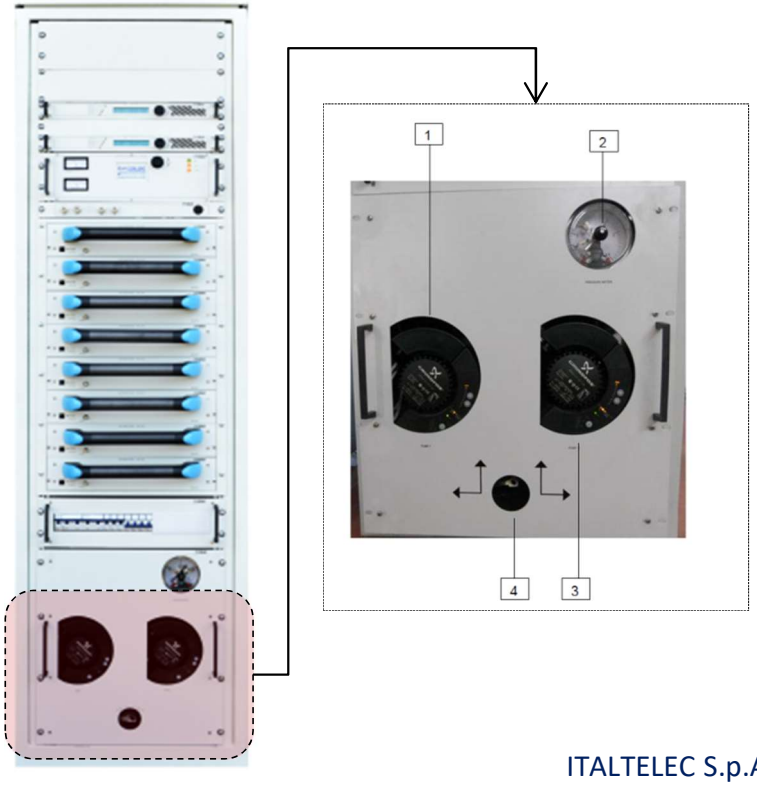
High-Power Liquid-Cooled Digital TV Transmitter

General Description

- **High power density** dictates precise liquid cooling technology to remove the dissipated heat.
- **The cooling system consists** of a pump unit, a heat exchanger and the hydraulic pipline kit.
- **Liquid cooling is the better solution** in terms of improved reliability and the increasing useful life of the transmitter and reduce the AC power consumption inside the transmitter room.
- **Increase the reliability of the electronic boards** that do not deteriorate due to the corrosion and abrasion produced by the forced air cleaner
- **Increase the usefull life of RF semiconductor** (LDMOS) due to running at a lower temperature.

General Description

- **Reduce maintenace transmitter time** due to operate in a clean environment
- It is an ideal cooling system for **hard, very hot, dusty or saline climates**.



Nr	Label	Description
1	Pump 1	Magna 2000 Pump
2	Pressure Mater	Meter M1 with Min&Max pressure switch
3	Pump 2	Magna 2000 Pump
4		V4 Flow switch for circuit config. 1 or 2 pumps

General Description

- Pumping Unit that includes the Water Pumps, the water Filter, the Expansion Crate. The unit is equipped with the Grundfos MAGNA intelligent circulator pump that is based on permanet-magnet motor ensuring the maximum efficency.

This is allowed by the auto adapt function that automatically sets the pump to the most efficient performance.

The necessary coolant flow is adapted by the rotational speed.

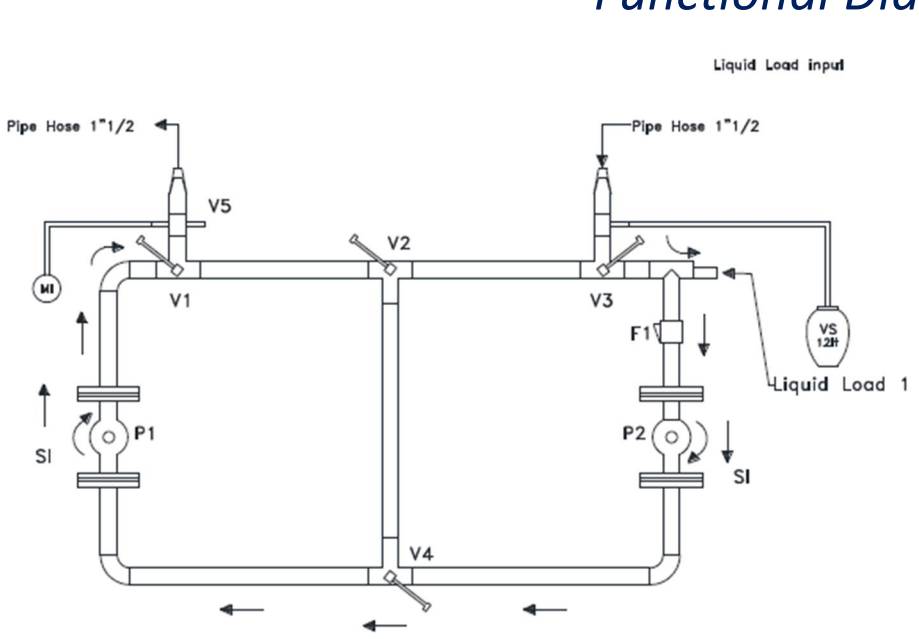
The Unit can be optionally equipped with additional stand-by pump for redundancy.

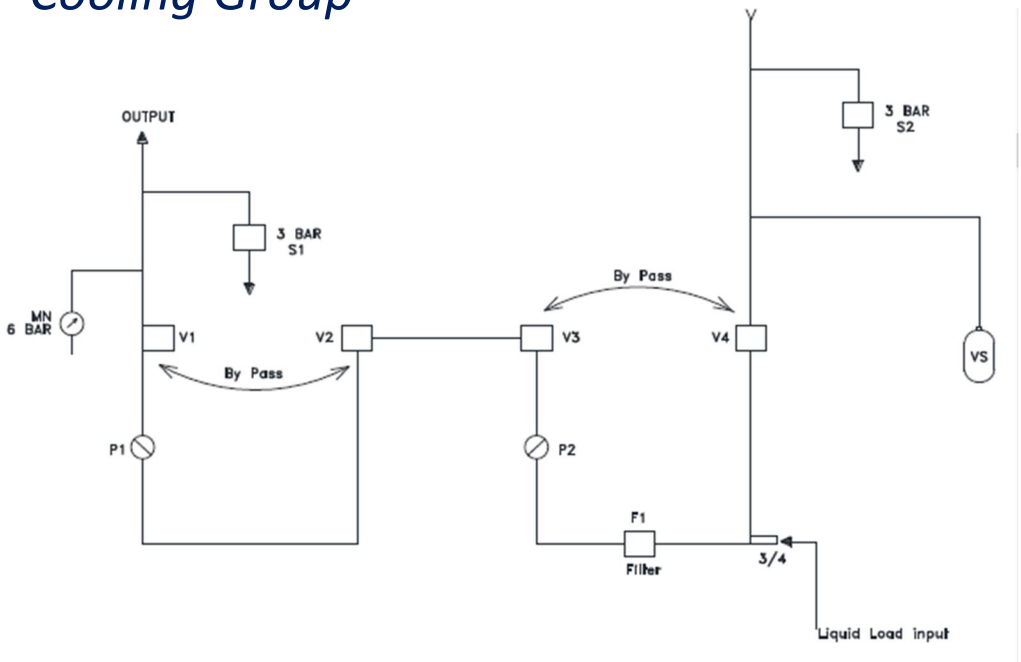
- **Heat Exchanger** water to air type, low noise, which purpose is to dissipate the heat generated by the RF devices inside the Power Amplifier modules.

General Description

The circuit is then completed by the **Hydraulic Pipeline Kit**, that includes the pipelines (Rigid or Flexible), and the Hydraulic Connectors and Valves.

Functional Diagram – Cooling Group

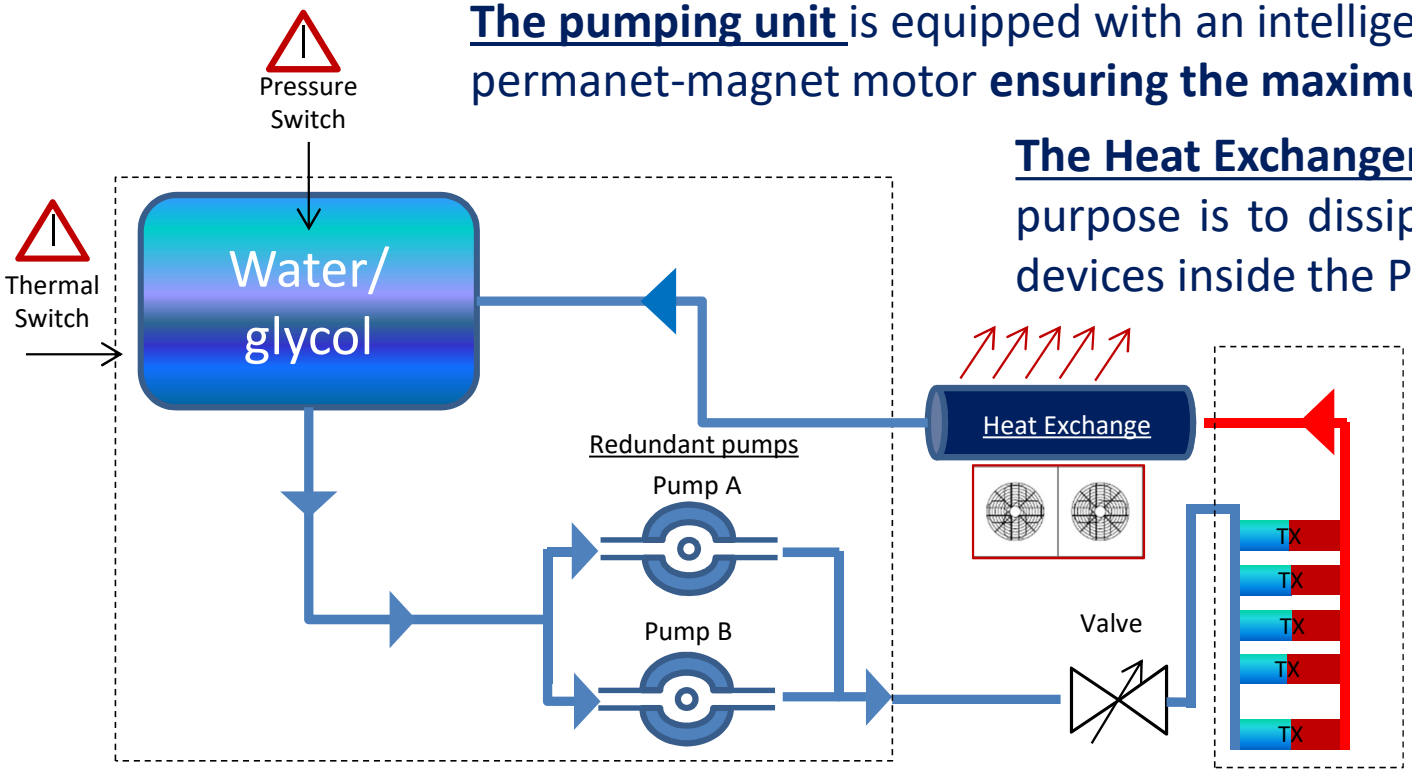




Functional Description

- **The liquid cooling unit** is based on a recirculation liquid loop. In fact the liquid is continuosly circulating through the electronic equipment in a maintenace free circuit

The pumping unit is equipped with an intelligent circulator pump that is based on permanet-magnet motor **ensuring the maximum effciency**.



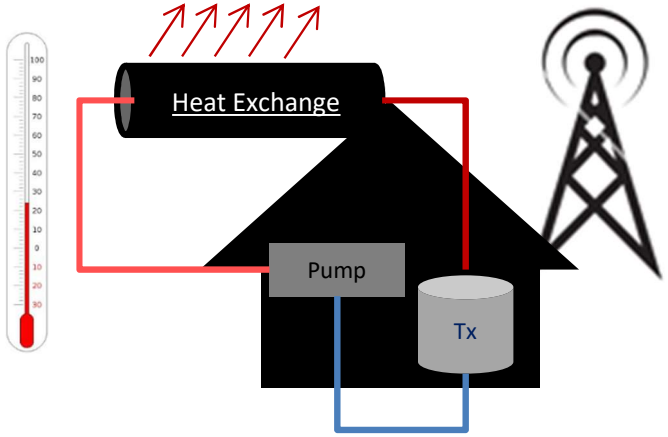
The Heat Exchanger water to air type, low noise, wich purpose is to dissipate the heat generated by the RF devices inside the Power Amplifier modules.

The Hydraulic Pipeline Kit. Includes the pipelines (rigid or flexible), and the hydraulic connectors and valves.

Preventing Condensation

A separate control unit for temperature control and to **avoid condensation in the transmitter system** at low ambient temperatures.

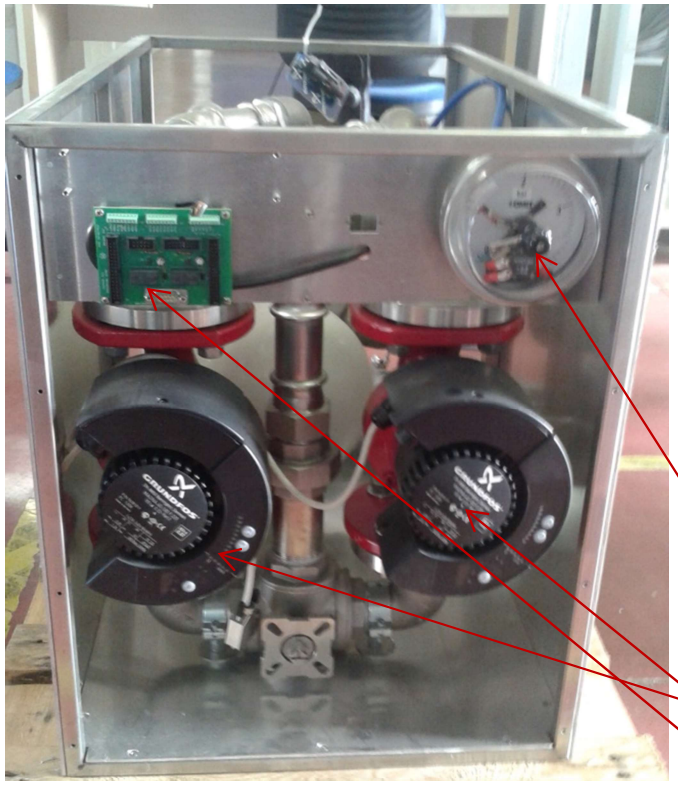
The heat exchangers may be installed anywhere outside the transmitter room.

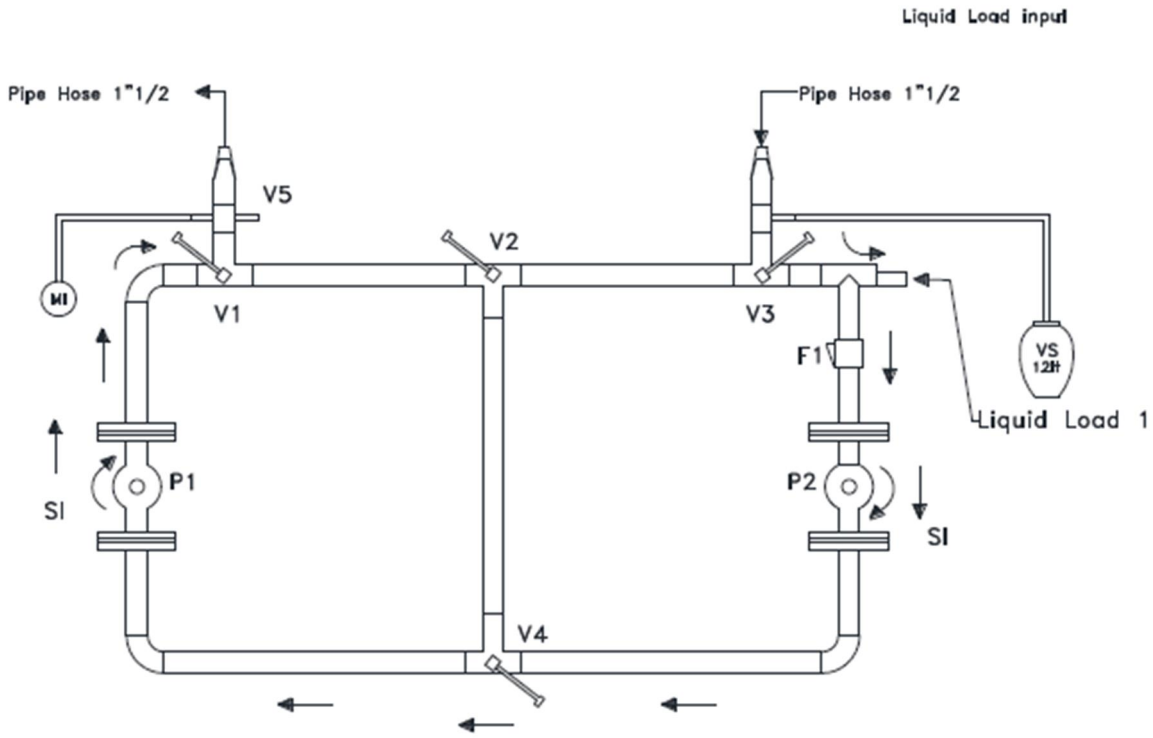


In liquid cooled equipment, we raise the temperature **setting of the cooling liquid in order to keep the ambient temperature above dew point.**

This ensures reliable operation of the system at outdoor temperatures between **-25°C and +50°C**

Control Unit





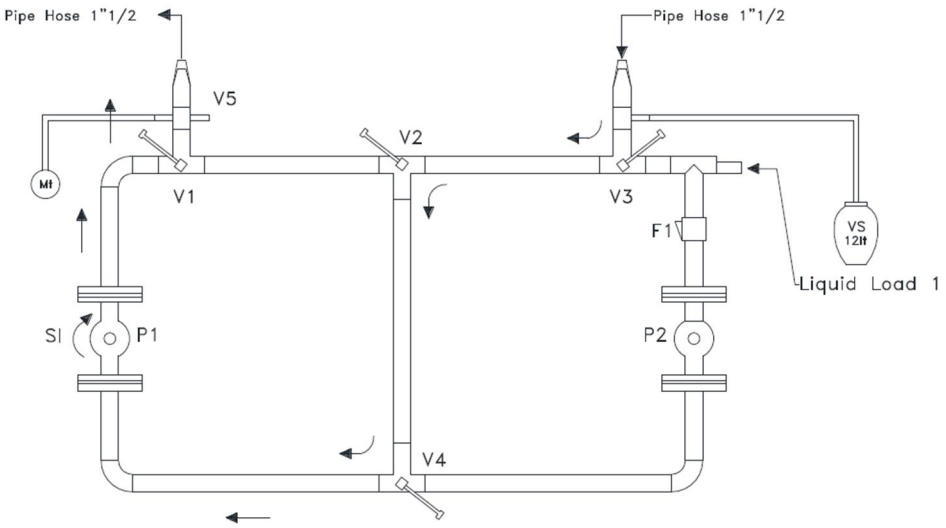
Nr	Label	Description
1	PUMP 1	Magna 2000 Pump
2	PRESSURE METER	Meter M1 with Min & Max pressure switch
3	PUMP 2	Magna 2000 Pump
4		V4 Flow switch for circuit config. 1 or 2 Pumps

Functional Diagram-Failure Pomp

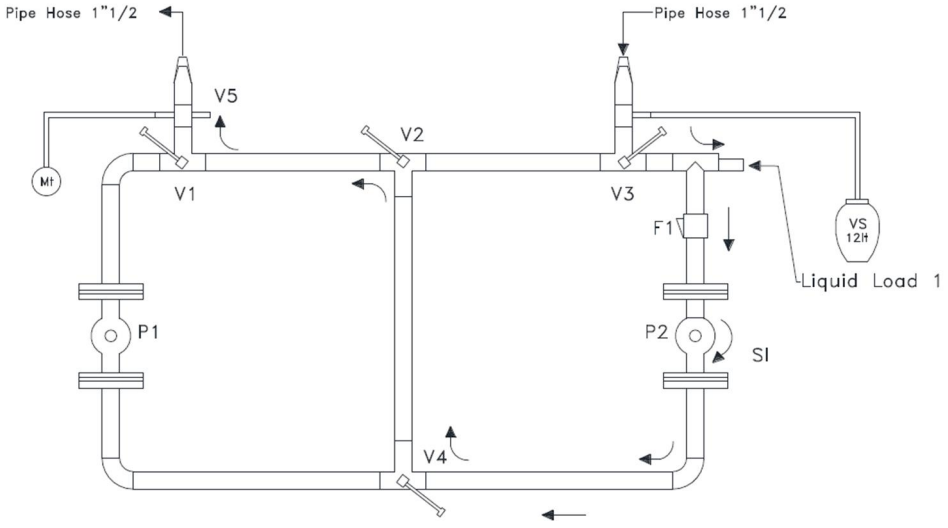
The unit can be optionally equipped with additional stand-by Pomp for redundancy.

The figs show the circulator rearrangement in the cooling in case of failure of Pump 2 or cleaning of Filter and Failure of Pump 1

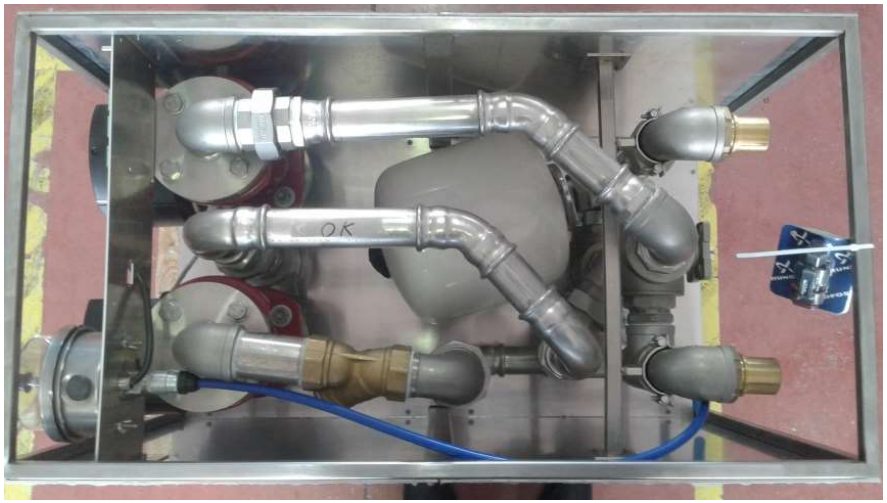
Failure of Pump 2 or Filter cleaning



Failure of Pump 1



Control Unit



IN

OUT

Liquid Load Input

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