Tender No. (SELCo. 04/2020)

Electrical materials

Total LOT 1 – Cables and Conductors	
Total LOT 2 – Transformers & Switches	
Total LOT 3 – Accessories	
Total LOT 4 – Wooden Poles	
Total LOT 5 – Steel Poles and Arms	
Total LOT 6 – Pillars	
Grand Total	
Discount	
Total after Discount(NIS)	

Total In words:……...

Company……. **Signature…….**

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The following data shall be filled and submitted with the tender:

Tender Number:……...

Tender Name:……...

Supplier Name: ……

Contact Person: ……

Address: ……....

Telephone Number: ……..

Fax number: ……..

Mobile Number: ……...

Email: ……

Bid Submission date and time: ……

Company……. **Signature…….**

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Instructions to bidders

- *The bidder shall submit one original financial offer in a separate envelope from one original and a copy of the technical offer.*
- *The bidder could participate in one or more lots of the tender, the supplier should price all items of the participated lots, else will be excluded.*
- *The bid validity should be not less than 90 days from the bid opening date.*
- *Each lot is indivisible.*
- *The bidder must submit a bank guarantee from local bank equivalent to 5% of the tender total value and in separate envelope, valid for 90 days from the date of submission; otherwise, quotation will be rejected.*
- *Prices are in NIS EXcluding VAT.*
- *The awarded supplier / suppliers and within 10 days from receiving the awarding letter shall submit a performance bond equivalent to 10% of the awarded value, valid for 180 days.*
- *The awarded supplier of LOT 1 shall bear all the expenses of two engineers from SELCo to visit and inspect the goods at the manufacturer premises including travelling and accommodation and all related costs.*
- *The awarded supplier of LOT 2 shall bear all the expenses of two engineers from SELCo to visit and inspect the goods at the manufacturer premises including travelling and accommodation and all related costs.*
- *The awarded supplier of LOT 4 shall bear all the expenses of two engineers from SELCo to visit and inspect the wooden poles at their origin including travelling and accommodation and all related costs.*
- *Payments: Within 30 days from delivery and technical approval for Lots(1,2,3,5&6). The acceptance and payments for lot 4 will be within 90 days from delivery and technical approval.*

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- ***Delivery: within (90) days*** *from the date of accepting and informing the bidder of acceptance of quotation.*
- *Fines: 1% of the item price per week of delay and not more than 10% of total bid value.*
- *Prices including all charges up to the warehouses of SELCo.*

- *Bid document non refundable price is 1000 NIS and will be paid when submitting the offer by the participants.*
- *In case of mistakes in summation, the unit price will be considered.*
- *The bidder shall submit manufacturer catalogs with the tender indicating the catalog number and technical specification for each offered item.*
- *Discount at source certificate is required from local suppliers.*
- *Tender document could be obtained from SELCo website or from procurement department.*
- *Thursday August, 20th 2020 12:00 pm is the final time of receiving the offers at SELCo headquarter/Procurement department. and in sealed envelopes.*
- *For further information please do not hesitate to contact the procurement department:*
  Eng. Abdelqadir Qaisieh
  Purchasing Manager
  Tel: 02 2283602/3
  Fax: 02 2283601
  Email: abed@selco.ps
  Website www.selco.ps.

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Schedule of requested Materials

LOT 1: Cables and Conductors:

No.	Item	Unit	QTY	Unit Price	Total Price
1	ACSR "Coyote" conductor (BS215 PART 2)	Km	10		
2	600/1000V, ABC 4x50+2x25 mm2 Al	Km	30		
3	600/1000V, ABC 4x95+2x25 mm2 Al	Km	45		
4	36kV, under-ground cable, single core 1x150mm2 Al (XLPE/PVC)	Km	30		
5	600/1000 V Concentric Cable 1X6+6 mm2 CU/XLPE/CU Lapped Wire/P. E.	Km	60		
6	600/1000V, underground cable 4*10 mm2 Cu	Km	7		
7	600/1000V, underground cable 4*16 mm2 Cu	Km	3		
8	600/1000V, underground cable 4*25 mm2 Cu	Meter	500		
9	600/1000V, underground cable 3*50+1*25 mm2 Cu	Meter	500		
10	600/1000V, underground cable 3*70+1*35 mm2 Cu	Meter	1,000		
11	600/1000V, under-ground cable, 1x70mm2 XLPE Cu- brown Class 5	Meter	200		
12	600/1000V, under-ground cable, 1x95mm2 XLPE Cu- Yellow Class 5	Meter	300		
13	600/1000V, under-ground cable, 1x240mm2 XLPE Cu	Meter	500		
14	Solid Copper Wire 6 mm2	Meter	700		
15	600/1000V, Stranded Cu PVC covered 1x16 mm2, class 5 (QTY 50% brown, 50% blue)	Km	1.5		
16	600/1000V, underground cable 3*1.5 mm2 Cu	Km	5		
17	Solid copper wire 1.5 mm2, yellow/green (Roll=100m)	Roll	200		
18	Stay wire, Nominal area 52 mm2, Calculated diameter 8 mm, Rated breaking strength 70 kN	Km	20		
Total Excluding VAT (NIS)					

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LOT 2: Transformers and Switches:

No.	Item	Unit	QTY	Unit Price	Total Price
1	400 KVA, 33/0.4 kV outdoor Pole Mounted Distribution Transformer 3 phase	Each	5		
2	630 KVA, 33/0.4 kV Indoor Distribution Transformer 3 phase	Each	1		
3	Switch-Disconnecters 33 kV with load breaking head, 3-phase, complete	Set	50		
Total Excluding VAT (NIS)					

LOT 3: Accessories:

No.	Item	Unit	QTY	Unit Price	Total Price
1	Polymeric tension insulator 36 kV- 1170mm creepage distance	Pcs	500		
2	Lightning Arresters 36kV,set of three phase	Set	25		
3	Straight joint for 42kV, under-ground cable, single core (35-150)mm2 Al (XLPE/PVC) (hot shrink)	Pcs	100		
4	Straight joint for 42kV, under-ground cable, single core (35-150)mm2 Al (XLPE/PVC) (cold shrink)	Pcs	25		
5	Outdoor termination kit for 42kV, under-ground cable, single core 1x95mm2 Al (XLPE/PVC) (Set of 3 phases) (cold shrink)	Set	30		
6	Warning plates for buried cables	Pcs	20,000		
7	Double -Walled corrugated pipe 6 inch	Meter	700		
8	Double -Walled corrugated pipe 3 inch	Meter	1,000		
9	BBI4 box (250x350x150)mm	Pcs	3,500		
10	BBI46 box (350x495x150)mm	Pcs	800		
11	MCCB 3X630A 50KA	Pcs	5		
12	MCCB 3X400A 50KA	Pcs	10		
13	MCCB 3X250A, 25 KA	Pcs	10		
14	MCCB 3X100A, 25 KA	Pcs	30		
15	MCCB 3X40A, 25 KA	Pcs	600		
16	MCB 2x32A 6KA	Pcs	2,500		
17	MCB 2x40A 6KA	Pcs	1,000		

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18	Heat shrinkable medium wall insulating tubing for conductors cross sectional area 6-50 mm2	Meter	3,000		
19	Heat shrinkable breakouts for power cables 4-25mm2 conductor / 2 cores	Pcs	5,000		
20	Heat shrinkable breakouts for power cables 185-300mm2 conductor / 4 cores	Pcs	100		
21	Heat shrinkable breakouts for power cables 35-70mm2 conductor / 4 cores	Pcs	150		
22	Heat shrinkable breakouts for power cables 4-35mm2 conductor / 4 cores	Pcs	500		
23	ABC Suspension Clamp for 4x(25-50)+2x25 mm2 Al	Pcs	3,000		
24	ABC Suspension Clamp for 4x(70-95)+2x25 mm2 Al	Pcs	3,000		
25	Tension anchor for ABC cable 4x(25-50)mm2 Al	Pcs	2,000		
26	Tension anchor for ABC cable 4x(70-95)mm2 Al	Pcs	2,000		
27	Insulated self-piercing Tap connectors for ABC (70-240/70-240) mm2 Al	Pcs	500		
28	Insulated self-piercing Tap connectors for ABC (4-35/16-150) mm2 Al	Pcs	15,000		
29	Insulated self-piercing Tap connectors for ABC (1.5-6/16-95) mm2 Al	Pcs	5,000		
30	Al parallel groove connecting clamp 35-185mm	Pcs	500		
31	Al/Cu parallel groove connecting clamp (10-50/35-120)mm	Pcs	100		
32	Al/Cu parallel groove connecting clamp (10-50/95-210)mm	Pcs	500		
33	Al/Cu parallel groove connecting clamp (6-50/16-70)mm	Pcs	200		
34	Compression terminal lug for 95mm2 conductor, Cu with 13mm hole	Pcs	500		
35	Compression terminal lug for 120mm2 conductor, Cu with 13mm hole	Pcs	150		
36	Compression terminal lug for 240mm2 conductor, Cu with 13mm hole	Pcs	200		
37	Compression terminal lug for 150mm2 conductor, Al/Cu with 13mm hole	Pcs	200		
38	Compression terminal lug for 185mm2 conductor, Al/Cu with 13mm hole	Pcs	200		
39	Compression terminal lug for 240mm2 conductor, Al/Cu with 13mm hole	Pcs	300		
40	Copper Earth Rod 1,5 m Long, 16mm Diameter	Pcs	500		
41	Porcelain Reel Insulator for permanent fences for LV networks	Pcs	5,000		
Total Excluding VAT (NIS)					

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LOT 4: Wooden Poles

No.	Item	Unit	Qty	Unit Price	Total Price
1	Wood poles, 10 m, top diam. 150-170 mm, impregnated	Each	500		
2	Wood poles, 8.5 m, top diam. 140-150 mm, impregnated	Each	4,000		
Total Excluding VAT (NIS)					

LOT 5: Steel Poles and Arms

No.	Item	Unit	QTY	Unit Price	Total Price
1	Lattice Steel Pole (L.S.P.) (70/80) 12 m (K2102)	Pcs	25		
2	Steel base for (L.S.P) (70/80) 2.25m long (L110A)	Pcs	25		
3	Arm for switch or cable (K1555)	Set	35		
4	Tension & Suspenion (L.S.P.)Side Arm (K) 2.85m, 75cm below top of the pole	Pcs	10		
5	Tension & Suspenion (L.S.P.)Side Arm (K63)	Pcs	20		
6	Lattice Arm for transformer (K183)	Set	20		
7	Anti -Climbing Steel Bars for L.S.P. (K113/8) with fixing screws	Set	60		
Total Excluding VAT (NIS)					

LOT 6: Pillars

No.	Item	Unit	Qty	Unit Price	Total
1	Pillar for 250 A	Each	15		
2	Pillar for 400 A	Each	10		
3	Pillar (35x45x20) cm3	Each	750		
4	Pillar (65x45x20) cm3	Each	550		
Total Excluding VAT (NIS)					

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Tender (SELCo 04/2020)
Technical Specifications

LOT 1: Cables and Conductors:

1. ACSR "Coyote" conductor

Standards

Aluminum clad steel reinforced aluminum conductor (ACSR/AW) aluminum alloy conductor (AA) and copper conductors shall comply with IEC standards or such other equivalent recognized national standard which the Bidder shall define.

Manufacture of ACSR and Aluminum Conductor

The manufacture of the ACSR/AW and AA conductor shall be carried out in a portion of the works specially set aside for such purposes. Precautions shall be taken during the manufacture and storage of ACSR conductor to prevent the possibility of contamination by copper or other materials that may adversely affect the aluminum. In the event of any machinery used for conductor manufacture being used for materials other than aluminum or steel strand the Supplier shall furnish the Purchaser with a certificate that the machinery has been thoroughly cleaned before use on aluminum or steel wire and the conductor supplied under this Contract is free from contamination.

The aluminum shall be of the highest purity commercially obtainable and the Supplier shall submit certificates of analyses giving the percentage and nature of any impurities in the metal of which the aluminum wires are made.

There shall be no joints in steel wires forming the core of composite conductors, excepting those made in the base rod or wire before drawing, unless the core consists of seven or more wires. In the latter case joints in individual wires are permitted, additionally to those made in the base rod or wire before drawing, but no two joints shall be less than 15 m apart in the complete steel core.

The steel strands shall be performed so that they remain inert and do not move relative to each

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other when the conductor is cut.

The steel core wires shall be uniformly covered with approved grease. In addition the inner aluminum wires shall be similarly treated. The grease shall fill all internal spaces except that excess grease shall be removed from the conductor before the application of the final layer of wires.

The outermost layer of all conductors shall be stranded with the right-hand lay.

Mechanical Properties

Steel Core

The steel core shall be comprised of stranded aluminum covered steel wire in accordance with ASTM B-416, Concentric-Lay-Stranded Aluminum-Clad Steel Conductors. The covering on each individual wire shall achieve a continuous dependable weld with the steel core and shall provide a uniform guaranteed minimum thickness of aluminum of 10 percent of the wire radius. The zone of diffusion shall be clearly defined.

Grease

The grease to be used in the conductor shall be chemically inert, shall not flow within nor exude from the conductor when at a temperature of 90ºC nor shall its characteristics be impaired after heating to 20ºC above its drop point for 150 hours. The grease shall be suitable for service temperatures in the range -10ºC to +75ºC. The suitability of the grease shall have been proven by tests acceptable to the Purchaser.

Conductor Characteristics

The conductors shall have the mechanical and physical properties approximating to the details given in this technical specification. The actual characteristics are to be set out in the Technical Schedules.

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No	Particulars	Unit	"Coyote" Required Specifications
1.	Reference Manufacturing Standards		British Sizes : BS 215 Part 2
2.	Max. Service Voltage (Um)	kV	36
3.	Conductor Material		Aluminium Conductor Steel Reinforced - (ACSR)
4.	Steel Core Construction		Stranded Galvanized Steel Wires
5.	Conductor Construction		Stranded Hard-drawn Aluminium Wires
6.	Cross section (Total)	mm2	151.8
7.	Cross section (AL)	mm2	131.7
8.	Cross section (Steel)	mm2	20.1
9.	Overall diameter of cond.	mm	15.9
10.	Overall diameter of core	mm	5.73
11.	AL stranded wire Diameter	mm	26X2.54
12.	Steel stranded wire Diameter	mm	7X1.91
13.	Theoretical linear weight without grease	Kg/Km	520.7
14.	Max. Conductor DC Resistance at 20 °C	Ω/km	0.2192
15.	Breaking Strength	KN	45.86
16.	Drum Material	M	Wood
17.	Wire Length on Drum	M	2000

2. Aerial Bundle Cables (ABC Cables)

General

The Aerial Bundle Cable shall be 600/1000 V grade cross-link polyethylene and shall be of the types and construction stated in the Schedules. All cables shall be manufactured and tested to the CENELEC HD 626. Cables shall be designed for a maximum continuous conductor temperature of 90 C^o, and for operation on a system with the neutral solidly earthed.

The cable shall be of self supporting type where all conductors share the load; i.e. no messenger wire or reinforced neutral conductor shall be used alone for suspension of the cable.

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Conductors

The conductors shall be hard drawn stranded aluminum and shall comply with all the requirements of IEC 60228.

Insulation

The materials used in the manufacture shall be black weather-resistant cross-linked polyethylene with a high resistance to ultra violet radiation. The insulation shall fit closely on but shall not adhere to the conductors.

Cable Identification

An approved method of identifying the manufacturer and year of manufacture shall be provided throughout the length of all cables. The cable shall be numbered longitudinally.

Core Identification

Identification of individual cores of the cable shall be by longitudinal ridges on the insulation and shall be provided throughout the length of all cables.

Testing

All cables, accessories and materials shall be subjected to and satisfactorily withstand the test requirements specified herein. All materials shall withstand such routine tests as are customary in the manufacture of the cables and accessories included in the Contract.

Sealing and Drumming

The cable shall be wound on to a strong non-returnable drum with enclosed flanges and barrel arranged to take a round spindle of a section adequate to support the loaded cable drum during installation and handling. The drum shall be lagged with strong closely fitting battens, which shall be securely fixed to prevent damage to the cable. Wooden drums shall be constructed of seasoned timber to prevent shrinkage of drums during shipment and subsequent storage on site. Each drum shall be clearly marked in a manner that cannot be obliterated with the particulars of the cable, including voltage, length, conductor size, number of cores gross and net weights, together with direction for rolling.

The ends of the cables shall be sealed by enclosing them in approved caps, tight fitting and adequately secured to prevent the ingress of moisture.

The end of the cable left projecting from the drum shall at all times be securely protected against damage.

<u>Each Drum shall contain 0.5 km quantity</u>

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3. 36kV, under-ground cable, single core 1x150mm2 Al (XLPE/LDPE)

The conductor shall be covered with:

- Conductors as to be with swelling powder to prevent axial ingress of water along the conductor
- An extruded semi-conducting layer
- A layer of dry vulcanized cross-linked polyethylene (XLPE) insulation
- An extruded vulcanized semi-conducting layer
- A layer of swelling tape to prevent axial ingress of water along the screen
- A layer of earthing screen of stranded copper, connection between copper and aluminum
- A layer of longitudinal aluminum to prevent water break-through
- A black outer LDPE (low density polyethylene) sheath that is laminated to the longitudinal aluminum, for water tightness and mechanical protection.

Rated Voltage	KV	18/30 (Um=36)
Nominal Cross-section	mm^2	150
Number of conductors	Nr	1
Material of conductor		Aluminum
Shape of conductor		Round stranded compacted class 2 to IEC 60226
Prevention of axial ingress of water along the conductor		By means of swelling powder
Type of conductor screen		Extruded firmly bonded semi-conducting layer
Type of insulation		Cross-linked polyethylene (XLPE)
Min. average thickness	mm	8.0
Type of insulation screen		Extruded firmly bonded semi-conducting layer
Prevention of axial ingress of water along the screen		By means of semi-conducting / swelling tape
Type of metallic screen		Copper wires applied helically
Prevention of water breaking through		By means of swelling powder between copper wires of metallic screen and aluminum copolymer coated tape over the metallic screen
Type pf outer sheath		Black LDPE
Nominal thickness	mm	2.5
Approx. outer diameter	mm	41.1
Approx. cable weight	Kg/Km	1790
Packing length in wooden drum	mt	1000
Min. bending radius during laying	mm	580
Max. DC resistance at 20°C	Ohm/km	0.206
Max. DC resistance at 90°C	Ohm/km	0.263
Reactance, 50 Hz (trefoil/flat)	Ohm/km	0.12
Cables specification		IEC 60502-2 % customer

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4. 600/1000 V Concentric cable 1x6+6 mm2 Cu/XLPE/Cu

Description	Unit	SIZE 1x6+6 mm^2
Conductor Nominal Area	mm^2	6
Conductor Material		Annealed Copper
Conductor Shape		Strand - Round
Conductor Stranding & Wire Diameter	No.xmm	7x1.06
Conductor Diameter	mm	3.18
Insulation Thickness XLPE	mm	1.0
Insulation Color		Red
Outer sheath color		Green
Core Diameter	mm	5.23
Concentric Layer :- Material Construction Diameter Over Concentric Layer	 No.xmm mm	 Cu Lapped Wire 22 x 0.6 6.43
Polyester Tape Thickness	mm	0.035
Sheath Thickness P. E.	mm	1.8
Over all Diameter Approx.	mm	10.13
Quantity per drum	Km	2

5. 600/1000V, underground cable 4X10, 4X16 and 4X25 mm2 Cu

Description/cable	4X10	4X16	4X25
Standard	IEC 60502/ BS 7889/ 97	IEC 60502/ BS 7889/ 97	IEC 60502/ BS 7889/ 97
Conductor material	Copper	Copper	Copper
Conductor flexibility	Stranded class 2	Stranded class 2	Stranded class 2
Insulation	XLPE	XLPE	XLPE
Sheath	Extruded PVC	Extruded PVC	Extruded PVC
Sheath color	Green	Green	Green
Lead free	Yes	Yes	Yes
Number of cores	4	4	4
Nominal sectional area of the core	10 mm2 7 wires	16 mm2 7 wires	25 mm2 7 wires
Nominal Insulated thick mm	0.7	0.7 mm	0.9 mm

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Nominal Sheath thick mm	1.8 mm	1.8 mm	1.8 mm
Cu Weight Approx.	363 Kg/Km	588 Kg/Km	960 Kg/Km
Cable Weight Approx.	695 Kg/Km	985 Kg/Km	1465 Kg/Km
Outdoor Diameter Approx.	18.5	22 mm	26 mm
Longitudinal Numbering	Each meter	Each meter	Each meter
Packing and Drumming	500m/drum	500m/drum	500m/drum

6. 600/1000V, underground cable 3X50+25, 3X70+35 mm2 Cu

Description/cable	3X50+25	3X70+35
Standard	IEC 60502/ BS 7889/ 97	IEC 60502/ BS 7889/ 97
Conductor material	Copper	Copper
Conductor flexibility	Stranded class 2	Stranded class 2
Insulation	XLPE	XLPE
Sheath	Extruded PVC	Extruded PVC
Sheath color	Green	Green
Lead free	Yes	Yes
Number of cores	4	4
Nominal sectional area of each core (phases)	50 mm2 19 wires	70 mm2 19 wires
Nominal sectional area of the core (Neutral)	25 mm2 7 wires	35 mm2 7 wires
Nominal Insulated thick mm	1 mm	1.1 mm
Nominal Sheath thick mm	1.8 mm	1.9 mm
Cu Weight Approx.	1600 Kg/Km	2104
Cable Weight Approx.	1975 Kg/Km	2718 Kg/Km
Outdoor Diameter Approx.	30.6 mm	35.6 mm
Longitudinal Numbering	Each meter	Each meter
Packing and Drumming	500m/drum	500m/drum

7. 600/1000 V Stranded Cu PVC covered (1x70),(1x95) mm2, Cu class 5

Description/cable	1X70	1X95
Conductor material	Copper	Copper
Conductor flexibility	Flexible Stranded class 5	Flexible Stranded class 5
Insulation	XLPE 0.8mm	XLPE 0.8mm
Outer Sheath	PVC 1.8mm	PVC 1.8mm
Sheath color	Brown	Yellow

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Lead free	Yes	Yes
Number of cores	1	1
Nominal sectional area	70 mm2	95 mm2
Construction of conductor	360 X 0.5	485 X 0.5
Nominal Insulated thick mm	1.4	1.6 mm
Cooper Weight	672 Kg/Km	912 Kg/Km
Approximate Net Weight	771 Kg/Km	1024 Kg/Km
Overall Diameter	15.6 mm	18.3 mm
Maximum DC Resistance at 20 C	0.272 ohm/km	0.206 ohm/km
Longitudinal Numbering	Each meter	Each meter
Packing and Drumming	100m/Roll	100m/Roll

8. 600/1000V, under-ground cable, 1x240mm2 XLPE Cu

Description/cable	1X240
Standard	IEC 60502/ BS 7889/ 97
Conductor material	Copper
Conductor flexibility	Stranded class 2
Insulation	XLPE
Sheath	Extruded PVC
Sheath color	Green
Lead free	Yes
Number of cores	1
Nominal sectional area of the core	240 mm2
Nominal Insulated thick mm	1.7 mm
Nominal Sheath thick mm	1.8 mm
Cu Weight	2327 Kg/Km
Cable Weight Approx.	2483 Kg/Km
Outdoor Diameter Approx.	30 mm
Longitudinal Numbering	Each meter
Packing and Drumming	500m/drum

9. Solid Copper Wire 6 mm2

Conductor material	Copper
Conductor flexibility	Solid Bars Class 1
Insulation	No Insulation
Nominal Diameter	6 mm
Packing	Pcs 3 meter each

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10. 600/1000V, Stranded Cu PVC covered 1x16 mm2, class 5

Conductor material	Copper
Conductor flexibility	Flexible Class 5
Insulation	PVC Insulation
Insulation thickness	1 mm
Nominal Diameter	16 mm2
Approx. overall diameter	7.2 mm
Colour	(QTY: 50% brown, 50% blue)
Packing	100 meter each Roll

11. 600/1000V, under-ground cable, 3X1.5 mm2 Cu

Description/cable	3X1.5
Standard	IEC 60502/ BS 7889/ 97
Conductor material	Copper
Conductor flexibility	Stranded class 1
Insulation	XLPE
Sheath	Extruded PVC
Sheath color	Green
Lead free	Yes
Number of cores	3
Nominal sectional area of the core	1.5 mm2
Nominal Insulated thick mm	0.7 mm
Nominal Sheath thick mm	1.8 mm
Cu Weight	43 Kg/Km
Cable Weight Approx.	154 Kg/Km
Outdoor Diameter Approx.	10.2 mm
Longitudinal Numbering	Each meter
Packing and Drumming	500m/drum

12. Solid copper wire 1.5 mm2, yellow/green

Conductor material	Copper
Conductor flexibility	Solid class 1
Insulation	PVC
Sheath color	Green / Yellow
Number of cores	1
Nominal sectional area	1.5 mm2
Nominal Insulated thick mm	0.7 mm
Weight Kg/km	20 Kg/Km
Overall Diameter	3 mm
Packing and Drumming	100m/roll

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13. Stay wire, Nominal area 52 mm2, Calculated diameter 8 mm

The stay wires shall be hot dip zinc-coated and manufactured from steel. They shall be in accordance with internationally recognized Standard. Such information shall be submitted with the Bid.
The wire shall have the following dimensions and strength:

Calculated approximate diameter	8.0 mm
Cross sectional area	52 mm2
Class	6X7
Rated breaking strength	70 kN
Number of strands	6X7
Approximate Mass	237 kg/km
Packing and Drumming	500 m/drum

LOT 2: Transormers and Switches

1. Distribution Transformers:

General

This specification covers the manufacture; testing, supply and delivery of distribution transformers and spares.

General Design

The transformers shall be of the mineral oil immersed core suitable for outdoor as well as indoor use with Oil Natural Air Natural (ONAN) cooling.

The transformers shall be designed to deliver full rated power continuously on any tapping within the specified tapping range under the following conditions:-

i) With the voltage of the untapped winding at rated value, without the need to de-rate the transformer at the extreme tap positions and without exceeding IEC temperature limits.

ii) Shall withstand up to 10% over-voltage With voltage without injurious overheating.

The transformers shall be connected in accordance with IEC 60076 or equivalent : three phase transformers to Vector Group reference Dyn 11.

The L.V. neutral shall be brought out of the tank to a readily accessible terminal and shall not be earthed inside the tank.

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The transformers on a particular contract with similar voltage ratios and connections shall be suitable for parallel operations on all relevant taps under which conditions they should share the load in proportion to their ratings subject to the tolerances on impedance laid down in IEC 60076.

Low impedance transformer are preferred, a maximum of 4.5% being envisaged on any size with no plus tolerance.
Earth studs are required at both the H.V. and the L.V. ends of transformer.

Minimum creepage distance of HV insulator is 1100 mm.
Cu flags with bolts and washers at LV bushings
Maximum working noise level is 65 DB.

Windings

Tappings shall be provided in the H.V. windings, preferably in the electrical centre of the windings, to permit variation of the number of H.V. turns without significant variation in the kVA rating. The variations shall be effected by means of a manually operated tapping switch to be provided.

All windings and terminations shall be fully insulated and those for service above 1000 volts shall be designed for impulse voltage tests.

Designs shall be such that electrical stresses are as uniform as possible throughout the windings under impulse conditions.

Windings shall be vacuum impregnated and insulating materials shall not be liable to soften, shrink, become brittle, carbonize, deteriorate, or collapse in any way during service.

Primary copper winding and cooper foil secondary winding

Cores

The magnetic circuit shall be earthed to the core clamping structure, at one point only, and the core assembly to the tank. Where transformers are not sealed, readily accessible removable bolted links shall be employed for the earthing connections.

The general construction of the cores, framework and the clamping arrangements shall be robust and such that they will be capable of withstanding completely any stresses which may occur due to handling, transport or service. All cores and yokes shall be terminated and clamped by means of a suitable framework. Suitable means shall be provided for lifting the cores from the tanks.

It shall not be possible for the core to move relative to the tank during handling or transport.

Particular attention shall be paid to maintaining low core loss consistent with sound design using low loss grain oriented steel of best quality.

Tapping Switches

The transformer shall be provided with approved off-circuit type tap changing equipment.
A fully insulated off-circuit, externally manually19/61operated ganged tapping switch shall be

supplied, capable of withstanding the specified impulse voltage when connected to the transformer windings.

Clearly visible tap position indication shall be provided. The tapping switch shall be operated by means of an external handle that can be positively located and locked in each operating position.

The switch shall be mechanically robust and provided with a device between the handle and the switch to permit operation without strain in the event of imperfect alignment between switch and handle; the switch operating shaft shall be fully insulated as between tank and switch and shall be provided with a suitable oil and vacuum tight gland where it passes through the tank.

The use of wood shall be avoided wherever possible and all the supports and terminal boards shall be completely unaffected by hot oil and non-moisture absorbent.

High grade insulating materials shall be used in the construction of tapping switches which shall be designed with special attention to the elimination of points where tracking is likely to occur.

Tapping switches shall be mounted on supports made of suitable high strength insulating material and shall be provided with self-aligning spring loaded wiping contacts capable of maintaining good electrical contact without the need for periodic maintenance.

All clearances between tapping switch contacts and leads shall be indicated on drawings submitted at the time of tendering and such clearances shall be sufficient to prevent tracking or flashover in the event of carbon or sludge deposits forming on leakage paths.

H.V. tappings: Minus 7.5% : Minus 5% : Minus 2.5% : 0% : plus 2.5% : Plus 5% : Plus 7.5%.

Bushings

All line terminals and neutral connections where specified, shall be brought out to porcelain outdoor type terminal bushings located on the top cover. Arcing horns shall be fitted on all transformer bushings. The arcing horn flash over distances shall be adjustable and set to 130-140 mm for 33kV phase to phase voltages. Cu connectors for incoming conductors shall be fitted on HV insulators.

Tanks and Conservators

General

Drain valves may be either screwed or flanged whilst conservator isolating valves shall be flanged.
Drain valves shall be complete with captive plugs that shall be either of non-ferrous metal or galvanized.
All internal steel surfaces or tanks and conservators shall be shot blasted and cleaned, and a coat of protecting compound, unaffected by hot oil, should be applied.
All external surfaces and parts made of steel are to be thoroughly shot blasted and cleaned, after which two coats of priming paint, preferably of zinc chromate, one intermediate coat and one coat of finishing paint are to be applied.
Transformers on which the paints are found to flake off or deteriorate within the guaranteed period shall be suitably cleaned and repainted free of charge by the supplier.

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Tanks

Each transformer shall be housed in a tank of welded steel plate construction suitably stiffened where necessary but with a flat base. Wheels or rollers are not required.
Each tank shall be provided with the accessories specified Table 1, the lifting lugs called for shall be suitable for lifting the transformer bodily by means of a hoist or crane when it is completely assembled and ready for service.
All transformers shall be provided with four fixing lugs on the base drilled with 15 mm holes for bolting to a platform. The fixing holes shall project beyond the ends of the tank and be placed to provide the most practical stable arrangement.
No radiators or tube coolers shall be used. Ribbed tanks may be supplied in order to achieve the necessary cooling under the conditions prevailing at site.

Conservators

Conservators shall be of dimensions such that oil expansion may occur over the working range temperature from no load with the transformer cold at minus 10ºC ambient air temperature to full load at plus 45ºC ambient air temperature while the sump pipe remains covered and the oil level is visible or indicated.

The fittings detailed in Table 1, shall be provided on all transformer conservators.

Drain plugs shall preferably incorporate approved sampling facilities, and shall be mounted at the lowest part of the conservator tank and so designed that the sampling device can be readily cleared in the event of its being blocked by an accumulation of sludge etc., without the necessity of having to dismantle the device completely.

Oil level gauges on conservator tanks shall be of the refracting plate glass or other approved type, marked wit the level at 20ºC at no-load and capable of indicating the level of oil over the specified working range.

Where dehydrating breathers are specified they shall be of the Silica gel type, which give indication of moisture absorption by change in color of the charge. The Silica Gel housing shall be of the type, which provides full visibility for inspection of the silica gel and shall be mounted in a position convenient for inspection and replacement of the silica gel. The breather is to incorporate an oil seal to prevent contact with the external air when breathing is not taking place. The breather to be fitted on the L.V. end of the transformer.
Where only a vent pipe without a breather and incorporating a filling hole is specified, it shall preferably be fitted with a cap and provided with very fine mesh non-corrodible anti-vermin gauze.

Accessories and Fittings

All transformers shall be provided with accessories and fittings in accordance with Table 1, unless otherwise specified in the enquiry.

Rating and diagram plates shall be of engraved steel, brass or other approved non-corrodible material.

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Where a thermometer pocket is provided, it shall be of a thin walled metal mounted in the tank cover.

The pocket shall project 25mm outside of the tank and shall be threaded along the whole projecting portion, a screwed cap shall be provided to cover the pocket when not in use.

When required lightning arresters equipped with galvanized brackets suitable for bolting to a vertical surface shall be mounted directly on to the transformer tank. The mounting surface shall be such that the centre lines of the arresters are parallel with the centre lines of the associated bushings, and at the same spacing as the bushings.

Table 1: ACCESSORIES AND FITTINGS FOR DISTRIBUTION TRANSFORMERS

Requirements for tank conservator of distribution transformer
Transformer Tank Fittings 1. Lifting lugs 2. Rating and diagram plate 3. Platform mounting lugs 4. Earthing Terminal 5. Lightning arrester brackets (Arcing Horns) 6. Lashing down facilities 7. Thermo meter with indicator. 8. Pressure relief valve
Conservator Fittings 1. Drain plug 2. Sampler 3. Separate filling hole with cap. 4. Dehydrating breather 6. Oil gauge 7. Silica gel can.

Insulating Oil

The transformer shall be filled with low viscosity mineral insulating oil, which complies in every respect with the provision of IEC 60296.

Tests

The following tests shall be carried out:

a) Routine covering test certificates shall be submitted, immediately after completion of tests in the factory, for each and every transformer. Guarantee certificates for losses for each rating and each primary voltage shall be submitted.

b) As a type test, temperature rises test on each different rating of transformer.

c) As a special test, an impulse voltage withstands test including chopped waves on each different rating of transformer.

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Note: If tests to b) and c) above have been carried out satisfactory on designs identical in all essential details, these tests may be waived on the production of acceptable covering test certificates.

Packing and Transport

Transformer shall be transported to destination with their tanks full of oil up to the service level.

Bushings and any accessories or fittings likely to be damaged shall be protected adequately against damage in transit.

Drawings and Diagrams

The following drawings shall be supplied with the bid:

General arrangement drawing of each rating of transformer offered showing:-

i) Minimum clearance (phase to phase and phase to earth) on H.V. and L.V. bushings including clearance H.V. to L.V.

ii) Positions and identification in a separate legend of all fittings with type numbers. iii), Size and position of all fixing holes.

iv) Total weights with and without oil and core lifting height and weight.

Detail dimensioned drawings of tapping switch illustrating type of material, clearances, between tapping points and to earth and method of operation.

Detailed dimensioned drawing of bushings, silica gel or plain oil seal type breather, and conservator.

The transformer skid base shall be suitable for installation on outdoor poles. The skid base diagram shall be submitted with the tender.

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General Technical Specifications of Distribution Transformers should be filled and attached with the offer:

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	Particulars	Unit	Guaranteed Values 33/0.4 kv	Guaranteed Values 33/0.4 kv
	Nominal rated power	**kVA**	**400 KVA**	**630 KVA**
a.1	Continuous Maximum Rating (C.M.R)	kVA		
a.2	Vector Group		DYN11	
a.3	Normal voltage between phases at no load			
	a) H.V.	Volts		
	b) L.V.	Volts		
a.4	Tappings			
	a) Plus (3x2.5%)	%/nos		
	b) Minus (3x2.5%)	%/nos		
a.5	Losses			
	a) No load loss at normal primary voltage (no tolerances on high side)	watts		
	b) No load loss at 10% primary over voltage(no tolerances on high side)	watts		
	c) Load loss at C.M.R. (no tolerances on high side)	watts		
a.6	Impedance volts at C.M.R. and normal ratio	%		
a.7	Regulation			
	-Regulation at C.M.R. and unity power factor	%		
	-Regulation at C.M.R. and 0.8 power factor	%		
a.8	Max temperature rise at C.M.R.:			
	i) Top oil by thermometer	^{o}C		
	ii) Average winding by resistance			
	iii) "Hot Spot" corresponding to (ii)			
a.9	Type of insulation used on windings			
	a) H.V.			
	b) L.V.			

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	Particulars	Unit	Guaranteed Values 33/0.4 kv	Guaranteed Values 33/0.4 kv
	Nominal rated power	**kVA**	**400 KVA**	**630 KVA**
a.10	Lightning Impulse Insulation level of:			
	a) H.V. winding	kVpk		
	b) L.V. winding	kVpk		
	c) Tap change equipment and connections			
	i) To earth	kVpk		
	ii) Between contacts	kVpk		
a.11	Are test certificates supplied supporting the level stated in Clause 11	Yes/No		
a.12	Max. core flux density at normal voltage and frequency at normal ratio	T		
a.13	Type of winding (i.e. Cu or Al, foil or layer)			
	(a) HV winding			
	(b) LV winding			
a.14	Rated Insulation Level			
	(a) 1.2/50 s wave	KV (peak)		
	(b) Power frequency withstand voltage	kV		
	Bushing:			
a.15	Principal insulation Material			
a.16	Indoor/outdoor			
a.17	Total external creepage distance	1100mm		
a.18	Protected creepage distance			
a.19	Clearance in air between phases			
a.20	Clearance in air between line metal and earth			
a.21	Bolt type for indoor			
a.22	Rated Insulation Level			
	(a) 1.2/50 s wave	KV (peak)		
	(b) Power frequency withstand voltage dry	kV		
	(c) Power frequency withstand voltage wet	kV		

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	Particulars	Unit	Guaranteed Values 33/0.4 kv	Guaranteed Values 33/0.4 kv
	Nominal rated power	**kVA**	**400 KVA**	**630 KVA**
b1.	Transformer type (breathing)			
b2.	Type of windings			
	HV			
	LV			
b3.	Type of insulation			
	HV winding			
	LV winding			
b4.	Type of tap changer			
b5.	Tap changer designation			
b6.	Type of axial coil supports			
	HV winding			
	LV winding			
b7.	Winding conductor material			
	HV winding			
	LV winding			
b8.	Core laminations designation	-		
b9.	Specific core loss	w/cm^3		
b10.	Type of bushings			
	HV			
	LV			
b14.	Total oil quantity	kg		
b15.	Total weight	kg		
b17.	Overall dimensions			
	Length	mm		
	Width	mm		
	Height	mm		
b18.	State all standards applied underneath:			
b19.	State identity of manufacturer underneath:			
	Transformer			
	Tap Changer			
	Bushings			

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2. Switch-Disconnecters 33 kV with load breaking head, 3-phase, complete

Item	Particulars	Unit	Required Specifications
1	Rated Voltage		33
2	Maximum Service Voltage	KV	36
3	Rated Frequency	Hz	50
4	Rated continuous current by 45 oC ambient temperature	A	630
5	Breaking Capacity	A	200
6	Rated shortcircuit current 1 sec.	kA	16
7	Impulse withstand voltage (a) To earth (b) Across the isolating distance	 KV KV	 170 195
8	Maximum temperature rise over current carrying parts	oC	90
9	Creepage distance across Polymeric insulator	mm	1050
10	Maximum bending torque at base of support insulator	KN	4
11	Equipped with Top and side mounting accessories including manual handle and 12 meter 1 inch steel pipe	Yes/No	Yes
12	3 separate, single pole	Yes/No	Yes
13	Arch champer	Yes/No	Yes

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LOT 3: Accessories

1. Polymeric tension insulator 36 kV-1170 mm creepage distance

No.	Particular	Unit	Required Specifications
1	Voltage	kV	36
2	Insulation Material		Polymeric
3	Total length	mm	456 mín
4	Max. working load	kN	70
5	Breaking load	kN	70
6	Minimum Creepage distance	mm	1170
7	Power Freq/Impulse withstand voltage	kV/kV	170
	(a) Dry	kV	150
	(b) wet	kV	120

2. Lightning Arresters 36kV,set of three phases

Design

This section covers the design, manufacture and testing of lightning arresters for outdoor service.

The arresters shall be capable of protecting the following equipment:

- Transformers which are directly connected to a line
- Transformers which are connected to a line via cables
- Capacitors
- Cables
- Autoreclosers and sectionalisers
- Circuit breakers and isolators
- Instrument transformers

The outdoor lightning arresters shall be of the metal oxide gap-less type, complying with IEC 60099-4.

The lightning arresters shall have the following characteristics:

Description	**Unit**	**Nominal voltage level**
Rated voltage of arrester	KV	39
Nominal discharge current (8.20 μs)	KA	10
Class Distribution Min. protective ratio		1.2

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The arresters shall be designed horizontally or vertically (standing or hanging) in standard lattice towers. The arresters shall be supplied complete with fixing materials and connection clamps.

The lightning arresters shall be fitted with a pressure relief device.

All arresters shall be fitted with incorrodible metal nameplates which are visible when the arrester is completely mounted and which clearly indicate the data specified in IEC in engraved or embossed characters.

All external ferrous parts shall be hot-dip galvanised.

Protection Characteristics

This is a combination of the following:

- Maximum residual voltage for steep current impulse (1/20 μs)
- Maximum residual voltage for current impulses with waveform (8/20 μs) and 0.5, 1.0 and 2.0 times nominal current
- Maximum residual voltage for switching impulse (30-100/60-200 μs)

The protection level for lightening impulse is the highest of

- maximum residual voltage for steep current impulse divided by 1.15
- maximum residual voltage at nominal current and 8/20 μs

The protection level for switching impulse is the maximum residual voltage at the specified switching impulse current.

The protection level shall have at least a margin of safety of 30 % compared to the BIL of the arrester housing.

Energy Requirements

The lightning arresters shall be designed to minimum line discharge class 2 according to IEC 99-4 for heavy duty arresters.

Housing

The outer housing shall be of a silicone rubber material offering high resistance to pollution. The specific creepage distance for any arrester shall not be less than 31 mm/kV system voltage, corresponding to heavy pollution according to IEC.

Tests

Lightning arresters offered or supplied to this specification shall comply with the tests detailed in IEC 99-4 including wet tests and any additional tests specified. Tests shall include requirements set out in the following:

Certified copies of type test reports shall be submitted with the bid and shall include calibrated oscillogram demonstrating that each type of arrester offered complies with the minimum specified requirements. The catalogue numbers applicable to each arrester shall appear on the

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oscillogram. The time to spark-over applicable to each test involving spark-over of the series gap shall be clearly shown.

Bidder should state what routine tests are carried out to prove the effectiveness of the seals of the arresters.

Bidder should state what tests are carried out to prove the capabilities of the arresters to withstand the effects of a multiple lightning strike.

3. Straight joint for 42kV, under-ground cable, single core (35-150)mm2 Al (XLPE/PVC) (hot shrink) & Outdoor termination kit for 42kV, under-ground cable, single core 1x95-150mm2 Al (XLPE/PVC) (Set of 3 phases) (hot shrink)

The Tender shall submit with his Tender drawings showing the types of terminations and joints proposed for the cable.
The joints shall include the suitable sleeves for connecting the cable conductors.

The joints shall be of a watertight, "pull-over" heat shrink type (Raychem or similar) without molding, free from sharp points or ridges, thoroughly clean internally and externally. The sleeves shall be of sufficient diameter and length to permit color-to-color jointing without undue bending, handling or deformation of the cores.

Terminations

Detailed drawings showing the types of cable sealing ends, terminal boxes and glands and overhead line terminations shall be submitted to the Purchaser for approval.
Stress cones or other approved means shall be provided for grading the voltage stress on the core insulation of screened cables.

Terminations for Medium Voltage cable shall be of an appropriate heat shrink design (Raychem or similar) incorporating a suitable arrangement of stress control, and rain-sheds for outdoor use

Termination kits shall include suitable heat shrink tubing to effectively shroud, seal and insulate the exposed cable conductor and connector.

Terminations into cable boxes shall include brass compression glands and back nuts of the correct size, which shall secure the cable outer sheath and ensure effective electrical continuity between the cable armoring wires and the metal enclosures on which the cable is terminated. At all rising terminations the cable inner sheath shall pass through the gland to terminate not less than 6 mm above the gland.

Provision shall be made for earthing all sealing end base plates, cable boxes, glands and armor clamps.

Instructions

As soon as possible after the commencement of a contract and before materials are dispatched, copies of the jointing and termination instructions applicable to the joints and terminations to be supplied shall be submitted in English to the Purchaser for approval, together with details of the physical and electrical characteristics of the filling medium proposed.

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Materials

Sets of jointing materials for terminating cables shall be complete with all miscellaneous jointing materials to complete the termination. One set of materials shall be sufficient for terminating one end of the cable or cables specified into one joint box. Each set of jointing materials shall be packed as one complete self-contained unit package.

Heat Shrink Materials

Heat shrink tubing and molded parts shall be flexible, flame retardant, polyolefin-based material of electrical insulating quality, and shall be obtained from an approved manufacturer. They shall be suitable for outdoor use in the conditions prevailing on site.

Each part shall bear the manufacturer's mark, part number and any other necessary markings to ensure correct identification for use on the correct size and type of cable. Each set of parts shall be packed as one unit with full and complete installation instructions and clearly marked to show the application.

The material shall reduce to the predetermined size and shape when heated above 120C°. The components shall also be provided with an internal coating of hot melt adhesive compound that shall not flow or exude at temperature below 85 C°. All parts and materials shall be tested to a program of tests to be agreed with the manufacturer.

4. Straight joint for 42kV, under-ground cable, single core (35-150)mm2 Al (XLPE/PVC) (cold shrink)

The application range shall include 95mm2 and 150mm2 cables.
The kit shall include all accessories and components needed for the installation including mechanical components, connectors and sleeves.
The kit shall be reliable, fast and easy to install and maintain high network reliability.
The joint shall include outer protection system to mechanical impact.
The joint shall be suitable for cable during shot circuit and the high temperature impact.
The joint sleeves shall be combined with a high performance sealant forms a reliable moisture seal and corrosion protection.

5. Outdoor termination kit for 42kV, under-ground cable, single core 1x95-150 mm2 Al (XLPE/PVC) (Set of 3 phases) (cold shrink)

The application range shall include 95mm2 and 150mm2 cables.
The termination shall be for outdoor installation.
The kit shall include all accessories and components needed for the installation including mechanical components, connectors and lugs.
It shall be made from a high performance, liquid silicon material specially formulated for tracking and split resistance.
Moisture sealing at the lug is integrated into the termination body eliminating the need for additional sealing tapes.
The kit shall be reliable, fast and easy to install.
Outstanding weathering, UV and Ozone resistance.

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Resistant to chemicals and fungi.
Excellent electrical properties, including good tracking resistance and high dielectric strength.
The kit shall be hydrophobic, non-flammable self-extinguishing.
Retain performance over wide temperature range -45 to +150 ℃.

6. Warning plates for buried cables

Plastic warning plates 30X100 cm2
Printing permanent warnings from electricity danger of buried cable

7. Double -Walled corrugated pipe 3 and 6 inch

The corrugated outer layer provides for mechanical strength combined with flexibility.
Very smooth inner layer to allow easy drawing with cable.
Manufactured from high impact strength HDPE in accordance EN50086-2-4.
Light flexible pipe intended for subsoil installation.
Resistant to high and low temperatures, acids, fuel, and various chemicals and possesses high electrical installing strength.
Low weight to carry, store and easy installation.

8. BBI4 box (250x350x150)mm

The required box shall be made of Acrylonitrile Butadiene Styrene with polycarbonate cover, plastic mounting base plate and circuit breaker holder attached with Din rail is required with the box. The base / cover attaching screws shall be suitable to be sealed by the technicians.

Specifications:

Cover	Transparent
Base	Gray
Dimensions (W x L x H)	250x350x150 mm3
Min. IP	65
Cover / base attachment	Screw type
Mounting plate	Required
CB window	Open
Prepayment meter	Open (dimensions will be submitted later)

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9. BBI46 box (350x495x150)mm

The required box shall be made of Acrylonitrile Butadiene Styrene with polycarbonate cover, the base / cover attaching screws shall be suitable to be sealed by the technicians.

Specifications:

Cover	Transparent
Base	Gray
Dimensions (W x L x H)	350x495x150 mm^3
Min. IP	65
Cover / base attachment	Screw type
CB window	Closed
Prepayment meter card & bush button	Closed
Mounting plate	Required
CB Holder	Not Required

10. MCCB (40A, 100A, 250A, 400A and 630A)

3 poles Molded Case Circuit Breakers
All MCCBs shall confirm to relevant standards IEC-60947-1& 2/IS-13947-1& 2.
80% - 100% adjustable overload
Adjustable short circuit setting.
Thermal-Magnetic protection

Minimum Current breaking capacity for each breaker as indicated in BOQ
Handle positions ON/OFF/TRIPPED

The MCCB comprises of switching mechanism, contact system, arc extinguishing device and tripping unit all contained in a compact Molded Case and Cover.
The insulating case and cover are made of high strength, heat resistant, flame retardant resin bonded thermo setting material which provides:-

- Interphase insulation of a high dielectric strength, making the MCCB considerably compact and light weight.
- The insulated enclosure with high withstand capacity against thermal and mechanical stresses.
- Protection against secondary fire hazards.
- Increased safety of operating personnel.

Standard conformity : IEC 60947-1& 2/IS:13947-1 & 2
Rated Operational Voltage : 415V AC
Rated Insulation Voltage : 690V AC
Type of release : Theromagnetic
Utilisation category : A
Rated Frequency : 50/60Hz
Ambient temp. : 40 C^o
Operating altitude : 2000 meters
Humidity : 0 - 90%
Rated Impulse Voltage : 8 KV

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Manufacturer catalogue shall be submitted with the tender for the offered items
Not box terminal
Ready to be connected using cable shoes

11. MCB 2x(32A & 40A)

Miniature Circuit Breaker
2 Poles (phase + neutral)
Circuit breaker shall confirm to relevant IEC standards
Rating current 32,40A
Current breaking capacity is 6KA
Handle positions ON/OFF
Clip on DIN rail 35 mm.

12. Heat shrinkable medium wall insulating tubing

low voltage tubes are installed for the insulation for sealing the crutches of plastic, paper and rubber insulated cables up to 1kV.

Specification:
Made from semi-rigid cross-linked halogen free polyolefin,
Offer resistance to abrasion, weathering, and atmospheric pollution
Resistant to corrosion and decay
Waterproof
IP68
Inner adhesive wall
UV Resistant

13. Heat shrinkable breakouts for power cables

low voltage breakouts (cable gloves) are installed for the insulation for sealing the crutches of plastic, paper and rubber insulated cables up to 1kV.

Specification:
For sealing and insulating multi-core cables
Made from semi-rigid cross-linked halogen free polyolefin,
Offer resistance to abrasion, weathering, and atmospheric pollution
Resistant to corrosion and decay

Waterproof
IP68
Inner adhesive wall
UV Resistant
Sealant lined

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14. ABC Suspension Clamp for 4x50+2x25 mm2 Al

Suspension clamp for all cable conductors
Suitable for cable Range 4x25 – 4x50+2x25 mm2
Used with M16 pigtail bolt
Metal parts Consist of hot dip galvanized steel and zinc-plating
Rubber insert part and weather resistant bushing.

15. ABC Suspension Clamp for 4x95+2x25 mm2 Al

Suspension clamp for all cable conductors
Suitable for cable Range 4x70+2x25 – 4x95+2x25 mm2
Used with M16 pigtail bolt
Metal parts Consist of hot dip galvanized steel and zinc-plating
Rubber insert part and weather resistant bushing.

16. Tension anchor for ABC cable 4x(25-50) mm2 Al

Anchoring clamp suitable for 4 conductors
Suitable for cable Range 4x25 – 4x50 mm2
Rupture: 3000 kg
Used with M16 pigtail bolt
Metal parts Consist of hot dip galvanized steel and zinc-plating
Rubber insert part and weather resistant bushing.
Complies with standard VDE 0211

17. Tension anchor for ABC cable 4x(70-95) mm2 Al

Anchoring clamp suitable for 4 conductors
Suitable for cable Range 4x70 – 4x95 mm2
Rupture: 4000 kg
Used with M16 pigtail bolt
Metal parts Consist of hot dip galvanized steel and zinc-plating
Rubber insert part and weather resistant bushing.
Complies with standard VDE 0211

18. Insulated self-piercing Tap connectors for ABC

These shall be manufactured and designed so as to provide facilities for taking services from the conductor run. These should also be suitable for aluminum to aluminum or aluminum to copper connection. These shall be fully insulated piercing clamps. All clamps shall be equipped with torque controlled bolts.

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19. Al parallel groove connecting clamp 35-185mm

For tap-off connection of AL-Alloy conductors Acc. to DIN 48201 and ACSR conductors acc. to DIN 48204

Al cross sectional area:	35-185 mm2
ACSR Cross sectional area:	35/6 - 150/25 mm2
Conductor diameter:	7.5-17.5 mm
Bolts:	2 x M10 X 60
Body:	High strength corrosion resistant Aluminum Alloy
Bolts:	DIN 933, steel 8.8, hot-dip galvanized
Pressure Pad:	AL-Alloy
Spring Washers:	DIN 127, steel, hot-dip galvanized
Conical washers (Acc. to order):	DIN 6796, corrosion-protected

20. Al/Cu parallel groove connecting clamp (10-50/35-120)mm

For connection of Al conductors acc. to DIN 48201 ACSR conductors acc. to DIN 48204 with copper tap-off conductors acc. to DIN 48201

Al conductor cross section:	35-120 mm2
ACSR conductor cross section:	35/6 - 95/15 mm2
Cu conductor cross section:	10-50 mm2
Al conductor diameter:	7.5 - 14.0 mm
Cu conductor diameter:	3.5 - 9.0 mm
Bolts:	2 x M8 X 45

Body:
High strength corrosion resistant AL-Alloy with hot forged bimetallic sheet, for copper tap-off

Bolts:	Steel, 8.8, DIN 933 hot-dip galvanized
Nuts:	Steel, 8, DIN 934 hot-dip galvanized
Conical washers:	Acc. to DIN 6796 corrosion protected
Pressure pad:	AL-Alloy, with spring washers DIN 127 hot-dip galvanized

21. Al/Cu parallel groove connecting clamp (10-50/95-210)mm

For connection of Al conductors acc. to DIN 48201 ACSR conductors acc. to DIN 48204 with copper tap-off conductors acc. to DIN 48201

Al conductor cross section:	95-210 mm2
ACSR conductor cross section:	35/6 - 95/15 mm2
Cu conductor cross section:	10-50 mm2

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Al conductor diameter:	12.5-19 mm
Cu conductor diameter:	3.5 - 9.0 mm
Bolts:	2 x M8 X 45

Body:
High strength corrosion resistant AL-Alloy with hot forged bimetallic sheet, for copper tap-off

Bolts:	Steel, 8.8, DIN 933 hot-dip galvanized
Nuts:	Steel, 8, DIN 934 hot-dip galvanized
Conical washers:	Acc. to DIN 6796 corrosion protected
Pressure pad:	AL-Alloy, with spring washers DIN 127 hot-dip galvanized

22. Al/Cu parallel groove connecting clamp (6-50/16-70)mm

For connection of Al conductors acc. to DIN 48201 ACSR conductors acc. to DIN 48204 with copper tap-off conductors acc. to DIN 48201

Al conductor cross section:	16-70 mm2
ACSR conductor cross section:	16/2.5 - 70/12 mm2
Cu conductor cross section:	6-50 mm2
Al conductor diameter:	5.1 - 11.7 mm
Cu conductor diameter:	2.7 - 9.0mm
Bolts:	2 x M8 X 40

23. Compression terminal lug for 240mm2 conductor, Cu with 13mm hole

COPPER COMPRESSION CABLE LUGS
For the connection of Cu conductors to copper bus bars.
Materials: E-Cu, DIN 40500/3 F-25
Conductor Cross sectional area is 240 mm2
Conductor diameter is 20.2 mm
Crimping sleeve length is 40 mm
Bolt hole diameter is 13 mm

24. Compression terminal lug for 120mm2 conductor, Cu with 13mm hole

COPPER COMPRESSION CABLE LUGS
For the connection of Cu conductors to copper bus bars.
Materials: E-Cu, DIN 40500/3 F-25
Conductor Cross sectional area is 120 mm2
Conductor diameter is 14.0 mm
Crimping sleeve length is 40 mm
Bolt hole diameter is 13 mm

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25. Compression terminal lug for 95mm2 conductor, Cu with 13mm hole

COPPER COMPRESSION CABLE LUGS
For the connection of Cu conductors to copper bus bars.
Materials: E-Cu, DIN 40500/3 F-25
Conductor Cross sectional area is 95 mm2
Conductor diameter is 12.5 mm
Crimping sleeve length is 40 mm
Bolt hole diameter is 13 mm

26. Compression terminal lug for 150, 185 and 240 mm2 conductors, Al/Cu with 13mm hole

Aluminum Tin-Plated Compression Cable Lug

Materials: Al 99.5
Surface Tin-Plated, 20 micron

Conductor Cross sectional area (mm2)	150	185	240
Conductor diameter (mm)	15.7	17.5	20.2
Min Crimping sleeve length (mm)	55	55	55
Bolt hole diameter (mm)	13	13	13

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LOT 4: Wooden Poles

The wooden poles shall comply with the following min. specifications:

Sizes of poles		
Height	10m	8.5m
Standard	BS 1990	BS 1990
Top Min. Diameter	150-170 mm	140-150 mm
Average Top Diameter	160mm	145mm
Bottom diameter at 1.5m	200-220 mm	175-190 mm
Approx weight	232 kg	197 kg
Approx volume	0.31cbm	0.25cbm
Species	Pinus Silvestris	Pinus Silvestris
Origin of wood	Scandinavian	Scandinavian
Treatment	Celcure AC-800/Class A Tanalith E3475	Celcure AC800/Class A Tanalith E3475
Retention	12 kg per one cbm of sabwood	12 kg per one cbm of sabwood
Process of treatment	Ruping	Ruping
Packing	Bundles	Bundles

CERTIFIED TEST REPORT

The Supplier shall furnish a certified test report ,this report certify that all poles have been inspected and tested and that they meet the requirements of specifications .

It shall be the responsibility of the supplier to perform or to have performed the tests specified.

The poles shall be tested against the relevant minimum dimension and strength values as per this specifications and applicable standards .

Copies of previous test certificates and test reports by a third party testing laboratory accredited to ISO/IEC 17025 shall be submitted with the offer for evaluation .

A copy of the accreditation certificate for the testing laboratory shall also be submitted with the tender .

Copies of test reports to be submitted shall include the following tests :

1- Ultimate strength test
2-Preservation penetration test
3-Dimensions test .
4-Preservative retention test .
5-Knots test .
6-Splits and checks test .
7-Straightness test
8-General defects test .

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Routine test reports for the treated wooden poles shall be submitted to Selco for approval before shipment/delivery of the goods .

On receipt of the treated wooden poles , Selco will inspect them and may perform or have performed any of the relevant tests in order to verify compliance with the specifications .

The supplier replace/rectify wooden poles which upon examination,test or use fail to meet any of the requirements in this specifications .

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LOT 5: Steel Poles and Arms

PARTICULAR TECHNICAL SPECIFICATIONS

STEEL POLES/STRUCTURES

General

Steel poles/structures shall be of lattice steel self-supporting, bolted construction.

The poles/structures shall be designed with main dimensions and electrical clearances according to the Purchaser's standard design.

The poles/structures shall be designed in accordance with BS, ASCE or other recognized standard to the approval of the Purchaser.

Pole/Structure types

The types and sizes of poles/structures shall be as described in the Schedule Requirement.

Accessories to Poles/Structures

All accessories, such as cross-arms, transformer arms, brackets, bases, bolts nuts, washers and all other shall be suitable to the poles/structures as described in the Schedule of Requirements.

CORROSION PROTECTION

General

All supplied equipment shall be protected against corrosion under service conditions. The protection shall also prevent corrosion during transport and handling.

Damage to the protection during transport and handling shall be repaired to the same quality as specified for the object.

Galvanizing

Except where otherwise specified all ferrous parts shall be galvanized.

Galvanizing shall be applied by the hot-dip process and shall consist of a continuous coating to minimum thickness as follows:

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	Average of Specimens tested µm (g/m2)		Any Individual Specimen tested µm (g/m2)
Rolled steel exposed to the atmosphere only	t<5 mm t≥5mm	87 (610) 95(685)	79 (550) 87(610)
Rolled steel underground Surface and in contact with ground	215 (1550)		190 (1370)
Cast iron and malleable iron	87(610)		70(500)

The zinc coating shall meet the requirements according to ASTM A123, A153, A239 and A385, or relevant standards

All steel shall be fully fabricated before galvanizing, no machine, boring, punching etc. will be allowed after galvanizing. Minor damage to the galvanizing resulting from transportation and handling shall be repaired in an approved manner, e.g. by painting with an approved zinc-rich paint, containing at least 92 weight per cent zinc powder.

After galvanizing all members shall be dipped in a dichromatic solution bath to avoid formation of white rust during storage and transportation.

Prior to bundling of steel members, after galvanizing, all members shall be completely dry.

STRUCTURAL STEEL

Structural steel shall be made by the open hearth basic oxygen or electrical furnace process, and shall comply in quality with the requirements for ST37-2 in DIN17100 or Grade 43 A in BS 4360. Steel of higher tensile grade if offered, shall comply with relevant DIN or BS Standards.

Only two strength classes may be used, low tensile steel (yield point 220-250 N/mm) and high tensile steel (yield point 300-350 N/mm2). For tubular poles the thickness shall be >2.2mm < 5.0mm, and the factor of safety shall be the ratio ultimate stress/yield point = 1.5 minimum.

Steel shall comply with the requirements of ASTM A143 and embrittlement tests shall be made in accordance with that specification.

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If the Supplier intends to use more than one quality of steel, he will be required to take every precaution to the satisfaction of the Purchaser against any possible intermixing of different qualities during transport, storage, handling, manufacture and installation.

Cast iron shall have a tensile strength of at least 140 N/mm2. It shall be made from the best grey pig and scrap iron and shall be close-grained, tough and uniform in character.

Malleable iron shall be of the black hearth type with a tensile strength of not less than 330 N/mm2.

BOLTED CONNECTIONS

Bolts shall conform to the requirements of Clause 4.5.5 below. Bolted connections may have one bolt only.

Minimum bolt spacing is equal to two point five (2.5) times the bolt diameter.
The distance from the centre of a fastener hole to the end of any connected part shall not be less than two (2.0) times the bolt diameter minus five (5.0) mm, and the distance to the adjacent edge shall not be less than one point five (1.5) times the bolt diameter.

The distance from the centre of a bolt to the face of the outstanding flange of an angle or other members shall be such as to permit the use of a socket wrench, in tightening the nut.

The bolt hole diameter shall be equal to the bolt diameter plus one point five (1.5) mm.

Allowable ultimate bearing stresses for bolts as well as members are equal to one point zero (1.0) times the ultimate stress Fu of the steel.
Allowable ultimate shearing stress for bolts and members is equal to zero point six (0.6) times the ultimate stress Fu of the steel.

SPLICES

Splices in all members of lattice steel structures shall be of the butt-splice or lap-splice type.
Splices of the main members shall be located immediately above horizontal members or diagonal brace connection.
Welding will be permitted in splices for tubular steel poles.

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CUTTING

Members shall be cut, drilled or punched and shaped to jig or by other means ensuring a proper fit. Arris formed by sawing or shearing shall be removed. Cracks and unevenness or sheared surface shall be removed by suitable means. Burrs shall be removed.

HOLES

Final hole diameter may not exceed the corresponding bolt diameter by more than 1.5 mm. Holes may be punched to full size in steel not exceeding 13 mm in thickness provided that the diameter of the hole exceeds the thickness of the material. Holes in steel thicker than 13 mm may be punched to a diameter 3 mm less than final and centre drilled to full size. Steel thicker than 16 mm must not be punched.

Incorrectly drilled or punched holes shall not be refilled by welding.

Cutting and punching may not be, carried out at lower steel temperature than 0°C.

Detail design shall be such as to avoid as far as possible eccentricities of joints. Pockets or depressions which would hold water shall be avoided. Tubes and similar profiles shall be properly drained.

WELDING

Execution of the Welding

The sequence of welding shall be such as to cause as small deformations and welding stresses as possible.

The welding shall be performed with equipment and in premises suitable for the purpose.

Equipment shall be well suited to the type of weld to be performed so that the right quality shall be attained.

No gaps or hollows may appear in the welding into which acid may penetrate during the pickling procedure preceding galvanizing.

The weld shall be ground flush to the surface in such places where the welding bulge prevents a perfect fitting of components together.

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A high bulge or uneven weld surface may be leveled out by chiseling or grinding.

Filler Metals for Welding

Standard filler metals shall be used and the strength class and quality shall be chosen to correspond to the base material.

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LOT 6: Pillars

General Specifications:

Weatherproof Housing

The weatherproof housing (IP 54) shall be manufactured from sheet steell. The pillar shall be rigid and self-supporting, designed for ground mounting on a flat base or pier or for fixing to standard lattice steel towers at accessible height. Fixing holes in the bottom and on the back shall be provided complete with M16 foundation or fixing bolts. The pillar shall consist of at least two compartments. The bottom cable entrance compartment to be with removable shield plates in bottom and back (depending of direction of cable entrance).

The upper, equipment compartment shall be arranged for front access only by means of side hinged doors that shall be fitted with an internal document holder and a locking bar to secure them top and bottom. The locking bar shall be operated by a central handle that shall be lockable by means of a padlock having a 10 mm or larger diameter hasp.

Incoming Cables, Links, Busbars and Conductors

Links, busbars and conductors shall be manufactured from hard drawn copper and arranged for access from the front only. The busbars must be fully shrouded.

Busbar support insulators shall be capable of withstanding rated short circuit conditions without undue stress and be resistant to mechanical shock and vibration however caused.

The pillar shall be equipped with internal digital multimeter allowing measurements in all phases on the incomer with the required required accessories for operating.

The pillar shall be equipped with internal lamps (15watt) and 16 Amps socket and there protection circuits MCPs (10Amps and 16Amps).

The pillar shall be equipped with ample dimensioned earth and neutral bars interconnected by a removable link.

Busbars shall be dimensioned for not less than 1200 Amps unless other rating is mentioned. The busbars shall have identification codes. The standard phase colours are Red (L1), Yellow (L2) and Blue (L3) (RYB).

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Specifications for items (1+2)

- All pillars shall be made of galvanized and painted steel.
- Steel thickness 2mm.
- Water proof with international protection not less than IP54.
- 2mm steel plate for installing the main MCCB, the plate shall be adjustable in/out.
- The main busbars, neutral busbar, earth busbar shall be installed and shall be suitable for the current for each panel.
- The panel shall be ready to be sealed and locked by the technicians.
- Suitable for fixing the incoming and outgoing cables.

- The power connection between main busbar and main MCCB (space) shall be implemented.
- MCCB and MCB specification is as mentioned in LOT3

Specifications for items (3+4)

- All pillars shall be made of galvanized and painted steel.
- Steel thickness 1.5mm.
- Water proof with international protection not less than IP54.
- The panel shall be ready to be sealed and locked by the technicians.
- The bottom holes shall be closed with tiny metal sheath.

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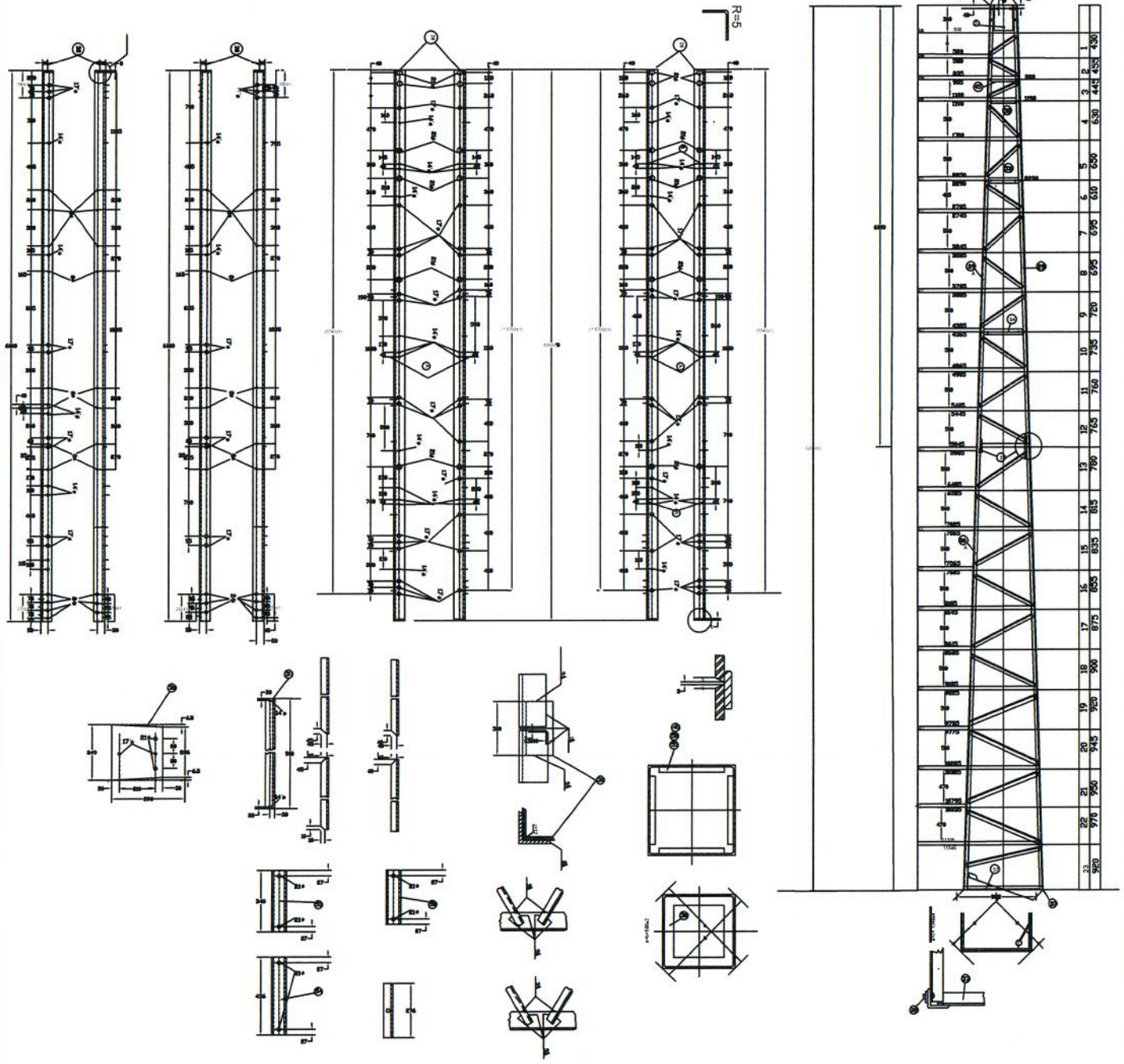

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Lattice Tower 70/80

Material List

weight (kg)	total length (m)	Length	Type	Qty.	No.
1027	27240	L	L. 45x45x45	11x4	1-11
142.3	42120	L	L. 45x45x5	12x4	12-23
231.8	24000	6000	L. 70x70x7	2+2	29
292.1	24000	6000	L. 80x80x8	2+2	30
18.-	995	249	⊕ 290x8	4	32
14.6	1200	300	L. 80x80x8	4	33
8.7	3600	900	L. 40x40x4	4	37
3.7	1104	276	L. 45x45x5	4	45
10.-	1160	290	⊏NP 8	4	52
11.8	1360	340	⊏NP 8	4	53
15.1	1744	436	⊏NP 8	4	54

Lot No. :	5
Item No. :	2

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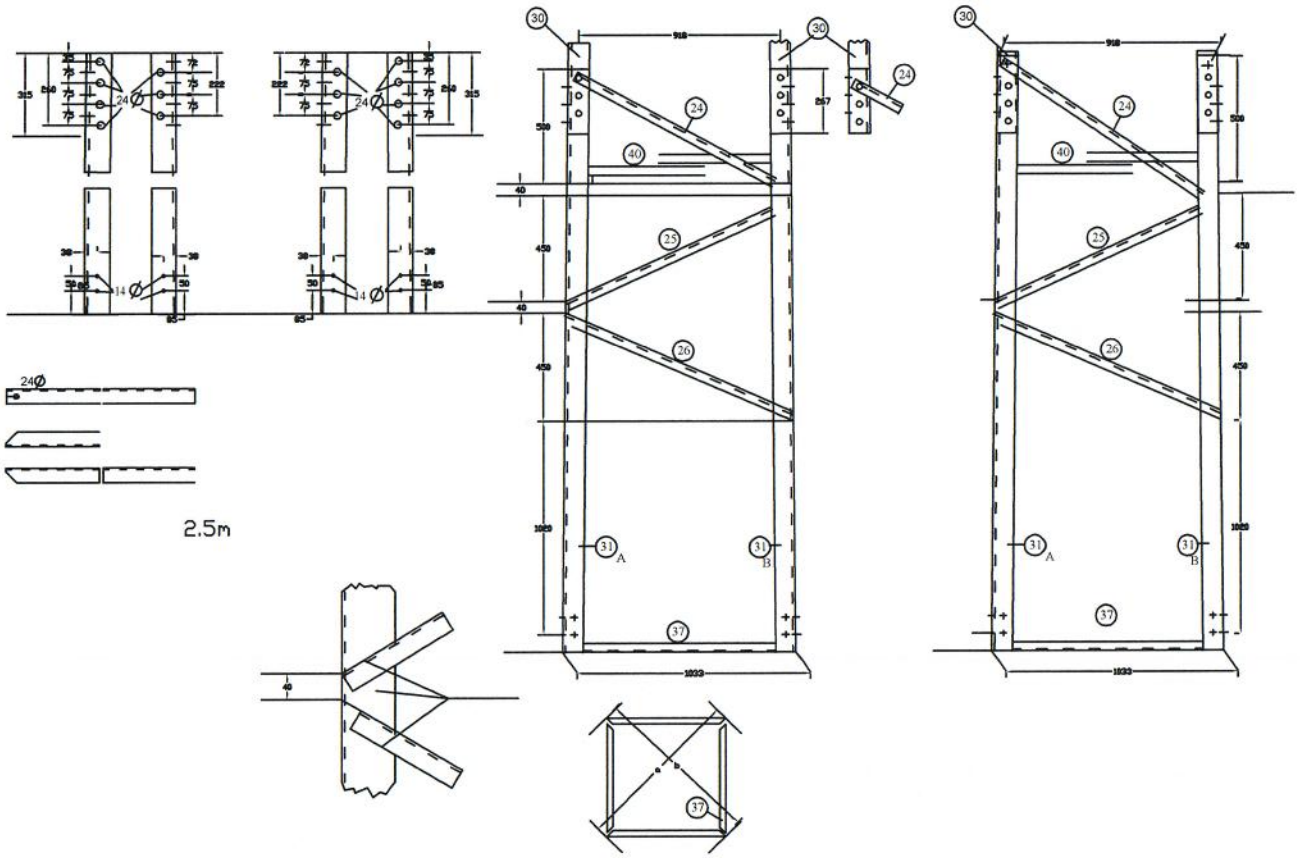
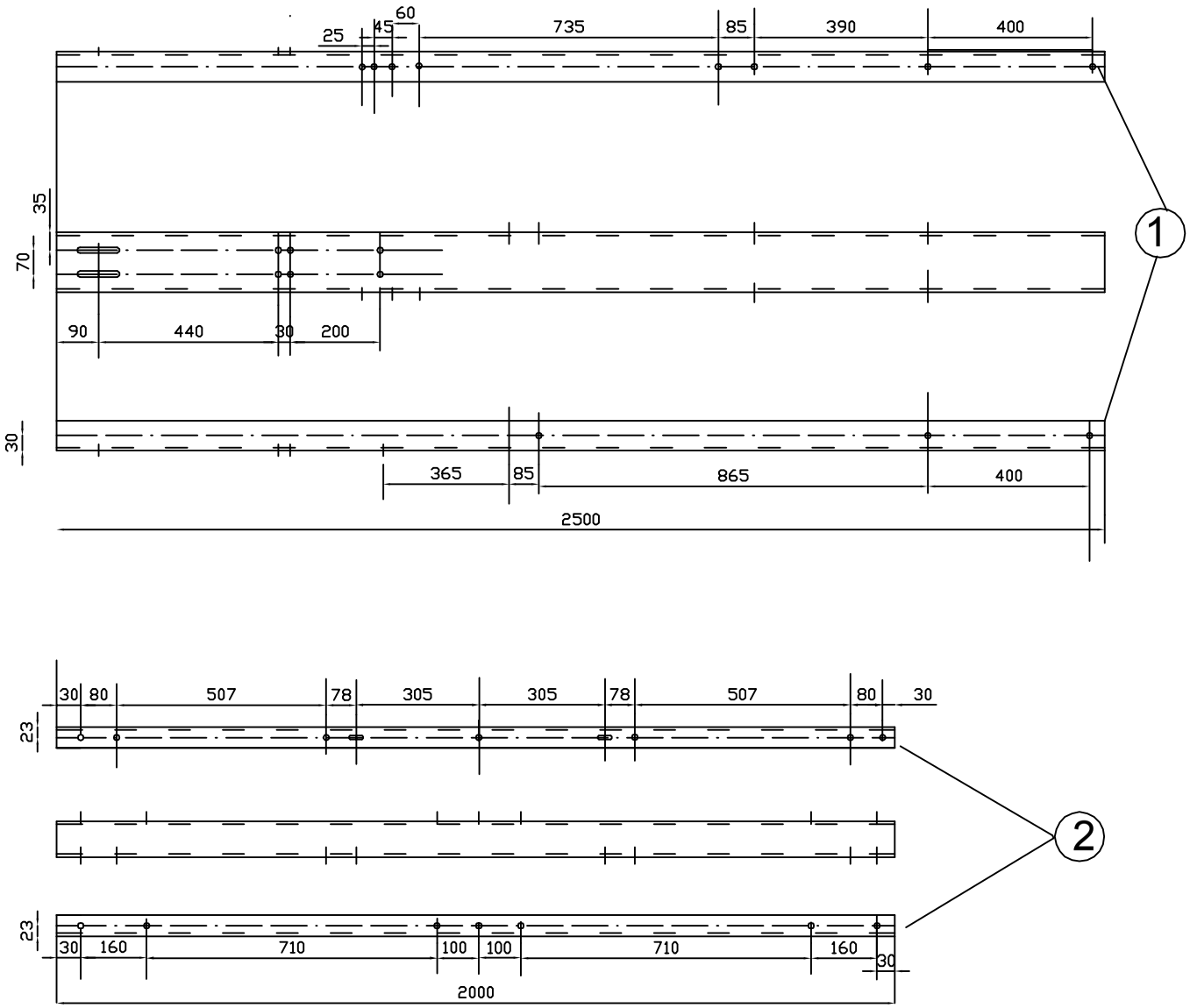
Tower Base 70/80



Material List

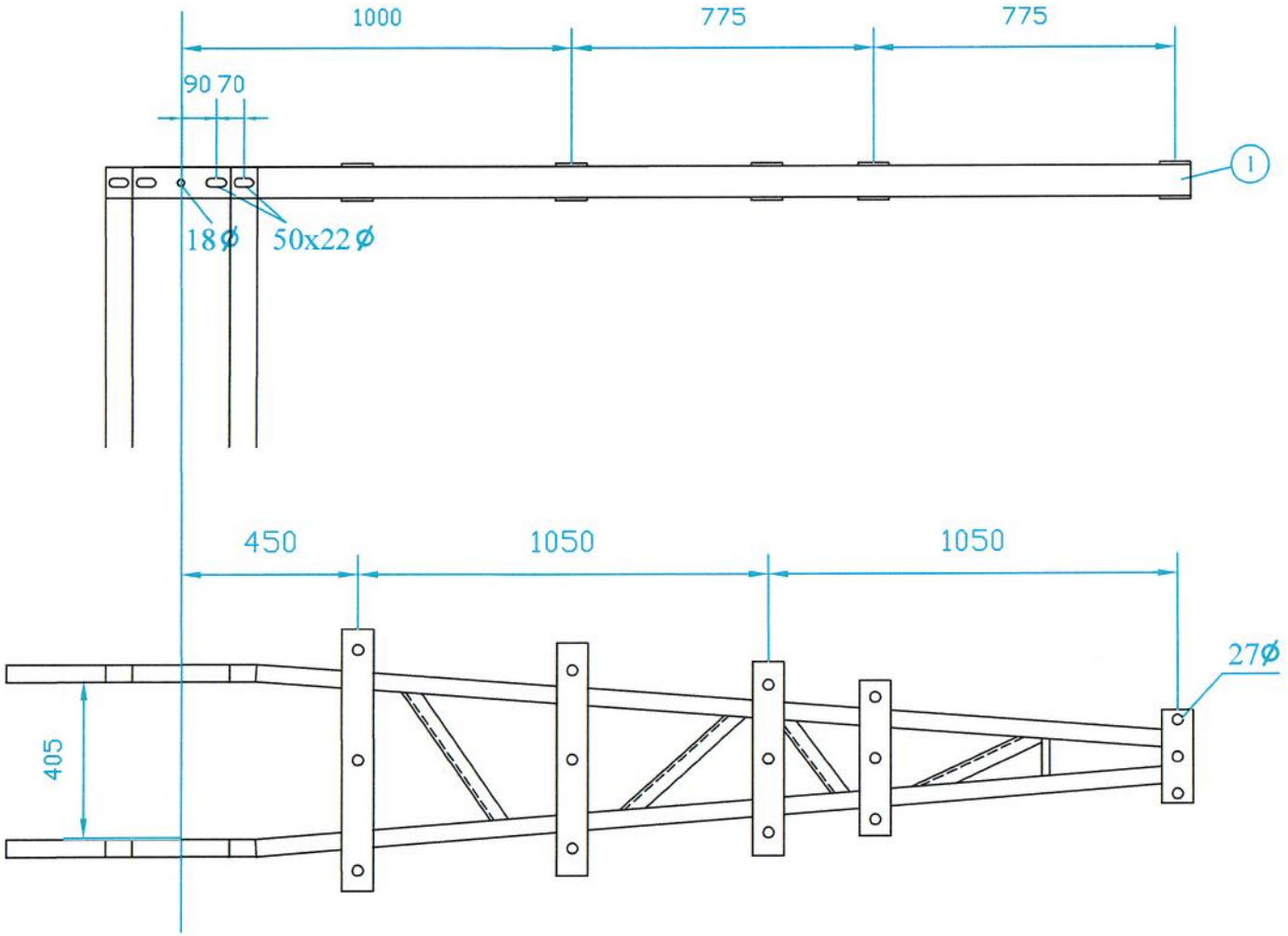
NO	TYPE	
24	∠	50x50x5
25	∠	50x50x5
26	∠	40x40x4
31	∠	80x80x8
37	∠	40x40x4
40	∠	45x45x5

Lot No:	5
Item No:	4



ARM TYPE - (K1555)

NO	TYPE	
1	U	140x60
2	U	80x45



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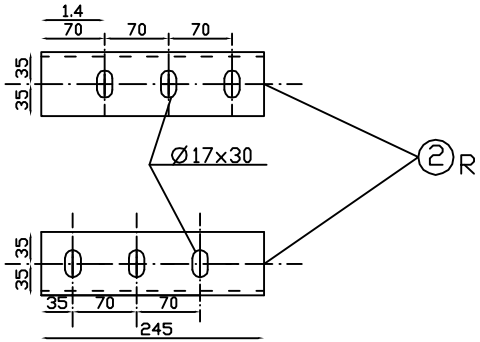
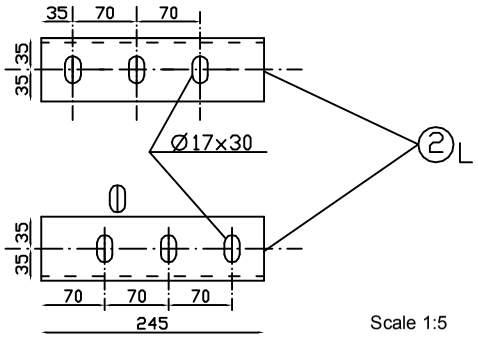
Arm Type (K63)

ARM TYPE - (K63)

NO	TYPE	Dimentions (mm)
1	U	80x45
2	中	80/8
3	𠂇	40/4

Lot No. :	5
Item No. :	8





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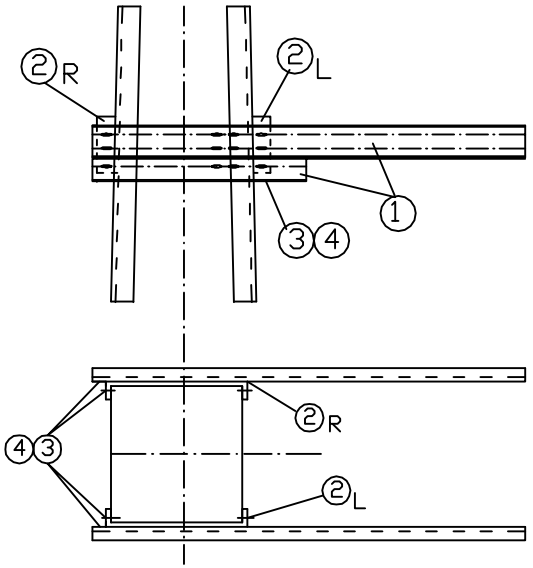

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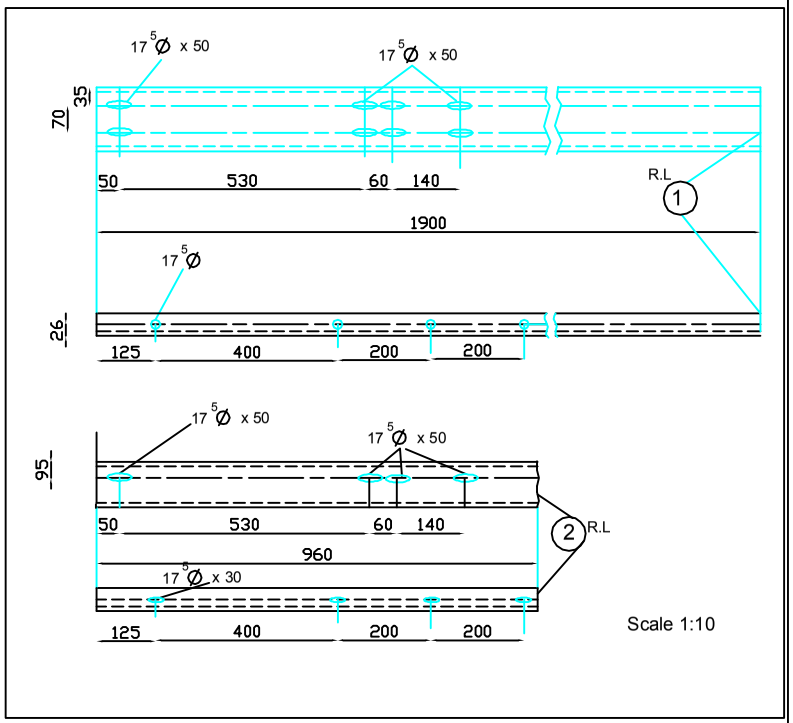

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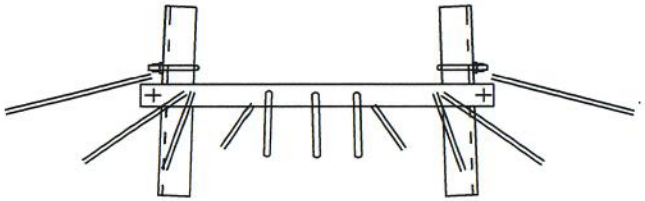
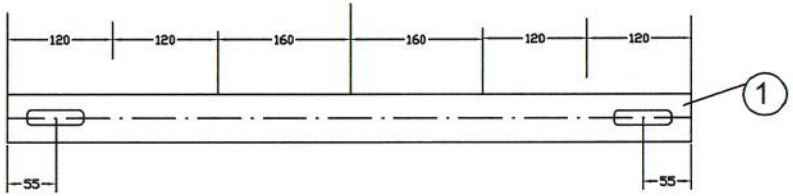
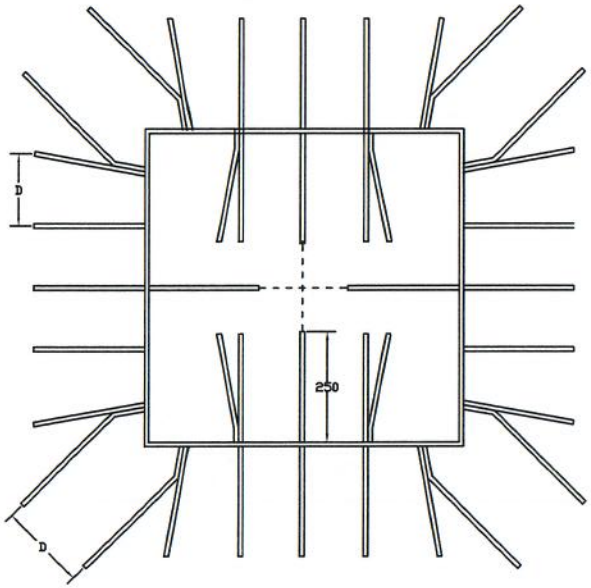
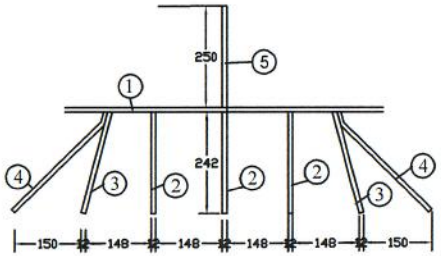
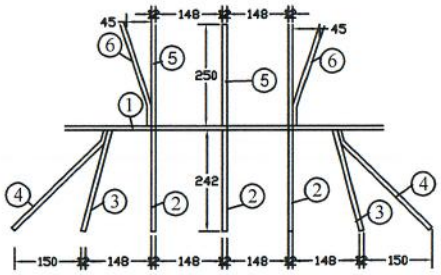
Arm Type K183











Southern Electric co.

SELCo

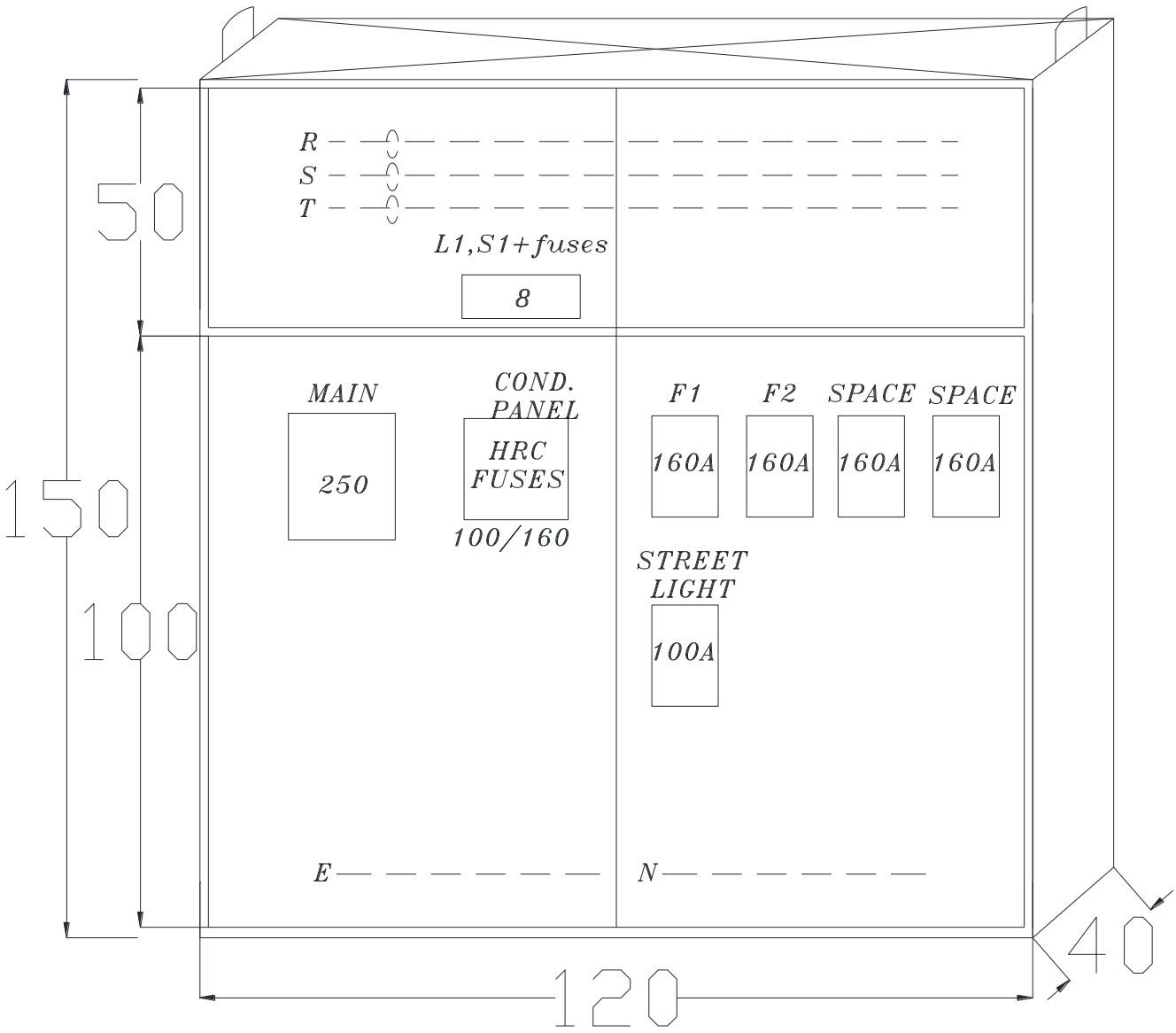
Southern Electricity Co. شركة كهـــرباء الجنوب

Gard against climbing for Lattice tower

NO	TYPE		Qty
1	⊕	50x6	4
2	⌀	12	12
3	⌀	12	8
4	⌀	12	8
5	⌀	12	8
6	⌀	12	4

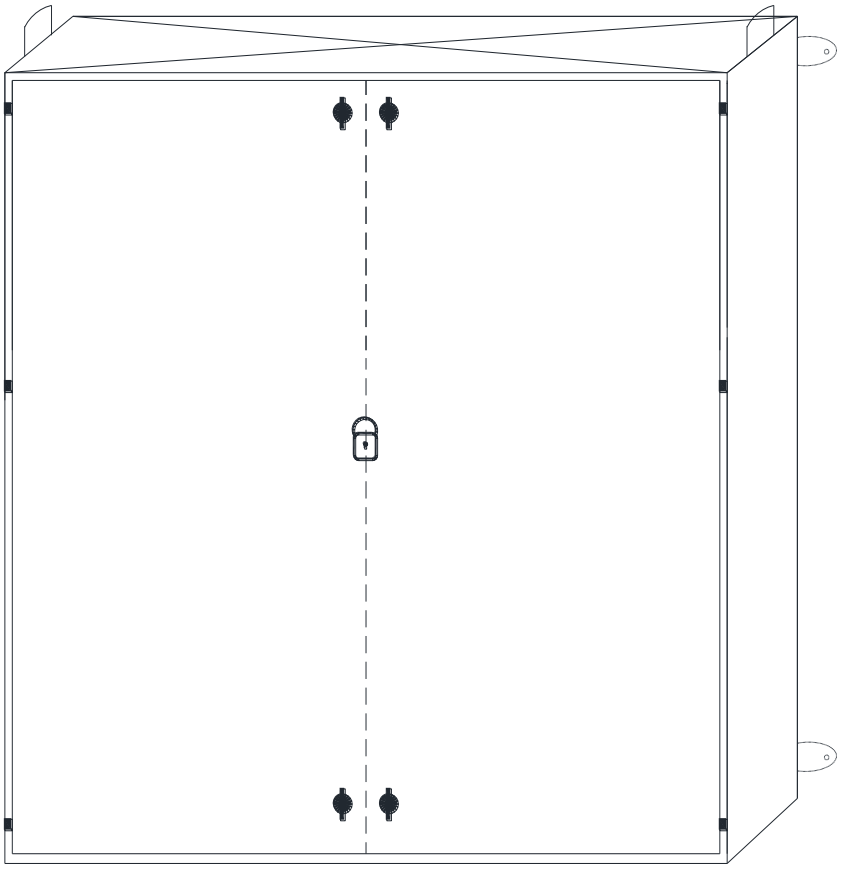
Lot No.:	5
Item No.:	10

PILLAR 2 WAY 600A FOR 160 KVA TR.
INDOOR VIEW



Palestine – Hebron – Al-hejre Fax: 02-2283601 فاكس: Tel:02-2283602/3 تلفون: – الهجره -الخليل – فلسطين
P.O. Box 3 | E-mail: info@selco.ps

PILLAR 2 WAY 600A FOR 160 KVA TR.
OUTDOOR VIEW



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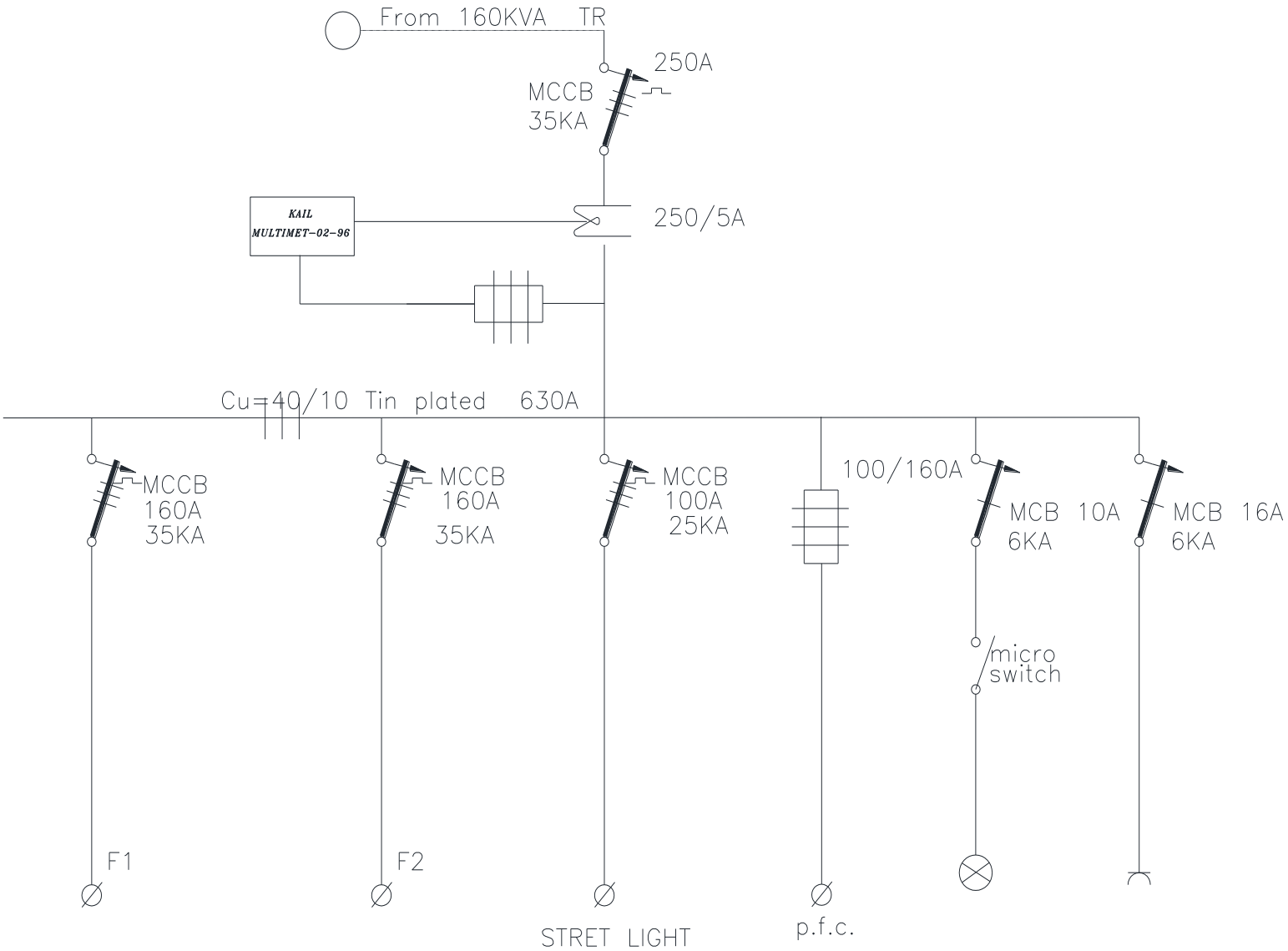
PILLAR 2 WAY 600A FOR 160 KVA TR.
Single Line Diagram



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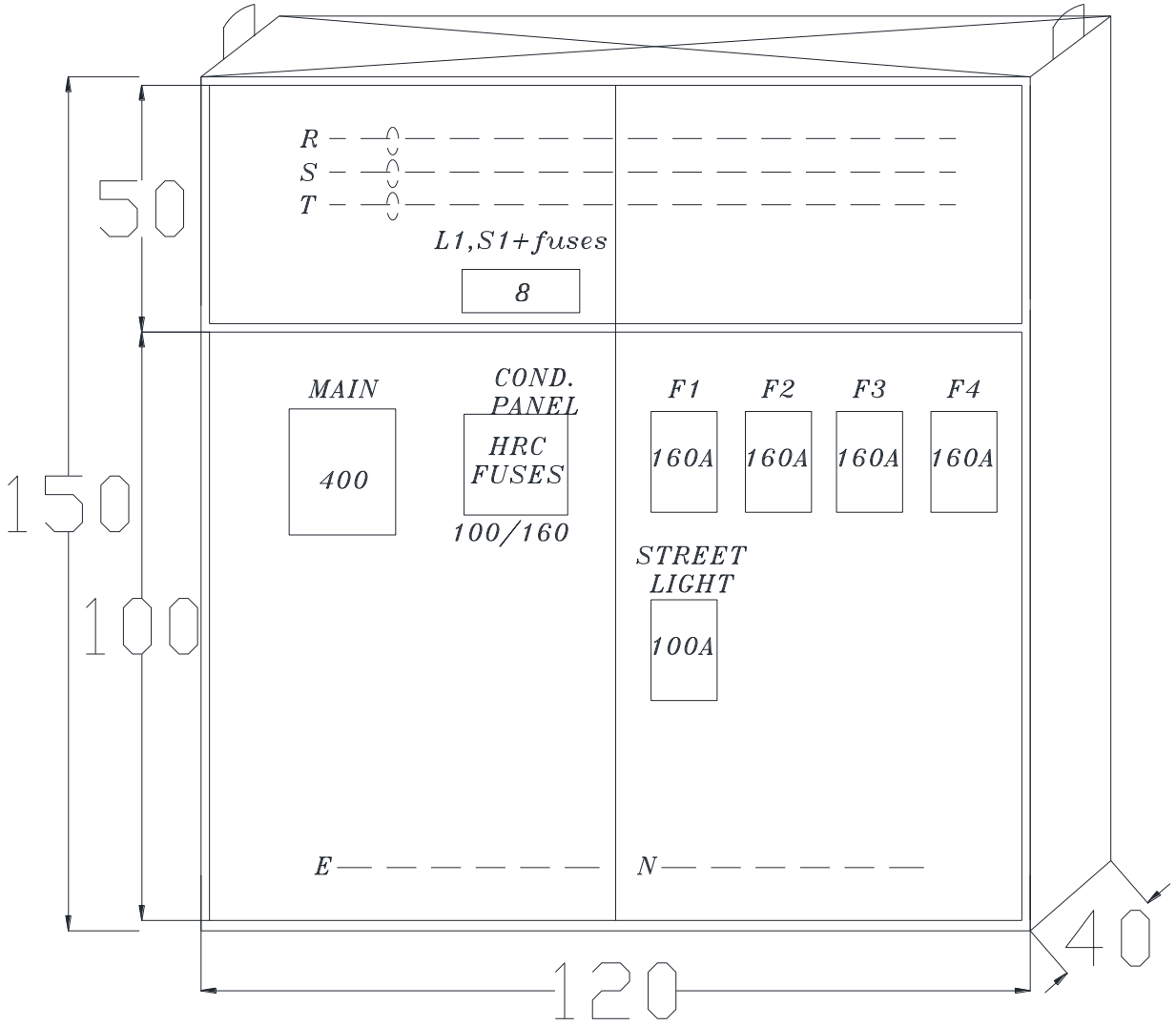
PILLAR 4 WAY 1200A FOR 250 KVA TR.
INDOOR VIEW



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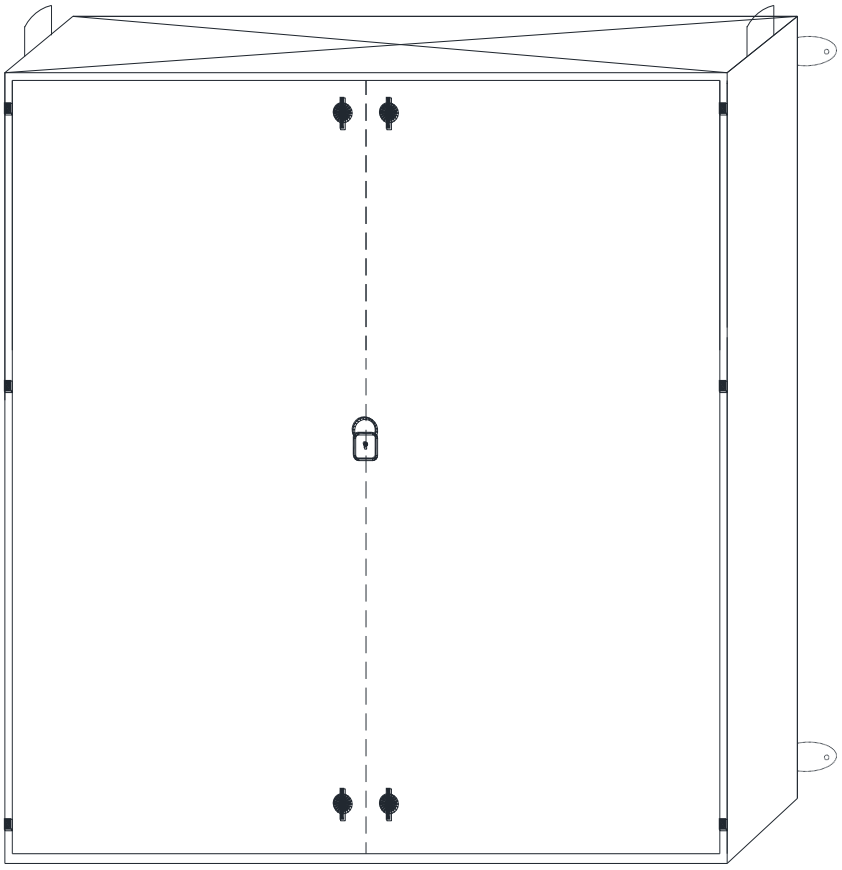
PILLAR 4 WAY 1200A FOR 250 KVA TR.
INDOOR VIEW



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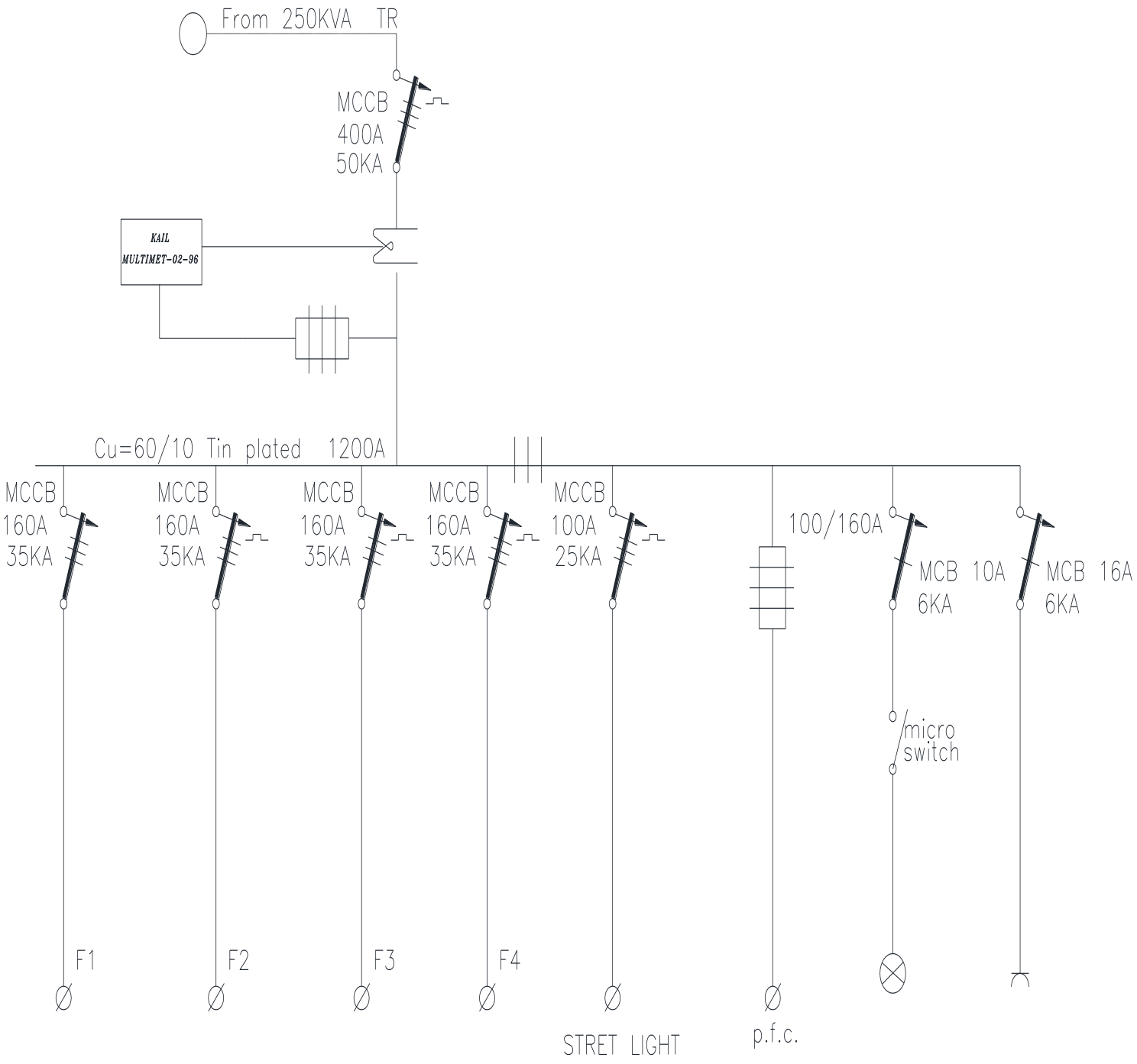
PILLAR 4 WAY 1200A FOR 250 KVA TR.
Single Line Diagram



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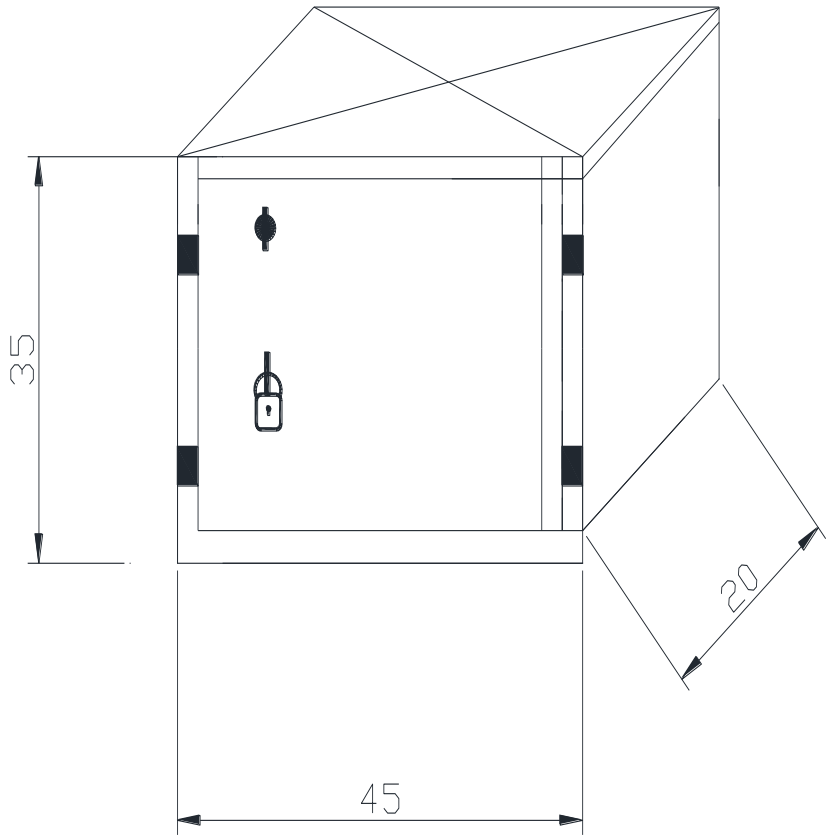
Pillar (35x45x20) cm3
OUTDOOR VIEW



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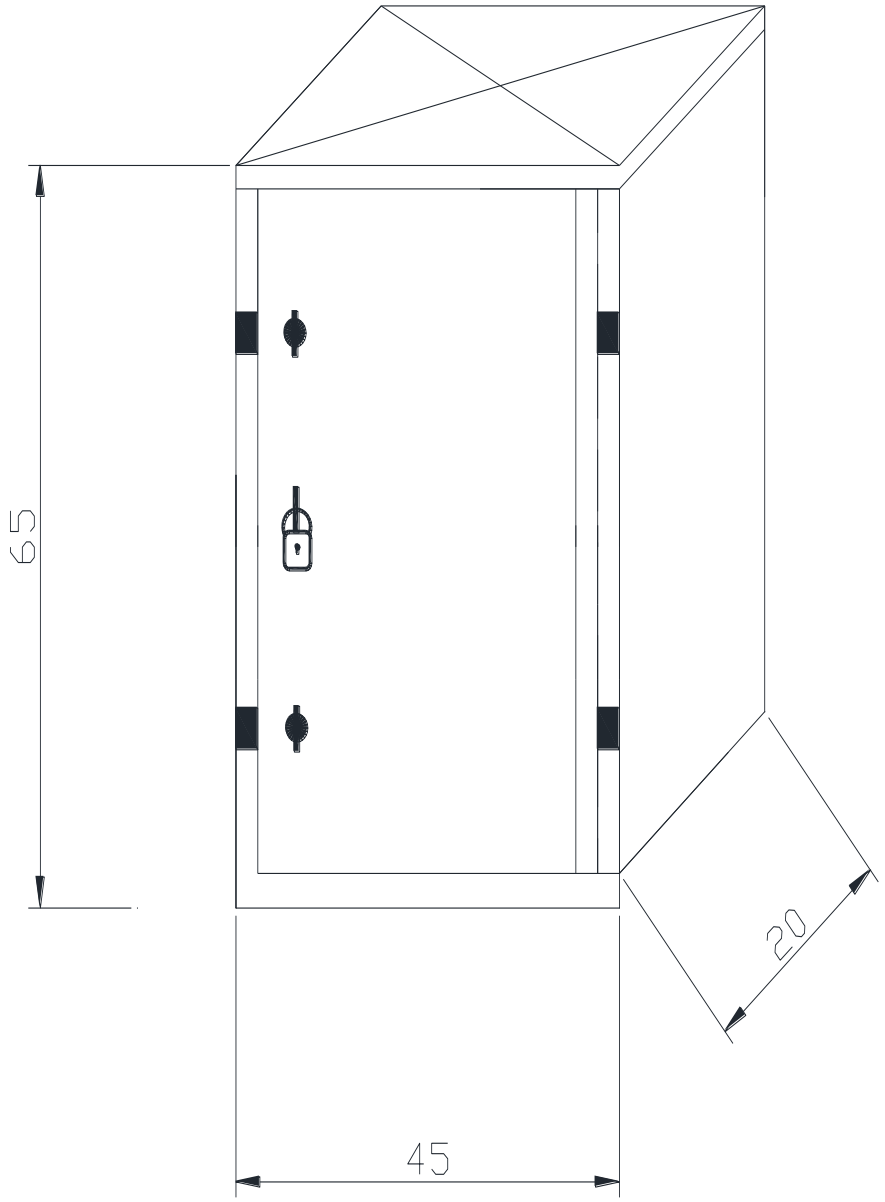
Pillar (65x45x20) cm3
OUTDOOR VIEW



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