

OPERATION MANUAL

Calpak X-FLOW Ultratank



$\eta_{th} = 99\%$

The Calpak X-FLOW tank produces the hot water that you need, with a 99% efficiency rate. This means that the energy source is fully used, thus saving you a lot of money.

$\Delta t = 1^{\circ}\text{C}$

The technology we have developed permits the transmission of water from the tank to the stainless hot water exchanger, with a temperature difference of only 1 degree. This means rapid achievement of the desirable temperature and a steady flow of hot water for consumption.



EPO PATENTED
TECHNOLOGY



LAB MEASUREMENTS
FOR EFFICIENCY BY
"DEMOKRITOS"

Ultratank CALPAK X-FLOW

Dear Customer,

Thank you for your preference for our products. Its leading technology, in conjunction with its functionality and reliability, makes it the most efficient solution for hot water management.

X Flow Ultratank will provide you endless hot water, fresh and clean water supply, with minimum energy consumption and 10 years factory warranty.

The product comprises the following main components:

- Hot water tank with internal stainless exchanger providing hot water.
- Circulation pump (included in the counterflow kit)
- Control unit (included in the counterflow kit)

Detailed descriptions and instructions for these components are provided later on in the manual.

Instructions for this manual

The manual includes 5 chapters:

- Guarantees & Compliance
- Instructions for Safe Operation - Proper Use
- Product Description
- Instructions for Operation & Maintenance
- Uses and configuration

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➤ 1 GUARANTEES & COMPLIANCE

The guarantee begins when the product is installed at the location of the final user. The legal sale document or receipt will be proof of the installation date.

Our company guarantees the excellent quality of the materials and the sound manufacture of the product. The guarantee covers all parts of the product and undertakes the responsibility of providing spare parts to replace any components with manufacturing defects.

The guarantee does not cover parts damaged or rendered defective during transportation, by scale which appear because of inadequate or wrong maintenance, or because of incorrect connection of the safety valve with the discharge system. Also, it does not cover any damages not related to defective materials or manufacturing defects, or other damages to third parties or assets in general.

The guarantee does not include cleaning, the regular maintenance of the equipment or the normal wear of the device itself. Such interventions will be made upon request of the user, who will also pay the respective cost.

There is no guarantee in the following cases:

- when non-authorized technical personnel intervene;
- when the installation does not comply with the applicable rules and instructions of the manufacturer;
- The user is unable to show the legal acquisition document to the authorized staff.
- when there is no serial number and proof of the date when the product was installed.

Make sure you have these at hand every time an intervention is required.

The product must be used and maintained in compliance with the manufacturer's instructions for operation and maintenance, and with the applicable national laws and local regulations.

1.1 HOT WATER TANK

There is a 10-year guarantee for the hot water tank.

The product to be installed must comply with the safety requirements of the EN 12828 standard.

Concerning the hydraulic circuit of the hot water, the following standards must be observed.

- EN 1717 - Protection against pollution of potable water in water installations and general requirements of devices to prevent pollution by backflow.
- EN806 - Specifications for domestic water installations (TRWI).
- National laws.

A necessary requirement for the safe operation of the product is the installation of an appropriate expansion vessel. A competent engineer and/or installer must be responsible for the sizing of the expansion tank.

4-bar valves are required. It is suggested to use an automatic water filling device, in order to ensure stable hydraulic pressure.

1.2 CIRCULATION PUMP

The circulation pump comes with a 2-year guarantee.

1.3 CONTROL UNIT

The control unit comes with a 2-year guarantee.



CE DECLARATION OF CONFORMITY

(in accordance with Directives 2004/108/EC and 2006/95/EC)

This Declaration certifies that the product complies with the requirements of Directives 2004/108/EC and 2006/95/EC (Directive on electromagnetic compatibility and Directive on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits), and certifies that the information included in the product's technical file are true.

Standards applied by the manufacturer:

EN 55022: 2010 and CISPR 22: 2008

EN 55024: 2010 and CISPR 24: 2010

EN 61000-4-2: 2009 and IEC 61000-4-2: 2008

EN 61000-4-3: 2006+A1: 2008 +A2: 2010

IEC 61000-4-3:2006+A1: 2007+A2: 2010

EN 61000-4-8: 2010 and IEC 61000-4-8: 2009

Year when the CE marking was added: 2015



Find below a model of the marking on the control unit and the safety marking affixed on visible places of the electrical panel.




(on the front of the device)



(where the ground wire is installed)

DATE OF PURCHASE:			
DATE OF INSTALLATION:			
ΤΥΠΟΣ:	CFA/3		
SN:	CFA/3xxxxx		
Un 230 V	In 20 mA	50 Hz	IP 20
		FOR INTERNAL INSTALLATION AND USE	

(on the front of the device)

	The device must not be used next to or mounted on top of other devices. If it is necessary to use the device next to or on top of other equipment, the device must be checked to verify that it functions properly in such configuration. When used in a very humid or hot environment, increased device emissions or lower immunity may be observed.
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(on the front of the device)

GENERAL TERMS

- **Marking of electronic device**
The device bears appropriate marking from its manufacturer.
- **Industrial mark/Trademark**
Available on the marking of the product
- **Product Assembly**
In line with the manufacturer's procedures
- **Instructions for installation and maintenance**
Provided by the manufacturer inside or on the packaging of the product
- **Protection against contact**
Satisfactory
- **Temperatures, arcs or radiation which may cause danger**
None identified
- **Insulation of electronic equipment**
There are no uncovered parts in the device.
- **Protection from dangers to the device which may be caused by external factors**
- **Mechanical resistance of the kit/mechanical parts**
The mechanical resistance of the plastic kit where the electronic material and the electrical circuit are placed is deemed adequate.
- **Ambient conditions**
The device is always installed indoors, in a secure place.
- **Overload conditions**
Results based on the testing of the device.

➤ 2 INSTRUCTIONS FOR SAFE OPERATION - PROPER USE

2.1 IN GENERAL

In this manual, you will find safety instructions which you must follow to ensure your own safety and to protect the product and the equipment connected to it. The instructions are accompanied by a warning triangle and, depending on the level of risk, they are divided into the following categories.



DANGER

This means that failure to implement protective measures may result in death, serious bodily injury or material damage.



WARNING

This means that failure to implement protective measures may result in serious bodily injury or material damage.



CAUTION

This means that failure to implement protective measures may result in bodily injury or material damage.



NOTE

A piece of information particularly significant for understanding and operating the device.

The successful and safe operation of the device depends on the proper transportation, storage, setting, installation, operation and maintenance of the device.

The product may be used only as a water heater and only in conformity with the information provided in this manual.

Any other use besides the intended one is considered inappropriate. The installer is the only person responsible for any damage. The operation of the system also includes compliance with maintenance and the terms of inspection. The spare parts must comply with the technical standards set by the manufacturer.

2.2 INSTRUCTIONS FOR SAFE OPERATION

- The installation, connection and initial start-up should only be undertaken by authorised and trained installers.
- Disconnect the power supply before you start doing any work on the device.
- Make sure that all the safety valves comply with the requirements of standard EN 12828 for connection with the heating side and standard EN 12897 for the water side.

2.3 ELECTRICAL INSTALLATION OF OPTIONAL ACCESSORIES

- Before any works on live parts, disconnect the power supply.
- Electrical installations may be undertaken only by specialised electricians and in line with the corresponding regulations.
- For each wired power connection, install a separate release system which complies with standard EN 60335-1, for all pole disconnect switches.
- Compare the voltage indicated on the sign with the supply voltage before connection to the electricity network.

2.4 WATER REQUIREMENTS

Please comply with the regulations on the prevention of corrosion and deposition. In areas with “hard” water, you must use a suitable water management system (as provided for in national legislation). More specifically, the water must have the following values.

Description	pH	Total dissolved solids	Total Hardness	Chlorine	Magnesium	Calcium	Sodium	Iron
Maximum acceptable levels	6.5 - 9.0	600mg/l	150mg/l	300mg/l	10mg/l	20mg/l	150mg/l	1mg/l

2.5 PRECAUTIONS IN THE WATER CONNECTION

During the operation of the product, and in combination with the temperature of the charging source, the temperature of the hot water may exceed 60 °C. Systems protecting from burns (such as a hot water mixing device) should be included during the installation of the system.

Use a pressure reducer if cold water connection pressure exceeds 6 bar.

➤ 3 PRODUCT DESCRIPTION

DEFINITION FOR ULTRATANK

"A fresh water tank, with the ability of connection to multiple charging sources. Its exceptional property is the ability to provide a large and stable flow of hot water, after being charged at a temperature exceeding the desired hot water temperature by only one degree, thus resulting in a more economical operation of power sources (heat pump, boiler, solar panels, etc.) and exerting less strain on the system. It may also be used as a buffer tank for space heating."



3.1 GENERAL DESCRIPTION

The main use of the product is to provide hot water for use and/or hot water for space heating purposes, as well as for any other heating-provision process, by adding the appropriate equipment.

The product comprises a thermally insulated steel tank filled with a heat transfer fluid (usually water), a heat exchanger, a counterflow circulation pump and a control unit with the respective temperature sensors or a flow switch.

In the conventional configuration of the product (Figure 1), we see the following:

- Cold water inlet on the upper side of the tank (position E1), to the stainless steel heat exchanger.
- Outlet of the stainless exchanger on the upper part of the tank (position E2), for the supply of hot water.
- Peripheral holes for the installation of temperature sensors and connection with hydraulic circuits of thermal sources (conventional boiler circuit, heat pump circuit, solar collectors circuit) and of electric resistance.
- Internal exchanger for the transmission of thermal energy.
- Counterflow circulation pump to forward the water of the exchanger and transfer thermal energy to the water for use.
- Control unit responsible for adjusting the temperature of the hot water to the desirable levels. This is achieved thanks to the automatic control of the operation of the counterflow circulation pump. Alternatively, there can be a flow switch to control the counterflow pump depending on whether there is a demand of hot water.



NOTE

An algorithm is used for the operation of the control unit, which takes into account the desirable temperature for the hot water and the desirable temperature for the hot water tank, indicating each time the corresponding point of operation of the electromechanical devices.



NOTE

The hydraulic circuit of the conventional boiler, the solar circuit, the circuit of the heat pump and/or any additional thermal source circuit may operate independently of one another and/or simultaneously.



NOTE

The product generates hot water at the desirable temperature, with minimal difference from the temperature of the water in the tank. With a separate hydraulic hot water circuit from the water stored in the tank, we manage to tackle the hygiene problem and, in particular, the growth of bacteria (see Legionella).

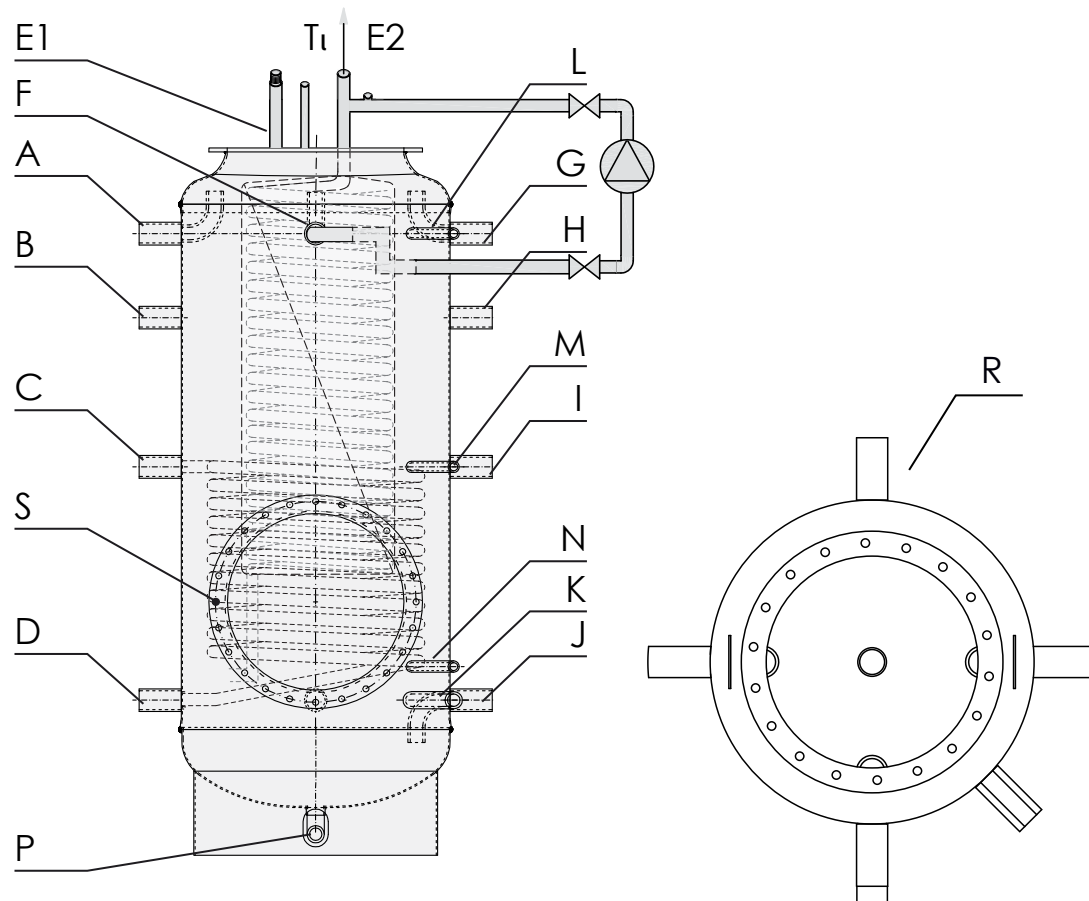


Figure 1 Conventional product configuration
Ultratank X-FLOW (plus)

POSITION	DESCRIPTION	Calpak X-FLOW 0,9 Dt1 /300lt (plus)	Calpak X-FLOW 1.5 Dt1 /500lt (plus)	Calpak X-FLOW 1.5/3/4,5 Dt1 /1,000 lt (plus)	Calpak X-FLOW 1.5/3/4,5 Dt1 /2,000 lt (plus)
A	Free flow	1½"	1½"	1½"	2"
B	Free flow	1½"	1½"	1½"	2"
C	Free flow/Inlet of exchanger of solar collectors in the "plus" model	1½"	1½"	1½"	2"
D	Free flow/Outlet of exchanger of solar collectors in the "plus" model	1½"	1½"	1½"	2"
E1	Cold water inlet (stainless steel)	¾"	1"	1" / 1½" / 1½"	1" / 1½" / 1½"
E2	Hot water outlet (stainless steel)	¾"	1"	1" / 1½" / 1½"	1" / 1½" / 1½"
F	Counterflow pump suction	1½"	1½"	1½"	2"
G	Free flow	1½"	1½"	1½"	2"
H	Free flow	1½"	1½"	1½"	2"
I	Free flow	1½"	1½"	1½"	2"
J	Free flow	1½"	1½"	1½"	2"
K	Free flow	1½"	1½"	1½"	1½"
L	Temperature sensor	½"	½"	½"	½"
M	Temperature sensor	½"	½"	½"	½"
N	Temperature sensor	½"	½"	½"	½"
P	Outflow	1"	1"	1"	2"
R	Heating element/ Recommended heating element	1½" 4KW	1½" 4KW	1½" 6KW	1½" 9KW
S	Side inspection flange	-	-	-	Ø508

3.2 TABLE OF DISTANCES AND OTHER INFORMATION

DISTANCES	DESCRIPTION	Calpak X-FLOW 0,9 Dt1/300 (plus)	Calpak X-FLOW 1.5 Dt1/500 (plus)	Calpak X-FLOW 1.5/3/4,5 Dt1/1000 (plus)	Calpak X-FLOW 1.5/3/4,5 Dt1/2000 (plus)
	Nominal Capacity (lt)	300	500	1000	2000
	Net Capacity (without the heat exchanger for the PLUS models) (lt)	279,7/(269,6)	469.2/(450.2)	883.6/(855.6)	2027.6/(1997.6)
	Diameter of the stainless speed-alternator	DN20	DN25	DN25/DN40/ DN40	DN25/DN40/ DN40
	Max. operating pressure of the stainless speed-alternator	10 bar	10 bar	10 bar	10 bar
	Weight (Kg) of empty Calpak X-FLOW 0,9 tank	109 / (119)			
	Weight (Kg) of empty Calpak X-FLOW 1.5 tank	-	159 / (193)	239 / (289)	402 / (459)
	Weight (Kg) of empty Calpak X-FLOW 3.0 tank	-	-	244 / (294)	407 / (464)
	Weight (Kg) of empty Calpak X-FLOW 4.5 tank	-	-	254 / (304)	417 / (474)
	Height of tank (without the insulation)	1680	1700	2100	2100
	Height of tank	1740	1800	2200	2200
	Total height of tank (with the speed-alternator)	1940	1950	2350	2350
	Outer diameter of tank (without the insulation)	520	640	800	1200
	Outer diameter of tank (with the insulation)	720	840	1000	1400
	Hot water tank ventilation	✓	✓	✓	✓
	Polyurethane insulation thickness (mm)	100	100	100	100
	Thermal losses (kWh/24h)	1.6	1.8	2.1	2.5
	Sheet thickness (mm)	2.5	2.5	3	4
	Capacity of charging heat exchanger (for PLUS models) (lt)	-- / (8)	-- / (15)	-- / (20)	-- / (24)
	Surface area of charging heat exchanger (for PLUS models) (m ²)	-- / (1.10)	-- / (1.90)	-- / (2.80)	-- / (6.10) inox
A	Free flow	1465	1460	1550	1580
B	Free flow	1270	1270	1550	1590
C	Free flow/(Inlet of heat exchanger of solar collectors in the "plus" model)	915	915	920	990
D	Free flow/(Outlet of heat exchanger of solar collectors in the "plus" model)	360	360	375	420
F	Counterflow pump suction	1465	1460	1730	1780
G	Free flow	1465	1460	1750	1780
H	Free flow	1270	1270	1550	1580
I	Free flow	910	915	920	990
J	Free flow	360	360	375	420
K	Inlet of charging heat exchanger	360	360	375	430
L	Temperature sensor	1465	1460	1730	1780
M	Temperature sensor	915	915	920	990
N	Temperature sensor	440	480	500	545
P	Outflow	40	40	40	40
R	Heating element	340	320	380	430

Note:

- The values are indicated in millimetres (mm).
- The distances are measured from the ground

3.2.1 CHARACTERISTICS OF ULTRATANK HOT WATER TANKS

- Manufactured from high-quality steel
- Robotic welds
- Tank's maximum pressure: 6 bar
- Maximum pressure of stainless DHW speed-alternator: 10 bar
- Maximum operating temperature: 95°C
- Integrated counterflow exchanger with a 99% energy efficiency (for fresh water)
- Stable charging exchanger (in the "plus" models)
- Possibility to connect up to 4 energy sources
- Large maintenance port $\Phi 508$ for the 2.000lt models
- Removable polyurethane insulation

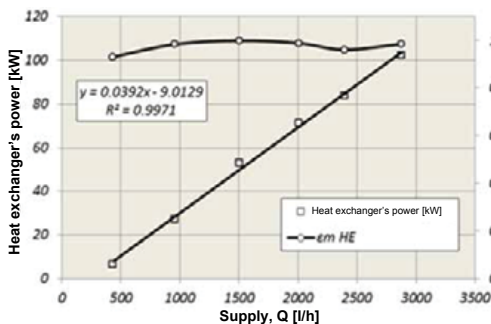


Figure 2
 $\eta_{th} = 99\%$ (source: National Centre for Scientific Research, Demokritos)

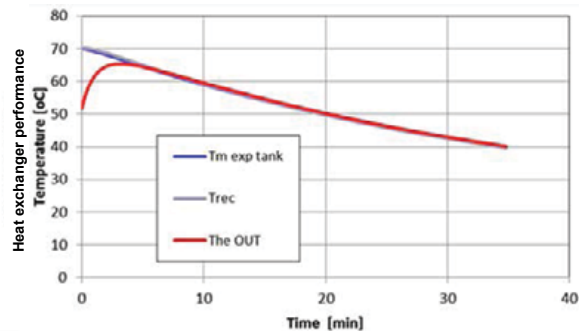


Figure 3
 $\Delta T = 1$ (source: National Centre for Scientific Research, Demokritos)

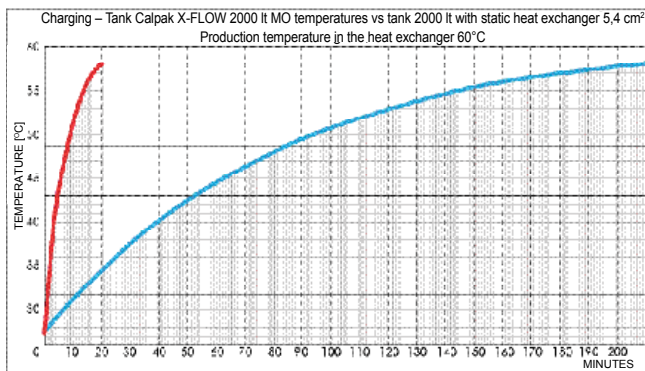


Figure 4 — Calpak X-FLOW — Tank with static heat exchanger 5,4m²

- Supply temperature
- Tank's average temperature
- Counterflow temperature

$T_{m \text{ exp tank}}$: Container's average temperature
 T_{rec} : Hydraulic circuit temperature
 $The \text{ OUT}$: Hot water supply temperature

ADVANTAGES OF CALPAK X-FLOW ULTRATANK

- Top performance rate (99%) for an additional 25% in energy savings (figure 2)
- Almost zero deviation between charging and supply temperature ($\Delta T = 1$) (figure 3)
- Very fast charging of the ultratank compared to conventional tanks (figure 4)
- Desirable consumption temperature achieved very fast
- Protection from the Legionella bacterium, thanks to the stainless steel continuous flow alternator
- Steady hot water supply at precise desirable temperature
- Long life span, minimum maintenance cost
- Easy installation or replacement of existing tank
- Easy system expandability with new energy sources
- Ideal use with heat pump and/or solar panels
- Applicable in homes, hotels and commercial buildings

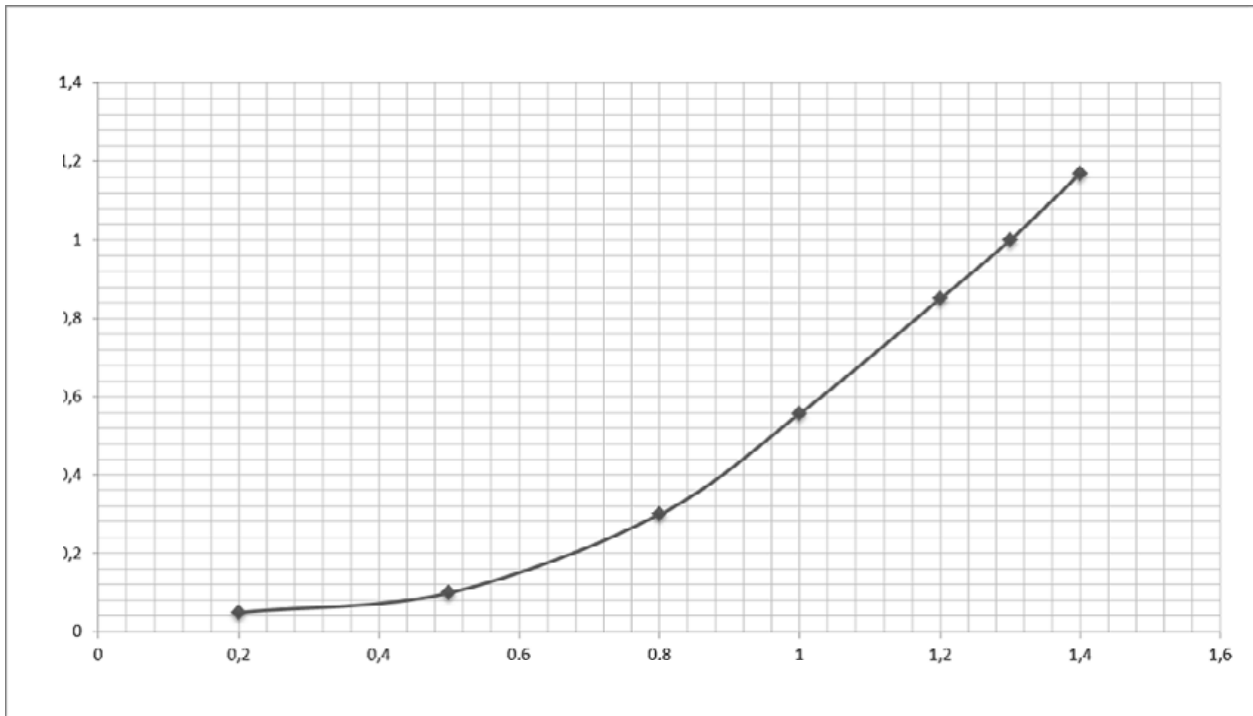


Figure 5.1 Pressure drop at the 0.9 m³/h DHW speed-alternator

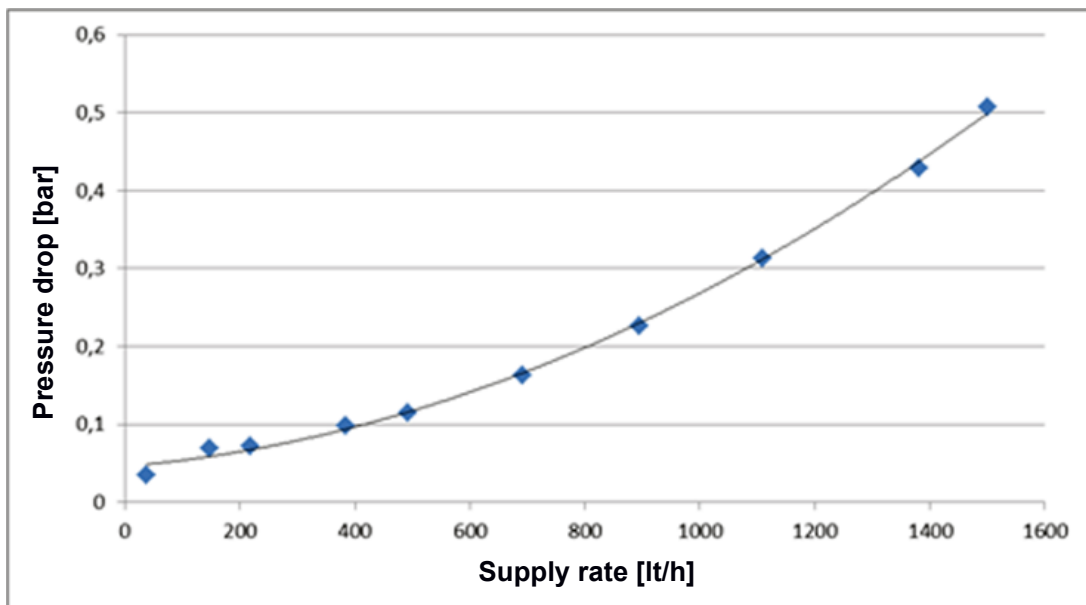


Figure 5.2 Pressure drop at the 1.5m³/h DHW speed-alternator

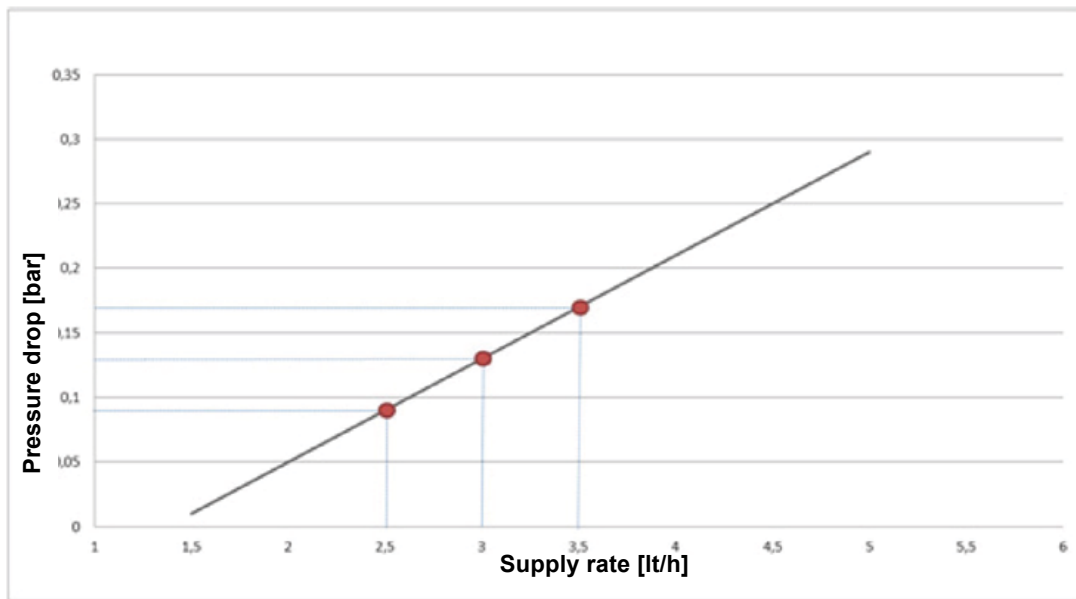


Figure 5.3 Pressure drop at the 3m³/h DHW speed-alternator

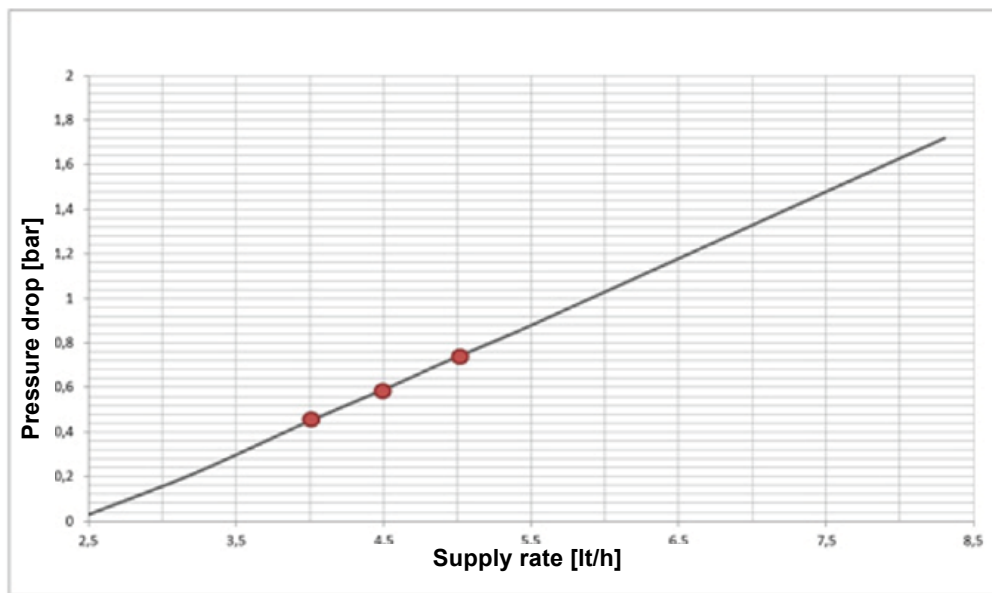


Figure 5.4 Pressure drop at the 4.5m³/h DHW speed-alternator

3.2.2 OPTIONS WHEN USING CALPAK X-FLOW ULTRATANKS

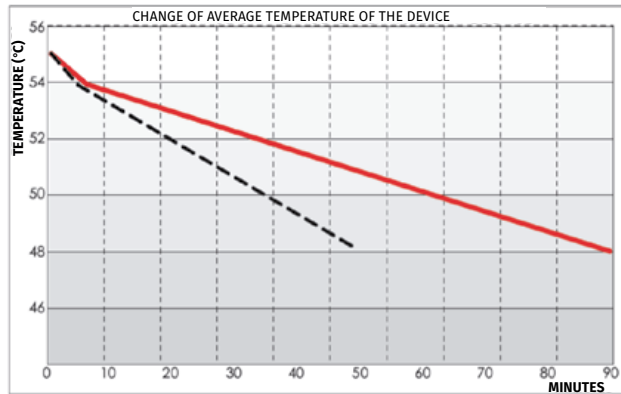
Regarding the dimensioning of the tank, Calpak suggests:

A Calpak X-FLOW with a 1,500 lt/h (1.5 model) supply heat exchanger can cover the needs of up to 25 rooms, assuming that:

1. The peak in demand lasts 1.30 hours or more, with uniform distribution.
2. Each shower lasts 20 minutes.

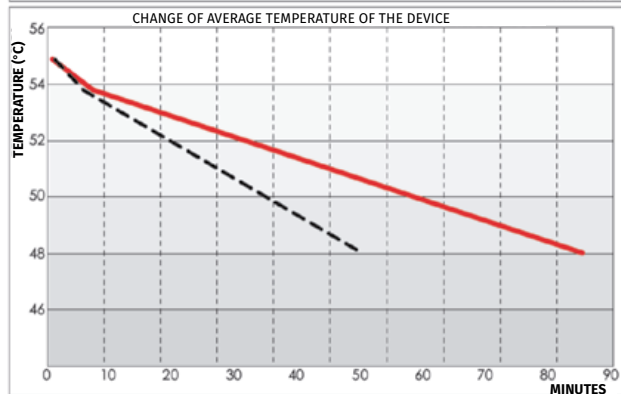
Obviously, this is not an absolute calculation, because a different approach may be required depending on the needs of the project and the estimations of each engineer.

Indicative charts on the coverage of peak demand in DHW at the desirable temperature



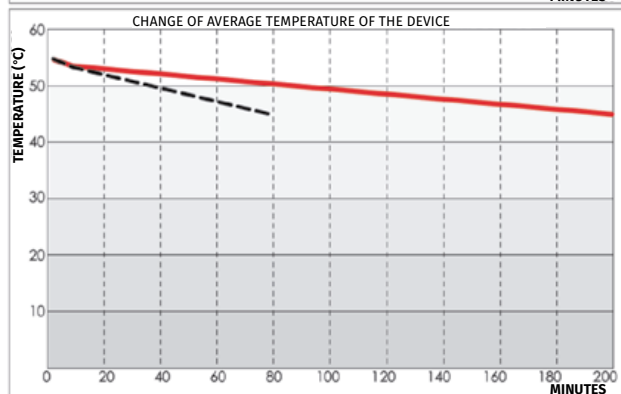
SCENARIO 1:

- a. A & B category hotel open throughout the year, Climate Zone A
 - b. 40 persons (60lt/person/day)
 - c. Water temperature = 48 °C, peak = 1.5 hours, concurrency = 50%, tank = 2000 lt
 - d. 16kW heat pump, source start-up and shutdown temperature: 54 °C and 55 °C respectively.
 - e. Month of reference: July
- Duration of peak coverage by Calpak X-FLOW = 1:31:00
Duration of peak coverage by a conventional tank in the same conditions = 0:50:00



SCENARIO 2:

- a. A & B category hotel open throughout the year, Climate Zone A
 - b. 40 persons (60 lt/person/day)
 - c. Water temperature = 48 °C, peak = 1.5 hours, concurrency = 35%, tank = 2000 lt
 - d. 16kW heat pump, source start-up and shutdown temperature: 54 °C and 55 °C respectively.
 - e. Month of reference: April
- Duration of peak coverage by Calpak X-FLOW = 1:27:00
Duration of peak coverage by a conventional tank in the same conditions = 0:51:00



SCENARIO 3:

- a. A & B category hotel open throughout the year, Climate Zone A
 - b. 40 persons (60 lt/person/day)
 - c. Water temperature = 45 °C, peak = 1.5 hours, concurrency = 50%, tank = 2000 lt
 - d. 16kW heat pump, source start-up and shutdown temperature: 54 °C and 55 °C respectively.
 - e. Month of reference: July
- Duration of peak coverage by Calpak X-FLOW = 3:24:00
Duration of peak coverage by a conventional tank in the same conditions = 1:20:00

*Note: — Calpak X-FLOW — — Conventional tank with heat exchanger performance 70%



NOTE

Calpak has developed specialised software to ensure with accuracy the coverage of hot water needs (DHW) in each individual case. If you wish, you may fill in the questionnaire (page 41) and send it to the Technical Department (export@calpak.gr) to receive a comprehensive technical report from our company, detailing with precision the function of the selected tank in relation to the consumption profile of your client.

3.3 COUNTER FLOW KIT

IN GENERAL

The counterflow kit consists of a circulation pump (which type and size vary according to the type and size of the corresponding DHW speed-exchanger), a special controller, a stainless steel pipe and several fittings that are necessary to complete the counterflow closed circuit. The controller can be replaced with a flow switch. The circulation pump is designed to be installed in heating systems. The maximum circuit pressure is 10 bar. The maximum and minimum temperature of the circulating liquid is 110°C and -10°C, respectively. The circulating liquid may be either clean water or a mixture of clean water and antifreeze liquid suitable for central heating systems. The maximum environment temperature in which the circulation pump functions properly is 35°C (for water at a temperature of 110°C) and higher than the dew point of the circulating liquid (to avoid condensation). To prevent burns, avoid contact with the circulation pump and the circulating liquid during operation. The circulation pump must not be used to transfer fuels or flammable liquids or be used in flammable environment. The curves indicating the performance of pumps appear in the relevant charts. For draining purposes, there are labyrinths in the pump's motor. When insulating, do not cover the labyrinths; otherwise, you may cause serious damage.

ELECTRICAL CONFIGURATION

The electrical connection must be undertaken by specialised individuals. The connection to power is shown in chart 4 of 3.3.5. For the electrical connection of the pump with power (1x230V, 50Hz), an appropriate connecting cable must be used (3G 1mm², H05RR- F). Before disconnection, make sure that all the necessary measures are taken in line with the applicable regulations. The power cord must be connected in such a way that it cannot come in contact with parts of the shell, because of the high temperature of the shell.



WARNING

This device is not intended to be used by people (including children) with reduced physical or mental capabilities, people who lack the necessary experience and knowledge, unless they are supervised or instructed on the use of the device by a person responsible for their safety. Children must be supervised so that they don't play with the device.

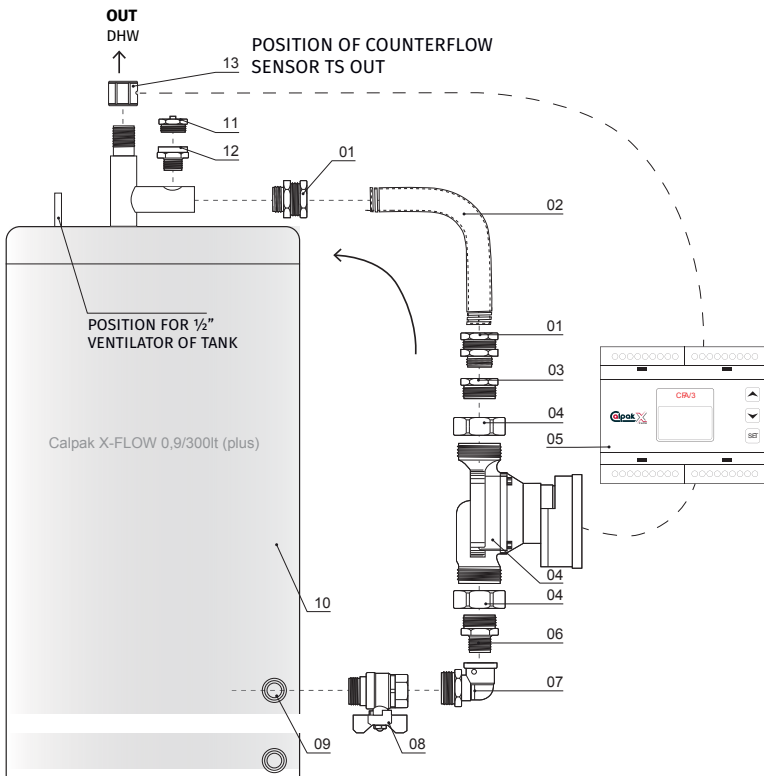
MAXIMUM OPERATION TEMPERATURES

Water temperature in the circuit (°C)	110	100	90	80
Maximum room temperature (°C)	35	50	60	70

SPEED ADJUSTMENT

The circulation pump's speed may be adjusted with the speed switch on the circulation pump's electric box: to the left for minimum (min.) speed and to the right for maximum (max.) speed. It is suggested that you adjust it to maximum speed.

3.3.1 CIRCULATOR CONFIGURATION AND INSTALLATION OF 0,9 M³/H CALPAK COUNTERFLOW KIT WITH CONTROLLER CFA/3 (with 300 LT tank)



Note: The above drawing applies applies for model: **Calpak X-FLOW 0,9/300 (plus)**

POSITION	DESCRIPTION	QUANT.	UNIT
01	Fitting DN20 x 3/4" M	2	pc
02	Flexible pipe 316L DN20	0,28	m
	Insulation of flexible pipe 9x22	0,28	m
03	Reducer USA 1 1/4"x3/4"	1	pc
04	Circulation pump DAB EVOSTA2 40-70/180X	1	pc
05*	Controller CFA/3 with two sensors	1	pc
06	Compression nipple 1 1/4" x 3/4"	1	pc
07	Elbow A/Ø 3/4"	1	pc
08	Ball valve 3/4"	1	pc
09	Suction connection point counterflow pump (see F image 1/p. 11)	-	-
10	Ultratank Calpak X-FLOW 0,9/300	1	pc
11	Rotation venting valve 1/2"M	1	pc
12	Bushing nipple 1/2"x 3/8"	1	pc
13*	Inlet 3/4" with sensor hose 8 mm	1	pc



CIRCULATION PUMP DAB EVOSTA2 40-70/180X

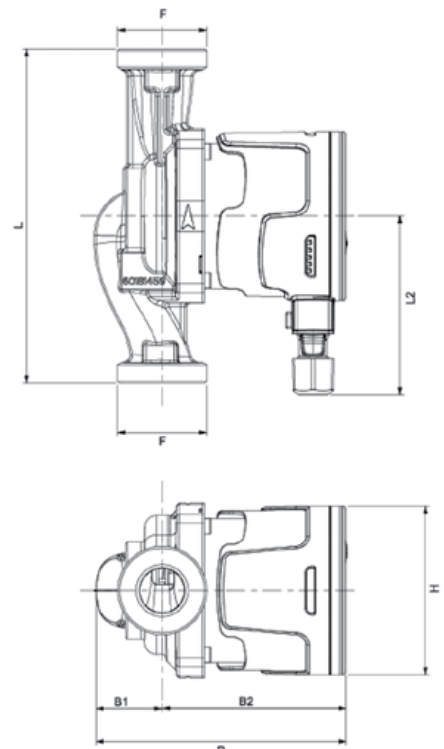
- Single-phase 230V/50Hz
- Motor insulation class F
- Motor protection rating IPX5
- Maximum water temperature +110 °C
- Energy efficiency index (EEI) ≤ 0.18
- Maximum power: 35 W
- Maximum current: 0.32 A
- Maximum flow rate: 3.6 m³/h
- Maximum head: 6.9 m
- Maximum operating pressure: 10 bar
- Weight: 2.35 kg
- CE certification

Dimensions (mm)						
L	L1	B	B1	B2	H	F
180	96	134,6	35,5	99,1	91	2"

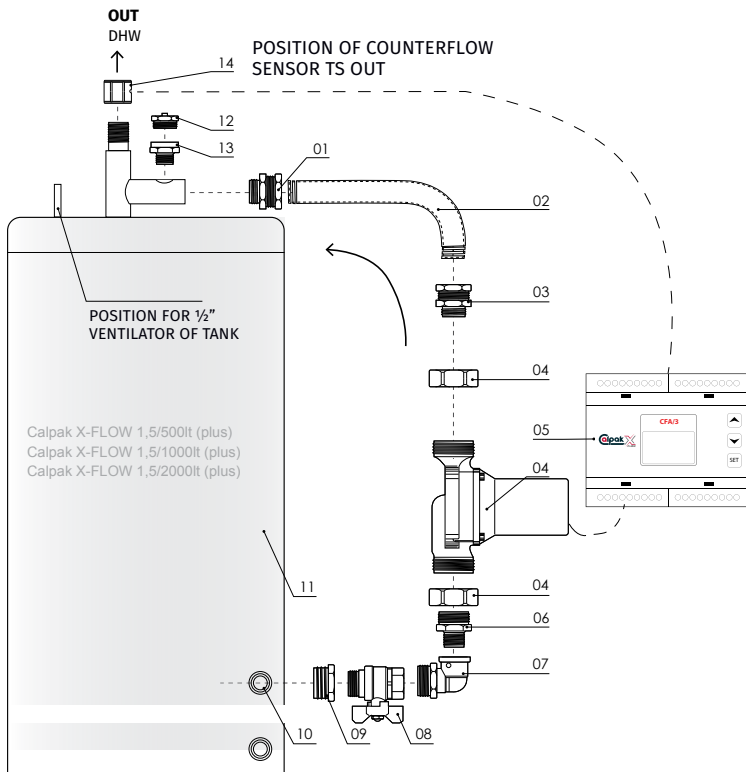
* Alternatively use of flow-switch instead of CFA controller. Install flow-switch 3/4" horizontally in **position 13** instead of inlet 3/4".



FLOW-SWITCH 3/4"



3.3.2 CIRCULATOR CONFIGURATION AND INSTALLATION OF 1,5 M³/H CALPAK COUNTERFLOW KIT WITH CONTROLLER CFA/3 (with 500, 1000, 2000 lt tanks)



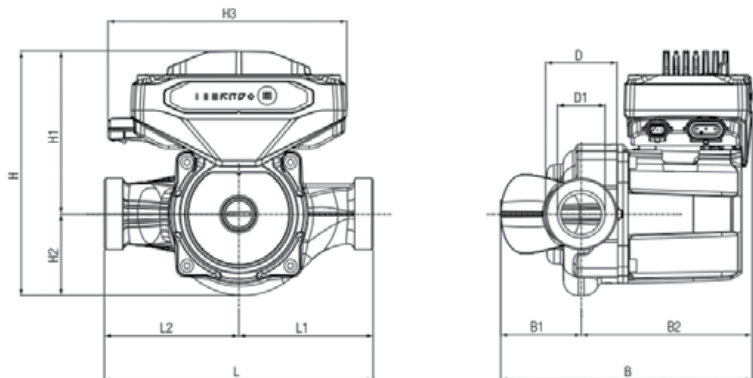
Note: The above drawing applies for models:
Calpak X-FLOW 1.5/500 (plus), Calpak X-FLOW 1.5/1000 (plus),
Calpak X-FLOW 1.5/2000 (plus)

POSITION	DESCRIPTION	QUANT.	UNIT
01	Compression nipple 1¼"x 1"	1	pc
02	316L DN25 flexible pipe	0,3 in 500lt 0,44 in 1.000lt 0,55 in 2.000lt	m
	9x35 flexible pipe insulation (black)		m
03	Nipple 1¼"	1	pc
04	Circulation pump DAB EVP OEM 100/180-32	1	pc
05*	Controller CFA/3 with two sensors	1	pc
06	Hexagon nipple 1¼" x 1"	1	pc
07	1"x1" compact elbow	1	pc
08	Ball valve 1"	1	pc
09	Reducer USA 1½"x1" (2"x1" at the 2000L tank)	1	pc
10	Suction connection point counterflow pump (see F image 1/p. 11)	-	-
11	Calpak X-FLOW tank 1,5/500 or 1,5/1.000 or 1,5/2.000	1	pc
12	½"M rotating venting valve	1	pc
13	Bushing nipple ½" x ¾"	1	pc
14*	Inlet 1" with sensor hose 8 mm	1	pc



CIRCULATION PUMP DAB EVP OEM 100/180-32

- Single-phase 230V/50Hz
- Motor insulation class F
- Motor protection rating IPX4D
- Maximum water temperature +95° C
- Energy efficiency index (EEI) ≤0.20
- Maximum power: 128 W
- Maximum current: 1.04 A
- Maximum flow rate: 9 m³/h
- Maximum head: 10 m
- Maximum operating pressure: 16 bar
- Weight: 3,4 kg
- CE certification



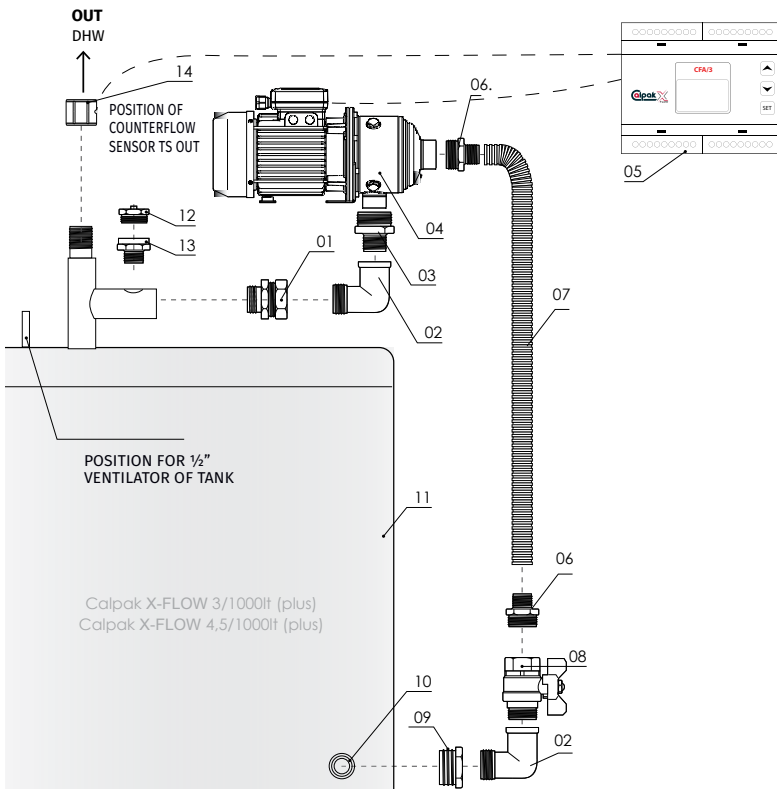
* Alternatively use of flow-switch instead of CFA controller. Install flow-switch 1" horizontally in **position 14** instead of inlet 1".



FLOW-SWITCH 1"

Dimensions (mm)												
B	B1	B2	D	D1	H	H1	H2	H3	L	L1	L2	
168	54	114	2"	32	164	109	55	159	180	90	90	

3.3.3 CIRCULATOR CONFIGURATION AND INSTALLATION OF 3,0 & 4,5 M³/H CALPAK COUNTERFLOW KIT WITH CONTROLLER CFA/3 (with 1000 lt tank)



POSITION	DESCRIPTION	QUANT.	UNIT
01	1 1/4" fitting	1	pc
02	1 1/4" x 1 1/4" elbow (M/F)	2	pc
03	Compression Niple (M) 1 1/4"x1"	1	pc
04	Grundfos Pump CM 5-2 (for 3.0) Grundfos Pump CM 5-3 (for 4.5)	1	pc
05*	Controller CFA/3 with two sensors	1	pc
06	Compression Niple (M) 1 1/2"x1 1/4"	2	pc
07	INOX flexib tube DN32 Pipe insulation 9x35	42	cm
08	Spherical switch 1 1/4"	1	pc
09	Reducer USA 1 1/2" x 1 1/4"	1	pc
10	Suction connection point counterflow pump (see F image 1/p. 11)	-	-
11	Calpak X-FLOW tank 3.0/1000 or 4.5/1000	1	pc
12	1/2"M rotating ventilator	1	pc
13	Bushing nipple 1/2"x 3/8"	1	pc
14*	1 1/2" Inlet with 8mm sensor hose	1	pc

* Tighten the nut by hand as much as possible and then with the appropriate wrench 1.5 to 2 more turns

Note: The above drawing applies for models: **Calpak X-FLOW 3.0/1000 (plus), Calpak X-FLOW 4.5/1000 (plus)**

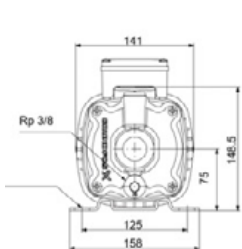
GRUNDFOS PUMP CM 5-2 / CM 5-3

- Three phase 230-40V / 50Hz
- CM 5-2 : 0,46kW - 2,2 / 1,2 Amp
- CM 5-3 : 0,6kW - 3,1 / 1,8 Amp
- Class F - IP55
- Maximum flow 6,2 m³/h - Maximum head 18 m (27m head for CM 5-3)
- Maximum operation pressure 10 bar.
Minimum pressure on suction side 0,1 bar at 95°C.
- Working fluid temperature limits -20 - 90°C
- Maximum ambient temperature 55°C
- CE, WRAS, ACR, TR, EAC certification

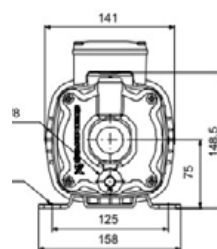
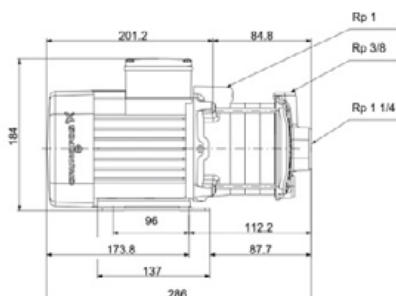
* Alternatively use of flow-switch instead of CFA controller. Install flow-switch 1 1/2" horizontally in **position 14** instead of inlet 1 1/2".



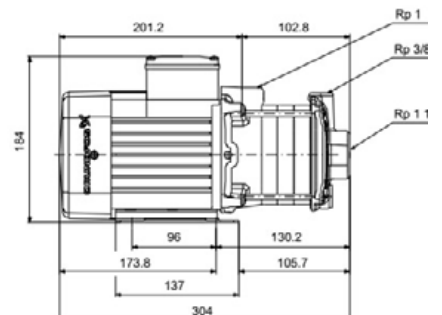
FLOW-SWITCH 1 1/2"



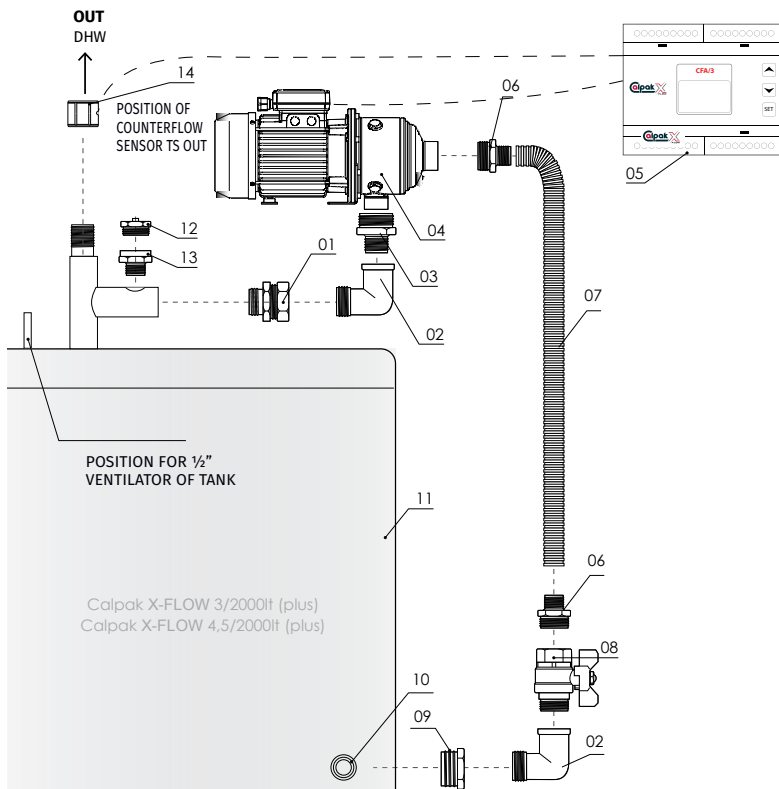
CM 5-2



CM 5-3



3.3.4 CIRCULATOR CONFIGURATION AND INSTALLATION OF 3,0 & 4,5 M³/H CALPAK COUNTERFLOW KIT WITH CONTROLLER CFA/3 (with 2000 lt tank)



POSITION	DESCRIPTION	QUANT.	UNIT
01	1/4" fitting	1	pc
02	1/4" x 1/4" elbow (M/F)	2	pc
03	Compression Niple (M) 1/4"x1"	1	pc
04	Grundfos Pump CM 5-2 (for 3.0) Grundfos Pump CM 5-3 (for 4.5)	1	pc
05*	Controller CFA/3 with two sensors	1	pc
06	Compression Niple (M) 1 1/2"x1 1/4"	2	pc
07	INOX flexib tube DN32 Pipe insulation 9x35	65	cm
08	Spherical switch 1 1/4"	1	pc
09	Reducer USA 2 x 1 1/4"	1	pc
10	Suction connection point counterflow pump (see F image 1/p. 11)	-	-
11	Calpak X-FLOW tank 3.0/2.000 or 4.5/2.000	1	pc
12	1/2"M rotating ventilator	1	pc
13	Bushing nipple 1/2"x 3/8"	1	pc
14*	1 1/2" Inlet with 8mm sensor hose	1	pc

* Tighten the nut by hand as much as possible and then with the appropriate wrench 1.5 to 2 more turns

Note: The above drawing applies for models: **CALPAK X-FLOW 3.0/2000 (PLUS), CALPAK X-FLOW 4.5/2000 (PLUS)**

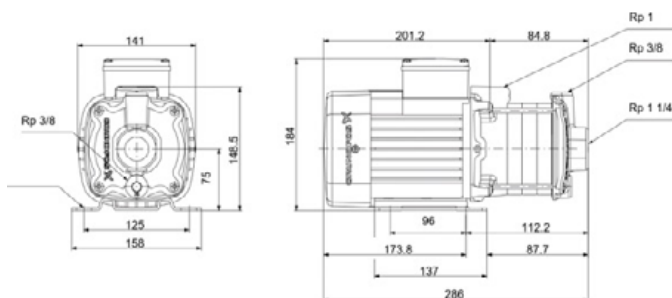
GRUNDFOS PUMP CM 5-2 / CM 5-3

- Three phase 230-40V / 50Hz
- CM 5-2 : 0,46kW - 2,2 / 1,2 Amp
- CM 5-3 : 0,6kW - 3,1 / 1,8 Amp
- Class F - IP55
- Maximum flow 6,2 m³/h - Maximum head 18 m (27m head for CM 5-3)
- Maximum operation pressure 10 bar.
Minimum pressure on suction side 0,1 bar at 95°C.
- Working fluid temperature limits -20 - 90°C
- Maximum ambient temperature 55°C
- CE, WRAS, ACR, TR, EAC certification

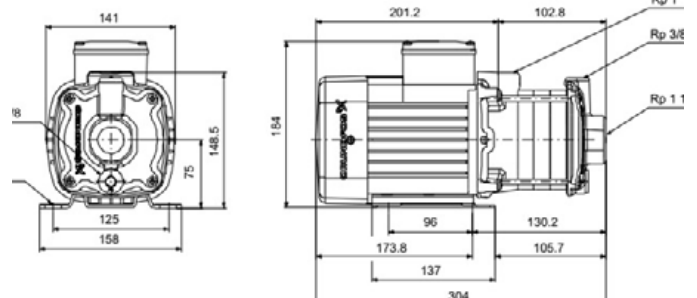
* Alternatively use of flow-switch instead of CFA controller. Install flow-switch 1 1/2" horizontally in **position 14** instead of inlet 1 1/2".



FLOW-SWITCH 1 1/2"



CM 5-2



CM 5-3

3.4 CONTROL UNIT

3.4.1. INTRODUCTION TO CFA/3

The CFA/3 electronic controller is suitable for monitoring and adjusting the temperature in any cooling or heating system. It is made to operate with a 230V (AC) current, and is equipped with four (4) inputs and four (4) outputs.

What is the CFA/3?

The CFA/3 features:

- Mounting for a panel rail
- An integrated transformer
- Integrated control keys and illuminated screen
- Integrated functions that are usually required during use (such as various timer types, latching contacts, enumerators, etc.)
- Real time clock
- Inputs and outputs depending on the instrument, the device and/or the application

WHAT CAN THE CFA/3 DO?

The CFA/3 is a rail automation system and has been designed to take up the least space possible on a panel.

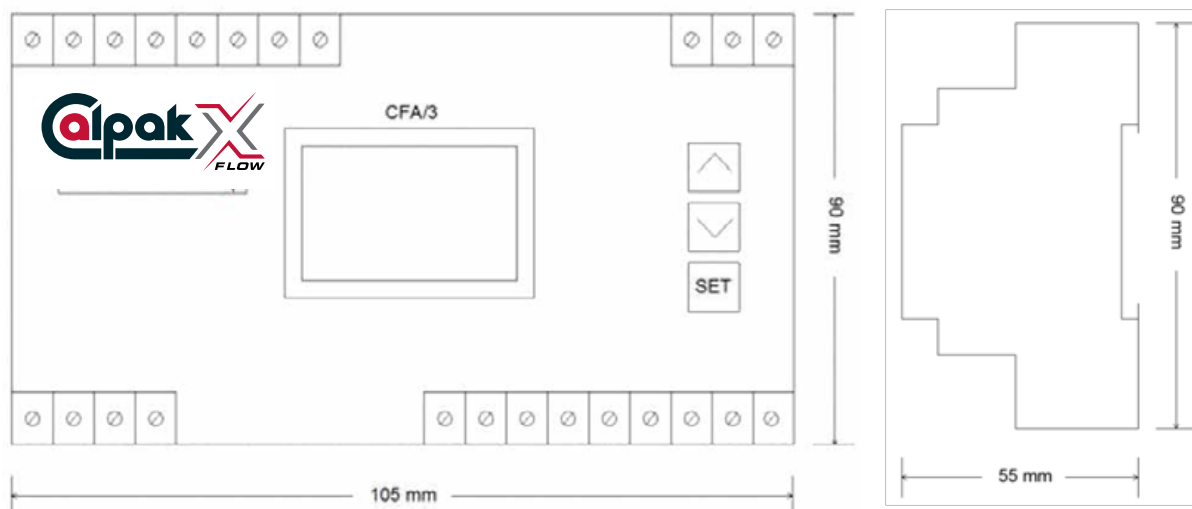


Figure 9 Control unit dimensions

The CFA/3 is available with a screen: 4 inputs and 4 outputs.

Dimensions: 105mm x 90mm x 55mm (L x W x H)

The CFA/3 has the following features:

- Direct 230V AC supply
- Connection to two (2) temperature sensors
- One (1) cold contact
- Two (2) 230V AC digital outputs (relays) for controlling and feeding (up to 6A) devices (counterflow circulation pump, heat source)

Optionally, with the addition of another temperature sensor, an auxiliary heat source may be activated by using a third 230V AC digital output (relay).



HAZARD

Always ensure that the system is not live when you disconnect cables or other associated material when in a possibly explosive and/or inflammable environment.

3.4.2 CFA/3 INSTALLATION AND WIRING

3.4.2.1 GENERAL INSTRUCTIONS

You should follow the following instructions for the installation and wiring of the CFA/3:

- Please ensure compliance with all relevant standards, as well as the international and local regulations for installation and wiring of any CFA/3 device. Contact the local authorities in order to find out what is applicable in each case.
- Use cables with the appropriate cross section, depending on current. Cables with a cross section of between 1mm² and 2.5mm² can be used in combination with the CFA/3.
- Do not overtighten the cables. Maximum torque is 0.5 Nm.
- Use cables with the shortest length possible. For longer lengths, please use screened cables.
- The cables must be installed in pairs: one neutral cable and one phase or signal cable.
- Isolate the high voltage cables (AC and DC) from the low voltage signal cables.
- Make sure that the cables are properly tensioned.
- If necessary, provide cables with lightning protection.
- Do not connect an external power supply at the same time.

Moreover, in the context of safe use, repair and maintenance of the device, please note the following:



CAUTION

- Users must make sure that the inspection, assembly and maintenance of the device is only carried out by authorised and specialised personnel, who must know the operating instructions.
- All installation and maintenance must be carried out while the device is deactivated.
- Modifications to the device are allowed only following consultation with the manufacturer. The use of original components and spare parts ensures total safety. The manufacturer assumes no liability if non - original components are used.
- The device must be protected from humidity and mechanical damage. Do not expose the device to temperatures outside the range of -5 °C to +50 °C.
- The panel device housing must be kept clean.
- A clearance of at least 40 cm must be left in front of the device.



NOTE

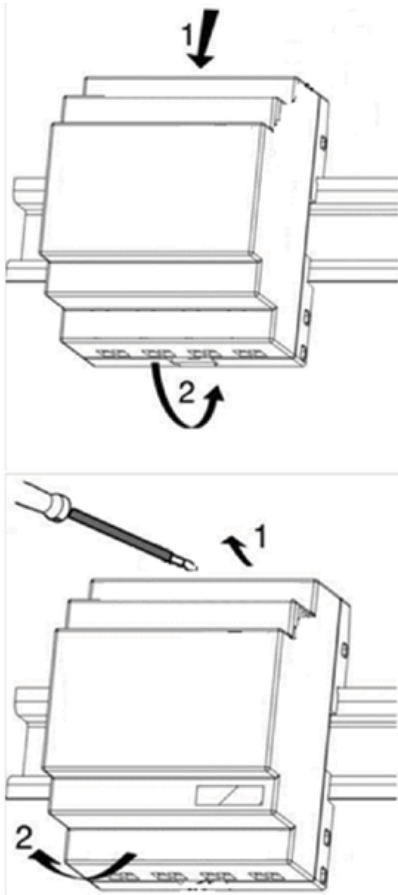
CFA/3 must be installed separately from power relays in order to avoid noise.



NOTE

The CFA/3 must be installed and wired by trained technicians, who must know and apply the rules and standards applicable for electrical installations.

3.4.2.2 CFA/3 INSTALLATION / REMOVAL



1. The CFA/3 is installed on a 35 mm top hat rail (DIN EN 50022).
2. The CFA/3 has a width of 105 mm (~6 SAU - surface area units)

The CFA/3 is installed on the rail as follows:

1. Instal the CFA/3 on the rail.
2. Push until the plastic protrusion on the back of the device 'locks' and holds the CFA/3 firmly on the rail.

The CFA/3 can be removed as follows:

1. Place a screwdriver in the socket on the upper side of the device and push the plastic protrusion down, until the CFA/3 is released from the rail.
2. Remove the CFA/3 from the rail.

3.4.2.3 CFA/3 CONNECTION AND WIRING

Use a screwdriver with a 3mm head width to wire the CFA/3. It is not necessary to use metal caps on the end of the wires. The cables used must have the following dimensions: For the connection, the torque must be 0.4...0.5 Nm or 3...4 lbs/in.



NOTE

Make sure that any bare conductors are sheathed. To protect against contact with live cables, the relevant national codes must be followed.

Connecting the supply

The CFA/3 requires a supply voltage of 230 V AC. Protection with fuses is recommended and depends on the supply to the digital outputs.



HAZARD

Failure to implement protective measures may result in death, bodily injury or material damage.

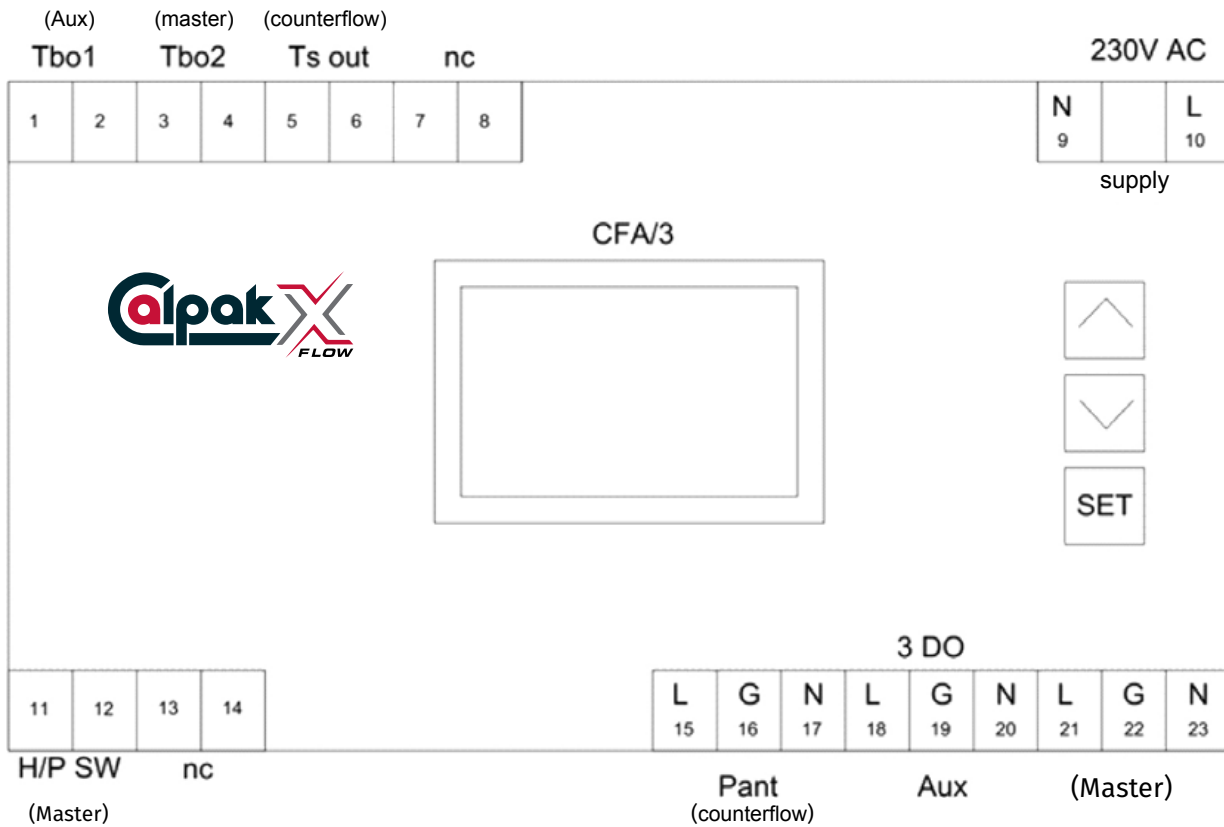


Figure 10 CFA/3 terminals

For more details, see the following terminal numbering table:

CFA/3		
Socket	Point	Description
1	Tbo 1	Upper tank temperature sensor (controls the auxiliary heat source AUX) (position L, see p.13) controls the auxiliary heating source (AUX)
2		
3	Tbo 2	Tank's temperature sensor in the middle or at the bottom (position M or N, see p. 13). Controls the master heating source (MASTER)
4		
5	Ts out	Hot water output temperature sensor (position 14, see pp. 21, 22, 23). Controls the counterflow circulator.
6		
7	n.c.	Not used
8		
9	N	Neutral
10	L	Phase (230V AC)
11	(master) H/PSW	Heat pump command (cold contact)
12		
13	n.c.	Not used
14		
15	Pant	Counterflow circulation pump (230V AC) / (Active contact)
16		
17		
18	Aux	Heat source output (230V AC) / (Active contact)
19		
20		
21	MASTER	Heat source output (230V AC) / (Active contact)
22		
23		

Conditions

- Maximum output current is 6A per output.
- NTC10K sensors required.
- The equipment should always be connected with the active contacts through an external 230V relay.

3.4.3 COMMISSIONING AND CUSTOMISATION

The CFA/3 is not equipped with an ON/OFF switch. It requires 230V AC to operate. The behaviour of the CFA/3 when voltage is supplied depends on the following:

- Whether a programme has been loaded
- Proper wiring
- The condition of the device before the interruption of the supply

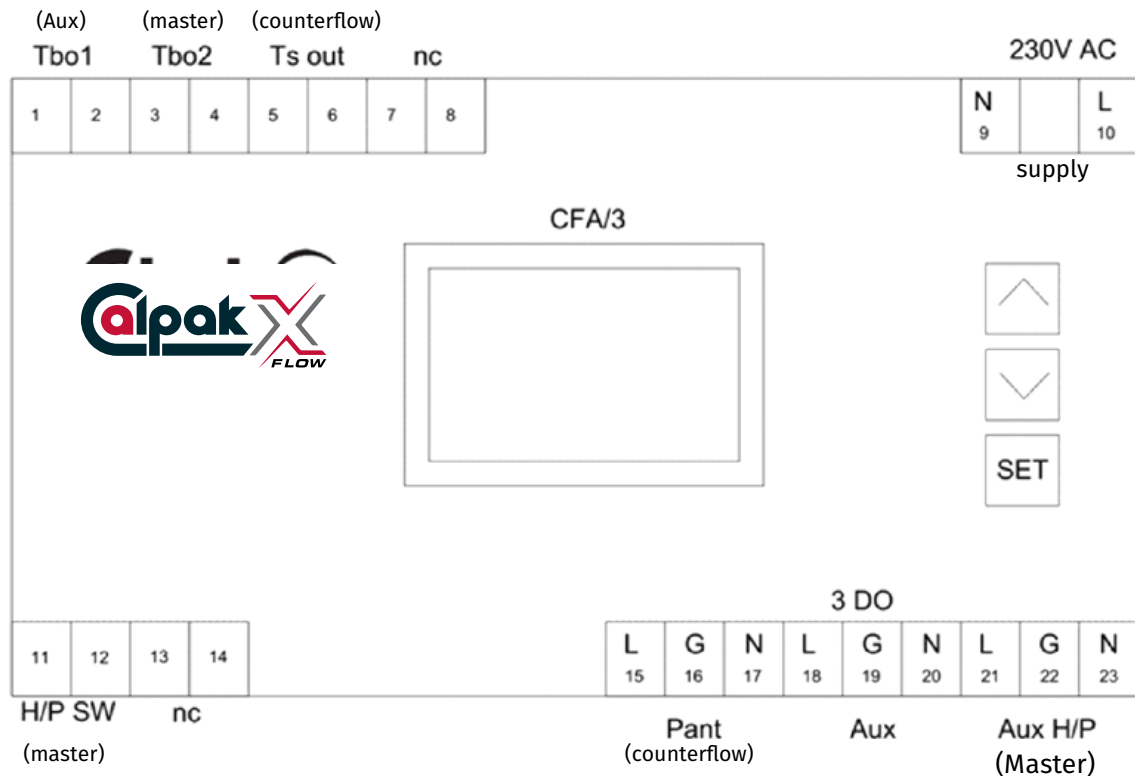


Figure 11 CFA/3 terminals

As soon as the CFA/3 is supplied with power, a diagram of the system will appear on the screen, depending on the programme installed.

CFA/3 Operation

The CFA/3 has been installed with a domestic hot water production monitoring and control programme. The following figures are examples from actual system operation.

If the electrical connection has been configured in accordance with the instructions, the logo will appear on the screen for 2 seconds (fig. 12) and immediately afterwards the general system operation diagram is shown (fig. 13)

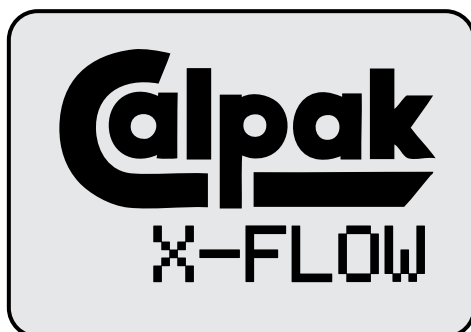


Figure 12

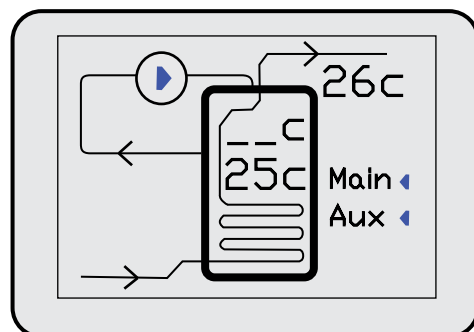


Figure 13

The user can see the temperatures of the storage tank, the counterflow pump, the heat source and the upper (Tbo 1), lower (Tbo 2) and storage tank output (Ts out).

In order to enter the system status and the various system settings, as shown in the following figures (14, 15), press the Λ key.

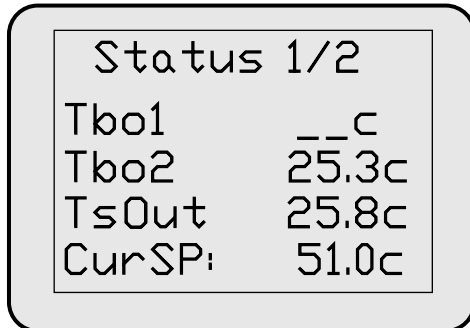


Figure 14

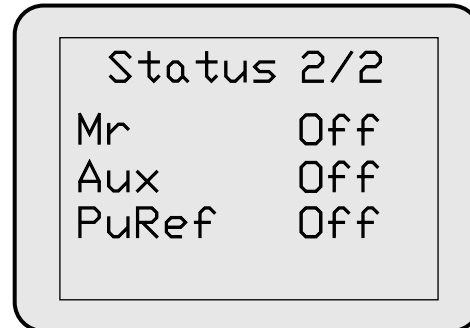


Figure 15

Specifically, while in the **Setup Ref** screen (fig. 16), by keeping the set key pressed, the user can set :

- (1) the **SpNor**, i.e. the desired DHW outlet temperature under normal operating conditions (e.g., 48°C).
- (2) the **SpEco**, i.e. the DHW outlet temperature in economy mode (usually adjusted lower than the Sp norm, e.g., 42°C). It is activated only with the **Sch/er S/p** (see below), for higher savings at night.
- (3) the **Diff** determining the counterflow Δt , i.e. the differential restart temperature. For example, if Sp norm = 48°C and Diff = 1, the counterflow begins at 47°C and stops at 48°C.
- (4) the **Reflu**, i.e. the way to activate/deactivate the counterflow function.
 - The counterflow is deactivated in the “Reflux off” option.
 - Apart from the Sp norm (eco) and the Diff (Δt), in the “Reflux on” option, the counterflow also “monitors” the tank’s temperature. This is mostly for domestic use. E.g., we set the Sp norm at 48°C and start heating the tank at 30°C. The counterflow will begin when the tank reaches 46°C, and ceases at 48°C. Between 46°C and 48°C, the counterflow will function according to the Δt that we have set. If the tank’s temperature falls below 44°C, the counterflow will stop until the temperature reaches 46°C again. In this way, we achieve higher temperatures in the tank. Caution: for the Reflux option to operate properly, the Tbo1 (Aux) sensor must be installed.
 - In the “Reflux max” option, the counterflow does not “monitor” the tank’s temperature, only the Sp norm (or Sp eco) and Diff (Δt). This is mostly for hotel use so that the system may always provide the hot water fast, from the top of the tank. The Tbo1 (Aux) sensor is not necessary for this option.

Following the above settings, the user must not press any key for about 3 seconds.

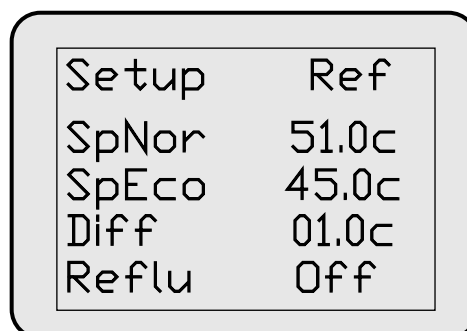


Figure 16

By pressing the Λ key in the **Setup Mr** screen (fig. 17) and keeping the set key pressed, users can set the heat pump water storage temperature (basic heat source), as well as the differential restart temperature. The heat pump or the boiler temperature setting must be at least 2°C greater than the hot water output temperature (Ts out).

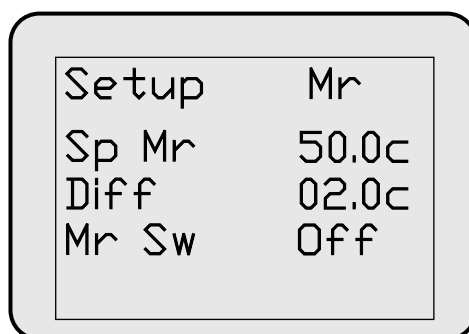


Figure 17

Setup Mr

- Sp Mr: Master source setpoint, e.g., 50°C
- Diff Mr: Master source Δt , e.g., 3°C
- Mr sw on: Master source always on. Monitors setpoint and Δt .
- Mr sw off: Master source off.
- Mr sw s1: Schedule 1
- Mr sw s2: Schedule 2
- Mr sw s1&2: Schedules 1 and 2 at the same time

By pressing the Λ key in the **Setup Aux** screen (fig. 18) and keeping the set key pressed, user can set the auxiliary or alternative heat source water storage temperature (boiler or electric resistance), as well as the differential restart temperature. The temperature setting for the auxiliary energy source must be identical to the hot water output temperature (Ts out).

Note: If the boiler is the only source of energy, adjust the desired operating temperatures in the heat pump settings (Settings H/P).

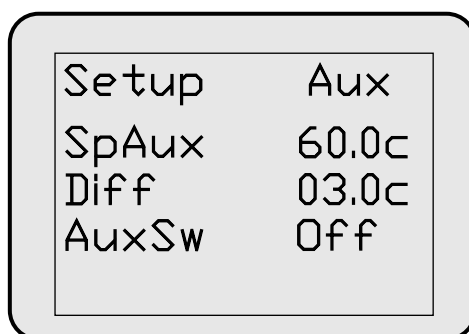


Figure 18

Setup AUX (Auxiliary source settings, e.g., boiler)

If we want to use AUX, we must use the temperature sensor for the Tbol Aux (NTC10K).

- Sp Aux: Setpoint AUX, e.g., 60°C
- Diff Aux: At AUX, e.g., 3°C
- Aux sw on: AUX always on. Monitors setpoint and At AUX
- Aux sw off: AUX off
- Aux sw s1: Schedule 1
- Aux sw s2: Schedule 2
- Aux sw s1&2: Schedules 1 and 2 at the same time

By pressing the Λ key in the **Sche/er S/p** screen (fig. 19) and keeping the set key pressed, the user can set the eco mode auto start and stop programme. The desired water temperature is the one we have set in the Sp Eco settings.

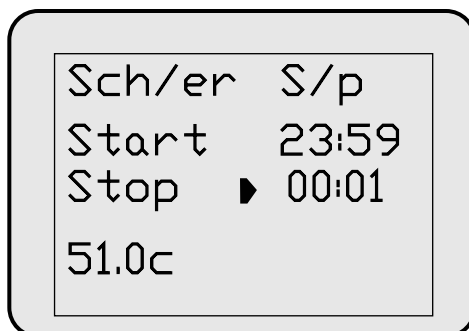


Figure 19

Sch/er S/p

The schedule for the counterflow eco mode (Start -> Stop). The temperature is the one set by the user in the eco mode.

Sch/er Sw

S1 schedule (Start -> Stop).

S2 schedule (Start -> Stop).

For master source and AUX.

By pressing the Λ key, a digital clock, showing hours and minutes, appears automatically on the screen (fig. 20). Users enter the time by keeping the set key pressed.



Figure 20

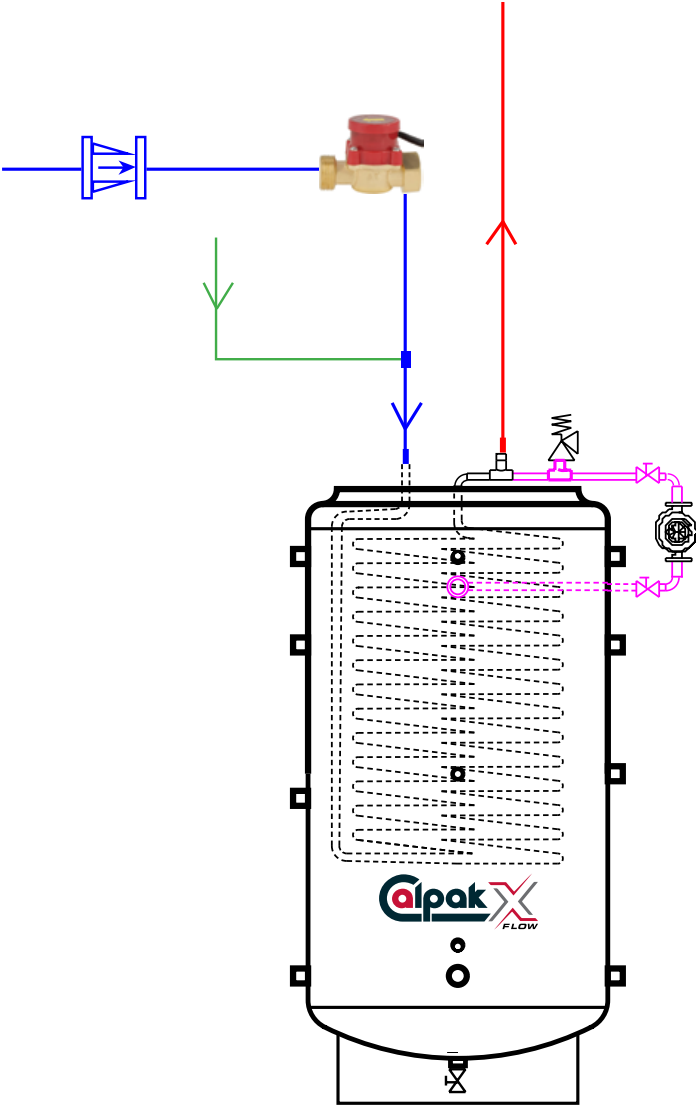
Notes:

1. In order to return to the main general screen, press the V key as many times as required.
2. **Reset:** To reset the controller to its original condition, press and hold the V key on the home screen.

3.5 COUNTER FLOW CONTROL VIA FLOW SWITCH

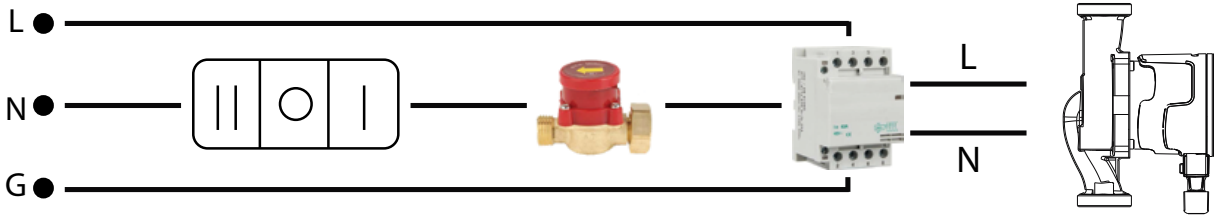
Instead of CFA controller, a flow-switch can be alternatively used to control counter flow. In such case, counterflow's circulation pump is activated every time there is hot water consumption (even small consumption). Consequently, system is operating with the maximum efficiency regardless of flow. Flow switch is recommended for small scale installations as X-flow's installation and operation becomes very simple.

WITH RECIRCULATION

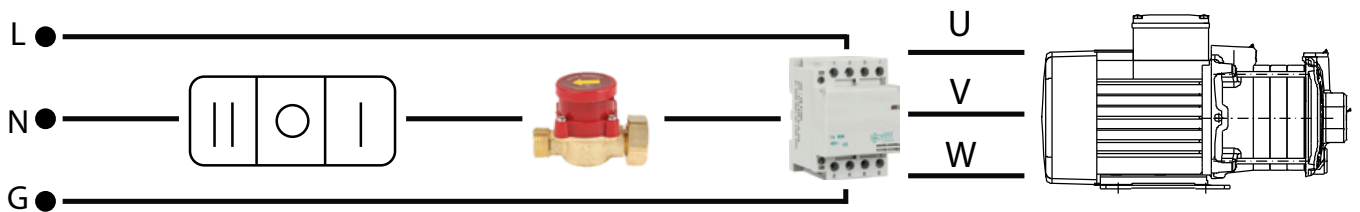


FLOW SWITCH ELECTRICAL CONNECTION

Connection to a single-phase pump



Connection to a three-phase pump



Explanation of symbols

- L ● Live
- N ● Neutral
- G ● Ground

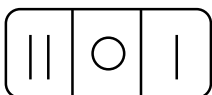
POWER SUPPLY



FLOW SWITCH



RELAY



SWITCH



- || **Auto**
Counterflow controlled by Flow Switch
- **Off**
Counterflow permanently disabled
- | **On**
Counterflow permanently on



SWITCH

Cable Connection

➤ 4 INSTRUCTIONS FOR OPERATION AND MAINTENANCE

4.1 OPERATION

Start product operation only if:

- all installation and connection works are completed.
- the tank has been filled with water as follows:
 1. We fill the tank with water, keeping the counterflow circulation pump's suction valve closed.
 2. We carry out a venting using two components: flange, counterflow circuit.
 3. We turn on the suction valve of the counterflow circulation pump.
 4. We repeat the venting of both components.
- all equipment insulation works are complete, and there is access for maintenance.
- the pressure reducer for hot water has been installed and adjusted (max. 6 bar).
- the pressure reducer for the closed circuit has been installed and adjusted (max. 3.5 bar).



NOTE

The X-FLOW tank can be internally cleaned with water only before it is put into operation, to remove any metal shavings, dirt, or other foreign particles that may be present inside the tank. After the initial filling and commissioning, the tank must not be drained again, neither under normal operating conditions nor in drainback systems. In cases where flushing or cleaning of the piping and the heating circuit in general is to be carried out, it is recommended to isolate the X-FLOW tank using the shut-off valves provided in the hydraulic installation.

4.2 MAINTENANCE

The periodic inspection of the product guarantees operation without problems and a long life span.



WARNING

- Contact with non-insulated parts of the product may cause an electric shock, fatal burns or injuries.
- If a circulation pump or an electric resistance (optional) are installed in the system, they should be isolated from the power supply during maintenance operations.
- All works performed on live components must comply with the appropriate procedures; otherwise, the life and health of people and the functioning of the product may be at risk.
- Only specialised authorised technicians may undertake maintenance works on the electric parts of the product.

Tests performed during the annual maintenance:

- Control on the operation of the circulator;
- Control on the operation of the optional electric resistance by activating it and monitoring the rise of temperature of the hot water tank ;
- Visual inspection of the general state of the hot water tank ;
- Visual inspection of the hot water tank's circuit;
- Visual inspection of connections and piping. In case of malfunction, detect the cause. Replacement of defective parts;
- Check of all electric components, connections and wires;
- Repair or replacement of worn out parts;
- Check of the central cold water supply and adjustment of the pressure reducer, if necessary;
- Turning on and off the cold water isolation valve to remove deposits and scale from inside the heat exchanger.

4.3 INSTRUCTIONS FOR USERS

Before delivering the heating system and the hot water tank, explain to the owner how it works and how he/she may perform checks on the heating system.

Deliver the technical documentation (the present document and all supporting documents) to the user and inform him/her that the documents should be immediately available at any time and kept somewhere very close to the installation area.

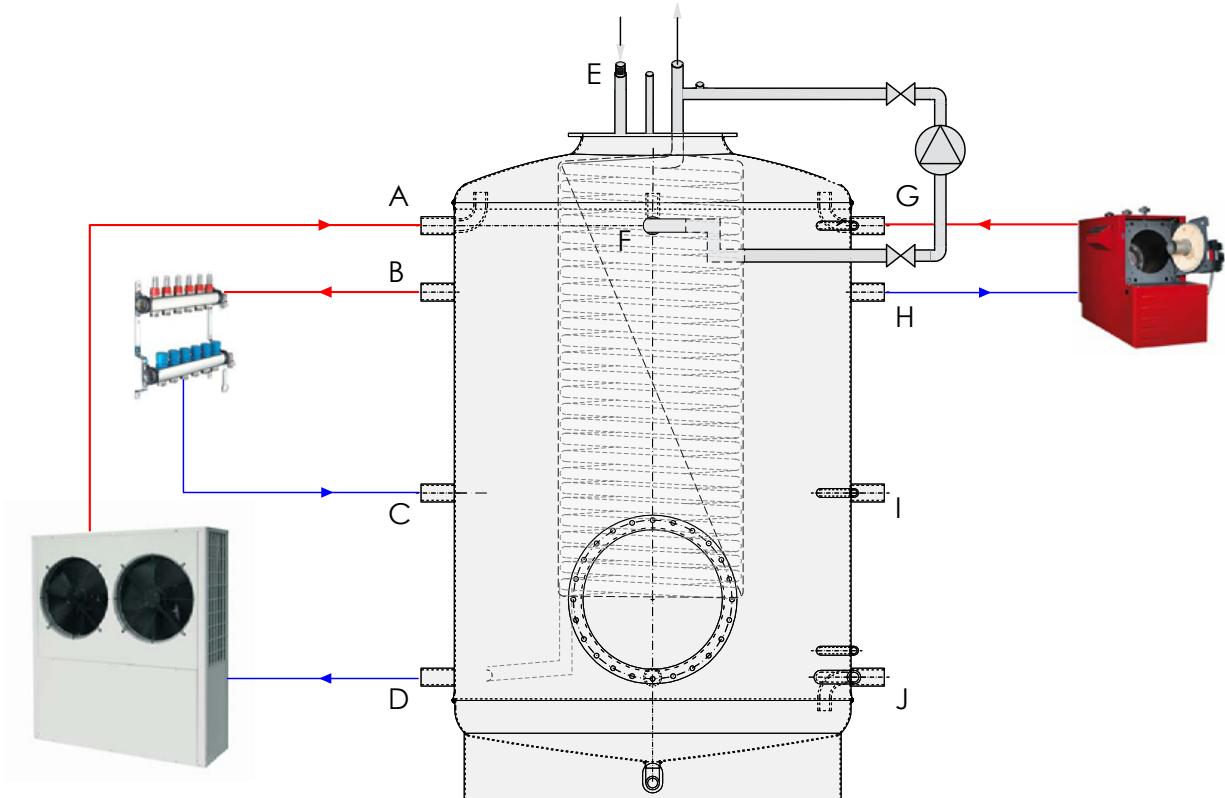
The technical documentation included in the scope of the installation is also a component of the device. It must be kept in a way that allows the user or the technicians to consult it at any time.

Product Recycling and Recall

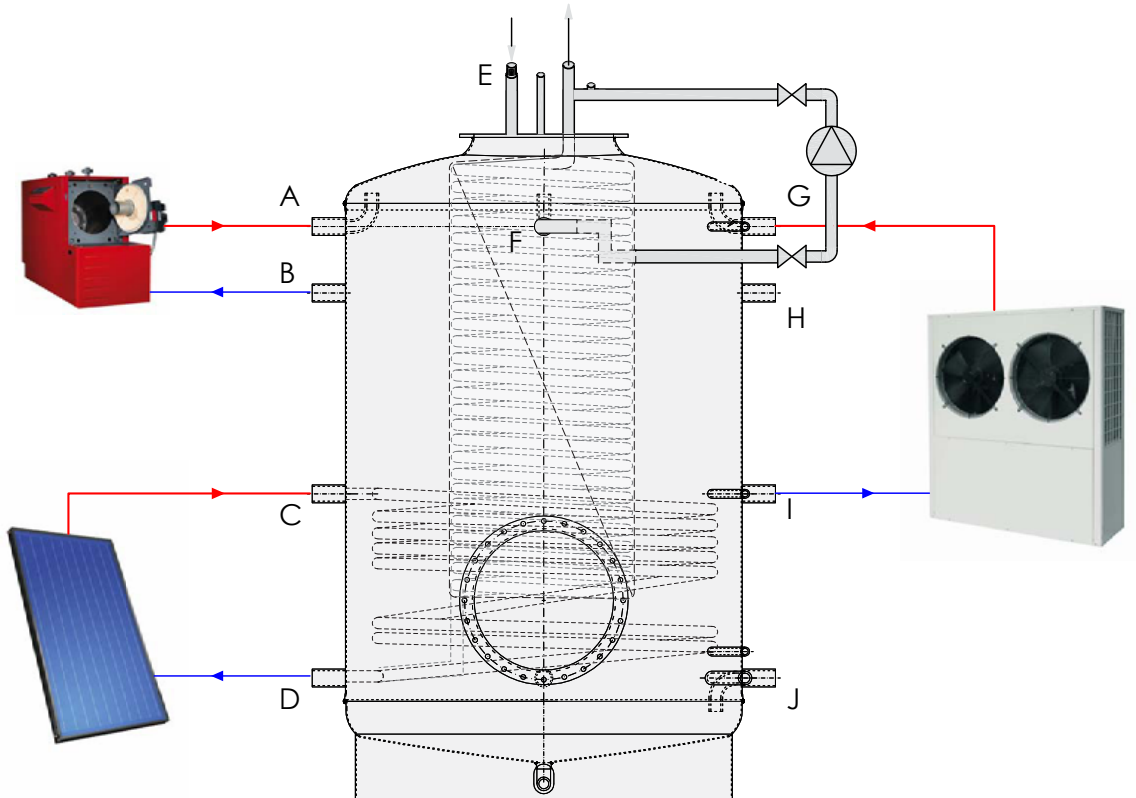
The devices are fully recyclable due to the materials from which they are manufactured, and they do not harm the environment. Please contact a specialised, certified company which recycles and recalls devices.

➤ 5 USES AND CONFIGURATION

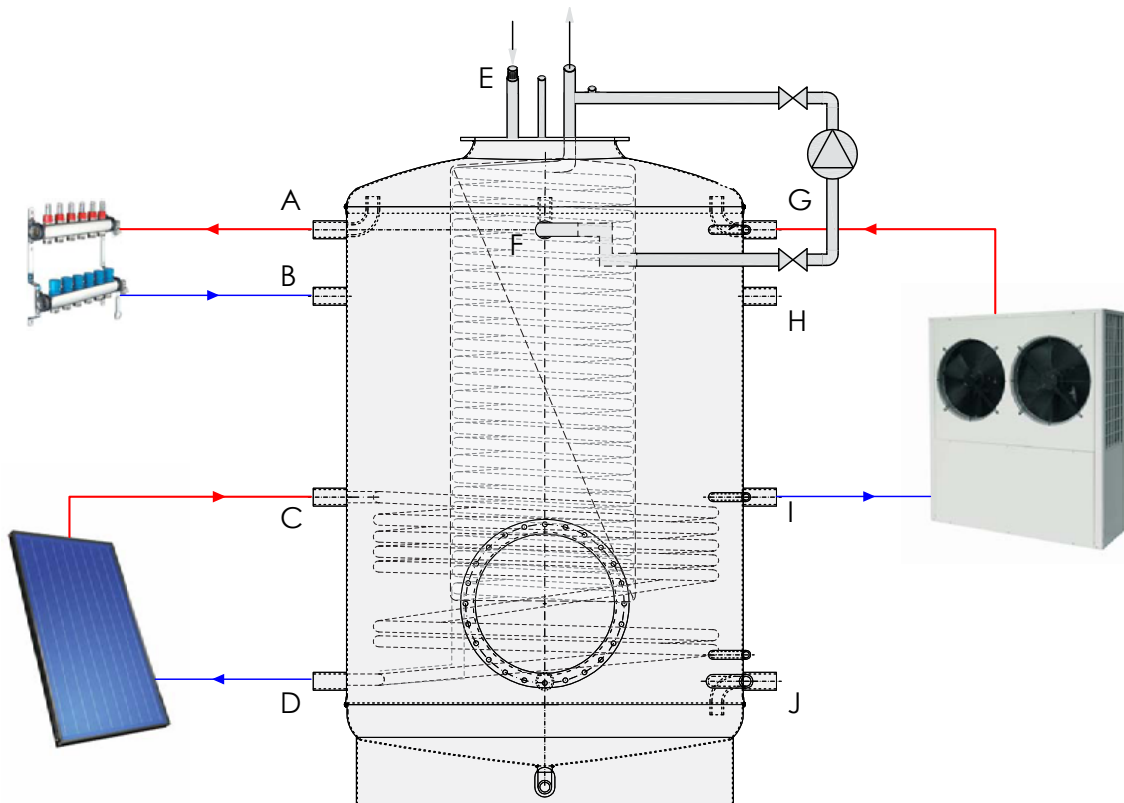
5.1 INDICATIVE USES AND CONFIGURATION



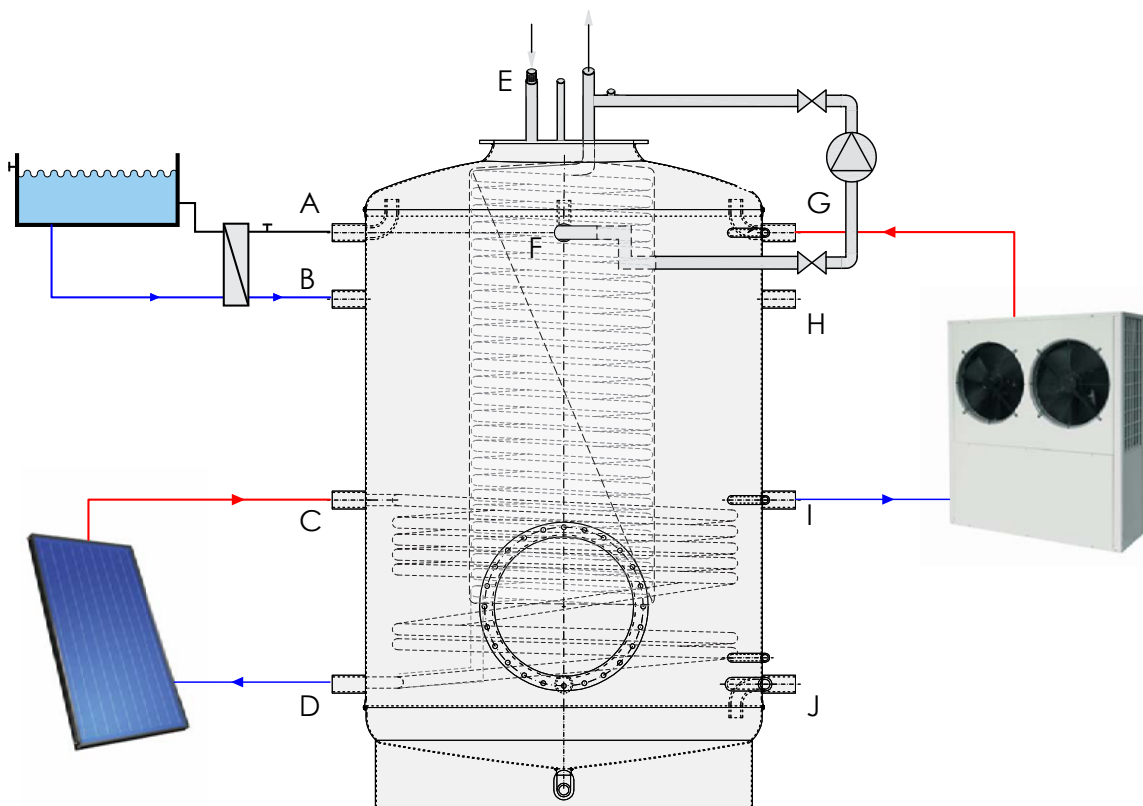
Use A: Underfloor heating and hot water heating using a heat pump and a boiler (if the boiler is the main source of energy, then connect it at the positions A and D)



Use B: Heating water with Calpak M4 solar panels, a heat pump and a boiler

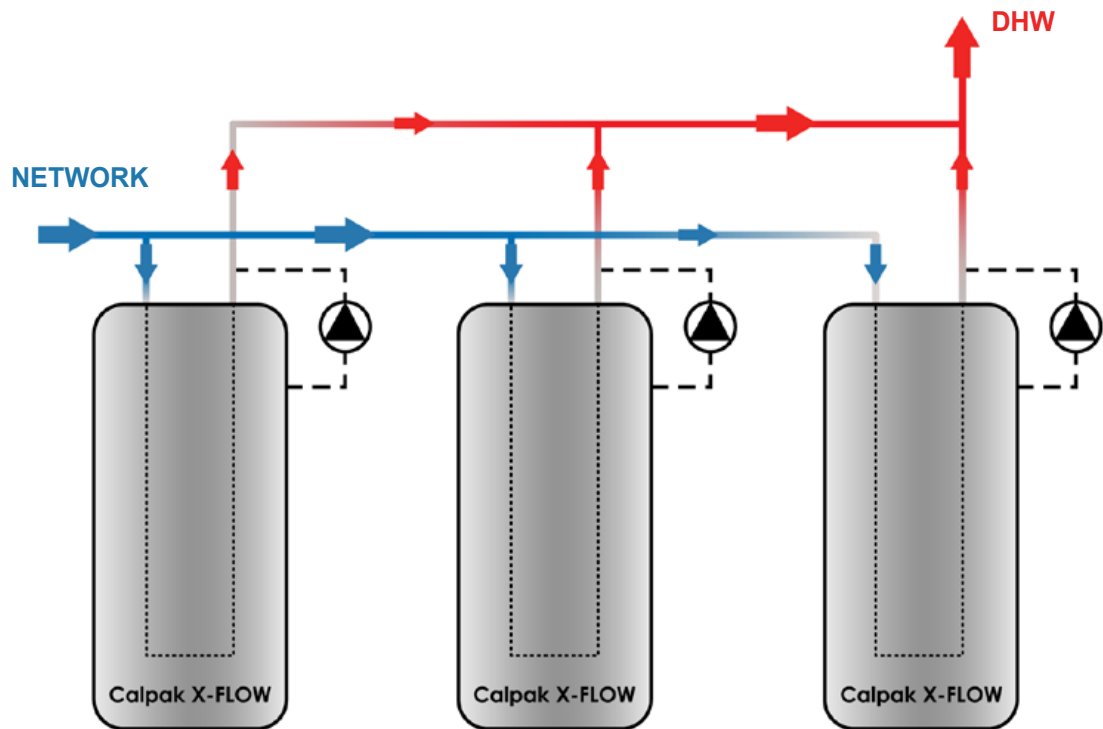


Use C: Underfloor heating and hot water heating using Calpak M4 solar panels and a heat pump



Use D: Heating a swimming pool using Calpak M4 solar panels and a heat pump

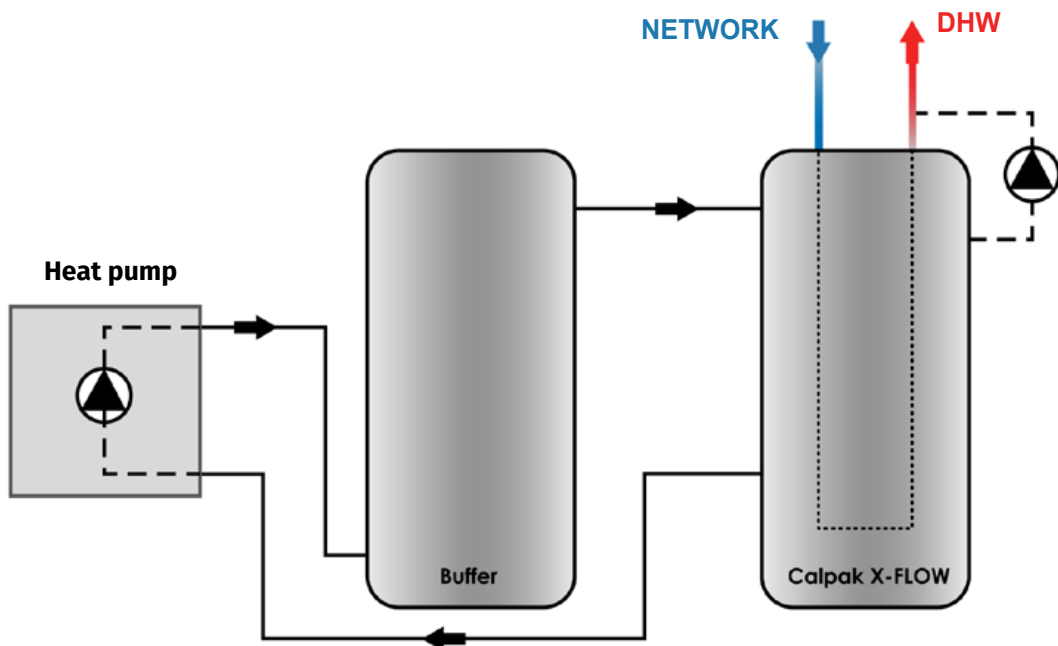
5.2 CONNECTION OF MULTIPLE CALPAK X-FLOW ULTRATANKS



Comments:

1. The suggested “reverse-return” configuration requires the calculation of appropriate pipe cross sections.
2. The counterflow check takes place separately for each Calpak X-FLOW ultratank, with a separate controller CFA and separate sensors.

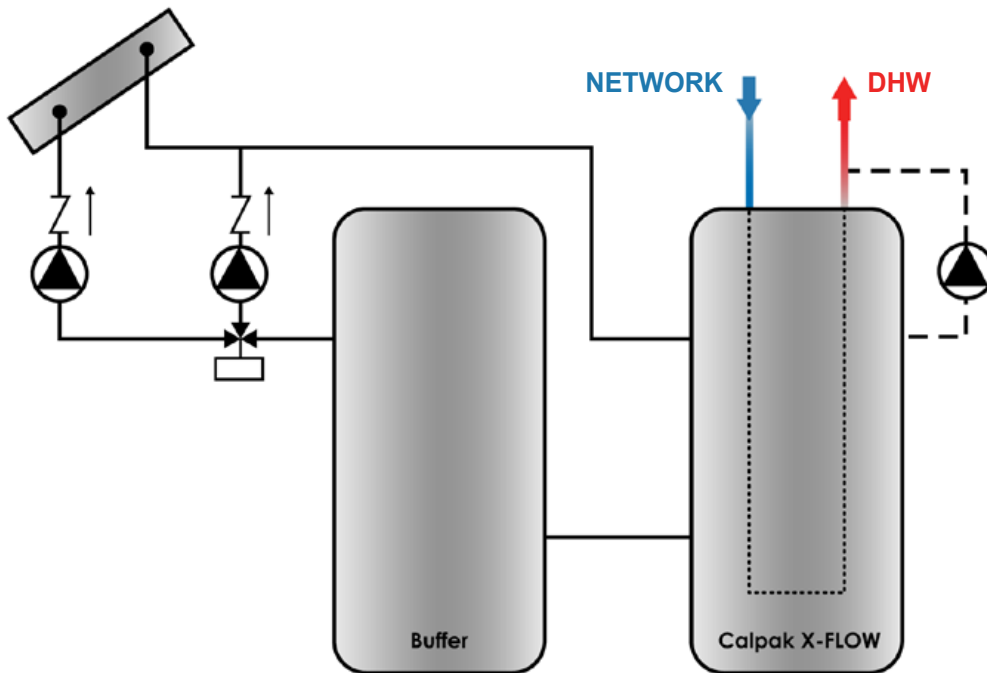
5.3.A. INDICATIVE CONNECTION OF CALPAK X-FLOW ULTRATANK TO THERMAL PUMP AND EXTERNAL BUFFER (FOR AMPLIFICATION OF THE DISCHARGING TIME)



Remark:

The above configuration does not need a circulation pump and automatism between the buffer and the Calpak X-FLOW.

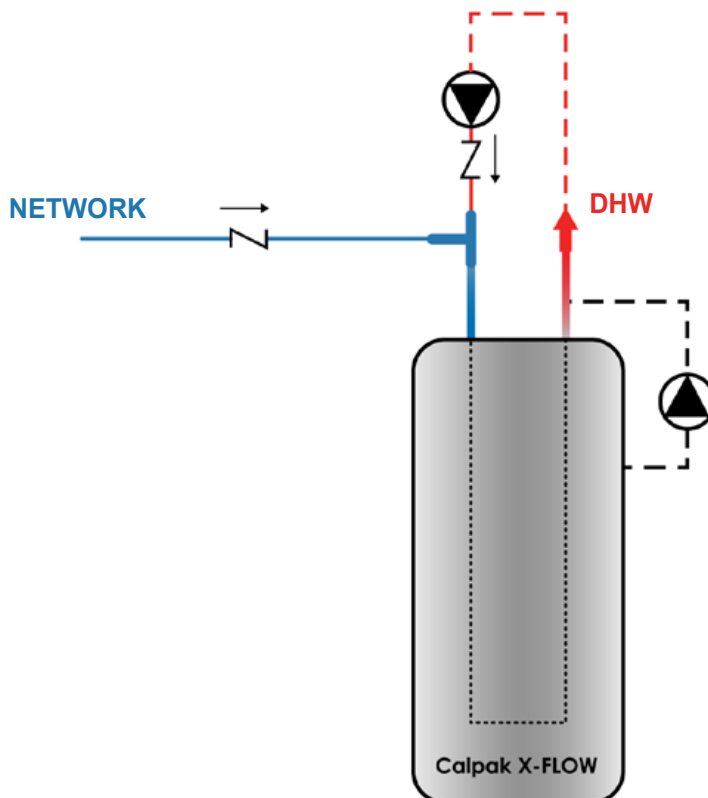
5.3.B INDICATIVE CONNECTION OF CALPAK X-FLOW ULTRATANK TO SOLAR COLLECTOR AND EXTERNAL BUFFER (FOR AMPLIFICATION OF THE DISCHARGING TIME)



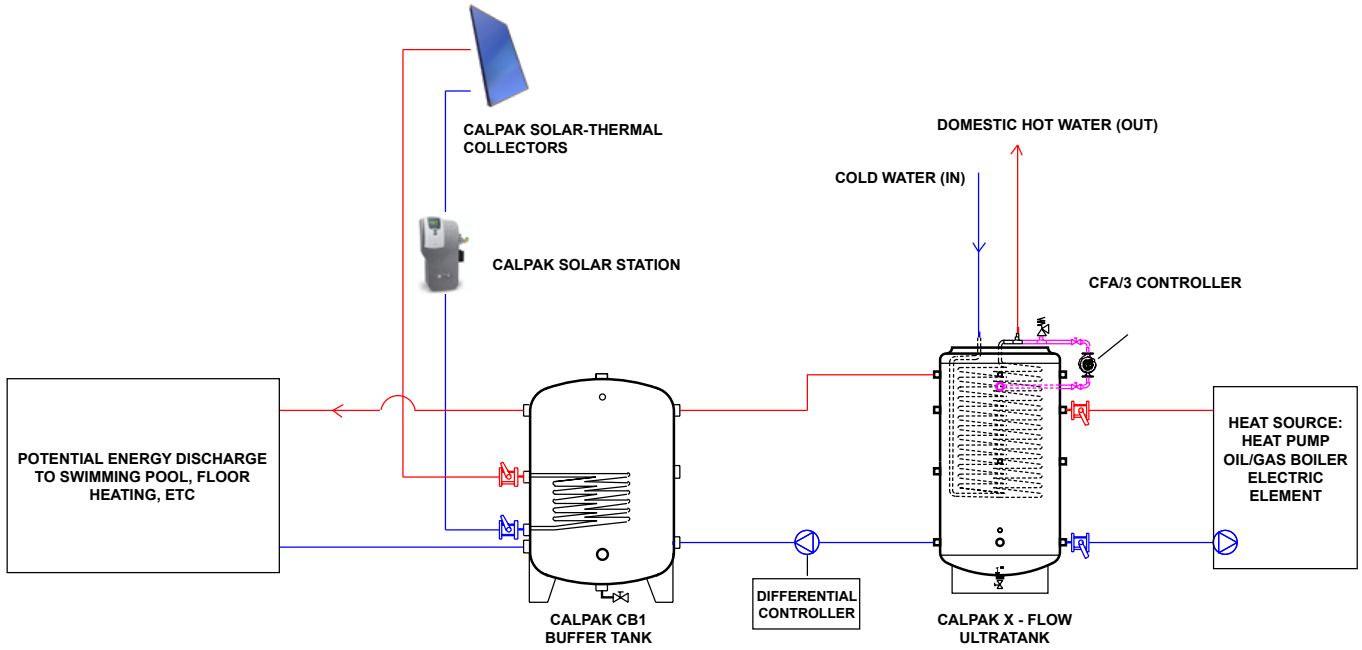
Remark :

The above configuration needs a circulation pump with automatism between the buffer and the Calpak X-FLOW. A connection to a backup source of energy is recommended.

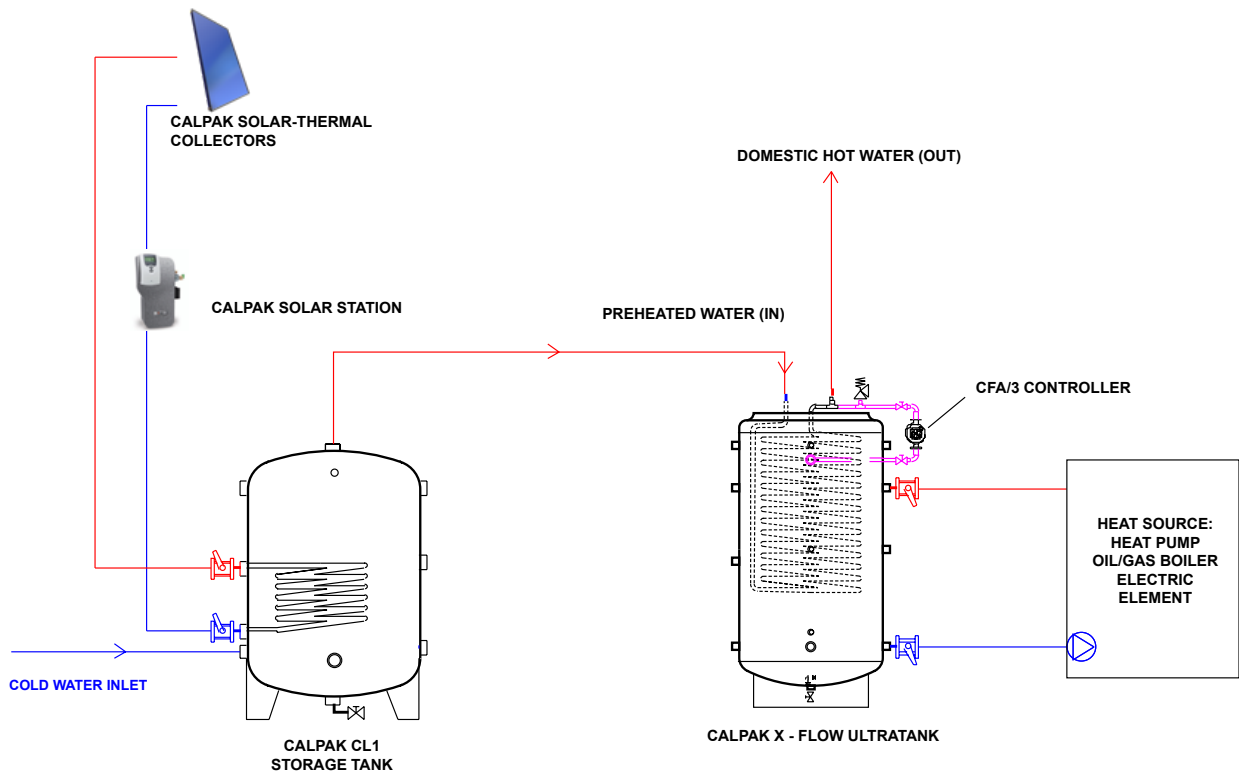
5.4 INDICATIVE RECIRCULATION CONNECTION OF THE CALPAK X-FLOW ULTRATANK



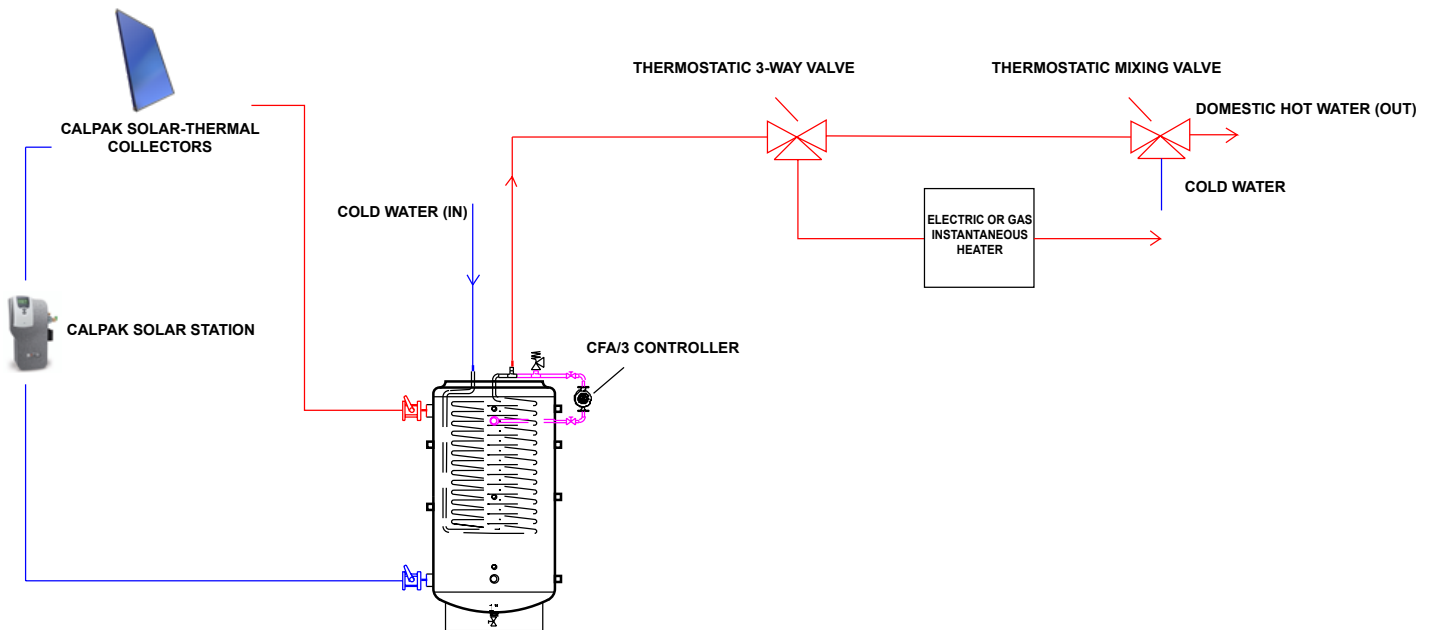
5.5A CONTRIBUTION OF CALPAK SOLAR-THERMAL COLLECTORS TO DHW PRODUCED BY THE X-FLOW FRESH WATER ULTRATANK



5.5B CONTRIBUTION OF CALPAK SOLAR-THERMAL COLLECTORS TO DHW PRODUCED BY THE X-FLOW FRESH WATER ULTRATANK – VERSION 2



5.5C CONTRIBUTION OF CALPAK SOLAR-THERMAL COLLECTORS TO DHW PRODUCED BY THE X-FLOW FRESH WATER ULTRATANK – VERSION 3



RECOMMENDATION :

All the above drawings are simplified in order to show basic functional patterns but they don't mention important details such as the appropriate three-valves and non-return valves, the thermostats and sensors, the controllers and remaining automatism, for instance.


We advise you to contact the technical department of our company for further assistance in the dimensioning and detailed design of your systems.

5.6.1 X-FLOW SELECTION TABLES

	CHARGING @ 65°C (or 55°C - eco mode) - HEAT PUMP						
	WATER SUPPLY POINTS	INDICATIVE AVAILABLE POWER OF H/P	RECOMMENDED MODEL ("plus" model selection for connection with solar collectors)		EXTRA POWER REQUIREMENT (back-up Heating Element)		EXTRA BUFFER TANK
House	3	9 kW	X-flow 0.9/300 (plus)	&	6 kW		
	5	11 kW	X-flow 0.9/300 (plus)	&	9 kW	or	CB1-1000 in case of underfloor heating
	8	16 kW	X-flow 1.5/500 (plus)	&	12 kW	or	CB1-1000 in case of underfloor heating
Hotel	10	16 kW	X-flow 1.5/1000 (plus)	&	12kW		
	20	32 kW	X-flow 1.5/1000 (plus)	&	12 kW		
	30	32 kW	X-flow 3.0/2000 (plus)	&	16 kW		
	40	50 kW	X-flow 3.0/2000 (plus)	&	16 kW		
	50 - 60	50 kW	X-flow 3.0/2000 (plus)			&	CB1-2000
	70 - 80	70 kW	X-flow 4.5/2000 (plus)	&	20 kW	&	CB1-2000
	90 - 100	100 kW	X-flow 4.5/2000 (plus)	&	9 kW	&	CB1-2000

	CHARGING @ 80°C - BOILER		
	WATER SUPPLY POINTS	INDICATIVE AVAILABLE POWER OF BOILER (GAS OR OIL)	RECOMMENDED MODEL ("plus" model selection for connection with solar collectors)
House	3	30 kW	X-flow 0,9/300 (plus)
	5	30 kW	X-flow 0,9/300 (plus)
	8	40 kW	X-flow 0,9/300 (plus)
Hotel	10	50 kW	X-flow 1,5/500 (plus)
	20	60 kW	X-flow 1,5/500 (plus)
	30	80 kW	X-flow 1,5/500 (plus)
	40	100 kW	X-flow 1,5/500 (plus)
	50 - 60	100 kW	X-flow 3,0/1000 (plus)
	70 - 80	150 kW	X-flow 3,0/1000 (plus)
	90 - 100	150 kW	X-flow 3,0/1000 (plus)

5.6.2 QUESTIONNAIRE FOR THE ACCURATE ASSESSMENT OF THE COVERAGE OF SPECIFIC NEEDS FOR DHW BY CALPAK X-FLOW

 CALPAK X-FLOW PRE-STUDY FORM		
Details of Interested Person		
Full name		
Address		
Telephone		
FAX		
Email		
Category Selection		
Basic building category		
Building subcategory		
Climate zone		
System Information		
Number of units		persons
Desirable hot water temperature		[°C]
Duration of peak time		[h]
Demand rate during peak time		[%Vd]
Total capacity of the device		[t]
Distribution Network Information		
Distribution network		
Sufficiency of insulation in the distribution network		
Area of distribution network		
Tank Information		
Tank installation location		
Information on Energy Source Location		
Location where the energy source is installed		
Sufficiency of insulation of the primary network		
Energy Source Information		
Energy source type A		
Thermal power of energy source A		kW
Discharging time		
Temperature of source ignition body T_{on}		[°C]
Temperature of source shutdown body T_{off}		[°C]
Month of reference		

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