

Dated: 29.06.2022**QUOTATION NOTICE**

Sealed quotations are invited for the installation of Surge Protection and Earthing in Chief Office EPABX Room. Your quotation should be superscribed on the top of sealed cover "Quotation for Ref. No. **E2/1680/2020**, dated **29.06.2022** with due on **08.07.2022 @ 12.00 Hrs.**

Tender Requirement:

AC mains power protection using primary & secondary protection		
		The incoming AC Mains power lines to the building which is feeding power to the equipment's are to be protected against all surges and transient disturbances during a direct or indirect lightning strike, Induced surges and other disturbances like, electromagnetic interference, Radio frequency interference and electrical noise etc. AC power line protection shall be provided in 3 stages with digital grounding and equi-potential bonding services. It must include Primary shunt protection to the incoming AC mains with parallel connected Single Block metal oxide varistor (MOV) based surge Diverters, secondary protection with three stage Series Power filter having MOV-LC-MOV configuration and equipment protection using energy conversion equipment with built in digital grounding device.
1	Primary protection - Surge Diverters	
	(a)	Surge Diverter: A single Block MOV (Metal Oxide Varistor) based Surge Diverter having 100KA three phase capacity with neutral protection shall be provided on the mains power entry point, Connection shall be between phase and neutral. The diverter should be wired to minimize the additional voltage added to that of the diverter due to inductive effects in the connecting leads.
	(b)	The Surge Diverter offered shall be of single block MOV and fully comply with Indian/international standards.
	(c)	Earth MOV used in the surge diverter should be protected with a thermal fuse which should open in case of MOVs temperature rise due to an over load situation. The health of each phase MOV should be indicated with LED and a common neon indicator to be provided on the front panel of the surge diverter enclosure.

	(d)	To provide robustness multiple independent monitoring circuits shall be provided in each surge protection device. Device such as spark Gaps, Gilding spark Gaps, Gas discharge tube based technology and products are not acceptable due to its high let through voltage and low level protection.
	(e)	Earth primary diverter shall contain a 100kA (8/20µs) or better Single block MOV as Surge absorbing material, providing robustness and additional life for multiple numbers of smaller impulses, a neutral to earth protection MOV of single Block 40kA ((8/20µs) or better of reputed made shall be fitted in each Diverter using short, non-twisted, direct connections. Surge diverters using multiple lower rated MOV's in parallel to attain 100KA and DIN rail mounted SPD's are not acceptable.
	(f)	The enclosure shall be a metal case high quality workmanship and materials suitable for a wall mounting installation and shall be IP-55 rated, Fan cooling is not acceptable. Potential free contacts should be available for remote monitoring and a circuit breaker or line fuses of appropriate rating shall be fitted to each phase diverters input

		Features	Specifications
1A	Technical Specification for 100kA Three Phase Surge Diverter		
	(a)	Lines Protected	3 Phase/neutral and 1 Neutral to Earth
	(b)	Opening Voltages	240V AC
	(c)	Max. Line Voltage	275V AC
	(d)	Protection	Transverse and common mode.
	(e)	Surge with stand	ANSI C62,41 cat A,B,C AS 1768-1991 cat A,B,C
	(f)	Surge Rating	8/20 µ sec pulse response, 1 pulse 100kA, 5 Pulse 70kA, 10 Pulse 35kA
	(g)	Performance	800 volts clamp for 3kA cat 8,950 volts clamp for 10kA cat C.
	(h)	Testing	The product offered must be tested lightning impulse current test of minimum 40 kA, 8/20µs by an Indian/international high voltage laboratory.
	(j)	Enclosure	IP55 with suitable entry gland
	(k)	Makes /Model	To be mentioned by the bidder

2	Secondary Protection - Multi stage Series Power Filter		
	(a)	A three stage series power filter of 32 Amps 1 Phase 2 wire should be installed after the surge diverter and before the UPS to protect sensitive equipment's from the damaging effects of lightning, power transients and RF Interference. The filter should have 3 stage protections.	
	(b)	The first stage should consist of metal oxide variastor are connected between each phase and neutral to absorb transverse mode surges generated by load switching and other power system disturbances. These MOV's in conjunction with the MOV between neutral and ground should absorb common mode surge caused by lightning induced disturbances or power system earth faults.	
	(c)	The second surge of the filter should inductor (L) wounded in cylindrical ferrite core and capacitors (C). The LC section low pass filter components should further attenuate surge voltage already clamped by the first stage MOV's. In addition to the filter should attenuate noise and power system harmonies and should be designed attenuate both transverse and common mode noise.	
	(d)	The third stage of protection should consist of MOV's connected across the load side of the filter in a similar configuration as stage 1. These MOV's should provide further stage of protection and safeguard the filters integrity and in addition to this, this stage should provide suppression of any surge generated by load side connected equipment's.	
	(e)	Each varistor (MOV) should be protected with a terminal fuse, in case of an overload the fuse should blow. And the capacitor in the filter also should be protected with a series fuse, so that filter failure should not interrupt the main supply. In addition to earth MOV status indicator a common indication for the availability of the filter is to be provided on the front panel of the filter.	
2A	Technical Specification for 32 Amps 1 Phase Three Stage Series Power Filter		
	(a)	Number of phases	1 Phase 2 wire
	(b)	Current rating	32 Amps Continuous per phase
	(c)	Rated VA	7.68 KVA
	(d)	Voltage drop	<3 Volts on full load
	(e)	Efficiency	99%
	(f)	Protection modes	Transverse and common mode.
	(g)	Protection stages	MOV-LC-MOV
	(h)	Filter Configuration	LC, Transverse & Common mode
	(j)	Inductors (L)	Wounded in cylindrical ferrite core
	(k)	Capacitors (C)	Self healing polypropylene

	(l)	Surge withstand	As per ANSI C62 .41. cat A,B,C AS 1768 1991 cat A, B, C
	(m)	Surge Rating	8/20 μ sec pulse response, 1 pulse 100kA, 5 Pulse 70kA, 10 Pulse 35kA
	(n)	Testing	The product offered must be tested lightning impulse current test of minimum 40 kA, 8/20 μ s by an Indian/international high voltage laboratory.
	(o)	Internal Protection	Each Phase neutral MOV individually protected with thermal fuse Each capacitor protected with series fuse
	(p)	Alarms	Individual components LED's common front panel indicator. External alarm via voltage free changeover contact.
	(q)	Enclosure	IP55 with suitable entry gland
	(r)	Make /Model	To be mentioned by the bidder
3	Equipment Level Protection Devices.		
	(a)	Military standard protection to the equipment's against electrical disturbances using energy conversion must be provided at each location. The offered protection system must comply to the latest international standards such as IEC and satisfy the needs for protection to the equipment's and facility .The device must comply to MID STD 810G and copy of test certificate must be attached with the offer	
	(b)	Therefore, an efficient lightning & surge protection system is to be provided to ensure protection against surges and transient over voltages through direct and indirect lightning strikes to be provided with near to zero potential between the earth and neutral (nominal <0.2 volts, max 0.5 volt) irrespective of earth pit resistance at the location.	
	(c)	The protection device should be able to eliminate abnormal voltage & induced current from lightning and other abnormal electrical disturbances and protect the connected equipment from all kind of surges, transient over voltages, electrical noise, Harmonic disturbances etc.	
	(d)	The protection device should be able to provide complete lightning protection and form optimistic grounding system (common grounding, equi-potential) while eliminating lightning surge current.	

	(e)	<p>Product offered should have the following test/features. Proof of compliance for the tests must be submitted along with the technical bid.</p> <ul style="list-style-type: none"> • Measurement of residual voltage test with voltage and current oscillogram graph for Line to Neutral and Neutral to Ground for positive as well as negative test pulse results. • Measurement of front of wave spark over voltage test with voltage oscillogram graph for Neutral to Ground for positive and negative test pulse results Residual Voltage test. • Operating duty test result with oscillogram for the test conducted. • Temporary over voltage (TOV) caused by faults or disturbances in low as well as high voltage system. • Short Circuit with stand capability test with oscillogram for Short circuit with stand test current capability and calibration. • Protection against direct contact, Standby power consumption, Measurement of limiting voltage, Thermal stability test. • Resistance to abnormal heat and fire, Tracking resistance, insulation resistance, dielectric strength and Ingress Protection (IP) rating test. • Conducted & radiated disturbances as per IEC 61000-6-3/CISPR 22 and Electromagnetic immunity as per IEC 61000-6-1. • RF electromagnetic fields immunity as per IEC 61000-6-1/IEC 61000-4-3. • Electrical fast transients immunity as per IEC 61000-4-4 • Surge immunity test as per IEC 61000-4-5. • Conducted disturbances immunity as per IEC 61000-4-6 	
	(f)	Product offered should have LED Display to monitor healthy/failure status, surge count with facility connect remote monitoring through LAN/RJ45	
	(g)	The product offered should be eco-friendly and should not make any kind of environmental pollution and the manufacturer must be certified as per ISO14001:2004 Environmental management system	
	(h)	Make /Model	To be mentioned by the bidder
3A	Technical Specifications for 120kA, single phase Equipment Level Protection (ELP) device.		
	(a)	Rated Voltage	220-240 VAC Single phase 50-60H

	(b)	Surge handling capacity	120 kA Max
	(c)	Max continues operating voltage (Uc)	275 Volts (L1-N), 255 Volts (N-G)
	(d)	Mode of protection	Single phase 2 wires 3 modes (L-N, L-G, N-G)
	(e)	Maximum Discharge Current (Imax)	40 kA (each Mode)
	(f)	Nominal Discharge Current (In)	10 kA (each Mode)
	(g)	Short circuit withstand	10 kA
	(h)	Assured bonding potential	≤ 1.0 V (Between earth and Neutral)
	(j)	Must be tested as per	IEC-61643-1, IEC 61643-11, IEC61000-6-1, IEC 61000-6-2, IEC61000-6-3, IEC6100-4-3, IEC61000-4-4, IEC61000-4-5, IEC61000-4-6 and Lightning Impulse withstand test of min.35 kA, 8/20 μ s with surge count.
	(k)	Indications	LED
	(l)	Surge counter	6 Digit 7 Segment LCD counter
	(m)	Operating temperature	-40°C - +80°C
	(n)	Enclosure	Pre-wired metal enclosure with Pulverulent body painting
	(o)	Display	System should have LED Display to monitor, healthy/failure status, surge count and an optional facility to connect remote monitoring through LAN/RJ45.
4	(p)	Make / Model	To be mentioned by the bidder
	10 Pair Telephone line/communication line protection modules		
	(a)	For protection of telephones and communication lines from the damaging effect of lightning surges, transient over voltage, 10 pair three stage protection module must be provide at each site	

	(b)	The device must protect the connected telephone equipments from induced transients due to lightning strikes causing direct induction or potential differences caused due to EPR (earth potential rise) during lightning strike.	
	(c)	The device must be a fast response one with low let-through voltage for fast rise time transients and must ensure operation at high frequencies with low insertion loss.	
	(d)	The protector must be a plug and play device for easy installation and replacement.	
	(e)	The telephone line surge protectors should be installed in the KRONE LSA blocks.	
	(f)	The device must have an earth termination to ensure a substantial connection to earth either by a cable or direct mounting to ensure proper grounding.	
	(g)	Configuration	10 pair suitable for KRONE blocks
	(h)	Protection stages	Gas arrester / series impedance / MOV per pair
	(j)	Capacitance	a-e, b-e 1.5 pF, : a-b 350 pF
	(k)	Loop inductance	2 μ H.
	(l)	Insertion loss	0.12 dB at 600 ohms
	(m)	Frequency response	Frequency response
	(n)	Make / Model	To be mentioned by the bidder

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Technical Specifications for bonding Cable

	(a)	Type	Bonding cable shall be used multi strand pure electrolytic Copper Cable with PVC Insulation as per IS/IEC/ASNZ standards.
	(b)	Certification	ISI certified
	(c)	Size	50/10 Sq.mm
	(d)	Insulation	PVC Insulation.
	(e)	Conductor Material: Pure Electrolytic Copper 50 sq. mm multi stranded copper green colour cable for earth looping through PVC pipe and 10 sq. mm multi stranded copper green colour cable for all equipment bonding.	
	(f)	To ensure a reliable and efficient protection system, the entire facility must be provided with equi-potential bonding systems. The bonding system must be undertaken without affecting any electrical interference with the existing installation and communication facility.	

6	Earthing & Grounding	
	(a)	The Earthing system shall consist of copper bonded SS Earth Rods and conductive and eco- friendly backfill compound, The type earth electrode shall be Plate earth electrode as per IS 3043
	(b)	Grounding shall be done with chemical earth rods using Earth Enhancing compound by deep driven with earth enhancing compound and should have facility to top up the gel in case the gel level reduces during long term usage.
	(c)	Earth rod shall be 250 micron copper bonded stainless steel rod of size 17mm dia and 3 meter long x 2 Nos. distance between the earth rod shall be minimum 1.5 meter as per the site condition and interconnect with 25x3mm copper strip.
	(d)	The connection to the earth rod for the user end should be terminated with bimetallic clamps to avoid terminal corrosion avoids terminal corrosion.
	(e)	Electrically conductive, non-soluble Earth Enhancing Compounds may be used. 20 kg per pit.
	(f)	Prefabricated concrete Inspection Chamber size 300 x300mm shall be provided.
	(g)	The grounding system reading shall not exceed 2 ohm Earth resistance for earth pits should be less than 2 ohm in all weather conditions and should not require any maintenance. Such earth pits should have a minimum life of 10 years

Bill of Materials as per the Specifications:-

No	Items	Total Qty
1	Primary protection 100KA 3ph	1 No
2	Three stage Filter Secondary protection 32A 1ph	1 No
3	Equipment level protection 120Ka 1ph	1 No
4	Telephone line protector 10 pair	24 Nos
5	Maintenance free Earthing	1 No
6	Cable 50sq mm Green colour	50m
7	Accessories	1 set

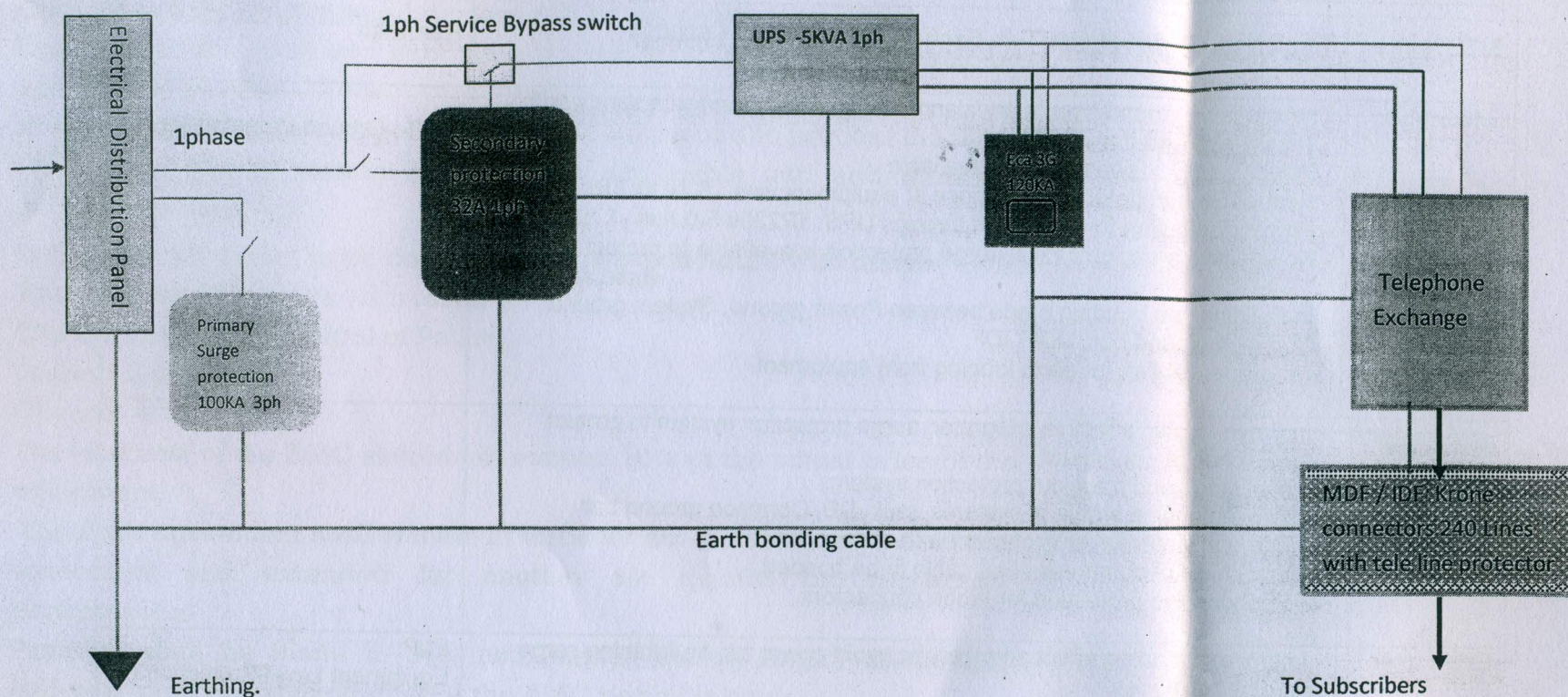
Documents to be attached with the bid

Item No.	Bidder must attach certificate/supporting documents as mentioned above items.
1 & 2	A Lightning impulse current withstand test of minimum 40 KA, 8/20µs by a Govt. High voltage test lab.
3.0	a) Test Report on IEC Test Format IEC-61643_11B as per IEC 61643-11:2011 (Low-voltage surge protective devices Part 11: Surge-protective devices connected to low-voltage power systems- Requirements and test methods.
	b) Confirmation of attestation as per low voltage directive 2014/35/EU in accordance with IEC/EN 61643-11:2012 with IEC-CE test report number endorsed on the certificate along with voltage protection level, Maximum Continuous Operating Voltage and Type II test ratings.
	c) Measurement of residual voltage test with voltage and current oscillogram graph for Line to Neutral and Neutral to Ground for positive as well as negative test pulse results.
	d) Measurement of front of wave spark over voltage test with voltage oscillogram graph for Neutral to Ground for positive and negative test pulse results Residual Voltage test.
	e) Operating duty test result with oscillograms for the test conducted.
	f) Temporary over voltage (TOV) caused by faults or disturbances in low as well as high voltage system.
	g) Short Circuit withstand capability test with oscillograms for Short circuit withstand test current capability and calibration.
	h) Lightning impulse current withstand test of minimum 35 kA, 8/20µs by govt. high voltage test lab report with test counter function recording before and after test mentioned in the report.

Scope of work

- 1 Fixing of Primary and secondary protection units with all required accessories.
- 2 Supply and fixing of equipment level protection units at equipment rooms with all required accessories and E+N voltage shall be less than <1.0 volt.
- 3 Supply and laying of 50sq mm copper cable for earth looping through suitable PVC pipe in ground for to connect Earthing.
- 4 Providing maintenance free chemical Earthing for Exchange
- 5 Wherever necessary, conduit pipes shall be used for laying cables to protect the Cables used for interconnection of Earth Pits and bonding from Potential damage.
- 6 If any Core cutting is carried out, on the Pavements and Roads for the scheduled Works, The same shall be properly filled with concrete and restore to its original state.
- 7 Integrated surge protection Layout Plan" shall be made available to Dept. after satisfactory completion of the Work
- 8 All the Devices, Components, Inter connecting cable, Connectors shall be in conformance with **IEC** Specification and standards.(**ANSI/UL 467 Grounding and bonding** of equipment's.)

1. Single Line Diagram of Proposed Integrated Protection for Tele Exchange at Tamil Nadu Police HQ, Chennai.



BOM for Integrated protection:-

No	Item Description	Qty	Remarks
1	Primary Surge protection for incomer panel - 100KA 3ph	1 No.	Connected parallel to incoming electrical panel
2	Secondary multi stage series surge filter 32 A 1 ph	1 No	Connected in series with- input to UPS
3	Equipment level surge & Transient protection 120 KA 1ph	1 No	Connecting parallel to the equipment to remove the body voltage, E+N voltage, surges and ground potential voltage rise
4	Telephone line protector Krone type	24Nos	For Telephone line
5	Chemical Earthing	1 No.	For equipment earth bonding
6	50 Sq mm Multi strand PVC insulated copper cable green colour	50 mtrs approx.	For equipment looping
7	Accessories	As reqd	10 sq mm cable, Clamps, SS 304 Nut bolts, SS tie etc

SURVEY REPORT /OBSERVATIONS AFTER THE INSTALLATION: -

SITE Name	Tamil Nadu Police H qtrs Tele Exchange at Chennai - 600004	Remarks
Site Status	<p>The site is on ground floor in an Island and lightning prone with sandy soil (easily exposed from GPR)</p> <ul style="list-style-type: none"> - Power supply : 1 phase supply available - Neutral-Ground potential difference at equipment was : 5.2v to 7.6v - Power distribution to equipment through UPS: 1P230v 5.0 Kva -1 No - No effective area lightning & surge protection is available to protect whole area. - In Building : no bonding made between Power ground, System ground, Common ground bar, MDF/ IDF. -No proper cabling for earth looping from equipment. 	GPR : Ground Potential Rise
Improvement Work to be done	<ul style="list-style-type: none"> - Improve / install effective integrated surge protection system to protect the Exchange equipment. - Install surge and transient protection system. - Improve bonding status of systems, rack, DB, Common ground bar - Made equi-potential environment with connection. - Metal shield of communication cable to be bonded. - Telephone line protection for krone connectors. 	
Effect after ELP installation	<ul style="list-style-type: none"> - Improve grounding effect and thereby avoid power trip by lightning surge and other damages. - Support 24 hours operation even under bad weather. - ELP monitor the power line surge, reverse surge, induced surge, via Distribution Boards, and eliminate with equi-potential environment - Targeting to make N-G potential difference at below 1.0V - Under equi-potential status at N-G below 0.5V with this environment can protect every system in the shelter from intrusion of various surges. ELP is designed to make easy equi-potential and common grounding. 	ELP: Equipment Level Protection by using energy conversion technology


Terms and conditions:

1. Quotations from only reputed dealers will be accepted.
2. Only quotation typed and submitted on the firm "Letter head" shall be accepted to process the file.
3. The quotation should be typed in proper as mentioned to process the file.
4. GST to be clearly mentioned wherever applicable and added in the quotation without fail.
5. Error free calculation to be done to arrive at a final figure with taxes.
6. The quotation should be addressed to:
O/o The Inspector General of Police,
Technical Services,
Chennai - 04.
7. The total cost of the AMC should not exceed 10% of the actual price of the equipment.
8. The AMC agreement shall remain in force for six months from the date of agreement and extended for another six months on satisfactory performance.
9. Payment shall be made in two installments one on expiry of the first half-year period and another after the AMC period is over.
10. The Quotation should carry the letter head of the firm with address and Landline / mobile number.
11. Advance Payment / Payment through bank / Payment on delivery is not possible.
12. The under signed have rights to reject or cancel the tender of order partially or fully without prior notice and reasons thereof.
13. Quotation should be valid for 90 days.
14. The quotations should be sealed and cellophane fasten and not stapled.
15. The reference number of the enquiry along with the item and due date should be super scribed on the top of the envelope.
16. In case of work order value is more than Rs. 5.00 lakhs, the company has to deposit 5% of the total value of the Work Order as security deposit at the time of submission of contract agreement. However, agreement has to be entered with Department, if the work order exceeds Rs. 3.00 lakhs.

Sd/- A.T.Durai Kumar
Inspector General of Police/Enft.,
(i/c) Technical Services, Chennai

To: All Vendors (tenders can be downloaded in www.tenders.tn.gov.in)

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Administrative Officer, 29/6/22
Police Telecommunication Branch,
Chennai - 04.


29/6/22