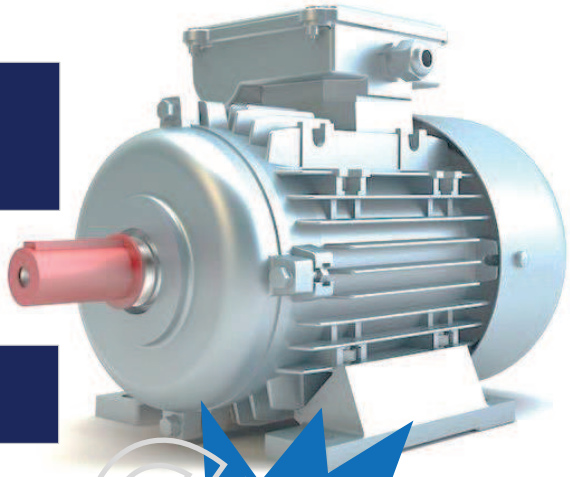
ElectroSyn



Sürekli Mıknatıslı Senkron Motor
Permanent Magnet Sychronous Motor

Most efficienct solution

High efficiency higher than IE4 level

High efficiency at low load

Vector control (FOC or DTC)

Sensorless control availability due to salincy in rotor

High kW/kg ratio

High power factor >0.99

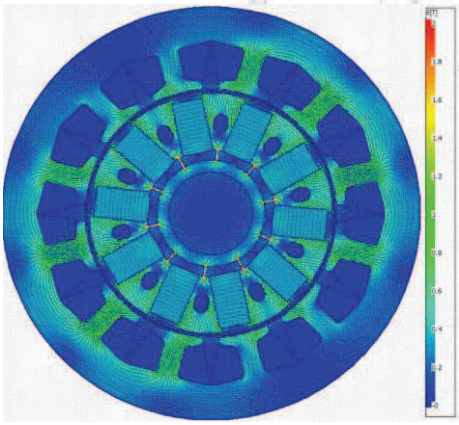
Speed control without sensor

Constant torque and power control

Low bearing temperature and high reliability

Compact dimensions

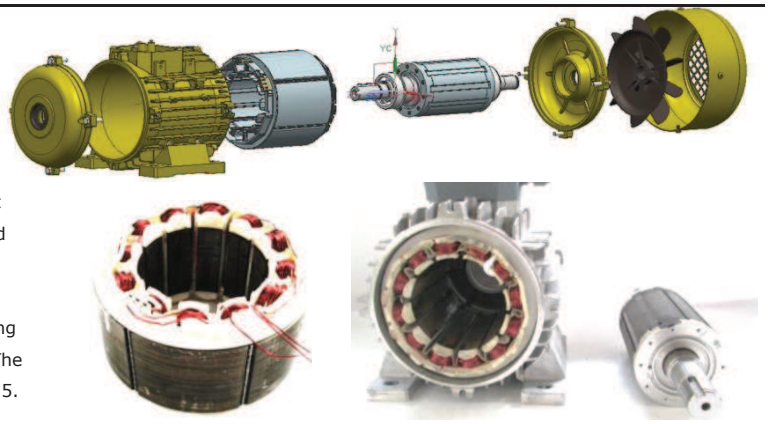
High speed (max.6000rpm)



High Efficiency Industrial Motors

Permanent Magnet Synchronous Motor

In **ElectroSyn** motor design, main properties of two different motors are combined in one motor that can run with vector control driver at higher efficiency than IE4 energy efficiency level.



Reluctance and permanent magnet synchronous motor technologies are combined in one motor. Rotor magnetic circuit is designed in the way of that motor can produce both magnet and reluctance torque. Magnets are inserted laminataion to get salincy between "d and "q" axis of rotor.

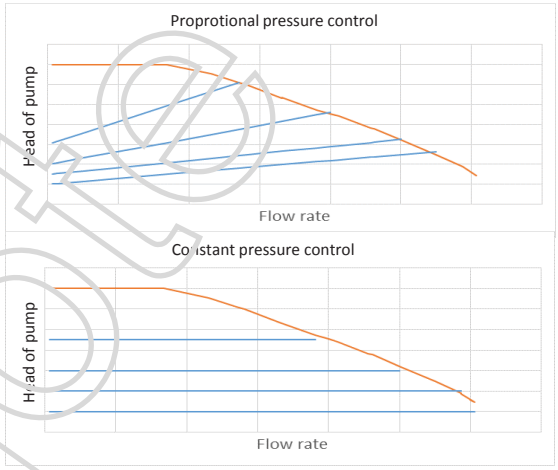
Low copper loss is achieved by using needle winding technology by decreasing end-turn dimensions. As known, needle winding couses high torque ripple. The magnetic circuit desing is optimized to decrease torque ripple lower than %15.

Constant torque application

PMSM motor can run in the applicatin that needs constant torque at required speed interval. The driver with FOC or DTC can make the motor run at precise torque control. This kind of torque control is used in traction application, eg. power train.

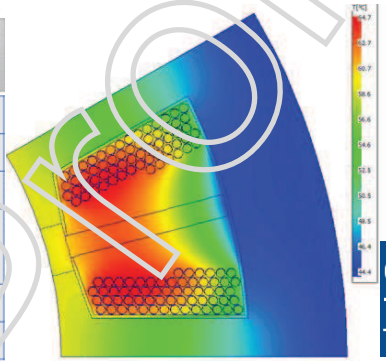
Variable speed application

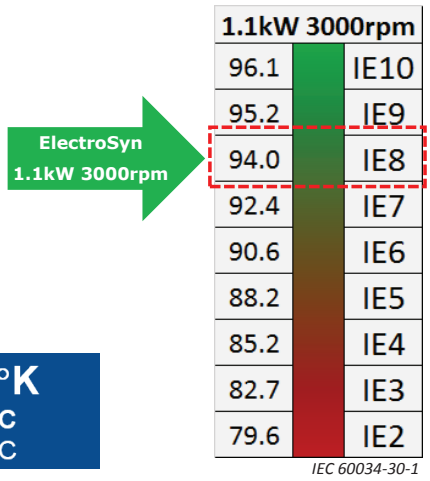
Variable speed control can be made with PMSM in the application that needs wide variable speed range. Base speed over max. speed ratio is between 2 and 3. It is ideal solution for fan and pump applications that need variable speed and high efficiency. Constant pressure, constant flow rate and proportional pressure control can made by the means of embedded firmware in driver electronic. These type of controls can be made with or without sensors. For sensorless pressure or flow rate control, linear torque vs current characterisitic of PMSM design is used as a sensor to measure pressure or flow rate of fan or pump. By the way, by using these measured value of pressure or flow rate, automatic adaptation to application that has variable hydraulic or air resistance can be made. PMSM motor and its driver can follow the pressure or flow rate need of applicaiton and adapt itself automaticlly to get lowest energy consumption.



Performance comparison of 1.1kW 3000rpm ElectroSyn motor and IE3 Asynchronous motor

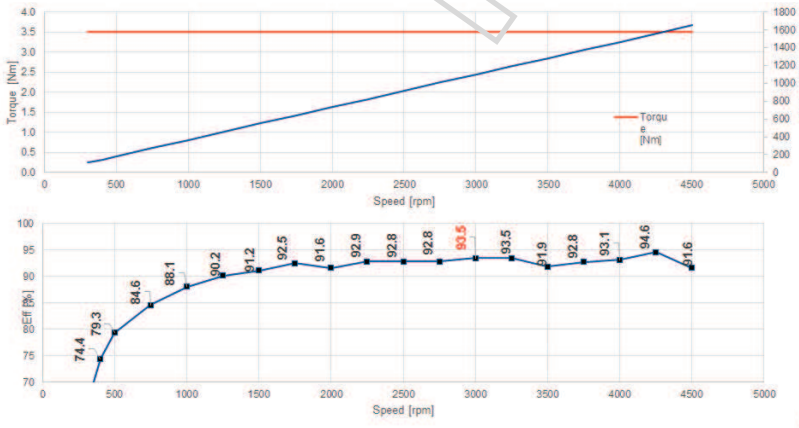
	Asynchronous 1.1kW 3000rpm IE3	ElectroSyn 1.1kW 3000rpm
Rated Eff [%]	83.7	93.5
Eff @%50	80.3	93.4
Eff @%25	70.1	89.6
Cost [%]	100	85
PF	0.87	0.99
Current [A]	2.2	2.5
Stack length [mm]	90	80





IEC 60034-30-1

1.1kW 3000rpm ElectroSyn motor synchronous performance curves

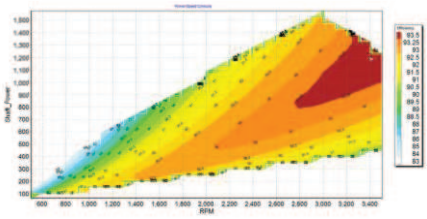


Annual energy cost calculation for 1.1kW IE3 Asynchronous ve ElectroSyn motor

Motor	Input Power [W]	Current [A]	VA
1.1kW 3000rpm IE3 Asynchronous	1314	2.2	1524
ElectroSyn 1.1kW 3000rpm	1176	2.5	1258
Difference	138	0.3	266

Annual running 6000h

0.138kWh x 6000h x 0.09$/kWh = **74.5$**



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