

Solution Description Hydra

1. General

2. Installation Considerations

Piping & Instrumentation Design (P&ID)

The following figure describes the hydraulic integration of the Hydra array into an existing Water Heating System.

The Hydra array connects to the Hot Water Loop and delivers the thermal energy absorbed from the air to it.

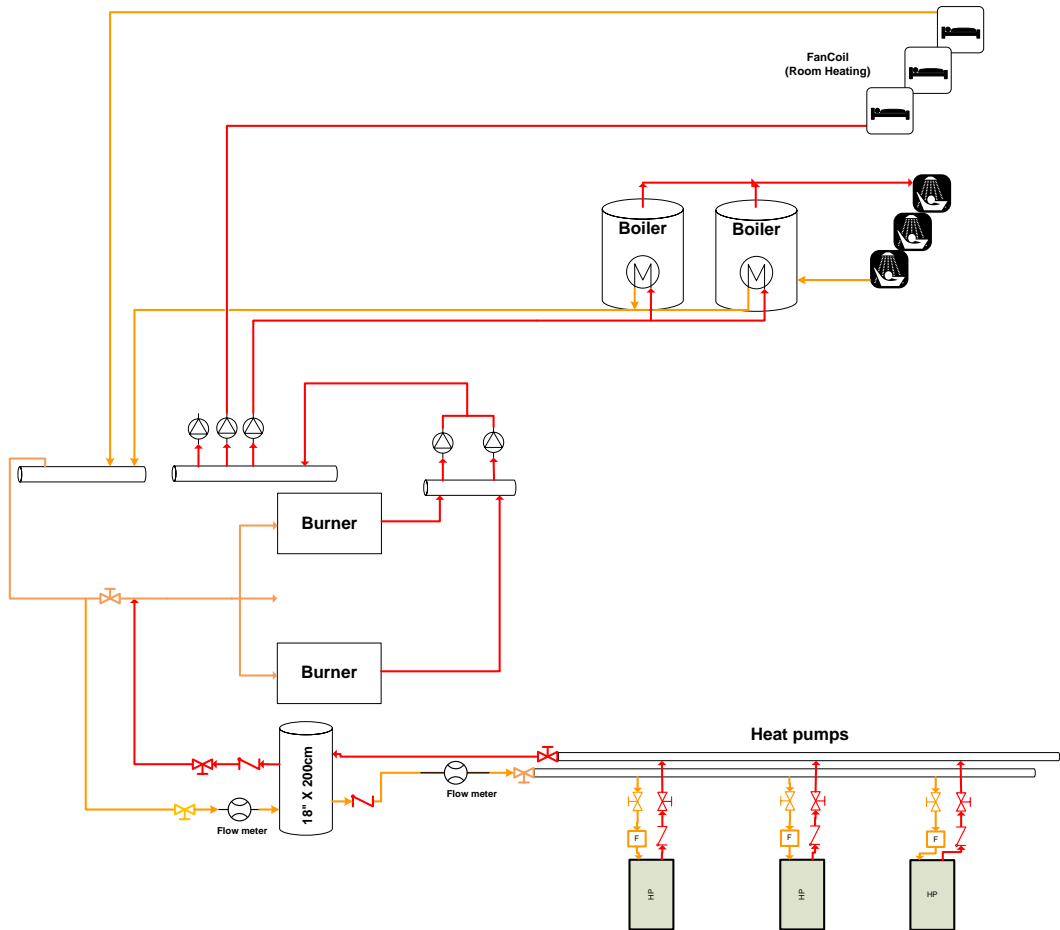
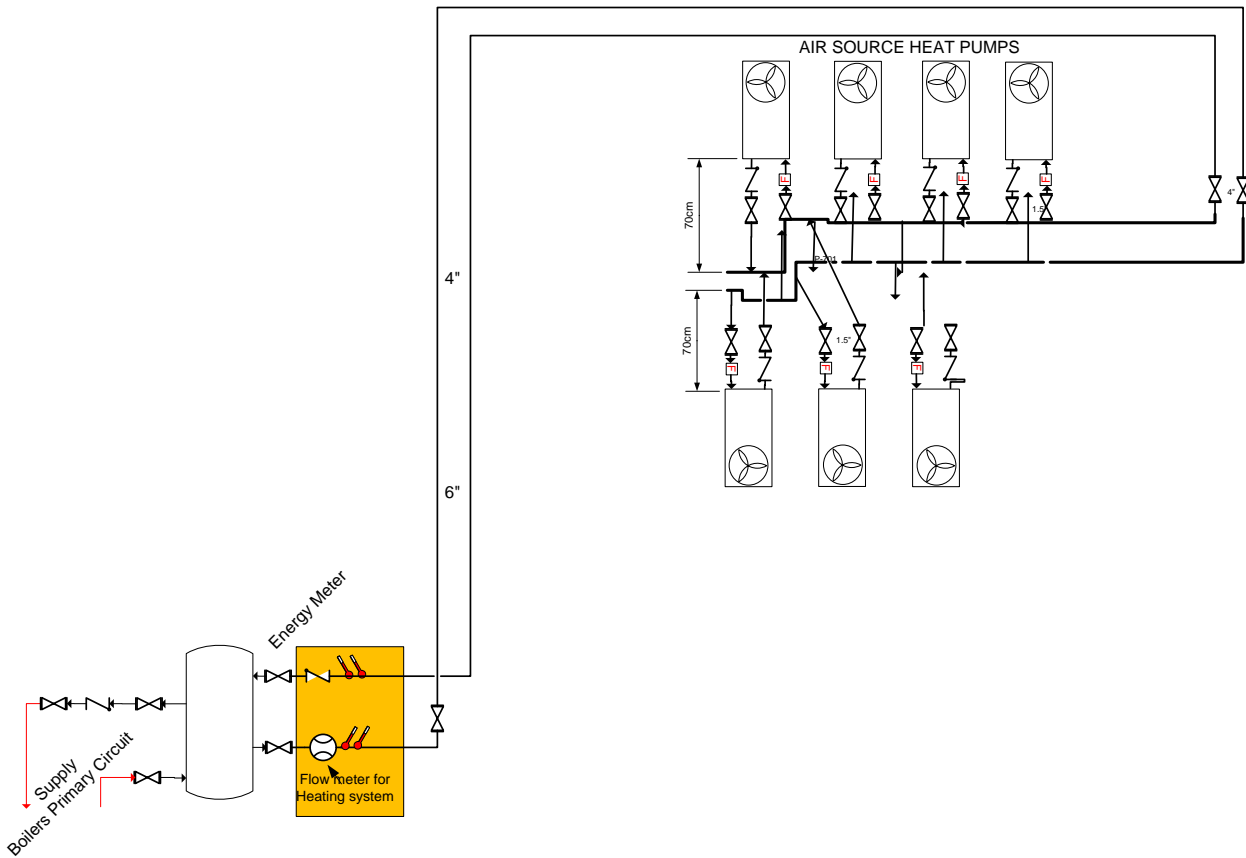


Figure 8 – General Layout (Hydraulic Integration)



The following figure describes the physical interconnection

tion of the Hydra units to the hot loop.

Each unit has an outgoing and an incoming pipe to the loop.

All piping work and material related to the interconnection of the Hydra units to the existing water heating systems shall be isolated.

Figure 9 - Loop Interconnection

Electricity

Component
Main fuse box supplies electricity to the Hydra units (including all required protections and hazards. Each unit uses 3 * 40 AMP
Electricity line from main electricity room to the Hydra fuse box
Electricity line that supplies electricity to the Hydra units

Typical installation pictures



Figure 10 – Hydra @ Crowne Plaza Athens, Greece



Figure 11 – Hydra @ Ramada Jerusalem, **Israel**

3. Software licenses

Each system (project) is provided by default with a Server license for each Hydra Unit and with 10 Client licenses (10 user names & passwords).

A symbolic annual license fee will required after the guarantee period.

4. Maintenance

During the guarantee period all the systems are monitored via the cloud on line 24x7 by Phoebus Energy's service department as well as by the local partner. Most of the typical failures will be detected by Phoebus on line service but some may be detected and reported by the customer.

Preventive Maintenance

Phoebus provides during the guarantee period a preventive maintenance service in order to maintain the proper system operation to meet the optimal operational parameters. Service preventive maintenance will be carried out in coordination with the customer and with minimum of ongoing operation disruption of the system. Preventive maintenance will be conducted at least once every 6 months and will include the following:

- a) Overhaul test
- b) Abnormal noise test
- c) Testing the operation pressures of the compressors
- d) Electric current tests
- e) Monitor & control system test
- f) Reinforcement of bolts
- g) Protections test
- h) DT test
- i) Heat pumps performance tests
- j) Troubleshooting
- k) Electrical panel check
- l) Reinforcement of bolts in Electrical Panel
- m) Overheating tests of electrical components

Corrective maintenance

Failures will be categorized into one of the following levels:

Critical –

- 1- Any failure that prevents the water to be at the committed temperature.
- 2- Any major water leaking related to the heating system installed

Major –

- 1- More than 50% of the Hydra units composing the “system” stop working
- 2- Decrease of system COP in more than 20%
- 3- Communication failure (for more than 6 hours)
- 4- Any Energy meter failure (for more than 6 hours)

Minor –

- 1- Any other sensor and/or meter failure (for more than 6 hours)
- 2- Decrease of system COP in less than 20%
- 3- Failure of single Hydra unit

Status	Action
Critical	1.1 Partner and / or Phoebus shall produce an action plan within one (1) business day from detection/notification of the failure 1.2 Phoebus will supply a workaround within two (2) business days from detection/notification 1.3 Partner may use spare parts in order to fix the problem
Major	1.1 Partner and / or Phoebus shall produce an action plan within two (2) business days from detection/notification of the failure 1.2 Phoebus will supply a workaround within four (4) business days from setting the action plan
Minor	1.1 Partner and / or Phoebus shall acknowledge the error within five (5) business days from detection/notification of the failure 1.2 Phoebus will supply a workaround within ten (10) days from the acknowledging the error.

Spare Parts

Phoebus Energy/ Local Partner will keep an upfront inventory of spare parts at a local warehouse. This inventory will include all the required items (Hydra units, Control items, etc.).