

Field Service Notes – Issue 6.
12 / 24 Volt DC Refrigerators & Freezers
fitted with Danfoss BD35F, BD50F
or ACC-CUBIGEL GD30FDC Compressors

PLEASE READ CAREFULLY BEFORE STARTING

• **Introduction -**

These notes are to be read in conjunction with any other instructions that may have been given by SHORELINE (UK) LTD and are designed to assist the user or installer in overcoming most problematic operations of SHORELINE 12/24vdc Fridges & Freezers which may occur in the field. Whilst every effort is made to ensure that our products leave our premises in full correct working order, and because every installation is different from another, field faults can occur. Our After Sales Service is here to help you overcome problems in achieving problem-free operation of your appliance. Our contact details can be found at the end of these notes.

- WARNING - ISOLATE THE DC SUPPLY TO THE APPLIANCE BEFORE COMMENCING ANY WORK. ARCING OF LIVE LEADS CAN CAUSE IRREPARABLE AND COSTLY DAMAGE TO YOUR APPLIANCE - YOU HAVE BEEN WARNED!.

• **LED INSTALLATION -**

All of our appliances are already fitted with a RED low-voltage LED alarm warning light. This indicator provides us with a fault analysis indication. This LED is continually OFF during normal operation.

DANFOSS: This 12 Volt LED is supplied ready connected onto a flying lead with spade crimps ready for installation onto the Electronic Unit which is mounted on the side of the motor compressor at the rear of the appliance. You will notice that one of the white leads has a BLACK TRACE on its entire length. This is the positive lead and is to be fitted onto the small '+' (third terminal down from the top). The other is the negative and is to be fitted onto the terminal marked 'D' (DIODE – this is the fifth terminal from the top). Refer to TABLE A: LED FAULT ANALYSIS at the end of these notes.

ACC-CUBIGEL: This 12 Volt LED is supplied ready connected onto a flying lead with SP1 Telephone Type connector plug ready for installation onto the Electronic Unit which is mounted on the side of the motor compressor at the rear of the appliance. This plug is to be pushed into the SP1 socket at the top of the electronic unit. Refer to TABLE A: LED FAULT ANALYSIS at the end of these notes.

• **LOWER VOLTAGE CUT-OUT LINKING WIRE –**

DANFOSS: To protect your battery from any permanent damage, your appliance is fitted with an automatic low voltage Cut-out protector. This will cut off the power supply to the appliance if the battery voltage falls below the limit stated below:

	Cut-out	Cut-In
12 volt	10.4 volts	11.7 volts
24 volt	22.8 volts	24.2 volts

By fitting a linking wire across two of the Electronic Unit terminals, we can reduce these Cut-out levels by approx. 1 volt. This is to assist in ‘nuisance tripping’ where possibly the installation may have used under-sized cables, or where other appliances or other connections are made through the same battery source which can reduce the required starting current of the motor. The linking wire has a single crimp on one end. This is to be connected to the ‘P’ terminal (second terminal from the bottom). The other end has a double ‘pick-a-back’ crimp. This is to be connected to the ‘C’ terminal along with the thermostat lead that is already fitted on this terminal. The new Cut-out levels will be as follows:

DANFOSS	Cut-out	Cut-In
12 volt	9.6 volts	10.9 volts
24 volt	21.3 volts	22.7 volts

Note - Low voltage limits are to be measured at the motor electronic unit. Beware of voltage drop over long cable lengths and through isolation switches of insufficient rating. Other electrical equipment, i.e. water pumps, should not be installed along the same cables supplying the appliance as low-voltage tripping can occur when these are switched on.

ACC-CUBIGEL: These electronic units are pre-programmed via specialist PC software at our factory to suit individual size refrigerators or freezers. No user adjustment is possible.

ACC-CUBIGEL	Cut-out	Cut-In
12 volt	9 volts	11 volts
24 volt	20 volts	23 volts

• **EXTENDED OPERATING VOLTAGE LINKING RESISTOR -**

DANFOSS: To enable the motor to operate from a wider range of supply voltages a linking resistor (220K Ohm Value) can also be fitted. This will allow the motor to operate from a supply voltage of between 9.6v to 31.5. This is of particular use when utilising the SHORELINE AC to DC Power Converter when the DC supply is from a 24v system. The linking resistor has a single crimp on one end. This is to be connected to the ‘P’ terminal (second terminal from the bottom). The other end has a double ‘pick-a-back’ crimp. This is to be connected to the ‘C’ terminal along with the thermostat lead that is already fitted on this terminal.

Note – A resistor may already be fitted to the ‘C’ terminal that controls the motor speed. This is not to be removed from the wiring circuit.

ACC-CUBIGEL: These electronic units are pre-programmed via specialist PC software at our factory to suit individual size refrigerators or freezers. No user adjustment is possible.

• **FAN INSTALLATION -**

Some of our appliances are already fitted with a Motor cooling fan. This is to maintain a cooler environment for the appliance to operate correctly in. We recommend a cooling fan to be

fitted to the appliance where the surrounding ambient temperatures can exceed +32°c (+90°f). All fans we supply are 12 volt and are suitable for 24 volt applications:

DANFOSS: The RED or positive fan lead should be connected to the small '+' (third terminal down from the top). If a LED indicator is fitted, you will need a 'pick-a-back' crimp connection to share this terminal. The BLACK or negative lead should be connected to the 'F' (FAN) terminal (fourth terminal down from the top).

ACC-CUBIGEL: The RED or positive fan lead should be connected to the small '+' (third terminal down from the top). The BLACK or negative lead should be connected to the 'F' (FAN) terminal (fourth terminal down from the top).

The fan needs to be positioned using the self-adhesive mounting pads with the fan blade drawing air through towards the side of the electronic unit. You may notice a slight delay in the fan starting after the Motor has started - this is normal.

- **FAN SWITCH INSTALLATION -**

In some instances, the running noise of the compressor cooling fan (as fitted above) may become disturbing to the ear, particularly at nighttime. To remedy this a fan switch can be fitted which will switch off the running of the cooling fan. However, this is not recommended for operation in very warm climates as detailed above, as this will put unnecessary duty on the compressor. To fit the fan switch first remove the BLACK fan lead terminal marked 'F' and fit this to one of the terminals on the rear of the switch. Then fit one end of the short link wire to the other terminal on the rear of the switch and the other end of this lead onto the now vacant 'F' terminal on the electronic unit. Remember that the fan will only operate when the compressor is running. The fan can now be switch on or off via the newly installed switch.

- **CABLE SIZE -**

Connection from the battery to your appliance should be made using a cable size selected from the chart below:

CABLE SIZE (mm ²)	CABLE LENGTH (metres) (Distance from battery to fridge)	
	12 Volt	24 Volt
2.5	2.5	5
4	4	8
6	6	12
10	10	20

- **AFTER SALES SERVICE -**

Should you require any additional service information, please contact us at the address below, **quoting your appliance model number and serial number as displayed on the inside or rear of your appliance.**



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DANFOSS BD35F or BD50F / ACC-CUBIGEL GD30FDC COMPRESSOR

ELECTRICAL FAULT ANALYSIS

	FAULT	POSSIBLE REASON	CORRECTIVE ACTION
1	Compressor does not run - LED flashes <u>once</u> every few seconds	Voltage/Current supply too low to electronic unit terminals. Battery protection cut-out	Check cable size is correct. Check rating of isolation switches or for loose battery or terminal connections.
		Battery voltage too low	Charge battery
2	Compressor does not run - LED flashes <u>three times</u> every few seconds THIS IS A SAFETY MOTOR PROTECTION FEATURE AND SHOULD AUTOMATICALLY RE-SET ITSELF AFTER 15 MINUTES	System pressures unequal before thermostat re-connects	If problem persists: Switch off power for 10 minutes, and then switch back on.
			Suspect Electronic Unit or Thermostat. Contact Shoreline
3	Compressor does not run	No power to unit	a) Check power at terminals on electronic unit. b) Check correct Polarity of <u>your</u> wiring.
		Defective line fuse or electronic unit	Replace fuse. If fuse blows again - contact SHORELINE
		Thermostat not making contact. Check by short-circuiting terminals T & C (Danfoss) or terminals T+ & T- (ACC) on electronic unit – compressor should then run continuously	Turn thermostat on or up to colder position
			Replace thermostat
			Replace electronic unit
Contact SHORELINE			
4	Compressor runs but no refrigeration cooling	Appliance blocked in with no air flow at rear or sides	Refer to user instruction for correct installation guidance
		Refrigerator system fault	Contact SHORELINE