Nova Kool LT201 & LT211 Refrigeration Conversion Kits

Nova Kool have been manufacturing refrigeration conversion kits for more than 30 years.
The LT201/LT211 kits are designed to convert any insulated space into a fridge or freezer. They're easy to install, efficient, reliable and economical. The most common use for these systems is converting existing ice-boxes or coolers into a fridge or freezer. When designing a new fridge or freezer, the user must first fabricate an insulated box with a tight fitting door or lid, or use an existing good quality cooler. The compressor condenser unit can be installed next to, or up to 3.6 metres away from, the enclosure. The copper tubing and wiring is included and can be played out as needed to connect the compressor unit with the cooling evaporator plate in the cold-box.

What's in the kit?

Nova Kool kits include everything you'll need for installation of the kit in an insulated box with a lid or door that seals. You'll need to provide wiring from your 12 or 24 volt DC power source. The compressor needs to be located within 3.6metres of the box in a well ventilated area with air allowed to enter low and escape above. The cold plates are mounted inside the enclosure and the lines are then led to the compressor location. Finally the quick connect fittings are tightened together and the system is then ready to start cooling. An optional AC/DC auto-switching module is also available as an option and longer 5.5m (18 feet) line sets are available by special order.

Compressor/Condenser

The heart of the LT201 system is the Danfoss BD35F compressor controlled by a Danfoss DC electronic module and equipped with an efficient fan cooled condenser.The system is pre-charged with R134a refrigerant.
LT211 systems are equipped with the larger capacity BD50F compressor.
An AC/DC multi-voltage auto-switching module is also available as an option.

Re-useable quick connects

Re-useable quick connects ensure that no gas is lost during installation.

Cooling Plates

Nova Kool evaporator plates are equipped with re-useable quick connects and pre-charged with R134a refigerant. Standard line sets are 3.6m (12 feet) long. Longer line sets of 5.5m (18 feet) are available by special order.

Cooling Plate options

A large range of evaporator plates are available to suit your application. Choose a plate that matches your cooling requirements. A small well insulated fridge should have a small plate. A large or poorly insulated fridge will require a larger plate. Freezers require large evaporator plates to maintain stable temperatures so in general it's best to choose the largest plate that you can fit in your freezer. Plates formed into a box or 'U' shape can be used to enclose a small freezer area inside a larger fridge space.The following pages will help you decide which system is best for your application and final pages will show you what is involved in a typical installation.

Thermostat

A Danfoss mechanical thermostat is included. These thermostat's are very precise and reliable.

Mounting Hardware and Installation Guide

Mounting hardware and an installation and trouble shooting guide are also included.

Speed resisters

Kits also include resisters that allow you to manually adjust the compressor speed to your needs. The resisters go in the thermostat circuit. The control module senses the resistance in the circuit and this sets the compressor speed so you can match your systems capacity to the required load.

Evaporator Plate options

F1

F1 plate - the F1 plate is 405mm x 255 mm - 1033 sq. cm area
(Note: the copper line set adds 40mm to overall measurement where lines enter the plate.)
The **F1** evaporator plate is suitable for small all fridge applications up to 120 litres litres in size.
See sizing chart for details.

F2 and F3 Plates are joined by flexible copper. Plates can be seperated by up to 450 mm

F2

The **F2** evaporator plate is two F1 plates joined by flexible copper.
The two plates can be seperated by up to 450mm for a neat installation without bends.
Suitable for all fridge applications up to 240 litres in size or all freezer applications up to 120 litres. Each plate is 405mm x 255 mm - 2067 sq. cm total plate area

F3

The **F3** evaporator plate is made up of three F1 plates joined by flexible copper.
The three flat plates are joined together with flexible copper so they can be seperated by up to 450mm.
Each plate is 405mm x 255 mm - 3100 sq. cm total plate area.
F3 is suitable for large all fridge applications up to 350 litres in size or all freezer applications up to 180 litres. See sizing chart for details.

RT6, RT4 & R26

These plates are used to enclose a small freezer area inside a fridge.

R26

The **R26** is "U" shaped with mounting holes.
It encloses a freezer area of ~ 6 litres volume.
280 mm wide x 255 mm deep x 60mm high. Plate aea is1033 sq. cm
Suitable for small fridge applications up to 120 litres with a 6 litre freezer area enclosed by the plate.

RT6

The **RT6** is Composed of three flat evaporator plates and alloy sides with mounting brackets and door: 356 mm wide x 279 mm deep x 172 mm high
Total plate area is 2620 sq. cm. Encloses a 15 litres freezer area.
Suitable for large fridge applications up to 300 litres in size.

RT4

RT4 - 267 mmx 317 mm x 165 mm
Plate surface area is - 2200 sq.cm ~ 14 litres volume
Suitable for large fridge applications up to 260 litres in size. RT4 encloses a 14 litre freezer area.
See sizing chart for details.

Bendable flat plates

These plates can be bent to fit almost any box size - a 50mm radius bend is recommended.

FL

FL evaporator plate is 915 mm long by 381 mm wide - 3480 sq.cm
You can bend this plate to fit the shape of your fridge or freezer.
Suitable for large fridge and freezer applications applications up to 500 litres in size or all freezer applications up to 250 litres.
See sizing chart for details.

FM

FM plate is 815 mm long by 292 mm wide - 2380 sq.cm
You can bend this plate to fit the shape of your fridge or freezer.
Suitable for large fridge and freezer applications applications up to 380 litres in size or all freezer applications up to 200 litres.
See sizing chart for details.

Which kit is right for my application?

The following pages will help you decide which kit is best for your application. There are an number of factors involved:
1. How large is the space that I want to cool?
2. Do I want to cool or freeze this area or divide the space into a fridge and freezer?
3. How much and what type of insulation is used?
4. How much power is available?

The information below will help you to decide which system is best for your application.
Alternatively you can contact us with the information above and we will recommend a system for you.
Call 1300 791 432 or 07 5549 1212 or email sales@oceansolutions.com.au or sales@novakool.com

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Which Evaporator plate option should I use?

All freezer area. Refer to the chart below and choose the largest Evap. Plate that will fit in your box: FL. FM or F3 plates are recommended wher they will fit in the available space.

All fridge area.
Refer to the chart below and choose the an Evap. Plate that will fit neatly in your box and match the cooling requirements.

Fridge with a small freezer area.
The R26, RT4, and RT6 are designed for this application. They can be mounted vertically or horizontally.
Refer to the chart below and choose the an Evap. Plate that will fit neatly in your box and match the cooling requirements.

Fridge with a freezer larger than 15 litres cooled by a single compressor.
This is referred to as a "spill-over" system. The fridge and freezer sections of a top loading box are seperated with an insulated panel that has holes or slots at the top and bottom to allow air to circulate. cold plates are mounted in the freezer section: cold air will spill over cooling the fridge section. By gradually closing off the slots or holes at the top the fridge/freezer reaches the correct balance of temperatures desired in each section.

Fridge and freezer area cooled by a two separate compressor/condenser units.
Obviously there are extra costs associated with a two compressor system and increased power usage but there are also substantial advantages; so for large fridge/freezers intended for long term full time use this can sometimes be the best way to go.
Both fridge and freezer temperatures can be accurately controlled and each side can be run independantly.
Each side can be independantly shut down so you're not cooling a large space for a few small items.

How large an area can I cool with the LT201 series? - see chart below.

Data below is a guide line only: assumes high quality PU insulation, in a top loading, holding fridge, or freezer .
Target temperatures 4C fridge and -12C freezer. Results may vary depending on ambient temperature, insulation quality, how often the lid is opened etc.

Insulation thickness	15 cm insulation		10.5 cm insulation		7.5 cm insulation		5 cm insulation	
LT201 - Plate option	Max fridge	Max Freezer	Max fridge	Max Freezer	Max fridge	Max Freezer	Max fridge	Max Freezer
F1	155	80	120	60	90	43	75	26
F2	300	155	235	120	170	80	110	55
F3	450	230	355	180	250	125	160	80
R26	150	6	120	6	90	6	75	6
RT4	330	14	260	14	185	14	120	14
RT6	380	15	300	15	220	15	130	15
FM	360	180	280	140	198	100	120	60
FL	510	260	400	198	285	142	170	85

To calculate internal volume of the area you intend to cool: Length in cm's x Width in cm's x Depth in cm's / 1000 = Total volume in litres.

Note: The LT211 optional comperssor/ condenser is powered by a Danfoss BD50F - which provides 25 to 30 % more cooling capacity.

FAQ's

Q: Do I need a professional to install the kit?
A: The quick connect ensure that the gas system integrity is maintained at all times so CFC's are not handled by the installer and no gas will escape during installation.

Q: Will I lose gas when I do the couplings up?
A: No the quick connect have re-useable valves that ensure no gas escapes during installation.

Q: How much power will it use?

A: The new Danfoss BD series compressors are speed variable so you can match compressor output to your cooling requirements. The LT201 systems will draw 2.1amps @ 12 volts while running at their slowest speed and at their highest speed setting they can draw up to 6.5 amps. The compressor will cycle on and off as the thermostat reaches it's set points.

When the compressor is running the LT201 will draw between 2.1 and 5.5 amps at 12 volts DC (1.1 to 2.8 amps @ 24VDC). The compressor will cycle on and off as the operating temperature is reached so overall power useagle can be as liitle as 15 amps per day for a small well insulated fridge up to a maximum of 132 amps per day for a very large, poorly insulated freezer.

How much power it uses depends on:
1. How large the fridge or freezer space is
2. Insulation quality and thickness.
3. Door seals.
4. Ambient temperatures; on a hot day the load on the fridge will be higher.
5. Ventilation: a poorly vetilated compressor/condenser will be less efficient.

Please contact us for assistance in estimating daily power useage of your application.

Q: I've seen other brands that claim lower power consumption than Nova Kool?

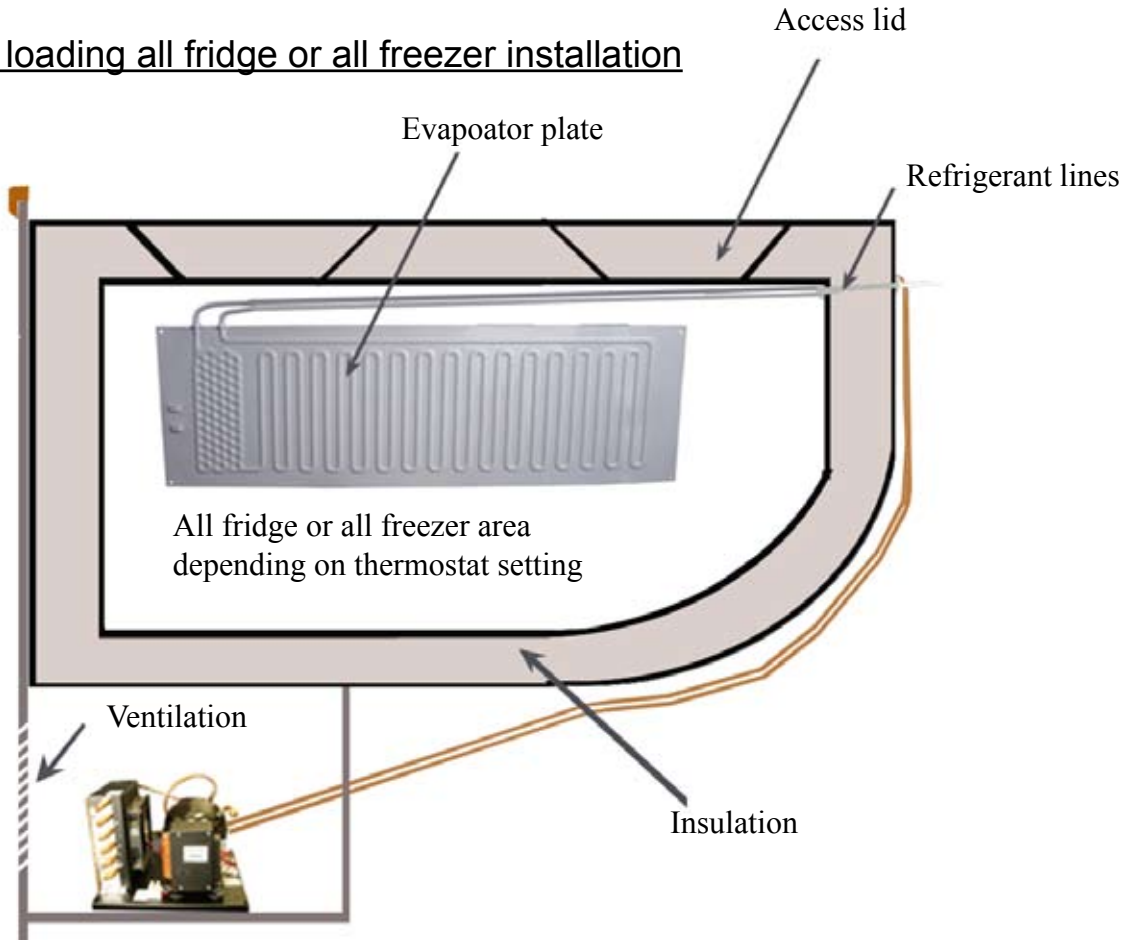
The power consumption data provided by most manufactures are completely unrealistic for Australian conditions. We try to provide an honest estimate of "real world" power consumption. Every installation is unique so use this data with caution.
Nova Kool have been refining the LT series for more than 25 years. The goal is to provide a system with optimal efficiency and reliability.
In "real world" conditions Nova Kool systems outperform and outlast the competition.

Q: I've been told that a BD50 will work better in the Tropics?

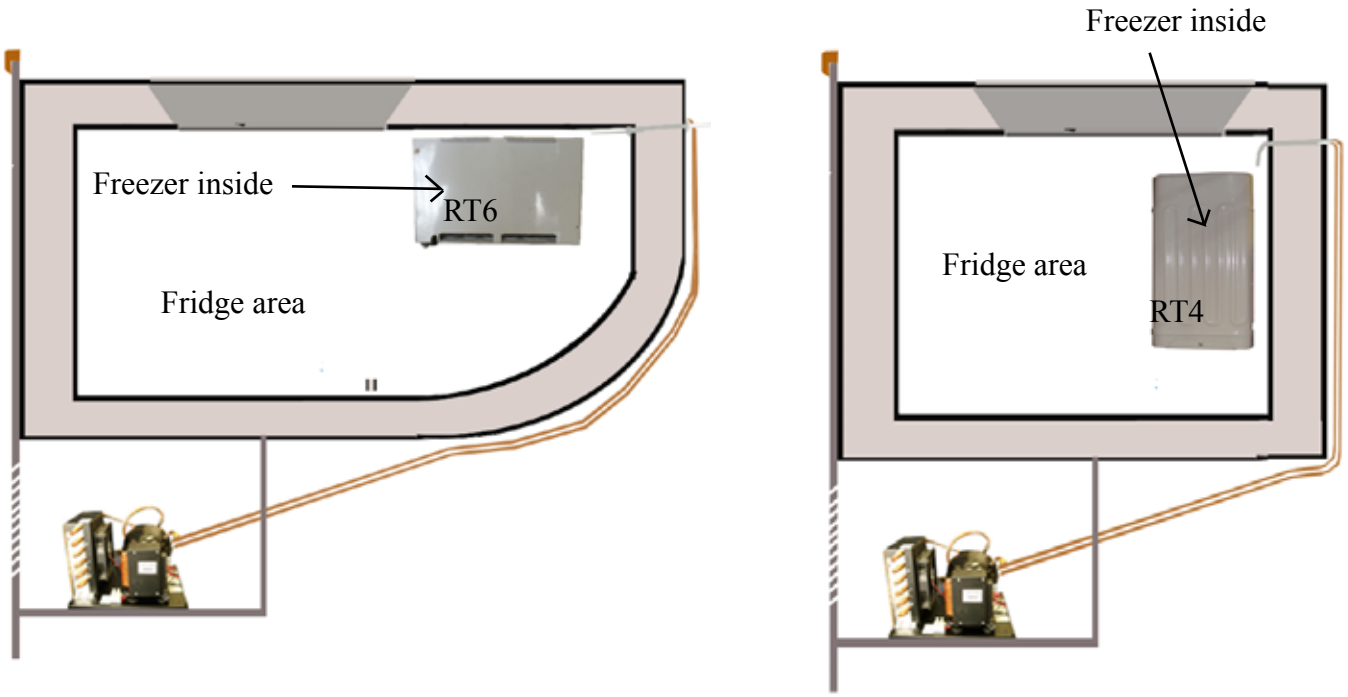
A: Unless you a have a very large or poorly insulated box the BD35F variable speed compressor utilized in the LT201 kits will do the same job as the BD50F while using less power. Choose the LT211 option if you require the more powerfull BD50F compressor.

Q: Where should I mount the compressor/condenser unit?
A: Any dry, well ventilated location within 3.6m (12feet) of the fridge or freezer. Closets, cupboards, cockpit lockers, lazarette, are all good locations. Remember no matter where you mount it, your unit will need ventilation. We recommend 120 sq in of ventilation, ideally 60 coming from down low in the cabin and 60 up high to allow the hot air to escape.

Typical top loading all fridge or all freezer installation

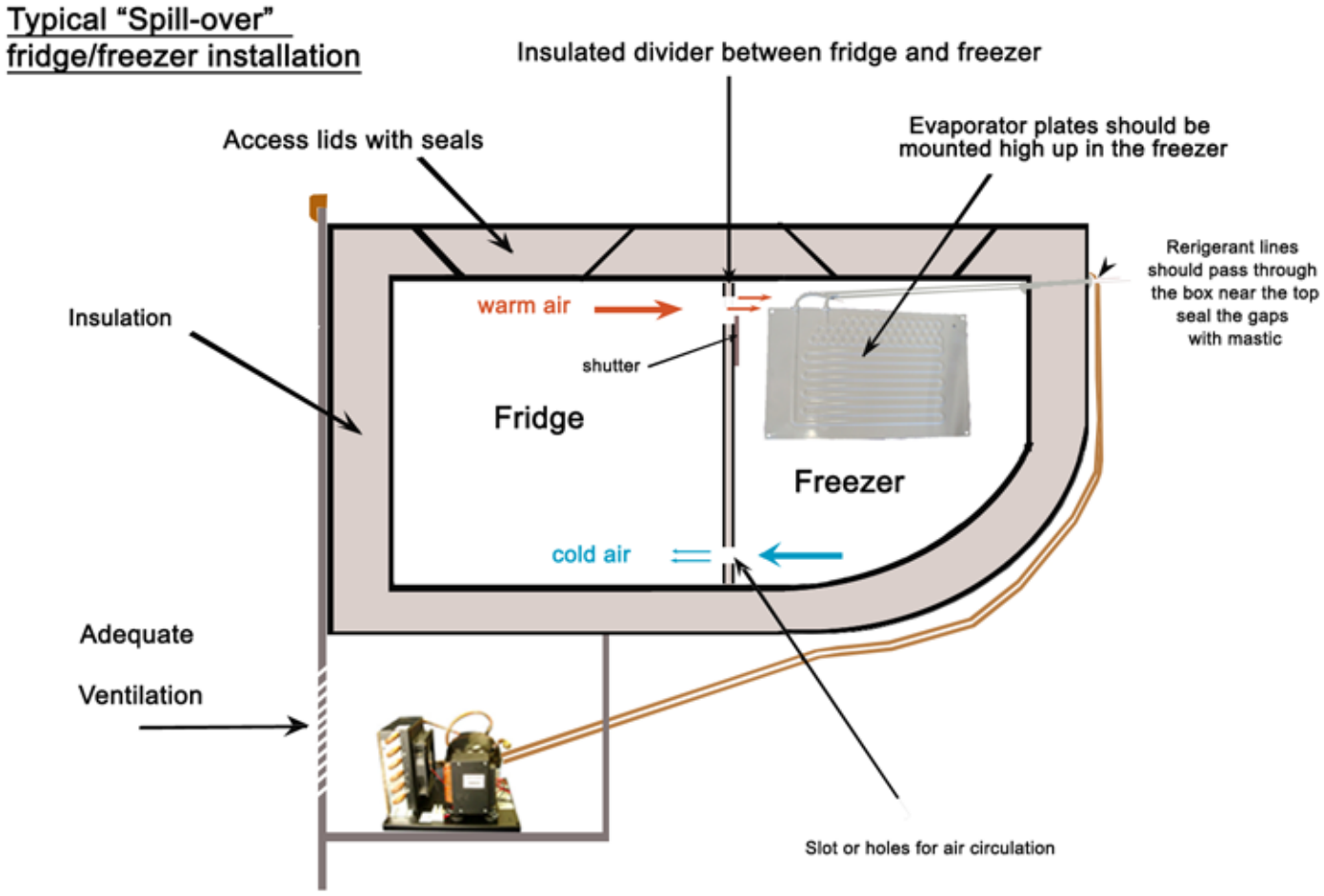


Typical top loading all fridge / freezer installations



RT4, R26 and RT6 can be mounted vertically or horizontally to enclose a small freezer inside a larger fridge area.

Q: I want a fridge and a freezer. How do I do this.
A: There are a number of ways to acheive this:
1. Use the R26, RT4 or RT6 to enclose a small freezer space inside a larger fridge area as shown above.
2. If air can circulate between the fridge and freezer area a single compressor "Spill-over" Fridge/Freezer can be created that allows larger freezer area's than the R26, RT4 or RT6.



3. If the fridge and freezer are in seperate boxes and there is no way to provide air circulation between the two area's then two separate conversion kits must be used. A two compressor system is more expensive and will use slightly more power than the single compressor systems described on the previous page but there are a number of advantages:
- Independent temperature control of the fridge and freezer.
- Each side can be independantly shut down so you're not cooling a large space for a few small items. So for large fridge/freezers intended for long term full time use this can sometimes be the best way to go despite the extra cost.

Do's and Dont's -

If you follow the installation instructions there is very little that can go wrong but here are a few things that have caused problems in the past:

- Do not install the thermostat control outside the box. The Danfoss mechanical thermostat control must be installed inside the box to function correctly.

- Do not overload the fan circuit. The fan circuit on the control module is only designed to run the 0.2 amp fan provided with the system. If an additional fan is added to the fan circuit the total load on the circuit must not exceeds 0.5 amps or the control module will shut the system down.

- Do provide at least as much ventilation as directed in the installation manual. Poor ventilation is the number one cause of fridge performance problems. The system must be able to circulate air past the condenser to work efficiently.

- Do not tamper with the access valve or attempt to alter the gas charge yourself! This access valve on the compressor is provided for use by an authorized service technician only. Unauthorized access will void your warranty.

- Do call us if you require more information or if you are in doubt about any aspect of the installation or operation of your refigeration system. We are here to help:

Ocean Solutions (Brisbane Qld. Australia): Call 1300 791 432 or 07 5549 1212 or email sales@oceansolutions.com.au

Nova Kool (Vancouver B.C. Canada): Call - 7am to 4 pm Pacific Standard Time +1-604-523-6515 email: sales@novakool.com