



# Voltage and Frequency Supervisor

## "VFS"

### - User Manual -



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# 1. INTRODUCTION

Thyatron develops and produces innovative and cost efficient power and control solutions for appliance OEMs worldwide. With product placements over the past 25 years in some of the harshest environments, Thyatron has acquired the know how to deliver reliable quality products.

The VFS is a device that supervises voltage and frequency of the power supply to protect the compressor and cuts off the output when the input mains voltage and/or frequency are out of limits.

## 1.1. Product Features Summary

- Voltage and Frequency Supervisor with adjustable limits
- Status LED (Embedded)
- Galvanic Isolated– Reinforced insulation
- Smart configurable start-up delay to protect from unstable supply (Timmer)
- Installation area monitoring for thermal event prevention

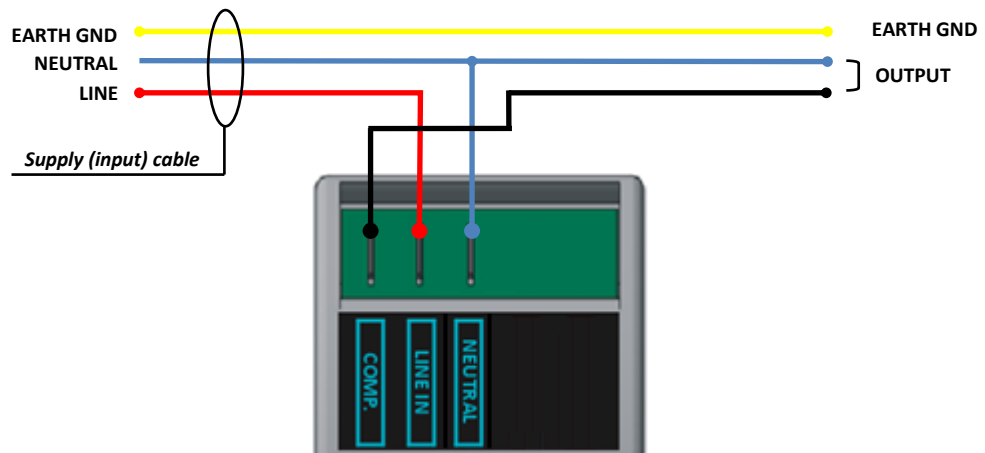
## 2. VFS

### 2.1. Connection Diagram

Check the insulation of the supply (input) cable according to local regulations before connecting to the ECU.

VFS is intended to be used with the protection of a fuse gG, type B, IEC60269-3-1.

Confirm compatibility with connection terminals as well as insulation. The connectors are Fast On terminals 6.3x0.8mm.



### 2.2. Voltage And Frequency Supervisor

VFS monitors voltage and frequency of main power and cuts off the output to the compressor and Fan Motor when the input mains voltage and/or frequency are out of limits. These values are programmable and at the parameter list you can find the limits and default values.

### 2.3. Ambient Temperature Monitoring

VFS monitors the temperature of its surrounding area and in case it detects a value higher than the upper limit value or a temperature rise pace greater than 15°C per 16 minutes it cuts out the output to protect the cooler and itself. VFS will reconnect the output when the temperature of the surrounding areas falls below 50°C and the rate of temperature rise becomes lower than 15°C per 16 minutes.

TEMPERATURE LIMIT	MAX TEMPERATURE RISING PACE
+80 °C	DT > 15 °C / 16 min

## 2.4. Intelligent Time Delay

Intelligent time delay provide a period of time to allow balance of the pressures of the refrigeration circuit between cycles, preventing startup under high pressure thus extending the lifetime of the compressor.

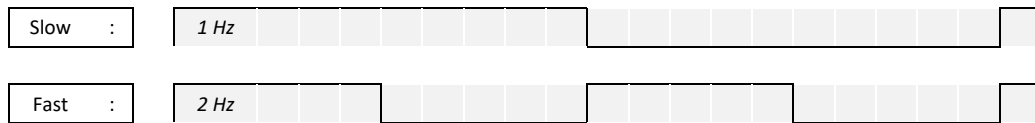
A randomized small time window will prevent simultaneous startup of multiple coolers at a single location to protect from sudden voltage drops and potential power supply overload.

## 2.5. Reconnecting Voltage Hysteresis

If the VFS reconnects after a cut off and the line voltage fluctuates near the VFS's input lower or higher limit voltage, it will utilize a voltage window to avoid continuous cutoffs triggered from the connecting voltage drop that may occur.

## 2.6. LED Indication

EVENT	LED
Output switched off	Blink Slow
Frequency out of limits	Blink Fast



## 3. PARAMETERS

The VFS is supplied with predetermined default settings. Parameter sets can be modified up-on request.


### 115V Version


Parameter table			Units	Value		
				Default	Min	Max
Electrical Limits	Voltage	Low Limit	VAC	100	90	130
		High Limit	VAC	120	90	130
	Frequency	Minimum	Hz	57	45	65
		Maximum	Hz	63	45	65

### 230V Version

Parameter table			Units	Value		
				Default	Min	Max
Electrical Limits	Voltage	Low Limit	VAC	200	160	250
		High Limit	VAC	245	160	250
	Frequency	Minimum	Hz	47	45	65
		Maximum	Hz	53	45	65

### 3.1. Electrical Limits

VOLTAGE	
High Limit	It is the <u>highest operational voltage</u> before the device will cut out its output.
Low Limit	It is the <u>lowest operational voltage</u> before the device will cut out its output. At reconnect conditions, must take into account the voltage window hysteresis (~7VAC).
	<b><i>The "Voltage Low Limit" must be less than "Voltage High Limit" at all times.</i></b>

FREQUENCY	
Max	It is the <u>highest operational frequency</u> before the device will cut out its output.
Min	It is the <u>lowest operational frequency</u> before the device will cut out its output.
	<b><i>The "Minimum Frequency" must be less than "Maximum Frequency" at all times.</i></b>

## 4. TECHNICAL SPECIFICATIONS

VFS Specifications			
		115V Version	230V Version
Operating conditions	Nominal Voltage	115 VAC	230 VAC
	Operation Voltage Bandwidth	55 - 145 VAC	110 - 285 VAC
	Ambient Temperature	Tmin -40°C Tmax+50°C	
	Humidity	0 - 85 %RH	
	Output Cut-Off Range (Programmable)	90 - 130VAC / 45 - 65 Hz	160 - 250VAC / 45 - 65 Hz
	Output Current Capacity	10(6)A	
Thermal protection		<ul style="list-style-type: none"> <li>- Temperature limits +85 °C</li> <li>- Temperature differential 15°C / 16 min</li> </ul>	
Plastic Housing		UL94 V-0 Flame Retardant	
Relay Lifetime		Output Relay lifetime cycles > 100.000	
Pollution Degree		III (3)	
PTI		250	
Insulation (between Main Power and Accessible Parts)		Reinforced	
Power Connections		6.3mm x 0.8mm flat, terminal	
Total weight (g)		0.155 kg	

## 5. STORAGE

Should not be stored in high temperature or high humidity condition. Usage, beyond the specified shelf life could compromise product long term reliability. The suitable conditions are +5 to +35°C and less than 75%RH in Relative Humidity indoor. Shelf Life, 2 years.

## 6. APPROVALS

Approvals		
<b>CB</b> - Test Certificate	IEC 60730-1 : 2013 + A1 IEC 60730 - 2 - 9 : 2015 + A1 : 2018	The controls pass the GW750 test according IEC 60335-1:2010 clause 30.2.3.2. Relays separately tested as sealed device according to IEC / EN 60079-15:2010 clause 22.5.
<b>CE0413</b> - Declaration of Conformity - Verification of Conformity	EN 60730 - 1 : 2016 EN IEC 60730 - 2 - 9 : 2019	
<b>RoHS III</b> (EU Directive 2015/863)		

**Further Information**

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