



## PROJECT

### PRO-ENERGY - PROMOTING ENERGY EFFICIENCY IN PUBLIC BUILDINGS OF THE BALKAN MEDITERRANEAN TERRITORY

<b>Work Package:</b>	3. Joint Regional Analysis, Strategy and Framework
<b>Activity:</b>	3.4 Joint Regional Analysis, Strategy and Framework-Joint Criteria for the selection of the pilot public buildings
<b>Activity Leader:</b>	Cyprus Energy Agency - CEA
<b>Deliverable:</b>	3.1.4. Joint Criteria for the selection of the pilot public buildings

<b>Version:</b>	Draft 1.0	<b>Date:</b>	06/05/2021
<b>Type:</b>	Report		
<b>Availability:</b>	Confidential		
<b>Responsible Partner:</b>	Region of Epirus - Regional Unit of Thesprotia		
<b>Editor:</b>	TREK Development S.A.		

# Interreg Balkan-Mediterranean PRO-ENERGY



***DISCLAIMER:***

This publication has been produced with the financial assistance of the European Union under the Interreg Balkan-Mediterranean 2014-2020. The contents of this document are the sole responsibility of the Region of Epirus - Regional Unit of Thesprotia, and can under no circumstances be regarded as reflecting the position of the European Union or of the Programme's management structures.

## CONTENTS

IDENTIFICATION SHEET .....	5
INTRODUCTION .....	6
1. Definition of Joint Criteria for the selection of the pilot building .....	7
2. Joint Criteria for selection of the public building .....	9
3. References.....	13
4. Annex.....	14

## IDENTIFICATION SHEET

<b>Project Ref. No.</b>	BMP1/2.2/2052/2019
<b>Project Acronym</b>	PRO-ENERGY
<b>Project Full Title</b>	'Promoting Energy Efficiency in Public Buildings of the Balkan Mediterranean territory'

<b>Security (distribution level)</b>	Confidential
<b>Date of delivery</b>	06/05/21
<b>Deliverable number</b>	3.1.4
<b>Type</b>	Report
<b>Status &amp; version</b>	Draft 1.0
<b>Number of pages</b>	26
<b>ACTIVITY contributing to the deliverable</b>	3.4 Joint Criteria for the selection of the pilot public buildings
<b>Responsible partner</b>	Region of Epirus - Regional Unit of Thesprotia
<b>Editor</b>	TREK Development S.A.

## INTRODUCTION

PRO-ENERGY is a transnational cooperation project, co-financed by the Cooperation Programme “Interreg V-B Balkan Mediterranean 2014-2020”, under Priority Axis 2, Specific Objective 2.2 Sustainable Territories. The project aims at promoting Energy Efficiency in public buildings in the Balkan Mediterranean territory and to create a practical framework of modelling and implementing energy investments interventions, through specific ICT monitoring and control systems, as well as through energy performance contracting (EPC). The specific objective of PRO-ENERGY is to reduce by more than 20% the energy spending in public buildings of the participating entities in one year after the implementation of pilot actions.

Based on the above, Work Package 3 (WP 3) “Joint Regional Analysis, Strategy and Framework” aims at analyze existing situation in project areas regarding energy efficiency, identify good practices and perform benchmarking, define joint strategy and action plan for the promotion of energy efficiency and prepare for energy intervention in public buildings.

More specifically, Activity 3.4 “Joint Criteria for the selection of the pilot public buildings” aims to identify the public pilot building which will be targeted to identify and develop energy investment initiatives in order to reduce energy consumption and promote good practices. Each partner will investigate at least three public buildings take into consideration the following criteria in order to select the public pilot building.



## 1. Definition of Joint Criteria for the selection of the pilot building

The selection of the pilot public building needs to address the following criteria:

- **Location [Building Area] /Climate Zone**

Consider if the main energy consumer is heating or cooling load (often depends on the season). *For example, in Cyprus there are 4 climate zones. Climate zone 4 (mountainous) has significantly different climate conditions than the other 3 zones, experiencing much colder winters.*

- **Type of building [School, museums, innovation centres etc]**

- **Cultural Value of the building**

Buildings with high cultural value or listed, present less opportunity for interventions and therefore will be difficult to reach energy efficiency level. Large interventions may alter their heritage character and hence are less attractive for big scale renovations.

- **Building Envelope /Construction**

*[Year of Construction, Year of renovation, Area of the building, New Buildings, already installed double-glazing, already installed thermal insulation on the roof, Anti- seismic upgrade, visible structural issues, visual building issues, previous implementation of other Energy Efficiency measures]*

*-Based on the Directive 2010/31/EC on EPBD and on [https://ec.europa.eu/energy/intelligent/projects/sites/iee/projects/files/projects/documents/ilete\\_labelling\\_and\\_certification\\_guide\\_en.pdf](https://ec.europa.eu/energy/intelligent/projects/sites/iee/projects/files/projects/documents/ilete_labelling_and_certification_guide_en.pdf)*

Knowledge of building codes in place at the time of the construction of the building will give an indication of the building's construction, which can be used for estimating insulation levels and give an overall indication of the quality of the envelope.

The building area is proportional to the cost for renovation, but also proportional to the energy consumption of the buildings. In general, the energy upgrading of larger buildings will have a greater impact.

Public buildings that have already planned energy and anti-seismic renovations are preferable to be avoided since there might not be enough time to implement the energy audits and decide the suitable measures.

Identification of the building: Data are collected on its geometrical parameters, including the characteristics of the enclosing elements and structures (walls, glazing, roof structure, foundation, etc.). A situational plan is prepared (orientation of the building in relation to the celestial directions, location in relation to the relief of the area and other buildings, etc.). The technical condition and characteristics of the technical equipment on the basis of which the installations for conversion, transmission and distribution of energy in the building are

built are assessed. Specifics in the operation of the building are identified - work schedule and temperature regime of the premises.

- **Comfort**

*[Summer thermal comfort issues, Winter thermal comfort issues, Indoor air quality]*

- **Energy**

*[Electrical Energy Consumption, Heating Fuel Consumption, Yearly Electricity cost, Yearly Heating cost, Water consumption, Energy Performance Certificate]*

During the selection of the public building, it should take into consideration the higher the:

- Energy Consumption from electricity per m<sup>2</sup> of the building
- Heating fuel consumption per m<sup>2</sup> of the building

the higher the environmental impacts and financial benefit would be for the building. In addition, these indicators will help identify the building with a high cost per user.

- **Use of the building & number of Users/Staff**

Public buildings that have the environment high on their educational agenda, are considered more likely to combine more easily activities and educational tools. These will be used for raising awareness on energy saving and climate change adaptation and mitigation, increasing the project impact and ensuring the longevity of the results. Active and sensitized staff are also very important for identifying suitable measures through the energy audits and for achieving a maximum impact of reducing energy consumption. The higher the number of staff the bigger impact the project will have. In addition, it is more beneficiary the building has also visitors (public) in order to give the best example of the energy consumption measures.

- **Electromechanical System**

*[installation of RES]*

- **Financial Support**

Financial support by other means will aid in the development of the project.

- **National, regional and local documents**



## 2. Joint Criteria for selection of the public building

### General Description of the building (max.500 words)

The Public building selected to promote energy efficiency is the Administrative center of Thesprotia Regional Unit. It is about a 3-floor building with external walls of stone masonry, windows of PVC frames with double glazing and roof made by concrete slab and wood structural framing system covered with tiles.

Heating system: Two central Boilers, two-pipe system and conventional radiators.

Cooling system: Split-type air conditioners.

Lighting: LED tube lamps T8.

**Name of the building:** *THESPROTIA REGIONAL UNIT MAIN BUILDING*

**Location (Country, City) / Climate Zone:** Greece, Igoumenitsa/B

**Type of building / Number of Users write description;**

*Office Building/One hundred and five*

**Cultural Value of the building from scale 1 (lowest) to 10 (highest) - write description:**

*It is about an emblematic Administration building, at the sea-front of the city, which services a lot of people and houses important departments of Thesprotia Regional Unit.*

*Cultural Value: 8*

**Building Envelope /Construction:**

- Building Area: *3411m<sup>2</sup>*
- Year of Construction: *before 1955*
- Year of Renovation: *n/a*

- New Buildings (extensions and additions, if any): *Second floor added (1980)*
- Building Thermal Insulation Category based on the Directive 2002/91/EC on the energy performance of buildings (EPBD): *Maximum values of the heat conductivity coefficient U (W/m<sup>2</sup> oK)*
  - External walls: *2.33>0.50*
  - Windows-Doors:*3.00=3.00 and 4.10>3.00*
  - Flat-Sloping Roofs: *3.70>0.45*
  - Walls in contact with ground: *4.70>1.00*
  - Floors in contact with ground: *3.10>0.90*

*(Table 3.4 a-Greek Building Energy Performance Regulation)*

- Type of glazing (single, double, with thermal insulation etc.): *PVC frame- double glazing*
- Type of thermal insulation on the roof: *No*
- Type of thermal insulation on the walls: *No*
- Anti- seismic upgrade (planning): *No, stable ground*
- Visible structural issues (write description): *No*
- Visual building issues: *Inadequate electrical installation-Old central heating equipment*
- Previous implementation of other Energy Efficiency measures: *Installation of GSHP (open-loop system) servicing the air conditioning of ground floor*

### Comfort

- Summer thermal comfort issues from scale 1 (smaller) to 10 (bigger): 6
- Winter thermal comfort issues from scale 1 to 10: 4
- Acoustic comfort issues from scale 1 to 10: 8
- Indoor air quality issues from scale 1 to 10: 6

### Energy

- Electrical Energy Consumption(kWh/m<sup>2</sup>/yr.): 36.87 (Conditioned area:3261 m<sup>2</sup>)
- Electrical Energy Consumption (KgCO<sub>2</sub>/m<sup>2</sup>/yr.): 0.036
- Type of Heating Fuel (Natural Gas, LPG, Diesel): *Diesel oil*
- Heating Fuel Consumption (Litter/m<sup>2</sup>): 2.48
- Yearly Electricity cost per square meter (€/m<sup>2</sup>/yr.): 6.396
- Yearly Heating cost per square meter (€/m<sup>2</sup>/yr.): 2.72
- Yearly Electricity cost per user (€/user/yr.): 20857 (2019)
- Yearly Heating cost per user (€/user/yr.): 8870.30 (2019)
- Yearly Water Consumption per user (Litter/user/yr.):1,288,000 *litters*

### Use of the building and number of Users/Staff

- Use of the building (as per the Directive 2002/91/EC): *Office Building*
- Number of staff: 105
- Number of total users: 200

- Number of users per shift (for buildings with 24h operation): *n/a*
- Operation program (working hours): *07:00 to 16:00*
- Environmental Education Activities: *Yes, education of Technical and Environmental Department personnel*
- Active and sensitized staff: *Yes*

Potential Financial Support (**write description**): *Proposal submission in a funding Program as a Public Building*

Electromechanical systems:

- HVAC systems (indicatively A/C systems, ventilation systems, central heating, fan coils etc., along with their technical characteristics, e.g. type, functionality, efficiency, no of units, year of installation, recent inspections etc.)  
  
*Two (2) steel central heating Boilers. Nominal Thermal Power: 930kWth and 814 kWth, Combustion efficiency: 91%*
- DHW systems (indicatively boiler, hot water systems etc., along with their technical characteristics, e.g. condition, type, year of installation, efficiency etc.): *Not Required*
- Lighting systems and equipment (e.g. number of LED lights, along with their technical characteristics, namely, power (W), luminous flux (lm) etc.)  
*Lighting: 1020 LED tube lamps T8, Power 9-18-22 W, ~100Lm/W*
- Other systems (e.g. BEMS, along with their characteristics if applicable): *No*
- RES systems integrated in building environment (along with their technical characteristics, e.g. type, capacity etc.)  
*Ground Source Heat Pump (GSHP): Power: Cooling :62 kWc, EER=4.78, Heating: 71 kWth, COP=3.76*
- Preventive and corrective maintenance contracts or procedures and inspection plans:  
*Contracts concerning the maintenance of the Elevator and the Geothermal System*

### 3. References

- Boilers' maintenance sheets
- GSHP Technical Data

## 4. Annex







# **β Cool**

B COOL MANUFACTURERS OF AIR-CONDITIONING EQUIPMENT LTD

## **GEO Series**



**GEO THERMAL HEAT PUMPS  
COOLING / HEATING APPLICATIONS  
INDOOR / OUTDOOR INSTALLATION**

Vol. 2-B2-01-10



ISO 9001  
BUREAU VERITAS  
Certification



**COOLING CAPACITY**  
7,65 kW – 100,4 kW (R410a)

**HEATING CAPACITY**  
9,0 kW – 113,0 kW (R410a)



The **BCOOL GEO series** includes packaged water cooled heat pumps for geothermal applications and indoor / outdoor installation. They are available in several types and models, with nominal capacities ranging from 7,65 to 100,4 kW in cooling and 9 to 113 kW in heating.

The **BCOOL GEO series** is ideal, in combination with underfloor cooling / heating systems or water terminal units / air-handling units, for air-conditioning of residences, school complexes, office-buildings, hotels, hospitals, etc., or for supplying cold or hot water in industrial applications.



◆ **Optimized design** for R410a refrigerant.

Casing: Galvanized Steel plate with polyester coating.

Assembly: Fully bolted / welding free.

Compressor: Hermetically sealed scroll type.

Water heat exchanger (source): Brazed, plate type.

Water heat exchanger (load): Brazed, plate type.

Electronic expansion valve, ensuring constant suction gas superheat at all operating conditions.

Safety and functional devices:

High / low pressure switch.

Phase sequence - phase failure - reverse phase and voltage monitoring device.

Evaporator low temperature protection.

Electronic microprocessor control with digital display.

◆ **Options:**

Differential water pressure switch.

High and low pressure manometers.

Desuperheater for sanitary hot water up to 80°C.

Hydraulic module with pumps and all necessary devices.

Bus module interface kit for Modbus connection.

Remote Keyboard.

Various optional capabilities.

## Nomenclature

G E O - X X X - X

1      2      3

- 1 GEO - Geothermal Heat Pump
- 2 Capacity (kW)
- 3 Refrigerant Liquid  
R410a

---

## Contents

### 1.0 TECHNICAL DESCRIPTION

#### 2.0 GEO R410a

- 2.1 Specifications GEO R410a 50 Hz
- 2.2 Cooling capacity table R410a
- 2.3 Heating capacity table R410a

### 3.0 OUTLOOK DRAWINGS

### 4.0 WIRING DIAGRAM

### Generally

The BCOOL GEO series, including geothermal heat pumps, consists of 11 basic models covering capacities from 7,65 up to 100,4 kW in cooling and 9 up to 113 kW in heating.

It is the end result of a thorough study and accurate design by experienced BCOOL research and development teams, to develop a small / mid size geothermal heat pump series with compact shape, high performance and reliability of the highest quality standards.

This series meets the highest levels of aesthetic and technical requirements, using the latest technological innovations, including environmentally friendly R410a refrigerant, that is chlorine-free and has zero ozone depletion potential. GEO units are therefore ideal for installation in residential, commercial and industrial applications, due to their robust construction, high-efficiency performance, reliability, selected materials and low operating sound levels.

### Casing

All units use metal parts that are fabricated from heavy gauge galvanized steel sheets, formed to ensure maximum rigidity that guarantees and preserves the unit's operation during the years. After fabrication these are degreased, phosphatised and electrostatically powder coated with an epoxy-polyester RAL 9002 coating of a thickness of 60-70 µm.

This fully automatic process ensures superior corrosion resistance against the most aggressive ambient conditions. This treatment can successfully withstand a salt spray test of 500 hours, according to ASTM B-117.

All components are assembled together using bolts, thus avoiding the need for welding which may harm the galvanization of the steel and ensuring that the whole assembly can fully withstand adverse weather conditions.

The compact footprint of the unit arises from detailed study and design by our engineering teams and results in a machine which fits easily in restricted areas, is simple and easy to install and maintain and has been designed with special fittings for easy transportation and lifting.

Removable side panels with special locks are used to permit access only to authorized personnel to internal components of the unit, for inspection and maintenance. Electrical and electronic equipment and components for proper unit's operation are located inside a weather proof (IP 55) electrical panel, with access via special key.

### Compressors

All units use low-noise, maintenance free, Hermetic Scroll compressors with low vibration levels, especially optimized for use with R410a refrigerant, provided from world class suppliers. They are equipped with a crankcase electrical heater for oil and are internally protected against potential overloading or electrical spikes.

The compressors are mounted on special anti-vibration rubber mounts, to absorb and eliminate any vibrations from the unit's operation.

### Water heat exchanger (source)

All units are equipped with a water Plate Heat Exchanger (source), selected from world class manufacturers.

It is made of stainless steel plates (AISI 3161.4401), especially formed to achieve a large heat transfer surface and assembled by means of an automatic brazing process, under vacuum.

There are probes for water temperature sensors and the whole heat exchanger is wrapped in a heavy insulation material.

### Water heat exchanger (load)

All units are equipped with a water Plate Heat Exchanger (load), selected from world class manufacturers.

It is made of stainless steel plates (AISI 3161.4401), especially formed to achieve a large heat transfer surface and assembled by means of an automatic brazing process, under vacuum.

There are probes for water temperature sensors and the whole heat exchanger is wrapped in a heavy insulation material.

## Refrigerant circuit

All units have one refrigerant circuit. Upon request, models GEO 060 - GEO 100 could have two refrigerant circuits.

The refrigerant circuit has, as expansion device, an electronic expansion valve.

Other components fitted are: suction accumulator, liquid receiver, 4-way reversing valve, check valve, sight glass, large capacity filter dryer and high/low pressure manometers (optional).

Unit protection is provided by a high/low pressure switch with auto reset.

## Microprocessor controller

All units are equipped with a sophisticated controller that combines intelligence with operating simplicity. The controller constantly monitors all machine parameters and precisely manages among others:

Automatic compressor control function through return water temperature.

Frost protection.

Hydraulic circuits pump control.

Compressor start-up time delay function.

Compressor running time records.

Over 150 programmable parameters.

Auto diagnostic stop function due to low water circulation, high/low operating pressure and compressor thermal overload.

Auto diagnostic stop function and digital display of approximately 30 possible error codes, including thermistor faults.

Digital displays of inlet/outlet source and load water.

Remote cool/heat selector switch.

Remote on/off switch.

Phase sequence - phase failure - reverse phase and voltage monitoring.

Many optional control capabilities (listed in optional accessories).

## Other unit accessories / options

R407C or R134a refrigerant liquid.

Models for high water temperature up to 70°C.

Glycol application for chilled water low temperature down to -5°C.

Compressors with inverter motor drive.

High and low pressure manometers.

Differential water pressure switch.

Pressure relief valve on compressor discharge.

Hydraulic module with pumps and all necessary devices.

A-meter, V-meter.

Water heat exchanger anti-freezing electrical heater.

Compressor noise reduction jacket.

Control for two pumps (one stand by).

Desuperheater for sanitary hot water up to 80°C.

## Optional accessories

**Microprocessor controller options:**

Remote keyboard.

BMS module interface kit for Modbus connection.

Parallel chiller operation with optional controller.

Microprocessor parameter reprogramming card.

## 2.1 Technical specifications

### GEO R410a

MODEL	5011a	GEO 008	GEO 010	GEO 015	GEO 020	GEO 030	GEO 040	GEO 050	GEO 060	GEO 080	GEO 090	GEO 100
Nominal Cooling capacity <sup>1</sup>	kW	7,65	10,55	15,2	20,6	30,9	39,1	45,9	61,8	78,2	93,0	100,4
	BT	2,2	3,0	4,3	5,9	8,8	11,3	13,3	17,6	22,2	26,1	28,5
	tons/h	26,088	35,966	51,838	70,227	105,602	132,295	156,477	211,564	266,591	312,955	342,273
Nominal Heating capacity <sup>2</sup>	kW	9,0	12,2	17,8	24,0	35,4	44,9	52,9	70,9	89,7	105,8	113,0
	Construction											
	Material/Color Galvanized steel / Light grey-beige (RAL 9002)											
Compressor SCROLL												
Quantity 1												
Capacity steps 0 - 100%												
Absorbed power kW 1,6 2,1 3,1 4,1 5,8 7,5 9,0 11,6 15,0 18,0 20,0												
Nominal operating current A 3,76 3,79 5,95 8,7 12,5 14,9 18,20 24,0 29,8 34,8 40,8												
Maximum operating current A 6,5 8,0 11,8 15,0 22,0 27,0 34,0 44,0 62,0 68,0 68,0												
Water heat exchanger (source) brazed, plate type												
Quantity 1												
Max. operating pressure Water side Bar 25												
Refrigerant side Bar 45												
Connections 1 1/4" 1 1/4" 1 1/4" 1 1/4" 1 1/4" 1 1/2" 1 1/4" 2" 2" 2" 2"												
Nominal water flow Lit/h 1.580 2.150 3.130 4.200 6.250 7.900 9.990 12.580 15.920 18.780 20.539												
Water heat exchanger (load) brazed, plate type												
Quantity 1												
Max. operating pressure Water side Bar 25												
Refrigerant side Bar 45												
Connections 1 1/4" 1 1/4" 1 1/2" 1 1/2" 1 1/2" 1 1/4" 1 1/4" 2" 2" 2" 2"												
Nominal water flow Lit/h 1.520 2.090 3.060 4.130 6.120 7.760 9.150 12.230 15.400 18.290 19.461												
Electrical characteristics Electric network 400 V / 3 Ph / 50 Hz												
Total absorbed power kW 1,6 2,1 3,1 4,1 5,8 7,5 9,0 11,6 15,0 18,0 20,0												
Nominal operating current A 3,4 3,8 5,0 6,7 12,5 14,9 18,4 24,0 29,8 38,8 40,0												
Compressor start inductive power W 90 90 90 90 90 90 90 180 180 180 180 180												
Voltage operating limits V 360 - 440												
Refrigerant circuit												
Number of circuits 1												
Expansion device Electronic expansion valve												
Refrigerant type R410a												
Dimensions Width mm 604 604 604 604 604 604 604 604 650 650 650 650												
Length mm 604 604 604 604 604 604 604 604 1.600 1.600 1.660 1.660												
Height mm 1.079 1.079 1.079 1.079 1.079 1.079 1.079 1.079 985 985 985 985												

#### NOTES

Nominal conditions are as following:

1 Source water temperature inlet 20°C, Entering / leaving chilled water temperature 12 / 7°C (cooling).

2 Source water temperature inlet 15°C, Entering / leaving heated water temperature 40 / 45°C (heating).

Electrical installation specifications are purely indicative and non-binding.

All connections to the system and the electrical installation must be in full accordance with the applicable national and local codes.

## 2.2 Cooling capacity table GEO R410a

Cooling capacity table for GEO R410a 50 Hz

Source water temperature inlet °C		10		15		20		25		30		35	
MODEL	Water outlet °C	Cooling capacity kW	E.E.R.	Cooling capacity kW	E.E.R.	Cooling capacity kW	E.E.R.	Cooling capacity kW	E.E.R.	Cooling capacity kW	E.E.R.	Cooling capacity kW	E.E.R.
GEO 008	10.0	8,874	6,692	8,706	6,238	8,239	5,186	7,734	4,200	7,206	3,509	6,648	2,049
	7.0	8,254	6,157	8,086	5,736	<b>7,650</b>	<b>4,780</b>	7,176	3,930	6,678	3,227	6,150	2,619
	5.0	7,650	5,650	7,520	5,268	7,099	4,308	6,640	3,618	6,166	2,959	5,653	2,400
GEO 010	10.0	12,238	7,032	12,006	6,555	11,362	5,450	10,666	4,506	9,998	3,687	9,168	2,994
	7.0	11,383	6,470	11,151	6,028	<b>10,550</b>	<b>5,023</b>	9,896	4,139	9,210	3,391	8,481	2,753
	5.0	10,550	5,937	10,371	5,535	9,790	4,611	9,168	3,802	8,503	3,109	7,796	2,522
GEO 015	10.0	17,632	6,864	17,298	6,398	16,370	5,320	15,367	4,398	14,318	3,599	13,209	2,922
	7.0	16,401	6,315	16,066	5,894	<b>15,200</b>	<b>4,903</b>	14,258	4,040	13,270	3,310	12,219	2,687
	5.0	15,200	5,795	14,942	5,403	14,106	4,501	13,209	3,712	12,251	3,035	11,233	2,461
GEO 020	10.0	23,896	7,070	23,443	6,590	22,186	5,479	20,827	4,530	19,405	3,707	17,901	3,010
	7.0	22,227	6,504	21,774	6,060	<b>20,600</b>	<b>5,050</b>	19,323	4,161	17,904	3,409	16,560	2,767
	5.0	20,600	5,969	20,250	5,565	19,117	4,636	17,901	3,823	16,604	3,126	15,223	2,535
GEO 030	5.0	35,861	7,392	35,181	6,890	33,295	5,729	31,255	4,736	29,122	3,876	26,865	3,147
	7.0	33,357	6,801	32,677	6,336	<b>30,915</b>	<b>5,200</b>	28,998	4,351	26,909	3,564	24,853	2,893
	10.0	30,915	6,241	30,389	5,819	28,689	4,847	26,865	3,997	24,917	3,268	22,846	2,651
GEO 040	10.0	45,356	7,070	44,496	6,590	42,111	5,479	39,330	4,530	36,832	3,707	33,978	3,010
	7.0	42,189	6,504	41,329	6,060	<b>39,100</b>	<b>5,050</b>	36,676	4,161	34,134	3,409	31,432	2,767
	5.0	39,100	5,969	38,435	5,565	36,205	4,636	33,978	3,823	31,515	3,126	28,895	2,535
GEO 050	10.0	53,244	7,000	52,234	6,525	49,434	5,425	46,405	4,485	43,238	3,670	39,887	2,980
	7.0	49,526	6,440	48,516	6,000	<b>45,900</b>	<b>5,000</b>	43,054	4,120	40,071	3,375	36,899	2,740
	5.0	45,900	5,910	45,120	5,510	42,595	4,590	39,887	3,785	36,995	3,095	33,920	2,510
GEO 060	10.0	71,723	6,692	70,363	6,239	66,591	5,186	62,510	4,288	58,244	3,509	53,730	2,849
	7.0	66,715	6,157	65,354	5,736	<b>61,830</b>	<b>4,780</b>	57,997	3,939	53,978	3,227	49,705	2,619
	5.0	61,830	5,650	60,779	5,268	57,378	4,308	53,730	3,618	49,835	2,959	45,692	2,400
GEO 080	10.0	90,712	6,692	88,992	6,238	84,321	5,186	79,060	4,288	73,664	3,509	67,956	2,849
	7.0	84,378	6,157	82,657	5,736	<b>78,200</b>	<b>4,780</b>	73,352	3,939	68,269	3,227	62,865	2,619
	5.0	78,200	5,650	76,871	5,268	72,570	4,308	67,956	3,618	63,029	2,959	57,790	2,400
GEO 090	10.0	106,688	6,692	104,468	6,238	98,869	5,186	92,810	4,288	86,476	3,509	79,774	2,849
	7.0	99,052	6,157	97,033	5,736	<b>91,800</b>	<b>4,780</b>	86,108	3,939	80,141	3,227	73,798	2,619
	5.0	91,800	5,650	90,239	5,268	85,190	4,308	79,774	3,618	73,991	2,959	67,840	2,400
GEO 100	10.0	116,464	7,392	114,255	6,890	108,131	5,729	101,504	4,736	94,577	3,876	87,248	3,147
	7.0	108,332	6,801	106,123	6,336	<b>100,400</b>	<b>5,280</b>	94,175	4,351	87,649	3,564	80,712	2,893
	5.0	100,400	6,241	98,693	5,819	93,171	4,847	87,248	3,997	80,922	3,268	74,196	2,651

### NOTES

- Bold values show nominal cooling capacities.
- Above figures are valid for water dt=5°C.

## 2.3 Heating capacity table GEO R410a

Heating capacity table for GEO R410a 50 Hz

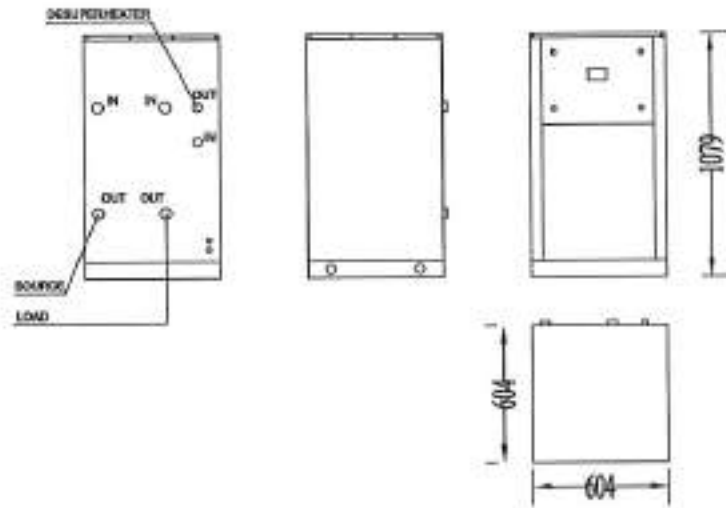
Source water temperature inlet °C		0		4		8		10		15		20	
MODEL	Water outlet °C	Heating capacity kW	C.O.P.	Heating capacity kW	C.O.P.	Heating capacity kW	C.O.P.	Heating capacity kW	C.O.P.	Heating capacity kW	C.O.P.	Heating capacity kW	C.O.P.
GEO 008	35,0	6,570	3,800	7,398	4,248	7,838	4,499	8,291	4,640	9,310	4,898	11,498	5,814
	45,0	6,373	2,839	7,056	3,268	7,654	3,458	8,101	3,659	<b>9,001</b>	<b>3,762</b>	10,348	4,286
	50,0	6,110	2,679	6,695	2,740	7,391	2,899	7,618	2,979	8,690	3,139	9,967	3,652
GEO 010	35,0	8,000	3,800	9,999	4,248	10,594	4,499	11,207	4,640	12,583	4,898	15,540	5,814
	45,0	8,614	2,839	9,537	3,268	10,345	3,458	10,949	3,659	<b>12,166</b>	<b>3,762</b>	13,906	4,286
	50,0	8,258	2,679	9,049	2,740	9,909	2,899	10,296	2,979	11,757	3,139	13,471	3,652
GEO 015	35,0	12,970	3,800	14,604	4,248	15,473	4,499	16,368	4,640	18,378	4,898	22,698	5,814
	45,0	12,581	2,839	13,930	3,268	15,110	3,458	15,992	3,659	<b>17,769</b>	<b>3,762</b>	20,428	4,286
	50,0	12,062	2,679	13,216	2,740	14,591	2,899	15,039	2,979	17,172	3,139	19,675	3,652
GEO 020	35,0	17,500	3,810	19,705	4,260	20,878	4,511	22,085	4,652	24,798	4,911	30,625	5,829
	45,0	16,975	2,846	18,795	3,277	20,388	3,467	21,578	3,669	23,975	3,772	27,563	4,298
	50,0	16,275	2,686	17,833	2,747	19,688	2,907	20,291	2,987	23,170	3,147	26,548	3,661
GEO 030	35,0	25,860	3,800	29,118	4,248	30,851	4,499	32,635	4,640	36,644	4,898	45,255	5,814
	45,0	25,084	2,839	27,774	3,268	30,127	3,458	31,885	3,659	<b>35,428</b>	<b>3,762</b>	40,730	4,286
	50,0	24,050	2,679	26,351	2,740	29,093	2,899	29,985	2,979	34,239	3,139	39,230	3,652
GEO 040	35,0	32,760	3,810	36,888	4,260	39,083	4,511	41,343	4,652	46,421	4,911	57,330	5,829
	45,0	31,777	2,846	35,184	3,277	38,165	3,467	40,393	3,669	<b>44,881</b>	<b>3,772</b>	51,597	4,298
	50,0	30,467	2,686	33,382	2,747	36,855	2,907	37,985	2,987	43,374	3,147	49,697	3,661
GEO 050	35,0	38,610	3,795	43,475	4,243	46,062	4,493	48,726	4,634	54,710	4,892	67,568	5,806
	45,0	37,452	2,835	41,467	3,264	44,981	3,453	47,606	3,655	<b>52,896</b>	<b>3,757</b>	60,811	4,281
	50,0	35,907	2,675	39,344	2,736	43,436	2,896	44,768	2,975	51,120	3,135	58,571	3,647
GEO 060	35,0	51,720	3,800	58,237	4,248	61,702	4,499	65,271	4,640	73,287	4,898	90,510	5,814
	45,0	50,168	2,839	55,547	3,268	60,254	3,458	63,771	3,659	<b>70,856</b>	<b>3,762</b>	81,459	4,286
	50,0	48,100	2,679	52,703	2,740	58,185	2,899	59,969	2,979	68,477	3,139	78,459	3,652
GEO 080	35,0	65,470	3,800	73,719	4,248	78,106	4,499	82,623	4,640	92,771	4,898	114,573	5,814
	45,0	63,506	2,839	70,315	3,268	76,273	3,458	80,725	3,659	<b>89,694</b>	<b>3,762</b>	103,115	4,286
	50,0	60,887	2,679	66,714	2,740	73,654	2,899	75,912	2,979	86,602	3,139	99,318	3,652
GEO 090	35,0	77,230	3,800	86,961	4,248	92,135	4,499	97,464	4,640	109,435	4,898	135,153	5,814
	45,0	74,913	2,839	82,945	3,268	89,973	3,458	95,325	3,659	<b>105,805</b>	<b>3,762</b>	121,637	4,286
	50,0	71,824	2,679	78,697	2,740	86,084	2,899	89,548	2,979	102,253	3,139	117,158	3,652
GEO 100	35,0	82,480	3,740	92,872	4,181	98,399	4,428	104,090	4,567	116,874	4,821	144,340	5,722
	45,0	80,006	2,794	88,584	3,216	96,089	3,403	101,698	3,602	<b>112,998</b>	<b>3,703</b>	129,906	4,219
	50,0	76,706	2,637	84,047	2,697	92,790	2,854	95,636	2,932	109,204	3,089	125,122	3,594

### NOTES

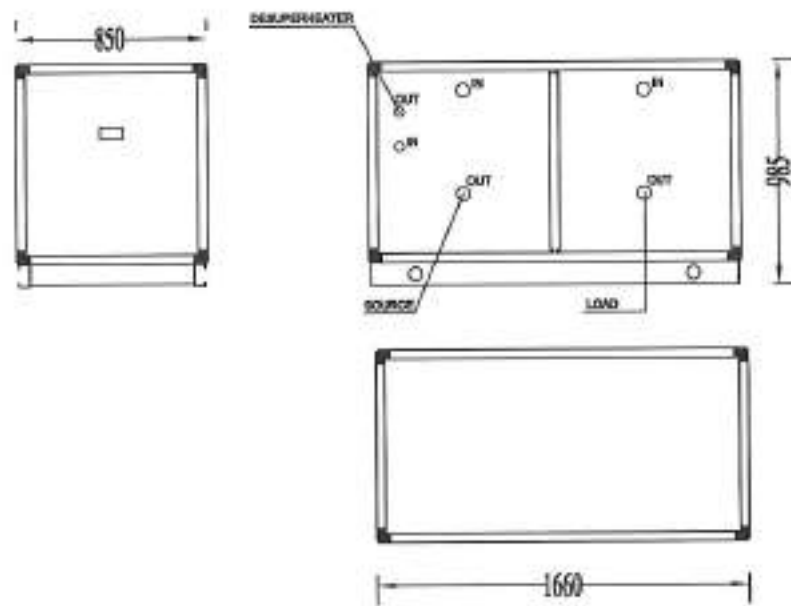
- Bold values show nominal heating capacities.
- Above figures are valid for water  $\Delta t=5^{\circ}\text{C}$ .



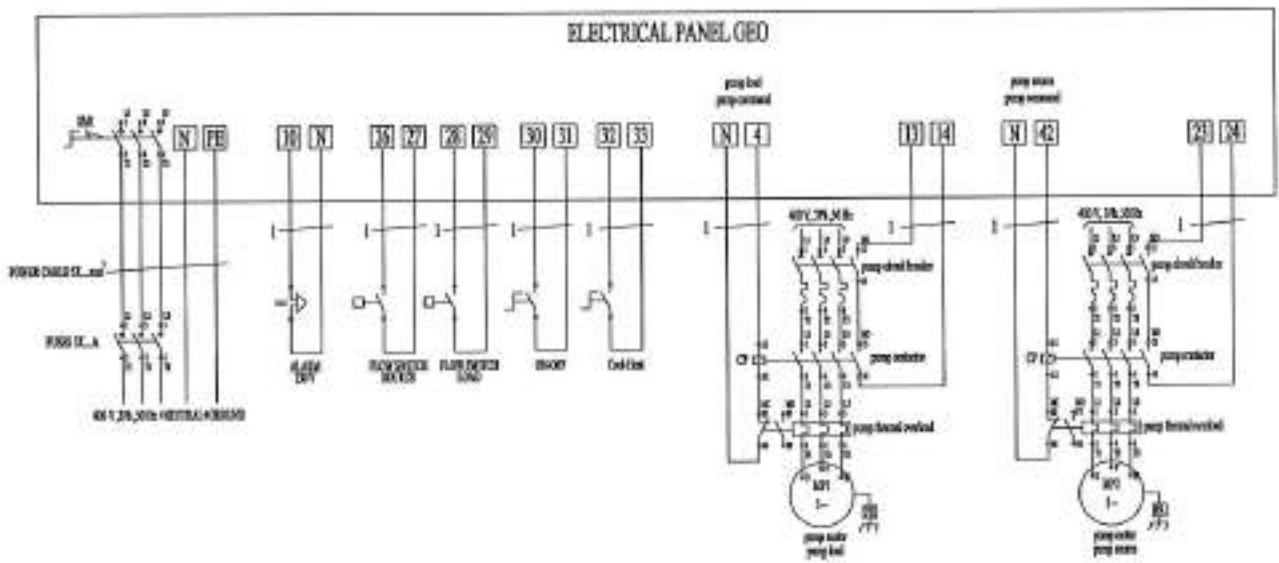
GEO 8-50



GEO 60-100



4.0 Wiring diagram



**B COOL MANUFACTURERS OF AIR-CONDITIONING EQUIPMENT LTD**

Omirou & Andromachis str., Mandra, Attica, Zip: 19 600, Greece

Phone: +30 211 0124898-9 Fax: +30 211 2159181

Office of North Greece: 27, M. Alexandrou str., Pylaia, Thessaloniki, Zip: 55 535

Phone: +30 2316 007072 Fax: +30 2316 007073

Web: [www.bcool.com.gr](http://www.bcool.com.gr) E-mail: [info@bcool.com.gr](mailto:info@bcool.com.gr)

