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BALTICA-S HEATING SYSTEM

User’s manual

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INTRODUCTION

Dear Customer!

Thank You for choosing AUTOTERM BALTICA-S heating system! We are doing everything to make this product meet Your requirements, so its quality satisfies every customer.

The AUTOTERM BALTICA systems are designed to be easy to install and use, to ensure the best experience when it comes to controlling Your climate.

	Please read carefully this manual before installing and operating the product. This manual contains needful information in order to use this product correctly. Disregard of these instructions can void the warranty of the product, lead to damage of product and/or property and be a risk to health.
	If the product is handled and/or installed improperly, there is a possibility of a fire hazard and damage of property because of high temperatures and electrical components are being used. **That is why all safety precautions, operation and installation instructions must be observed.**

For other languages of this manual, please see www.autoterm.com/manuals.

SAFETY INSTRUCTIONS

Risk to health and/or damage of product

- The product may only be used for the purposes specified in this operation manual.
- **DO NOT** use the product in closed and/or poorly ventilated places (e.g., garage, workshop, etc.)
- Do not step on the heater or put any objects on it and in it.
- Do not put any body parts or items into the fans of the product.
- Do not allow hot air to be blown directly at people, animals or heat sensitive objects.
- Do not use water as a coolant.
- To avoid burns, do not touch the radiator cores and the coolant and water hoses while the product is operating.

Risk of damage due electrical nature

- Disconnect the product from the power supply before working on the product.
- Do not connect/disconnect any wiring of the product while it is connected to the power supply or operating.
- Do not connect the product to the power circuit of the vessel, when the engine is operating and there is no battery.
- Do not use fuses rated differently from indicated on the electric circuit diagrams.
- Do not use makeshift devices (wires etc.) instead of fuses.

Risk of fire and explosion

- The heater is not designed for installation and use on any type of ADR transportation vehicle.
- The vehicle or space where the product is installed must be equipped with a fire extinguisher.
- Do not cover the product with clothing, pieces of fabric and so on, and do not place such objects in front of the front panel of the product.
- Do not use or install the product in places, where flammable vapours or gases or large amounts of dust may form and accumulate.
- Do not use or install the product in places, where flammable and/or explosive items or substances are stored.
- Avoid contact of any flammable objects with the heater's exhaust pipe and liquid hoses.

Personnel certified by AUTOTERM is needed

- In case of faults in the operation of the product, contact specialized repair organizations authorized by AUTOTERM.
- Repairs and works not described in this manual should be done only by certified professional

LIABILITY

IN THE CASE OF NON-COMPLIANCE with the requirements, the persons who installed the heaters assume all risks and any responsibility for the occurrence of adverse consequences and related damage resulting from installing and repairing by personnel not having AUTOTERM certification, and/or using non-original spare parts for repair.

AUTOTERM LLC will not be held liable for damage caused by improper installation of the parking heater (Flow 5), which does not meet the requirements and recommendations of the vehicle manufacturer. In this case, all risks are borne by the installer of the additional equipment.

In case of any problems, we strongly recommend contacting certified service centres. Contact information and location of certified service centres can be found at our website www.autoterm.com

GENERAL INFORMATION

AUTOTERM BALTICA-S – the smallest of three BALTICA heating systems – is an excellent solution for room and domestic water heating in your van, small camper or boat where size of the system is a factor.

WHAT'S IN THE BOX

Contents of the installation kit depends on configuration.

Basic installation kit consists of:

- One AUTOTERM FLOW 5 liquid heater with installation kit;
- One AUTOTERM COMFORT CONTROL panel.
- One AUTOTERM FC9 fan speed controller.
- Two AUTOTERM CHX heating matrices.
- One EKO-AIR passive heat exchanger.
- Set of hose connectors and adapters.
- One relay set.

Additional items depending on configuration:

* Coolant expansion tank.
* CHM36 thermal fan controller.
* Coolant/water hose (length selected by the customer).

HOW IT WORKS

Room heating: Liquid heated by the FLOW 5 heater flows through the EKO-AIR heat exchanger to the CHX heating matrices, where two fans blow air through the heated radiator cores creating a flow of warm air.

Water heating: With the help of a pressure pump, the cold water is driven from the tank ensuring the flow of cold water to a mixing valve or faucet. At the same time, the cold water is driven through the EKO-AIR heat exchanger, where it is heated, ensuring the flow of hot water to a mixing valve or faucet.

BEFORE INSTALLING BALTICA-S

Before installing BALTICA-S evaluate the installation location considering the size of components, as well as the maximum length of the system (max 12 m with one coolant pump) and the height of the system (height between the coolant pump and the highest point of the system cannot exceed 0,6 m).

ⓘ	Vehicle manufacturers may have restrictions on installing pre-heaters due to emission class EURO5 or higher.
ⓘ	Some manufacturers anticipate their van conversion to campers and may provide connectors and adapters necessary for connection of the heater to the engines cooling system.
ⓘ	**IT IS IMPERATIVE THAT YOU GET FAMILIAR WITH VEHICLES MANUFACTURER'S RECOMMENDATIONS BEFORE INSTALLING THE FLOW 5 HEATER. FOLLOW THOSE RECOMMENDATIONS STRICTLY.**
ⓘ	To install the FLOW 5 liquid heater, follow the instruction manual provided with heater installation kit.

Once you have reached the section "*The installation of the coolant system*" follow the general installation instructions, but keep in mind your cooling option: the engine cooling system or the expansion tank.

When installation of the heater is complete, return to this manual.

INSTALLATION OPTIONS OF BALTICA-S

The BALTICA-S heating system is designed to be installed in a variety of vehicles with an internal combustion engine (ICE) (e.g., vans, Type B campers, cabin motorboats) and without (e.g., travel and folding trailers, sailboats).

Because of the variety of vehicles, end-user preferences and connection options it's important to remember that BALTICA-S is sold as a base set and additional items for the specific installation must be purchased separately.

There are two types of installation options for BALTICA-S:

- COMBINED SYSTEM – connecting the system using vehicles engine.
- INDEPENDENT SYSTEM – without using the vehicles engine.

COMBINED SYSTEM

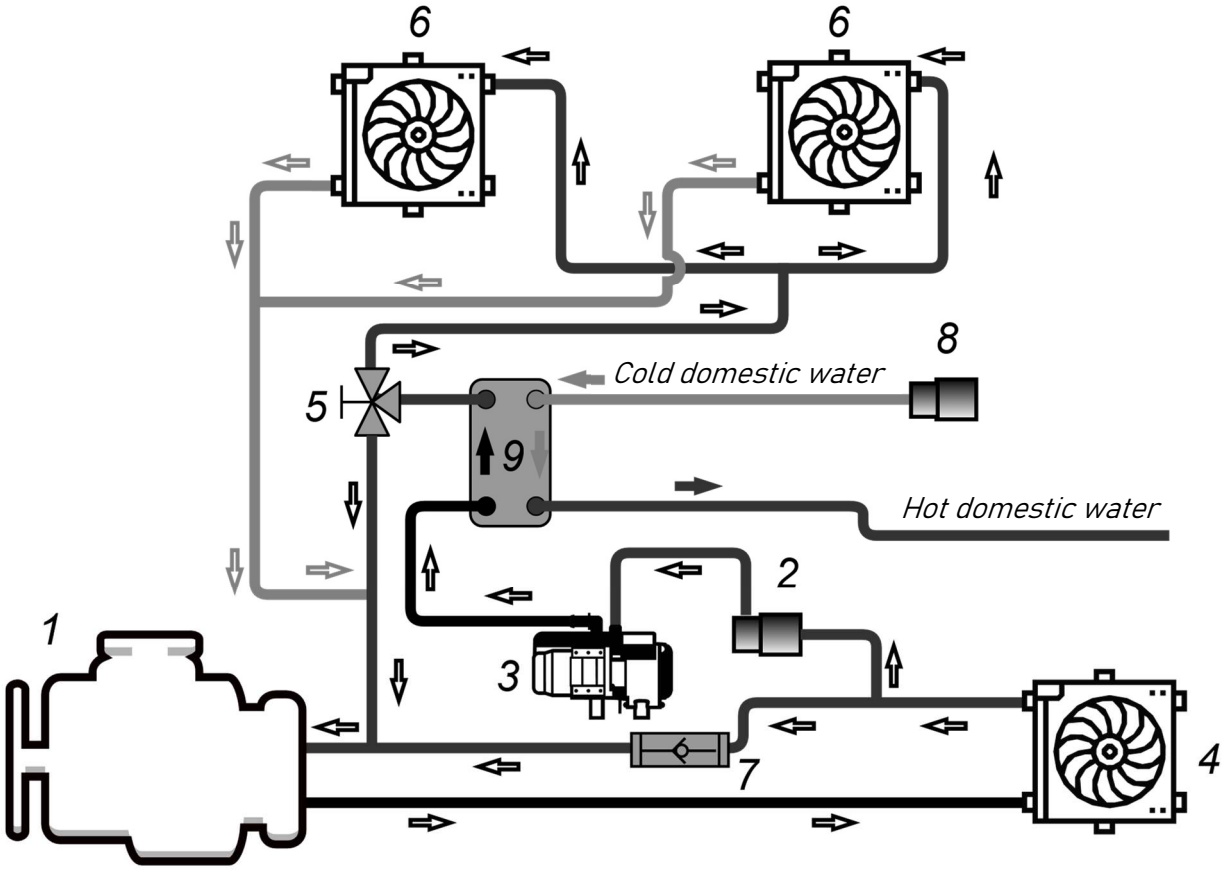
If for some reason it is not possible to install combined system on your vehicle, go to the next section "INDEPENDENT SYSTEM".

Combined system consists of heater FLOW 5 and ICE. The vehicle interior can be heated by both the vehicle engine and the FLOW 5 heater.

There are pros and cons to this type of installation:

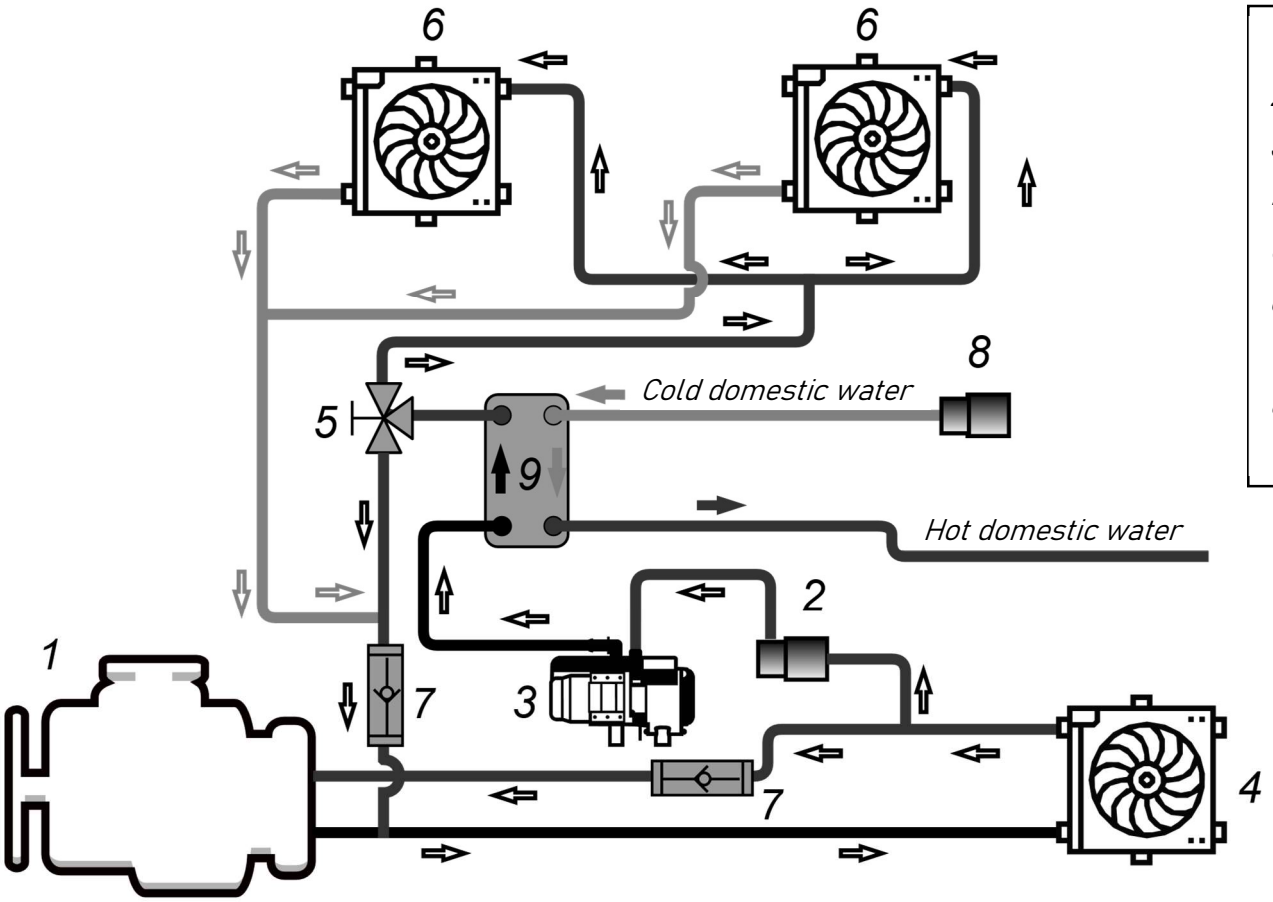
+ Possibility to use the perks of BALTICA-S system while driving without turning on the liquid heater.
+ The high power of the heating and water system when both the engine and liquid heater are running.
+ Possibility to pre-heat the engine in the cold seasons.
- When the liquid heater is running part of the thermal energy is constantly spent on heating the engine block. During the cold season it can cause a power loss of the liquid heater. Consider this when choosing this type of installation.

Following connection diagrams (Figure 1 & 2) are informative and may not be suitable for your vehicle.
It may be necessary to change the connection points to the engine cooling system or installation points of additional components according to the recommendations and requirements of the vehicle manufacturer.



1 – Vehicle engine
2 – Coolant pump
3 – liquid heater FLOW 5
4 – Vehicle interior heater
5 – Distribution valve
6 – CHX heater matrix
7 – Non-return valve
8 – Water pressure pump
9 – EKO-AIR heat exchanger

Figure 1 – Connection diagram of combined system.



1 – Vehicle engine
2 – Coolant pump
3 – Liquid heater FLOW 5
4 – Vehicle interior heater
5 – Distribution valve
6 – CHX heater matrix
7 – Non-return valve
8 – Pressure water pump
9 – EKO-AIR heat exchanger

Figure 2 – Connection diagram of combined system.

According to these diagrams (Figure 1 & 2) with the help of coolant pump (2) liquid heater (3) takes coolant from the engines cooling system (1). Coolant liquid heated by the heater (3) flows through EKO-AIR heat exchanger (9) heating it, where the heat is passed on to the domestic water, which is being circulated through heat exchanger (9) by a pressure pump (8). The coolant liquid passing the heat exchanger (9) enters distribution valve (5) where the flow is passed on to CHX heater matrices (6) for interior heating or back to the engines cooling system (1).

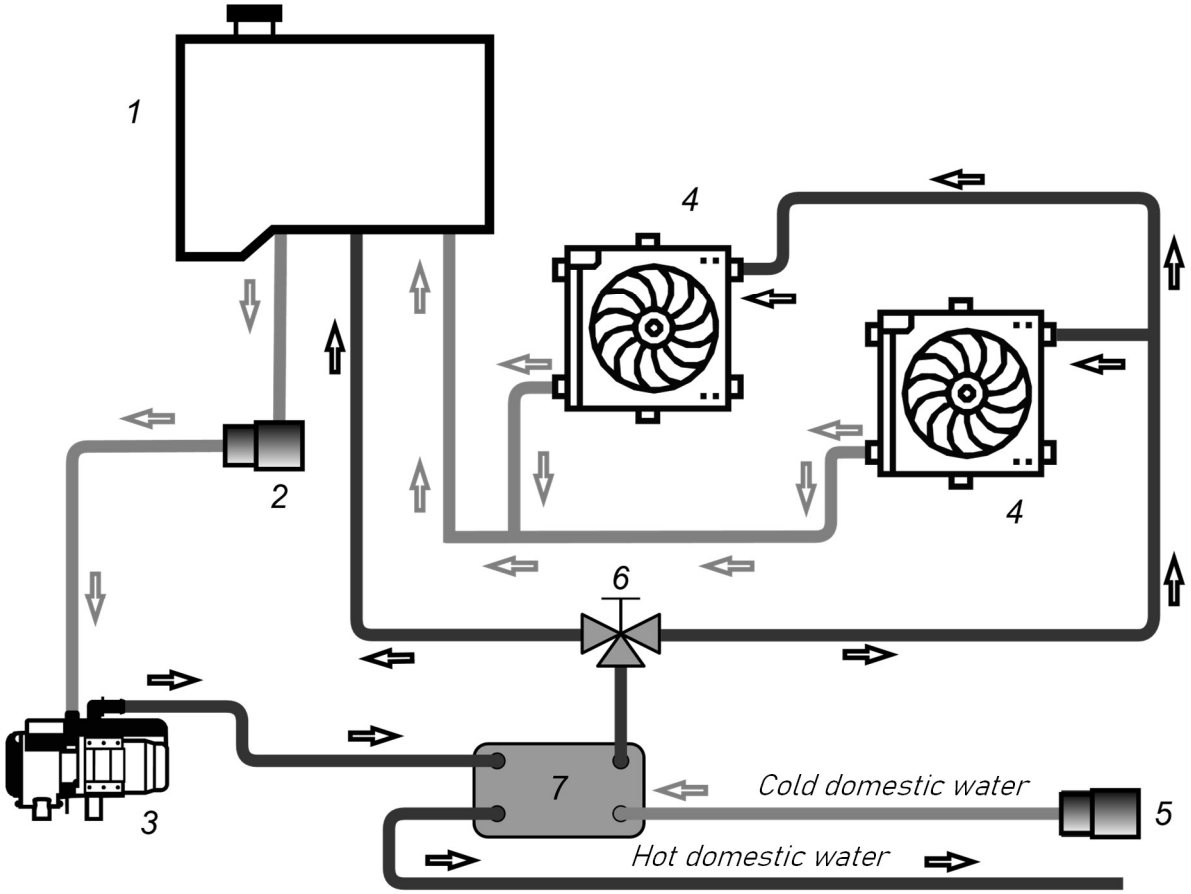
* Distribution valve (5) can be either manually or electronically controlled. Its purpose is to disconnect the flow of heated coolant to the heating system during the hot seasons.
* The non-return valves (7) purpose is to ensure the correct direction of coolant flow.
* The pressure pump (8) is used to pump domestic water from a cold-water tank to the heat exchanger (9) and then supply heated water to a faucet. More detailed information on heating domestic water in the corresponding section.

Distribution valve, non-return valve and the pressure pump are not included in the base set of BALTICA-S.

INDEPENDENT SYSTEM

The independent system is a closed loop where the flow and heating of the coolant is done only by the liquid heater FLOW 5. That is why an expansion tank is needed. For this system minimal amount of coolant liquid is at least 5,5 litres.

According to the diagram (Figure 3) with the help of coolant pump (2) liquid heater (3) takes coolant from the expansion tank (1). Coolant liquid heated by the heater (3) flows through EKO-AIR heat exchanger (7) heating it, where the heat is passed on to the domestic water, which is being circulated through heat exchanger (7) by a pressure pump (5). The coolant liquid passing the heat exchanger (7) enters distribution valve (6) where the flow is passed on to CHX heater matrices (4) for interior heating or back to expansion tank (1).



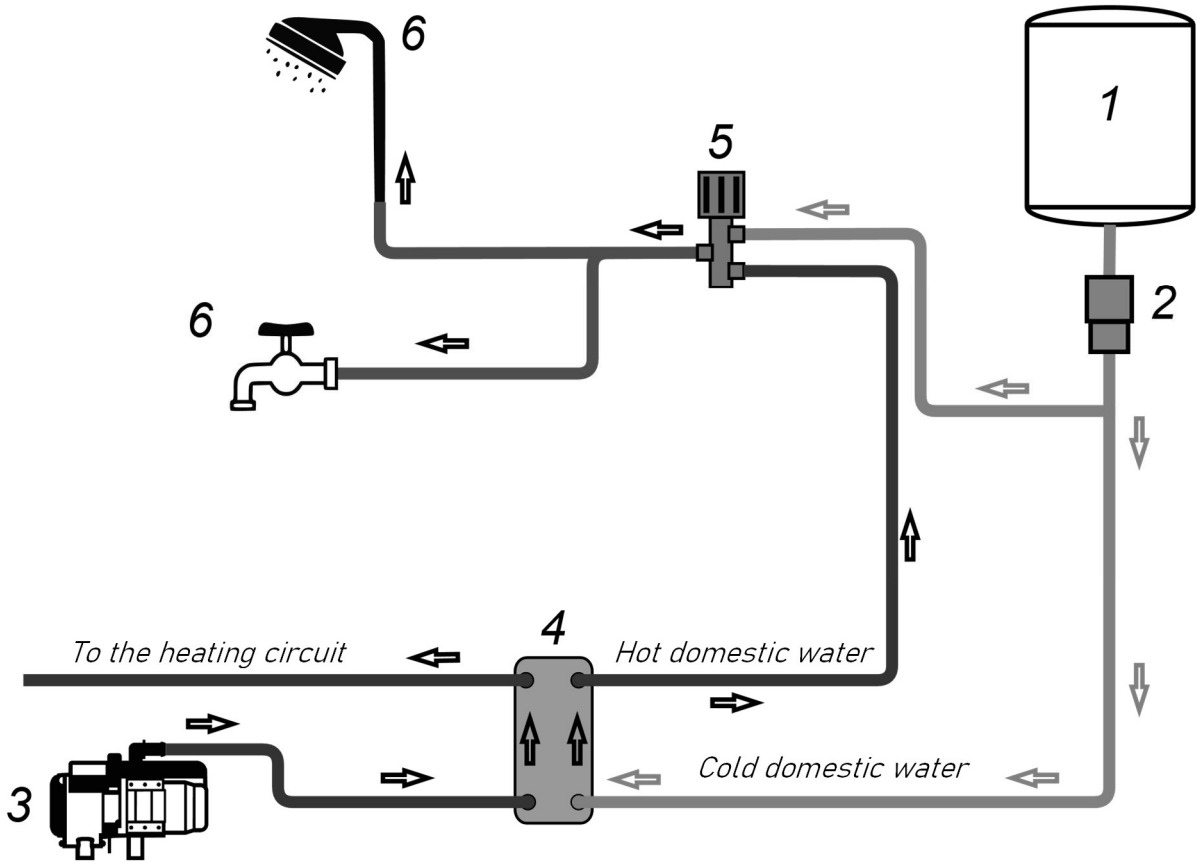
1 – Expansion tank
2 – Coolant pump
3 – Liquid heater FLOW 5
4 – CHX heater matrix
5 – Pressure water pump
6 – Distribution valve
7 – EKO-AIR heat exchanger

Figure 3 – Connection diagram of independent system.

DOMESTIC WATER HEATING

The BALTICA-S heating system allows to heat water for domestic needs by the flow-through method. For maximum water heating efficiency, the coolant liquid must be heated to the maximum temperature. Heating of the coolant liquid to 80-90 °C can take up to 30 minutes depending on the connection of the system, amount of the liquid and ambient temperature.

Example of connection and working principle is shown in Figure 4.



1 – Cold water tank
2 – Pressure water pump
3 – Liquid heater FLOW 5
4 – EKO-AIR heat exchanger
5 – Thermostatic mixing valve
6 – Shower and kitchen faucets

Figure 4 – Connection diagram for water heating.

According to the diagram (Figure 4) cold water from the water tank (1) is being pumped to the EKO-AIR heat exchanger (4) and thermostatic mixing valve (5) by a pressure pump (2). Then the water heated by the heat exchanger (4) enters the mixing valve (5), after which water at a set temperature flows either to the faucet (6).

ⓘ	The recommended flow-through of the pressure water pump is 3-8 l/min and working pressure 2.8-3.5 bar. Pump with a higher flow-through can lead to insufficient heating of heat exchanger.
⚠	To avoid severe burns and scalding it is imperative to install thermostatic mixer valve before supplying water to faucets. The mixer valve should be set within temperature range of 28-46 °C.

CONTROL OPTIONS AND SETUP

The AUTOTERM BALTICA-S is provided with two control devices: the AUTOTERM COMFORT CONTROL for heater control and the AUTOTERM FC9 for fan speed control. The AUTOTERM CHM36 thermal fan controller is available as an additional option.

For complete information, setup and operating the AUTOTERM COMFORT CONTROL and CHM36 thermal controller see instruction manual provided with the respective control device.

AUTOTERM COMFORT CONTROL

The setup of COMFORT CONTROL depends on your heating needs.

Settings for air and domestic water heating:	
Temperature	80 °C
Thermostat	Enabled
Circulation	Enabled
Hysteresis	MAX 1 °C, MIN 4 °C
Fan	30 °C
Coolant pump	Wait mode – Enabled
Operation mode:	Thermostat mode
Set the desired temperature. Set work time from 1h up to infinity.	

Settings for domestic water heating only:	
Temperature	80 °C
Thermostat	Disabled
Fan	Disabled
Coolant pump	Wait mode – Enabled
Operation mode:	Pre-heating
Set the desired temperature, set work time from 40 min up to infinity.	

AUTOTERM FC9

AUTOTERM FC9 controller is designed for smooth CHX matrix heater fan speed control. The fan speed is controlled by moving the four sliders on the front panel.

The FC9 can be powered by any 12V power supply with a power of at least 600W.

In the BALTICA system the power source through a relay can be either FLOW 5 liquid heater or CHM36 thermal fan controller.

The FC9 controller must be mounted indoors where humidity level doesn't exceed 65%.

For mounting FC9 controller, make an 147x41 mm opening and drill two ø3mm holes as shown in Figure 5. Insert the controller in the opening and fasten the front panel with the self-tapping screws form the kit.

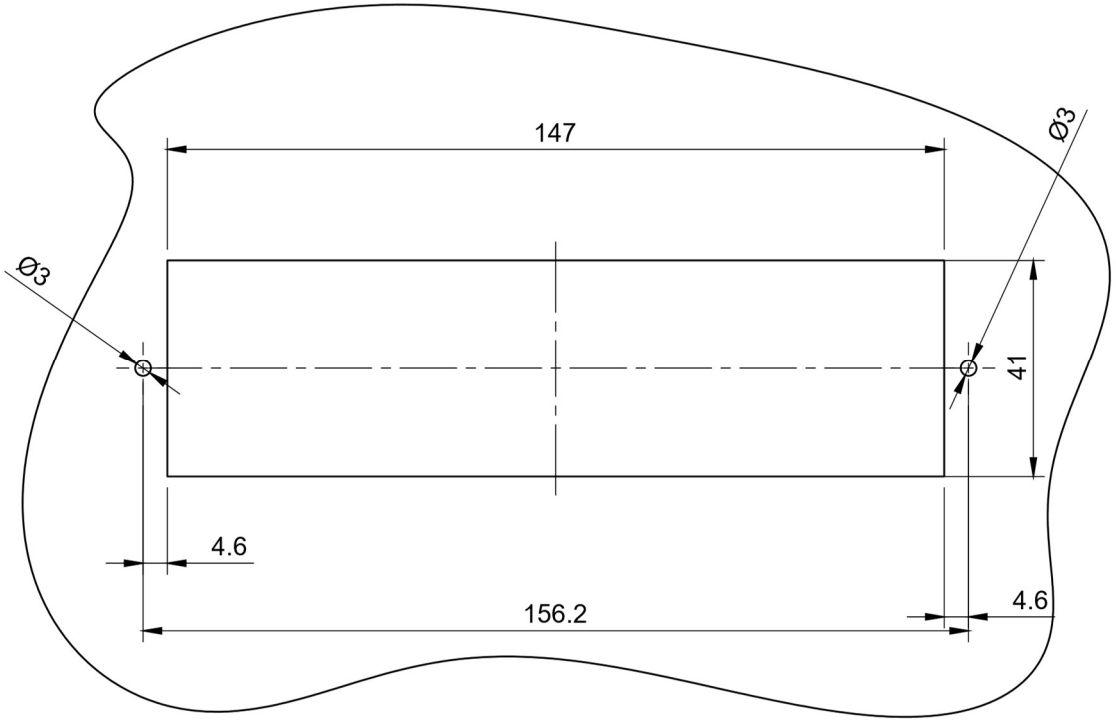


Figure 5 – Mounting of FC9 controller

For connecting FC9 controller see electrical connection diagram Figure 6. For connecting FC9 with additional CHM36 thermal controller see Figure 7.

The FC9 fan speed controller comes with four wire extenders (50mm). There is a 3-pin connector (FC1) at the controller end and 4-pin connector at the other. The 4-pin connector allows to directly connect the fans of the CHX heater matrices.

To extend the wires or to connect other devices, cut the 4-pin connector and connect the wires according to the connection diagram.

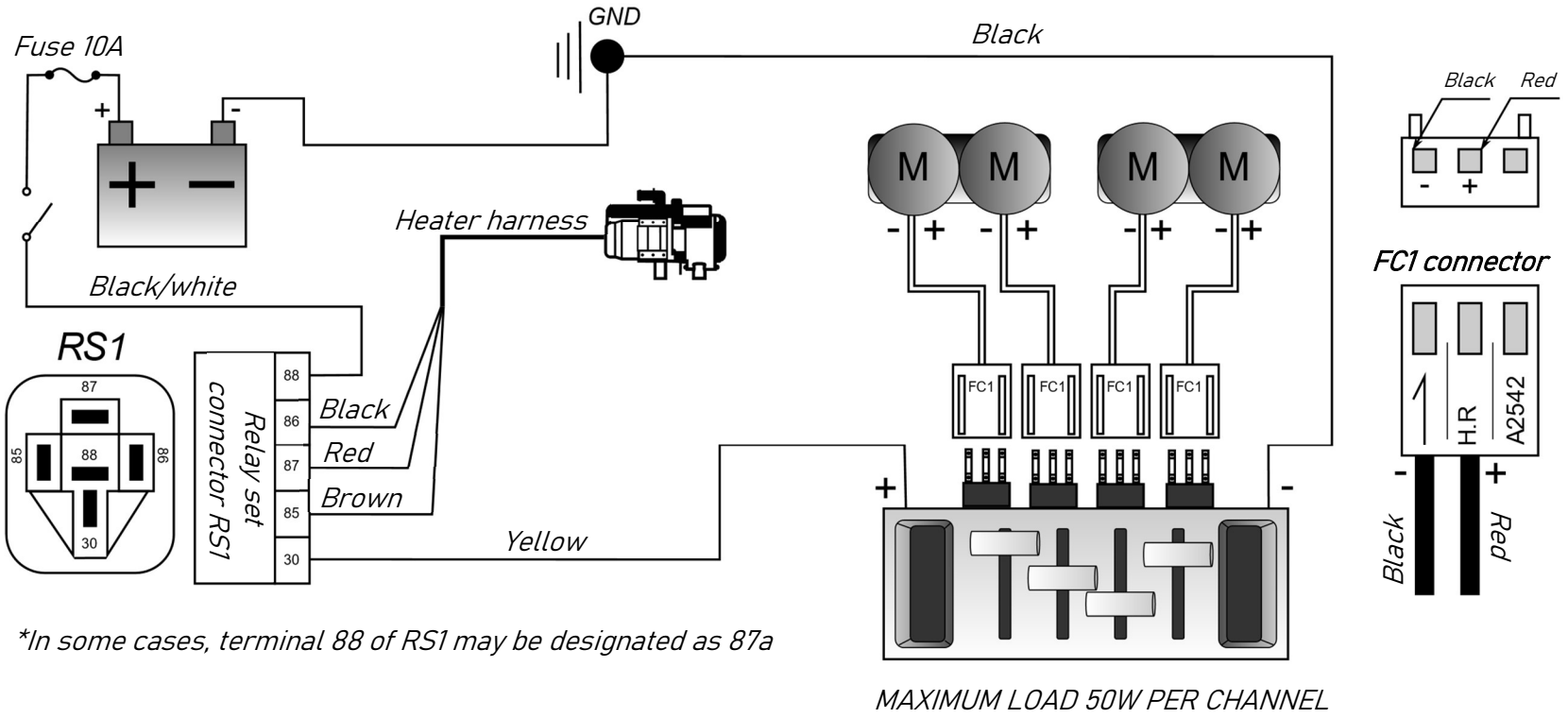


Figure 6 – Connection of FC9 controller

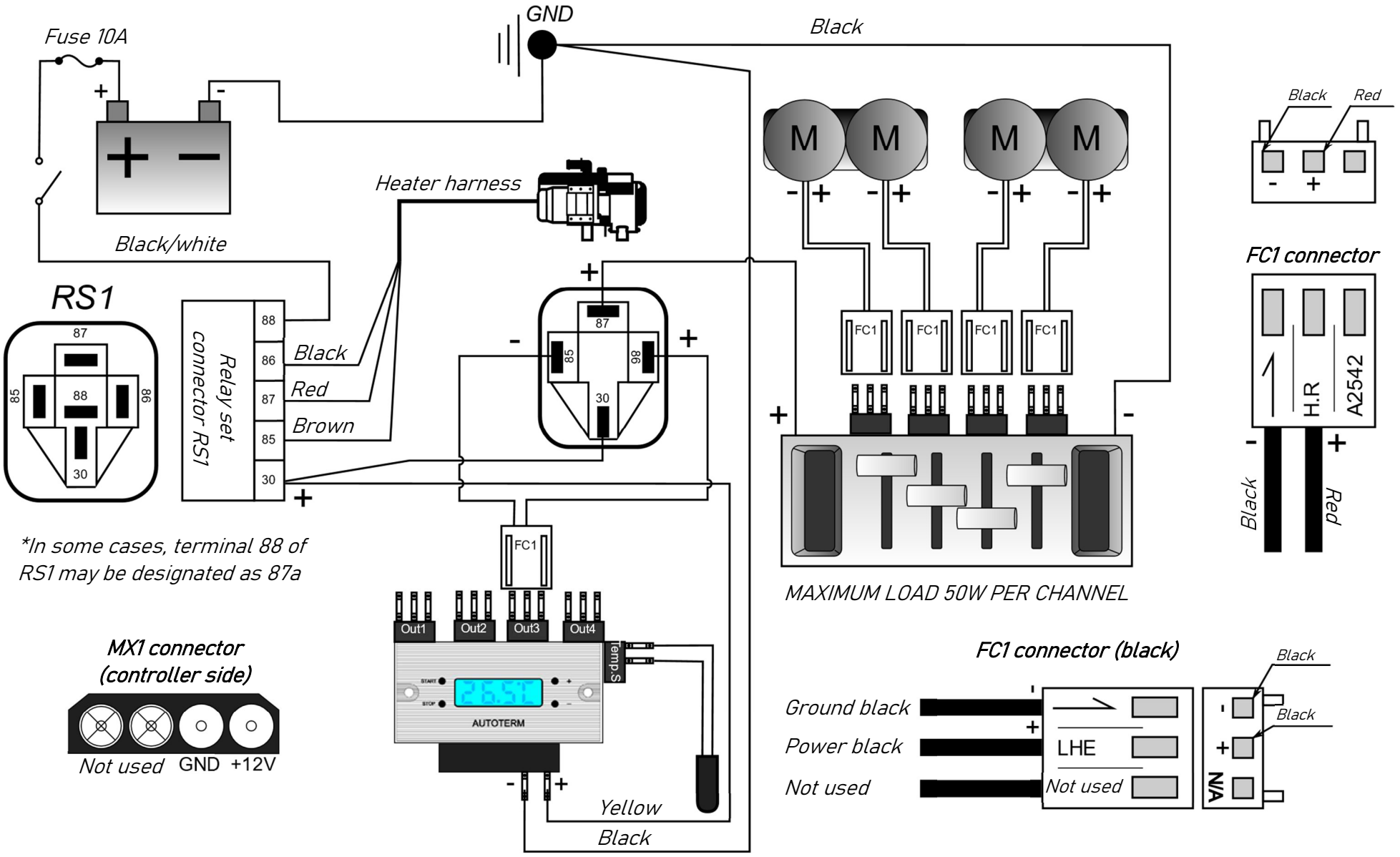


Figure 7 – FC9 controllor connection with additional CHM36 thermal conroller

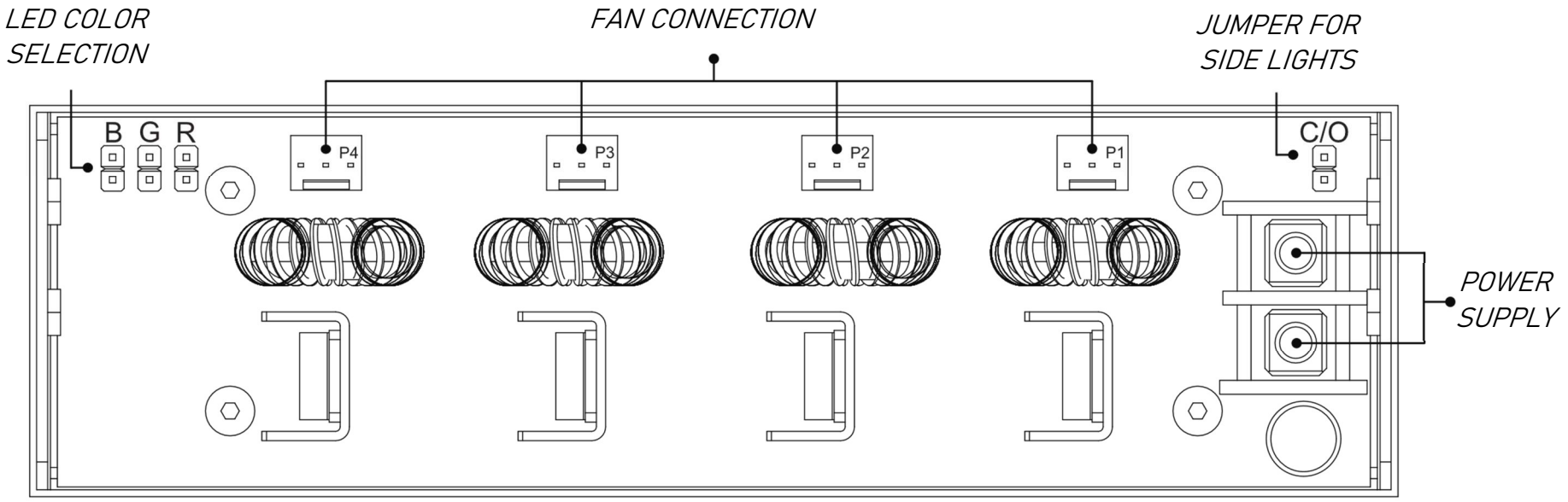


Figure 8 – Back of the FC9 controller

To choose the color of the side lights swith the jumpers (see Figure 8) on the back of the pannel:

G+R:  Yellow	B:  Blue	R:  Red	B+R:  Purple
B+G+R:  White	G:  Green	B+G:  Cyan	

SYSTEM CHECK AND FIRST LAUNCH

Once the installation is complete, check:

- the tightness of the air intake, exhaust, and fuel pipes clamps
- the tightness of the coolant and water system clamps
- the battery voltage
- if wiring is connected properly
- if all system components are fastened securely

Follow the instructions in section 4 *"Testing the heater after installation and first launch"* of the FLOW 5 manual to make sure the heater is working properly.

TECHNICAL PARAMETERS

AUTOTERM FLOW 5

Characteristics	Models		
	FLOW 5B	FLOW 5D	
Voltage:	12V	12V	24V
Heating medium:	Coolant, antifreeze coolant		
Optimal liquid/coolant volume:	10 - 12 l		
Coolant liquid flow rate:	At 0 bar pressure: 1200 l/h At 0.18 bar pressure: 800 l/h		
Heating power:	5 kW		
Power consumption:	42 W		
Power consumption, at start:	122 W		120 W
Max. work altitude (MASL):	1000 m		
Fuel:	Petrol fuel in accordance with EN228	Diesel fuel in accordance with EN590	
Fuel consumption:	0,7 l/h max	0,62 l/h max	
Control mode:	Manual, standard remote control, modem		
Weight of the heater:	2,4 kg		
Heater dimensions:	220 x 90 x 136 mm		

CHX HEATING MATRIX

Dimensions:	336.17 x 157 x 81.88 mm
Rated voltage:	12V
Operating voltage range:	6-14V
Electrical power consumption:	14W
Weight:	2.4kg
Operating temperature range:	-10 C deg. + 80 C deg.
Air flow:	140 m^3/h
Airflow static pressure:	7.1mm H_2O
Rated blower motor speed:	3100 RPM +/- 10%
Noise level:	44.5 dB
Heating capacity:	1400 Watts

EKO-AIR HEAT EXCHANGER

Dimensions:	240 x 90 x 55 mm
Heating capacity	10 kW
Maximum allowable pressure PS:	31 bar
Maximum flow rate:	5 m^3/h
Maximum allowable temperature TS:	220 °C
Minimum allowable temperature TS:	-196 °C
Inner diameter:	Ø 12.7 mm (1/2 in)

AUTOTERM FC9

Dimension:	148.5 x 42.5 x 75 mm
Power output:	up to 50W per channel
DC Input:	+12V (standard 4-pin connector)
DC Output:	0V-12V DC
Control Channels:	4
LED Colour:	White, Blue, Green, Cyan, Red, Purple, Yellow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air and liquid heaters