

CONNECTION OF COMPRESSOR MOTORS TO **FrigoPack** REFRIGERATION INVERTERS

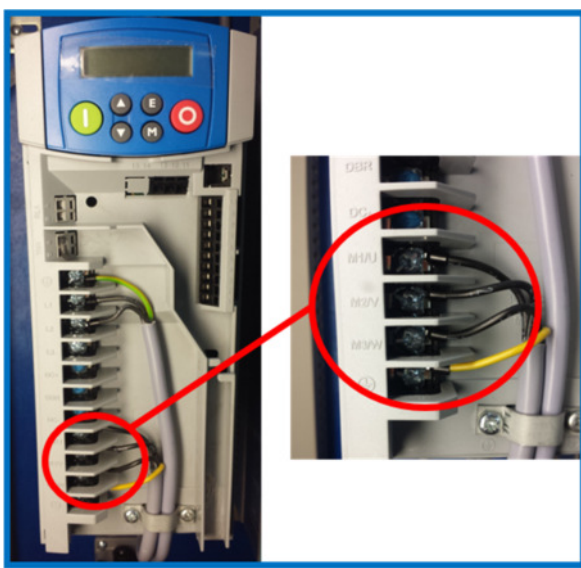
0. General Information

- Operation in the delta connection:
 - Advantages:
 - Smaller compressors can be used for the same cooling capacity
 - Smaller relative minimum capacity
 - Disadvantages:
 - Larger **FrigoPack** refrigeration inverter required
 - Higher cost
 - Lower COP at higher speed
 - Higher acoustic noise
 - Bypass emergency operation complicated and expensive (4 contactors, 2x motor cables)

- Operation in the star connection:
 - Advantages:
 - Minimum overall installed cost
 - Optimum COP
 - Lower compressor stress (longer working life)
 - Bypass emergency operation simple and low cost (2 contactors, 1x motor cable)
 - Disadvantages:
 - Higher relative minimum refrigeration capacity

0.1 Motor connection terminals of the **FrigoPack** Refrigeration Inverters

The motor connection terminals are accessible after the removal of the terminal cover (see Application Information Bulletin 1-001.2). The motor cable can now be connected to the Inverter terminals with the U/M1, V/M2, W/M3 and PE labelling as shown on the picture below.



FrigoPackE FMV

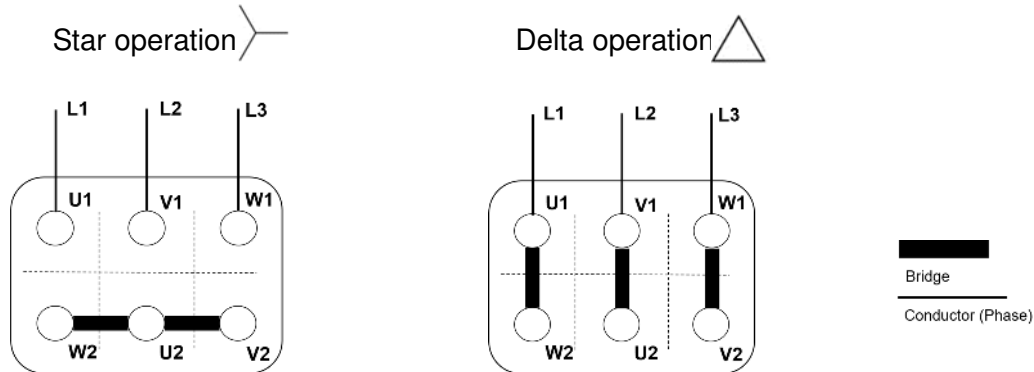


FrigoPack FU+

1. Operation of various types of compressors with *FrigoPack* Refrigeration Inverters

1.1 Smaller-size semi-hermetic reciprocating/piston compressors (up to about 30 m³/h at 50 Hz)

- Typical motor winding (six terminals):

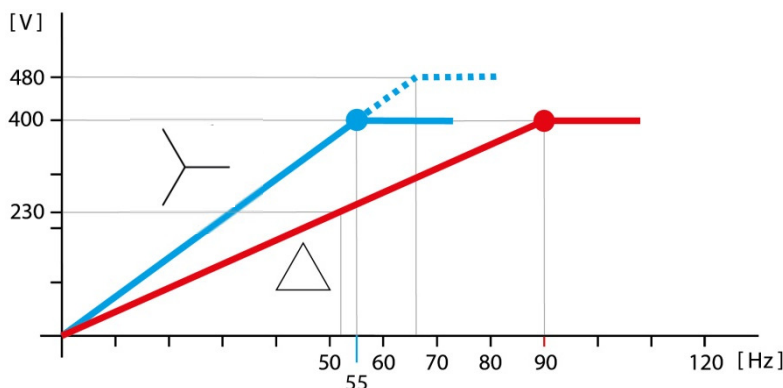


- Possible connections with *FrigoPack* Refrigeration Inverters:

Connection	Rated voltage/Frequency	Inverter current	Power
Star	3AC 400 V / 50 Hz	100 %/	100 % *
	3AC 480 V / 60 Hz (USA)	100 %	120 %
Delta	3AC 230 V / 50 Hz/	170 %/	100% *
	3AC 400 V / 87 Hz	170 %	170%

* related connection

- Voltage to frequency characteristic:



Possible operating range of frequency with 3AC 400 V voltage supplies (typical limiting values):

- When using strong MT/HT motors:

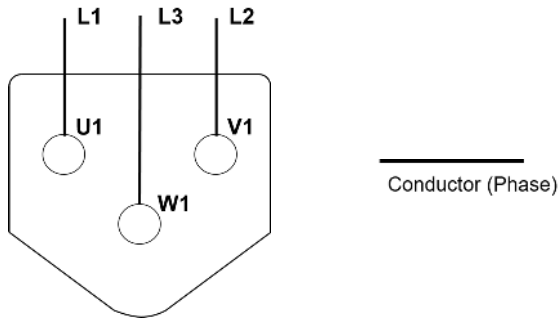
LT (-35 °C):	20-30 ... 65-75 Hz	Low evaporating temperature
MT (-10 °C):	20-30 ... 60-70 Hz	Medium evaporating temperature
HT (+ 5 °C):	20-30 ... 50-60 Hz	High evaporating temperature
- When using LT compressors with small motors:

LT (-35 °C):	25-35 ... 50-65 Hz	Low evaporating temperature
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1.2. Small to medium-size fully hermetic reciprocating/piston or scroll compressors
(up to about 100 m³/h at 50 Hz)

- Typical motor winding (three terminals):

Using the example of a 3AC 230 V / 50 Hz motor winding

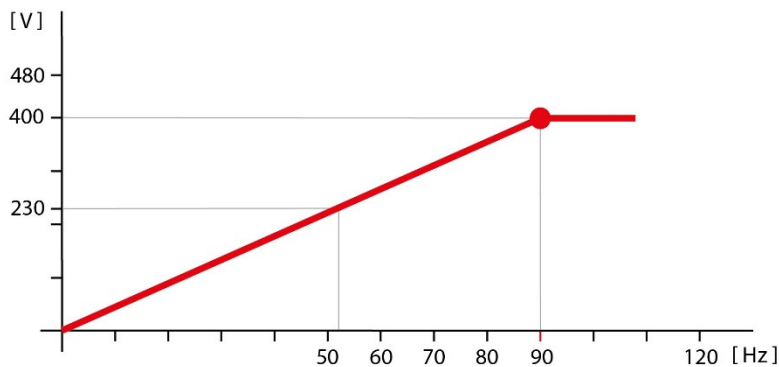


- Possible connections with **FrigoPack** Refrigeration Inverters:

<u>Rated voltage/Frequency</u>	<u>Inverter current</u>	<u>Power</u>
3AC 230 V / 50 Hz	100 %	100 %*
3AC 400 V / 87 Hz	100 %	170 %

* related connection

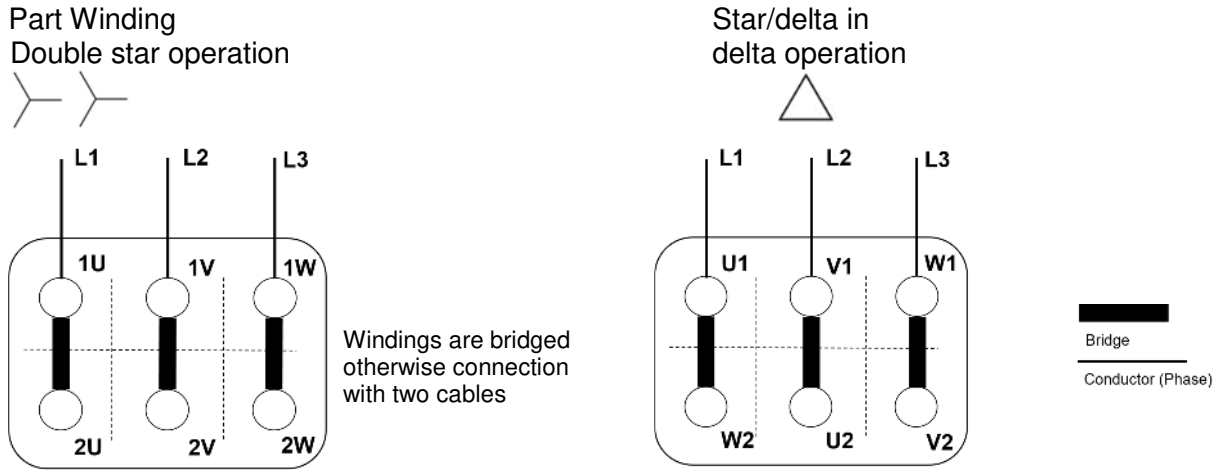
Voltage to frequency characteristic



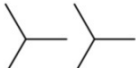

- Possible operating range of frequency with 3AC 400 V voltage supplies:
 - Refer to compressor manufacturer's technical data:
 Typical: 20-45 ... 90-120 Hz

1.3. Medium to large open or semi-hermetic reciprocating/piston or screw compressors
 (from about 100 m³/h at 50 Hz)

- Typical motor winding (six terminals):

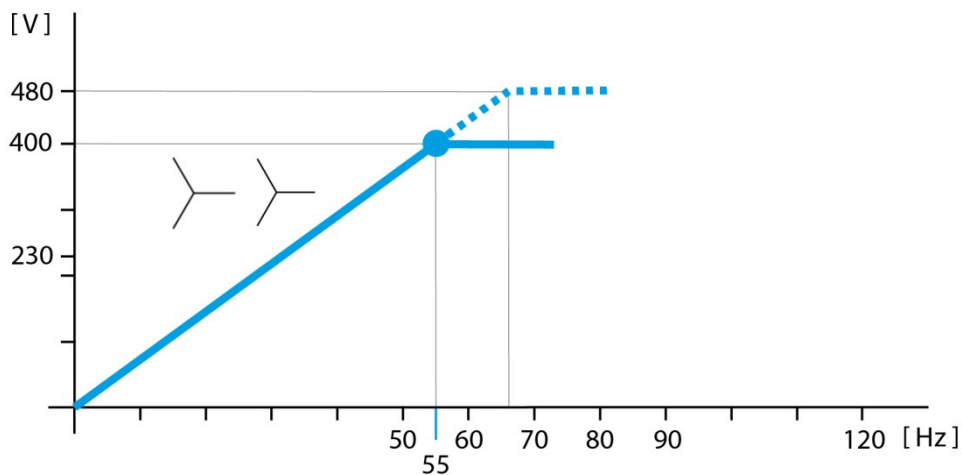


- Possible connections with **FrigoPack** Refrigeration Inverters:

Connection	Rated voltage/Frequency	Inverter current	Power
Double star 	3AC 400 V / 50 Hz	100 %	100 % *
	3AC 480 V / 60 Hz (USA)	100 %	120 %
Delta 	3AC 480 V / 50 Hz	100 %	100 % *
	3AC 480 V / 60 Hz (USA)	100 %	120 %

* related connection

- Voltage to frequency characteristic:



- Possible operating range of frequency with 3AC 400 V voltage supplies:
 - See compressor manufacturer's technical data