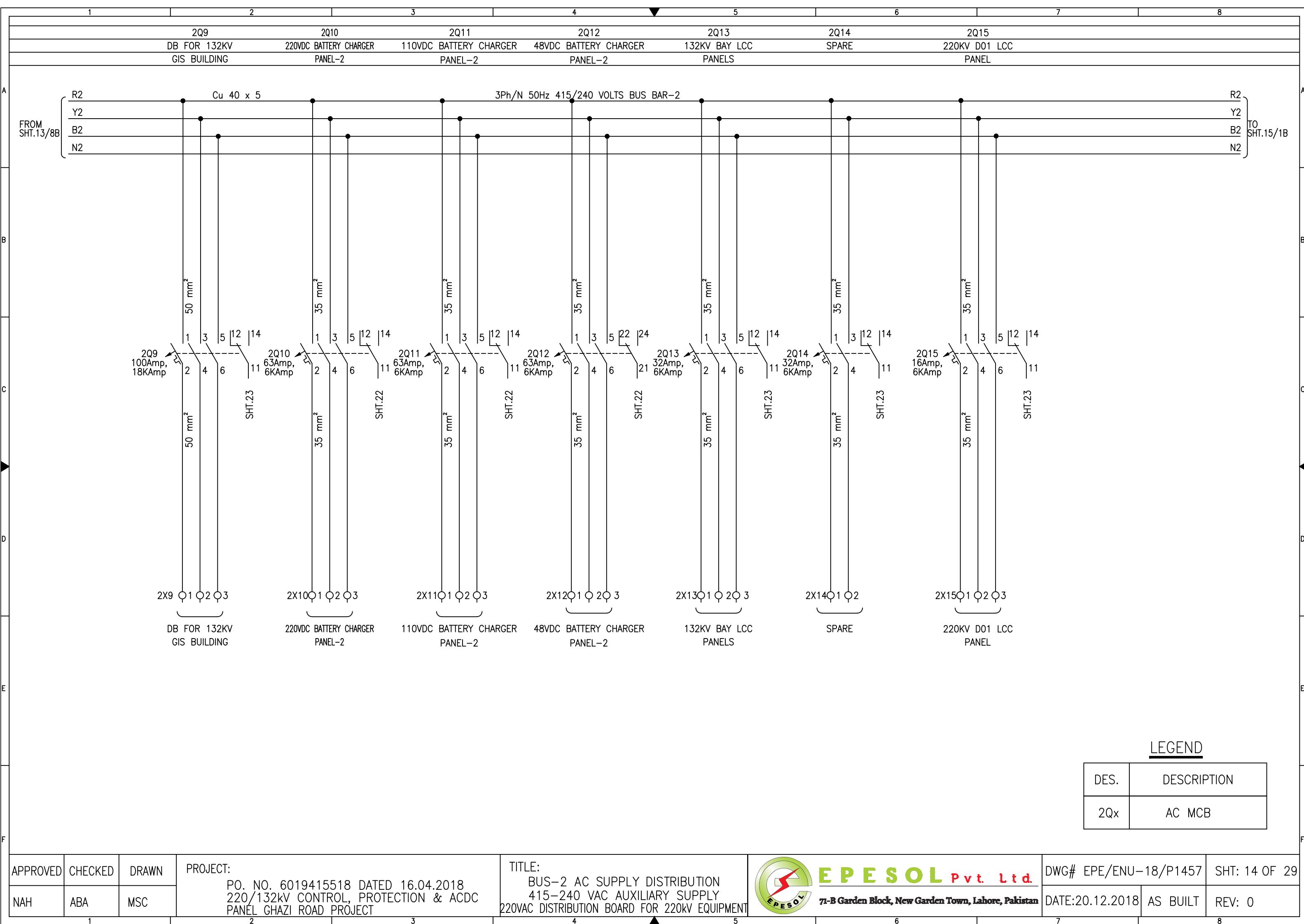
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|----------|---------|-------|---|---|---|-----------------------|---------------|
| APPROVED | CHECKED | DRAWN | PROJECT: PO. NO. 6019415518 DATED 16.04.2018 220/132kV CONTROL, PROTECTION & ACDC PANEL GHAZI ROAD PROJECT | TITLE: BUS-1 AC SUPPLY DISTRIBUTION 415-240 VAC AUXILIARY SUPPLY 220VAC DISTRIBUTION BOARD FOR 220kV EQUIPMENT |  EPESOL Pvt. Ltd. 71-B Garden Block, New Garden Town, Lahore, Pakistan | DWG# EPE/ENU-18/P1457 | SHT: 09 OF 29 |
| NAH | ABA | MSC | | | | DATE:20.12.2018 | AS BUILT |

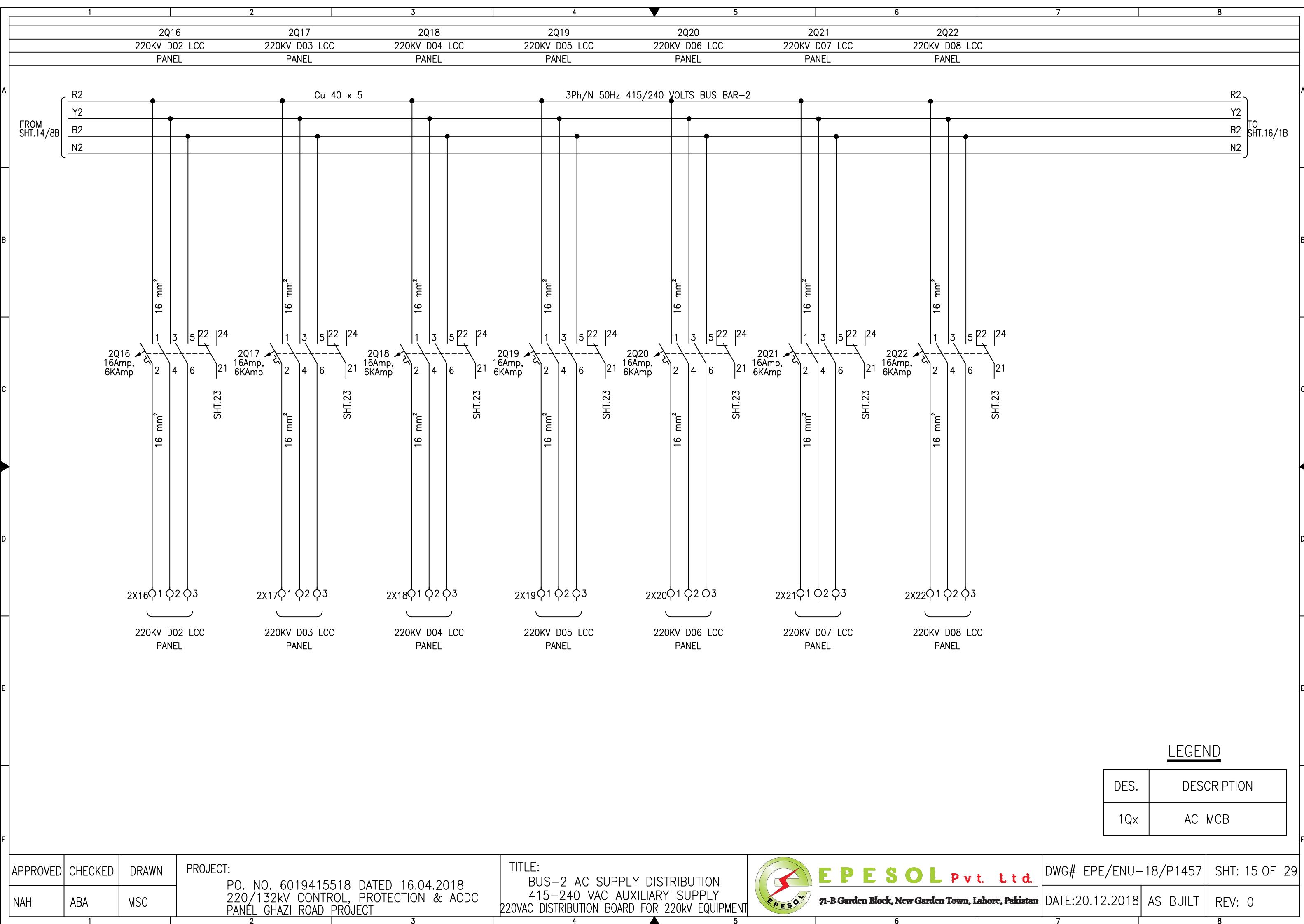


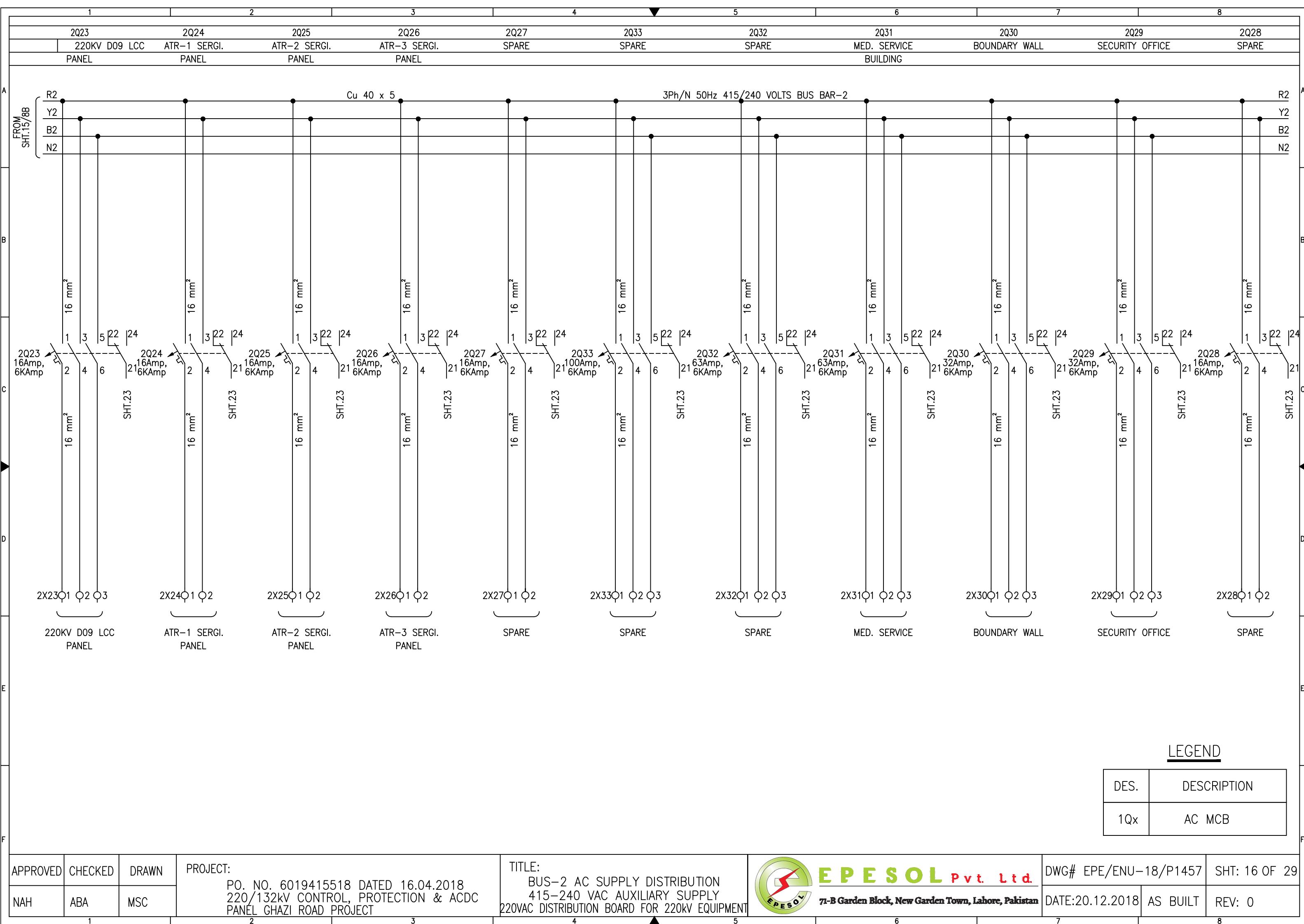


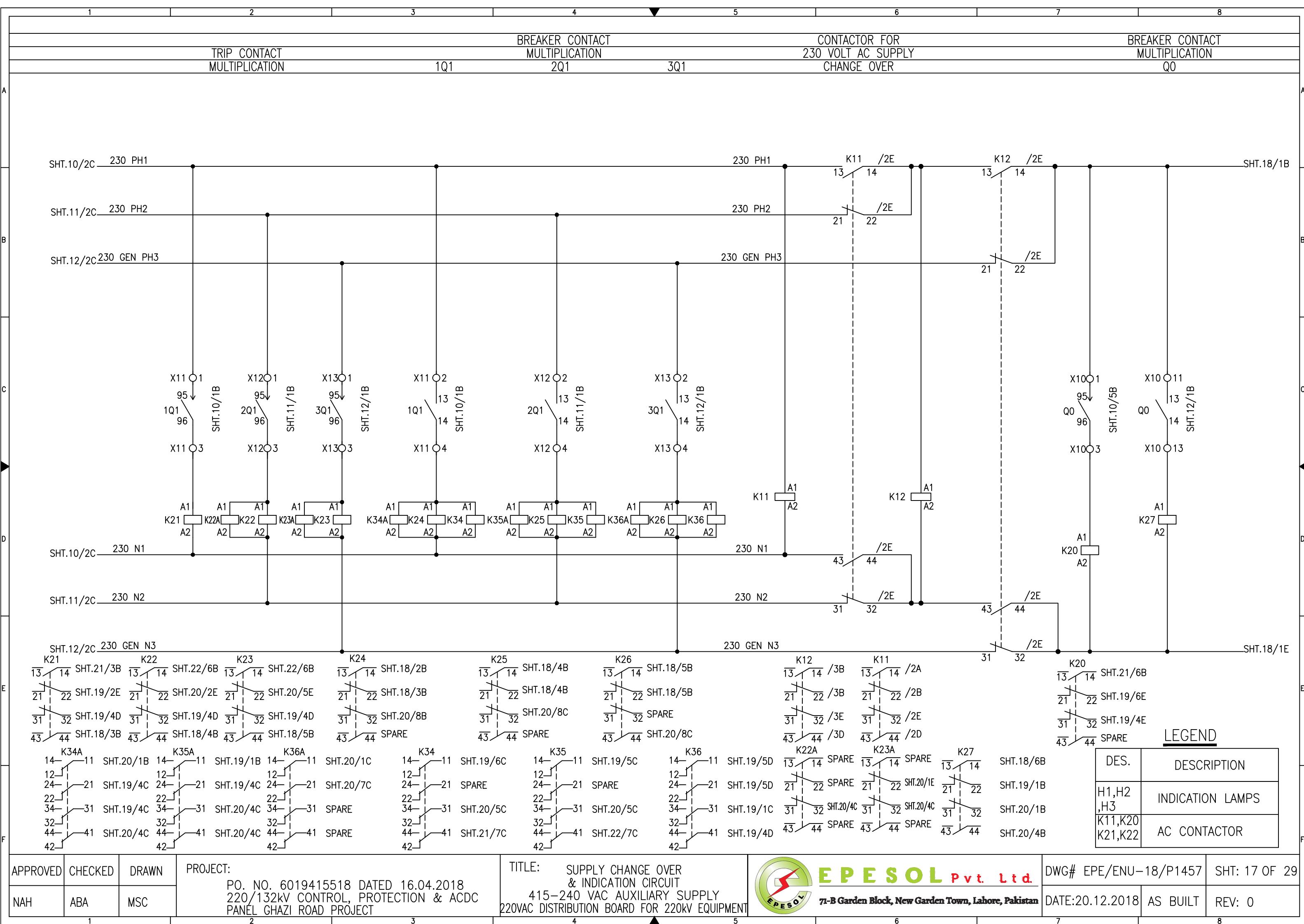


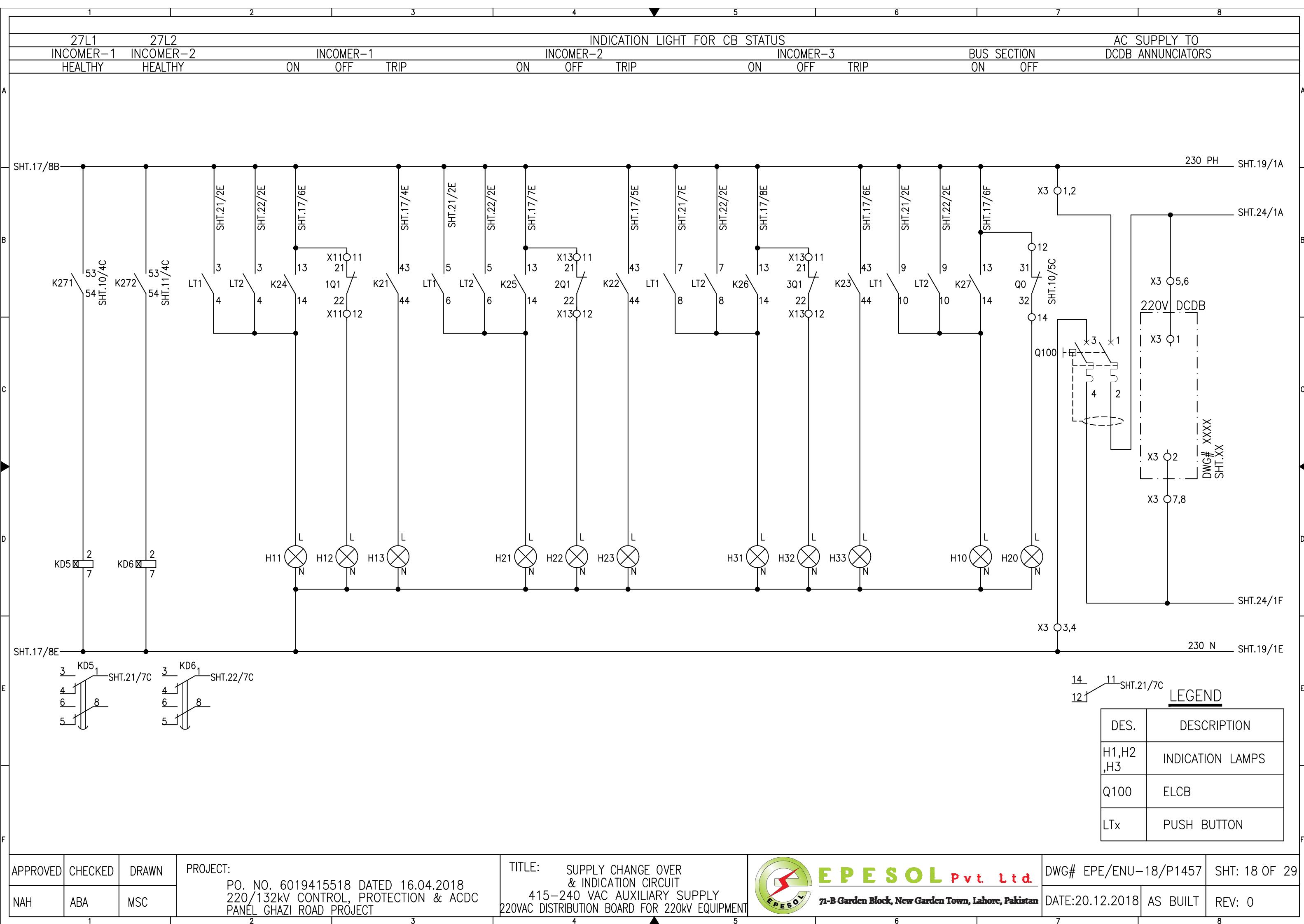


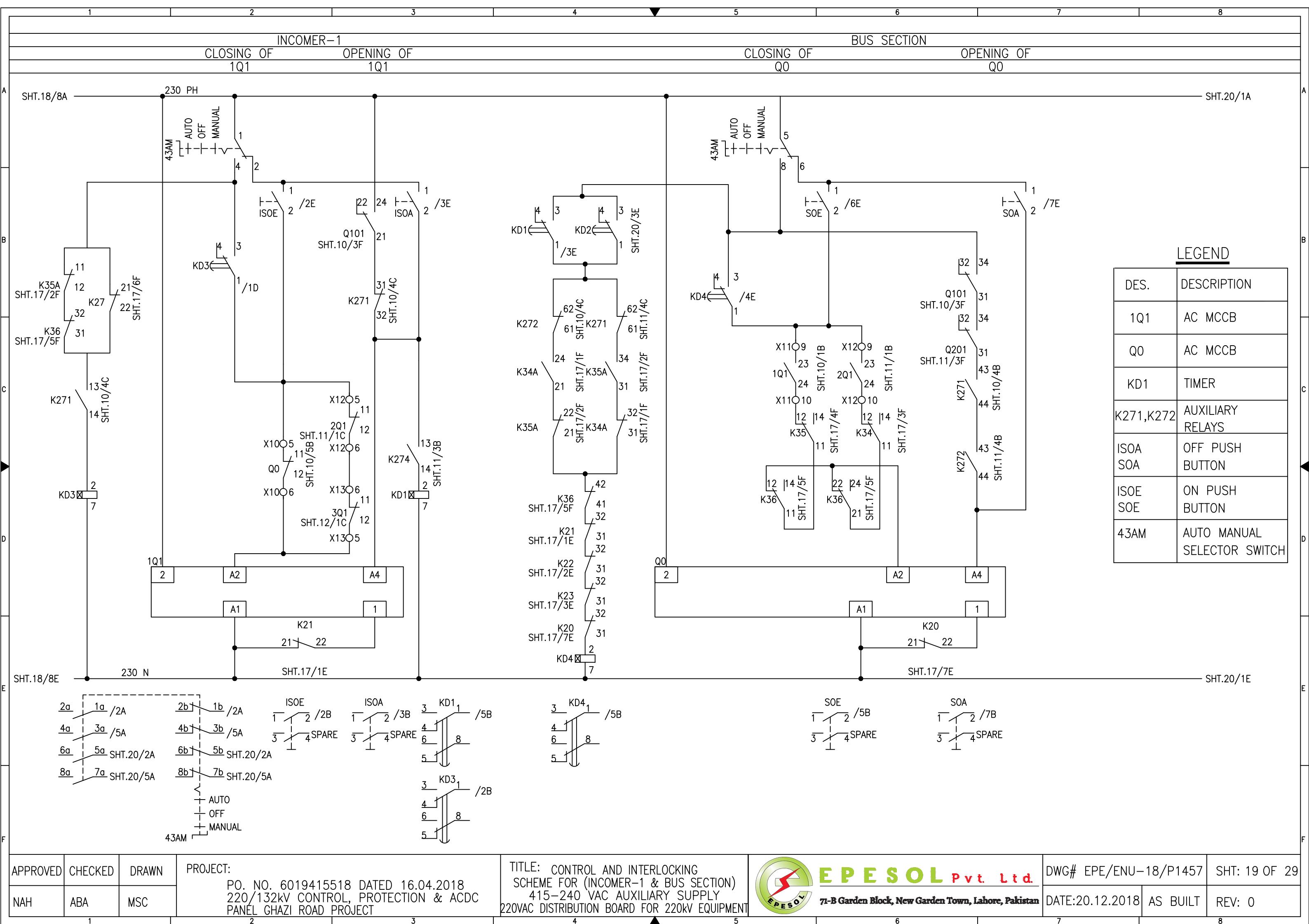


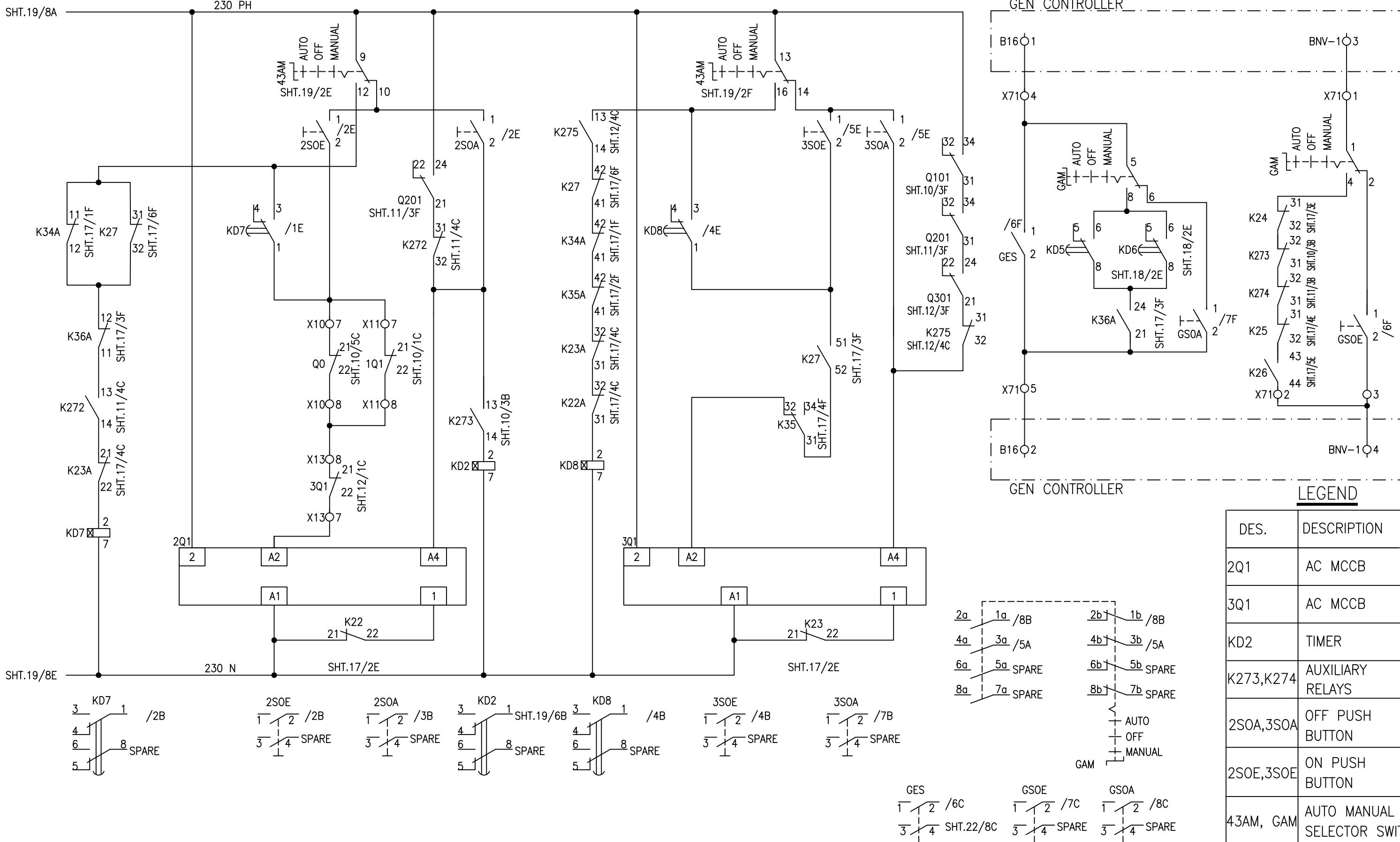
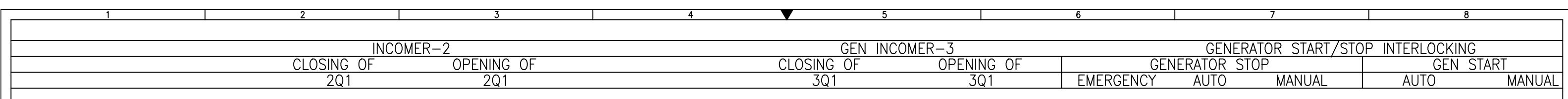






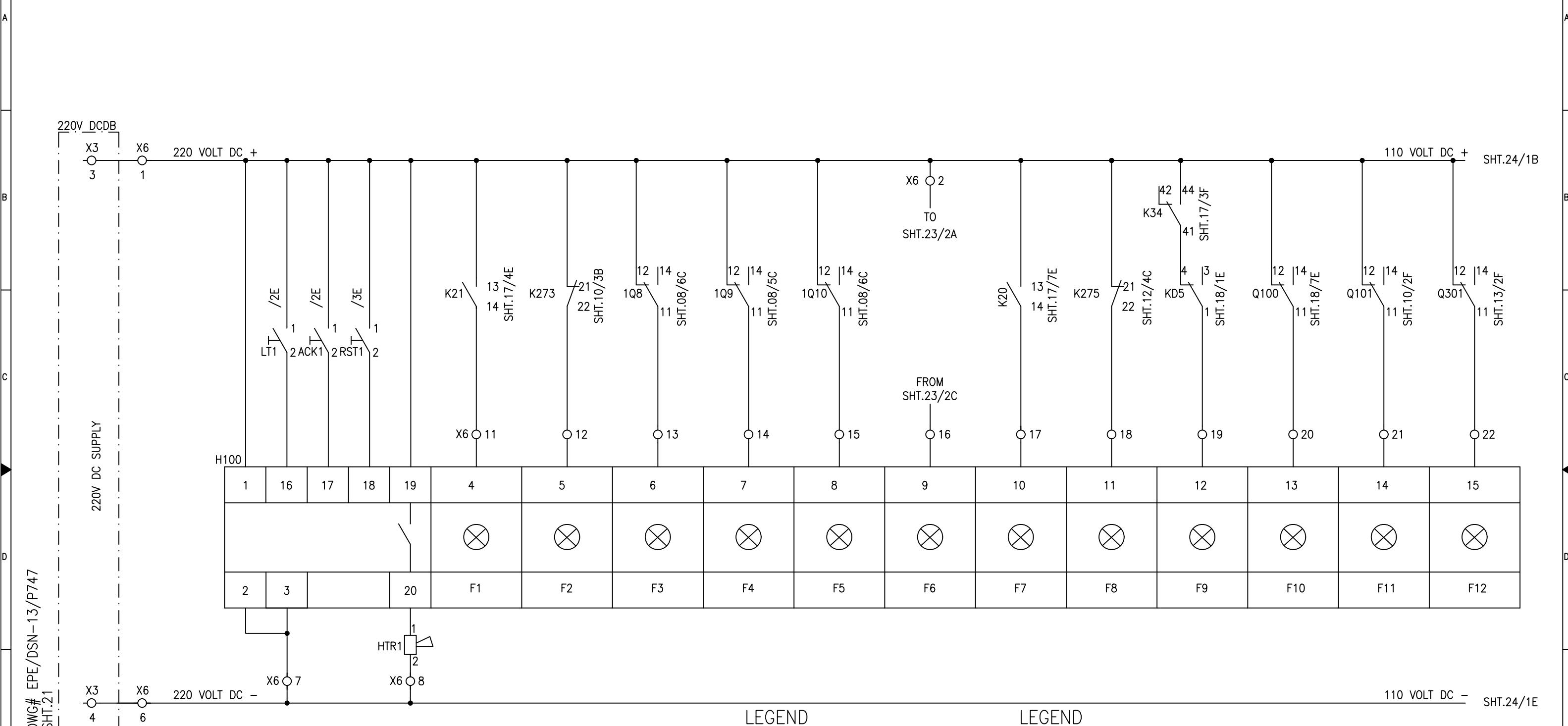






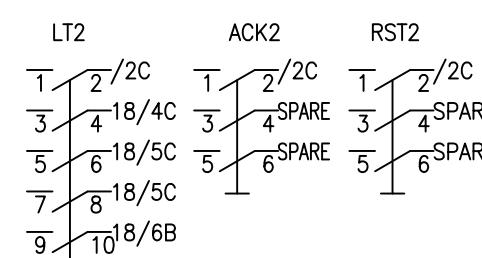
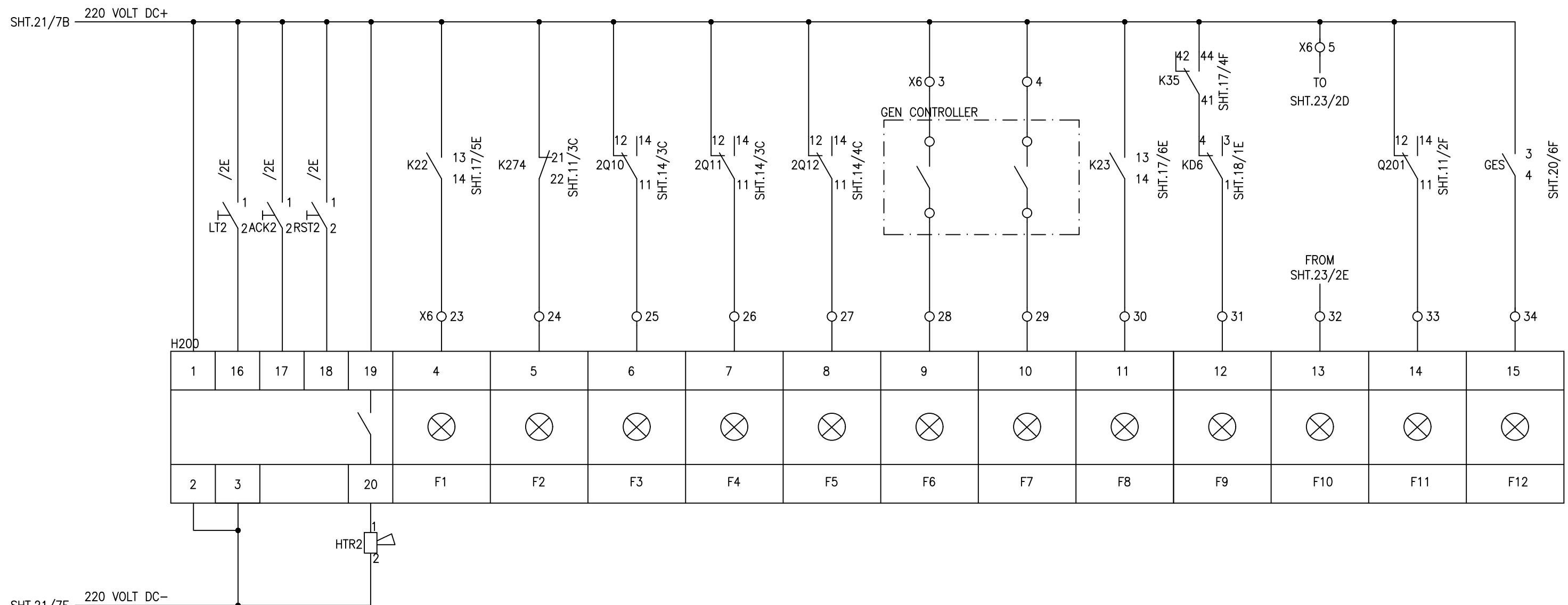
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|----------|---------|-------|---|--|-----------------------|---------------|
| APPROVED | CHECKED | DRAWN | PROJECT: PO. NO. 6019415518 DATED 16.04.2018 220/132kV CONTROL, PROTECTION & ACDC PANEL GHAZI ROAD PROJECT | TITLE: CONTROL AND INTERLOCKING SCHEME FOR (INCOMER-2 & GEN) 415-240 VAC AUXILIARY SUPPLY 220VAC DISTRIBUTION BOARD FOR 220kV EQUIPMENT | DWG# EPE/ENU-18/P1457 | SHT: 20 OF 29 |
| NAH | ABA | MSC | | | | |

| | | | | | | | |
|----|-----|-----|------------|-----------|------------|----------------|----------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| LT | ACK | RST | HOOTER | AC INC-1 | UV RELAY | 220VDC BATTERY | 110VDC BATTERY |
| | | | MCCB | INCOMER-1 | CHARGER-A | CHARGER-A | 48VDC BATTERY |
| | | | INITIATION | TRIPPED | SUPP. FAIL | SUPP. FAIL | BUS-1 |



| APPROVED | CHECKED | DRAWN | PROJECT: | TITLE: | DWG# | SHT: |
|----------|---------|-------|---|--|---|---|
| NAH | ABA | MSC | PO. NO. 6019415518 DATED 16.04.2018 220/132kV CONTROL, PROTECTION & ACDC PANEL GHAZI ROAD PROJECT | ANNUNCIATOR CIRCUIT 415-240 VAC AUXILIARY SUPPLY 220VAC DISTRIBUTION BOARD FOR 220kV EQUIPMENT | EPE SOL Pvt. Ltd. 71-B Garden Block, New Garden Town, Lahore, Pakistan | EPE/ENU-18/P1457 DATE: 20.12.2018 AS BUILT REV: 0 |

| | | | | | | | |
|------------|---------|-----|--------|-----------|-----------|----------------|----------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| | | | | | | | |
| LT | ACK | RST | HOOTER | AC INC-2 | UV RELAY | 220VDC BATTERY | 110VDC BATTERY |
| INITIATION | TRIPPED | | MCCB | INCOMER-2 | CHARGER-B | CHARGER-A | 48VDC BATTERY |

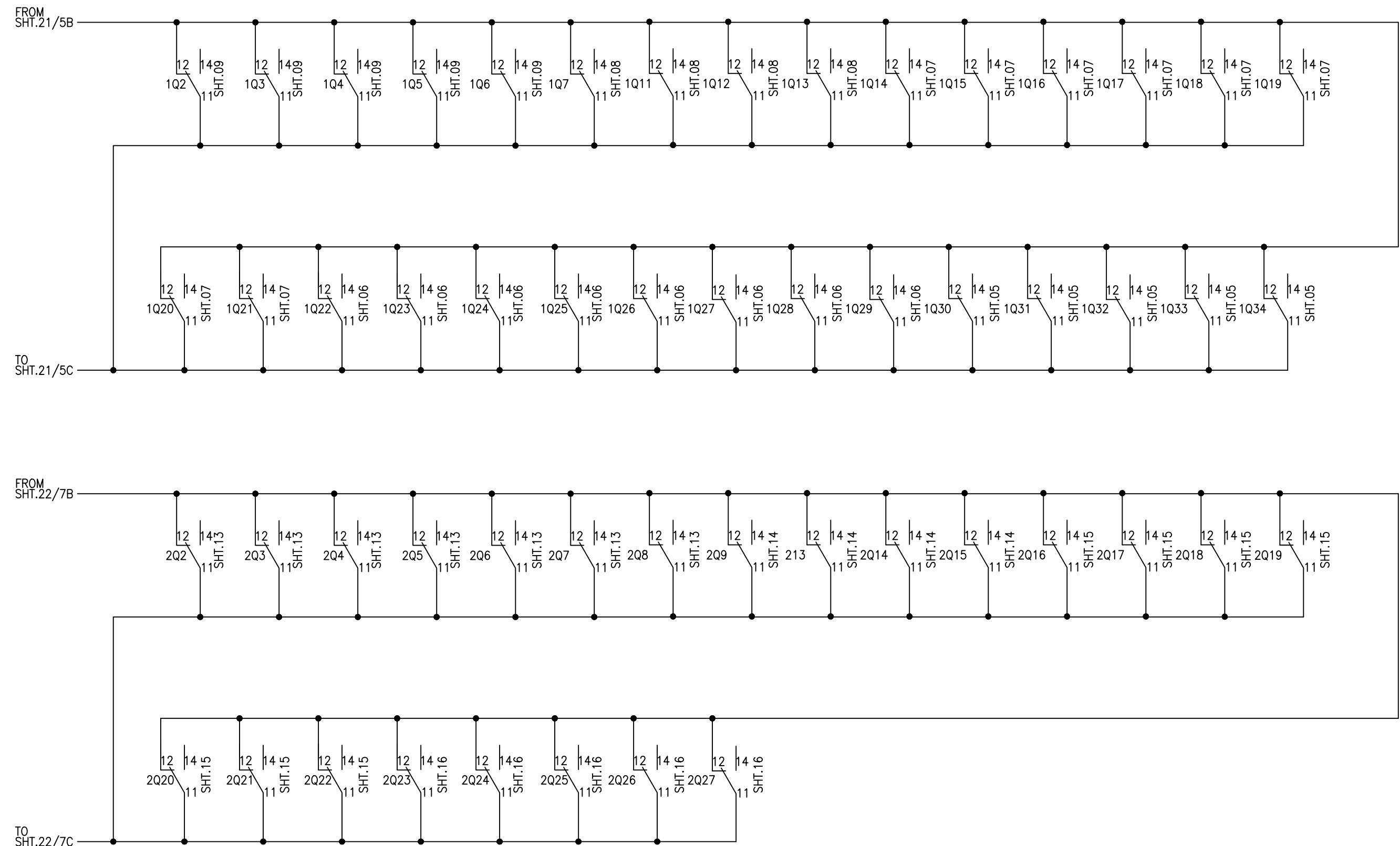


LEGEND

| DES. | DESCRIPTION |
|------|----------------|
| 2Qx | AC MCB |
| 2Q1 | AC MCCB |
| Q102 | AC MCB |
| H200 | DC ANNUNCIATOR |

LEGEND

| DES. | DESCRIPTION |
|-------------------|-------------|
| HTR2 | HOOTER |
| LT2,ACK2, RST2 | PUSH BUTTON |
| K274 | AUX. RELAY |

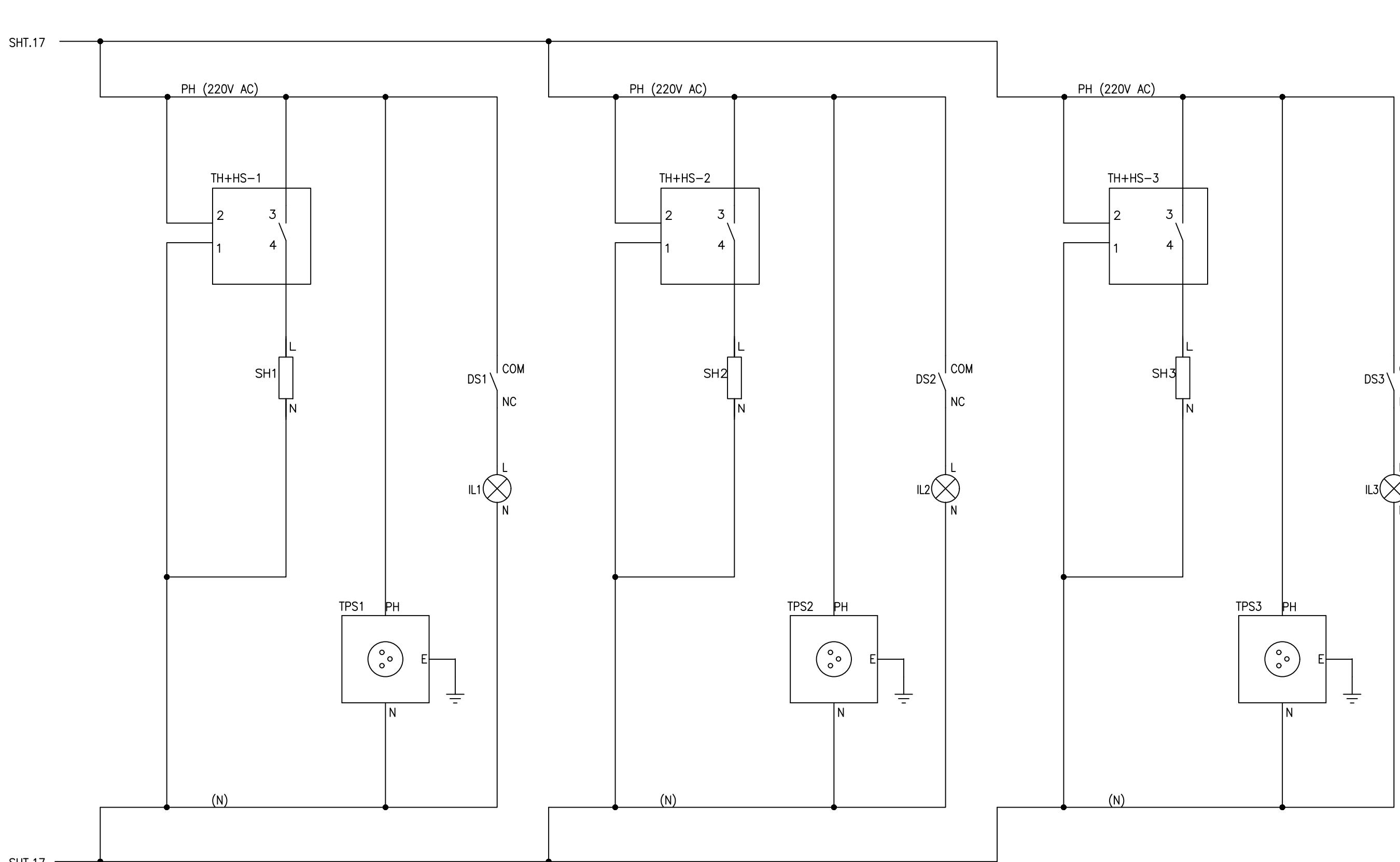


| APPROVED | CHECKED | DRAWN | PROJECT: PO. NO. 6019415518 DATED 16.04.2018 220/132kV CONTROL, PROTECTION & ACDC PANEL GHAZI ROAD PROJECT | TITLE: MCB ALARMS 415-240 VAC AUXILIARY SUPPLY 220VAC DISTRIBUTION BOARD FOR 220kV EQUIPMENT | EPE SOL Pvt. Ltd. 71-B Garden Block, New Garden Town, Lahore, Pakistan | DWG# EPE/ENU-18/P1457 | SHT: 23 OF 29 |
|----------|---------|-------|---|---|---|-----------------------|---------------|
| NAH | ABA | MSC | | | | DATE: 20.12.2018 | AS BUILT |

HEATING & LIGHTING SUPPLY
PORTION-1

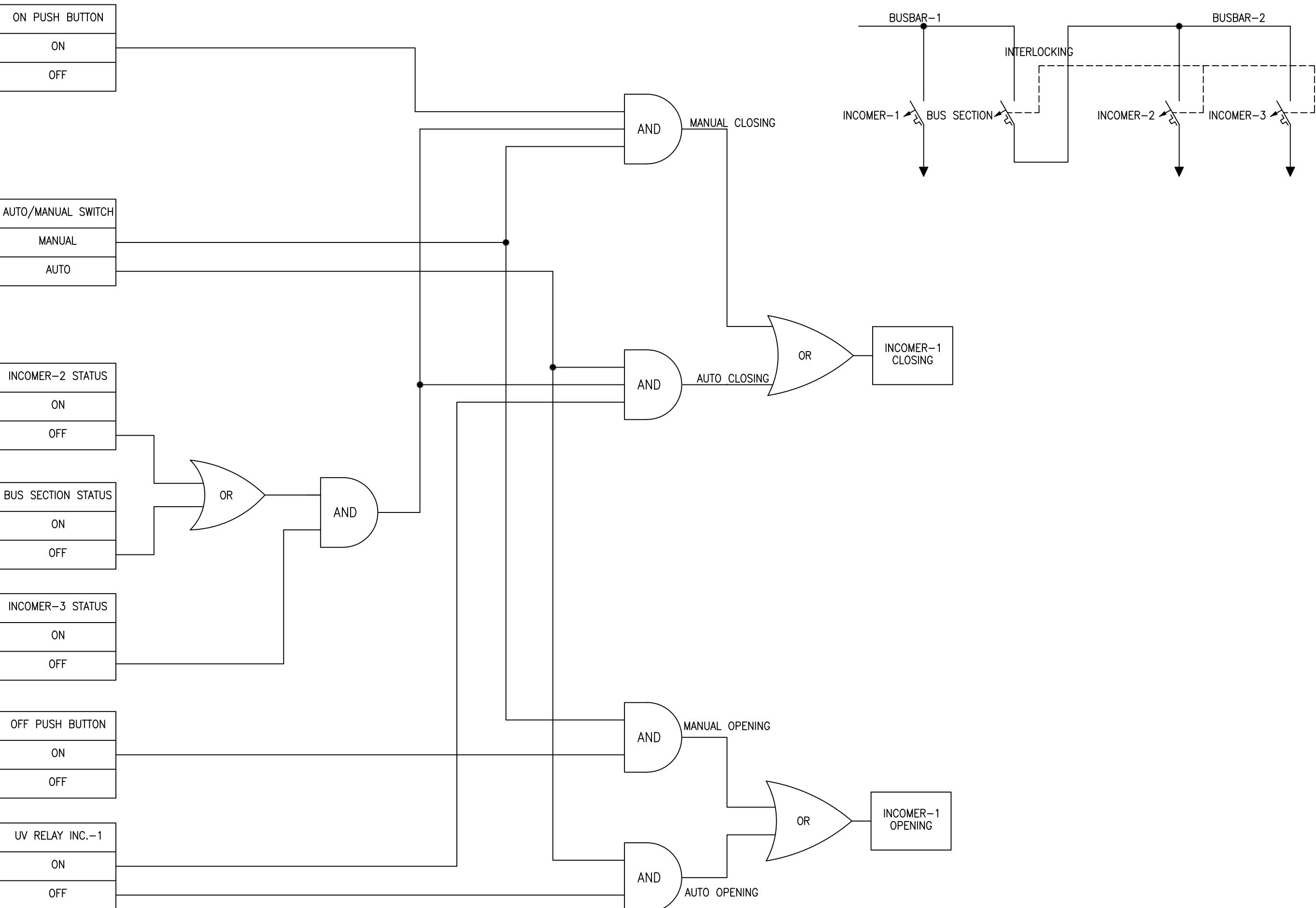
HEATING & LIGHTING SUPPLY
PORTION-2

HEATING & LIGHTING SUPPLY
PORTION-3



LEGEND

| DES. | DESCRIPTION |
|--------------------|------------------------|
| Q101 Q102 | AC MCB |
| TPS1 TPS2 | THREE PIN SOCKET |
| SH1 SH2 | SPACE HEATER |
| TH+HS-1 TH+HS-2 | THERMOSTAT & HUMIDSTAT |
| IL1 IL2 | CUBICLE LIGHTING |
| DS1 DS2 | DOOR SWITCH |

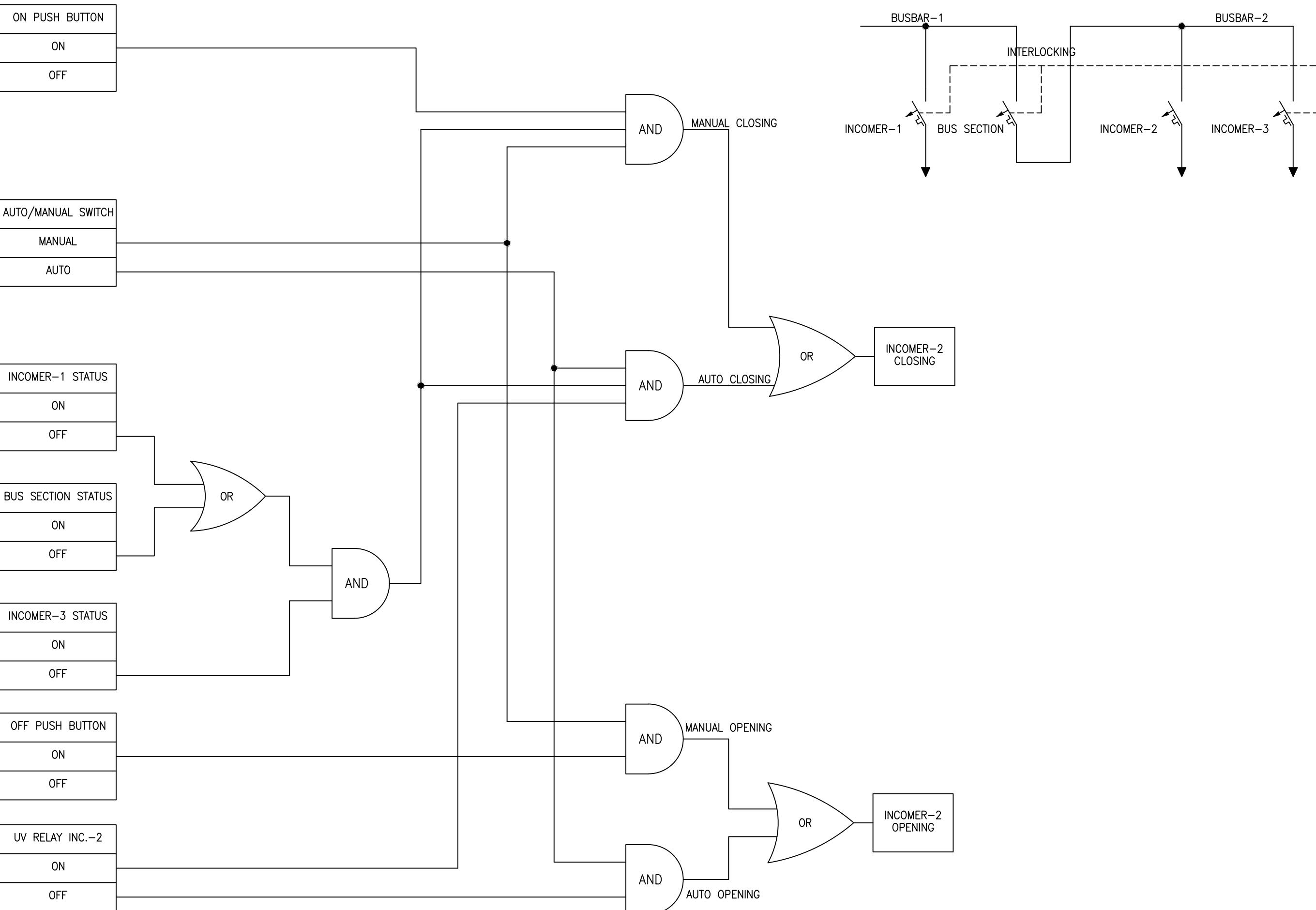


| APPROVED | CHECKED | DRAWN | PROJECT: PO. NO. 6019415518 DATED 16.04.2018 220/132kV CONTROL, PROTECTION & ACDC PANEL GHAZI ROAD PROJECT | TITLE: INCOMER-1 CLOSING CLOSING & OPENING LOGIC DIAGRAM 415-240 VAC AUXILIARY SUPPLY 220VAC DISTRIBUTION BOARD FOR 220kV EQUIPMENT | DWG# EPE/ENU-18/P1457 | SHT: 25 OF 29 |
|----------|---------|-------|---|--|-----------------------|---------------|
| NAH | ABA | MSC | | | | |



E P E S O L **Pvt. Ltd.**
71-B Garden Block, New Garden Town, Lahore, Pakistan

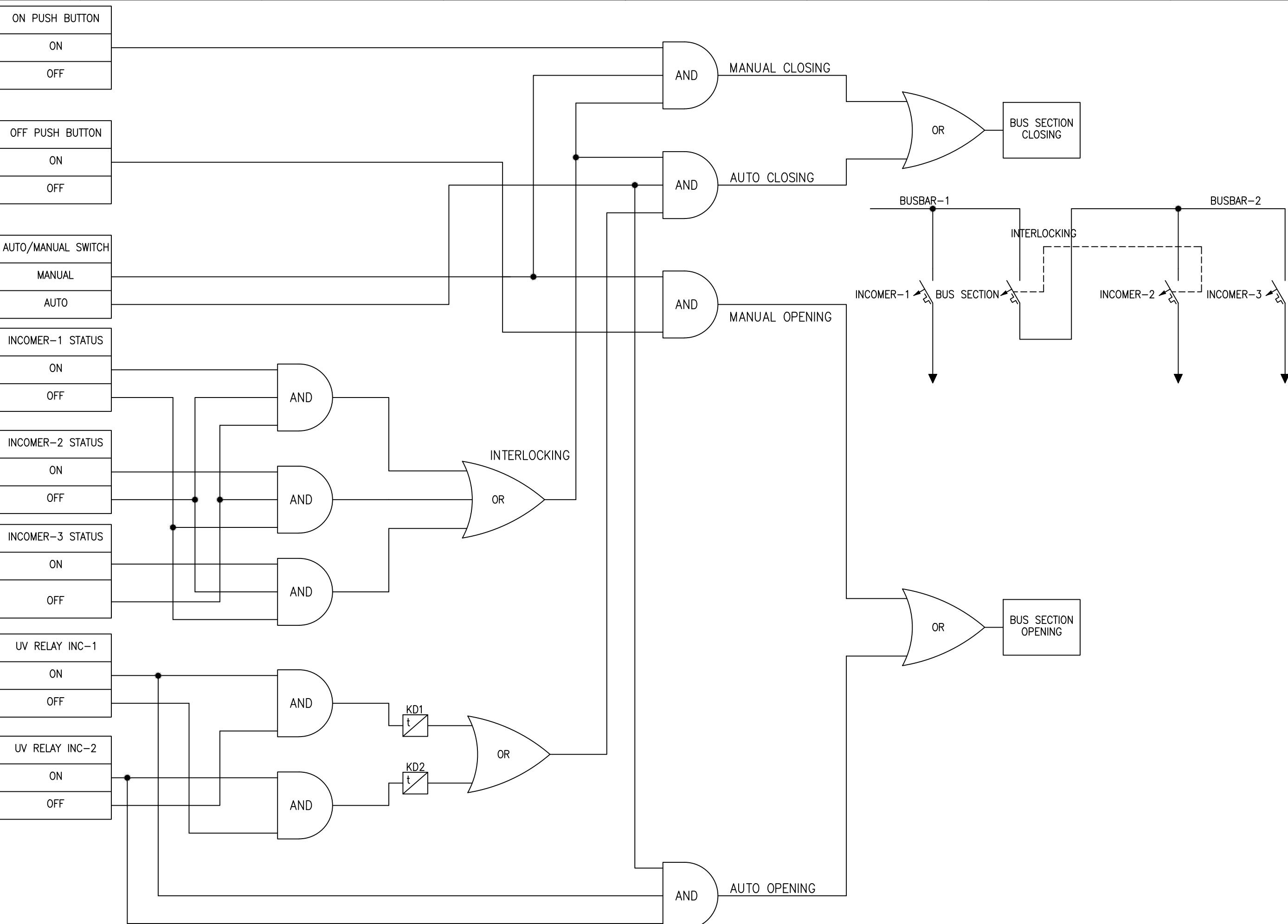
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REV: 0



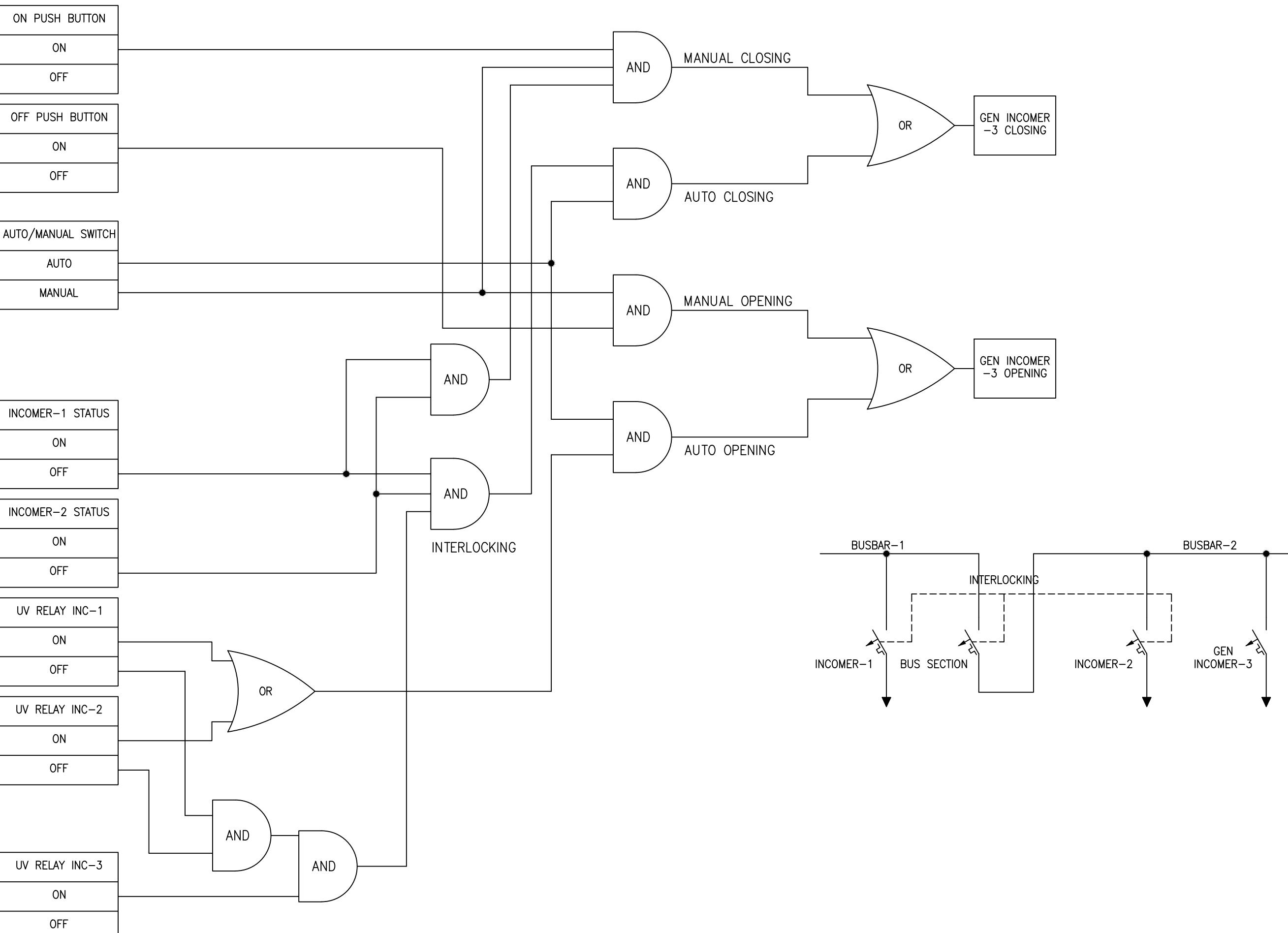
| APPROVED | CHECKED | DRAWN | PROJECT: PO. NO. 6019415518 DATED 16.04.2018 220/132kV CONTROL, PROTECTION & ACDC PANEL GHAZI ROAD PROJECT | TITLE: INCOMER-2 CLOSING CLOSING & OPENING LOGIC DIAGRAM 415-240 VAC AUXILIARY SUPPLY 220VAC DISTRIBUTION BOARD FOR 220kV EQUIPMENT | DWG# EPE/ENU-18/P1457 | SHT: 26 OF 29 |
|----------|---------|-------|---|--|-----------------------|---------------|
| NAH | ABA | MSC | | | DATE:20.12.2018 | AS BUILT |



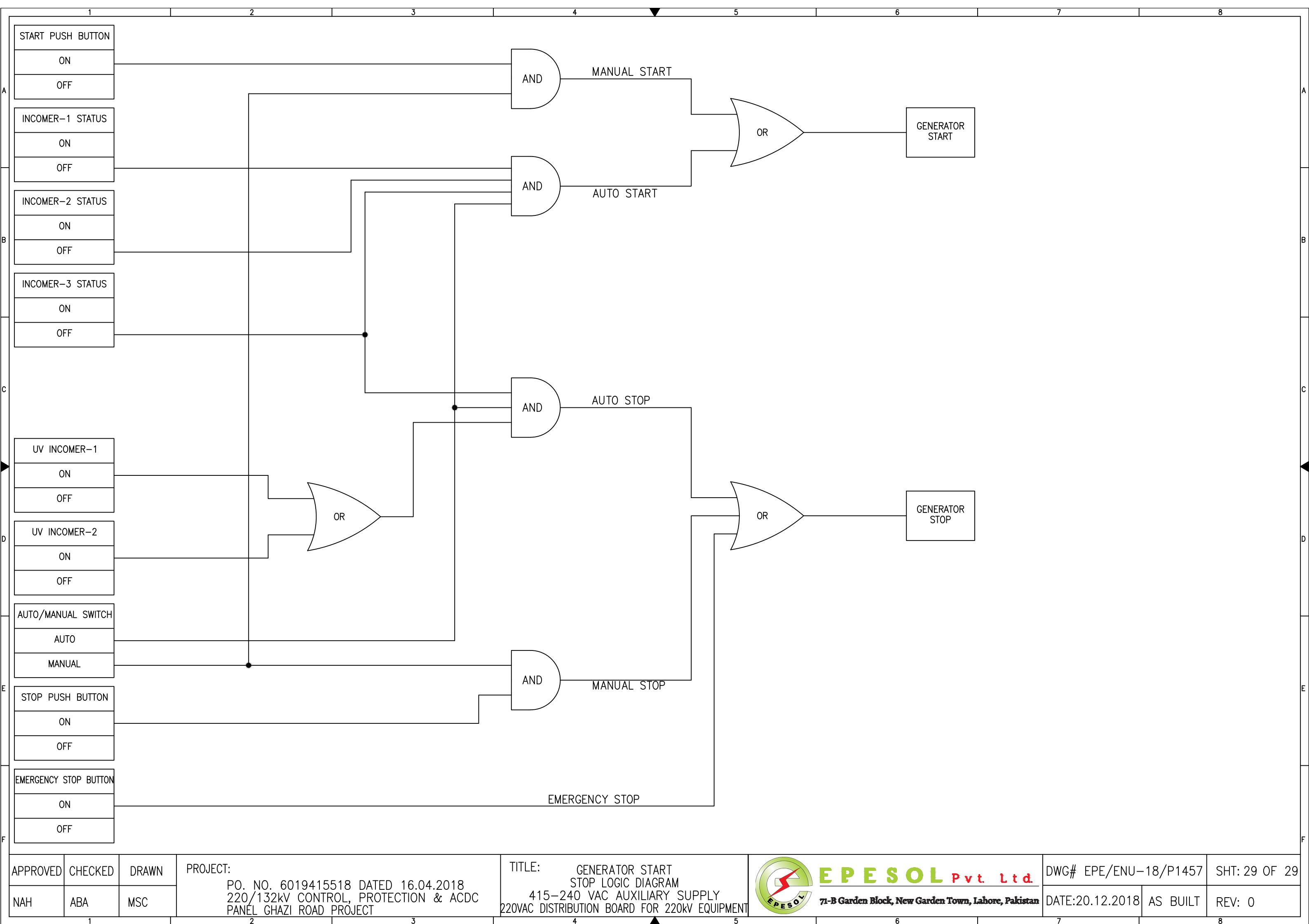
E P E S O L **Pvt. Ltd.**
71-B Garden Block, New Garden Town, Lahore, Pakistan



| APPROVED | CHECKED | DRAWN | PROJECT: PO. NO. 6019415518 DATED 16.04.2018 220/132kV CONTROL, PROTECTION & ACDC PANEL GHAZI ROAD PROJECT | TITLE: BUS SECTION CLOSING CLOSING & OPENING LOGIC DIAGRAM 415-240 VAC AUXILIARY SUPPLY 220VAC DISTRIBUTION BOARD FOR 220KV EQUIPMENT | EPE SOL Pvt. Ltd. 71-B Garden Block, New Garden Town, Lahore, Pakistan | DWG# EPE/ENU-18/P1457 | SHT: 27 OF 29 |
|----------|---------|-------|---|--|---|-----------------------|---------------|
| NAH | ABA | MSC | | | | DATE: 20.12.2018 | AS BUILT |



| APPROVED | CHECKED | DRAWN | PROJECT: | TITLE: | DWG# | SHT: |
|----------|---------|-------|---|---|------------------|--------------------|
| NAH | ABA | MSC | PO. NO. 6019415518 DATED 16.04.2018 220/132kV CONTROL, PROTECTION & ACDC PANEL GHAZI ROAD PROJECT | GEN INCOMER-3 CLOSING & OPENING LOGIC DIAGRAM 415-240 VAC AUXILIARY SUPPLY 220VAC DISTRIBUTION BOARD FOR 220kV EQUIPMENT | EPE/ENU-18/P1457 | 28 OF 29 |
| | | | | E P E S O L P v t . L t d . 71-B Garden Block, New Garden Town, Lahore, Pakistan | DATE: 20.12.2018 | AS BUILT REV: 0 |



| APPROVED | CHECKED | DRAWN | PROJECT: PO. NO. 6019415518 DATED 16.04.2018 220/132kV CONTROL, PROTECTION & ACDC PANEL GHAZI ROAD PROJECT | TITLE: GENERATOR START STOP LOGIC DIAGRAM 415-240 VAC AUXILIARY SUPPLY 220VAC DISTRIBUTION BOARD FOR 220kV EQUIPMENT | DWG# EPE/ENU-18/P1457 | SHT: 29 OF 29 |
|----------|---------|-------|---|--|-----------------------|---------------|
| NAH | ABA | MSC | | | DATE:20.12.2018 | AS BUILT |