

Installation & operating instructions
Isotherm Cruise & Cruise INOX marine refrigerators

Type: CR 42, CR 49, CR 65, CR 85 & CR 130



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1. Introduction

1.1 General

Isotherm refrigerators are specially designed to operate in tough marine environments. They are fitted with a fully hermetic, leak-free compressor, they offer the lowest possible power consumption and noise level. All models are simple to install. They can withstand an angle of heel up to 30°, for a short time. To ensure that your Isotherm fridge operates as efficiently as possible, please follow these general guidelines:

- Unnecessary opening of the fridge door will increase power consumption.
- Good ventilation of the compressor and condenser unit will reduce power consumption.
- The electrical system should be in good condition. Inspect batteries and charging levels regularly. Always use a separate starter battery for the engine. Follow carefully the guidelines regarding electrical cable areas and fuse placements.
- Keep the inside of the fridge and freezer clean and dry. Remove any water from condensation that may have collected in the drip tray or the plastic basket.
- Keep the door slightly open to air the refrigerator when leaving the boat for any length of time.
- Clean the inside of the refrigerator with luke warm water and a mild detergent before taking the fridge into operation the first time.

The refrigerators are equipped with an evaporator forming a freezer compartment placed in the top of the cabinet. It has a door hinged above the evaporator.

The CR 130 Drink has no freezer compartment, the evaporator is positioned on the rear wall.

The freezer compartment is made to keep pre-frozen food frozen during a short period of time and not to freeze food.

CR 49, 65, 85 & 130 are also available in an INOX version.

They have a more exclusive door in stainless steel and they also have a flush mounting frame for a smooth flat mounting on board. The doors have a stainless steel door lock of a more rigid type and are also equipped with interior trims in stainless steel.

1.2 Safety and precautions

For your own and others safety, read this first.



Danger! When connected to mains power, ensure that the power supply is equipped with an earth safety automatic switch, a "ground fault circuit interrupter".



Danger! Never touch bare electrical wiring connected to the AC power supply.

Do not use the device if the connector cables show visible damage.

Never connect battery charger direct to the refrigeration system.

A battery charger **must** be connected to the battery, never direct to the refrigeration system.

Danger! In addition to acid, a newly-charged battery contains explosive gas.

Never cover the ventilation openings for the compressor unit.


Refrigerant may never be let out in the air.

Repair of the refrigeration circuit must be done by a certified technician.

1.3 Environmental markings

This appliance is marked according to the European directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE). By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product.



The symbol  on the product, or on the documents accompanying the product, indicates that this product may not be treated as household waste. Instead it shall be handed over to the applicable collection point for recycling of electrical and electronic equipment.

Disposal must be carried out in accordance with local environmental regulations for waste disposal.

For more detailed information about treatment, recovery and recycling of this product,

please contact your local city office, your household waste disposal service or the shop where you purchased the product.



2. Operation

The refrigerators are available in two versions, standard with mechanical thermostat and optionally in ASU version. CR 42 and CR INOX cannot be equipped with ASU. Temperature regulation for both systems are described separately below.

The refrigerators are made for use at ambient temperatures between 32°F and 113°F.

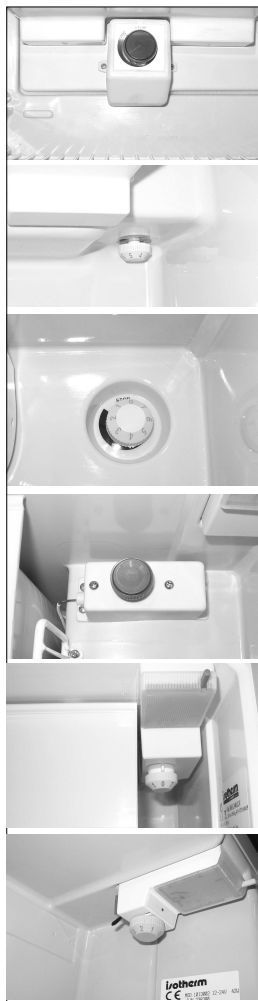
2.1 Temperature regulation thermostat

The refrigerator is fitted with a manually operated thermostat. This is turned clockwise to reduce temperature and anti-clockwise to both increase temperature and activate the on-off switch at the end position, 0-position. A certain spring resistance is recognized at the off position.

It is advisable to start with the thermostat in a medium position. It is advisable to keep a temperature of 41-43°F inside the refrigerator. Higher temperatures will reduce storage time.

The ambient temperature influences the temperature also inside the fridge. Avoid direct sunshine and other heat sources close to the refrigerator.

The thermostat control knob is placed inside the refrigerator, see description below.



Thermostat in CR 42, on rear wall below freezer compartment.

Thermostat in CR 49, inside on horizontal wall at the rear.

Thermostat in CR 65, inside on the rear wall to the right.

Thermostat in CR 85 & CR 130, inside to the right behind the light.

Alternative position in the light housing, for CR 49, 65, 85 & 130.

Thermostat in CR 130 Drink, inside integrated in the light housing.

2.2 Temperature setting ASU

The Isotherm refrigerators with ASU can be operated in two ways. When energy saving is needed, switch to "NORMAL.AUTO" position.

Optimal refrigeration temperature is than automatically maintained while consuming the lowest amount of battery power possible. When there is no need of energy saving, switch to "MAN.TEMP" position on the panel. The automatic function is now partially blocked and refrigeration temperature can be manually adjusted. In its centre position, the unit is switched off. The panel should be positioned where it easily could be seen. Control cable length is 4 m (13 ft.). Behind the panel a hole of 1/2" must be drilled for the cable.



NORMAL.AUTO position

- The green light indicates that power is being supplied and the refrigeration programme is activated.

- When the engine is running and the voltage supply (measured at the electronic unit) is above 13.2 (26.4) volt, the compressor starts to supply cooling energy to the holding plate. It starts within the first 30 seconds and operates first at low speed with the yellow "Economy" indicator lit.

After less than half a minute, the speed of the compressor and the fan increase by 75% and the red «Freeze» indicator light comes on. This operation condition is maintained until the holding plate is completely frozen at approximately 7°F. This can take 20 to 40 minutes depending on the model, ambient temperature and refrigerator size. On reaching this temperature, the compressor stops and the red light goes out. When the temperature of the holding plate rises to 14°F the compressor restarts to charge the holding plate and the red light comes on again. This process is repeated, keeping the holding plate at its optimum efficiency level. When the engine is stopped, the compressor also stops shortly afterwards.

When the engine is stopped and the battery voltage is below 12.7 (25.4) volt, the surplus of refrigeration energy stored in the holding plate is used first.

Only when this has been consumed does the compressor start. The yellow light indicates that it is now running, in the first hand, at its low "Economy" speed to "top-up" the holding plate only and maintain the refrigeration temperature. This condition starts when the temperature of the holding plate rises to 30°F and stops when it reaches economy level of 21°F.

MAN.TEMP position

This position can be used either when shore-power or solar panels are being used or when energy saving is not required and a higher or lower refrigerator temperature is desirable for some reason. The automatic function is partially blocked, the temperature regulated by means

of the rheostat on the panel, clockwise for colder and anticlockwise for warmer. "A" indicates the holding plate temperature point for "accumulation". In the "MAN.TEMP" position, the compressor starts and runs in the first hand in low speed to maintain the temperature chosen and keep the noise on lowest possible level. If the difference between chosen and real temperature is more than 11°F, the compressor will automatically speed up for faster cooling down. As soon as this extra power is not needed, the compressor speed will be reduced for lowest power consumption and keeping selected temperature.

Indicator lights

Green:

Power is on, compressor standing.

Green+yellow:

Compressor running within the higher temperature range. (Low voltage).

Green+red:

Compressor running with the lower temperature range. (High voltage).

Green+yellow+red:

Compressor running at lowest possible speed to reach selected temperature in MAN.TEMP mode.

Flashing yellow+red:

Error signal from electronic unit. Automatic start attempt after 1 min.

Flashing yellow:

Low battery voltage sensor has switched off. Automatic re-start occurs when engine is started to charge batteries again.

There is a delay of up to 30 sec. before reactions after panel operations.

2.3 User tips

- The freezer compartment is meant for short time storage of pre-frozen food. It has not capacity for quick or deep freezing.
- Start up the refrigerator if possible 6 hours before it shall be loaded with food.
- When making ice in the ice tray, place it direct on the evaporator and put nothing on top of the ice tray. For quicker ice-making, turn the thermostat to coldest position.
- Load the food inside the refrigerator in such a way, air can circulate to equalize the temperature.
- Do not cover the shelves with glass or paper etc.
- To reduce the amount of ice building up in the evaporator, cover all liquids and moist food.
- Let all hot foods cool well before putting them into the refrigerator.

2.4 Defrosting

The evaporator is working on below freezing temperatures and will form frost and ice from humidity in the air. The humidity increases with higher outside temperature, with

storage of non sealed fresh food and liquids and the time the door is kept open. Defrosting shall be made when the frost layer is more than 1/8" thick.

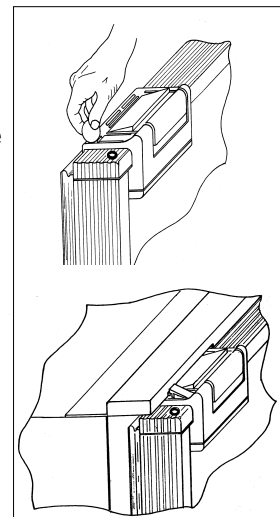
Set the thermostat in OFF position or switch off on the ASU control panel. Store the foodstuff and the liquid as cold as possible during the defrosting process.

Do not use sharp metal tools to remove frost or ice. Do not re-start until the refrigerator is completely defrosted, cleaned and dried. Empty and clean also the plastic drip tray below the evaporator. Place towels in the bottom of the refrigerator to collect melt water.

3. Maintenance

The Isotherm refrigeration systems have a fully hermetic closed cooling system and do not require any maintenance or refilling of refrigerant. The compressor is of mobile type and has a very high efficiency and an outstanding life-time. The refrigerator shall be left in the boat during the winter. (If the temperature is below freezing point, the compressor may not start). The maintenance is reduced to periodically, not less than a year, cleaning of the condenser from dust. Use a soft brush and no sharp tools. Keep the cabinet inside clean.

Use lukewarm water and a mild detergent for cleaning the inside. Put the doors, during not in operation periods, in their slightly open ventilation position. Release the catch on the door for this purpose with a coin or a small screwdriver (see fig.) (not valid for Stainless steel version, "INOX"). Take out the bulb from the interior light to avoid power consumption or switch off a main switch if there is one installed connected to the refrigerator power supply.



3.1 Battery voltage sensor

To protect the batteries from becoming completely discharged, a battery voltage sensor switches off the compressor automatically at the following levels:

System voltage V	Cut out V	Cut in V
12	9.6 (10.4)	10.9 (11.7)
24	21.3 (22.8)	22.7 (24.2)

If the bridge between C and P is cut off, values within the () are valid.

For ASU refrigerators:

System voltage V	Cut out V	Cut in V
12	10.0	12.0
24	22.0	23.5

4 Installation instructions

Many boats have a space which is intended for a fridge. The Isotherm Cruise fridge has been designed to suit the general dimensions normally used for this purpose.

The compressor should normally stand upright in the boat, but will operate at an angle of heel up to 30° and for short periods even more. CR 42 has the compressor attached on a separate bracket by its rear side. This can be moved up to 4.9 ft. away from the fridge.

The pipes must be handled and bent with great care to avoid damages.

Avoid mounting the refrigerator close to a heat source, like gas ovens and heaters. Also avoid a position allowing direct sunshine on the refrigeration unit.

The mounting position should be dry and protected from splashing water.

For easier mounting of the refrigerator, use the mounting rails available as optional equipment, on the models not having three side mounting frame.

The types CR 49 and CR 65 have mounting frame as standard. CR 42 can be equipped with the same type of frame as on CR 49. Other models can be mounted with mounting rails, one on each side of the cabinet.

CR 85 and CR 130 can also be equipped with three side flush mounting frame.

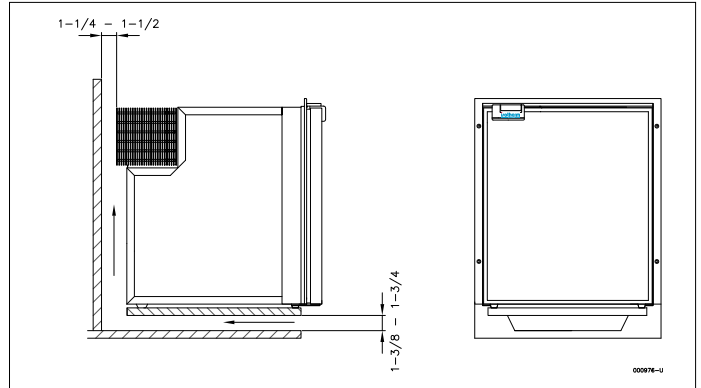
The INOX type refrigerators have a flush mounting frame, three side frame, as standard.

The refrigerators shall be standing on the rubber feet and locked in position by means of the mounting frame or mounting rails. When no rails or frames are used the cabinet must be well fastened into the surrounding constructions.

Avoid mounting close to a heat source, like gas oven and heaters. Also avoid a position allowing direct sunshine on the refrigerator. The mounting should be dry and protected from splashing water.

4.1 Ventilation

It is very important that the compressor/condenser unit is well ventilated and that cold air can enter at the bottom, pass behind the fridge and warm air can leave at the top in the area where it is mounted. The natural flow of air from below and upwards behind the fridge can be increased by arranging ventilation openings at the rear. Make sure there is a free area of 15 - 23 sq.in. below and behind the refrigerator to allow ventilation air to pass behind from below. See fig.



4.2 Door front panel

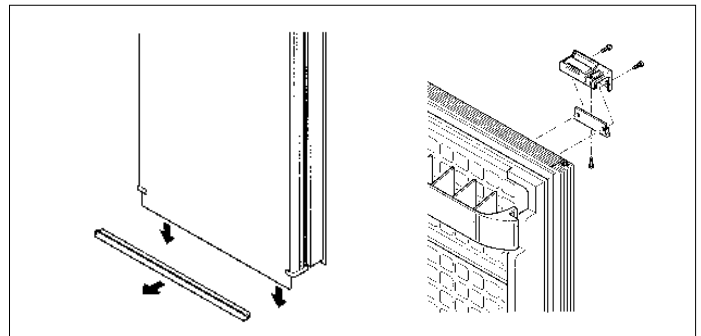
The front panels on the doors can be replaced or additional standard front panels in white, teak, mahogany or cherry can be mounted on top of the standard panel. CR 42, 49 & 65 are also available in version with fully white door and stainless steel mounting frame.

The INOX models have doors in stainless steel and do not have exchangeable door fronts.

Use a screwdriver or a knife as a lever and pull off the lower door profile. Unscrew the three screws holding the door lock.

Mount the extra panel on top of the existing one, fasten the door lock again and push in the lower door profile.

See fig.



4.3 Reverse the door hinge

The doors on the refrigerators are as standard mounted with the hinges to the right hand side.

The door can be hinged to the left by means of changing position of the upper and lower hinge fittings.

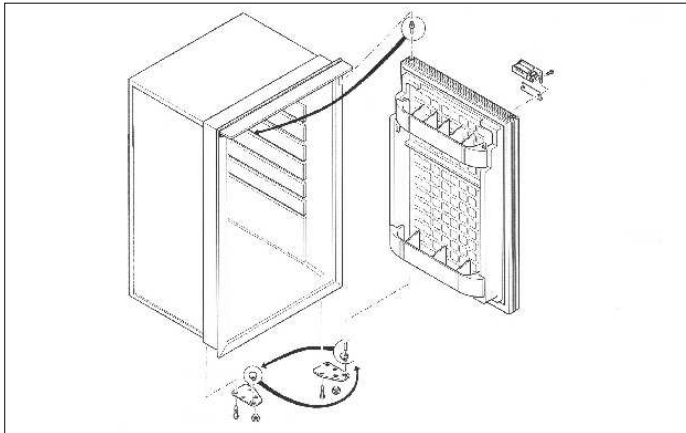
The door lock must also be moved to the other side.

See fig.

CR 42 & 49 have the lower hinge assembly mounted in a plastic fitting, only these parts and the hinge pin must be moved to the other side. The upper hinge pin is threaded into the top part above the door, unscrew the top part to take off the door and move the pin to the other side.

On CR 65, 85 & 130 both the upper and lower hinge fittings has to be taken of and mounted on the other side instead. The lower door support is also moved to the other side.

CR INOX up to CR 85 can also be re-hinged as described above, but CR 130 has left or right doors with side mounted door locks and cannot be changed.



4.4 Electrical connections/wiring

DC 12 or 24 volt

When connecting the refrigerator electrically, it is important that following points are considered:

Always use cables of sufficient area. The area in the following table should be regarded as a minimum.

- * Always connect the refrigerator directly to the battery or to the battery main switch on the plus circuit. Do not connect it via the boats own control panel or other diversions as this can cause a voltage drop in the power supply. Use the included fuse holder with a 15A fuse. Use 7.5A fuse in a 24 volt system. The fuse shall be mounted on the plus cable.
- * Connect the red cable to the positive (+) terminal and the black to the negative (-) terminal. Use tab type terminals for the connection to the electronic unit and other cable connectors of sufficient size for the cable size selected.
- * Do not connect the refrigerator direct to a battery charger. The battery charger must be connected to the battery.

AC (100-240 volt)

The live and neutral wires must be connected to the terminals marked **L** and **N** on the electronic unit. Nominal voltages from 100 to 240 VAC 50/60 Hz. Upper safety cut out limit is 270 VAC and lower limit is 80 VAC. Earth connection is to be placed on the compressor foot near the electronic unit. There is a hole drilled in the foot for this purpose, use a 5/32" screw and nut and a ring cable shoe on the wire.

Connection of mains power plug must fulfil valid electrical safety regulations and properly fused with 4A. Wire gauge, AWG18.

General AC/DC

Both AC and DC power supply can be connected to the electronic unit at the same time. AC will be preferred power supply source if that is the case. If the AC power supply is disconnected, a time delay of 1 minute will be activated before the compressor continuous on DC power supply. If AC power supply is established there will be no delay in compressor operation, when power supply is shifting from DC to AC. The light power supply is connected to A and C. The output voltage on A and C is always regulated to 12 VDC. A 12 VDC bulb must be used for both 12 and 24 VDC power supply systems.

See wiring diagram

4.5 Wire gauge selection 12 & 24 Volt

Wire gauge #	Max cable length in ft. 12V	Max cable length in ft. 24V
12	13	26
10	20	39
8	33	66

4.6 Inner light

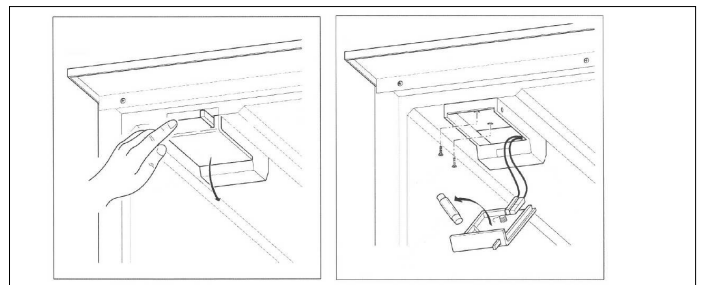
The refrigerators except CR 42 & CR 42 INOX have inner light mounted in the top of the cabinet.

Be sure the right type, 12 or 24 volt, is mounted before the refrigerator is powered. Both 12 and 24 volt bulb are included in the delivery.

Max 3W bulb is to be used.

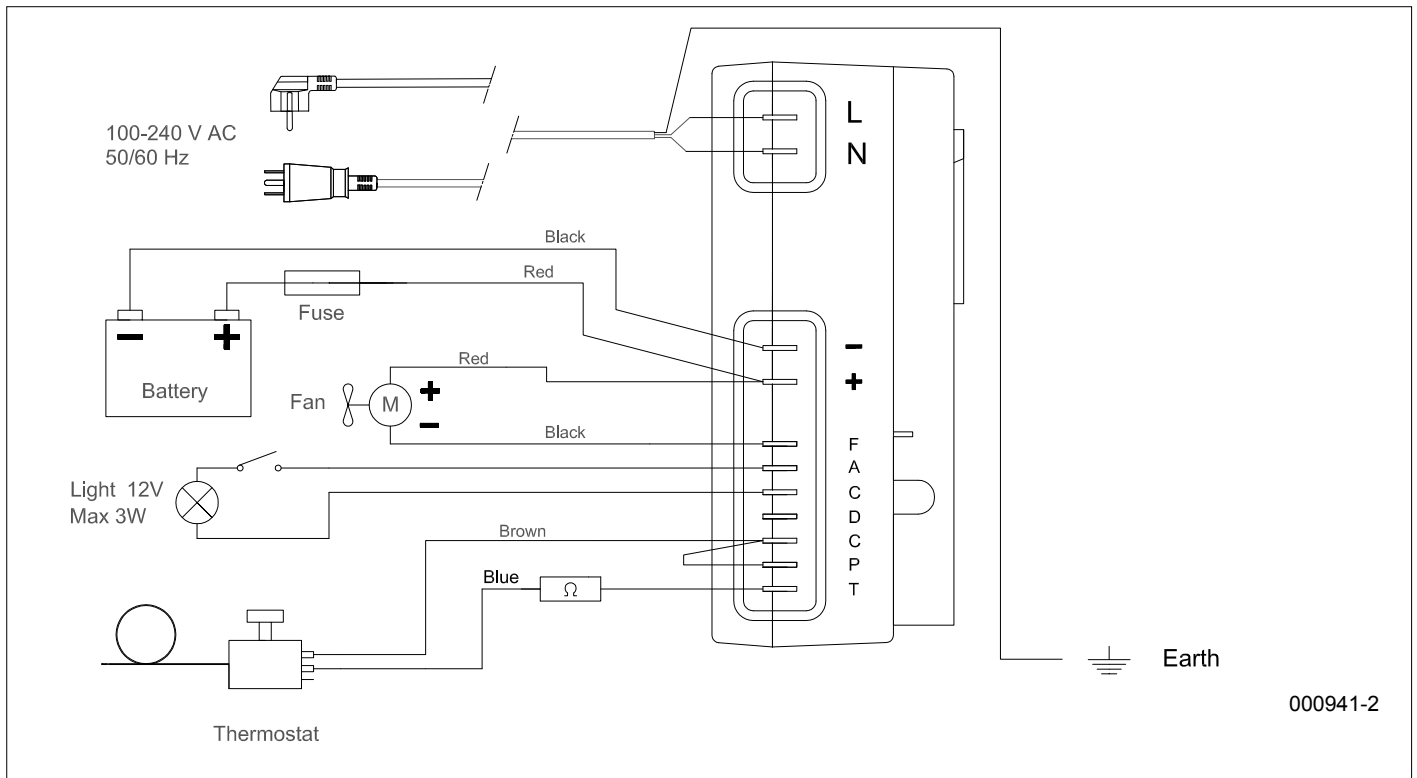
When replacing the bulb, push the light glass assembly downwards with the on-off push pin. Replace the bulb and push back the light assembly into the plastic housing.

See fig. below.

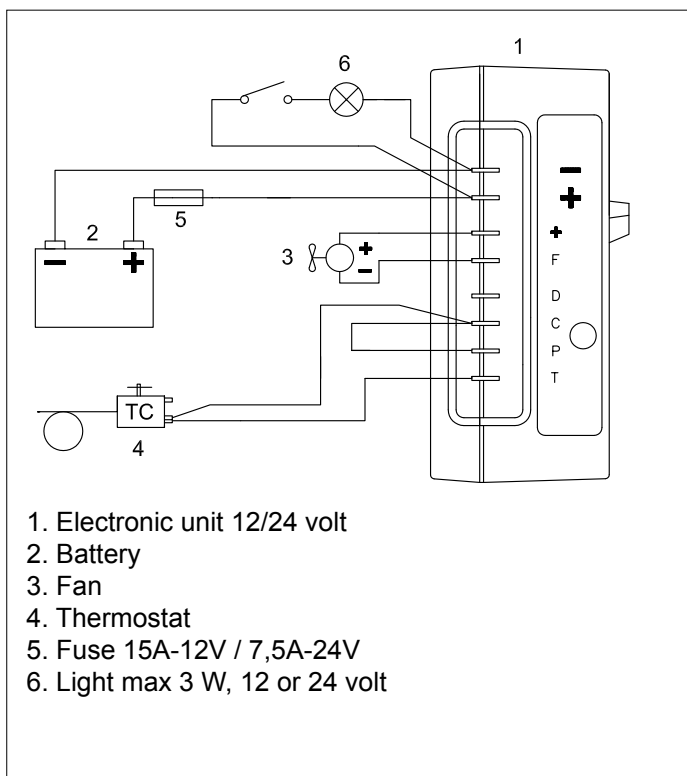


4.7 Wiring diagram

Refrigerator AC/DC

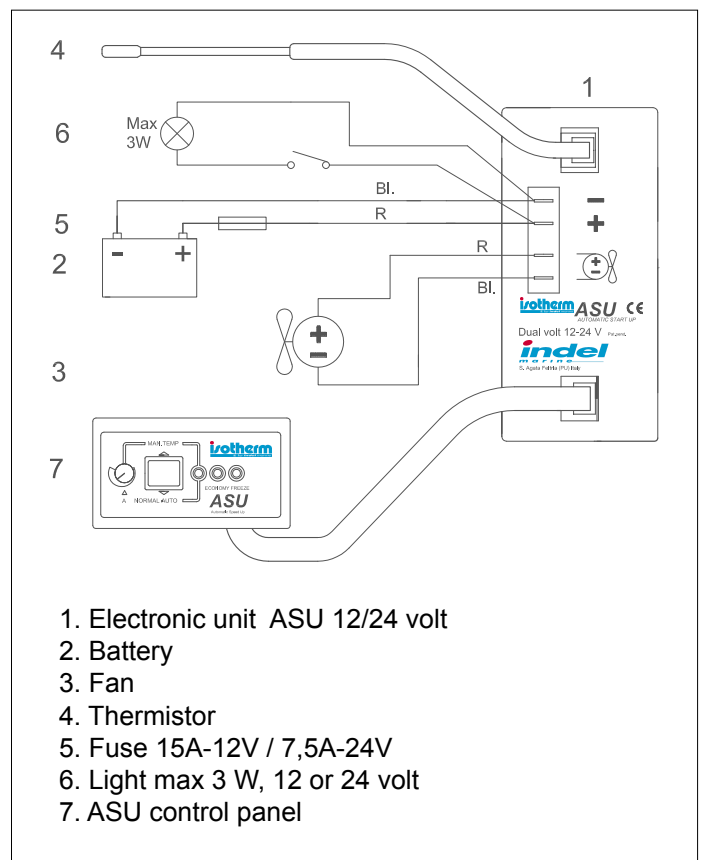


Refrigerator with standard thermostat



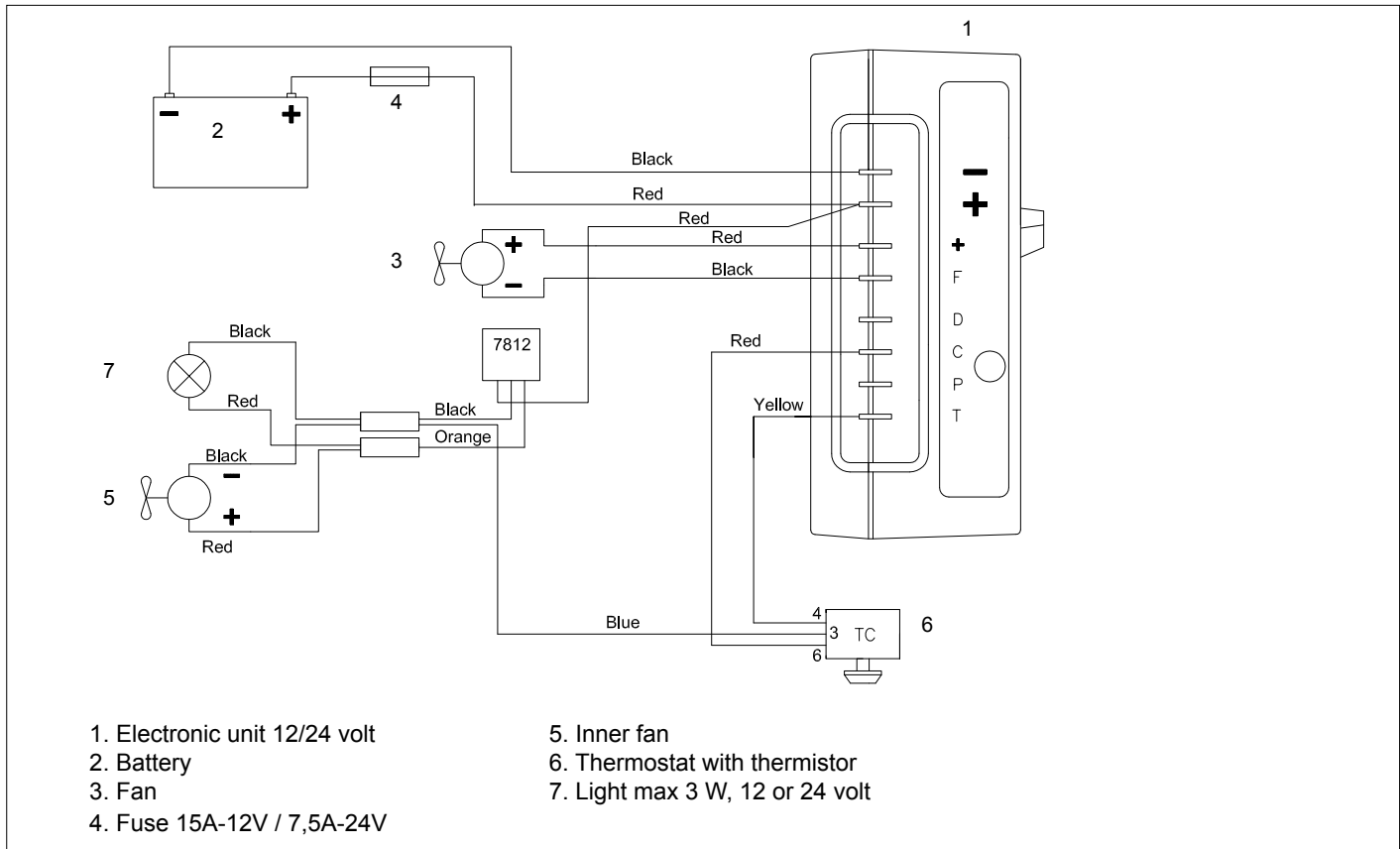
1. Electronic unit 12/24 volt
2. Battery
3. Fan
4. Thermostat
5. Fuse 15A-12V / 7,5A-24V
6. Light max 3 W, 12 or 24 volt

Refrigerator ASU



1. Electronic unit ASU 12/24 volt
2. Battery
3. Fan
4. Thermistor
5. Fuse 15A-12V / 7,5A-24V
6. Light max 3 W, 12 or 24 volt
7. ASU control panel

Refrigerator CR 130 Drink



5 Technical data

Voltage

12 or 24 volt DC also AC/DC as an option

Power consumption when compressor is running:

CR 42, 49 & 65: 2,5 - 2,7 A at 12 V (half at 24 V)
 CR 85: 3.8 - 4 A at 12 V
 CR 130: 4,7 - 5 A at 12 V
 CR 130 Drink: 5- 5,3 A at 12 V

Average consumption:

CR 42 & 49: 0,6 A at 12 V
 CR 65: 0,7 A at 12 V
 CR 85: 0,8 A at 12 V
 CR 130: 1,2 A at 12 V
 CR 130 Drink: 1,4 A at 12 V

Average consumption measured at 43°F in the refrigerator and 72°F ambient temperature. The average consumption is much dependent on the way the fridge is used and how well the ventilation is working.

Compressor:

Danfoss BD35F

Refrigerant:

R134a, filling amount is printed on the sticker inside the fridge.

Fuse:

15 A for 12 volt or 7,5 A for 24 volt respectively.

Isotherm refrigerators fulfil valid EMC directives and are CE-marked.



6 Fault finding

Fault	Possible cause	Action
Fridge not cold, compressor will not start.	No power supply. Battery in poor condition. Faulty thermostat. Faulty electronic unit.	Check that power is present at electronic unit. Check fuse. Check polarity on connectors and cables. Bridge the thermostat over T-C, see wiring diagram. If compressor starts, this indicates a faulty thermostat. If the compressor does not start, this indicates a faulty electronic unit or compressor. Contact an authorized service agent. A possible leak in the cooling system, contact an authorized service agent.
Compressor makes only short start attempts.	Bad power supply, too low voltage or voltage drop at start attempts. Discharged batteries.	Check cables, terminals and other connections, possible verdigris or corrosion, Clean. Charge batteries, run the engine or connect a battery charger. Voltage must be kept above 11.0 V at start attempts.
Compressor runs but no refrigeration generated.	Loss of refrigerant. Leakage in pipes or evaporator. Pipes blocked.	Pressure and leak test. Check for pipe damages. Repair possible leak, evacuate and re-fill refrigerant. (All this to be made by refrigeration specialist).
Compressor runs long time but not generating enough cold.	Bad ventilation. Condenser too warm. Cooling fan not working Too much frost on evaporator. Door not closing well. Condenser blocked by dust.	Improve ventilation for compressor. Re-place fan. Defrost. Check/adjust door position and door seal. Clean condenser.
Fuse blows.	Wrong fuse size. Faulty electronic unit.	Check fuse, 15 A-12 V / 7,5 A-24 V Exchange electronic unit.

If a complicated fault does occur, such as requiring specialist assistance, please contact Indel Marine USA, Inc or your local marine distributor for advice.

7 Installation dimensions

Type	Height	Width	Depth
CR 42	20-3/4	15	18-3/4 (12-1/2)
CR 42 INOX	20-7/8	15-3/4	20-5/16 (14-15/16)
CR 49	20-3/4	15	18-1/2
CR 49 INOX	20-7/8	15-3/4	20-5/16
CR 65	20-7/8	17-3/4	20-3/8
CR 65 INOX	20-3/4	18-7/16	21-3/16
CR 85	24-5/8	18-3/4	20-1/4
CR 85 INOX	24-3/8	19-1/2	21-3/4
CR 130/CR 130 Drink	29-5/8	20-3/4	19-7/8
CR 130 INOX/ CR 130 Drink INOX	29-5/16	21-7/16	21-3/8

Please notice! Refrigerators with AC/DC electronic unit have a depth of 3/4" more than in the table above.

Dimension drawings can be seen on www.indelmarineusa.com