



DUO N PR

Installation and Operation Manual
DUO Thermal Store with Immersed DHW Tank
DUO 390/130 N PR, DUO 600/200 N PR, DUO 750/200 N PR,
DUO 1000/200 N PR, DUO 1700/200 N PR

EN

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1 - Description

DUO N Thermal Stores are intended for storing and subsequent distribution of thermal energy from various heat sources like solid-fuel boilers, heat pumps, electric boilers etc. A DHW tank is integrated inside the thermal store. For a better thermal layering, the tank volume is separated by a metal plate. The lower section is equipped with a solar heat exchanger. The thermal store shall be connected to a sealed heating system with forced circulation.

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, non-return valves etc. When more heat sources shall be combined, it is recommended to use a smart controller for both the heat source and heat consumer sections of a heating circuit, i.e. also for charging and discharging a thermal store.

1.1 - Models

Models DUO 390/130 N PR, DUO 600/200 N PR, DUO 750/200 N PR, DUO 1000/200 N PR and DUO 1700/200 N PR permitting installation of electric heating elements and other external heat sources.

1.2 - Tank protection

The inner DHW tank is made of stainless steel. A chain-type magnesium anode is installed in it for an increased level of protection. The thermal store has no inner surface finish, the outer surface is lacquered.

1.3 - 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 made of fleece, 100 mm thick, with a hard polystyrene surface. It is closed by quick locks.

1.4 - Packaging

Tanks are delivered standing, each screwed to its pallet, packed in bubble wrap. The tank is then shrink-wrapped together with its pallet.

It is forbidden to transport and/or store the storage tanks 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 qualified staff according to valid rules and Manufacturer's Instructions.

This appliance is designed to accumulate heating water and distribute it subsequently. It shall be connected to a heating system and heat sources. This appliance is also suitable for accumulator 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.

Before filling the thermal store, fill and pressurize the inner DHW tank first!!!

3 - Technical Data and Dimensions

Regulus DUO N PR

Regulus DUO 390/130 N PR Thermal Store (code:19139, insulation - code: 19293)

Rozměrové schéma		NÁVARKY			
		poz.	popis	připojení	výška [mm]
		Zdroje tepla			
		B1	Přívodní od zdroje tepla	G 1" F	780
		B2	Vratná do zdroje tepla	G 1" F	130
		B3	Přívodní od zdroje tepla	G 1" F	1630
		B4	Vratná do zdroje tepla	G 1" F	880
		B5	Přívodní od zdroje tepla	G 1" F	1540
		Otopná soustava			
		H1	Přívodní do otopné soustavy	G 1" F	780
		H2	Vratná z otopné soustavy	G 1" F	210
		Solární systém			
		X1	Přívodní od solárních kolektorů	G 1" F	660
		X2	Vratná do solárních kolektorů	G 1" F	210
		Elektrické topné těleso			
		E1	El. topné těleso (TV)	G 6/4" F	980
		E2	El. topné těleso (vytápění)	G 6/4" F	720
		E3	El. topné těleso (vytápění)	G 6/4" F	720
		Příprava teplé vody			
		W1	Studená voda	G 3/4" F	1880
		W2	Teplá voda	G 3/4" F	1880
		W3	Cirkulace	G 3/4" F	1880
		A1	Anoda	G 3/4" F	1855
		Regulace a zabezpečení			
		C1	Teplotní čidlo	G 1/2" F	750
		C2	Teplotní čidlo	G 1/2" F	510
		C3	Teplotní čidlo	G 1/2" F	1160
		C4	Teplotní čidlo	G 1/2" F	1020
		T	Teploměr	G 1/2" F	1630
		M	Tlakoměr	G 1/2" F	510
		P	Pojistný ventil	G 1/2" F	400
		Odvzdušnění			
		O	Odvzdušňovací ventil	G 1/2" F	1880
		Uchycení č. sk.			
		F1	Uchycení č. sk. - horní	M6	1430
		F2	Uchycení č. sk. - spodní	M6	1270

Total volume:	396l
Immersed DHW tank volume:	264 l
Fluid volume in Thermal Store:	123 l
Heat exchanger (HX) volume:	9l
Heat exchanger surface area:	1,5 sqm
Max. working temp. in thermal store:	95 °C
Max. working temperature in heat exchanger:	95 °C
Max. working temperature in DHW tank:	95 °C
Max. working pressure in DHW tank:	3 bar
Max. working pressure in thermal store:	6 bar
Max. working pressure in HX:	10 bar
Empty weight:	117 kg
Electric heating element (Accessories):	type ETT-C, F2, M, P, U
Number and max. length of heating element:	3 x 500 mm

Regulus DUO 600/200 N PR Thermal Store (code:19133, insulation - code: 19321)

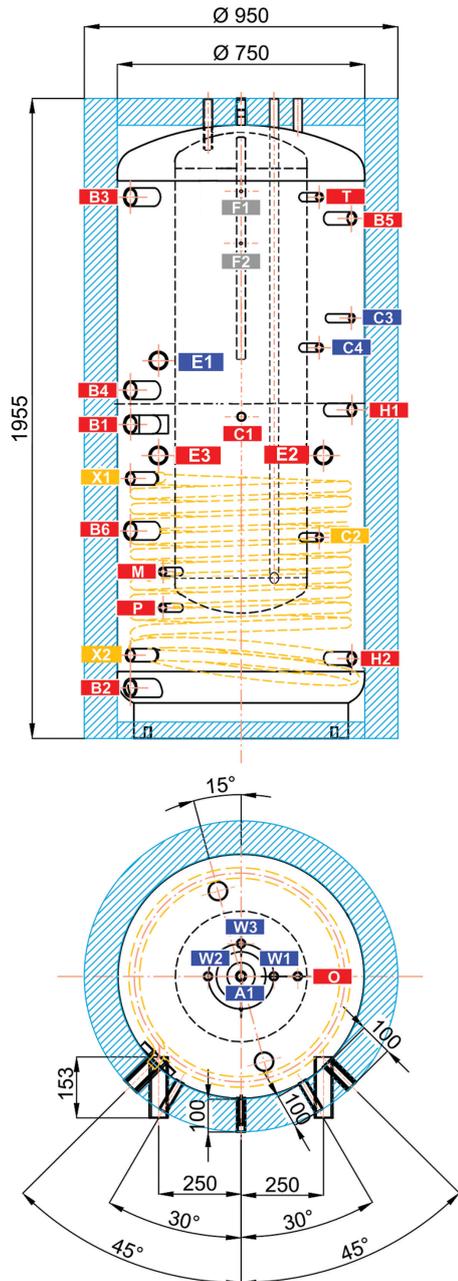
Rozměrové schéma		NÁVARKY		
poz.	popis	připojení	výška [mm]	
Zdroje tepla				
B1	Přívodní od zdroje tepla	G 6/4" F	985	
B2	Vratná do zdroje tepla	G 6/4" F	135	
B3	Přívodní od zdroje tepla	G 6/4" F	1635	
B4	Vratná do zdroje tepla	G 6/4" F	1090	
B5	Přívodní od zdroje tepla	G 1" F	1570	
B6	Přívodní od zdroje tepla	G 6/4" F	660	
Otopná soustava				
H1	Přívodní do otopné soustavy	G 1" F	1030	
H2	Vratná z otopné soustavy	G 1" F	225	
Solární systém				
X1	Přívodní od solárních kolektorů	G 1" F	820	
X2	Vratná do solárních kolektorů	G 1" F	235	
Elektrické topné těleso				
E1	El. topné těleso (TV)	G 6/4" F	1180	
E2	El. topné těleso (vytápění)	G 6/4" F	890	
E3	El. topné těleso (vytápění)	G 6/4" F	890	
Příprava teplé vody				
W1	Studená voda	G 3/4" F	1910	
W2	Teplá voda	G 3/4" F	1910	
W3	Cirkulace	G 3/4" F	1910	
A1	Anoda	G 3/4" F	1880	
Regulace a zabezpečení				
C1	Teplotní čidlo	G 1/2" F	1000	
C2	Teplotní čidlo	G 1/2" F	625	
C3	Teplotní čidlo	G 1/2" F	1310	
C4	Teplotní čidlo	G 1/2" F	1220	
T	Teploměr	G 1/2" F	1635	
M	Tlakoměr	G 1/2" F	510	
P	Pojistný ventil	G 1/2" F	400	
Odvzdušnění				
O	Odvzdušňovací ventil	G 1/2" F	1910	
Uchycení č. sk.				
F1	Uchycení č. sk. - horní	M6	1660	
F2	Uchycení č. sk. - spodní	M6	1500	

Total volume:	559
Immersed DHW tank volume:	372 l
Fluid volume in Thermal Store:	174 l
Heat exchanger (HX) volume:	131
Heat exchanger surface area:	2,4 sqm
Max. working temp. in thermal store:	95 °C
Max. working temperature in heat exchanger:	95 °C
Max. working temperature in DHW tank:	95 °C
Max. working pressure in DHW tank:	3 bar
Max. working pressure in thermal store:	6 bar
Max. working pressure in HX:	10 bar
Empty weight:	143 kg
Electric heating element (Accessories):	type ETT-C, F2, M, P, U
Number and max. length of heating element:	3 x 500 mm

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Regulus DUO 750/200 N PR Thermal Store (code:19135, insulation - code: 19327)

Rozměrové schéma



NÁVARKY

poz.	popis	připojení	výška [mm]
Zdroje tepla			
B1	Přívodní od zdroje tepla	G 6/4" F	960
B2	Vratná do zdroje tepla	G 6/4" F	155
B3	Přívodní od zdroje tepla	G 6/4" F	1655
B4	Vratná do zdroje tepla	G 6/4" F	1065
B5	Přívodní od zdroje tepla	G 1" F	1590
B6	Přívodní od zdroje tepla	G 6/4" F	635
Otopná soustava			
H1	Přívodní do otopné soustavy	G 1" F	1005
H2	Vratná z otopné soustavy	G 1" F	245
Solární systém			
X1	Přívodní od solárních kolektorů	G 1" F	795
X2	Vratná do solárních kolektorů	G 1" F	255
Elektrické topné těleso			
E1	El. topné těleso (TV)	G 6/4" F	1155
E2	El. topné těleso (vytápění)	G 6/4" F	865
E3	El. topné těleso (vytápění)	G 6/4" F	865
Příprava teplé vody			
W1	Studená voda	G 3/4" F	1955
W2	Teplá voda	G 3/4" F	1955
W3	Cirkulace	G 3/4" F	1955
A1	Anoda	G 3/4" F	1925
Regulace a zabezpečení			
C1	Teplotní čidlo	G 1/2" F	975
C2	Teplotní čidlo	G 1/2" F	615
C3	Teplotní čidlo	G 1/2" F	1285
C4	Teplotní čidlo	G 1/2" F	1195
T	Teploměr	G 1/2" F	1655
M	Tlakoměr	G 1/2" F	510
P	Pojistný ventil	G 1/2" F	400
Odvzdušnění			
O	Odvzdušňovací ventil	G 1/2" F	1955
Uchycení č. sk.			
F1	Uchycení č. sk. - horní	M6	1680
F2	Uchycení č. sk. - spodní	M6	1520

Total volume:	757 l
Immersed DHW tank volume:	568 l
Fluid volume in Thermal Store:	174 l
Heat exchanger (HX) volume:	15 l
Heat exchanger surface area:	2,5 sqm
Max. working temp. in thermal store:	95 °C
Max. working temperature in heat exchanger:	95 °C
Max. working temperature in DHW tank:	95 °C
Max. working pressure in DHW tank:	3 bar
Max. working pressure in thermal store:	6 bar
Max. working pressure in HX:	10 bar
Empty weight:	166 kg
Electric heating element (Accessories):	type ETT-C, F2, M, P, U
Number and max. length of heating element:	3 x 635 mm

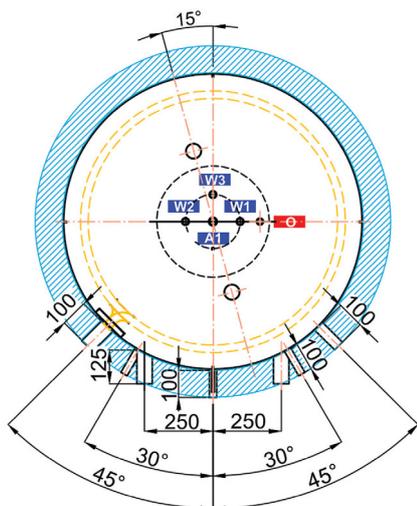
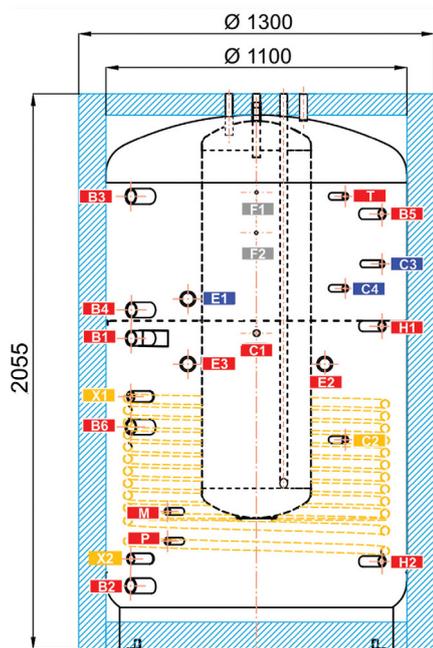
Regulus DUO 1000/200 N PR Thermal Store (code: 19149, insulation - code: 19329)

Rozměrové schéma		NÁVARKY		
poz.	popis	přípojení	výška [mm]	
Zdroje tepla				
B1	Přívodní od zdroje tepla	G 6/4" F	1115	
B2	Vratná do zdroje tepla	G 6/4" F	200	
B3	Přívodní od zdroje tepla	G 6/4" F	1700	
B4	Vratná do zdroje tepla	G 6/4" F	1220	
B5	Přívodní od zdroje tepla	G 1" F	1635	
B6	Přívodní od zdroje tepla	G 6/4" F	785	
Otopná soustava				
H1	Přívodní do otopné soustavy	G 1" F	1160	
H2	Vratná z otopné soustavy	G 1" F	290	
Solární systém				
X1	Přívodní od solárních kolektorů	G 1" F	950	
X2	Vratná do solárních kolektorů	G 1" F	300	
Elektrické topné těleso				
E1	El. topné těleso (TV)	G 6/4" F	1310	
E2	El. topné těleso (vytápění)	G 6/4" F	1020	
E3	El. topné těleso (vytápění)	G 6/4" F	1020	
Příprava teplé vody				
W1	Studená voda	G 3/4" F	2055	
W2	Teplá voda	G 3/4" F	2055	
W3	Cirkulace	G 3/4" F	2055	
A1	Anoda	G 3/4" F	2025	
Regulace a zabezpečení				
C1	Teplotní čidlo	G 1/2" F	1130	
C2	Teplotní čidlo	G 1/2" F	740	
C3	Teplotní čidlo	G 1/2" F	1440	
C4	Teplotní čidlo	G 1/2" F	1350	
T	Teploměr	G 1/2" F	1700	
M	Tlakoměr	G 1/2" F	510	
P	Pojistný ventil	G 1/2" F	400	
Odvzdušnění				
O	Odvzdušňovací ventil	G 1/2" F	2055	
Uchycení č. sk.				
F1	Uchycení č. sk. - horní	M6	1725	
F2	Uchycení č. sk. - spodní	M6	1565	

Total volume:	903 l
Immersed DHW tank volume:	711 l
Fluid volume in Thermal Store:	174 l
Heat exchanger (HX) volume:	18 l
Heat exchanger surface area:	3,2 sqm
Max. working temp. in thermal store:	95 °C
Max. working temperature in heat exchanger:	95 °C
Max. working temperature in DHW tank:	95 °C
Max. working pressure in DHW tank:	3 bar
Max. working pressure in thermal store:	6 bar
Max. working pressure in HX:	10 bar
Empty weight:	180 kg
Electric heating element (Accessories)::	type ETT-C, F2, M, P, U
Number and max. length of heating element:	3 x 700 mm

Regulus DUO 1700/200 N PR Thermal Store (code: 19145, insulation - code: 19357)

Rozměrové schéma



NÁVARKY

poz.	popis	připojení	výška [mm]
Zdroje tepla			
B1	Přívodní od zdroje tepla	G 6/4" F	1150
B2	Vratná do zdroje tepla	G 6/4" F	235
B3	Přívodní od zdroje tepla	G 6/4" F	1675
B4	Vratná do zdroje tepla	G 6/4" F	1255
B5	Přívodní od zdroje tepla	G 1" F	1610
B6	Přívodní od zdroje tepla	G 6/4" F	820
Otopná soustava			
H1	Přívodní do otopné soustavy	G 1" F	1195
H2	Vratná z otopné soustavy	G 1" F	325
Solární systém			
X1	Přívodní od solárních kolektorů	G 1" F	935
X2	Vratná do solárních kolektorů	G 1" F	335
Elektrické topné těleso			
E1	El. topné těleso (TV)	G 6/4" F	1295
E2	El. topné těleso (vytápění)	G 6/4" F	1055
E3	El. topné těleso (vytápění)	G 6/4" F	1055
Příprava teplé vody			
W1	Studená voda	G 3/4" F	2055
W2	Teplá voda	G 3/4" F	2055
W3	Cirkulace	G 3/4" F	2055
A1	Anoda	G 3/4" F	2025
Regulace a zabezpečení			
C1	Teplotní čidlo	G 1/2" F	1165
C2	Teplotní čidlo	G 1/2" F	775
C3	Teplotní čidlo	G 1/2" F	1425
C4	Teplotní čidlo	G 1/2" F	1335
T	Teploměr	G 1/2" F	1675
M	Tlakoměr	G 1/2" F	510
P	Pojistný ventil	G 1/2" F	400
Odvzdušnění			
O	Odvzdušňovací ventil	G 1/2" F	2055
Uchycení č. sk.			
F1	Uchycení č. sk. - horní	M6	1700
F2	Uchycení č. sk. - spodní	M6	1540

Total volume:	1682 l
Immersed DHW tank volume:	1486 l
Fluid volume in Thermal Store:	174 l
Heat exchanger (HX) volume:	22 l
Heat exchanger surface area:	4,0 sqm
Max. working temp. in thermal store:	95 °C
Max. working temperature in heat exchanger:	95 °C
Max. working temperature in DHW tank:	95 °C
Max. working pressure in DHW tank:	3 bar
Max. working pressure in thermal store:	6 bar
Max. working pressure in HX:	10 bar
Empty weight:	268 kg
Electric heating element (Accessories):	type ETT-C, F2, M, P, U
Number and max. length of heating element:	3 x 955 mm

4 - Operation

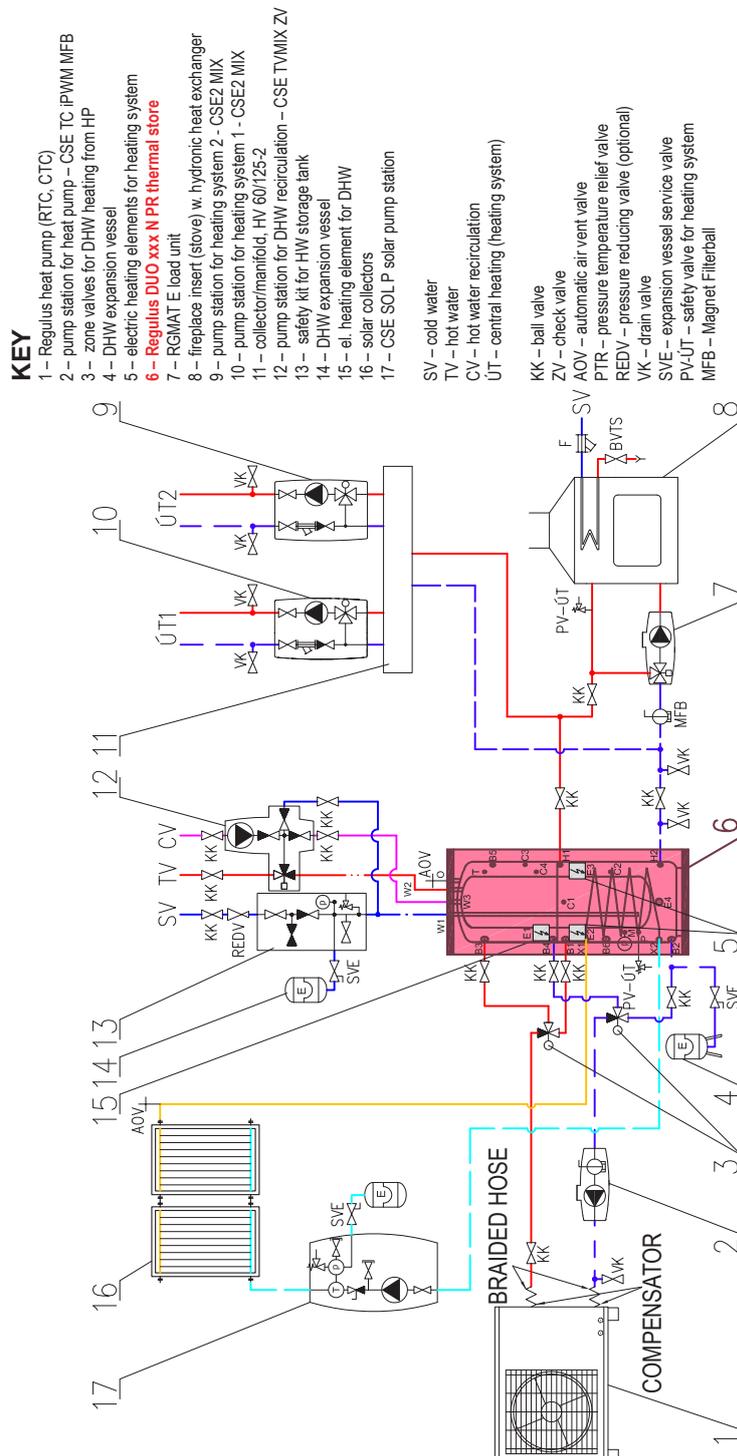
This tank is designed to accumulate thermal energy in household or industrial applications, however always in sealed pressure circuits with forced circulation.

Hot water is heated by heating water inside the integrated DHW tank. It connects with fittings to both cold and hot water piping, possibly also to a hot water recirculation circuit. When hot water is drawn from an outlet point, cold water flows into the immersed DHW tank and heats up from the heating water in the thermal store to a temperature set by the thermostat placed in the sheath of the DHW tank, or in a heating system controller. Hot water temperature should be set to 60-65 °C. This temperature guarantees the best operation and at the same time, it prevents formation of Legionella bacteria.

5 - Typical Layout Example with Thermal Store

During commissioning and during operation, the pressure in the hot water storage tank must always be higher than in the heating system. Otherwise, there is a risk of damage to the hot water tank. If there is a situation when the water pressure in the hot water tank is about to drop (e.g. interruption of the water supply from the line), do not open any hot water outlet fittings (shower, taps, etc.) until the situation has passed.

Hydraulic variant : Solar set with heat pump combined with electric heating elements and fireplace



6 - Installation and Commissioning

Installation shall meet valid rules and may be done by qualified staff only.

Installation of an el. heating rod may be done by qualified staff only.

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. BP 400. Anti-corrosion protective liquid should be also used, e.g. BP 100 Plus.

6.1 - Connection to heat sources

Place the tank on the floor, as close to your heat source as possible and level it. Connect the heating system according to one of the schematic diagrams - see Chap. 5. 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 system. In such a case, the inlet for hot heat-carrying liquid coming from the solar thermal system shall be connected to the G 1" upper sleeve of the heating coil. The lower G 1" heating coil outlet shall be connected to the return solar piping through which cooled solar fluid returns to solar collectors. Insulate meticulously all the piping between the tank and the solar thermal system.

6.3 - Heating element installation

Electric heating elements shall be installed into G 6/4" side connections. They can be connected either directly (elements with integrated thermostat) or via the controller of the entire heating system. Electric heating elements shall be wired by a professionally qualified person only.

Warning: All 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. The connection to the tank, including the fittings, is shown in the diagram of the recommended connections in Chap. 5. 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. To prevent water loss, we recommend installing an expansion vessel at the cold water inlet to the immersed tank with a minimum volume of 4% of the total volume of water in the DHW piping, including heat exchangers, recirculation pipes, etc. (usually 8 l). Installation of an expansion vessel is one of the necessary conditions for the extended warranty. Should the water be too hard, install a water softener upstream of the tank. In case the water source contains mechanical impurities, install a filter.

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.

During commissioning, the immersed hot water tank shall be filled and pressurized first, after that the thermal store can be filled. If the thermal store was filled first, the DHW tank would get damaged!!!

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 in Chap. 6.4. of this Manual.

Fill the heating system 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

Product description

Thermal insulation is a part of thermal stores to reducing its heat loss. For easier handling, the insulation shall not be fitted on the tank until it reaches its definite place of installation.

Warning

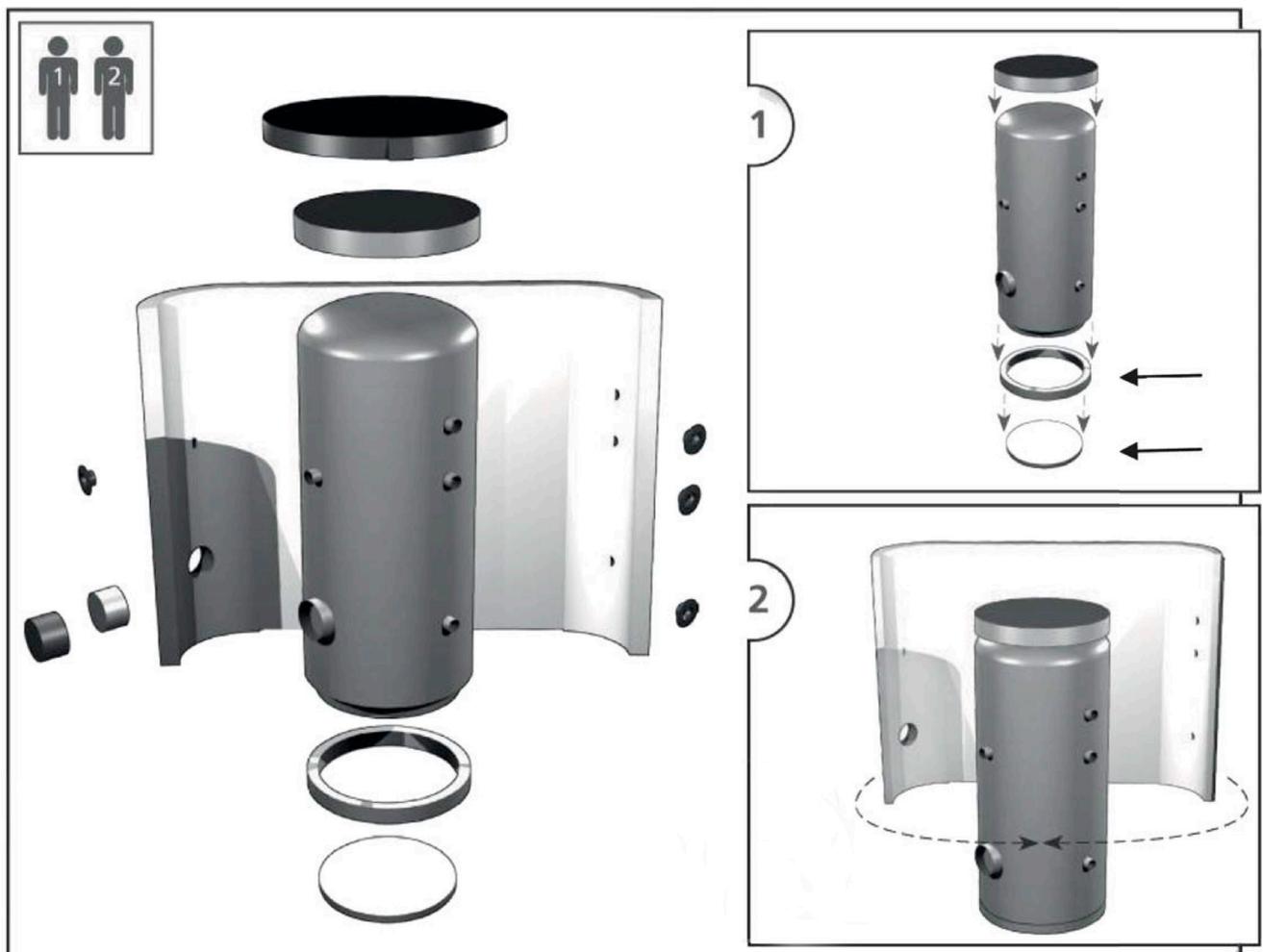
Insulation installation shall be done in two persons. Do not use any tools for installation. Keep away from open fire.

Installing Insulation

1. Fix the tank following installation instructions.
2. 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.
3. Use the holes for connections as a rest during the insulation installation.
4. At least one person presses the insulation to the tank, pulling both ends together. The other person closes the insulation lock from the side.
5. Put on the upper insulation and cover.
6. Push on the covering plastic rosettes depending on the size of connections.
7. 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.

The thermal stores come with an anti-corrosion sacrifice magnesium anode rod as standard. The condition of the anode rod shall be checked within 12 months after commissioning and subsequently always not later than 12 months after the last check. In locations where water contains more ferrites or calcites, it is recommended to check the anode rod every 6 months. If more than one third of its total volume is consumed, the anode rod shall be replaced with a new one. Disregarded of its state, the magnesium anode rod shall be always replaced with a new one within 24 months from commissioning.

In order to replace a magnesium anode rod, decrease the pressure inside the Thermal Store to the atmospheric value first, then the pressure inside the hot water tank. Replace the anode rod and pressurize the inner hot water tank first, then pressurize the Thermal Store.

If damage to a tank occurs due to the neglected substitution or a wrong replacement procedure of a magnesium anode rod, the warranty cannot be claimed.

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 according to the conditions described in this Manual and according to the Warranty Certificate. A Warranty Certificate forms an integral part of the supply. Tank transport or storing in a horizontal position is considered a warranty violation!