

INSTALLATION AND USER MANUAL

SELF-CONTAINED DC SYSTEMS

Battery-powered (DC) compressor.

Reverse-cycle cooling and heating · 12 V, 24 V and 48 V DC.

SDC 12-7000 · SDC 24-7000

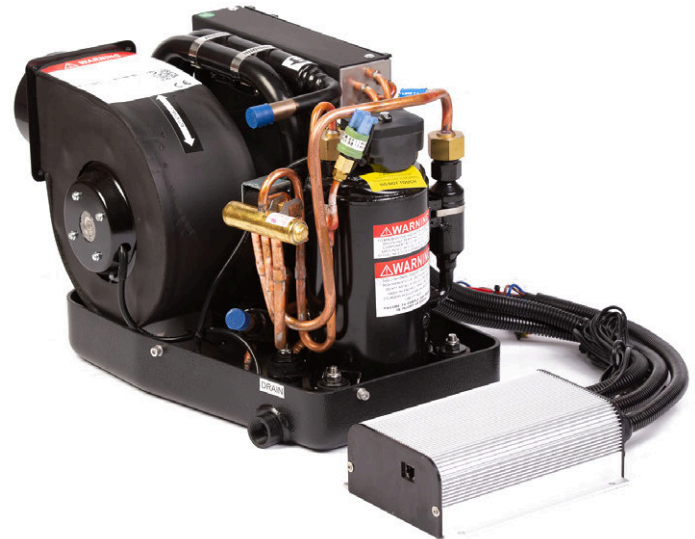
SDC 24-12000 · SDC 48-16000

VERSION 3.1 · OCTOBER 2026 · EN

SDC



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About this manual

Thank you for choosing MBC Marine

This manual covers the installation, commissioning, operation, maintenance and troubleshooting of MBC Marine **SDC** self-contained marine air conditioning units with DC compressor, powered from a 12 V, 24 V or 48 V battery system. Keep it on board, close to the unit, for the whole life of the system.

WHO SHOULD READ WHAT

Reader	Read these parts
Boat owner / user OWNER	Part 1 Safety · Part 9 Operation · Part 10 Maintenance · 11.2 First checks
Installer INSTALLER	All parts, especially Parts 3–8. Hand this manual to the owner after commissioning.
Service technician TECHNICIAN	Parts 7, 9.6, 10.2 and 11. Refrigerant work requires certification (1.6).

Section headings carry the same coloured tags, so each reader can find the parts relevant to them at a glance.

SAFETY SIGNS USED IN THIS MANUAL



WARNING

A hazardous situation which, if not avoided, **could result in death or serious injury**.



CAUTION

A hazardous situation which, if not avoided, **could result in minor or moderate injury**.



NOTICE

Information about **damage to the unit or the boat**, or loss of performance or warranty. No personal injury risk.



NOTE

Useful information and tips for correct installation and operation.

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PART 1

Safety

Read this part completely before installing, operating or servicing the unit. Ignoring these instructions may result in death, serious injury, fire or damage to the boat.

1.1 Intended use OWNER INSTALLER

The unit is designed exclusively for cooling, heating and ventilating the interior of boats, using seawater as the heat source and heat sink, and powered from the boat's DC battery system. Any other use is considered improper. Use the unit only within the operating limits in 2.6 and according to this manual.

1.2 Qualified personnel INSTALLER

Installation, electrical connection and commissioning must be carried out only by qualified personnel familiar with marine DC electrical and plumbing practice and with the applicable regulations. Work on the refrigerant circuit is reserved for certified refrigeration technicians. A professional installation according to this manual is a condition of the warranty.

1.3 Electrical safety OWNER INSTALLER



WARNING – HIGH DC CURRENT, FIRE HAZARD

Batteries deliver very high short-circuit currents. A short circuit or an undersized, loose or unfused cable can overheat, melt and start a fire. Before working on the electrical installation, switch off the main battery switch and secure it against being switched on again. Remove watches, rings and metal jewellery and use insulated tools.

- Protect the unit with its own slow-blow (ANL type) fuse in the positive cable, max. 18 cm (7") from the battery (7.1).
- Use cables of the cross-section given in 7.3, with properly crimped terminals.
- Do not operate the unit with the electrical box cover removed.

1.4 Fire, fuel and exhaust gases **OWNER**

INSTALLER



WARNING

Do not install the unit in the engine room, in the bilge, or in any compartment containing petrol engines, fuel tanks, LPG/CNG cylinders, regulators, valves, fuel lines or fittings. The unit must not be able to draw carbon monoxide, exhaust gases or other toxic vapours into the cabin.

During installation and maintenance wear safety glasses and work gloves, and keep a fire extinguisher close to the work area. The refrigerant circuit contains pressurised copper pipes.

1.5 Limitation of liability **OWNER** **INSTALLER**

MBC Marine assumes no liability for damage resulting from:

- incorrect installation or connection;
- mechanical impact or overvoltage;
- undersized power supply cables or an unsuitable battery system;
- modification of the product without written permission from MBC Marine;
- use outside the intended purpose or the specified operating limits.

1.6 Refrigerant R134a **OWNER** **TECHNICIAN**



WARNING – REFRIGERANT CIRCUIT

- The unit contains R134a refrigerant under pressure.
- Do not pierce, cut, drill or heat any part of the refrigerant circuit.
- Escaping refrigerant can cause frostbite. In a closed space it displaces oxygen; when heated by an open flame it produces toxic gases.
- If you notice a refrigerant leak (oily residue, hissing, ERROR 5): switch the unit off, ventilate the cabin and call a qualified technician.
- Only certified technicians may open the refrigerant circuit. Brazing is allowed only after the refrigerant has been recovered and the circuit has been purged with nitrogen.

PART 2

Product overview

2.1 Models covered OWNER INSTALLER

SDC units are self-contained, reverse-cycle air conditioners for DC battery systems: compressor, condenser, evaporator and blower are mounted on one base tray, with a separate electrical box. The DC compressor is driven directly from the battery by the compressor driver in the electrical box.

Model	Supply	Cooling	Heating
SDC 12-7000	12 V DC	7 000 Btu/h	8 000 Btu/h
SDC 24-7000	24 V DC	7 000 Btu/h	8 500 Btu/h
SDC 24-12000	24 V DC	12 000 Btu/h	13 000 Btu/h
SDC 48-16000	48 V DC	16 000 Btu/h	17 000 Btu/h

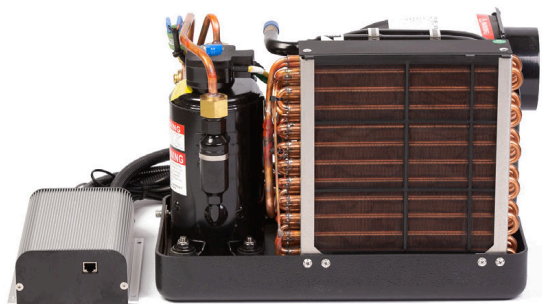
Full technical data: Part 12.

2.2 Package contents INSTALLER

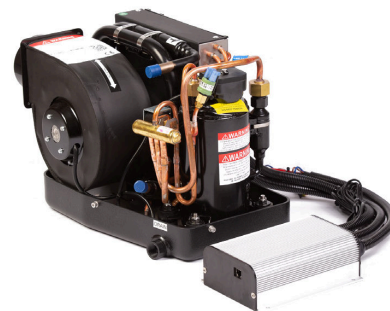
Before starting, check that the shipping box and the unit are undamaged. Do not install a damaged product; return it to the place of purchase. The package contains:

Qty	Item	Purpose
1	Air conditioning unit with electrical box	–
1	Display CD-3 (control panel)	User control
1	LAN data cable, 5 m	Display ↔ control board
1	Room temperature sensor	Connects to the AII (white) socket
4	Mounting brackets	Securing the unit

A smart display is available as an option. If any item is missing or damaged, do not start the installation; contact your distributor or MBC Marine.



Condenser side with electrical box



Compressor side

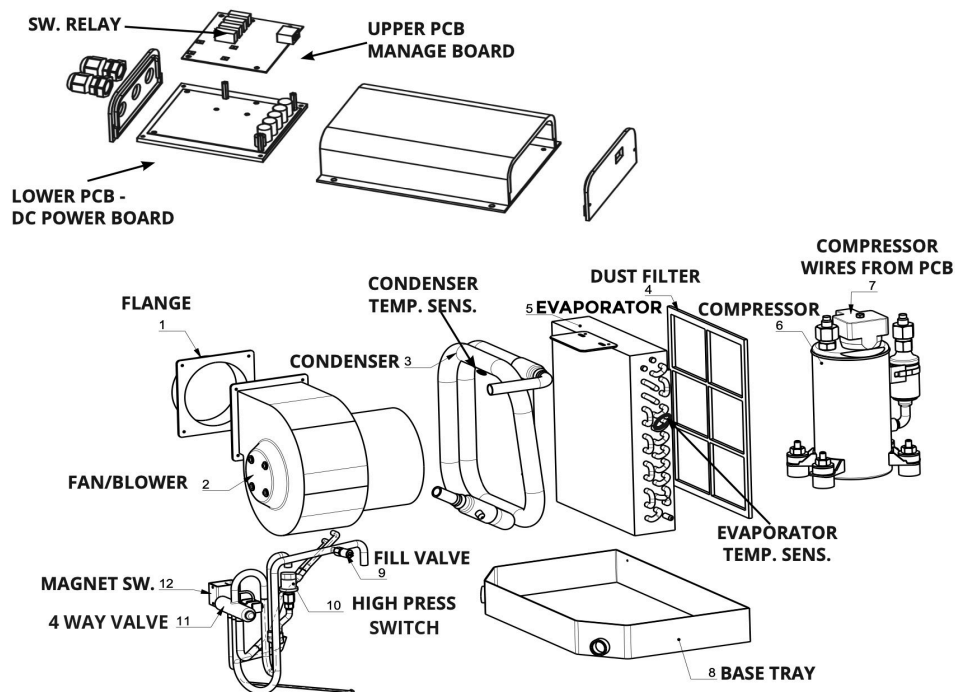


Blower side



Evaporator side and blower outlet

2.3 Main components INSTALLER TECHNICIAN



SDC unit – exploded view. 1 Flange · 2 Fan / blower · 3 Condenser · 4 Dust (air) filter · 5 Evaporator · 6 Compressor · 7 Compressor wires from the control board · 8 Base tray · 9 Service (fill) valve · 10 High-pressure switch · 11 4-way (reversing) valve · 12 Magnetic switch (valve coil). Electrical box: upper PCB (control board), lower PCB (DC power board), switch relay. Condenser and evaporator temperature sensors are factory fitted.

2.4 How the system works **OWNER** **INSTALLER**

The unit relies on the balance of three circuits. A fault in any of them reduces performance or triggers a protective shutdown:

- ❶ **Seawater circuit** – carries heat away from (cooling) or to (heating) the condenser. Without proper water flow the compressor overheats.
- ❷ **Air circuit** – circulates cabin air through the evaporator. Insufficient airflow can freeze the evaporator (cooling) or overheat it (heating).
- ❸ **DC power supply** – battery, fuse, cables and connections. DC systems are sensitive to voltage stability, cable quality and ventilation of the electrical box; most faults can be traced back to these factors.

In COOL mode the unit moves heat from the cabin into the seawater. In HEAT mode the 4-way valve reverses the cycle and the unit extracts heat from the seawater and releases it into the cabin (reverse-cycle heating).

2.5 DC compressor technology **OWNER** **INSTALLER**

The compressor runs directly on the battery voltage, powered by the compressor driver in the electrical box. This gives:

- **No generator or shore power needed** – the unit runs from the boat's battery bank.
- **Silent operation at anchor** – no generator noise or exhaust.
- **ECO mode** – lower current draw for longer battery autonomy (see Part 12).

Because the unit draws high currents at low voltage, the cable cross-section, the quality of every connection and the capacity of the battery bank directly affect operation. Follow Part 7 carefully.

2.6 Operating limits

OWNER**INSTALLER**

The limits refer to the seawater temperature at the unit's seawater inlet, assuming correct installation, continuous water flow, free air circulation and a clean filter.

Mode	Seawater temperature at inlet
COOL	below 32 °C
HEAT	7 °C – 18 °C

- **Cooling:** do not operate at seawater temperatures of 32 °C or above. High seawater temperature or low water flow reduces performance even below this limit and can cause a protective shutdown.
- **Heating:** use HEAT mode only between 7 °C and 18 °C seawater temperature. Below 7 °C there is not enough heat in the water; above 18 °C heating is rarely needed.



NOTICE

Operation outside these limits may reduce performance, cause protective shutdowns (e.g. ERROR 8, 9, 10) and is excluded from warranty.

PART 3

Planning the installation

3.1 Before you start INSTALLER

Plan the location of all system components in advance: the unit and its electrical box, air ducts, seawater hoses and pump, seawater intake and outlet, condensate drain, battery, fuse and cable routes, and the display. No two boats are the same: the correct set-up depends on the specific vessel. Most problems reported in the field are not caused by the unit but by installation faults such as undersized cables, poor ventilation of the electrical box, a clogged filter or undersized ducting.



NOTICE

Start the installation only when every component location complies with the applicable regulations. Plan enough free space for installation and later maintenance.

3.2 Choosing the location INSTALLER

REQUIREMENTS

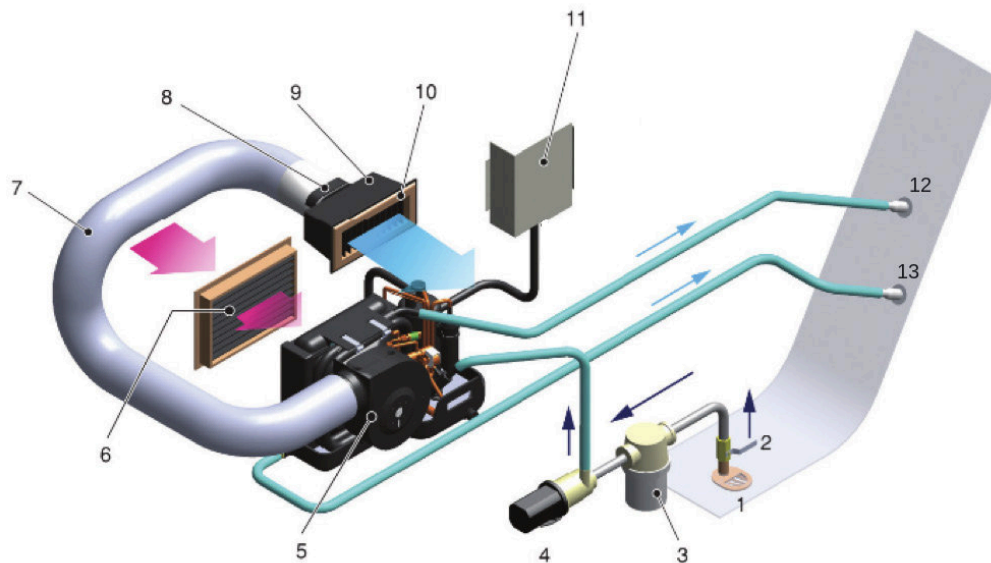
- Dry, well-ventilated enclosed space, protected from heat sources and exhaust gases.
- Stable, level, horizontal base (e.g. the bottom of a cabinet or seat), at least **60 mm** free space on all sides for airflow.

- Return air grille and air filter easily accessible for cleaning; access for later service.
- Compressor side placed as far as possible from the return air opening, to reduce noise.
- Room for the electrical box in the return air path (see 4.2).
- Battery bank as close as possible to the unit, to keep the power cables short (Part 7).
- Possible condensate drain route to the bilge (see 4.3).

AVOID

- Engine room, machinery spaces, bilge (see 1.4).
- Wet or damp floor areas.
- Paths of exhaust fumes or carbon monoxide.
- Tight, closed or poorly ventilated compartments, especially for the electrical box.

3.3 Typical installation **INSTALLER**



- 1. Scoop-type thru-hull fitting
- 2. Ball valve (seacock)
- 3. Seawater strainer
- 4. Seawater pump

- 5. Air conditioning unit
- 6. Return air grille
- 7. Flexible duct
- 8. Duct ring

- 9. Transition box
- 10. Supply air grille
- 11. Electrical box
- 12. Seawater outlet (overboard)

- 13. Condensate drain outlet

PART 4

Mounting the unit

4.1 Mounting INSTALLER

Choose a position that leaves room for unrestricted return air, a direct supply duct route, condensate drainage, the power cables, the seawater hoses and future service access. Avoid positions that require long ducts, sharp bends or difficult hose routing.

- 1 Place the unit on a stable, horizontal surface with at least 60 mm clearance on all sides.
- 2 Tilt the unit **1-2 cm towards the condensate drain** so that the drain pan empties completely and the evaporator does not stand in water.
- 3 Secure the unit with the 4 brackets supplied, spaced evenly along the edges of the drain pan. Tighten firmly but not excessively.
- 4 Mount the electrical box as described in 4.2.



WARNING

Do not install the unit in the bilge or engine compartment. Make sure the selected place is sealed off from gases and vapours coming from these spaces.

4.2 Electrical box placement INSTALLER

The compressor driver in the electrical box generates heat and needs constant cooling air, especially on 12 V models because of their higher current. Mount the box **between the unit's air intake and the return air grille**, in the airflow path but without blocking the intake. In this position air flows around the box whenever the unit runs. Keep at least 10 cm free space around the box.



NOTICE

Never install the electrical box in a closed, unventilated compartment or behind panels. Overheating causes ERROR 6 shutdowns and shortens the life of the electronics. MBC Marine may refuse warranty claims if the box is installed in an unventilated or enclosed space.



Wrong: box in a closed compartment, no airflow – heat cannot dissipate



Correct: box mounted in the airflow path, cooled by the intake air

4.3 Condensate drain **INSTALLER**

In COOL mode the unit produces condensate, collected in the drain pan. Route the drain hose with a continuous fall to the bilge, ideally close to the automatic bilge pump. Where gravity drainage is not possible, collect the condensate and pump it out with a dedicated drain pump. The drain route depends on the boat and is not part of the standard unit.



NOTICE

- Do not connect the drain pump outlet to the discharge line of any other system.
- Never route the drain to an area where water cannot be collected or pumped out.

Drain test: after installation pour water into the drain pan and check that it drains freely to the bilge. No more than 1-2 cm of water may remain in the pan.

4.4 Display (control panel) INSTALLER

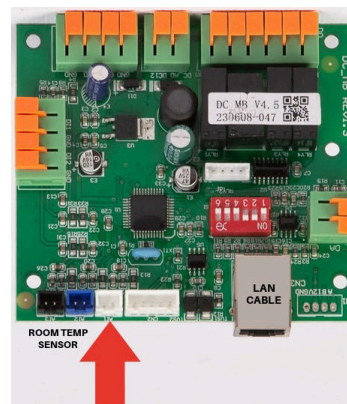
Install the display (type CD-3; a smart display is available as an option) on an easily accessible wall, above the mid-height of the cabin, protected from heat and light. Do not install it:

- in direct sunlight or near heat-producing appliances;
- on partition walls with heat accumulating behind them;
- directly above or below supply or return air grilles.

Connect the display to the control board with the 5 m LAN cable supplied.

4.5 Room temperature sensor INSTALLER

For correct operation the unit must measure the temperature of the cabin. **Always install the supplied room temperature sensor** (black cable with copper tip). Place it in the return air stream, away from supply air and heat sources, and connect it to the **AI1 (white)** socket on the control board.



Room temperature sensor socket (AI1, white) and LAN socket on the control board

PART 5

Air system



NOTICE

Insufficient airflow is the most common cause of malfunction. Even a 30–40 % airflow loss can cause performance problems and error codes (ERROR 4 in heating, ERROR 9 in cooling).

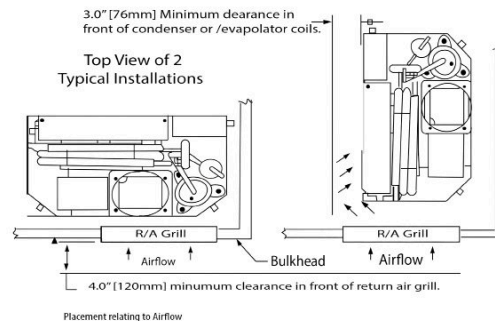
5.1 Return air **INSTALLER**

The unit draws cabin air in through the return grille, passes it over the evaporator and blows it out through the supply side. The return air grille must be at least the minimum size given in Part 12. A grille that is too small restricts airflow and may freeze the evaporator (ERROR 9) or overload the compressor. The unit may also be placed so that its air inlet is not in the same space as the return grille, provided free airflow is ensured.



NOTICE

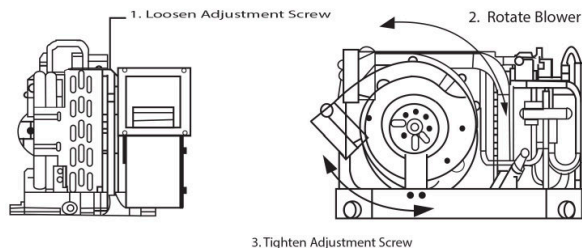
The unit does not need to be installed directly against the return air grille. Maintain a minimum 60 mm (2.4") clearance around the unit to ensure adequate airflow.



Return air: keep the minimum clearance in front of the evaporator coil.

5.2 Blower orientation **INSTALLER**

Before installation, turn the blower outlet to the position that gives the most direct route to the supply duct. Loosen the fixing screw, rotate the blower horizontally or vertically, then tighten the screw firmly.



1 Loosen the adjustment screw · 2 Rotate the blower · 3 Tighten the screw

5.3 Supply air and ducting **INSTALLER**

- Use thermally and acoustically insulated duct of the diameter given in Part 12. Never reduce the duct diameter (e.g. a 150 mm outlet must not be reduced to 100 mm).
- Supply grilles must be at least the minimum size and number given in Part 12.
- Maximum number of supply outlets: **2** for SDC 12-7000, SDC 24-7000 and SDC 24-12000; **3** for SDC 48-16000.
- Keep the total duct length below 4 m (all models). Avoid 90° and sharp bends: each can reduce airflow by up to 25 %.
- Install ducts taut, without kinks or creases, and make sure furniture cannot compress them later. Repair or replace a damaged or clogged duct.

- Install supply grilles as high as possible in the cabin, because cold air sinks.
- Do not point the supply louvres towards the return grille: this short-circuits the air and reduces performance.
- Avoid undersized grilles, closed louvres or narrow branches: the fan cannot push enough air, the evaporator can freeze in cooling (ERROR 9) or overheat in heating (ERROR 4).



Incorrect installation: uninsulated duct, reduced diameter, excessive length and sharp bends, creased and compressed duct.
Consequences: reduced performance, frequent shutdowns and error codes, shorter service life.

PART 6

Seawater system

The seawater circuit removes heat from the condenser (cooling) or supplies heat to it (heating). Insufficient flow leads to compressor overheating, error codes (ERROR 8, 10, 12) and shutdown. The circuit must be unobstructed, continuous and free of air. Required flow per model: Part 12.

6.1 Component order INSTALLER

- 1 Scoop-type thru-hull fitting
- 2 Ball valve (seacock), directly on the fitting
- 3 Seawater strainer (observe the flow direction arrow)
- 4 Seawater pump
- 5 Condenser inlet of the unit (lower connection, marked with an arrow)
- 6 Condenser outlet → overboard fitting



NOTICE

Do not share the seawater circuit with other systems (e.g. toilet or engine cooling). This causes flow problems and error codes.

6.2 Seawater intake INSTALLER

Fit the scoop-type intake as deep as possible on the hull, low and close to the keel, where it is easily accessible. The deeper the intake, the cooler the water and the better the efficiency. Drill the hull with the correct size and seal the fitting with a sealant suitable for underwater use, following the sealant manufacturer's instructions. Mount the ball valve directly on the intake fitting.



WARNING

The seawater circuit must be closable during malfunction or maintenance. Operating without a ball valve (seacock) is a flooding hazard and may endanger life.

6.3 Pump and strainer INSTALLER

- Install the centrifugal pump and the strainer **at least 30 cm below the waterline**, so that they fill by gravity. A centrifugal pump cannot self-prime; fill it with water before first use. The pump can be mounted horizontally or vertically.
- Keep the strainer close to the pump. Orient the pump head so that the outlet points upwards (see figure 6.7).

- Install the strainer where it is easy to open and inspect. Replace a plastic strainer housing every 2 years.
- All suction-side components (thru-hull, valve, strainer, pump) must be airtight.
- The pump output of the control board supplies the **nominal voltage of the unit** (12, 24 or 48 V DC); use a pump rated for this voltage. The output is limited to **3 A**. For a pump with a higher current draw, install an external switching relay (see 7.7).



NOTICE

Never operate the system without a strainer: debris destroys the pump and can lead to complete system failure. MBC Marine is not responsible for failures caused by an incorrectly installed or operated seawater pump.

6.4 Hoses INSTALLER

- Use only plastic hose with stainless steel spiral reinforcement that does not collapse when bent or twisted.
- Route the hose with a continuous rise from the intake to the strainer, the pump and the condenser inlet: no loops, high points or 90° fittings where air can be trapped.
- Double-clamp all hose connections. Seal metal threads with thread-sealing cord or marine-grade sealant.

6.5 Seawater outlet INSTALLER

Install the overboard outlet above the waterline, at most 150 mm above it, so the flow can be checked visually. Keep it at least 150 cm from the intake, so the system does not draw in its own warm discharge water. Seal it with underwater sealant.

6.6 Galvanic protection and bonding INSTALLER

Connect all metal parts in contact with seawater (intake fitting, pump, unit base tray if made of stainless steel) to the boat's bonding system. Install a zinc or aluminium sacrificial anode upstream of the pump to protect the condenser and pump from electrolytic corrosion.



NOTICE

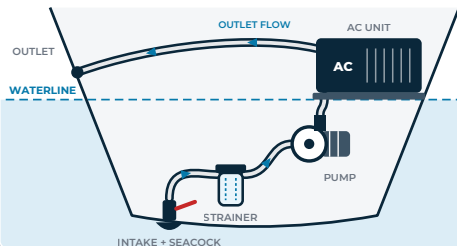
MBC Marine assumes no liability for damage caused by electrolysis or corrosion if no sacrificial anode or bonding is installed. Galvanic corrosion of the condenser is excluded from warranty.

6.7 Correct and incorrect seawater installation INSTALLER



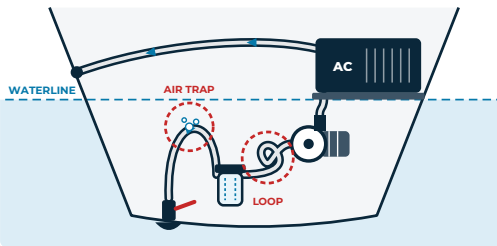
CORRECT

Steady rise from intake to unit, then down to the outlet. Pump and strainer below waterline.



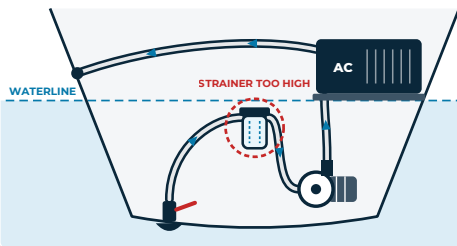
INCORRECT

Loops, kinks or high points in the hose trap air and stop the flow.



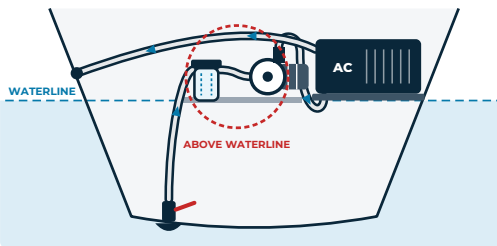
INCORRECT

The strainer must not be higher than the pump. Keep it low and close to it.



INCORRECT

Pump and strainer above the waterline: the pump cannot fill and runs dry.



PUMP HEAD ORIENTATION



Outlet pointing up
Air escapes, pump primes



Outlet sideways
Air stays in the pump



Outlet pointing down
Air stays in the pump

Correct: steady rise from inlet to unit, then down to the outlet; strainer and pump below the waterline; hoses double-clamped. Incorrect: loops or high points that trap air, strainer above the pump, pump or strainer above the waterline.

6.8 Seawater system checklist **INSTALLER**

- ☐ All connections and threads sealed; hoses double-clamped.
- ☐ Ball valve fully operable and easily accessible.
- ☐ Strainer accessible, clean, bowl intact, flow arrow correct.
- ☐ Pump and strainer at least 30 cm below the waterline; pump outlet pointing up.
- ☐ Suction side airtight; hose rising continuously to the unit.
- ☐ Outlet above the waterline (max. 150 mm), at least 150 cm from the intake.
- ☐ All wetted metal parts bonded; sacrificial anode installed.
- ☐ Pump current within 3 A, or relay installed.
- ☐ When the boat is launched and before first start: no leaks at fittings and connections, sufficient water flow at the outlet.



NOTE

If you do not have sufficient training to install the seawater system, consult a qualified boat technician.

PART 7

DC electrical installation



WARNING – HIGH DC CURRENT

Switch off the main battery switch before working on the electrical installation. Only qualified electricians may connect the unit, in accordance with marine electrical standards.



NOTICE

Undersized power cables cause voltage drop, malfunction and permanent damage to the control board. MBC Marine does not provide warranty coverage for failures caused by undersized power supply wiring.

7.1 Power requirements INSTALLER

- Check that the battery voltage matches the model: 12 V, 24 V or 48 V DC (see the nameplate).
- Install a separate **slow-blow ANL type fuse** in the positive cable, max. 18 cm (7") from the positive battery terminal (ISO 10133 / ABYC E-11), to protect the unit and the cables against overload. Fuse rating per model: Part 12.
- Install a main battery switch to isolate the unit.
- Place the battery bank as close as possible to the unit. A dedicated battery bank for the air conditioner, independent of the starting and domestic batteries, is preferred.
- Crimp all cables with matching, high-quality ring terminals. Avoid unnecessary connectors and fuse holders that add resistance.
- The voltage drop between the battery and the unit terminals must not exceed **0.3 V (12 V), 0.6 V (24 V) or 1.2 V (48 V)**, at start-up and in operation.



ANL fuse holder

7.2 Measuring the total cable length INSTALLER

The recommended cross-section depends on the **total cable length**: the distance from the positive battery terminal, via the fuse and the unit, all the way back to the negative battery terminal.

- ➊ Measure the positive cable from the battery terminal to the fuse holder, and from the fuse holder to the ring terminal on the unit.
- ➋ Measure the negative cable from the ring terminal on the unit to the negative battery terminal.
- ➌ Add the lengths. If you use a power rail (negative or both), include the rail length. The rail cross-section must be equal to or larger than the selected cable cross-section.

Find the cross-section in table 7.3, rounding up to the next larger size. Parallel cables are allowed on both the positive and the negative side; the cross-section is then the sum of the individual cables.

7.3 Power cable cross-section INSTALLER

SDC 12-7000

Total length (m)	(ft)	mm ²	AWG
0-3	0-10	16	6
3-6	10-20	25	4
6-12	20-40	35	2
12-24	40-80	70	2/0

SDC 24-12000

Total length (m)	(ft)	mm ²	AWG
0-3	0-10	10	8
3-6	10-20	16	6
6-12	20-40	35	2
12-24	40-80	50	0

SDC 24-7000 · SDC 48-16000

Total length (m)	(ft)	mm ²	AWG
0-3	0-10	6	10
3-6	10-20	16	6
6-12	20-40	25	4
12-24	40-80	35	2

7.4 Voltage limits at the unit terminals

INSTALLER TECHNICIAN

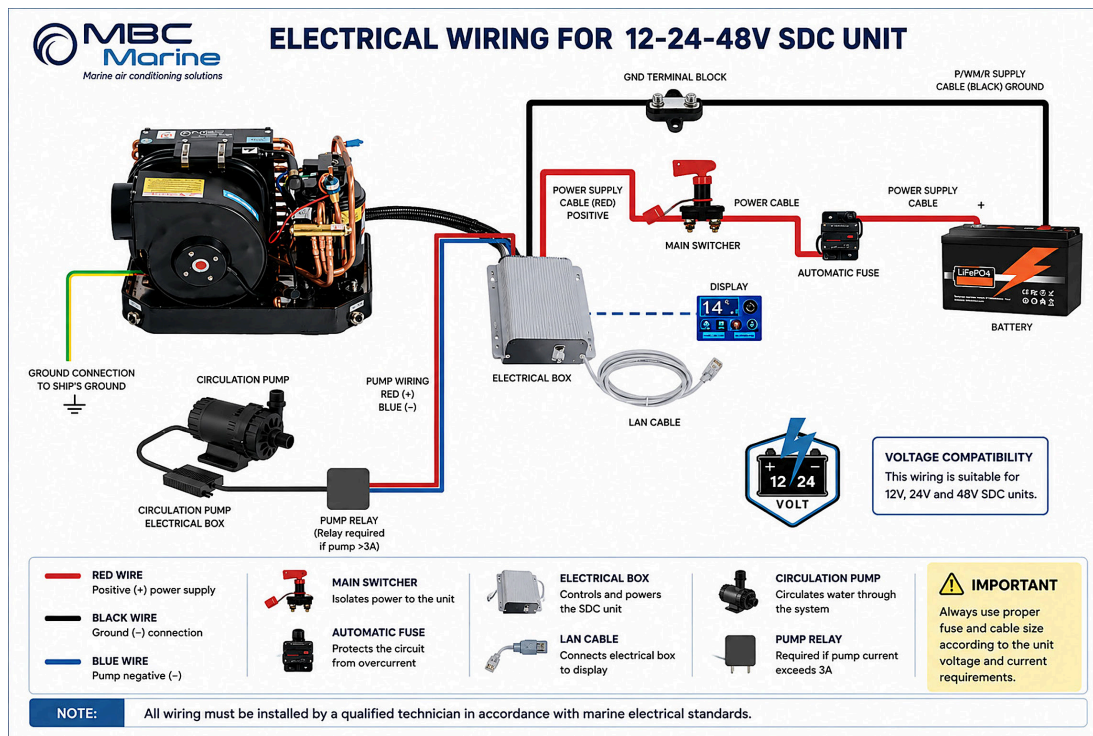
Measured at the unit's ring terminals	12 V models	24 V models	48 V model
Maximum voltage (charging included)	14.8 V	29.6 V	59.2 V
Minimum during compressor start	11.8 V	23.6 V	47.2 V
Minimum in operation, under load	11.5 V	23.0 V	46.0 V
Max. drop battery → unit	0.3 V	0.6 V	1.2 V



NOTICE

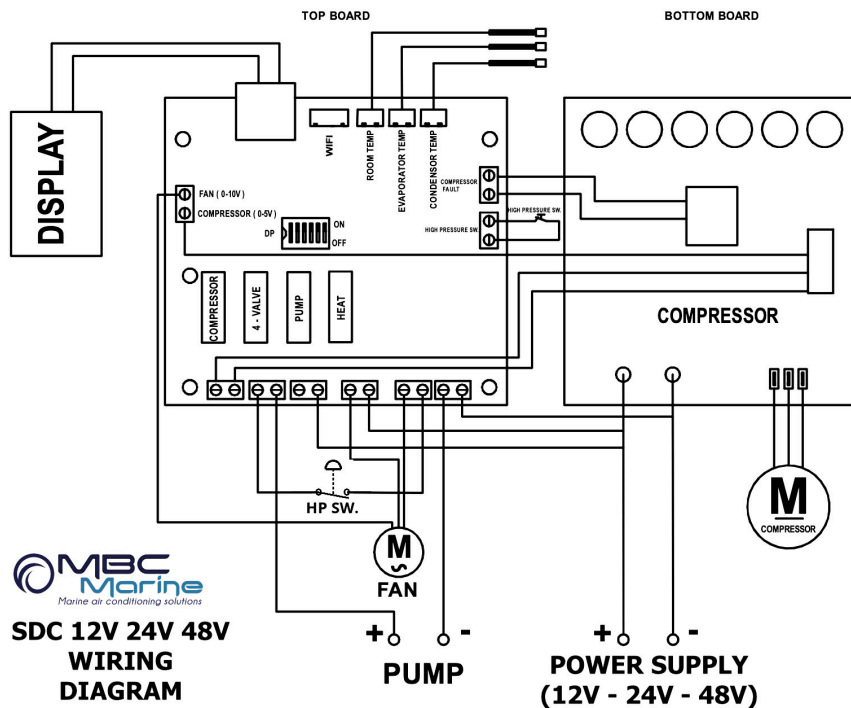
Voltage outside these limits triggers ERROR 6 (see 11.5). Set the charger so that its highest charging (absorption / boost) voltage does not exceed the maximum above. A charger in boost mode or a poorly regulated DC source can exceed the maximum voltage. With LiFePO₄ batteries, make sure the BMS can supply the start-up current and does not cause voltage spikes when it disconnects.

7.5 Wiring overview INSTALLER TECHNICIAN



Electrical wiring for 12, 24 and 48 V SDC units: battery, main switch, fuse, electrical box, display (LAN cable), seawater pump with relay (required above 3 A) and ground connection to the ship's ground.

7.6 Wiring diagram INSTALLER TECHNICIAN



SDC 12 V / 24 V / 48 V wiring diagram: top board (control) and bottom board (DC power), compressor, fan, high-pressure switch (HP SW.), seawater pump and power supply

7.7 Display, sensors and pump INSTALLER

TECHNICIAN

Connector	Connects to
LAN socket (RJ45)	Display, via 5 m LAN cable
Al1 – white	Room temperature sensor
Blue	Evaporator temperature sensor (factory fitted)
Black	Condenser temperature sensor (factory fitted)
Pump output (red +, blue –)	Seawater pump, unit nominal voltage (12 / 24 / 48 V DC), max. 3 A; use a relay above 3 A

A red LED on the side of the electrical box shows the compressor driver status as a blink code (11.5).

7.8 DIP switch settings INSTALLER TECHNICIAN



NOTICE

Change DIP switches only with the power switched off, and only if you understand the effect.

Switch	OFF	ON
SW1 / SW2 – mode	SW1 OFF + SW2 ON: cooling and heating (factory) · SW1 ON + SW2 ON: cooling only	
SW3 – after power failure	Unit stays off	Restores last operating state
SW4 – evaporator & condenser sensors	Sensors active	Sensor functions disabled
SW5 – seawater pump	Runs with the compressor	Runs continuously after start
SW6 – ventilation (FAN) mode	Available	Not available

Factory setting: SW1 OFF · SW2 ON · SW3 ON · SW4 OFF · SW5 OFF · SW6 OFF

7.9 Electrical checklist **INSTALLER**

- ☐ Battery voltage matches the model.
- ☐ ANL slow-blow fuse in the positive cable, max. 18 cm from the battery; main switch installed.
- ☐ Cable cross-section according to 7.3 for the measured total length.
- ☐ All ring terminals properly crimped, tight, clean and corrosion-free.
- ☐ Voltage drop battery → unit within the limit in 7.4 (0.3 / 0.6 / 1.2 V).
- ☐ Electrical box in the airflow path with 10 cm free space, cover closed.
- ☐ Pump within 3 A, or connected through a relay.
- ☐ Unit and all wetted metal parts connected to the ship's ground.
- ☐ Display connected with the LAN cable; room sensor on A11 (white).
- ☐ DIP switches at the correct setting for the installation.

7.10 Battery bank sizing INSTALLER

While the compressor runs, the unit draws the current given in Part 12; one hour of running uses the same number of ampere-hours (Ah). The compressor cycles on and off with the set temperature, so the real consumption over a night is usually lower. Size the bank for the running time you need: **required usable capacity (Ah) = running current (A) × hours**. Divide by the usable depth of discharge: approx. 0.8 for LiFePO₄, 0.5 for lead-acid / AGM.

Model	V DC	Cooling Ah/h, max. normal / ECO	Heating Ah/h, max. normal / ECO	Min. bank LiFePO ₄ (Ah)	Min. bank AGM (Ah)	BMS continuous discharge (A)
SDC 12-7000	12	33 / 18	38 / 23	200	300	50
SDC 24-7000	24	11 / 9	20 / 12	100	150	40
SDC 24-12000	24	20 / 12	42 / 24	120	200	50
SDC 48-16000	48	18 / 12	25 / 17	120	200	40

Minimum bank: 8 hours of cooling in ECO mode at maximum current, rounded up. The BMS must deliver at least the fuse rating continuously and must not disconnect during compressor start. A dedicated bank for the air conditioner is preferred (7.1).

PART 8

Commissioning (first start-up)

8.1 Before switching on **INSTALLER**

- ☐ Seawater and electrical checklists (6.8, 7.9) completed; drain test done (4.3).
- ☐ Air ducts and their insulation correctly fitted; ducts clean.
- ☐ Air filter fitted; all grilles open and unobstructed.
- ☐ Seacock open; strainer clean and filled with water.
- ☐ No tools or packaging left inside the unit or the electrical box; covers closed.

8.2 First start **INSTALLER**

- ➊ Open the seacock. Make sure the pump and hoses are filled with water and free of air (gravity filling).
- ➋ Switch on the main battery switch. The display shows the start screen; tap it to open the main screen.
- ➌ Select COOL mode (or HEAT, depending on the seawater temperature) and a set temperature well below (or above) the cabin temperature.
- ➍ Within a short time check a steady water flow from the overboard outlet. **No flow? Switch off immediately** and vent the pump.

- ➎ Measure the voltage at the unit's ring terminals at compressor start and in operation; it must stay within the limits in 7.4.
- ➏ Check that the compressor runs without metallic or vibrating noise and moves freely on its rubber mounts.
- ➐ Check airflow at every supply grille at all fan speeds.
- ➑ After 10–15 minutes of operation check that the supply air is clearly cooler (or warmer) than the return air and that no error code is shown.
- ➒ Check all water connections and the drain for leaks.

8.3 Handover to the owner **INSTALLER**

- Explain basic operation (Part 9), the operating limits (2.6) and the owner maintenance tasks (10.1).
- Show the seacock, the strainer, the air filter, the fuse and the main battery switch.
- Fill in and sign the commissioning and handover record (8.4) together with the owner, and start the maintenance log (10.5).
- Hand over this manual and register the product at www.mbc-marine.com (2-year warranty for registered units installed by an MBC partner, see Part 13).

8.4 Commissioning and handover record INSTALLER OWNER

Fill in at the first start, sign together with the owner and keep a copy with this manual. A copy also serves as proof of professional installation for the warranty registration (Part 13).

Boat name / hull no.

Unit model / serial no.

Battery type / capacity (Ah)

Installer company

Date of first start

Measured at first start	Value
Voltage at the unit terminals: at start / in operation	V
Voltage drop battery → unit (limit: 7.4)	V
Running current, cooling / heating	A
Cable cross-section / total length (7.3)	mm ² / m
Seawater in / overboard outlet	°C
Return air / supply air, cooling	°C
Return air / supply air, heating	°C

- ☐ Unit level and secured, at least 60 mm free space around it (Part 4)
- ☐ Electrical box in the airflow path, 10 cm free space (4.2)
- ☐ Condensate drain routed and tested (4.3)
- ☐ Ducts and grilles as Part 5; air filter fitted
- ☐ Seacock, strainer and pump below the waterline, no loops (Part 6)
- ☐ ANL fuse (Part 12), main switch, cable size (7.3) and ground checked
- ☐ DIP switches set as required (7.8)
- ☐ Cooling and heating tested; no error code after the test run
- ☐ Owner instructed (8.3); manual and maintenance log handed over

Installer – name and signature

Owner – name and signature

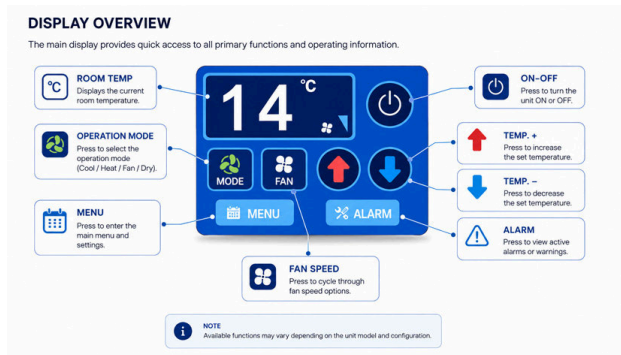
PART 9

Operation

9.1 Control panel **OWNER**

The CD-3 display is a touch screen that shows real-time information about the system. After power-on it shows the MBC Marine start (sleep) screen with the room temperature: tap the screen to open the main screen, which gives access to all everyday functions.

Button	Function
ON/OFF	Switches the unit on or off
MODE	Selects the operating mode: Cool / Heat / Fan (Fan only if enabled with SW6)
TEMP + / -	Raises / lowers the set temperature; the set value is shown while you press
FAN	Cycles through the fan speeds
MENU	Opens the status screens and settings
ALARM	Shows active alarms and error codes



Main screen

14 °C



Start (sleep) screen

9.2 Everyday use **OWNER**

- 1 Make sure the seacock is open and the main battery switch is on.
- 2 Tap the screen, then press ON/OFF to switch the unit on.
- 3 Press MODE to select COOL, HEAT or FAN (ventilation only).
- 4 Set the desired temperature with TEMP + / -.
- 5 Press FAN to choose the fan speed.



NOTICE

Wait at least 5 seconds before switching between COOL and HEAT, so that the control can stop the compressor and switch the 4-way valve safely.

9.3 Tips for comfort and battery life **OWNER**

- Keep hatches, windows and doors closed while cooling or heating.
- Choose a moderate set temperature; the compressor then runs less often and uses less battery power.
- Use a higher fan speed in hot, humid conditions; this also prevents evaporator icing.
- Keep the return and supply grilles free; do not cover them with cushions or curtains.
- Clean the air filter regularly (Part 10).

- After a power failure the unit restarts in its last state or stays off, depending on DIP switch SW3.
- Watch the battery state of charge: a weak or discharged battery causes undervoltage shutdowns (ERROR 6).

9.4 Fan speeds and protection settings

TECHNICIAN

The fan has 5 speed levels with factory settings. A technician may adjust them on the fan speed screen (9.6), for example to reduce airflow noise in small or quiet cabins, or to improve comfort in spaces with unusual ventilation.

The protection settings set the seawater-side and evaporator limits that stop the compressor. The evaporator protection in HEAT mode (ERROR 4) is factory set to 70 °C. The heating seawater protection (Hot Water Protect) is factory set to 5 °C: it refers to the condenser temperature, which in HEAT mode is about 2 K below the seawater temperature, hence the seawater limit of 7 °C (2.6).



NOTICE

Lower fan speeds reduce airflow: keep enough airflow for safe operation, otherwise the evaporator may freeze (ERROR 9) or overheat (ERROR 4). Change protection limits only with the approval of MBC Marine technical support.

9.5 Status screens OWNER TECHNICIAN

SYSTEM STATUS SCREEN

This screen provides real-time information about the system status and key operating parameters.

Compressor Status
Shows whether the compressor is running.

Seawater Pump Status
Indicates the status of the seawater pump.

Electric Heater
Shows the status of the electric heater.

3-Way Valve Status
Indicates the position of the 3-way valve.

Return Air Temperature
Temperature of the air returning from the cabin.

Evaporator Temperature
Temperature at the evaporator coil.

Refresh / Back
Returns to the previous screen.

Scroll Up
Navigate to the previous item.

Scroll Down
Navigate to the next item.

PARAMETER	EXPLANATION
COMPRESSOR	Indicates the current operational status of the compressor. OFF: The compressor is not running; no active cooling or heating is taking place. ON: The compressor is running, and the refrigerant is circulating in the system.
PUMP	Indicates seawater pump status. OFF: No seawater flow – system cannot cool or heat. ON: Seawater is circulating. Note: Continuous pump operation is required for safe performance.
HEAT	This function applies only to units equipped with electric heating. Electric heating is not available on SDC models.
VALVE	Indicates the status of the 3-way valve. OFF in cooling mode, ON in heating mode.
RETURN TEMP.	Temperature of air returning from the cabin.
EVAPORATOR TEMP.	Temperature at the evaporator coil, approximately equal to the air temperature of the fan air.



NOTE

The values shown are for reference only and may vary depending on operating conditions.

SYSTEM DETAILS SCREEN

This screen shows detailed operating information and allows you to check system parameters in real time.

Condenser Temp.
Temperature of the condenser.

Comp. Current
Real-time compressor current draw (A/V).
Not available on SDC units.

Temp. Format
Select between °C and °F display.

Control Fan
Determines whether the fan operation follows the compressor status automatically.

Refresh / Back
Returns to the previous screen.

Scroll Up
Navigate to the previous item.

Scroll Down
Navigate to the next item.

PARAMETER	EXPLANATION
CONDENSER TEMP.	Temperature of the condenser.
COMP. CURRENT	Real-time compressor current draw (A/V). Not available on SDC units.
TEMP. FORMAT	Select between °C and °F display.
CONTROL FAN	Determines whether the fan operation follows the compressor status automatically. OFF: The fan runs continuously, regardless of whether the compressor is active. ON: The fan only runs when the compressor is operating – this allows for more energy-efficient and quieter operation.



NOTE

The values shown are for reference only and may vary depending on operating conditions.

9.6 Technician settings (PIN protected) TECHNICIAN



NOTICE

The settings menu is intended for qualified service personnel only. Incorrect settings can impair operation and protective functions. The PIN code is provided by MBC Marine to authorised partners.

1 PARAMETER SELECTION MENU

Use this menu to access parameter settings and adjust screen brightness.



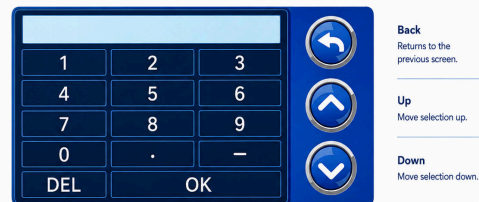
PARAMETER	EXPLANATION
 PRAM. SETTINGS	Technician-only menu, protected by PIN code.
 BRIGHT ADJ.	Adjusts screen brightness.



NOTE: This menu is intended for qualified service personnel only. Improper changes may affect system performance.

2 PIN ENTRY SCREEN

Enter the correct PIN code to access the technician settings menu.



KEY	FUNCTION
0 - 9	Enter PIN code.
.	Decimal point (if required).
-	Delete last entry.
DEL	Clear entire entry.
OK	Confirm PIN code and enter the settings menu.



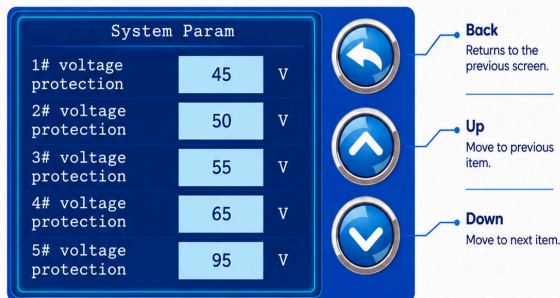
IMPORTANT WARNING:

The PIN-protected menu provides access to fine settings and advanced configuration options of the unit.

We recommend that only qualified personnel make adjustments to factory settings, as improper changes may affect system performance.

3 SYSTEM PARAM – FAN SPEED SETTINGS

Adjust the fan speed levels in 5 steps to match your installation requirements.



PARAMETER	EXPLANATION
Parameter Settings	The screen displays the fan speed settings in 5 steps. Each level can be individually adjusted between 35V and 99V, corresponding to the fan's power output. The screen shows the default factory settings.



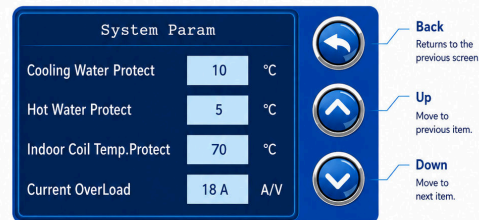
NOTE:

Adjusting the factory fan speed levels may be necessary in the following cases:

- To reduce airflow noise in compact or quiet cabin spaces
- To improve comfort in areas with unique ventilation characteristics

4 SYSTEM PARAM – PROTECTION SETTINGS

Configure system protection limits to ensure safe and reliable operation.



PARAMETER	EXPLANATION
 Cooling Water Protect	This function defines the lower temperature limit for seawater cooling during cooling mode. If the incoming seawater temperature drops below the set value, the unit will automatically stop the compressor to prevent freezing or excessive cooling.
 Hot Water Protect	This setting is used in heating mode and defines the minimum allowable seawater temperature (used as the heat source). If the seawater temperature in the condenser approaches the set limit, the system will shut down the heating mode to protect the condenser from freezing. This function also provides protection against potential damage to the condenser caused by excessively cold conditions.
 Indoor Coil Protect	Sets the maximum allowed temperature for the evaporator. If this limit is exceeded, the system will shut down and display Error 4 to prevent overheating.
 Current Overload	This function is not available on SDC units.



NOTE: The above values are for reference only and may vary depending on operating conditions.

PART 10

Maintenance and lay-up


WARNING

Switch off the unit and the main battery switch before any maintenance. Close the seacock before opening the strainer.

10.1 Owner maintenance **OWNER**

When	Task
Before each trip / weekly in season	Check that water flows steadily from the overboard outlet while the unit runs.
Weekly in season	Inspect the strainer; clean the basket if debris is visible.
Monthly in season	Remove and rinse the air (dust) filter with fresh water; let it dry before refitting.
Monthly	Check that grilles are free, the condensate drains (no water around the unit) and nothing covers the electrical box.
Always	Never run the unit without the air filter or with the seacock closed.

10.2 Annual service by a technician **TECHNICIAN**

- Clean or descale the condenser (seawater side) with a suitable marine descaler; flush thoroughly with fresh water.
- Inspect and, if worn, replace the sacrificial anode; check the bonding connections.
- Check pump, hoses, clamps and seacock for wear and leaks. Replace a plastic strainer housing every 2 years.
- Clean the drain pan and drain line; check the evaporator coil for dirt.
- Check all DC terminals for tightness, heat marks and corrosion; measure the voltage drop under load (limit: 7.4). Check the fuse holder.
- Check operating values on the status screens and the refrigerant circuit for leaks (certified technician only).

10.3 Lay-up and winterization **OWNER** **TECHNICIAN**

In salt water, remove seawater from the system for longer stops. In winter, protect the system against frost; frost damage is excluded from warranty.

- 1 Switch off the unit and the main battery switch.
- 2 Close the seacock.

- 3 Drain the seawater circuit (strainer, pump, hoses, condenser), or flush it with fresh water and fill it with a non-toxic, environmentally friendly antifreeze suitable for marine systems, following local regulations.
- 4 Clean the strainer and the air filter.
- 5 Leave the seacock closed and label it.

10.4 Recommissioning OWNER INSTALLER

Refill and vent the seawater circuit, check all hoses and clamps for leaks, open the seacock and follow the first-start steps in 8.2.

10.5 Maintenance log

OWNER

TECHNICIAN

Record every maintenance task, repair and parameter change. Copy this page when it is full.

Date	Op. hours	Work carried out / parameter changed	Voltage at unit (V)	Current (A)	Name / signature

Troubleshooting

11.1 How faults are shown OWNER

The control system protects the unit by shutting it down when it detects a fault, and shows an error code on the display. Some faults are temporary and clear automatically; others need a technician. Most error codes do not indicate an internal failure but an installation or operating problem: power supply, seawater flow or airflow.



WARNING

Owners: only carry out the checks marked for owners. Do not open the electrical box or the refrigerant circuit. Work marked **Technician** must be done by qualified personnel.

Current values in this manual are for information only. Actual values depend on seawater temperature, air temperature and humidity, and the quality of the installation (ducting, cable size, connections).

11.2 First checks for owners OWNER

Symptom	Check
Unit does not start, display dark	Main battery switch on? Fuse intact? Battery charged?
Runs, but no cooling / heating	Correct mode and set temperature? Seacock open? Water flowing from the outlet? Strainer clean? Seawater within limits (2.6)?
Weak airflow	Air filter clean? Grilles open and unobstructed? Fan speed too low?
Water around the unit	Drain hose blocked or kinked? Unit still tilted towards the drain?
Error code on the display	Note the code, see table 11.3. If it persists, call a technician.

11.3 Error code overview

OWNER

TECHNICIAN

Code	Error	Typical cause	Unit reaction	Recovery / action
1	Room temperature sensor	Sensor or cable (All, white) open or faulty	System stops	Restarts automatically when the sensor is OK
2	Evaporator temperature sensor	Sensor or cable (blue) open or faulty	System stops	Restarts automatically when the sensor is OK
3	Condenser temperature sensor	Sensor or cable (black) open or faulty	System stops	Restarts automatically when the sensor is OK
4	Evaporator overheat (heating)	Insufficient airflow in HEAT mode	Compressor stops	Restarts automatically after cooling down; check air system
5	Refrigerant leak	Leak or low charge; abnormal operating conditions	System stops	Do not use the unit – call a technician
6	Compressor driver fault	Power supply, wiring or ventilation; see LED blink code (11.5)	Compressor stops	Technician reads the LED blink code
8	High refrigerant pressure	Low seawater flow (cooling) or low airflow (heating)	Compressor stops	Check seawater flow and airflow
9	Evaporator icing (defrost)	Low airflow, cold seawater, low refrigerant charge	Compressor stops, defrost	Restarts automatically after defrost
10	Seawater temperature protection	Interrupted seawater flow; seawater ≥ 32 °C (cool) or < 7 °C (heat)	Compressor stops	Check continuous seawater flow; respect limits
11	Incorrect connection	COM1 / DI3 connectors loose; damaged LAN cable	System stops	Check connectors and LAN cable, restart
12	Compressor overcurrent	Low seawater flow; low supply voltage; thin cables; loose connections	Compressor stops	Check seawater flow and power supply
15	Communication display ↔ control board	LAN cable, display or control board	System stops	Restarts when communication returns; check LAN cable

Codes 7, 13 and 14 are not used on SDC units.

11.4 Error code details **TECHNICIAN**

1 Room temperature sensor

The room temperature sensor on the white AI1 socket is disconnected or faulty.

POSSIBLE CAUSES

- Connector loose or not plugged in
- Damaged cable
- Faulty sensor

WHAT THE TECHNICIAN DOES

- Check that the white connector is firmly seated in the white AI1 socket.
- Inspect the cable for damage.
- Replace the sensor with a compatible MBC sensor if faulty.

2 Evaporator temperature sensor

The evaporator sensor on the blue socket reads an open circuit (infinite resistance) or an implausible value.

POSSIBLE CAUSES

- Broken wire
- Connector not properly seated on the control board
- Faulty sensor

WHAT THE TECHNICIAN DOES

- Inspect the wiring and connector.

- Replace the sensor with a compatible one if damaged.

3 Condenser temperature sensor

The condenser sensor on the black socket is disconnected or faulty.

POSSIBLE CAUSES

- Broken wire
- Connector not properly seated
- Faulty sensor

WHAT THE TECHNICIAN DOES

- Check the black connector and wiring.
- Replace the sensor if faulty.

4 Evaporator overheat protection (HEAT mode)

In HEAT mode the evaporator (indoor coil) temperature has reached the protection limit (70 °C). The compressor stops and restarts automatically after the coil has cooled down. Occasional occurrence (once every 20–30 minutes) is not critical.

POSSIBLE CAUSES

- Restricted airflow: dirty filter, closed or undersized grilles
- Ducts too long (over 4 m), kinked or reduced in diameter

WHAT THE OWNER CAN DO

- Clean the air filter; open all grilles; select a higher fan speed.

WHAT THE TECHNICIAN DOES

- Check grilles and ducting against Part 5 and correct as needed.

5 Refrigerant leak

The control detects a suspected refrigerant leak or low charge from the operating conditions; the unit has no refrigerant pressure sensor for this. Other faults (e.g. no seawater flow) can also trigger ERROR 5. Oil traces in the base tray may indicate a leak.

WHAT THE OWNER CAN DO

- Switch the unit off, ventilate the cabin and call a technician. Do not use the unit.

WHAT THE TECHNICIAN DOES

- First verify continuous seawater flow, clean intake and strainer, correct pump operation without air locks, airflow and supply voltage. Do not open the circuit before these are confirmed.
- Measure the pressures with gauges. If a leak is confirmed: recover the refrigerant, pressure-test with dry nitrogen and locate the leak with an approved detector.
- Repair by brazing or by replacing the component; repeat the nitrogen pressure test.

- Evacuate thoroughly and recharge with the type and amount of refrigerant on the nameplate.

6 Compressor driver fault

The compressor driver has stopped the compressor to protect itself. The code 6 alone does not tell the cause: the red LED on the side of the electrical box shows it as a blink code. See 11.5.

WHAT THE OWNER CAN DO

- Check the battery charge and switch the unit off at the main switch for 10 minutes, then restart. If the code returns, call a technician.

8 High refrigerant pressure

The high-pressure switch has tripped: heat is not being removed and the condensing pressure is too high. The compressor stops.

POSSIBLE CAUSES

- COOL mode: seawater flow low or stopped (air-locked pump, clogged strainer, blocked intake or hose). Low flow can trigger ERROR 10 and ERROR 8 together.
- HEAT mode: airflow too low (ducts over 4 m, undersized grilles, dirty filter)
- Refrigerant overcharge; rarely a faulty pressure switch

WHAT THE OWNER CAN DO

- Check water flow at the outlet and clean the strainer; clean the air filter and open the grilles.

WHAT THE TECHNICIAN DOES

- Vent the pump, check intake and hoses; check the air system against Part 5.
- If the error persists with correct seawater flow and airflow, check the switch and the refrigerant charge, and contact MBC Marine service. Never bridge or bypass the pressure switch.

9 Evaporator icing – defrost

Under normal circumstances this is not a fault. The evaporator has started to ice up; the compressor stops and defrosting runs. The unit restarts automatically within a few minutes.

POSSIBLE CAUSES

- Low airflow: low fan speed, dirty filter, restricted return air, undersized supply grilles
- Cold seawater (approx. 13–16 °C) combined with a warm cabin, typically early in the season
- Low refrigerant charge, if the error also occurs in warm weather

WHAT THE OWNER CAN DO

- Clean the filter, open all grilles, choose a higher fan speed.

WHAT THE TECHNICIAN DOES

- Check the air system and the evaporator sensor; check the refrigerant charge if the fault persists in warm conditions.

10 Seawater temperature protection

The unit does not measure seawater flow directly; it monitors the condenser temperature. ERROR 10 stops the compressor when the seawater side is outside the operating limits: 32 °C or above in COOL mode, or below 7 °C in HEAT mode (see 2.6).

POSSIBLE CAUSES

- Interrupted seawater flow (most common): the water left in the condenser heats up from the refrigerant, and the system detects this as an incorrect seawater temperature.
- Seawater temperature outside the operating limits
- Switching between HEAT and COOL without waiting (5 seconds)

WHAT THE OWNER CAN DO

- Check that the seawater flow is continuous (steady stream from the outlet while running); seacock open, strainer clean. Then restart the unit.

WHAT THE TECHNICIAN DOES

- Check the pump for air locks and the intake, hoses and condenser for blockages; check the condenser sensor (black).

11 Incorrect connection

The control board detects a faulty connection between the board and its connectors.

POSSIBLE CAUSES

- COM1 or DI3 connector not properly attached to the control board
- Damaged LAN cable

WHAT THE TECHNICIAN DOES

- Check that the COM1 and DI3 connectors are firmly seated.
- Inspect the LAN cable and replace it if damaged; then restart the unit.

12 Compressor overcurrent

The compressor's current draw exceeds the maximum limit. The compressor stops.

POSSIBLE CAUSES

- Insufficient seawater flow: faulty or air-locked pump, clogged strainer, blocked hose
- Low supply voltage: the compressor draws more current to compensate
- Undersized power cables; loose or corroded connections
- Refrigerant shortage; dirty condenser

WHAT THE TECHNICIAN DOES

- Check the pump, clean the strainer and check the seawater circuit for blockages.

- Measure voltage and current at the unit's ring terminals in operation and compare with Part 12 and the limits in 7.4. Check cable sizes against 7.3 and the fuse.

15 Communication: display ↔ control board

The display cannot communicate with the control board. The system stops and restarts automatically when communication returns.

POSSIBLE CAUSES

- Loose or damaged LAN cable; corroded RJ45 connectors
- Faulty display or control board

WHAT THE TECHNICIAN DOES

- Reseat and clean the connectors; replace the LAN cable.
- Replace the display, then the control board (upper PCB), if the fault persists.

11.5 ERROR 6: LED blink codes **TECHNICIAN**

When ERROR 6 appears, observe the **red LED on the side of the electrical box**. It blinks a repeating pattern of short and long flashes (e.g. 2 short, 2 long – pause – 2 short, 2 long). Always wait for the complete sequence, count carefully and find the fault in the table.



NOTE

ERROR 6 is almost never a driver failure. In DC systems it is caused by the power supply (voltage, cables, connections, battery, charger, BMS) or by poor ventilation of the electrical box. Check these first, before replacing components.

RECOMMENDED CHECK SEQUENCE

- ❶ **Power supply** – measure the voltage at the unit's ring terminals at start-up and in operation (limits and max. drop: 7.4).
- ❷ **Wiring** – cable cross-section and length (7.3); terminals tight, clean, corrosion-free. Hot terminals indicate poor contact.
- ❸ **Ventilation** – electrical box in the airflow path with 10 cm free space (4.2).
- ❹ **Battery, charger and BMS** – capacity, state of charge and voltage stability; for LiFePO4 batteries check the BMS limits.

- ❺ **Control box** – only if the fault persists after all external causes are excluded: inspect or replace the electrical box.



WARNING

Measurements on the live DC installation must be made only by qualified personnel. Beware of short circuits between battery terminals and tools.

Blinks	Fault	Typical causes	What to do
2 short 2 long	Overcurrent protection	Current rises gradually while voltage is stable, typically 8–15 min after start: loose or oxidised terminals, electrical box without airflow (heat trap), internal driver fault	Clean and re-crimp terminals; check the voltage drop (7.4); improve box ventilation. If current still rises at stable voltage: replace the electrical box.
3 short 2 long	Undervoltage protection	Voltage at the unit drops below the minimum, mainly at compressor start: undersized or long cables, loose terminals, weak or undersized battery, BMS limitation (LiFePO4: high temperature or low charge)	Measure the voltage at start and in operation. Re-crimp and clean terminals; shorten cable runs or increase the cross-section; check battery health and the BMS.
4 short 2 long	Overvoltage protection	Voltage above the maximum (7.4): charger output too high or in boost mode, poorly regulated DC source, BMS voltage spikes at disconnection, sudden load disconnection	Measure the voltage when the fault occurs. Lower the charger output voltage; use a well-regulated charger; install a DC/DC stabiliser if overvoltage recurs.
5 short 2 long	Compressor start failure	Deep voltage drop at start (long or thin cables, loose terminals), weak battery, BMS limiting the inrush current, mechanically stuck compressor, faulty relay or driver circuit	Measure the voltage at the moment of start (a 12 V system dropping to 10–11 V indicates a supply problem). If the voltage is stable and the compressor still does not start, the compressor or control board is defective.
2 short 3 long	Low-voltage protection (in operation)	Voltage falls below the operating minimum after the start, under load: discharged battery, insufficient charger power, too many consumers on the same DC line, oxidised terminals, BMS limitation	Measure the voltage under load (limits: 7.4). Charge or replace the battery; check charger capacity; reduce other loads; clean and re-crimp terminals.
3 short 3 long	Overload protection	Current exceeds the limit, typically after 5–15 min of operation: poor connections, electrical box overheating, undersized cables, weak battery or charger, BMS voltage fluctuation	Check cable size (7.3), terminals, battery and charger capacity and BMS limits. Rising current at stable voltage: box overheating; current fluctuating with voltage: supply problem.
4 short 3 long	Overheat protection	Electrical box above its temperature limit: closed compartment without ventilation, high ambient temperature, blocked airflow or clogged filter, long operation at low fan speed	Move the box into the airflow path with 10 cm free space. Clean filters; increase the fan speed; in hot conditions add ventilation or a small auxiliary fan.

11.6 Faults without an error code TECHNICIAN

Symptom	Possible causes	Check / remedy
Compressor does not start, no error code	Set temperature already reached; FAN mode selected; SW1/SW2 set to cooling only (in HEAT); restart delay after a stop	Check mode and set temperature (lower in COOL, higher in HEAT); check DIP switches (7.8); wait a few minutes. If the LED on the electrical box blinks, see 11.5.
Compressor starts and stops frequently (short cycling)	Room sensor in the supply air stream or near a heat source; set temperature close to cabin temperature; restricted airflow (repeated ERROR 4 / 9 cycles)	Move the sensor into the return air stream (4.5); check filter, grilles and ducts (Part 5).
Weak cooling or heating, no error code	Dirty filter or coil; ducts too long, kinked or reduced; ECO mode; hatches open; warm seawater; low refrigerant charge	Measure supply and return air temperatures: a difference below approx. 8 K at high fan speed after 15 min indicates a fault. Check the air system, then the refrigerant charge (certified technician).
Cools in HEAT mode / no heating, cooling OK	4-way valve not switching: no voltage at the 4-valve output, faulty coil or stuck valve; SW1/SW2 set to cooling only	Check the DIP switches (7.8). In HEAT, check the voltage at the 4-valve output and the coil; tap the valve body lightly while switching. Replace the coil or valve if faulty.
Noise or vibration	Pipes touching the casing; loose brackets; debris in the blower; air in the seawater pump (cavitation); unit not on a firm base	Check brackets and rubber mounts, clear the blower, vent the seawater circuit (6.4); separate touching pipes carefully.
Water on the floor around the unit	Drain blocked or not falling; unit not tilted towards the drain; condensation on uninsulated ducts or cold pipes	Clean the drain, check the fall (4.1, 4.3); insulate ducts and cold surfaces.
Battery discharges faster than expected	Normal mode instead of ECO; very low set temperature; poor cabin insulation; pump on continuously (SW5 ON); undersized bank	Compare the current with Part 12; use ECO mode; check SW5; check the bank size (7.10).
Fuse blows	Fuse not slow-blow type or too small; short circuit; seized compressor	Use the ANL slow-blow rating in Part 12; check cables for damage; measure the compressor windings (technician).

11.7 R134a P-T table TECHNICIAN

Saturation pressure of R134a (gauge, at sea level). Use it to convert gauge readings into evaporating and condensing temperatures.

°C	bar (g)	°C	bar (g)
-10	1.0	30	6.7
-5	1.4	35	7.9
0	1.9	40	9.2
5	2.5	45	10.6
10	3.1	50	12.2
15	3.9	55	13.9
20	4.7	60	15.8
25	5.6		

GUIDELINE VALUES IN COOL MODE

- Evaporating temperature: approx. 0–8 °C (low-side gauge approx. 1.9–2.9 bar).
- Condensing temperature: approx. 8–15 K above the seawater inlet temperature.
- Air temperature difference supply / return: approx. 8–12 K at high fan speed.

Measure only after at least 15 minutes of stable operation, with a clean filter and correct seawater flow. Values outside these ranges point to an airflow, seawater flow or refrigerant charge problem.



WARNING

Connecting gauges opens the refrigerant circuit. Only certified technicians may do this (1.6).

PART 12

Technical data

SDC units		SDC 12-7000	SDC 24-7000	SDC 24-12000	SDC 48-16000
Power supply	V DC	12	24	24	48
Cooling capacity	Btu/h	7 000	7 000	12 000	16 000
Cooling current, normal / ECO	A	20-33 / 12-18	9-11 / 7-9	18-20 / 10-12	16-18 / 11-12
Heating capacity	Btu/h	8 000	8 500	13 000	17 000
Heating current, normal / ECO	A	22-38 / 14-23	18-20 / 10-12	40-42 / 24	23-25 / 15-17
Fuse, ANL slow-blow	A	50	40	50	40
Refrigerant		R134a			
Seawater flow	m ³ /h · l/min	0.55 · 9	0.6 · 10	0.9 · 15	1.2 · 20
Airflow	m ³ /h	350	350	450	600
Noise level	dB(A)	50	< 50	< 50	55
Dimensions H × W × D	mm	298×380×200	298×380×200	300×490×285	330×500×490
Min. return air grille (nominal size)	mm	250×250	250×250	250×250	300×250
Min. supply air grilles (nominal size)	mm	200×100	200×100	2 × 200×100	2 × 150×250
Supply outlets, max.	pcs	2	2	2	3
Supply duct diameter	mm	100	100	125	150
Seawater hose diameter	mm	16	16	16	16
Pump output (control board)	V DC	12	24	24	48
Pump output current	A	max. 3 A; relay required above 3 A			
Weight	kg	18	18	22	24

Current values are for information only; actual values depend on seawater and air temperature, humidity and the quality of the installation.

PART 13

Warranty

13.1 Limited warranty OWNER

MBC Marine provides a limited warranty for its marine air conditioning systems against defects in materials and workmanship, for the original end user, within the warranty period. If a verified defect is found during the warranty period, MBC Marine may, at its sole discretion, repair or replace the defective component(s) or refund the purchase price in part or in full. In the case of a refund, the contract is considered terminated and no further claims can be made.



NOTICE

Every warranty claim is based on the **original invoice** showing the **serial number** of the unit. Keep the invoice; without it no warranty claim can be processed.

13.2 Warranty period OWNER

Product status	Warranty
Registered and installed by an official MBC partner	2 years, full warranty
Not registered, or not installed by an MBC partner	1 year: first 6 months parts and labour, last 6 months parts only

The warranty starts on the date of purchase, the date of installation or, for OEM installations, the date the vessel is delivered to the end user, but never later than 3 years after the manufacturing date. The manufacturing date can be verified from the serial number through MBC Marine customer service.

13.3 Product registration OWNER

Register your product at www.mbc-marine.com to benefit from the full warranty. For unregistered products as well, the original invoice with the serial number (13.1) is required for any warranty claim.



NOTICE

Improper grounding, incorrect connection to the seawater or electrical system, or installation not according to this manual voids the warranty.

13.4 Exclusions OWNER

- Normal wear and tear (e.g. filters, fuses).
- Labour costs for removal or reinstallation of the system.
- Damage during transport or improper storage.

- Galvanic corrosion due to missing or inadequate grounding or galvanic protection.
- Installation not following the official MBC Marine guidelines.
- Corrosion, improper maintenance, misuse or external damage.
- Unauthorised modifications, non-genuine parts or repairs by unauthorised personnel.
- Water damage to electrical components such as control boards or displays.
- Frost damage due to insufficient winterization.
- Use of unauthorised refrigerants.
- Damage caused by undersized power supply wiring or an unsuitable or unstable DC supply (under- or overvoltage, spikes, charger or BMS behaviour).
- Failures caused by an electrical box installed in an unventilated or enclosed space.
- Failures caused by restricted airflow (undersized ducts, blocked grilles, dirty filters, improper installation).
- Failures caused by ducting not according to Part 5: more supply outlets or less grille area than specified (5.1, 5.3, Part 12), ducts longer than 4 m, or a reduced duct diameter.
- Failures from operation outside the specified limits or contrary to this manual.
- Indirect, incidental or consequential damages (including travel costs, lost time, financial loss or personal injury).

13.5 Final provisions **OWNER**

MBC Marine reserves the right to amend this warranty policy at any time without prior notice, in particular to comply with national or EU legislation. Statutory rights of consumers remain unaffected.

PART 14

Legal disclaimer

MBC Marine has prepared this manual based on the most current information available. It cannot cover every possible situation; please contact our experts for specific questions or unusual requirements. While every precaution has been taken to ensure accuracy, MBC Marine is not liable for errors or omissions, nor for damage arising from the use of the product or of the information in this manual.

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MBC Marine Ltd. · Petőfi Sándor u. 39/A · 2049 Diósd · Hungary · www.mbc-marine.com

EU Declaration of Conformity: see the following page.

EU Declaration of Conformity

Manufacturer	MBC Marine Ltd. Petőfi Sándor u. 39/A, 2049 Diósd, Hungary
Product	SDC self-contained marine air conditioning unit for 12 V, 24 V and 48 V DC battery systems
Models	SDC 12-7000, SDC 24-7000, SDC 24-12000, SDC 48-16000
Refrigerant	R134a

This declaration of conformity is issued under the sole responsibility of the manufacturer. The products described above are in conformity with the relevant Union harmonisation legislation:

- **2014/30/EU** Electromagnetic Compatibility Directive
- **2011/65/EU** and **(EU) 2015/863** RoHS Directive

The rated voltage is below 75 V DC; the Low Voltage Directive 2014/35/EU therefore does not apply. Electrical safety has been assessed against the standards listed opposite.

Harmonised standards and technical specifications applied:

EN 60335-1	Household and similar electrical appliances – Safety – General requirements
EN 60335-2-40	Particular requirements for electrical heat pumps, air conditioners and dehumidifiers
EN 55014-1 / -2	Electromagnetic compatibility – Emission / Immunity
EN IEC 63000	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Conformity applies when the product is installed and operated according to this manual.

PLACE AND DATE OF ISSUE	NAME AND FUNCTION	SIGNATURE
Budapest, 15.10.2025	Roland Várnai, CEO	





MBC Marine Ltd.

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