Invertek Drives.com

Compressors

INDUSTRIAL, COMMERCIAL & REFRIGERATION

Refrigeration Compressor Control

High efficiency, high performance cooling capacity control

OPTIDRIVE™

Reliable & easy to use variable frequency drives for refrigeration compressor applications

Dedicated HVAC-R Control

With **OPTIDRIVE™** variable frequency drives

Installation of **OPTIDRIVE™** variable frequency drives to control refrigeration compressors, significantly reducing energy consumption, and improving system COP (coefficient of performance)

IP20 **IP55** / NEMA 12 **IP66** / NEMA 4X

Improved System Performance, Matching Cooling Capacity to Changing System Demand, Reduced Energy Costs, 20% Free Cooling Capacity, Extended Compressor life.

Compressors are used in a wide range of HVAC-R systems, providing cooling and heating (reversable heat pumps) for industrial, commercial & food retail applications. In the past, cooling was delivered by running the fixed speed compressor to meet the cooling demand of the system, and then turning it off when the desired cooling had been reached. This type of system control, uses a thermostat to turn the compressor on and off. A good example of this type of control is the domestic fridge.
This method of "on-off" capacity control is still used today, but is very inefficient. The introduction of AC variable frequency drive technology, allows HVAC-R machine builders and system integrators to vary the cooling capacity of the compressor by changing the compressor speed, to accurately maintain the cooling requirement. This is achieved by fitting a pressure transducer into the low-pressure suction line. The transducer measures the suction pressure and the controller compares the actual pressure to the required set-point. The controller subsequently adjusts the compressor's speed to run faster or slower, by varying the 0 to 10V or 4...20mA speed demand signal to the **OPTIDRIVE™**, to maintain the system set-point during periods of high and low cooling demand.

This method of smooth capacity control provides improved system stability, by reducing the under and overshoot around the set-point, which is common with "on-off" control systems. It has been calculated, that by reducing the error around the set-point, by using **OPTIDRIVE™**, for every 1-degree Kelvin improvement, the user can save 4% in energy consumption. In supermarket applications, providing a stable temperature inside their refrigerated display cases, extends product life, and lowers costs associated with food wastage. 20% free additional cooling capacity can be achieved on an existing fixed speed compressor connected to a 50Hz supply, by simply installing an **OPTIDRIVE™** variable frequency drive. Most compressor motors are designed for 50Hz or 60Hz supplies. The **OPTIDRIVE™** allows the maximum output speed of the compressor to be safely increased from 50Hz to 60Hz. Compressor capacity increases proportionally to output speed. Therefore, setting the **OPTIDRIVE™** output frequency to 60Hz, the cooling capacity is increased by 20%. If the compressor being controlled by the variable frequency drive is on the lead compressor, on a multi-compressor refrigeration rack system, it is possible to increase the output speed of the compressor beyond 60Hz. Semi hermetic compressors, can run safely at output speeds of 65Hz to 70Hz, providing 30% - 40% free cooling capacity. The maximum & minimum output speed should always be confirmed by contacting the compressor manufacturer. Increasing the output speed, and thereby the cooling capacity, could result in the second fixed speed compressor on the rack, operating less often. This results in lower energy costs, improved system control, and extended compressor life, due to fewer starting cycles.
OPTIDRIVE™, ideal for OEMs and also refrigeration contractors & installers for retrofit applications, providing a cost effective and energy efficient solution to control the cooling capacity of the compressor to correspond with the varying system demand.

It can be supplied enclosed as IP20 for OEMs to install in their electrical control panel, or IP66, which allows the OEM or contractor and installer to mount **OPTIDRIVE™** on the wall, inside the electrical switch room, or directly on the compressor rack. This eliminates the need for an electrical control panel, lowering costs.

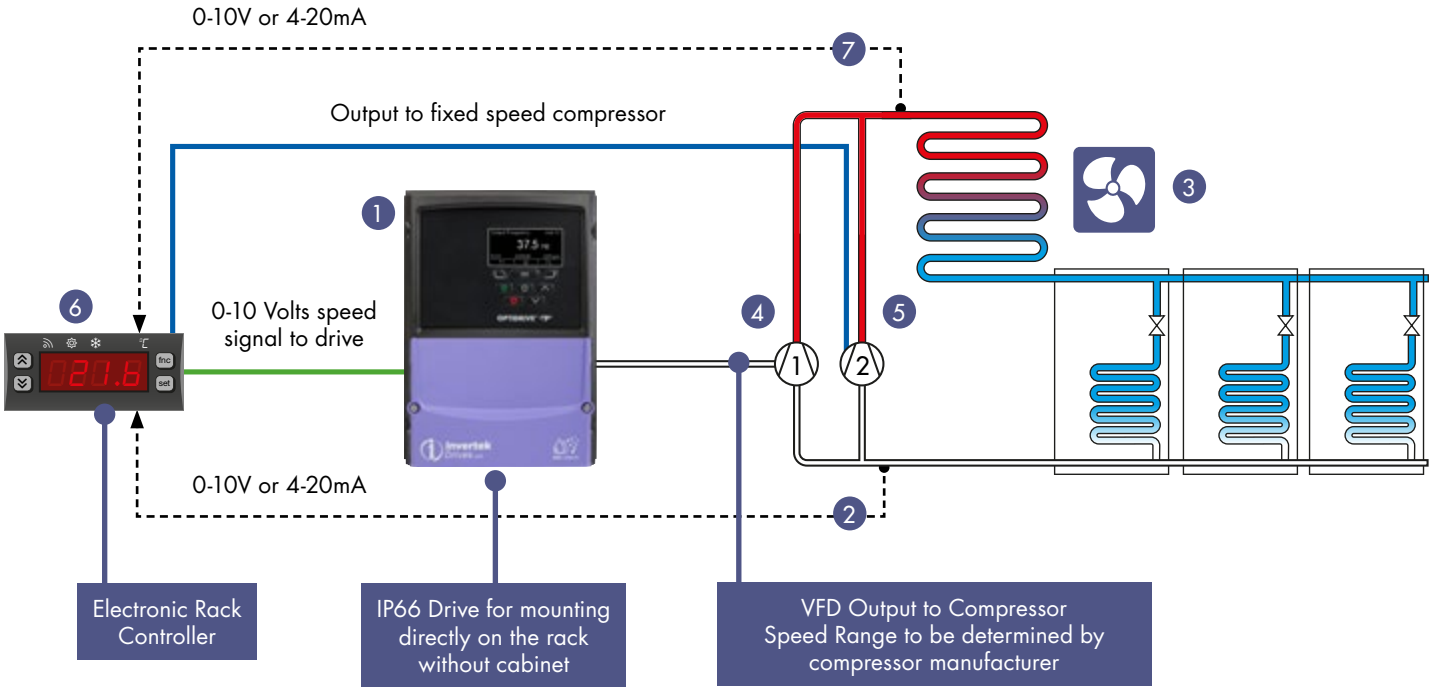
Sensorless Vector Control for all Motor Types

Precise and reliable control for **IE2, IE3, IE4 & IE5** motors.
One drive, many compressor solutions

- **IM** IE2 & IE3 Induction Motors
- **PM** AC Permanent Magnet Motors
- **BLDC** Brushless DC Motors
- **SynRM** Synchronous Reluctance Motors
- **LSPM** Line Start PM Motors

Typical Drive System for refrigeration Compressors & Condenser Fans

1. Variable speed drive
2. Low Pressure Transducer
3. Condensing Fans
4. Variable speed Compressor
5. Fixed Speed Compressor/Compressors
6. Rack Controller
7. High Temperature Pressure Transducer



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Contact Invertek Drives
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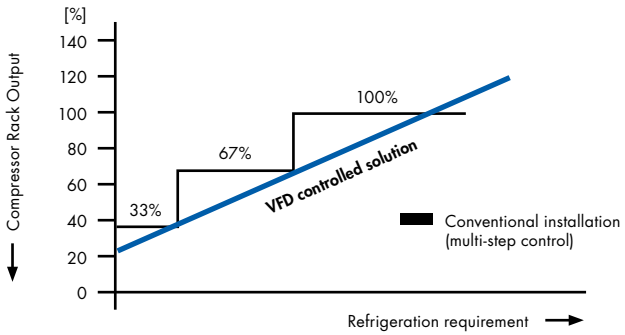
OPTIDRIVE™
Variable Frequency Drives

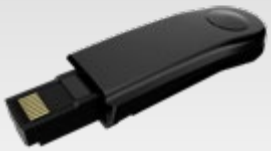
IP20 IP55 / NEMA 12 IP66 / NEMA 4X

- ✓ World leading compressor control
- ✓ Easy to use
- ✓ Simple to commission
- ✓ Easily integrated with HVAC-R systems
- ✓ Rugged, robust design

Lower energy consumption



Optistick Smart



NFC
Bluetooth®
OPT-3-STICK-IN

Rapid Commissioning Tool

- Allows copying, backup and restore of drive parameters
- Provides Bluetooth interface to a PC running OptiTools Studio or the OptiTools Mobile app on a smartphone
- Onboard NFC (Near Field Communication) for rapid data transfer

Motor Technology & Safety

- High starting torque, to ensure semi hermetic compressors start under all conditions
- Independent speed ramps, to match compressor acceleration & deceleration speed profiles
- TÜV approved STO (safe torque off) input, for improved system & compressor protection.
- PTC input, motor thermal protection
- Low harmonic solution, meeting the requirements of EN 61000-3-2 & EN 61000-3-12 which reduces the total rms input current. This can reduce fusing and cabling requirements.
- Integral built-in EMC (electromagnetic compatibility) filters for C1 & C2 conducted emissions compliance
- IP20 enclosures for mounting drives inside electrical panels
- IP66/55 for mounting drives on the wall of electrical switch rooms or on compressor rack frame

Save Energy

- Improved temperature control and system stability, results in less food wastage and shrinkage
- Suction Set-point control carried out by the controller or directly in the drive, reducing over/under shoot, saving 4% energy per 1-degree Kelvin saved
- Built-in Soft starting, reducing peak starting current tariffs, lower energy costs
- Fewer compressors needed to meet cooling capacity, extended speed range 25Hz up to 87Hz or compressor manufacturers limits, lowering system costs

Reduced Maintenance Costs

- Less stop-starts, due to extended speed range, longer compressor life
- Soft starting, reduces the mechanical stress at compressor start up, extends compressor life

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