

 **Technical requirements for Automation system**

Water treat project

Tbilisi, 2025

1. **GENERAL DATA**

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| 1 | Basis for purchase | Water treat, enrichment plant Madneuli |
| 2 | Type of work | Construction, Greenfield |
| 3 | Customer | JSC RMG Copper, Georgia, Bolnisi region, Kazreti village area |
| 4 | Project code | P23/7 Water Treat |
| 5 | Equipment and Services to be supplied | 1. PLC cabinet with HMI;
2. RIO cabinet;
3. Elaboration of PLC code and HMI screens
4. FAT & Commissioning
 |
| 6 | Delivery time, until | 21th of November, 2025 г. |

**Company must have:**

- All licenses/permits to carry out the relevant type of work;

- Experience in implementing projects using control system equipment and software similar to those used in the Company;

- Availability and sufficiency of free production capacity, qualified personnel necessary to perform the scope of work specified in the technical specifications.

**The list of works of the Supplier must include, but not be limited to, the following requirements:**

- Сollection of initial data to clarify details regarding the connection of signals of the designed equipment;

- Elaboration of design documentation products, including wiring diagrams, specifications (bill of materials), layout drawings;

- Manufacturing, packaging and supplying PLC and RIO cabinets;

- Elaboration of the program code and HMI screens;

- Providing FAT and Commissioning of the system.

Supplier must give last PLC and HMI backups to the customer. PLC and HMI codes must be opened for Customer without any restrictions.

1. **WARRANTY**

- Supplier must ensure that the quality of all supplied equipment meets this technical specification;

- Supplier ensures protection of all supplied equipment from manufacturing defects;

- The warranty period is 18 months from the date of completion of acceptance tests and delivery of equipment;

- Supplier is obliged to eliminate free of charge all defects in the equipment supplied to the Customer, repair and/or replace any defective/faulty components during the warranty period.

1. **MAIN TECHNICAL REQUIREMENTS**

**PLC cabinet:**

Size of the cabinet should be able to contain all necessary equipment. Stand-alone version enclosure is preferable. IP must be IP54 or higher, color – grey (RAL7035). Cable entrance - Top and bottom. Enclosure, door and rear panel: dipcoat-primed, powder-coated on the outside, textured paint Mounting plate and gland plates: Zinc-plated. Lighting, portable table, pocket for documentation. Power supply - 220 V AC 1ph. Terminals - Spring loaded type, 2,5 mm2 wire max, fuse protection for +24V terminal in each control/instrumentation loop.

PLC should be able to utilize program code according to the process description and IO list. It must be modular in order to cover all IOs. There must be 15% spare IO for each type of signal.

Communication cable between PLC and RIO will be done with optic fiber cable.

All VFDs are connected by the FTP cat.5e cable so there must be unmanaged switches in RIO and PLC cabinets. Quantity of ports should cover all VFDs and have at least 2 spare ports.

Minimum requirements for the PLC:

* 24 V DC power supply;
* Main language – Ladder diagram, FBD is acceptable as second language;
* Communication – Ethernet IP is a must for VFD control. Nevertheless, other protocols can be used for communication between PLC, HMI, modules;
* Non-volatile memory;
* High performance, the execution time of a logical operation does not exceed 0.001 ms.

**Minimum requirements for the HMI:**

* Diagonal 12 inch or higher;
* Minimum resolution 1280x800 pixels;
* There should be memory for keeping alarms and trends for at least 2 months;
* Number of Colors - 16.7 million minimum;
* Single-Touch Resistive Touch Screen or better;
* 24 V DC power supply;
* Enclosure Type - panel mount.

**PLC/HMI Code:**

PLC Code must be primary done in Ladder.

All motors must have 2 modes of control: manual and automatic. In manual mode operator can start and stop motor from HMI, all program protections are not working in this mode. In automatic mode operator can start and stop motor from HMI and it is being monitored by system with all program protections.

All PID regulators must have 2 modes of control: manual and automatic. In manual mode PID is not working. In automatic mode, PID is working under the setpoint from HMI made by operator or engineer.

All instruments must have 4 Limits: LL (Trip), L (Warning), H (Warning), HH (Trip).

HMI must have trends for all AI, AO, and Motors’ RPM (Ethernet IP devices). The HMI must be able to keep trends for at least 2 month.

Totalizers must keep data for at least 6 month.

HMI must have alarm list where all alarms can be kept for at least 2 month.

HMI screen must have 2 levels of access: Operator and Engineer. Operator can manipulate equipment in manual and automatic modes, can see trends, alarms. Engineer can do the same as Operator and additionally can change setpoints, PIDs coefficients, Instruments’ ranges. Engineer only can reset totalizers.

1. **ATTACHEMENTS**
* Process Description
* IO List with comments
* P&ID Diagrams