

acceptance tests.

| 2. For EPC contractors only | | |
|---|--|---|
| GUARANTEED TECHNICAL PARTICULARS FOR CIRCUIT BREAKERS | | |
| Sl. No | Description | 132 kV SF6 CB |
| 1 | a) Maker's name country of manufacture. | CG POWER AND INDUSTRIAL SOLUTIONS LTD. |
| | b) Manufacturer's type designation. | 120-SFM-40AA |
| 2 | Applicable Technical Standards | IEC 62271-100 |
| 3 | a) Rated voltage (kV) | 145 KV |
| | b) Rated Frequency (Hz) | 50HZ |
| 4 | Number of Poles | 3 |
| 5 | Class (Outdoor/Indoor) | Outdoor |
| 6 | Rated normal current: | |
| | a) Under site conditions (Amps) | Upto 3150A |
| | b) Rated (Amps) | Upto 3150A |
| 7 | Rated short circuit breaking current: | CHIEF ENGINEER/PROJECTS APTRANSCO/VIS/VIJAYAWADA |
| | a) R.M.S. value of AC. component of rated short circuit current (kA) | 40 kA |
| | b) Percentage DC component | 45% |
| | c) Asymmetrical breaking current (including DC component) | 47.4kA |
| | d) Certificate or report no. | Please refer enclosed type test report. |
| | e) Oscillogram No. | Please refer enclosed type test report. |
| 8 | Rated short circuit making current (kA) | 100 kA |
| 9 | First Pole to clear factor | 1.3 |
| 10 | Rated transient recovery voltage for terminal faults (kV peak) | 249 kVp |
| 11 | Rated characteristics for short line faults. | Tested for Test Duty L90 and L75 as per IEC-62271-100. |
| 12 | Rated operating sequence . | O-0.3sec-CO-3min-CO |
| 13 | Rated duration of short circuit (sec.) | 3 sec |
| 14 | Rated out of phase breaking current (kA) | 10 kA |
| 15 | Opening time (ms) | < 30 ms |
| 16 | Arcing time (ms) | |
| | a) At 10% rated breaking current | < 30 ms |
| | b) At 25% rated breaking current | < 30 ms |
| | c) At 50% rated breaking current | < 30 ms |
| | d) At 100% rated breaking current | < 30 ms |
| | e) Maximum Arcing time at lowest fault currents | < 30 ms |
| 17 | Break time (ms) | Drawing approval subject to valid vendor registration |
| | a) At 10% rated breaking current | < 60 ms |
| | b) At 25% rated breaking current | < 60 ms |
| | c) At 50% rated breaking current | < 60 ms |
| | d) At 100% rated breaking current | < 60 ms |
| | e) Maximum break time at lowest fault current | < 60 ms |
| 18 | Closing time (ms) | < 100 ms |
| 19 | Maximum Pole discrepancy time: | |
| | a) Opening (ms) | < 3.3 ms |
| | b) Closing (ms) | < 5 ms |
| 20 | Rated line charging breaking current (kA) | 50 A |
| 21 | Maximum cable charging current | |

| acceptance tests. | | |
|-------------------|--|--|
| | a) On supply side | <2.3 p.u |
| | b) On line side | <2.3 p.u |
| 22 | Rated small inductive breaking current (kA) | Not applicable As per IEC 62271-100 |
| 23 | Max. rise of temperature over ambient temperature for current rating under clause 6. | Within limits of IEC-56 /IEC- 62271 - 100 & IEC-694 |
| 24 | Interrupting capacity based on duty cycle as per clause 11. | |
| | a) AC Component (kA) | 40 kA |
| | b) Percentage DC Component | 45.00% |
| 25 | Latching current (kA) | 100 kAp |
| 26 | No of breaks in series per pole | Single Break |
| 27 | Length of contact travel (mm) | 120 mm |
| 28 | Total length of break per pole (mm) | 90 mm |
| 29 | Type of devices, if any, used to obtain uniform voltage distribution between breaks | Not required Since single break design. |
| 30 | Recovery voltage distribution between breaks in percent of rated voltage: | |
| | a) Single line to ground fault | Single break. Hence it is not applicable. |
| | b) Interruption of short lines | |
| | c) Switching off an unloaded Transformers | |
| 31 | Type of main contact | Multifinger crown |
| 32 | Type of arcing-contacts and/or arc control device | TULIP/NOZZLE |
| 33 | Material of contacts | |
| | a) Main | Copper Chromium |
| | b) Arcing | Copper Tungsten |
| | c) Auxiliary | Silver plated brass |
| 34 | Whether contacts are silver plated | Yes ,main contacts |
| 35 | Thickness of silver coating (mm) | 25 microns |
| 36 | Contact pressure (kg/sq. mm.) | 0.3 kg/mm |
| 37 | Insulation level of the breaker : | |
| | a) One-minute power frequency withstand voltage (kV rms) | 275 kV rms. CHIEF ENGINEER/PROJECTS APTRANSCO/VS/VIJAYAWADA |
| | b) Switching surge withstand test voltage (kV peak) | Not applicable. |
| | c) Impulse withstand test voltage (kV peak) | 650 kVp |
| | d) Max. dynamic p.f. over voltage withstand (kV peak) | Not applicable |
| 38 | Minimum clearance in Air (mm) | |
| | a) Between Phases (live parts) | Refer enclosed GA drawing |
| | b) Between live parts and earth | Refer enclosed GA drawing |
| | c) Centre to centre distance between phases | 1700 mm (Refer enclosed GA drawing) |
| | d) The safety boundaries during a breaking operation for circuit breakers with an external exhaust for ionized gases or flames | N.A. |

| | | |
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| 39 | Whether the circuit breaker is suitable for fixed trip operation or trip free operation and whether it is provided with a lock-out device preventing closing of the breaker | Trip free, lockout switch provided |
| 40 | Method of closing | |
| | a) Normal | Electrical |
| | b) Emergency | Electrical |
| 41 | Type of closing mechanism | Spring Force |
| 42 | a) Normal voltage of closing | 220 VDC |
| | b) Pick up range, (volts) | 187 VDC to 242 VDC |
| 43 | a) Normal voltage of closing | 220 VDC |
| | b) Pick up range, (volts) | |
| | i) Power at normal voltage of closing mechanism, (watts) | 400 W |
| | ii) Power at 85% of normal voltage, (watts) | 340 Watts at 187 V DC |
| 44 | Type of tripping mechanism | Spring |
| 45 | Normal voltage of tripping coils, (volts) | 220 VDC |
| 46 | a) Power at normal voltage for tripping coils, (watts) | 2 x 400 W at 220 V DC |
| | b) Power at 70% normal voltage for tripping coils, (watts) | 2 x 280 Watts at 154 V DC |
| 47 | Arc duration at 100% (ms) Interruption capacity: | |
| | a) Opening Arcing time No. of loops and time including resistor current duration (cycle) | < 30 ms |
| | - Resistor current duration, (cycle) | N.A. |
| | -Total length of the arc, (mm) | Not measured |
| | - Max. length of the arc, (mm) | Not measured |
| | -Total interrupting time measured from instant of trip coil energisation to arc extinction of resistor current (cycles). | < 60 ms |
| | b) Closing time measured from instant of application of power to closing device up to arcing contacts touching, (cycles). | <7 cycles |
| 48 | Critical current (current giving the longest arc when a break takes place) (kA) | Not applicable |
| 49 | a) Recovery voltage when circuit breaker tested at 100% rated breaking capacity, (kV inst.) | 249 kVp |
| | b) Rate of rise of re-striking voltage at breaking(kV/Micro. sec.) | |
| | i) for 30% breaking capacity, | 5 |
| | ii) for 100% breaking capacity, | 2 |
| | c) Maximum over voltage factor of the circuit breaker when switching off. | Drawing approval subject to valid vendor registration |
| | i) Unloaded transformers. | < 2.3 p.u. |
| | ii) Loaded transformer | < 2.3 p.u. |
| | iii) Open circuited lines | < 2.3 p.u. |
| 50 | When switching of synchronous systems: | |
| | a) Max. current (kA) | 7.9 kA |
| | b) Max. contacts of 1 pole (kV) | Parameters as per IEC-56 /IEC 62271-100 |

**CHIEF ENGINEER/PROJECTS
APTRANSCO/VS/VIJAYAWADA**

| | | |
|----|---|---|
| 51 | No. of openings the circuit breaker is capable of performing without inspection, replacement of contacts or other main parts. | |
| | a) at 50% rated current | 3000 |
| | b) at 100% rated current | 1000 |
| | c) at current corresponding to 50% rated breaking capacity | 20 |
| | d) at current corresponding to 100% rated breaking capacity | 10 |
| 52 | a) Weight of complete circuit breaker (kg.) | 1450 Kgs. Approx |
| | b) Impact loading for foundation design, to include dead load plus impact value on opening at maximum interrupting ratings, in terms of equivalent static load, (kg.) | 2000 kg/pole Downward, 2000 kg/pole Upward |
| | c) Overall dimensions: | |
| | Height (mm) | AS PER GA DRAWING |
| | Width (mm) | |
| | Length (mm) | |
| 53 | Porcelain: | |
| | a) Make | MODERN/ABIL/IEC/ARGILON-GERMANY/SARAVANA INSULATORS(SIL)/LIAONING SHUANGLING/FUSHUN HIGH TECH ELECTRIC/ LILING HUAXIN/LILING PUKOU INSULATORS / PRATHAMESH CERAMICS/ M\S LILING THRU M\S DALIAN CERAMIC TECHNIC-CHINA/EQ. |
| | CHIEF ENGINEER/PROJECTS APTRANSCO/VS/VIJAYAWADA | |
| | b) Type | Hollow porcelain/ Equivalent |
| | c) Descriptive pamphlet No. | Please refer enclosed GA drg |
| | d) Weight (kg.) | |
| | e) Transport dimensions (mm) | |
| | f) Height above floor required to remove porcelain, (mm) | |
| | g) Insulation class | |
| | h) One minute dry power frequency withstand, kV (r.m.s.) | 275 |
| | i) 10 seconds wet power frequency withstand, kV (peak) | 275 |
| | j) Flash over voltage (kV) | >275 kV |
| | k) Full wave impulse withstand voltage kV (peak) | 650 kV |
| | l) Switching surge withstand voltage kV (peak) | Not applicable |
| | m) Corona discharge voltage, (kV r.m.s.) | 92 kV |
| | n) Nature of the dielectric | SF6 Gas |
| | o) Creepage distance total protected (mm) | Total= 4495mm |
| | p) Volume of insulating medium per porcelain, | 2.5 kg per pole |
| | q) Permissible safe cantilever loading on installed porcelain (kgm) | Suppot=1580 kg Inteurptter=1520kg |
| 54 | Operating mechanism : | |

| | | |
|----|---|---|
| | iii) kg/sq.cm. for auto re-closure duty | |
| | j) Time of air compressor to charge the reservoirs: | |
| | i) From atmospheric to pressure indicated in (g) above, (minutes) | |
| | ii) From pressure indicated in (g) above to that in (h) above (minutes) | |
| | | CHIEF ENGINEER/PROJECTS APTRANSCO/VIS/VIJAYAWADA |
| 56 | Rated pressure of SF ₆ gas in the circuit breaker (kg/sq.cm) | 6 kg/cm ² (g) at 20 ⁰ C |
| 57 | Rated pressure of SF ₆ gas in the gas cylinders (kg./sq.cm.) | Approx 20 Kg/cm ² |
| 58 | Quantity of SF ₆ gas required per single pole unit (kg.) (3 pole unit for 145kV) | 2.5 kg/pole |
| 59 | Quantity of SF ₆ gas per cylinder (kg.) | 9 kg |
| 60 | Weight of empty cylinder (kg.) | 20kg |
| 61 | Quantity of absorbent required per pole (kg.) | 300 gms |
| 62 | Recommended interval for renewal of absorbent in case of outdoor circuit breakers operating in tropical conditions. | ONLY WHEN INTERRUPTER IS OPENED FOR CONTACT INSPECTION |
| 63 | Chemical composition of absorbent | Activated alumina Na2OAl2O3SiO2. |
| 64 | Quantity of absorbent covered in the scope of supply (including spare quantity) (kg.) | As filled in the interrupter |
| 65 | Limits of gas pressure for pressure operation of circuit breaker (kg./sq.cm.) | 5.0 to 6.0 kg/cm ² at 20 deg.C |
| 66 | Pressure and temperature at which the temperature compensated gas pressure switch | |
| | a) alarm (kg./sq.cm., ° C) | 5.5 +/-0.3 kg/cm ² at 20 deg.C |
| | b) Cut off (kg./sq.cm. ° C) | 5.0 +/-0.3 kg/cm ² at 20 deg.C |
| 67 | Name of SF6 supplier and country of origin | Allied Signals/Ashahi/Glass/IOL/Eqvt & USA Japan |
| 68 | Quantity of SF6 gas supplied for | |
| | a) Actual use in breakers (kg.) | 7.5 kg |
| | b) As spare (kg.) | 1.5 kg |
| 69 | Chemical composition of gas: | |
| | a) Qty. of air by weight (ppm) | As per IEC-376 |
| | b)Qty. of H2O by weight (ppm) | |
| | c)Qty. of CF4 by weight (ppm) | Drawing approval subject to valid vendor registration |
| | d) Qty. of free acid by weight (ppm) | |
| 70 | No. of auxiliary contacts provided | |
| | a) Those close when breaker is closed. | 10 NC (Spare) |
| | b) Those open when breaker is closed. | 10 NO (Spare) |
| | c) Those adjustable with respect to the position of main contacts. | Nil |
| | d) Continuous rating of contacts. | 20 Amp |
| | e) Breaking capacity of contacts. | 2 Amp |
| 71 | Whether the equipment covered by this Bid have been fully type tested and if so, whether the copies of the type test cert. enclosed to the bid offer. | Yes,Type Test Report Enclosed |

IF IN DOUBT ASK!

LIST OF DOCUMENTS:


Drawing approval subject to valid vendor registration

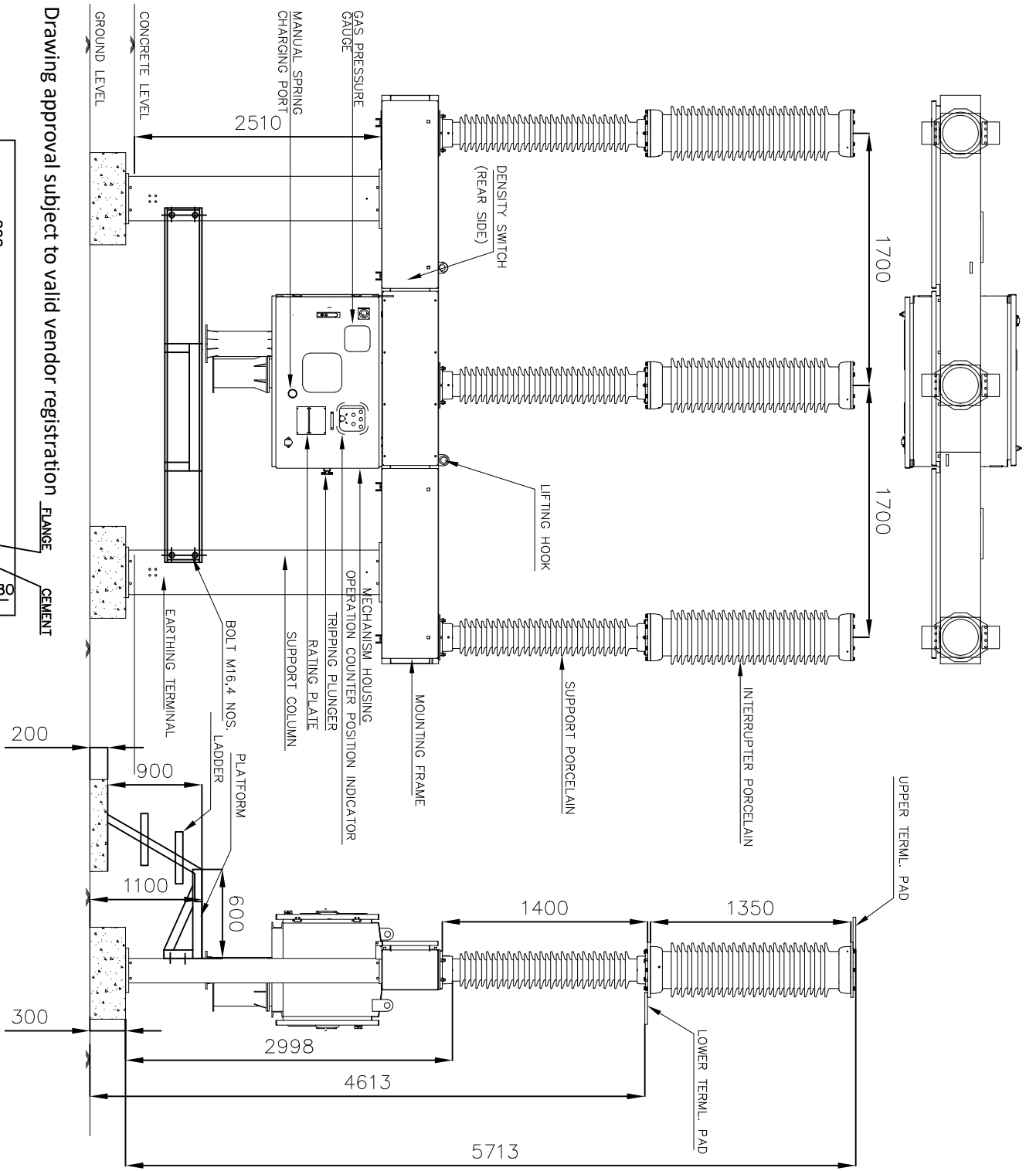
| SR.NO. | LIST OF DRAWINGS | DRAWING NO. | TOTAL SHEET |
|--------|---------------------------|--------------------|-------------|
| 1 | LIST OF DRAWINGS | CG-145AA-31MM-LIST | 1 |
| 2 | GENERAL ARRANGEMENT | CG-145AA-31MM-GA | 1 |
| 3 | SCHEMATIC DIAGRAM | CG-145AA-31MM-SCH | 4 |
| 4 | BILL OF MATERIAL | CG-145AA-31MM-BOM | 1 |
| 5 | RATING PLATE | CG-145AA-31MM-RP | 1 |
| 6 | MECHANISM HOUSING DETAILS | CG-145AA-31MM-MH | 1 |
| 7 | WIRING DIAGRAM | CG-145AA-31MM-WIR | 3 |

NOTE: 1. Drawings Approval subject to valid type test reports, to be checked during acceptance tests.
 2. For EPC contractors only.

1. Minimum 300mm plinth shall be maintained for CT/PT/CVT/Isolators/IV/LA/Breakers in the substation during foundation works to ensure safe live to ground clearance per IE rules.
2. Since the supply of terminal connectors is not in the scope of manufacturer as mentioned in the drawings. The EPC contractor shall be instructed to supply the same line with CT/PT/CVT/Isolator/IVT/LA/Breaker's requirement and compatibility.

CHIEF ENGINEER/PROJECTS
APTRANSCO/VS/VIJAYAWADA

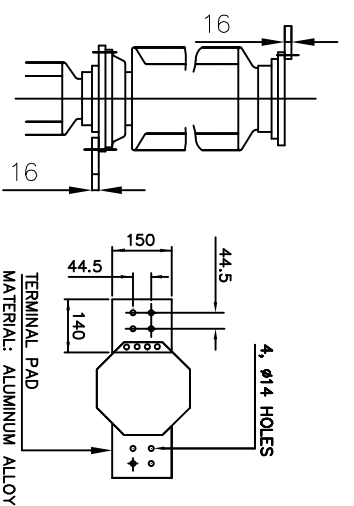
| | | | | | |
|---|---------------|----------------|-------------------------------|---------------------------|---|
| 5 | NAME | NAME | CUSTOMER: APTRANSCO | TITLE: LIST OF DRAWINGS | THIRD ANGLE PROJECTION |
| 4 | DRN | RAS | STD APPROVAL 31MM/KV CREEPAGE | FOR: 145KV, 40 KA, SP-SP |  CG Power and Industrial Solutions Limited <small>SWITCHGEAR DIVISION SJ,AMBAD, NASHIK</small> |
| 3 | CHD | NSR | APPD | GCB TYPE: 120-SFM-40AA | |
| 2 | SCALE: N.T.S. | DATE: 26.04.23 | ALL DIMENSIONS ARE IN mm | DRG.NO:CG-145AA-31MM-LIST | |
| 1 | REVISION | DATE: 26.04.23 | ALL DIMENSIONS ARE IN mm | DRG.NO:CG-145AA-31MM-LIST | 1 / 1 RO |



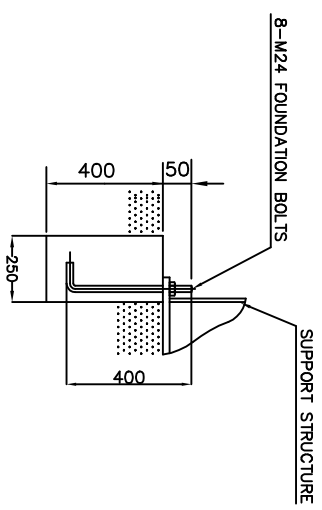
FOUNDATION DESIGN

CHIEF ENGINEER/PROJECTS
APTRANSCO/VS/VIJAYAWADA

NOTE: - CLEAN BOTH CONNECTING SURFACES OF TERMINAL PADS AND TERMINAL FLANGE WITH SAND PAPER AND COAT SUPPLIED COMPOUND BEFORE CONNECTING.



DETAIL OF UPPER AND LOWER TERMINAL PADS



DETAIL OF FOUNDATION BOLT

NOTE: -

- 1) TOTAL WEIGHT:-1450 Kg.(APPROX.)
- 2) TOTAL GAS WEIGHT :-7.5 Kg. (APPROX.)
- 3) MAXIMUM SHOCK LOAD DURING OPERATION :-2000 Kg.
- 4) FINISH :- ALL EXPOSED FERROUS PARTS ARE PAINTED WITH SHADE 631 of IS 5 : EXCEPT SUPPORT COLUMN
- 5) CREEPAGE DISTANCE 4495 mm,
- 6) HARDWARES EXPOSED TO ATMOSPHERE ARE H.D.G./S.S./DACRO.
- 7) OVERALL TOLERANCE ON DIMENSIONS IS 2%.
- 8) MAKE OF INSULATORS: ABIL/JSI/IEC/MODERN/RAVIKIRAN/ CJI/SARVANA/LILING HUAXIN/EQ.
- 9) RATED OPERATING DUTY - 0-0.3SEC-CO-3MIN-CO.

TITLE: GENERAL ARRANGEMENT

THIRD ANGLE PROJECTION

FOR: 145KV, 40 KA, SP-SP

GCB TYPE: 120-SFM-40AA



DRG.NO.:CG-145AA-31MM-GA

REVISION

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NAME

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DATE

DATE:26.04.23

ALL DIMENSIONS ARE IN mm

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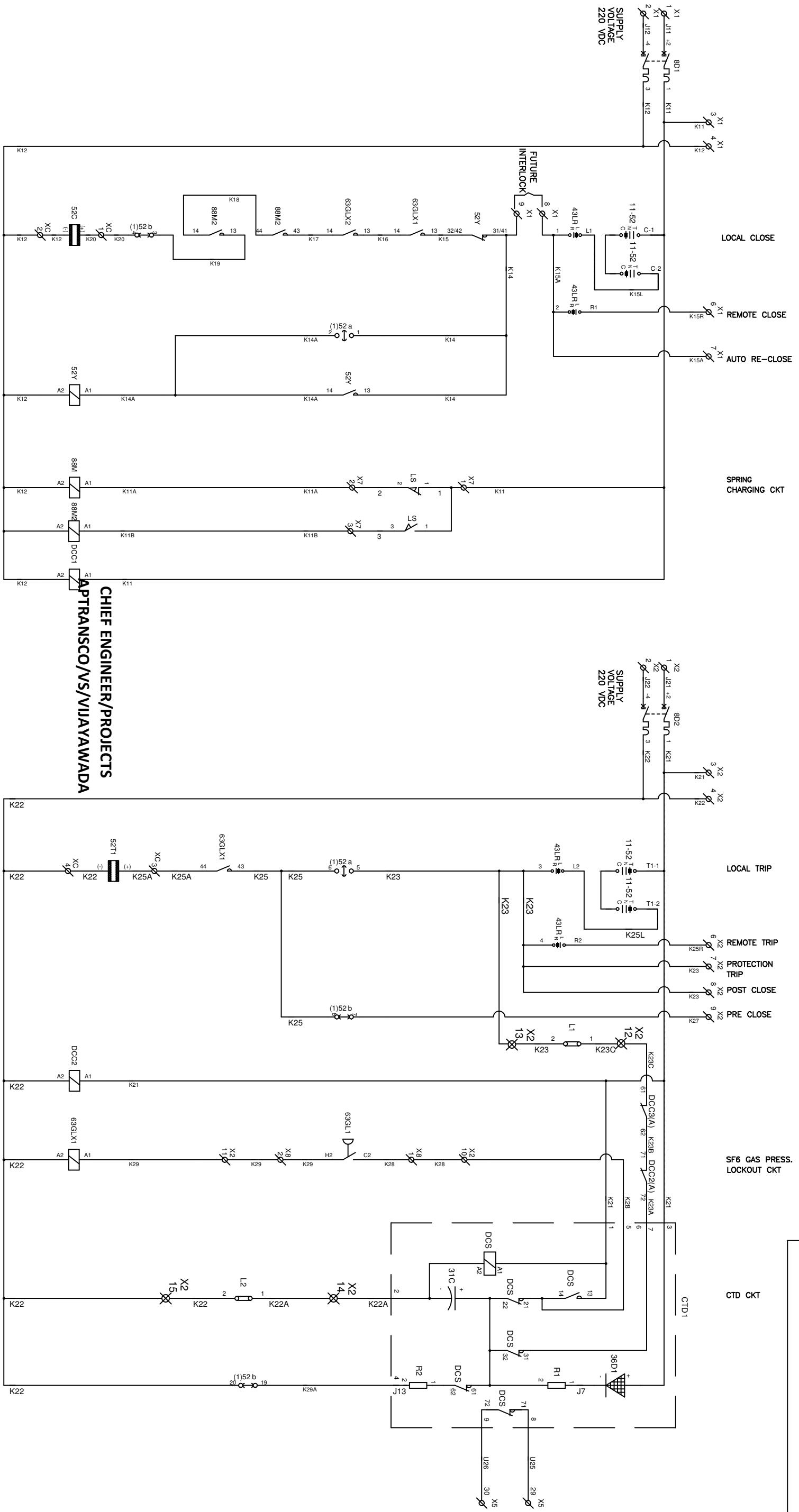
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Drawing approval subject to valid vendor registration



CLOSING CIRCUIT

TRIP CIRCUIT-1

REMOVE THE SHORTING TO BYPASS THE CTD FROM CIRCUIT.

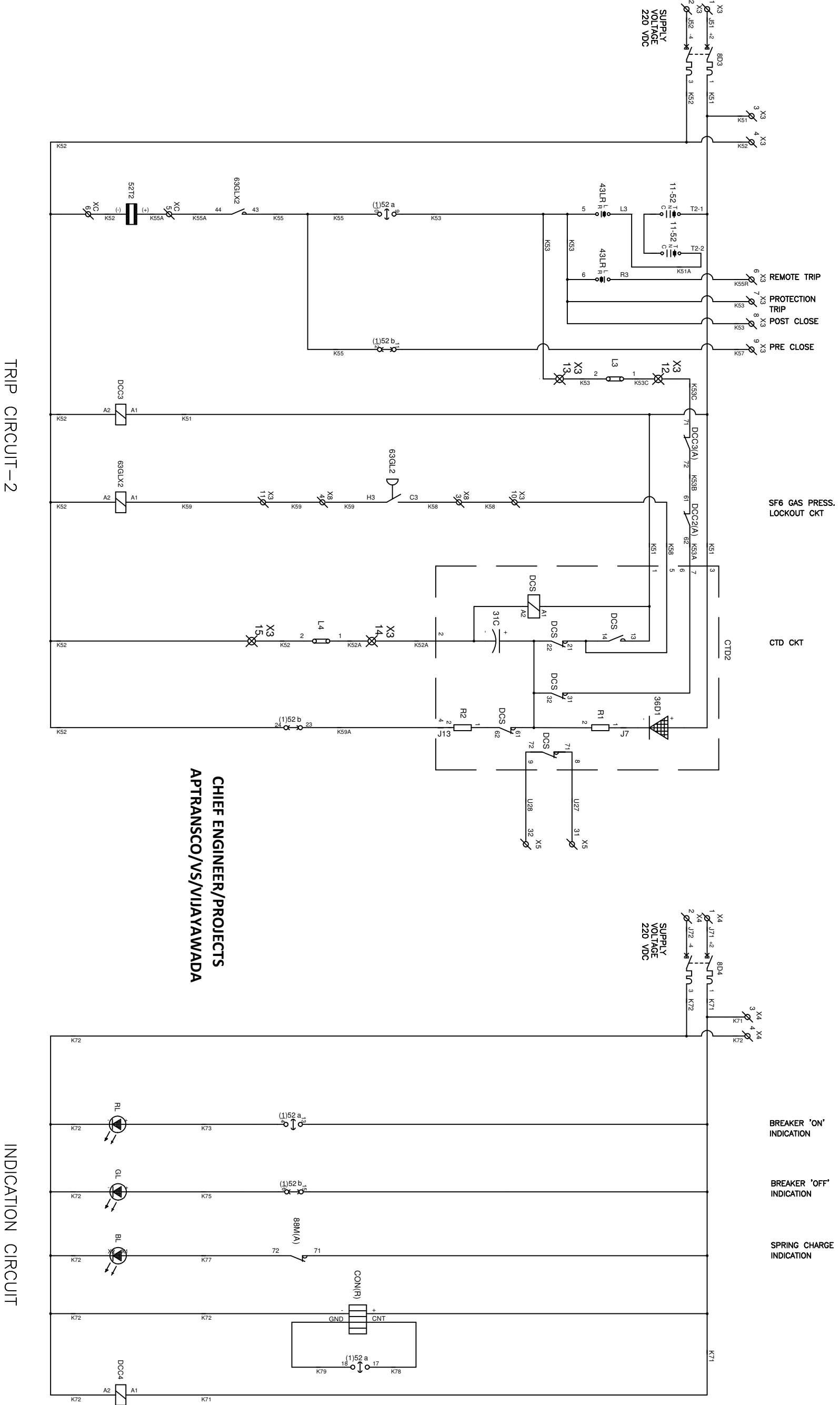
| | | | | | | | |
|----|----------|------------------------|------|---------------------|----------------|-------------------------------|--|
| NO | REVISION | 2 | NAME | DATE | DATE: 26.04.23 | ALL DIMENSIONS ARE IN mm | |
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| | | NAME | | CUSTOMER: APTRANSCO | | TITLE: SCHEMATIC DIAGRAM | |
| | | DRN | | RAS | | STD APPROVAL 31MM/KV CREEPAGE | |
| | | CHD | | NSR | | FOR: 145KV, 40 KA, SP-SP | |
| | | APPD | | GNP | | GCB TYPE: 120-SFM-40AA | |
| | | SCALE: N.T.S. | | | | DRG.NO:CG-145AA-31MM-SCH | |
| | | THIRD ANGLE PROJECTION | | | | | |

CTD COMPONENT
CAPACITOR : 350 VDC ,1000MFD
RESISTOR (R1,R2): 300 OHM, 30W
DIODE : 20A



CG Power and Industrial Solutions Limited
SWITCHGEAR DIVISION SS,AMBAD, NASHIK

Drawing approval subject to valid vendor registration



REMOVE THE SHORTING TO BYPASS THE CTD FROM CIRCUIT.

TRIP CIRCUIT-2

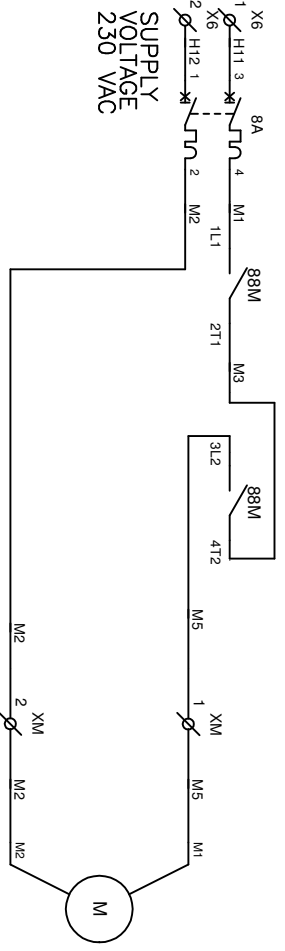
INDICATION CIRCUIT

CHIEF ENGINEER/PROJECTS
APTRANSCO/VS/VIJAYAWADA

CTD COMPONENT
CAPACITOR : 350 VDC , 1000MFD
RESISTOR(R1,R2) : 300 OHM, 30W
DIODE : 20A

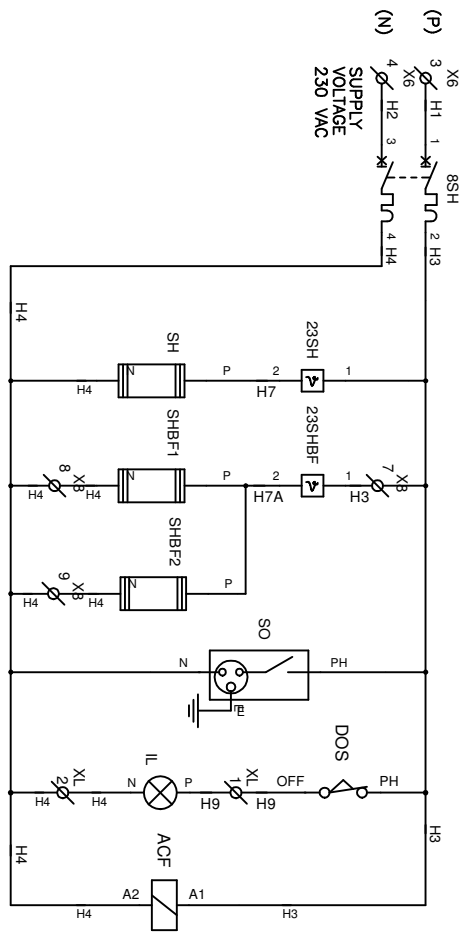
| | | | | | |
|--|----------|------|------|--------------------------|---|
| NO | REVISION | NAME | DATE | ALL DIMENSIONS ARE IN mm | DRG.NO:CG-145AA-31MM-SCH |
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| NAME CUSTOMER: APTRANSCO STD APPROVAL 31MM/KV CREEPAGE DRN RAS CHD NSR APPD GNP SCALE: N.T.S. | | | | | TITLE: SCHEMATIC DIAGRAM FOR: 145KV, 40 KA, SP-SP GCB TYPE: 120-SFM-40AA |
| DATE: 26.04.23 DATE: 26.04.23 | | | | | THIRD ANGLE PROJECTION CG Power and Industrial Solutions Limited SWITCHGEAR DIVISION SS,AMBAD, NASHIK |

SPRING CHARGING MOTOR CIRCUIT



Drawing approval subject to valid vendor registration

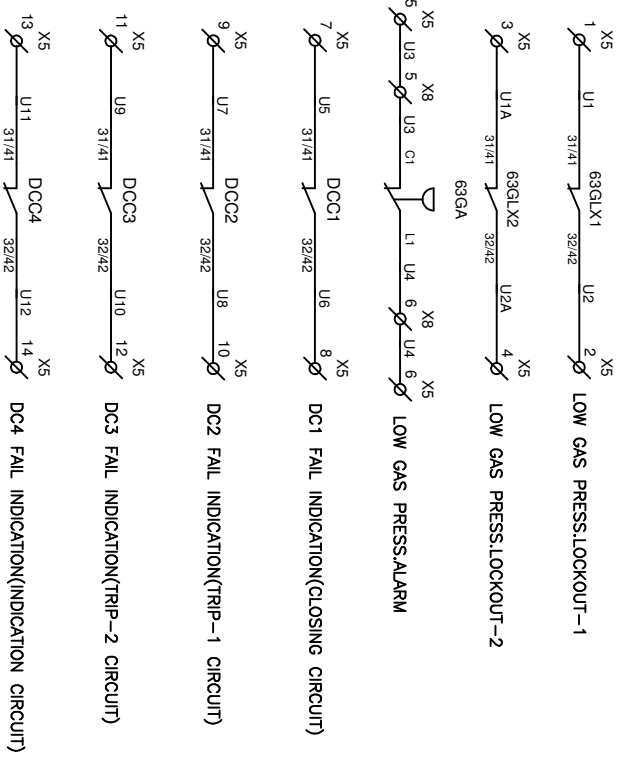
LAMP AND HEATER CONTROL CIRCUIT



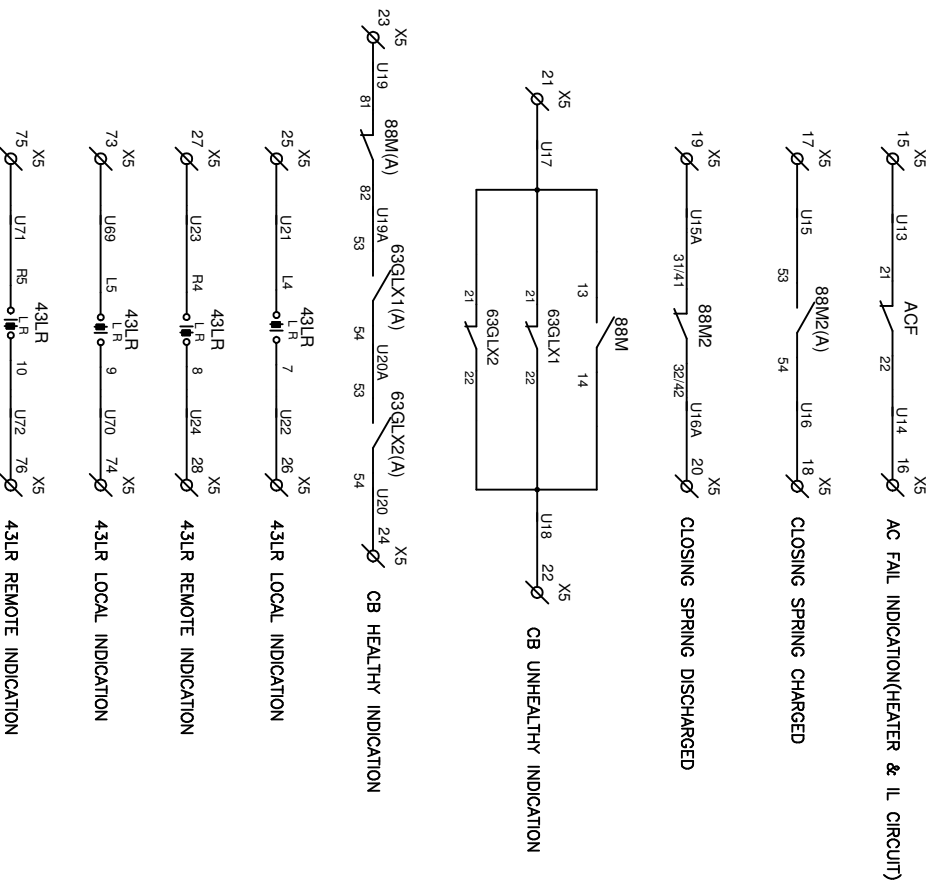
NOTE:

- 1) BILL OF MATERIAL AS PER DRG. NO. CG-145AA-25MM-BOM
- 2) TERMS. SHOWN 'Ø' ARE WIRED UPTO TERMINAL BLOCKS
- 3) THIS DIAGRAM IS SHOWN IN THE FOLLOWING CONDITIONS.
 - a) GCB OPEN
 - b) SFG GAS PRESSURE IS ZERO
 - c) 43LR SWITCH IS IN REMOTE POSITION
 - d) CONTROL & AUXILIARY SUPPLY IS NOT APPLIED
 - e) CLOSING SPRING IS DISCHARGED
- 4) ON FAILURE OF SUPPLY TO MOTOR, ONE OPEN-CLOSE OPERATION IS POSSIBLE.

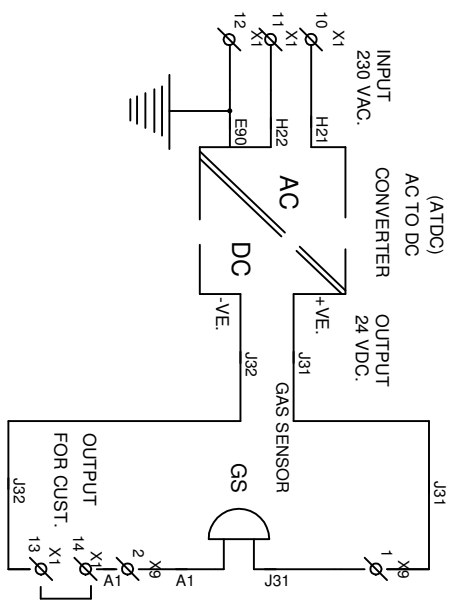
ALARM/INDICATION CONTACTS



ALARM/INDICATION CONTACTS



SENSOR CIRCUIT



CHIEF ENGINEER/PROJECTS
APTRANSCO/VS/VIJAYAWADA

TITLE: SCHEMATIC DIAGRAM

THIRD ANGLE PROJECTION

NAME CUSTOMER: APTRANSCO

FOR: 145KV, 40 KA, SP-SP

CG Power and Industrial Solutions Limited

STD APPROVAL 31MM/KV CREEPAGE

GCB TYPE: 120-SFM-40AA

SWITCHGEAR DIVISION SS,AMBAD, NASHIK

SCALE: N.T.S.

DRG.NO.:CG-145AA-31MM-SCH

3 / 4 RO

ALL DIMENSIONS ARE IN mm

DATE: 26.04.23

3 / 4 RO

REVISION

DATE: 26.04.23

3 / 4 RO

IF IN DOUBT ASK!

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|----------------|---------|---|------------------------------|-------|------------------|----------------|---------------------------------|
| 8A | CATDESC | MINIATURE CIRCUIT BREAKER(MCB), C CURVE | VIDDESC | QUANT | RATING1 | RATING2 | MFG |
| 8B1 | | MINIATURE CIRCUIT BREAKER(DC MCB), C CURVE | MCB FOR MOTOR CRT | 1 | 2 POLE | 4A | SCHNEIDER/SEMENS/EATONEQ. |
| 8D2 | | MINIATURE CIRCUIT BREAKER(DC MCB), C CURVE | MCB FOR CONTROL CRT | 1 | 2 POLE | 6A | SCHNEIDER/SEMENS/EATONEQ. |
| 8D3 | | MINIATURE CIRCUIT BREAKER(DC MCB), C CURVE | MCB FOR CONTROL CRT | 1 | 2 POLE | 6A | SCHNEIDER/SEMENS/EATONEQ. |
| 8D4 | | MINIATURE CIRCUIT BREAKER(DC MCB), C CURVE | MCB FOR CONTROL CRT | 1 | 2 POLE | 6A | SCHNEIDER/SEMENS/EATONEQ. |
| 8D4 | | MINIATURE CIRCUIT BREAKER(DC MCB), C CURVE | MCB FOR HEATER CRT | 1 | 2 POLE | 6A | SCHNEIDER/SEMENS/EATONEQ. |
| 11-82 | | TRIP-NEUTRAL-CLOSE SWITCH 4 POLE (4T-4C) 3 POSITION, 45deg ANGLE, SPRING RETURN. | TRIP-NEUTRAL-CLOSE SW | 1 | 680V AC/DC | 22A | SWITRON / SHIRKE/EG. |
| 239H | | THERMOSTAT FOR HEATER CONTROL | THERMOSTAT | 1 | 230 VAC | | APTVELICO/ELEXP/EG. |
| 239HBF | | THERMOSTAT FOR HEATER CONTROL | THERMOSTAT | 1 | 230 VAC | 25A | APTVELICO/ELEXP/EG. |
| 43LR | | LOCAL-REMOTE SWITCH (5L+5R), 2 POSITION, 90Deg, STAY PUT TYPE | LOCAL REMOTE SW | 1 | 440V AC/DC | | SWITRON / SHIRKE/EG. |
| 52C | | CLOSE COIL | CLOSING COIL | 1 | 220 VDC | 121 Ohm +/- 5% | POWERINST/ECOSUN ENGE/EG |
| 52T1 | | TRIP COIL (1) | TRIP COIL-1 | 1 | 220 VDC | 121 Ohm +/- 5% | POWERINST/ECOSUN ENGE/EG |
| 52T2 | | TRIP COIL (2) | TRIP COIL-2 | 1 | 220 VDC | 121 Ohm +/- 5% | POWERINST/ECOSUN ENGE/EG |
| 52Y | | AUXILIARY CONTACTOR 2NO-2NC | ANTIING CONTACTOR | 1 | 220 VDC | | SCHNEIDER/SEMENS/EATONEQ. |
| 52Y(A) | | ADD ON BLOCK (2NO) | | 1 | | | SCHNEIDER/SEMENS/EATONEQ. |
| 63GA | | GAS DENSITY SWITCH ALARM (NO), ON: 5.5 kg/m ³ , OFF: 6.0 kg/m ³ , ON: 5.5 kg/m ³ at 200C | LOW GAS PRESS ALARM | 1 | | | REGENCY EL ELECTRIC/TRAFA/EG |
| 63GL1 | | GAS DENSITY SWITCH LOCKOUT (NO), OFF: 5.0 kg/m ³ , ON: 5.5 kg/m ³ at 200C | LOW GAS PRESS L/O-1 | 1 | | | REGENCY EL ELECTRIC/TRAFA/EG |
| 63GL2 | | GAS DENSITY SWITCH LOCKOUT (NO), OFF: 5.0 kg/m ³ , ON: 5.5 kg/m ³ at 200C | LOW GAS PRESS L/O-2 | 1 | | | SCHNEIDER/SEMENS/EATONEQ. |
| 63GLX1 | | AUXILIARY CONTACTOR 2NO-2NC | CONTRACTOR FOR 63GL-1 | 1 | 220 VDC | | SCHNEIDER/SEMENS/EATONEQ. |
| 63GLX1(A) | | ADD ON BLOCK (2NO) | | 1 | | | SCHNEIDER/SEMENS/EATONEQ. |
| 63GLX2 | | AUXILIARY CONTACTOR 2NO-2NC | CONTRACTOR FOR 63GL-2 | 1 | 220 VDC | | SCHNEIDER/SEMENS/EATONEQ. |
| 63GLX2(A) | | ADD ON BLOCK (2NO) | | 1 | | | SCHNEIDER/SEMENS/EATONEQ. |
| 63M | | POWER CONTACTOR (3NO-1NC) | MOTOR CONTACTOR | 1 | 220VDC | | SCHNEIDER/SEMENS/EATONEQ. |
| 63M2 | | AUXILIARY CONTACTOR 2NO-2NC | MOTOR CONTACTOR | 1 | 220 VDC | | SCHNEIDER/SEMENS/EATONEQ. |
| 63M2(A) | | ADD ON BLOCK (2NO) | | 1 | | | SCHNEIDER/SEMENS/EATONEQ. |
| 63M(A) | | ADD ON BLOCK (2NO) | | 1 | | | SCHNEIDER/SEMENS/EATONEQ. |
| 63M(A) | | BKR AUXILIARY SWITCH (18NO-16NC) | AUX. SW. | 1 | 240VAC | | H.K INDUSTRIESSHIRKE/EG |
| ACF | | AUX CONTACTOR 2NO-2NC | AC SUPERV CONTACTOR | 1 | 220V AC | | SCHNEIDER/SEMENS/EATONEQ. |
| BL | | LED BLUE SPRING CHARGED INDICATION | SPRING CHARGING IND | 1 | 220V DC | | SIEMENS/EG. |
| CONR | | 4 DIGIT DIGITAL COUNTER | | 1 | 90-270V DC/AC | 4-9999 | SELCO/EG. |
| CTD1 | | CTD(220VDC) | CAP TRIP DEVICE | 1 | | | CGPSL/PARAM CONTROL/EG |
| CTD2 | | CTD(220VDC) | CAP TRIP DEVICE | 1 | | | CGPSL/PARAM CONTROL/EG |
| DCC1 | | AUXILIARY CONTACTOR 2NO-2NC | DC1 SUPERV CONT. | 1 | 220 VDC | | SCHNEIDER/SEMENS/EATONEQ. |
| DCC1(A) | | ADD ON BLOCK (2NO) | | 1 | | | SCHNEIDER/SEMENS/EATONEQ. |
| DCC2 | | AUXILIARY CONTACTOR 2NO-2NC | DC1 SUPERV CONT. | 1 | 220 VDC | | SCHNEIDER/SEMENS/EATONEQ. |
| DCC2(A) | | ADD ON BLOCK (2NO-2NC) | | 1 | | | SCHNEIDER/SEMENS/EATONEQ. |
| DCC3 | | AUXILIARY CONTACTOR 2NO-2NC | DC2 SUPERV CONT. | 1 | 220 VDC | | SCHNEIDER/SEMENS/EATONEQ. |
| DCC3(A) | | ADD ON BLOCK (2NO-2NC) | | 1 | | | SCHNEIDER/SEMENS/EATONEQ. |
| DCC4 | | AUXILIARY CONTACTOR 2NO-2NC | DC1 SUPERV CONT. | 1 | 220 VDC | | SCHNEIDER/SEMENS/EATONEQ. |
| DCC4(A) | | ADD ON BLOCK (2NO) | | 1 | | | SCHNEIDER/SEMENS/EATONEQ. |
| DOS | | DOOR OPERATED SWITCH | SW FOR LAMP | 1 | 230 VAC | 5A | BRISK/SUPRA/EG. |
| GL | | LED GREEN | BKR. OFF IND. | 1 | 220VDC | | DSQUARE/GRAFTECH/TEKNIK/EG. |
| GS | | SF6 GAS PRESSURE SENSOR | GAS SENSOR | 1 | 230 VAC | 8W | PRINIZ/EG. |
| IL | | ILLUMINATION LAMP (LED) | ILL LAMP | 1 | | | GRAFTECH/SQUARE/EG |
| L1 | | FUSE LINK | FUSE LINK | 1 | 16A | | EATON/BUSSMAN/SHWAR/SIEMENS/EG. |
| L2 | | FUSE LINK | FUSE LINK | 1 | 16A | | EATON/BUSSMAN/SHWAR/SIEMENS/EG. |
| L3 | | FUSE LINK | FUSE LINK | 1 | 16A | | EATON/BUSSMAN/SHWAR/SIEMENS/EG. |
| L4 | | FUSE LINK | FUSE LINK | 1 | 16A | | EATON/BUSSMAN/SHWAR/SIEMENS/EG. |
| LS | | LIMIT SWITCH (1C/O) | LIMIT SW. | 1 | | | OMRON/SHTELL/EG. |
| M | | UNIVERSAL MOTOR FOR SPRING CHARGING | MOTOR | 1 | 230 VAC/DC | IP750W | KPT/EG. |
| RL | | LED RED | BKR. ON IND. | 1 | 220VDC | | DSQUARE/GRAFTECH/TEKNIK/EG. |
| SH | | ANTICONDENSATION HEATER | SPACE HEATER | 1 | 230V AC | 100W | APTVELICO/SWRA/EG. |
| SHBR1 | | ANTICONDENSATION HEATER | SPACE HEATER | 1 | 230V AC | 100W | APTVELICO/SWRA/EG. |
| SHBR2 | | ANTICONDENSATION HEATER | SPACE HEATER | 1 | 230V AC | 100W | APTVELICO/SWRA/EG. |
| SO | | SWITCH SOCKET UNIT | SW. SOCKET UNIT | 1 | 230 VAC | 10/20A | ANDHORE/EG. |
| X1 | | STUD TYPE TERMINAL BLOCK-CST389/CATM3-VTS-M3 | CONNECTWELL/ELMEXV/INPAR/EG. | 13 | | | CONNECTWELL/ELMEXV/INPAR/EG. |
| X2 | | STUD TYPE TERMINAL BLOCK-CST389/CATM3-VTS-M3 | CONNECTWELL/ELMEXV/INPAR/EG. | 10 | | | CONNECTWELL/ELMEXV/INPAR/EG. |
| X2-12,13,14,15 | | DIS-CONN. TYPE TERMINAL BLOCK-CDTTS | CONNECTWELL/ELMEXV/INPAR/EG. | 4 | | | CONNECTWELL/ELMEXV/INPAR/EG. |
| X3 | | STUD TYPE TERMINAL BLOCK-CST389/CATM3 | CONNECTWELL/ELMEXV/INPAR/EG. | 10 | | | CONNECTWELL/ELMEXV/INPAR/EG. |
| X3-12,13,14,15 | | DIS-CONN. TYPE TERMINAL BLOCK-CDTTS | CONNECTWELL/ELMEXV/INPAR/EG. | 4 | | | CONNECTWELL/ELMEXV/INPAR/EG. |
| X4 | | STUD TYPE TERMINAL BLOCK-CST389/CATM3-VTS-M3 | CONNECTWELL/ELMEXV/INPAR/EG. | 4 | | | CONNECTWELL/ELMEXV/INPAR/EG. |
| X5 | | STUD TYPE TERMINAL BLOCK-CST389/CATM3-VTS-M3 | CONNECTWELL/ELMEXV/INPAR/EG. | 76 | | | CONNECTWELL/ELMEXV/INPAR/EG. |
| X6 | | STUD TYPE TERMINAL BLOCK-CST389/CATM3-VTS-M3 | CONNECTWELL/ELMEXV/INPAR/EG. | 4 | | | CONNECTWELL/ELMEXV/INPAR/EG. |
| X7 | | TERMINAL BLOCK -CMT 4KU12 5V/UT-4 | CONNECTWELL/ELMEXV/INPAR/EG. | 3 | | | CONNECTWELL/ELMEXV/INPAR/EG. |
| X8 | | TERMINAL BLOCK -CMT 4KU12 5V/UT-4 | CONNECTWELL/ELMEXV/INPAR/EG. | 9 | | | CONNECTWELL/ELMEXV/INPAR/EG. |
| X9 | | TERMINAL BLOCK -CMT 4KU12 5V/UT-4 | CONNECTWELL/ELMEXV/INPAR/EG. | 2 | | | CONNECTWELL/ELMEXV/INPAR/EG. |
| XG | | TERMINAL BLOCK -CMT 4KU12 5V/UT-4 | CONNECTWELL/ELMEXV/INPAR/EG. | 6 | | | CONNECTWELL/ELMEXV/INPAR/EG. |
| XL | | TERMINAL BLOCK -CMT 4KU12 5V/UT-4 | CONNECTWELL/ELMEXV/INPAR/EG. | 2 | | | CONNECTWELL/ELMEXV/INPAR/EG. |
| XM | | TERMINAL BLOCK -CMT 4KU12 5V/UT-4 | CONNECTWELL/ELMEXV/INPAR/EG. | 2 | | | CONNECTWELL/ELMEXV/INPAR/EG. |
| ATDC | | AC TO DC CONVERTER | TB FOR MOTOR | 2 | 230 VAC TO 24VDC | | WEIDMULLAR/SHAW/SUN/SELCO/EG |

- NOTES:-
- AUXILIARY SWITCHES ARE SHOWN FOR OPEN BREAKER.
 - AUXILIARY CONTACTORS CONTACTS ARE SHOWN IN DE-ENERGISED POSITION.
 - GAS PRESSURE SWITCH IS SHOWN FOR NO GAS PRESSURE.
 - LOCAL REMOTE CHANGEVER SWITCH IS SHOWN IN REMOTE POSITION.
 - ARE OPEN CONTACTS
 - ARE CLOSE CONTACTS
 - SIZE OF WIRE = 1.5 sq.mm, ANNEALED BARE COPPER PVC INSULATED.
 - COLOUR OF WIRE FOR AC CIRCUIT-BLACK, FOR DC CIRCUIT & SPARE CONTACTS-GRAY & FOR EARTHING-GREEN.
 - STUD TYPE TERMINAL BLOCKS ARE PROVIDED WHEREVER REQ.
 - 52A CONTACTS ARE OPEN WHEN BREAKER IS OPEN.
 - 52B CONTACTS ARE CLOSE WHEN BREAKER IS OPEN.
 - 52C CONTACTS ARE OPEN WHEN BREAKER IS OPEN.
 - 52D CONTACTS ARE CLOSE WHEN BREAKER IS OPEN.
 - MARKED TERMINAL BLOCKS ARE OF DISCONNECTING TYPE
 - TERMINAL ARE WIRED UPTO TERMINAL BLOCKS FOR REMOTE CONTROL PANEL OF CIRCUIT BREAKER.
 - REFER SCHEMATIC DIAGRAM NO : CG-145AA-31MM-SCH -01.02.03.04
 - DURING DETAILED ENGINEERING/EXECUTION STAGE CHANGE IN TB NOS/FERRULES/COMPONENT MAKE/MODEL IS APPLICABLE & WILL BE DONE IN AS BUILT DRAWING TO SUIT THE CUSTOMER REQUIREMENT. HOWEVER, CG STANDS FOR THE GUARANTEE FOR ITS PERFORMANCE & SUITABILITY AS PER THE REQUIREMENTS.
 - 20% SPARE TERMINAL WILL BE PROVIDED

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|----|----------|---------------|---------------------|----------------|--------------------------|--------------------------|---|
| 5 | | | | | | | |
| 4 | | | | | | | |
| 3 | | | | | | | |
| 2 | | | | | | | |
| 1 | | | | | | | |
| NO | REVISION | NAME | DATE | DATE: 26.04.23 | ALL DIMENSIONS ARE IN mm | DRG.NO:CG-145AA-31MM-BOM | |
| 5 | | NAME | CUSTOMER: APTRANSCO | | | TITLE: BILL OF MATERIAL | |
| 4 | | DRN | RAS | | | FOR: 145KV, 40 KA, SP-SP | |
| 3 | | CHD | NSR | | | GCB TYPE: 120-SFM-40AA | |
| 2 | | APPD | GNP | | | | |
| 1 | | SCALE: N.T.S. | | | | | |
| 1 | | | | | | | |

CHIEF ENGINEER/PROJECTS
APTRANSCO/VS/VIJAYAWADA



THIRD ANGLE PROJECTION



MADE IN INDIA

GAS CIRCUIT BREAKER

| | | |
|---|---|---|
| TYPE 120-SFM-40AA | | STD. IEC62271-100 |
| RATED VOLTAGE | 145 kV | RATED LIGHTNING IMPULSE WITHSTAND VOLTAGE |
| RATED FREQUENCY | 50 Hz | 650 kVp |
| RATED NORMAL CURRENT | 3150 A | RATED SHORT-CIRCUIT BREAKING CURRENTS |
| FIRST POLE TO CLEAR FACTOR | 1.5 | 40 KA |
| RATED SF6 GAS PRESSURE 6.0 kg/cm ² -g(AT 20°C) | RAT.OPR.SEQ. 0-0.3SEC-CO-3MIN-CO | |
| TOTAL WEIGHT 1450Kg | GAS WEIGHT 7.5Kg | RATED SHORT-CIRCUIT MAKING CURRENT |
| RATED SHORT TIME CURRENT 40 KA FOR 3 SECONDS | POWER FREQUENCY WITHSTAND VOLTAGE : 275 KV(rms) | |
| SF6 LOW PRESSURE 5.5 kg/cm ² -g(AT 20°C) | SF6 LOCKOUT PRESSURE 5.0 kg/cm ² -g(AT 20°C) | |
| RATED OUT OF PHASE BREAKING CURRENT 10 KA | MINIMUM CREEPAGE DISTANCE: 31 mm/kV. | |

SR. NO. : **

NOTES: -

- MATERIAL : STAINLESS STEEL 0.5THK/TRAFOLITE
 - *YEAR OF MFG. : CURRENT YEAR
 - *' SERIAL NO - AS APPLICABLE
 - '**' - PUT CURRENT YEAR
 - *** PO NO.& DATE : AS PER CONTRACT REVIEW
 - ### LETTER NO. TO BE ADDED AFTER APPROVAL BY APTRANSCO.
- NOTE: 1. Drawings Approval subject to valid type test reports, to be checked during acceptance tests.
2.For EPC contractors only.

| | | | |
|-------------------------------------|---------|---------------------------------|-------------------|
| | | SCAN QR CODE FOR PRODUCT MANUAL | |
| RATED COIL VOLTAGE -TRIPPING | 220 VDC | RATED COIL VOLTAGE -CLOSING | 220 VDC |
| MOTOR VOLTAGE | 230V AC | AUX CIRCUIT VOLTAGE | -1Ø,230V AC,50HZ. |
| YEAR OF MFG. : ** | | WO. NO : XXXXXX | |
| CUSTOMER: APTRANSCO | | | |
| PO NO.& DATE : *** | | | |
| APTRANSCO APP. DRG. LETTER NO : ### | | | |

CHIEF ENGINEER/PROJECTS
APTRANSCO/VS/VIJAYAWADA

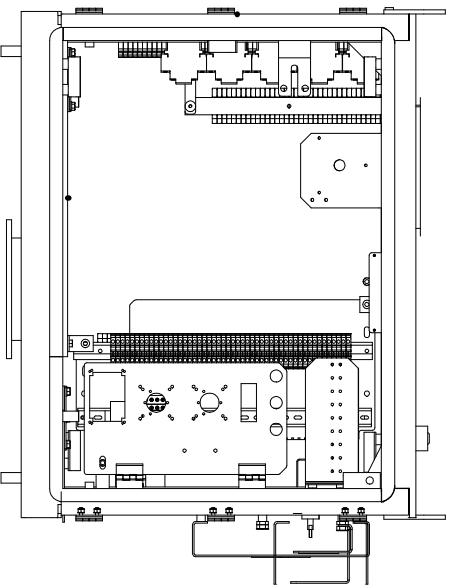
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|--------------------------|----------|---------------|---------------------|--|
| 5 | | NAME | CUSTOMER: APTRANSCO | |
| 4 | | DRN | RAS | STD APPROVAL 31MM/KV CREEPAGE |
| 3 | | CHD | NSR | |
| 2 | | APPD | GNP | |
| 1 | | SCALE: N.T.S. | | |
| NO | REVISION | NAME | DATE | DATE:26.04.23 |
| 1 | 2 | 3 | 4 | 5 |
| ALL DIMENSIONS ARE IN mm | | | | |
| TITLE: BILL OF MATERIAL | | | | THIRD ANGLE PROJECTION |
| FOR: 145KV, 40 KA, SP-SP | | | | CG Power and Industrial Solutions Limited SWITCHGEAR DIVISION SS,AMBAD, NASHIK |
| GCB TYPE: 120-SFM-40AA | | | | |
| DRG.NO:CG-145AA-31MM-RP | | | | 1 / 1 RO |

IF IN DOUBT ASK!

Drawing approval subject to valid vendor registration

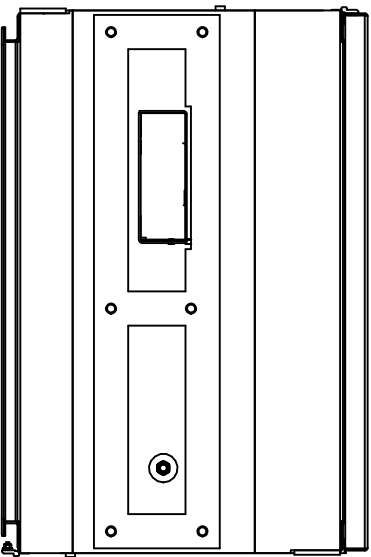
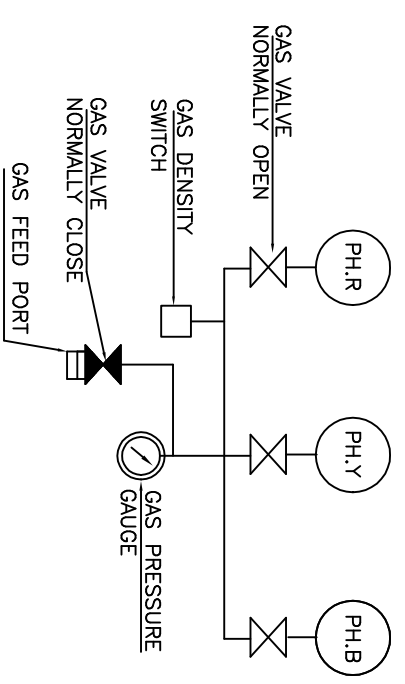
NOTE: 1. Drawings Approval subject to valid type test reports, to be checked during acceptance tests.
2. For EPC contractors only.

1. Minimum 300mm plinth shall be maintained for CT/PT/CVT/Isolators/IV/LA/Breakers in the substation during foundation works to ensure safe live to ground clearance per IE rules.
2. Since the supply of terminal connectors is not in the scope of manufacturer as mentioned in the drawings. The EPC contractor shall be instructed to supply the same line with CT/PT/CVT/Isolator/IV/LA/Breaker's requirement and compatibility.

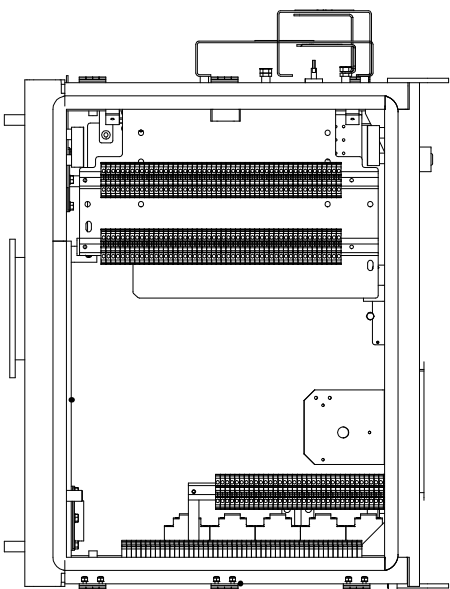


FRONT VIEW(WITHOUT DOOR)

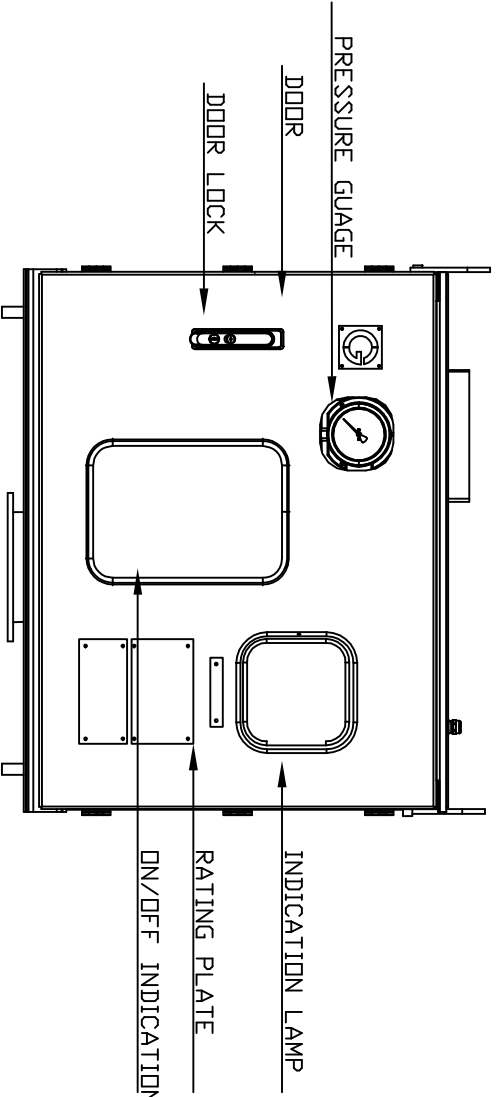
SINGLE LINE DIAGRAM FOR GAS SYSTEM



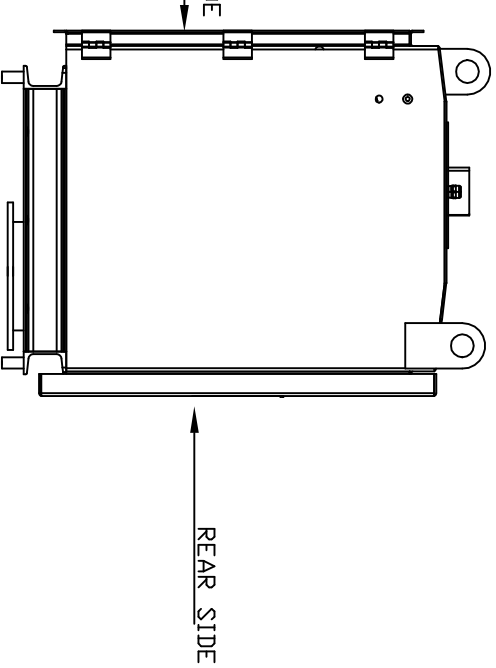
TOP VIEW



REAR VIEW(WITHOUT DOOR)



FRONT VIEW



SIDE VIEW

NOTES:-
1. THICKNESS OF SHEET: 3 mm
2. FINISHING SHADE 631 OF IS:5.
3. DEGREE OF PROTECTION:- IP55
4. THE COMPONENT LAYOUT SHOWN ON THE DRAWING IS FOR INDICATION PURPOSE MAY SLIGHTLY ALTER AT MANUFACTURING STAGE DEPENDING ON OPERATIONAL REQUIREMENT OR DUE CHANGE IN THE COMPONENT MAKE
5. 2 SEPARATE TRIP COILS WITH 2 SEPARATE PLUNGERS ARE PROVIDED.

CHIEF ENGINEER/PROJECTS
APTRANSCO/VS/VIJAYAWADA

TITLE: MECH. HOUSING ASSY

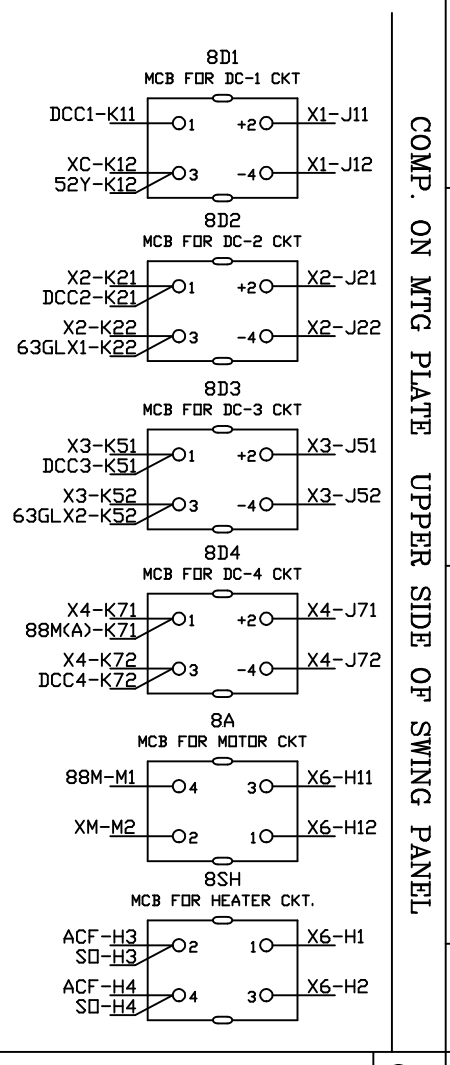
THIRD ANGLE PROJECTION

| | | | | | | | |
|---|----|----------|---|------|---------------|----------------|--------------------------|
| 5 | NO | REVISION | 2 | NAME | DATE | DATE: 26.04.23 | ALL DIMENSIONS ARE IN mm |
| 4 | | | | DRN | RAS | | |
| 3 | | | | CHD | NSR | | |
| 2 | | | | APPD | GNP | | |
| 1 | | | | | SCALE: N.T.S. | | |

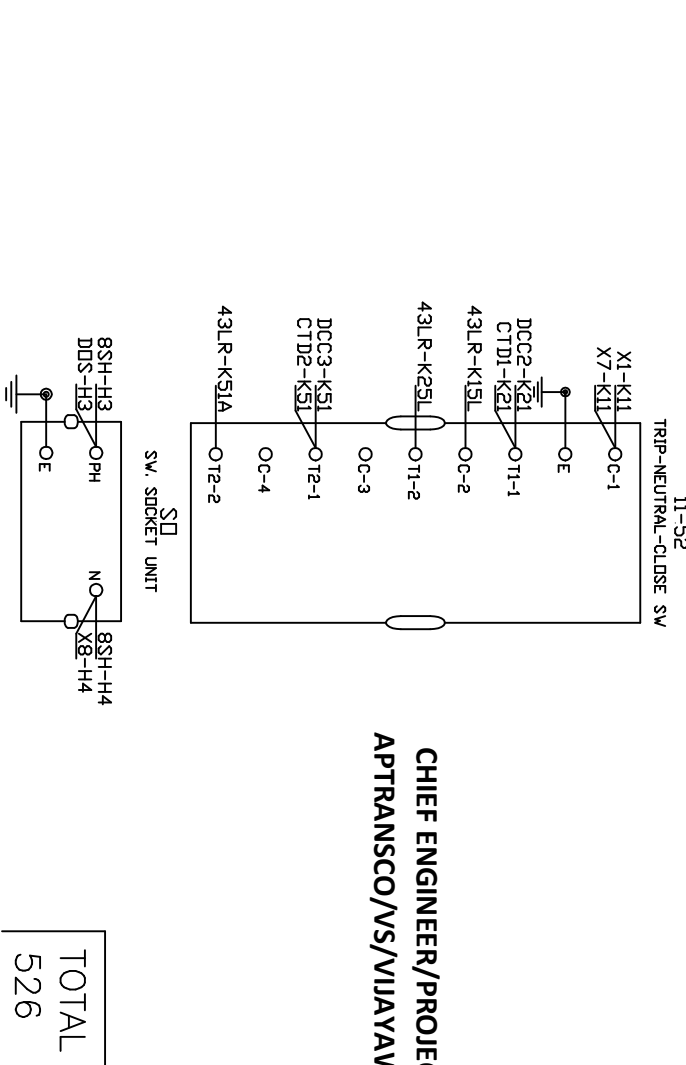
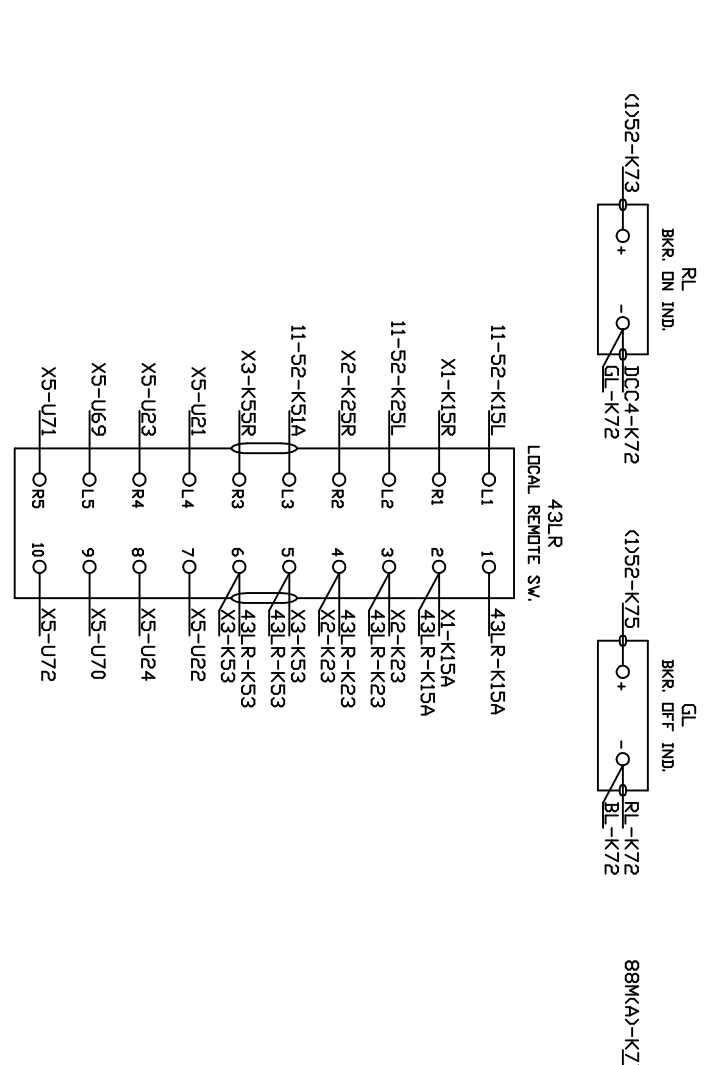
| | |
|---|-------------------------------|
| 5 | CUSTOMER: APTRANSCO |
| 4 | STD APPROVAL 31MM/KV CREEPAGE |
| 3 | FOR: 145KV, 40 KA, SP-SP |
| 2 | GCB TYPE: 120-SFM-40AA |
| 1 | DRG.NO.:CG-145AA-31MM-MH |



CG Power and Industrial Solutions Limited
SWITCHGEAR DIVISION SA, AMBAD, NASHIK



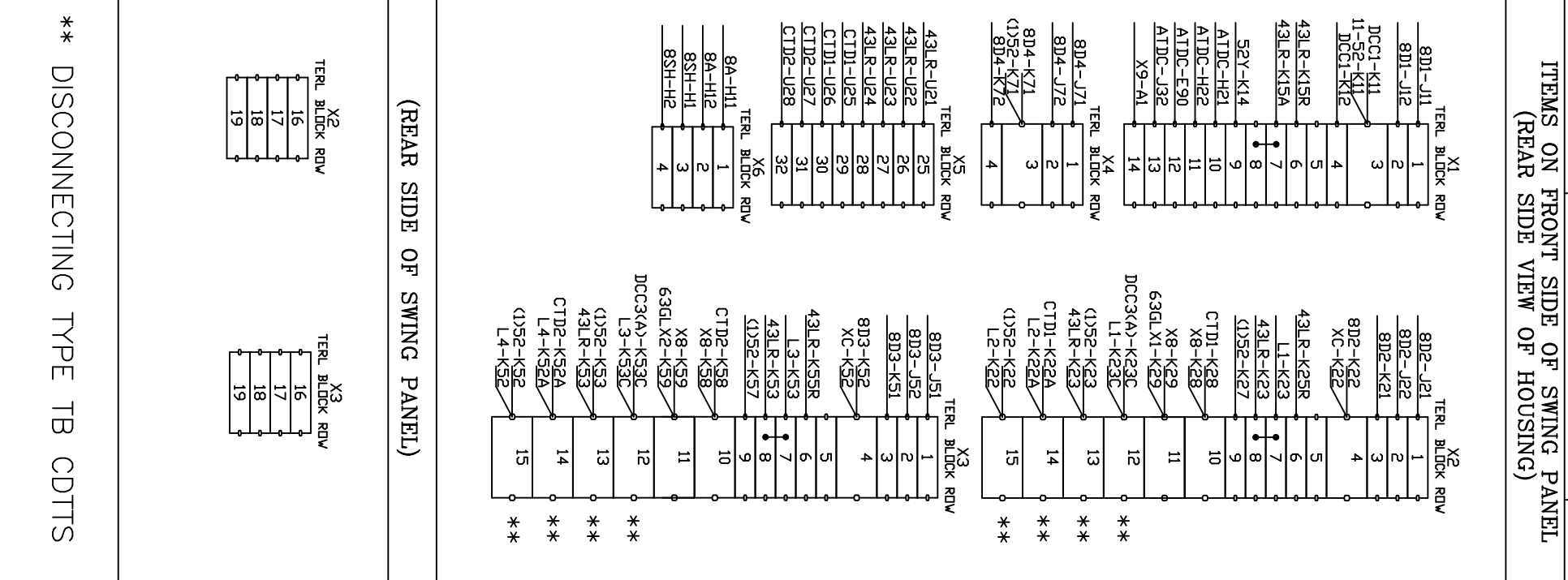
COMP. ON MTG PLATE OF SWING PANEL



TOTAL CONNECTIONS
526

CHIEF ENGINEER/PROJECTS
APTRANSCO/VS/VIJAYAWADA

| NO | REVISION | NAME | DATE |
|----|----------|------|------|
| 1 | | | |
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** DISCONNECTING TYPE TB CDTTs

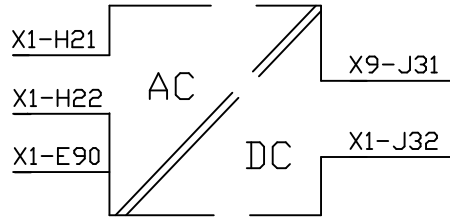
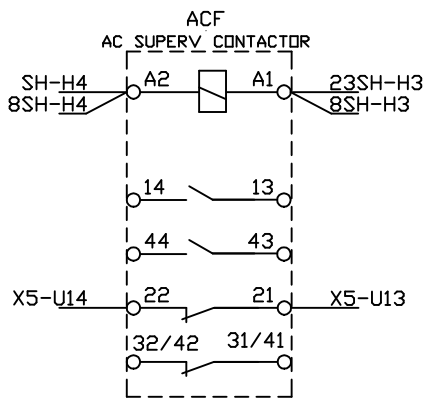
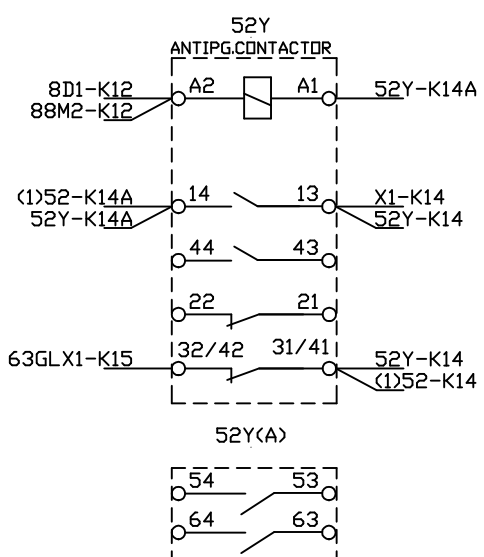
TITLE: WIRING DIAGRAM

FOR: 145KV, 40 KA, SP-SP
 GCB TYPE: 120-SFM-40AA

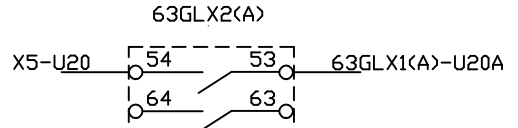
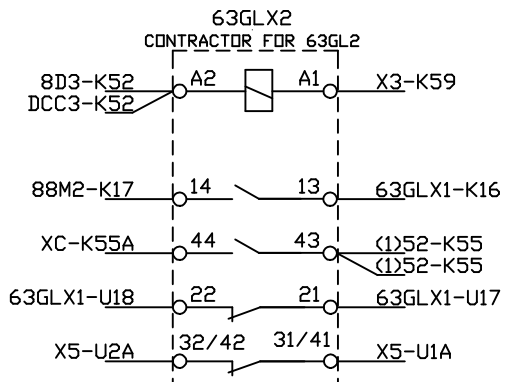
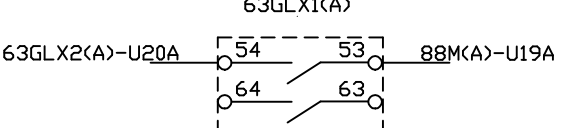
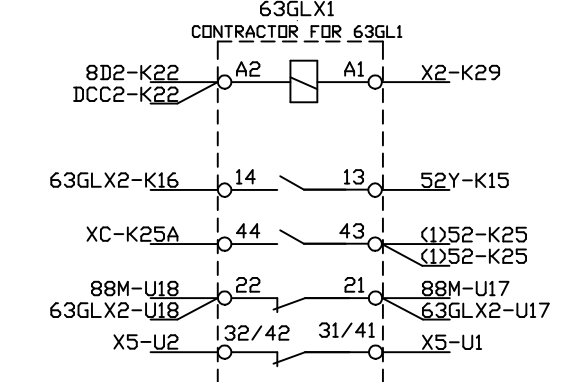
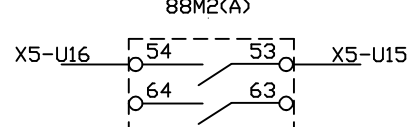
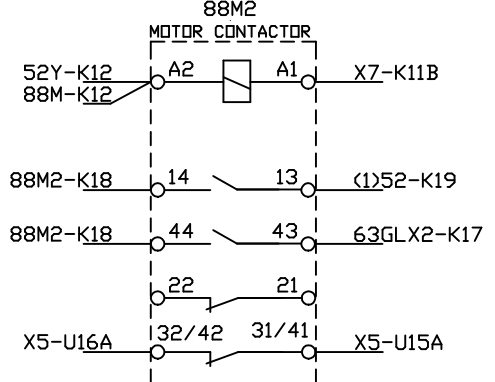
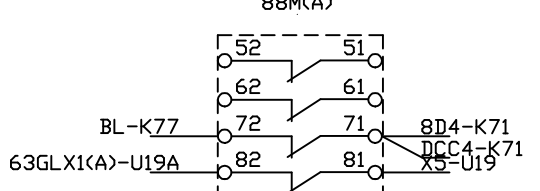
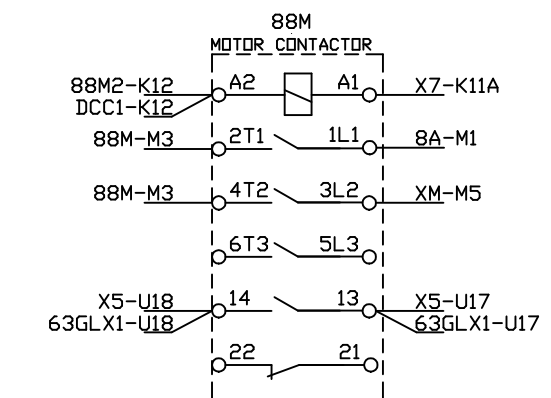
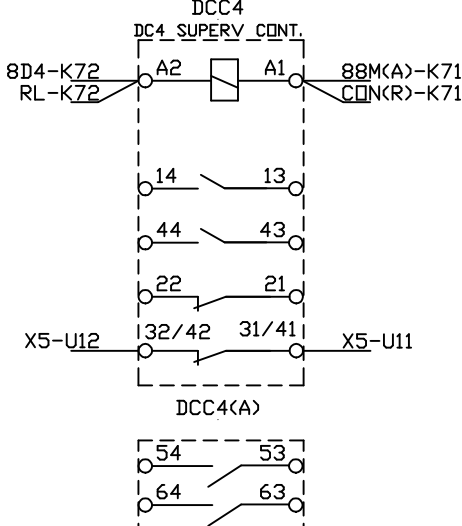
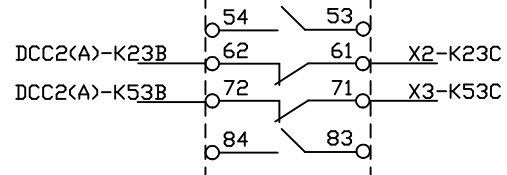
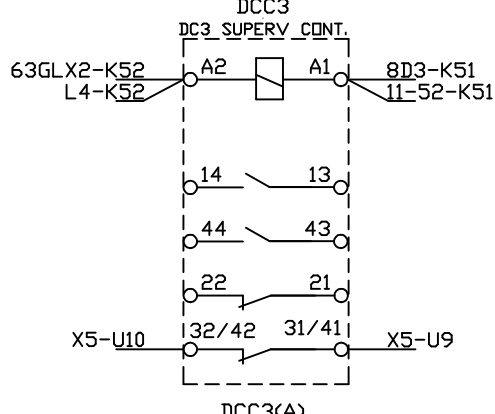
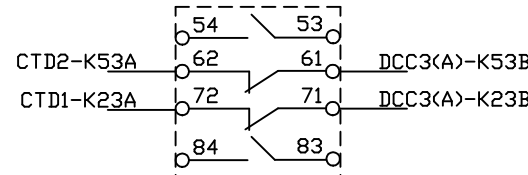
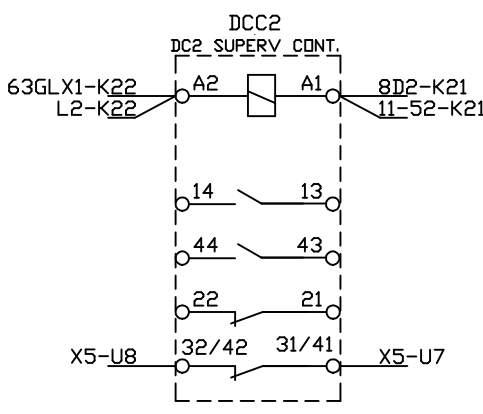
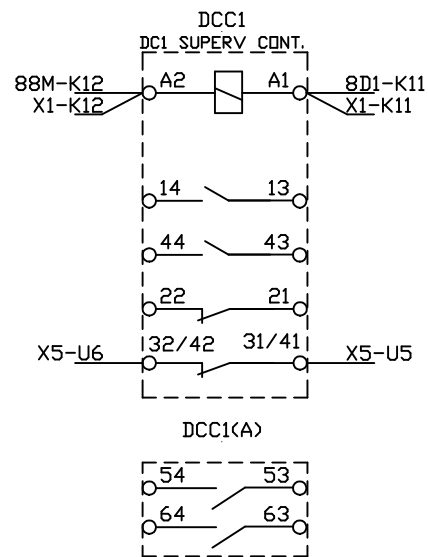
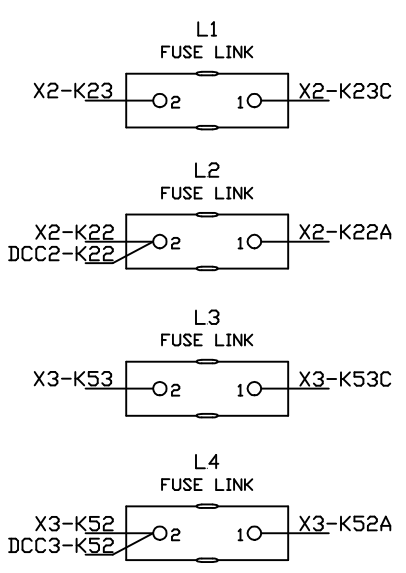


THIRD ANGLE PROJECTION

| | | | |
|---|---------------------|----------------|--|
| NO | 1 | REVISION | |
| NO | 2 | | |
| NO | 3 | | |
| NO | 4 | | |
| NO | 5 | | |
| NAME | | DATE | |
| DATE | | DATE: 27.04.23 | |
| SCALE | | N.T.S. | |
| ALL DIMENSIONS ARE IN mm | | | |
| NAME | | DRN | |
| NAME | | CHD | |
| NAME | | NSR | |
| NAME | | APPD | |
| NAME | | GNP | |
| CUSTOMER | APTRANSCO | | |
| STD APPROVAL | 31MM/KV CREEPAGE | | |
| TITLE | WIRING DIAGRAM | | |
| FOR | 145KV, 40 KA, SP-SP | | |
| GCB TYPE | 120-SFM-40AA | | |
| DRG.NO. | CG-145AA-31MM-WIR | | |
| THIRD ANGLE PROJECTION | | | |
| CG Power and Industrial Solutions Limited | | | |
| SWITCHGEAR DIVISION, S.A.M.BAD, NASHIK | | | |
| 2 / 3 | RO | | |

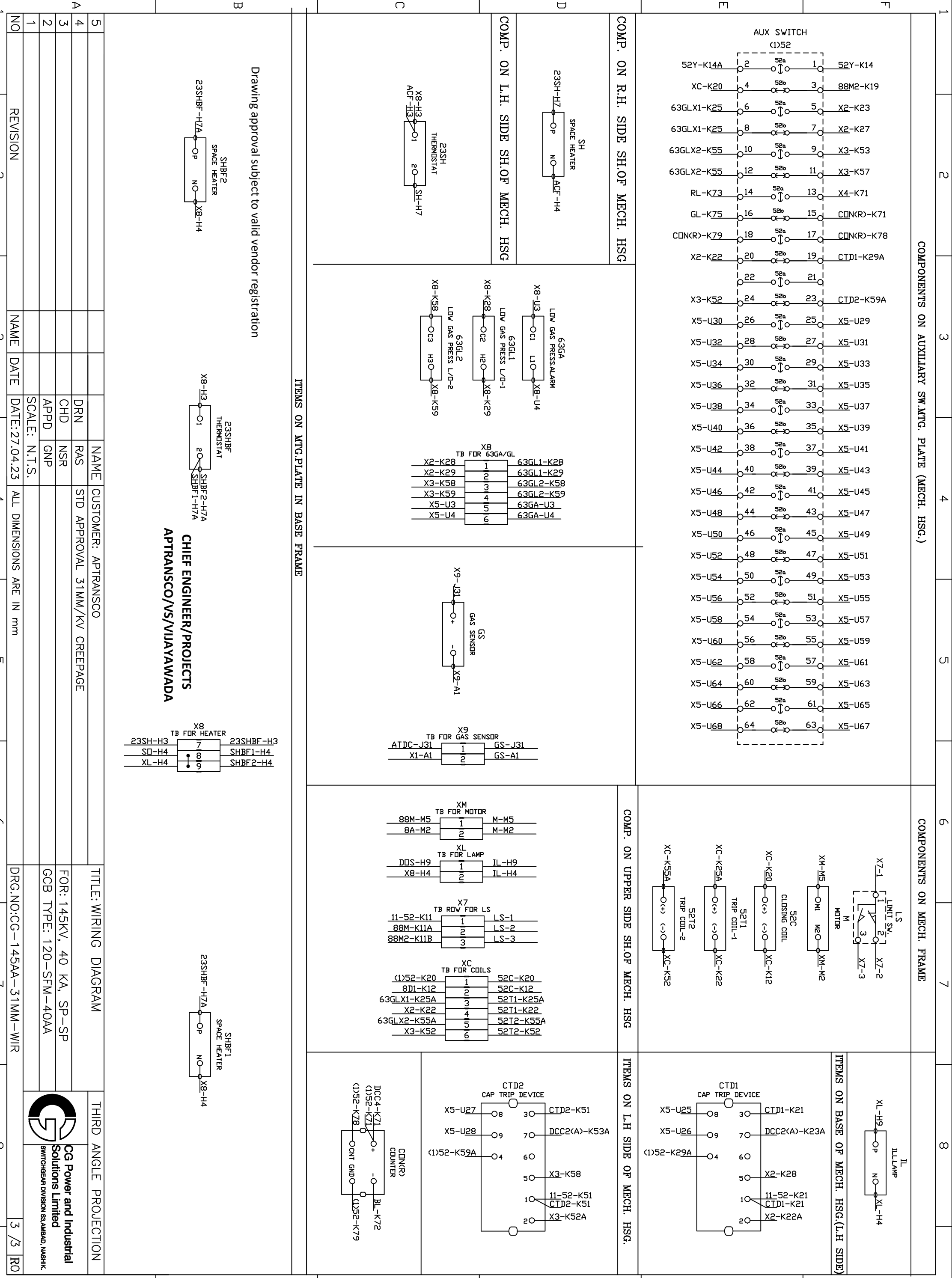


CHIEF ENGINEER/PROJECTS
APTRANSCO/VS/VIJAYAWADA



Drawing approval subject to valid vendor registration

COMP. ON OF BACK SIDE OF TB MTG PLATE



| NO | REVISION | NAME | DATE | ALL DIMENSIONS ARE IN mm |
|----|----------|------|----------------|--------------------------|
| 1 | | | DATE: 27.04.23 | |
| 2 | | | | |
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Drawing approval subject to valid vendor registration

ITEMS ON MTG.PLAATE IN BASE FRAME

COMP. ON R.H. SIDE SH.OF MECH. HSG

COMP. ON L.H. SIDE SH.OF MECH. HSG

COMP. ON UPPER SIDE SH.OF MECH. HSG

ITEMS ON L.H. SIDE OF MECH. HSG.

COMPONENTS ON MECH. FRAME

ITEMS ON BASE OF MECH. HSG. (L.H. SIDE)

THIRD ANGLE PROJECTION

TITLE: WIRING DIAGRAM

CUSTOMER: APTRANSCO

FOR: 145KV, 40 KA, SP-SP

GCB TYPE: 120-SFM-40AA

DRG.NO.:CG-145AA-31MM-WIR

CHIEF ENGINEER/PROJECTS

APTRANSCO/VS/VIJAYAWADA

CG Power and Industrial Solutions Limited

SWITCHGEAR DIVISION SS,AMBAD, NASHIK

SCALE: N.T.S.

DATE: 27.04.23

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