

Personal Thermal Regulation Technology
To Keep Your Body Cool and Comfortable in Harsh Conditions!

On line Shopping



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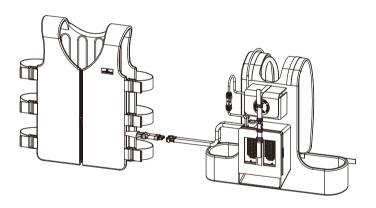
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Designed in USA Made in China

Backpack Individual Cooling System

Model: COMP-BICS-12100V

Operation Manual





PERSONAL THERMAL TECHNOLOGY

COMPCOOLER

Personal Thermal Technology

Personal Liquid Circulation Cooling System

- Liquid Cooling Garment
- ICE Water Cooling Unit
- Mini Chiller Cooling Unit

Reduce body core temperature and decrease the incidence of thermal stress while increasing comfort, safety, focus and endurance.

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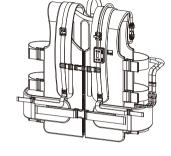


System Description

The Compcooler Backpack Individual Cooling System (BICS) is a self-contained personal cooling device.

BICS uses a battery-powered mini refrigeration system (a.k.a. chiller) housed in a backpack to cool liquid in a reservoir. A pump in the chiller unit circulates the cold liquid to a tubing-lined garment. The User's body heat is absorbed by the liquid and returned back to the chiller unit to be cooled again. This process continues in a closed loop as long as the system is powered 'On'.

BICS is powered by a 12V DC rechargeable battery pack. or vehicle power, and delivers 100W of cooling capacity. Temperature control is 5°C to 30°C (41°F to 86°F) with an accuracy of +/-1°C (2°F).



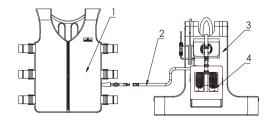
The system is programmable and will automatically operate at the User's preferred temperature set point. The set point can be adjusted using a tethered control pad. The User may pre-cool the unit to achieve the coldest liquid needed.

Components List

Item	Part number	Description	Quantity
1	COMP-BICU-12100	Compact Chiller Unit	1
2	COMP-BICS-BP	Backpack	1
3	COMP-MLCV-XX	Mesh Liquid Cooling Vest	1
4	COMP-RB-1220	Battery, 12V DC, 20A	1
5	COMP-BC-1220	Battery Charger, 110V-220V AC	1
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Component Description

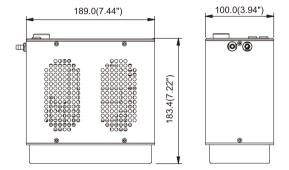
- 1. Mesh Liquid Cooling Vest Part no. COMP-MLCV-XX
- 2. Quick Fitting Connection 3. Rechargeable Battery
- Part no. COMP-RB-1220 4. Chiller Unit Part no. COMP-BICU-12100



Optional Components

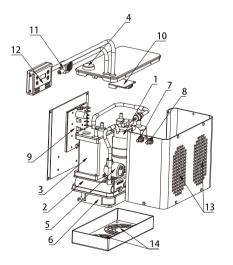
Ite	em	Part Number	Description	
	1	COMP-FBCG-BLXX/FR	Full Body Cooling Garment (Optional Fire Resistant)	
	2	COMP-LCTV-XX	Liquid Cooling Molle Tactical Vest (Custom Unit)	

Dimensions, Chiller Unit



Chiller Unit Callouts

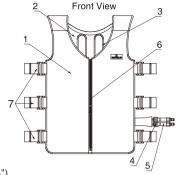
- 1. Miniature Rotary Compressor
- 2. Condenser
- 3. Reservoir
- 4. Filler cap
- 5. Water pump
- 6. Fans
- 7. Liquid inlet
- 8. Liquid outlet
- 9. Drive board
- 10. Control board
- 11. Power connection
- 12. Control pad
- 13. Air inlet
- 14. Exhaust





Liquid Cooling Vest Callouts

- 1. Outer Fabric: Soft stretch mesh
- 2. Liner; Soft stretch mesh
- 3. Cooling Channel; Silicone micro-tubing
- 4. Aluminum manifold
- 5. Male quick-connect fittings
- 6. Front Zipper
- 7. Adjustable tabs

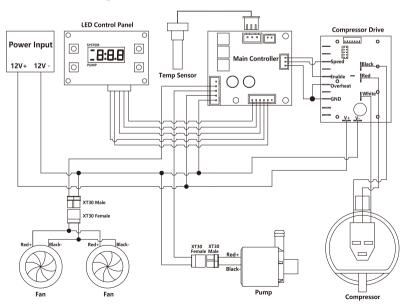


Liquid Cooling Vest Sizes

Note: Garment can expand 30% (max 10cm/4") with adjustable tabs.

Feature	XS/S	M/L	XL/2XL	3XL/4XL
Chest	84cm/33.1"	100cm/39.4"	108cm/42.5"	123cm/49.6"
Length	64cm/25.2"	68cm/26.8"	70cm/27.6"	73cm/28.8"

Chiller Control Diagram



Chiller Unit Technical Datasheet Part no, COMP-BICU-12100

Feature	Description
Compressor	Miniature DC Rotary Compressor
Refrigerant	R-134a
Cooling capacity	50-150W (ref. performance curves)
Circulation Capacity	800 ml / min
Cooling Liquid	Water, Water/Glycol Mixtures
Liquid Temperature	5°C to 30°C (41°F to 86°F)
Voltage	12VDC (Range 12-16.8VDC)
Operating Current	3-10 Amps
Max Power Draw	120 W
Power Connector	Break away EC5
Cooling Liquid Connector	CPC quick fitting, 1/4"
Refrigerant Control	Capillary Tube
Dimension	189 x100x184mm (7.44 x 3.94 x 7.22 inch)
Weight	2.5KG (5.5lbs)
Noise	52 dBA
Housing Materials	Aluminum
Color	Desert Tan or Black
Operating Ambient Temperature	0°C to 45°C (32°F to 113°F)
Storage temperature	-20°C to 70°C (-4°F to 158°F)

Chiller Controls

- System start mode; full speed
- Temperature setting; chiller slows when cooling liquid nears temperature set point
- Automatic shutoff; compressor shuts off if liquid temperature is less than 3°C (6°F)
- Automatic restart; compressor restarts when liquid temperature is 1°C (2°F) higher than set point

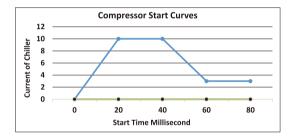


Rechargeable Battery Specifications

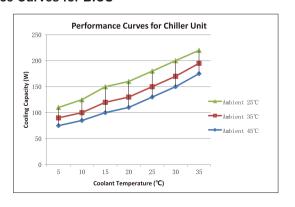
- Part no. COMP-RB-1220
- Rechargeable Battery: Li-Ion
- Voltage: 12-16.8V DC
- Capacity: 240W
- Max Output: 20A Charging: 110/220V AC Charger
- Charging time: 4-5 hours
- Battery Status: 3 lights show remaining capacity
- Battery Case: Aluminum
- Color: Desert tan and black
- Weight: 1.5 Kg (3.3 lbs)
- Size: 157 x 69 x 86mm (6.2 in x 2.7 in x 3.4 in)
- Operation Time: 2 3 hours for chiller unit



Compressor Start Curves



Performance Curves for BICU



System Preparation

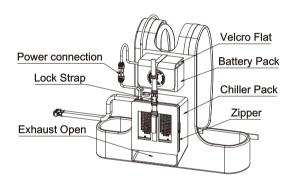
The following steps are to be performed prior to donning the vest and backpack for the first time:

1. Battery: Charge the battery using the included charger. LED lights on the battery charer housing indicate charging progress. A red light indicates the battery is still charging. A green light indicates the battery is fully charged.

Pressing "Remaining Battery Capacity" on the battery indicates, by percentage, how full the battery is. 3 Led lights indicate 80-100% capacity, 2 lights indicate 60-80% capacity and 1 light indicates ≤ 50% capacity. Reference illustration at right.

Typical charge time to 'full' is 4 hours. A fully charged battery will operate up to 3 hours.

2. Assemble Battery and Chiller to Backpack; Place a charged battery into the upper (smaller) compartment of the backpack and feed the cord through the hole in the side. Secure the top of the compartment with the Velcro® flap.



Place the chiller unit in the lower (larger) compartment of the backpack ensuring the air inlets of the chiller face the opening of the backpack. Feed the battery cord and flexible coolant tubes attached to the chiller through the available openings of the compartment. Close the flap of the compartment using the zipper.

3. Connections:

- a. Power cords; connect the cords coming from the battery compartment and chiller compartment. The EC5 power connector has a quick break away feature that is easily assembled or disassembled. Once connected, pack the connector on the left side of the battery compartment.
- b. Flexible Tubes; Connect the flexible pair of tubes from the chiller to the cooling vest. The tubes have quick-release fittings on both ends. Simply press the button on the fitting to release it. Conversely, when connecting the fitting, an audible 'click' ensures a good connection.



Note: While the tubing fittings are designed to mate with Compcooler's line of personal cooling devices and garments, they may be replaced by the User for compatibility with different garments or pads. The flexible tubes are \(\frac{4}{3} \) diameter. Any User supplied barbed fittings must be sized accordingly.

4. Priming the System; If using the BICU for the first time, a two-step priming process is required. Before priming, it is imperative to understand the types of liquid to be used with the chiller.

The chiller can be set to cool liquid above, or below, the freezing point of water. Accordingly, the type of liquid to be used depends on the programmable temperature setting of the chiller. Please follow these guidelines for liquid preparation:

- Plain, clean water must be used for temperature settings above 1°C (33°).
- Anti-freeze liquid (such as 20% glycol with 80% clean water) must be used for temperature settings below 1°C (33°).
- Deionized water may be used for isolation applications.

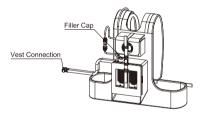


DO NOT use salt water, caustic, corrosive, or flammable fluids as these will damage the IRCU and void the warranty.

Priming Steps:

Step 1:

- a. Remove the filler cap from the top of the chiller (reference diagram at riaht).
- b. Using a funnel, fill the reservoir with liquid until full.
- c. Press the 'Pump' button on the control pad to start circulation and allow it to run for 1 minute. This allows the liquid to circulate in a closed loop between the chiller reservoir and cooling vest.
- d. Turn off the pump.



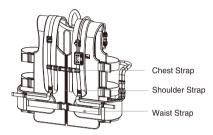
Step 2:

- a. Using a funnel, fill the reservoir until full. This is required since some of the liquid has been used to fill the extension tubes and cooling vest during Step 1 of the priming process.
- b. Replace the reservoir cap.
- 5. Pre-Testing and Pre-Cooling; With the unit attached to battery, turn the power switch on. Using the control pad, ensure 'Pump" is off. Press "System" on to start refrigeration and use the "Temp Up/Down" buttons to set the desired cooling temperature. The temperature should come down in a few minutes and remain at that temperature in standby mode.

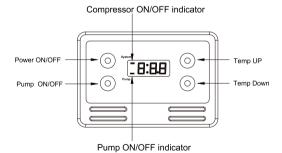
Note: This refrigeration unit has a temperature control feature that stops cooling when the liquid reaches a temperature 3°C (6°F) below the User setting and begins cooling when the liquid reaches a temperature 1°C (2°F) above the User setting.

System Operation

- 1. Don the vest; Once donned, zip the vest and adjust the tabs to create a snug fit. For optimal cooling performance, wear the vest against bare skin.
- 2. Don the backpack; after following instructions for preparing the backpack (reference prior section), place arms through the shoulder straps ensuring the pack rests on the back with the zipper facing outward. Secure the waistband and adjust the shoulder straps for a comfortable fit.



- 3. Connect cooling vest to backpack; connect the tubes on the vest to the tubes on the backpack using the guick-connect fittings. An audible 'click' of the guick-connect fittings ensures a proper connection.
- 4. Start system; Press the System On/Off switch located on the control pad to turn the system 'On'. Press the On/Off switch again to turn the system 'Off'.
- 5. Temperature Setting: Use the 'Temp' up and down buttons on the remote controller to set the desired temperature for the circulation liquid. The liquid temperature will go down to the set point in minutes.



Note: Setting is completed when number stops blinking. The steady number shows the current liquid temperature. Indicator shows the ON/OFF status of refrigerator, pump and water level.



6. Start Pump: Press the 'Pump' button on the control pad to start or stop circulation. Ensure the quick fitting is connected in a closed loop between the chiller unit and vest before circulation begins. Make sure no kinks exist in the tubes. Otherwise, flow and cooling performance will be impeded.

Notes:

The system is now cooling through the vest. A comfortable body cooling temperature range is between 15°C to 20°C (59° to 68°F) per military studies. It is recommended that the starting temperature should be set at 20°C (68°F). If that is not cold enough, use the arrow Up/Down buttons on the control pad to lower the temperature. Keep in mind that lower temperature settings result in more power consumption and therefore less cooling time.

For extended cooling time, keep a spare charged battery ready. For even greater prolonged cooling, the system can be connected to a vehicle's DC power source, like a car or motorcycle battery using an optional power cord kit supplied by Compcooler.

If this latter choice of power is preferred, please have the electrical connections made by a professional. Please make sure your vehicle's battery can handle 200W and 3-10 Amp operation. The peak amperage cannot exceed 15A 20ms. Otherwise, the compressor may be damaged.

The chiller can operate at any angle up to 180° for up to 8 hours. However, it is not recommended that the chiller operate in this manner for longer periods.

Maintenance

- 1. **Cleaning**: Several parts of the BICU may require cleaning as follows:
 - a. Chiller Unit; The protective metal housing of the chiller box may be cleaned with a damp cloth and alcohol-based cleaning solution.
 - b. Vest; Machine washing with cold water on a gentle or delicate cycle is acceptable using a laundry bag. Hang drying is the only acceptable drying method. Do not use bleach, an iron or place the vest in a machine dryer.
 - c. **Backpack**; use a damp cloth and mild dish detergent to clean the backpack.
 - d. To keep the chiller at optimum cooling capacity, the condenser should be kept free of dust and dirt. There is a filter on the backpack that can be cleaned of dust and contamination using 50-100 psi compressed air.



Note – always use protective eyewear when cleaning with compressed air.

- e. Reservoir: Connect the battery and vest to the chiller unit per instructions in the section for System Operation. Remove the filler cap from the top of the chiller and upend the unit to drain the liquid. If the liquid contains anti-freeze, contain, and discard this liquid according to your local regulations.
- f. Refill the reservoir with a solution of clean water, disinfectant and/or scale remover. Allow that to dwell for 10 minutes and drain again. Leave the drain cap off and allow the reservoir to dry completely. Replace the filler cap before next use.

2. Charging Refrigerant: (not recommend for uncertified operator)

If the cooling capacity has been decreased due to lack of refrigerant, the BICU will need to be recharged by a licensed refrigeration specialist using 100g of R134a refrigerant.

Storage

Chiller and Cooling Vest:

- 1. Disconnect the battery cord from the chiller.
- 2. Disconnect the flexible tubing between the vest and chiller.
- 3. Empty and clean the reservoir by following the instructions under Maintenance section.
- 4. Pack the unit for storage.
- 5. Restart: after long term storage the chiller reservoir should be flushed using a solution of clean water and 5% detergent. Follow Priming instruction number 4 under the section for System Preparation and allow this solution to circulate for 10 minutes with a cooling vest connected. Then empty the detergent solution (reference Maintenance section 1.e) and refill with the proper operating liquid according to the same priming instructions.

Battery Storage

- Keep in a clean, dry, and ventilated room at 0°C-35°C (32°F-95°F)
- Keep away from any heat source
- Do not touch corroded contacts or elements
- Charge stored batteries every 6 months
- Keep batteries out of children's reach



Do not use batteries if any damage or abnormalities are observed

Components Renewal

- Battery; additional batteries can be purchased from your dealer, either to replace a damaged battery or for providing extended cooling times.
- Chiller Unit; if damaged, entire unit needs replacement. Contact your dealer for assistance.
- Cooling Vests; various types of cooling vests are available. Please reference (www.compcooler.shop/collections/liquid-cooling-garment) for vest options.

Cautions



- 1. Do not use a battery other than that which was supplied with the BICS.
- 2. Repetitively cycling the BICS within a short period of time using the 'System On/Off' button will adversely affect the refrigeration system and power consumption.
- 3. Do not block the air inlet and outlet. It may lessen cooling performance or worse vet, cause the compressor to overheat.
- 4. Ensure cooling vest is connected properly to the chiller before starting the pump. Otherwise, leakage will occur.
- 5. Use anti-freeze liquid if temperature setting lower than 0°C.
- 6. Do not operate the BICS close to a heat source or in ambient temperatures greater than 45°C (113°F).
- 7. Do not operate the BICS in wet or submerged conditions.
- 8. Stop operation if high vibration or abnormal noise is observed.
- 9. Always use protective eyewear when cleaning the BICU with compressed air.

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Troubleshooting

Problem Description	Possible Cause	Solution
	Drained battery	Check battery status by following instructions under section for System Preparation, #1.
No power	Bad connection	Check that the connection between the battery cord and chiller is secure and tight. Replace battery set if power cord is damaged.
	Compressor not working	With power on, touch the compressor. If vibration can be felt, compressor is working. If no vibration is felt, compressor is faulty and requires replacement. Contact your dealer for further instructions.
Low cooling capacity	Low refrigerant level	Check if air from condenser outlet is hot. Air should be hot for normal operation. Recharge refrigerant R134a if needed.
	Low coolant water level	Check liquid level inside reservoir. Replenish if low.
	Blockage at chiller inlet	Ensure there are no obstructions at inlet to chiller.
	Improper temperature setting	Check that the temperature setting on the control pad is with the range for comfortable body cooling.
	Pump is Off	Turn pump on.
	Problem with fitting connection between chiller and vest	Check that quick-connect fitting connection of flexible tubes are connected properly and not blocked, broken or kinked.
No liquid flow	Pump malfunction	Remove filler cap while Power and Pump are 'On'. Observe if water is flowing into reservoir. If no water flow is observed, pump is faulty and BICS requires replacement. Contact your dealer for further instructions.
Cooling vest is wet	Condensation	The cooling vest is designed for use as an undergarment worn beneath other clothing. When operating under conditions of high temp and humidity, condensation will naturally occur and is not indicative of a defect or leak.
Faulty temperature sensor	No feedback; reference 'P1' fault code on remote controller.	Check if sensor connection on the control board is loose or replace the sensor.

Safety



Warning: It is important to become thoroughly familiar with the operating characteristics of the Backpack Individual Cooling System. It is the owner's responsibility to assure proper User training of the cooling system including component knowledge, system preparation, system operation and maintenance. Disregarding this warning can result in injury to the operator and severe mechanical damage to the unit.

Warranty

Compcooler warrants this product to be free from defects in workmanship and materials, under normal residential use and conditions, for a period of one (1) year from the date of shipment. Shipping and handling fees are to be paid for by the customer. The manufacturer agrees, at its option during the warranty period, to repair any defect in material or workmanship or to furnish a repaired or refurbished product of equal value in exchange without charge (except for fees for shipping, handling, packing, return postage, and insurance which will be incurred by the customer). Such repair or replacement is subject to verification of the defect or malfunction and proof of purchase as confirmed by showing the model number on original dated sales receipt.

Certifications

CE, UL, FDA, FCC, RoHS, PSE

CE, UL, FDA, FCC, RoHS, PSE

ROHS

PS



Customer service: simonsun@compcooler.com

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