

# ECO - HL - HLE

## *Installation, Operating and Servicing Instructions*

**ECO** 100 / 130 / 160

**HL** 100 / 130 / 160 / 210 / 240

**HLE** 100 / 130 / 160 / 210 / 240



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## WARNINGS

### WHO SHOULD READ THESE INSTRUCTIONS

These instructions should be read by:

- the specifying engineer
- the installer
- the user
- the service engineer

### SYMBOLS

The following symbols are used in this manual:



Essential instruction for the correct operation of the installation.



Essential instruction for the safety of persons and the environment.



Danger of electrocution.



Danger of burns

### RECOMMENDATIONS



- Please, read carefully this manual before installing and commissioning the tank.
- It is prohibited to carry out any modifications to the inside of the appliance without the manufacturer's prior and written agreement.
- The product must be installed and serviced by trained engineers, in compliance with current standards.
- The installation must comply with the instructions in this manual and with the codes and standards governing systems for the production of hot water.
- Any failure to follow instructions relating to tests and test procedures may result in personal injury or risks of pollution.
- To guarantee safe and correct operation of the appliance, it is important to have it serviced and maintained every year by an approved installer or maintenance company.
- In case of anomaly, please call your service engineer.
- The parts may only be replaced by genuine factory parts. You will find a list of the spare parts and their reference number ACV to the end of this document.



- It is important to switch the tank OFF before carrying out any work.
- There are no user accessible parts inside the tank casing.

### APPLICABLE STANDARDS

The appliances carry the **CE** mark in accordance with the standards in force in the various countries.



### WARNINGS

This documentation is part of the information delivered with the appliance and must be given to the user and stored in a safe place!

An approved installer must carry out the assembly, commissioning, maintenance and repair of the system, in accordance with current standards in force.

ACV shall not accept any responsibility for damage caused by non-compliant location of the system or by use of the parts or connections not approved by ACV for this application.



The manufacturer reserves the right to change the technical characteristics and specification of its products without notice.



The availability of some versions and their accessories is market dependant.

### PACKING

Units are shipped ready to install, tested and packaged in a cardboard box.

#### *Contents of the package*

- One hot water tank.
- One multilingual technical instruction manual.
- One wall-mounting kit with support and one flow diverter.

# INTRODUCTION

## DESCRIPTION OF THE SPECIFICATIONS

### “Tank-in-Tank” system

“Tank-in-Tank” is a heat exchanger with a built-in accumulator, made up of two concentric tanks: the inner tank contains domestic water to be reheated (secondary) and the outer tank contains the heating fluid (primary) which circulates between the two tanks and transfers its heat to the domestic water.

### Hot water exchanger accumulator

The inner tank is the heart of the tank: it is subject to the aggressiveness of the supply water, to high pressures and to variations in temperature. This tank is made of solid chrome-nickel stainless steel (*stainless steel 304 or duplex*), fully welded under argon protection using the Tungsten Inert Gas (T.I.G.) technique.

Before assembly, the convex bottoms are pickled and passivated in order to improve the tank's lifespan and in particular its resistance to corrosion. The shell is corrugated all the way up using an exclusive manufacturing process. This design gives considerable resistance to pressure and limits the adherence of lime scale by allowing the tank to expand and contract.

### Outer tank

The outer tank containing water from the primary circuit arriving from the boiler, is made of carbon steel STW 22.

### Thermal Insulation

Soft polyurethane foam - 30 mm thickness.

### Lining

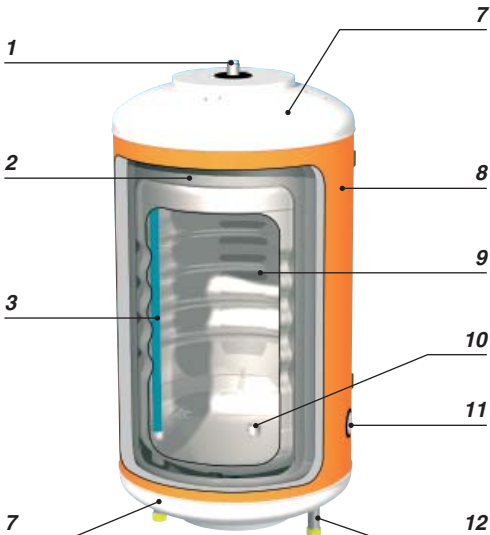
Exterior of casing vinyl coated and polypropylene cap.

### Electric heating element in HLE

The HLE tank is equipped with one 2200 W heating element controlled by the thermostat of the HLE.

### Description

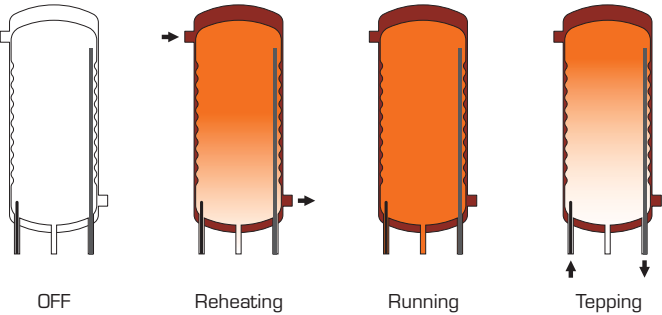
1. Air valve
2. Steel STW 22 outer tank
3. Domestic hot water outlet
4. Pocket containing the control thermostat
5. Electric heating element 2200 W [HLE only]
6. Insulating foam
7. Polypropylene cap
8. Polyurethane foam insulation
9. Stainless steel (304 or Duplex) inner tank
10. Domestic water return
11. Outlet and return pipes for the heating fluid
12. Domestic cold water inlet



## DESCRIPTION OF OPERATION

### Operating cycle

The thermostat is triggered and starts up the pump which loads the heating fluid. This fluid circulates around the inside tank and heats up the domestic water. When the required temperature is reached, the thermostat stops the loading pump.

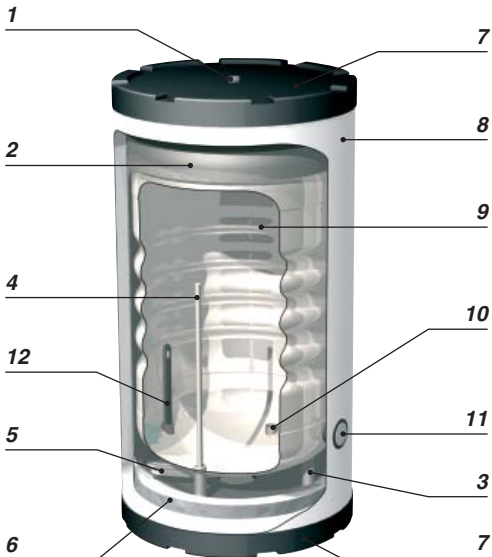


- Cold Water
- Domestic hot water
- Heating fluid

### Losses when shut down in °C/h

Models	Losses in °C/h	
ECO 100 / HL 100 / HLE 100	$\Delta T = 40^{\circ}C$	0,28
ECO 130 / HL 130 / HLE 130	$\Delta T = 40^{\circ}C$	0,25
ECO 160 / HL 160 / HLE 160	$\Delta T = 40^{\circ}C$	0,23
HL 210 / HLE 210	$\Delta T = 40^{\circ}C$	0,21
HL 240 / HLE 240	$\Delta T = 40^{\circ}C$	0,21

Temperature losses with ambient  $T^{\circ}$  of 20°C



# TECHNICAL CHARACTERISTICS

## OPERATING CONDITION

### Maximum service pressure [tank filled with water]

- Heating circuit: 3 bar
- DHW circuit: 10 bar

### Test pressure [tank filled with water]

- Heating circuit: 4,5 bar
- DHW circuit: 13 bar

### Operating temperature

- Maximum temperature: 90°C

### Water quality

- Chlorides: < 150 mg/L [304 Stainless steel]  
< 2000 mg/L [Duplex]
- $6 \leq \text{ph} \leq 8$

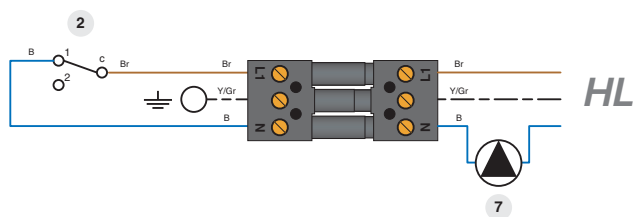
Tank characteristics		ECO 100	ECO 130	ECO 160	HL 100	HL 130	HL 160	HL 210	HL 240	HLE 100	HLE 130	HLE 160	HLE 210	HLE 240
Total capacity	L	105	130	161	105	130	161	203	242	105	130	161	203	242
Primary capacity	L	30	31	35	30	31	35	39	42	30	31	35	39	42
Primary fluid flow rate	L/h	2100	2600	3500	2100	2600	3500	4200	5500	2100	2600	3500	4200	5500
Primary pressure drop	mbar	17	22	37	17	22	37	45	51	17	22	37	45	51
Heating surface	m <sup>2</sup>	1,03	1,26	1,54	1,03	1,26	1,54	1,94	2,29	1,03	1,26	1,54	1,94	2,29

Tank performances		ECO 100	ECO 130	ECO 160	HL 100	HL 130	HL 160	HL 210	HL 240	HLE 100	HLE 130	HLE 160	HLE 210	HLE 240
Peak flow at 40°C	L/10'	236	321	406	236	321	406	547	700	236	321	406	547	700
Peak flow at 60°C	L/10'	117	161	209	117	161	209	272	337	117	161	209	272	337
Peak flow at 40°C	L/60'	784	1063	1349	784	1063	1349	1820	2319	784	1063	1349	1820	2319
Peak flow at 60°C	L/60'	384	549	689	384	549	689	913	1165	384	549	689	913	1165
Constant flow at 40°C	L/h	658	890	1132	658	890	1132	1527	1943	658	890	1132	1527	1943
Constant flow at 60°C	L/h	320	465	576	320	465	576	769	994	320	465	576	769	994
Pre-heating time	minutes	24	22	22	24	22	22	20	20	24	22	22	20	20
Coefficient	NL	1,0	2,1	3,0	1,0	2,1	3,0	5,2	11,8	1,0	2,1	3,0	5,2	11,8
Power drawn	kW	23	31	39	23	31	39	53	68	23	31	39	53	68
Heating time with the 2,2 kW heating element, from 10 to 60°C		—	—	—	—	—	—	—	—	2 h 43'	3 h 27'	4 h 20'	5 h 37'	6 h 37'

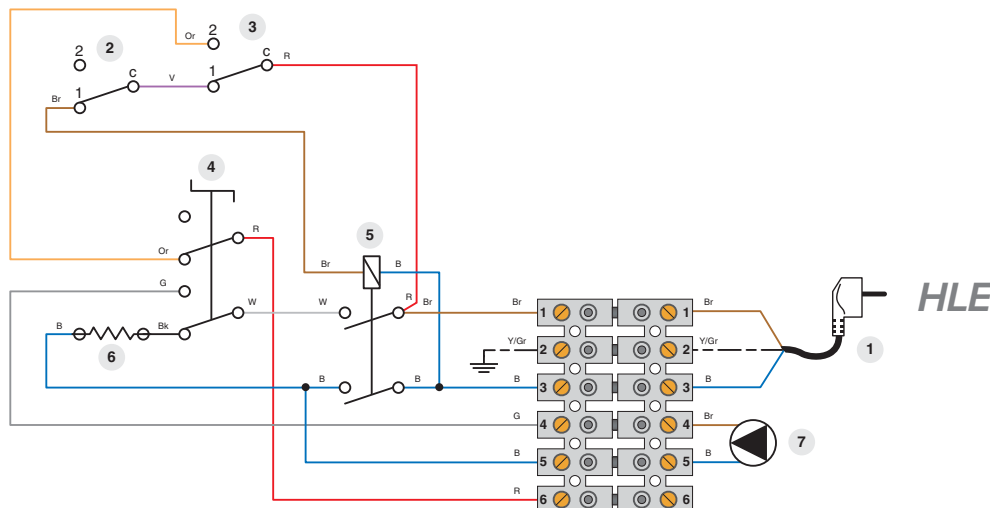
Running conditions: 85°C

Water intake T°: 10°C

## WIRING DIAGRAM



1. 230 Volt connection cord
2. Control thermostat [60/90°C]
3. Manual reset high limit thermostat [103°C max.]
4. Summer/Winter switch
5. Domestic hot water priority relay
6. Electric heating element
7. Load pump [in option]



- B. Blue
- Bk. Black
- Br. Brown
- G. Grey
- Or. Orange
- R. Red
- V. Violet
- W. White
- Y/Gr. Yellow/Green

# INSTALLATION INSTRUCTIONS

## INSTALLATION

This hot water tank should not be installed where it will be exposed to outside weather conditions.

Choose the most appropriate location according to the position of the boiler and the proximity of the domestic hot water distribution system, in order to reduce heat losses and minimise the pressure drops.

It may be installed either on the floor or on a wall using the fixtures supplied, depending of the model.



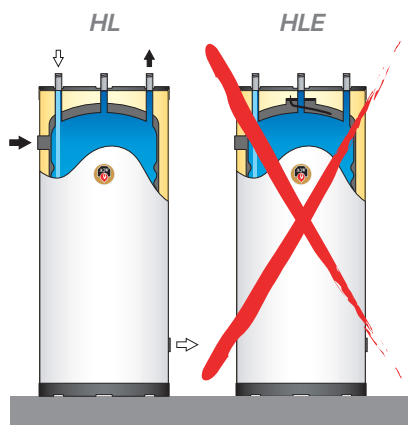
The HLE models must be assembled with the heating element to the bottom (DHW pipes to the bottom).



In horizontal configuration, the peak output and the first hour continuous output will be reduced. In this case, we recommend to oversize the tank.

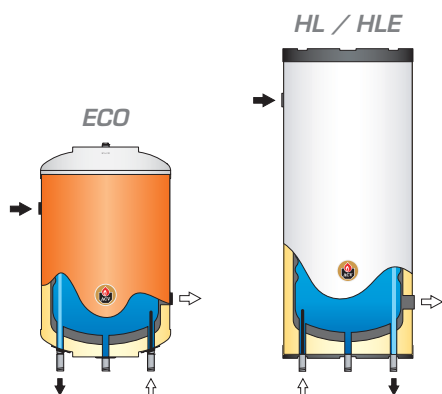
### Floor mounting : Only for HL units.

1. Connect the cold water inlet to the tube with the long PVCC dip tube (see diagram below).
2. This configuration does not require the plastic flow diverter.



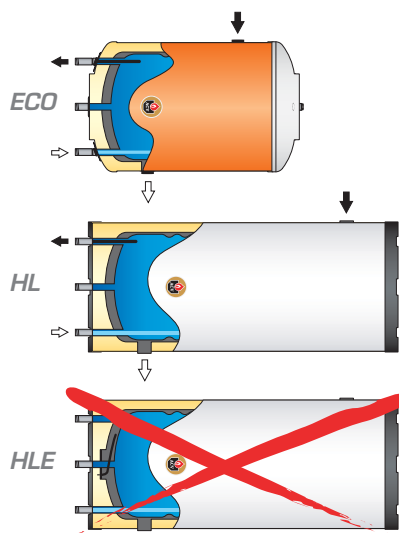
### Vertical wall hung position with the domestic water connection on the bottom side:

1. Mount the tank on the wall, using the supplied brackets.
2. Install the flow diverter into the domestic cold-water connection (see diagram below).



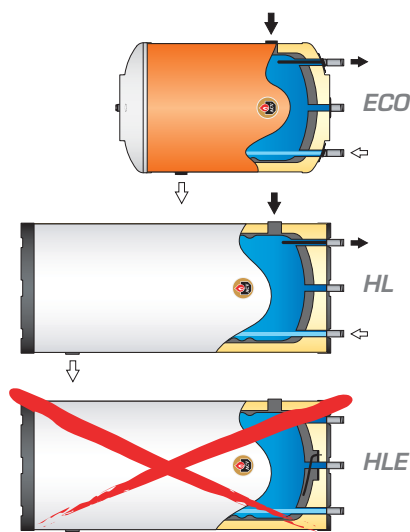
### Horizontal wall hung position with the domestic water connection on the left side:

1. Mount the tank on the wall, using the supplied brackets.
2. Move if necessary the long PVCC dip tube in lower domestic connection (see diagram below).
3. Install the flow diverter into the domestic hot-water connection.



### Horizontal wall hung position with the domestic water connection on the right side:

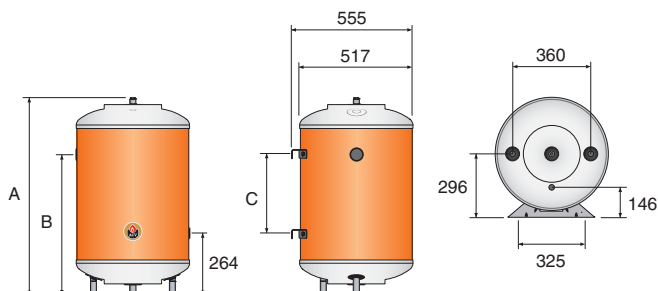
1. Mount the tank on the wall, using the supplied brackets.
2. Move if necessary the long PVCC dip tube in lower domestic connection (see diagram below).
3. Install the flow diverter into the domestic hot-water connection.



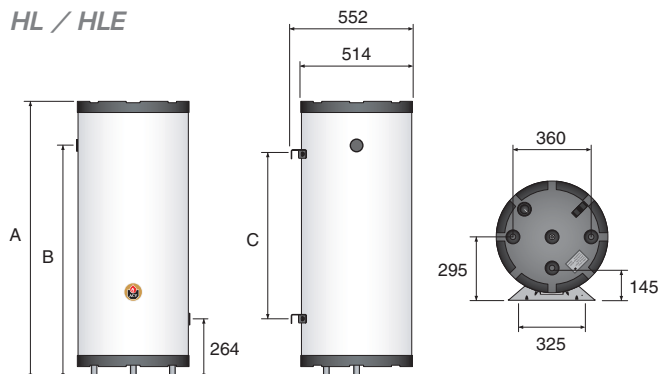
# INSTALLATION

DIMENSIONS	ECO 100	ECO 130	ECO 160	HL 100	HL 130	HL 160	HL 210	HL 240	HLE 100	HLE 130	HLE 160	HLE 210	HLE 240
A mm	882	1042	1242	847	1007	1207	1479	1726	847	1007	1207	1479	1726
B mm	629	789	989	629	789	989	1261	1508	629	789	989	1261	1508
C mm	365	525	725	365	525	725	997	1244	365	525	725	997	1244
Weight empty [kg]	40	47	55	40	47	55	65	75	40	47	55	65	75

## ECO



## HL / HLE



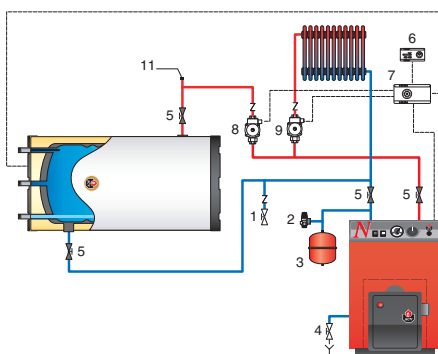
## CENTRAL HEATING CONNECTIONS

### PIPE DIMENSIONS

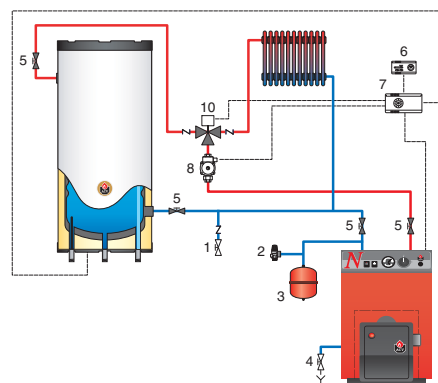
Models		Central heating
ECO / HL / HLE	100 L	1"1/4
ECO / HL / HLE	130 L	1"1/4
ECO / HL / HLE	160 L	1"1/4
HL / HLE	210 L	1"1/4
HL / HLE	240 L	1"1/4

1. System filling valve
2. Safety valve calibrated to 3 bar
3. Expansion vessel
4. Drain cock
5. Isolation valve, heating system
6. Room thermostat
7. Optional boiler control [BC 01 or BC 03]
8. Boiler pump
9. Heating pump
10. 3-ways motorized mixing valve
11. Air valve of the primary circuit

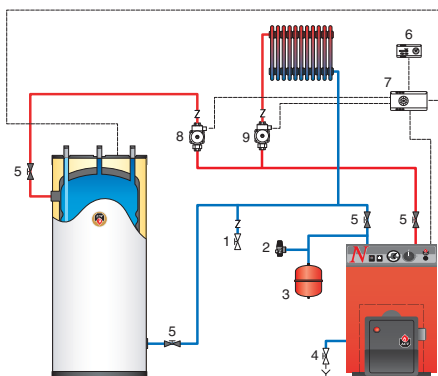
Single tank with primary pump.  
Horizontally mounted wall hung tank. **(Excepted for the HLE)**



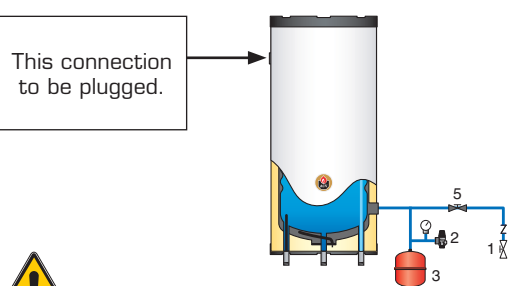
Single tank with three ways motorized mixing valve.  
Vertically mounted wall hung tank.



Single tank with primary pump.  
Floor mounted tank. **(HL only)**



**HLE** tank used as electric domestic  
hot water heater only



This connection  
to be plugged.



Do not power the heating element if the  
outside tank is not filled and drained.

# INSTALLATION

## DOMESTIC HOT WATER CONNECTIONS

### PIPE DIMENSIONS

Models	Cold / hot water connections	Auxiliary connexion
ECO / HL / HLE 100 L	Ø 3/4" [M]	Ø 3/4" [F]
ECO / HL / HLE 130 L	Ø 3/4" [M]	Ø 3/4" [F]
ECO / HL / HLE 160 L	Ø 3/4" [M]	Ø 3/4" [F]
HL / HLE 210 L	Ø 3/4" [M]	Ø 3/4" [F]
HL / HLE 240 L	Ø 3/4" [M]	Ø 3/4" [F]

1. Isolating valve
2. Pressure reducer
3. Non-return valve
4. Expansion tank
5. Safety valve
6. Drain cock
7. Air vent
8. Thermostatic mixing valve
9. Circulation pump
10. Drawoff tap
11. Earth connection

**⚠** The installation of a domestic safety unit is compulsory. In order to avoid water dropping on the tank, the domestic safety unit should not be placed directly above the tank.

The third domestic water outlet can be used as a return from the domestic hot water circulation loop.

Mains water kits could be in some countries due to approval regulations.

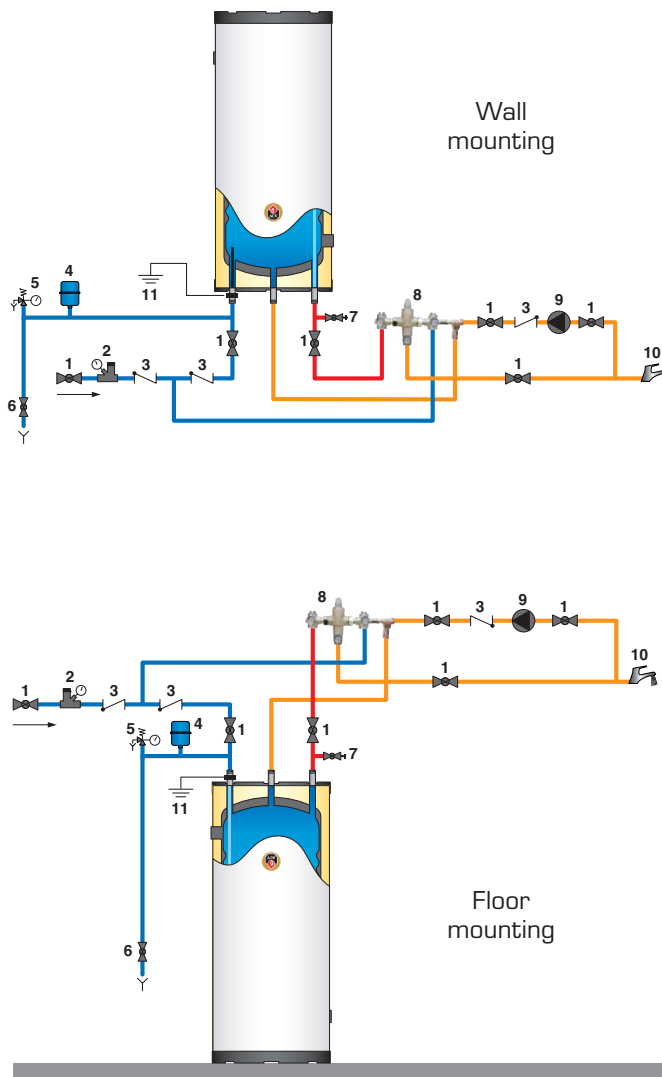
To avoid all risk of corrosion connect the sanitary tank directly in the earth.

### Recommendations

- The pipe feeding the tank with cold water must be fitted with a safety unit comprising at least the following:
  - An isolating valve [1]
  - a non-return valve [3]
  - a safety valve [4]: *(set to < 10 bar)*
  - a sanitary expansion vessel of appropriate dimensions.
- When the operating pressure exceeds 6 bar a pressure reducer [2] must be installed before the safety unit.
- Union fittings are recommended for easy removal of the connections. Ideally the "dielectric" version is preferable in order to protect the connections against corrosion in the presence of dissimilar metals such as copper and galvanised steel.
- The installation of an expansion vessel avoids safety valve runoff (loss of water).
- Domestic hot water expansion vessel capacity:
 

5 Litres:	for the following models:	100
8 Litres:	for the following models:	130 / 160
12 Litres:	for the following models:	210 / 240

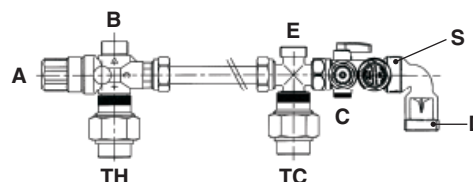
**👉** Please see the technical instruction manual of the expansion vessel's manufacturer for further details.



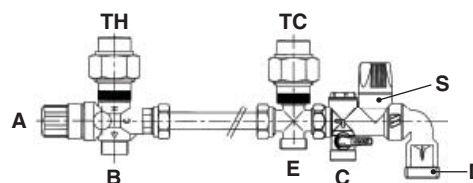
### Domestic hot water kit

- A. Thermostatic mixing valve
- B. Mixed water outlet
- C. Cold water inlet
- D. Drainage connection
- E. Expansion vessel connection
- S. Safety unit
- TH. Outlet hot water tank
- TC. Inlet cold water tank

### Floor mounting



### Wall mounting





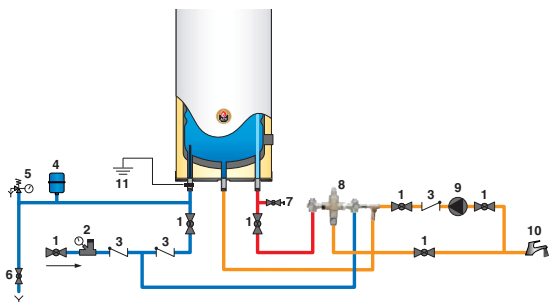
Before pressurising the central heating tank (primary) you should first pressurise the domestic hot water tank (secondary).

Both the domestic hot water tank and the central heating tank must be filled before using the tank.

## FILLING THE TANK

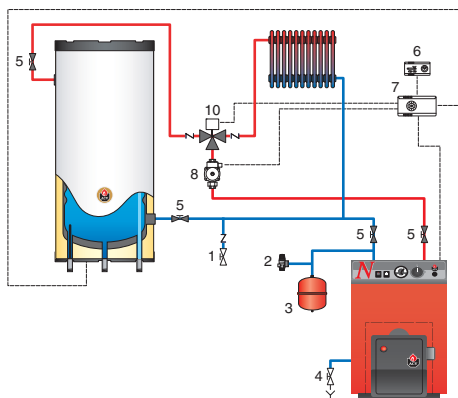
### Domestic hot water tank

1. Close the drain cock [6] of the DHW circuit.
2. Open the isolating valve [1] of the DHW circuit for the filling.
3. Bleed the air in the circuit by turning on a nearby hot water tap [10]. Fill the tank until the flow rate stabilises.
4. Turn off the hot water tap [10].



### Central heating tank

1. Close the drain cock [4] on the tank's primary circuit.
2. Open the isolation valves [5] on the central heating circuit connected to the boiler.
3. Bleed the air in the circuit by opening the air vent located on the upper part of the tank.
4. Follow the instructions supplied with the boiler for filling.
5. When the tank is full and the air has been removed, the bleed valve should be closed.



Ensure that the bleed valve is properly sealed.

6. If any antifreeze is needed in the primary circuit it must be compatible with Public hygiene rules and not be toxic. A food-type Propylene Glycol is recommended. Consult the manufacturer to ensure that the antifreeze is compatible with the tank's construction materials.



Never use car antifreeze or undiluted antifreeze.

This can cause serious injury, death or damage to the premises.

## CHECKS TO BE CARRIED OUT BEFORE START-UP

- Safety valves (domestic hot water) and (central heating) correctly installed and discharge connected to the drains.
- Domestic hot water tank and primary circuit filled with water.
- Air bleed correctly carried out on both circuits.
- Air valve sealed.
- Both hot and cold water pipes correctly connected to the tank's hot water circuit.
- Heating feed and return correctly connected to the tank.
- The electrical cabling is correct.
- The tank's thermostat is set according to the instructions shown in § "Setting the thermostat".
- Connections checked and free of leaks.

## SETTING THE THERMOSTAT

### Factory settings

The thermostat of the tank is factory preset to the minimum recommended by the standards, over a range of settings from 60 to 90°C.

To increase the temperature: turn the button clockwise.

To reduce the temperature: turn the button anticlockwise.

When adjusting the tank's thermostat, make sure that the boiler temperature is set to a value at least 10°C higher than tank's thermostat.

## Recommendations



There is a risk that bacteria including "Legionella pneumophila" may develop if a minimum temperature of 60°C is not maintained both in storage and in the hot water distribution network.



There is a risk of scalding from hot water!

ACV recommends the use of a thermostatic mixing valve set to provide water at 60 °C or less.

- The water heated to wash clothes, dishes and for other purposes can burn and cause serious injury.
- Children, the elderly, the sick or the disabled are the most at risk from burns due to very hot water. Never leave them on their own in a bath or under the shower. Never allow young children to turn on hot water taps or fill their own baths.
- Set the water temperature appropriately according to the intended use and plumbing codes.



When repeatedly drawing small amounts of hot water, a "stratification" effect may develop in the tank. The upper layer of hot water may then reach very high temperatures. A thermostatic mixing valve will stop water at excessively high temperatures reaching the outlets.

## MAINTENANCE

### PERIODIC CHECKS BY THE USER

- Check the pressure of the boiler's pressure gauge: it should be between 0.5 and 1.5 bar.
- Carry out a monthly visual inspection of the valves, connections and accessories in order to detect any leaks or malfunctions.
- Periodically check the air valve located on the upper part of the tank to make sure that it is not leaking.
- If you notice anything unusual, contact a technician or your heating engineer.

### ANNUAL SERVICE

The annual service, carried out by a technician, must include the following:

- Checking the air valve:  
The air bleed can lead to water being added to the system. Check the pressure on the boiler's pressure gauge.
- Manually activate the domestic hot water safety valve once a year. This operation will lead to a discharge of hot water.



**Before drawing any hot water through the safety unit, make sure that the discharge goes directly to the drain in order to avoid any risk of burning or damage.**

- The discharge pipe should be open to the atmosphere.
- If the safety unit occasionally "drips" this may be due to an expansion problem or to clogging of the valve.
- Follow the circulator's maintenance instructions.
- Check that the valves, cocks, controllers and any electrical accessories installed are working properly (*see the manufacturer's instructions if necessary*).

### REPLACEMENT OF THE ELECTRIC HEATING ELEMENT FOR THE HLE

- Switch off and disconnect the mains power supply to the appliance.
- Drain the primary tank.

### EMPTYING

#### Recommendations



**Empty the tank if it is to be switched off for the winter and there is a risk of frost conditions exposure.**

**If the central heating water (primary circuit) contains any antifreeze, only the domestic hot water should be drained.**

**Before draining off the domestic hot water, insulate the tank to bring the central heating pressure (primary circuit) down to 1 bar, in order to protect the tank against a risk of collapsing.**

**If the central heating circuit does not contain any anti-freeze, both the central heating and hot water circuits should be drained.**

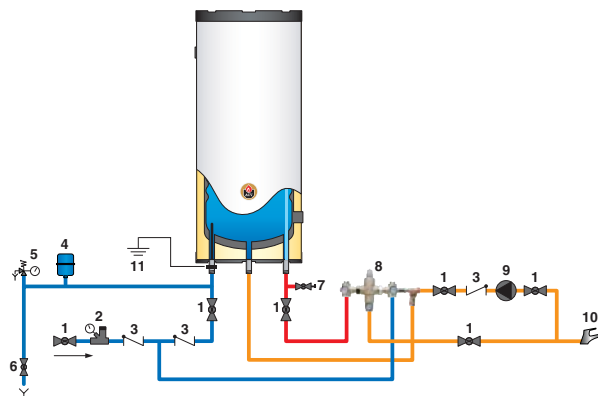
### Domestic hot water tank

To empty the domestic hot water tank:

1. Switch off the electrical power supply to the tank.
2. Close the isolation valve [1].
3. Open the drain cock [6] and the air vent [7].
4. Allow the water to flow out into the drain.
5. After emptying, return the valves to their initial positions.



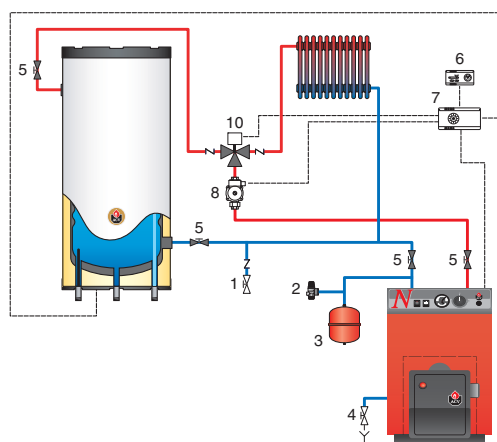
**In order to allow emptying the valve [6] must be located at the lowest point on the tank.**

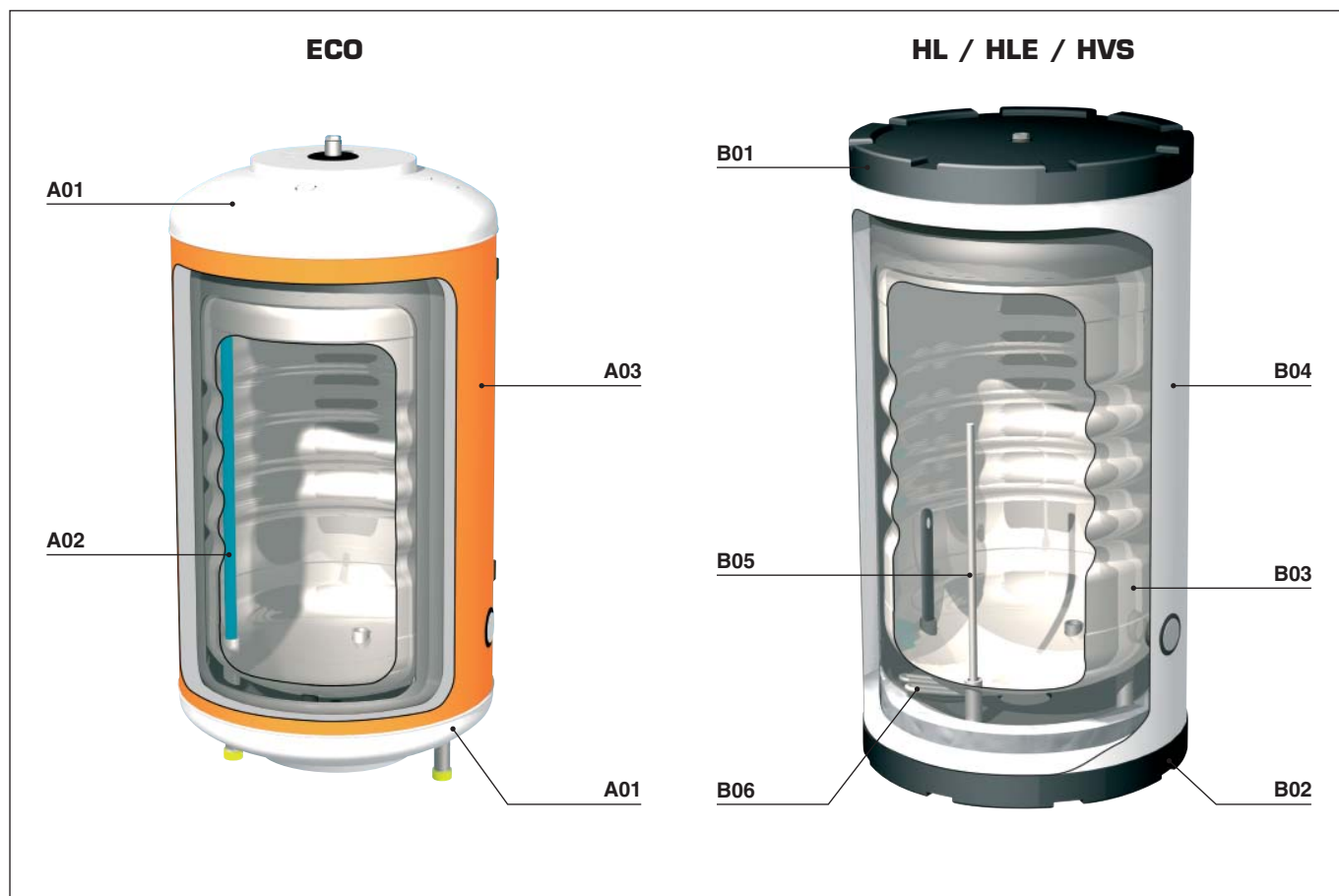


### Central heating tank

To empty off the primary circuit:

1. Switch off the electrical power supply to the tank.
2. Close the shut-off valves [5] on the primary circuit.
3. Connect a hose to the drain valve [4].
4. Open the drain valve [4] and drain the hot water off.
5. To speed up the process, open the air vent located on the upper part of the tank.
6. When the emptying is finished, close the drain cock again then screw the air valve up again.

















N°	ECO 100	ECO 130	ECO 160
A01	497B5009	497B5009	497B5009
A02	497B0003	497B0005	497B0007
A03	51410243	51410244	51410245

N°	HL 100	HL 130	HL 160	HL 210	HL 240
B01	49410170	49410170	49410170	49410170	49410170
B02	39554131	39554131	39554131	39554131	39554131
B03	497B0003	497B0005	497B0007	497B0009	497B0010
B04	51410183	51410184	51410185	51410186	51410187
B05	39438027	39438027	39438027	39438027	39438027

N°	HLE / HVS 100	HLE / HVS 130	HLE / HVS 160	HLE / HVS 210	HLE / HVS 240
B01	49410170	49410170	49410170	49410170	49410170
B02	39554132	39554132	39554132	39554132	39554132
B03	497B0003	497B0005	497B0007	497B0009	497B0010
B04	51410183	51410184	51410185	51410186	51410187
B05	39438027	39438027	39438027	39438027	39438027
B06	5476D001 [HLE]	5476D001 [HLE]	5476D001 [HLE]	5476D001 [HLE]	5476D001 [HLE]



	ECO	HL	HLE	HVS
	55445006	55445006	55445006	55445006
	49410036	49410036	49410036	49410036
	—	54442045	54442045	54442045
	—	—	54764009	—
	—	—	54428107	54428107
	—	—	54762004	—
	—	—	55412023	55412023
	—	—	24614157	—
	—	—	—	24614158
	—	51410180	51410180	51410180
	—	51410181	51410181	51410181
	51410216	—	—	—