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REPUBLIC OF ALBANIA
UNDP-ALBANIA
Number: 65526

TECHNICAL SPECIFICATIONS
ELECTRIC DESIGN

FOR THE CONTRACT
PREPARATION OF DESIGN AND SUPERVISION FOR REPAIR AND
RETROFITTING OF:

ISMET NANUSHI JOINT HIGH SCHOOL

LOT I
MUNICIPALITY OF DURRES

CLIENT



CONSULTANT



August 2020

I – Cable

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I- b / 2) FG7OM1 type cable: STANDARDS: 20-13 CEI 20-38 CEI UNEL 35382 - 35384 CEI EN 60332-3-24 (CEI 20-22 III) CEI EN60332-1-2 CEI EN 50267-2 -1. CEI EN 61034-2 CEI 20-37 / 4-0



0.6kV	Nominal voltage U0
1kV	Nominal voltage U
4kV	Insulation test voltage
1,2kV	Maximum voltage Um
90°C	Maximum operating temperature
+250°C	Temp.max, short circuit mode
0°C	Minimum installation temperature

Conductors and cables of this type have a high quality because they are resistant to fire, burn without flame, ie do not spread fire and do not cause smoke and emission of toxic substances in case of combustion.

Used indoors and outdoors as well as in humid environments. Suitable for aerial, cable, pipe or duct metal installations, masonry, metal structures, etc. Flexible conductor, copper grade 5. Isolation- HEPR quality G7. Against humidity. Thermoplastics- quality M1

I-b / 3) Cable type FTG1O (O) M1: STANDARDS: CEI 20-22 III / 20 - 35/20 - 37/20 - 45. FIRE RESISTANT IN COMPLIANCE WITH IEC 331 / CEI 20 - 36 EN 50200

Standard voltage U0 / U: 0,6 / 1kV

Maximum voltage Um: 1200 V

Maximum allowed temperature, normal operation: + 900 C

Maximum allowed temperature, short circuit work: + 2500 C

For use in places where, in the event of fire, people are exposed to serious hazards caused by smoke, toxic and corrosive gases where the protective covers of equipment are damaged, etc. which need to be avoided; Suitable for supplying emergency exits, gas or smoke signals, stairs, elevators.



Standard flexible PVC pipe light type + 90 ° C ICTA

Diameters 16/20/25/32/40/50

Classification 3422

Mounted placed inside solid surfaces.

II -BM distribution boxes (inside the wall) and boxes of sockets and switches



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Distribution boxes are for mounting under plastering, over plastering.

PVC boxes IP40; IP44.

Distribution boxes:

	DISTRIBUTION BOX BM NAMED PT 1 or PT3... .7
	DISTRIBUTION BOX FOR CARTRIDGE WALL ASSEMBLY
	BM BOX FOR INSTALLATION OF CELLS AND SOCKETS
	CASE BOX & SOCKETS FOR INSTALLATION IN CARTRIDGE WALLS

III- Vending machines of customer supply lines

Main technical specifications

Magneto-thermal automata with protection curves B, C and D of the standard CEI EN60898-1 with the following characteristics:

Basic features

Insulation voltage (Ui) Phase-Phase 440V

Working voltage (Ue) Phase-Phase 400V; Neuter-phase 230V

Magnetic Circuit Breaker B (3-5In) OK; Kurba C (5-10In) OK

According to CEI EN60898-1

Circuit breaker class 3

On and off power for one pole (Icn1) Icn1 = Icn

According to CEI EN60947-2

Nominal pulse voltage (Uimp) 4kV

Degree of pollution 3 (according to CEI EN 60947-1)

Electrical Cycles ($\leq 20A$) 20000Cycles; ($\geq 25A$) 10000Cycle;

Mechanical Cycles 20000 Cycles

Operating / turning temperature: $-25^{\circ}C$ to $+70^{\circ}C$ / $-40^{\circ}C$ to $+70^{\circ}C$

Humidity (IEC 60068-1) Execution 2 (humidity 95% at $55^{\circ}C$)

Neutral disconnection / switching on: On disconnection, opening of the neutrino after time and on switching off closing of the neutrino prematurely

Vending machines with magneto-thermal and differential protection, installed for the protection of lines that supply directly to consumers.

Differential circuit breaker 2P - 4P Technical Specifications Id = 0.03A			
		• Rated voltage:	230 - 400 V 1f/3f
		• Frequency:	50 - 60 Hz
		• Insulation voltage:	500 V
SD Type- class AS (selective) Differential circuit breaker 2P-4PS Technical specifications			

IV - Plugs and Switches

Plugs must be according to the project. Plugs as well as switches can be of the type that are mounted under plastering or over plastering. We divide the sockets according to the task they will perform in:

- Single-phase, two-phase or three-phase voltage sockets
- Telephone sockets and LAN system
- TV Socket

Single-phase voltage sockets as shown in the figure below have 1 node for Phase, 1 node for zero and a "spring" plate for ground.



All plugs must be of the 16 amp 2-pin type and protruding to the surface. They should have a flat fitting should have a color that goes with the lighting switch buckles.

White / gray is a line outlet supplied by the normal GS mains

Red is the line socket supplied by the UPS

All plugs must be of a similar type specified as follows:

With 250v safety separator, 2P-16A. Playbus Range

With 250v safety separator, 2P-10A. Playbus Range

Lighting control switches

The location of the lighting switches is shown in the planimetry.

Generally lighting switches throughout the building should be suitable for flat mounting.

Playbus Range GW 30011, 1P-16A, color according to the architect.

The switches must be of the type manufactured for AC mains control. They must have a minimum scale of 10 amps.

The keys according to the place where they will be used and the way of meeting-disconnection are:

One pole key

Bipolar switches

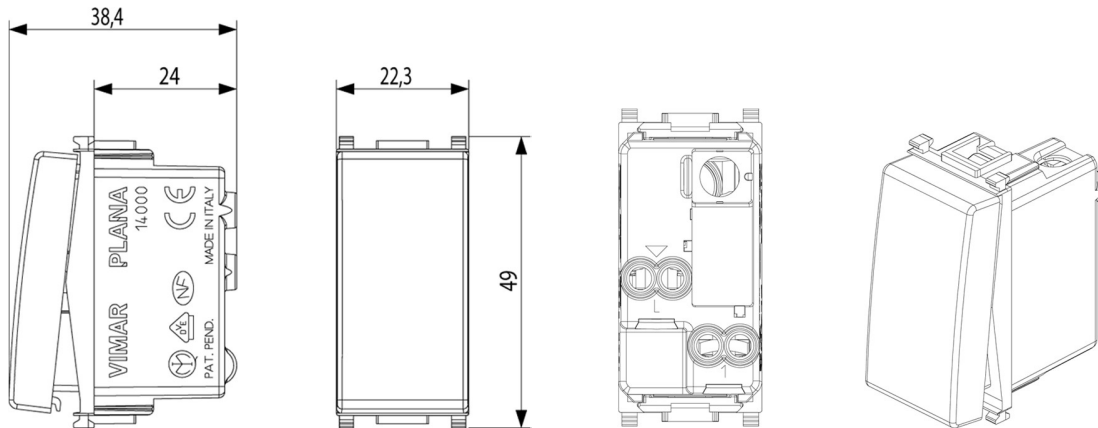
Deviat keys

Keys with time signal with time disconnection

Time-lapse alarm light switches are usable on stairs, corridors, etc.

The following figures show some different types of keys:

Lighting control key	1P/1M/ 10 A/ 250 V~ 1- Key, flat surface.
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Note: Dimensions are optional

V - Panel clamps

Clamp, (CONNECTION / DISTRIBUTION POINT), 4P, 160A, 400 / 230V, 50hZ

Electrical technical characteristics electric:

Rated current 160A

Number of Poles 4

KPI 20kA

ICW 6kA

Uimp 8kV

Physical technical characteristics:

Suitable clamp to be mounted on the base (profile) DIN metal Fe / zN

Dimensions 45x72x98mm

Number of clamps / hinges 7 pieces

Geometric dimensions of clamps [1xø9 - 1xø8 - 5xø6]

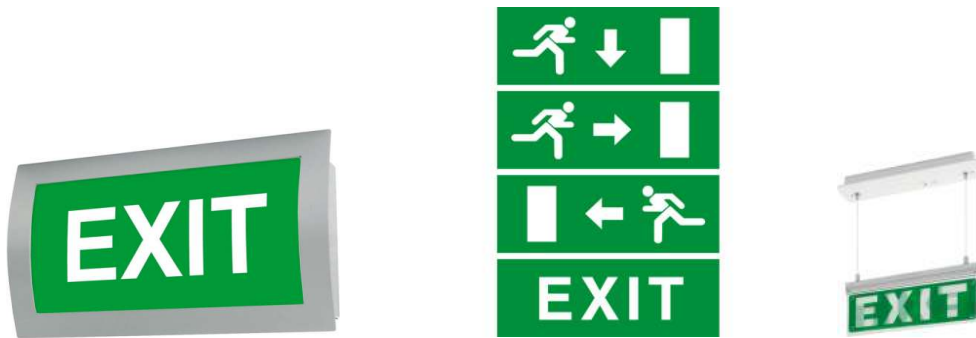
Maximum section for conductors [1x5mm² - 1x25mm² - 5x10mm²]

VI- Emergency lights and exit signs

The emergency lighting package must be installed in those places where the project has provided. The lid of the package must be green and have the appropriate markings:

- A man running,

- Arrow indicating the direction of departure,
- The word exit.
- Written in white



VII- Uninterruptible power supply (ups), of security and telephony centers.

The following are the Technical Specifications that UPS must have:

1 phase in input and 1 phase in output:

- a) Single phase connection 230V + N + E / 50Hz
- b) Installed power 3kVA / 2.4 kW (1 phase, 50Hz).
- c) Output power with 1 phase 3kVA / 2.4kW, 50Hz.
- d) Back-up time of 10 minutes at 3kVA / 2.4kW.
- e) Input voltage tolerance + / - 20%
- f) Converter with IGBT technology with directed power equipment, which operates with pulse width modulation (PWM)
- g) Power Factor > 0.99
- h) Low harmonic distortion (THDI) < 3%
- j) Inverter using IGBTs power conductor operated in PWM and equipped with output filter. Adjustment with digital signal processor (DSP- DSP digital signal processor).



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Others :

- a) Separation of UPS and batteries
 - b) Impact and user interface
 - c) Integrated for manual and automatic by-pass.
- The batteries will be hermetic on a separate shelf, with valve-regulated lead-acid (VRLA). In conformity with ISO140001, ISO9001, TUV

Modes of operation

Have the opportunity to choose between the following methods:

- "On Line" mode
- High Efficiency mode : "Economy" mode
- "Global Supply System (GSS) mode

Self-test, remote and preventive maintenance

- a) The UPS must be able to automatically perform battery tests to check their efficiency. The test should generate an alarm for detected defects.
- b) The UPS will be equipped with a self-diagnostic system

UPSs must be fabricated to meet the following standards:

- a) Electromagnetic Compatibility - EN50091-2 Electromagnetic compatibility and IEC 62040-2 Electromagnetic compatibility
- b) Safety - (EN) IEC62040-1-1 General and safety provisions for UPS installed in operator-accessible areas;
- c) EN ISO 9001: 2000 Certification quality systems - The UPS manufacturer must be in accordance with the ISO 9001: 2000 standard, for Quality Assurance in the following processes: Design, Development, Production, Installation and Technical Support
- d) ISO 14001 (Manufactured in one of the EU countries)



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CONFORM OF RULES: TUV, VDE, EN / IEC 6040-3, FCC PART 15CLOS A, IEC 60950, IEC61000-3-3

VIII- Uninterruptible power supply (ups), of information cabinet

The following are the Technical Specifications that UPS must have:

3 phases in input and 3 phases in output:

- a) Three-phase connection 400V + N + E / 50Hz
- b) Installed power 15kVA / 12 kW (3 phase, 50Hz).
- c) Output power with 3 phases 15kVA / 12kW, 50Hz.
- d) Back-up time of 10 minutes at 15kVA / 12kW.
- e) Input voltage tolerance + / - 20%
- f) Converter with IGBT technology with directed power equipment, which operates with pulse width modulation (PWM)
- g) Power Factor > 0.99
- h) Low harmonic distortion (THDI) <3%
- i) Inverter using IGBTsi power conductor operated in PWM and equipped with output filter. Adjustment with digital signal processor (DSP- DSP digital signal processor).

Others :

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- b) Impact and user interface
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- d) ISO 14001 (Manufactured in one of the EU countries)

According to the rules of:

TUV, VDE, EN/IEC 6040-3, Fcc Part 15Clos A, IEC 60950, IEC61000-3-3

WIRE AND CABLES

All wires and cables must have the relevant local authority's approval certificate and the factory test certificate.

Wires must be plain annealed copper conductors, insulated with PVC single core for drawing inside conduits and trunking.

Insulated wires and sheath need to be with colored isolating to identify phase and neuter.

All the cases when PVC cables terminate in a fuse distribution board, electrical equipment etc must be left a freely quantity cable to permit in the future stripping of reconnection wire terminals without causing their withdrawal.

Cables for every section of installation shall be socked closed through tubes and in summary inserting boxes system for that particular separate cable. Cables need to be installed using "loop" system.

Stripping of cable insulation with PVC must be done using a proper tool for stripping and not a knife.

Wires must be colored to be identified. BLACK must be used for neutral conductors; GREEN/YELLOW must be used for earth conductors and RED, BLUE and Yellow for phase conductors. The same colors must be used for connection of the same phase conductors. The same colors shall be used for connection on the same phase of supply throughout the installations.

All single core cables must be delivered in such a way to show the labels of producen, seals or other proof of origin and the contractor, must obtain certificates of routine tests against a given order, when requested by the Engineer.

The number of cables to be installed in conduits or trunking must be such as to permit easy drawing in without damaging the cables and must never be more than 40%. Installation shall comply with the Local Electricity Authority's regulations



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FLEXIBLE CABLES (WITH SOME MULTIPLE CORE WIRES FOR EVERY WIRE)

All the cables must have approval certificate from relevant local authority and fabric certificate.

PVC insulation of the cable multiple wire or with single wire easy conductor from temper conductor isolating with PVC upper final sheath must resist 600/1000V.

All the cables put within tubes shall be isolated with high conduction PVC.

Flexible cable consist of multi-striped wire and depending on what we have:

- Three wire cable, 1 neuter, 1 earth (for mono phase system)
- Four wire cable, 3 phase and 1 neuter (for three phase system, without earthing)
- Five wire cable, 3 phase and 1 neuter and 1 earthing (for three phase system, with earthing)

Flexible cable must have colored wire for identification. BLACK shall be used for neuter conductor, GREEN/YELLOW shall be used for earth conductor and RED/BLUE and YELLOW for phase conductors. Same colors shall be used for connections on the same phase conductors. Same colors shall be used for connections on the same phase of supply throughout the installation.

Any cable smaller than 2.5mm² must not be used in the installation, unless it is specifically mentioned. The earth continuity conductor must have a minimum size required by regulations.

CHANNELS AND ACCESSORIES

Electric installation can be done in two ways:

- Under plaster inserted in flexible PVC tube
- Above plaster in PVC channels (is introduced in point 8.1.7)

Accessories of installation under plaster are:

- Flexible tube PVC different dimensions in dependence of dimension and number of wires that shall be put in it.
- Distribution boxes (introduced in point 8.1.5)
- Boxes for fixing plugs or breakers (introduced in 8.1.13 and 8.1.14)

All those must be set before plastering is done.

Electrical installation under plaster must be done according to the following steps:

- Opening of channels in the wall with such a dimension that flexible tube will be freely inserted and such a depth that must draw above final plaster level.
- Put flexible cable and PVC tube which will be temporary fixed with plaster (later close channels with mortar plaster)
- After plastering is done, insert wire or cable with their guide which will be entered freely and leave an adequate amount on both sides to continue the connections and mounting



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Flexible tube shall be of type DL 44 Range (NF Range) for corridors and/or of the type DL 50 Range (BR PVC Range) for fabricated rooms of GEWISS-ITALY or another similar producer will be accepted according to the appropriate standards as following:

- Compliance with standards: CEI 23-32
- (Resistance) Firmness of isolation: 100MΩ
- IP rating IP:IP40
- Impact resistance: IK08
- Installation temperature:-5/60C

Channels and putting of PVC flexible tube shall be fixed in distance of 0.4 m suspend ceiling on horizontal runs and lowering for switches and plugs shall be made right vertical and no with angle and arc form

DISTRIBUTION BOXES

Distribution boxes, depending on the system to be used, are under plaster and above plaster so that the way of fixing them is with plaster or screw.

Materials and their technical characteristic are the same as for flexible tube described in the point 8.1.4

Dimensions of distribution boxes vary according to the circumstances and need. They are in circle form, square, rectangle and their shutter covers are with different colors

It is important that connections of wires/cables inside draw boxes shall be realize with joined clamp (point).

FLEXIBLE CONNECTION

Flexible connections are used usually in laboratories and consist of the electric line runs near device with ending draw box and from here into device that will be connected one flexible connection is used outside wall. For this outlet cable from the draw box must be well insulated within technical condition. Cable is to be with two insulation layers and inside flexible tube. Its connection with the device shall be made in its holder.

CABLE TRUNKING

System of canals channels is frequently used in reconstruction especially when an old electric system have be put out of work and a new one shall be installed without damaging plaster or in construction with dismounting materials.



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Systems of channels as system under the plaster with flexible tube have to be completed according to all the technical condition of electrical installation described in the point 8.1.4

System of channels must be on series NP 40/42 produced by GEWISS-ITALY or other producer meeting the appropriate standards.

System of channels consist of accessories such as:

- Channels with different dimensions, depending on the number of the wire/ cable plugs, switches etc, to be installed in it, length 2 m
- Corners (serve to form an angle in installation) which depend on the channels is being used
- Deviation in T form
- Draw boxes at different dimensions.

Mounting of channels is to be made by screws, and be put 0.4m under level of ceiling, distribution network and on high plugs/switches for their mounting.

LAMPS AND LUMINARIES

The location of luminaries must be as indicated in drawing of electrical engineer. The lighting installation have be carried out using PVC insulate cables type NUM run within PVC conduit concealed inside building plaster or in canals when is system of canals is being used.

The cables must be 1.5mm² (minimum) section to suit the circuit loaded, the needed tolerance, being made to ensure that the limit of volt drop for the final sub-circuits. In all instances a separate earth continuity conductor must be installed. No more than three lighting circuits shall be bunched in the same conduit. Luminaries shall be securely fixed on the environment ceiling, suspended or direct on surface of ceiling according to the kind of luminaries and recommendation given from manufacturer (neon together with lamps shall be supplied by the contractor)

Throughout suspended ceiling area where fluorescent luminaries are to be installed, final connections of each luminaries shall be made by means of a three core flexible cable of suitable heat resisting qualities via a plug in ceiling rose connected to the conduit box or cable trunking. The appearance and light distribution characteristics of all luminaries must comply the detailed information given in this specification. The design and the construction of the luminaries shall be such that lamp cap are not subject to temperature in excess of the continuous running temperatures for which they are designed

LIGHT SWITCHES

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The location of lighting switches indicated according to the project done by the electrical project engineer.

Generally lighting switches throughout the building must be suitable for flush mounting (under plaster) . Flush switch within the building must be as follow:

Play bus range GW 30 011, IP-16, color by architect. The switches must be of the "quick-make slow break" type designed to control AC circuits. They must be rated at a minimum of 10 amps. Switches must be of the "broad rocker" type gauge to give multiple switch units, until the specifications are produced. Switches must be mounted in an electric network to provide required spreading, when boxes with metallic cable shall be fit flatly on the wall plaster. Switches can be of such a form to be mounted on the layer of plaster. Those kinds of switches are frequently usable in these cases when trunking electrical distribution system is used.

It is also recommended to use it in wood and metal rooms, in transformer rooms of generator.

Switches, according to the position where they are being used and the on-off way of switch are divided:

- One pole switches
- Two poles switches
- Deviat switches
- Switches with signal lamp and time switch

One pole switches must be used usually in a small area where the number of luminaries is small(1or2)

Two poles switches must be used usually in those area where the number of switches is big and can be switch on -off in partial way for example in classes. Where are two rows with luminaries, they can be switch on in alternative way only one raw or both at the same time.

Deviation switches are used in those area where there are two in/out. After they switch on in one in/out coming side and they can be switched off the other in/out coming, or may be used in corridors

Switches with signal lamp and time switches are used in staircases, or corridors.

In following figures are given some different type switches:





SOCKET OUTLETS AND PLUGS

A complete system of socket outlet units must be provided in the position indicated on the drawings done by the electrical project engineer.

All sockets to be mounted in schools/kindergarten shall be of the earthed type and be protected for children.

Sockets like switches can be the type mounted under or on the plaster.

Sockets are divided according to their functions:

- Voltage socket one, two or three phase



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- Phone socket and LAN system
- TV sockets

One phase voltage socket as indicated in the following figure have one pin per phase. one for neutral and one for earth fig 1 or earth contact fig 2.



Fig. 1



Fig. 2 Earthing contacts

All sockets unless otherwise specified, must be of 16 amps 2 pin and be out of surface. They must be flush mounted and have a color to match the plates for lighting switches.

All the sockets must be of similar type and specified as follow:

Playbus Range, with safety shutters 250 v, 2P 16A

Playbus Range, with safety shutters 250 v, 2P 16A

Other electrical accessories such as push-buttons, flush mounting box etc must be according to the GEWISS Catalogue generale 2000 or approved similar type.

Two and three phase sockets are used only in laboratories or in workshops and are recommended to be of the type on the plaster as indicated in fig., or down plaster as indicated in fig.2.



Three phases socket above-mentioned is 16A.380V with earth, so cable supplying that is 5 wires 2.5 mm².

In case of three-phase machinery more powerful than in the base of device power are foreseen to be used, electrical engineer must account the dimension of the supply cable and amps of the socket.

Phone socket and LAN system are the same and are detailed described in point 8.6 and 8.7.

TV sockets must be coaxial with direct protection.





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EARTHING SYSTEM

All apparatus or their parts not solidly connected to the earth continuity system must be connected to a single earthing point system in an approved manner by solid conductors secured by means of substantial bonding clamps. Where any piece of equipment is connected to water, gas or fuel line, the apparatus shall be bonded to the line using 20mm x 1.5mm tinned copper type or equivalent PVC insulated earth cable. Throughout all conduits and trunking installations a separate protective conductor shall be installed, connected to an earth terminal in each conduit box, and installed within each length of flexible conduit.

Nevertheless the provision of a separate protection conductor, the continuity of the conduit and trunking installation shall be the same standard as though they were the sole protective conductors.

Earth electrodes shall be profile L of galvanized steel 50X 50X5(or galvanized earth electrodes), which must be put at least 2 m deep in the ground. The number of earth electrodes depends on the sort of the site and on R_e (earth resistance), which shall be smaller than 4Ω . For this after terminating and fixing electrodes measurements with R_e apparatus shall be made and a report shall be held, which shall be introduced to supervisor. In case that R_e is more than 4Ω , then the number of electrodes shall be increased to get the required one.

Electrodes shall be placed in rectangle, square and triangle form according to their number but always in a length of 1.50 m from each other. Electrodes shall be connected with each other by means of zinc bond 40x4mm, by means of welding or screw and nut. Connection point of electrodes shall be made with final connection against the rust. From the final point shall be come out with a continuity zinc bond 40mmx4mm and entered in the transformer room and the potential busbar and from there in all equipment's of the transformer room laying a earthing cable with the diameter min.25 mm².

From the main Tu distribution panel the earthing shall be spread together with cable and/trunking of neutral and phase, in all off voltage and shall be of dimension min 2.5mm².

Metallic parts of installation and other pieces connected with installation shall be eathed in dependent manner from distribution neuter and neuter of the distribution transformer. Continuity of earthing conductor shall be installed in all circuits and to stick in metallic part of fixed luminaries, with clutches of earthing all the sockets and metallic parts of the wall.

All metallic parts of equipment and motors shall be connected with earth system.



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ATMOSPHERIC PROTECTION SYSTEM

Atmospheric protection system is very indispensable for geographic location and atmospheric condition of Albania.

Atmospheric protective system is and shall be raised dependent, from the earth system and to comply application conditions according to the Local Electricity Authority Regulations.

The value of the resistance of this system shall be smaller than 1Ω . During the system's work (after the electrodes shall be put) shall be carried out the measurements of the R and in the case if that is more than 1Ω , then the number of electrodes shall be increased until required value. The measurements shall be repeated twice. Once with damp ground and another time with dry ground.

Materials that shall be used for this system (bands, electrodes that shall be inserted in the ground, arrow, fixed bolt etc) shall be made of zinc or galvanized iron. Bands shall be with dimensions of 40 mm x 4mm, or 30 mm x 3mm, or bar with diameter min. 10 mm.

Electrodes shall be with length 1.5 m, as in the cases of using iron of "L" shape (50 x 50 x 4 mm) galvanized, as well as using zinc electrode manufactured from the factory.

Arrow shall be from zinc, for ex. a zinc tube 3/4 which shall be made with peak and have such a length to exit min 0.6 m above the highest point of the object.

Bolt and nut that shall be used to fix the band with electrodes has to be min. M 12

Installation of the atmospheric protective system depending on the object can be realized:

- For existing object that shall be reconstructed without have not this protective system.
- For new object that shall be constructed

For existing objects needed:

- A channel with depth of min 0.5 m and with adequate width shall be opened to lay the band, which will be laid in all perimeter of the object, about 1m far
- Extension of the band in all perimeter
- Opening of the holes and putting the electrodes 1.5m in depth 2m, so 0.5m below ground level in four angles of the object, and their connection to the object
- Outlet of electrodes with bands, at least two angles of the object, (diagonal), up to roof/terrace fixing the band on the wall by means of screw and plastic holders.
- Out coming on roof/terrace connected with each other, forming a "loop" with the same band.
- On the higher point-s of the roof/terrace arrow is fixed, which is connected to the above mentioned "loop".

Note: All the connections shall be made in such a manner to have high conduit and not to have corrosion and oxidation of the connection points.

For new objects a protection system raised the same way as above mentioned: different electrodes and bands shall be put in the ground after being hydro-isolated all along the perimeter.

POWER DISTRIBUTION

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LOW VOLTAGE DISTRIBUTION

network projected from by the electrical Engineer and shall comply with all the conditions with the local electricity authorities regulations.

Low voltage distribution starts from the transformer side of low voltage to every socket, switch and luminar. Distribution of low voltage shall be made with trunking or cables, which are described in the point 8.1.2.

THE MAIN LOW VOLTAGE PANEL

The main low voltage panel shall be put in the transformer room, in the case that it is in the building or in particular building, or in the case that building supplied with low voltage.

The main low voltage panel may be of the type on the plaster (mounted with screw and holder directly on the wall at height of 0.9 m from the floor level) or under plaster. It shall be metallic, painted, resistant against corrosion, and be locked up.

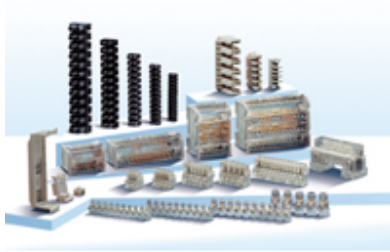
Its dimensions are in dependence of the electrical device that shall be mounted which are in dependence of the building load.

The main low voltage panel have to contain at least:

- Energy meter
- Main disconnector 3 phase 400V automation, amper depend on the load
- Three phase automation for every floor (suggested that every floor to be provided with three phases for a better security distribution of the load)
- Ampermeter for every phase with indication on its cover
- Voltmeter with three positions to be measured every phase with indication and commanding in its cover
- Signals of the phases with idication in its cover
- Bunches of the earth connected with earthing system

It's mounting with components, shall be made by an electrical specialist under the supervision of the engineer. All the bunches and cable trunking inside panel shall be made by means of bunching and not nastroband

In following figure are introduced some sort of bunching, fabricated GEWISS-Italy



Metallic panel shall be connected with earthing system.

An instance of the main panel of the low voltage may be of the type VESTA 400 fabricated from A:B:B -Italy or accepted other similar as specified follow:

- Mounting on the surface(manufactured in the fabric from sheets)
- Fabric manufactured with steel sheets baked in the oven
- Frontal control with MCB SACE ISOMAX;S3N-250
- Ampermeter 0-250/s and kwh gauge
- Dimensions :600x400x1800mm

In the following figures introduced some different types of the fabricated low voltage panel GEWISS, Italy.



DISTRIBUTIONS PANEL ON FLOORS

ADRESA: Rr. "Himë Kolli", Nd.24, H.9, Nr.14 , Tiranë
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Distributions panels on floors are distribution points of low voltage, which except distribution of the voltage for floor make possible selection of the protection.

Those panels are the type that shall be mounted under or above the plaster.

Panels depending on the load may be up to 12 elements for one floor and more than elements for 2 floors, and so on.

Because those panels are installed in public area (schools/kindergartens), they shall be locked up for security.

Important elements of these panels are:

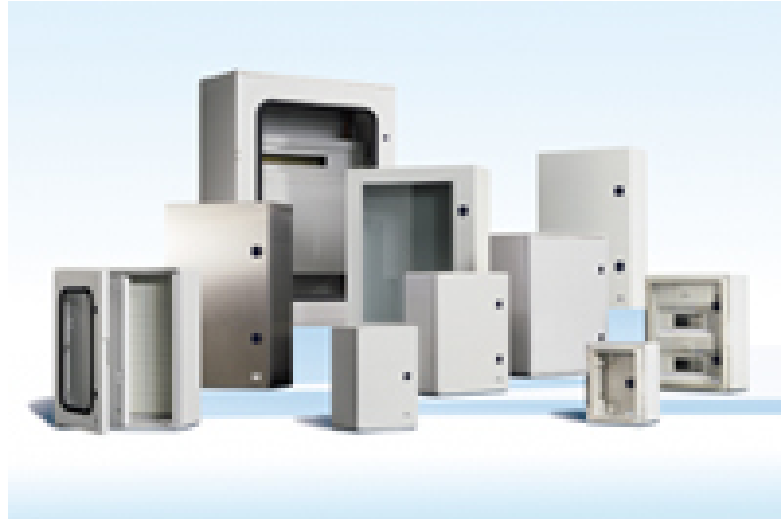
- Main disconnecter automation 3 phase magneto-thermo with differential protection, amperes depending on the load;
- Signals of the phases(3 pieces)
- Magneto-thermo one phase automation's of the power (sockets), their amperes depending on the sockets that shall be supplied,
- Magneto-thermo automations of the luminaries their amperes depending on the luminaries shall be supplied,

It is recommended that system of luminaries to be separated from the power system.

Figurative examples of these panels are given below and are GEWISS Italy fabricated, series 40 CD. It is recommended to be use those similar with those that comply with the same conditions.



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TECHNICAL SPECIFICATION

Min. installing temperatures	-25 °C
Max. installing temperatures	60 °C
IK Code	07
Test of wire warming	750 °C

BOXES OF AUTOMATION SWITCHES

Boxes of automation switches are electric panels for particular area, the same as floor panels, with a difference that number of the panels is reduced.

These boxes shall be used in the area of toilets-showers, in different laboratories of the school, in conference hall etc.

In the area of toilets-showers in which boilers are mounted, must be put those boxes and in their consistency shall be a differential protection, and particular automation for every boiler and luminar system.

In following figures some types of automation boxes are introduced which belong to production of GEWISS, Italy and are recommended to be used those or a similar production.



In figure 1 boxes of automations that put under plaster are introduced and in figure 2 those put above plaster.

Mounting of the boxes on plaster shall be done by means of screw with holders, while these under plaster shall be fixed with plaster and mustn't be above plaster level.

FUSES (CIRCUIT BREAKERS)

Fuses (circuit breakers) are separators of the circuit, which operate in automatic manner in the case of overload and open circuit shortcut. For this the selection of amperes of automation shall consider the protection load.

Circuit breakers used in public area are magneto-thermos and with differential protection.

Circuit breakers are protective units from overload. They are to be put in the boxes of the automaton switches, in the panels of the floors and in the main panel of the low voltage.

According to the number of the phase they protect one phase and three phase circuit breakers.

According to the amperes they are divided :6A;10A; 20A;25A;32A

According to the number of the poles circuit breakers divided: one pole, two poles three poles and four poles.

In the following figure a group of automations are introduced, as individual examples of some types to the production GEWISS-Italy, recommended using similar automations.



Type MTC45, 4500C

Tension, magneto-thermic, compact, separator

1P - 1P+N - 2P - 3P - 4P

Technical specification

		
	• Breaking capacity:	4,5 kA
	• On – of characteristics:	C
	• Nominal Tension:	230 - 400 V
	• Frequency:	50 - 60 Hz
	• Isolating tension:	500 V

Compact circuit breaker 1P+N C 6 4.5KA 1M

Compact circuit breaker 3P C10 4.5KA 2M



Compact one-part differential circuit breaker 4P C25 4.5KA AC/0.3



Type,SD,class,AC Differential circuit breaker 2P - 4P
--

Technical specification			
			
		• Nominal tension:	230 - 400 V
		• Frequency:	50 - 60 Hz
		• Isolating tension:	500 V
Type,SD,class,AS,(selective) Differential circuit breaker 2P-4P			
Technical specification			
			
		• Nominal tension:	230 - 400 V
		• Frequency:	50 - 60 Hz
		• Isolating tension:	500 V

FIRE DETECTION SYSTEM

CONTROL DEVICE

Contractor shall cover installation, test connection and shall guarantee a high quality of the operating signal device towards the fire and alarm system including loudspeakers, luminaries, alarm device, contacts of breaking the glass alarm panel of the fire, charger of the battery, accompanying the relay. Shall be provided and connected in accordance with specifications, at



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positions shown on the drawings. Installation shall be done with JY-(st)-Y2x1mm² cable to fire extinguisher and NYMHY 2x1mm, to loudspeaker.

All the signals shall be provided with an indicated arrow of fire place. The main signals shall also be provided connected between terminals in a manner to help commanding of signals unit in previous drawings.

Signals of smoking.

These must operate in a manner to keep a balance between opened and closed room so when smoke fills in an open room it shall have contact to activate the signal. Every signals shall be projected to cover an area of 100 m².

All the smoking signals are to be installed in a waysuch as to be easily changed and replaced.

AUTOMATIC FIRE DETECTOR

Detector operation or calling points will start as follow:

- Head of alarm devices or calling point shall be lit
- Address of the tools, number of area and description of every place shall be given in control unit (and repetition unit).

Detector operation or calling points shall start as follow:

- Head of alarm devices or calling point shall be lit.
 - Address of the tools, number of the area and description of every place shall be given in control unit (and repetition unit).
 - Alarm shall be transmitted to the fire brigade.
 - Loudspeakers of the ground shall sound in continuity.
- Loudspeakers in all other areas shall pulse.

SIGNAL DEVICES

The main signal shall not contain electronic elements or repair components.

An isolation short-circuit shall be installed with trunking to separate fire zones. A maximum of 20 elements shall be installed between insulation.

All the tools shall be supplied with an integral alarm signal. Where signals are installed inside room, it is the same as not functioning. Electric sources, devices of alarm shall be installed out of rooms.

ALARM BELLS

Loudspeakers of alarm shall be placed among building. The location shall be assigned to secure:

- Minimum of sound level from 75 db(A) is present in every class.
- Non-Functioning of one bell shall not influence in general level of the signal system
- At least one bell for every fire, to be activated.

Alarm bells shall be synchronized by a motor

Alarm bells shall produce a sound level from 92-94 dB (a)

The writing on the alarm bells shall be in red and in clear form" Fire"



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LAN SYSTEM (LOCAL AREA NETWORK)

NETWORK DISTRIBUTION

Since information technology is taught in high school as a subject of the education curriculum there is a need for a laboratory, which except of computer installation shall have a LAN network suitable for the school area.

LAN network consists of a server (with Windows2000(win NT) hub, for a fixed number of computers, depending on the class and hub. All the computers shall be supplied with standard network card and cable with connector RJ 45. Computers are with network right determined from central computer(server). Additional devices to be necessary, are network printers ad network scanners, which offer additional possibility for pupils.

DATA OUTLETS

The terminal sockets are part of the network distribution. They can consist of one or two parts. Sockets of the LAN network is to be set at the same high as voltage sockets recommended at a hight of 0.9 m. They may be of the type below plaster or over it (to be included in the channel system).

Sockets of the network LAN are the same with the telephonic system of the type Playbus Range,RJ45 category 5,GW30267,white color, (or similar with the color of the voltage and phone sockets)

Important note: All the material components and equipment of electrical system such as switches, plugs, lights, cameras, etc, must be delivered on the construction site only after the example and technical specifications and brochures has been approved by writing from the supervisor and UNDP Engineer.

Eng. Ylli Molla
Nr. Lic. E.0206/2