



Criteria Frequency operation Melotte submersible pump units

Frequency control of Melotte submersible pump units is possible, taking into account following criteria:

- When starting the Melotte submersible pump unit the frequency control should be set in such a way that a constant torque ($U/f = \text{constant}$) is present.
- The basis voltage should be equal to the nominal voltage of the motor.
- The maximum frequency is indicated on the type tag of the motor (in general 50Hz for motors wound for 50 cycles (100Hz PMM) and 60Hz for motors wound for 60 cycles (120Hz. PMM)). Higher frequencies only possibly allowed after consultation with Melotte Pumptechnology.
- Maximum current consumption of the applied submersible motor as mentioned on the type-tag however, may never be exceeded.
- The minimal starting frequency is 30Hz (60Hz PMM) (preferably 50Hz at motors wound for 50Hz (100Hz PMM) and 60Hz for motors wound for 60Hz (120Hz PMM)) and the start should simulate direct on line starting and should not exceed 0,5 seconds.
- The frequency during operation should not be chosen to be less than 20Hz (40Hz PMM) at Melotte type TP or UP motors and 30Hz (60Hz PMM) on all other motors, taking into account the other criteria mentioned in this summary.
- Lower frequencies only possibly allowed after consultation with Melotte Pumptechnology.
- Ramp down time of the submersible pump unit or motor also should not exceed 0,5 seconds.
- No slip compensation should be applied.
- The velocity of the water alongside the motor should in no case be less than 0,2 m/sec at nominal frequency. It may be possible to agree to lower velocities at lower frequencies, but only after consultation with and acceptance by Melotte Pumptechnology.
- The current protection should switch off the Melotte submersible pump unit according the below mentioned prescriptions and within the time limits mentioned:
 - 6 x FLC 4 tot 6 sec.
 - 2 x FLC less than 40 sec.
 - 1,5 x FLC less than 80 sec.
 - 1,2 x FLC less than 180 sec.(Note: FLC = full load current).

GENERAL:

- Submersibles motors on behalf of submersible pump units distinguish themselves from standard above ground motors, amongst others in the fact that bearing design requires slide bearings instead of ball bearings. In order to obtain sufficient lubrication film, a minimal number of rotations per minute is required, reason for some of the above mentioned criteria.
- If a frequency inverter other than an NFO Sinus® is used, an adequate operating output sinus filter should always be applied as close as possible behind the frequency control device to prevent possible occurring peak-currents and/or too high Du/Dt 's in the pump cable and the motor windings.
- Furthermore also please consult the suppliers of the frequency control devices with regard to further criteria such as maximum cable lengths, application of mains-interference filters etc.