Application Solution

Monitoring VFDs for positive proof of flow

PROOF OF FLOW ON VFDS USING CURRENT SENSORS

Variable frequency drives (VFDs) operate by varying the voltage and frequency to a motor along a preset V/Hz curve, controlling the speed of the motor to demand requirements, reducing energy consumption. At slow speeds the drive will output low voltage and low frequency; at full speed the drive will output full rated voltage and frequency. Current will of course follow the V/Hz curve, low at low speed and high at full speed. Because load current is always variable, it is difficult to have a fixed setpoint for current that will accurately detect a belt loss or coupling shear.

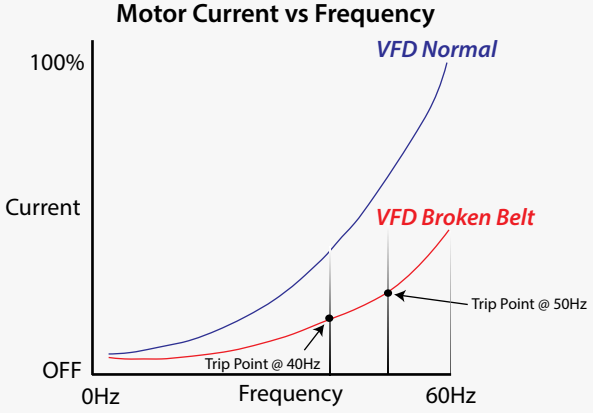
Key Points

- It necessary to monitor ***both*** output amperage and frequency to know the drive is operating correctly under load.
- To detect coupling shear or belt loss, VFD current sensors must be installed on the load side of a variable frequency drive to sense changes in both frequency and current under load.
- The 2350VFD current sensor utilizing a microprocessor measures and learns the VFD variable frequency to current ratio- or Amp/Frequency curve. Once learned, the 2350VFD current sensor alarms when the actual Amp/Frequency relationship is outside the normal operating range, such as a belt loss.

SET-POINT CALIBRATION

The current sensor trip point is set occurs when the current deviates from the learned Amp/Hz curve above a minimum VFD operating frequency, either 40 or 50 Hz (customer selectable). The Senva 2350 VFD current sensor comes preset to training mode at 40Hz so it is ready learn and calibrate.

The first time the VFD is run above 40Hz for more than 10 seconds the 2350VFD learns the normal operating Amp/Frequency curve. Blinking LED's on first start up indicate the VFD is in learning mode, and a single flashing LED indicates calibration is complete and it is ready for use. On rare occasions the span in current between unloaded motor operation and loaded motor operation at 40Hz may be too small with very small motors, so a 50Hz training mode is provided in those cases. A button on the VFD can change the VFD current sensor to train at 50Hz.



In order to detect belt loss/coupling shear on variable frequency drives, the current sensor trip point is set when the current deviates from the learned Amp/Hz curve above a minimum VFD operating frequency, either 40 or 50 Hz (customer selectable).

SIZING THE VFD CURRENT SENSOR

The 2350 VFD has a wide range and enhanced sensitivity for small VFDS, with a range of 2 to 135 amps. For motors less than 2 amps FLA the 2350VFD current sensor will need have the conductor wrap through the sensor according to the following table:

MOTOR FLA	CONDUCTOR WRAPS
≥2A	None
>0.5A and ≤1A	1 wrap
≤0.5A	3 wraps

2350VFD Autoset current sensor self-learns for positive proof of flow on both VFD and constant volume fans and pumps