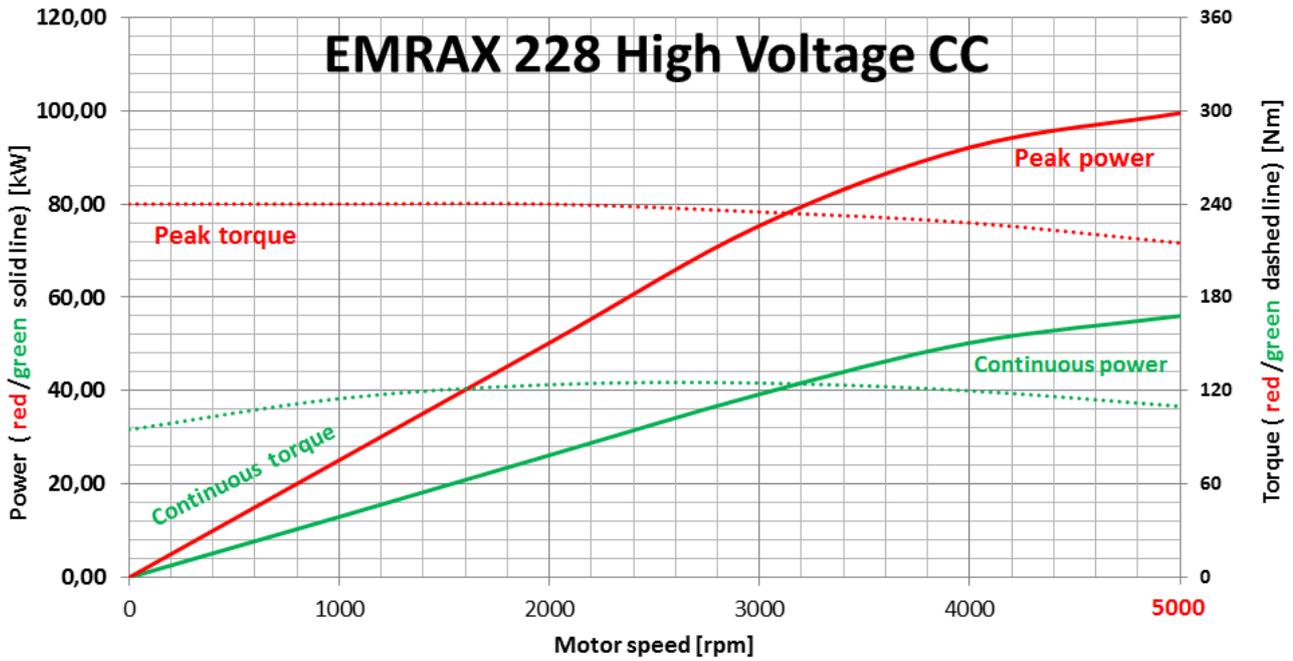


EMRAX 228 Technical Data Table (dynamometer test data)

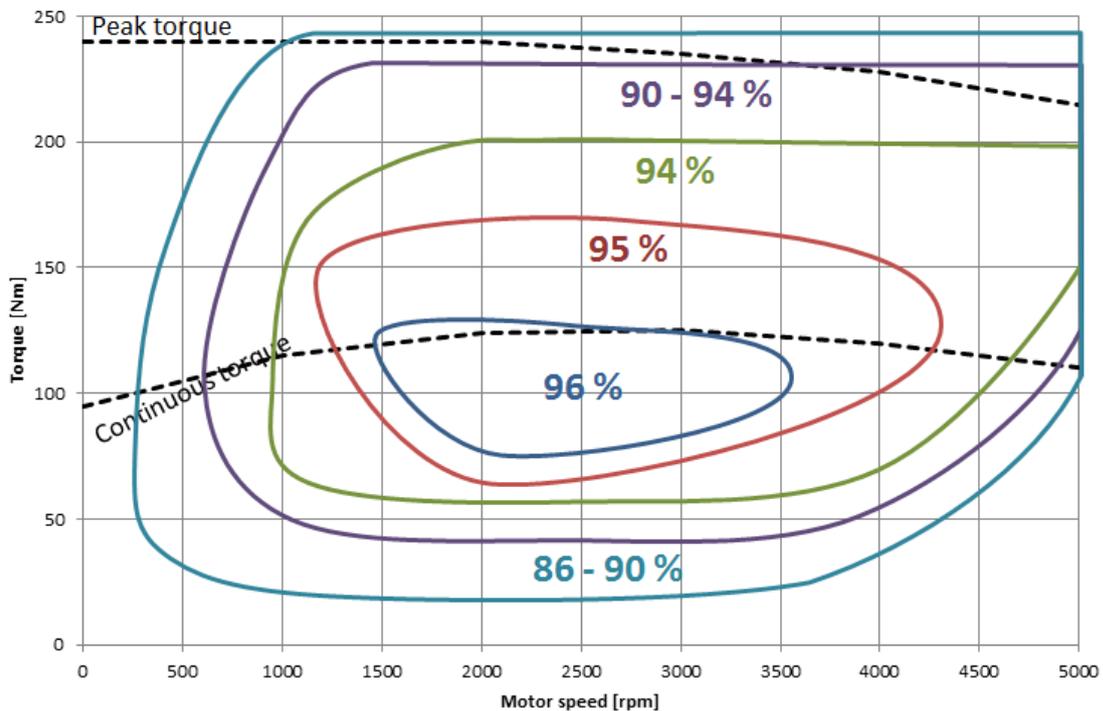
| Type | EMRAX 228 High Voltage | | | EMRAX 228 Medium Voltage | | | EMRAX 228 Low Voltage | | |
|--|--|-----------------------------------|-----------------------------------|--------------------------|-----------------------------------|-----------------------------------|-------------------------|-----------------------------------|-----------------------------------|
| Technical data | | | | | | | | | |
| Air cooled = AC Liquid cooled = LC Combined cooled = Air + Liquid cooled = CC | AC | LC | CC | AC | LC | CC | AC | LC | CC |
| Ingress protection | IP21 | IP65 | IP21 | IP21 | IP65 | IP21 | IP21 | IP65 | IP21 |
| Cooling medium specification (Air Flow = AF; Inlet Water/glycol Flow = WF; Ambient Air = AA) If inlet WF temperature and/or AA temperature are lower, then continuous power is higher. | AF=20m/s ; AA=25°C | WF=8l/mi n at 50°C; AA=25°C | WF=8l/mi n at 50°C; AA=25°C | AF=20m/s ; AA=25°C | WF=8l/mi n at 50°C; AA=25°C | WF=8l/mi n at 50°C; AA=25°C | AF=20m/s ; AA=25°C | WF=8l/mi n at 50°C; AA=25°C | WF=8l/mi n at 50°C; AA=25°C |
| Weight [kg] | 12,0 | 12,3 | 12,3 | 12,0 | 12,3 | 12,3 | 12,0 | 12,3 | 12,3 |
| Diameter ϕ / width [mm] | 228/86 | | | | | | | | |
| Maximal battery voltage [Vdc] and full load/no load RPM | 670 Vdc (5300/6500 RPM) | | | 470 Vdc (5170/6500 RPM) | | | 130 Vdc (4400/5200 RPM) | | |
| Peak motor power at max RPM (few min at cold start / few seconds at hot start) [kW] | 100 | | | | | | | | |
| Continuous motor power (at 3000-5000 RPM) depends on the motor RPM [kW] | 28 - 42 | 28 - 42 | 35 - 55 | 28 - 42 | 28 - 42 | 35 - 55 | 28 - 42 | 28 - 42 | 35 - 55 |
| Maximal rotation speed [RPM] | 5500 (6500 RPM peak for a few seconds) | | | | | | | | |
| Maximal motor current (for 2 min if cooled as described in Manual) [Arms] | 240 | | | 340 | | | 900 | | |
| Continuous motor current [Arms] | 115 | | | 160 | | | 450 | | |
| Maximal motor torque (for a few seconds) [Nm] | 240 | | | | | | | | |
| Continuous motor torque [Nm] | 125 | | | | | | | | |
| Torque / motor current [Nm/1Aph rms] | 1,1 | | | 0,75 | | | 0,27 | | |
| Maximal temperature of the copper windings in the stator and max. temperature of the magnets [°C] | 120 | | | | | | | | |
| Motor efficiency [%] | 92 – 98 | | | | | | | | |
| Internal phase resistance at 25 °C [m Ω] | 18 | | | 8,0 | | | 1,12 | | |
| Input phase wire cross-section [mm ²] | 10,2 | | | 15,2 | | | 38 | | |
| Wire connection | star | | | | | | | | |
| Induction in Ld/Lq [μ H] | 177/183 | | | 76/79 | | | 10,3/10,6 | | |
| Controller / motor signal | sine wave | | | | | | | | |
| AC voltage between two phases [Vrms/1RPM] | 0,0730 | | | 0,0478 | | | 0,0176 | | |
| Specific idle speed (no load RPM) [RPM/1Vdc] | 9,8 | | | 14 | | | 40 | | |
| Specific load speed (depends on the controller settings) [RPM/1Vdc] | 8 – 9,8 | | | 11 – 14 | | | 34 – 40 | | |
| Magnetic field weakening (for higher RPM at the same power and lower torque) [%] | up to 100 | | | | | | | | |
| Magnetic flux – axial [Vs] | 0,0542 | | | 0,0355 | | | 0,0131 | | |
| Temperature sensor in the motor | kty 81/210 | | | | | | | | |
| Number of pole pairs | 10 | | | | | | | | |
| Rotor inertia (mass dia=175mm, m=5,5kg) [kg*cm ²] | 421 | | | | | | | | |
| Bearings (front:back) - SKF/FAG | 6206:6206 (for radial forces) or 6206:7206 (for axial-radial forces; for pull mode; e.g. for air propeller) or 6206:3206 (for axial-radial forces; for pull-push mode; »O« orientation, $\alpha=25^\circ$); other bearings are possible (exceptionally) | | | | | | | | |

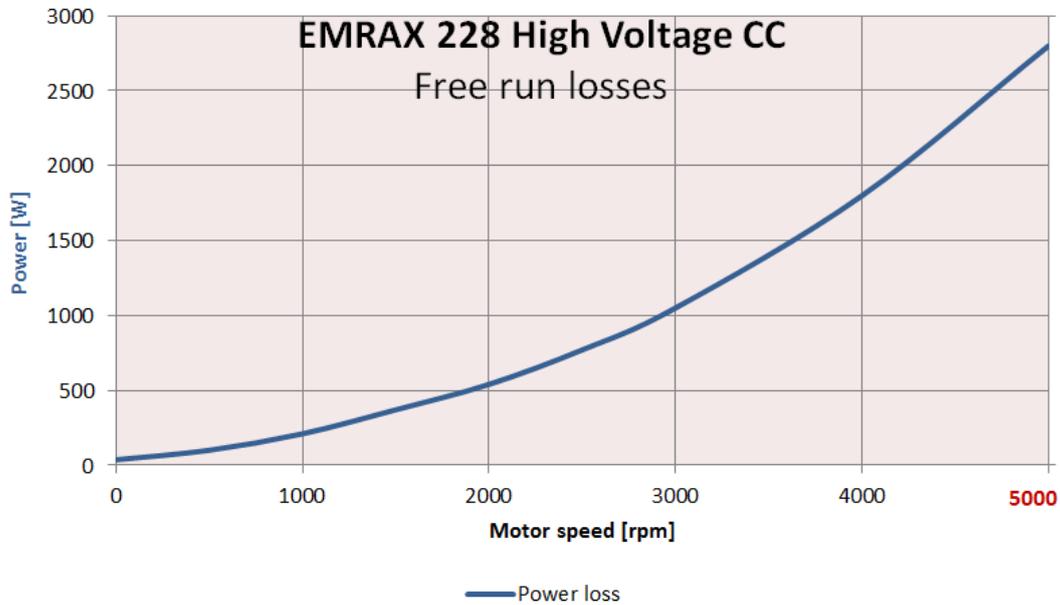
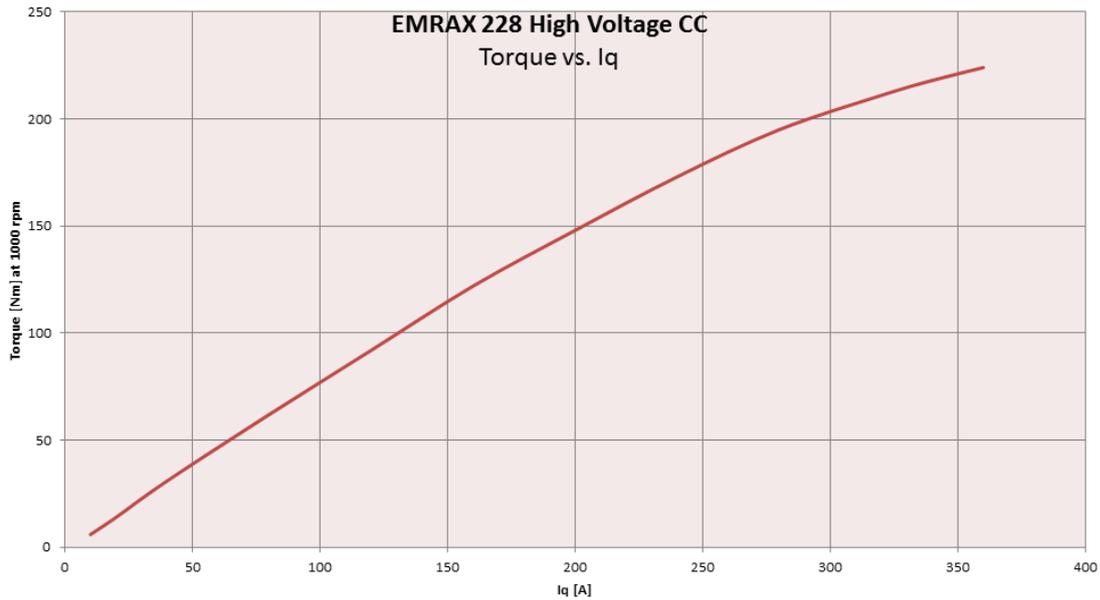
Graphs valid for EMRAX 228 High Voltage Combined Cooled (CC):



Note 1: for determining peak or continuous power (kW) you should choose motor speed and then read power from chosen power curve (in the left graph side)
 Note 2: for determining peak or continuous torque (Nm) you should choose motor speed and then read torque from chosen torque curve (in the right graph side)

EMRAX 228 High Voltage CC
Efficiency map





Graphs of the EMRAX 228 Medium and Low voltage motor type:

Graphs of EMRAX 228 Low Voltage and EMRAX 228 Medium Voltage are similar to graphs of EMRAX 228 High Voltage. The only differences are the DC voltage and motor current. These two parameters can be read from the Technical data table for the EMRAX 228 Low and Medium Voltage motor.

Low Voltage motor needs 4 x higher current and 4 x lower DC voltage for the same power/torque and RPM, compared to EMRAX 228 High Voltage motor.

Medium Voltage motor needs 1.52 x higher motor current and 1/3 lower DC voltage for the same power/torque and RPM, compared to EMRAX 228 High Voltage motor.

Graphs of the EMRAX 228 Liquid cooled (LC) and EMRAX 228 Air Cooled (CC):

Continuous power of the liquid cooled or air cooled motor is 20% lower than continuous power of the combined cooled motor. The peak power is the same. Data is presented in the Technical Data Table.