

Variable Speed Motor (VSM) Technology

The VSM Technology integrates an electric motor with a built-in Variable Frequency Drive (VFD). By combining these two technologies a myriad of improvements are now possible such as increased energy efficiency, reduced installation cost, process control options, and built-in error proofing.

The VSM Technology is available from 2 HP to 10 HP with both standard shaft and C-face options.

Standard Features

- Remote Keypad Controller with RJ45 Connection
- Bluetooth® Communication
- Factory Programming for Application Specific Solutions

VSM Technology Applications & Benefits

Benefits

- VFD tuned and programmed by Tuthill to plug and play in your application
- Integrated motor & VFD eliminates control enclosure, wiring, motor starter, over-load and costly installation wiring time
- Eliminates vacuum booster “wind-milling” and shaft seal failures
- Reduces vacuum pump down cycle time by 30-40% depending on chamber volume
- Wireless VFD communication and interrogation
- Meets IE5 Efficiency standard - The highest in the industry
- Available in C-flange or standard shaft options
- Analog or discrete motor feedback signal (speed, power, amps, etc.)

Applications

- Process pressure control (vacuum or positive pressure)
- Vacuum booster rapid “lock-load” cycles
- Booster VFD speed ramp-up for large chamber volumes
- Turndown pump speed to reduce energy consumption during “stand-by” periods
- Pressure boost for air blower pneumatic conveying applications



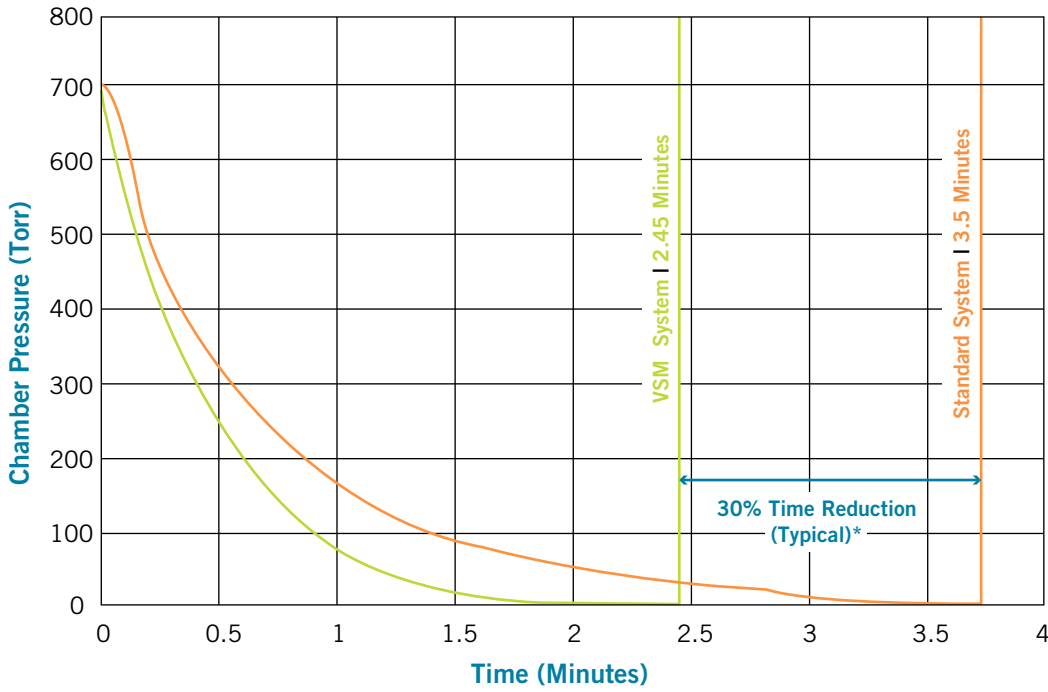
Specifications

Voltage & Power Requirements:	380V - 480Vac (+/- 10%) - 3-phase
Input Frequency:	50/60 Hz
Overload Capacity:	150% for 1 minute (most models)
Switching Frequency:	4kHz, 8kHz, 12kHz, 16kHz, 24kHz, 32kHz
NEMA Frames:	140, 180, 210
Mounting:	Foot, C-Face
Analog References:	0-10Vdc, 0-20mAdc, 4-20mAdc
Digital Inputs:	24Vdc (1 = 8 - 30Vdc; 0 = 0 - 4Vdc)
Input Configurations:	2 Fixed DI's; 2 Configurable (AI or DI)
Output Relay:	NO contact; 250Vac, 6A / 30Vdc, 5A
Standards & Certifications	UL 580C, cUL 580C, CE Mark

Environmental

Enclosure	TEFC/IP54 Motor with UL Type 12/IP54 Drive
Operating Temp.	-10 to 50°C
Storage Temp.	-40 to 70°C
Relative Humidity	0 95% (non-condensing)
Vibration (Operating)	1 G Peak at 20 Hz
Vibration (Non-operating)	0.2G Peak at 20 to 50Hz
Maximum Elevation	Up to 1000 meters
	Up to 2000 meters
Elevation for De-rated Operation	De-rate above 1000 meters
	-1% for every 100 meters

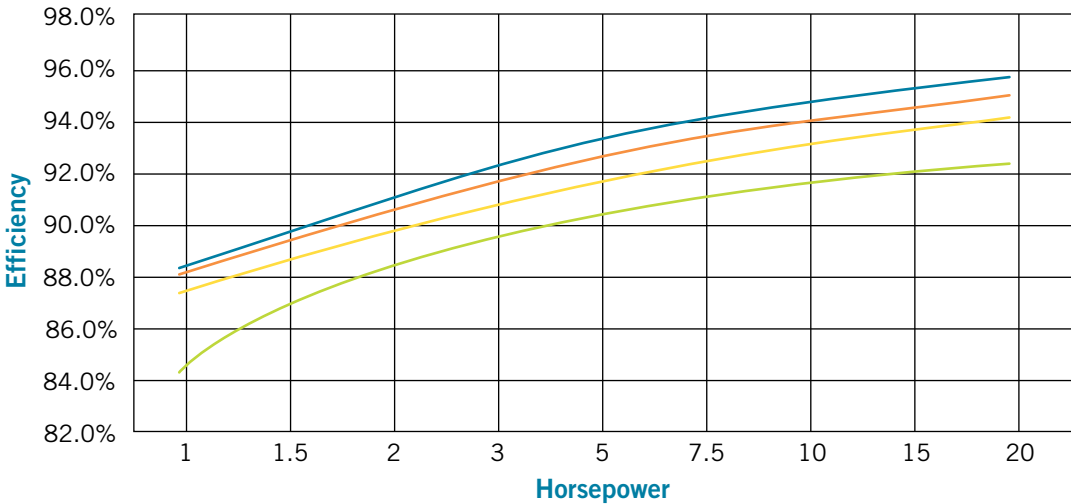
Standard Vacuum Booster System vs. Booster with VSM Technology Performance



Data from actual laboratory testing from atmosphere to 0.1 Torr.

* Actual time savings will vary depending on system staging ratio and chamber volume.

Efficiency Performance Curves



Monitored Parameters

- Drive Module Temp.
- Drive Control Board Temp
- DC Bus Voltage
- Estimated Speed
- Output Frequency
- Output Voltage
- DC Bus Ripple
- Status Word/Fault Word
- DI Status Word
- Motor Power
- Motor Torque

VSM Technology IE 3 NEMA Premium IE 4 NEMA Super Premium IE 5 IEC TS 60034-30-2:2016

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