Dynamatic®
DRIVE SOURCE INTERNATIONAL, INC.

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INSTALLATION COMPARISON BETWEEN VARIABLE FREQUENCY DRIVES AND EDDY CURRENT DRIVES FOR PRESS APPLICATIONS

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	**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 and mitigates harmonic interference to peripheral equipment	**Input Isolation Transformer** Small input isolation transformer (on board) included in all Dynamatic® controls
	Input Line Reactor Noise mitigation on input side of drive	**None Required**
	Output Harmonic Filters Used to reduce the amplitude of fixed frequency currents to prevent them from entering the rest of the system	**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.[1]	**None Required** No specialty cable requirements, only national electrical code standards apply.
System Grounding	**Factory Recommended** Complex grounding system due to Pulse Width Modulation[1]	**None Required** No specialty grounding requirements, only national electrical code standards apply.

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INSTALLATION COMPARISON BETWEEN VARIABLE FREQUENCY DRIVES AND EDDY CURRENT DRIVES FOR PRESS APPLICATIONS (CONTINUED)

Motor Considerations	VFD	Dynamatic®
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.	**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 element and static element in variable 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.[2] Installation of shaft bearing protection highly recommended.	**None required** Due to absence of shaft currents
Motor Heating	**Oversizing Motors** The ability of a motor to cool itself effectively is reduced as the motor is slowed down. Oversizing the motor or providing external forced air ventilation may be required with extended operation at low speeds and high loads.	**None Required** Standard TEFC or ODP motors suffice
Dynamic Braking	**Factory Recommended** Dynamic braking (Re-gen) is required to control the bus voltage on the drive. Bus voltage needs to be dissipated to avoid resultant nuisance tripping or capacitor failure.	**None Required** The Eddy Current Drive is able to dissipate the energy without compromising its internal electronics.

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References

1. Shuman, B. (2009). *Building a Reliable VFD System.* Published by Belden, Inc.
2. Boyanton, H. (2010). *Bearing Damage Due to Electric Discharge: Electrical Discharge Due to Machining of Bearings.* Published by Shaft Grounding Systems: Albany, OR.