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HSK 1000 PR+

Installation and Operation Manual

THERMAL STORE with stainless-steel DHW tube heat exchanger HSK 1000 PR+

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HSK 1000 PR+

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1 - Description

HSK PR+ Thermal Stores are intended for storing and subsequent distribution of thermal energy of heating water. They are fitted with a stainless-steel tube DHW heat exchanger, permitting installation of electric heating elements and connection of other heat sources. For a better thermal layering, the tank volume is separated by a baffle. The lower section is equipped with a steel solar heat exchanger. This thermal store shall be always connected to a sealed heating circuit.
For proper operation of a tank, it is necessary to have an optimum hydraulic design of the entire heating system, i.e. position of circulation pumps for both heat sources and heating circuits, valves, check valves etc. When more heat sources shall be combined, it is recommended to use a smart controller for both the heat source and heat sink sides of a heating circuit, i.e. also for charging and discharging a thermal store..

1.1 - Tank protection

The thermal store has no inner surface finish, the outer surface is painted in gray. The DHW heat exchanger is made of stainless steel.

1.2 - Thermal insulation

Thermal insulation is available as a separate item. For easier handling, the insulation shall not be fitted on the tank until it reaches its definite place of installation. The insulation is 100 mm thick, with PUR leather surface, and closes with a zipper.

1.3 - Packaging

Thermal stores are delivered standing, each screwed to its pallet, packed in bubble wrap
It is forbidden to transport and/or store the thermal stores in a horizontal position.

2 - General Information

This Owners Manual is an integral and important part of the product and must be handed over to the User. Read carefully the instructions in this Manual as they contain important information concerning safety, installation, operation and maintenance. Keep this Manual for later reference. The appliance shall be installed by a qualified person according to valid rules and Manufacturer‘s Instructions.

This appliance is designed to accumulate thermal energy and distribute it subsequently. It must be connected to a heating system and heat sources. This appliance is suitable for continuous heating of domestic hot water.

Using the thermal store for other purposes than above described is forbidden and the manufacturer accepts no responsibility for damage caused by improper or wrong use or filling procedure.

The appliance shall be installed by a qualified person according to valid rules, otherwise the warranty becomes null and void.

3 - Technical Data and Dimensions of HSK 1000 PR+

Main Features	
Application	Combination thermal store with DHW heating in an integrated stainless-steel heat exchanger, fitted with a tight separating metal plate that increases seasonal coefficient of performance (SCOP) of a heat pump and the efficiency of a solar thermal system, wiht a solar heat exchanger in the lower tank section below the plate. Thermal stores are supplied uninsulated. Thermal insulation is available as a separate item, see the codes below.
Working fluid	Water (heat exchanger), water; water–glycol mixture (max. 1:1) or water/glycerine mixture (max. 2:1 (thermal store).
Thermal store code	20998
Insulation code	22159

Energy Efficiency Data (as per EC Regulation No. 812/2013)	
	valid for a thermal store with insulation
Energy efficiency class	N/A
Static loss	127 W
Storage volume	897 l

Technical data	
Total thermal store volume	916 l
Fluid volume in thermal store	869 l
Fluid volume above separating plate	314 l
Fluid volume below separating plate	555 l
Fluid volume of DHW heat exchanger above the separating plate	21.0 l
Fluid volume of DHW heat exchanger below the separating plate	8.0 l
Fluid volume in solar heat exchanger	18.0 l
Surface area of DHW heat exchanger above the separating plate	6.0 m²
Surface area of DHW heat exchanger below the separating plate	2.0 m²
Solar heat exchanger surface area	3.2 m²
Max. working temperature in thermal store	95 °C
Max. working temperature in DHW heat exchanger	95 °C
Max. working temperature in solar heat exchanger	95 °C
Max. working pressure in thermal store	4 bar
Max. working pressure in DHW heat exchanger	10 bar
Max. working pressure in solar heat exchanger	10 bar
Thermal store diameter	790 mm
Thermal store diameter with insulation	990 mm
Thermal store overall height with insulation	2130 mm
Tipping height without insulation	2111 mm
Thermal store perimeter insulation thickness	100 mm
Thermal store bottom insulation thickness	50 mm
Thermal store top insulation thickness	100 mm
Empty weight without insulation	180 kg

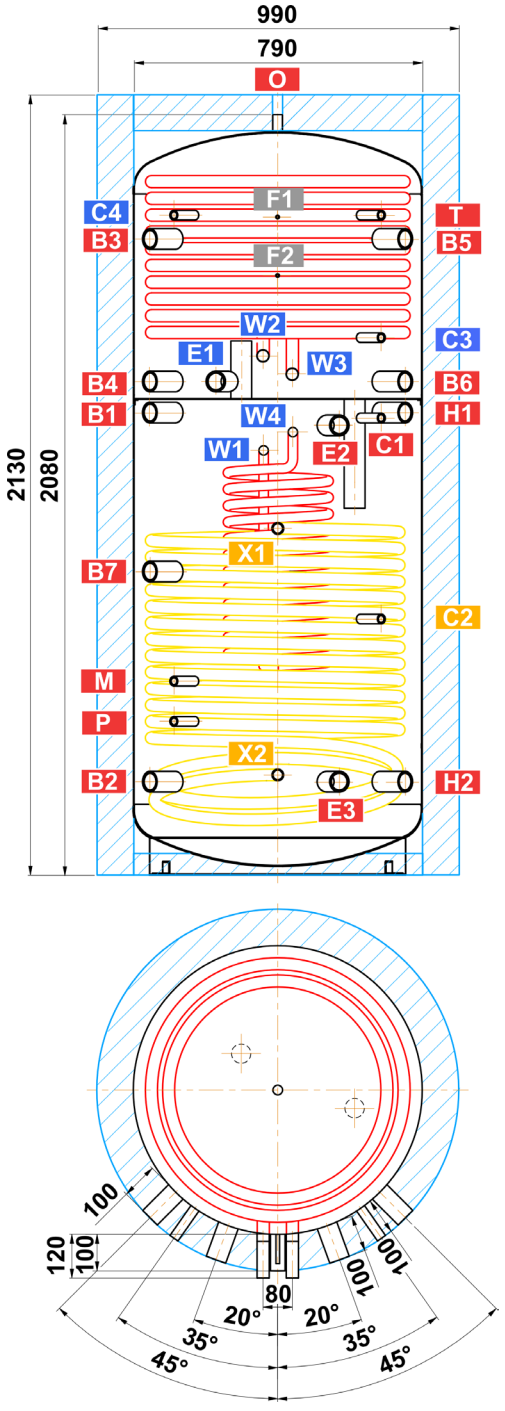
Accessories	
Electric heating element	types ETT-A, D2, R, S, C, F2, M, P, U
Heating element max. length	815 mm

Materials	
Thermal store material	S235JR
Thermal store perimeter insulation	fleece
Thermal store outer surface insulation	hard polystyrene
Top and bottom thermal store insulation	fleece
DHW heat exchanger	AISI 316 L
Solar heat exchanger	S235JR+N

Insulation thermal conductivity λ ≤ 0.037 W/mK, thermal resistance (short/long term) 150/100 °C, fire class E.

Volume of supplied DHW (heated from 10 °C to 40 °C)				
Heated volume	Temperature in thermal store	Backup heater	Flow rate [l/min]	Hot water volume [l]
Entire	50 °C	10 kW	8	508
			12	401
			20	270
Entire	50 °C	none	8	509
			12	389
			20	268
Above metal sheet	50 °C	10 kW	8	225
			12	219
			20	121
Entire	60 °C	10 kW	8	1478
			12	989
			20	751
Entire	60 °C	none	8	824
			12	734
			20	637
Above metal sheet	60 °C	10 kW	8	497
			12	353
			20	271
Entire	80 °C	none	8	1332
			12	1269
			20	1181

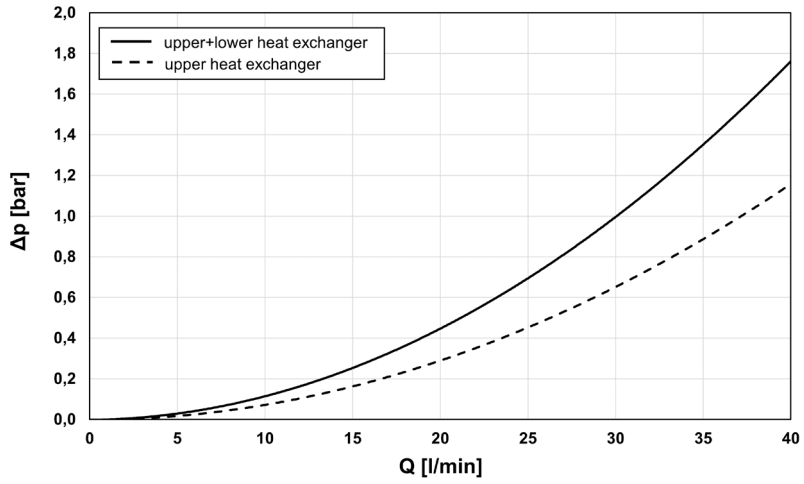
Dimensions



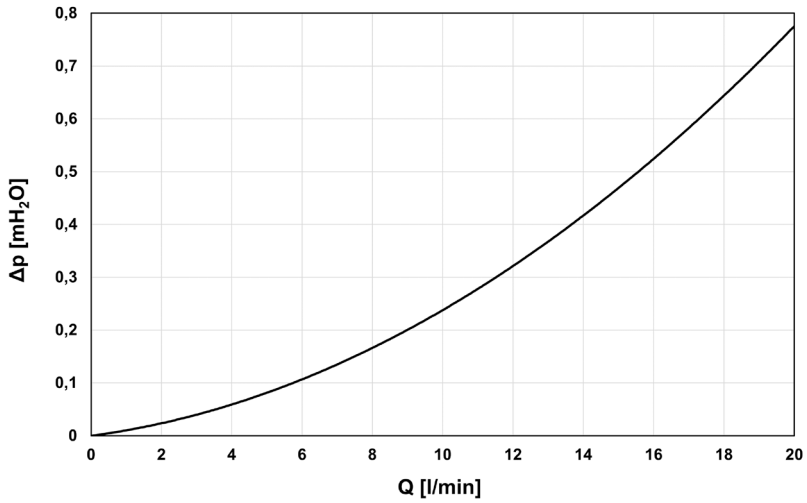
CONNECTIONS

pos.	description	connection	height [mm]
Heat sources			
B1	Supply from heat source	G 6/4" F	1265
B2	Return to heat source	G 6/4" F	255
B3	Supply from heat source	G 6/4" F	1740
B4	Return to heat source	G 6/4" F	1350
B5	Supply from heat source	G 6/4" F	1740
B6	Return to heat source	G 6/4" F	1350
B7	Supply from heat source	G 6/4" F	830
Heating system			
H1	Flow to heating system	G 6/4" F	1265
H2	Return from heating system	G 6/4" F	255
Solar thermal system			
X1	Supply from solar collectors	G 1" F	945
X2	Return to solar collectors	G 1" F	270
Electric heating element			
E1	El. heating element (DHW)	G 6/4" F	1350
E2	El. heating element (space heating)	G 6/4" F	1230
E3	El. heating element (space heating)	G 6/4" F	255
DHW heating			
W1	Cold water	G 1" M	1160
W2	Domestic hot water	G 1" M	1420
W3	Recirculation	G 1" M	1370
W4	Domestic hot water	G 1" M	1210
Control and safety			
C1	Temperature sensor	G 1/2" F	1250
C2	Temperature sensor	G 1/2" F	700
C3	Temperature sensor	G 1/2" F	1470
C4	Temperature sensor	G 1/2" F	1805
T	Thermometer	G 1/2" F	1805
M	Pressure gauge	G 1/2" F	530
P	Safety valve	G 1/2" F	420
Air discharge			
O	Air vent valve	G 1/2" F	2080
Pump station support			
F1	Pump station support – upper	M6	1800
F2	Pump station support – lower	M6	1640

DHW heat exchanger pressure drop graph



Solar heat exchanger pressure drop



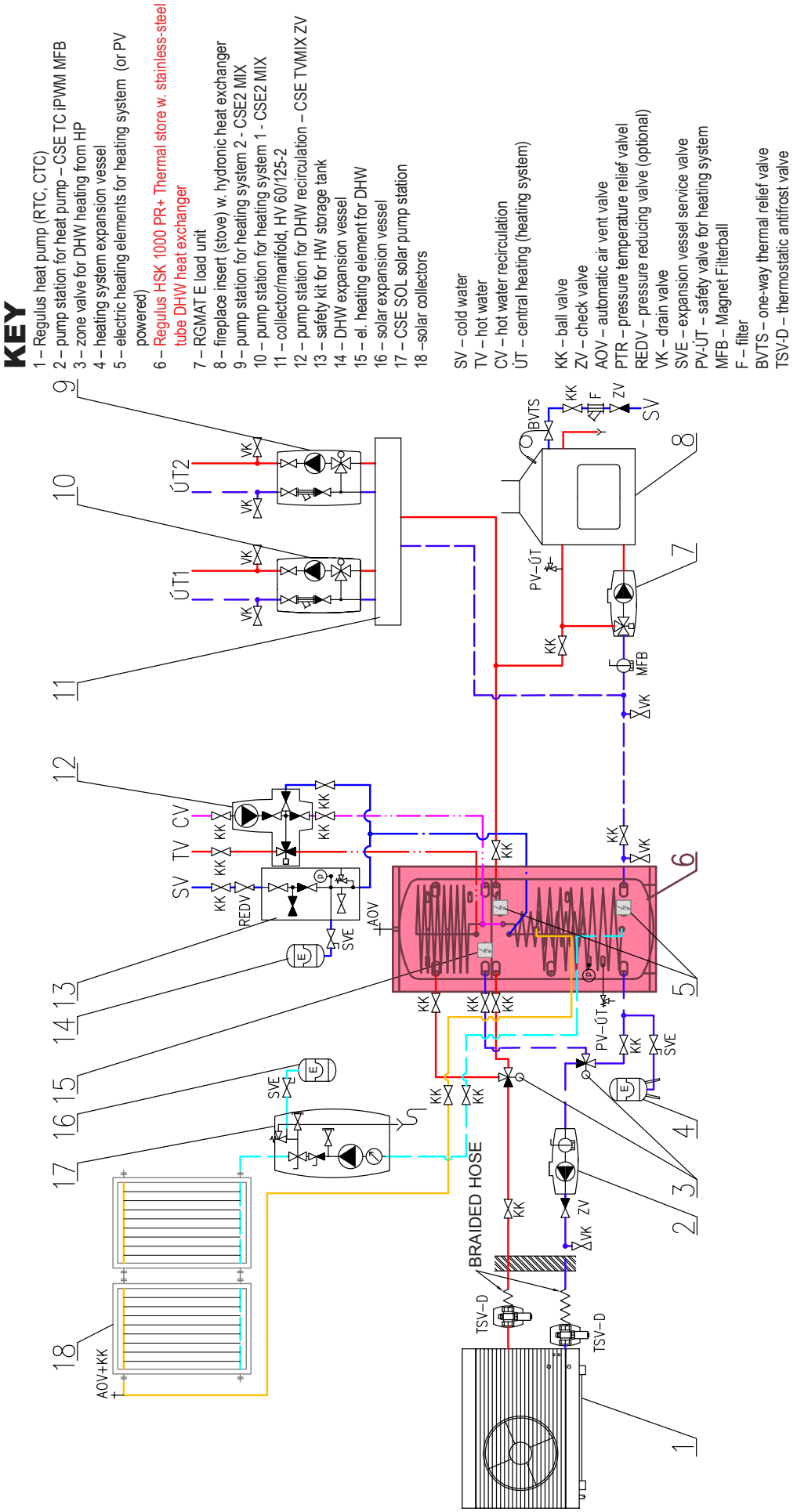
4 - Operation

This tank is designed for heating and storing heating water in household or industrial applications, however always in closed pressure circuits with forced circulation. Hot water is heated inside the thermal store from several possible heat sources like various kinds of heating boilers, renewable energy sources or also electric heating elements. A stainless--steel tube DHW heat exchanger is heated by heating water inside the thermal store. It connects through 1” threaded fittings. When hot water is drawn from the outlet point, cold water flows into the immersed heat exchanger and heats up by the heating water.
The thermal store shall be connected to heat sources through connecting threaded fittings.
Individual connection points are assigned according to the circuits to be connected. There is a wide choice of combinations; the following chapter describes just some examples.

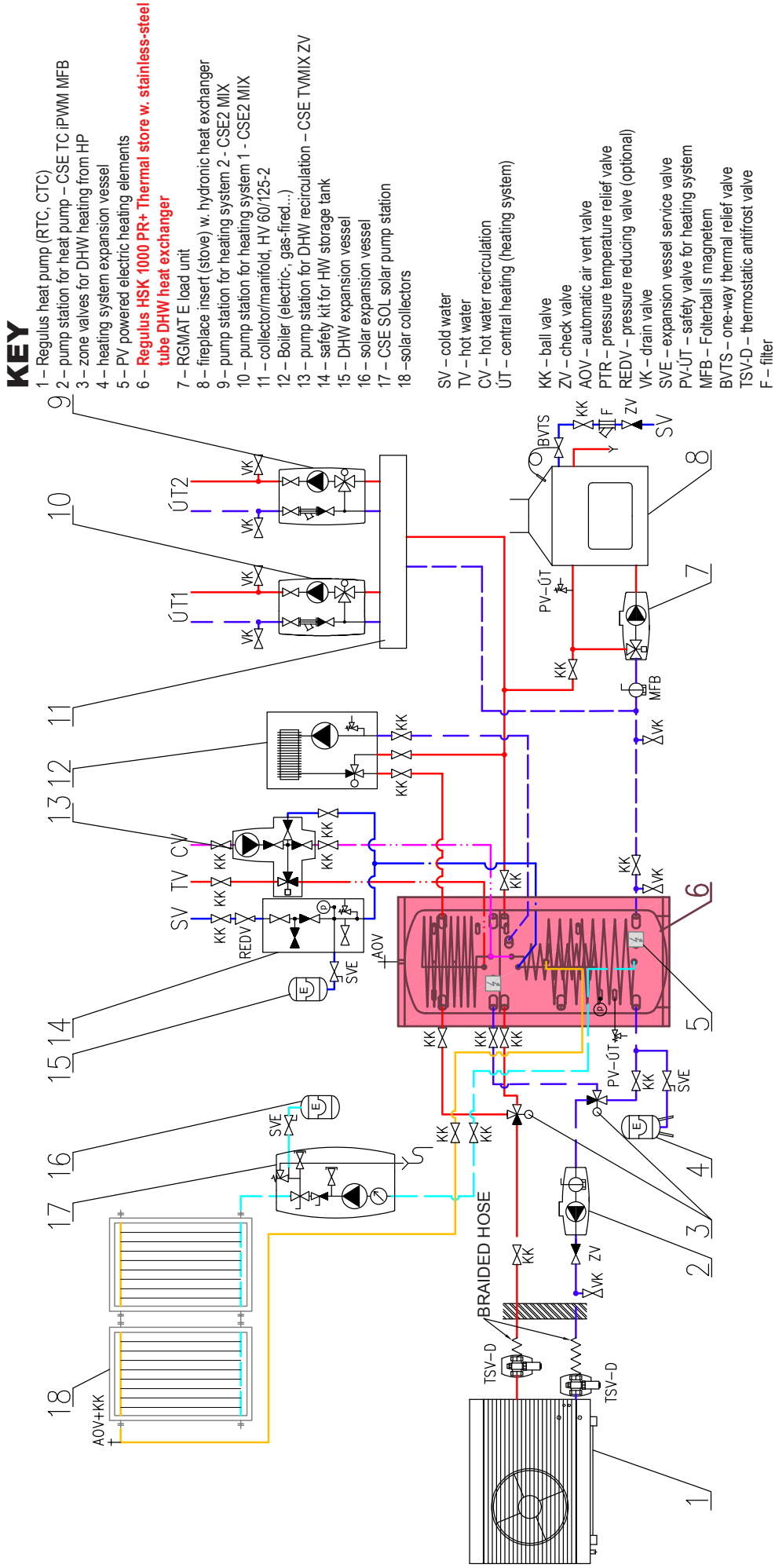
5 - Typical Layout Examples with Thermal Store

Example I.

Solar collector + el. heating element+ fireplace



Example II.
Solar collector + gas-fired boiler+ fireplace



6 - Installation and Commissioning

Installation must meet valid rules and may be done only by qualified staff.
Defects caused by improper installation, use or handling are not covered by warranty.

After the tank is installed and connected to an existing heating system, it is recommended to clean the entire heating system using a suitable cleaning agent, e.g. MANTA 400 PLUS.
Anti-corrosion protective liquid should be also used, e.g. MANTA 100 PLUS.

6.1 - Connection to heat sources

Place the tank on the floor, as close to your heat source as possible. Connect the heating circuits to inlets and outlets respecting the thermal stratification in the tank. Install a drain valve at the lowest point of the tank.
Install an air vent valve at the highest point of the system. Insulate all the connection piping.

6.2 - Connection to a solar thermal system

The tank can be used with a solar thermal system. In such a case, the inlet for hot solar fluid coming from the solar thermal system shall be connected to the upper tapping of the G 1" heating coil and the lower outlet to the return piping to the solar thermal system. Insulate meticulously all the piping between the tank and the solar thermal system.

6.3 - Installation of an el. heating element

The G 6/4" side tappings are designed to accommodate electric heating rods. They can be connected either directly to the mains (thermostat-equipped rods), or to a heating system controller. The installation may be done by qualified staff only.
Warning: Electric heating elements shall be protected by a safety thermostat.

6.4 - Connection to water mains

DHW piping shall be done according to valid rules. Installation of a pressure reducing valve on the immersed tank inlet is recommended. For water mains pressure above 6 bar a pressure reducing valve is necessary. Install a DHW expansion vessel of 2 l min. volume at the cold water inlet. Installation of the expansion vessel is a condition for the warranty to be valid. Should the water be too hard, install a water softener before the tank. In case the water contains mechanical impurities, install a strainer.

Table of limit values for total dissolved solids in hot water.

Description	pH	Total dissolved solids (TDS)	Ca	Chlorides	Mg	Na	Fe
Max. value	6,5 - 9,5	600 mg/l	40 mg/l	100 mg/l	20 mg/l	200 mg/l	0,2 mg/l

6.5 - Commissioning

Ground the tank before commissioning.
The tank shall be filled up together with the heating system, respecting valid standards and rules. In order to minimize corrosion, special additives for heating systems should be used. The quality of heating water depends on the quality of filling water at commissioning, on the top-up water and on the frequency of topping up. This has a strong influence on the lifetime of heating systems. Poor quality of heating water may cause problems like corrosion or incrustation, esp. on heat transfer surfaces.
Quality of DHW shall meet the conditions shown in the Table of limit values for total dissolved solids in hot water on this page.

Fill the heating circuits with the appropriate fluids and air-bleed the entire system. Check all connections for leaks and verify the system pressure. Set the heating controller in compliance with the documentation and manufacturer's recommendations. Check regularly the proper function of all control and adjustment elements.

7 - Installing Insulation on the Tank

Warning

Insulation installation shall be done in two or three persons, depending on its size. The zippered, PVC coated insulation **must not be installed at temperatures below 20 °C.** If this cannot be avoided, the insulation shall be pre-warmed in another room to at least 20 °C. It is impossible to install insulation of lower temperature, there is a risk of damage, esp. to the zipper.
Do not use any tools for installation.
Keep away from open fire.

Installing Insulation

1. Fix the tank following installation instructions.
2. Fit the bottom insulation parts.

3. Wrap the insulation around the tank carefully. Check that the insulation adheres to its body perfectly. This can be reached by rubbing and patting the insulation by hand from its center evenly in both directions until the insulation adheres to the tank's surface completely and no bubbles are left.
4. Use the holes for tappings as a rest during the insulation installation.
5. At least one person presses the insulation to the tank, pulling both ends together. The other person closes the zipper.
6. Put on the upper insulation and cover
7. Push on the covering plastic rosettes depending on the size of tappings, or put on the flange plug(s) with insulation.
8. Finish the tank installation in compliance with the respective instructions and valid standards and rules.

Warranty on insulation

□ Warranty shall become null and void if:
- the procedure described in the Installation Manual was not respected,
- the product was used for other purposes than intended.

□ Warranty does not cover:
- usual wear and tear,
- damage caused by fire, water, electricity or a natural disaster,
- defects caused by failure to use the product in compliance with its intended purpose, by improper use and insufficient maintenance,
- defects caused by mechanical damage to the product,
- defects caused by tampering or incompetent repair.

8 - Maintenance

If the tank is fitted with a heating element, disconnect it from the mains first. Clean the exterior of the tank with a soft cloth and a mild detergent. Never use abrasive cleaners or solvents.
Check all connections for leaks.

9 - Disposal

Packaging shall be disposed of in compliance with the valid rules. When the product reaches the end of its life, it shall not be disposed of as household waste. It shall be dropped off at a Local Waste Recycling Center. Insulation shall be recycled as plastic and the steel vessel as scrap iron.

10 - Warranty

This product is covered by warranty under conditions specified in this Manual and the respective Warranty Certificate. The Warranty Certificate is an integral part of supply of this Thermal Store.

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