

STUDENTS' WORKSHOP

MINI PROJECT - 2

Title: DUAL HYDRO SYSTEM - Hydro pumps working alternatively

Functional description:

This automation system controls the operation of two water pumps powered by 230V L1 + N which work alternately at low water pressure..

The system has a three position switch (AUTO, PUMP-1, PUMP-2) for selecting the mode of operation of the installation..

- In the AUTO position pumps run in alternatively mode controlled by pressure switch and alternator.
- In the PUMP-1 position only works P1 pump controlled by the pressure switch and the level float sensor.
- In the PUMP-2 position only works P2 pump controlled by the pressure switch and the level float sensor.

This way of selection allows to change one pump in case of failure without interruption of the system.

The operation of this automation is powered with 24 VAC through a transformer 230/24VAC which allows operation with security voltajes, due to the control elements (pressure switch and level float) are in contact with water.

Hydro pumps are protected from overheating with thermal relay F1 and F2, we must take special care when connecting thermal relays since being single phase pumps and AC relays, it must be connected using the three contacts of the contactor and relay (see power scheme).

Power input to the electrical panel, outputs to motors, pressure switches and level float sensor are connected to the electrical panel through terminal strips.

The green lamps indicate the operation of hydro pumps PUMP-1 and PUMP-2.
The red lamps indicate the activation of thermal relay F1 and F2.

An auxiliary relay (C9-A41 X / 024 CA) will be used to protect contactors against a possible short in the cable in the level float sensor.

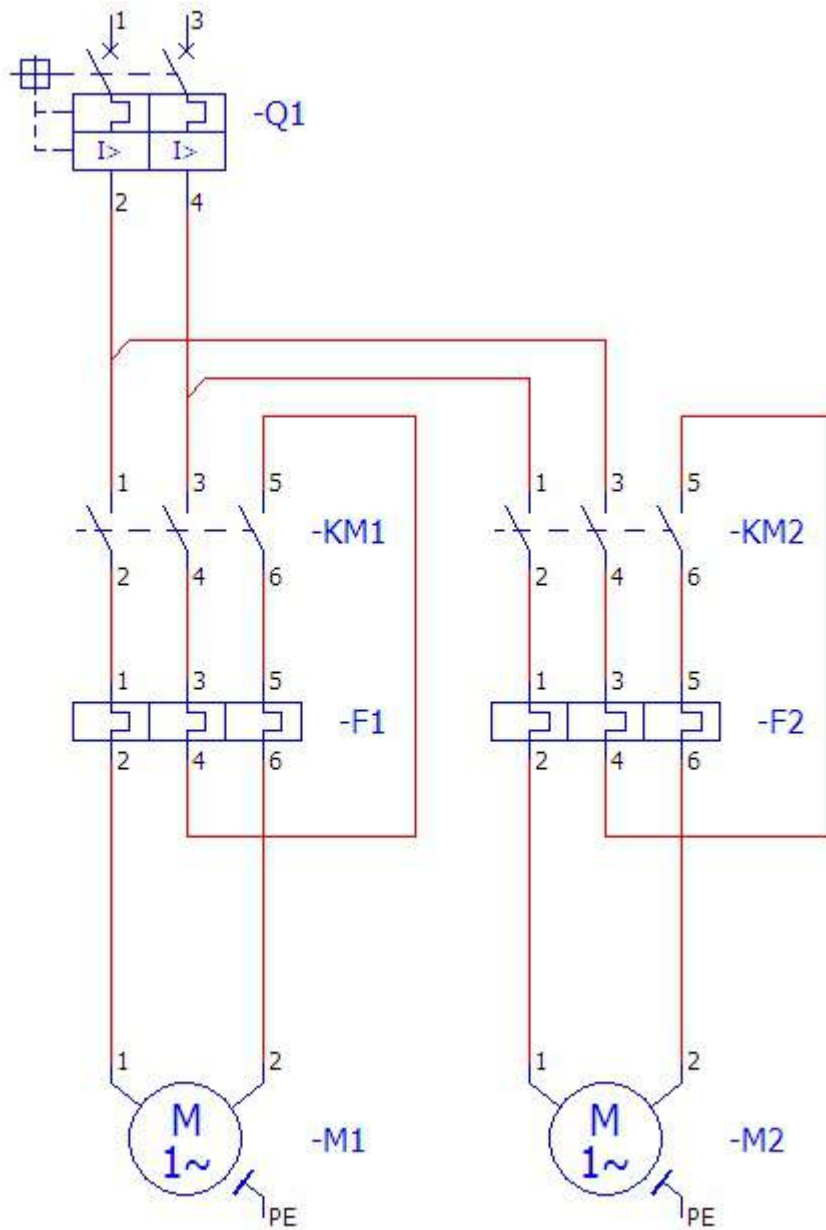
Colors of the wires must be:

BLACK (Phase) and BLUE (Neutral) 2.5 mm. for the power circuit powering pumps.

BLACK (Phase) and BLUE (Neutral) 2.5 mm. for powering the transformer.

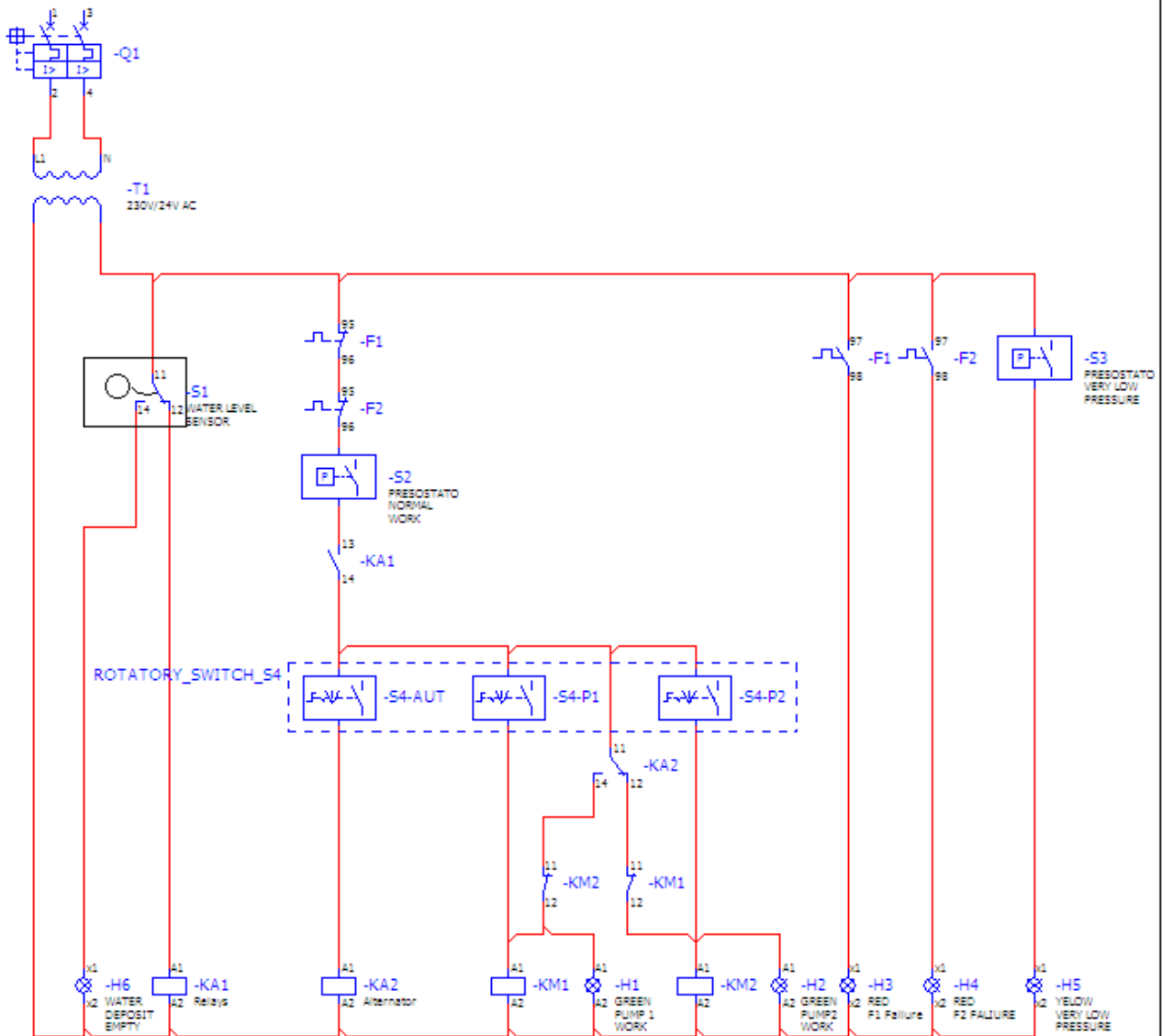
RED 1.5 mm. for powering the automation (contactors).

Important: A phase of the transformer secondary must be earthed



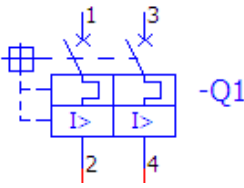

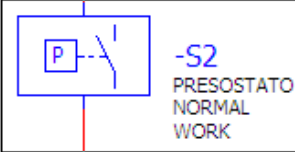

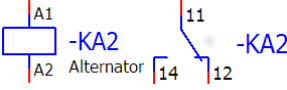

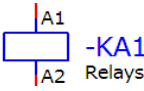

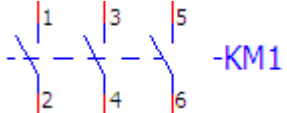

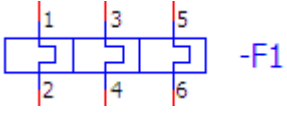

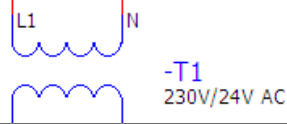

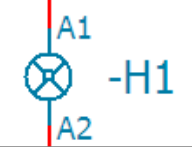

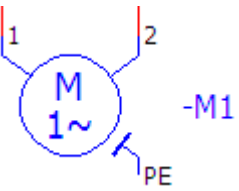

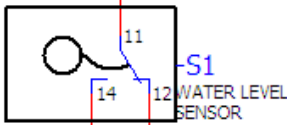

Task :

Installing the Electric system, devices and wiring, and checking operation .



Materials:

- Q1** – Magneto Thermal Switch 1P+N/16A
- KM1, KM2** - Contactor TRIP. CWM9.10 (4KV, 230/24V AC)
- F1, F2** – Thermal Relais RW27-2.8 (1,8/2,8A)
- S1** – Water level Float Sensor.
- S2, S3** – Pressure Switch TYPE PM5
- S4** - 3 ways Switch (PGN1282U) “1-2-3”
- T1** - Transformer 230/24-40VA
- KA1** - Relay (C9-A41 X/024 CA) with socket (S9-M RELECO)
- KA2** - Alternator LOVATO LVMP05 24V/220VAC
- H1, H2, H3, H4, H5, H6** - Lamps 2 Red, 2 Green, 2 Yellow.

<p>Magneto Thermal Switch 1P+N/16A</p>  <p>-Q1</p>		<p>Pressure switch TYPE PM5</p>  <p>-S2 PRESOSTATO NORMAL WORK</p>	
<p>Alternator LOVATO LVMP05 24V/220VAC</p>  <p>-KA2 Alternator</p>		<p>Relay (C9-A41 X/024 CA) with socket (S9-M RELECO)</p>  <p>-KA1 Relays</p>	
<p>Contactor TRIP. CWM9.10 (4KV, 230/24V AC)</p>  <p>-KM1</p>		<p>Thermal Relay RW27-2.8 (1,8/2,8A)</p>  <p>-F1</p>	
<p>Transformer 230/24 VAC 40VA</p>  <p>-T1 230V/24V AC</p>		<p>Lamps: 2 Red, 2 Green, 2 Yellow.</p>  <p>-H1</p>	
<p>HYDRO PUMP</p>  <p>-M1</p>		<p>Water level float sensor</p>  <p>-S1 WATER LEVEL SENSOR</p>	

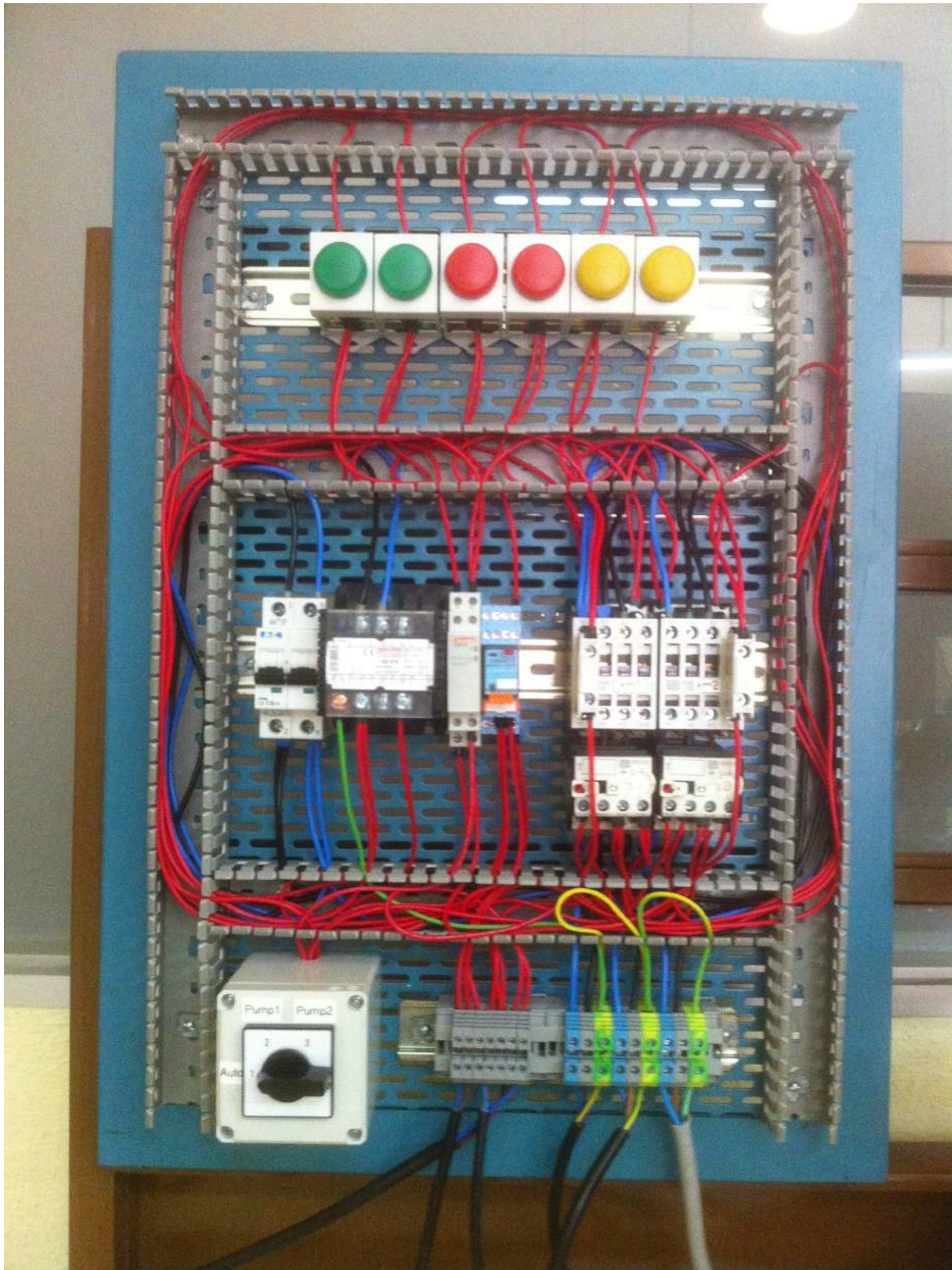
3 way Switch (PGN1282U) "1-2-3"



Overview of the trainer panel



Water circuit



Electrical circuit