Dynamic®

DRIVE SOURCE INTERNATIONAL, INC.

INSTALLATION COMPARISON CONSIDERATIONS FOR PUMP AND FAN DRIVES

Considerations	VFD	Dynamatic
Cable Length	**50 feet** Most VFD manufacturers recommend no more than 50 feet from the VFD output to motor termination due to inductance and EMI interference [(1)]	**500 feet** Factory recommended length up to 500 feet (transmitting only DC voltage) before requiring increase in wire size
External Cooling	**Forced Air HVAC or Water Cooling** Switching losses in VFDs create heat which must be mitigated through external cooling methods	**Ambient Air** Total switching losses equal less than 1/10% of total system power
Harmonic Mitigation	**Input Isolation Transformer** Limits current to drive [(1)] and mitigates harmonic interference to peripheral equipment **Input Line Reactor** Noise mitigation on input side of drive [(1)] **Output Harmonic Filters** Used to reduce the amplitude of fixed frequency currents to prevent them from entering the rest of the system [(1)]	**Input Isolation Transformer** 6KVA, 575VAC included in all Dynamatic controls **Input Line Reactor** None Required **Output Harmonic Filters** None Required
Installation Cabling	**Factory Recommended** Special consideration must be given to the proper installation and operation of the overall system that comprises the VFD, the motor it controls, and the cable that connects them. The way in which VFD-based systems are constructed and operated will have an impact on both the longevity and reliability of all the components of the system, as well as nearby or adjacent systems [(3)]	**None Required** No specialty cable requirements, only national electrical code standards apply

System Grounding	**Factory Recommended** Complex grounding system due to Pulse Width Modulation [2]	**None Required** No specialty grounding requirements, only national electrical code standards apply
Requirements for Inverter Duty Motor	**Factory Recommended** Pulse Width Modulation can cause voltage transients well above the rated voltage of the motor which can lead to failure of the insulation system in a very short period of time [1]	**None Required** Standard Class F insulated, Design B motors
Brand Flexibility	**Factory Recommended** Motor manufacturers limit warranty to select, pre-tested VFDs	**Non-exclusive** Dynamatic systems are compatible with all motor manufacturers
Bearing Protection	**Applicable** "Shaft currents" which flow as a result of shaft-to-frame electrical potentials. A major source of the "shaft current" in this class of bearing failure is the potential induced between the rotating speed electric motors, this potential is associated with the use of solid state gating devices used to generate DC current for DC motors or AC variable Frequency (VFD) power for AC motors [3] Installation of shaft bearing protection highly recommended.	**None Required** Due to absence of shaft currents
Anti-Ratcheting	**Available Option**	**Available Option**

References

1. Natural Resources Canada (2009). 4 Selection of VFD Drives. Published by Natural Resources Canada.

2. Shuman, B. (2009). Building a Reliable VFD System. Published by Belden, Inc.

3. Boyanton, H. (2010). Bearing Damage Due to Electric Discharge: Electrical Discharge Due to Machining of Bearings. Published by Shaft Grounding Systems: Albany, OR.