DATE: 21.04.2023

M/s HLL Infra Tech Services Ltd. (HITES)

CORRIGENDUM 01

NAME OF WORK: CONSTRUCTION OF NURSING COLLEGE PHASE II AT MALABAR CANCER CENTRE (MCC), THALASSERY

Tender No. HITES/IDS/MCC-NC/23/02 (etender ID: 2023_HITES_572378_1)
Dated 18.04.2023

With reference to the tender for Construction of Nursing College Phase II at Malabar Cancer Centre (MCC), Thalassery, the following amendments may please be noted:

SL. No	As per Tender	Amended as
1	Volume I NIT – Clause 12.C (Page no.6) Tender Document Fees/e-tender processing fee and Earnest Money Deposit (EMD): Tender Document Fees /e-tender processing fee of Rs.5,900/-(inclusive of GST) and Earnest Money Deposit of Rs.50,000/-.	Volume I NIT – Clause 12.C (Page no.6) Tender Document Fees/e-tender processing fee and Earnest Money Deposit (EMD): Tender Document Fees /e-tender processing fee of Rs.11,800/-(inclusive of GST) and Earnest Money Deposit of Rs.1,00,000/-.
2	Technical Specification for ELV works is attached herewith as Annexure-I, which will form part of Vol IV Technical Specifications.	

All other terms and conditions of the tender will remain unchanged.

The bidder shall sign and seal all pages of Corrigendum-01 and submit along with the e-tender.

For HITES

Sd/-

Authorized Signatory

Annexure-I

NAME OF WORK: CONSTRUCTION OF NURSING COLLEGE PHASE II AT MALABAR CANCER CENTRE (MCC), THALASSERY

Tender No. HITES/IDS/MCC-NC/23/02 (etender ID: 2023_HITES_572378_1)

TECHNICAL SPECIFICATIONS FOR ELV WORKS

Scope of work

- Network system
- Audio system
- Public Address System
- CCTV system

A. NETWORK SYSTEM

Scope of work

Supply, installation, testing, commissioning and handing over of Network system including all materials and manpower as per the specifications , bill of quantities , drawings, layout and schematic diagram to the satisfaction of client & consultant.

The contractor shall carry out the entire work of the system which consists of following devices/items/works:
Data outlets, RJ45
4 pair UTP Cat 6 data cable
Patch panels
Ethernet switches
Metal racks
Contractor shall follow CPWD / IS specifications for installation works for the system.
The list of approved manufacturers for the products covered in the system is attached separately.
Contractor shall avail product approval before procurement of the materials.
Shop drawings shall be submitted and get approved from Engineer-In-Charge (EIC) before commencing the installation works at site.

1.0 Standards and Codes

Following standards and codes are to be considered while designing the Network system for the project:-

CPWD standards: wiring installations
IEC 60364 -5 -523 : Installation method of electrical conductors/cables
Sec 54, Electricity Act 2003 & R36: Wiring in high rise buildings
IEC 732 IS 4648-1968(reaffirmed 1997): Electrical wiring

2.0 Manufacturing standards

Cables	:	Cat 6 UTP cable – ISO/IEC 11801
PVC conduits	:	BIS CODE: 4985 – 2000, IS 9537 part-3.
Data sockets	:	BS 6305, 6312
Cable trays	:	IS 4759, 2629, 2633

3.0 Technical specification

4 pair unshielded twisted pair cable shall be used for data system wiring. Cat6 cable shall be Gig true 550Hz Solid Cable UTP of 23 AWG. The cat 6 cable must be drawn through 25 mm dia PVC conduit from each Network outlet to the nearest patch panel located in the service room of each floor.

The maximum length of the cat6 cable must be limited to 80 meters in the conduit.

The cat6 cable must comply with following standards:

ANSI/TIA/EIA-568-C.2 –Category 6.
UL® 444, Safety Vol.1, Sec 13.
ISO/IEC 11801 Class E.
ETL Verified.
RoHS 2002/95/EC
E196163-P
EN71-3, EPA 3050
PVC: CMR; CSA, CMG, FT4; Plenum: CMP, FT6

L3 Fully Managed Network Switch

General Features

Switch shall have minimum 24 BASE-T Ports with minimum 370W AC power supply

Switch shall support Internal Redundant Power supply. Switch shall have Console Port 10/100/1000BASE-T RJ-45 port for out-of-band CLI management & Management Port 10/100/1000BASE-T RJ-45 port for out-of-band IP management. Switch shall have 1 x USB 2.0 Type A port

Performance

Shall support at least 168 Gbps switching capacity

Switch shall have at least Forwarding rate – 125 Mpps. Switch shall have Packet Buffer Memory of minimum 2 MB

Stacking

The Switch shall support Stacking Capability. Switch shall support stacking and shall support Minimum 80Gbps of stack throughput.

Physical

The Power input shall be 100 to 240 VAC, 50 to 60 Hz

Operation Temperature shall be in range of 0 to 50 ˚C (32 to 122 °F)

Storage Temperature shall be in range of -40 to 70 ˚C (-40 to 158 °F)

Operating Humidity shall be in range of 10% to 90% RH

Storage Humidity shall be in range of 5% to 90% RH

System Management and Administration

Switch should support Software upgrades

L2 Ethernet Switch

General Features
Switch shall have interfaces 24 x 10/100/1000BASE-T ports
Switch shall be Rack Mountable. Switch should Media Interface Exchange - Auto MDI/MDIX adjustment for all twisted-pair ports
Network Cables - UTP Cat. 5, Cat. 5e (100 m max.)
Port Standards & Functions - Ports 1 to 24 compliant with IEEE 802.3ab

Performance
Shall support at least 56 Gbps switching capacity
Switch shall have Forwarding rate – 77.4 Mpps at least. Switch shall have Packet Buffer Memory – minimum 4.1MB.
Switch shall have MAC Address Table Size - 8K entries. Switch shall have minimum CPU Memory 256 MB DDR3 & Flash Memory 32 MB

Physical
The Power input shall be AC Input: 100 to 240 V AC, 50/60 Hz interal universal power supply. Operation Temperature shall be in range of -5 to 50 °C (23 to 122 °F). Storage Temperature shall be in range of -40 to 70 °C (-40 to 158 °F). Operating Humidity shall be in range of 10% to 90% non-condensing. Storage Humidity shall be in range of 5% to 90% non-condensing

System Management and Administration
Switch should support Software upgrades

4.0 Installation

4 pair cat 6 cables must be used for wiring from each Network outlet. For each floor, wires from each Network socket shall be taken to the patch panel installed in a metal rack. Cable shall be provided with identification labels on both ends. Cable must be terminated in patch panel in a neat manner. Before termination, cable must be tested for its performance as per the standard specifications.

4 pair cat 6 cables must be drawn in PVC conduit embedded in concrete slab or installed on surface of wall. PVC conduit must be either embedded in concrete or installed below RCC slab on surface as per site condition. The PVC conduit rigid type of minimum 25mm dia. When conduits are to be taken open, it can be either installed on wall or beneath concrete slab by using GI saddle spaced at 60cm intervals. Contractor must use standard fittings like bend, couplers etc. from the same manufacturer to ensure good workmanship.

Cable tray to be used shall be perforated pre-painted GI cable trays with perforation not more than 17.5%, in convenient sections. Accessories like couplers, Tees, Bends, etc. must be from same manufacturer.

Network outlets shall be of modular type. Type and finish of Network sockets must match with other electrical wiring accessories of the project. Network socket and back box must be from same manufacturer. Network socket must be modular type matching with other electrical wiring devices. Cable tags must be provided at both ends to identify the cable.

When a bunch of PVC conduits are to be installed above false ceiling, cable support system using anchor fasteners, threaded rods and GI slotted C channel of appropriate size may be used.(Separate rate will not be given for the cable support system using GI slotted channel) GI back boxes of suitable size must be concealed in the block/RCC wall to accommodate data sockets. Network sockets must be RJ45 type and back box must be from manufacturer of wiring accessories. Network socket must be modular type matching with other electrical wiring devices. Cable tags must be provided at both ends to identify the cable.

UTP Cable must be tested by OEM certified engineer. Cat 6 cables must be terminated at patch panels kept in metal racks of lockable type located in service room or in a convenient place located close to the false ceiling.

Provision must be done to contain the cables laid from each floor to the existing core switch located at lower ground floor of the building for data system. This shall be achieved by using suitable sized containment system (cable tray/cable trunking) which runs between floors & core switch in the building. Tray/Trunking shall be hot dipped galvanized perforated type and installed on wall or hanged from RCC slab using proper support system/ anchor fasteners at regular intervals. Cable laid in the tray shall be neatly dressed using heavy gauge cable tie at regular intervals.

6.0 Warranty

The warranty should cover the total Defect Liability Period (DLP) of this contract.

7.0 Contractor's responsibility

Shop drawings

Upon award of the job, the contractor shall submit a set of shop drawings for the approval of the consultant. The drawing shall clearly indicate position of Network sockets, routing of conduit, cable tray, patch panels, racks etc.

A schematic diagram must be submitted to have an overall view of the system. Standard symbols of devices and its mounting height must be clearly marked in the layouts.

The drawing must be submitted in hard copies.

Material Approval

The contractor shall submit technical data sheets of all components to be used for the system in the project for consultant's approval. The submittal shall include product's technical data sheets from the manufacturer, compliance statement, company profile, reference list etc.

All products to be proposed must be from a single manufacturer unless otherwise specified.

The material procurement may commence upon approval of material submittal and shop drawings.

8.0 As built drawings and Maintenance manuals

On successful completion of the work, contractor must submit three sets of hard copies and softcopy in DVD in AutoCAD format of latest version of as built drawings and operation & maintenance manual to the client. The document shall be submitted as directed by the EIC.

B. AUDIO SYSTEM

1.0 Scope of work

Supply, installation, testing ,commissioning and handing over of Audio system including all materials and manpower as per the specifications , bill of quantities , drawings, layout and schematic diagram to the satisfaction of client and consultant.

The contractor shall carry out the entire work of the system which consists of following devices/items/works:
Speakers
Amplifiers
HDMI Cables, Speaker cables
Microphones
Cable containment system

Contractor shall follow CPWD specifications / IS specification for supply & installation works for the system. The list of approved manufacturers for the products covered in the system is attached separately.

Contractor shall avail product approval before procurement of the materials.
Shop drawings shall be submitted and got approved from EIC before commencing the installation works at site.

2.0 Standards and Codes

Following standards and codes are to be considered while designing the audio system for the project.
CPWD standards for wiring installations

IEC 60364 -5 -523	:	Installation method of electrical Conductors/cables
Sec 54, Electricity Act 2003 & R36	:	Wiring in high rise buildings
IEC 732 IS 4648-1968(reaffirmed 1997)	:	Electrical wiring

Technical specification

<u>Wall mounted column Speakers</u>

The Wall mounted speakers shall have built-in protection to ensure that, in the event of a fire, damage to the loudspeaker does not result in failure of the circuit to which it is connected. The 30W bi-directional column loudspeakers shall provide good speech intelligibility and background music reproduction in corridor area.

Technical specifications of the wall mounted speaker is attached below and contractor must select the product based on these information.

Enclosure	: 2-way bass-reflex type
Rated Input	: 30W
Rated Impedance	: 8Ω

100V line: 330Ω(30W), 500Ω(20W), 670Ω(15W), 1kΩ(19W), 2kΩ(5W)
70V line: 170Ω(30W), 250Ω(20W), 330Ω(15W), 500Ω(19W), 1kΩ(5W)

Sound Pressure Level	: 90 dB (1W, 1m)

Frequency Response	: 80 Hz - 20k Hz
Speaker Component	: 12 cm dynamic speaker + 2.5 cm dome tweeter
Speaker Cord	: 2-core cabtyre cord with diameter of 6 mm
Operation Temperature	: - 10 deg C to + 50 deg C
Accessory	: Bracket…1, Bracket mounting screw…2, Bracket mounting washer…2
Water Protection	: IP X4 (can be installed vertically or horizontally. *)

Mixer Amplifier

The amplifiers shall have equipped with an inbuilt music source, which can provide hours of uninterrupted music through bluetooth streaming or USB pen drive and supplied with an IR remote control for controlling the music source. Also it should offer the essentials of public address in an affordable package.

Technical specifications of the Mixer amplifier is attached below and contractor must select the product based on these information.

Mains power supply	: 220-230 V, AC, 50 Hz / 60 W/120 W respectively
Inrush current	: 10 A/ 36 A respectively
Frequency response	: 80 Hz to 18 kHz (+1/-3 dB @ -10 dB ref. rated output)
Distortion	: <1% @ rated output power, 1 kHz
AUX input	
Connector	: Cinch, stereo converted to mono
Sensitivity	: 200 mV to 300 mV
Impedance	: 22 kohm
S/N (flat at max. volume)	: ≥70 dB
Headroom	: >25 dB
Insert 1 x	
Connector	: RCA Cinch
Sensitivity	: 1V
Impedence	: >10 kohm
Loudspeaker output 100 V	
Connector	: Screw terminal, floating
Max. / rated ouput power	: 90/60W - 15.5 V (60 W) & 180W/120W- 22 V (120 W) respectively
Operating temperature	: -5 oC to +45 oC
Storage and transport temperature	: -40 oC to +70 oC
Relative humidity	: <95%

3.0 Installation

The installation shall be carried out with quality workmanship as per the specifications, approved shop drawings and to the satisfaction of client and consultant.

Speaker cable shall be laid in PVC conduit and installed on brick/concrete walls by means of GI saddles of proper size at regular intervals of 60cm. Contractor must coordinate with other services before finalizing the cable route and ensure that radio interference is avoided by keeping safe distance from other communication/electrical cables as mentioned in the specifications. Cable may also be installed beneath the concrete slab of typical floors by the

method mentioned earlier. When cable needs to be terminated in any device, suitably sized glands & check nuts must be used and fixed on the back box. When cable run on RCC slab, has to be taken to a device located on false ceiling, it shall be dropped down using flexible conduit pipe. Flexible conduit must be properly attached to the nearest support structure by using cable tie.

When cable has to be terminated in devices located below false ceiling at lower levels (e.g., wall mounted speaker), cable must be drawn through a PVC pipe of minimum diameter 25mm from the nearest device above false ceiling. PVC pipe used to draw this cable must be concealed in block wall from a location 10 cm above false ceiling grid to the back box of speaker. When cable run along walls or concrete slabs the plumb and line must be maintained to ensure good workmanship. Cable shall not run at angles other than 90 degree to the wall or slab.

Contractor must submit method statement and inspection report before commencing any installation of speciality or in criticality.

Contractor must submit shop drawings clearly indicating mounting heights of all devices used in the system, which is mentioned in the standard codes. For position/location of devices, contractor must coordinate with other services and architect. Back boxes must be installed in neat manner keeping an eye on the aesthetic view.

Number of speakers in each class rooms must be decided based on the specification clauses pertaining to the item.

Wall mounted speakers must be installed with proper mounting brackets and cable must be terminated in the speaker in neat manner by means of proper glands. Cable to the wall mounted box speakers must be concealed.

Amplifiers and microphones shall be placed in each class rooms of the building. All interconnecting cable between amplifiers, router and controller must be included in the scope of work. All cables inside each class room must be neatly dressed.

When a bunch of PVC conduits are to be installed above false ceiling, cable support system using anchor fasteners, threaded rods and GI slotted C channel of appropriate size may be used .(Separate rate will not be given for the cable support system using GI slotted channel) . GI back boxes of suitable size must be concealed in the block/RCC wall to accommodate telephone sockets. Cable laid in the tray shall be neatly dressed using heavy gauge cable tie at regular interval.

C. TECHNICAL SPECIFICATIONS - PUBLIC ADDRESS SYSTEM

Scope of Work

- Supply, installation, testing and commissioning of public address system including all material and manpower as per the specifications, bill of quantities, drawings, layout and schematic diagram and to the satisfaction of client, consultant.

- The contractor shall engage only authorized agency supported by OEM to carry out the work.

- The system utilized to serve the dual purpose of providing back ground music, making general announcement or to transmit evacuation message under fire condition.

- The contractor shall carry out the entire work of the system which consists of following devices/items/works:

- Wall mounted column speakers, provided in general corridor areas.
- Digital to Analogue conveter, located in lower ground floor of the building.
- Speaker cable armoured FRLS type
- Cable support system

Standards and codes

- IEC 60268-5
- EMC immunity acc. to EN 55103-2
- EMC emission acc. to EN 55103-1
- EN 60065

Technical specification

- Speakers

Speakers shall be especially designed for broadcasting high quality voice communications and approved by an appropriate authority for use in such situations.

Speakers shall be ceiling or wall mounted as shown in the schedule of work and shall be completed with mounting brackets accessories etc.

Speakers shall be of high efficiency yielding maximum output at minimum power across 200 – 12000 Hz frequency range. Speakers shall have a line matching transformer for direct connection to amplifiers with multiple taps. Speakers shall be mounted in a rugged housing with vandal resistant grille. Speakers shall be interconnected in the zone configuration. Speakers may be provided in the corridors at particular intervals.

- Wall mounted column Speakers

The Wall mounted speakers shall have built-in protection to ensure that, in the event of a fire, damage to the loudspeaker does not result in failure of the circuit to which it is connected. The 6/10W bi-directional column loudspeakers shall provide good speech intelligibility and background music reproduction in corridor area.

Technical specifications of the wall mounted speaker is attached below and contractor must select the product based on these information.

Height in mm	:	260
Depth in mm	:	180
Woofer size in inch	:	5.25
Tweeter size in inch	:	1

Colour	:	black / white
Low impedance dynamic power in watts	:	80
Max SPL 1m in dB	:	107
Main construction material	:	ABS plastic
IP rating	:	40
Applicable in 100V	:	Yes
Vertical dispersion angle 1000 Hz	:	180°
Width in mm	:	170
Loudspeaker system	:	2-way
Woofer cone material	:	coated paper
Mounting system	:	U-bracket
Impedance in ohms	:	16
SPL 1W/1m in dB	:	88
Frequency response in Hz	:	70 - 20K
Grille main material	:	steel
Applicable low impedance	:	Yes
Horizontal dispersion angle 1000 Hz	:	180°
Net weight product (kg)	:	2.85

Cabling

PA system wiring shall be done by 2 core x 1.5 sq. mm FRLS PVC insulated copper twin twisted armoured, shielded cable.

The speakers in each zone are connected in parallel and are connected to the respective output.

The cables from each zone are separately routed and terminated to the existing system by using the digital to analogue conveter.

Installation

The installation shall be carried out with quality workmanship as per the specifications, approved shop drawings and to the satisfaction of client and consultant.

Armoured PA system cable shall be installed on brick/concrete walls by means of GI saddles of proper size at regular intervals of 60cm. Contractor must coordinate with other services before finalizing the cable route and ensure that radio interference is avoided by keeping safe distance from other communication/electrical cables as mentioned in the specifications.

Cable may also be installed beneath the concrete slab of typical floors (if required) by laying through PVC conduit. When cable needs to be terminated in any device, suitably sized glands & check nuts must be used and fixed on the back box. When cable run on RCC slab, has to be taken to a device located on false ceiling, it shall be dropped down using flexible conduit. Flexible conduit must be properly attached to the nearest support by using cable tie.

When cable has to be terminated in devices located below false ceiling at lower levels (e.g., wall mounted speaker), cable must be drawn through a pvc pipe of minimum diameter 25mm from the nearest device above false ceiling. PVC pipe used to draw this cable must be concealed in block wall from a location 10 cm above false ceiling grid to the back box

of speaker. When cable run along walls or concrete slabs the plumb and line must be maintained to ensure good workmanship. Cable shall not run at angles other than 90 degree to the wall or slab.

When cable from each zone/floor has to be taken from each floor to the existing system located at lower ground floor of the building, cable trays may be used. Cable tray size must be decided based on the no of cable to be installed on the tray. Cable tray must be installed in the service shaft for ELV services as shown in the layout. Cable tray must be installed on the wall by means of GI slotted C channels, threaded rods & anchor fasteners. Cables laid on the cable tray must be neatly dressed by means of cable saddles and bolts.

Contractor must submit method statement and inspection report before commencing any installation of speciality or in criticality.

Contractor must submit shop drawings clearly indicating mounting heights of all devices used in the system, which is mentioned in the standard codes. For position/location of devices, contractor must coordinate with other services and architect. Back boxes must be installed in neat manner keeping an eye on the aesthetic view.

Number of speakers in a zone must be decided based on the specification clauses pertaining to the item.

Wall mounted speakers must be installed with proper mounting brackets and cable must be terminated in the speaker in neat manner by means of proper glands. Cable to the wall mounted box speakers must be concealed.All interconnecting cable between amplifiers, digital to analogue converter must be included in the scope of work.

The cable from each zone of the building must be taken to existing system placed in the rack at lower ground floor of the building. Cable from false ceiling in the room must be extended up to the rack. For this purpose cable trunking/tray may be used. All cables must be neatly dressed.

Testing

Entire PA system shall be tested to establish the following:
Functionality of the PA system
Combined systems shall be tested for the overriding feature for prioritizing fire alarm and life safety requirements.
Acceptable audibility of the public address in all spaces and record sound pressure levels of the Public address Vis a Vis the ambient noise levels.
The Provision of speakers is proposed so as to cover the entire area uniformly to have better communication system in the College.
The Speakers shall be distributed in the entire floor and shall be configured in different zones. The announcement can made in zone wise or to all the speakers simultaneously in ALL CALL mode. Fire message shall be announced immediately on receipt of fire signal from the fire alarm panel to all zones.

Contractor’s responsibility

Shop drawings

Upon award of the job, the contractor shall submit a set of shop drawings for the approval of the consultant. The drawing shall clearly indicate position of speakers, amplifiers, routers

controller etc. The drawing shall indicate clearly the loop, routing of cable, no of devices connected in a loop. A schematic diagram must be submitted to have an overall view of the system. The symbols and mounting heights of all devices must be clearly marked in the layouts.

The drawing must be submitted as hard copies.

Contractor may proceed with installation only after approval of shop drawings from the EIC.

Material Approval

The contractor shall submit technical data sheets of all components to be used for the system in the project for consultant's approval. The submittal shall include product's technical data sheets from the manufacturer, compliance statement, company profile, reference list etc.

All products to be proposed must be from a single manufacturer unless otherwise specified.

The material procurement may commence only after getting approval of material submittal and shop drawings.

Training to the client

On successful completion of the work, contractor must conduct a training session to the client's representative in presence of the consultant. The session shall include familiarization of the system, operation, routine maintenance etc. Competent person from OEM must conduct the training session.

As built drawings and Maintenance manuals

On successful completion of the work, contractor must submit three sets of hard copies and softcopy in DVD in AutoCAD format of latest version of as built drawings and operation & maintenance manual to the client. The document shall be submitted as directed by the EIC.

D. IP BASED CCTV SYSTEM

1. Standards and codes

UL 60950-1, emission EN55022 class B
FCC part15 class B
CE standards
ANSI C63.4: 2003
Class A Digital Device UL 60065, 7th Edition. 2007-12-11 CAN/CSA-C22.2 UL60065-03, 1st Edition, 2006-04 + A1:2006
EN55022:2006, Class A
EN50130-4:1995+A1:1998+A2:2003 LVD 2006/95EC
EN60950-1:2006+A11:2009 IEC 60950-1:2005 (2nd Edition)

2. Scope of work

Supply, installation, testing & commissioning of IP based CCTV surveillance system as per following details:

- IP based dome camera(fixed & varifocal)
- IP based Bullet camera

- Network Video Recorders
- Storage hard disk
- LED display units
- Core switches
- PoE switches
- Patch Panels
- Racks

Contractor shall engage only authorized agency of OEM to carry out the work. Contractor shall submit OEM's authorization letter before carrying out the work.

3. Technical specification

The system offered must be capable of simultaneous viewing, recording and playback facility. All components going to be used must be compatible for high definition & high resolution capability.

The system shall be IP based and capable of viewing from multiple locations using appropriate web based applications apart from viewing in the monitor provided in the central sever room.

A dedicated camera system provided in the examination hall shall be IP based and capable of viewing from confidential room. The backup camera system of the examination hall shall be taken to the main server room of the total campus. The IP based CCTV system shall be done as per the requirement of the client.

4. 16 Channel Network Video Recorder

Professional and Reliable dual OS design to ensure high reliability of system running ANR technology to enhance the storage reliability when the network is disconnected
HD input H.265/ H.264/MJPEG/MPEG4 video formats
Connectable to the third-party network cameras
Up to 16 IP cameras can be connected
Recording at up to 12 MP resolution
Supports live view, storage, and playback of the connected camera at up to 12 MP resolution
HD Output
HDMI and VGA outputs provided
HDMI Video output at up to 4K (3840 x 2160) resolution
HD Storage
Up to 4 SATA interfaces connectable for recording and backup
Storage space effectively saved by 50% to 70% with the use of H.264+decoding format
HD Transmission
1 self-adaptive 10M/100M/1000M network interface
8/16 independent PoE network interfaces are provided

Various Applications
Centralized management of IP cameras including configuration, information import/export, real time information display, two-way audio, upgrade etc.
Connectable to smart IP cameras, recording, playback and backing up of VCA alarms can be realized. VCA detection alarm is supported
Instant playback for assigned channel during multi-channel display mode

Smart search for the selected area in the video and smart playback to improve the playback efficiency
Supports HDD quota and group modes; different capacity can be assigned to different channels.

Video/Audio input	IP video input	16-ch
		Up to 12MP resolution
	Two-way audio	1-ch, RCA (2.0 Vp-p, 1kΩ)
Network	Incoming bandwidth	256 Mbps
	Outgoing bandwidth	256 Mbps
	Remote connection	16
Video/Audio output	Recording resolution	12MP/8MP/6MP/5MP/4MP/3MP/ 1080p/UXGA/720p/VGA/4CIF/DCIF/ 2CIF/CIF/QCIF
	HDMI output resolution	4K (3840 x 2160)/60Hz, 4K (3840 x 2160)/30Hz, 1920 x 1080p/60Hz, 1600 x 1200/60Hz, 1280 x 1024/60Hz, 1280 x 720/60Hz, 1024 x 768/60Hz
	VGA output resolution	1920 x 1080p/60Hz, 1280 x 1024/60Hz, 1280 x720/60Hz, 1024 x 768/60Hz
	Audio output	1-ch, RCA (Linear, 1 KΩ)
Decoding	Decoding format	H.265/H.264+/H.264/MPEG4
	Live view/ Playback resolution	12MP/8MP/6MP/5MP/4MP/3MP/ 1080p/UXGA/720p/VGA/4CIF/DCIF/ 2CIF/CIF/QCIF
	Synchronous playback	16-ch
	Capability	4-ch @ 4K, or 16-ch @ 1080p
Hard disk	SATA	4SATA interfaces for 4HDDs
	Capacity	Up to 10 TB capacity for each HDD
External interface	Network interface	1 RJ-45 10/100/1000 Mbps self-adaptive Ethernet interface
	Serial interface	1 RS-485 (half-duplex), 1 RS-232
	USB interface	3 (Front panel: 2 x USB 2.0; Rear panel: 1 x USB 3.0)
	Alarm in/out	16/6
POE Interface	Interface	16 RJ-45 10/100 Mbps self-adaptive Ethernet interfaces
	Power	≤200W
	Supported standard	IEEE 802.3 af/at
General	Power supply	100 to 240 VAC
	Power	≤300 W
	Consumption (without hard disk)	≤20 W (without enabling PoE)
	Working temperature	10 to +55℃
	Working humidity	8 to 90 %

	Chassis	19-inch rack-mounted 1.5U chassis
	Dimensions(W x D x H)	440 x 413 x70 mm (17.5"x 15.3" x 2.8") approximately
	Weight (without hard disk)	≤ 5 Kg (11 lb)

5. IP IR dome camera

Parameter	Dome Network Camera
Image Sensor Type	1/3" 4 MP CMOS sensor - minimum
Min. Illumination	0.03 lux color @ F1.4 (Color, 1/3s, 30 IRE) 0 lux B/W with IR LEDs on @ F1.4
Shutter Speed	1/3(4) – 1/100,000 s
Lens	2.7-12 mm F1.4 motorized focus/zoom lens
Digital Zoom	16x
Day &Night	IR cut filter with auto switch
Digital Noise Reduction	3D DNR
Wide Dynamic Range	120dB
Compression Standards	
Video Compression	H .265/H.264H/Smart Codec/MJPEG (Sub Stream)
HD Recording	Yes
Video Bit Rate	32 Kbps – 8 Mbps
Dual Stream	Yes
Max. Resolution	2688×1520
Night Vision Distance	30 m
Frame Rate	4 MP at 1 – 20fps, 3 MP at 1 – 25/30fps D1/CIF at 1 – 25/30fps
Image Settings	Remote configuration, motorized zoom adjustments and auto focus
Backlight compensation	Yes, zone optional (BLC/HLC/WDR)
Alarm Trigger	Configurable motion detection and camera tamper detection settings, including configurable alarm notifications
General	Fully featured IP cameras that pair perfectly with an 8- or 16-or 64- channel Performance Series NVR. Waterproof (IP66) and IK10 vandal resistant camera housing and remote configuration, motorized zoom adjustments and auto focus through NVR
Communication Interface	1 RJ45 10M/100M Ethernet interface
Power Supply	Built-in PoE (Power over Ethernet) eliminates separate power supply and associated wiring; 12 V DC inputs where PoE power is unavailable
Ingress Protection level	IP66
IR Range	30 meters

Dimensions(mm)	122x88.9 mm
Weight	540g

6. IP IR Bullet Camera

Image Sensor Type	1/3" 4 MP CMOS sensor - minimum
Colour Support	Colour
Lens	2.7 mm -13.5mm, MFZ,F1.4
Digital Zoom	16x
Day /Night	(IR-cut filter) Auto (ICR)/Color/BW
Dual Stream	Yes
Noise Reduction	3D DNR
Wide Dynamic Range	120dB
Compression Standard	
Video Compression	H.265/H.264H/Smart Codec/MJPEG (Sub Stream)
Max. Resolution	2688x1520
Night Vision Distance	30 m
Image Settings	Remote configuration, motorized zoom adjustments and auto focus
General	Fully featured IP cameras that pair perfectly with an 8- or 16- or 64-channel Performance Series NVR. Waterproof (IP66) and IK10 vandal resistant camera housing and remote configuration and auto focus through NVR
Communication Interface	1 RJ45 10M/100M Ethernet interface
Power Supply	Built-in PoE (Power over Ethernet) eliminates separate power supply and associated wiring; 12 V DC inputs where PoE power is unavailable
Ingress Protection level	IP66
IR Range	30 meters
Dimensions(mm)	214.8 x 90.4 mm

7. Network switch

Network Ports: 8/24 auto speed-sensing 10/100 RJ-45 ports
Network Protocol and Standards
IEEE 802.3i 10BASE-T
IEEE 802.3u 100BASE-TX
IEEE 802.3ab 1000BASE-T
IEEE 802.3x Flow Control
IEEE 802.3af/at
IEEE 802.3ae 10 DTE Power via MDI

Performance Specifications
Forwarding modes: Store-and-forward
Packet forwarding rate: 95.24Mpps
Network latency: Less than 20 ps for 64-byte frames in store-and-forward mode for 100Mbps to 100Mbps transmission
Address database size: 1000 media access control (MAC) addresses per system
Addressing: 48-bit MAC address
Acoustic noise: 56.9dB (2*smart fans)

Power Supply
Total power consumption: 436.3 W/240 V

Physical Specifications
Dimensions: (L x W x H)
440 x 308 x 44 mm (17.36 x 12.12 x 1.73 in)

Environmental Specifications
Operating temperature: -5 to 50°C
Storage temperature: -20 to 70°C
Operating humidity: 0% to 95% relative humidity
Storage humidity: 0% to 95% relative humidity

Electromagnetic Emissions
CE, VCCI, FCC, BSMI, CCC
Safety: CB, UL, BSMI, CCC

8. 40 inch LED monitor

Screen	LED
type	42 inch
Display size Panel	1920X1080 pixel, full HD
Screen resolution	16:9
Aspect ratio	178/178 degreesPAL/NTSC/SECAM,
Viewing angle Contrast Interface	TV, VGA, AV, USB, HDMI & audio input

Audio output, wall mount or table mount kit
PIP facility : must be provided
Voltage range : 90 to 270 v ac
Viewing matrix hall be 12 pictures in a single monitor

9. Hard disk

Specifications	10 TB
Formatted capacity	10 TB
Form factor	3.5-inch
Advanced Format (AF)	Yes
RoHS compliant3	Yes
Performance	
Data transfer rate (max) Buffer to host Host to/from drive (sustained)	6Gb/s 194 MB/s
Cache (MB)	128
Load/unload cycles4	300,000
Non-recoverable read errors per bits read	<1 in 10^{14}
Limited warranty (years)3	3 or more
Power Management	
Average power requirements (W) Read/Write Idle Standby and Sleep	 6.2 5.5 0.4
Environmental Specifications	
Temperature (°C, on the base casting) Operating Non-operating	0 to65 -40 to 70
Shock (Gs) Operating (2 ms, read/write) Operating (2 ms,read) Non-operating (2 ms)	 30 65 250
Acoustics (dBA) Idle Seek (average)	 25 30
Physical Dimensions	
Height (in./mm, max)	1.028/26.1
Length (in./mm, max)	5.787/147
Width (in./mm, ± .01 in.)	4/101.6
Weight (lb./kg, ± 10%)	1.58/0.72

Installation

The installation shall be carried out with quality workmanship as per the specifications, approved shop drawings and to the satisfaction of client and consultant.

Material Approval

Upon award of the job, the contractor shall submit technical data sheets of all components to be used for the system in the project for consultant's approval. The submittal shall include products technical data sheets from the manufacturer, compliance statement, OEM's authorization letter, company profile, reference list etc.

The material procurement may commence only after getting approval of material submittal and shop drawings.

Shop drawings

Upon award of the job, the contractor shall submit a set of shop drawings for the approval of the consultant. Contractor must submit shop drawings clearly indicating location of cameras, network video recorders, LED monitor, racks, cable route, installation method of cameras etc. before commencement of work.

A schematic diagram must be submitted to have an overall view of the system. The symbols and mounting heights of all devices must be clearly marked in the layouts. The drawing must be submitted as hard copies. Contractor must submit method statement and inspection report before commencing any installation.

Contractor may proceed with installation only after approval of shop drawings from the consultant. Cat6 cable shall be drawn through PVC conduit from location of camera to the PoE switch in respective floor. The connection from PoE switch to the core switch shall be provided. The NVRs is located in the central server room of the centre.

PVC conduit to be used shall be of medium duty rigid type and contractor must use standard accessories of conduits like bends, couplers, junction boxes etc. from same manufacturer where ever required. The minimum size of PVC conduit shall be 25mm dia. PVC conduit shall be either concealed or surface type depending on the site requirement. If installed on surface, it shall be fixed on brick/concrete walls by means of GI saddles of proper size at regular intervals of 60cm. Contractor must coordinate with other services before finalizing the cable route and ensure that radio interference is avoided by keeping safe distance from other communication/electrical cables as mentioned in the specifications. PVC conduit may also be installed beneath the concrete slab of typical floors by the method mentioned earlier. When cable needs to be terminated in any device, suitably sized connectors must be used.

When conduit run along walls or concrete slabs the plumb and line must be maintained to ensure good workmanship. Conduit shall not run at angles other than 90 degree (vertical or horizontal) to the wall or slab.

Power supply to the CCTV equipment's shall be taken from outlets fed from UPS.
NVRs with hard disks shall be placed in server room of the centre. Metal racks of suitable size must be used to keep the NVR.
All cables from cameras shall be concealed in the wall and terminated in NVRs by appropriate method .The cable s shall be laid with proper identification tag.
LED monitor shall be fixed on the wall in the control room by using wall mounting kits. 6Amp UPS power point shall be provided by the contractor to hook up the monitor. Necessary power points to feed NVRS must be provided by the contractor.

Testing

CCTV system shall be tested in accordance with the specifications, the testing instructions provider by the manufacturer and to the satisfaction of the consultant and client.
Testing must be done by the specialist contractor for the system to ensure that all equipment’s are performing to the requirements as mentioned in the specifications.
Testing may be conducted in the presence of representatives from consultant and client.
Performance of each device in the system may be verified against the values mentioned in the

specification. Any suggestions from consultant may be incorporated by the contractor before handing over of the system.

Training to the client

On successful completion of the work, contractor must conduct a training session to the client's representative in presence of the consultant. The session shall include familiarization of the system, operation, routine maintenance etc. Competent person from OEM must conduct the training session. As built drawings and Maintenance manuals.

On successful completion of the work, contractor must submit three sets of hard copies and Softcopy in DVD in AutoCAD format of latest version of as built drawings and operation & maintenance manual to the client. The document shall be submitted as directed by the consultant.

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