

System components

Configuring

Configuring the motor

Overview

SIMOTICS FD

Motors of the SIMOTICS FD series are designed for a wide range of different applications. For outdoor use, special applications or specific boundary conditions, an inquiry must be made to establish whether a catalog version is suitable or a special version is recommended. This is particularly the case with:

- Applications with increased mechanical stress due to vibration or shocks
- Installation on deck (ships)
- Direct exposure to weather in coastal areas
- Frame sizes V15, V5 and V6
- Piston engines, hackers, crushers, shredders, shearing machines, main press drive
- Use as energy storage device
- Deviating rated motor voltages, speeds or power ratings

Structure of catalog motor selection tables

The SIMOTICS FD motors have been optimized for operation with converters of the SINAMICS range. The selection tables are therefore structured as follows:

1. Motor type – cooling method (1LM1, 1LL1, 1LH1, ...)
2. Line voltage/frequency (400 V, 50 Hz; 460 V, 60 Hz; ...)
3. Type of infeed (controlled or uncontrolled)
4. Rated speed (1500 rpm, 1800 rpm, ...)

In the selection tables, a SINAMICS converter is also recommended for each motor. The motor data is specified for operation on this converter, or on another converter that is comparable with regard to the output voltage (section "Voltage supply").

Ambient conditions and installation altitude

For air-cooled motors the catalog data is applicable to ambient temperatures of -20 to +40 °C and installation altitudes of up to 1000 m above sea level. For ambient conditions outside this range, derating is necessary.

Reduction factor k_{HT} for non-standard installation altitudes and/or coolant temperatures for 1LM1/1MM1, 1LL1, 1LQ1/1MQ1 and 1LP1 air-cooled motors

Installation altitude above sea level	Coolant temperature (air)				
m	30 ... 40 °C	≤ 45 °C	≤ 50 °C	≤ 55 °C	≤ 60 °C
≤ 1000	1.00	0.96	0.92	0.87	0.82
≤ 1500	0.97	0.93	0.89	0.84	0.80
≤ 2000	0.94	0.90	0.86	0.82	0.77

For water-cooled motors the catalog data is applicable for an ambient temperature of -20 to +55 °C and for installation altitudes of up to 1000 m above sea level. The cooling water inlet temperature may be up to +25 °C. For ambient conditions (cooling water temperature, installation altitude, ambient temperature) outside this range, derating is necessary. There should be a max. difference of 10 K between the cooling water temperature and ambient temperature in order to minimize condensation in the motor interior. Anti-freeze must be added to the cooling water at low temperatures.

Reduction factor k_{HT} for non-standard installation altitudes and/or coolant temperatures for 1LH1/1MH1 and 1LN1/1MN1 water-cooled motors

Installation altitude above sea level	Coolant temperature (water)					
m	≤ 25 °C	≤ 30 °C	≤ 35 °C	≤ 38 °C	≤ 40 °C	≤ 45 °C
≤ 1000	1.00	0.95	0.90	0.86	0.84	0.79
≤ 1500	0.97	0.92	0.87	0.83	0.81	0.77
≤ 2000	0.94	0.89	0.85	0.81	0.79	0.74

Overview (continued)**Operating modes**

The operating data specified in the catalog for SIMOTICS FD motors is applicable to operating mode S1 (continuous duty according to EN 60034-1). Overload is possible in the case of duty types S2 (short-time duty), S3 (intermittent periodic duty) and S6 (continuous operation periodic duty). The applicable overload factors can be taken from the tables below for these three operating modes.

The overload factors are valid on starting when the motor is cold and when the resulting torque is less than or equal to the maximum overload torque (T_B). If the motor is prewarmed due to recent operation or it is in a thermal steady-state due to continuous duty (S1), thermal class 155 (F) will be exceeded under overload conditions. Depending on the amount of overload, the maximum winding temperature can be exceeded and the motor can be damaged.

Motor type	Overload factors for short-time duty			for intermittent, periodic duty		for continuous operation, periodic duty		
	Operating mode S2			Operating mode S3		Operating mode S6		
	10 min.	30 min.	60 min.	60 %	80 %	25 %	40 %	60 %
1.M.....-....	1.80	1.20	1.10	1.16	1.02	1.70	1.35	1.20
1.L.....-....	1.70	1.15	1.05			1.60	1.30	1.15
1.P.....-....				1.22	1.07			
1.Q.....-....	1.80	1.20	1.10			1.70	1.35	1.20
1.H.....-....	1.70	1.15	1.05			1.60	1.30	1.15
1.N.....-....								

With 1LQ1/1MQ1, 1LP1, 1LH1/1MH1 and 1LN1/1MN1, it is not permitted for the cooling to be interrupted.