

Compressor Speed Control

What is it?

Do I need it?

What are the options?

Q: What is compressor speed control?

The Danfoss BD 35 and BD 50 compressors that most marine refrigeration manufacturers use in their refrigeration systems have variable speed capability.

Fact 1: The longer and slower the compressor runs the more efficient it is; the faster the compressor runs the more cooling power it has.

So ideally we want to run the compressor at the fastest speed initially to cool the box down and then run it as slow as possible to maintain temperatures. Then there should be provision for the speed to be adjusted manually or automatically when warm goods are put in the box and/or when external conditions change.

Fact 2: The highest loading on the electronics, and therefore the highest risk of failure, happens during the first few minutes of start-up with a warm box and the compressor running at maximum speed.

Ideally, as a safeguard against electronic failure from overloading, we should start the compressor in a slow speed, where there is less strain on the electronics, and then gradually increase it (ramp up) to maximum.

Q: Do I need it?

By fully utilizing the variable speed feature, your system will be far more efficient and you will be providing much-needed protection for the electronics. *NOTE: It is recommended that pumped-water cooled systems and those with holding plates be operated at maximum speed.*

Q: What are the options?

(1) **Fixed speed**: Speed is set either at lowest speed (2000 RPM), where thermostat wires are connected directly to the thermostat terminals on the compressor controller, or at a fixed speed between 2000 and 3500 RPM accomplished by the addition of a resistor in the thermostat circuit.

(2) **Manual Speed Adjustment - Speed Board**: This gives user-adjustable speed selection from 2000 to 3500 RPM, by adjustment of a potentiometer with a small screwdriver. The Speed Board is a PCB that plugs on to the compressor controller.



(3) **Smart Speed - Merlin**: Speed automatically adjusted to achieve the best compressor run time for increased efficiency. Cold-start ramp-up routine from medium speed to protect electronics. **Merlin** is a PCB that plugs on to the compressor controller.

(4) **System Control - Guardian**: Remote panel that allows manual speed selection with rotary knob. Also gives precise temperature control using integrated Coastal MK II digital thermostat/thermometer, and fault diagnostics provided by troubleshooting LED.



(5) **The Ultimate Combo! - Guardian plus Merlin**: Gives operator full system temperature control and diagnostics, plus the choice of using either the automatic speed routine of **Merlin**, or manual speed override.