

Regulus

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RBC 200 HP - 1500 HP

Installation and Operation Manual
Hot Water Storage Tanks
with upsized heating-water heat exchanger
RBC 200 HP, RBC 300 HP, RBC 300 HP 3.2, RBC 400 HP,
RBC 500 HP, RBC 750 HP, RBC 1000 HP, RBC 1500 HP

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RBC 200 HP - 1500 HP

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1 - Description

RBC HP Hot water storage tank for domestic use (further HW tank) with one upsized heat exchanger, G 5/4" connection (750, 1000, 1500 l HW tanks have a G 6/4" connection). These HW tanks (except for 1000 and 1500 l variants) permit installation of an electric heating element into a G 6/4" connection.

HW storage tanks with an upsized heat exchanger are especially suitable to be combined with a heat pump. For a proper operation of the HW tank, it is necessary to design optimum hydraulics of the whole heating system, i.e. position of circulation pumps for sources and heating circuits, valves, non-return valves etc.

1.1 - Models

Eight models of 205, 2x299, 407, 509, 764, 884 a 1516 l capacity.

1.2 - Tank protection

Enamel on the inner surface guarantee long service life. Enamel is done according to DIN 4753 standard. Further qualitative improvement is reached thanks to a magnesium anode rod installed inside the tank (bigger tanks are fitted with more anode rods). The RBC HP 3.2 variant and all tanks from 400 l upwards are fitted with 2 magnesium anode rods. Tanks of 750, 1000 and 1500 l volume are fitted with 3 magnesium anode rods.

1.3 - Thermal insulation

Tanks up to 500l are supplied with a hard polyurethane insulation 55 mm thick with a white PVC surface. 750 and 1000l tanks are supplied with a hard polyurethane insulation 75 mm thick with white PU leather surface. 1500 l tank features 100 mm thick insulation.

1.4 - Connection points on the tank

- 2x lateral with G 5/4" inner thread, for the heating coil (750, 1000 and 1500 l tanks have a G 6/4" thread)
- 2x lateral with G 5/4" inner thread, for cold water inlet and hot water outlet (200, 300 and 400 l tanks have a G 1" thread, 1500 l tank has a G 2")
- 2x lateral with G 1/2" inner thread, for a temperature sensor and thermometer (RBC 1000 HP and RBC 1500 HP tanks have one extra sheath)
- 1x lateral with G 1" inner thread, for circulation (200, 300 and 400 l tanks have a G 3/4" thread)
- 1x top with G 5/4" inner thread, for a magnesium anode rod (750, 1000 and 1500 l tanks have 2 upper anode rods)
- 1x lateral with G 6/4" inner thread, for an el. heating rod (not in RBC 1000 HP and RBC 1500 HP)
- 1x flange for the lateral inspection hole

1.5 - Packaging

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

2 - General Information

The appliance shall be installed by a qualified person according to valid rules and Manufacturer's Instructions. 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.

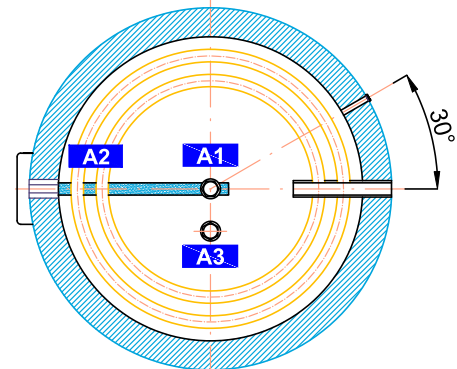
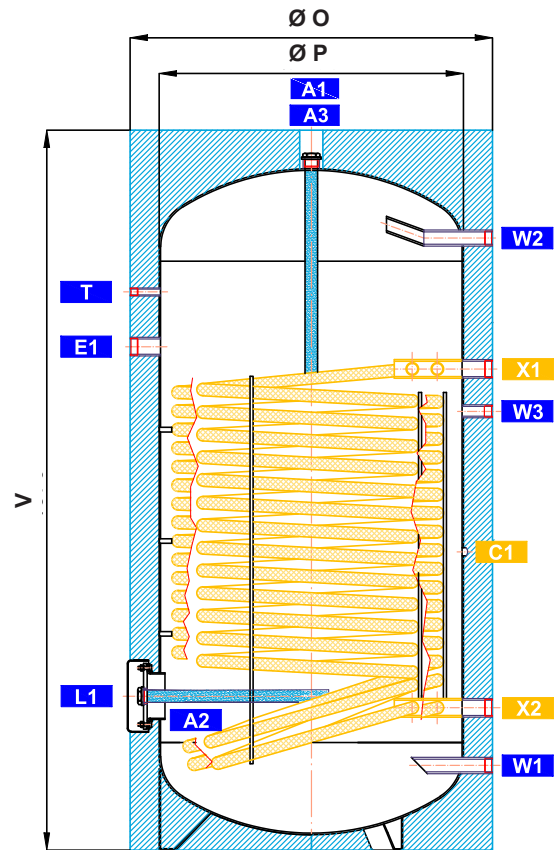
Using the tank for other purposes than stated above is forbidden and the manufacturer accepts no responsibility for damage caused by improper or wrong use.

3 - Operation

This tank is designed for operation in closed pressure circuits. Hot water is heated in the tank via the integrated hydronic heat exchanger from a selected heat source. HP models of HW tanks with upsized heat exchanger surface area are especially suitable for DHW heating by a heat pump; however also other heat sources can be used, like e.g. a hot-water boiler or solar collectors. An electric heating rod can be installed into the tank for DHW backup heating.

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.

4 - Technical Data and Dimensions of RBC HP Models



- Tank code a
- Total tank volume b
- Heating heat exchanger volume c
- Heating heat exchanger surface area d
- Empty weight (transport) e
- Max. working temperature - tank 95 °C
- Max. working temperature - heating heat exch. 110 °C
- Max. working pressure - tank 10 bar
- Max. working pressure - heating heat exch. 10 bar
- DHW heating $\Delta t = 35$ °C (60 input - 10/45) - heat exch. ... f

Model		RBC 200 HP	RBC 300 HP	RBC 300 HP 3.2	RBC 400 HP	RBC 500 HP	RBC 750 HP	RBC 1000 HP*	RBC 1500 HP*
Tank code	a	10534	10535	18748	10536	8546	10537	7883	16714
Tank volume [l]	b	205	299	299	407	509	764	884	1516
Heating heat exch. volume [l]	c	13	23	27	31	36	48	64	70
Heating heat exch. surface area [m ²]	d	3	3,8	3,2	5	5,9	7,5	10	11
Empty weight (transport) [kg]	e	128	155	130	187	220	290	320	344
DHW heating $\Delta t = 35$ °C (60 input - 10/45) [kW] ([l/h])	f	38 (940)	48 (1190)	40 (990)	64 (1580)	75 (1850)	95 (2350)	127 (3140)	140 (3460)
Dimensions [mm]	V	1265	1710	1710	1655	1785	1870	2120	2285
	Ø O	610	610	604	710	760	950	950	1200
	Ø P	500	500	500	600	650	790	790	1000
Tipping height [mm]	-	1410	1820	1820	1810	1950	2100	2330	2590
Magnesium anode rod (code)		464	3698	448	3698	3698	4025/3698	2 x 3698	2 x 3698
Magnesium anode rod for the lower flange (code)		-	-	4611	4025	4025	448	448	464
Magnesium anode rod, chain type (code)		-	-	-	-	-	13112	13112	13112

*RBC 1000 HP and RBC 1500 HP tanks have no G 6/4" connection for a heating element but they have an extra G 1/2" connection for a control & safety sensor.

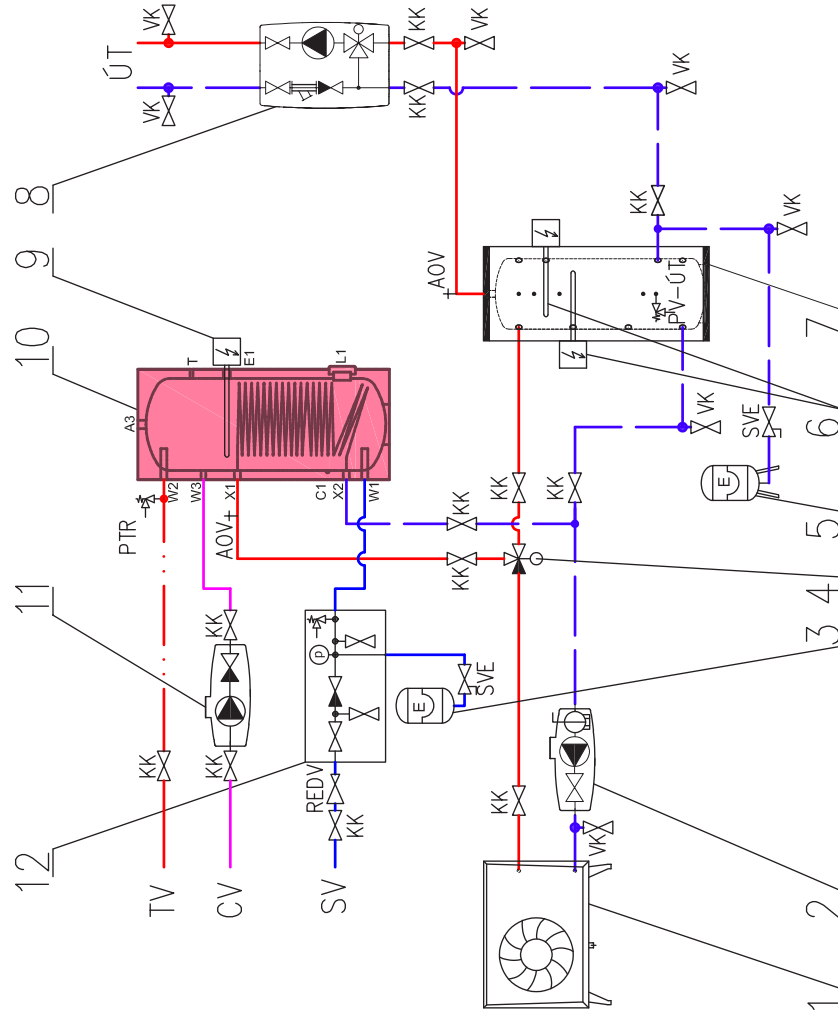
CONNECTIONS

		RBC 200 HP	RBC 300 HP	RBC 300 HP 3.2	RBC 400 HP	RBC 500 HP	RBC 750 HP	RBC 1000 HP	RBC 1500 HP		
pos.	description	conn.	height [mm]	conn.	height [mm]	conn.	height [mm]	conn.	height [mm]		
DHW heating											
W1	cold water	G 1" F	67	G 1" F	67	G 5/4" F	175	G 5/4" F	220	G 2" F	315
W2	hot water	G 1" F	1164	G 1" F	1609	G 5/4" F	1595	G 5/4" F	1590	G 2" F	1935
W3	recirculation	G 3/4" F	990	G 3/4" F	840	G 1" F	1375	G 1" F	1140	G 5/4" F	1460
Auxiliary heat source											
E1	electric heating element	G 6/4" F	940	G 6/4" F	950	G 6/4" F	1165	G 6/4" F	1300	-	-
Control and safety											
C1	temperature sensor	G 1/2" F	593	G 1/2" F	1300	G 1/2" F	690	G 1/2" F	775	G 1/2" F	1193
C2	temperature sensor	-	-	G 1/2" F	1000	-	-	-	-	G 1/2" F	542
C3	temperature sensor	-	-	G 1/2" F	450	-	-	-	-	-	-
T	temperature indicator	G 1/2" F	1040	G 1/2" F	1465	G 1/2" F	1385	G 1/2" F	1450	G 1/2" F	1730
Heat sources											
X1	supply from heat source	G 5/4" F	890	G 5/4" F	1080	G 5/4" F	1100	G 5/4" F	1250	G 6/4" F	1685
X2	return to heat source	G 5/4" F	210	G 5/4" F	230	G 5/4" F	250	G 5/4" F	370	G 6/4" F	345
Flange											
L1	flange	8 x M10	257	8 x M10	270	8 x M10	280	8 x M10	400	8 x M10	400
Magnesium anode rod											
A1	magnesium anode rod	-	-	G 5/4" F	1675	-	-	-	G 5/4" F	1790	G 5/4" F
A2	magnesium anode rod	-	-	-	257	M8	280	G 5/4" F	400	G 5/4" F	400
A3	magnesium anode rod	G 5/4" F	1230	G 5/4" F	1675	-	1620	G 5/4" F	1790	G 5/4" F	2040

5 - Typical Installation Examples

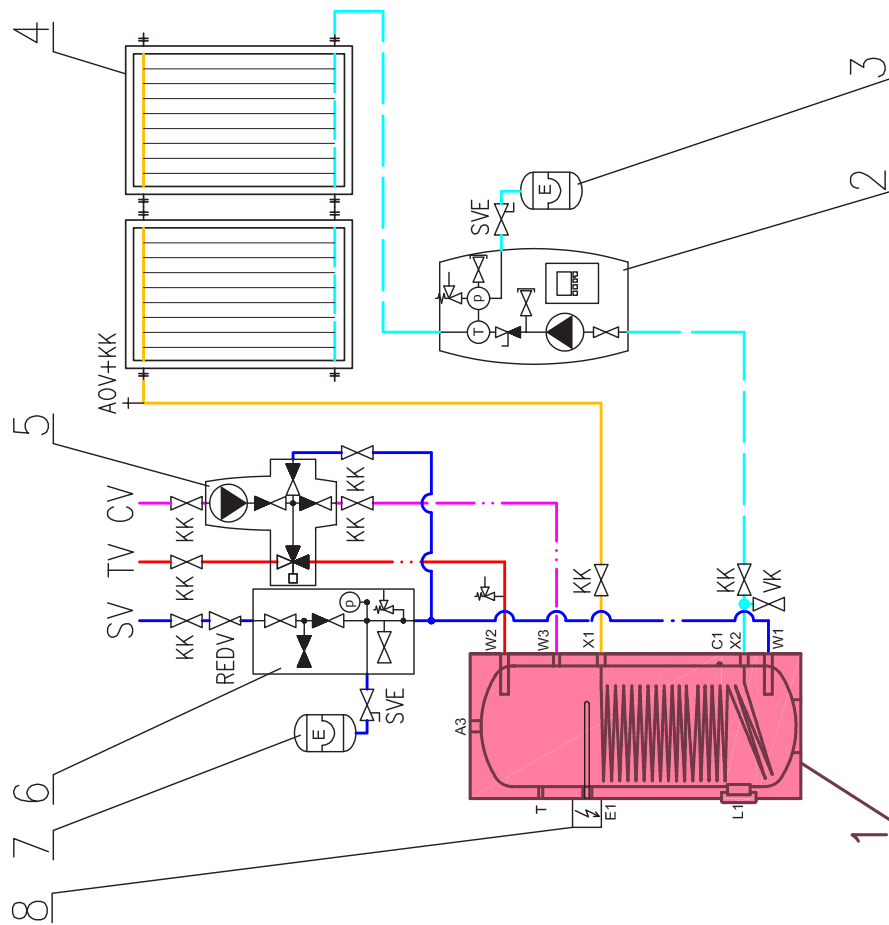
Example I.
- with a heat pump

- KEY**
- 1 – heat pump
 - 2 – pump station for heat pump – CSE TC IPWM MFB
 - 3 – DHW expansion vessel
 - 4 – three-way zone valve, DHW/HC
 - 5 – heating system expansion vessel
 - 6 – electric heating elements for heating system
 - 7 – PS N+ thermal store
 - 8 – pump station for heating system - CSE2 MIX
 - 9 – electric heating element for DHW
 - 10 – **RBC HP hot water storage tank**
 - 11 – pump station for DHW recirculation – CSE ZV
 - 12 – safety kit for HW storage tank
- SV – cold water
 - TV – hot water
 - CV – hot water recirculation
 - ÚT – central heating (heating system)
 - KK – ball valve
 - ZV – check valve
 - AOV – automatic air vent valve
 - PTR – pressure temperature relief valve
 - REDV – pressure reducing valve (optional)
 - VK – drain valve
 - SVE – expansion vessel service valve
 - PV-ÚT – safety valve for heating system
 - MFB – Magnet Filterball



Example II.
- with a solar thermal system

- KEY**
- 1 – RBC HP hot water storage tank
 - 2 – CSE SOL solar pump station
 - 3 – solar thermal system expansion vessel
 - 4 – solar collectors
 - 5 – pump station for DHW recirculation – CSE TVMIX ZV
 - 6 – safety kit for HW storage tank
 - 7 – DHW expansion vessel
 - 8 – electric heating element
- SV – cold water
 - TV – hot water
 - CV – hot water recirculation
 - ÜT – central heating (heating system)
 - KK – ball valve
 - ZV – check valve
 - AOV – automatic air vent valve
 - PTR – pressure temperature relief valve
 - REDV – pressure reducing valve (optional)
 - VK – drain valve
 - SVE – expansion vessel service valve



6 - Installation and Commissioning

Installation shall meet valid rules and may be done only by qualified staff. The tank shall be placed on the floor, as close to the heat source as possible.

Warning: *Defects caused by improper installation, use or handling are not covered by warranty.*

6.1 - Connection to heat sources

Connect the heat source to the X1, X2 inlet and outlet of the heat exchanger using G 5/4" fittings.

6.2 - Connection to a solar thermal system

The tank can be used with a solar thermal system. In such a case, the inlet from the solar thermal system shall be connected to the upper connection X1 of the G 5/4" heat exchanger and the lower outlet X2 to the return piping to the solar thermal system. Insulate meticulously all the piping between the tank and the solar thermal system using insulation suitable for solar systems.

6.3 - Heating element installation

An electric heating element can be installed in the side connection E1 with a G 6/4" thread (the RBC 1000 HP and RBC 1500 HP tanks are not fitted with a connection for the installation of an electric heating element). Tanks of all sizes can be retrofitted with another heating element by inserting it into the lower flange L1. The precondition is that the magnesium anode rods are replaced with an electronic anode rod and the factory-supplied flanges with a new flange containing a G 6/4" connection for the installation of an electric heating element and a G 1/2" connection for the electronic anode rod. Ordering codes for kits with el. anode rods with a flange for the installation of another heating element can be found in the table in chapter 6.5. Heating elements of output up to 12 kW can be used (depending on the tank diameter and element length), connected either directly to the mains (thermostat-equipped elements), 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. G 5/4" fittings are used to connect the tank to a cold water inlet and hot water outlet. A safety kit shall be installed at the cold water inlet that meets the requirements of ČSN 06 0830, e.g. codes 17387 or 18678 depending on the tank volume. Installation of a reducing valve at the tank inlet is recommended. If the pressure from water mains exceeds 6 bar, a reducing valve is necessary. In order to prevent water loss, an expansion tank should be installed at the cold water inlet as well (8 l volume for RBC 200 HP, 12 l volume for RBC 300 HP and 400 HP, 18 l volume for RBC 500 HP, 24 l volume for RBC 750 HP, 35 l volume for RBC 1000 HP, 60 l volume for RBC 1500 HP).

Should the water be too hard, install a water softener before the tank. In case the water contains mechanical impurities, install a strainer.

Install a PTR valve at the hot-water outlet from the tank, e.g. code 17240 with a connection kit 17526. A suitable thermostatic mixing valve should be also installed, preventing too hot water from entering the taps.

Install a drain valve to the lowest point of the tank. Complete DHW piping shall be properly insulated.

6.5 - Electronic anode rod installation

A so called electronic anode rod can be used instead of the magnesium one. In such a case it is not necessary to take out the rod for check, just visual check of the indication lamp of the electronic anode rod is sufficient. To install the electronic anode rod, it is necessary to remove all magnesium anode rods from the tank. Sufficient space is needed between above the tank permitting to install the electronic anode rod, see the table below with recommended anode lengths.

Electronic Anode Kits for RBC HP Hot Water Storage Tanks.

For tanks	El. Anode Kit code - replacement	Anode rod length	El. Anode Kit code w. lower flange*	Anode rod length
RBC 200 HP, RBC 300 HP	17375	750 (550/200)	17434	750 (550/200) + 350(200/150)
RBC 300 HP 3.2	-	-	17432	500 (350/150) + 350 (200/150)
RBC 400 HP, RBC 500 HP	17376	750 (550/200) + 350 (200/150)	17434	750 (550/200) + 350(200/150)
RBC 750 HP, RBC 1000 HP	17377	800 (550/250) + 450 (200/250)	17428	800 (550/250) + 450 (200/250)
RBC 1500 HP	14377	800 (550/250) + 450 (200/250)	17435	800 (550/250) + 600 (350/250)

* The Kit shall be used when an electric heating element needs to be installed in the lower flange.

6.6 - Commissioning

Ground the tank before commissioning.

Fill the heating circuits with the appropriate fluids and air-bleed the entire system. Check all connections for leaks and verify the system pressure.

Fill the tank with cold water following this procedure:

- open the shut-off valve at the tank inlet;
- open hot water on the mixer tap, as soon as water starts to flow out of the mixer tap, the filling of the tank is finished, close the mixer;
- check the tightness of all connections and system pressure

Set the heating controller in compliance with the documentation and manufacturer's recommendations. Check regularly a proper function of all control and adjusting elements.

The quality of top-up and heating water is set by ČSN 07 7401:1992. **Hot water quality must meet the conditions shown in the Table of limit values for total dissolved solids in hot water, page 7 of this Manual.**

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

7 - Tank Insulation

Product description

Thermal insulation is a component of tanks that reduces heat losses. Thermal insulation of polyurethane foam with zipped PVC layer is used.

Warning

Insulation dismantling and installation shall be done in two or three persons. The foam insulation with a PVC foil and zipper must not be dismantled/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 a lower temperature, there is a risk of damage, esp. to the zipper.

Do not use any tools for installation.

Keep away from open fire.

Warranty on insulation

- Warranty shall become null and void if:
 - the product was used for other purposes than intended.
- Warranty does not cover:
 - usual wear and tear,

- damage caused by fire, water, electricity or another 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, Replacement of Magnesium Anode Rod

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 tanks are supplied with an anti-corrosion sacrifice magnesium anode rod as standard that protects its inner parts against corrosion. For this reason it is necessary that the anode rod is checked regularly, namely 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 every 6 months. If more than 1/3 of its total volume is consumed, the anode shall be replaced with a new one. Disregarded of its state, the magnesium anode rod shall be replaced with a new one within 24 months from commissioning. In case an electronic anode is used, the above described procedures are not necessary. Then only a visual check of the indication lamp is necessary every 3 months. Proper working of the electronic anode rod is described in its User's Manual.

9 - Disposal

Packing 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 is an integral part of the supply. Tank transport or storing in a horizontal position is considered a warranty violation!

