

Názov stavby: ASU N° 9 Košice
Project name: ASU N° 9 Košice

Objekt: Rozvodňa T81
Object: Electrical room T81

Objednávateľ: AIR LIQUIDE AGS GmbH
Investor: AIR LIQUIDE AGS GmbH

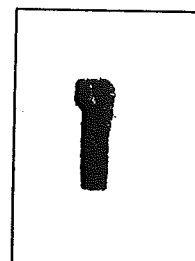
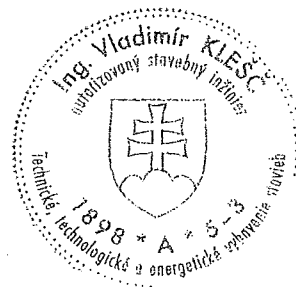
Stupeň: Realizačný projekt Unit 2
Level: Realisation project Unit 2

Časť: Elektroinštalácia
Area: Wiring

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Obsah dokumentácie:
Contents of documentation:

Technická správa
Technical report



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Košice, jún 2005

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1. Project covers

Switch box RMS 07

Lighting and plug-in installation of object

Connection of equipment

Lightning conductor and earthing

2. Used regulations and standards

The design is worked out according to the valid regulations and standards STN, ON, which are related to the designed distributions. The design documentation is assigned according to regulations and STN standards valid in time of its design. The main are:

STN 33 0300 - Types of environments for electrical equipment,

STN 33 2310 - Regulations for electric equipment in different environments,

STN IEC 61140 - Protection against injuries caused by electric power

STN 33 2000-1 - Electric wiring installation in buildings, Section 1: Operating range, occupancy and fundamental

STN 33 2000-3 - Electric wiring installation in buildings Section 3: Basic performance detection

STN 33 2000-4-41 - Electric wiring installation in buildings Section 4: Safety security, Chapter 41: Protection against injuries caused by electric power,

STN 33 2000-5-54 - Electric equipment, Section 5: Selection and installation of electric equipment, Chapter 54: Earthing systems and protective conductors (wires)

STN 33 2000-4-43 - Electric equipment, Section 4: Safety, Chapter 43: Protection against over current,

STN 33 2000-4-473 - Electric equipment, Section 4: Safety, Chapter 43: Applied protective precautions to secure safety, subsection 473: Safety precautions against over current

STN 34 1390 – Regulations for protection against lightning

3. Basic technical data

Distribution system: 3/N/PE AC 230/400 V 50 Hz, TN-S

Protection against contact:

acting parts by isolating acting parts like barriers or covers

nonacting parts by automatic disconnection of power supply

Environment: 311 – basic

 325 – with increased corrosive aggression

 411 - external

Cover of electrical equipment and devices is designed with consideration of type of environment, in which they will be fixed according to STN 33 2310. Covering is marked in legend in designs.

Degree of importance of power supply according to STN 34 1610: 3.degree.

Installed output $P_i = 16 \text{ kW}$

Calculated output $P_p = 16 \text{ kW}$

Projected annual electrical power consumption: $A = 40 \text{ MWh}$

Degree of electric power consumption safety : 3

Standardization of electric equipment according to public note no. 718/2002: B

Measurement of taking of electrical power: not covered

Short-circuit rate in RMS 07: According to design for SP: up to 10 kA

Dimensioning is designed according to STN 33 2000-5-523, STN 33 2000-4-43 and STN 332000-4-473

Impedances and short-circuit rates were controled by program SICHR.

Lighting systém: Intensity of artificial lighting was designed according to STN 36 0450 and STN 36 0451.

Category of lighting: B3

Intensity of lighting: 50 - 300 Lx

Compensation of power factor: local: here are designed with compensation fluorescent fittings with $\cos \phi = 0.9$.

Coloured marking of wires will be made by STN 60 446

Laying of cables will be made by STN 33 2000-5-52

4. Technical solution

Switch boxes – Connection of lighting and plug-in installation of object is designed from switch box RMS 07. Switch box is from sheet-steel manufacture, embedded, 120 modular, located near entrance doors to object. Content of switch box is shown at drawing 87416. Power supply to switch box is solved in another object.

Lighting installation – Artificial lighting of ground floor is done fluorescent suspension fittings. Fitting are placed to height of 2.8 m from floor. Artificial lighting of battery room and capacitors is designed by fluorescent fittings fixed at ceiling. Lighting of transformer cells and cable area is designed by incandescent light fittings fixed cca 1.8 m from floor. Lighting of entrances is designed by incandescent light fittings fixed cca 40 cm over the doors. Its operation is controlled by the power switches from entrance to illuminated areas. Switches are fixed cca 1.2 m from floor.

Emergency orientational lighting in object (Epk 2 Lx) is designed by fluorescent mural fittings placed over entrances from rooms. Switching on of emergency lighting is from blackout.

Distribution system of lighting installation will be lined by cable CYKY type fixed under surface. Cable CYKY 3C – 5C x 1,5 type is used for fittings. Cable of CYKY 2A – 3A x 1,5 type is used for turnings to the switches.

Plug-in installation. Single phase sockets 230 V/16 A and socket boxes 400 V/32 A, 230 V/16 A, 24 V/10 A are placed in the object for local needs. Wiring of type CYKY 3Cx2,5 or 5Cx6 fixed under surface are used for connection.

Connection of equipments

- Instantaneous water heater under wash basin is connected stably – outlet no. 17

- 2 exhaust fans are designed in project VZT in distributing centres. Functioning of fans are controlled from temperature in room by thermostat (fans are switched off at 30 °C)
- Exhaust fans (for 230 V) in transformer cells are controlled directly by thermostat
- the heating is made by electrical convectors

Wiring. The cable CYKY type, placed under surface, is used for bridging. Design of fire stopping is adopted from project for construction permission.

Main connection – main earth terminal, placed under switch box RMS 07, is used for connection with branching point PEN wire in RMS 07, earthing and VZT. Wire FeZn ø8 or CYA 25 is used for bridging.

Lightning and earthing. In object, there is solved lightning system formed by trellis work. Trap wiring will be connected with all metal objects overlapping the shape of roof. Trapping system is connected with grounding by 4 covered drop-ins. Test terminals are placed in box KO125 at height 0.6 m from terrain.

Grounding is designed according to STN 33 2000-5-54 by wire FeZn 30/4 or ø8 mm placed in concrete bed. Wire FeZn will be placed to concrete bed so nearest to bottom, so it will be surrounded with minimally 5 cm layer of concrete. Outlets for connection from grounding are in place of test terminals. Grounding is bridged with steel reinforcement of concrete bed. Bridging will be done by welding.

Connections of grounding wires in footing will be done by welding. All connections of groundings have to be protected against corrosion by passive protection (eg: pouring with asphalt or other insulating material, anticorrosive strip). Anticorrosive protection may not change conduction of connections. Earthing wires are needed at transition to concrete in length minimally 20 cm over surface and it is needed to protect against corrosion 30 cm under surface by passive protection. Maximal resistance of grounding is to 15 Ω, earthing is to 5 Ω.

5. Security and protection of health at work.

All works must be performed in accordance with the valid STN standards in the time of their realization.

Concretely the security regulations for service and work on electric equipment is included in STN 33 2000, STN 33 1310, a STN 34 3103 standards.

Assembly works, according to this documentation, can be executed only by corporate or personal entities, who have a valid authorization in accordance with § 4 of the public note no. 718/2002 Coll. Issued by Ministry of work, social matters and family SR. All equipment, machines and devices mentioned in this design documentation must include the certificates valid in Slovak Republic for a given environment in which they will be located.

Electric equipment must be maintained in the condition which fully conforms to the valid electro technical standards. Preventive, professional and authorized maintenance must be performed by the workers qualified according to § 22 of the public note no. 718/2002 Coll. issued by Ministry of work, social matters and family SR.

Before electric equipment's launch into the operation an inspection and professional testing and then the regular inspections and testing of electrical equipment in accordance with the public notice of Ministry of work, social matters and family SR No. 718/2002 Coll. according to § 12 must be accomplished. The specified inspections and tests of electric equipment must be executed in accordance with the valid regulations. The revisions must be an integral part of due maintenance. The revisions extent and deadlines of electric equipment is covered by STN 33 1500. These revisions can be executed only by qualified inspector according to § 24 public notice of Ministry of work, social matters and family SR No. 718/2002 Coll. Contractor is obliged to add a real performance of wiring into one set of design documentation.

In case of fire, injury or some average in the wiring it is possible to switch off the electric power supply to the object. Electric equipment does not include the components which cannot be cut.

Košice, Juny 2005

Prepared by : Ing. Vladimír Klešč

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6. Technical specification

A. Switch boxes

- 1 pc - switch box RMS 07 of sheet-steel embedded manufacture, 120 modular, cover IP 30/20, content:
 - 1 pc - circuit breaker C100/3, 100 A, trip coil 230 V
 - 3 pcs - circuit breaker C1/1, 1 A
 - 1 pc - stop button harmony 1-0, red
 - 1 pc - diverter of overvoltage, classes B+C
 - 2 pcs - circuit breaker C25/3, 25 A
 - 1 pc - circuit breaker C50/3, 50 A
 - 2 pcs - current protector 32 A 30 mA
 - 1 pc - current protector 63 A, 30 mA
 - 13 pcs - circuit breaker B10/1, 10 A
 - 9 pcs - circuit breaker C16/1, 16 A
 - 2 pcs - circuit breaker C20/1, 20 A
 - 1 pc - built-in socket 230 V, 16 A
 - 4 pcs - motoric circuit breaker 2,5 – 4 A
 - 4 pcs - contactor 20 A

- 1 pc - main earthing terminal

B. Installation material

- 35 pcs - fluorescent suspension fitting 2x36 W, 230 V, IP 54, chain suspender, length 70 cm (531 31 02)
- 8 pcs - fluorescent ceiling fitting 2x36 W, 230 V, IP 54, (531 31 02)
- 23 pcs - mural incandescent light fitting 1x100 W, 230 V, IP 54 (511 26 01)
- 16 pcs - fluorescent ceiling fitting with emergency supply 1x11 W, 230 V, IP 44, NM – not continuing emergency lighting (TMTLUX 11 W)
- 10 pcs - half-countersunk switch no.1, IP 20
- 4 pcs - mural switch no.1, IP 44
- 5 pcs - half-countersunk double socket 230 V, IP 20
- 15 pcs - instrument box KP 68
- 25 pcs - distribution box KR 68

- 4 pcs - regulator devireg 121
- 4 pcs - plastic chest of drawers Mi, 400 V/32 A, 2x 230 V/16 A, 24 V/10 A
- 5 pcs - convector 2,5 kW, IP 20
- 2 pcs - convector 1 kW, IP 54

C. Cables and wires

- 520 m - cable CYKY 3Cx1,5, under surface
- 250 m - cable CYKY 2Ax1,5, under surface
- 280 m - cable CYKY 3Cx2,5, under surface
- 120 m - cable CYKY 5Cx6, under surface
- 120 m - cable CYKY 4Bx1,5, under surface
- 30 m - wire CYA 25, under surface

D. Lightning and earthing

- 25 m - collecting wire FeZn ø8/PV21
- 80 m - collecting wire FeZn ø8/SS
- 40 m - leakage wire FeZn ø8/ø29
- 120 m - wire FeZn ø8 in footings
- 4 pcs - test terminal SZ
- 4 pcs - descriptive labels from man-made material
- 4 pcs - box KO 125
- 4 pcs - four-way cross connector SK
- 2 pcs - terminal for connection of gutter So

E. Other

- fire stoppings
- connection of installation, termination of cables and wires
- connection of earthing wires, welding of wires in footings
- special testing and inspection