

495 - VARIABLE FREQUENCY DRIVES

I. GENERAL

These variable frequency drive specifications supersede all other JEA water wastewater variable frequency drive specifications that may be referenced elsewhere. All VFD's shall be on the JEA water wastewater approved manufacturer list. A VFD 100HP and above shall not be installed in an MCC without prior JEA Standards approval. If a VFD less than 100HP is installed in an MCC, the bucket must be upsized to the next largest frame of VFD to ensure future replacement.

I.1. VFD RATED CABLE

VFD Rated cable shall be installed on the output of the drive for all VFD applications. Cable shall be high flexible stranded Class K circuit conductors or better with XLPE 0.03 in minimum insulation, tinned copper strands, foil shield and braid. For 1 AWG and above cable must have three symmetrically positioned ground conductors for common mode rejection. For 1 AWG and above 2 mil dual foil shield shall be allowed. The cable shall be rated for a minimum of 1000V but may require higher based on design requirements. The cable shall be ran intact and as close to the VFD and motor terminals as possible for maximum shielding protection. Both ends of cable shall be installed with shielded gland plates that are rated for a corrosive environment for proper grounding and dielectric grease applied to prevent corrosion of cable. Follow all manufacturers' installation procedures and recommendations. The cable shall be Lutze DRIVEFLEX , SAB VFD Symmetrical XLPE TR or Belden Extra Flexible series.

I.2. LINE REACTORS

VFD's shall have a minimum 5% AC Line Reactor or equivalent for harmonic mitigation either as an internal feature or an external device such as a line reactor or DC choke for below 75HP. For 75HP and above, the VFD must limit harmonic voltage and current to acceptable levels as defined by IEEE 519-2014 without the use of additional 12 or 18 Pulse Rectifier bridges. If harmonic mitigation is required, each VFD must have its own built in active filter or passive filter provided for each VFD such as a Matrix or TCI filter. If a passive filter is used, a contactor shall be provided to prevent leading power factor. Standalone active filters will not be accepted unless pre-approved by JEA engineering and manager of facility for large applications or medium voltage.

I.3. OUTPUT FILTER

dV/dT Output filter is required if the motor to the drives rated distance is exceeded based on the drive manufacturers specifications or design requirements. Cable type, conduit type, motor insulation rating and cable length shall be used to calculate the maximum distance in order to protect the motor from voltage spikes and overheating.

I.4. VFD PROGRAMMING

All VFD's shall come pre-programmed to the description of the specified application.

I.5. VFD DRAWINGS

All drawings shall come with a parameter sheet, on the drawing, with instructions for drive parameter configuration of the application.

I.6. FRONT END SURGE SUPPRESSION

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Provide front-end surge suppression (internal or external) to protect input electronics. The protection shall at minimum meet (VDE 0160 Standard—2.3 x line voltage for 1.3 msec) for transient protection.

II. VFD SPECIFIC REQUIREMENTS

II.1. SIZING

VFD's shall be sized for 110% continuous and 120% for 1 minute.

II.2. RATING

II.2.1. VFD's shall be rated for a minimum of 50 Celsius ambient temperature at full load capacity without shortening the lifespan. If the VFD is not able to meet this requirement then it shall be upsized till it meets it.

II.2.2. In applications with the VFD heatsink out the back design, for venting the heat to the outside, drives shall be rated a minimum of NEMA 12.

II.2.3. Rated for service in a corrosive environment. Provide documentation that the drive as a whole and not just individual components/assemblies meets at minimum IEC/EN 60721-3-3 3C3 or ANSI/ISA-71.04 G3 ratings.

II.3. REQUIRED CERTIFICATION

Certification through Profi International (PI) for compliances with the Profibus DP and Profinet protocols and the Profidrive interface on all telegrams to ensure it matches published standards for communication with automation controllers (ie PLCs). PPO4 and PPO5 telegrams shall be available and conform to IEC 61800-7 and Profidrive telegrams. Shall be able to transmit Actual Power, % Torque, Motor Current, Alarm Code and Fault Code over PPO telegrams.

II.4. ADDITIONAL REQUIREMENTS

II.4.1. Each drive shall come with a keypad that supports Local/Remote, Jog, Run and Stop. Shall have ability to reverse the pump through keypad.

II.4.2. VFD's shall be flange mount capable and capable of a free standing design.

II.4.3. Capability to detect a dead short on the output and prevent damage to the VFD. Drive shall also be able to be disconnected while the motor is running, with no status indicator to the drive, and be able to protect itself.

II.4.4. The drive manufacturer shall supply the drive and all necessary options as specified. VFDs that are manufactured by a third party and "brand labeled" shall not be acceptable.

III. WARRANTY

All drives shall come with a certified five year warranty with documentation showing proof. JEA is not responsible for any warranty costs including travel, labor, parts, or other costs for a full 5 years from the date of startup of the Drive. The warranty shall cover all drive failures including line anomalies – including lightning strikes, load anomalies, moisture or corrosives. During the warranty period, the VFD distributor shall repair or replace the warrantied VFD at no cost to JEA.

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III.1. COMMISSIONING

Startup of the drive shall be commissioned by a certified factory representative.

III.2. SERVICE TECHNICIANS

The VFD distributor shall employ and make available proficient manufacturer-authorized service technicians to perform service calls to VFDs supplied to JEA within 48 Hours. The VFD distributor shall provide service technicians, all necessary tools, test and safety equipment, etc., that are required to make field repairs. Service personnel shall adhere to all JEA Safety Rules & Regulations.