

Submersible bore well pumps & submersible rewindable motors

Variable frequency drive (Frequency converters)

Frequency converter is an ideal device to control the performance of the pump, by adjusting the speed of the motor. It is therefore also an ideal starter type, both for reduction of the locked-rotor current and for reduction of pressure surges.

SEI submersible motors can be connected to a variable frequency drive (VFD) with some precautions as mentioned below.

Operation with frequency converter

There are several things that should be considered when using frequency converters together with submersible motors. Some of the conditions for running submersible motors on frequency converters are mentioned below.

1. The frequency converter must have some kind of output filter to limit voltage peaks (U_{peak}) and to reduce dU/dt (or dV/dt) which causes stress on the insulation of the submersible motor. The maximum voltage (U_{peak}) should be reduced to a level of less than 850 V; maximum voltage (U_{peak}) & dU/dt should be limited in accordance with the following table.

Max. peak voltage & max. dU/dt for SEI submersibles		
Motor	Max. U_{peak} voltage	Max. dU/dt
4" WF	850 V Phase - Ground	2000 V/micro s.
6" WF	850 V Phase - Ground	500 V/micro s.
8" WF	850 V Phase - Ground	500 V/micro s.
10" WF	850 V Phase - Ground	500 V/micro s.

The typical output filters for frequency converters are LC and are also called sinusoidal filters or RC filters. Frequency converter suppliers can supply data regarding U_{peak} and dU/dt for their different frequency converter series.

Normally, filters are required if long motor cables are to be used together with the frequency converter.

The U_{peak} and dU/dt values should be measured on the motor terminals.

2. Frequency converters are normally designed for use in an industrial environment. If a frequency converter is used in residential areas, it might be necessary to add some kind of input filter to prevent electrical disturbances from the frequency converter from affecting other equipment on the same mains.
3. When variable frequency drive is used care should be taken to operate between a frequency range of 30 Hz to 50/60 Hz. When operating with variable frequency drive at 30 Hz due to reduction in flow, the motor can get over heated. We recommend a minimum permissible flow of 10% of rated flow.